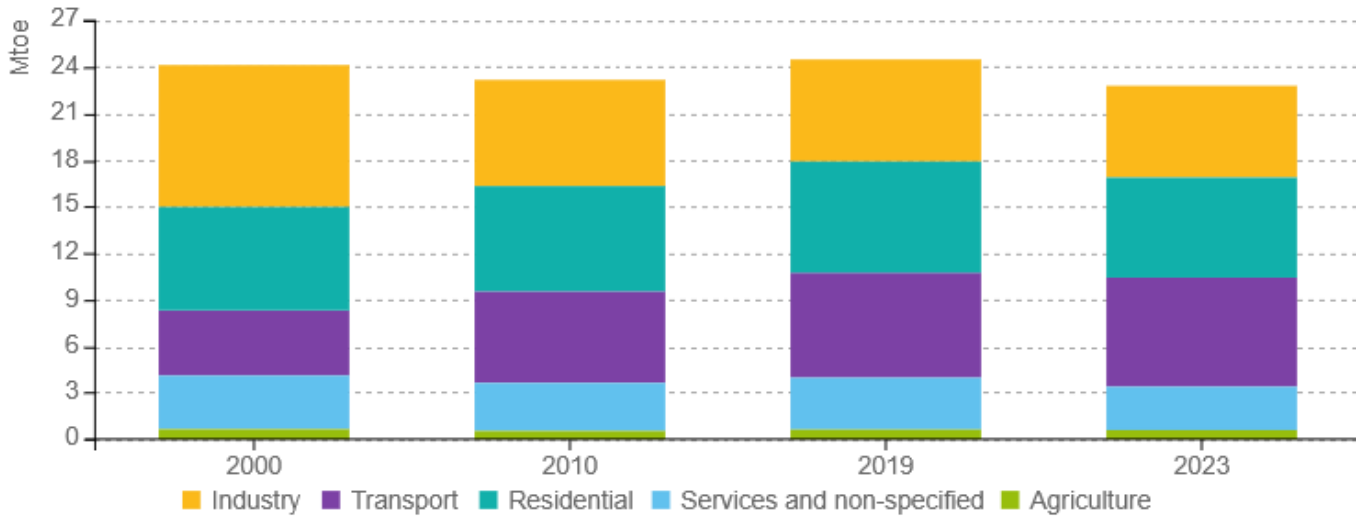
# Energy efficiency trends and policies

## Overview

Final energy consumption has slightly grown between the years 2000 and 2022 but in the year 2023 dropped below the 2010 level. In 2023, the final energy consumption reached 22.8 Mtoe (at normal climate), i.e. it was by 1.4 Mtoe lower than in 2000 and by 0.4 Mtoe lower than in 2010. Energy savings and structural changes were able to more than fully compensate the energy consumption growth driven by the activity and other effects. Energy consumption decreased significantly in all sectors except transport, where it grew by 67% from the year 2000.

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




Source: ODYSSEE

Energy efficiency of final consumption, as measured by ODEX, improved by an average of 1.5%/year from 2000 to 2023 (or 29.4% in total). The largest energy efficiency gains were obtained in the industry sector (2.8%/year), followed by services (1.3%/year) and residential (1.2%/year). The transport sector reached only a tiny decline in ODEX , it fell by 3% between 2000 and 2023.

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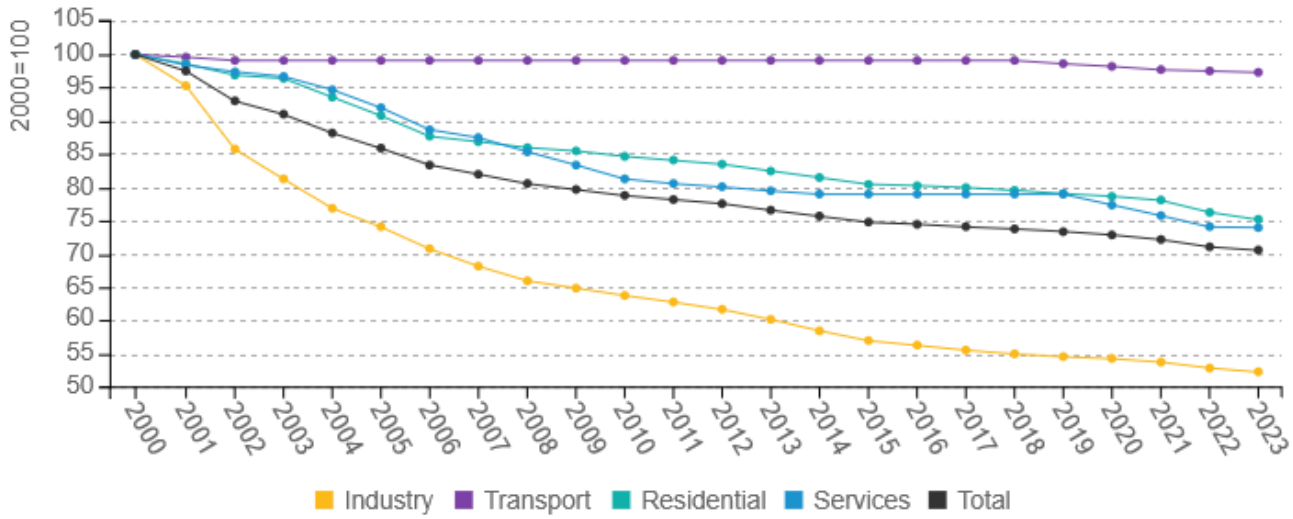
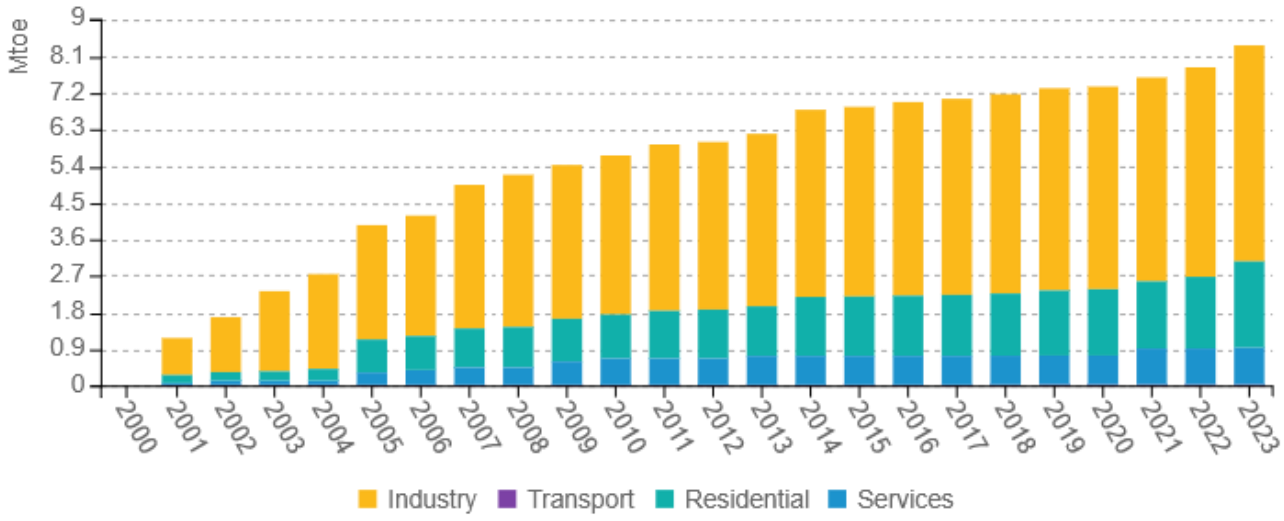
*Figure 2: Technical Energy Efficiency Index*




