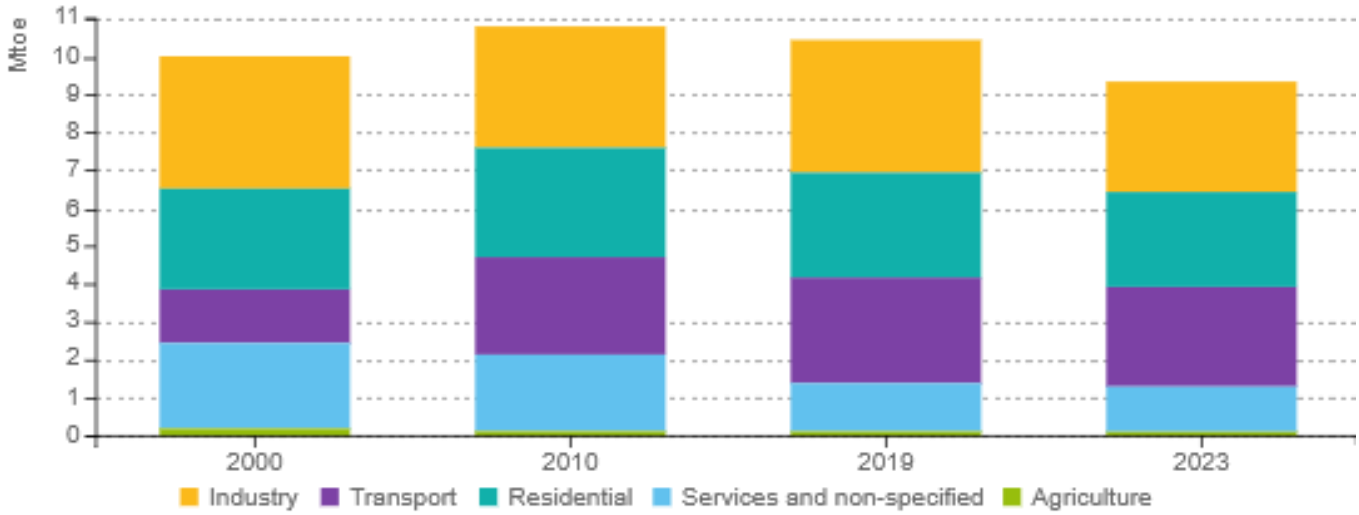
Energy efficiency trends and policies

Overview

In 2023, Slovakia's final consumption reached 9.34 Mtoe, which represents a decrease of 6.7% compared to 2000. Industry had the largest share of final consumption (31% in 2023). Consumption in services, agriculture and households decreased in both absolute and relative terms. Conversely, the share of final consumption in transport increased from 14.1% in 2000 to 28.1% in 2023.

Figure 1: Final energy consumption by sector (with climatic corrections)



Source: ODYSSEE

The energy efficiency of final consumers measured by ODEX has improved over the period 2000-2023 by 2.4% on average. Significant improvement was achieved in services (4.1% per year) and in industry sector (3.0% per year). For households, energy efficiency progress was 1.8% per year. Energy efficiency in transport improved on average by only 0.9% per year.

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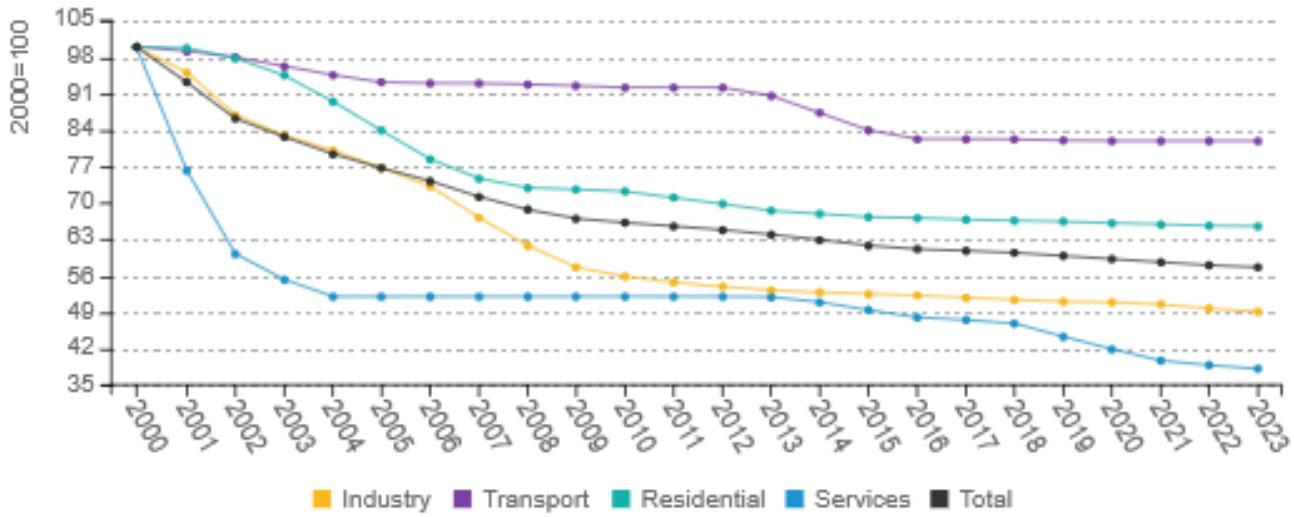
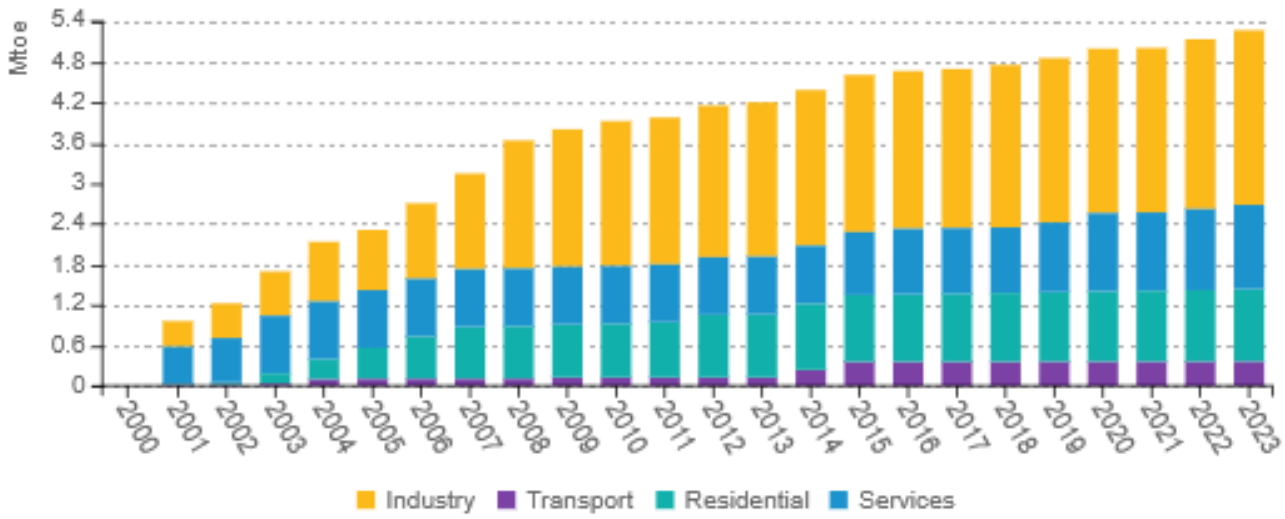
Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

Total energy savings in 2000-2023 are 5.28 Mtoe. The main part of energy savings is in industry (49.1%). A lower percentage of savings is in services (23.%) and in the household sector (20.3%). The lowest energy savings are in the transport sector (7.0%).

