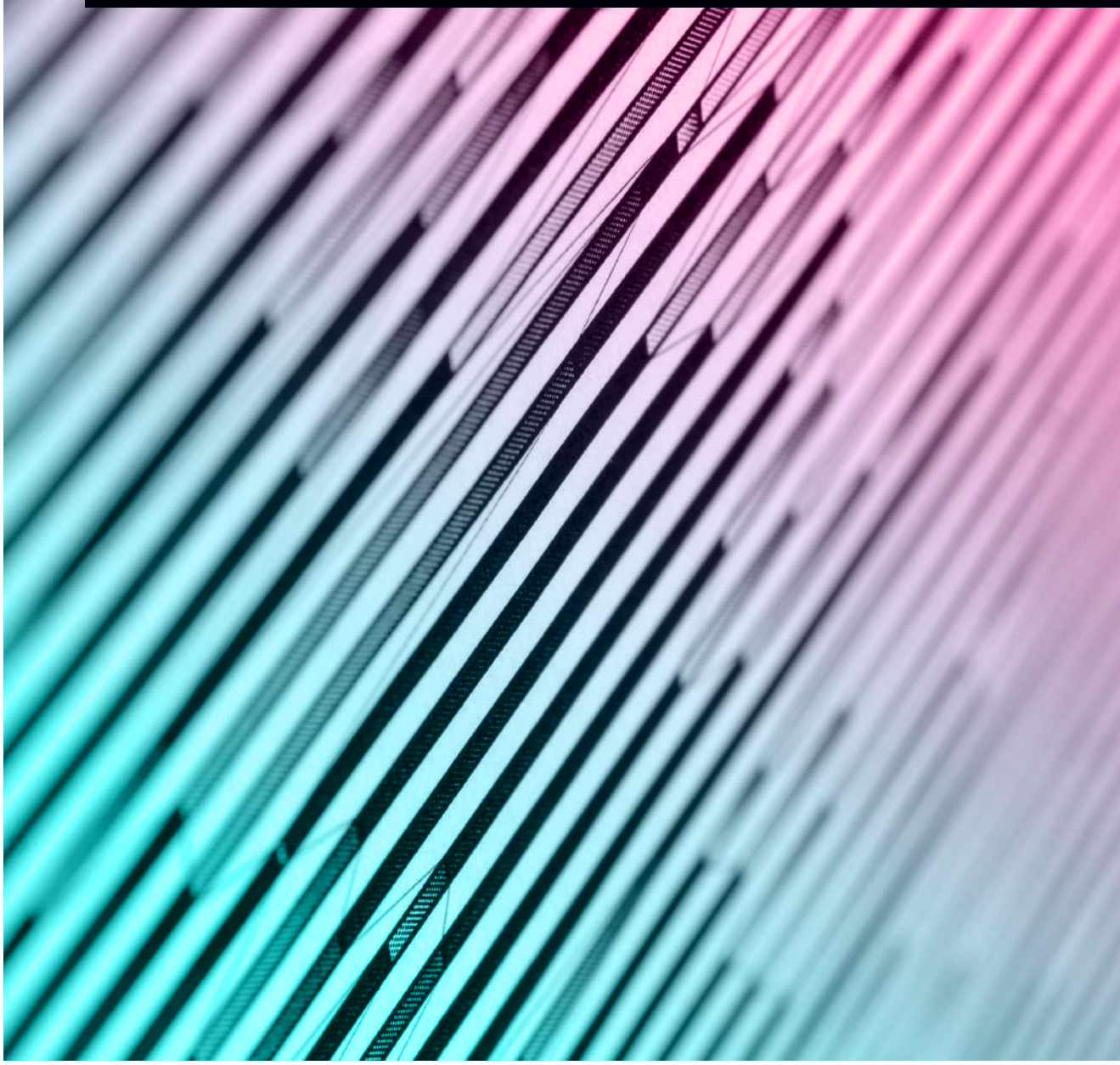
statistics

# Energy efficiency indicators

## HIGHLIGHTS



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# Energy efficiency indicators

HIGHLIGHTS

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# INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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The European Commission also participates in the work of the IEA.

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## Important cautionary notes

The IEA energy efficiency indicators statistical report is based on national annual data collected by the IEA since the 2009 Ministerial agreement. Since 2017, energy efficiency indicators data are also available online: www.iea.org/statistics.

The IEA Secretariat is working with national administrations to improve data quality over time. Still, as collecting end-use energy and activity data is particularly challenging, data availability is variable across IEA countries, and the coverage may be incomplete for a given sector in a given country. This publication presents a selection of energy efficiency indicators data for the 26 IEA Member countries where data are available, mainly in graphical format; and an analysis of overall IEA trends. Data are based on submissions from national administrations to the IEA.

Inquiries should be addressed to energyindicators@iea.org.

Please note that all IEA data is subject to the following Terms and Conditions found on the IEA's website: www.iea.org/t&c/ .

Energy efficiency indicators data for IEA Member countries[1,2] were collected by the Energy Data Centre (EDC) of the IEA Secretariat, headed by Mr. Duncan Millard. Within the IEA, data were prepared by Mr. Gianluca Tonolo, Ms. Urszula Ziebinska, and Ms. Mafalda Silva who also produced this report.

Ms. Roberta Quadrelli had overall responsibility for this report. Desktop publishing support was provided by Ms. Sharon Burghgraeve. This report benefited from discussions and feedback from several IEA colleagues including Tyler Bryant, Jae Sik Lee, Samuel Thomas; Stéphanie Bouckaert, Pierpaolo Cazzola, John Dulac and Araceli Fernandez Pales.

The IEA would like to thank and acknowledge the dedication and professionalism of the statisticians working on energy efficiency data in all the respective countries.

Data for several European countries have been collected through cooperation with the Odyssee project: www.indicators.odyssee-mure.eu/, as detailed in the *Country notes*.

Enquiries about data or methodology should be addressed to:

Energy Data Centre – Energy Efficiency Indicators
Telephone: (+33-1) 40-57-67-41
E-mail: energyindicators@iea.org

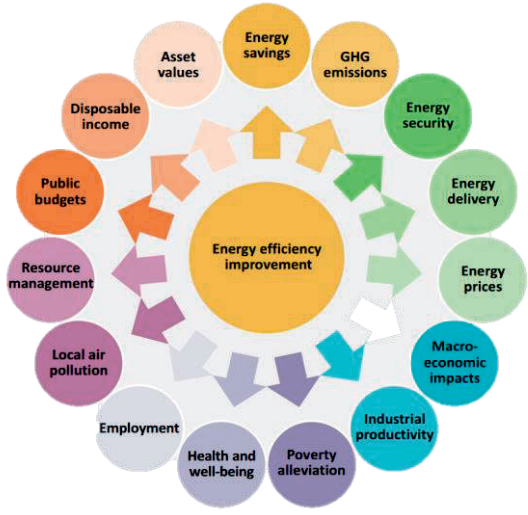
1. This document is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. In this publication, "country" refers to a country or a territory, as the case may be.
2. The countries considered in this publication reflect IEA membership at the date of preparing this publication (October 2017).

# ENERGY USE AND EFFICIENCY: KEY TRENDS IN IEA COUNTRIES

Reliable energy end-use data and indicators are key to inform and monitor the effectiveness of energy efficiency policies, as they help to grasp the drivers of energy demand.

Energy efficiency is "the first fuel": it is key for cost-effective energy transitions and the one energy resource that all countries possess in abundance. Strong energy efficiency policies are vital to achieving the key energy-policy goals of reducing energy bills, addressing climate change and local air pollution, improving energy security, and increasing energy access (IEA, 2017).

**Figure 1. Multiple benefits of energy efficiency**



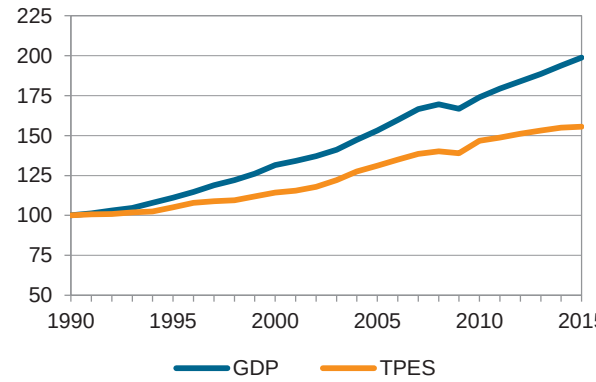

Energy efficiency can also drive a number of "multiple benefits", such as macroeconomic development, public budget increase, enhanced health and well-being, industrial productivity and energy delivery improvements (IEA, 2014a; Figure 1).

This report draws on last year's successful launch of *the Energy efficiency indicators – Highlights* and provides an updated selection of data, as collected by the IEA from member countries since 2009[1]. Based on such data, this chapter introduces some historical trends of energy consumption and presents an overview of the final energy-consuming sectors.

## Global decoupling trends

Globally, energy consumption and economic development have been decoupling, with gross domestic product (GDP) increasing by more than 95% between 1990 and 2015, whereas total primary energy supply (TPES) grew by 56% (Figure 2).

**Figure 2. World GDP and TPES trends (1990=100)**



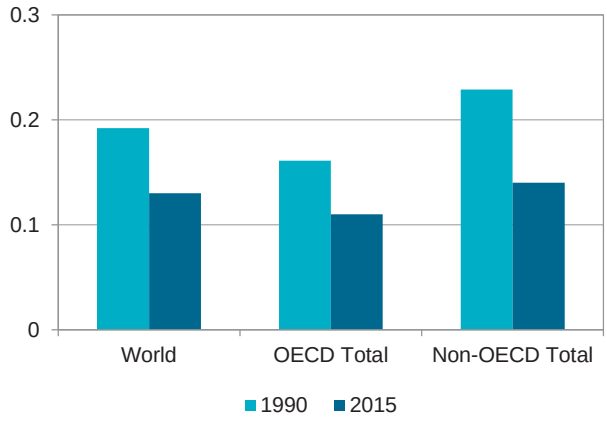

Sources: IEA *World energy balances*, 2017; TPES: total primary energy supply; GDP based on 2010 USD, market exchange rates.

1. Time series collected generally start in 1990.

The amount of energy used to generate a unit of GDP, also called energy intensity of the economy (TPES/GDP), decreased globally by 32% between 1990 and 2015, with large regional variations (Figure 3). For example, in China[1], intensity more than halved (-66%) over the same period.

**Figure 3. Energy intensity 1990 and 2015**

toe/thousand 2010 USD PPP




Sources: IEA World energy balances, 2017; TPES: total primary energy supply; GDP based on 2010 USD PPP.

## Is energy intensity an energy efficiency indicator?

The energy intensity of a country's economy is often used as an indicator of energy efficiency – the main reasons being that, at an aggregate level, it is a proxy measurement for the energy required to satisfy the energy services demanded, and the fact that the indicator is relatively easily available to evaluate and compare across countries. However, a country with relatively low energy intensity does not necessarily have high energy efficiency. For instance, a small service-based country with a mild climate would have a lower intensity than a large industry-based country with a cold climate, even if energy is used more efficiently in the latter country. Equally, trends towards lower intensity are not necessarily driven by efficiency improvements.

Other elements also play a role in defining intensity levels and trends, including: the structure of the economy (share of large energy-consuming industries); geographic characteristics (e.g. longer distances implying higher demand from the transport sector); the overall climate and weather conditions (demand changes for heating or cooling); and the exchange rate (IEA, 2014b).

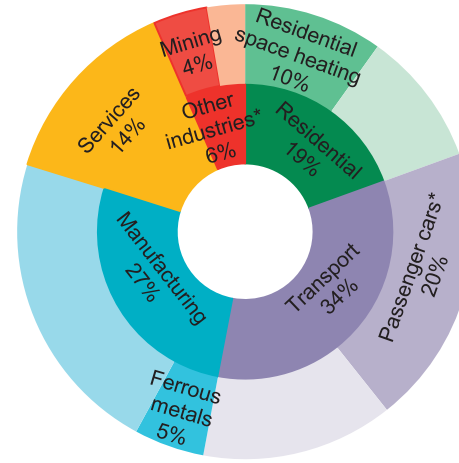
That's why it is important to conduct more detailed analysis that provides insight on the factors driving final energy use trends.

## IEA[2] energy end-use and efficiency trends

### Energy and emissions by end-use

In the IEA, the transport sector accounted for the highest share of final energy consumption[3] in 2014[4] (34%), followed by manufacturing industry (27%) and the residential sector (19%, Figure 4).

**Figure 4. Largest end-uses by sector in IEA, 2014**




* Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks.

Passenger cars alone used more energy than the entire residential sector and, together with freight road

1. Including the People's Republic of China and Hong Kong, China.

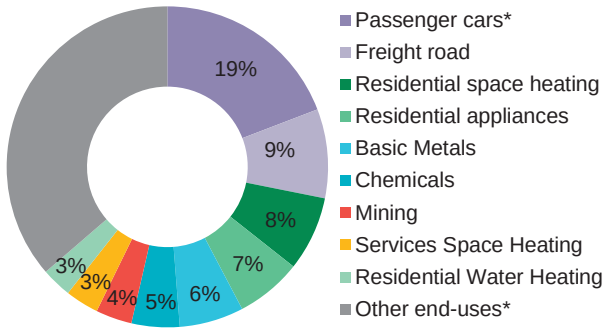
2. For the remainder of this chapter, the IEA aggregate refers to the nineteen IEA member countries for which energy efficiency data covering most of the end-uses are available: Australia, Austria, Canada, Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, New Zealand, The Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. These countries represented about 95% of the total IEA final energy consumption for 2014.

3. In this publication, final energy consumption includes oil and gas extraction; coal mining; blast furnaces and coke ovens energy and transformation losses; it excludes non-energy use, military consumption, pipeline transport.

4. The latest detailed energy use data available for most IEA countries at the time of preparation of this publication.

vehicles, they accounted for almost a third of final energy-related $CO_2$ emissions (Figure 5). In North America (Canada and United States) and Oceania (Australia and New Zealand) transport represented the largest consuming sector. This was, in large extent, due to higher per-capita distances travelled and the use of bigger vehicles.

**Figure 5. Top ten $CO_2$ emitting end-uses in IEA, 2014**




* Passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-ten.

The manufacturing sector, driven by the ferrous metals and chemical/petrochemical sub-sectors, had the largest energy share in OECD Asia (Japan and Korea); and the residential sector, dominated by consumption for space heating and appliances, was largest in most European countries.

In almost all the IEA countries, emissions for both residential space heating and appliances were larger than those of any manufacturing sub-sector; in some countries, like the United Kingdom, space heating was the largest emitting end-use (Figure 5).

## Residential sector

Space heating accounted for over half of the IEA energy consumption in the residential sector (Figure 6), with the highest shares in European countries (Czech Republic 70%, Austria and the United Kingdom 67%) and the lowest in Asia and Oceania (Japan 25%, New Zealand 29% and Australia 36%).

Energy efficiency improvements for space heating have occurred across IEA countries, mostly in the form of better insulation of new buildings, improvements in heating equipment and refurbishment of old buildings. The effects are tracked by trends in residential space heating intensity – defined as energy consumption per floor area – which significantly decreased in many IEA countries (Figure 7). For instance, Austria, France, Germany, Ireland, Korea, Netherlands and Spain have experienced reductions of more than 30% since 2000.

As one would expect, warmer countries generally have lower space heating intensities, as less energy is needed on average to keep the temperature inside residential buildings at a comfort level.

**Figure 6. Shares of residential energy consumption by end-use in IEA, 2014**

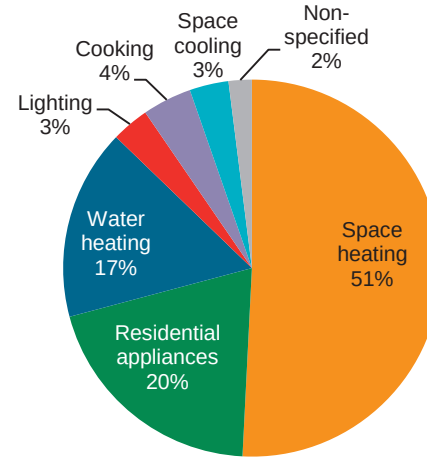
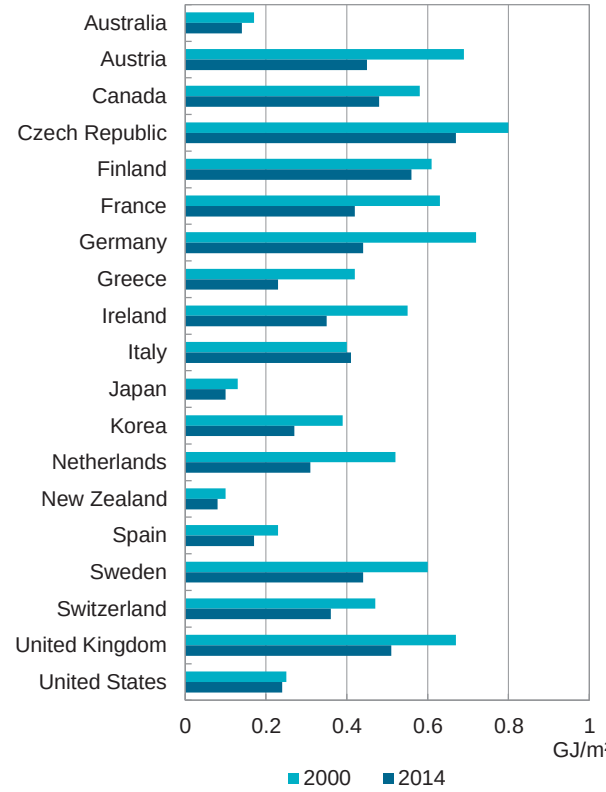



**Figure 7. Energy intensity* per floor area of residential space heating by country**




* corrected for temperature.

## Industry and services[1]

In IEA, the largest energy consuming manufacturing sub-sector was ferrous metals (21%), followed by chemicals/petrochemicals (20%), paper and printing (14%) and food and tobacco (12%) (Figure 8).

In terms of structure of the manufacturing sector, the largest value added in the IEA was produced by the machinery sub-sector[2] (35%), followed by transport equipment (14%) and food and tobacco (11%) (Figure 9).

**Figure 8. Shares of manufacturing energy consumption by sub-sector in IEA, 2014**

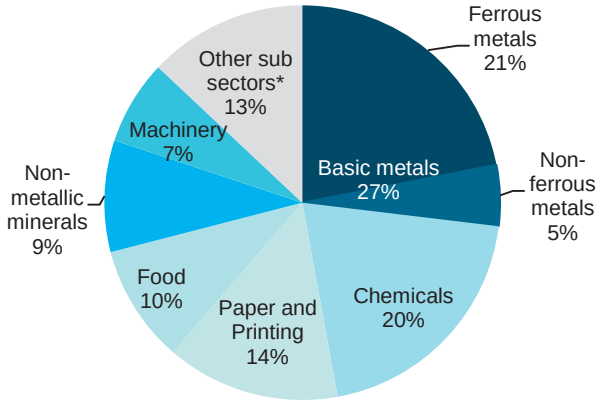
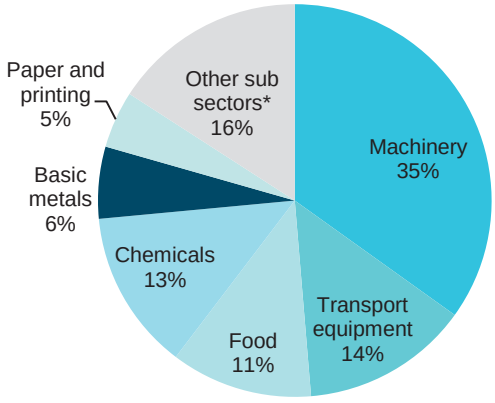



**Figure 9. Shares of manufacturing value added by sub-sector in IEA, 2014**




1. In this publication, services are analysed together with industry due to limitations in data availability for a complete assessment of end-use energy trends in services. Industry includes manufacturing industry, agriculture/fishing, mining and construction.

2. Includes ISIC Divisions 25-28: Manufacture of fabricated metal products, except machinery and equipment; manufacture of computer, electronic and optical products; manufacture of electrical equipment; manufacture of machinery and equipment n.e.c.

The intensities of the manufacturing sub-sectors – defined by energy consumption per value added – vary greatly (Figure 10). Within manufacturing, basic metals and non-metallic minerals are the most energy intensive sub-sectors, while machinery is the least intensive one; the energy intensity of services is lower than that of any manufacturing sub-sector.

**Figure 10. Manufacturing and services: selected intensities in IEA, 2014**

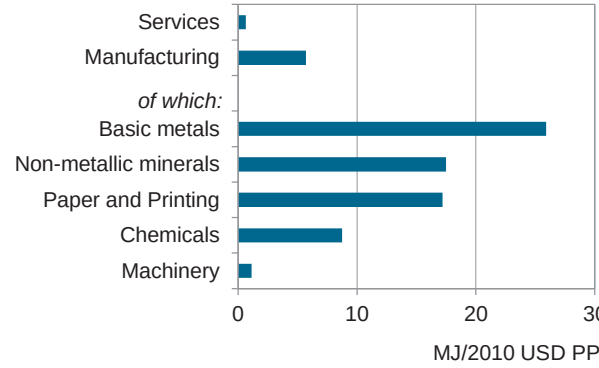
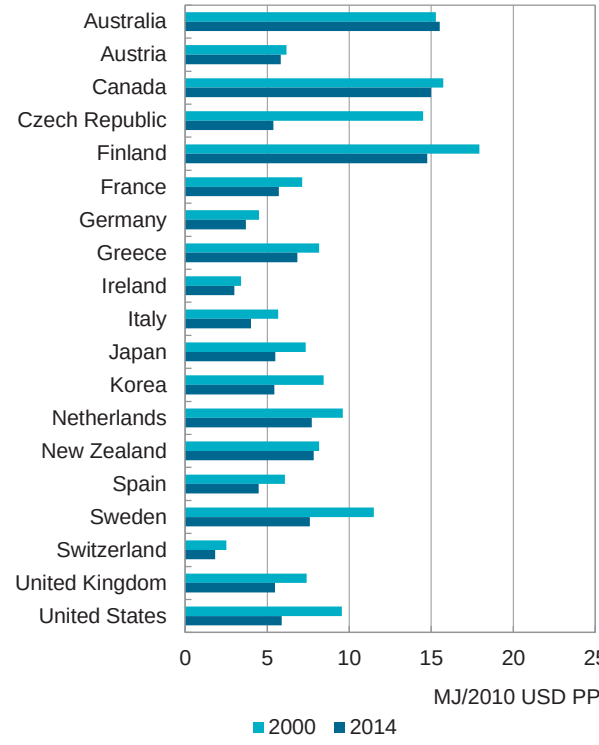



**Figure 11. Energy intensity of manufacturing by country, 2000-2014**




The average manufacturing energy intensity in a country depends on the relative weight of the different sub-sectors in the manufacturing mix. For example, the intensity is particularly high in countries like Finland

(Figure 11), where the paper, pulp and printing industry – which is very energy-intensive – represented in 2014 57% of total manufacturing energy consumption.

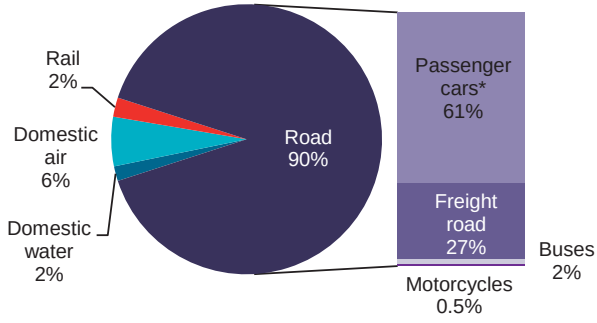
Overall, the manufacturing sector intensity has decreased over time across virtually all countries. For example, in the United States it decreased about 38% in the period 2000-2014, due to efficiency improvements mainly in the chemicals and basic metals sub-sectors, but also because of increasing shares of low energy-intensive sub-sectors, like machinery.

Changes over time in the importance of different sub-sectors in the manufacturing mix can significantly affect the overall intensity of this sector. Similarly, a change of the economic structure from manufacturing to services will affect countries' energy intensity. Identifying and removing the effects of structural changes from those of energy efficiency is therefore essential (see the section *Cross sectoral energy efficiency trends*).

## Transport

The transport[1] sector energy consumption in the IEA is dominated by road vehicles (91%), with passenger cars and freight road – together representing about 88%. Air accounts for 6%; water and rail transport account together for roughly 4% (Figure 12).

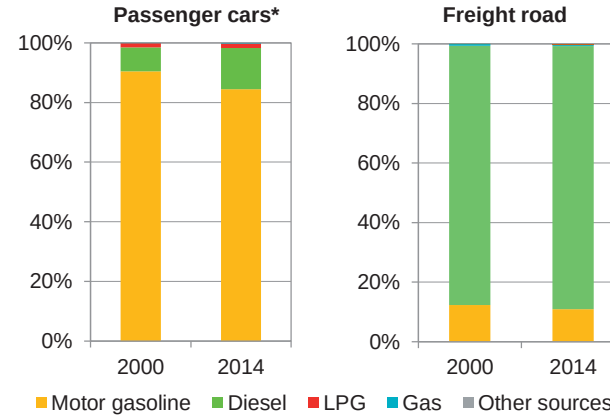
**Figure 12. Energy consumption in transport in IEA, 2014**




* Passenger cars includes cars, sport utility vehicles and personal trucks.

Across the IEA countries motor gasoline[2] remains the dominant fuel for passenger cars even though the share of diesel[2] has increased from 8% in 2000 to 14% in 2014. In European countries, diesel represented approximately 50% of passenger car consumption in 2014, comparing to about 24% in 2000. Freight road energy consumption is dominated by diesel in all countries (Figure 13).

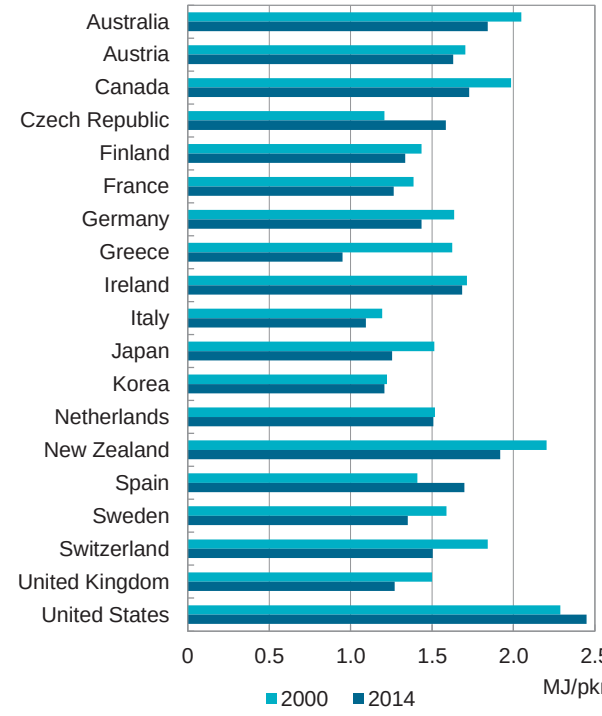
**Figure 13. Energy consumption in road transport**




*Passenger cars includes cars, sport utility vehicles and personal trucks.

Passenger transport intensity (energy per passenger-kilometre) indicates the amount of energy used to move one passenger over a distance of one km. Intensity levels vary across countries depending on the share of modes (e.g. road, air, water, rail), vehicle types in the mix (e.g. passenger cars, buses, etc.) and on the average occupancy (passengers per vehicle) – which in many countries has decreased over time as people increasingly drive their vehicles alone.

**Figure 14. Energy intensity of passenger transport by country, 2000-2014**




1. Transport excludes international aviation and marine bunkers, pipeline.
2. In this publication, gasoline and diesel include the biofuel components.

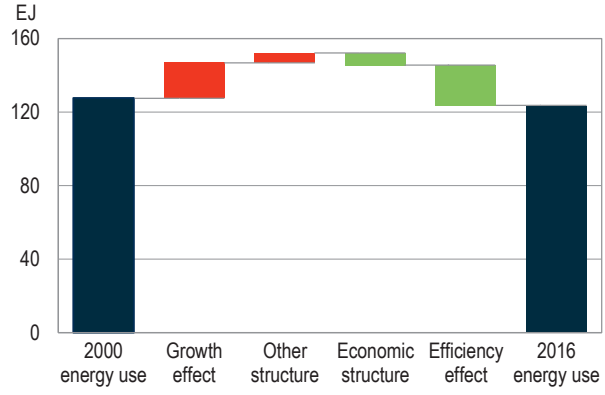
Passenger transport intensity is particularly high in countries like the United States, due to the large use of passenger cars (of which a high share are Sport Utility Vehicles, SUVs) and domestic flights as compared to more efficient transportation modes like buses and trains. Conversely, it is comparatively low in countries like France, where rail transport is relatively common (Figure 14).

Reductions in passenger transport intensity have occurred in most countries due to modal shift (e.g. to passenger trains), and improvements in passenger cars efficiency, like in Switzerland (-18% from 2000 to 2014). In most countries, the improvements have been partly offset by a decrease in occupancy rates of vehicles.

## Cross-sectoral energy efficiency trends

Global economic growth and energy consumption are decoupling. The decomposition analysis of factors driving energy consumption trends[1] for IEA member countries indicates that in the IEA the decoupling was mainly due to efficiency improvements (Figure 15)[2].

**Figure 15. Drivers of final energy consumption in IEA**

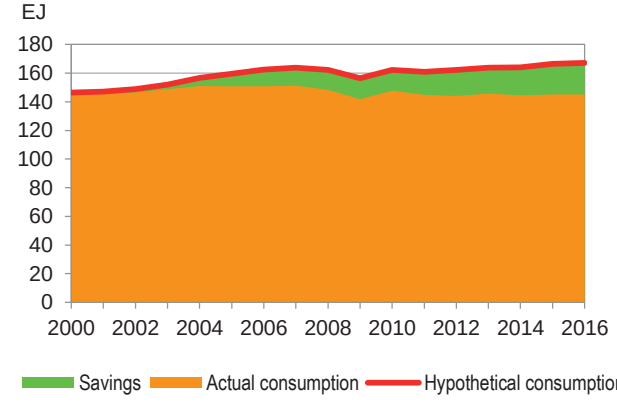



Source: adapted from *Energy Efficiency 2017, Market Report Series*, based on IEA Energy efficiency indicators database, 2017.

Energy efficiency has more than offset the upward pressure on energy consumption mainly due to economic growth. Economic structural change (shift to less intensive industries and services) has also offset the energy consumption increase from structural effects in the residential and transport sectors (i.e. larger building floor area per person, more appliance ownership per person and an increased use of energy intensive types of transport such as passenger vehicles).

In 2016, energy efficiency across all end-use sectors in IEA countries was responsible for over three quarters of the downward pressure on energy consumption. The energy savings from efficiency gains were three times larger than the reduction associated with economic structural changes. This provides clear evidence that the decline in energy intensity, at least in IEA countries, was driven, in large part, by efficiency gains (IEA, 2017).

**Figure 16. Estimated energy efficiency savings in IEA**




Source: adapted from *IEA Energy efficiency Market Report, 2017,* based on the IEA Energy efficiency indicators database, 2017.

The estimated annual energy savings due to efficiency improvements since 2000 in all IEA countries reached approximately 22 EJ in 2016, equivalent to the final energy consumption of Germany, France and the United Kingdom combined (Figure 16).

At a sectoral level, the efficiency of the residential sector has improved the most, followed by the industry and services sector. The efficiency of the transport sector in IEA member countries has shown relatively slower improvements (IEA, 2017).

## References

IEA (2017), *Energy efficiency 2017, Market report series* OECD/IEA, Paris.

IEA (2014a), *Capturing the multiple benefits of energy efficiency*, OECD/IEA, Paris.

IEA (2014b), *Energy Efficiency Indicators: Fundamentals on Statistics*, OECD/IEA, Paris.

1. Please refer to the section on *Methodological notes* for a description of the IEA decomposition analysis and of its differences between this publication and the *Energy Efficiency 2017*.
2. Additional decomposition analysis across end-use sectors is provided in the *Energy Efficiency 2017* publication.

# PART I

# EXPLANATORY NOTES

# 1. ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| MJ: | megajoule ($10^6$ joules) |
| GJ: | gigajoule ($10^9$ joules) |
| PJ: | petajoule ($10^{15}$ joules) |
| $CO_2$: | carbon dioxide |
| Comb.: | combustible |
| LPG: | liquefied petroleum gases |
| Gas: | natural gas |
| $m^2$: | square metre |
| pers: | person |
| pass.: | passenger |
| dw: | dwelling |
| PCs: | personal computers and information technologies |
| TVs: | televisions and home entertainment |
| TC: | temperature corrected |
| HDD: | heating degree days |
| CDD: | cooling degree days |
| USD: | United States dollar |
| GDP: | gross domestic product |
| PPP: | purchasing power parity |
| VA: | value added |
| pkm: | passenger-kilometres |
| tkm: | tonne-kilometres |
| NA: | not available or confidential |

# 2. METHODOLOGICAL NOTES

## The IEA energy efficiency indicators data collection

In 2009, IEA Members committed to collect energy efficiency indicators data through a new annual questionnaire. The questionnaire collects energy consumption and activity data for various end-uses, sub-sectors and modes/vehicle types across the four sectors: residential, services, industry and transport. The questionnaire is available online at the IEA energy efficiency statistics web page: www.iea.org/statistics/topics/energyefficiency/.

The IEA also developed a manual on energy efficiency data and indicators, *Energy Efficiency Indicators: Fundamentals on Statistics*; and one on how to use indicators to inform policies, *Energy Efficiency Indicators: Essentials for Policy Making*, both of which can be downloaded from the above IEA web page.

## Notes on data quality

The analysis of demand-side energy efficiency trends requires highly disaggregated end-use energy data across the sectors of final consumption: residential, services, transport and industry. Examples of such disaggregated data include energy consumption by end-use (space heating, cooking, appliances, etc.) for the residential sector; or energy consumption by mode/vehicle type (passenger cars, motorcycle, freight trucks, etc) for transport. Deriving energy efficiency indicators also requires consistent "activity data" covering the wide range of activities specific to each sub-sector/end-use, such as floor area, passenger-kilometres, production of key manufacturing output (cement, aluminium, iron, etc.), number of employees in each service category, etc.

While almost all countries have developed energy statistics to produce national energy balances, more disaggregated end-use energy and activity data are not always as readily available. Therefore, the development of energy efficiency indicators generally requires additional efforts, such as mapping the different available data through administrative sources, setting up new data collections; but also establishing new institutional arrangements to share and manage the different data.

The IEA end-use data collection agreed in 2009 is still work in progress, with developing quality and coverage across Member countries. Currently, IEA countries generally have relatively detailed data for the industry sector thanks to well established data collections to develop energy balances. Relatively important progress has been observed in the coverage of the residential sector, while detailed data for the services sector still remains unavailable for most countries. The availability of transport data varies greatly across countries, with activity data (passenger-kilometres, tonne-kilometres, vehicle stock etc.) often requiring additional development.

Furthermore, as indicators are calculated as a ratio of energy consumption and corresponding activity, and since the various data may not be collected by the same institution, the data quality assessment is particularly important. For example, consistency of boundaries and definition between energy and activity data is essential to create meaningful indicators, and to analyse their trends. Data users should also be aware that small changes in intensities may be caused by uncertainty in measurement of energy or activity data, and thus weight should be given to long-term trends. Other important validation criteria include internal consistency, consistency with external data sources, and

plausibility (values of indicators need to fall within expected ranges to be meaningful).[1]

The IEA Secretariat is continuously working with Member countries to improve the overall quality of the energy efficiency indicators database, including its consistency with the data provided by national administrations to develop the IEA energy balances and with the data reported by other organisations. We expect to keep improving data quality over time, and are grateful for the feedback to this publication received from the different data providers and data users.

# Definitions of products

## Oil

Oil includes crude oil, natural gas liquids, refinery feedstocks, additives as well as other hydrocarbons (including emulsified oils, synthetic crude oil, mineral oils extracted from bituminous minerals such as oil shale, bituminous sand, etc., and oils from coal liquefaction), refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other oil products.

Graphs shown for the transport sector in this publication present the disaggregation of the oil products described below.

### Motor gasoline

Motor gasoline is light hydrocarbon oil for use in internal combustion engines such as motor vehicles, excluding aircraft. Motor gasoline is distilled between 35°C and 215°C and 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). In this publication and differently from the IEA energy balances, motor gasoline for transport includes liquid biogasoline or ethanol.

### Diesel

Diesel includes diesel oil for fuel use in compression ignition (diesel) engines fitted in road vehicles. Distillation range is 160°C to 390°C. In this publication and differently from the IEA energy balances, diesel for transport includes liquid biodiesels.

### LPG

LPG are light paraffinic hydrocarbons derived from refinery processes, crude oil stabilisation plants and natural gas processing plants. They consist mainly of propane ($C_3H_8$) and butane ($C_4H_{10}$) or a combination of the two. They could also include propylene, butylene, isobutene and isobutylene. LPG are normally liquefied under pressure for transportation and storage.

## Coal

Coal includes all coal, both primary (including hard coal and lignite) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, gas works gas, coke oven gas, blast furnace gas and other recovered gases), as well as peat (including peat products) and oil shale.

## Gas

Gas includes natural gas (excluding natural gas liquids).

## Combustible renewables and wastes

Combustible renewables and wastes comprises solid biofuels, liquid biofuels, biogases, industrial and municipal wastes. Combustible renewables and wastes data are often based on incomplete information, with particularly high caution on data quality.

Solid biofuels are defined as any plant matter used directly as fuel or converted into other forms (e.g. charcoal) before combustion. This covers a multitude of woody materials generated by industrial process or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, sulphite lyes also known as black liquor, animal materials/wastes and other solid biofuels).

Liquid biofuels include biogasoline, biodiesel and other liquid biofuels. Liquid biofuels consumed in the transport sector are included, in this publication, under motor gasoline and diesel.

Biogases comprise landfill gas, sewage sludge gas and other biogases from anaerobic fermentation.

Note that biofuels refer only to the amounts of biomass specifically used for energy purposes. Therefore, the non-energy use of biofuels is null by definition.

Municipal waste consists of products that are combusted directly to produce heat and/or power and comprises wastes produced by households, hospitals and the tertiary sector that are collected by local authorities for incineration at specific installations.

1. For a more comprehensive discussion of validation criteria by sector, please see the chapter on *Data validation* in *Energy Efficiency Indicators: Fundamentals on Statistics*: http://www.iea.org/publications/freepublications/publication/IEA_EnergyEfficiencyIndicatorsFundamentalsonStatistics.pdf.

Industrial waste of non-renewable origin consists of solid and liquid products (e.g. tyres) combusted directly, usually in specialised plants, to produce heat and/or power.

## Electricity

Electricity includes electricity generated from all sources.

## Other sources

Other sources includes heat, the direct use of geothermal (excluding geothermal heat pumps) and of solar thermal heat. Heat refers to heat produced for sale.

For some countries, this category could include some of the products mentioned above. For country-specific information, please refer to the chapter on *Country notes*.

# Definitions of end-uses/ sub-sectors

## Residential sector

Residential includes energy consumed by all households excluding fuel and electricity used by households for transport. The different end-uses within the residential sector are described below.

### Space heating

Space heating includes the different means of heating spaces, which can be achieved through many systems and fuels. Heating systems can broadly be separated into two types, namely central heating and dedicated area/room heating. Central heating systems can heat the entire dwelling; they include hot water and steam systems with radiators, floor or wall furnaces, district heating, heat pumps, etc. Area-dedicated heating systems can be divided into several categories: standalone electric heaters, fireplaces, and stand-alone stoves using oil products or other fuels, such as coal or wood. It is not rare that households use a combination of several systems, e.g. electrical heaters to complement insufficient base central systems. Heating systems can generate heat using a number of energy sources such as electricity, natural gas, coal, fuel oil, liquefied petroleum gas (LPG), kerosene, biofuels, and active or passive solar energy.

### Space cooling

Space cooling includes all equipment used for cooling a living area, which can be divided into two broad categories: central cooling systems and room-dedicated systems. Central air conditioners feed into a duct system that could also be used by a central heating system. Wall air conditioners and split systems are used to cool a room. There are other possible cooling systems such as swamp coolers (or evaporative coolers), which cool air through evaporation of water; heat pumps that can be used in reverse mode to cool the air or district cooling. Most of the cooling systems in the residential sector run exclusively on electricity.

### Water heating

Water heating, also known as domestic hot water, includes systems that are used for heating water for showers, bathing, washing, etc. A number of tank-based or tankless systems can be used to heat the water. Water heating can be produced alone or in combination with space heating systems. The main energy sources used by water heating systems include natural gas, LPG, electricity, biofuels and, increasingly, solar thermal energy in a growing number of countries.

### Cooking

Cooking includes energy consumed to cook meals using a wide range of stoves, from advanced induction stoves to traditional three-stone stoves. A number of energy sources are used for cooking such as natural gas, electricity, biofuels, LPG, kerosene and coal. Beside stoves, ovens are also included in the energy consumption for cooking. Cooking appliances such as toasters and microwave ovens, due to the difficulty in separating their respective consumption, are normally reported under other appliances.

### Lighting

Lighting includes energy consumed for interior or exterior lighting of dwellings today mainly powered by electricity. Incandescent lamps, which have been around for more than a century, are slowly being replaced by more efficient fixtures, e.g. fluorescent tubes, compact fluorescent lamps and LEDs (light-emitting diodes). More and more countries are passing regulations to phase out the use of incandescent bulbs. Households that do not have any access to electricity still rely on traditional forms of lighting such as kerosene and LPG lamps, and sometimes even candles and flashlights. Moreover, off-grid solar applications for lighting may become more prominent in the future.

### Residential appliances

Residential appliances encompasses two main categories: large (or major) appliances (sometimes also called white appliances or white goods) and other

(usually much smaller) appliances. In this publication, residential appliances are disaggregated as below:

- Refrigerators, also including freezers and refrigerators/ freezers combinations;
- Dish washers;
- Clothes washers;
- Clothes dryers;
- TVs, also including home entertainment devices;
- PCs, also including other information technology devices;
- Other appliances, including all appliances not specified above, such as phones, hair driers, microwaves, vacuum cleaners etc. For country specific information, please refer to country notes.

In this publication, for energy consumption, dish washers, clothes washers and clothes dryers may be presented jointly as washing equipment.

### Non-specified

Non-specified includes all consumption for energy uses that are not specified above. For some countries, this category could also include data from end-uses listed above. For country specific information, please refer to the chapter on *Country notes*.

## Industry sector

### Manufacturing

It includes all the manufacturing subsectors listed below [ISIC Division 10 to 18 and 20 to 32]. Manufacture of coke and refined petroleum products [ISIC Division 19] is excluded from this publication.

**Food** includes manufacture of food, beverages and tobacco [ISIC Divisions 10 to 12];

**Textiles** includes manufacture of textile, wearing apparel and leather [ISIC Divisions 13 to 15];

**Wood** includes wood and products of wood and cork (other than pulp and paper) [ISIC Division 16];

**Paper and printing** includes paper, pulp and printing [ISIC Divisions 17 and 18];

**Chemicals** includes chemicals, and chemical and pharmaceutical products [ISIC Divisions 20 and 21] excluding petrochemical feedstocks;

**Rubber** includes manufacture of rubber and plastics products [ISIC Division 22]. If not available may be included under non-specified manufacturing;

**Non-metallic minerals** includes non-metallic minerals such as glass, ceramic, cement, etc. [ISIC Division 23];

**Basic metals** includes manufacture and casting of ferrous metals and non-ferrous metals [ISIC Division 24];

- **Ferrous metals** covers manufacture and casting of Iron and steel including energy used in blast furnaces and coke ovens [ISIC Class 2410 and Class 2431];
- **Non-ferrous metals** includes manufacture and casting of non-ferrous metals (e.g. aluminium) [ISIC Class 2420 and Class 2432];

**Machinery** includes machinery: fabricated metal products, machinery and equipment other than transport equipment [ISIC Divisions 25 to 28];

**Transport equipment** [ISIC Divisions 29 and 30];

**Other manufacturing** includes the manufacture of furniture and other manufacturing (e.g. jewellery) [ISIC Division 31 and 32]; and non-specified manufacturing.

### Other industries

It includes agriculture, mining and construction.

**Agriculture** includes agriculture, forestry and fishing [ISIC Division 01 to 03];

**Mining** covers mining and quarrying including coal, oil and gas extraction [ISIC Division 05 to 09];

**Construction** [ISIC Divisions 41 to 43].

## Services sector

Services sector includes services and the commercial sector [ISIC Division 33 to 99].

## Transport sector

Transport covers all transport modes using commercial energy, independently of the sector where the transport activity occurs. As a consequence, cycling, walking or sailing are not covered in this sector, even though these modes could represent sizeable activities in terms of passenger-kilometres (pkm).

Transport excludes international marine and aviation bunkers, pipeline transportation, and when possible fuel tourism.

The transport sector is divided by segment (passenger and freight), mode (road, rail, air and water) and by vehicle type (e.g. cars, motorcycles, etc).

### Road transport

It includes passenger and freight road transportation, as listed below.

**Passenger cars** includes passenger light-duty vehicles carrying up to eight persons, cars, minivans, sport

utility vehicles and personal-use pickup trucks. [1] Passenger cars cover a number of categories, such as taxis; hire cars, ambulances and motor homes.

**Buses** includes urban, suburban and intercity mini-coaches, trolleybuses, minibuses and bus vehicles.

**Motorcycles** includes powered 2- to 4-wheeled road motor vehicles not exceeding 400 kilograms.

**Freight road** transport covers the movement of goods within the national boundaries by road vehicles designed, exclusively or primarily, to carry goods: light duty freight vehicles (vans and pickups), heavy-duty goods vehicles (trucks or lorries), road tractors, and agricultural tractors permitted to use roads open to public traffic.

### Rail transport

It includes passenger and freight trains transportation.

Passenger trains includes any movement of passengers through railway, on a given railway network, regional, urban or suburban, within the national boundaries. Passenger rail transport includes trains, metro vehicles and trams (streetcars). Rail transport can be powered by electricity, diesel or steam.

Freight trains includes any movement of goods by railway vehicles on a given railway network, regional, urban or suburban, within the national boundaries. Rail transport can be powered by electricity, diesel or steam.

### Air transport

It includes domestic passenger and freight airplanes.

Passenger airplanes includes passenger airplanes, aircrafts configured for the transport of passengers, used for domestic travels. For country-specific coverage, please refer to country notes.

Freight airplanes covers the movement of goods by aircrafts configured for the transport of freight or mail, operating within the national boundaries. For country-specific coverage, please refer to country notes.

### Water transport

It includes domestic passenger and freight ships and excludes fuel used for ocean, coastal and inland fishing (included under agriculture) and military consumption.

**Passenger ships** covers the movement of passengers, by any kind of vessel, boat or ship, undertaken at sea, or on lakes and rivers, within the national boundaries. International water transport is excluded from national totals, while inland waterways transport is included. For country-specific coverage, please refer to country notes.

**Freight ships** covers the movement of goods by any kind of vessel, boat, barge or ship, undertaken at sea, or over lakes and rivers, within the national boundaries. International water transport is excluded from national totals, although it has been the largest carrier of freight throughout recorded history. For country-specific coverage, please refer to country notes.

# Definitions of activity data

## Residential sector

### Population

**Dwellings** includes only primary residences excluding unoccupied dwellings and secondary residences.

**Residential floor area (surface)** includes only floor area of occupied dwellings.

## Industry sector

**Value added** in USD at the price level and purchasing power parities (PPPs)[2] of the year 2010.

## Services sector

**Value added** in USD at the price level and PPPs of the year 2010.

## Transport sector

**Passenger-kilometres (pkm)** is a unit of measure of passenger transport activity. One passenger-kilometre represents the transport of one passenger over one kilometre. For all vehicles, it is the total distance travelled of all passenger summed up.

**Tonne-kilometres (tkm)** is a unit of measure of goods transport activity. One tonne-kilometre represents the transport of one tonne over one kilometre. For all vehicles, it is the total distance travelled of all tonnes summed up.

1. For some countries, pick-up trucks are reported either in passenger transport or freight transport according to their main use. For country-specific information, please refer to the chapter on *Country notes*.

2. Purchasing power parities are the rates of currency conversion that equalise the purchasing power of different currencies.

**Vehicle-kilometres (vkm)** is a unit of measure of vehicle activity. One vehicle-kilometre represents the movement of a vehicle over one kilometre. For all vehicles, it corresponds to the product of the number of vehicles in stock and the average distance travelled by vehicle.

**Occupancy (passenger per vehicle)** represents the average number of passengers per vehicle. It can be calculated dividing pkm by vkm.

**Load (tonne per vehicle)** represents the average tonnes of goods transported by one vehicle. It can be calculated dividing tkm by vkm.

## Comparability with the IEA energy balances

This publication is based on the IEA energy efficiency indicators data collection which is additional to that used for the IEA energy balances. Due to the emphasis on final end-uses across sectors, some differences occur between the final energy consumption in this publication and the total final energy consumption reported in the IEA energy balances, for the following reasons:

- In this publication, non-energy use is excluded from final energy consumption;
- Energy consumption in ferrous metals (part of basic metals and called iron and steel in the IEA balances) also includes energy consumption and losses in transformation for blast furnaces and coke ovens, which are accounted under the energy and the transformation sectors in the IEA energy balances;
- Energy consumption in mining also include energy consumed to extract oil, gas and coal;
- Transport excludes pipeline transportation and fuel tourism;
- Military energy consumption is excluded, while it is included in the total final energy consumption in the IEA Energy Balances under the other non-specified category.

Besides these systematic differences, some discrepancies might occur due to the higher data disaggregation of this publication, and to the need to adapt different approaches/methodologies (e.g. bottom-up vs top-down) to collect or estimate these data at a country level. Additionally, for some countries different offices/institutions are responsible for preparing the energy balances and the energy efficiency data shown in this publication, which may also lead to unintended discrepancies.

## Estimates of $CO_2$ emissions by end-use

The estimates of $CO_2$ emissions from fuel combustion presented in this publication are calculated using the IEA energy efficiency database, the IEA energy balances and the default methods and emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories.*

This publication presents only $CO_2$ emissions from fuel combustion, from all reported energy uses of fuels, excluding emissions from non-energy use of fuels and including emissions reallocated from electricity and heat generation (using the same methodology as in the IEA (2017) *$CO_2$ emissions from fuel combustion* publication).

**$CO_2$ emissions from fuel combustion**

$CO_2$ = Fuel consumption * Emission factor,

where:

Fuel consumption = amount of fuel combusted,

Emission factor = implied emission factor, based on energy balances fuel mix within and default emission factors

Fossil fuel categories in the energy efficiency indicators template (coal, oil, gas) are more aggregated than those within the IEA energy balances. Country-specific implied emission factor for oil, coal and gas are computed based on the mix of individual products reported within the IEA energy balances. Emissions are then summed across all fuel categories to obtain total emissions for a given end-use or sub-sector.

Emissions estimates could differ from those published in the IEA (2017) *$CO_2$ emissions from fuel combustion* publication mainly because the energy consumption data may differ from the IEA energy balances (see previous section). Also, the IEA Secretariat estimates of $CO_2$ emissions from fuel combustion may differ from the figures that a country submits to the UNFCCC for a variety of reasons.

# Temperature correction[1]

The amount of energy required for space heating (and space cooling) is highly dependent on the ambient temperature, and this impact on energy consumption may easily mask the effects of energy efficiency improvements. For example, a country may dramatically reduce the amount of energy needed for space heating over a year simply due to an exceptionally warm winter. The opposite may also be true. The reduction in energy consumption due to the energy efficiency improvements in heating systems may be offset by an extra energy demand due to an extremely cold winter.

Therefore, in order to accurately monitor the evolution of energy consumption for space heating in the residential sector (in this publication services' space heating is not temperature corrected) over time, it is essential to eliminate the impact of temperature variations and to analyse temperature-corrected data. In this publication one of the most common methods has been adopted for such correction, namely the use of heating degree days (HDD).

HDD are a simplified measure of the intensity and duration of cold weather over a certain period in a given location. The value of HDD for a period, for example a winter, is determined by subtracting for each day the average daily temperature from a base temperature (assumed to be the temperature below which heating systems are turned on), and then adding up this difference for the days of the period for which the average outside air temperature is lower than the base temperature. When the outside air temperature is equal to or higher than the base temperature, HDD are zero. The higher heating degree days, the colder the season, the greater the amount of energy required for space heating. HDD can be defined as:

**Heating degree days**

$$HDD = \sum_{k=1}^{n} (T_{base} - T_k)$$

$$T_{base} > T_k,$$

where:

$T_{base}$ is the base temperature,

$T_k$ is the average temperature of day $k$,

$n$ is the total number of days in the given period.

As noted above, two factors are key for the calculation of HDD. The first is the base temperature, which should be set at the level of outside air temperature at which residents of a given region tend to turn on their heating systems. This level can vary across different regions depending on many factors, such as the ability to tolerate cold temperatures, the variety of building types, the thermal properties of buildings, the density of occupants, etc. For example, the base temperature in the United Kingdom is typically 15.5°C while in the United States it is typically 65°F (equivalent to 18°C). The base temperature should be carefully determined based on the characteristics of the region, since this choice will impact the temperature correction of the energy consumption data. It may also evolve in time, for example if people already turn on their thermostat at higher outside temperatures.

The second factor is the time series of average daily temperatures. For example, if the average temperature on one day is 5 degrees below the base temperature, there are five HDD for that day. To get the annual number of HDD, all positive values of HDD are summed for each day in the year.

When the national HDD figures are available, the data of energy consumption for space heating can be corrected for temperature variations. This publication uses a simplified methodology, which assumes that the elasticity for adjusting heating requirements is 1, as shown below:

**Temperature correction**

$$Energy_{TCi} = Energy_{actual\ i} * \frac{HDD_{period\ average}}{HDD_{year\ i}},$$

where:

$Energy_{TCi}$ is the temperature-corrected energy consumption for the year $i$,

$Energy_{actual\ i}$ is the actual energy consumption in year $i$,

$HDD_{period\ average}$ is the average heating degree days of the given period (2000-latest year), and

$HDD_{year\ i}$ is the total heating degree days in the year $i$.

Such correction intends to remove the fluctuations in energy consumption due to fluctuations in temperature in the given year compared with the average temperature of a country. For example, if a year has 500 HDD and the annual average HDD for the country is 250,

1. See Annex C *in Energy Efficiency Indicators: Fundamentals on Statistics.*

the corrected energy consumption for space heating would be half of the actual energy consumption. Of course, comparison of space heating efficiency indicators across countries is still difficult as a country on average experiencing colder temperatures than another country will need on average to consume more to heat the same floor area.

Similarly, cooling degree days (CDD) are a measure of the intensity of warm weather to correct energy consumption data for space cooling. In this publication, temperature corrections are made only for calculating intensity indicators. Therefore, energy consumption data show the fluctuations due to temperature change. Space cooling is temperature corrected only for countries where CDD are data available.

## Decomposition into drivers of final energy consumption

The IEA decomposition analysis aims at identifying the causes of changes in energy demand, by separating the role of activity and structural changes to isolate changes in energy intensity due to energy efficiency. As described below, this isolated change in energy intensity can then be used as a proxy for estimating energy efficiency improvements and is called the "efficiency effect". Three main factors are distinguished in the decomposition analysis (see Table 1), as presented below.

**Activity** is the level of action that drives energy use. It is broken into sectors and measured by appropriate data: value-added output in the industry and services sectors; population in the residential sector; passenger-kilometres for passenger and tonne-kilometres for freight transport.

**Structure** reflects the mix of activity levels within a sector: the share of production represented by each sub-sector of industry or services; the floor area per person, number of dwellings per person and appliance ownership rates in the residential sector; and the modal share of vehicles in passenger and freight transport. Because different activity types have different energy intensities, shifts in the structure of activity affect energy demand.

**Efficiency** is the amount of energy used per unit of activity in each end-use or sub-sector. This publication uses the term "efficiency effect" to be distinguished from the term "energy intensity." The decomposition analysis is undertaken at the most disaggregated level possible with the available data, so that changes in energy intensity can be used as a proxy for energy efficiency.

In this publication, the Logarithmic Mean Divisia Index (LMDI) additive method has been used to perform the decomposition analysis.

This decomposition method is comparable to that used in the *Energy Efficiency 2017* (IEA, 2017), although some differences exist. These include the treatment of base years and assumptions used for the transport sector. Both publications use the Logarithmic Mean Divisia Index (LMDI) method, although *Energy Efficiency 2017* uses a rolling year decomposition, whereas this publication applies a fixed year approach.

On the passenger transport side, in this publication, intensities are calculated as energy per passenger-kilometre, whereas in *Energy Efficiency 2017* intensities are calculated as energy per vehicle-kilometre, decoupling the occupancy (passenger per vehicle) from the efficiency effect. These differences could lead to different estimated energy savings, although these are not expected to vary significantly.

**Table. 1. Data and indicators included in the IEA decomposition analysis presented in this publication**

| Sector | End-use/sub-sector | Activity | Structure | Efficiency |
|---|---|---|---|---|
| **Residential** | Space heating | Population | Floor area / population | Temperature-corrected energy / floor area |
| | Water heating | Population | Occupied dwellings / population | Energy / occupied dwelling |
| | Cooking | Population | Occupied dwellings/ population | Energy / occupied dwelling |
| | Space cooling | Population | Floor area / population | Temperature-corrected energy / floor area |
| | Lighting | Population | Floor area / population | Energy / floor area |
| | Appliances | Population | Appliance stock/ population | Energy / appliance unit |
| **Passenger transport** | Passenger car; bus; rail; domestic aviation | Passenger kilometre | Share of passenger-kilometres by mode | Energy / passenger-kilometre |
| **Freight transport** | Freight road transport; rail; domestic shipping | Tonne kilometre | Share of tonne-kilometres by mode | Energy / tonne-kilometre |
| **Manufacturing** | Food; textiles; wood; paper and printing; chemicals; rubber; non-metallic minerals; basic metals; machinery; transport equipment; furniture/ other manufacturing | Value added | Share of value added | Energy / value-added |
| **Services** | Services | Value added | Share of value added | Energy / value-added |
| **Other industries** | Agriculture; construction | Value added | Share of value added | Energy / value-added |

# Notes on graphs

## Cross sectoral overview

### Largest end-uses by sector

It shows the share of energy consumption by sector (residential, transport, manufacturing, services and other industries), highlighting the largest energy consuming end-use/sub-sector within the residential, transport and manufacturing sectors. Other industries includes agriculture and fishing, mining and construction.

### Top-6 $CO_2$ emitting end-uses

It shows the shares of $CO_2$ emissions in total $CO_2$ emissions from final energy consumption for the largest six emitting end-uses/subsectors. Emissions include emissions reallocated from electricity and heat generation.

### Final energy consumption by source

It shows the time series of final energy consumption by energy source.

### Drivers of final energy consumption[1]

It shows the results of the IEA decomposition analysis of final energy consumption into drivers. The three dashed lines represent the activity, the structure and the efficiency effects that drive final energy consumption, shown as solid line.

### Estimated energy savings from efficiency[1]

It shows the hypothetical energy consumption if no energy efficiency improvements since 2000 had occurred compared with the actual final energy consumption. The difference represents an estimate of the energy savings due to efficiency improvements since 2000.

### Estimated cumulative energy savings by sector[1]

It shows the contribution of the different sectors (residential, industry and services, passenger transport and freight transport) to the overall cumulative energy savings resulting from the efficiency improvements since the year 2000 until the latest year available.

1. In the graphs presenting the results of the IEA decomposition analysis, the final energy consumption may be smaller than the actual final energy consumption if some end-uses/sub-sectors are excluded from the decomposition due to data availability. For any given country, please refer to the note at the bottom of the corresponding cross-sectoral overview page.

## Residential sector

### Residential energy consumption by end-use

It shows the time series of residential energy consumption by end-use. Residential end-uses include: space heating; space cooling; lighting; cooking; water heating; residential appliances; non-specified.

### Residential energy consumption by end-use, latest year

It shows the share of each end-use in the residential energy consumption for the most recent available year.

### Residential energy consumption by source

It shows consumption by end-use and energy source in the residential sector, for 2000 and for the most recent available year. In this graph, other end-uses include space cooling; lighting; residential appliances and non-specified.

### Appliances per dwelling, 2000-latest year % change

It shows the percent change in the residential appliances diffusion, calculated as average number of units of appliances per dwelling, between 2000 and the latest year available.

### Energy intensities by end-use per floor area

It shows selected end-use intensities calculated as temperature-corrected energy per floor area ($GJ/m^2$).

### Energy intensities by end-use per dwelling

It shows selected end-use intensities calculated as energy per dwelling.

## Industry and Services sectors

### Industry and Services energy consumption

It shows the time series of energy consumption for manufacturing, services, agriculture, mining and construction.

### Manufacturing energy consumption by sub-sector

It shows the shares of energy consumption in manufacturing for the top-six consuming sub-sectors, for the most recent available year.

### Value added by sector

It shows the shares of value added in total GDP for manufacturing, services, agriculture, mining and construction, for 2000 and the most recent available year.

### Manufacturing value added by sub-sector

It shows the share of value added in manufacturing for the top-six consuming sub-sectors, for the most recent available year.

### Manufacturing energy consumption by source

It shows the shares of the different energy sources in manufacturing, for 2000 and for the most recent available year.

### Selected energy intensities

It shows intensities calculated as energy per value added for agriculture, construction, mining, services and manufacturing; and for the largest five energy consuming manufacturing sub-sectors.

## Transport sector

Note that transport excludes international marine and aviation bunkers, pipelines and fuel tourism.

### Transport energy consumption by mode/vehicle type

It shows the time series of energy consumption split by road (passenger cars, buses, motorcycles, freight road), rail, air, water. Passenger cars includes cars, sport utility vehicles and personal trucks.

### Transport energy consumption by mode/vehicle type, latest year

It shows the shares in transport energy consumption of the different modes/vehicle types: road (passenger cars, buses, motorcycles, freight road), rail, air, and water, for the most recent available year.

### Energy consumption in road transport by source

It shows the share of different fuels (motor gasoline, diesel, LPG, natural gas and other) in passenger cars and freight road transport, for 2000 and for the most recent available year.

### Transport activity by mode/vehicle type

It shows the share of each mode/vehicle type in activity for passenger transport (passenger-kilometres) and road transport (tonne-kilometres), for 2000 and the most recent available year.

### Energy intensities for passenger transport

It shows intensities, calculated as energy per passenger-kilometre, for selected passenger transport modes/vehicles.

### Energy intensities for freight transport

It shows intensities, calculated as energy per tonne-kilometre, for selected freight transport modes/vehicles.

# 3. UNITS AND CONVERSIONS

All the energy data reported in this publication are based on a **"net"** energy content, which excludes the energy lost to produce water vapour during combustion.