Source: ODYSSEE

Total energy savings reached 8.4 Mtoe in the period from 2000 to 2023, the bulk of it in industry (5.3 Mtoe, i.e. 63% of total savings); other savings were: 2.1 Mtoe in households, 0.9 Mtoe in services and only 0.04 Mtoe in transport. We can observe an increased growth of energy savings in last three years, which can be likely attributed mainly to economy regeneration after COVID, increased energy prices and prices of CO2 permits.

*Figure 3: Energy savings by sector*




Source: Odyssee

The total energy supply dropped by 7.1 Mtoe (-15.7%) in the period 2010-2023. All variation components added to the drop. We can observe the biggest drop in transformation sector (- 2.7 Mtoe in power sector, -2.2 Mtoe in other transformations). The final energy consumption contributed by a decrease of 1.8 Mtoe. Non-energy uses

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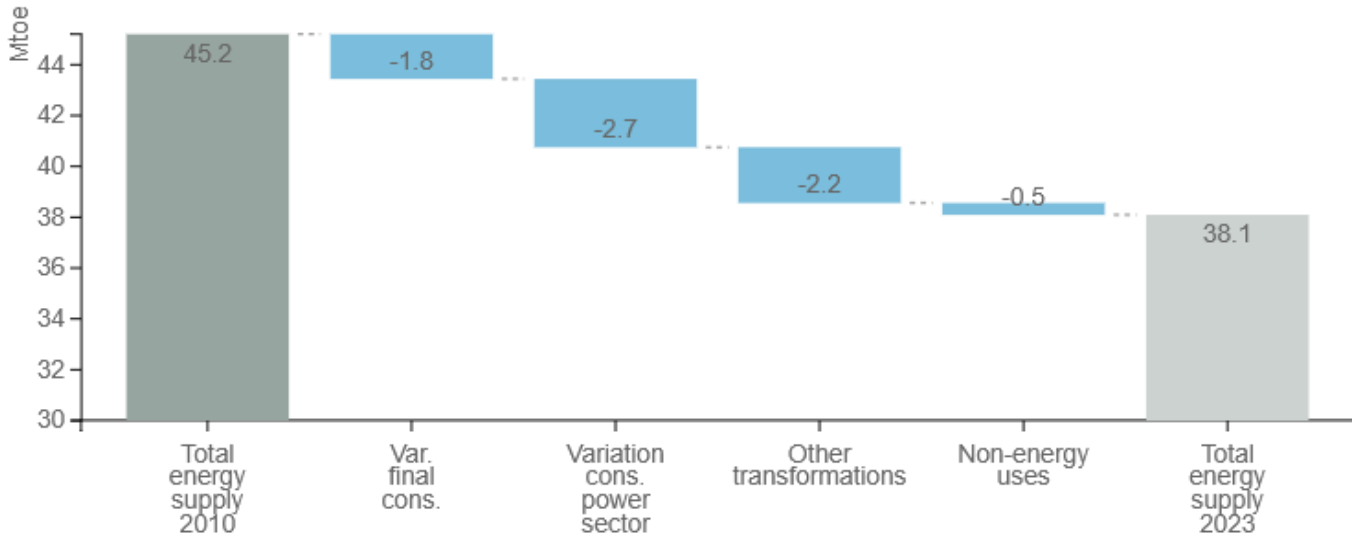
decreased by 0.5 Mtoe. Beside the improvement in the power sector, we can see growing share of renewable energy in power production.

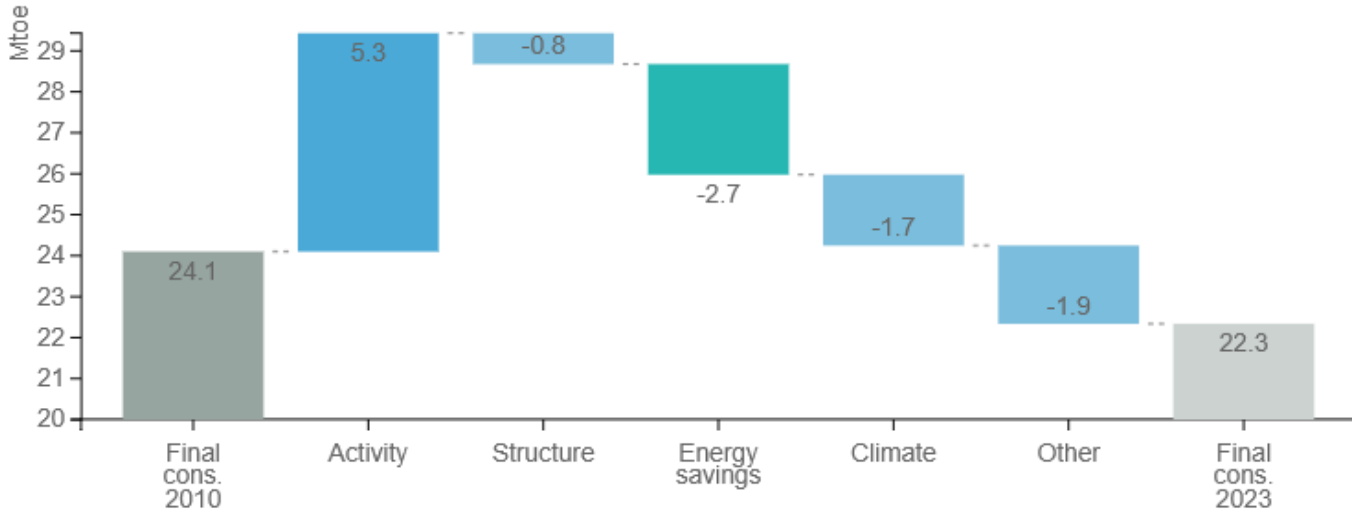
*Figure 4: Main drivers of the total energy supply variation*