Figure 3: Energy savings by sector



Source: Odyssee

Total energy supply in 2023 was 16.7 Mtoe, while in 2010 the total energy supply was 18.7 Mtoe. Factors such as technological changes in industry, increased energy efficiency in buildings, and more efficient appliances are behind the reduction in final energy consumption by 1.9 Mtoe. This is 95% of this decrease in total energy supply in the years 2010-2023.

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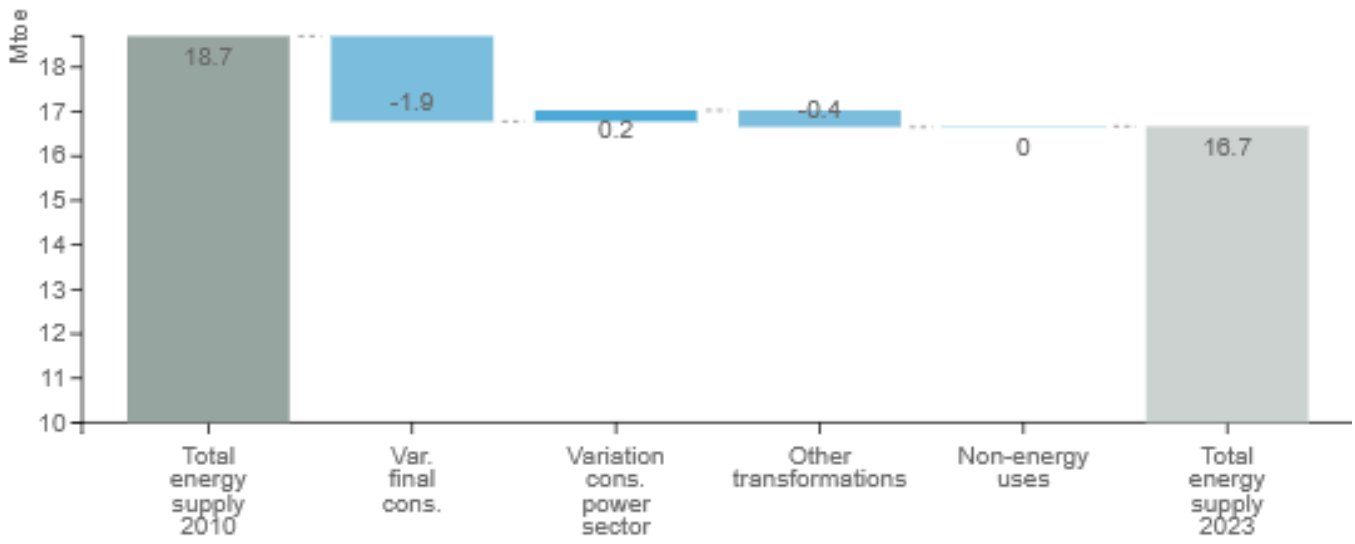
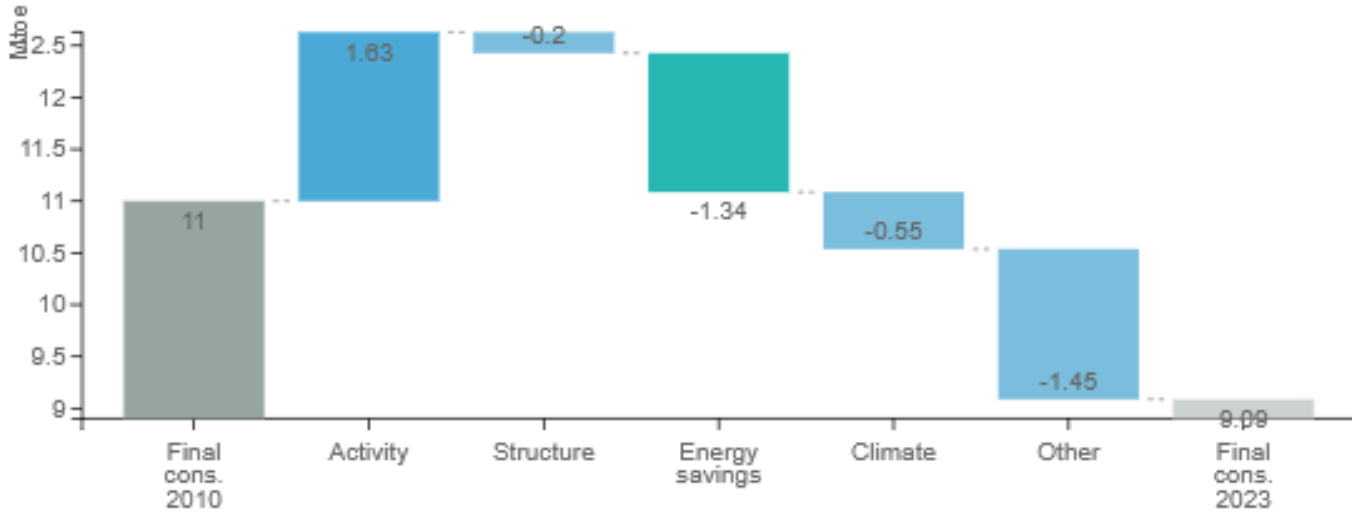
Figure 4: Main drivers of the total energy supply variation



Source: Odyssee

Final energy consumption was 11 Mtoe in 2010. In 2023, final energy consumption was 1.91 Mtoe lower than in 2010. The increase in final energy consumption due to development activities is practically entirely equal to energy savings. The remaining reduction in final energy consumption is due to climate change and other factors.

Figure 5: Main drivers of the final energy consumption variation



Source: Odyssee

Table 1: Sample of cross-cutting measures

Measures	NECP	Description	Expected savings,

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	measures		impact evaluation
Recovery and resilience plan of the Slovak Republic	Yes	The main strategic document defining policies, priorities, milestones and framework measures needed to support the Slovak economy for its recovery after the covid pandemy and to react to the identified main challenges and systemic shortcomings of the Slovak economy.	2.14 TJ
Long-term renovation strategy of the building stock (2020)	Yes	A long-term renovation strategy of the building stock was prepared as strategic document to support the renewal of the national stock of residential and non-residential buildings, both public and private, with a view to achieving a highly energy-efficient and decarbonised building stock by 2050. The strategy forms part of the Integrated National Energy and Climate Plan of the Slovak Republic.	2.14 TJ
Integrated national energy and climate plan for the years 2021 - 2030	Yes	The main strategic document defining energy and climate policies and objectives for the period 2021-2030	1.28 TJ

Source: MURE

Buildings

Final energy consumption in buildings was 4.9 Mtoe in 2000 and 3.69 Mtoe in 2023. This is a positive change of 24.9%. In the case of the residential buildings category, we observe only a slight positive change. In the case of the public buildings category, we observe a reduction in final energy consumption of 47.4%.