## General conversion factors for energy

| *To:* | TJ | Gcal | Mtoe | MBtu | GWh |
|---|---|---|---|---|---|
| *From:* | multiply by: | | | | |
| **terajoule (TJ)** | 1 | $2.388 \times 10^{2}$ | $2.388 \times 10^{-5}$ | $9.478 \times 10^{2}$ | $2.778 \times 10^{-1}$ |
| **gigacalorie (Gcal)** | $4.187 \times 10^{-3}$ | 1 | $1.000 \times 10^{-7}$ | 3.968 | $1.163 \times 10^{-3}$ |
| **million tonnes of oil equivalent (Mtoe)** | $4.187 \times 10^{4}$ | $1.000 \times 10^{7}$ | 1 | $3.968 \times 10^{7}$ | $1.163 \times 10^{4}$ |
| **million British thermal units (MBtu)** | $1.055 \times 10^{-3}$ | $2.520 \times 10^{-1}$ | $2.520 \times 10^{-8}$ | 1 | $2.931 \times 10^{-4}$ |
| **gigawatt hour (GWh)** | 3.600 | $8.598 \times 10^{2}$ | $8.598 \times 10^{-5}$ | $3.412 \times 10^{3}$ | 1 |

## Conversion factors for mass

| *To:* | kg | t | lt | st | lb |
|---|---|---|---|---|---|
| *From:* | multiply by: | | | | |
| **kilogramme (kg)** | 1 | $1.000 \times 10^{-3}$ | $9.842 \times 10^{-4}$ | $1.102 \times 10^{-3}$ | 2.205 |
| **tonne (t)** | $1.000 \times 10^{3}$ | 1 | $9.842 \times 10^{-1}$ | 1.102 | $2.205 \times 10^{3}$ |
| **long ton (lt)** | $1.016 \times 10^{3}$ | 1.016 | 1 | 1.120 | $2.240 \times 10^{3}$ |
| **short ton (st)** | $9.072 \times 10^{2}$ | $9.072 \times 10^{-1}$ | $8.929 \times 10^{-1}$ | 1 | $2.000 \times 10^{3}$ |
| **pound (lb)** | $4.536 \times 10^{-1}$ | $4.536 \times 10^{-4}$ | $4.464 \times 10^{-4}$ | $5.000 \times 10^{-4}$ | 1 |

## Conversion factors for volume

| *To:* | gal U.S. | gal U.K. | bbl | $ft^3$ | l | $m^3$ |
|---|---|---|---|---|---|---|
| *From:* | multiply by: | | | | | |
| **U.S. gallon (gal U.S.)** | 1 | $8.327 \times 10^{-1}$ | $2.381 \times 10^{-2}$ | $1.337 \times 10^{-1}$ | 3.785 | $3.785 \times 10^{-3}$ |
| **U.K. gallon (gal U.K.)** | 1.201 | 1 | $2.859 \times 10^{-2}$ | $1.605 \times 10^{-1}$ | 4.546 | $4.546 \times 10^{-3}$ |
| **barrel (bbl)** | $4.200 \times 10^{1}$ | $3.497 \times 10^{1}$ | 1 | 5.615 | $1.590 \times 10^{2}$ | $1.590 \times 10^{-1}$ |
| **cubic foot ($ft^3$)** | 7.481 | 6.229 | $1.781 \times 10^{-1}$ | 1 | $2.832 \times 10^{1}$ | $2.832 \times 10^{-2}$ |
| **litre (l)** | $2.642 \times 10^{-1}$ | $2.200 \times 10^{-1}$ | $6.290 \times 10^{-3}$ | $3.531 \times 10^{-2}$ | 1 | $1.000 \times 10^{-3}$ |
| **cubic metre ($m^3$)** | $2.642 \times 10^{2}$ | $2.200 \times 10^{2}$ | 6.290 | $3.531 \times 10^{1}$ | $1.000 \times 10^{3}$ | 1 |

## Decimal prefixes

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

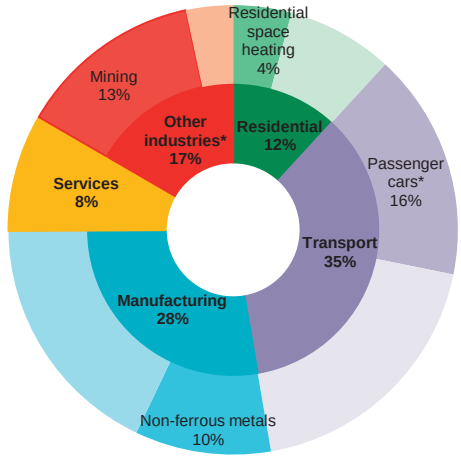
# PART II

# COUNTRY GRAPHS AND TABLES

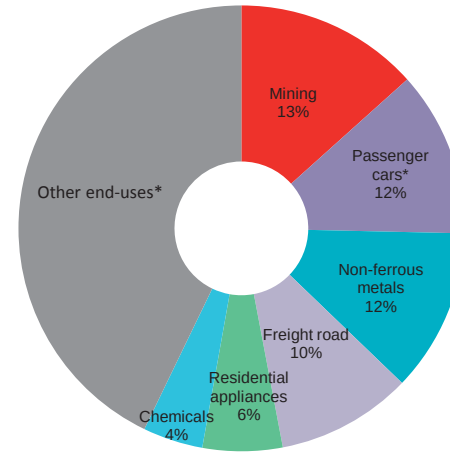
# AUSTRALIA

## Cross-sectoral overview

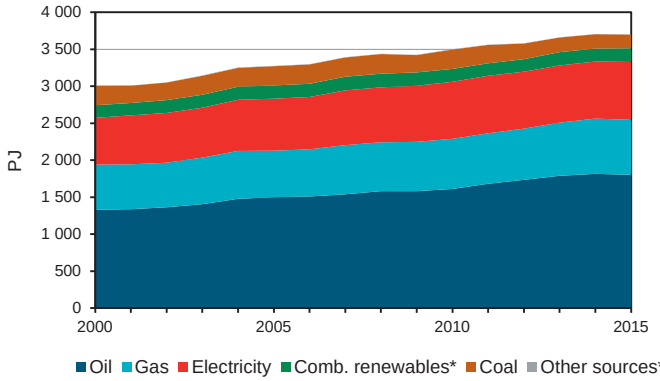
### Largest end-uses by sector, 2015



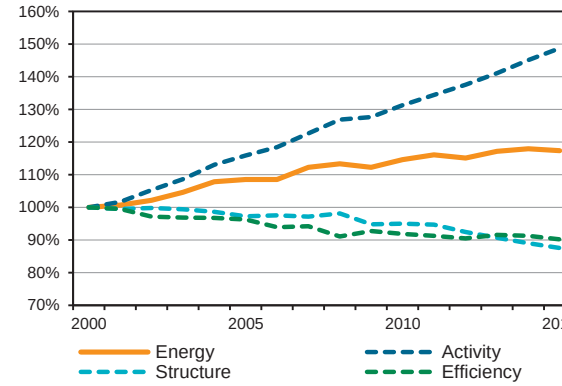

### Top six $CO_2$ emitting end-uses, 2015**



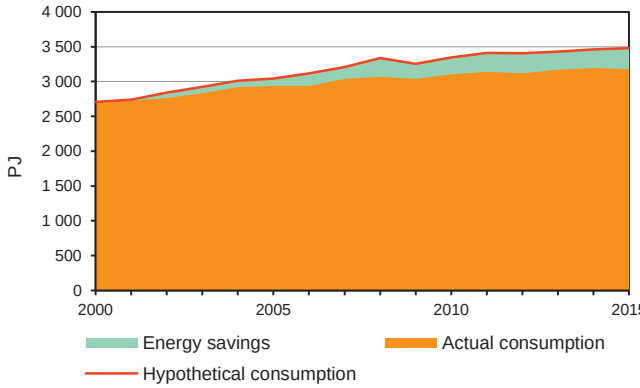

### Final energy consumption by source



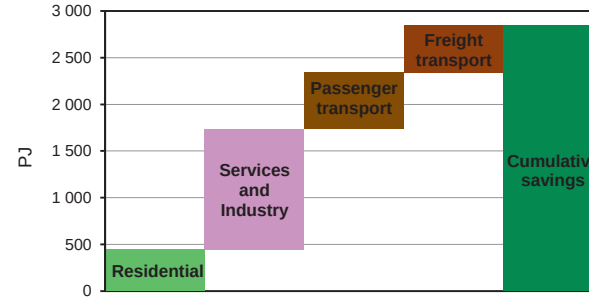

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

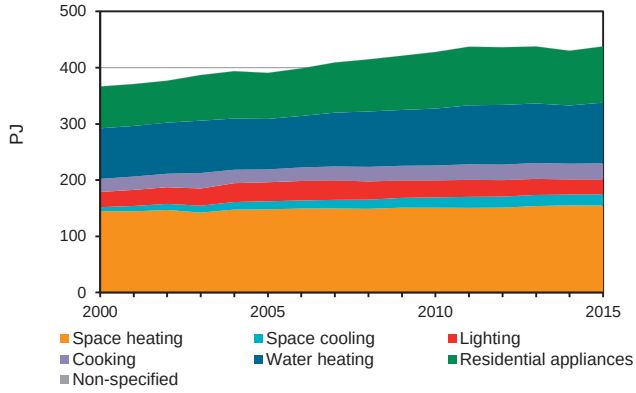
***These figures display results from the IEA decomposition analysis and cover approximately 89% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# AUSTRALIA

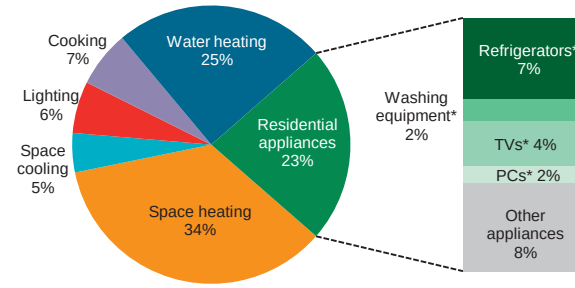
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 367 | 47 | 19 | 19 | 114 | 2.6 |
| **2015** | 438 | 58 | 24 | 18 | 145 | 2.6 |

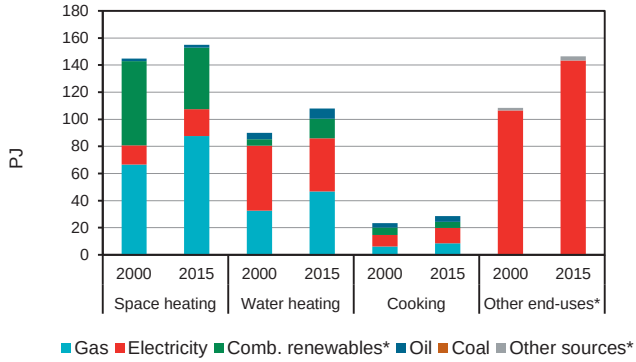
### Residential energy consumption by end-use



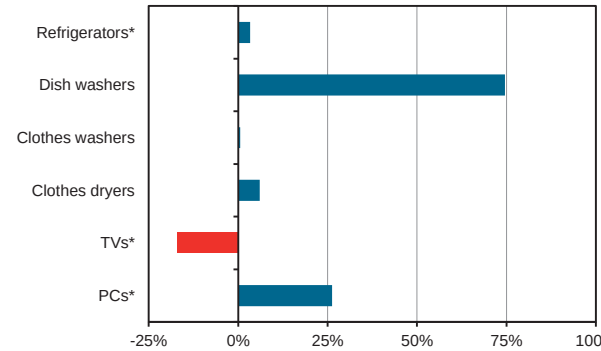

### Residential energy consumption by end-use, 2015



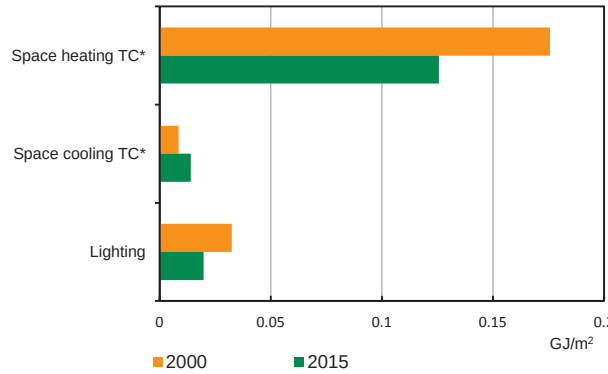

### Residential energy consumption by source



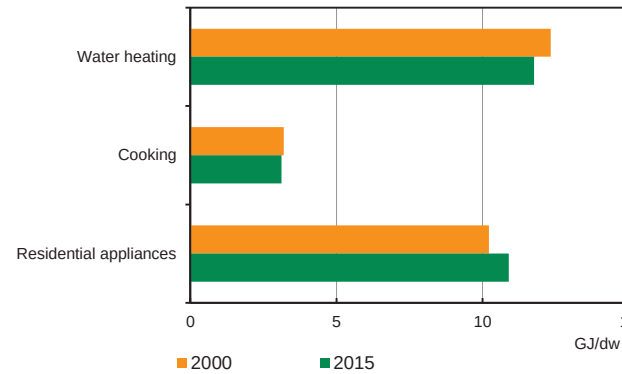

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



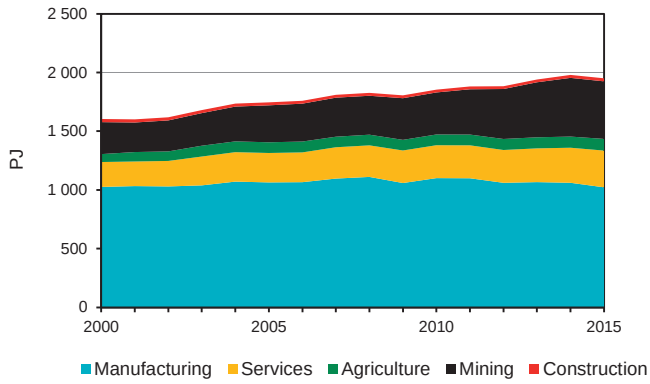

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes TVs only; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# AUSTRALIA

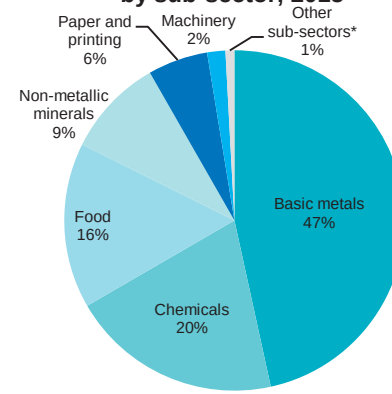
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 026 | 212 | 366 | 692 | 67 | 286 |
| **2015** | 1 022 | 313 | 616 | 1 070 | 67 | 468 |

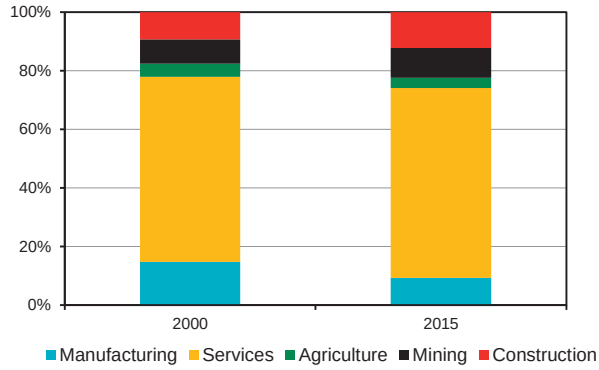
### Industry and services energy consumption



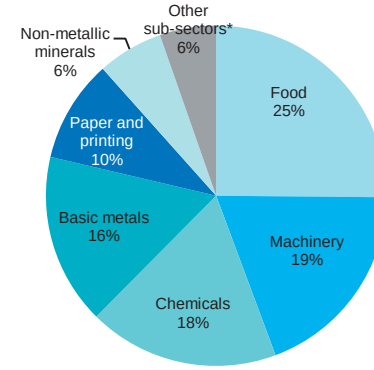

### Manufacturing energy consumption by sub-sector, 2015



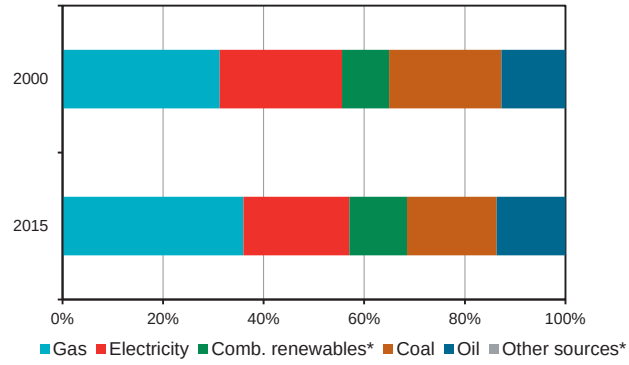

### Value added** by sector



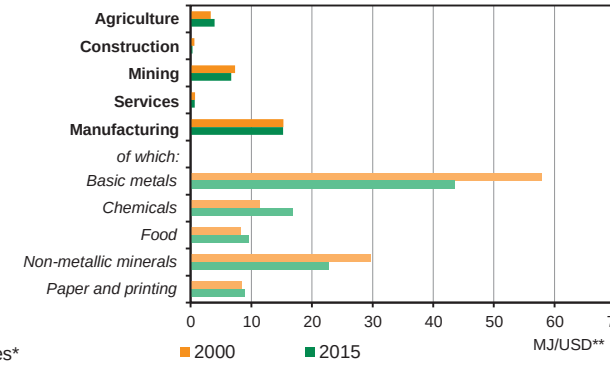

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



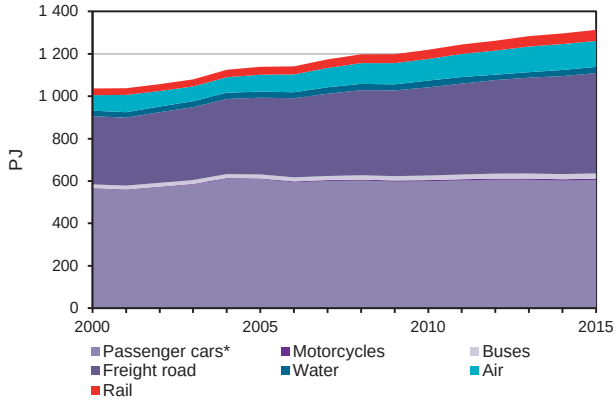

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# AUSTRALIA

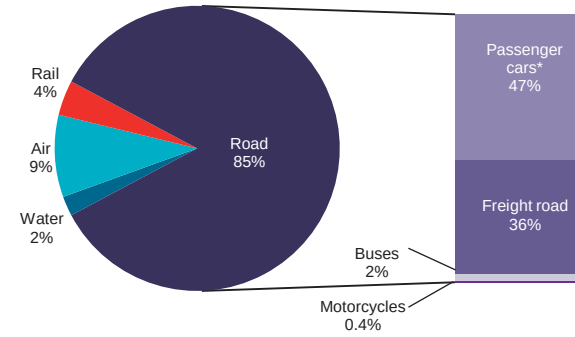
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 673 | 364 | 329 | 375 | 1.8 | 3.0 |
| **2015** | 779 | 534 | 426 | 720 | 1.8 | 3.2 |

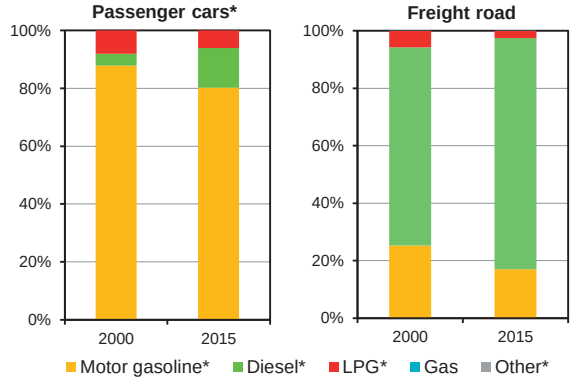
### Transport energy consumption by mode/vehicle type



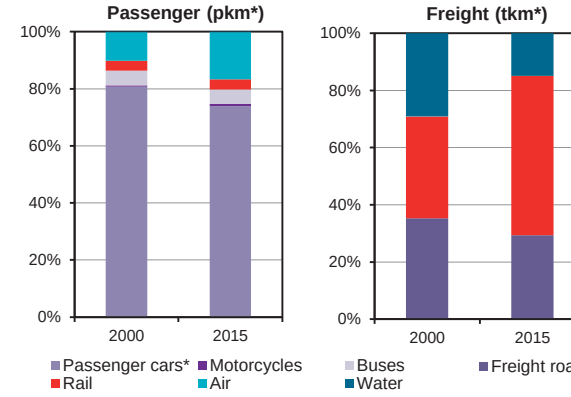

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

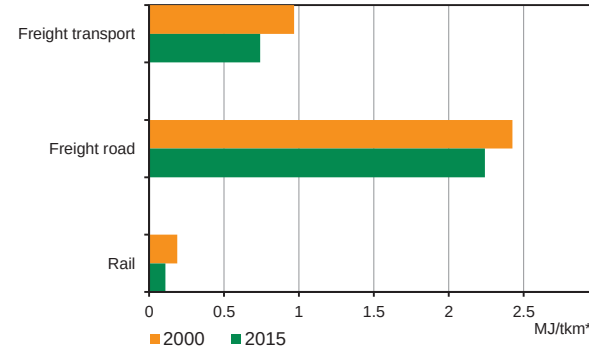



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

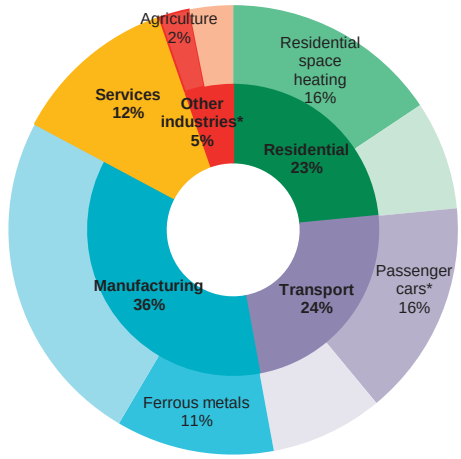



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

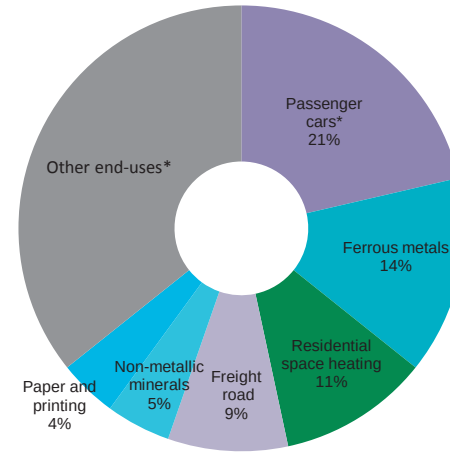
# AUSTRIA

## Cross-sectoral overview

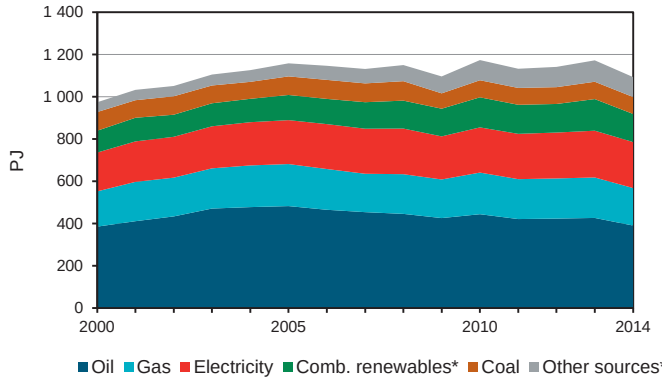
### Largest end-uses by sector, 2014



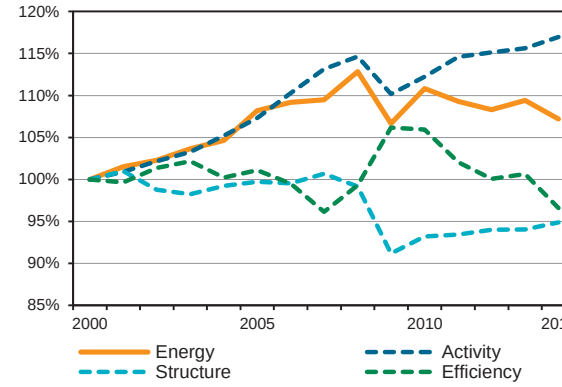

### Top six $CO_2$ emitting end-uses, 2014**



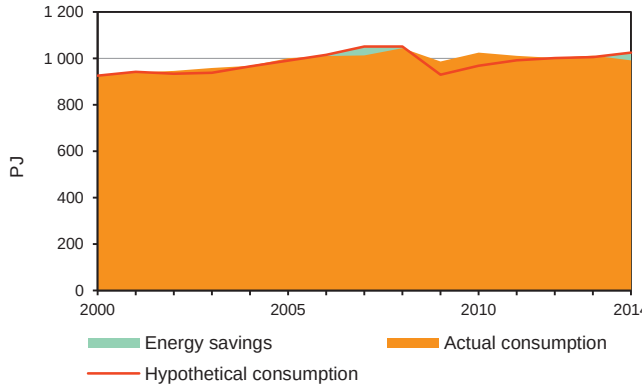

### Final energy consumption by source



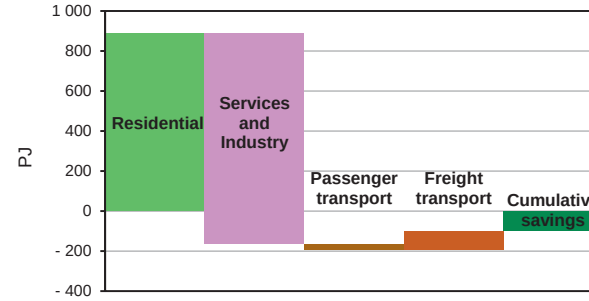

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

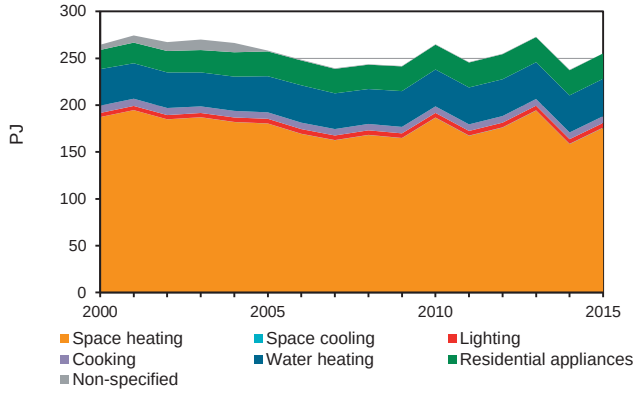
***These figures display results from the IEA decomposition analysis and cover approximately 97% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# AUSTRIA

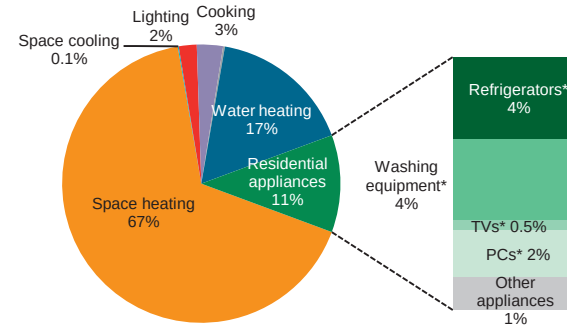
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 264 | 60 | 8 | 33 | 91 | 2.5 |
| **2015** | 255 | 42 | 9 | 30 | 100 | 2.3 |

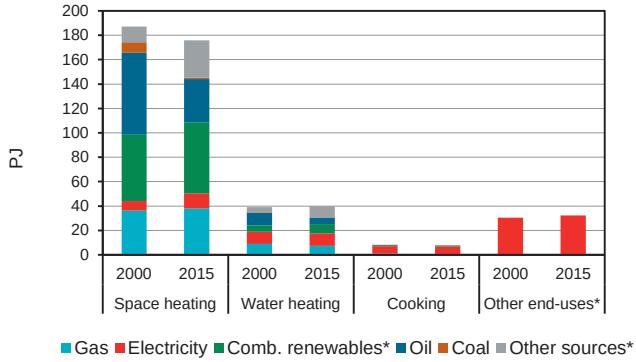
### Residential energy consumption by end-use



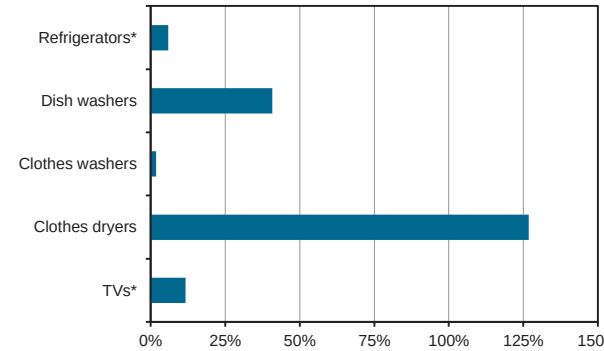

### Residential energy consumption by end-use, 2014



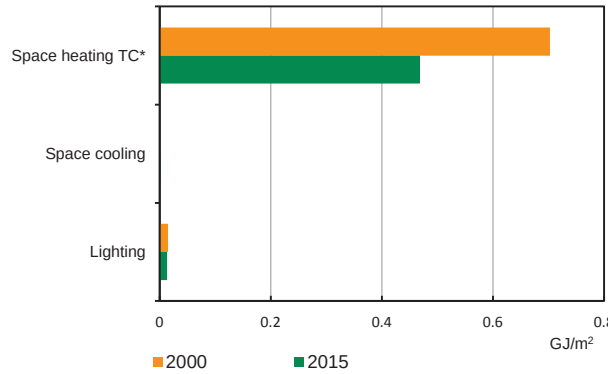

### Residential energy consumption by source



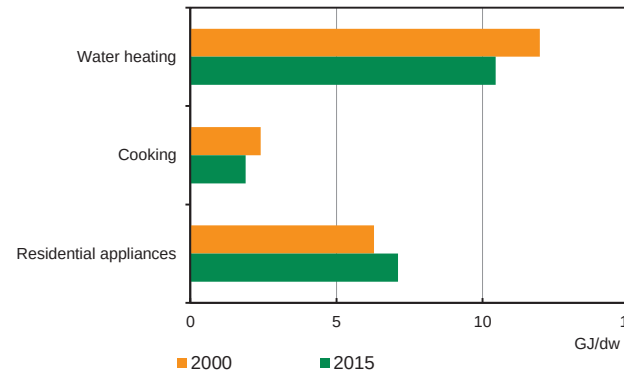

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



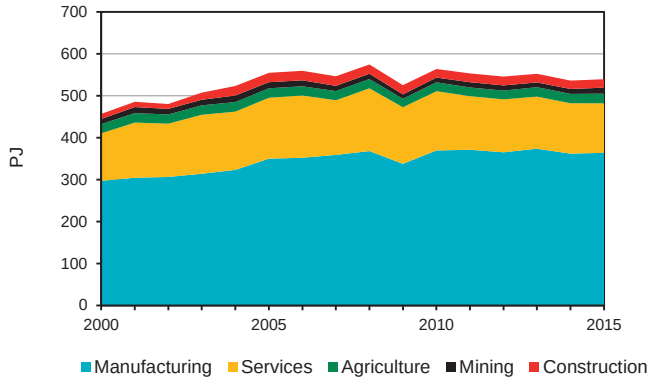

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# AUSTRIA

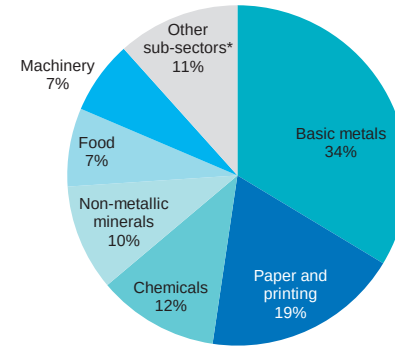
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 297 | 113 | 46 | 302 | 48 | 182 |
| **2015** | 364 | 117 | 57 | 369 | 63 | 231 |

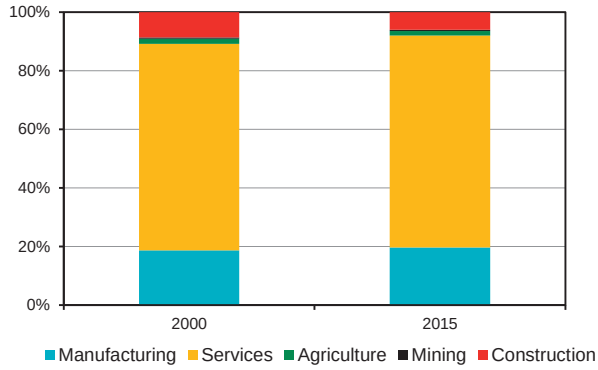
### Industry and services energy consumption



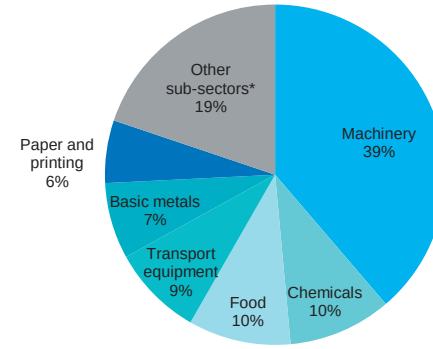

### Manufacturing energy consumption by sub-sector, 2015



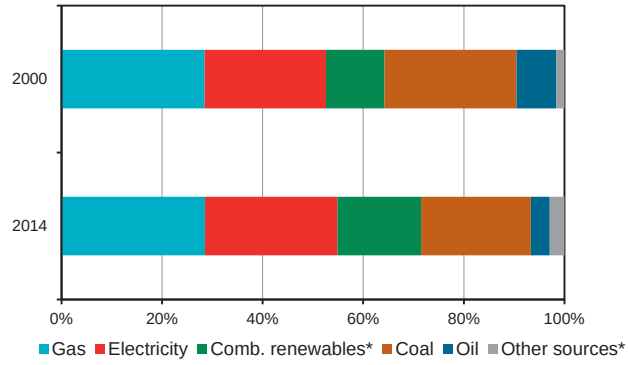

### Value added** by sector



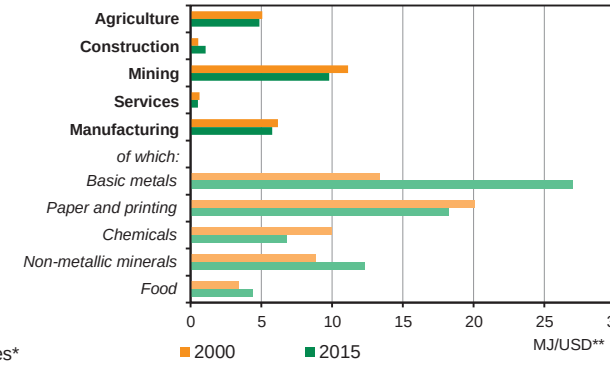

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



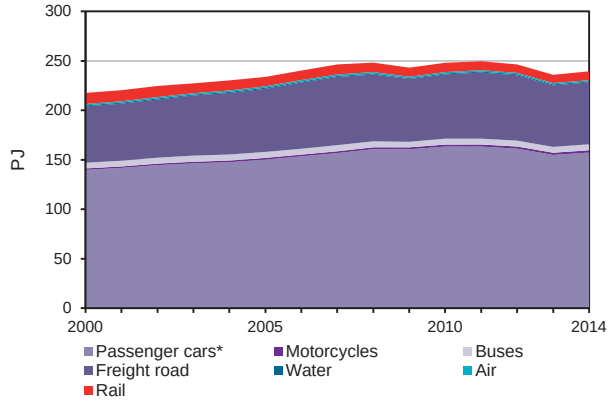

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# AUSTRIA

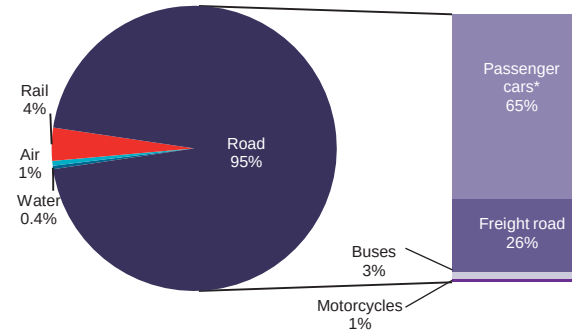
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 152 | 65 | 89 | 56 | 1.2 | 4.1 |
| **2014** | 170 | 69 | 104 | 73 | 1.2 | 4.3 |

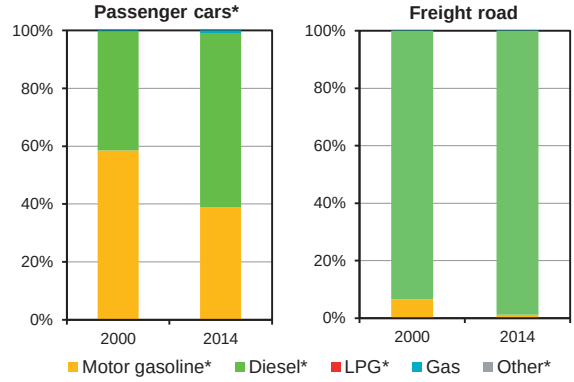
### Transport energy consumption by mode/vehicle type



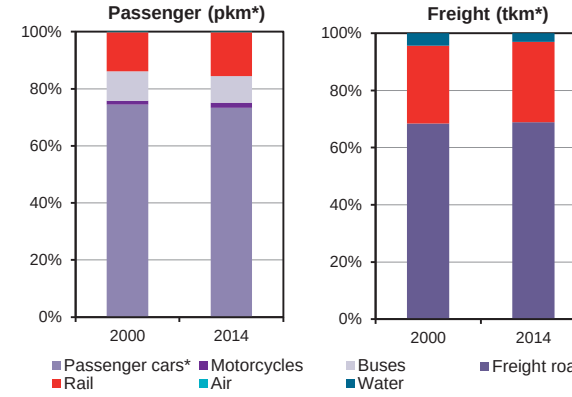

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source




### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

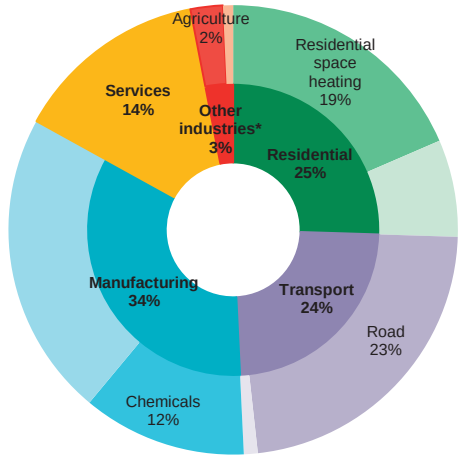
### Energy intensities for freight transport

*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

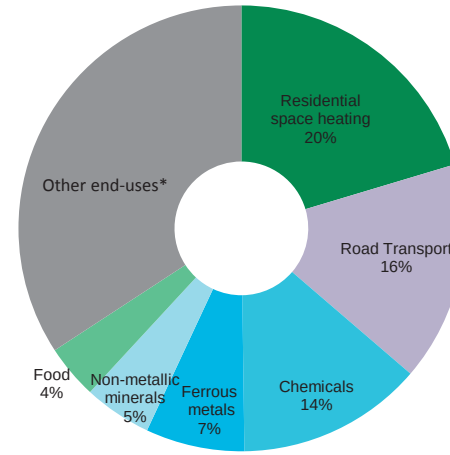
# BELGIUM

## Cross-sectoral overview

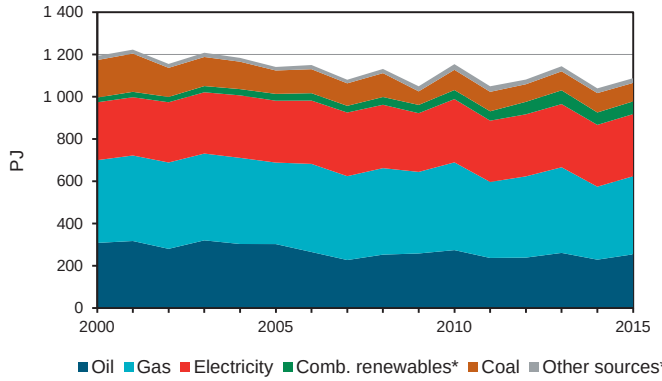
### Largest end-uses by sector, 2013




### Top six $CO_2$ emitting end-uses, 2013**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

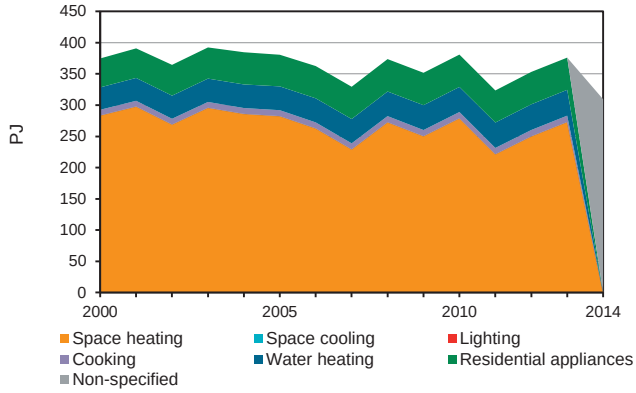
***These figures display results from the IEA decomposition analysis and cover approximately 94% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# BELGIUM

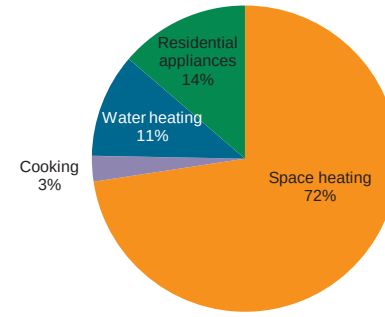
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 375 | 96 | 10 | 37 | 82 | 2.5 |
| **2014** | 309 | NA | 11 | 28 | 81 | 2.4 |

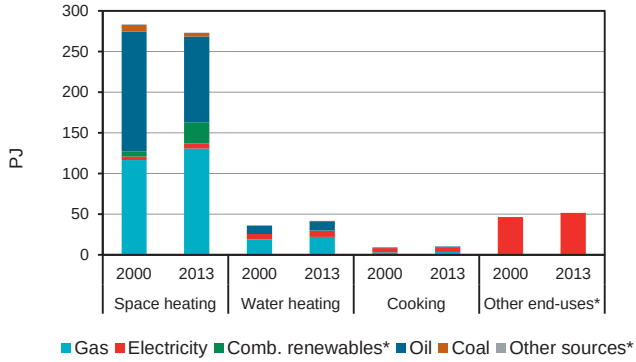
### Residential energy consumption by end-use



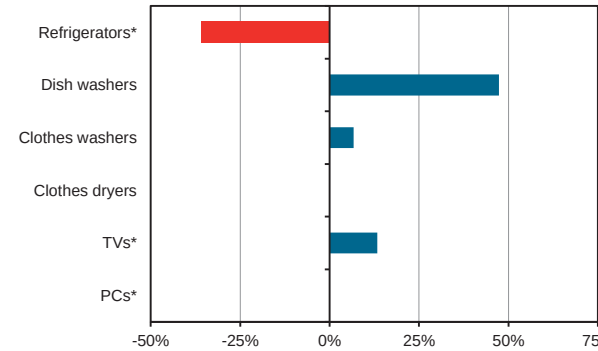

### Residential energy consumption by end-use, 2013



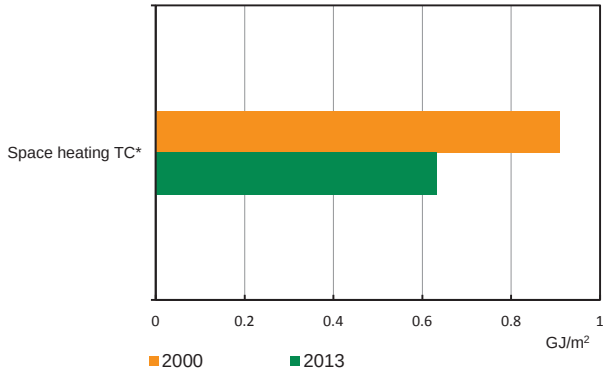

### Residential energy consumption by source



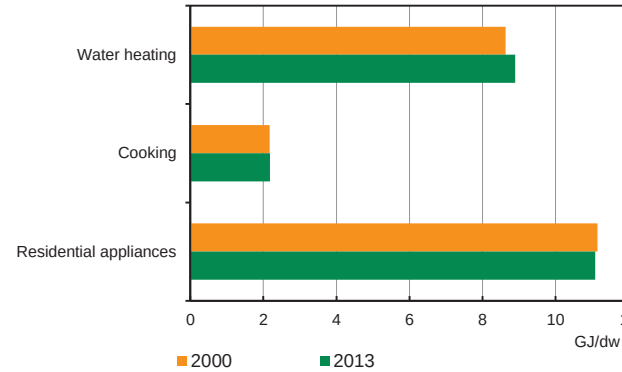

### Appliances per dwelling, 2000-13 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



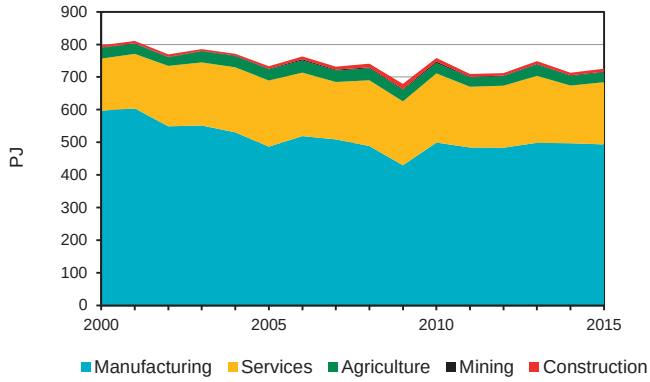

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# BELGIUM

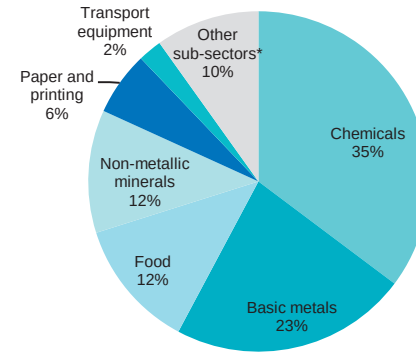
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 597 | 160 | 41 | 365 | 50 | 245 |
| **2015** | 493 | 191 | 41 | 448 | 55 | 304 |

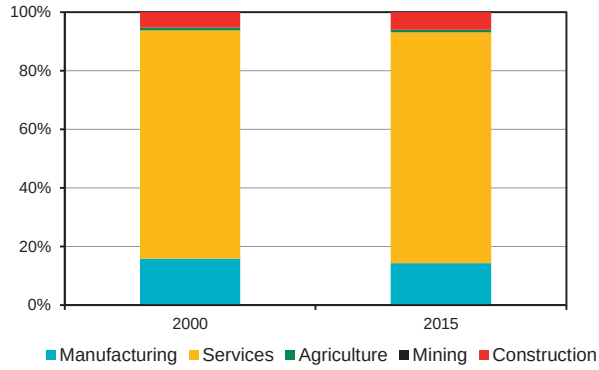
### Industry and services energy consumption



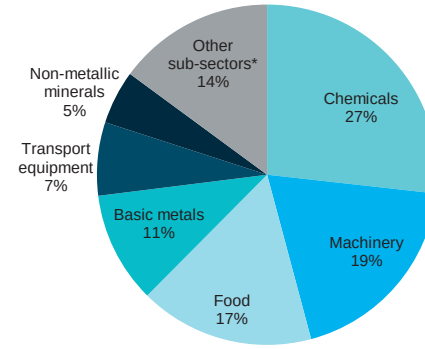

### Manufacturing energy consumption by sub-sector, 2015



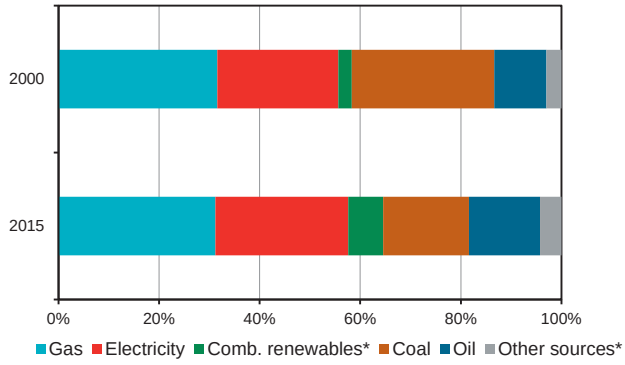

### Value added** by sector



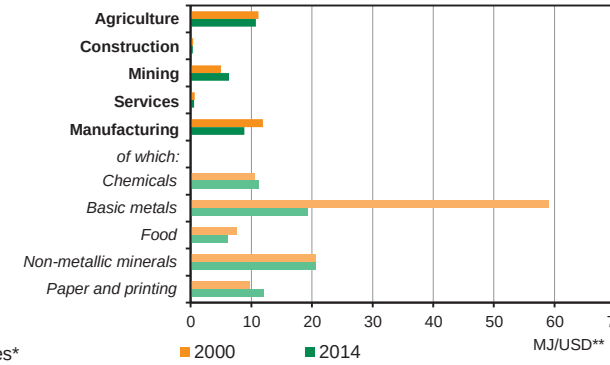

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



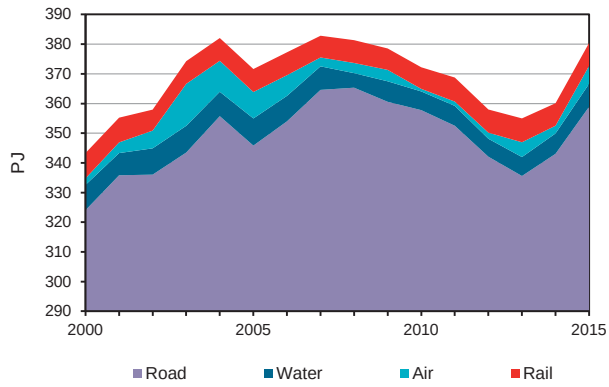

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# BELGIUM

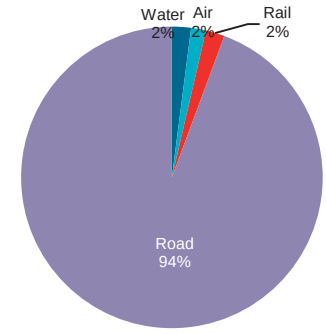
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | NA | NA | 125 | 60 | 1.5 | NA |
| **2015** | NA | NA | 134 | 77 | NA | NA |

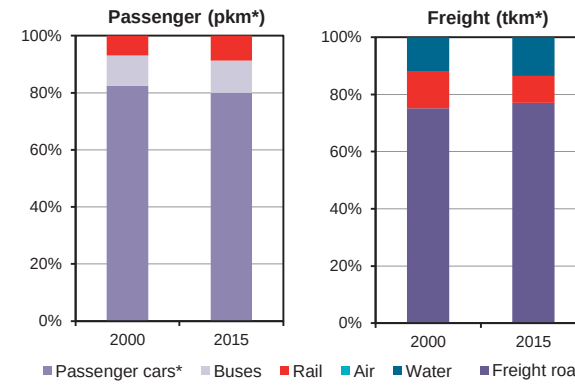
### Transport energy consumption by mode/vehicle type



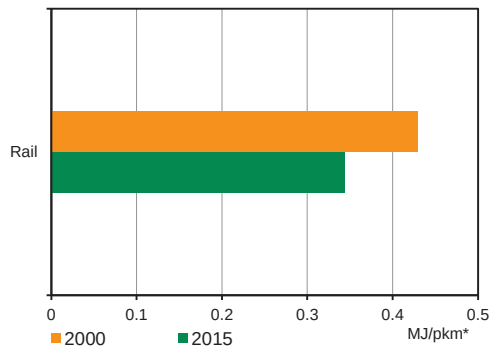

### Transport energy consumption by mode/vehicle type, 2015



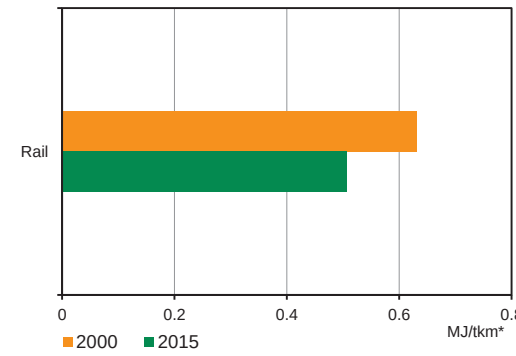

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

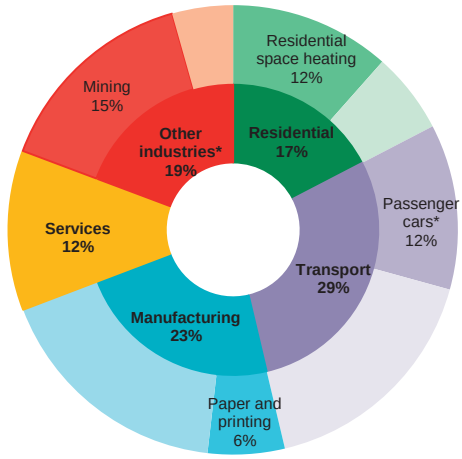



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

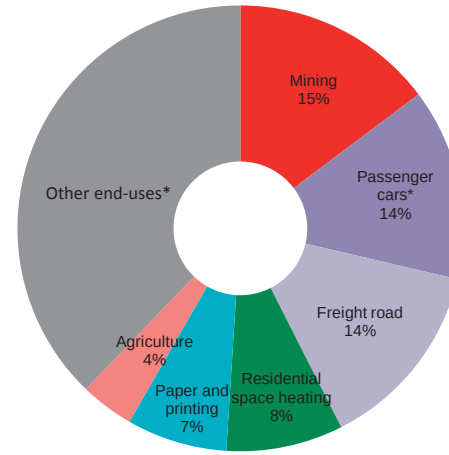
# CANADA

## Cross-sectoral overview

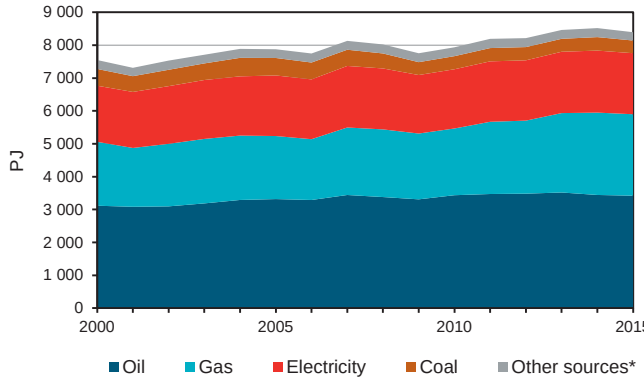
### Largest end-uses by sector, 2015



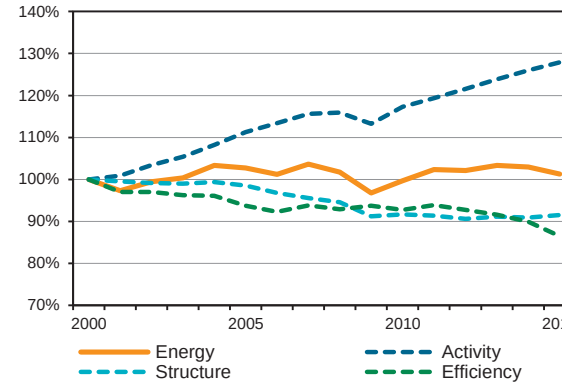

### Top six $CO_2$ emitting end-uses, 2015**



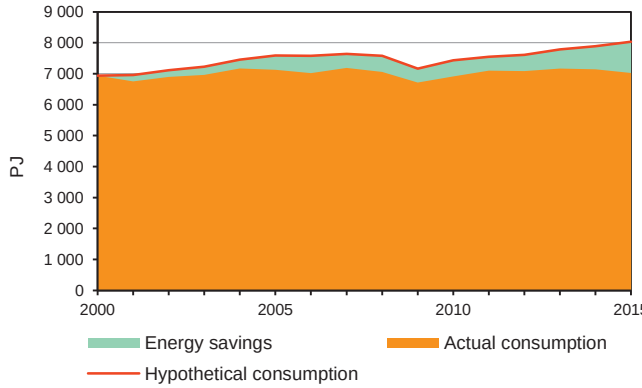

### Final energy consumption by source



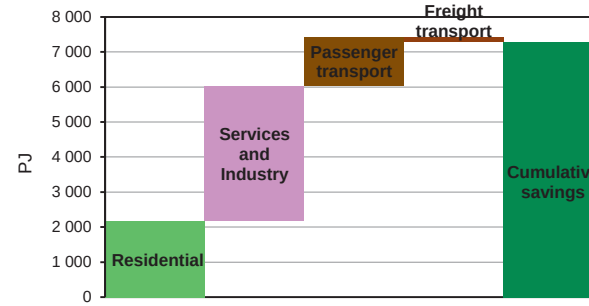

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

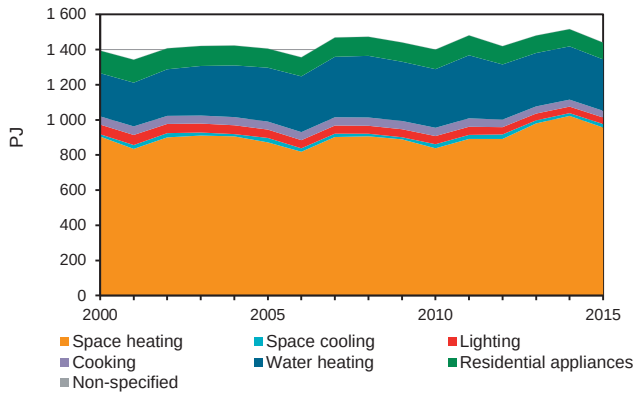
***These figures display results from the IEA decomposition analysis and cover approximately 90% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# CANADA

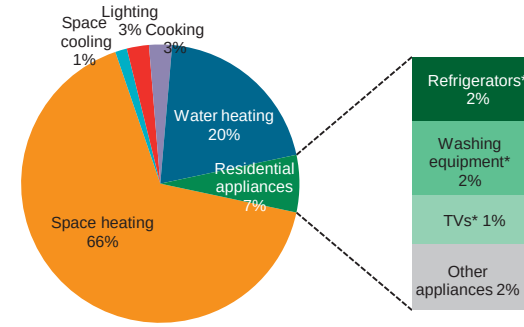
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 1 394 | 61 | 31 | 45 | 129 | 2.6 |
| **2015** | 1 440 | 47 | 36 | 40 | 143 | 2.5 |

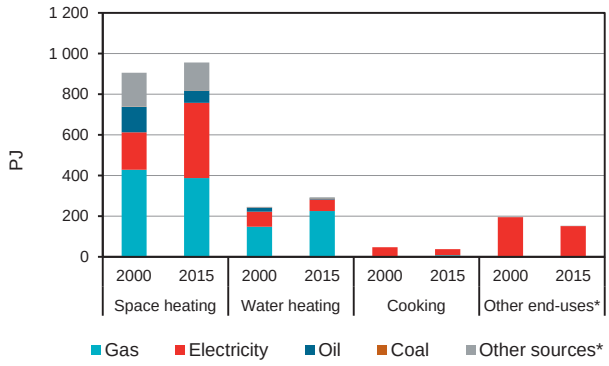
### Residential energy consumption by end-use



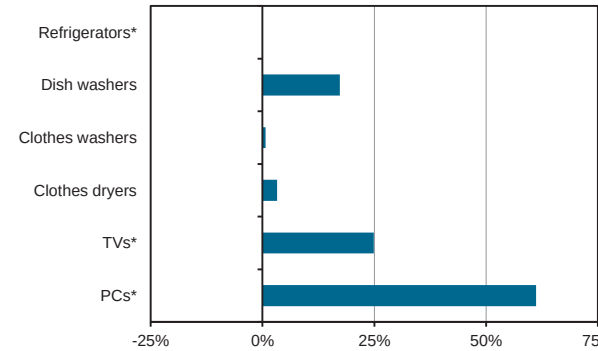

### Residential energy consumption by end-use, 2015



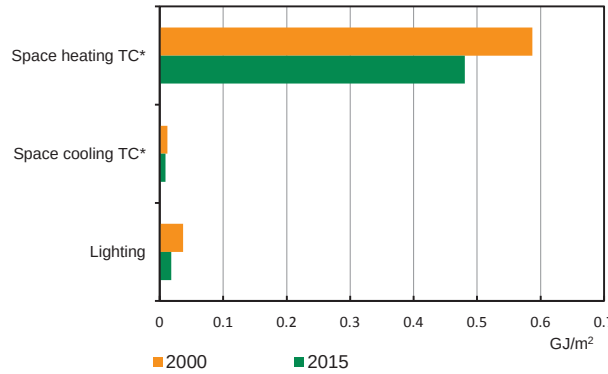

### Residential energy consumption by source



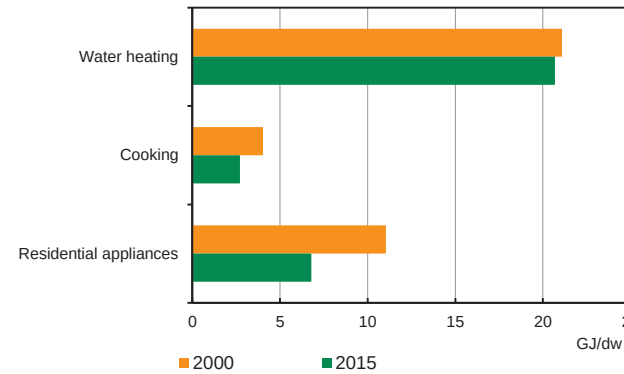

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

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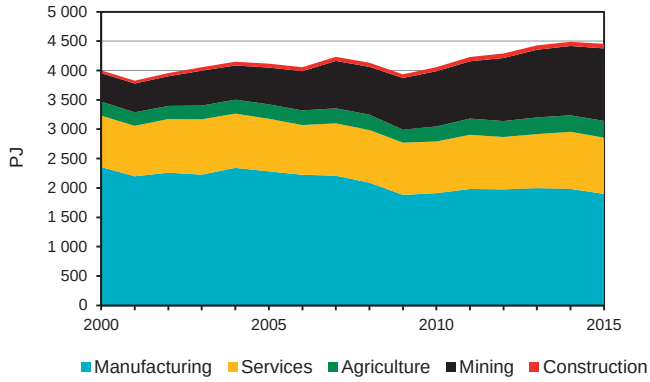
# CANADA

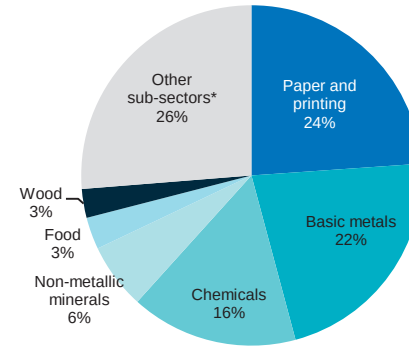
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 2 355 | 869 | 771 | 1 134 | 150 | 595 |
| **2015** | 1 898 | 945 | 1 598 | 1 514 | 133 | 863 |

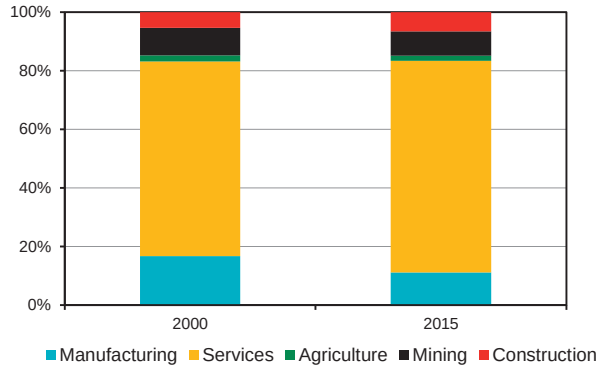
### Industry and services energy consumption



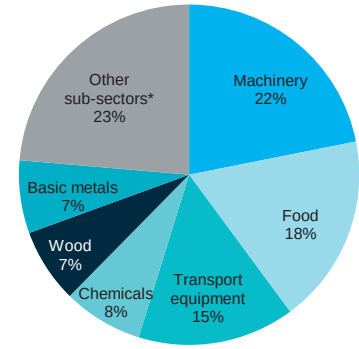

### Manufacturing energy consumption by sub-sector, 2015



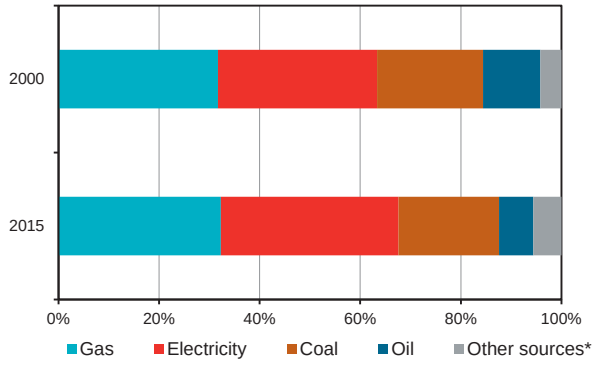

### Value added** by sector



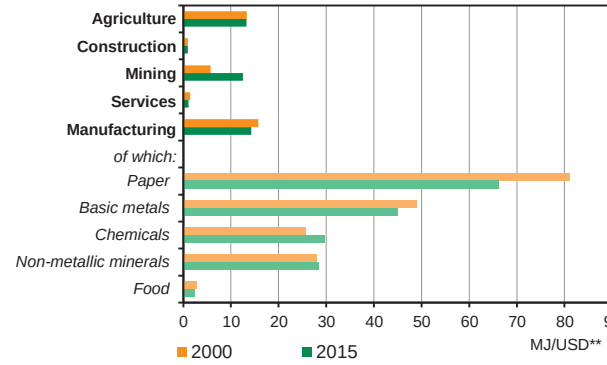

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



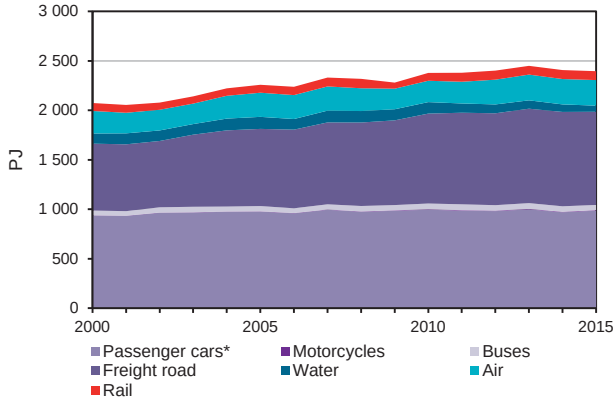

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# CANADA

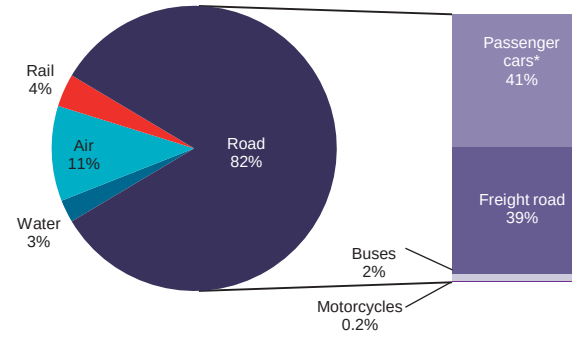
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 1 211 | 864 | 610 | 775 | 1.6 | 3.1 |
| **2015** | 1 300 | 1 097 | 762 | 972 | 1.6 | 2.7 |

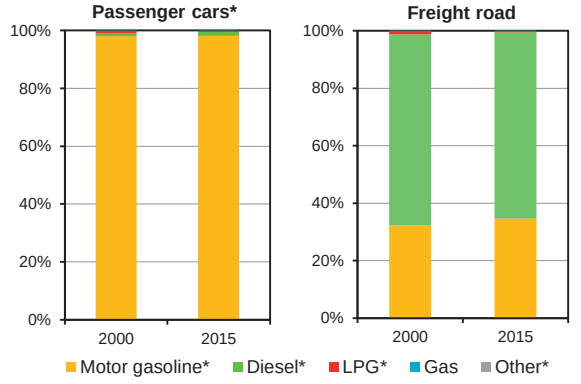
### Transport energy consumption by mode/vehicle type