Source: Odyssee

The final energy consumption decreased by 1.8 Mtoe (-7.5%) in the period 2010-2023. The increase of final energy consumption caused by rise of activity (+5.3 Mtoe) was fully compensated by other drivers. Energy savings reached 2.7 Mtoe, structural effects led to consumption decrease by 0.8 Mtoe. Other effects brought about a reduction of 1.9 Mtoe and climate change of 1.7 Mtoe.

*Figure 5: Main drivers of the final energy consumption variation*




Source: Odyssee

According to the latest NECP update the required end-use energy consumption should decrease from 25.0 Mtoe (latest 2024 data) to 20.3 Mtoe in 2030. The Czech Republic has decided to reach the target by alternative

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measures. Two measures are the most important - the New Green Savings Programme 2021+, with expected energy total cumulative savings of 2.04 Mtoe in the period 2021 - 2027, which focuses on energy savings in living buildings and the Operational Program Technology and applications for competitiveness 2021-2027 in industry sector with expected total cumulative energy savings of 0.21 Mtoe in the period 2021 - 2027. Big expectations are related to the introduction of the Modernisation Fund, which could bring total cumulative energy savings of 0.7 Mtoe in industry and 0.4 Mtoe in services and public sector. A typical cross-cutting measure is represented by the State programme to promote energy savings 2022+ (EFEKT 3), which concentrates on non-investment subsidies.

*Table 1: Sample of cross-cutting measures*

| Measures | NECP measures | Description | Expected savings, impact evaluation |
|---|---|---|---|
| Voluntary scheme for improving energy efficiency | Yes | The voluntary scheme for improving energy efficiency is an alternative policy measure on the basis of a voluntary arrangement between the State and stakeholders to carry out end-consumer end-use activities aimed at reducing final energy consumption. The measure targets households, industry, services as well as public sector. | 0.44 Mtoe |
| Voluntary agreements on energy efficiency with businesses | No | Voluntary agreements on energy efficiency measures and reporting between the Ministry of Trade and Industry and single businesses. | 0.08 Mtoe |
| State programme to promote energy savings 2022+ (EFEKT 3) | Yes | The State programme to promote energy savings (EFEKT 3 / EFEKT 2022+) focuses on investment and non-investment aid for energy efficiency support measures. | 0.3 Mtoe |

Source: MURE

## Buildings

Energy consumption in buildings fluctuated around 10 Mtoe in the period 2000 - 2023. It dropped by 0.87 Mtoe (-8.6%) in the given period. The consumption of services decreased by 0.66 Mtoe (-19%), consumption of households by 0.2 Mtoe (-3.1%).

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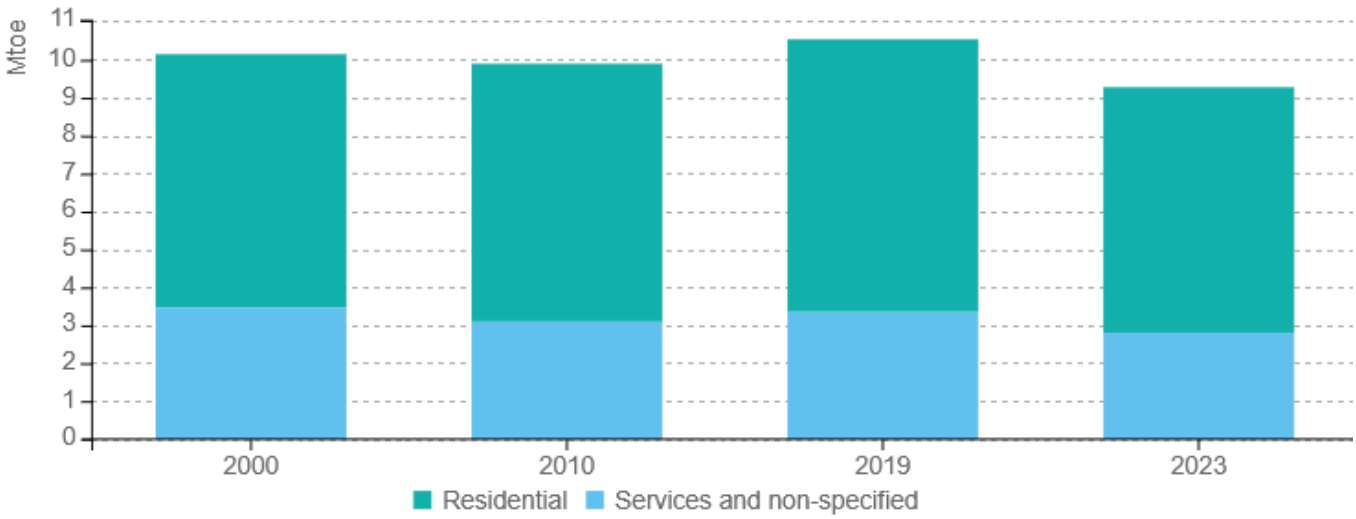
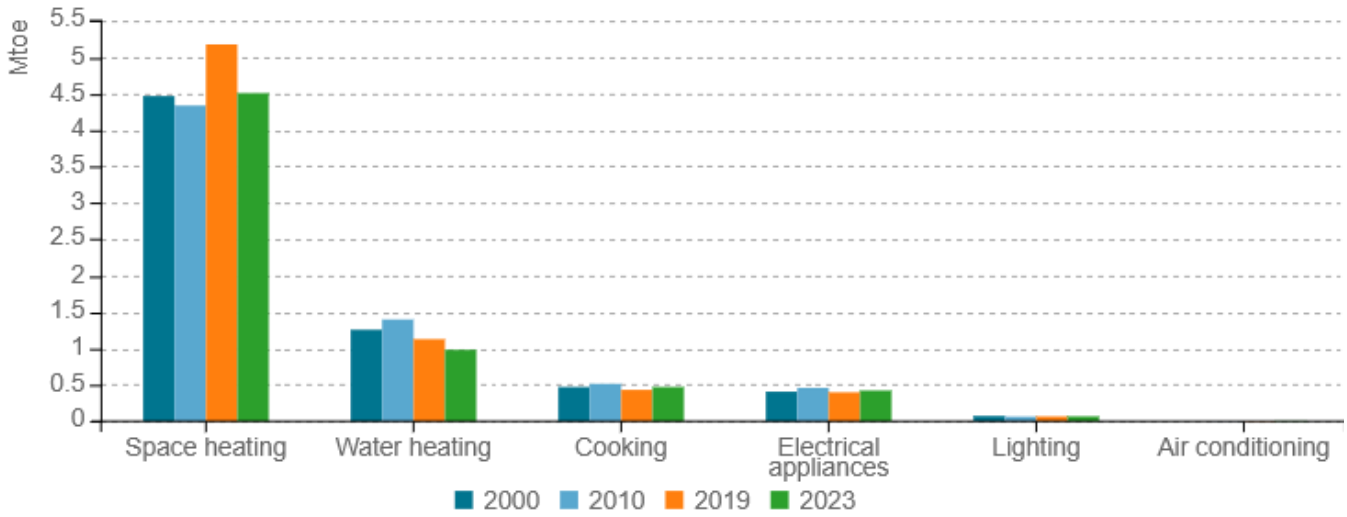
*Figure 6: Final energy consumption in buildings (with climatic corrections)*