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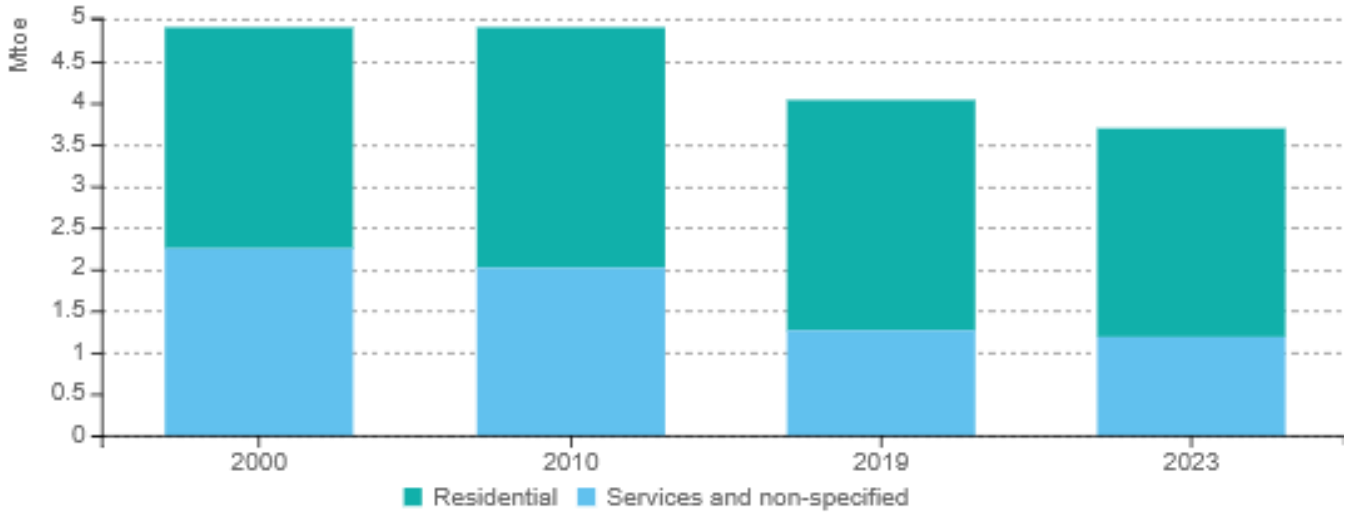
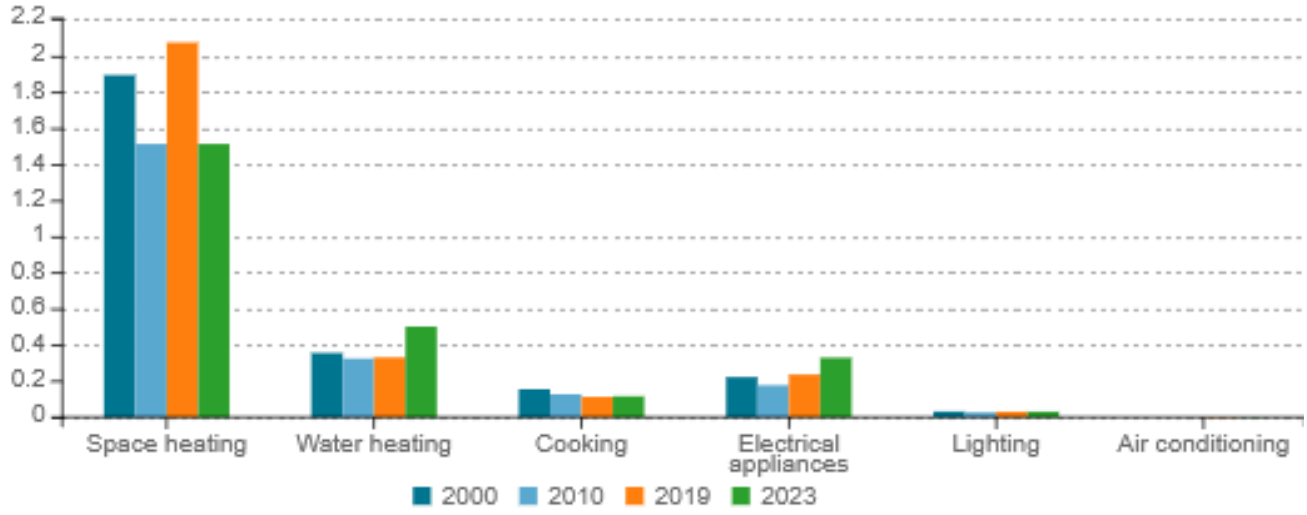
Figure 6: Final energy consumption in buildings (with climatic corrections)



Source: Odyssee

Comparing energy consumption in households, we clearly see the dominance of energy consumption in the area of heating (61% in 2023). The areas of water heating and electrical appliances together accounted for 33% of energy consumption in 2023. In the case of energy consumption by electrical appliances, we see an increasing trend in consumption.

Figure 7: Energy consumption by end-use of households (with climatic corrections)



Source: Odyssee

From the data on energy consumption for household heating in the years 2000 - 2023, we see a decrease in energy consumption around 2007 (about one third compared to 2001 or 2002). Since then, it has been at approximately the same level, except for the corona crisis period, where in 2019 - 2021 we see a clear increase in

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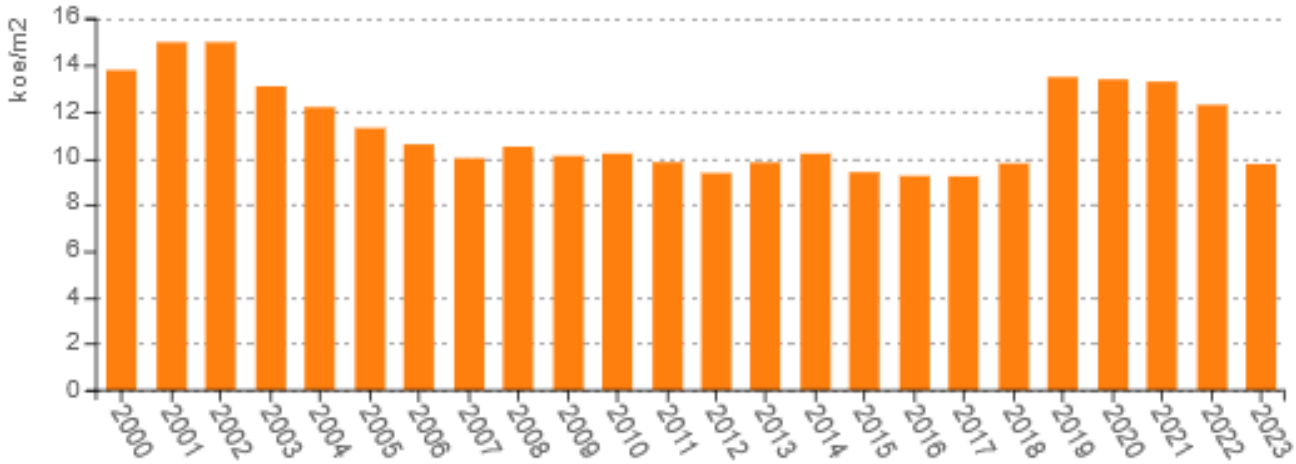
energy consumption for household heating. In 2022, this consumption was already decreasing and in 2023 it was at the level of 2007 (10 koe/m2).