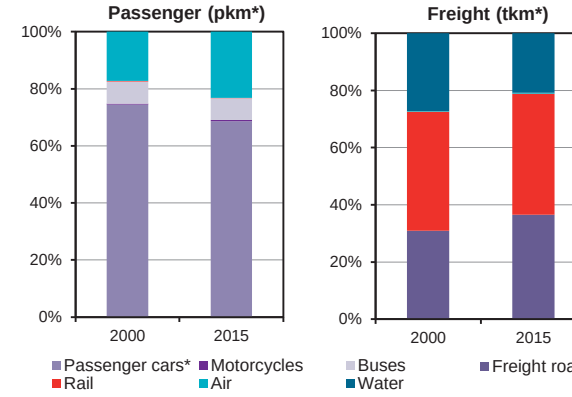

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

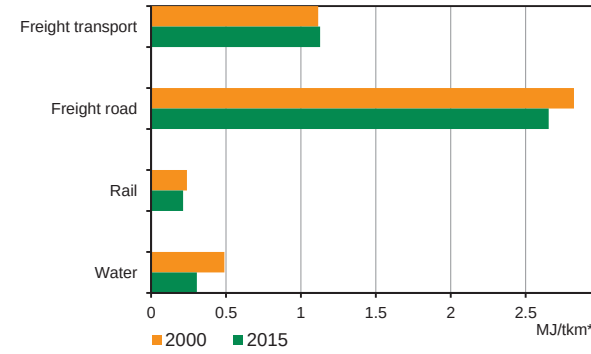



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

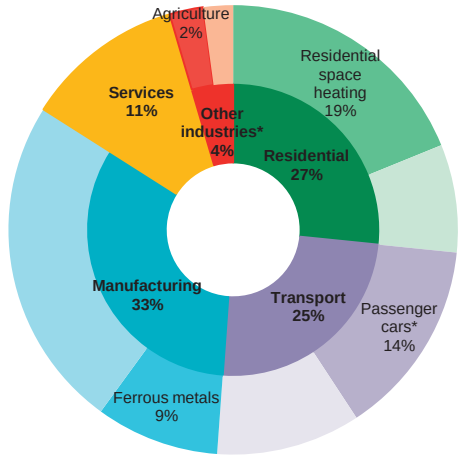



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

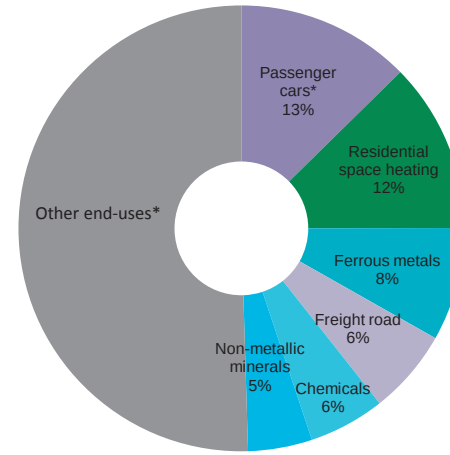
# CZECH REPUBLIC

## Cross-sectoral overview

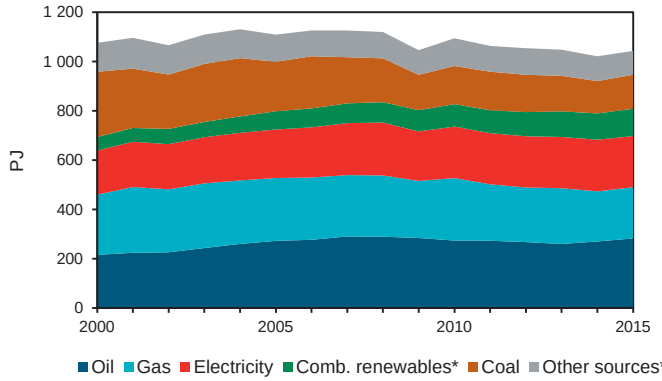
### Largest end-uses by sector, 2015



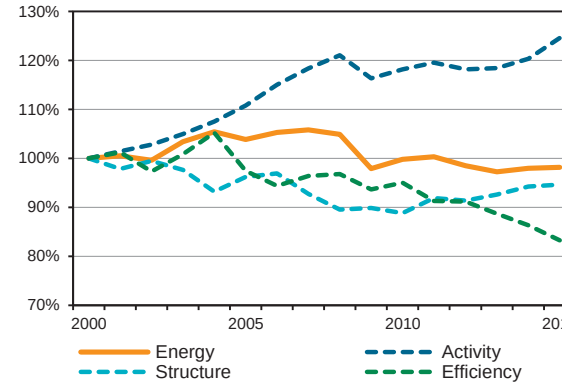

### Top six $CO_2$ emitting end-uses, 2015**



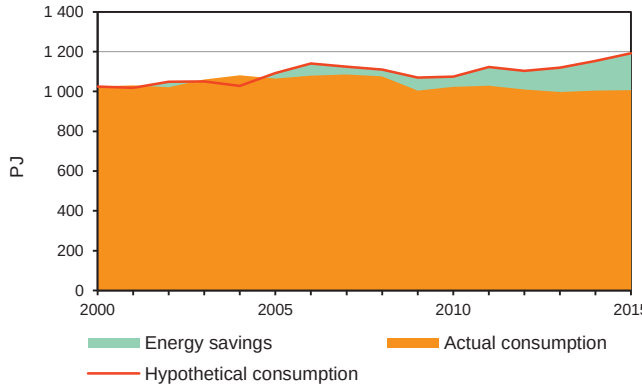

### Final energy consumption by source



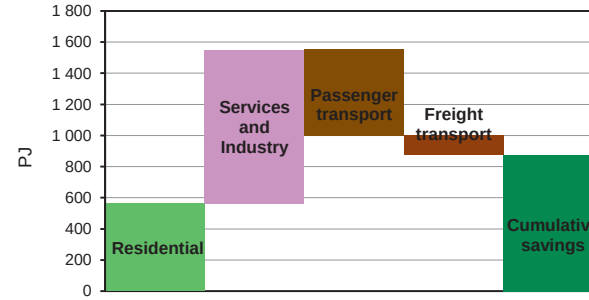

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

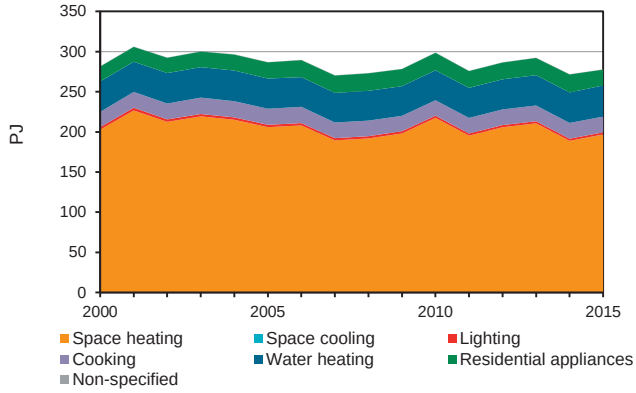
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# CZECH REPUBLIC

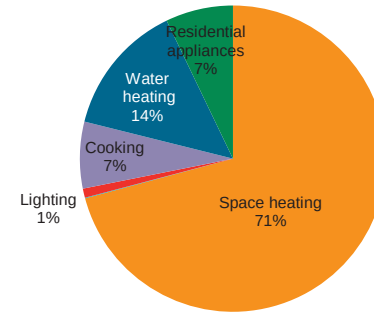
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 282 | 59 | 10 | 27 | 73 | 2.7 |
| **2015** | 278 | 47 | 11 | 26 | 77 | 2.5 |

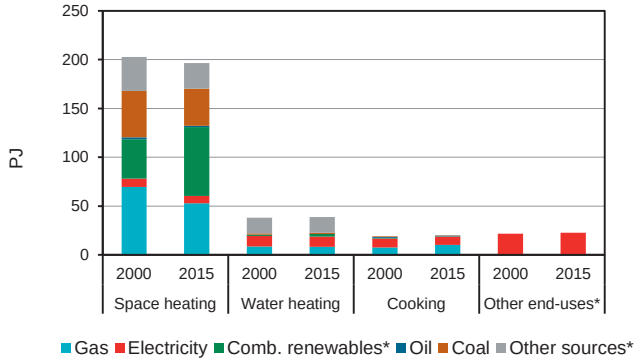
### Residential energy consumption by end-use



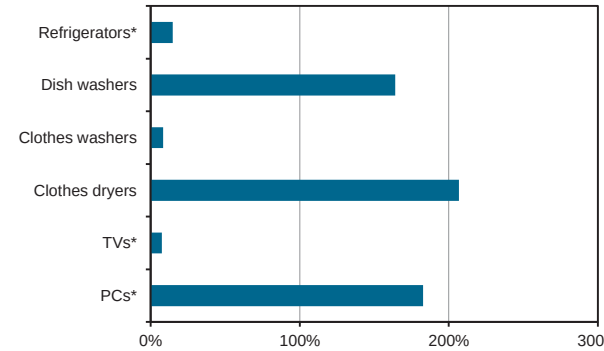

### Residential energy consumption by end-use, 2015



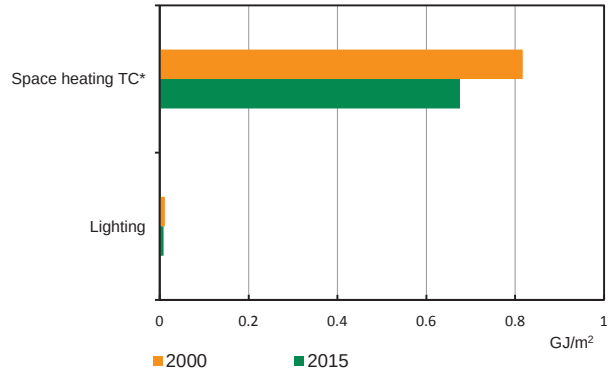

### Residential energy consumption by source



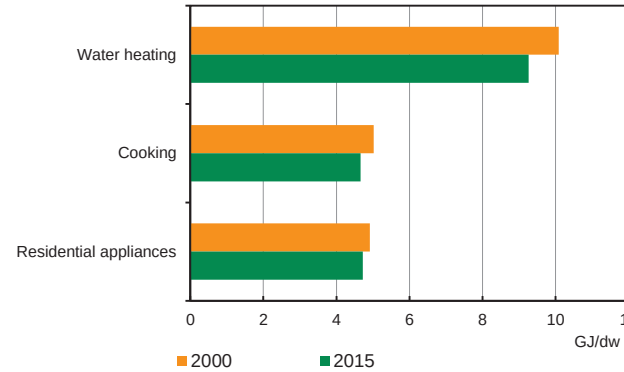

### Appliances per dwelling, 2004-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



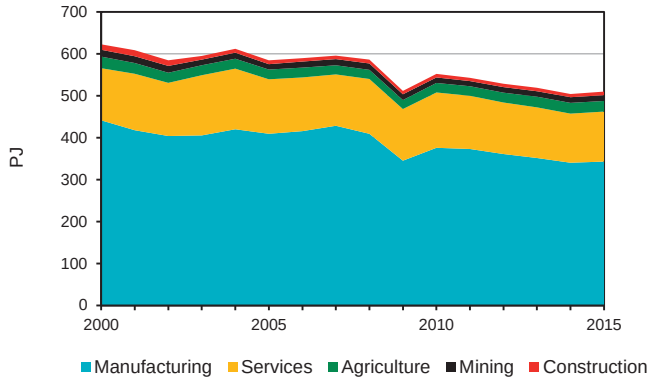

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# CZECH REPUBLIC

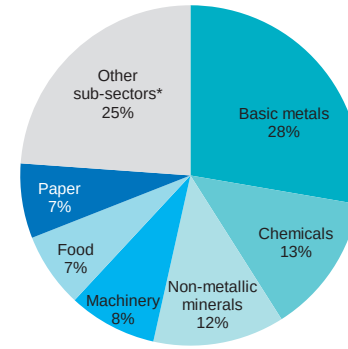
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 441 | 124 | 57 | 207 | 30 | 153 |
| **2015** | 343 | 119 | 48 | 307 | 67 | 205 |

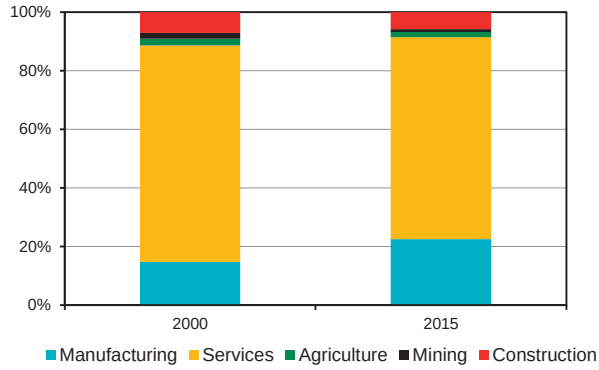
### Industry and services energy consumption



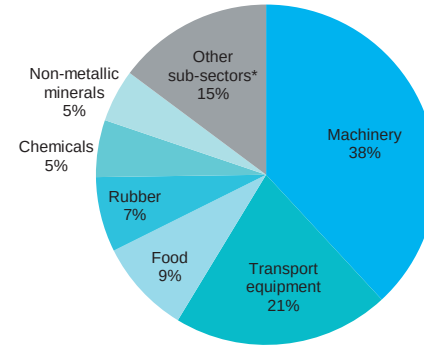

### Manufacturing energy consumption by sub-sector, 2015



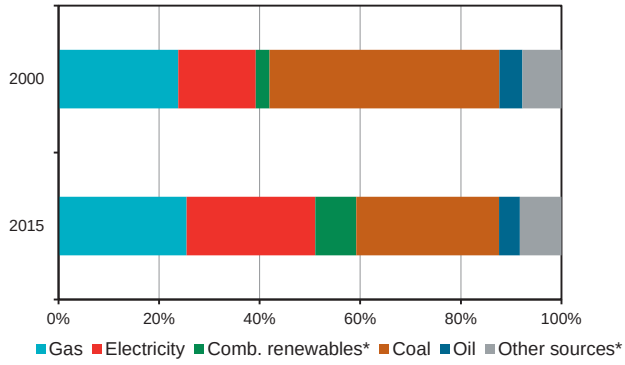

### Value added** by sector



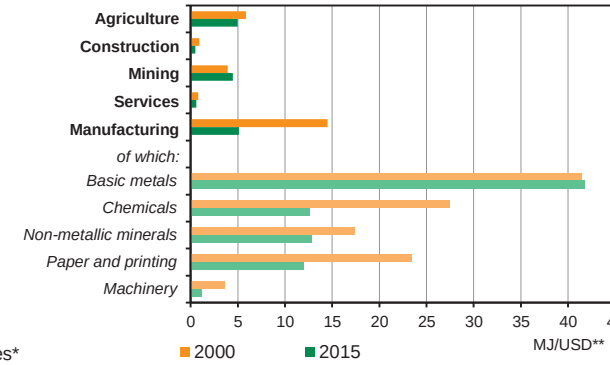

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



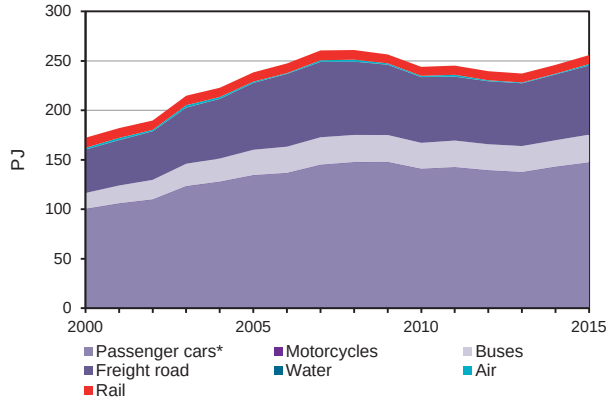

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# CZECH REPUBLIC

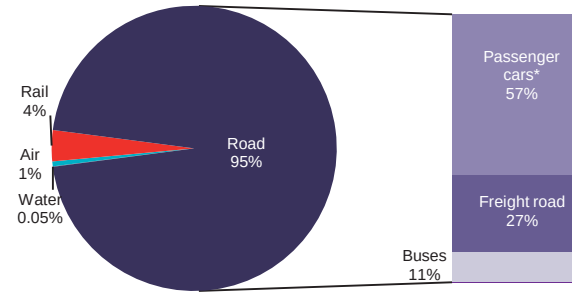
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 122 | 50 | 101 | 57 | 2.0 | 4.8 |
| **2015** | 181 | 75 | 114 | 75 | NA | NA |

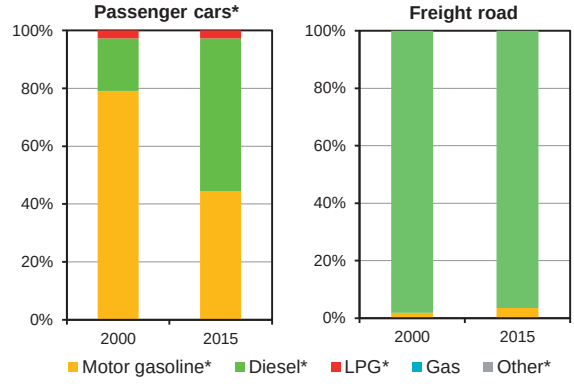
### Transport energy consumption by mode/vehicle type



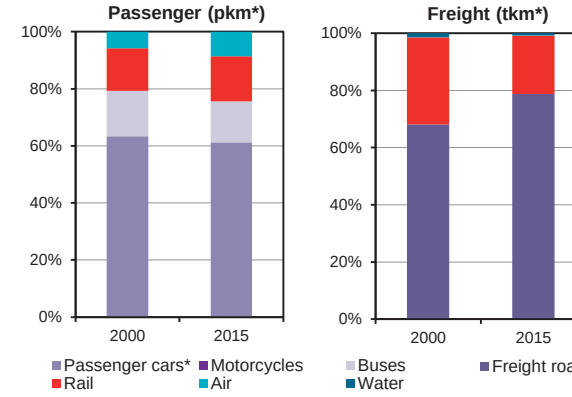

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

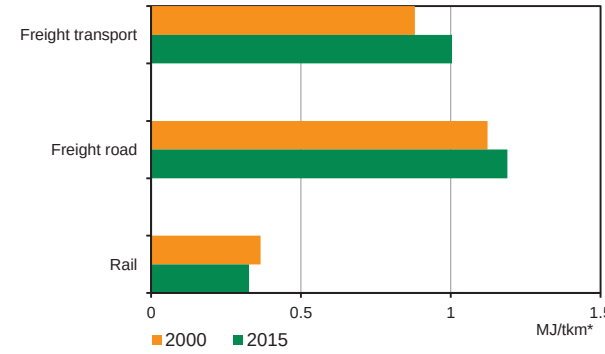



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

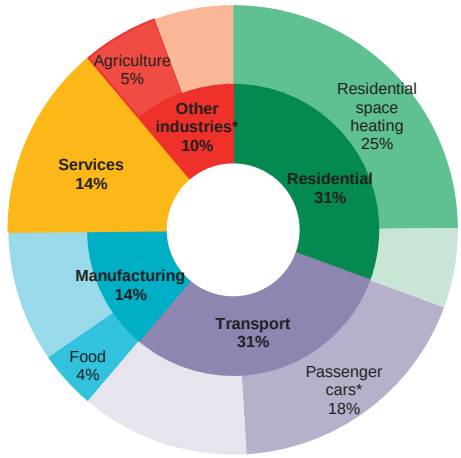



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

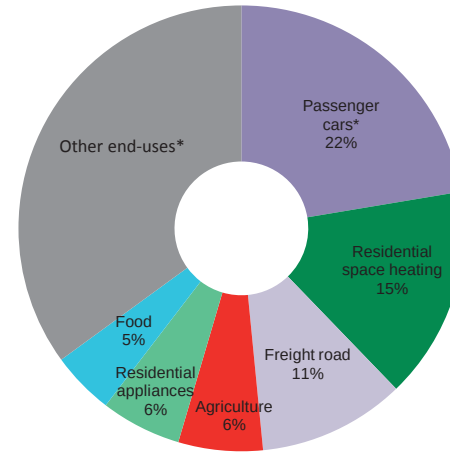
# DENMARK

## Cross-sectoral overview

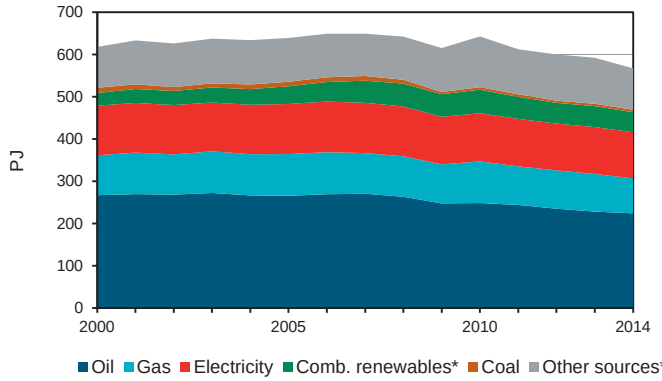
### Largest end-uses by sector, 2014



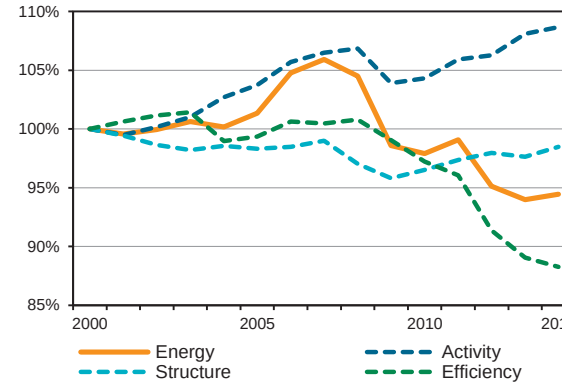

### Top six $CO_2$ emitting end-uses, 2014**



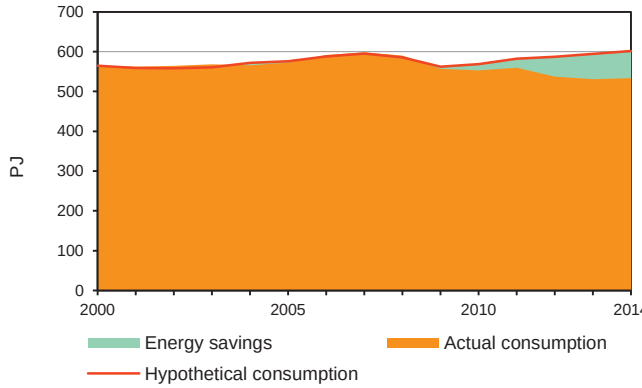

### Final energy consumption by source



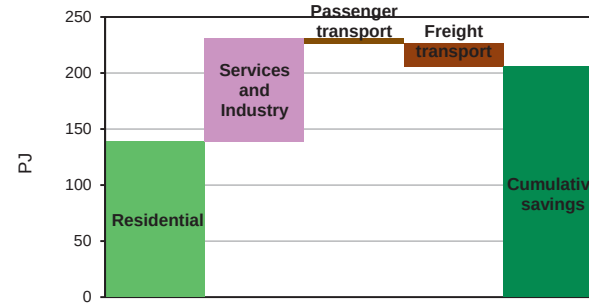

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***

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**Includes emissions reallocated from electricity and heat generation.

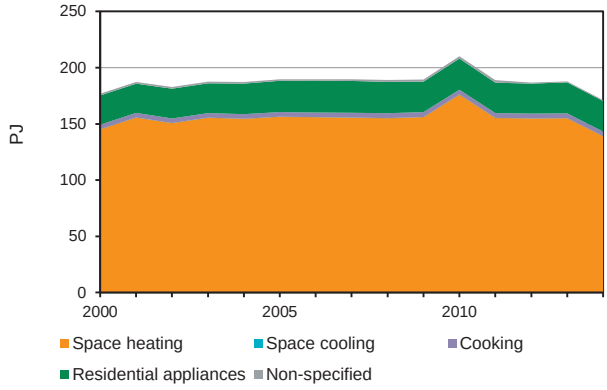
***These figures display results from the IEA decomposition analysis and cover approximately 92% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# DENMARK

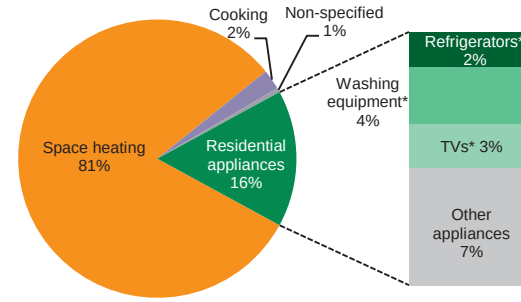
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 177 | 40 | 5 | 33 | 109 | 2.1 |
| **2014** | 171 | 24 | 6 | 30 | 118 | 2.1 |

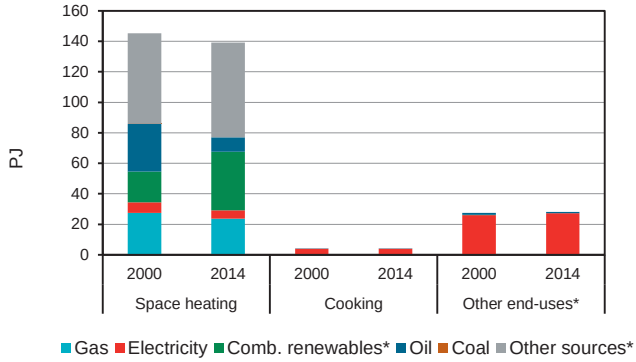
### Residential energy consumption by end-use



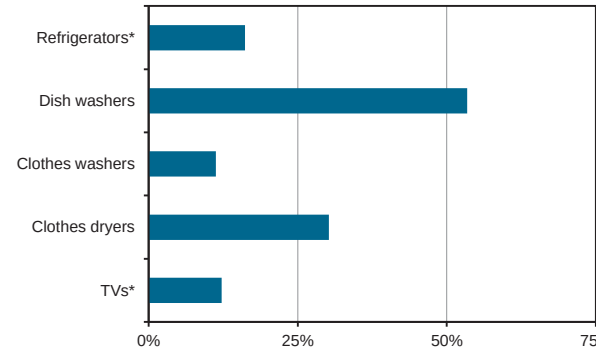

### Residential energy consumption by end-use, 2014



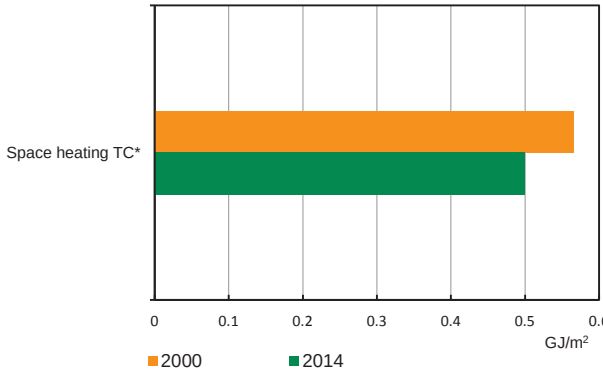

### Residential energy consumption by source



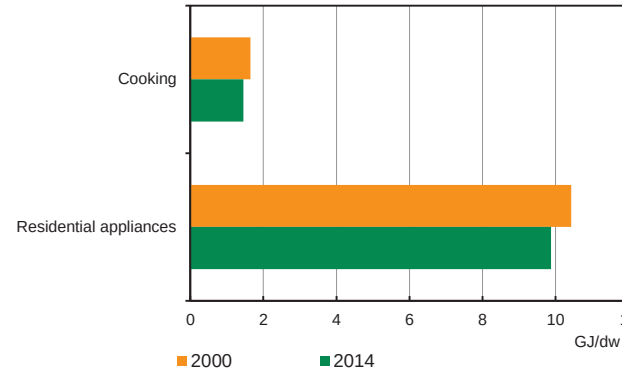

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



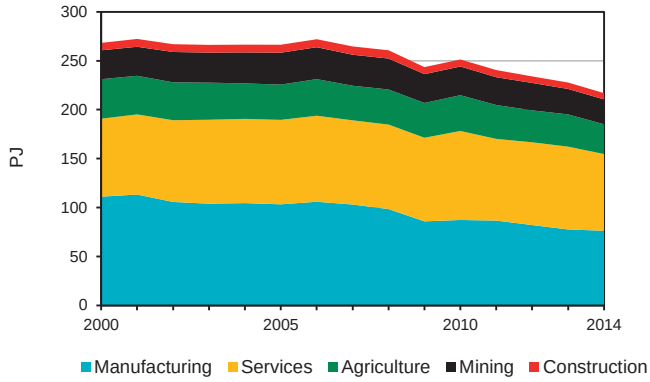

*Share of fossil fuels includes only the direct use of oil, gas and coal; space heating includes water heating; refrigerators includes freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# DENMARK

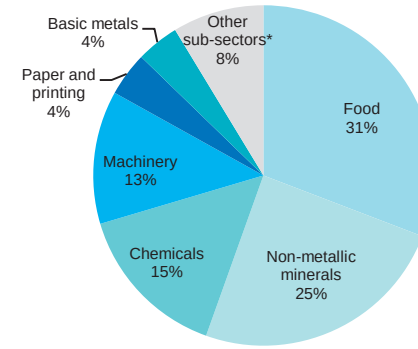
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 111 | 80 | 77 | 217 | 27 | 133 |
| **2014** | 76 | 78 | 62 | 237 | 29 | 161 |

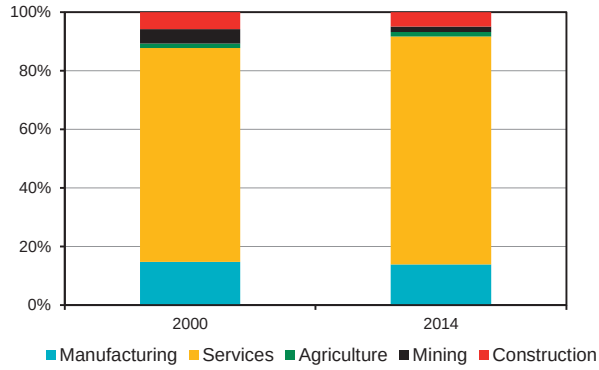
### Industry and services energy consumption



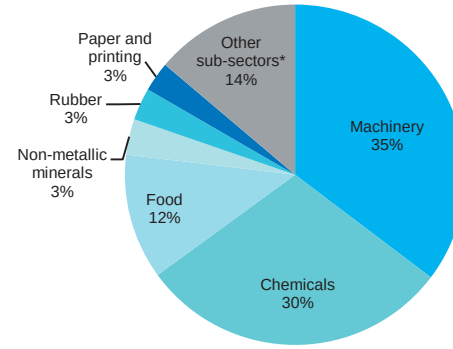

### Manufacturing energy consumption by sub-sector, 2014



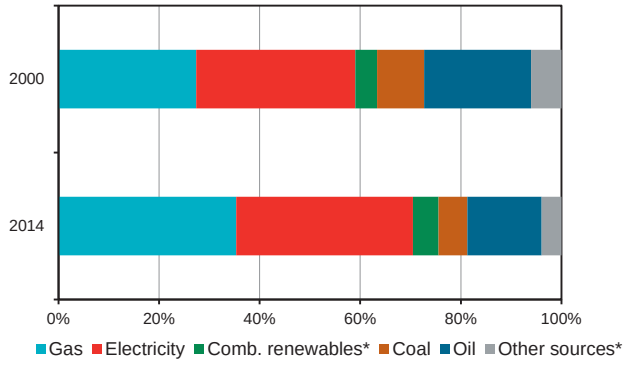

### Value added** by sector



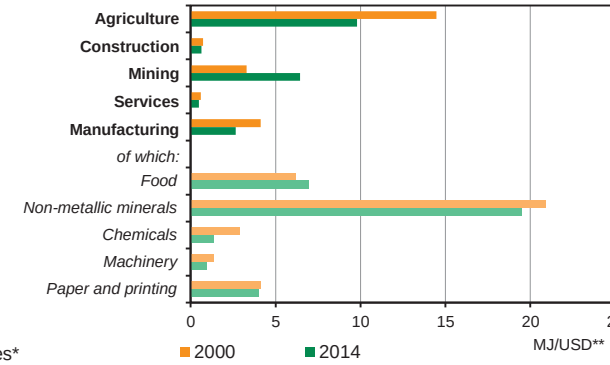

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



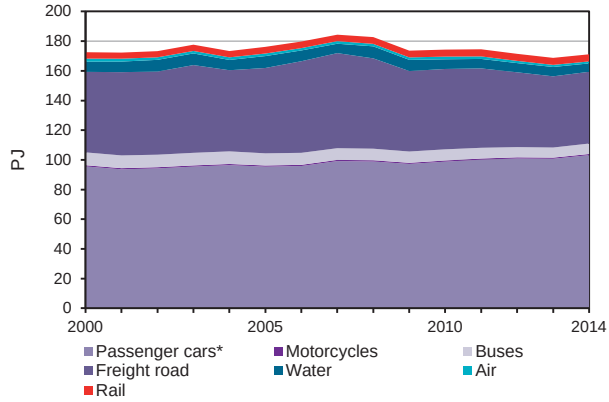

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# DENMARK

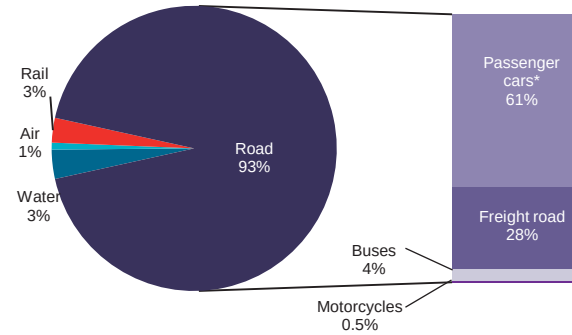
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 110 | 63 | 64 | 26 | 1.5 | 2.8 |
| **2014** | 116 | 56 | 68 | 25 | 1.4 | 2.0 |

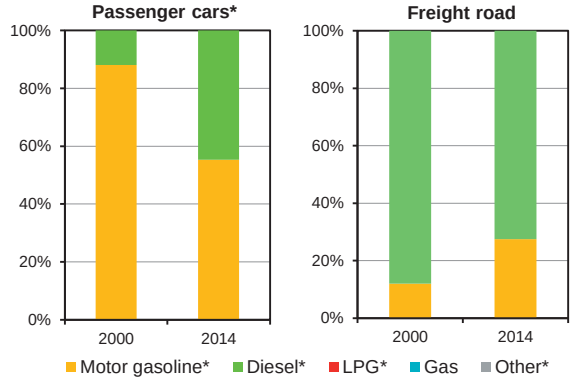
### Transport energy consumption by mode/vehicle type



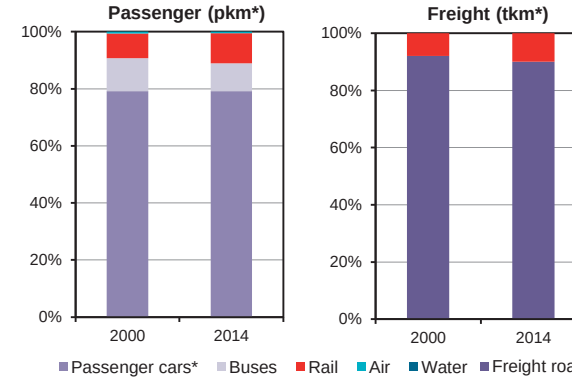

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

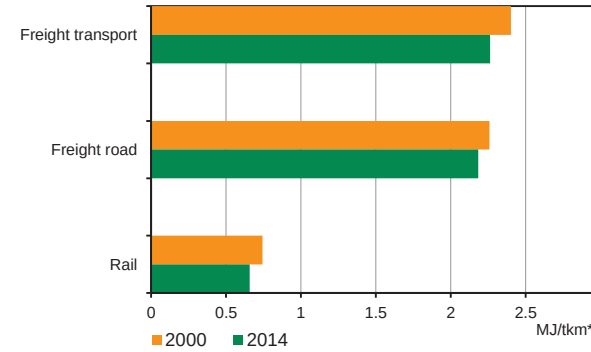



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

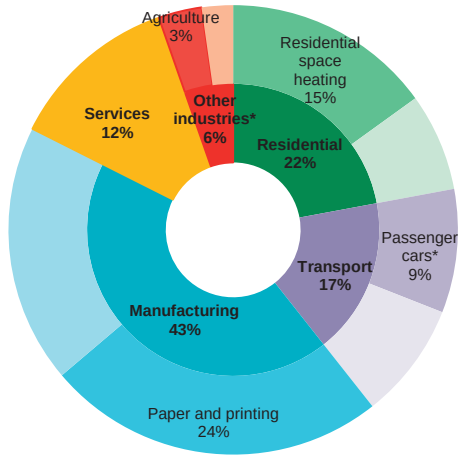



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

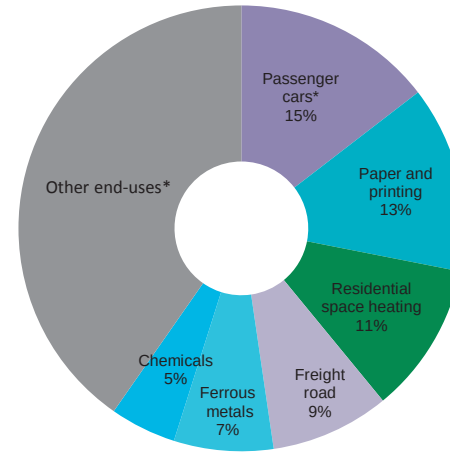
# FINLAND

## Cross-sectoral overview

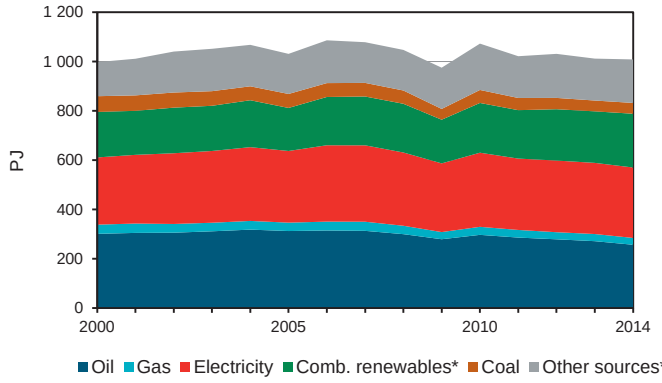
### Largest end-uses by sector, 2014



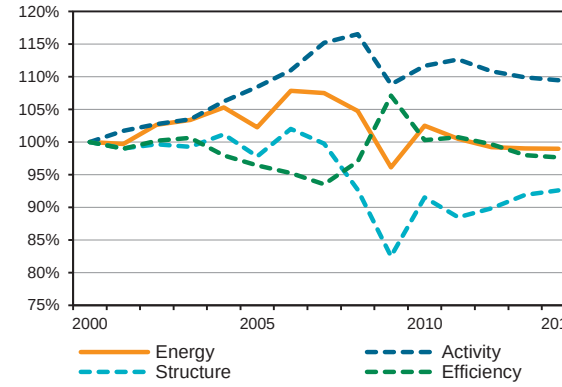

### Top six $CO_2$ emitting end-uses, 2014**



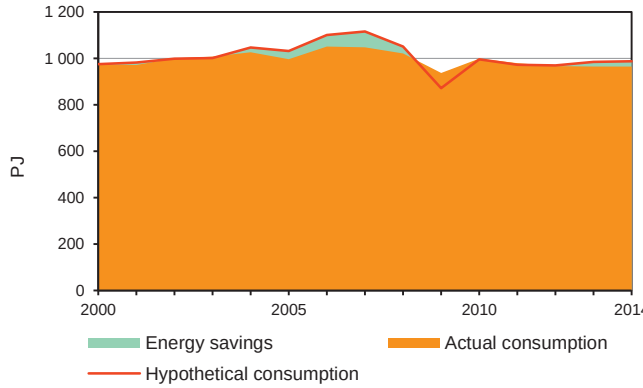

### Final energy consumption by source



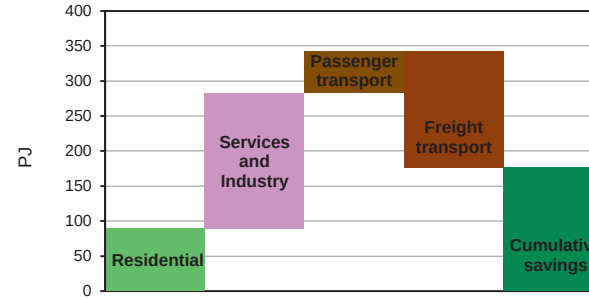

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

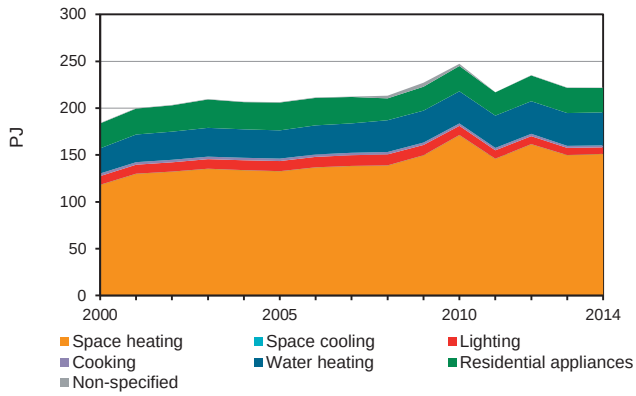
***These figures display results from the IEA decomposition analysis and cover approximately 97% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# FINLAND

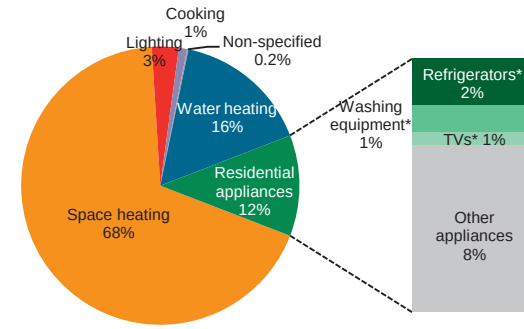
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 184 | 22 | 5 | 36 | 93 | 2.3 |
| **2014** | 222 | 9 | 5 | 41 | 101 | 2.1 |

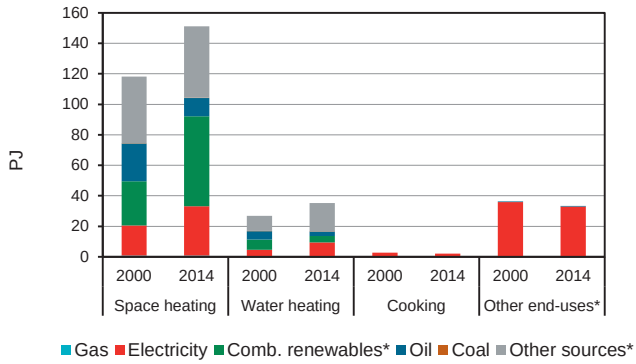
### Residential energy consumption by end-use



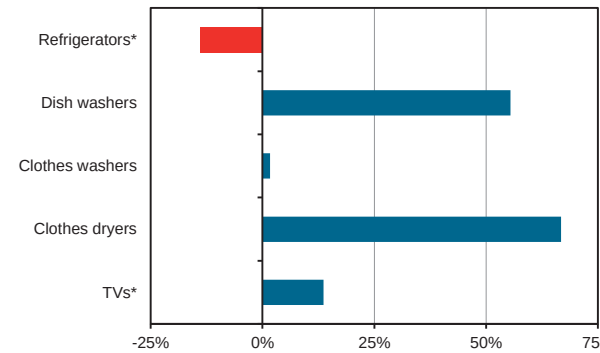

### Residential energy consumption by end-use, 2014



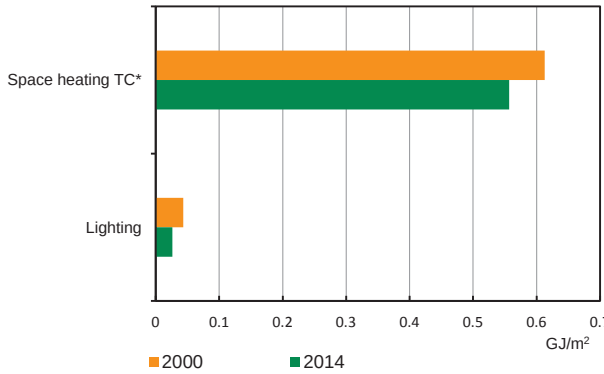

### Residential energy consumption by source



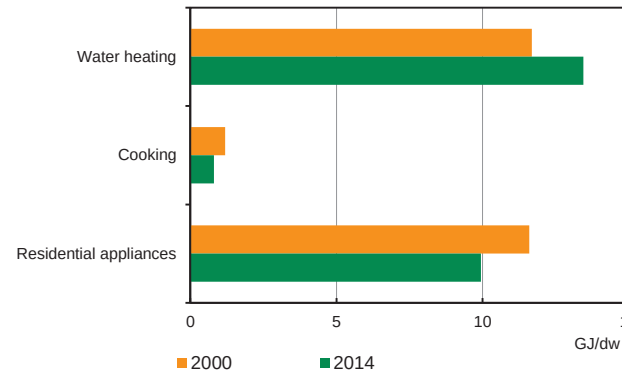

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



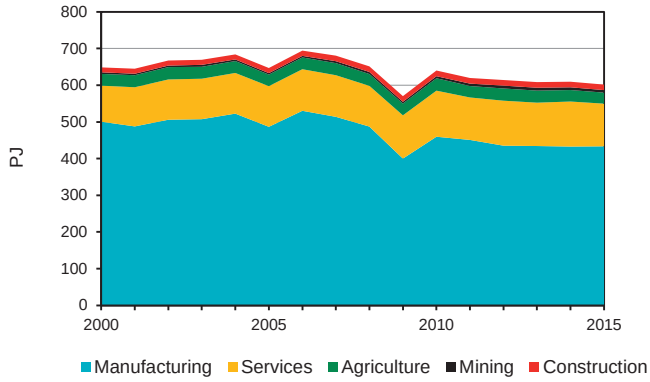

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# FINLAND

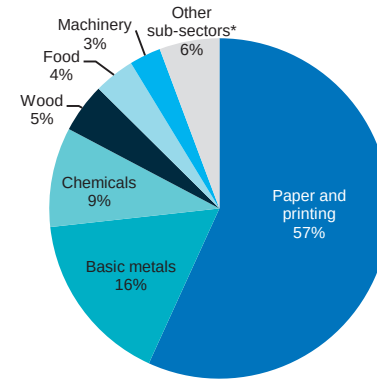
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 501 | 98 | 50 | 174 | 28 | 106 |
| **2015** | 433 | 116 | 52 | 205 | 28 | 125 |

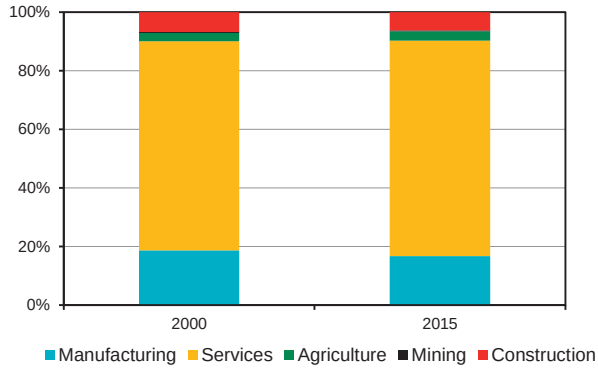
### Industry and services energy consumption



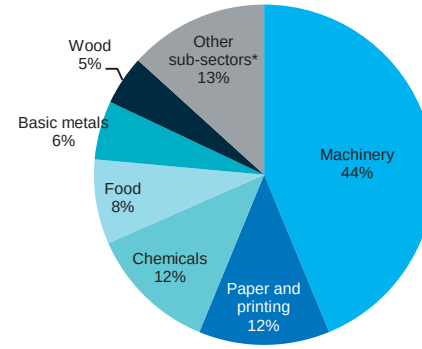

### Manufacturing energy consumption by sub-sector, 2015



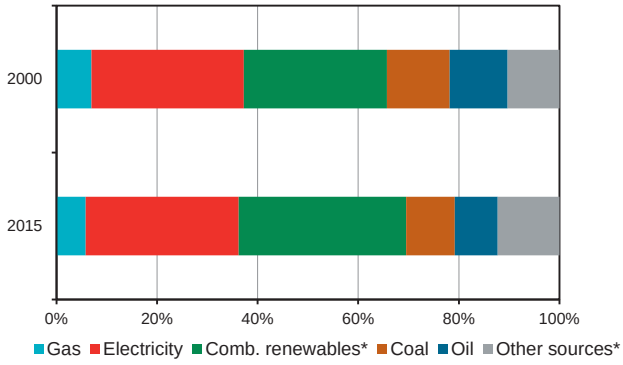

### Value added** by sector



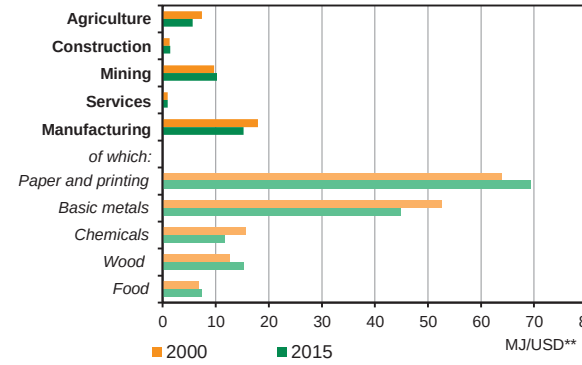

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



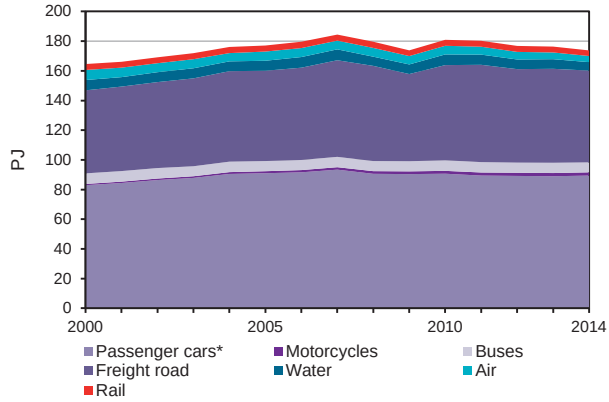

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# FINLAND

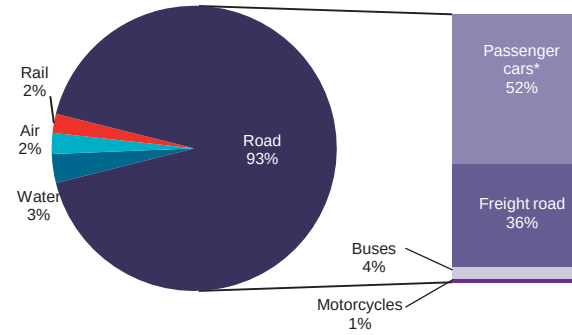
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 99 | 66 | 69 | 39 | 1.4 | 4.6 |
| **2014** | 103 | 70 | 77 | 30 | 1.4 | 2.8 |

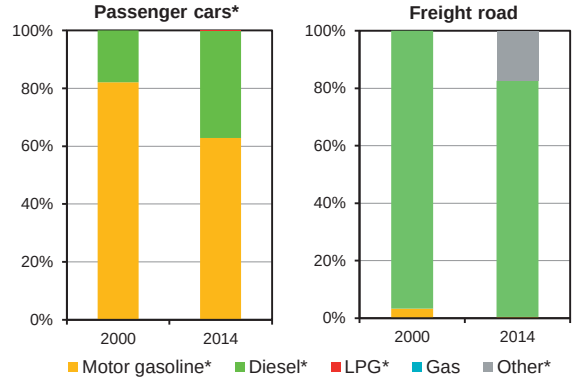
### Transport energy consumption by mode/vehicle type



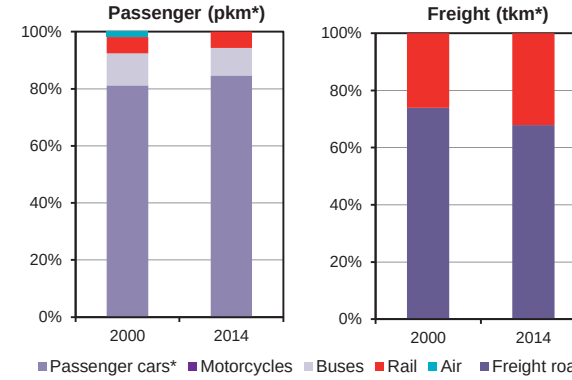

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

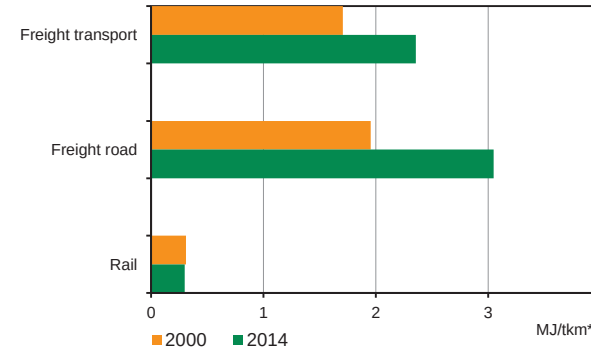



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

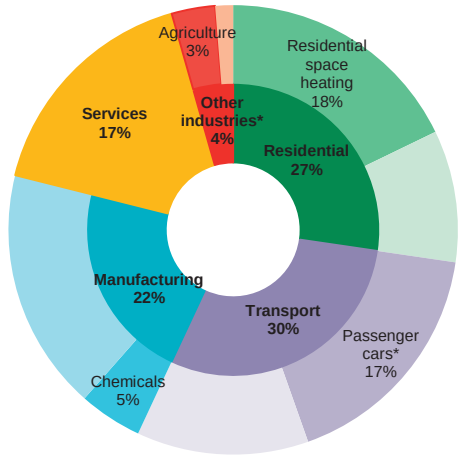



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

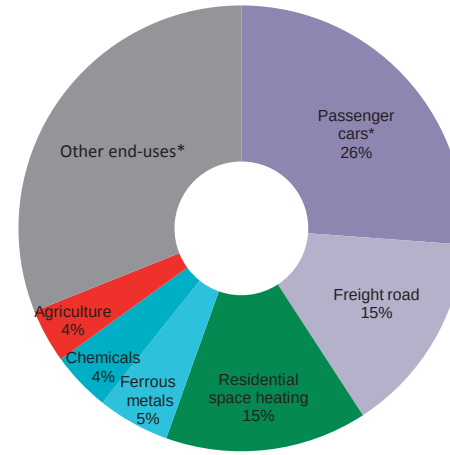
# FRANCE

## Cross-sectoral overview

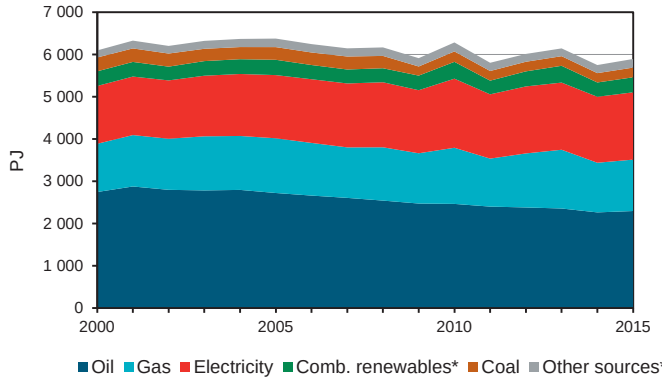
### Largest end-uses by sector, 2015



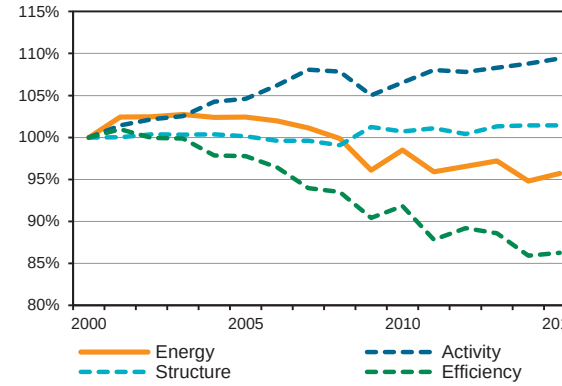

### Top six $CO_2$ emitting end-uses, 2015**



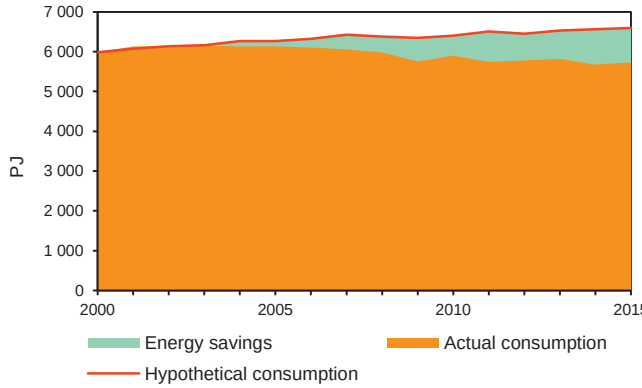

### Final energy consumption by source



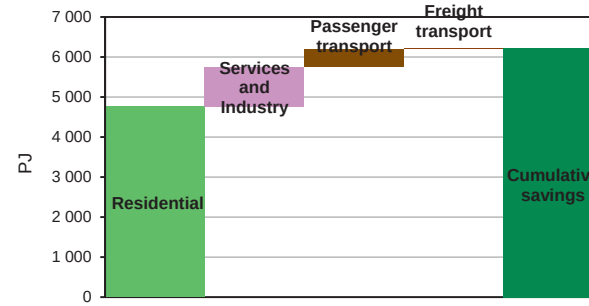

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***

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**Includes emissions reallocated from electricity and heat generation.