Source: Odyssee

Energy consumption for space heating rose by 4% in the period from 2010 to 2023 despite massive waves of building insulation, and its share in total energy consumption of households increased from 64% to 70%. Energy consumption for water heating decreased by 30% since 2010. Between 2010 and 2023, energy consumption from cooking and electrical appliances decreased slightly, by 9% and 8% respectively, while consumption of lighting grew by 6%.

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




Source: Odyssee

The energy consumption for space heating per m2 decreased by 14% over 2000 - 2022, but it stagnated during last 15 years. A significant drop occured in the year 2023 (-13%), likely due to high energy prices.

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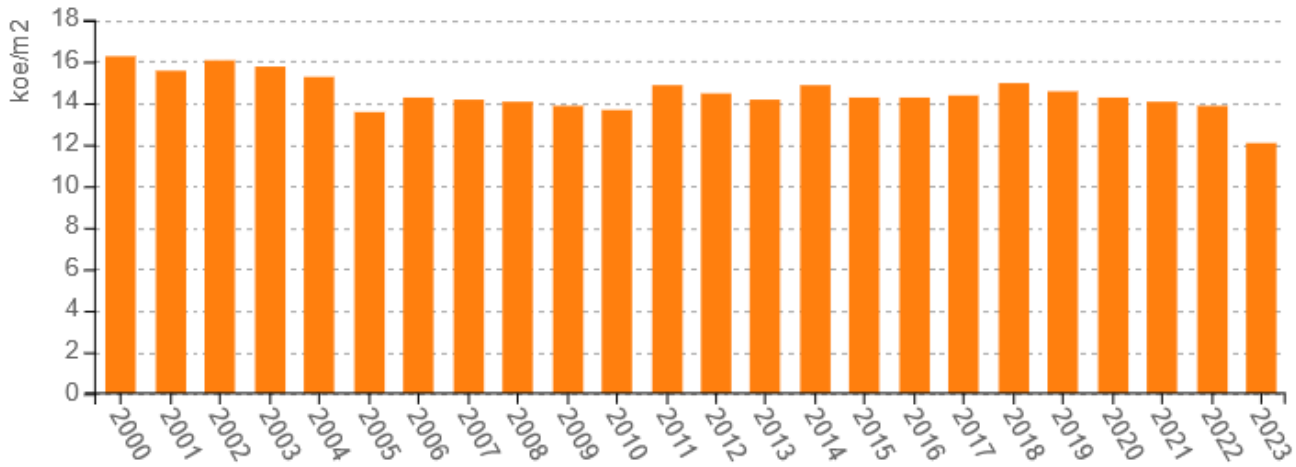
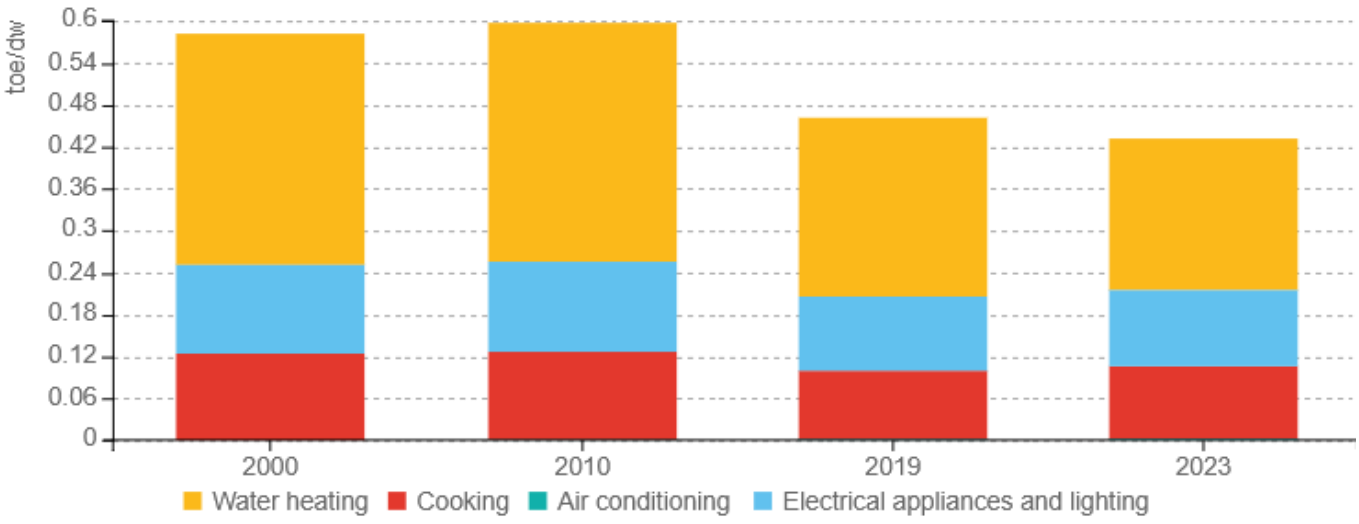
*Figure 8: Energy consumption of household space heating per m2 (with climatic corrections)*