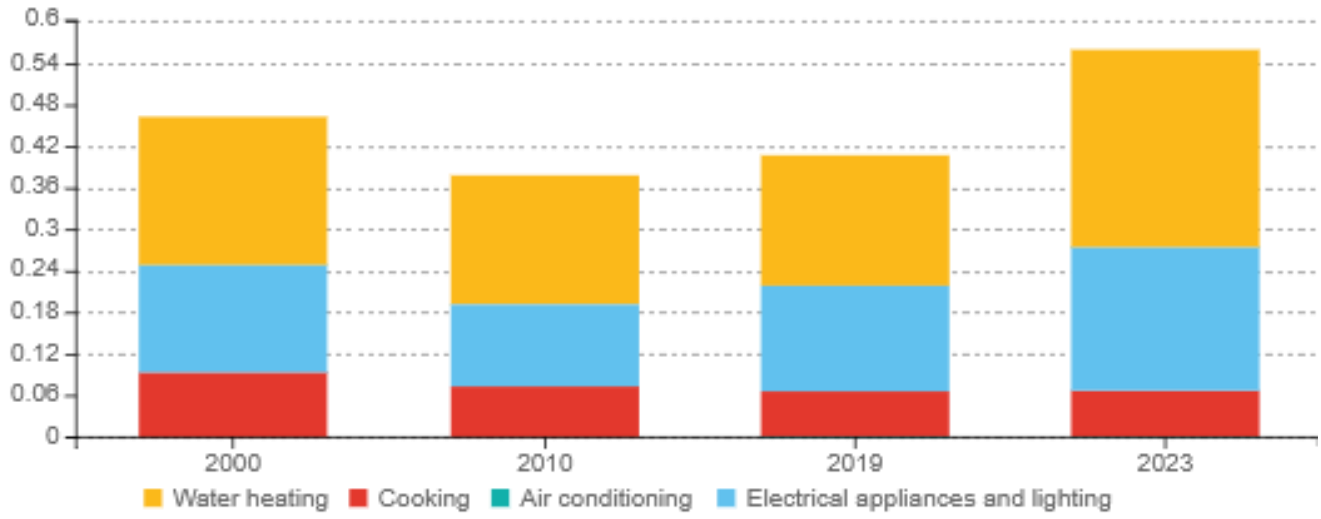
Figure 8: Energy consumption of household space heating per m2 (with climatic corrections)



Source: ODYSSEE

In 2023, energy consumption for water heating was 33% higher than in 2000. Energy consumption for electrical appliances and lighting also has a similar upward trend. In 2023, it represents an increase of 34% compared to 2000. In the case of energy consumption for cooking, we recorded a decrease of 29% in 2023 compared to 2000.

Figure 9: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

From the collected data, we see a decrease in electricity consumption per dwelling in 2010 by a quarter compared to the other monitored years (2000, 2019 and 2023). This is due to the global financial crisis of 2008. Significant changes in electricity consumption per dwelling are the change in the case of electrical appliances and in the case

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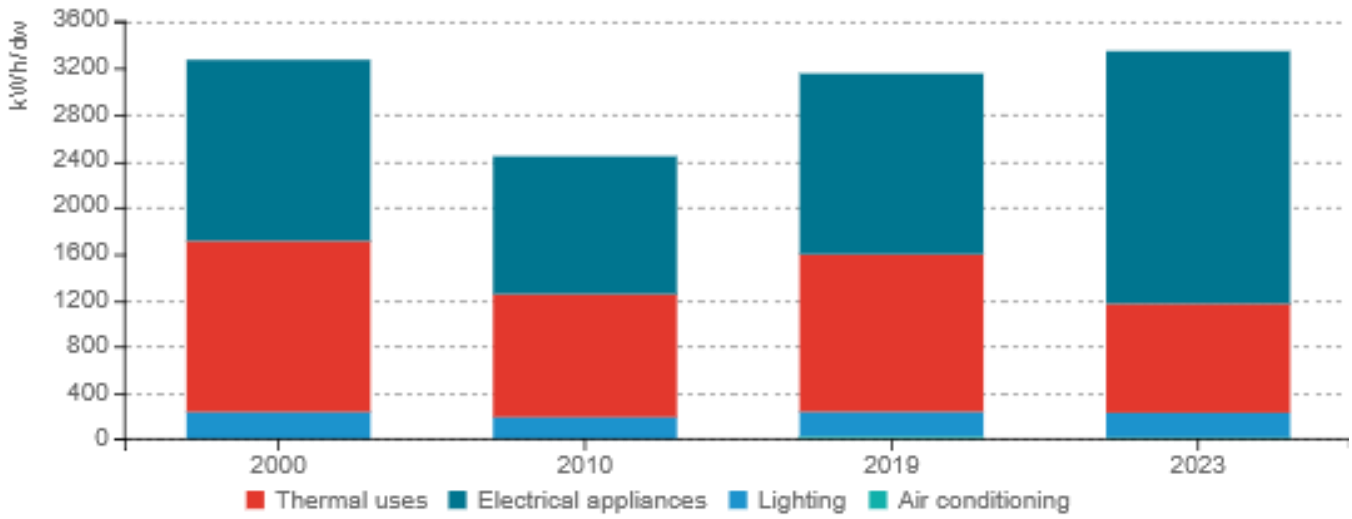
of thermal uses. Electricity consumption per dwelling by using electrical appliances was 40% higher in 2023 compared to 2000. Electricity consumption for thermal uses was 36% lower in 2023 compared to 2000.

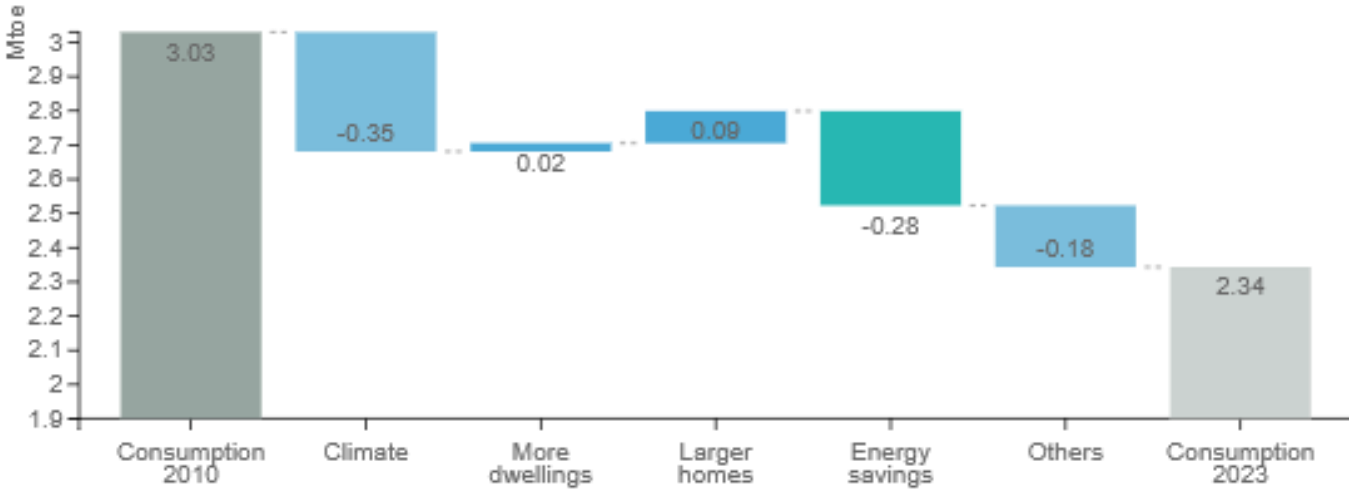
Figure 10: Electricity consumption per dwelling by end-use (with climatic corrections)



Source: Odyssee

Energy consumption for households was 3.03 Mtoe in 2010 and 2.34 Mtoe in 2023. This decrease is mainly due to two significant factors. Climate change is responsible for a lower energy consumption of 0.35 Mtoe. Energy savings represent 0.28 Mote. Interestingly, household size is responsible for an increase in energy consumption of 0.09 Mtoe between 2010 and 2023.