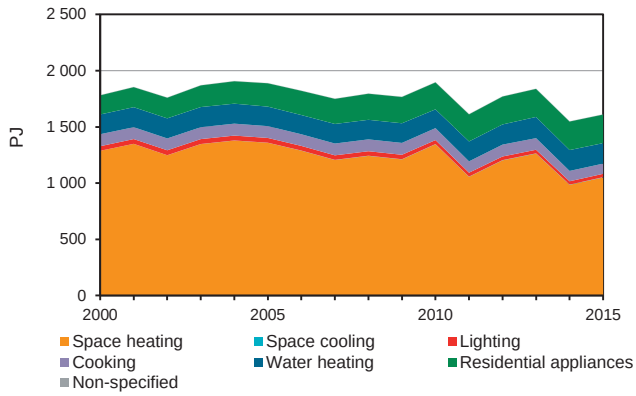
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# FRANCE

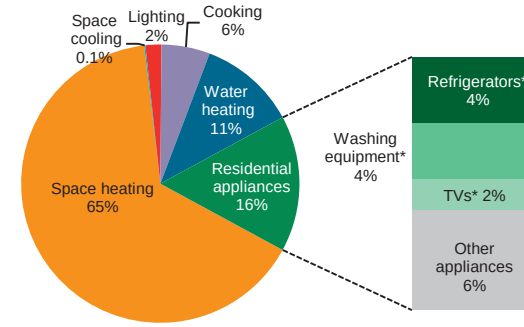
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 1 781 | 64 | 59 | 30 | 89 | 2.4 |
| **2015** | 1 610 | 58 | 64 | 25 | 92 | 2.3 |

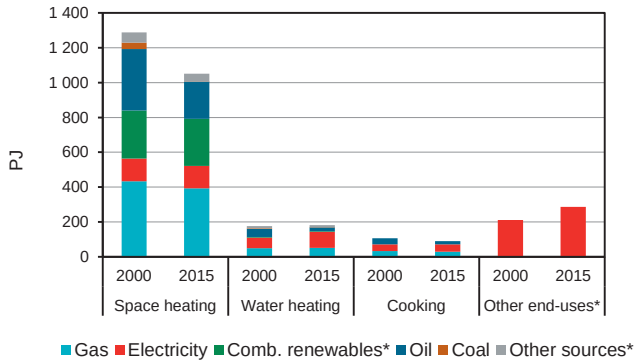
### Residential energy consumption by end-use



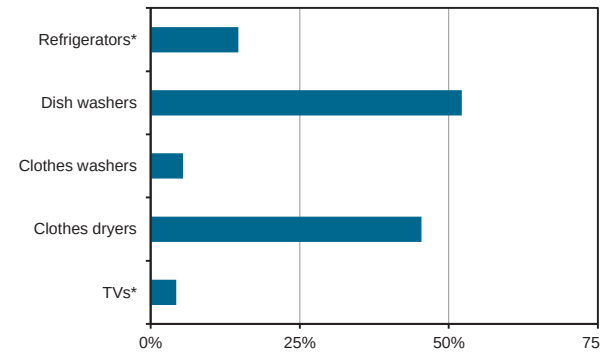

### Residential energy consumption by end-use, 2015



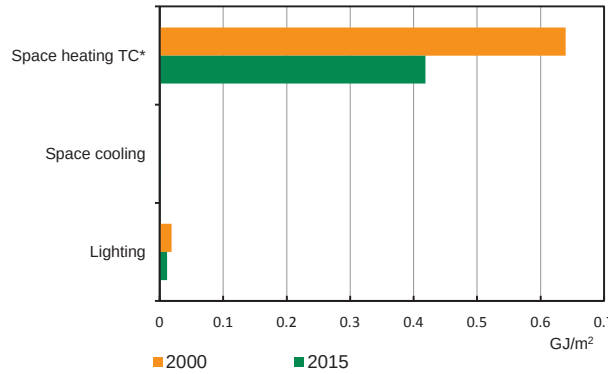

### Residential energy consumption by source



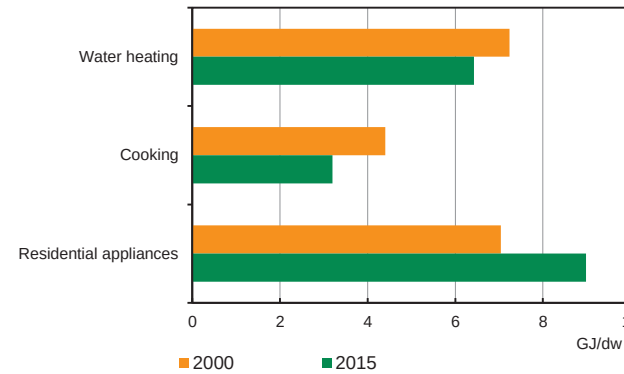

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



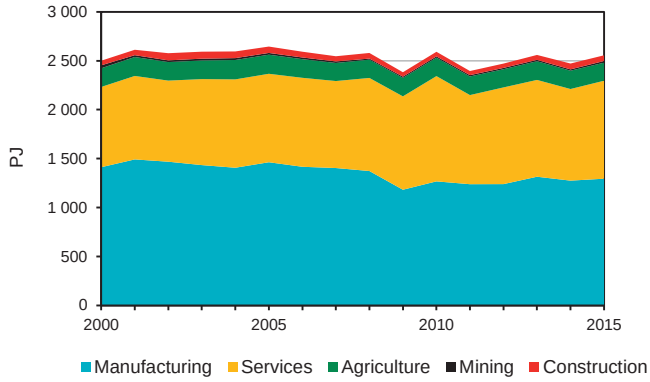

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# FRANCE

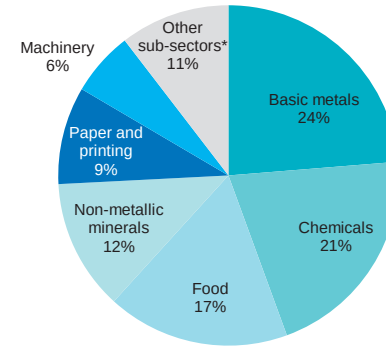
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 412 | 821 | 268 | 2 069 | 198 | 1 449 |
| **2015** | 1 294 | 983 | 260 | 2 447 | 225 | 1 781 |

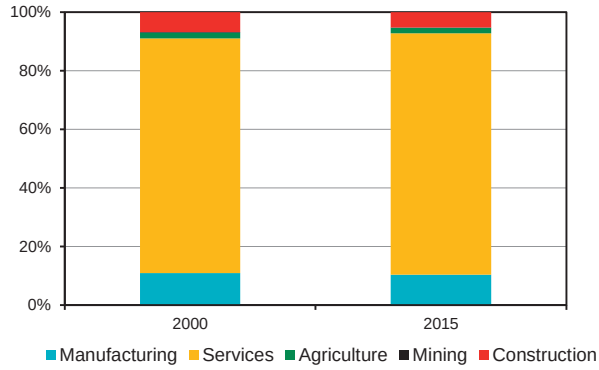
### Industry and services energy consumption



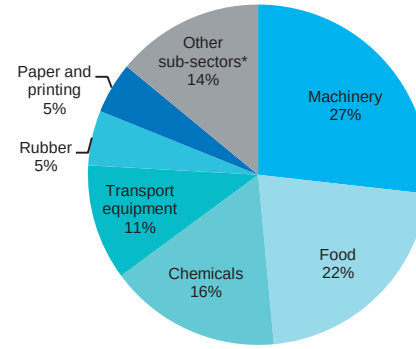

### Manufacturing energy consumption by sub-sector, 2015



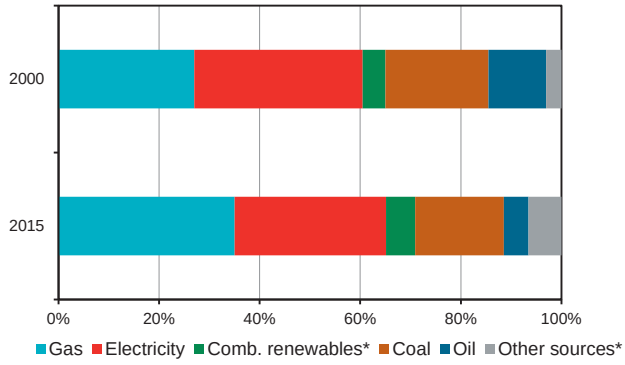

### Value added** by sector



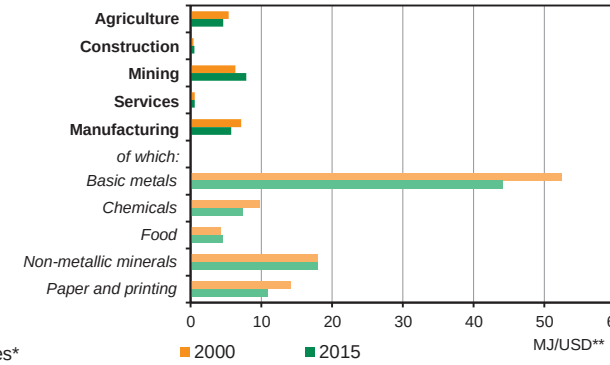

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



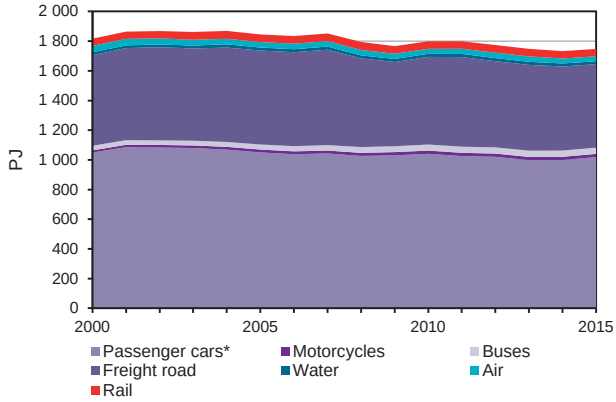

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# FRANCE

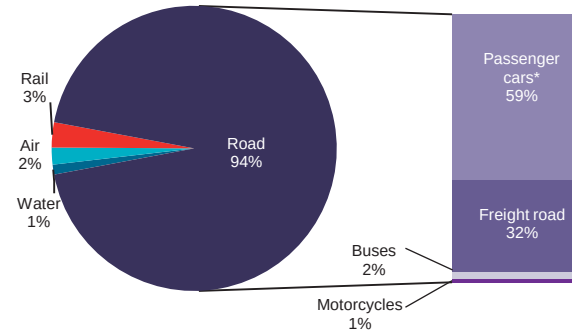
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 1 162 | 655 | 838 | 268 | 1.8 | 2.0 |
| **2015** | 1 150 | 598 | 913 | 214 | 1.8 | 1.5 |

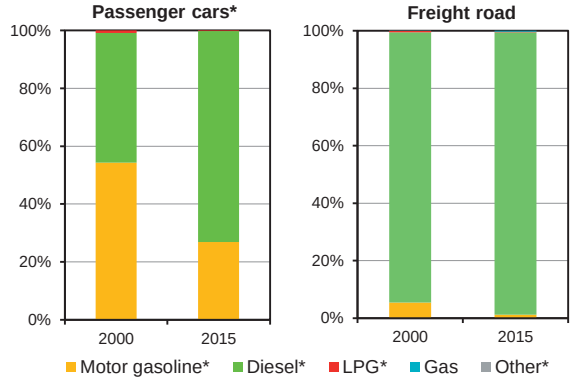
### Transport energy consumption by mode/vehicle type



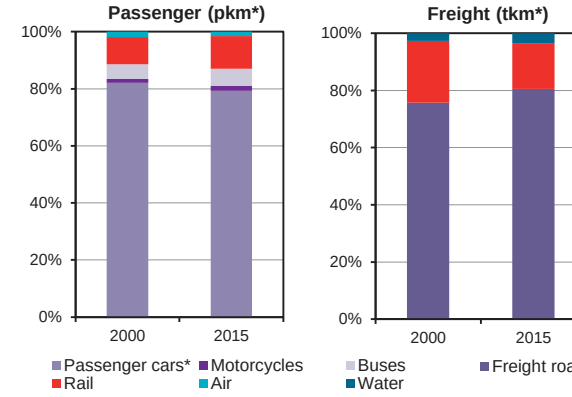

### Transport energy consumption by mode/vehicle type, 2015



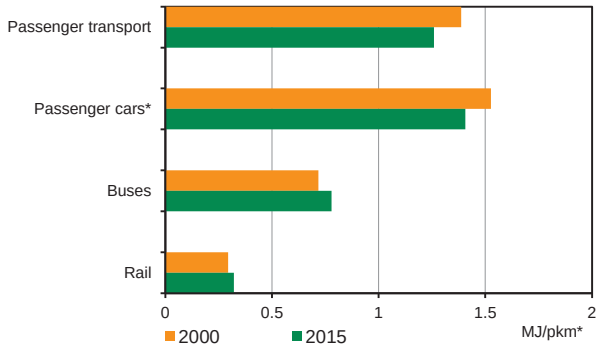

### Energy consumption in road transport by source




### Transport activity by mode/vehicle type




### Energy intensities for passenger transport



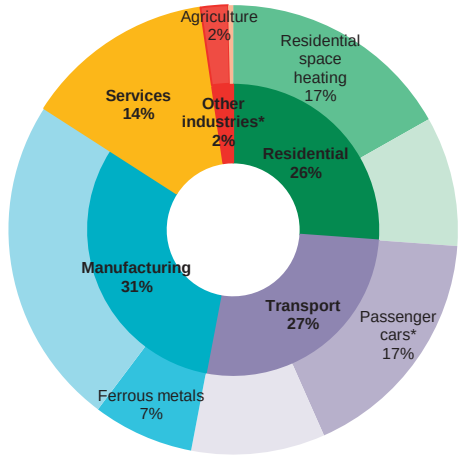

### Energy intensities for freight transport

*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

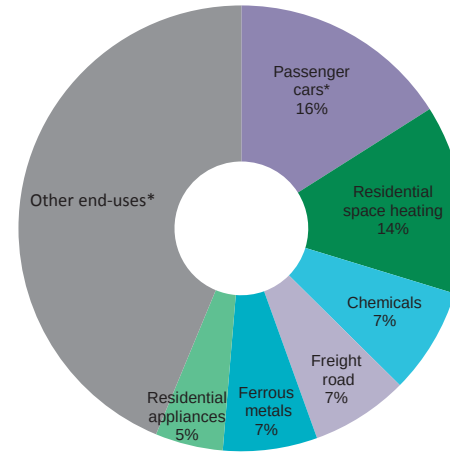
# GERMANY

## Cross-sectoral overview

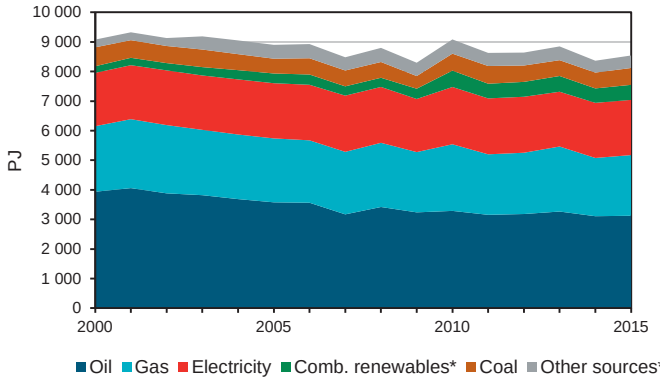
### Largest end-uses by sector, 2015



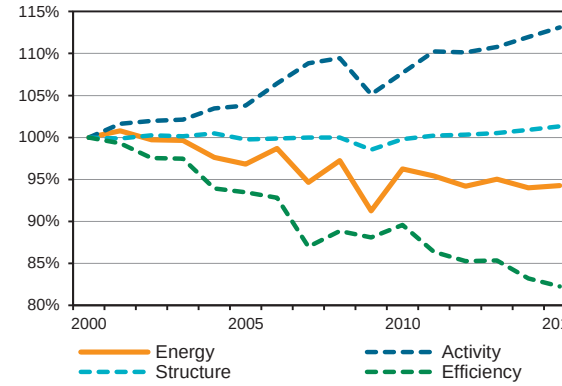

### Top six $CO_2$ emitting end-uses, 2015**



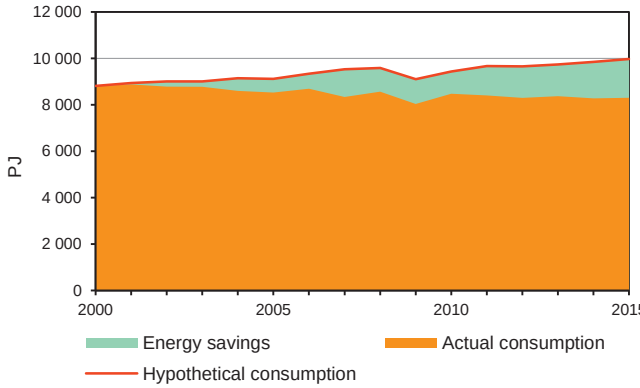

### Final energy consumption by source



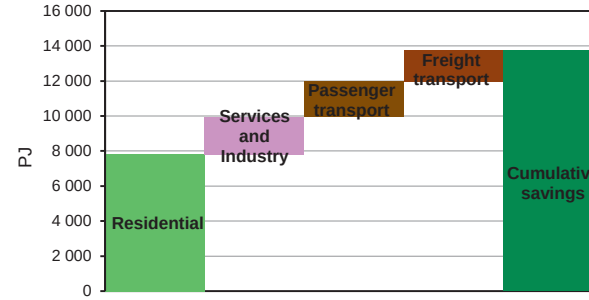

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

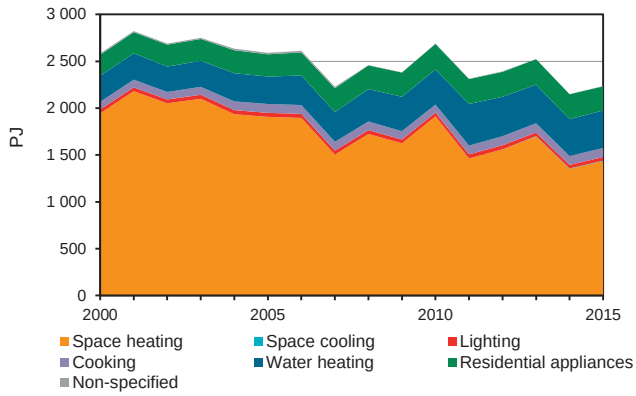
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# GERMANY

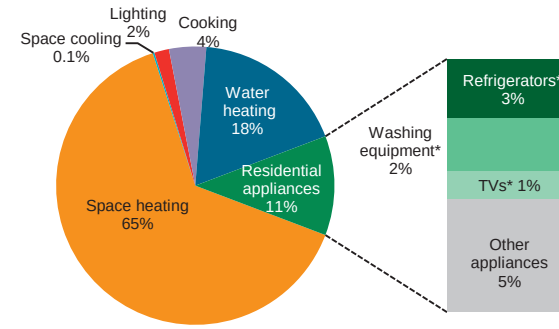
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 2 585 | 82 | 81 | 32 | 85 | 2.3 |
| **2015** | 2 233 | 81 | 82 | 27 | 96 | 2.1 |

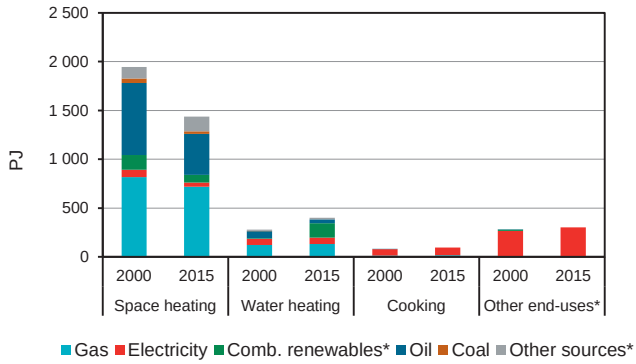
### Residential energy consumption by end-use



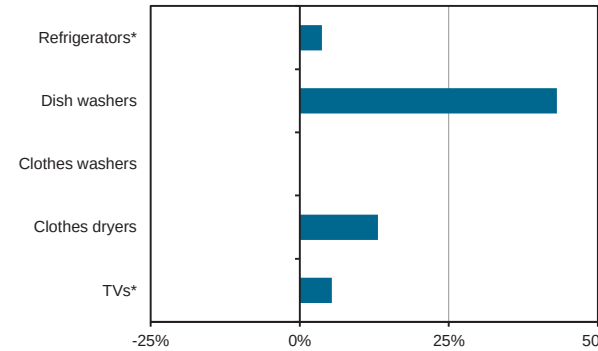

### Residential energy consumption by end-use, 2015



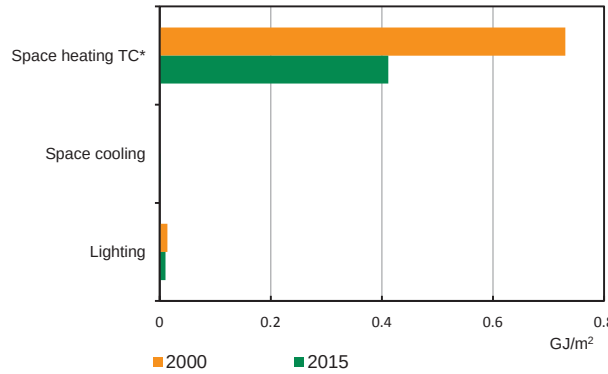

### Residential energy consumption by source



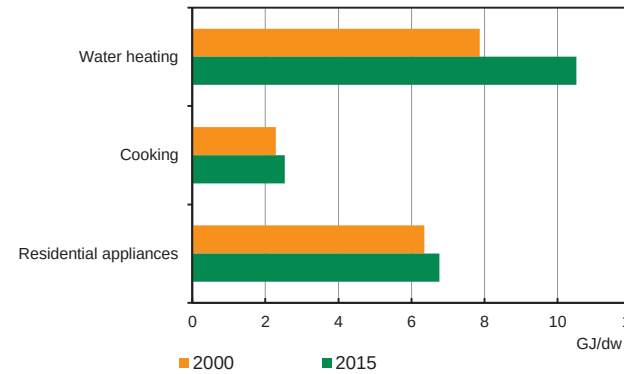

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



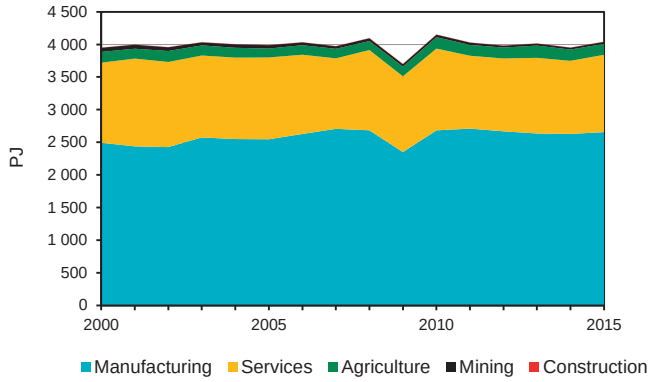

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# GERMANY

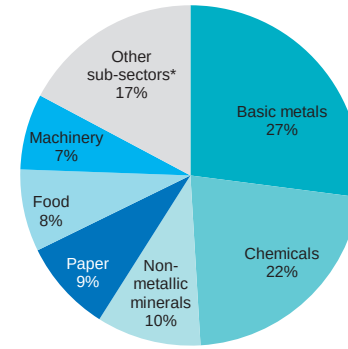
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 2 493 | 1 228 | 230 | 2 963 | 554 | 1 807 |
| **2015** | 2 656 | 1 160 | 199 | 3 507 | 720 | 2 158 |

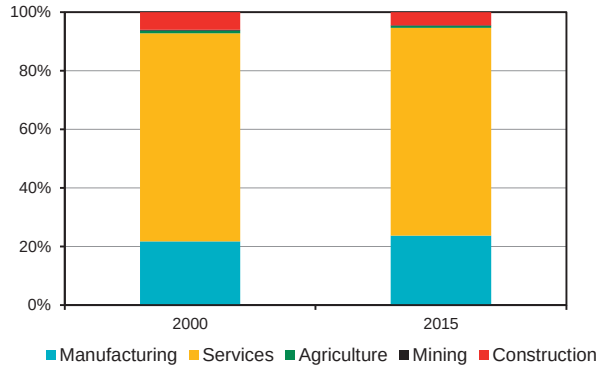
### Industry and services energy consumption



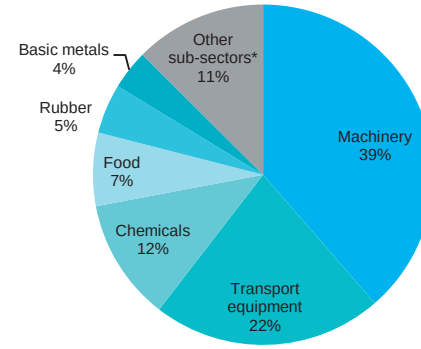

### Manufacturing energy consumption by sub-sector, 2015



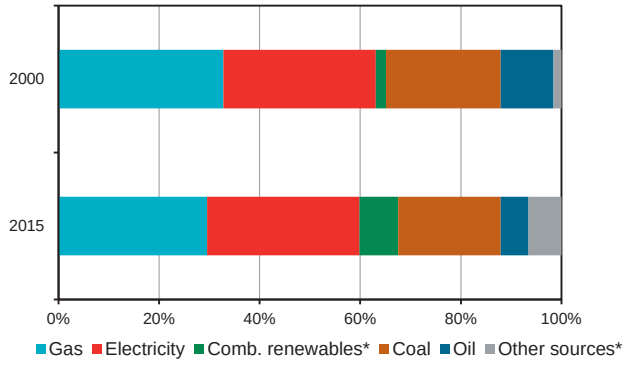

### Value added** by sector



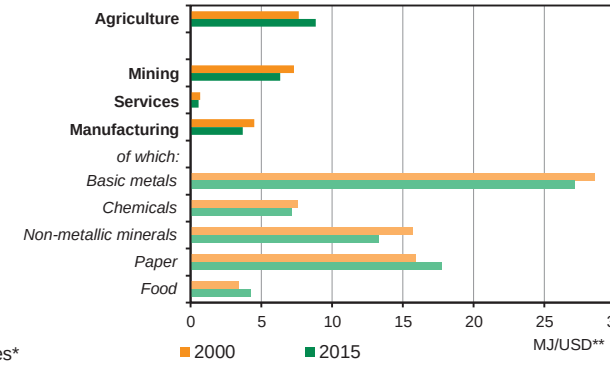

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



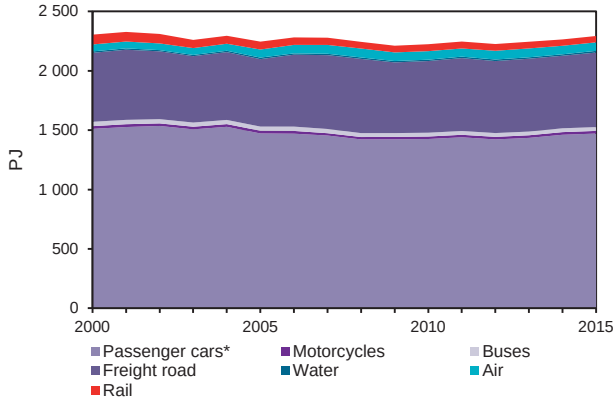

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# GERMANY

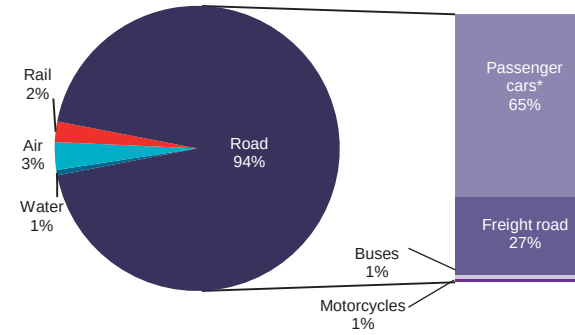
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 1 664 | 641 | 1 018 | 496 | 1.5 | 4.6 |
| **2015** | 1 618 | 675 | 1 128 | 631 | 1.5 | 5.0 |

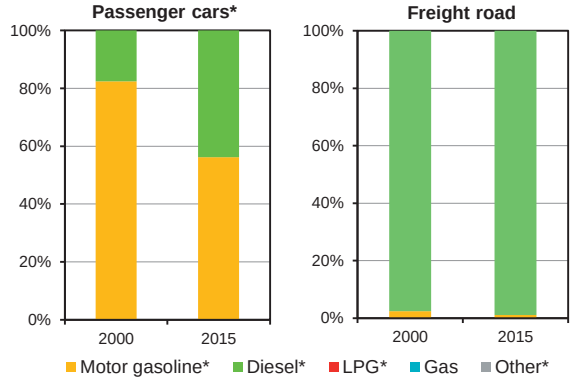
### Transport energy consumption by mode/vehicle type



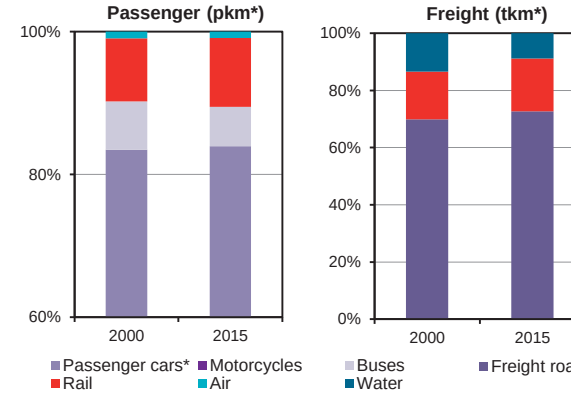

### Transport energy consumption by mode/vehicle type, 2015



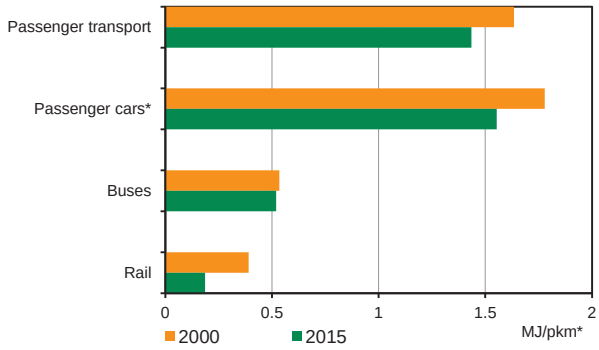

### Energy consumption in road transport by source



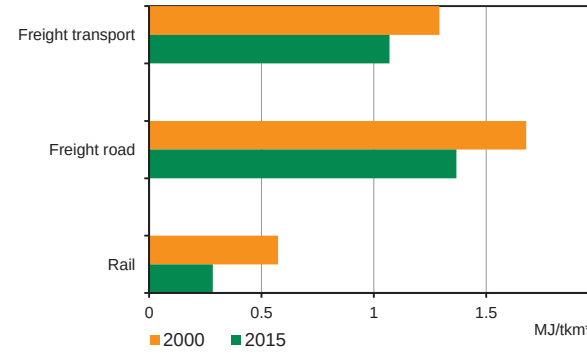

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

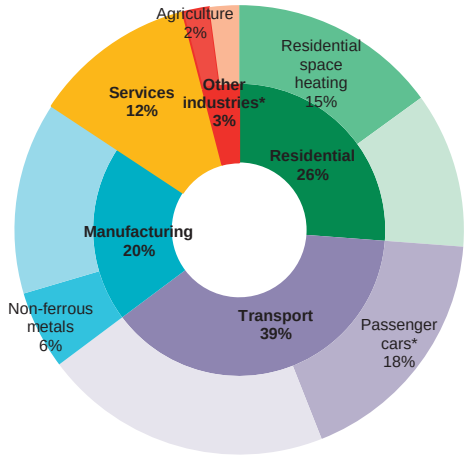



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

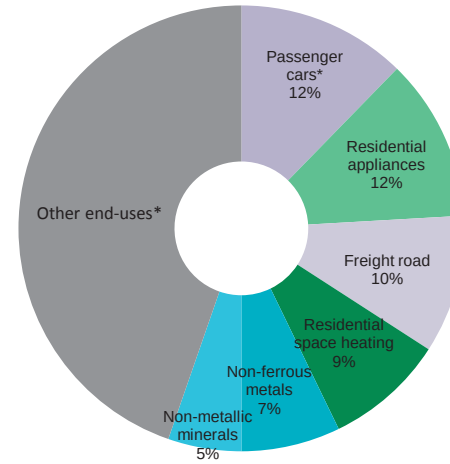
# GREECE

## Cross-sectoral overview

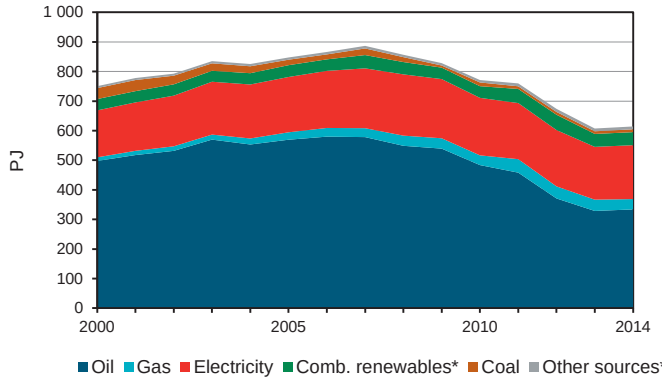
### Largest end-uses by sector, 2014



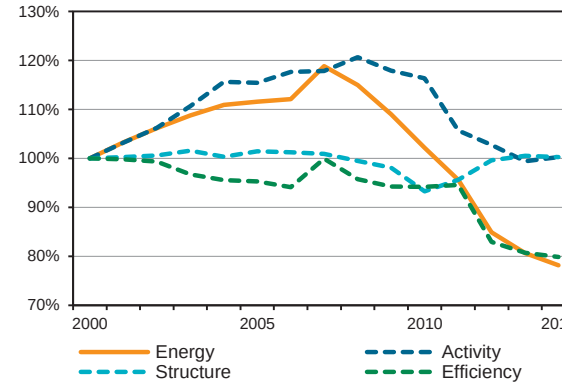

### Top six $CO_2$ emitting end-uses, 2014**



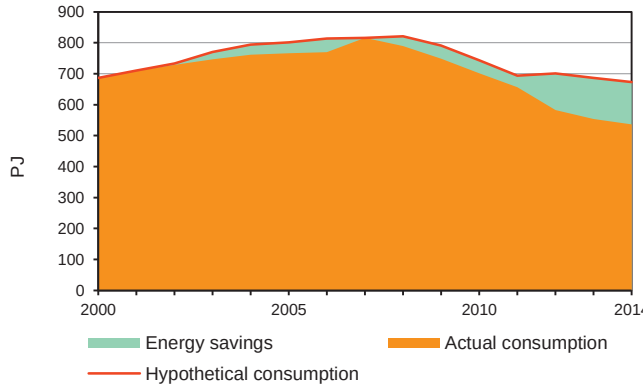

### Final energy consumption by source



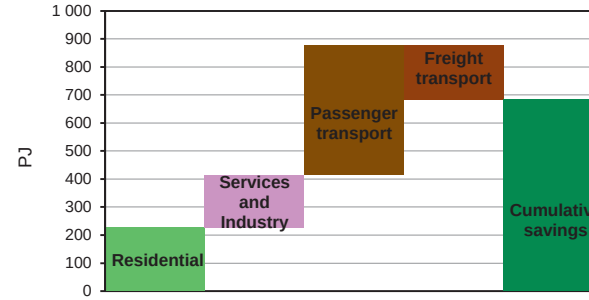

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

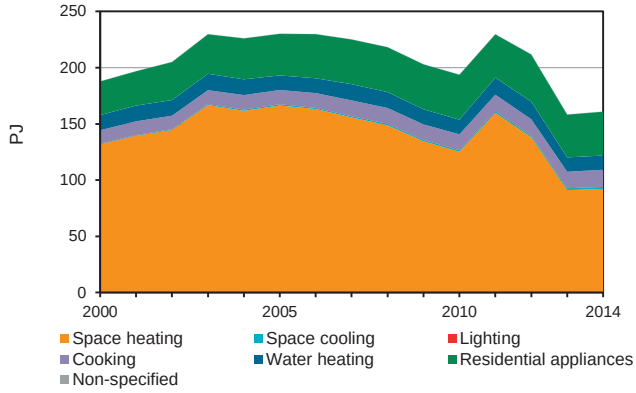
***These figures display results from the IEA decomposition analysis and cover approximately 92% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# GREECE

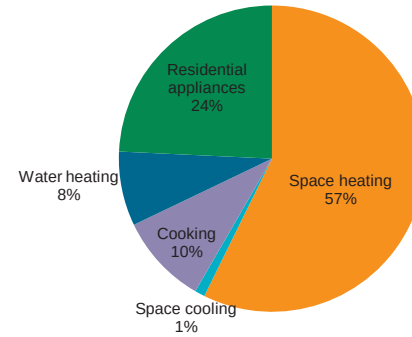
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 188 | 73 | 11 | 17 | 85 | 2.8 |
| **2014** | 161 | 52 | 11 | 15 | 88 | 2.4 |

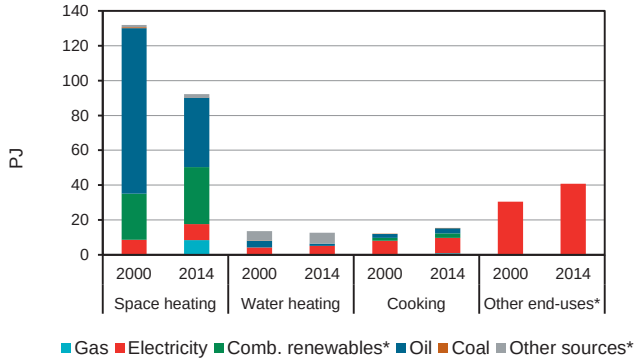
### Residential energy consumption by end-use



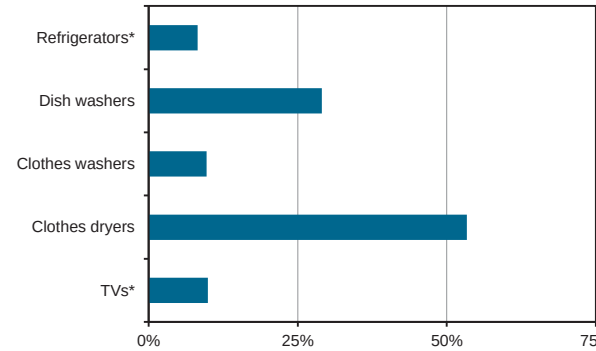

### Residential energy consumption by end-use, 2014



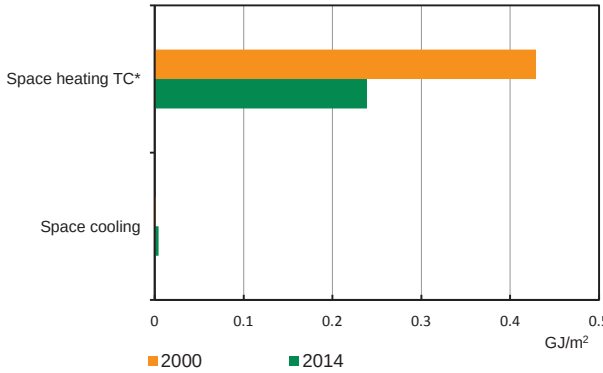

### Residential energy consumption by source



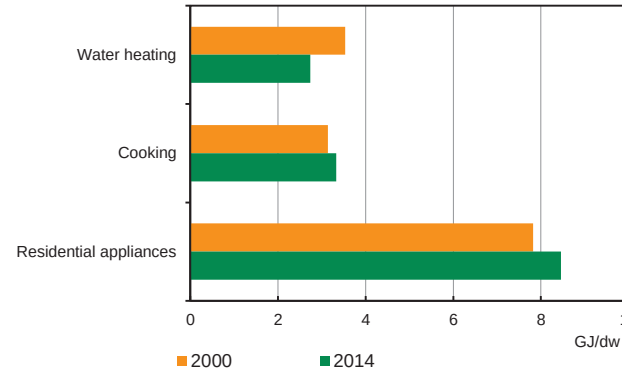

### Appliances per dwelling, 2000-13 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



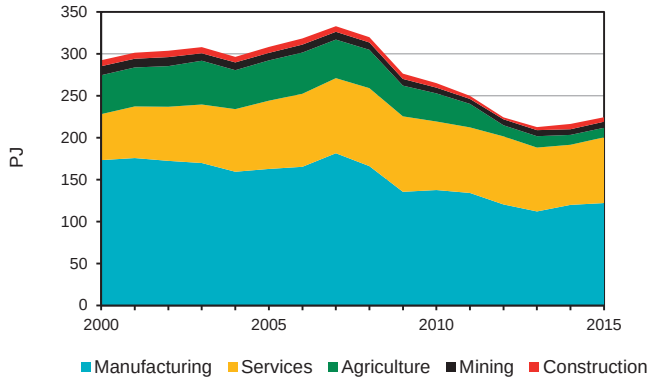

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# GREECE

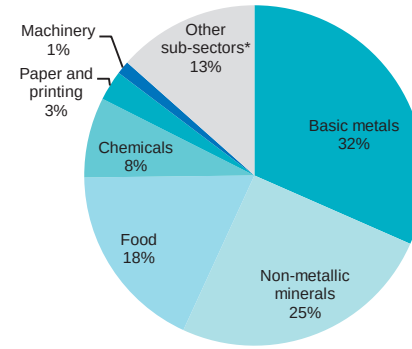
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 173 | 55 | 64 | 271 | 21 | 183 |
| **2015** | 122 | 78 | 24 | 264 | 18 | 194 |

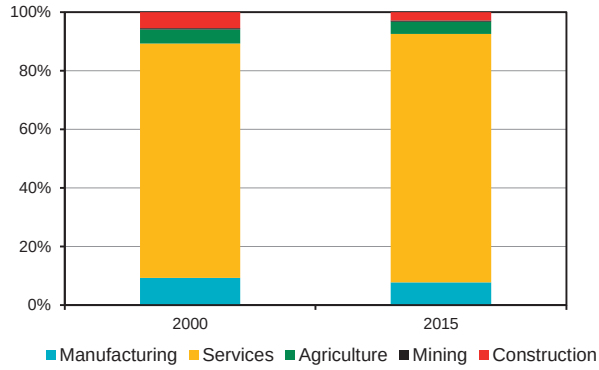
### Industry and services energy consumption



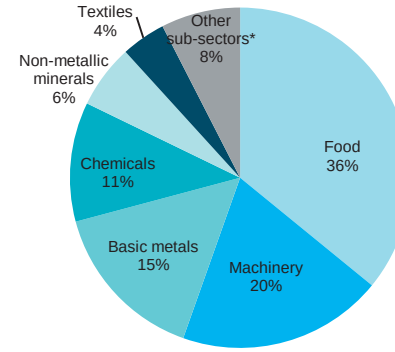

### Manufacturing energy consumption by sub-sector, 2015



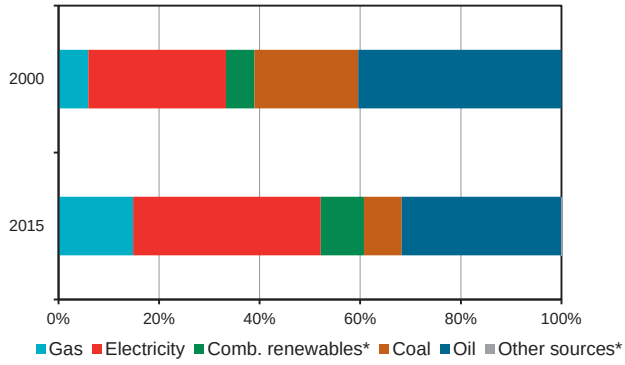

### Value added** by sector



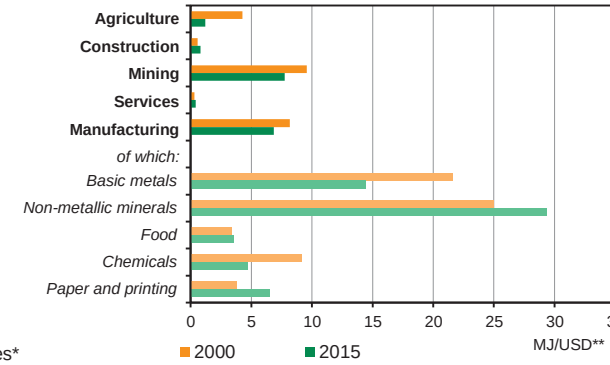

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



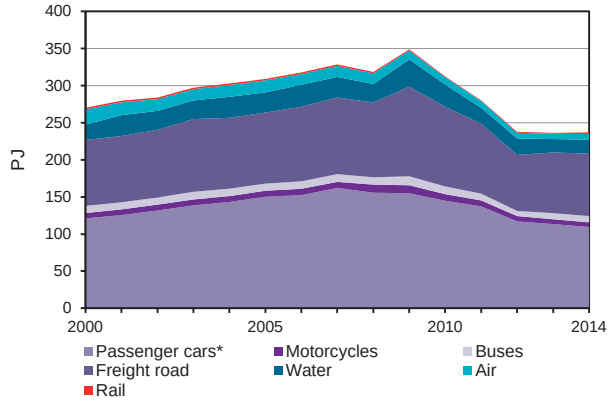

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# GREECE

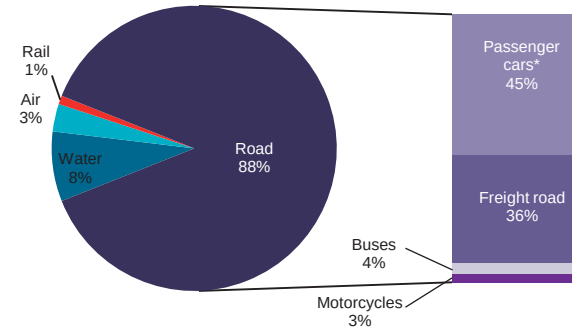
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 160 | 110 | 99 | 23 | 1.4 | NA |
| **2014** | 134 | 103 | 141 | 15 | 1.8 | NA |

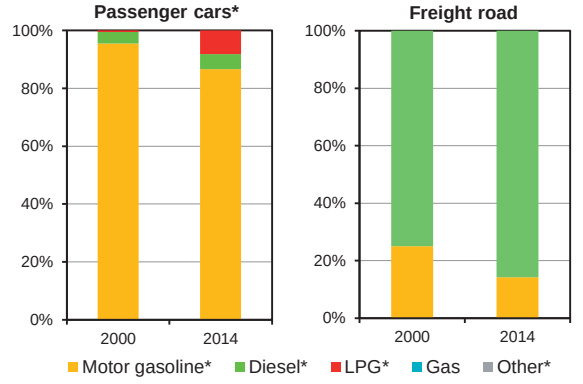
### Transport energy consumption by mode/vehicle type



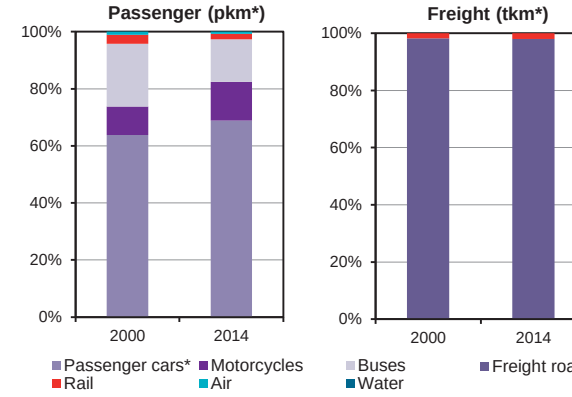

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

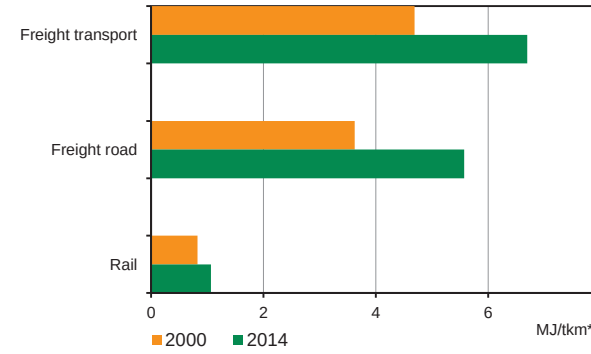



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

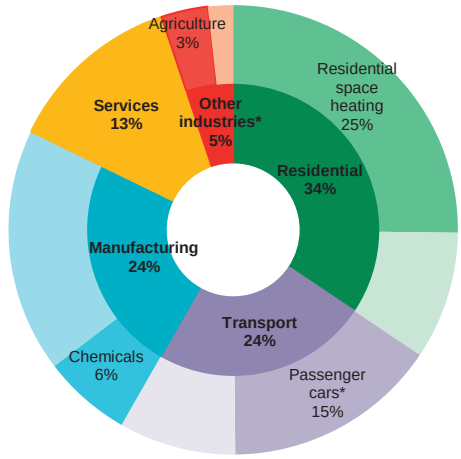



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

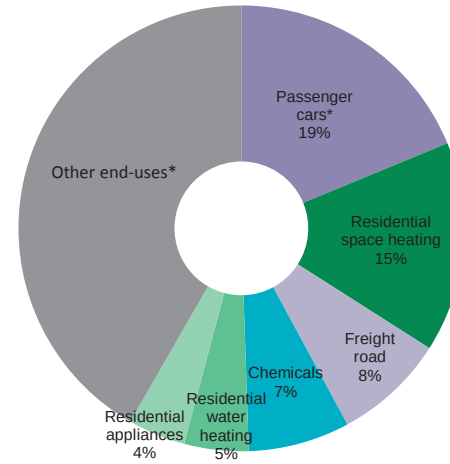
# HUNGARY

## Cross-sectoral overview

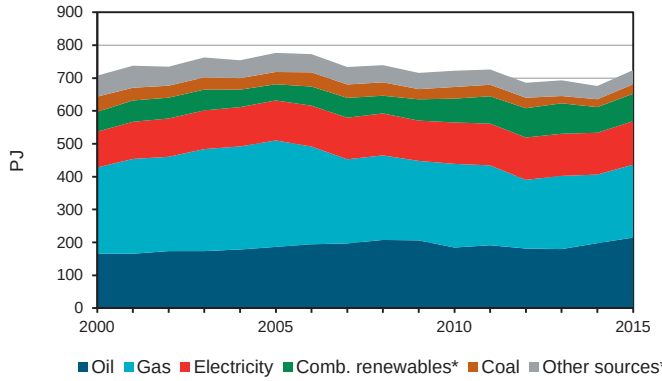
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

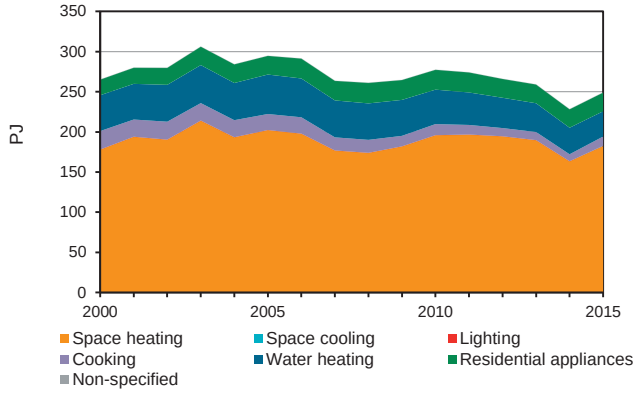
***These figures display results from the IEA decomposition analysis and cover approximately 94% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# HUNGARY

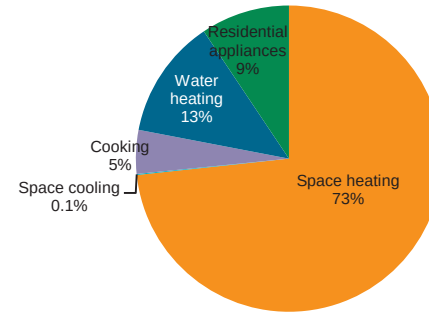
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 265 | 54 | 10 | 26 | 103 | 2.7 |
| **2015** | 249 | 51 | 10 | 25 | 100 | 2.5 |

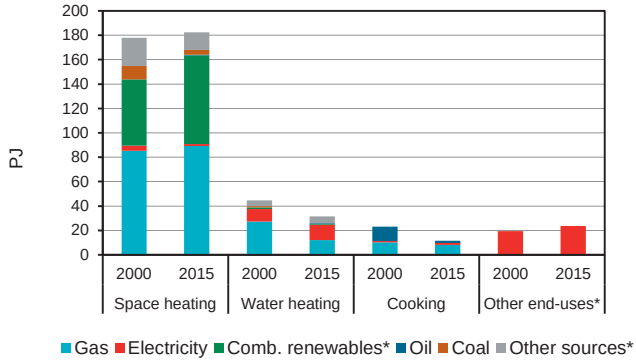
### Residential energy consumption by end-use



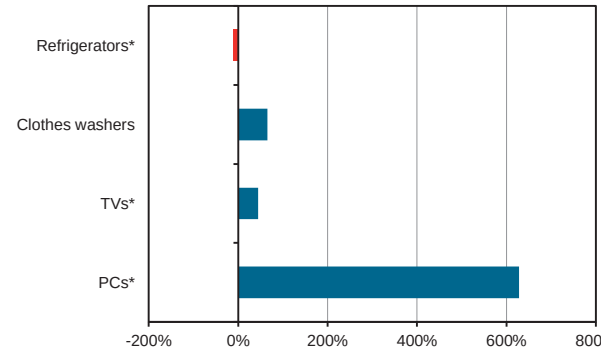

### Residential energy consumption by end-use, 2015



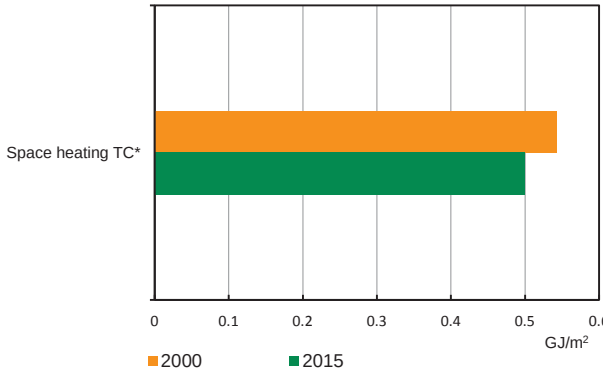

### Residential energy consumption by source



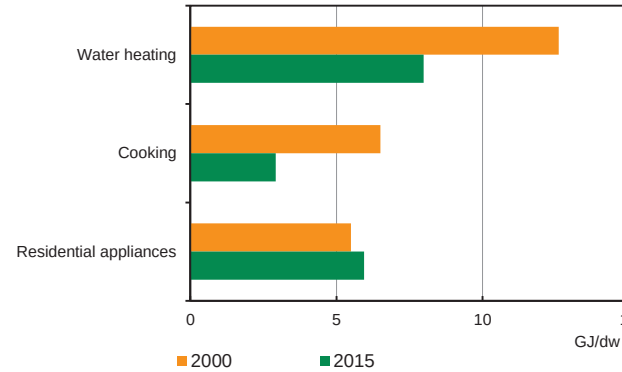

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

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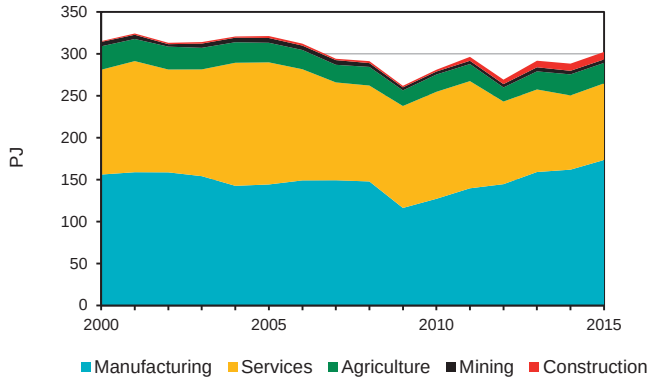
# HUNGARY

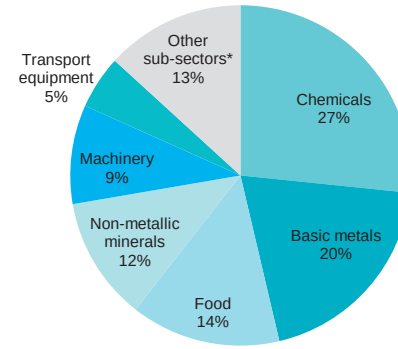
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 156 | 125 | 34 | 177 | 26 | 101 |
| **2015** | 173 | 91 | 37 | 235 | 43 | 135 |

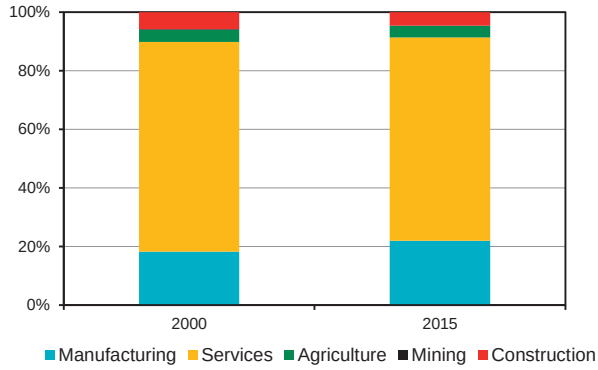
### Industry and services energy consumption



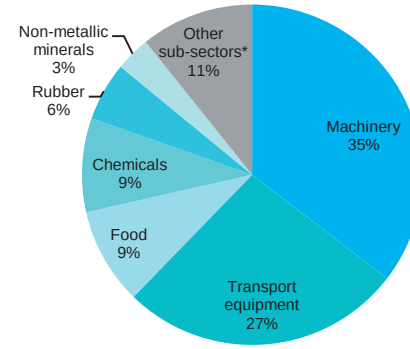

### Manufacturing energy consumption by sub-sector, 2015



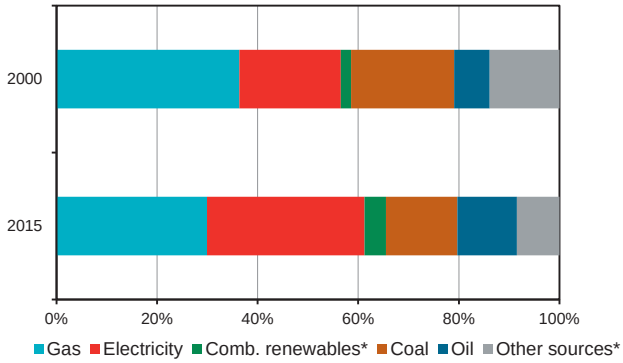

### Value added** by sector



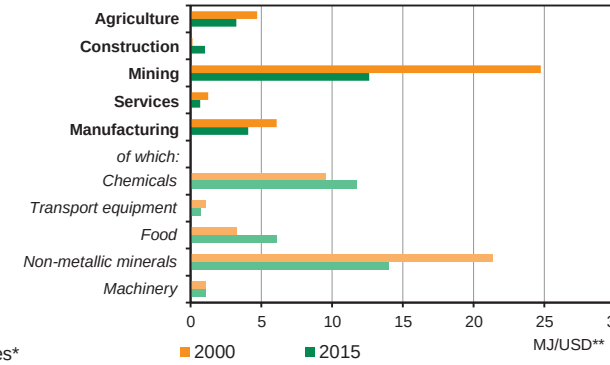

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities

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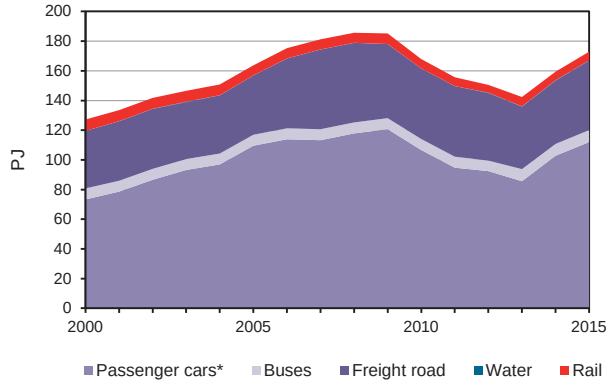
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# HUNGARY

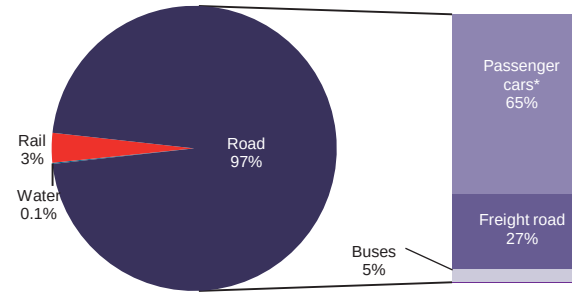
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 86 | 41 | 79 | 28 | 2.9 | NA |
| **2015** | 124 | 49 | 83 | 50 | NA | NA |

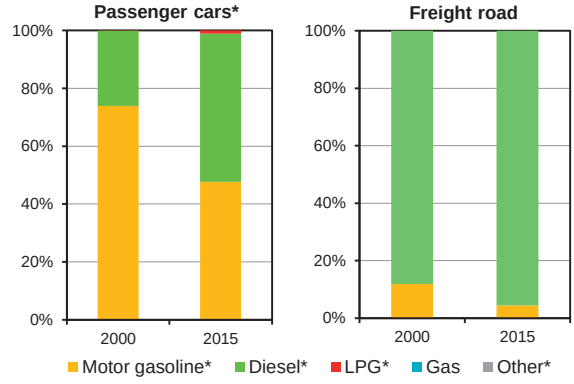
### Transport energy consumption by mode/vehicle type



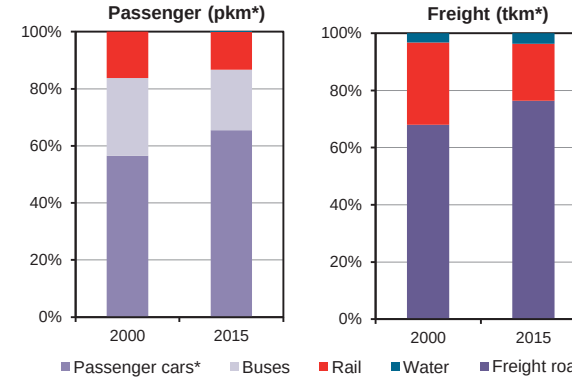

### Transport energy consumption by mode/vehicle type, 2015



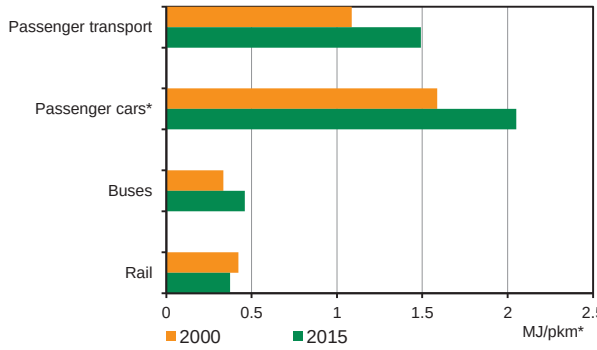

### Energy consumption in road transport by source



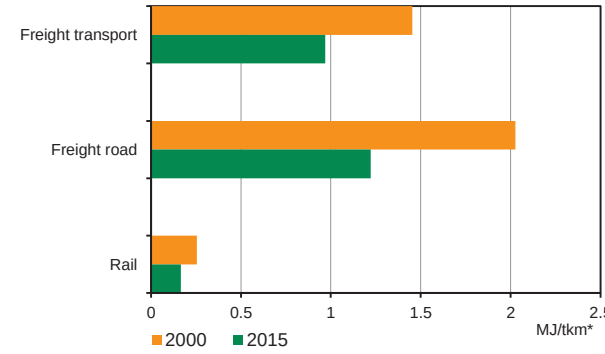

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

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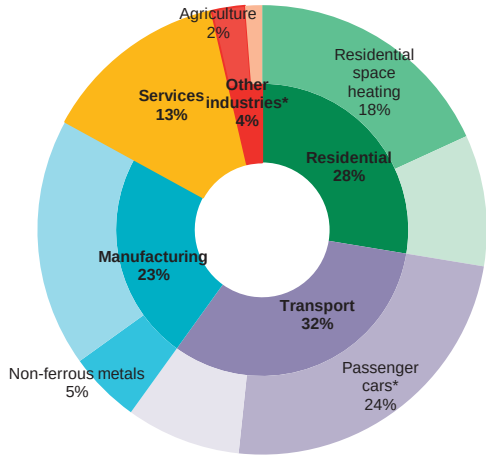
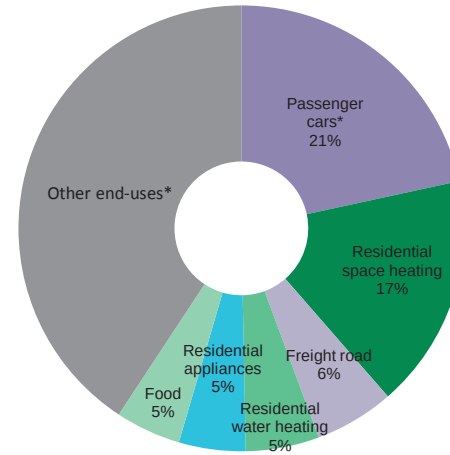
# IRELAND

## Cross-sectoral overview

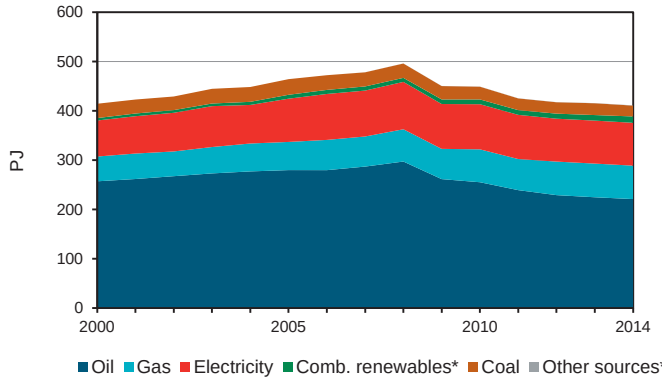
### Largest end-uses by sector, 2014



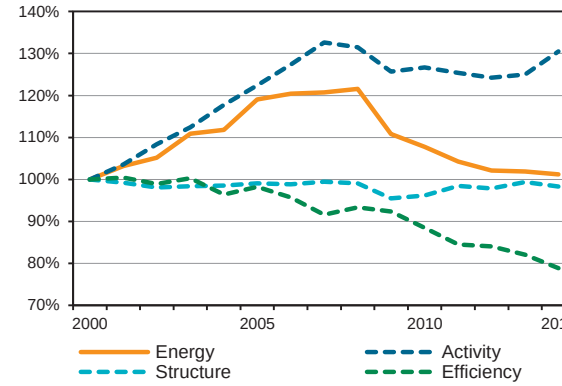

### Top six $CO_2$ emitting end-uses, 2014**



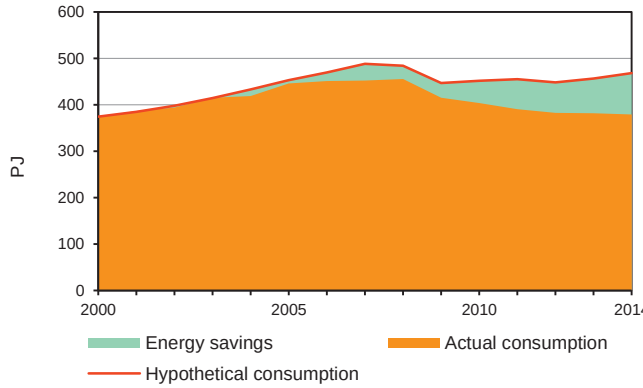

### Final energy consumption by source



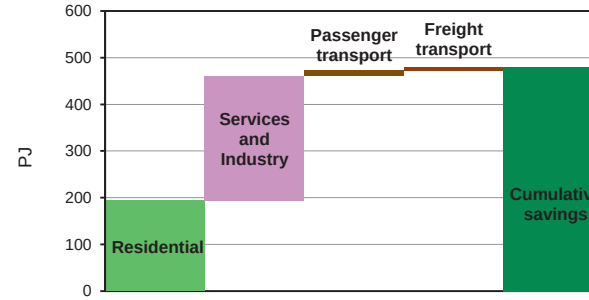

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

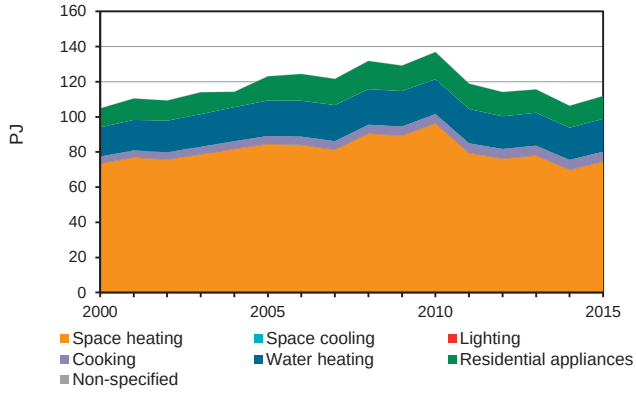
***These figures display results from the IEA decomposition analysis and cover approximately 99% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# IRELAND

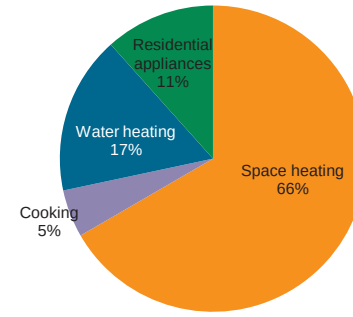
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 105 | 94 | 4 | 28 | 107 | 3.1 |
| **2015** | 112 | 90 | 5 | 24 | 120 | 2.6 |

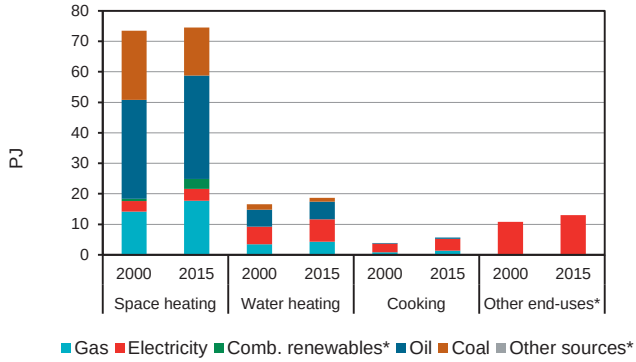
### Residential energy consumption by end-use



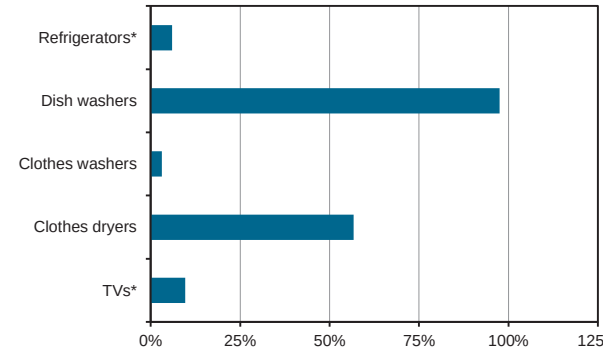

### Residential energy consumption by end-use, 2015



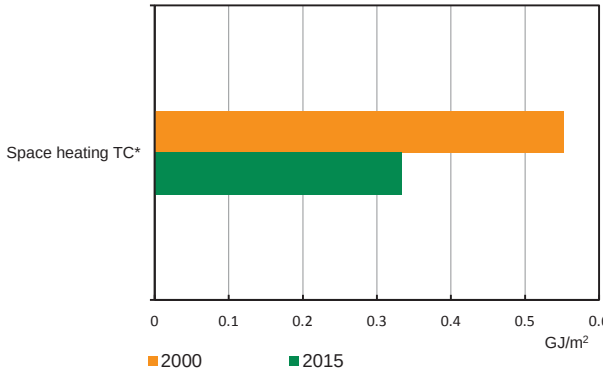

### Residential energy consumption by source



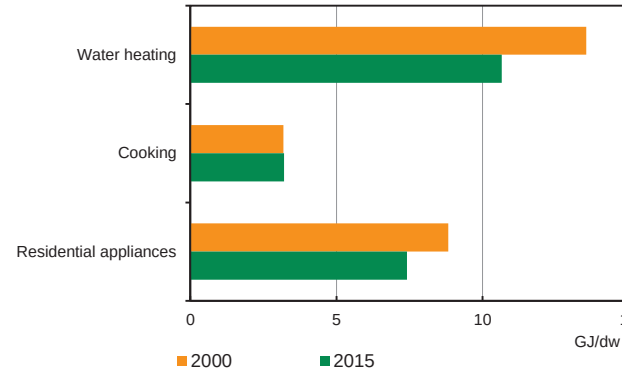

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



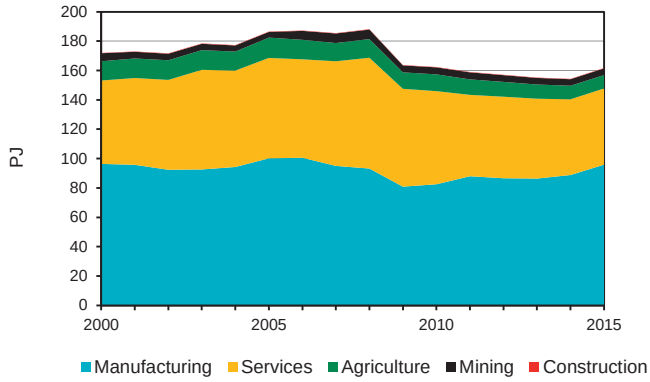

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# IRELAND

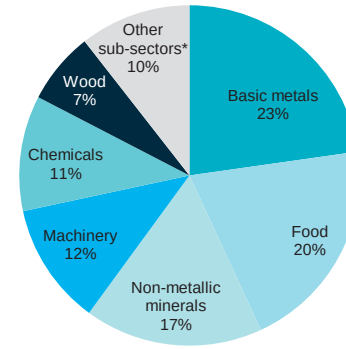
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 96 | 57 | 19 | 148 | 28 | 66 |
| **2015** | 96 | 52 | 14 | 272 | 32 | 115 |