Source: ODYSSEE

Energy consumption for water heating per dwelling decreased by 34% in the period 2000-2023. Energy consumption per dwelling for cooking and electric appliances and lighting dropped by 16% and 14%, respectively, in the same period.

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




Source: ODYSSEE

Electricity consumption per dwelling was stable over the period 2000-2023. Whereas the share of thermal uses grew by 4 pp, from 56% to 60%, share of electrical appliances from decreased by 3 pp, from 37% to 34%, and lighting by 1 pp, from 7% to 6%; the share of air conditioning grew from 0% to 1%.

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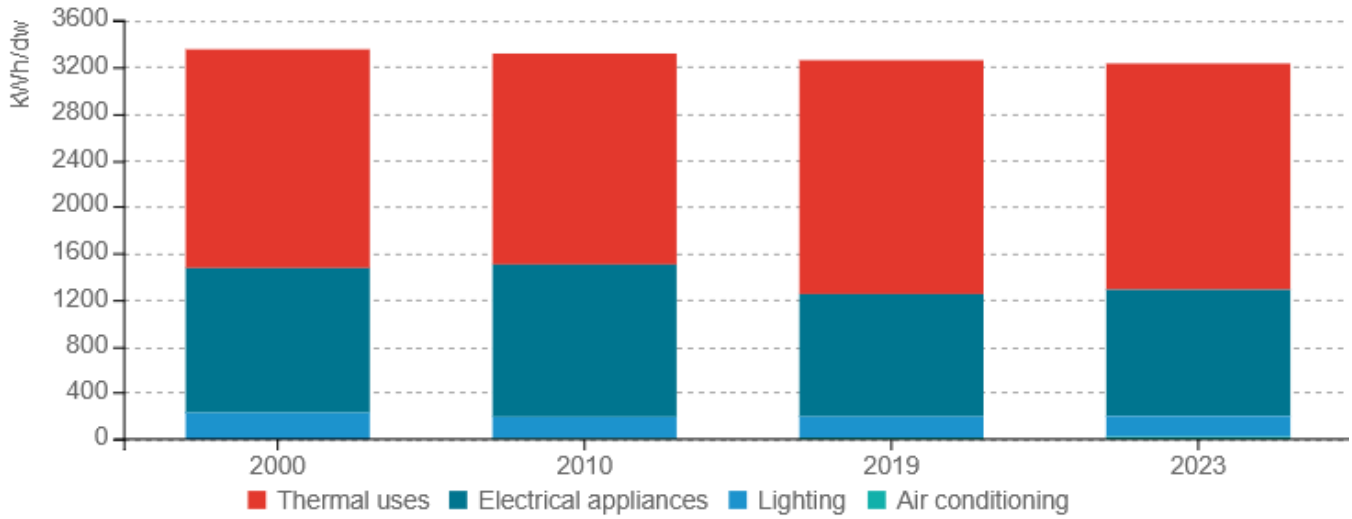
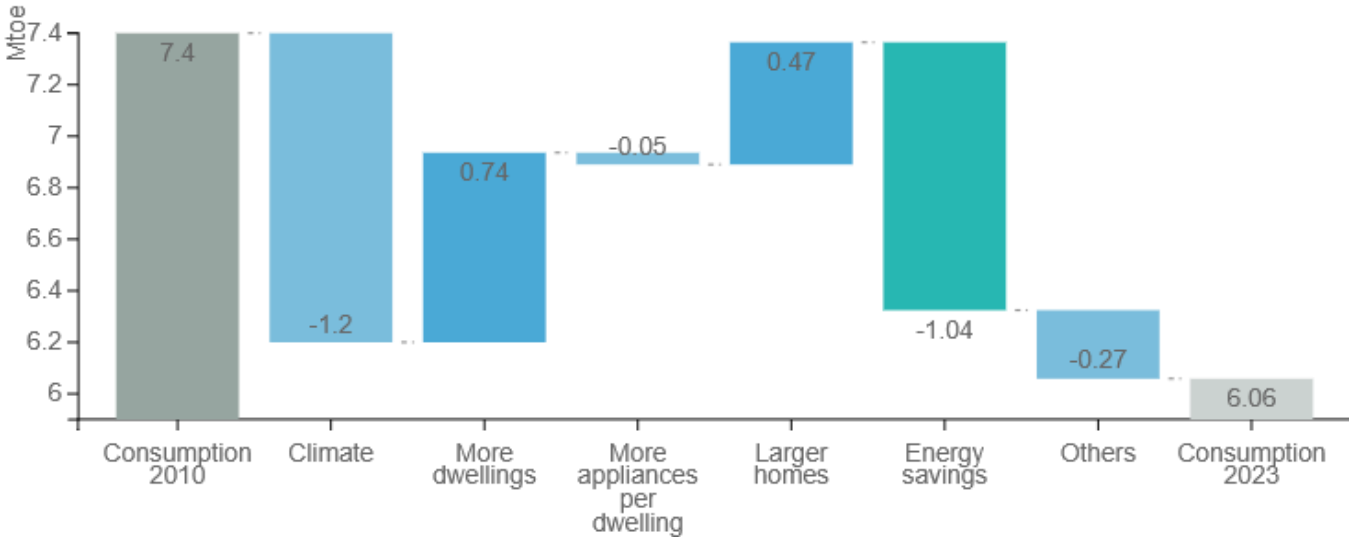
*Figure 10: Electricity consumption per dwelling by end-use (with climatic corrections)*




Source: Odyssee

Energy consumption of households dropped by 1.34 Mtoe, from 7.4 Mtoe in the year 2000 to 6.06 Mtoe in 2023. Energy savings reached 1.04 Mtoe. Increased number of dwellings led to increase of consumption by 0.74 Mtoe and larger homes by 0.47 Mtoe. In spite of increased number of electric appliances, their higher efficiency led to drop in consumption by 0.05 Mtoe. Other factors (behaviours) brought about 0.272 Mtoe of savings. Climate differences between the two years caused drop by 1.2 Mtoe.