Figure 11: Main drivers of the energy consumption variation in households



Source: ODYSSEE

Energy consumption in households for heating was 1.64 Mtoe in 2010 and 1.36 Mtoe in 2023. Climate change is primarily responsible for this decline. Energy savings represent only about half of the impact of climate change.

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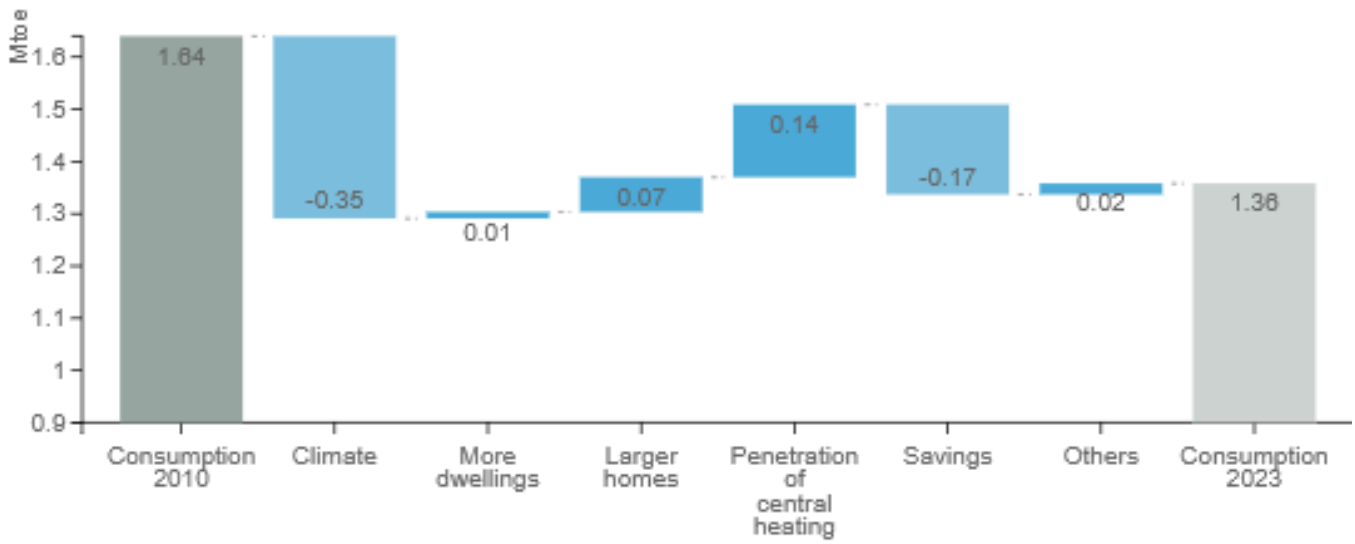
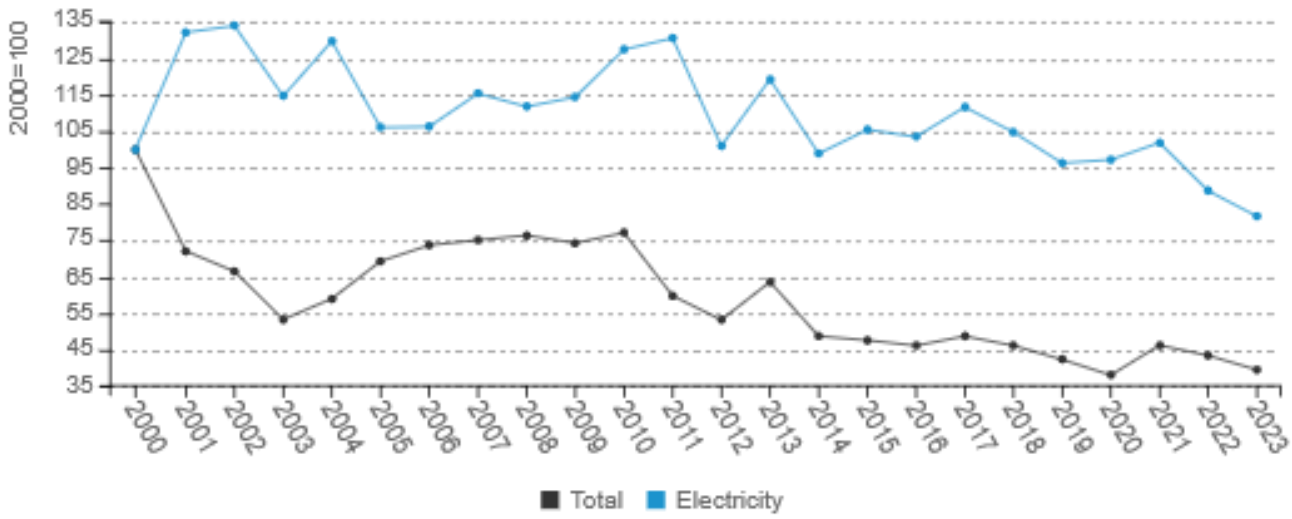
Figure 12: Main drivers of the space heating consumption variation of households



Source: Odyssee

Energy consumption per employee in services decreased by 60.5% in 2023 compared to 2000. Electricity consumption per employee decreased by 18.3% in 2023 compared to 2000. From the collected data, we see a high percentage of electricity consumption in the total energy consumption per employee in services.

Figure 13: Energy and electricity consumption per employee in services (with climatic corrections)



Source: ODYSSEE

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Table 2: Sample of policies and measures implemented in the building sector

Measures	NECP measures	Description	Expected savings, impact evaluation
Replacement of white goods	No	Support for the sale of energy-saving products, handing over a very old product to electrical waste to the Envidom collective system. Energy savings are calculated for refrigerators and freezers (including built-in and free-standing products).	0.12 TJ
Improving the energy efficiency of single-family homes	No	Financial support for renovation of single-family houses, which in this way will take on a significantly higher pace and energy level than has been the case so far. The support will lead to implementation of energy efficiency renovation measures at single-family houses and the introduction of selected green elements in the process recovery.	0.37 TJ
Improving energy efficiency in non - residential buildings to reduce greenhouse gas emissions	Yes	The aim of the measure is to improve the energy efficiency of non-residential buildings in order to achieve a highly energy efficient and decarbonized building stock and thus contribute to reducing energy poverty and meeting the binding targets for reducing greenhouse gas emissions by 2030. Depends on availability of financial sources for various instruments (see general description).	0.37 TJ

Source: MURE

Transport

Transport consumption grew by an average of 2.6% per year between 2000 and 2023. Currently, of this consumption, trucks and vans account for 47%, cars for 43.1%, buses for 8%, rail for 2% and motorcycles for 1%.