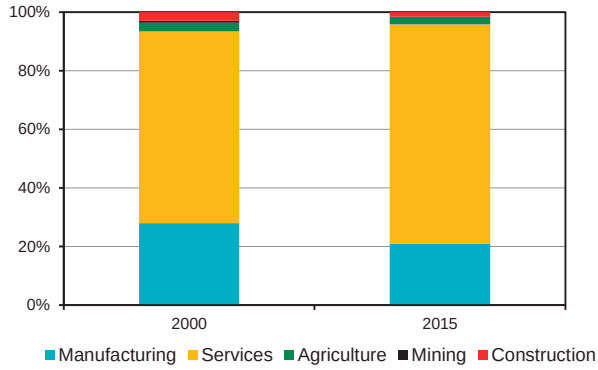
### Industry and services energy consumption



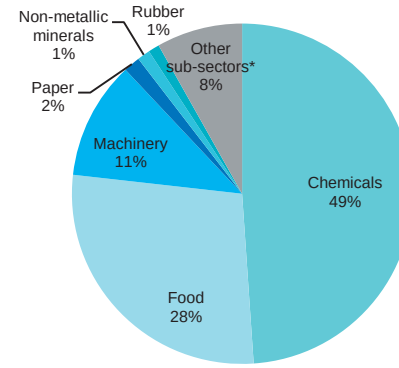

### Manufacturing energy consumption by sub-sector, 2015



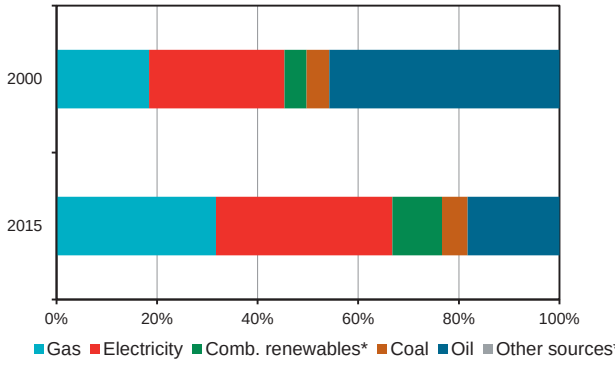

### Value added** by sector



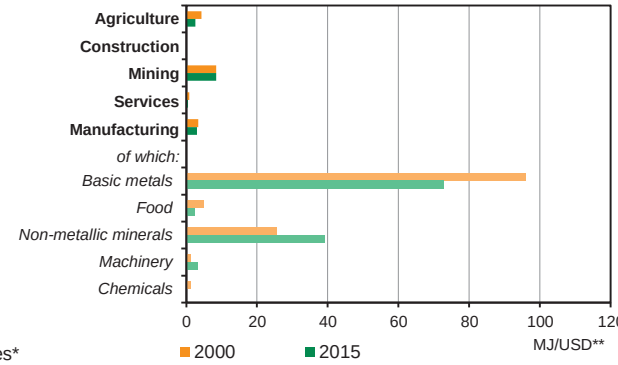

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



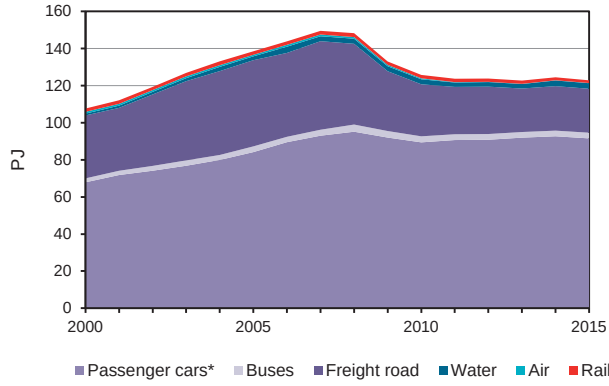

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# IRELAND

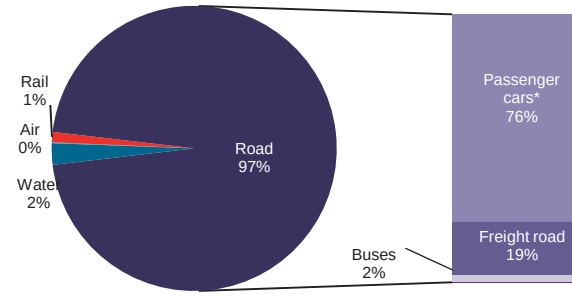
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 72 | 36 | 42 | 13 | 1.5 | NA |
| **2014** | 97 | 27 | 58 | 10 | 1.3 | NA |

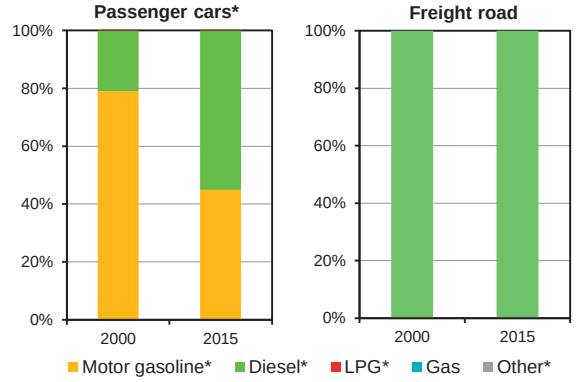
### Transport energy consumption by mode/vehicle type



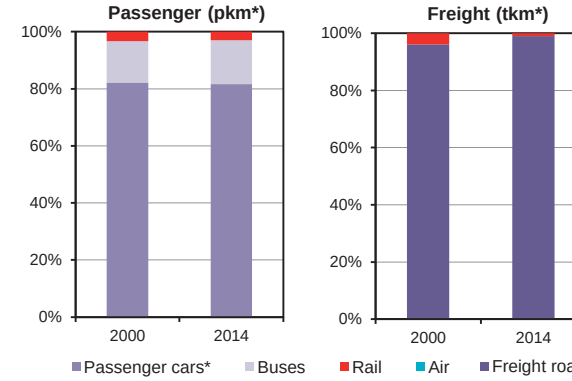

### Transport energy consumption by mode/vehicle type, 2015



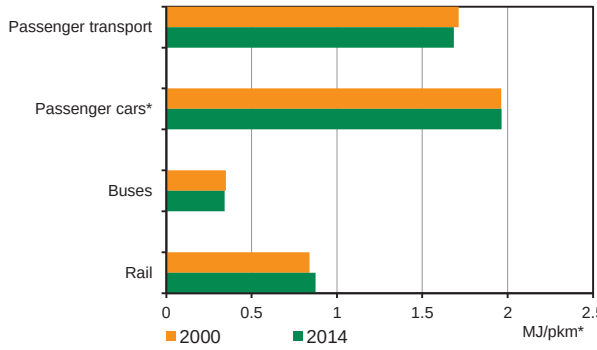

### Energy consumption in road transport by source



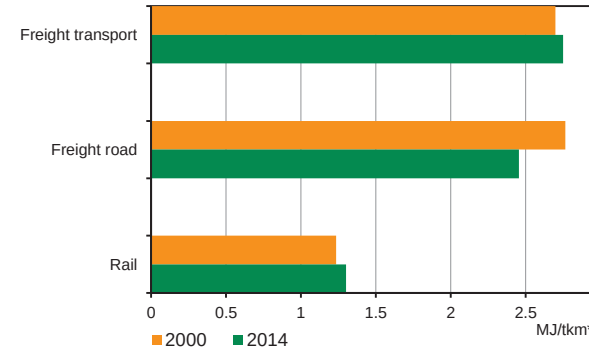

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

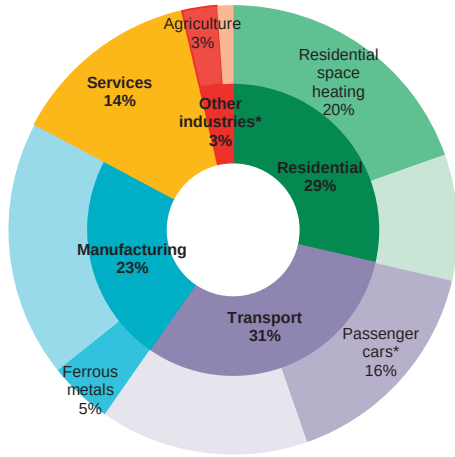



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

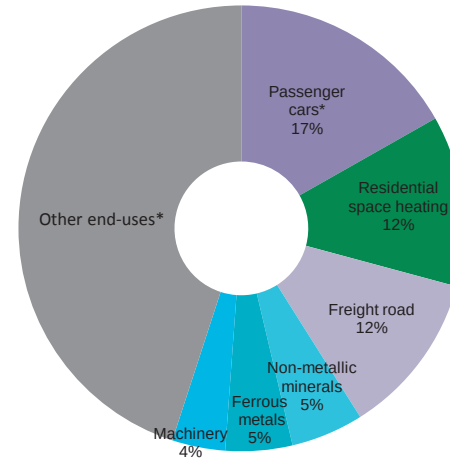
# ITALY

## Cross-sectoral overview

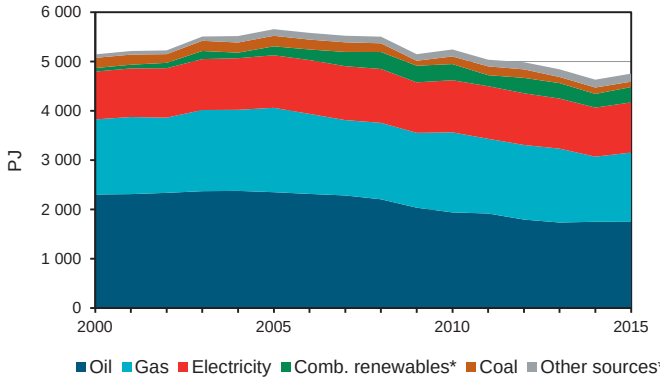
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

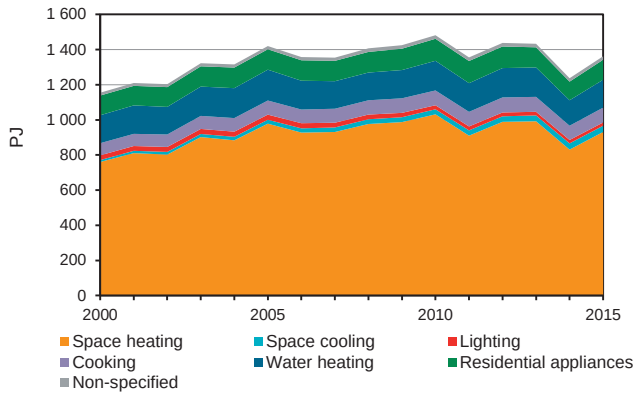
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# ITALY

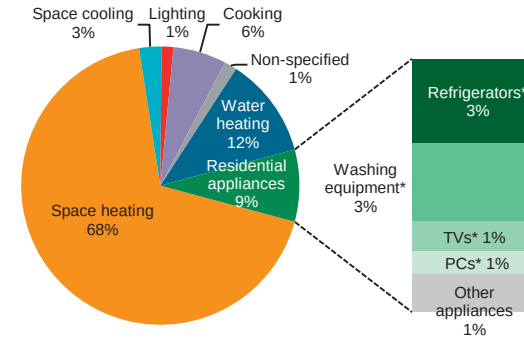
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 1 155 | 93 | 57 | 20 | 96 | 2.6 |
| **2015** | 1 362 | 67 | 61 | 22 | 93 | 2.5 |

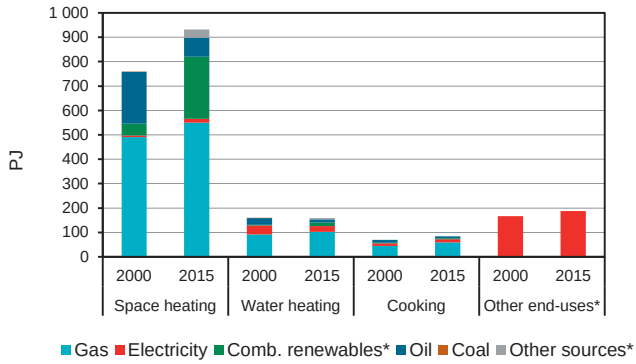
### Residential energy consumption by end-use



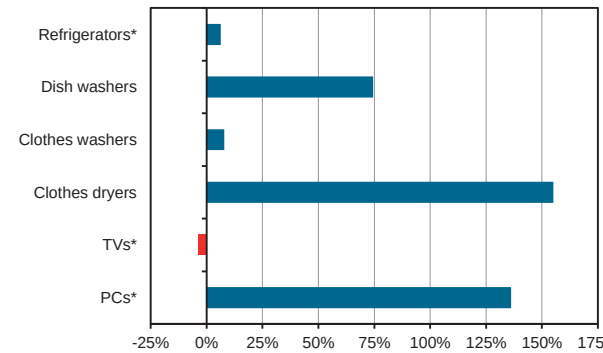

### Residential energy consumption by end-use, 2015



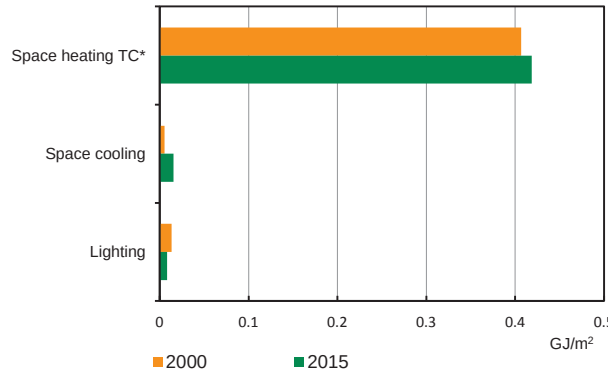

### Residential energy consumption by source



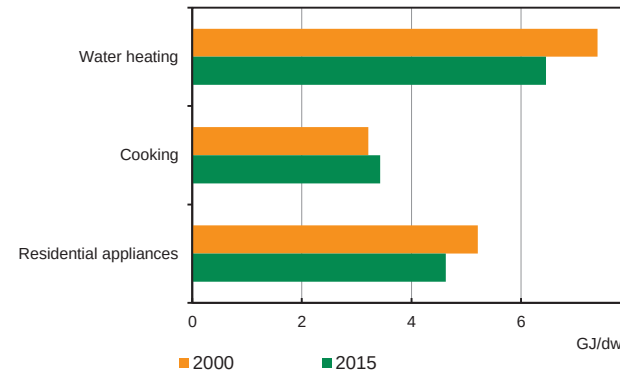

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

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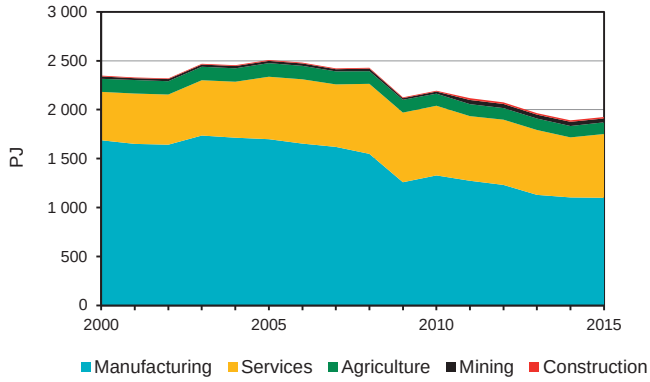
# ITALY

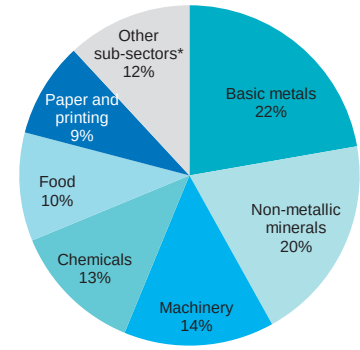
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 687 | 475 | 166 | 1 995 | 298 | 1 289 |
| **2015** | 1 099 | 622 | 174 | 1 984 | 287 | 1 346 |

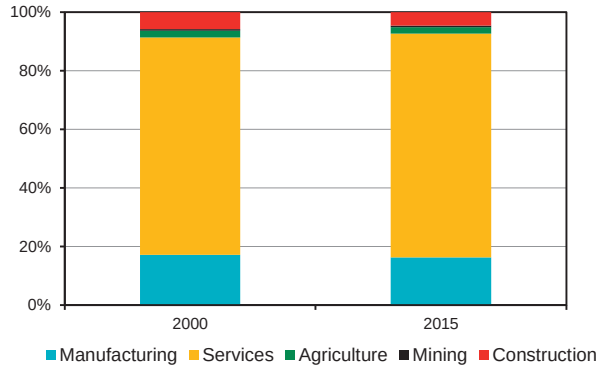
### Industry and services energy consumption



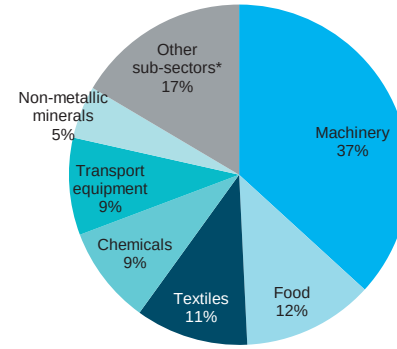

### Manufacturing energy consumption by sub-sector, 2015



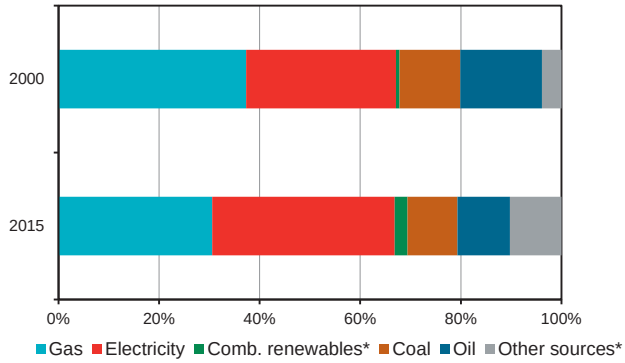

### Value added** by sector



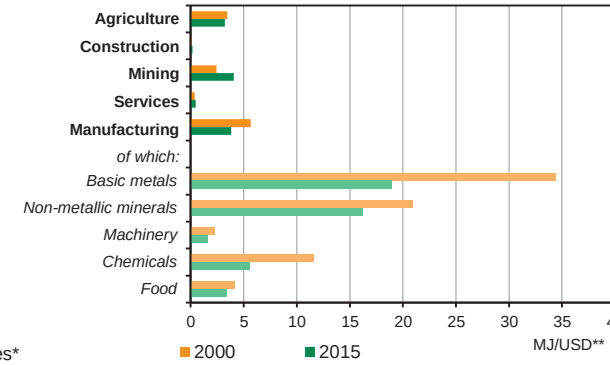

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



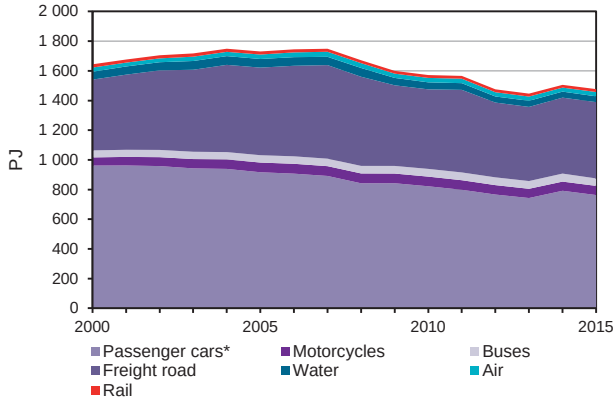

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# ITALY

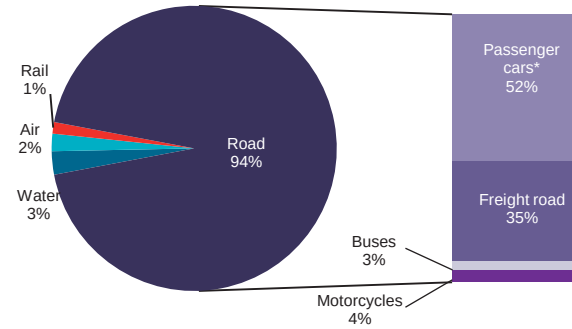
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 1 104 | 540 | 926 | 245 | 1.6 | 1.2 |
| **2015** | 917 | 560 | 904 | 185 | 1.6 | NA |

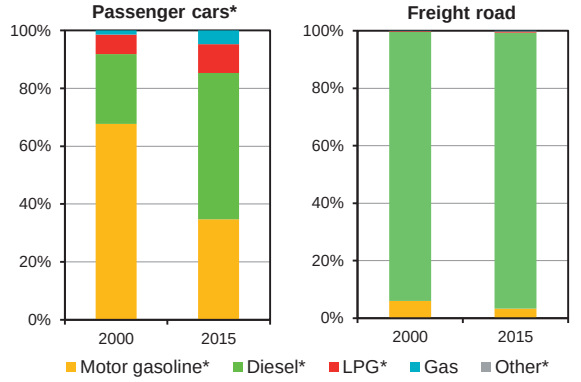
### Transport energy consumption by mode/vehicle type



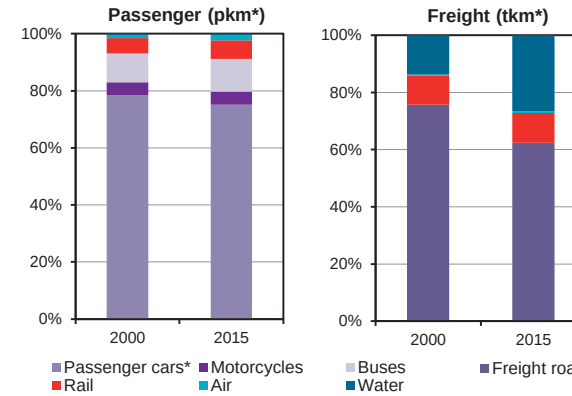

### Transport energy consumption by mode/vehicle type, 2015



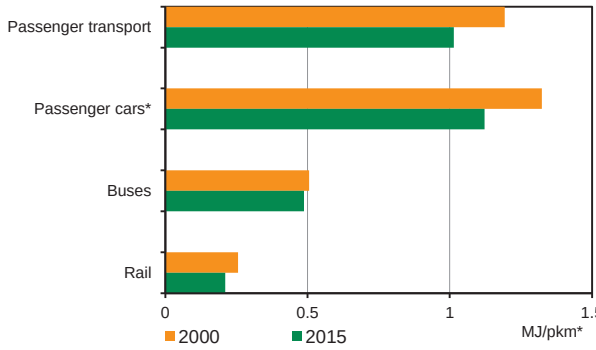

### Energy consumption in road transport by source



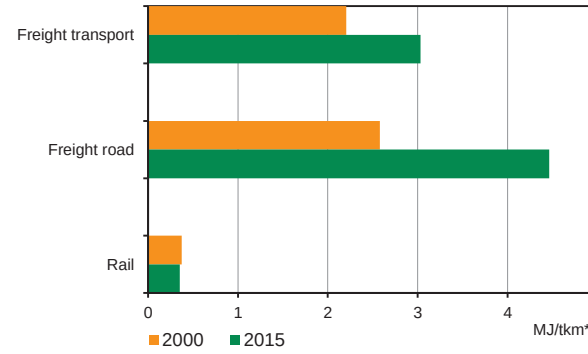

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

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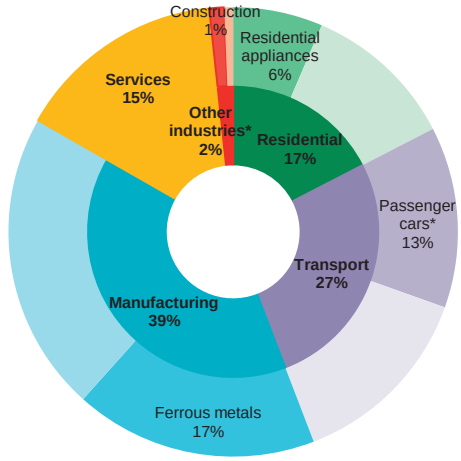
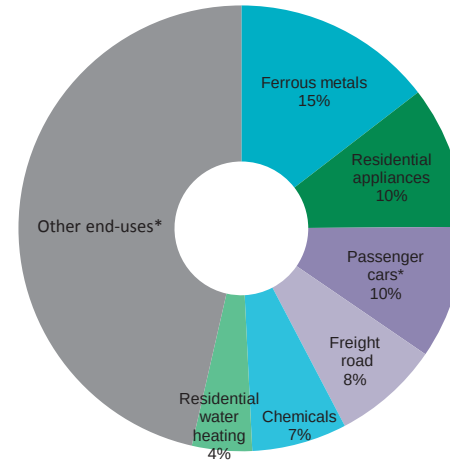
# JAPAN

## Cross-sectoral overview

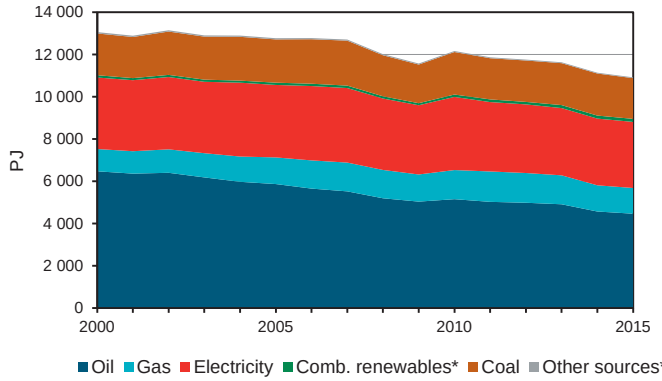
### Largest end-uses by sector, 2015



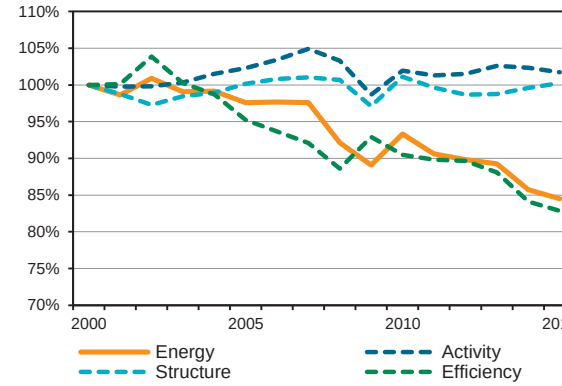

### Top six $CO_2$ emitting end-uses, 2015**



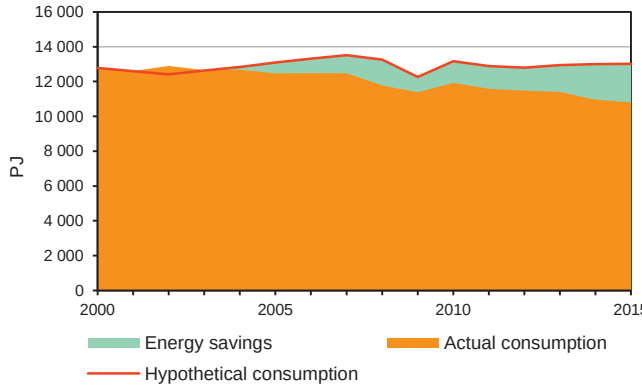

### Final energy consumption by source



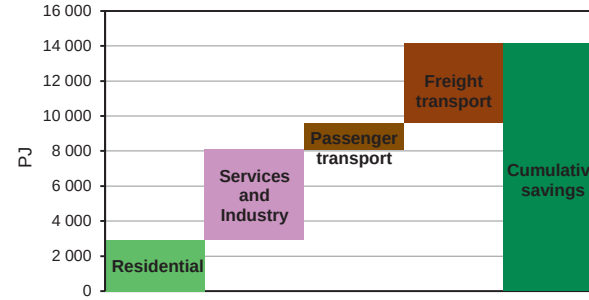

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

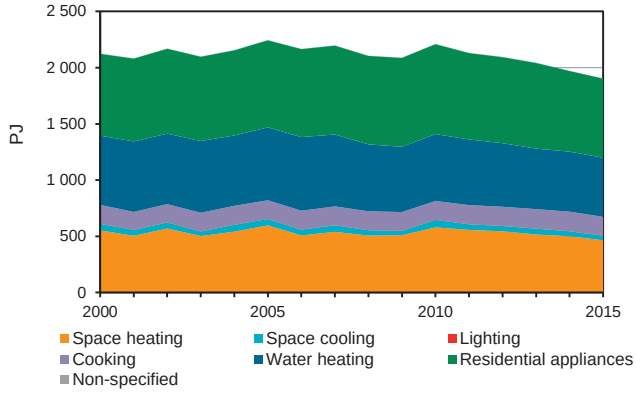
***These figures display results from the IEA decomposition analysis and cover approximately 100% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# JAPAN

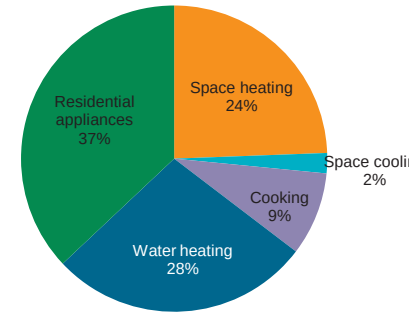
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 2 124 | 89 | 127 | 17 | 93 | 2.8 |
| **2015** | 1 903 | 82 | 127 | 15 | 95 | 2.4 |

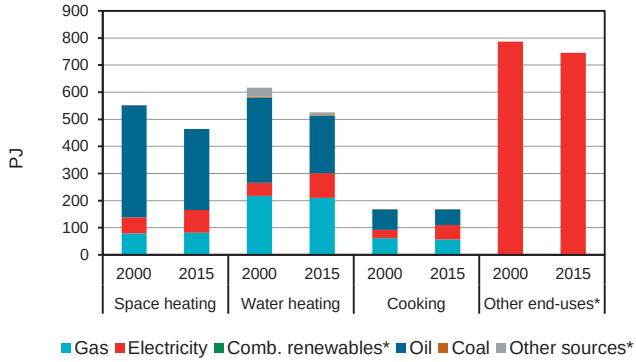
### Residential energy consumption by end-use



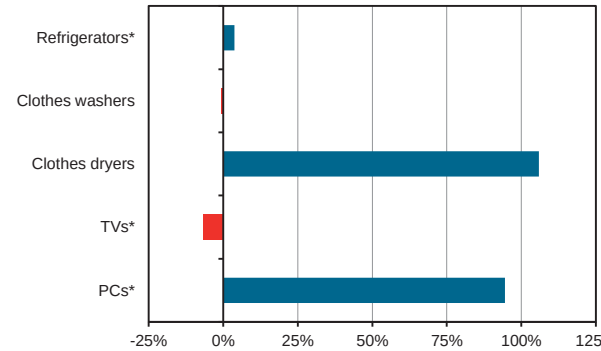

### Residential energy consumption by end-use, 2015



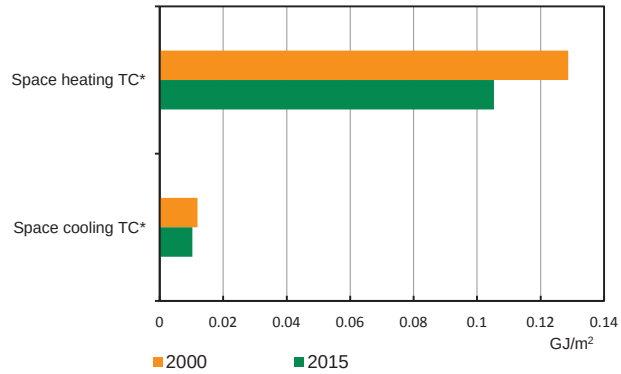

### Residential energy consumption by source



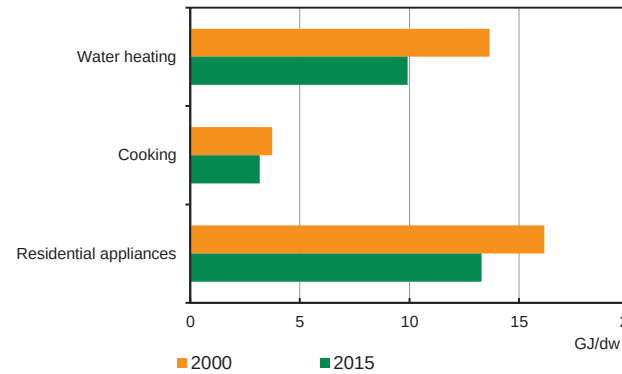

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



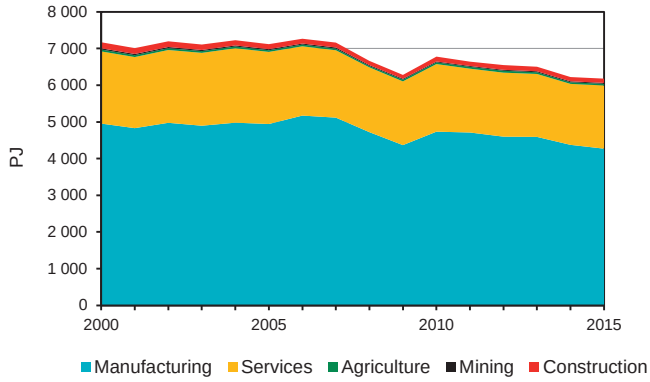

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# JAPAN

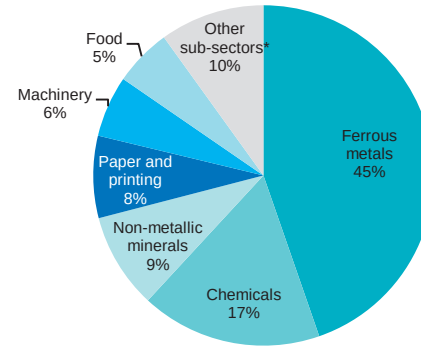
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 4 954 | 1 966 | 250 | 4 005 | 674 | 2 553 |
| **2015** | 4 271 | 1 642 | 186 | 4 458 | 809 | 2 825 |

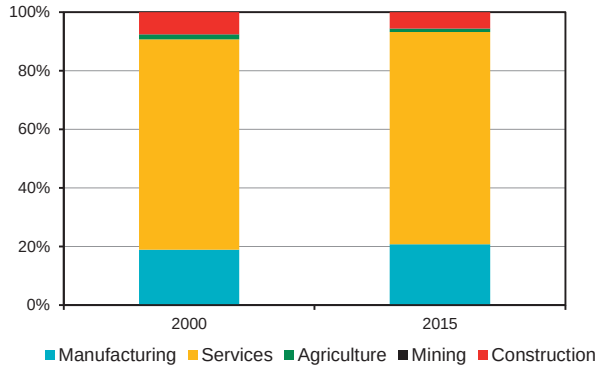
### Industry and services energy consumption



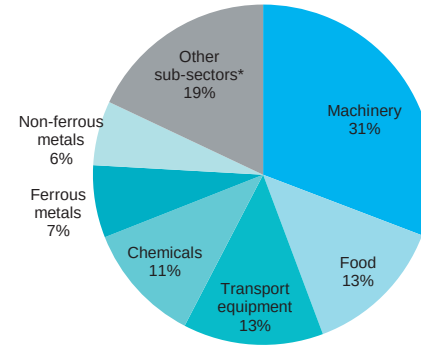

### Manufacturing energy consumption by sub-sector, 2015



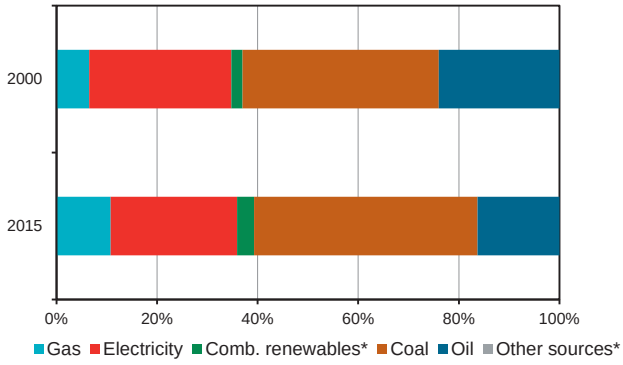

### Value added** by sector



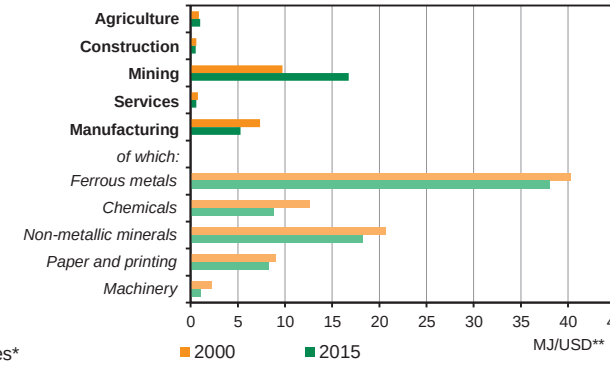

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



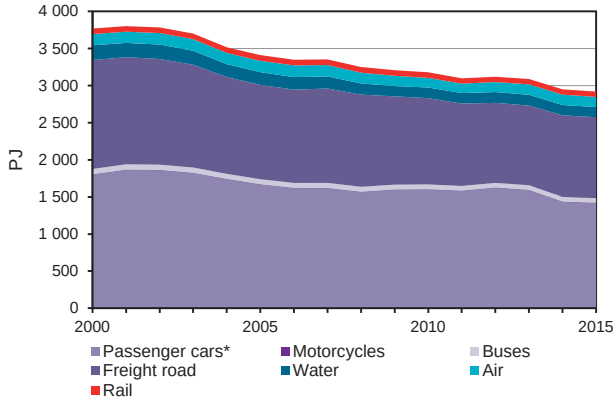

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# JAPAN

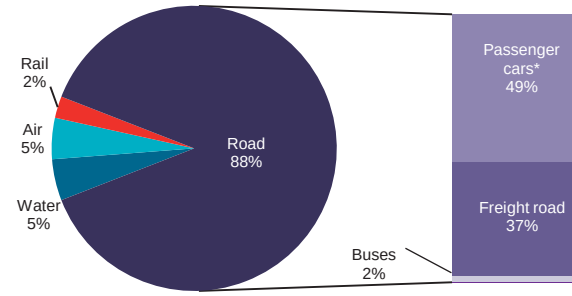
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 2 149 | 1 622 | 1 420 | 479 | 1.8 | 0.9 |
| **2015** | 1 714 | 1 207 | 1 396 | 407 | 1.6 | 1.0 |

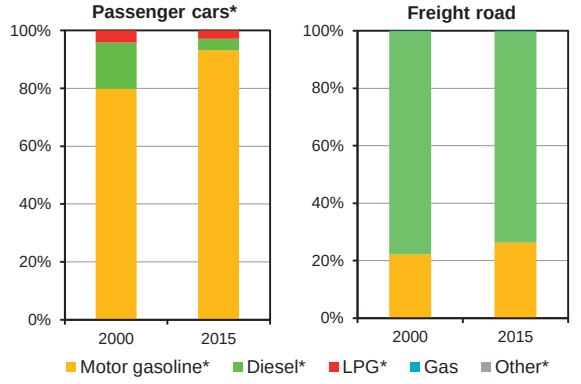
### Transport energy consumption by mode/vehicle type



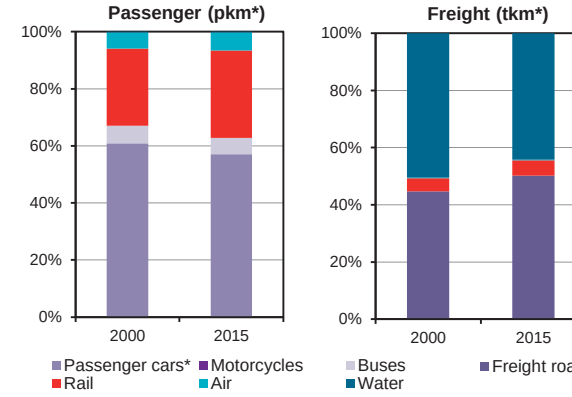

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source




### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

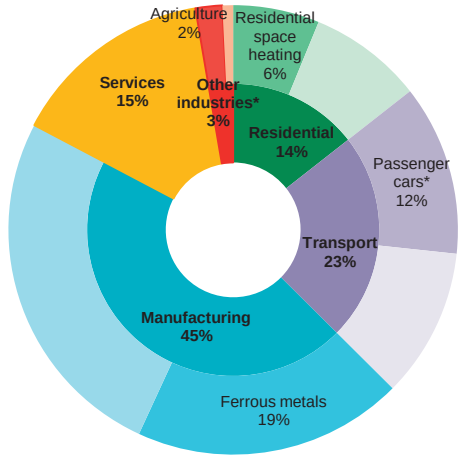
### Energy intensities for freight transport

*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

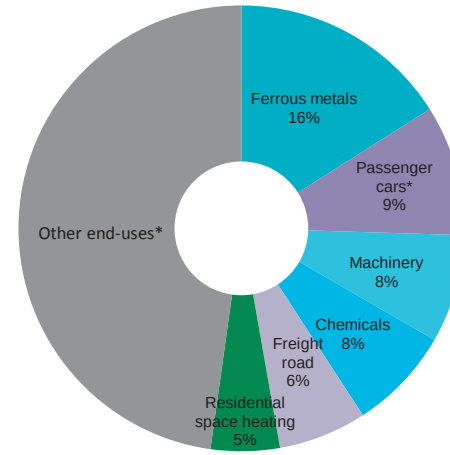
# KOREA

## Cross-sectoral overview

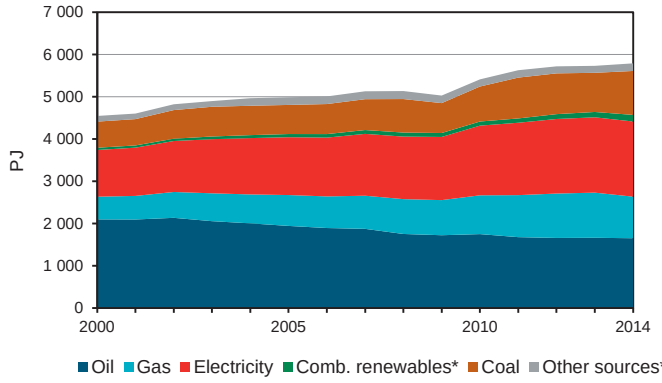
### Largest end-uses by sector, 2014



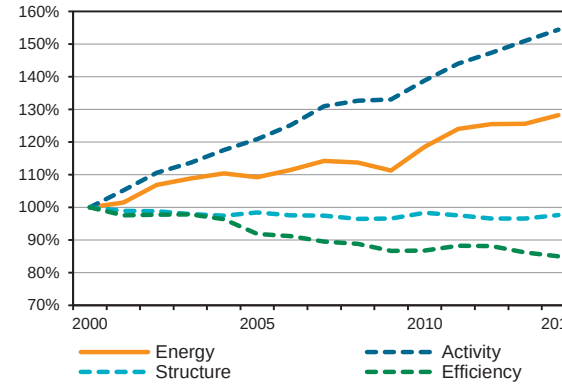

### Top six $CO_2$ emitting end-uses, 2014**



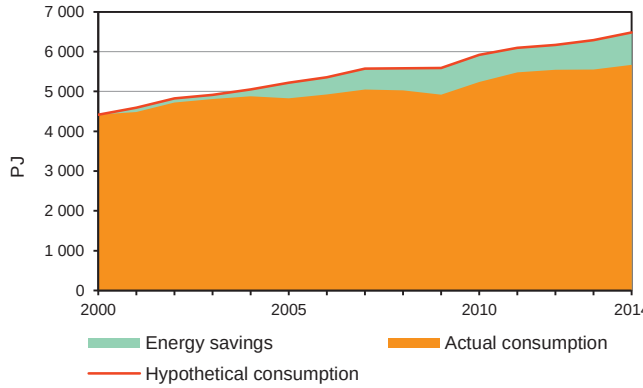

### Final energy consumption by source



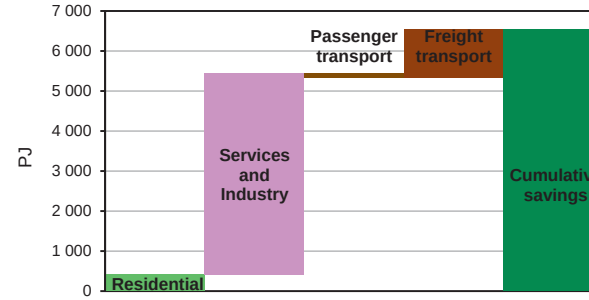

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

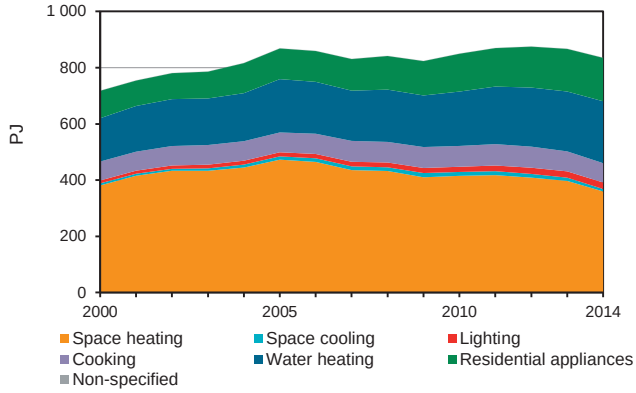
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# KOREA

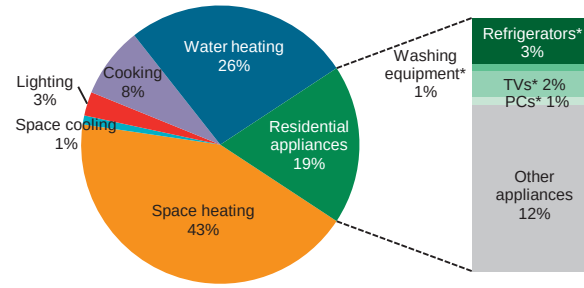
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 718 | 87 | 47 | 15 | 86 | 4.3 |
| **2014** | 835 | 78 | 50 | 17 | 94 | 3.3 |

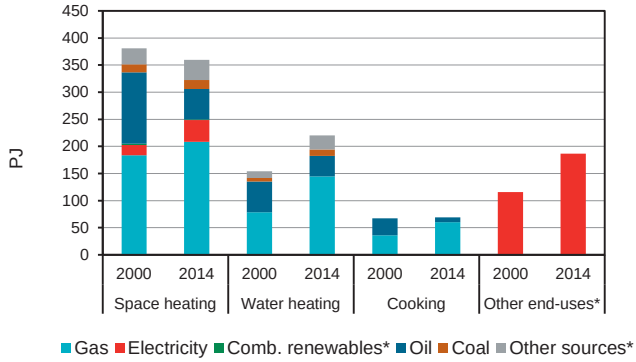
### Residential energy consumption by end-use



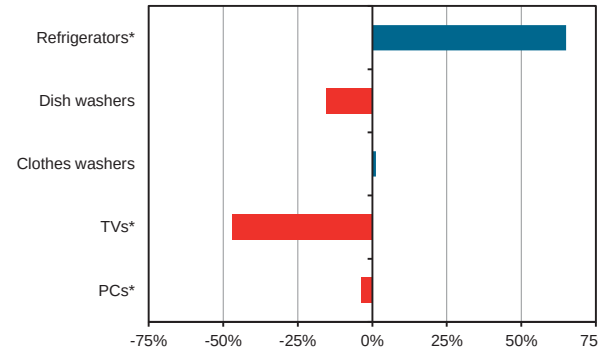

### Residential energy consumption by end-use, 2014



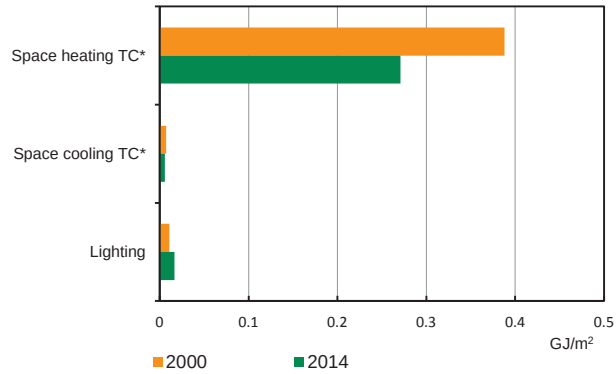

### Residential energy consumption by source



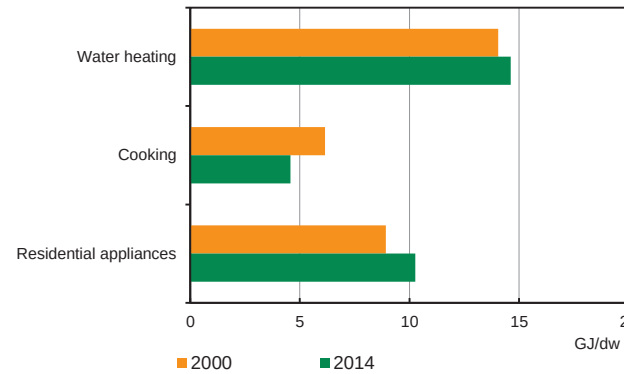

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



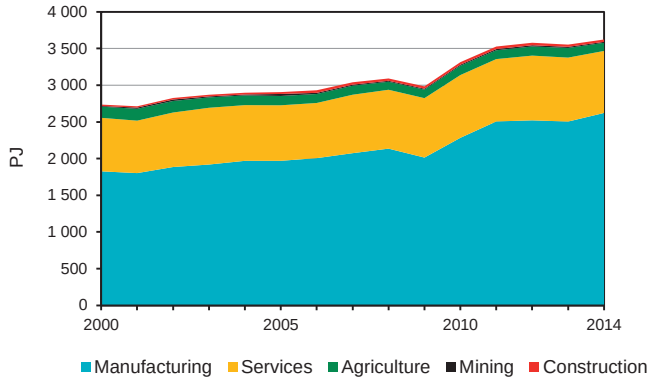

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# KOREA

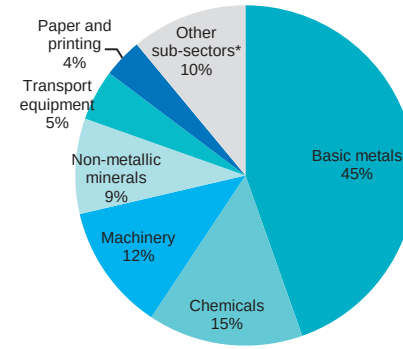
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 826 | 730 | 180 | 977 | 216 | 541 |
| **2014** | 2 622 | 845 | 156 | 1 698 | 482 | 908 |

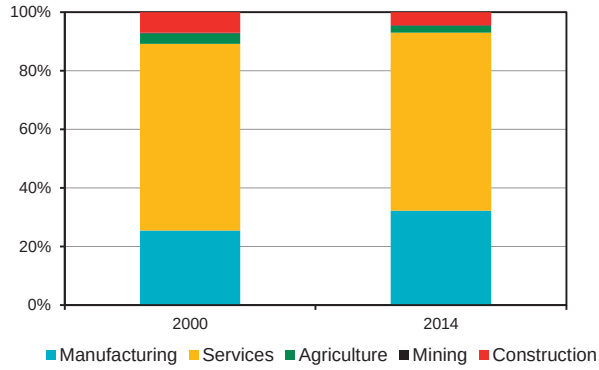
### Industry and services energy consumption



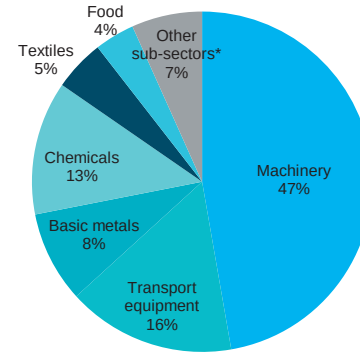

### Manufacturing energy consumption by sub-sector, 2014



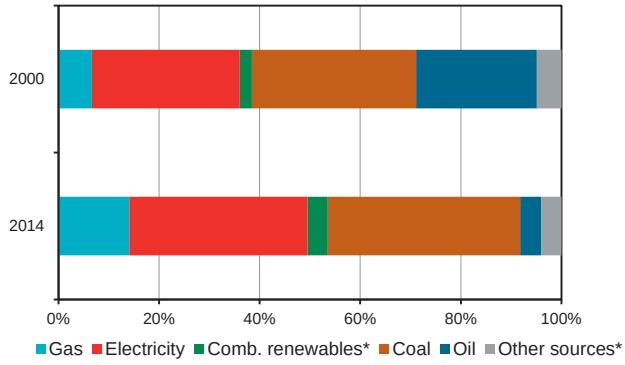

### Value added** by sector



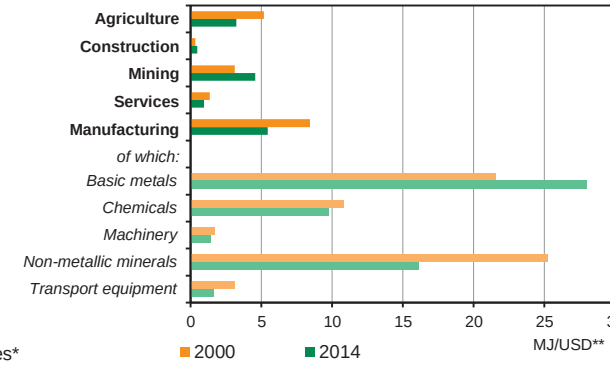

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



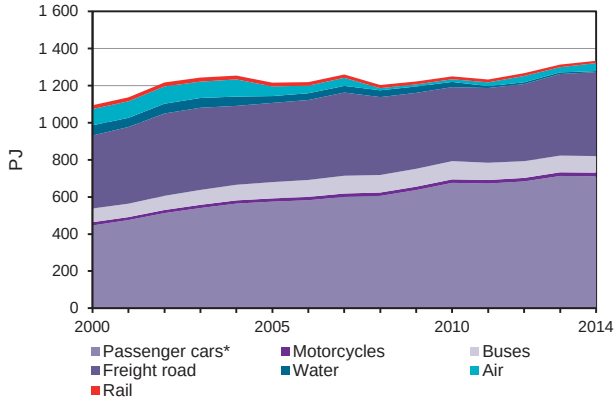

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# KOREA

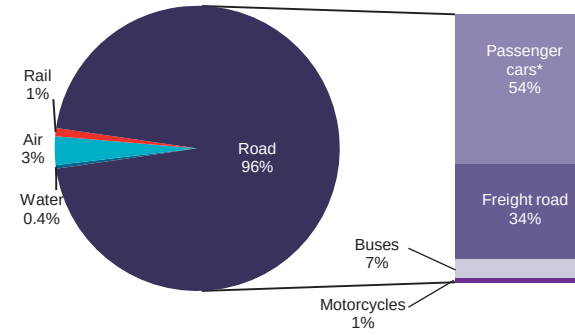
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 626 | 468 | 512 | 106 | 3.8 | 2.9 |
| **2014** | 870 | 464 | 720 | 151 | 3.9 | 2.8 |

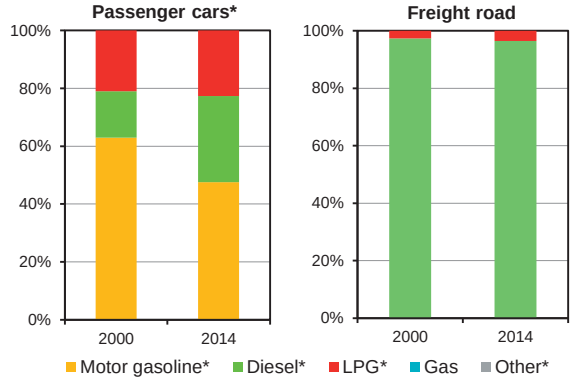
### Transport energy consumption by mode/vehicle type



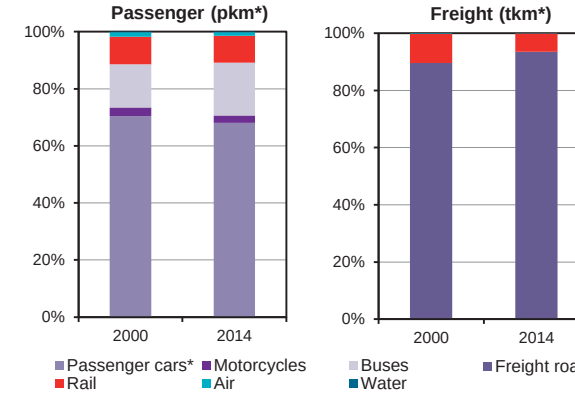

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

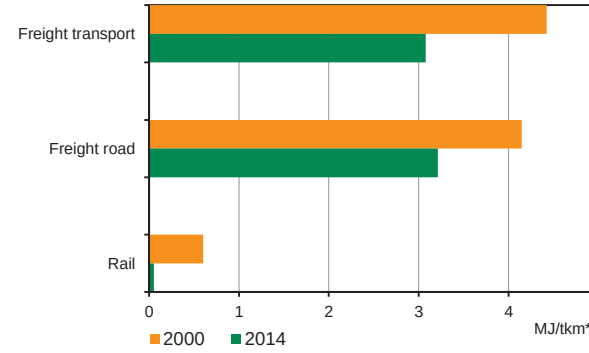



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

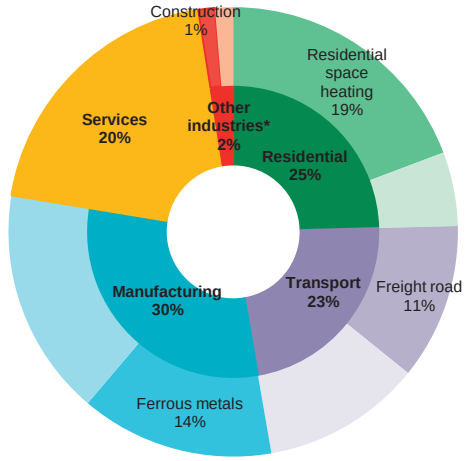



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

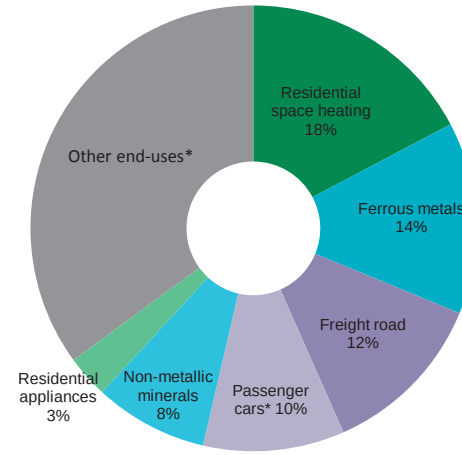
# LUXEMBOURG

## Cross-sectoral overview

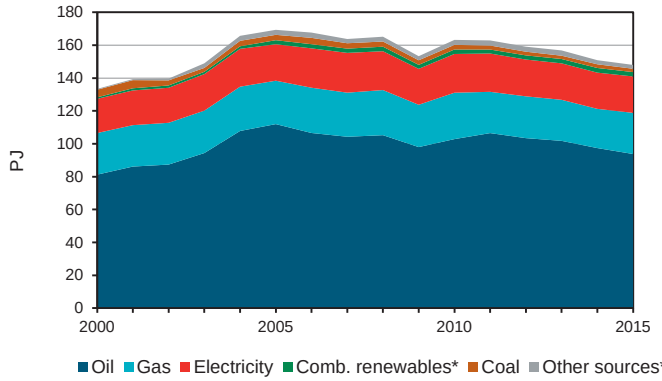
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

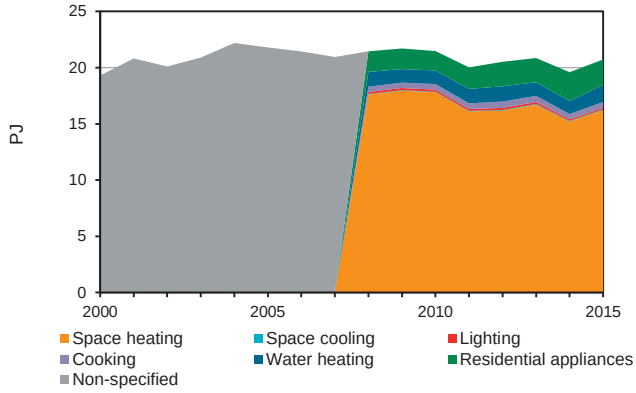
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# LUXEMBOURG

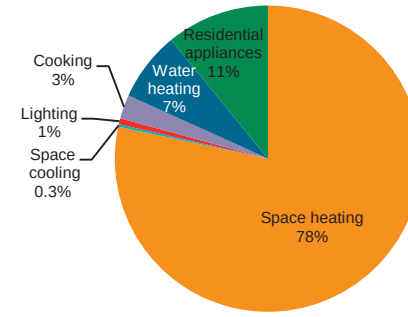
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 19 | NA | 0.4 | 44 | 119 | 2.6 |
| **2015** | 21 | 91 | 0.6 | 37 | 132 | 2.5 |

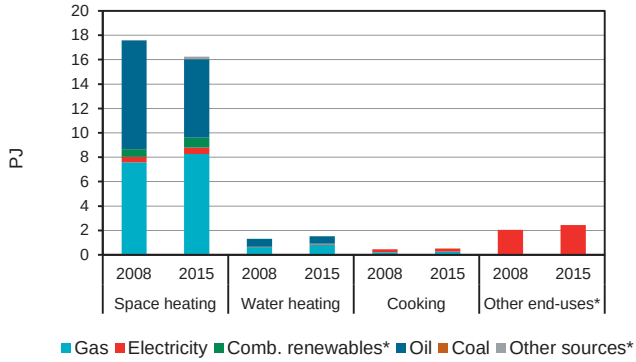
### Residential energy consumption by end-use



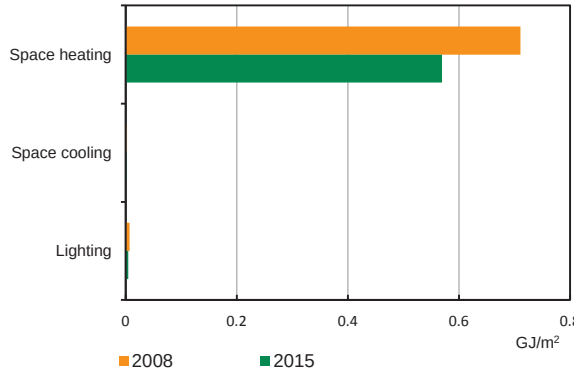

### Residential energy consumption by end-use, 2015



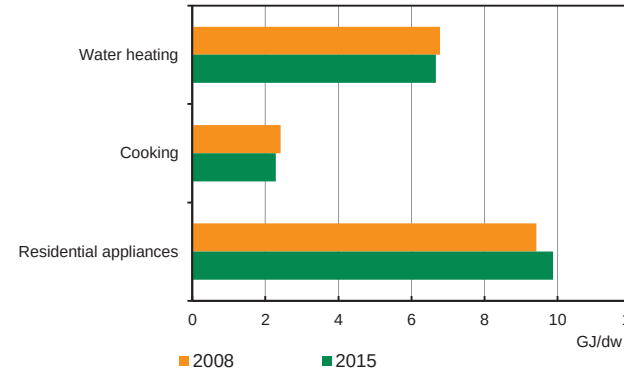

### Residential energy consumption by source




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



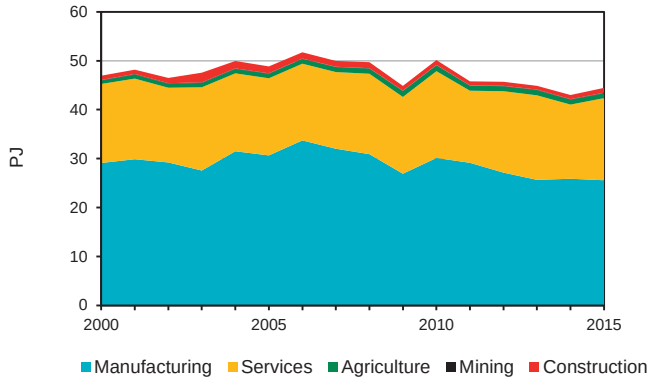

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# LUXEMBOURG

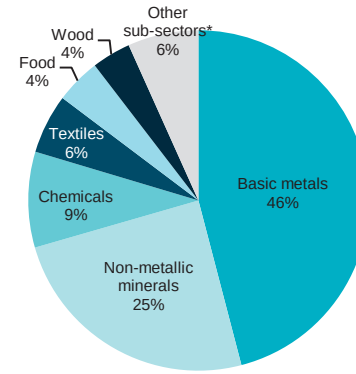
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 29 | 16 | 2 | 32 | 3 | 24 |
| **2015** | 26 | 17 | 2 | 50 | 2 | 39 |

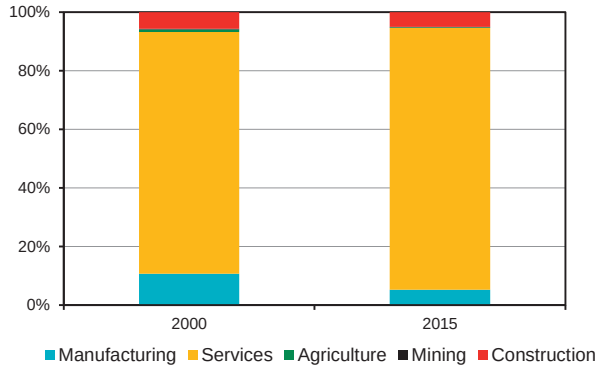
### Industry and services energy consumption