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




Source: ODYSSEE

Energy consumption for space heating of households dropped by 0.92 Mtoe, from 4.97 Mtoe to 4.05 Mtoe between 2000 and 2023 years. The predominant effect came from climate conditions (-1.2 Mtoe), with energy savings adding a further 0.44 Mtoe to the overall reduction. The growth in the dwelling stock increased the

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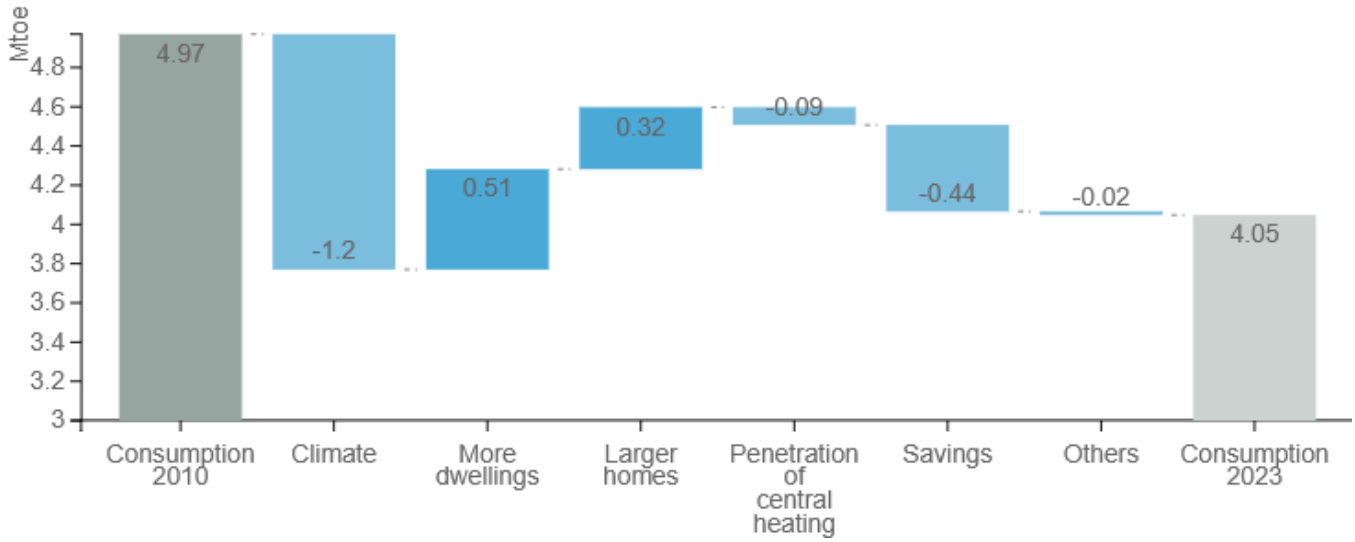
consumption by 0.51 Mtoe and larger homes by 0.32 Mtoe. Penetration of district heating saved 0.09 Mtoe of energy and other factors 0.02 Mtoe.

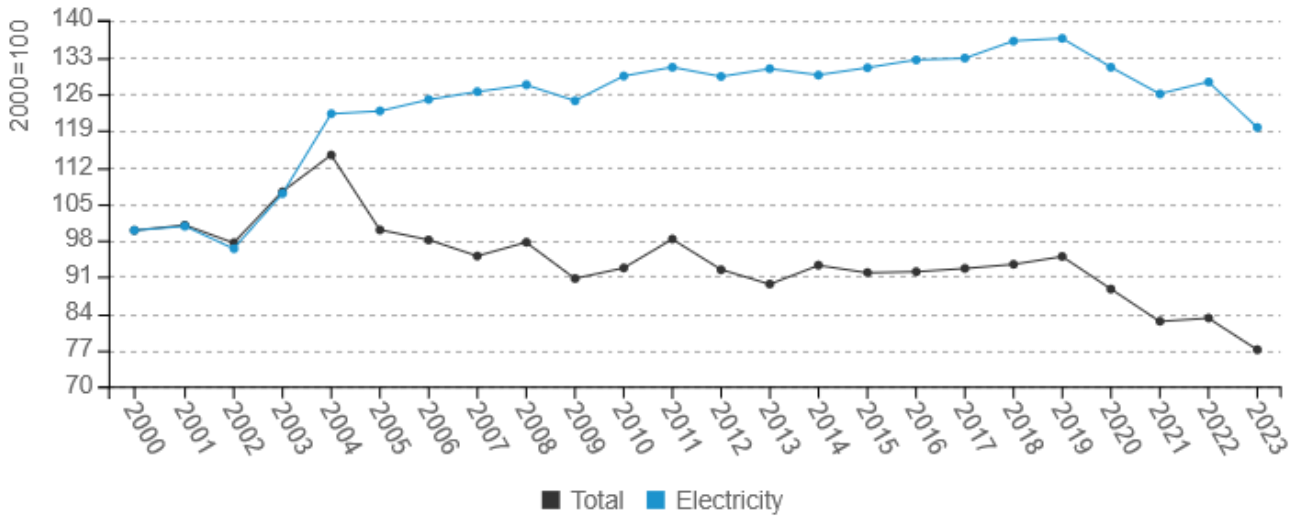
*Figure 12: Main drivers of the space heating consumption variation of households*




Source: Odyssee

The energy consumption per employee in service sector decreased by 1.1%/year since 2000. After a stagnation from 2014 to 2019, it dropped significantly in the last four years. The electricity consumption per employee grew by 0.8%/year due to the diffusion of electrical appliances in offices. However, the trend reversed in the last four years.