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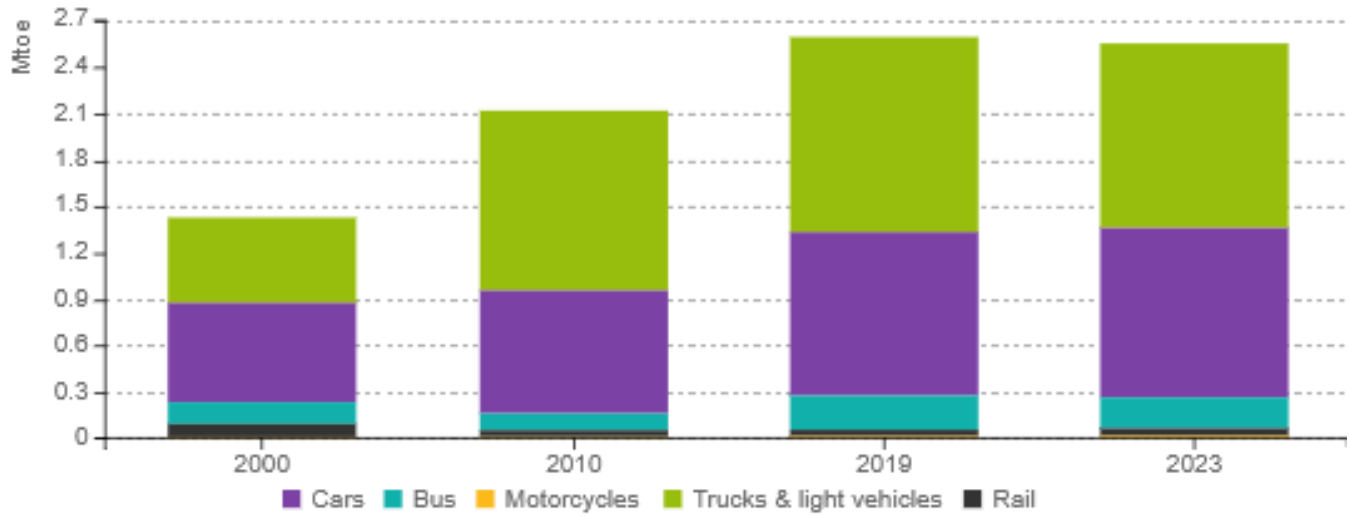
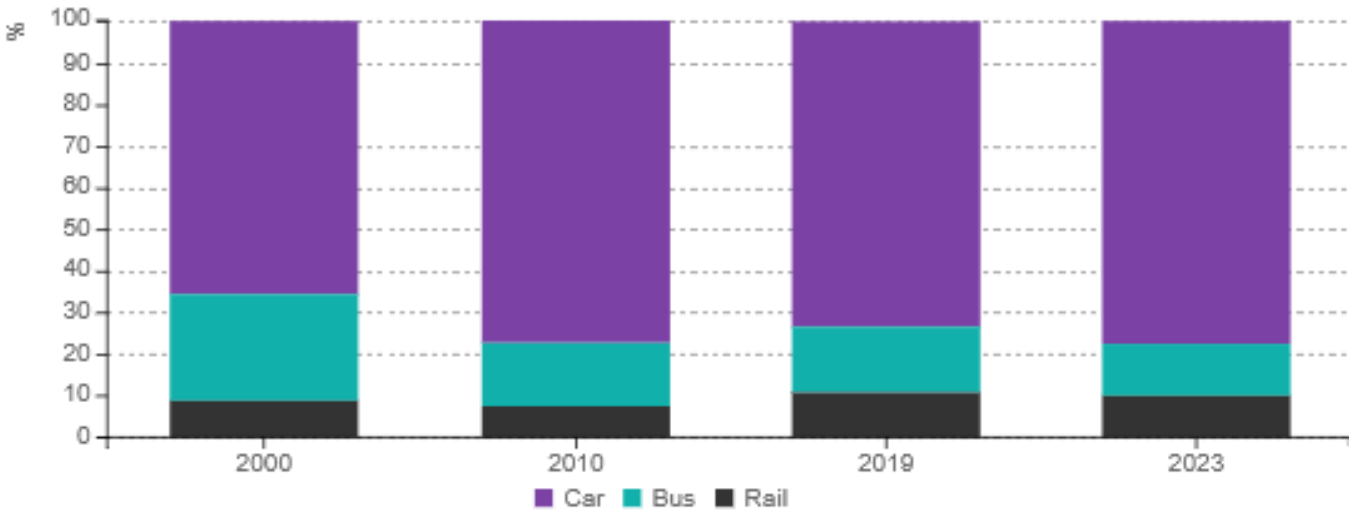
Figure 14: Transport energy consumption by mode



Source: ODYSSEE

In 2000, car transport accounted for 66% of passenger transport, buses 26% and trains 9%, but in 2023 cars increased their share of consumption to 77.5%, while the share of buses decreased to 12.5% and trains remained stable with a share of 10.0%. This means that passenger car transport is growing in Slovakia and passenger train transport has strengthened at the expense of bus transport. This is also due to the state's policy in train transport (free travel for students and pensioners). However, such a benefit does not apply to bus transport. One of the main factors of the dominance of individual car transport is the large reserves in the quality of transport services provided in public passenger transport. Systematic changes are primarily needed towards a better offer of continuous service.

Figure 15: Modal split of inland passenger traffic



Source: ODYSSEE

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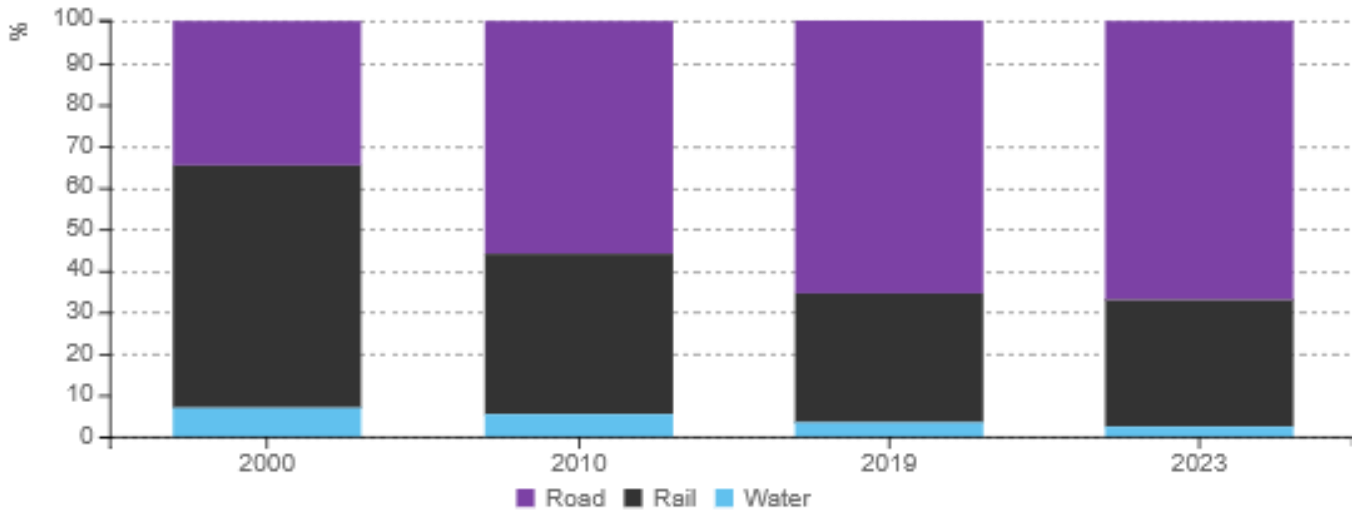
In the period 2000-2023, the share of freight transport by rail decreased from 58% to 30% while freight transport by road increased significantly from a share of 35% in 2000 to 67% in 2023. This is influenced by the conditions of goods transport by rail and the overall trend preferring speed of delivery over other transport parameters.