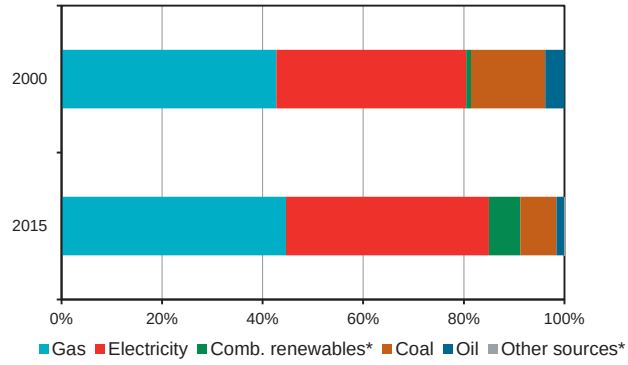

### Manufacturing energy consumption by sub-sector, 2015




### Value added** by sector




### Manufacturing energy consumption by source




### Selected energy intensities

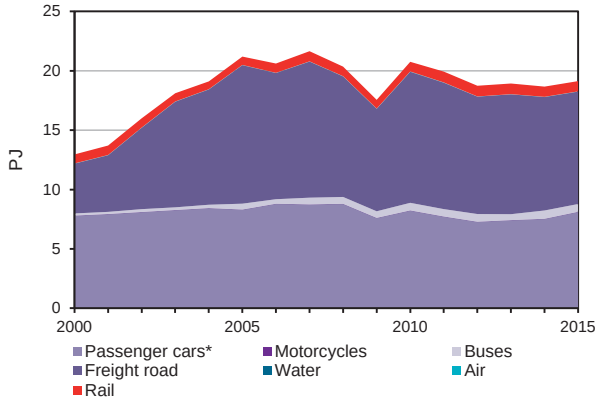
*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# LUXEMBOURG

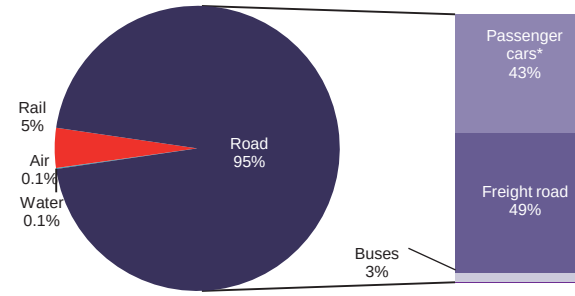
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 8 | 5 | 6 | 9 | NA | NA |
| **2015** | 9 | 10 | 9 | 7 | 1.2 | NA |

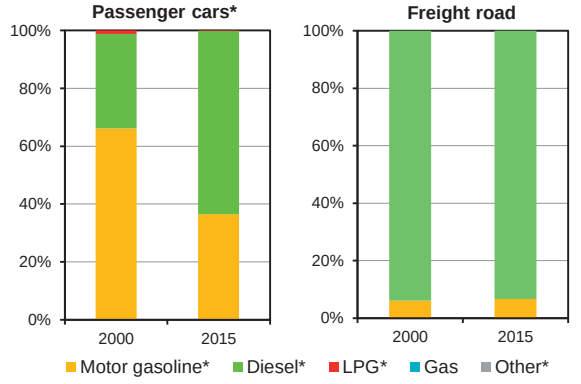
### Transport energy consumption by mode/vehicle type



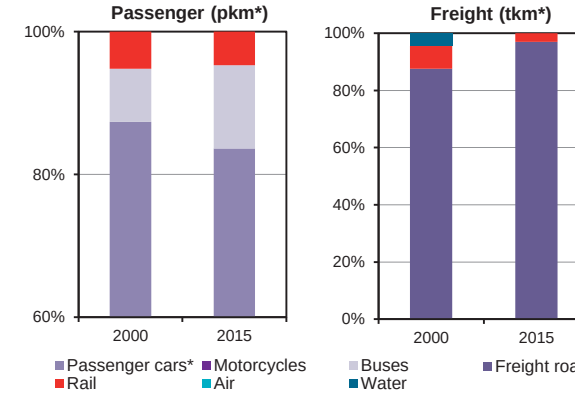

### Transport energy consumption by mode/vehicle type, 2015



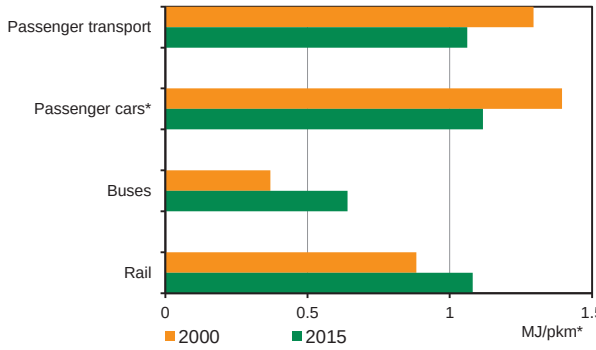

### Energy consumption in road transport by source



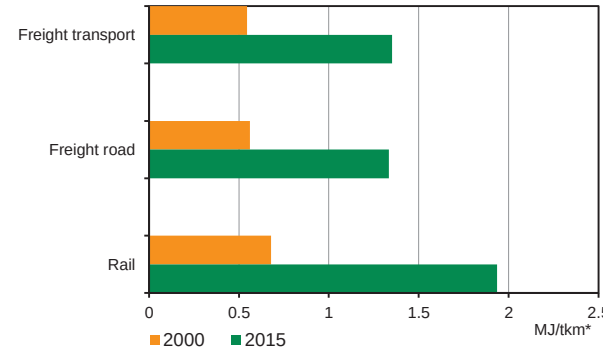

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

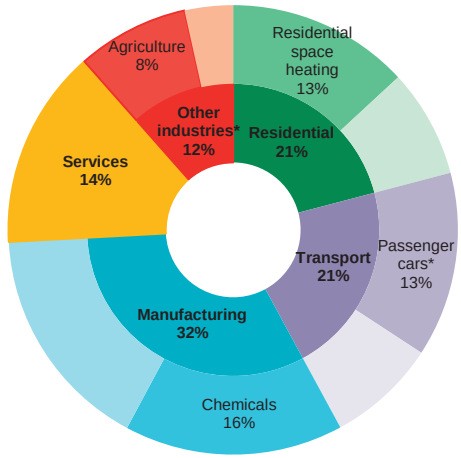



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

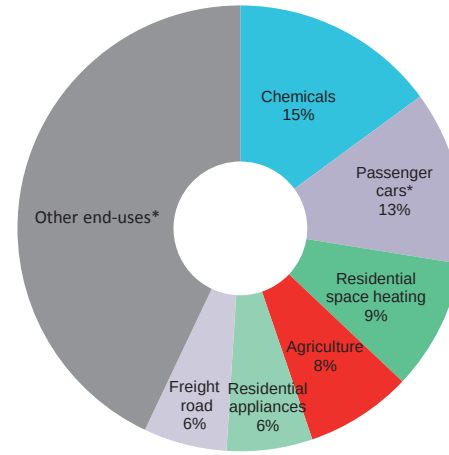
# NETHERLANDS

## Cross-sectoral overview

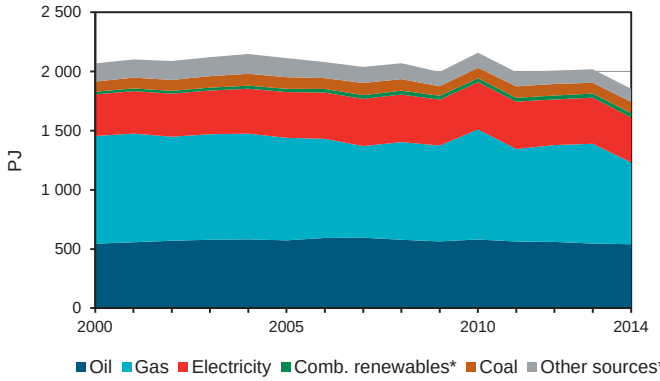
### Largest end-uses by sector, 2014



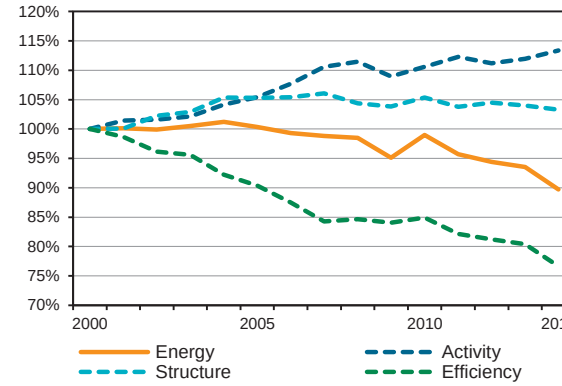

### Top six $CO_2$ emitting end-uses, 2014**



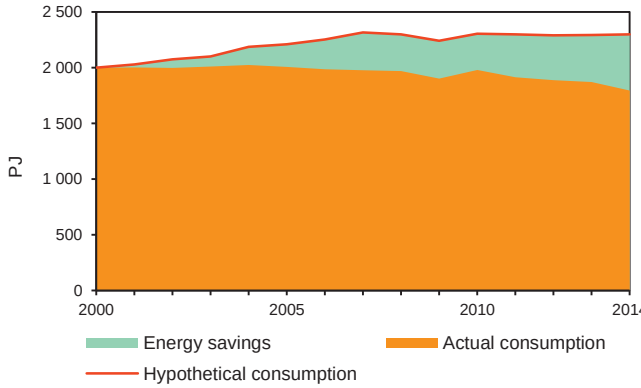

### Final energy consumption by source



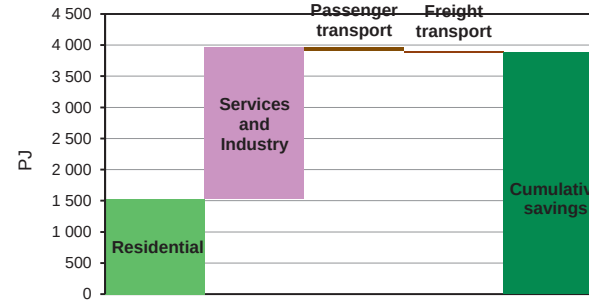

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

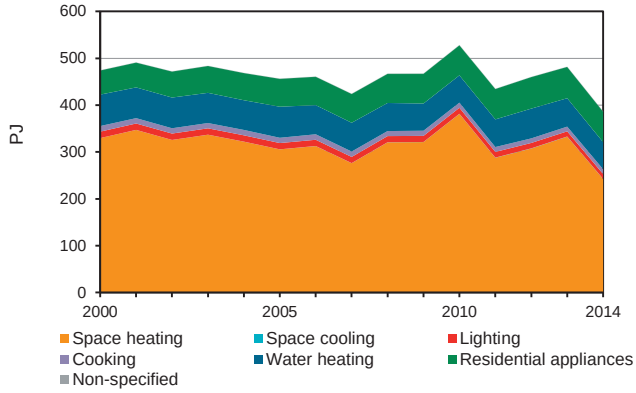
***These figures display results from the IEA decomposition analysis and cover approximately 96% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# NETHERLANDS

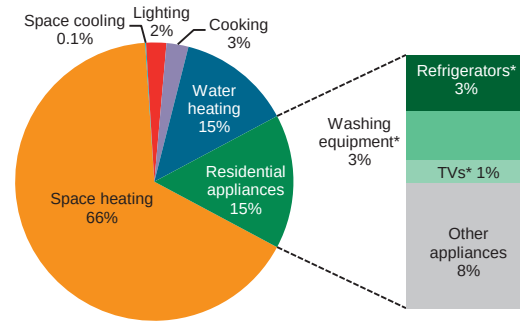
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 474 | 92 | 16 | 30 | 106 | 2.4 |
| **2015** | 413 | 88 | 17 | 24 | 124 | 2.3 |

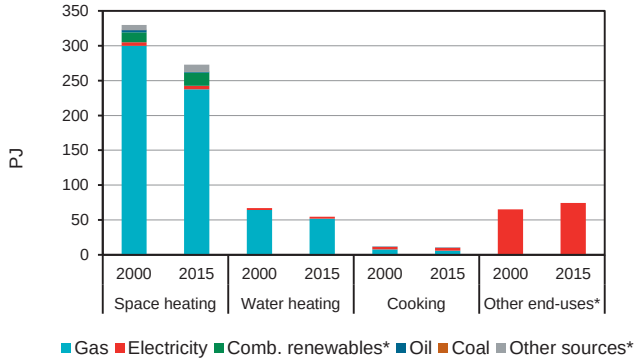
### Residential energy consumption by end-use



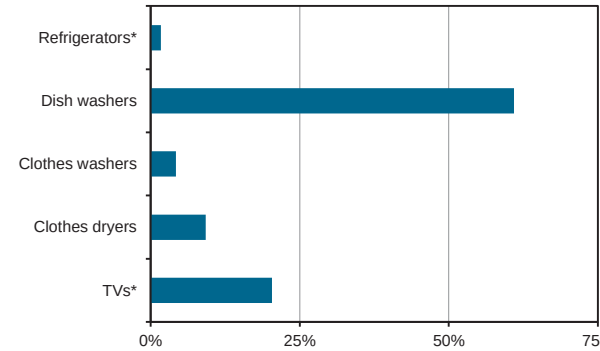

### Residential energy consumption by end-use, 2015



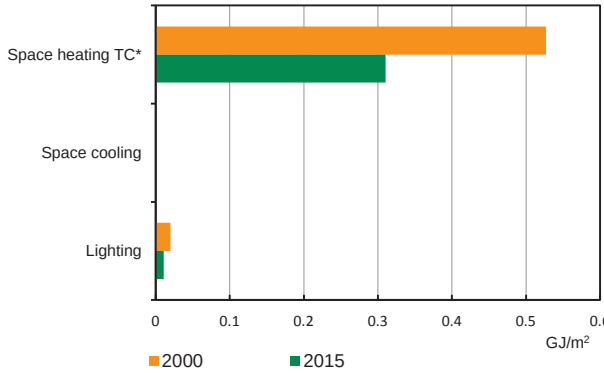

### Residential energy consumption by source



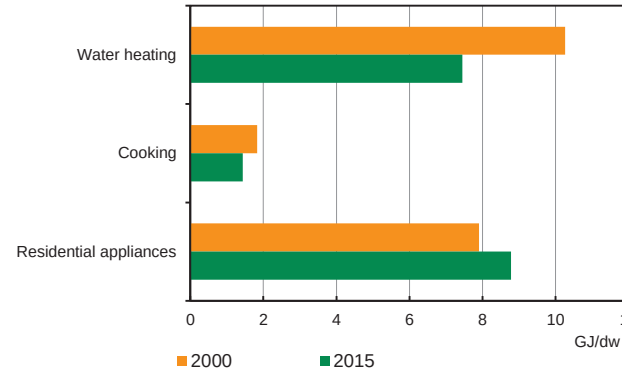

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

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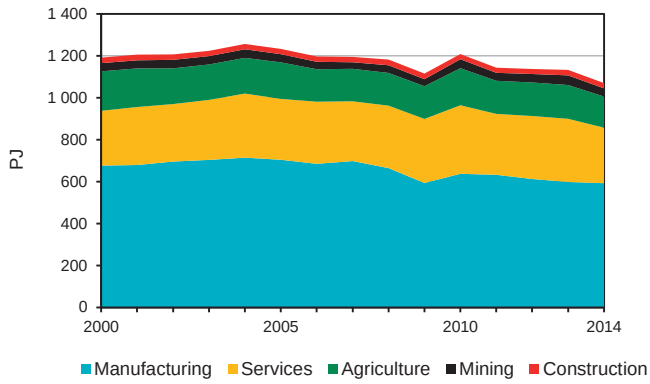
# NETHERLANDS

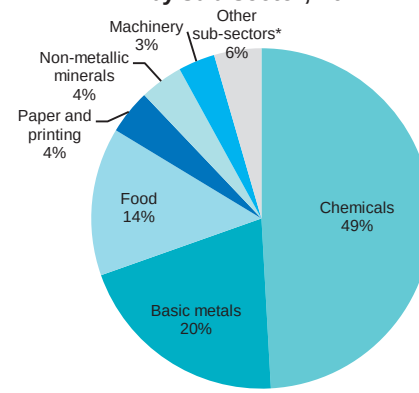
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 676 | 261 | 254 | 653 | 70 | 431 |
| **2014** | 592 | 265 | 213 | 757 | 77 | 534 |

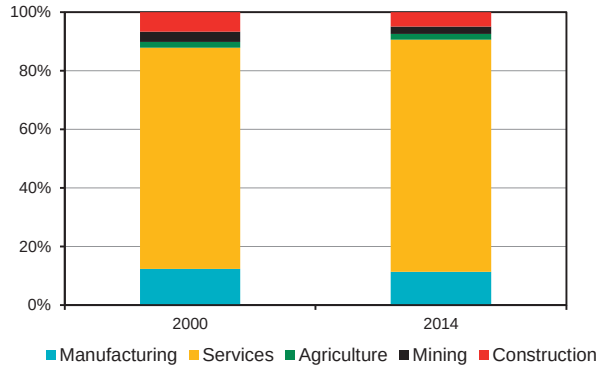
### Industry and services energy consumption



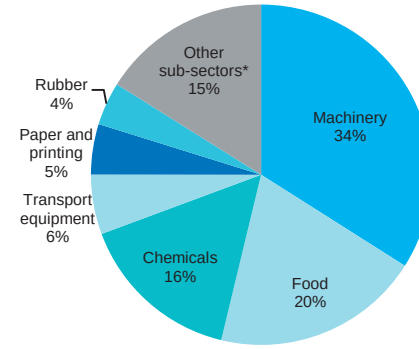

### Manufacturing energy consumption by sub-sector, 2014



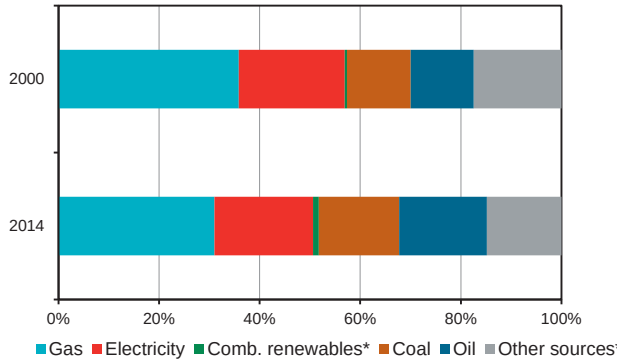

### Value added** by sector



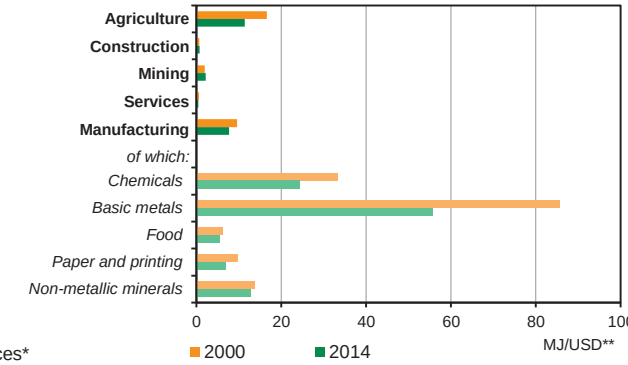

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



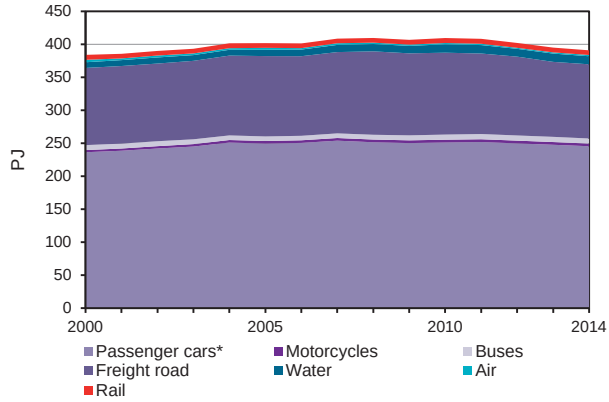

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# NETHERLANDS

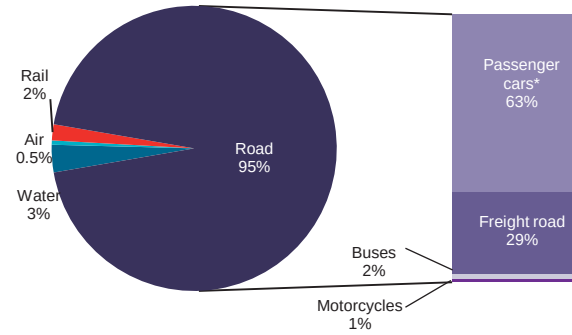
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 256 | 128 | 169 | 92 | 1.6 | 2.0 |
| **2014** | 264 | 127 | 175 | 103 | 1.4 | 2.1 |

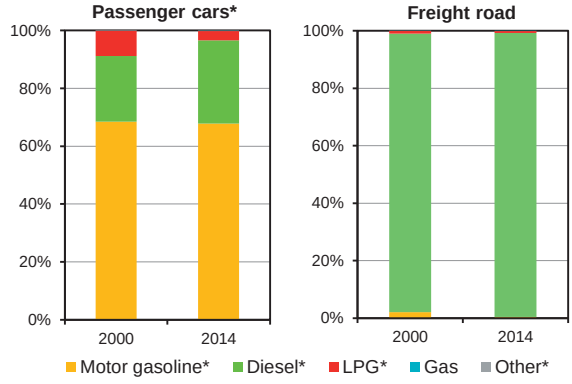
### Transport energy consumption by mode/vehicle type



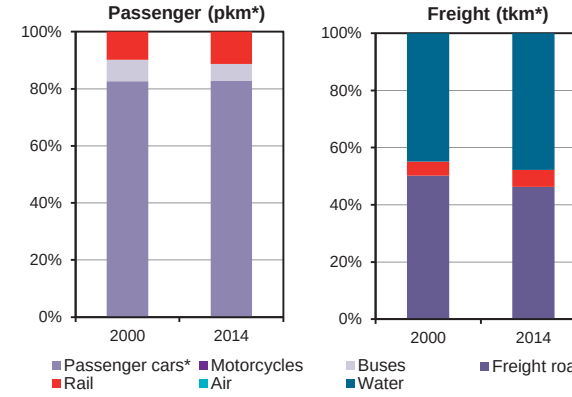

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

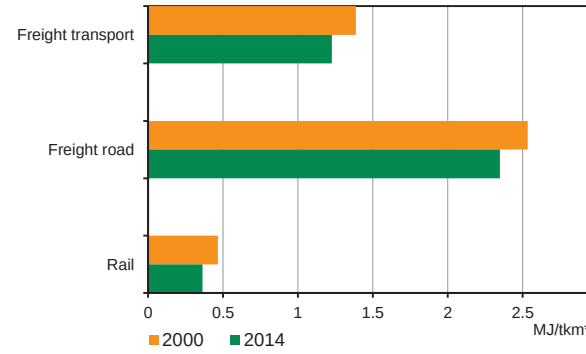



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

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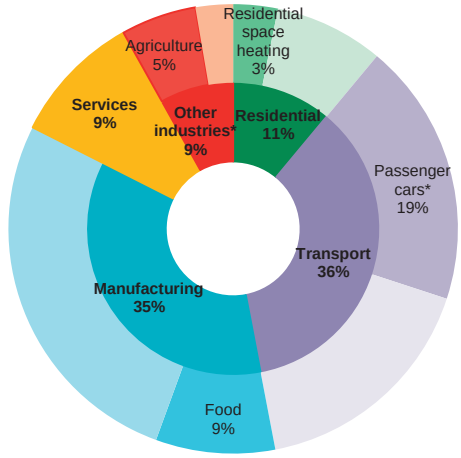
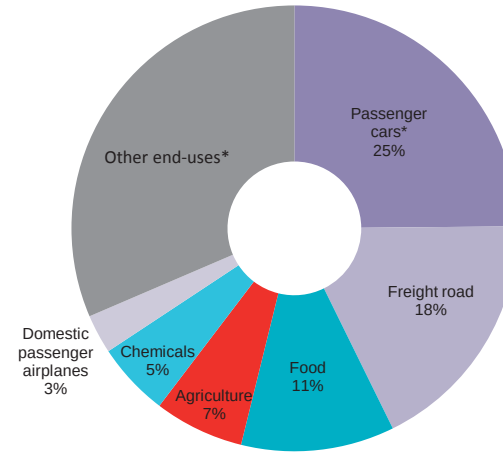
# NEW ZEALAND

## Cross-sectoral overview

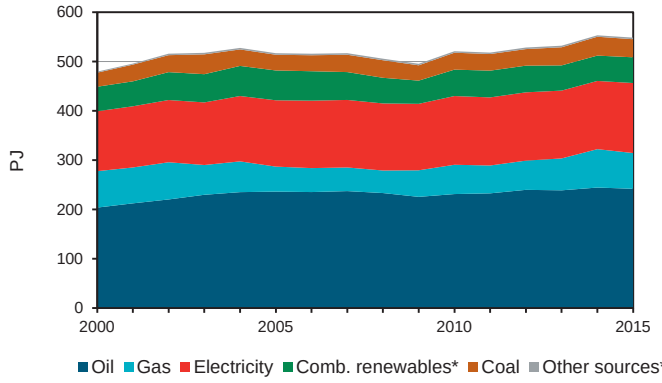
### Largest end-uses by sector, 2015



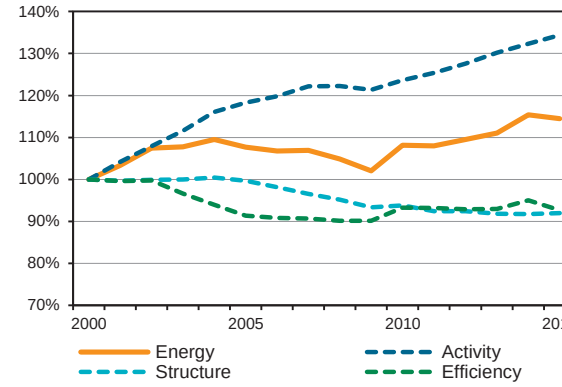

### Top six $CO_2$ emitting end-uses, 2015**



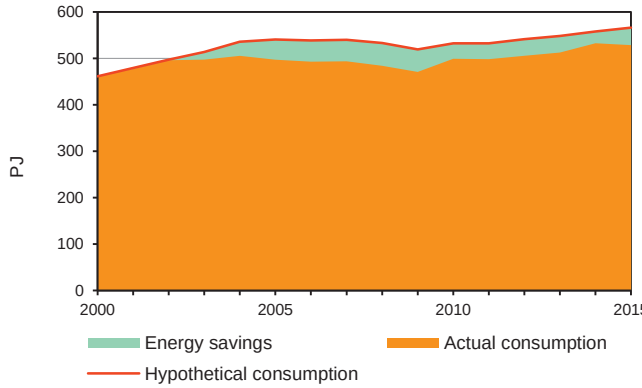

### Final energy consumption by source



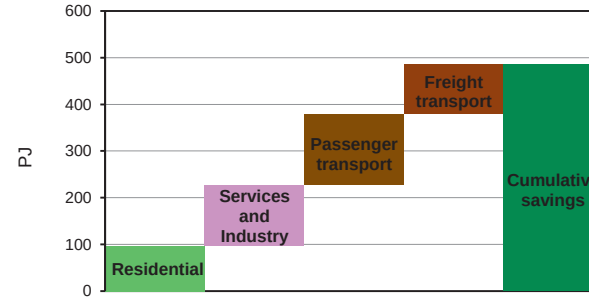

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

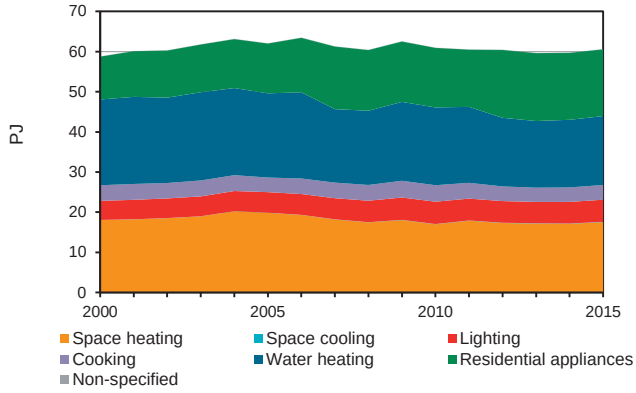
***These figures display results from the IEA decomposition analysis and cover approximately 96% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# NEW ZEALAND

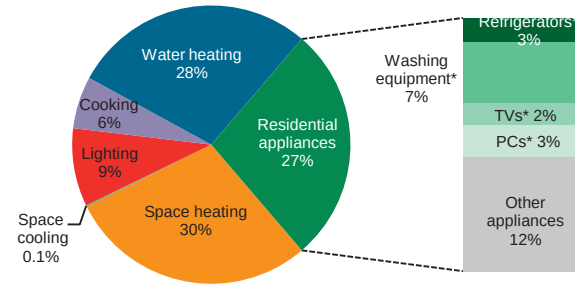
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 59 | 31 | 4 | 15 | 120 | 2.7 |
| **2015** | 61 | 30 | 5 | 13 | 132 | 2.6 |

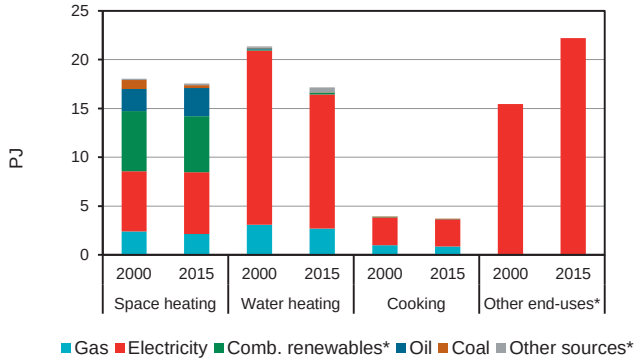
### Residential energy consumption by end-use



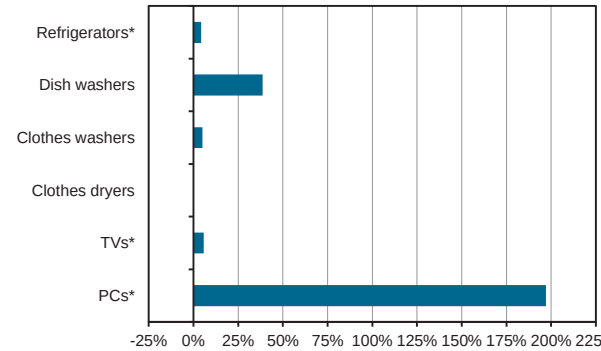

### Residential energy consumption by end-use, 2015



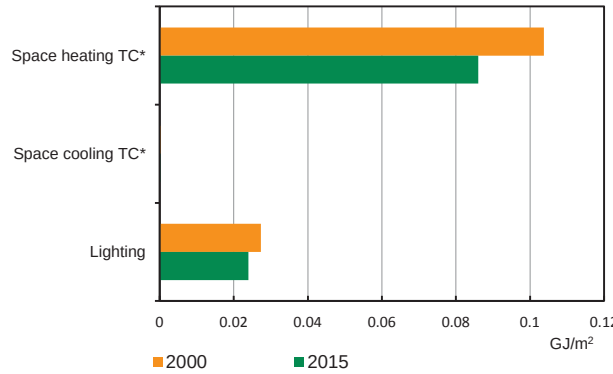

### Residential energy consumption by source




### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

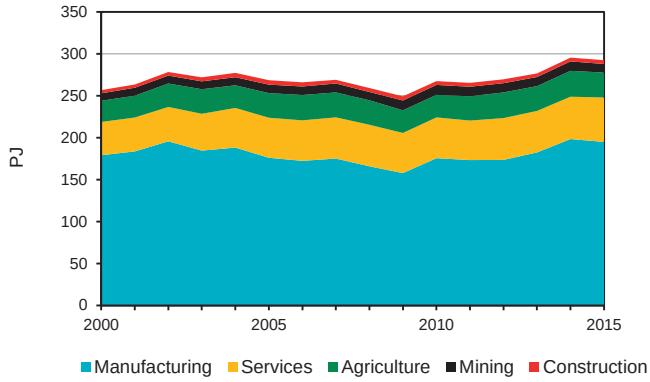
*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# NEW ZEALAND

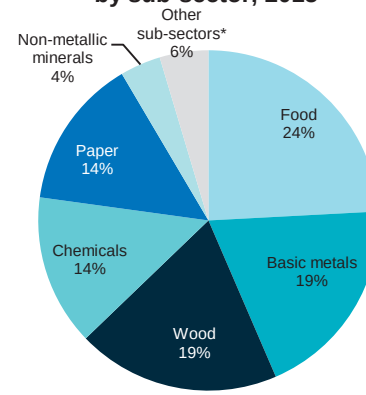
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 179 | 39 | 38 | 106 | 22 | 53 |
| **2015** | 195 | 51 | 44 | 156 | 25 | 78 |

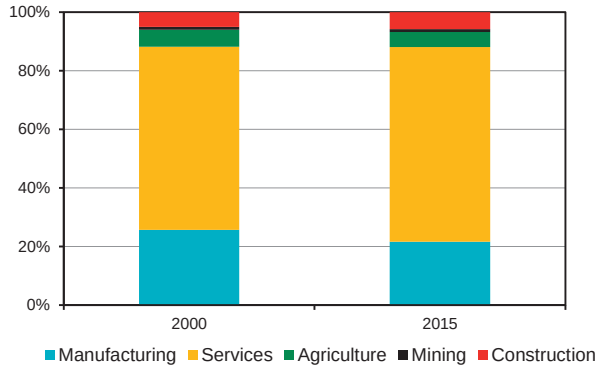
### Industry and services energy consumption



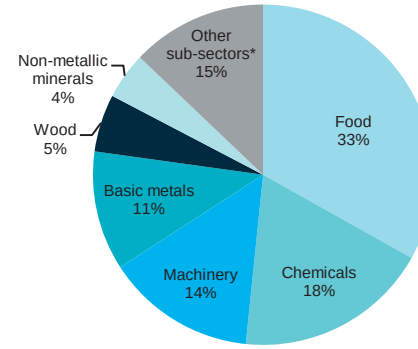

### Manufacturing energy consumption by sub-sector, 2015



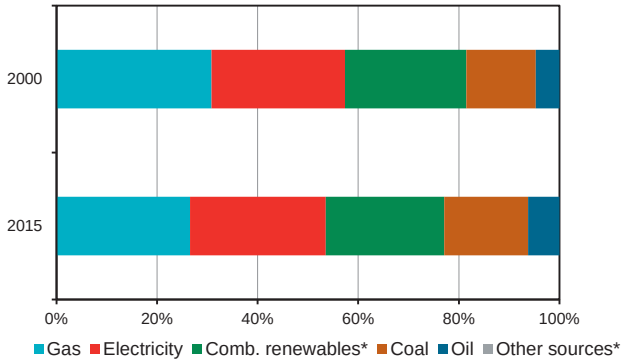

### Value added** by sector



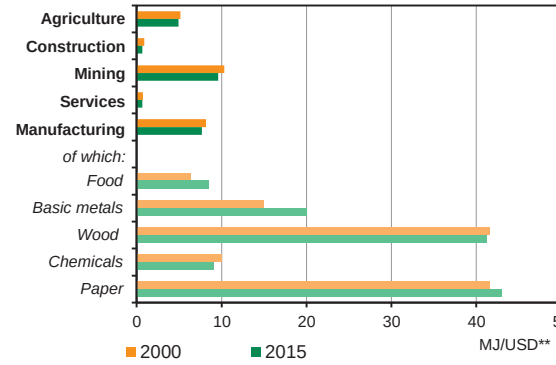

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



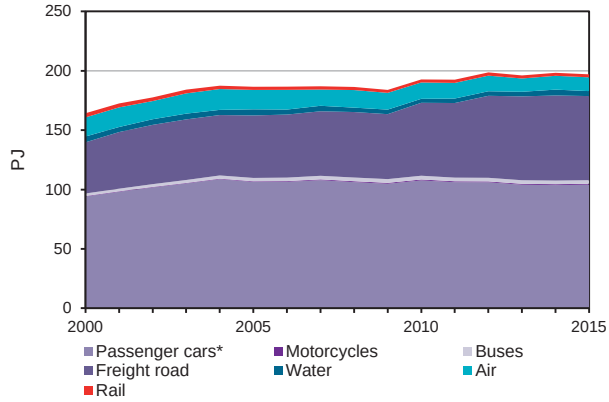

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# NEW ZEALAND

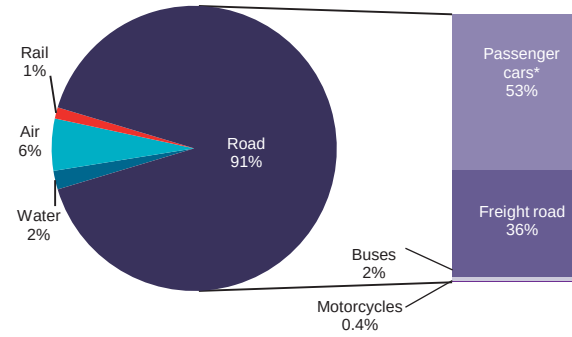
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 113 | 51 | 51 | 25 | 1.7 | 2.4 |
| **2015** | 120 | 77 | 64 | 40 | 1.6 | 3.1 |

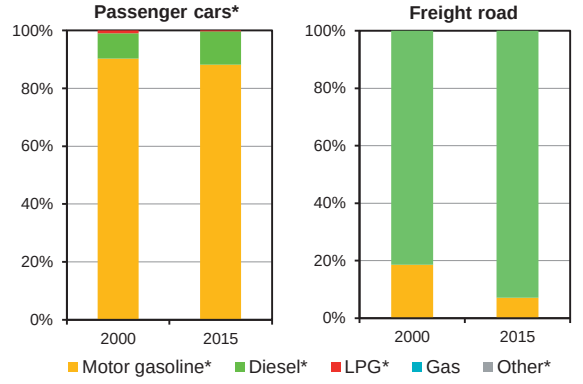
### Transport energy consumption by mode/vehicle type



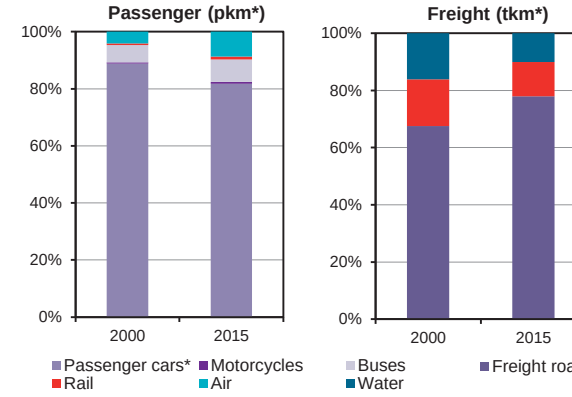

### Transport energy consumption by mode/vehicle type, 2015



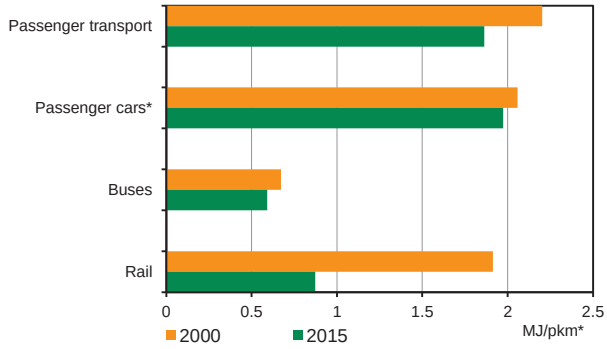

### Energy consumption in road transport by source



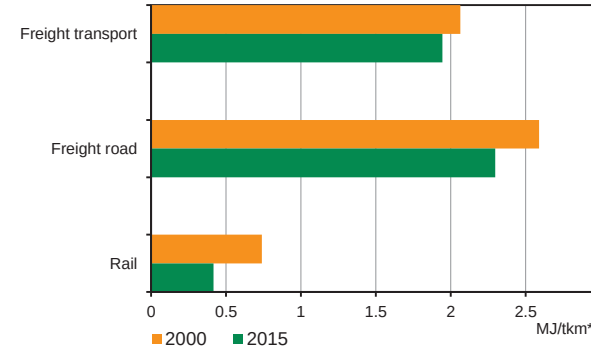

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

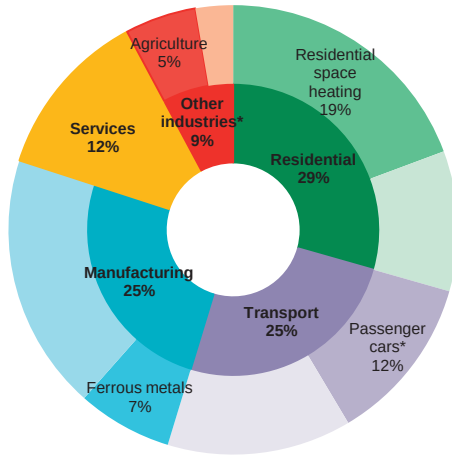



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

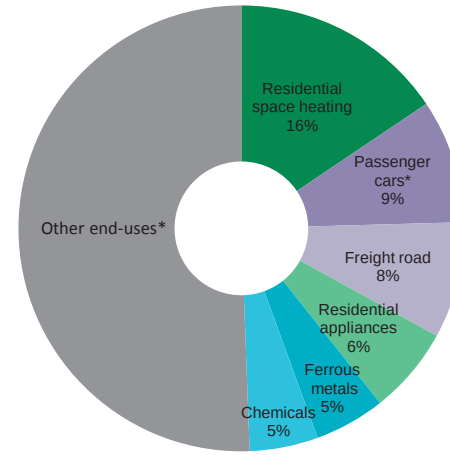
# POLAND

## Cross-sectoral overview

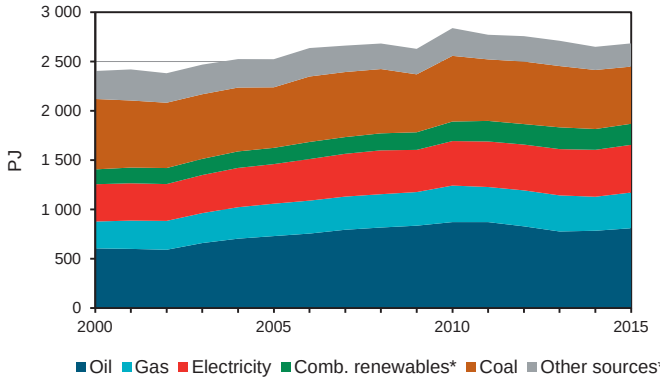
### Largest end-uses by sector, 2015



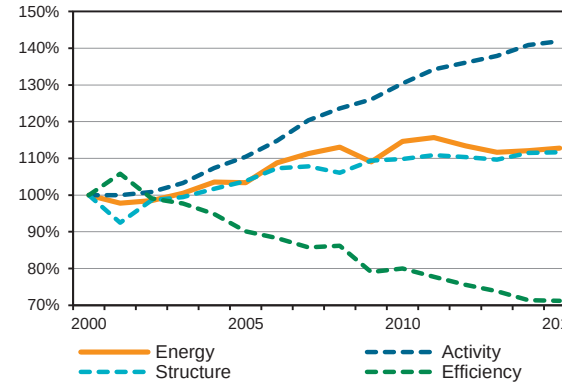

### Top six $CO_2$ emitting end-uses, 2015**



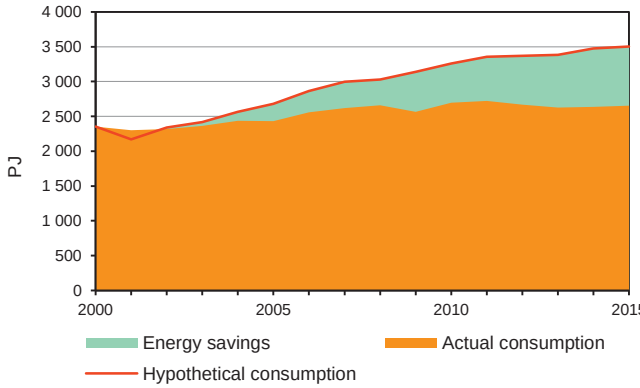

### Final energy consumption by source



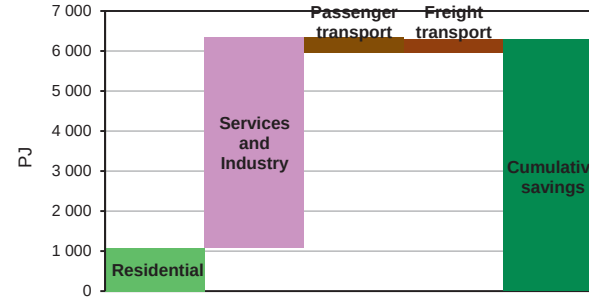

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

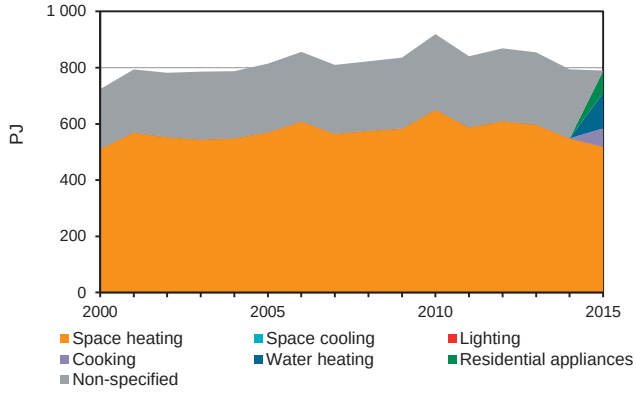
***These figures display results from the IEA decomposition analysis and cover approximately 97% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# POLAND

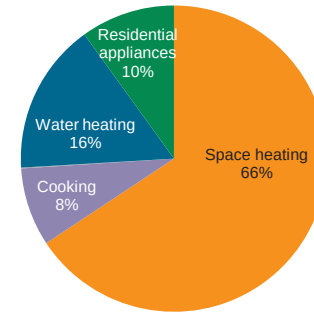
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 724 | 50 | 38 | 19 | 67 | 3.2 |
| **2015** | 790 | 59 | 39 | 21 | 74 | 2.7 |

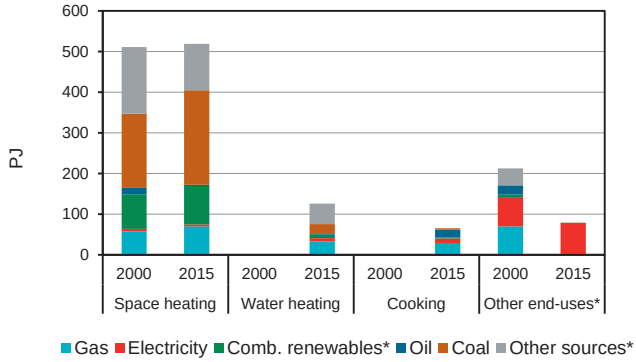
### Residential energy consumption by end-use



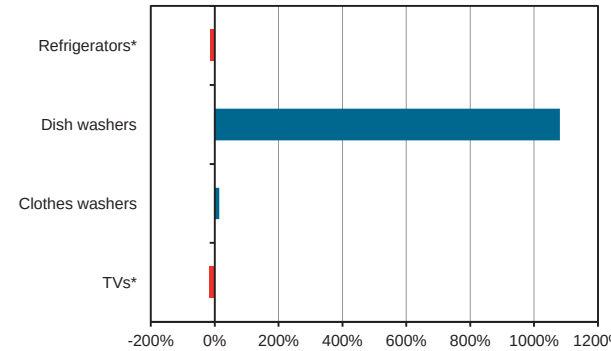

### Residential energy consumption by end-use, 2015



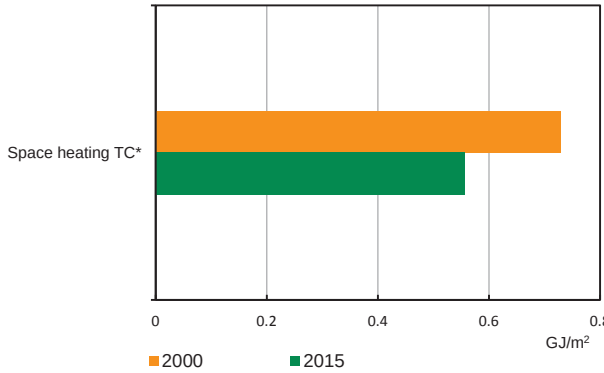

### Residential energy consumption by source




### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area



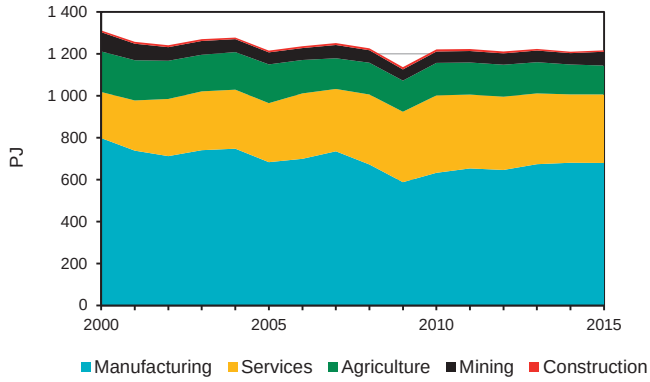

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# POLAND

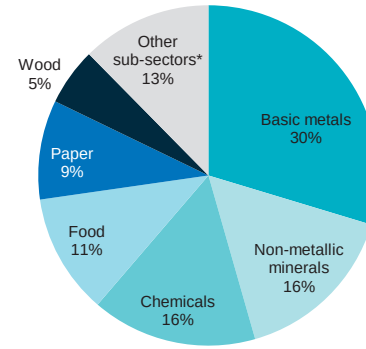
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 798 | 220 | 293 | 542 | 39 | 322 |
| **2015** | 679 | 327 | 210 | 919 | 142 | 500 |

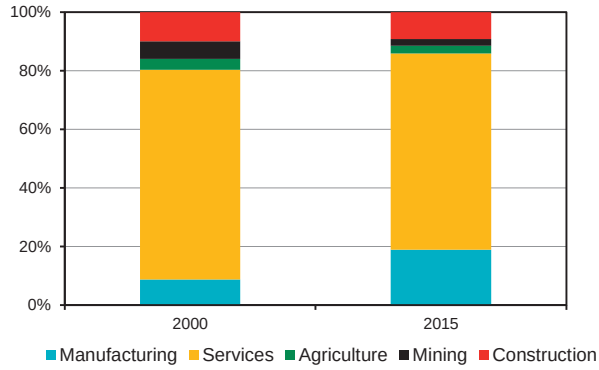
### Industry and services energy consumption



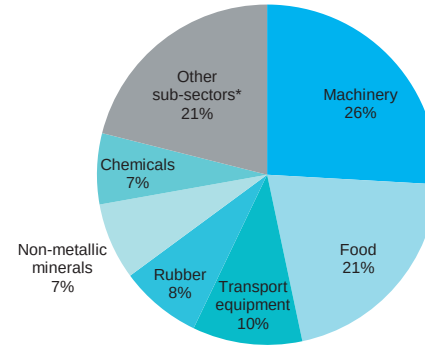

### Manufacturing energy consumption by sub-sector, 2015



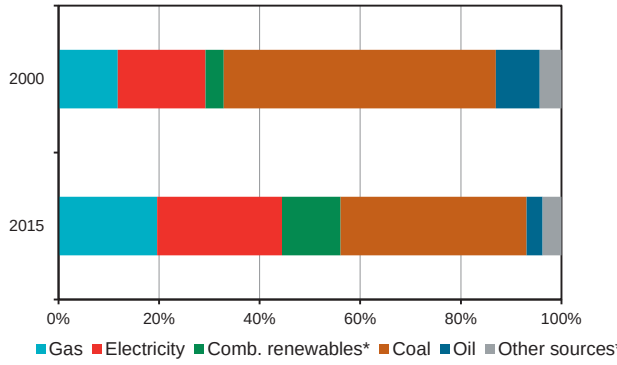

### Value added** by sector



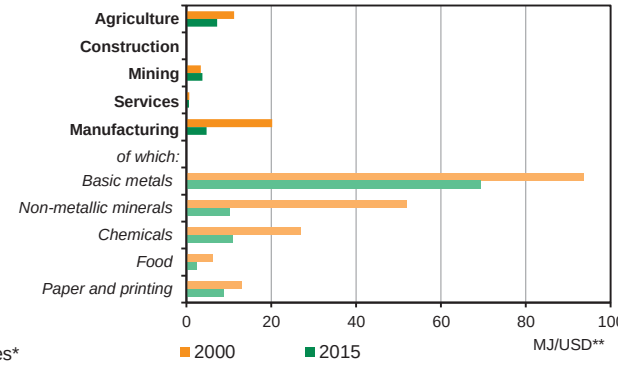

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



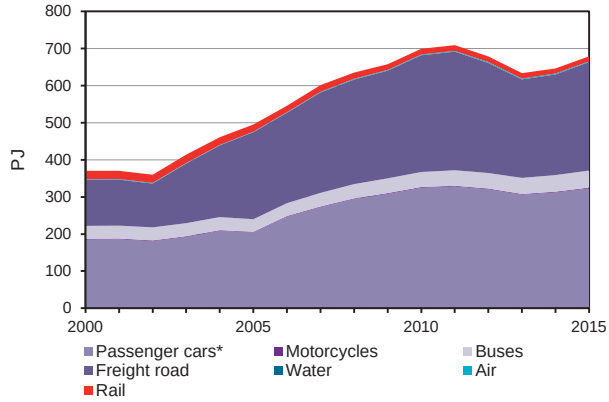

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# POLAND

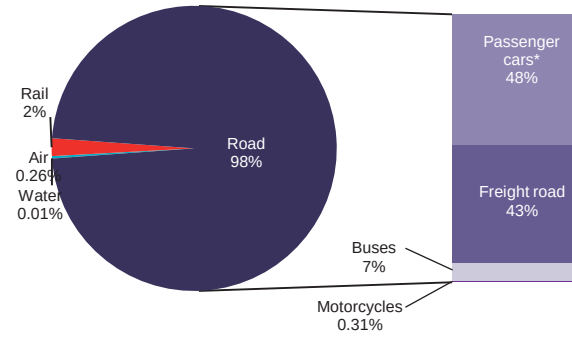
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 229 | 141 | 191 | 131 | 1.9 | NA |
| **2015** | 376 | 303 | NA | 324 | NA | NA |

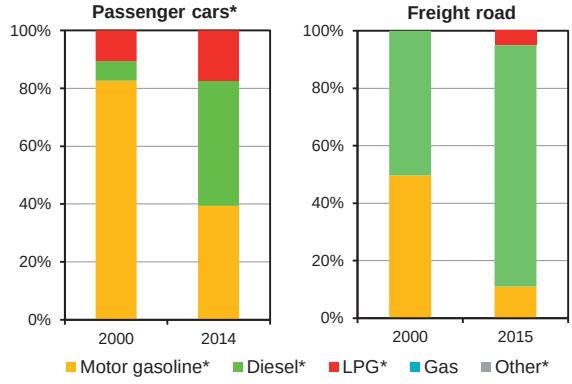
### Transport energy consumption by mode/vehicle type



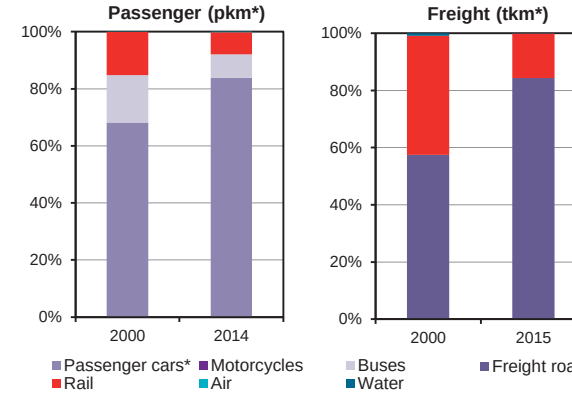

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

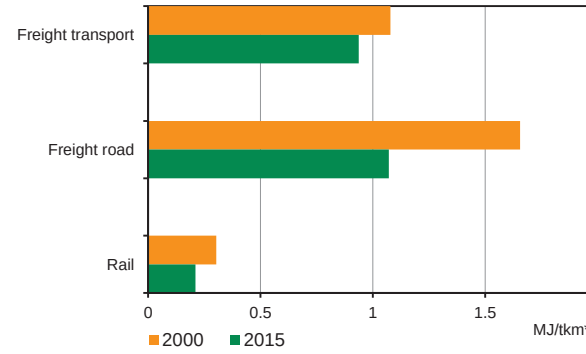



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

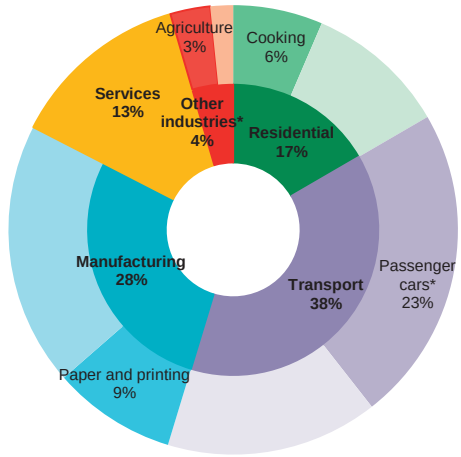



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

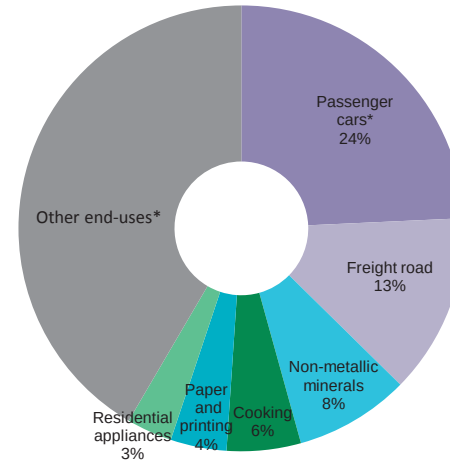
# PORTUGAL

## Cross-sectoral overview

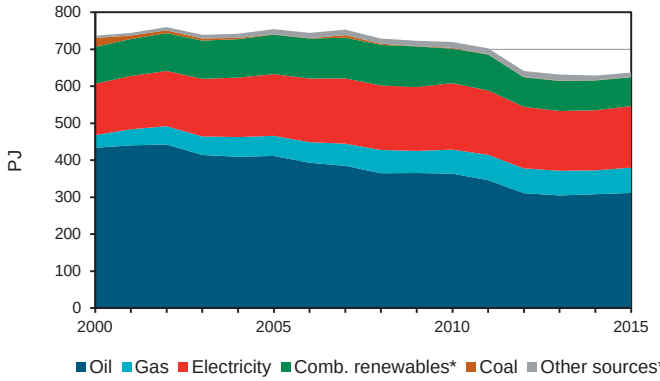
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

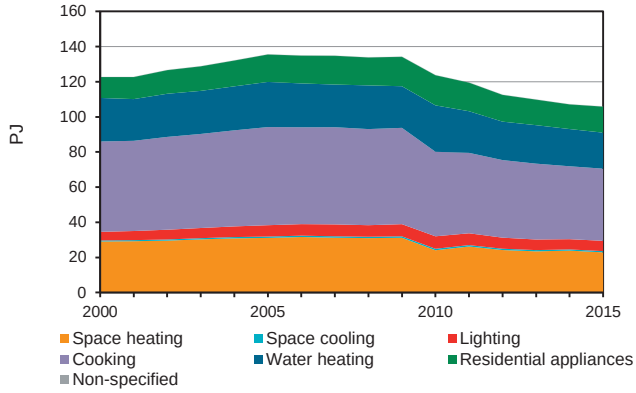
***These figures display results from the IEA decomposition analysis and cover approximately 97% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# PORTUGAL

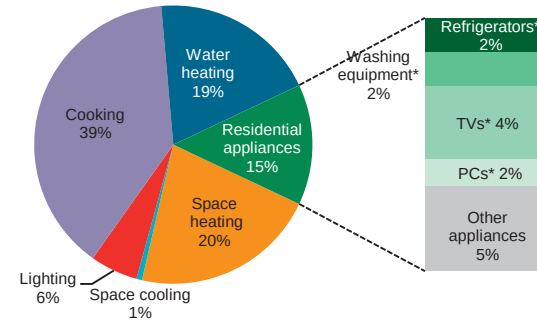
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 123 | 4 | 10 | 12 | 86 | 3.1 |
| **2015** | 106 | 12 | 10 | 10 | 109 | 2.6 |

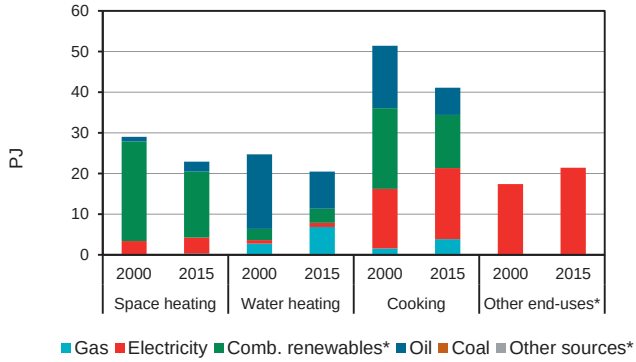
### Residential energy consumption by end-use



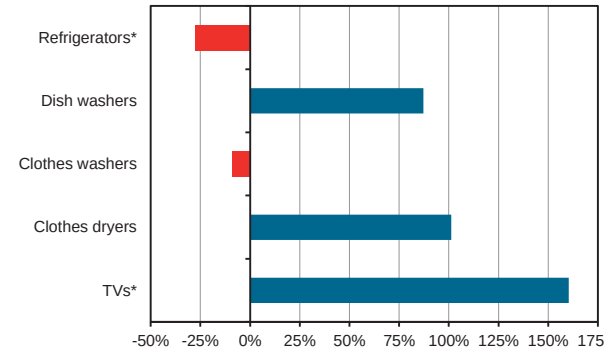

### Residential energy consumption by end-use, 2015



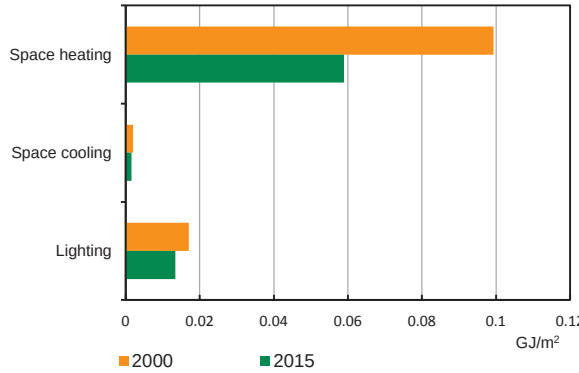

### Residential energy consumption by source



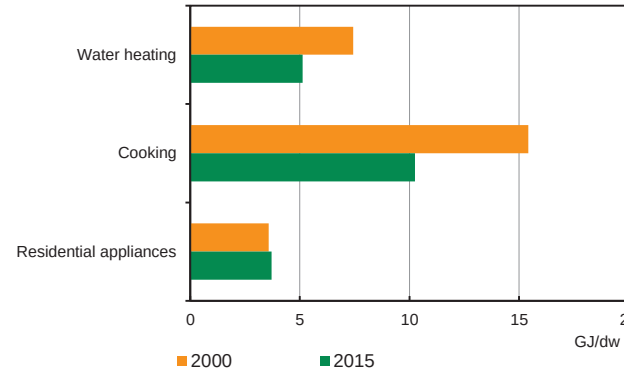

### Appliances per dwelling, 2000-12 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



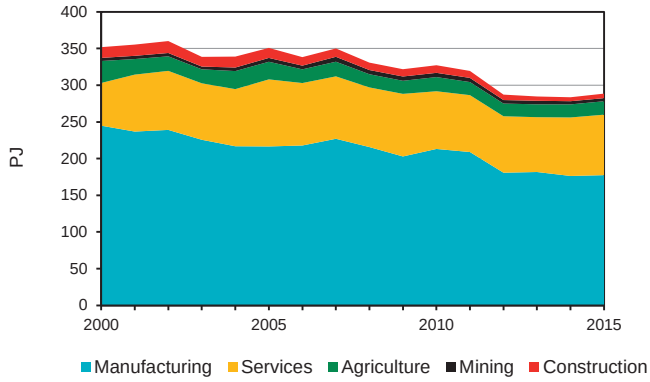

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# PORTUGAL

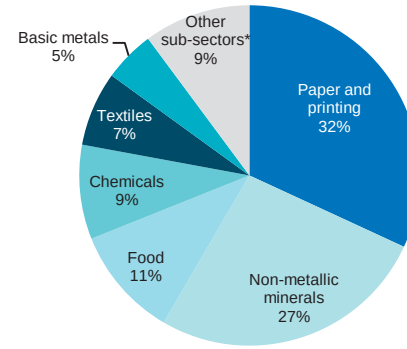
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 245 | 54 | 49 | 265 | 33 | 160 |
| **2015** | 177 | 77 | 29 | 272 | 34 | 184 |

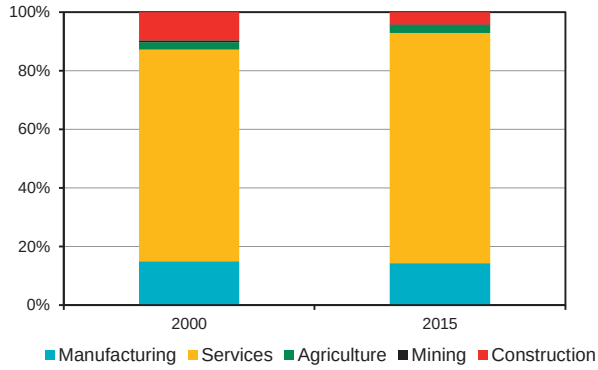
### Industry and services energy consumption