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




Source: ODYSSEE

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The main measure for the building sector is the New Green Savings Programme 2021+ which focuses on family houses and apartment buildings. The Operational Program Technology and applications for competitiveness 2021-2027 aims, besides others, at improving the energy performance of buildings in the business sector and the Operational Programme Environment 2021-2027 has a Priority Axe supporting improvement of energy efficiency in public buildings. Additional support to public buildings and business sector in the City of Prague (Prague is excluded from most operational programmes) is provided from the Modernisation Fund.

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

| Measures | NECP measures | Description | Expected savings, impact evaluation |
|---|---|---|---|
| New Green Savings Programme 2021+ | Yes | The New Green Savings Programme 2021+ focuses on investment support for improving energy performance of single-family and apartment buildings. Partial and comprehensive renovation of residential buildings are supported. | 0.34 Mtoe |
| Prohibition of solid fuel boilers of 1st and 2nd class | Yes | This regulatory measure lays down minimum standards for the operation of stationary combustion sources of energy that are set beyond the requirements of EU law. | 0.024 Mtoe |
| Information campaign on raising awareness about energy efficiency | Yes | The measure, managed by the Ministry of Industry and Trade, aims to raise awareness of energy efficiency with a view to changing the behaviour of energy consumers and reducing energy consumption. | 0.08 Mtoe |

Source: MURE

## Transport

Road transport represents 97% of the energy consumption in the transport sector in 2023. Cars account for 58% of the sector's consumption (62% in 2000) and road freight transport for 35% (26% in 2000). Bus transport represents 4.2% and rail transport 3%. Domestic air and water transport are negligible (around 0.1%).

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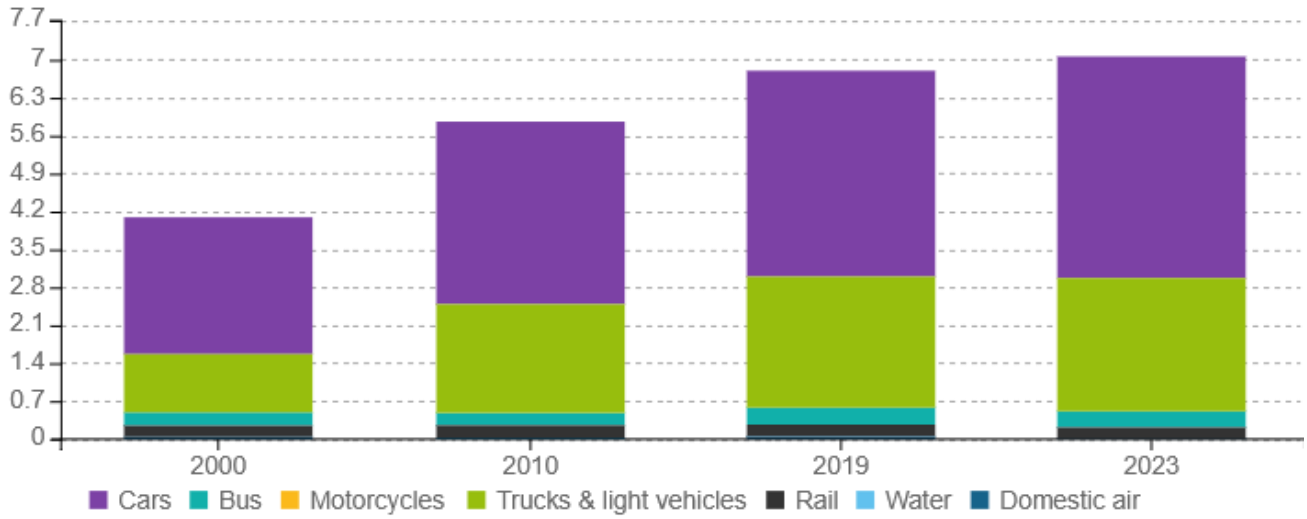
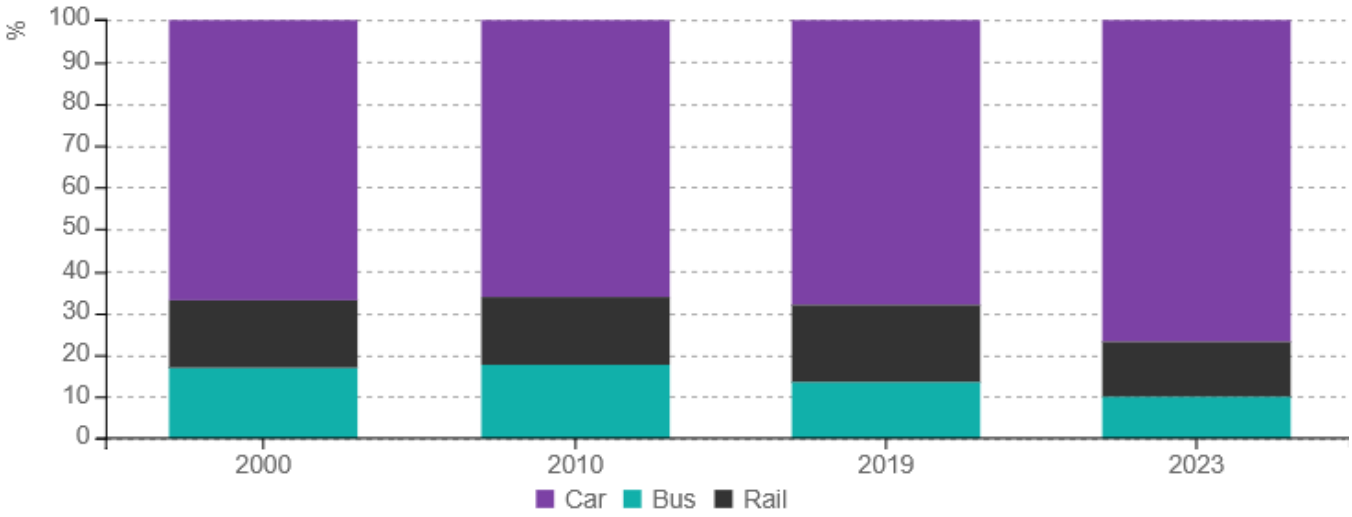
*Figure 14: Transport energy consumption by mode*




Source: ODYSSEE

We observe an adverse trend in switching from public transport modes to cars in passenger transport. Share of car traffic grew from 67% to 77% at the expense of railways and buses between years 2000 and 2023.