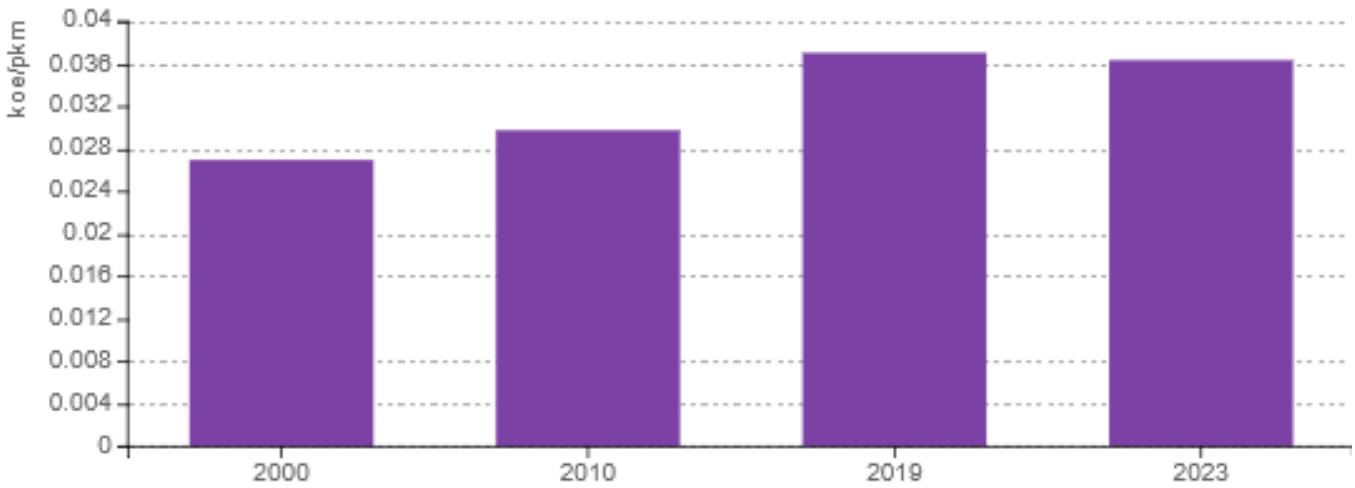
Figure 16: Modal split of inland freight traffic



Source: ODYSSEE

Energy consumption in cars per passenger kilometer increased from 0.027 koe/pkm in 2000 to 0.036 koe/pkm in 2023. This is an increase of 35%. This results from the phenomenon of a decrease in the share of passenger transport in mass passenger transport in favor of an increase in the share of passenger transport in individual passenger transport and at the same time from the phenomenon of a high share of travel by one passenger in one car.

Figure 17: Energy consumption of cars per passenger-km



Source: ODYSSEE

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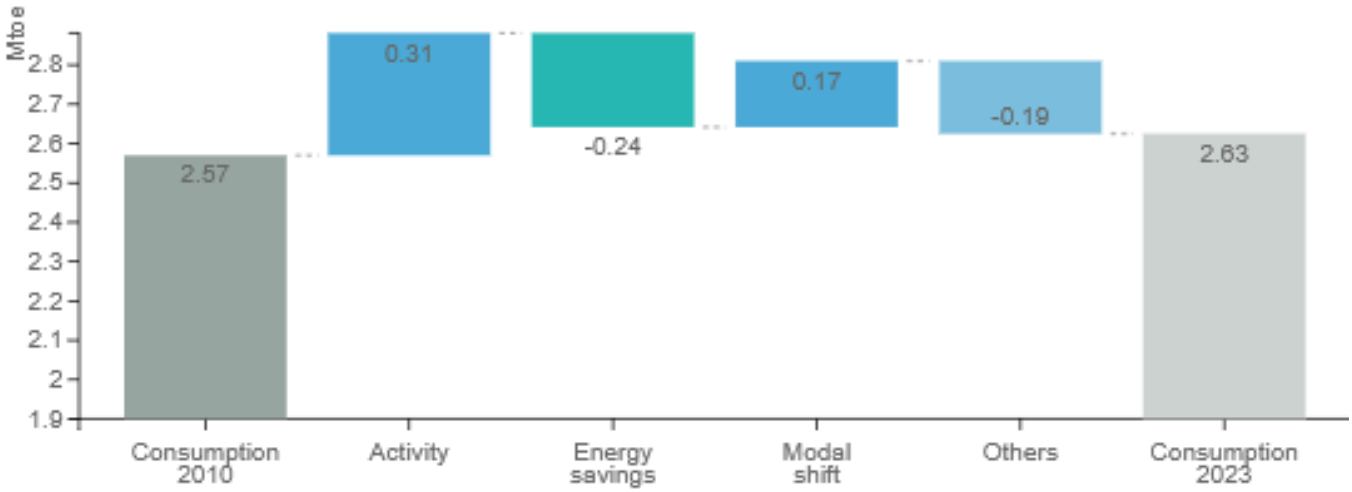
The overall growth in transport consumption from 2.57 Mtoe in 2010 to 2.63 Mtoe in 2023 (+0.06 Mtoe) was mainly influenced by an increase in individual car transport of passengers and freight (+0.31 Mtoe) and a significant shift in the transport of goods from less energy-intensive modes of transport (rail and water) to road freight transport (+0.17 Mtoe). The above trends were only partially eliminated by technical savings (e.g. improving the fuel efficiency of engines), which meant a reduction in consumption by approximately 0.24 Mtoe.

Figure 18: Main drivers of the energy consumption variation in transport



Source: ODYSSEE

Table 3: Sample of policies and measures implemented in the transport sector

Measures	NECP measures	Description	Expected savings, impact evaluation
Support for bicycle transport	Yes	The aim of the measure is to increase the rate of use of bicycle transport within urban areas of towns and municipalities as a relevant mode of transport. (see general description)	0.11 TJ
Promoting energy efficient transport	Yes	The aim of the measure is, respecting the principle of technological neutrality, to motivate natural and legal persons to purchase such vehicles, components and installations that contribute to meeting the objectives of energy efficiency, RES and emission reductions. Covers infrastructure but also vehicles (see general description).	0.11 TJ
Renewal and modernization of	Yes	The aim is to reduce the energy intensity of transport by increasing the attractiveness of public passenger transport by renewing and	0.11 TJ

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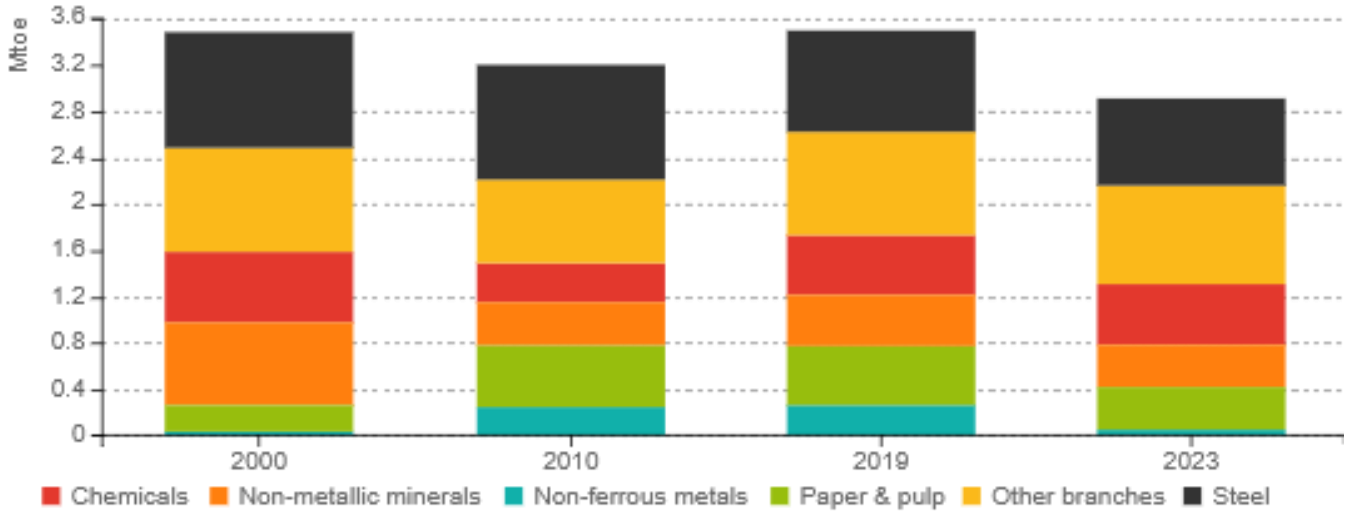
the vehicle fleet - rail transport		purchasing new vehicles for public rail passenger transport and urban rail public transport, thus creating conditions for sustainable regional and urban mobility. (see general description).	