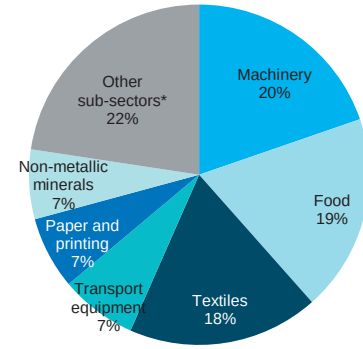

### Manufacturing energy consumption by sub-sector, 2015



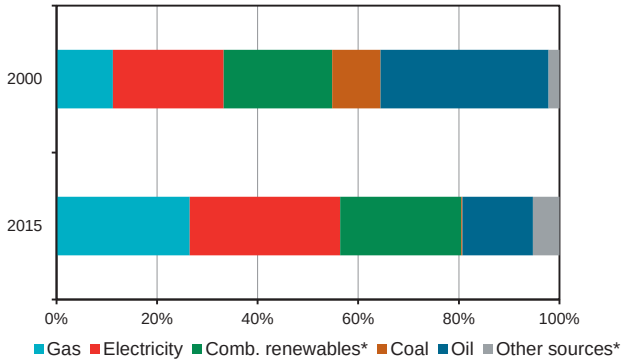

### Value added** by sector



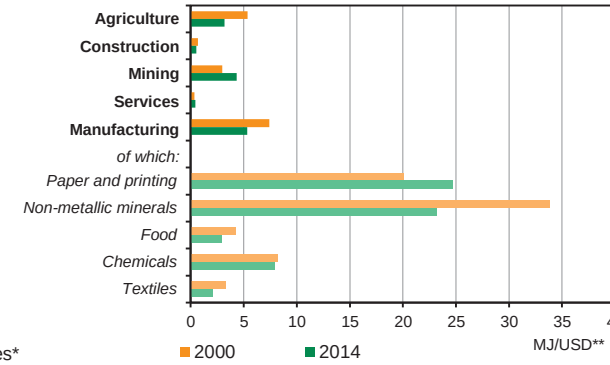

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



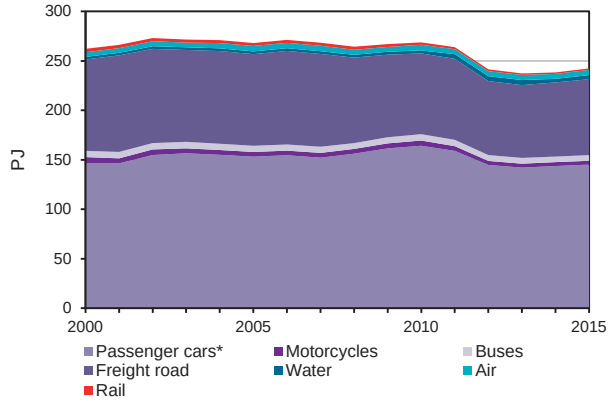

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# PORTUGAL

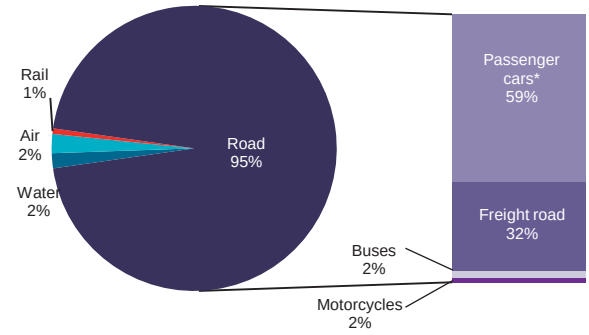
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 166 | 97 | 93 | 41 | 1.5 | 1.9 |
| **2015** | 161 | 82 | 103 | 38 | NA | NA |

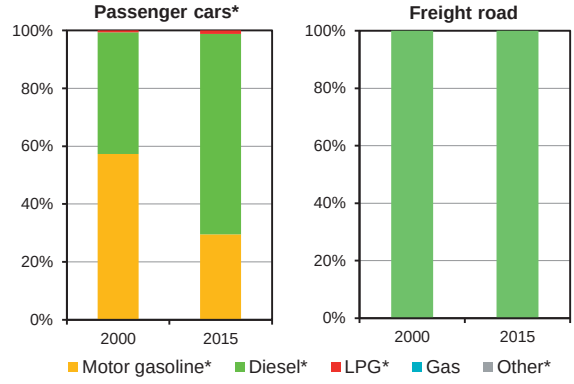
### Transport energy consumption by mode/vehicle type



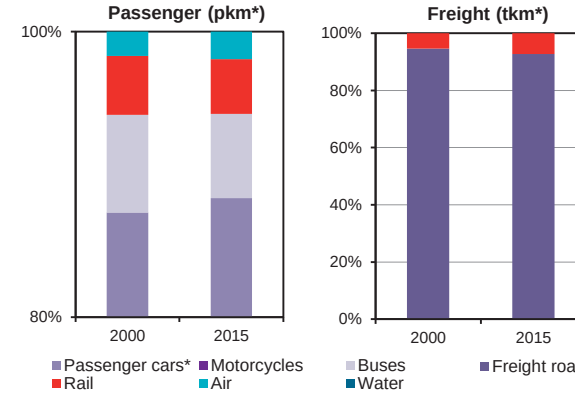

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

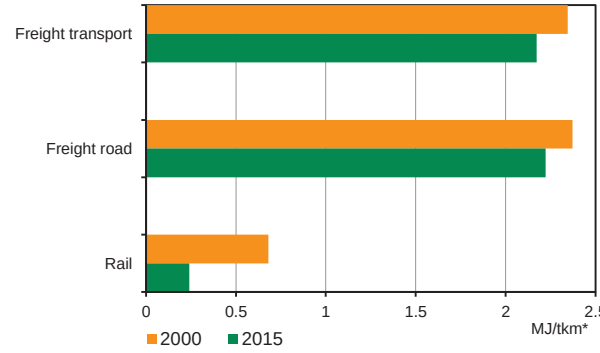



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

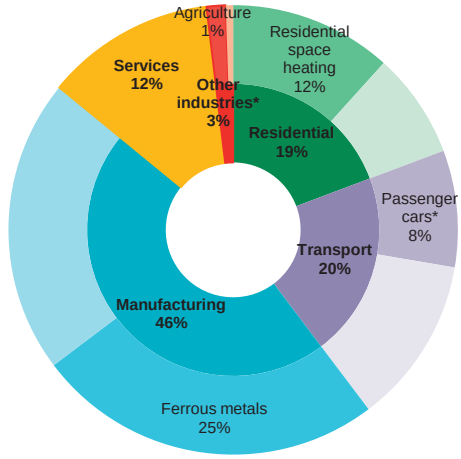



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

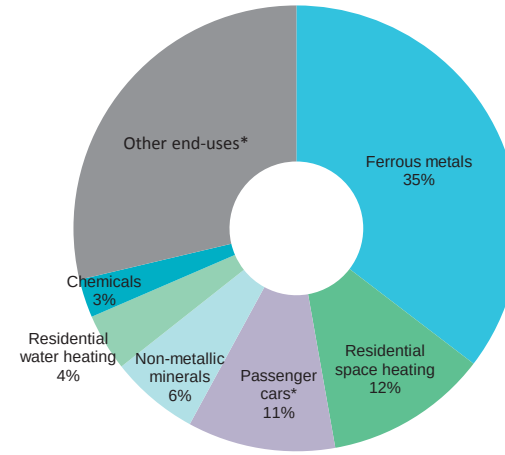
# SLOVAK REPUBLIC

## Cross-sectoral overview

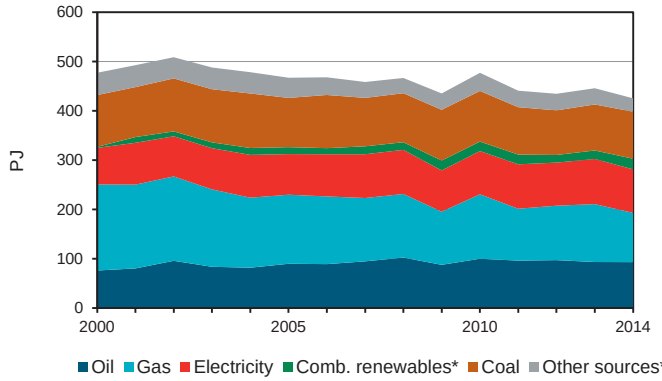
### Largest end-uses by sector, 2014




### Top six $CO_2$ emitting end-uses, 2014**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

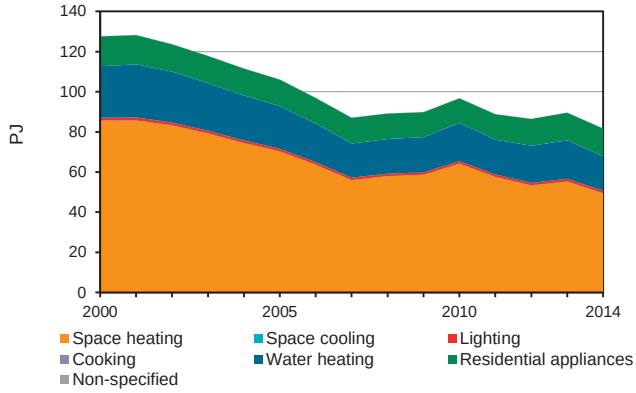
***These figures display results from the IEA decomposition analysis and cover approximately 94% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# SLOVAK REPUBLIC

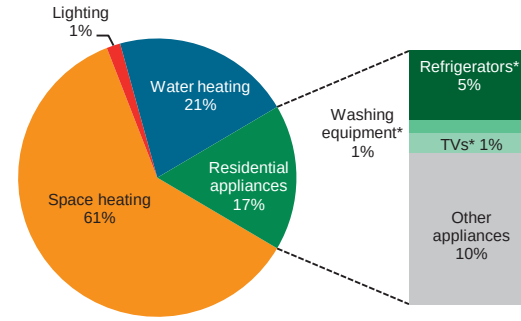
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 128 | 67 | 5 | 24 | 82 | 3.3 |
| **2014** | 82 | 72 | 5 | 15 | 86 | 3.1 |

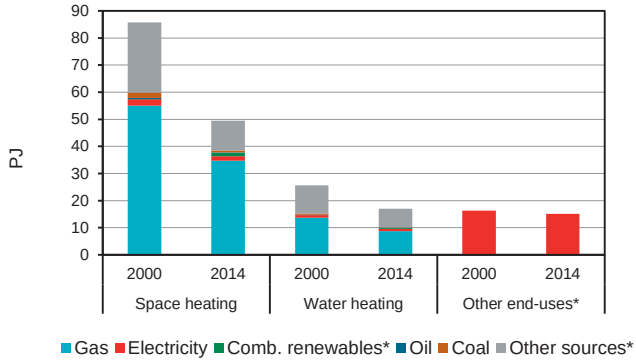
### Residential energy consumption by end-use



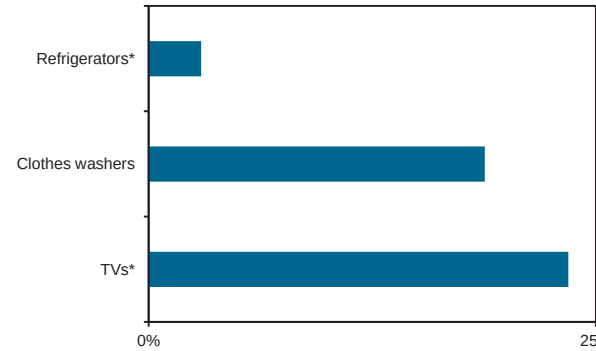

### Residential energy consumption by end-use, 2014



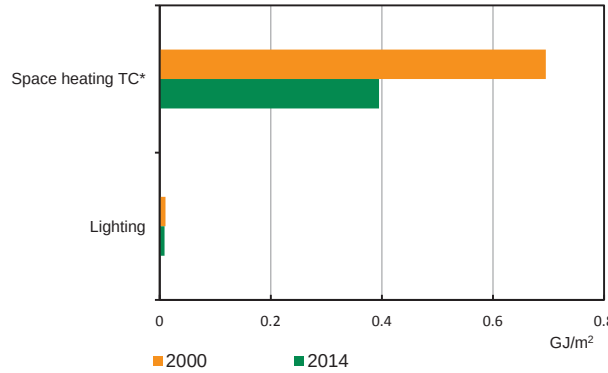

### Residential energy consumption by source



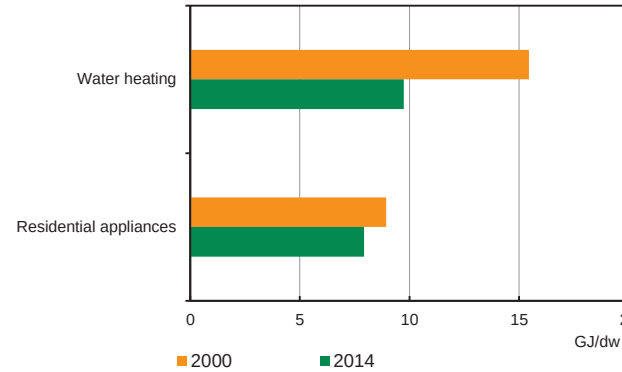

### Appliances per dwelling, 2000-14 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

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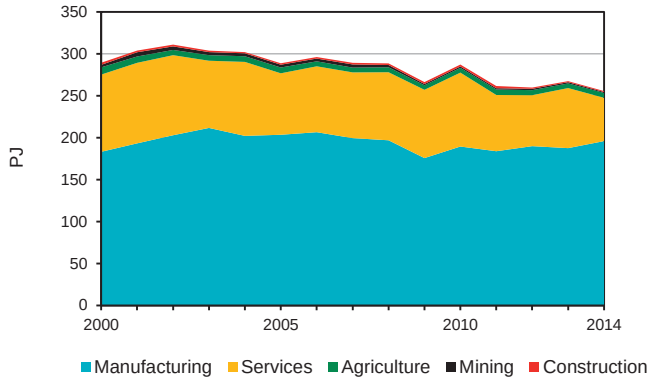
# SLOVAK REPUBLIC

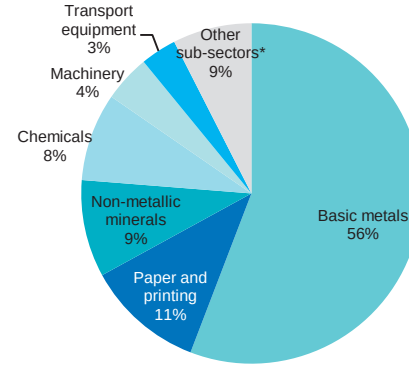
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 183 | 92 | 14 | 82 | 9 | 53 |
| **2014** | 196 | 52 | 8 | 144 | 29 | 78 |

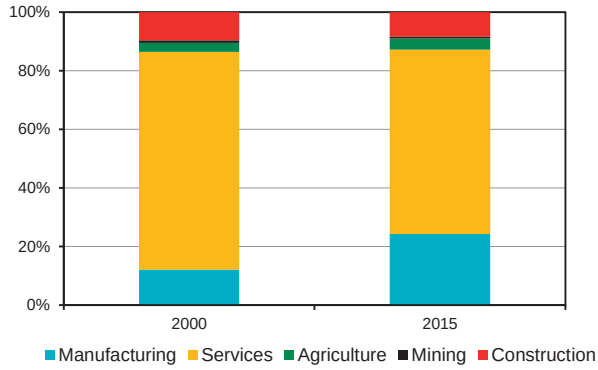
### Industry and services energy consumption



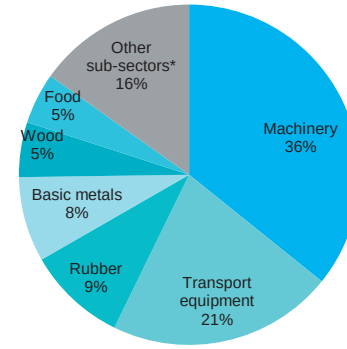

### Manufacturing energy consumption by sub-sector, 2015



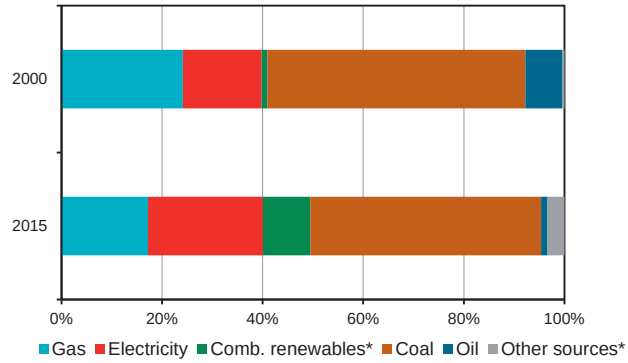

### Value added** by sector



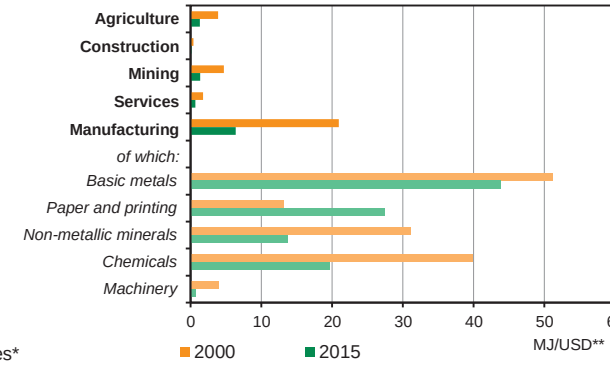

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities

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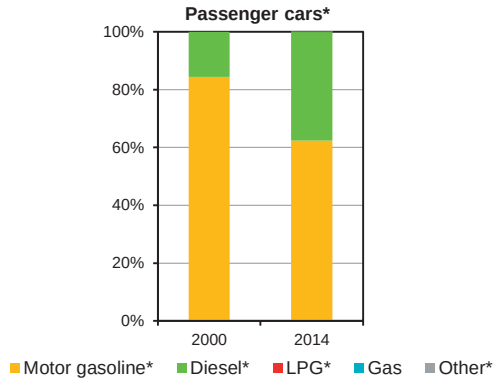
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# SLOVAK REPUBLIC

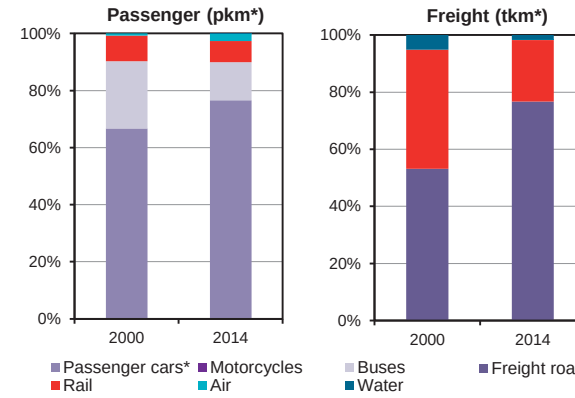
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | NA | NA | 36 | 27 | 1.9 | NA |
| **2014** | NA | NA | 35 | 41 | 1.4 | NA |

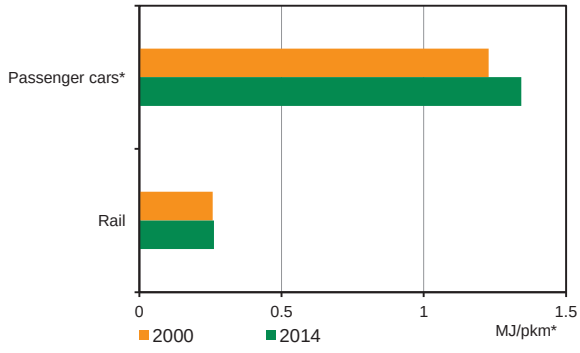
### Energy consumption in road transport by source



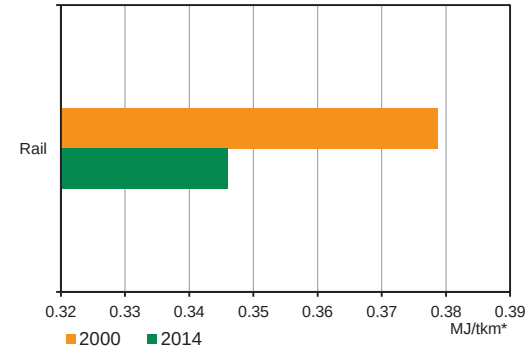

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

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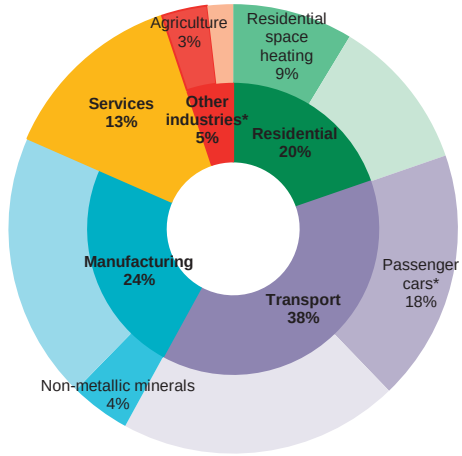
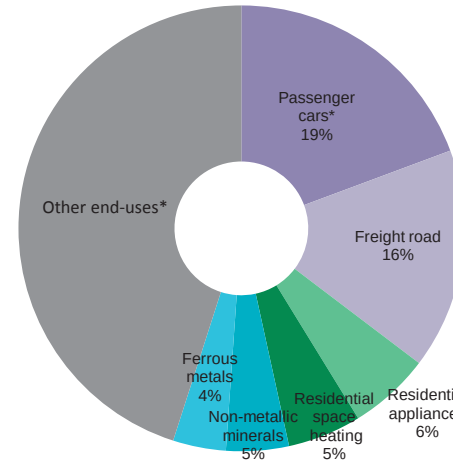
# SPAIN

## Cross-sectoral overview

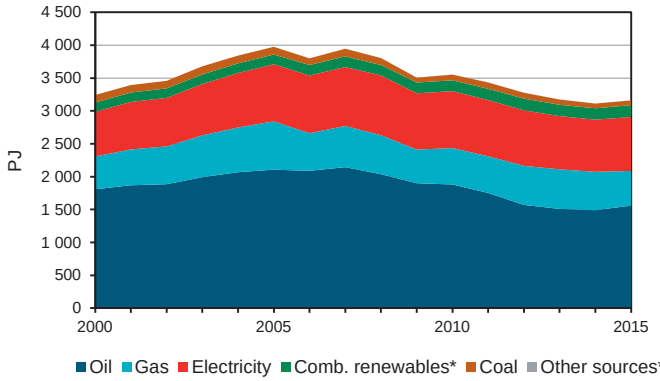
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

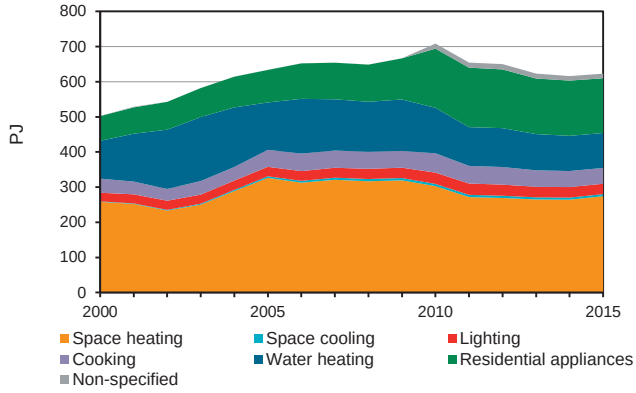
***These figures display results from the IEA decomposition analysis and cover approximately 99% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# SPAIN

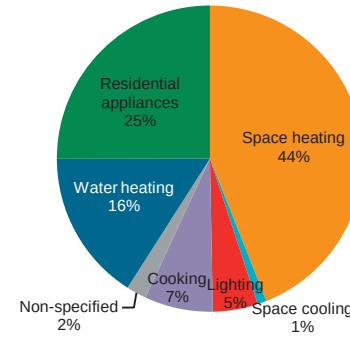
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 503 | 51 | 41 | 12 | 89 | 3.1 |
| **2015** | 623 | 56 | 47 | 13 | 92 | 2.5 |

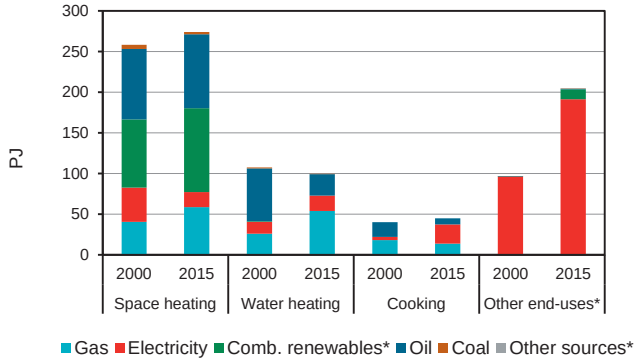
### Residential energy consumption by end-use



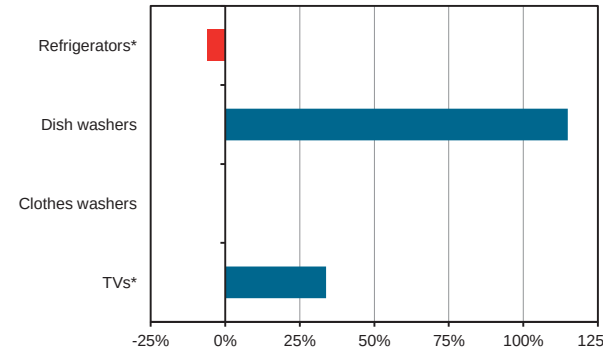

### Residential energy consumption by end-use, 2015



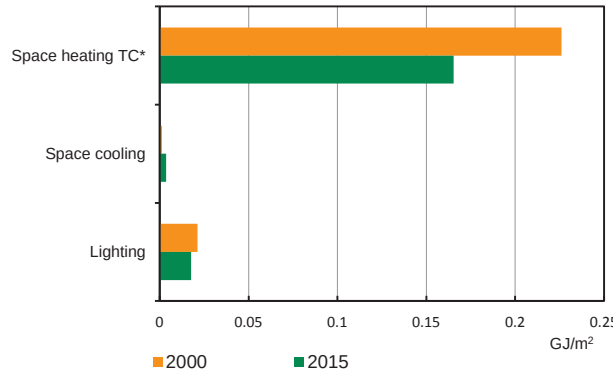

### Residential energy consumption by source



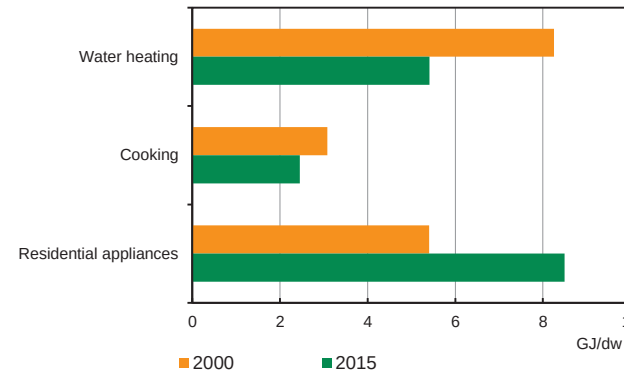

### Appliances per dwelling, 2000-10 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



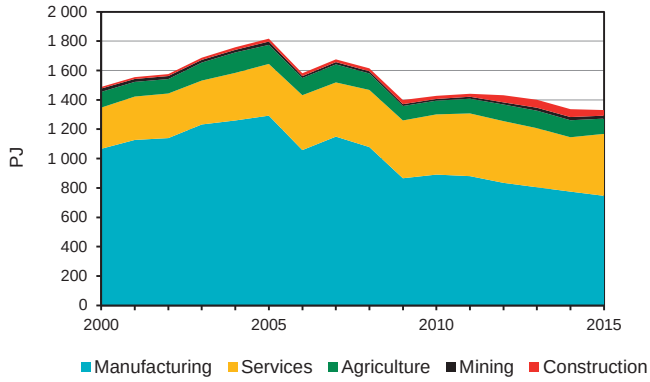

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# SPAIN

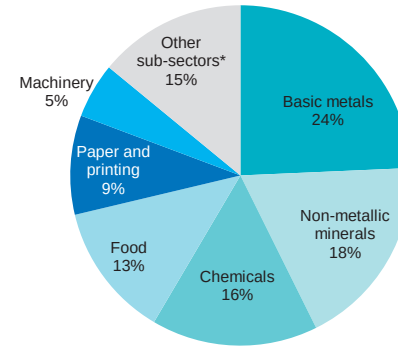
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 067 | 281 | 141 | 1 211 | 176 | 720 |
| **2015** | 746 | 420 | 162 | 1 495 | 174 | 1 043 |

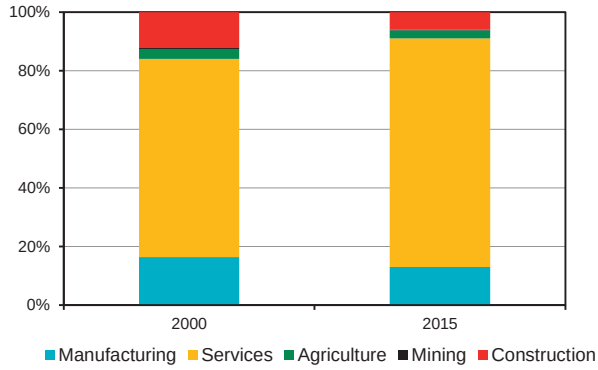
### Industry and services energy consumption



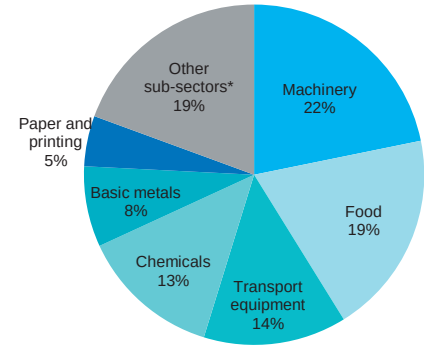

### Manufacturing energy consumption by sub-sector, 2015



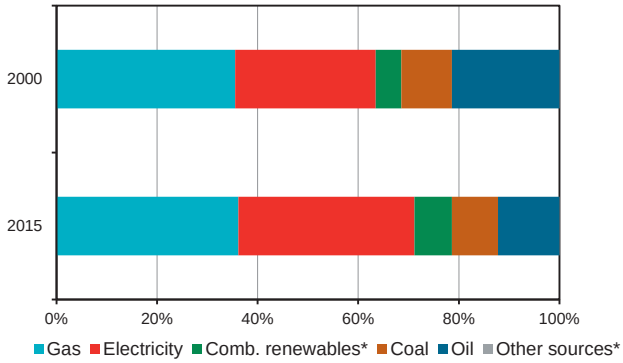

### Value added** by sector



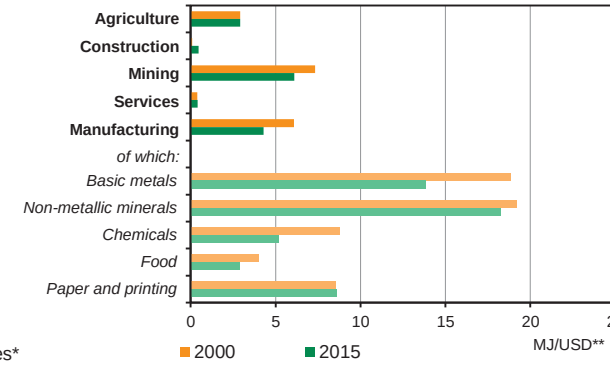

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



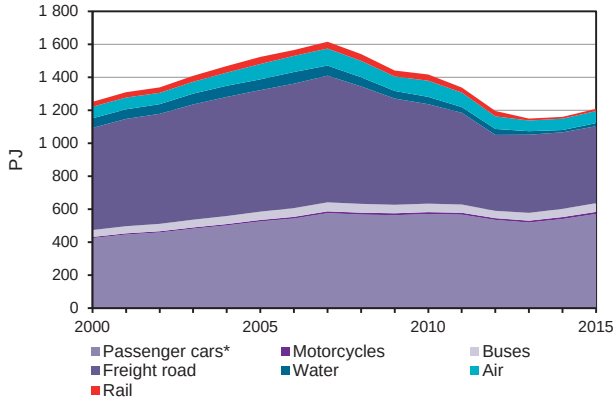

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# SPAIN

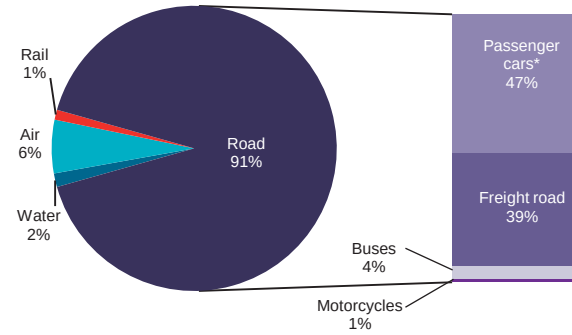
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 562 | 690 | 399 | 346 | 1.9 | 2.3 |
| **2015** | 720 | 490 | 418 | 309 | 1.5 | 1.4 |

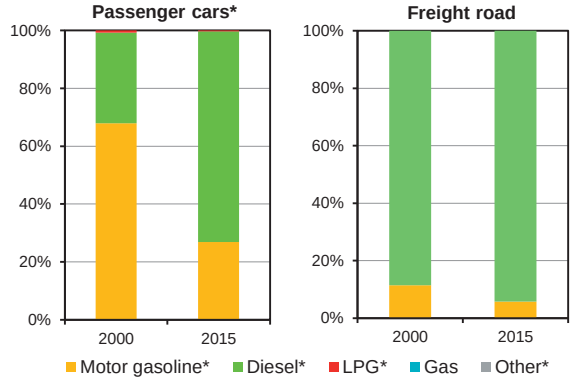
### Transport energy consumption by mode/vehicle type



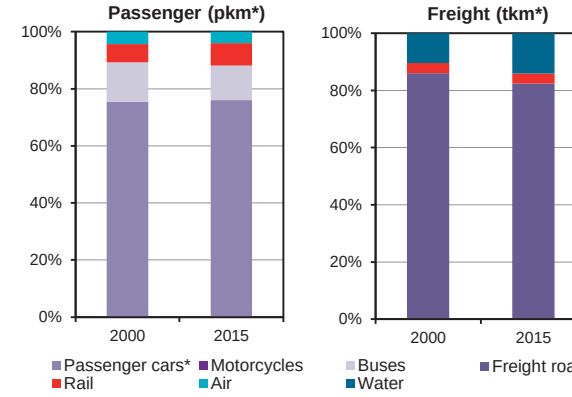

### Transport energy consumption by mode/vehicle type, 2015



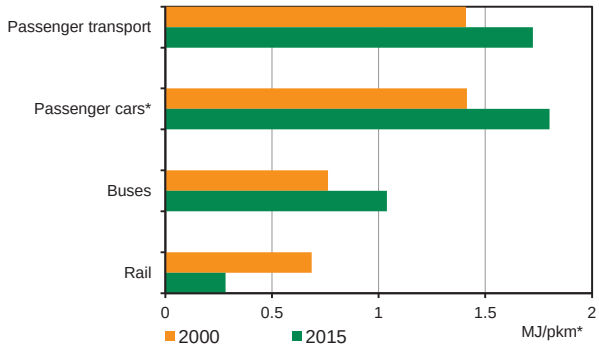

### Energy consumption in road transport by source



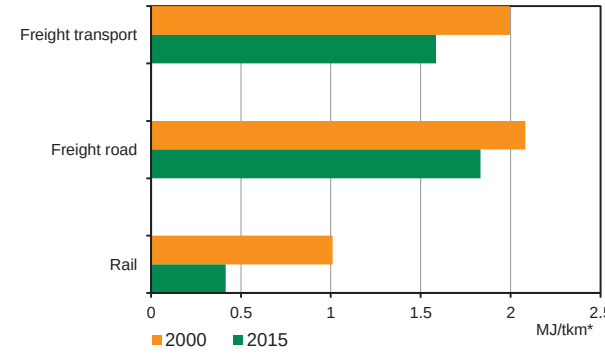

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

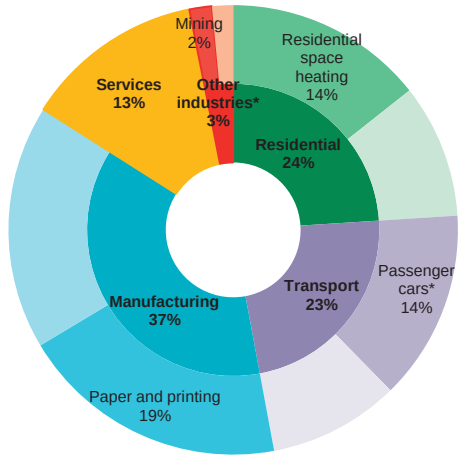



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

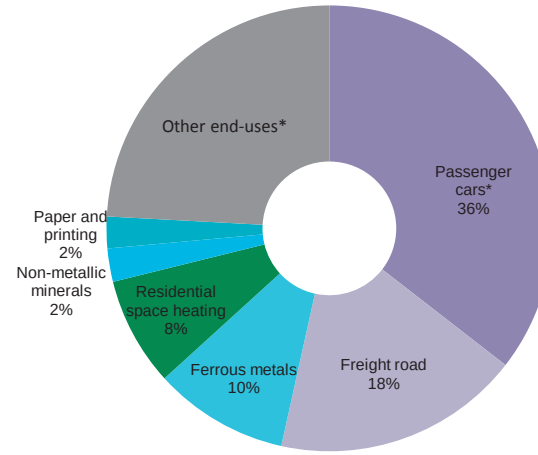
# SWEDEN

## Cross-sectoral overview

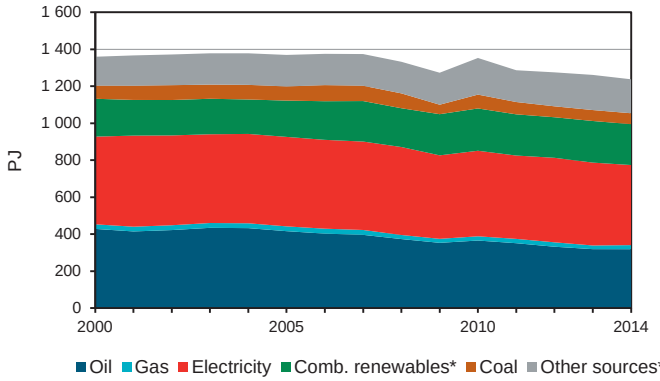
### Largest end-uses by sector, 2014



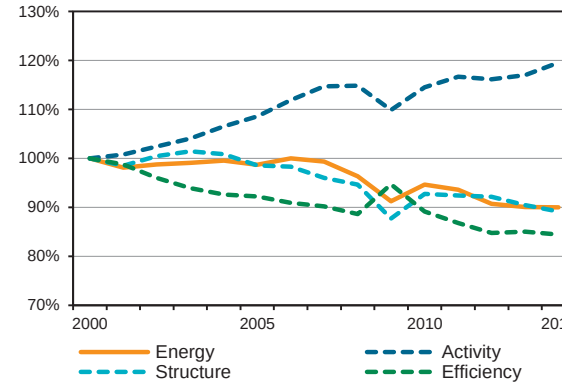

### Top six $CO_2$ emitting end-uses, 2014**



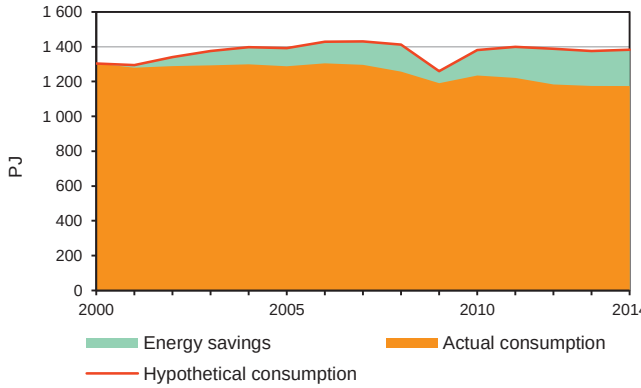

### Final energy consumption by source



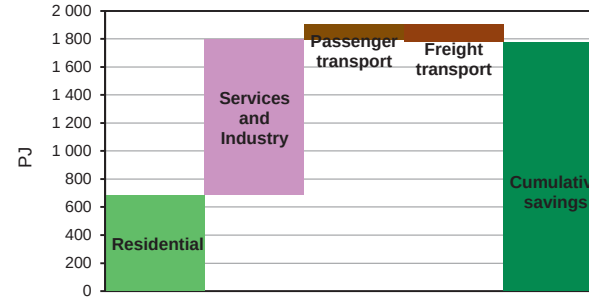

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-14***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

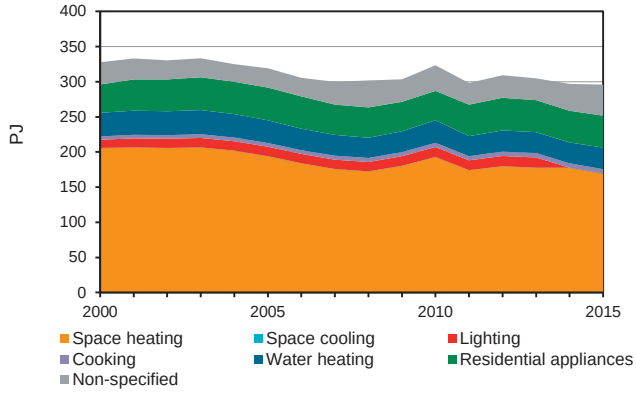
***These figures display results from the IEA decomposition analysis and cover approximately 96% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# SWEDEN

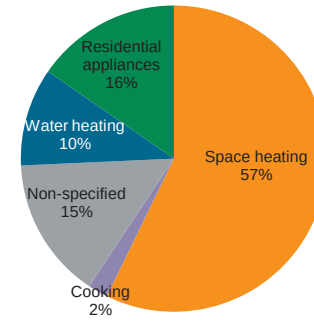
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 328 | 24 | 9 | 37 | 93 | 2.1 |
| **2015** | 296 | 2 | 10 | 30 | 95 | NA |

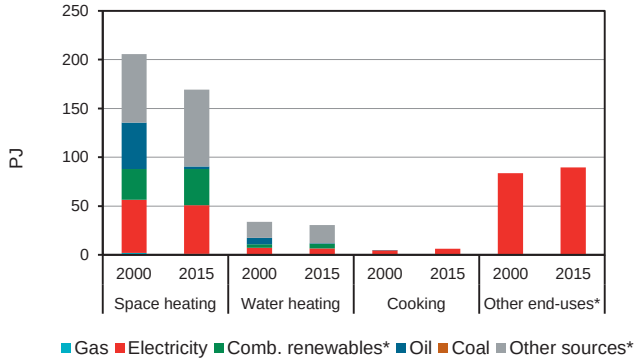
### Residential energy consumption by end-use



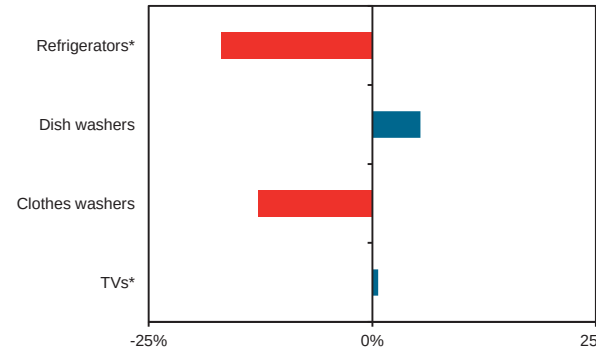

### Residential energy consumption by end-use, 2015



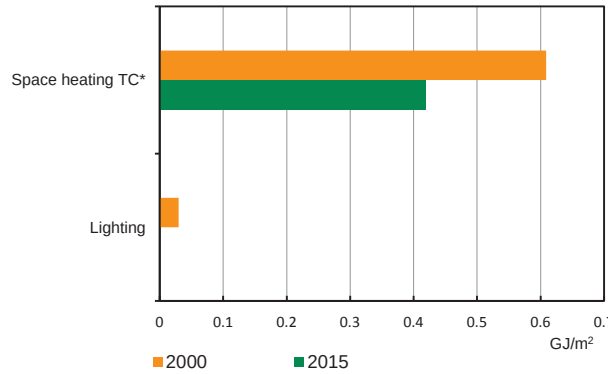

### Residential energy consumption by source




### Appliances per dwelling, 2000-13 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

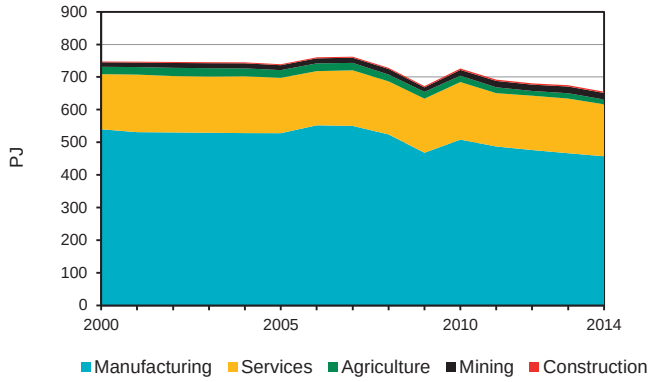
*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# SWEDEN

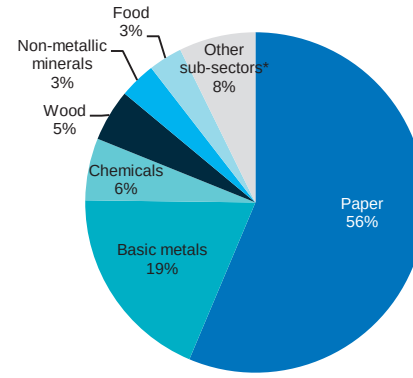
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 540 | 169 | 39 | 318 | 47 | 199 |
| **2014** | 457 | 159 | 39 | 415 | 60 | 267 |

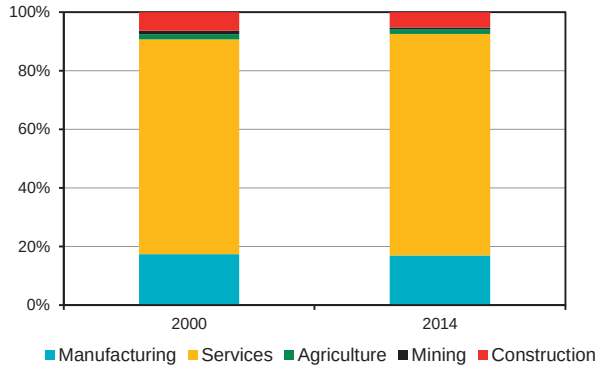
### Industry and services energy consumption



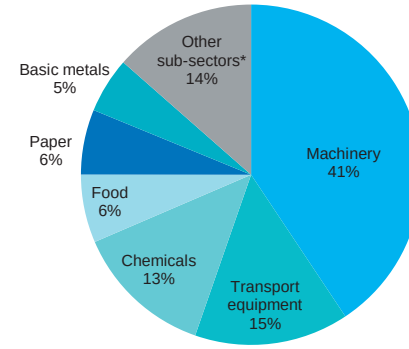

### Manufacturing energy consumption by sub-sector, 2015



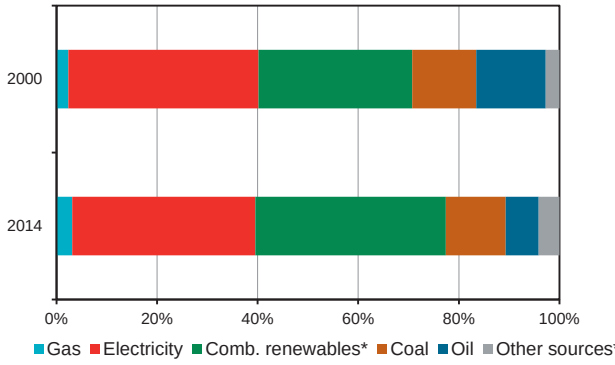

### Value added** by sector



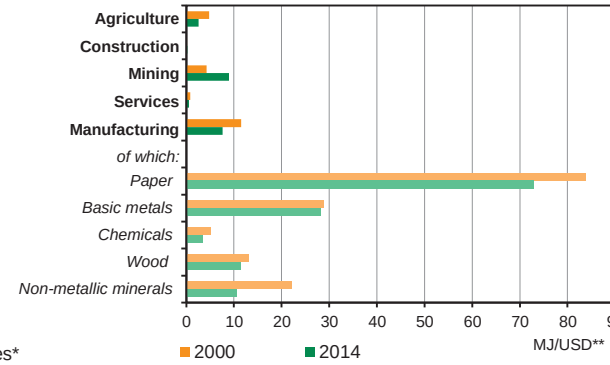

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



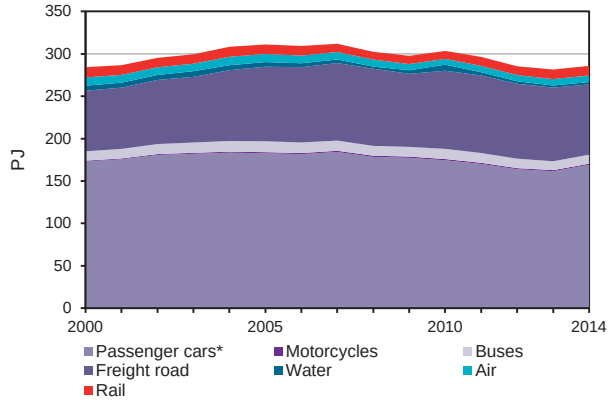

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# SWEDEN

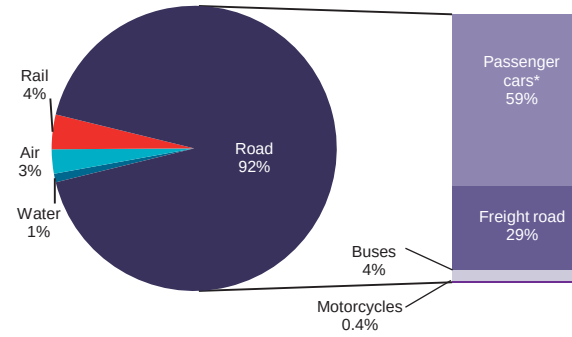
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 198 | 86 | 125 | 64 | 2.0 | 4.7 |
| **2014** | 192 | 93 | 142 | 60 | 2.1 | 3.1 |

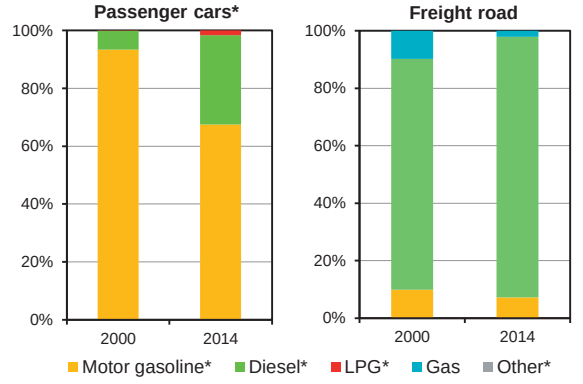
### Transport energy consumption by mode/vehicle type



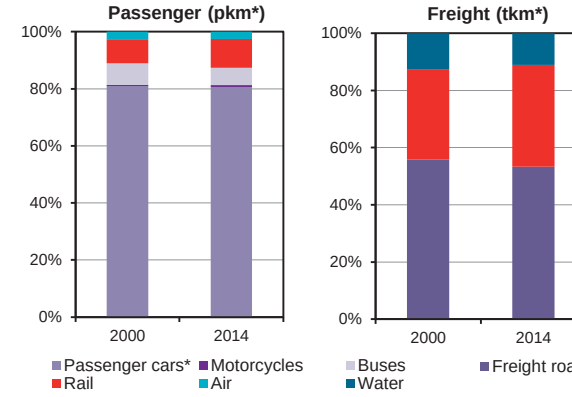

### Transport energy consumption by mode/vehicle type, 2014




### Energy consumption in road transport by source

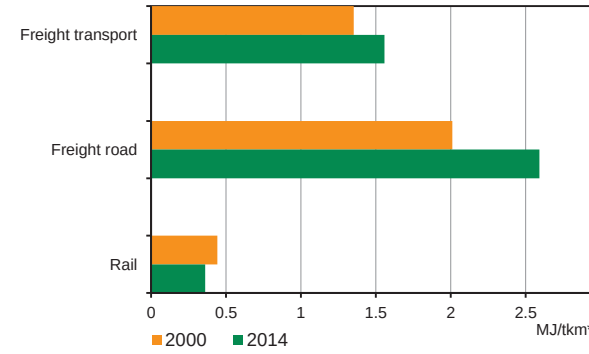



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

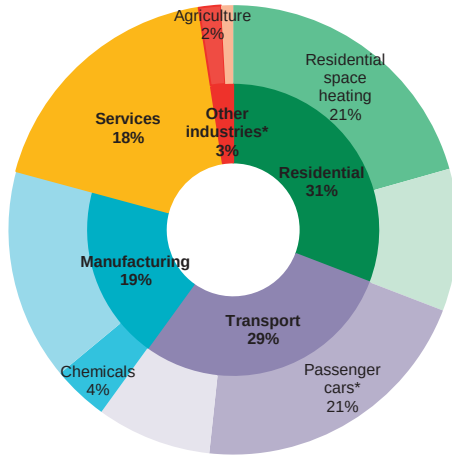



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

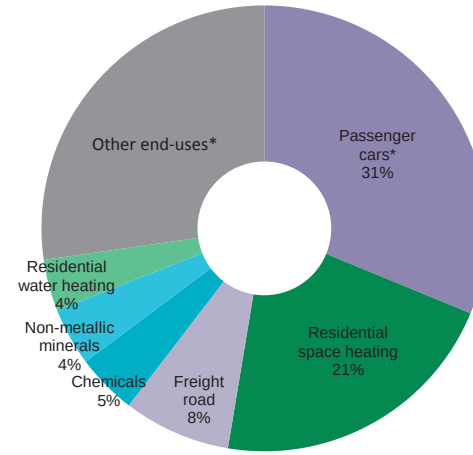
# SWITZERLAND

## Cross-sectoral overview

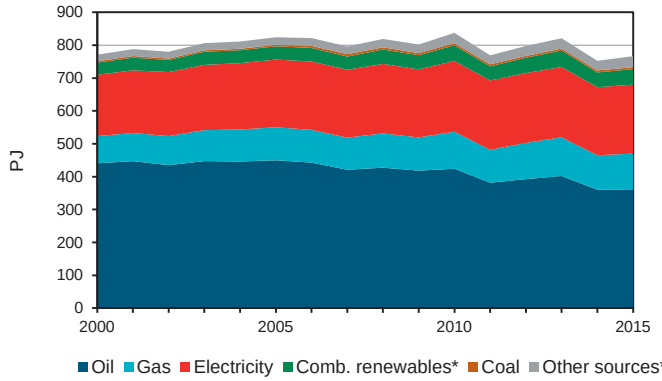
### Largest end-uses by sector, 2015




### Top six $CO_2$ emitting end-uses, 2015**




### Final energy consumption by source




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

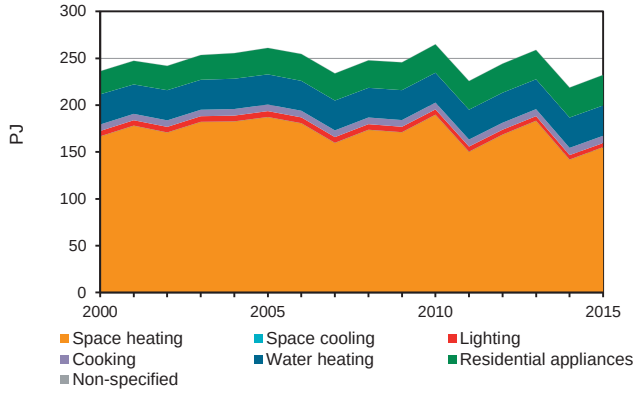
***These figures display results from the IEA decomposition analysis and cover approximately 98% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# SWITZERLAND

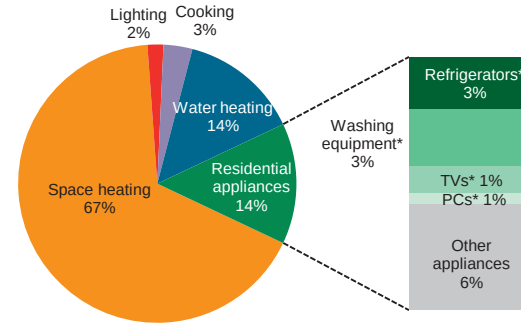
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 236 | 78 | 7 | 33 | 119 | 2.3 |
| **2015** | 232 | 69 | 8 | 28 | 129 | 2.3 |

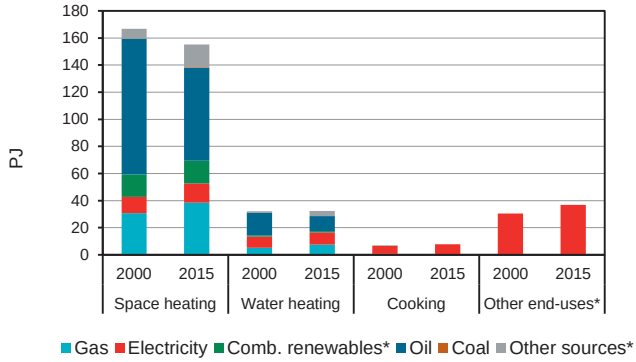
### Residential energy consumption by end-use



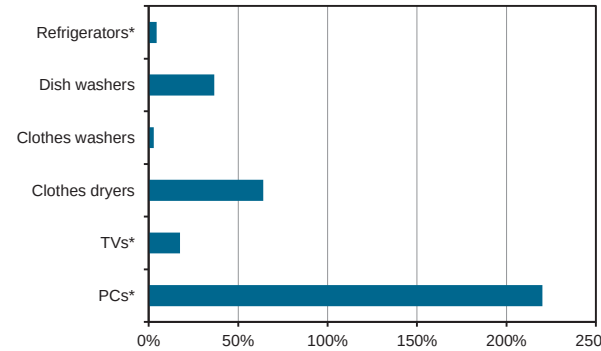

### Residential energy consumption by end-use, 2015



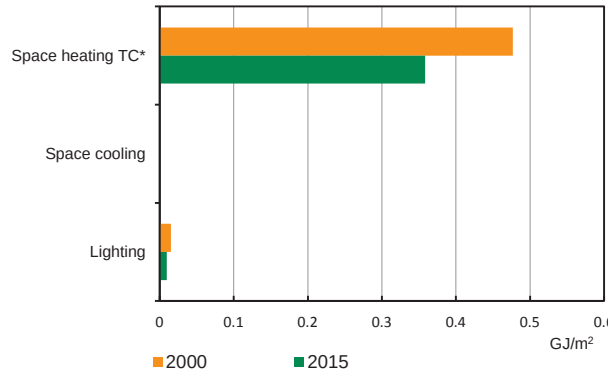

### Residential energy consumption by source




### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

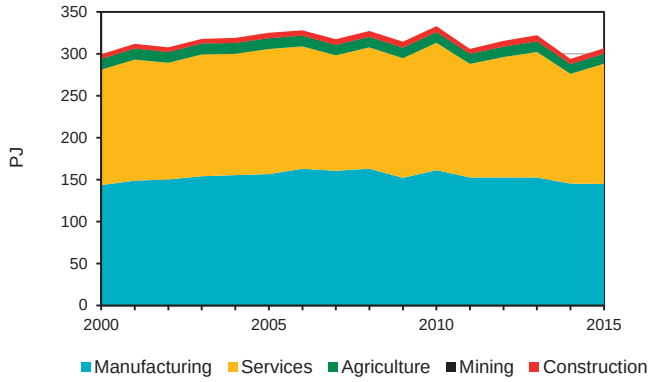
*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# SWITZERLAND

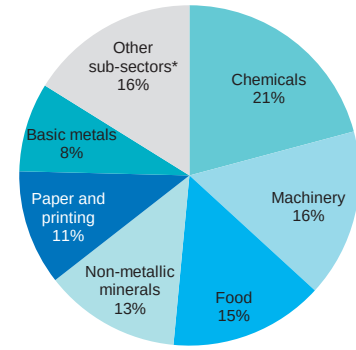
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 143 | 133 | 18 | 334 | 57 | 209 |
| **2015** | 145 | 133 | 18 | 433 | 79 | 280 |

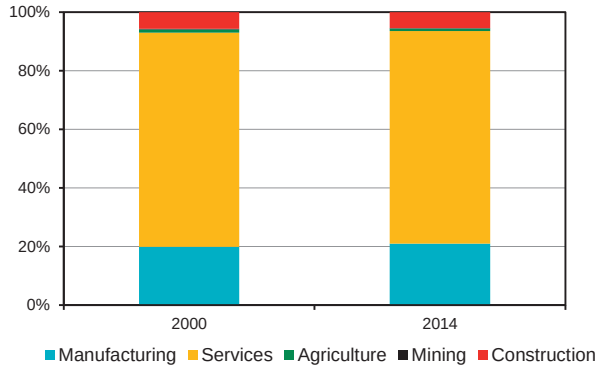
### Industry and services energy consumption



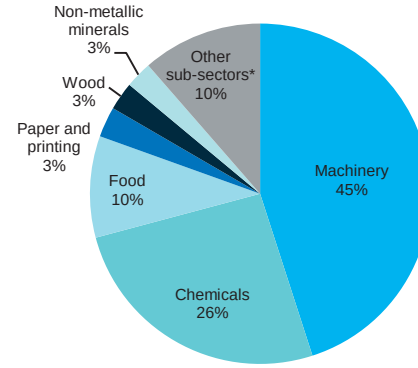

### Manufacturing energy consumption by sub-sector, 2015



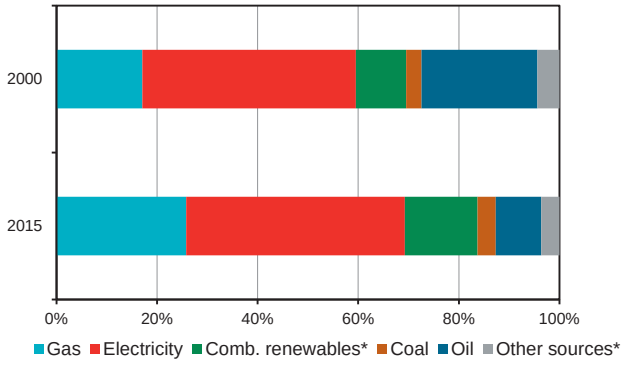

### Value added** by sector



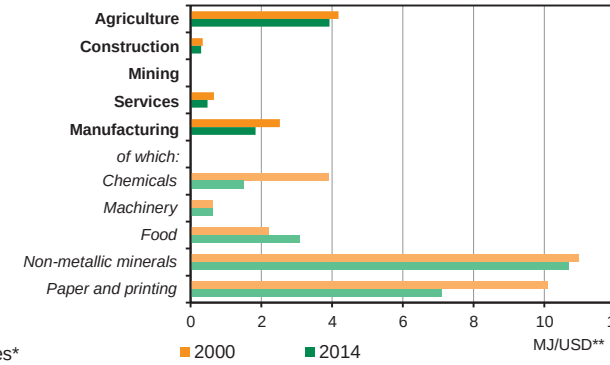

### Manufacturing value added** by sub-sector, 2014




### Manufacturing energy consumption by source




### Selected energy intensities



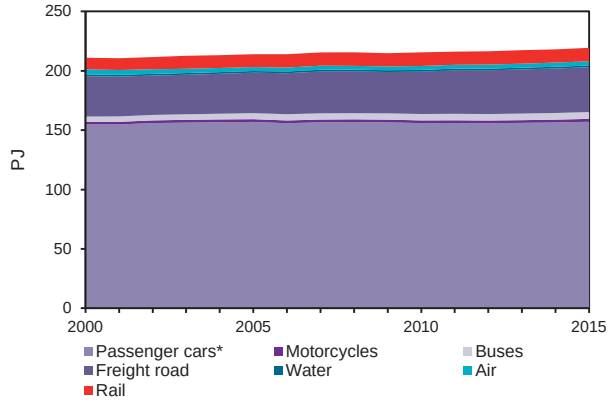

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# SWITZERLAND

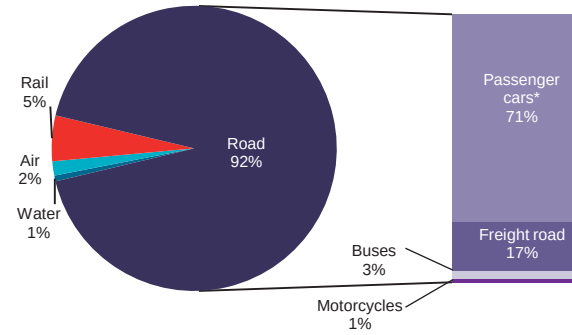
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 174 | 37 | 95 | 25 | 1.6 | 2.6 |
| **2015** | 179 | 41 | 120 | 30 | 1.7 | 2.7 |

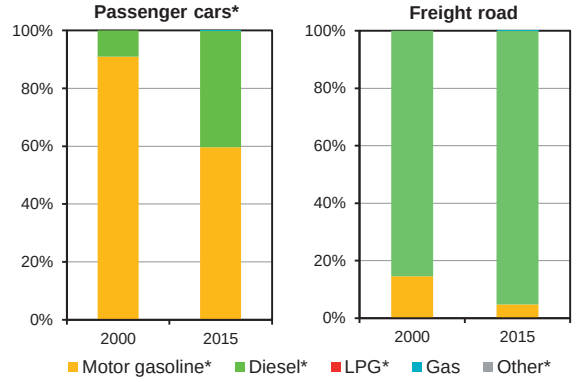
### Transport energy consumption by mode/vehicle type



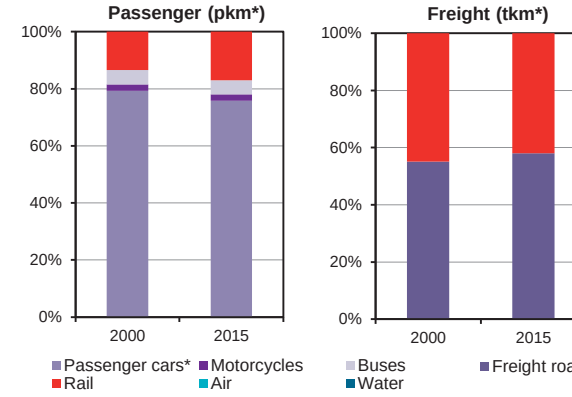

### Transport energy consumption by mode/vehicle type, 2015




### Energy consumption in road transport by source

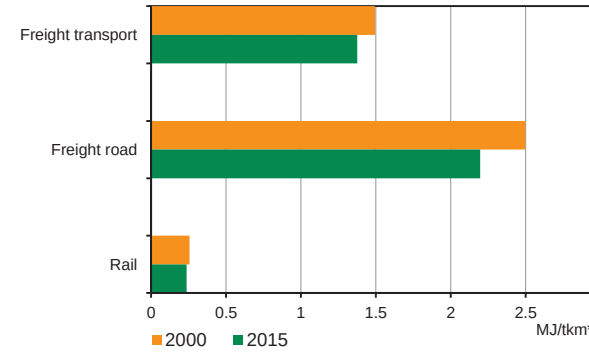



### Transport activity by mode/vehicle type




### Energy intensities for passenger transport

### Energy intensities for freight transport

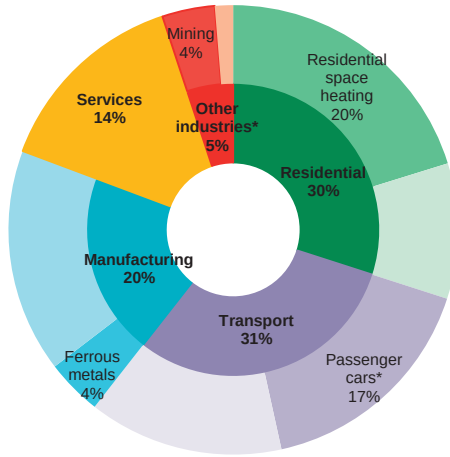



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

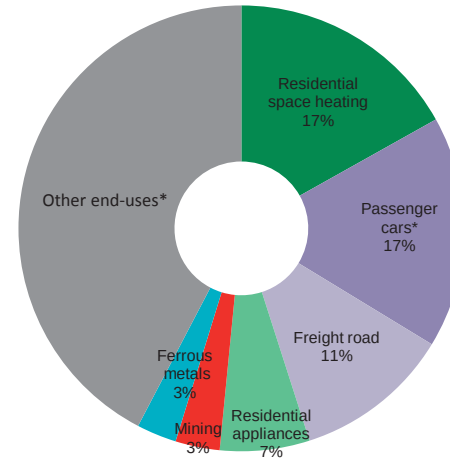
# UNITED KINGDOM

## Cross-sectoral overview

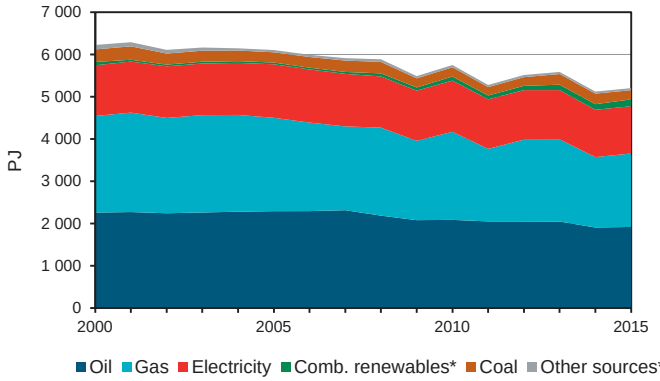
### Largest end-uses by sector, 2015



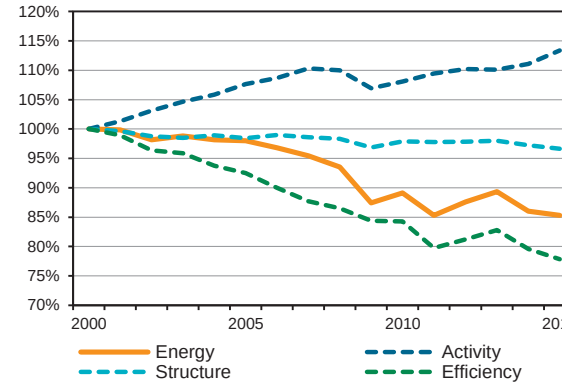

### Top six $CO_2$ emitting end-uses, 2015**



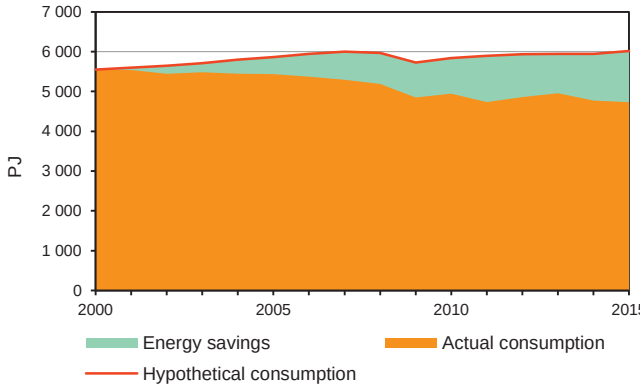

### Final energy consumption by source



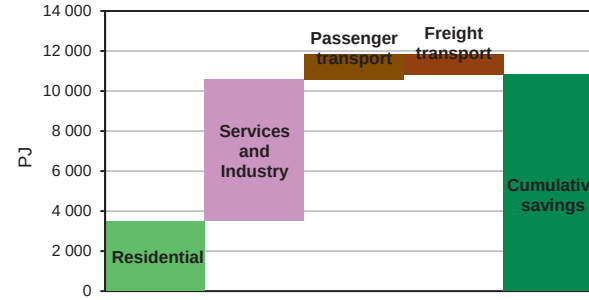

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

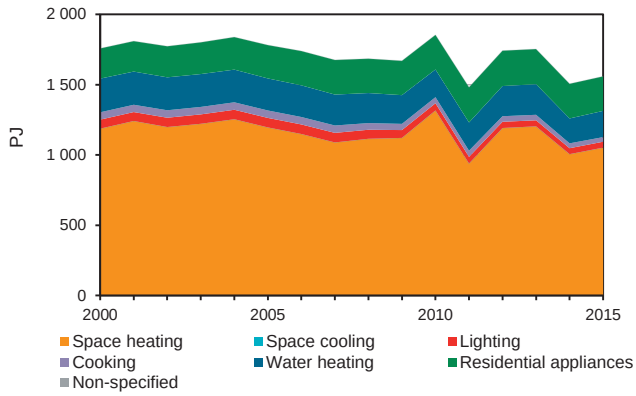
***These figures display results from the IEA decomposition analysis and cover approximately 95% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# UNITED KINGDOM

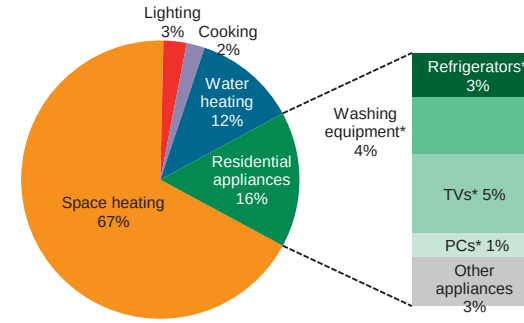
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 1 758 | 93 | 59 | 30 | 72 | 2.9 |
| **2015** | 1 559 | 86 | 65 | 24 | 78 | 2.8 |

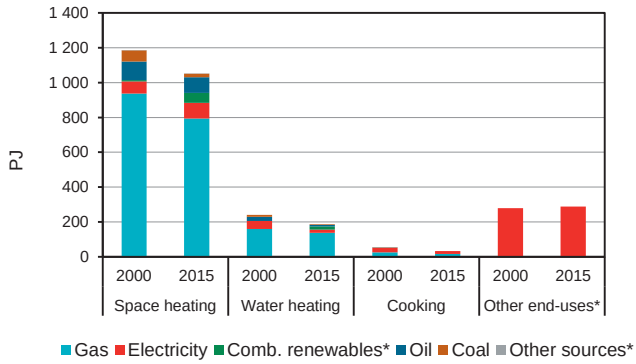
### Residential energy consumption by end-use



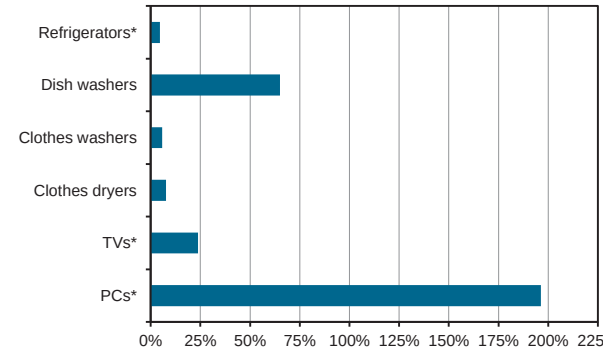

### Residential energy consumption by end-use, 2015



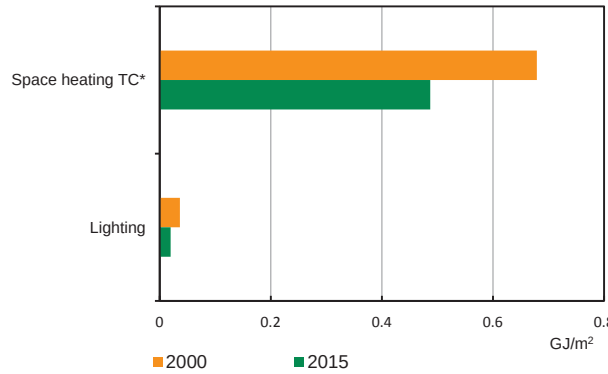

### Residential energy consumption by source



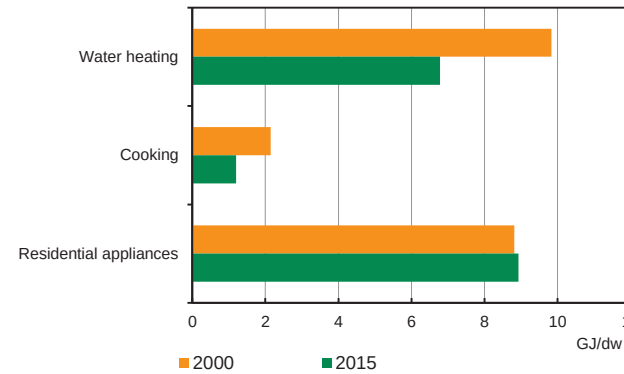

### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling



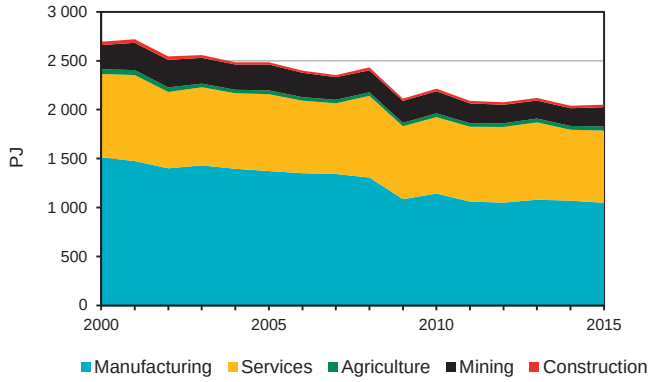

*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# UNITED KINGDOM

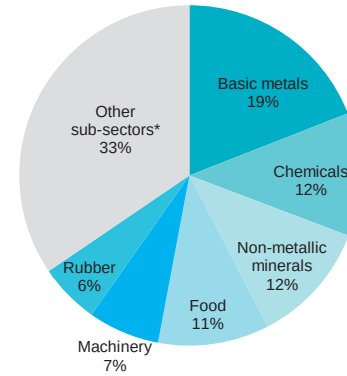
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 1 513 | 852 | 330 | 1 945 | 204 | 1 311 |
| **2015** | 1 048 | 739 | 265 | 2 514 | 195 | 1 825 |

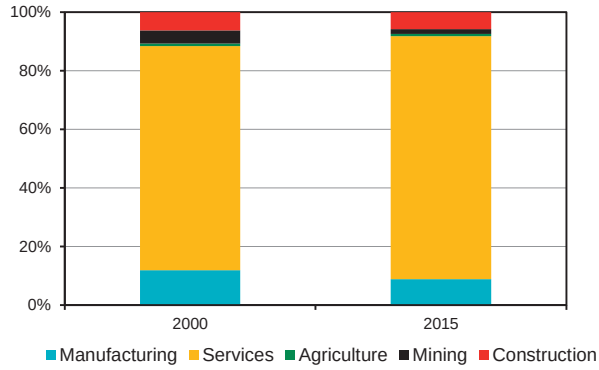
### Industry and services energy consumption



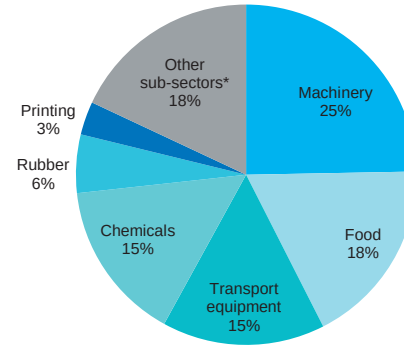

### Manufacturing energy consumption by sub-sector, 2015



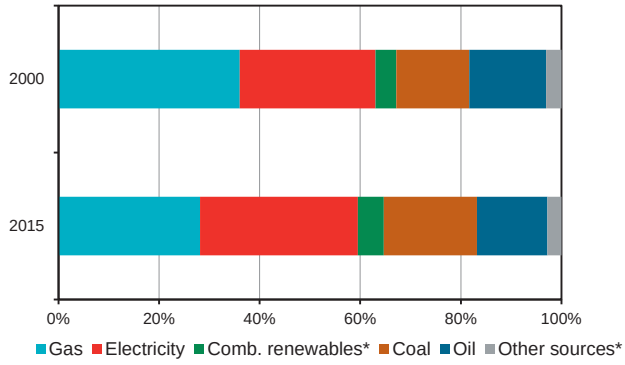

### Value added** by sector



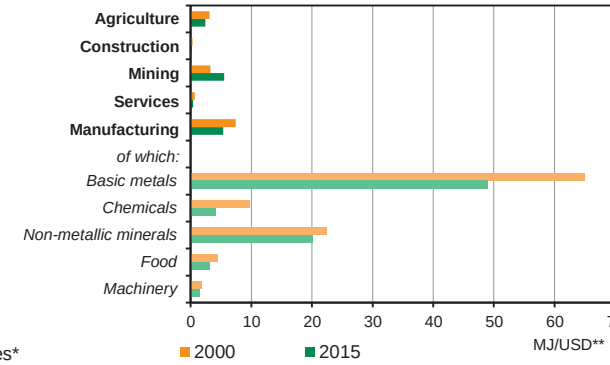

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



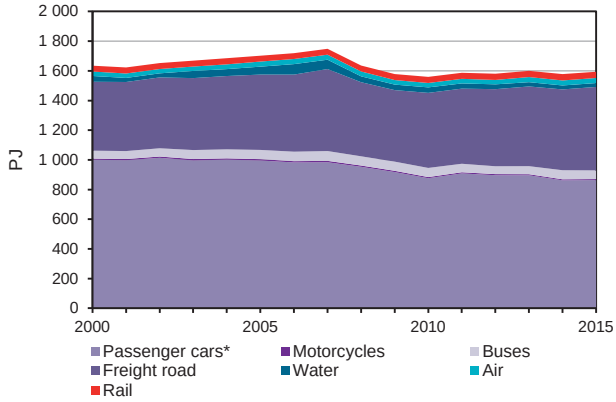

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# UNITED KINGDOM

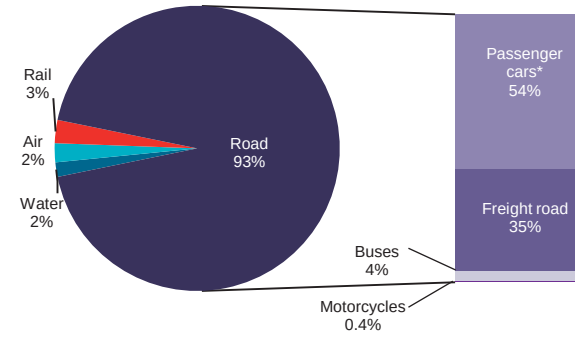
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 1 117 | 518 | 745 | 244 | 1.7 | 2.0 |
| **2015** | 992 | 601 | 787 | 201 | 1.7 | 1.5 |

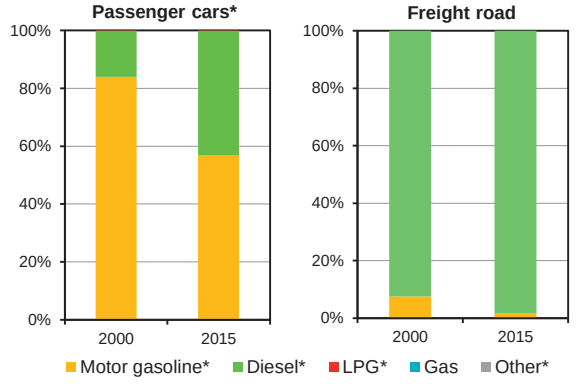
### Transport energy consumption by mode/vehicle type



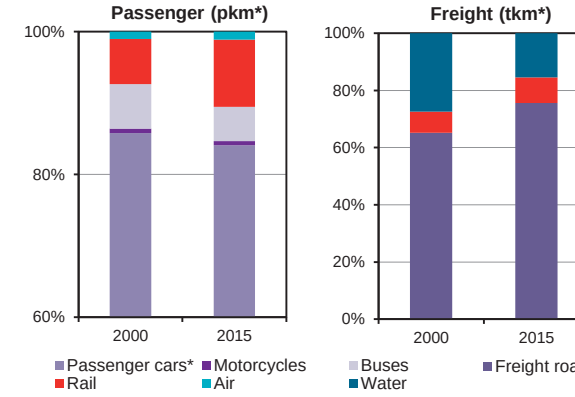

### Transport energy consumption by mode/vehicle type, 2015



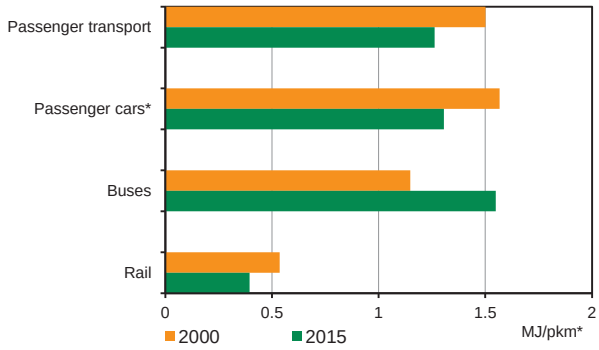

### Energy consumption in road transport by source



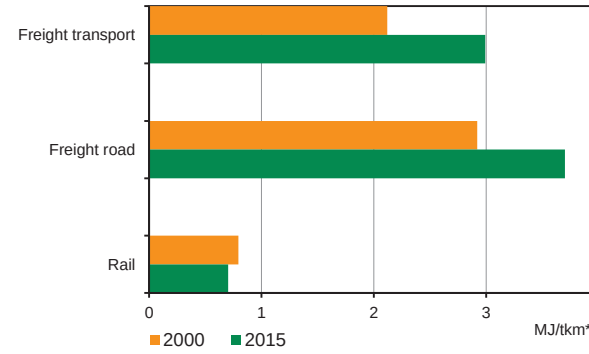

### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

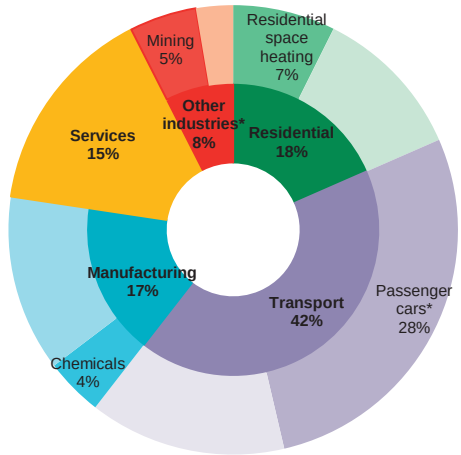



*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

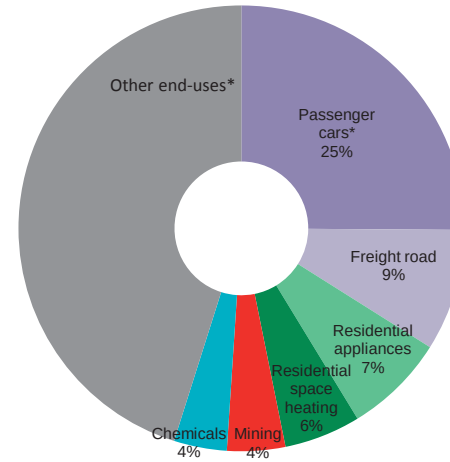
# UNITED STATES

## Cross-sectoral overview

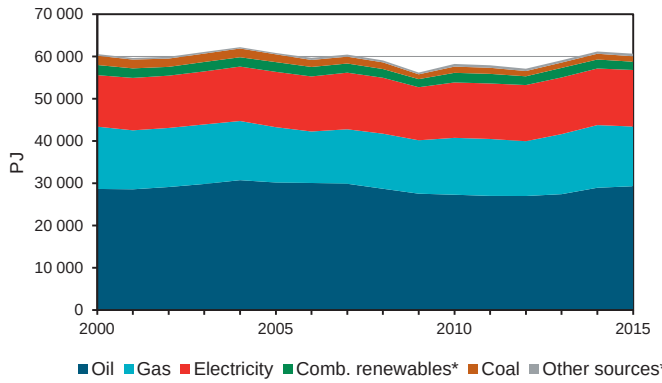
### Largest end-uses by sector, 2015



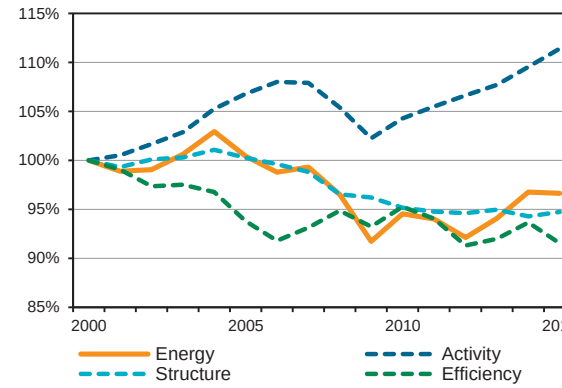

### Top six $CO_2$ emitting end-uses, 2015**



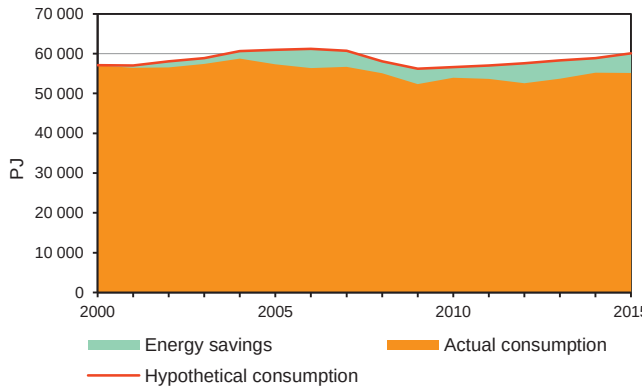

### Final energy consumption by source



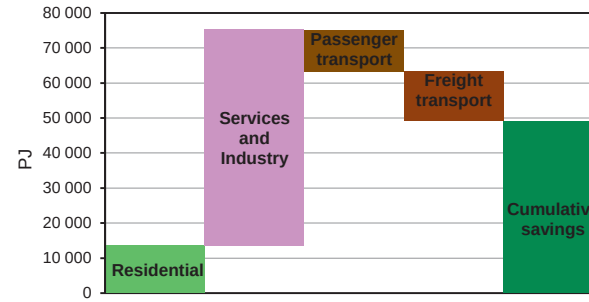

### Drivers of final energy consumption***




### Estimated energy savings from efficiency***




### Estimated cumulative energy savings by sector, 2000-15***




*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

**Includes emissions reallocated from electricity and heat generation.

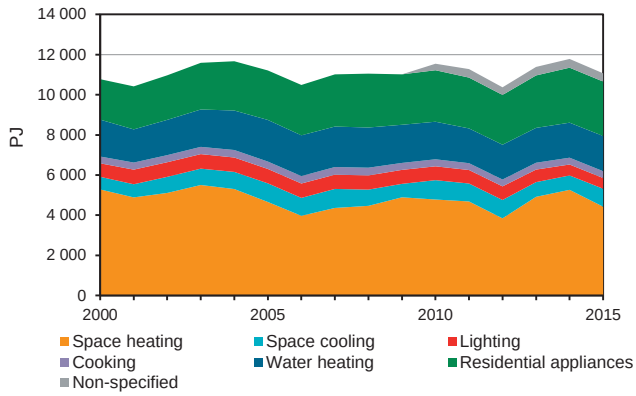
***These figures display results from the IEA decomposition analysis and cover approximately 94% of final energy consumption. For more information on the decomposition methodology, please refer to the methodological notes.

# UNITED STATES

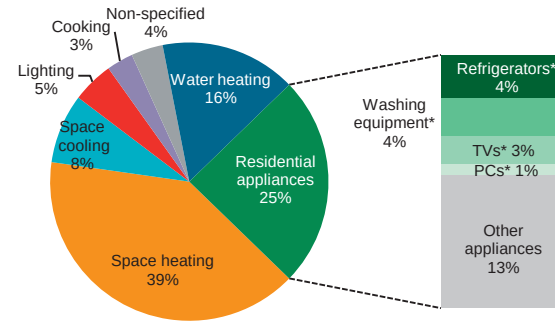
## Residential sector

| | Residential consumption (PJ) | Share of fossil fuels* in space heating (%) | Population (million) | Consumption per capita (GJ/pers) | Average dwelling surface (m²) | Average dwelling occupancy (pers/dw) |
|---|---|---|---|---|---|---|
| **2000** | 10 775 | 84 | 282 | 38 | 196 | 2.8 |
| **2015** | 11 069 | 82 | 322 | 34 | 181 | 2.7 |

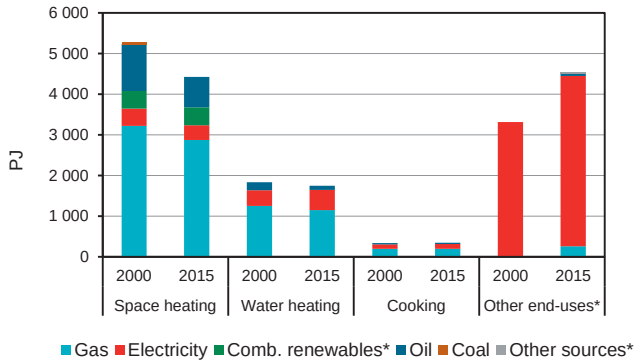
### Residential energy consumption by end-use



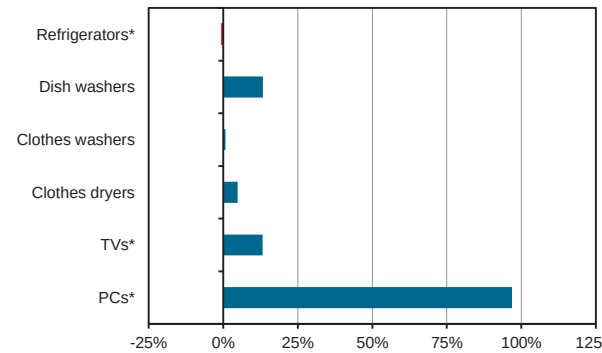

### Residential energy consumption by end-use, 2015



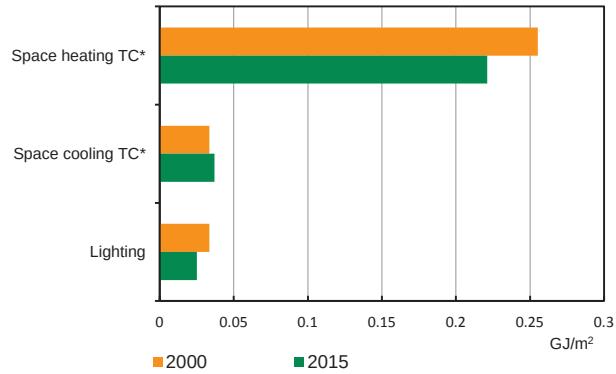

### Residential energy consumption by source




### Appliances per dwelling, 2000-15 % change




### Energy intensities by end-use per floor area




### Energy intensities by end-use per dwelling

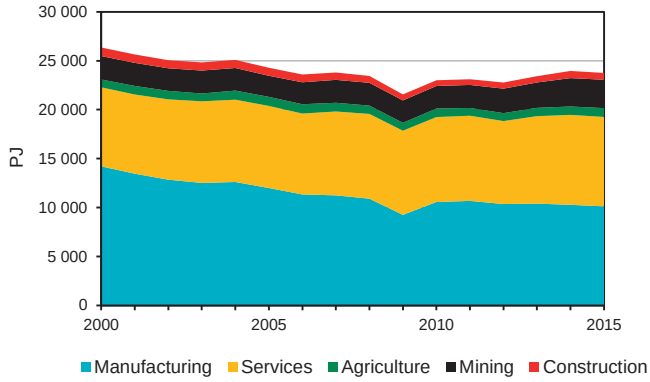
*Share of fossil fuels includes only the direct use of oil, gas and coal; refrigerators includes also freezers and refrigerator-freezer combinations; washing equipments includes dish washers, clothes washers and dryers; TVs includes also home entertainment; PCs includes also other information technology; other end-uses includes space cooling, lighting, residential appliances and non-specified; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources; TC refers to temperature correction, for more information please refer to the explanatory notes.

# UNITED STATES

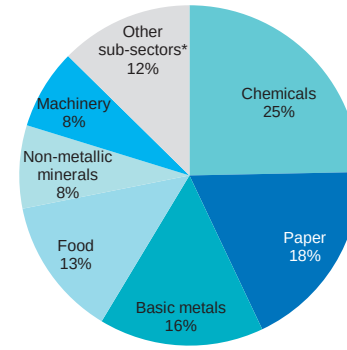
## Industry and Services sectors

| | Manufacturing consumption (PJ) | Services consumption (PJ) | Other industries* consumption (PJ) | GDP PPP** (billion USD) | Manufacturing VA** (billion USD) | Services VA** (billion USD) |
|---|---|---|---|---|---|---|
| **2000** | 14 204 | 8 083 | 4 068 | 12 713 | 1 488 | 9 449 |
| **2015** | 10 121 | 9 088 | 4 497 | 16 597 | 1 757 | 12 485 |

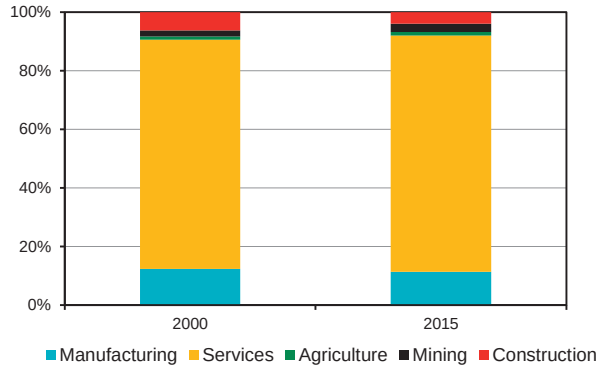
### Industry and services energy consumption



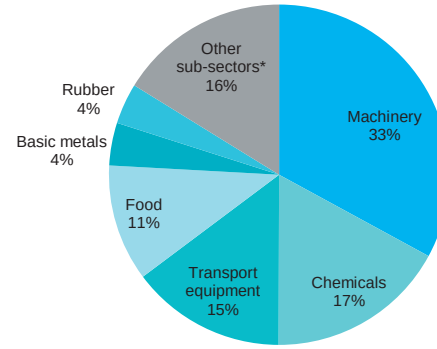

### Manufacturing energy consumption by sub-sector, 2015



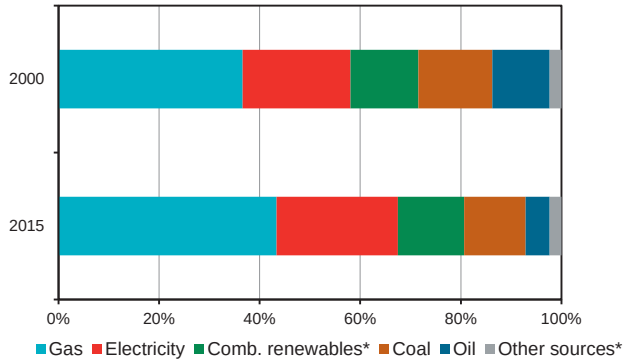

### Value added** by sector



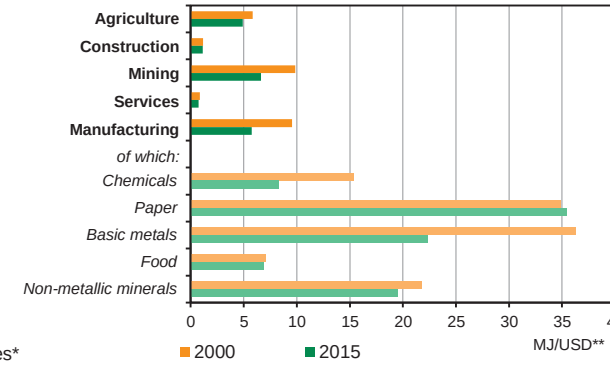

### Manufacturing value added** by sub-sector, 2015




### Manufacturing energy consumption by source




### Selected energy intensities



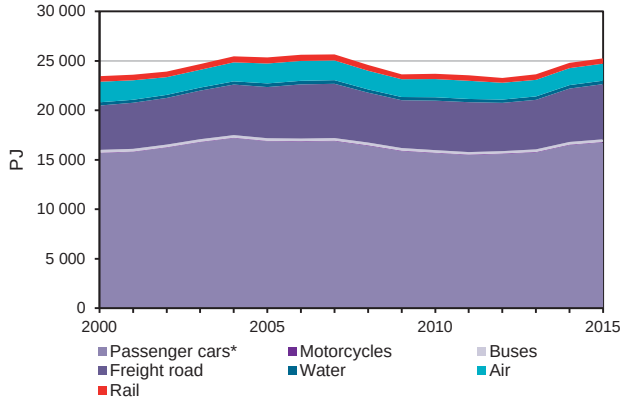

*Other industries includes agriculture, mining and construction; other sub-sectors includes all remaining manufacturing sub-sectors beyond the top-6; comb. renewables includes combustibles renewables and wastes; other sources includes heat and other energy sources.
**GDP and VA are at the price levels and PPPs of year 2010; GDP = gross domestic product; VA = value added; PPP = purchasing power parity.

# UNITED STATES

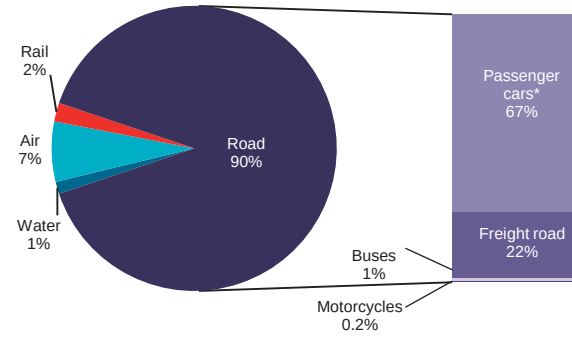
## Transport* sector

| | Passenger transport consumption (PJ) | Freight transport consumption (PJ) | Pass. transport (billion pkm*) | Freight transport (billion tkm*) | Pass. cars* occupancy (pers/car) | Load of trucks* (tonnes/truck) |
|---|---|---|---|---|---|---|
| **2000** | 18 179 | 5 281 | 7 950 | 6 618 | 1.6 | 7.4 |
| **2015** | 18 961 | 6 303 | 7 845 | 6 292 | 1.4 | 6.6 |

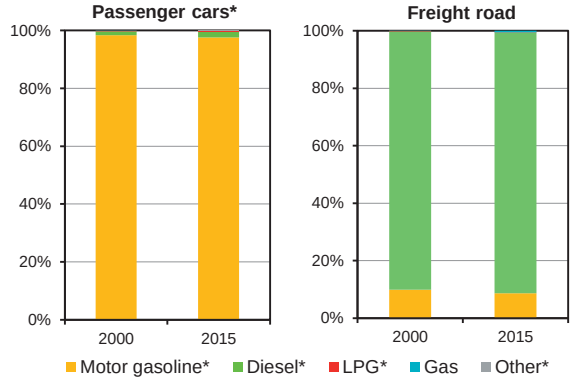
### Transport energy consumption by mode/vehicle type



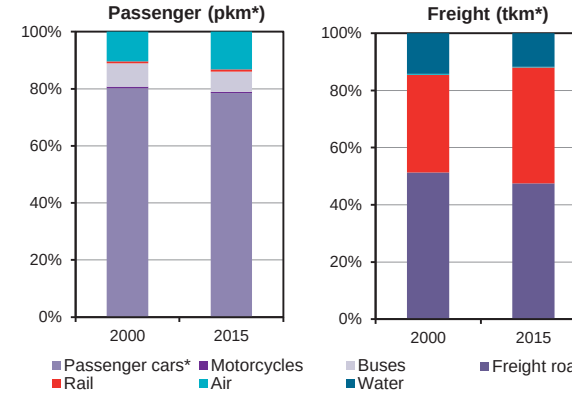

### Transport energy consumption by mode/vehicle type, 2015



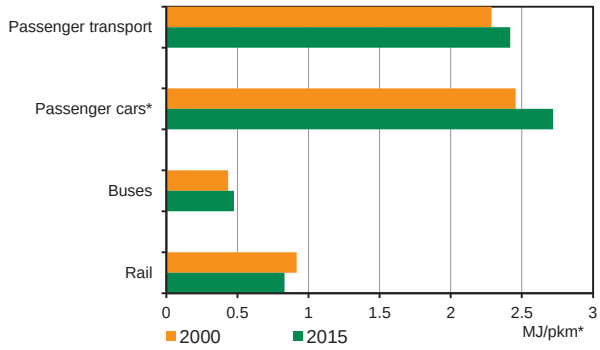

### Energy consumption in road transport by source




### Transport activity by mode/vehicle type




### Energy intensities for passenger transport




### Energy intensities for freight transport

*Transport excludes international marine and aviation bunkers, pipelines, and when possible fuel tourism; pkm refers to passenger-kilometres and tkm to tonne-kilometres; passenger cars includes cars, sport utility vehicles and personal trucks; average load of trucks refers to the average load of freight road vehicles; motor gasoline and diesel include liquid biofuels; LPG refers to liquefied petroleum gas; other includes electricity and other energy sources.

# COUNTRY NOTES

## General notes

The notes given in this document refer to data for the years 2000 to 2015 published in this book, as well as on the online data service.

Data are obtained from National Administrations through annual submission of a questionnaire or from the Odyssee database, as indicated for each country in the section on sources.

In some instances it has been necessary for the IEA Secretariat to estimate some data; explanations of the estimates are provided in the country notes.

For the 2017 edition of this publication, value added data have been revised from a 2005 basis to a 2010 basis. This may cause differences from previous releases of data and indicators.

## Australia

### Sources

Australian Government, Department of the Environment and Energy.

### Years covered

2000-2015.

### General note

All data refer to the financial year (e.g. July 2014 to June 2015 for 2015).

Discrepancies between the IEA energy efficiency indicators and the IEA energy balances figures are under investigation. A program of work is underway to improve the quality and consistency of these data in Australia. As such, these data should be used carefully.

### Residential sector

Data for residential energy consumption have been revised for all end uses.

Data for TVs include TVs only. Data for home entertainment are reported under other appliances.

Data for energy consumption of swimming pools and spas are included under other appliances. Data for energy consumption of natural gas for swimming pools and spas is included in other end-uses, other sources.

### Industry and services sectors

Data for energy consumption and value added for paper and printing also include wood.

Data for energy consumption and value added for chemicals also include rubber and plastics and manufacture of coke and refined petroleum products.

Data for energy consumption and value added for machinery includes transport equipment.

Data for value-added for other manufacturing are not available.

### Transport sector

Revisions in the upcoming annual data cycle are expected, which are expected to reallocate some energy use from freight transport into passenger transport, as a significant proportion of light commercial vehicle use in Australia is for passenger vehicles rather than for freight movement. These revisions are expected to result in a higher energy intensity for passenger cars; a lower energy intensity for freight road transport; and a lower occupancy of passenger cars than what is shown in this publication.

# Austria

## Sources

Austrian Energy Agency; Odyssee database.

## Years covered

2000-2014 (2015 – partially).

## General note

Some discrepancies between the IEA energy efficiency indicators and the IEA energy balances figures might occur.

## Residential sector

Data for stocks of PCs are not available.

Data on energy consumption per appliance type and appliance diffusion is not available for the year 2015.

## Industry and Services sectors

The data for value added have been revised and show a significant decrease in 2009 for basic metals (ISIC 24), leading to a considerably higher intensity of the sector. This does not reflect physical intensity, as it is based on financial data (notably value added).

## Transport sector

Data for energy consumption and activity (passenger-kilometres and tonne-kilometres) of freight airplanes and passenger ships are not available. Energy consumption data might be partially included under passenger airplanes and freight ships, respectively.

Data for energy consumption and activity for the transport sector is not available for the year 2015.

# Belgium

## Sources

Odyssee database supplied by the Observatoire Energie - Ministry of Energy.

## Years covered

2000-2013 (2014/2015 – partially).

## General note

Results of the IEA decomposition analysis are not available.

Data for the energy consumption of the transport sector are not available for all modes. Data for this sector were obtained from the country energy balance. Still, the share of transport energy use may be underestimated due to missing data.

Some discrepancies between the IEA energy efficiency indicators and the IEA energy balances figures may arise from estimations included to avoid breaks in the time series of natural gas and electricity consumption resulting from a change in the methodology. Work is ongoing to align data and revise historical time series.

## Residential sector

Data for energy consumption for residential appliances include lighting.

Data for energy consumption of residential appliances is available only as a total included under other appliances. Data for energy consumption for space cooling are not available.

Data for energy consumption disaggregated by end use is not available for the years 2014 and 2015.

## Industry and Services sectors

Data for value added of several sub-sectors for the year 2015 are not available.

## Transport sector

Data for passenger cars occupancy are not available for the years 2014 and 2015, and data for freight road load are not available for the full time series.

Data for energy consumption for motorcycles, buses, freight road, freight airplanes and passenger ships are not available. These latter data might be partially included under passenger airplanes and freight ships, respectively.

Data for energy consumption for passenger cars only include LPG, and hence are not representative of this transport mode.

# Canada

## Sources

Natural Resources Canada, Statistics Canada.

## Years covered

2000-2015.

## General notes

Data for energy consumption of combustible renewables and waste are included under other sources.

Differences between the IEA energy efficiency indicators and the IEA energy balances result from different timing of reporting requirements, sources used, as well as definitions and scope of coverage. Work to align the two approaches is ongoing, and the following publications may include revisions.

Detailed energy use information for Canada is available from Canada's National Energy Use Database: http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/home.cfm.

## Industry and Services sectors

Data for value added for Canada are based on price levels and PPPs of 2005, instead of 2010 as for other countries.

Pulp and paper represents 99% of the energy use and 65% of the value-added in the paper and printing category.

The energy consumption for the non-metallic minerals sub-sector for the years 2014 and 2015, as well as the split of fuels for some data points of the time series, were estimated by the IEA Secretariat.

Some data have been combined due to confidentiality issues. For example, electricity and renewables and waste are combined in the food [ISIC 10-12] sub-sector.

## Transport sector

Data for buses include urban/local light rails (metro trains, light trains and urban buses).

Data on the energy use for air transport include both domestic and international transport. The energy use and activity data for marine transport include domestic and trans-border, but exclude other international transport.

Differences between data in the IEA energy efficiency indicators and the IEA energy balances for the consumption of motor gasoline and automotive diesel in road transport are due to the allocation of the consumption for transport purposes under the services sector in the IEA energy balances.

# Czech Republic

## Sources

Ministry of Industry and Trade.

## Years covered

2000-2015.

## General note

Some discrepancies between the IEA energy efficiency indicators and the IEA energy balances figures might occur. Work is ongoing to align the data.

## Residential sector

Data for energy consumption for space cooling are not available.

Data for energy consumption for 2015 for lighting are estimated by the IEA Secretariat.

Disaggregated data of energy consumption by appliance type and of appliances stocks are not available for the year 2015.

Data for energy consumption for clothes dryers are available from 2004 onwards.

## Industry and Services sectors

Data for energy consumption for rubber and other manufacturing are available only from the years 2007 onwards.

Data for energy consumption for 2015 for rubber and plastics, machinery, transport equipment, other manufacturing, non-specified manufacturing and construction are based on IEA Secretariat estimates.

Data for value added for 2015 for all sub-sectors are based on IEA Secretariat estimates.

## Transport sector

Data for vehicle-kilometres of passenger cars and freight road transport – and thus occupancy of passenger cars and load of freight road transport – are not available for several years.

Data for energy consumption and passenger-kilometres for motorcycles are not available.

Data for energy consumption for freight airplanes and passenger ships might be included under passenger airplanes and freight ships, respectively.

# Denmark

## Sources

Danish energy Agency through the Odyssee database.

## Years covered

2000-2014.

## Residential sector

The data for combustible renewables and waste in space heating includes the heat contribution of heat pumps.

Data for energy consumption of water heating is included under space heating. Lighting energy consumption is included under other appliances.

Data for PCs are not available.

## Transport sector

Data for tonne-kilometres of freight road transport include only Danish registered vehicles with a capacity of over 6 tonnes.

Data for activity of motorcycles are not available.

# Finland

## Sources

Odyssee database supplied by Statistics Finland.

## Years covered

2000-2014 (2015 – partially).

## General note

Some discrepancies between the IEA energy efficiency indicators and the IEA energy balances might occur.

## Residential sector

Data for energy consumption for space cooling are not available.

Data for PCs are not available.

Data for energy consumption for other appliances includes electric saunas and electric pre-heating of cars.

Data for energy consumption are not available for the year 2015.

## Industry and Services sectors

Data for energy consumption for the services sector for the year 2015 is based on IEA Secretariat estimates.

Data for energy consumption for rubber [ISIC 22] for the year 2015 is based on IEA Secretariat estimates.

## Transport sector

Data for passenger-kilometres of motorcycles and passenger ships, and tonne-kilometres data for freight airplanes and freight ships are not available.

Data for the energy consumption of freight airplanes and passenger ships are not available. They might be partially included under passenger airplanes and freight ships, respectively.

Data for energy consumption are not available for the year 2015.

Work is ongoing to improve data for energy consumption of passenger cars and freight road transport.

# France

## Sources

Odyssee database; Ministère de l'Environnement, de l'Énergie et de la Mer.

## Years covered

2000-2015.

## General note

Energy and activity data include only metropolitan France except for value-added for the industry and services sub-sectors, which includes overseas departments.

## Residential sector

Data for PCs are not available for the whole time series.

## Industry and Services sectors

Data for 2015 on the energy consumption of the services sector are based on IEA Secretariat estimates.

# Germany

## Sources

Federal Ministry for Economic Affairs and Energy, Federal Ministry for Transport and Digital Infrastructure, Federal Statistical Office, Fraunhofer-Gesellschaft.

## Years covered

2000-2015.

## General note

Discrepancies between the IEA energy efficiency Indicators, the IEA energy balances and national figures result from differences in the data scope and definitions, e.g. air transport. Work is ongoing to align these sources.

Data presented for Germany in this publication come from the submission to the IEA as of January 2017.

## Residential sector

Data for residential energy consumption have been revised for the years between 2006 and 2015 according to a new methodology.

Data for space cooling are available from 2013 onwards. PCs data are not available.

Data for combustible renewables and waste include direct use of geothermal and solar thermal heat.

## Industry and Services sectors

Data for the energy consumption of construction are not available.

Data for the energy consumption of agriculture is based on a national survey. However, the data are not compatible with the national energy balances. Work is in progress to solve this issue.

# Greece

## Sources

Odyssee database (CRES) supplied by Ministry for Environment and Energy.

## Years covered

2000-2014 (2015 – partially).

## Residential sector

In 2013, taxation on oil products for space heating increased substantially, leading to reduced consumption in the residential sector. According to external sources, the consumption of oil products has been partially replaced by non-commercial solid biofuels not yet reported. This leads to a significant reduction of total space heating consumption in 2013, affecting also the energy intensity of this end use. The space heating intensity shown should, thus, be considered with caution. Work is ongoing to address this issue for the next editions of this publication.

Data for the energy consumption for other appliances includes lighting.

Data for PCs are not available.

Energy consumption split by appliance type is not available for the years 2014 and 2015.

## Industry and Services sectors

Data for rubber and other manufacturing are not reported separately.

## Transport sector

Data for vehicle-kilometre of buses and freight trucks from 2000 to 2009 are based on IEA Secretariat estimates.

The full amount of energy consumption from water transport is allocated to freight ships.

The full amount of energy consumption from air transport is allocated to passenger airplanes.

# Hungary

## Sources

Hungarian Energy and Public Utility Regulatory Authority.

## Years covered

2000-2015.

## General note

Results of the IEA decomposition analysis are not available.

Some breaks in energy consumption data may occur between 2012 and 2013, resulting from an energy consumption survey introduced in 2014. For instance, some energy consumption was reallocated between

industry and services sectors. There are also some breaks in the time series of value added data.

### Residential sector

Data for energy consumption for space heating from combustible renewables and waste from 2000 to 2009 are based on IEA Secretariat estimates.

Data for occupied dwelling for 2015 are based on IEA Secretariat estimates.

Data for energy consumption disaggregated by end-use for the years 2011 to 2014 are estimated by the IEA Secretariat.

Data for energy consumption for other appliances includes all residential appliances, cooling and lighting. Energy consumption for space cooling is reported separately for the year 2015.

### Industry and Services sectors

Data for combustible renewables and wastes consumption in the services sector for 2000 to 2009 are based on IEA Secretariat estimates.

Data for energy consumption for rubber and other manufacturing are reported separately from 2013 onwards.

### Transport sector

Data for energy consumption and activity (passenger-kilometres) for passenger cars include motorcycles.

Data for passenger car occupancy are not available after 2010.

Data for energy consumption of passenger and freight trains from 2000 to 2012 are based on IEA Secretariat estimates.

Data for activity (passenger-kilometre) of passenger trains from 2000 to 2006 are based on IEA Secretariat estimations.

Data for activity and energy consumption of air transport is not available. Energy consumption of freight ships includes passenger ships up to 2012.

Data for activity (tonne-kilometres) of freight transport include both domestic and international travels.

## Ireland

### Sources

Sustainable Energy Authority of Ireland through the Odyssee database.

### Years covered

2000-2014 (2015 – partially).

### General note

Between 2008 and 2009, there is a break in series for certain oil products due to a new methodology being applied to sectoral demand by Sustainable Energy Ireland. This change can also explain breaks between 2006 and 2007.

### Residential sector

Data for energy consumption in the residential sector relies significantly on estimates. The Irish administration is working on more precise data, which will be included in future versions of this publication.

Data for energy consumption for lighting and residential appliances split by appliance type are not available.

Data for stock of appliances are partially estimated by the IEA Secretariat. Data for PCs are not available.

### Industry and Services sectors

Data for value added of the chemicals [ISIC 20-21] and other manufacturing sub-sectors for the year 2015 are not available.

### Transport sector

Discrepancies between the IEA energy efficiency indicators and the IEA energy balances for oil products are due to different reporting sources. Work is ongoing to align the two data-sets, and revisions may occur in the future.

Data for activity of passenger transport (passenger kilometre) are not available for 2015.

Data for tonne-kilometres of ships are not available after 2008.

Data for energy consumption of freight road transport exclude light duty vehicles.

Data energy consumption of motorcycles are not available.

## Italy

### Sources

Ministry of Economic Development, Terna and ENEA; Ricerca Sistema Energetico (RSE).

### Years covered

2000-2015.

### Residential sector

The methodology used to calculate combustible renewables and waste consumption in the residential sector from 2002 was revised, leading to a break in series between 2001 and 2002.

Data on appliances diffusion for the year 2015 is not available.

### Industry and Services

Data for value added for wood and wood products, paper and printing, basic metals, machinery, non-metallic minerals and rubber and plastics for the year 2015 are based on IEA Secretariat estimates.

## Japan

### Sources

Ministry of Economy Trade and Industry (METI), Agency for Natural Resources and Energy.

### Years covered

2000-2015.

### Residential sector

Data for energy consumption for residential appliances include lighting.

Data for energy consumption of residential appliances disaggregated by appliance type are not available. The average dwelling surface was estimated as the ratio between the total dwelling area and the number of occupied dwellings.

Data for diffusion of dish washers are available from 2004 onwards.

### Industry and Services

All data for value added are based on 2005 instead of 2010, as for the other countries.

### Transport sector

Data for energy consumption and passenger-kilometre of motorcycles are not available.

## Korea

### Sources

Korea Energy Economics Institute.

### Years covered

2000-2014.

### Residential sector

Data for other appliances include electricity consumption for cooking and night-time electricity, which represents mostly space heating. This may affect cooking end-use indicators.

Data for diffusion of clothes dryers are not available.

### Industry and Services sectors

Data for energy consumption for chemicals [ISIC 20-21] includes rubber [ISIC 22].

Data for energy consumption for other manufacturing includes electricity, gas and water supply.

The shares of industry sub-sector in value added and energy intensities may differ from last year publication, as the source of macroeconomic data is now the OECD Annual National Accounts database.

### Transport sector

In the current edition of this publication, the energy consumption of domestic passenger and freight airplanes has been revised by the Korean administration.

Data for passenger cars include passenger vans (up to 15 passengers).

## Luxembourg

### Sources

STATEC–NSI Luxembourg.

### Years covered

2000-2015.

### General note

There may be some discrepancies between this publication and the IEA energy balances. Work is ongoing to improve data consistency.

### Residential sector

Data for energy consumption disaggregated by end-use is available from year 2008 onwards.

Data for the energy consumption of residential appliances disaggregated by appliance type is not available.

Data for diffusion of appliances are available only for year 2011.

### Industry and Services sectors

Heat consumption in industry is reported only from 2003.

Energy consumption of combustible renewables and waste in the wood manufacturing sub-sector is reported only from 2005, leading to a break in the energy intensity time series.

Due to confidentiality issues data for energy consumption of chemicals [ISIC 20-21] includes rubber [ISIC 22], whereas regarding value added, rubber [ISIC 22] are included in the manufacture of non-metallic mineral products [ISIC 23]. For this reason the corresponding intensities are not calculated.

Data for value added of basic metals [ISIC 24] and Machinery [ISIC 25-28] are not available.

### Transport sector

Data for energy consumption of motorcycles and freight airplanes are not available.

Data for passenger-kilometres for motorcycles, passenger airplanes and passenger ships are not available.

Data for tonne-kilometres of freight airplanes are not available.

Data for vehicle-kilometres for passenger cars are available from 2008 onwards.

Data for load of freight road transport are not available for the entire time series, and occupancy of passenger cars is not available prior to 2008.

The full amount of energy consumption in water transport is allocated to passenger ships.

Work is ongoing to revise data for energy consumption of buses, passenger cars and freight road transport.

## Netherlands

### Sources

Energy research Centre of the Netherlands (ECN) through the Odyssee database.

### Years covered

2000-2014 (2015 – partially).

### Residential sector

Data for PCs are not available for the whole time series.

### Industry and Services sectors

The IEA Secretariat estimated some data for energy consumption from heat, oil, and combustible renewables and waste.

Data for energy consumption for rubber [ISIC 22] and other manufacturing are included in other sub-sectors.

Data for energy consumption for the year 2015 is not available.

### Transport sector

Data for passenger-kilometres of motorcycles, passenger airplanes and passenger ships are not available.

Data for tonne-kilometres of freight road transport include national transport by Dutch vehicles and the share of international transport by Dutch vehicles taking place within Dutch borders (estimated as 100 km per international trip).

Data for tonne-kilometres for freight ships includes only freight traffic in rivers.

Data for energy consumption for domestic passenger ships and domestic freight airplanes is not available.

Data for energy consumption and activity for the year 2015 is not available.

## New Zealand

### Sources

Energy efficiency and conservation authority (EECA).

### Years covered

2000-2015.

### Residential sector

Data for energy consumption for residential lighting for the period between years 2000 to 2006 have been revised by the national administration.

### Industry and Services sectors

Data for value added are based on 2005 instead of 2010, as for other countries.

Data for value added for chemicals [ISIC 20-21] includes rubber [ISIC 22] and refining and coke processing [ISIC 19].

## Poland

### Sources

Central Statistical Office.

### Years covered

2000-2015.

### General note

Some discrepancies between the IEA energy efficiency indicators and the IEA energy balances figures might occur. Work is ongoing to improve data consistency.

### Residential sector

Data for energy consumption disaggregated by end use is available only for the year 2015.

Data for energy consumption for other appliances in 2015 includes lighting.

Data on appliances stock are available up to 2014. Data for stocks of PCs and clothes dryers is not available.

### Industry and Services sectors

Data for value added for the year 2015 are based on IEA Secretariat estimates.

### Transport sector

Data for passenger-kilometres are not available for 2015.

Data for passenger-kilometres for motorcycles are not available.

Data for load of freight road transport are not available.

Data for energy consumption and activity (passenger-kilometres and tonne-kilometres) of passenger ships and freight airplanes are not available. Data for energy consumption might be partially included under freight ships and passenger airplanes, respectively.

## Portugal

### Sources

Direção Geral de Energia e Geologia, Diretora de Serviços de Planeamento e Estatística.

### Years covered

2000-2015.

### General notes

There may be some discrepancies between the IEA energy efficiency indicators and the IEA energy balances. Work is ongoing to improve data consistency.

Some transport energy consumption may be included under industry and services.

### Residential sector

Data on average dwelling surface for the years 2014-2015 are estimated by the IEA Secretariat.

Data for energy consumption of residential appliances disaggregated by appliance type are available from 2010.

Results from a survey on energy consumption of solid biofuels in households led to break in series of combustible renewables and wastes between 2009 and 2010.

Data for diffusion of appliances are available up to 2012.

Data for diffusion of PCs and clothes dryers are available only for years 2010-2012.

### Industry and Services sectors

Data for value added for the year 2015 are not available.

Data on combustible renewables and wastes (solid biofuels) were revised based on a survey for industry, resulting in breaks in the energy consumption data for some sub-sectors between 2011 and 2012, e.g. for non-metallic minerals. Further revisions are expected in the future.

### Transport sector

Data for passenger-kilometres of motorcycles are not available.

Data for energy consumption and activity (passenger-kilometres) of passenger ships are not available. Some amounts may be partially included under freight ships.

Data for the activity (tonne-kilometres) of freight airplanes are available from 2010, whereas the corresponding energy consumption data are not available for the time series. Some amounts may be partially included under passenger airplanes. Hence, the data series for domestic freight airplanes was removed from the publication figure for consistency purposes.

Data for the stock of freight trucks include commercial road transport from 2010 onwards. However, data for tonne-kilometres of freight trucks exclude commercial road transport.

Data for passenger cars occupancy and load of freight road transport are not available for 2014.

Data for energy consumption from 2013 to 2015 have been estimated by the IEA Secretariat.

# Slovak Republic

## Sources

Ministry of Economy.

## Years covered

2000-2014 (2015 – partially).

## General note

Results of the IEA decomposition analysis are not available.

Data for the energy consumption of transport are not available for all modes. Data for this sector were obtained from the country energy balance. Still, the share of transport energy use may be underestimated due to missing data.

## Residential sector

Data for energy consumption for space heating include cooking.

Data for energy consumption for space cooling are not available.

Data for energy consumption for other appliances include dish washers, clothes dryers and PCs.

Data for diffusion of dish washers, clothes dryers and PCs are not available.

## Industry and Services sectors

Data for energy consumption for rubber [ISIC 22] and other manufacturing are included under non-specified manufacturing, while data for value added are reported separately.

## Transport sector

The disaggregation of energy consumption in transport is not available for some modes/vehicle types (e.g. freight road transports/trucks).

Data for the activity of domestic passenger ships and domestic freight airplanes are not available until 2013.

Data for vehicle-kilometres of passenger trains are available from 2011 onwards.

Data for load of freight road transport are not available for the entire time series.

Data for energy consumption of motorcycles, buses, domestic passenger ships, freight road transport and domestic freight airplanes are not available. Freight airplanes and passenger ships consumption might be partially included under passenger airplanes and freight ships, respectively.

Data for energy consumption of freight ships are available only from 2006 to 2011.

# Spain

## Sources

Instituto para la diversificación y ahorro de energía (IDEA) through the Odyssee database.

## Years covered

2000-2015.

## General note

Results of the IEA decomposition analysis are not available.

## Residential sector

Data for electricity consumption for different end-uses have been revised back to 2010 according to a new methodology by the Spanish administration. This causes some breaks between 2009 and 2010.

Data for energy consumption of residential appliances disaggregated by appliance type is not available.

Data for diffusion of residential appliances are available up to 2010.

### Industry and Services sectors

Data for energy consumption for rubber [ISIC 22] and other manufacturing are included under non-specified manufacturing, while data for value added are available separately.

Data for value added for 2014-2015 for all sub-sectors are based on IEA Secretariat estimates.

Data for value added for 2014-2015 for coke and refined petroleum products [ISIC 19] are not available.

## Sweden

### Sources

Swedish Energy Agency through the Odyssee database.

### Years covered

2000-2014 (2015 – partially).

### Residential sector

Data on average dwelling occupancy is not available for the year 2015.

Data for stocks and diffusion of residential appliances are available only up to 2013.

Data for energy consumption for space cooling are not available.

Data for energy consumption and stocks of appliances split by appliance type is available until 2013.

Data for energy consumption of residential appliances include lighting for the years 2014-2015, and data for other appliances include clothes dryers, TVs and PCs.

### Industry and Services sectors

Data for value added is not available for several industry sub-sectors for the year 2015.

Data for the energy consumption of services for the year 2015 are not available.

### Transport sector

Data for energy consumption and activity are not available for 2015.

At the time of this publication, activity data have been partially revised. These revisions will be included in the next edition of this book. Work is ongoing to improving data consistency with the IEA energy balances data.

Split of road transport energy consumption for 2014 is based on IEA Secretariat estimates.

## Switzerland

### Sources

Swiss Federal Office of Energy SFOE.

### Years covered

2000-2015 (partially).

### Residential sector

Data for energy consumption for space cooling are not available.

### Industry and Services sectors

Data for energy consumption for the wood manufacturing sub-sector are not available, while data for value added are.

Data for energy consumption for machinery also include transport equipment, while data for value added are available separately. The intensity figures are calculated aggregating data for value added.

Data for value added for manufacturing sub-sectors for the year 2015 are not available.

### Transport sector

Discrepancies in data for the transport energy consumption in relation to the IEA energy balances are due to different accounting methodologies (e.g. fuel tourism is excluded in this publication, different calorific values may be used, etc.).

Data for passenger-kilometres for domestic passenger airplanes and ships are not available.

## United Kingdom

### Sources

Department for Business, Energy and Industrial Strategy (BEIS).

## Years covered

2000-2015.

## Residential sector

The combined energy consumption of clothes washers and clothes dryers is allocated in equal shares to each category.

Data for energy consumption for other residential appliances include microwaves, kettles and space cooling.

# United States

## Sources

United States Energy Information Administration (EIA); for transport activity data: Bureau of Transportation Statistics (BTS).

## Years covered

2000-2015.

## General note

Data can show breaks between 2011 and 2012 due to a new methodology based on the Annual Energy Outlook 2015 reference case (EIA).

## Transport sector

The data for freight road tonne-kilometres and energy consumption have been revised for years 2008-2011 and 2000-2015 respectively, leading to a significant increase in the intensity of freight road transport and a decrease in energy saving coming from this sector. These changes are based on temporary estimates of the Freight Analysis Framework (FAF4) and the IEA Secretariat and might be further updated by the Bureau of Transportation Statistics during the upcoming annual data cycle.

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This statistical report is designed to help understand what drives final energy use in IEA member countries in order to improve and track national energy efficiency policies.

It is the second edition of a comprehensive selection of data that the IEA has been collecting each year, after its member states recognised in 2009 the need to better monitor energy efficiency policies.

The report includes country-specific analysis of end uses across the largest sectors – residential, services, industry and transport. It answers questions such as:

- What are the largest drivers for energy use trends in each country?
- Was energy saved because of efficiency progress over time?
- How much energy is used for space heating, appliances or cooking?
- What are the most energy-intensive industries?

Improving energy efficiency is a critical step for governments to take to move towards a sustainable energy system. This report highlights the key role of end-use energy data and indicators in monitoring progress in energy efficiency around the world.

This publication is complemented by the new *Energy Efficiency Indicators* database, which contains annual data from 2000 to 2015, covering end use energy consumption by energy product, end use energy efficiency indicators, and carbon intensity indicators for the four sectors.

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