Source: MURE

Industry

Final energy consumption in industry decreased from 3.49 Mtoe in 2000 to 2.91 Mtoe in 2023. The largest decrease in energy consumption is in non-metallic minerals (0.35 Mtoe), with a reduction of 49% over 2000-2023.

Figure 19: Final energy consumption of industry by branch



Source: ODYSSEE

The specific energy consumption in steel production decreased on average by 1.7% per year in the period under review from 2000 to 2023, while in paper and cellulose production it increased on average by 2.3% per year.

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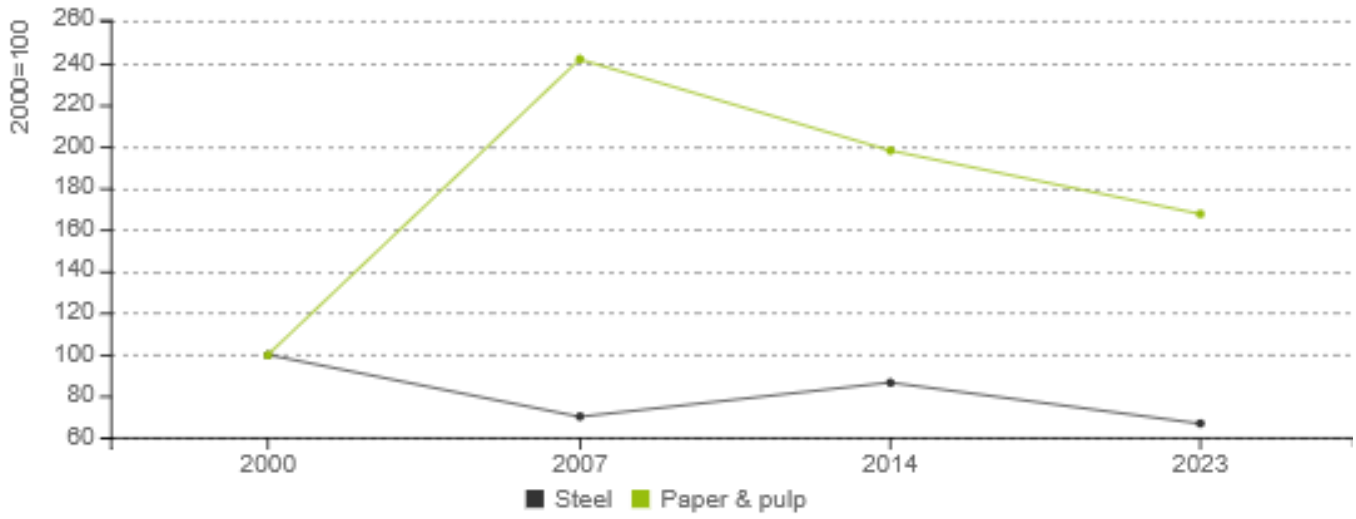
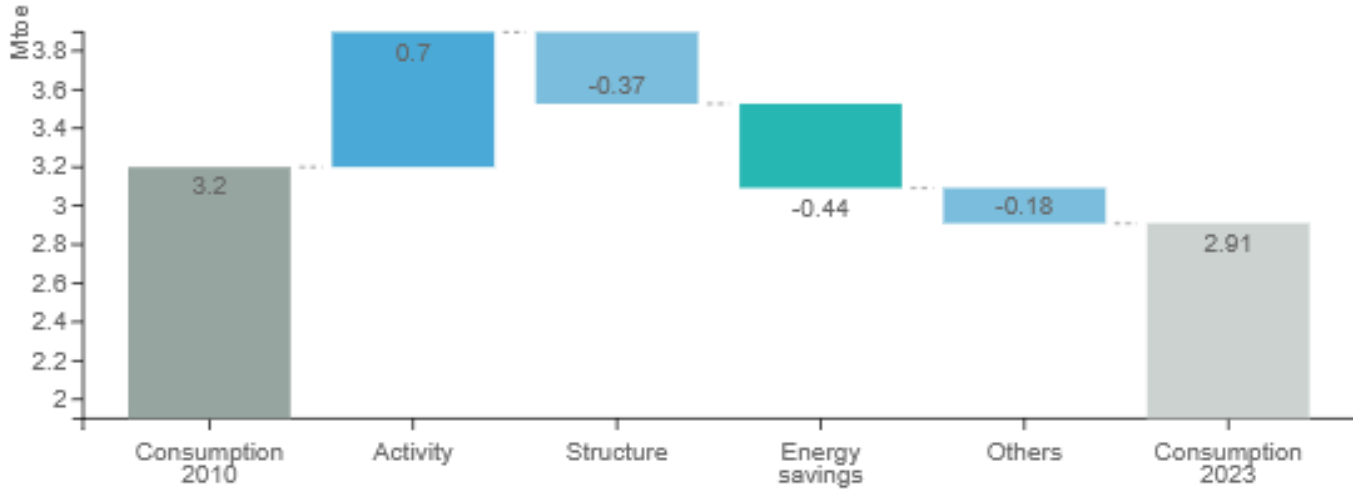
Figure 20: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

Total industrial consumption for the forecast period 2010-2023 decreased from 3.2 Mtoe to 2.91 Mtoe. The increase in consumption by industrial activities (0.7 Mtoe) is fully compensated by energy savings (0.44 Mtoe) and structural changes (0.37 Mtoe).

Figure 21: Main drivers of the energy consumption variation in industry



Source: ODYSSEE

Table 4: Sample of policies and measures implemented in the industry sector

Measures	NECP	Description	Expected savings,

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	measures		impact evaluation
Implementation of energy management, environmental management and EMAS systems in companies	Yes	The aim of the measure is to identify the potential for energy savings and a systematic approach to energy management at the level of individual entities of the national economy through the implementation of energy management systems, environmental management or EMAS and the resulting monitoring of energy efficiency in the entity itself.	0.14 TJ
Increasing energy efficiency and reducing emissions in companies in a competitive way	Yes	Support for an implementation of investment projects in order to reduce energy intensity and CO2 production. Its aim is to provide support for projects only to the extent necessary for their implementation, which will also result in significant savings of public funds.	0.41 TJ
Support for energy audits for small and medium-sized enterprises (SMEs)	Yes	The aim of the measure is to support the implementation of energy audits in SMEs. The measure does not include support for the implementation of measures identified by the energy audit.	0.14 TJ

Source: MURE

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