*Figure 15: Modal split of inland passenger traffic*




Source: ODYSSEE

We can observe a similar adverse trend in switching from railways to trucks in freight transport. The share of freight road transport grew from 62% to 78% between 2000 and 2023.

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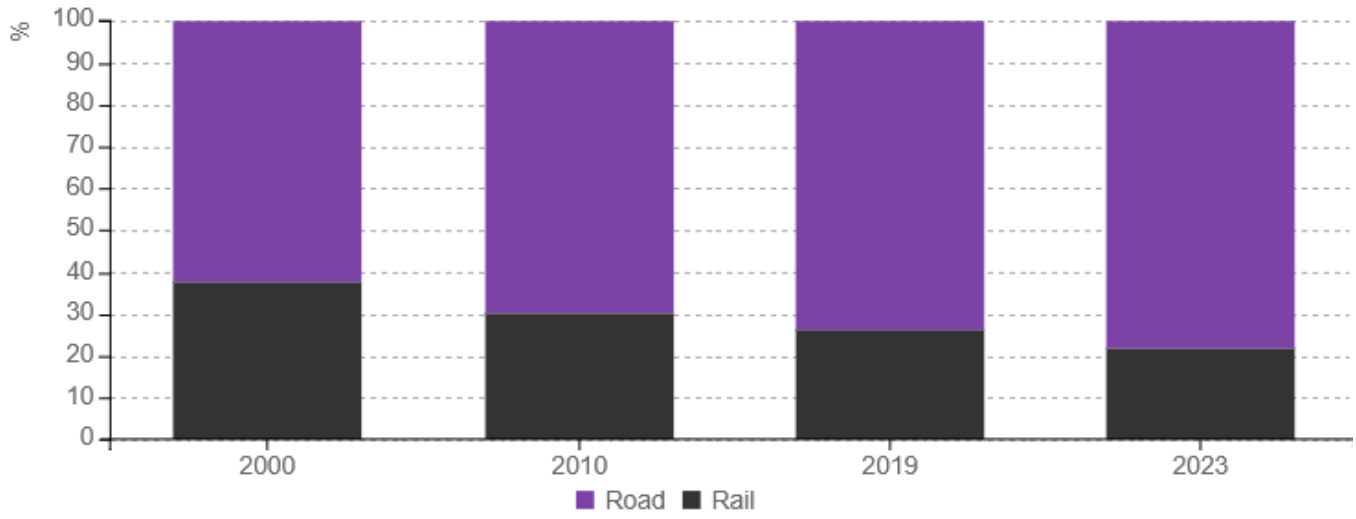
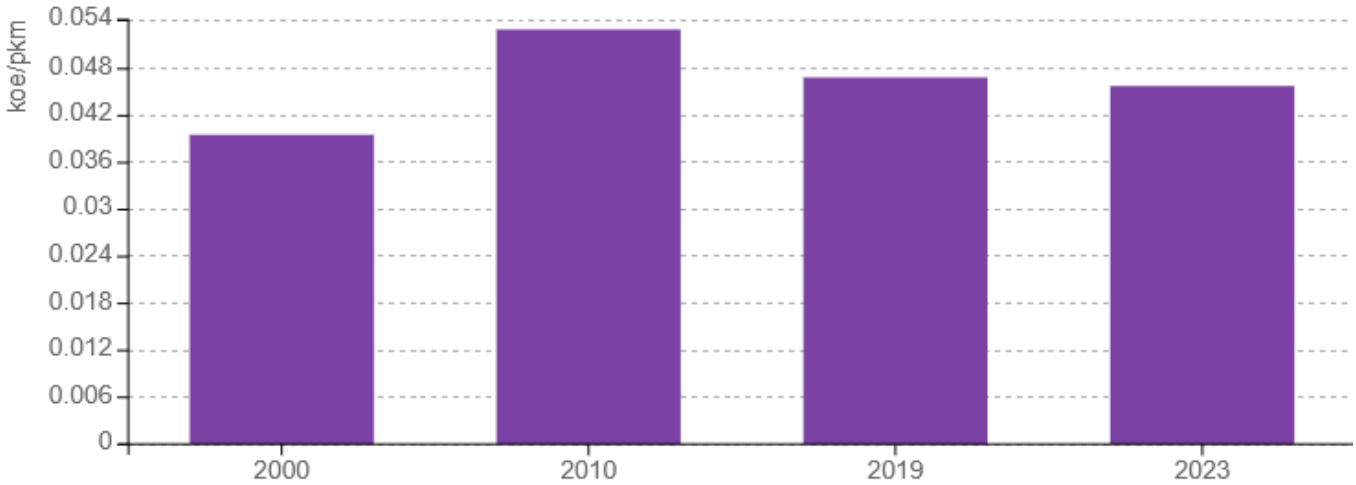
*Figure 16: Modal split of inland freight traffic*




Source: ODYSSEE

There was a peak of energy consumption of cars per passenger-km about the year 2010. The number of cars grew very rapidly, and the growth was covered mainly by old second-hand cars with high specific consumption. The share of new or at least newer second-hand cars started to grow about the year 2010 and led to decreasing energy consumption per passenger-km (-1.1%/year over 2010-2023).

*Figure 17: Energy consumption of cars per passenger-km*




Source: ODYSSEE

Transport energy consumption increased by 19% in the period 2010 - 2023 (+ 1.13 Mtoe). This trend is caused by the development of transport activity (+1.49 Mtoe - more passenger-kilometre and tonne-kilometre) and adverse modal shift (+0.46 Mtoe - shift from railways to road transport). Other effects saved 0.81 Mtoe of energy. Energy savings amounted only to 0.01 Mtoe.

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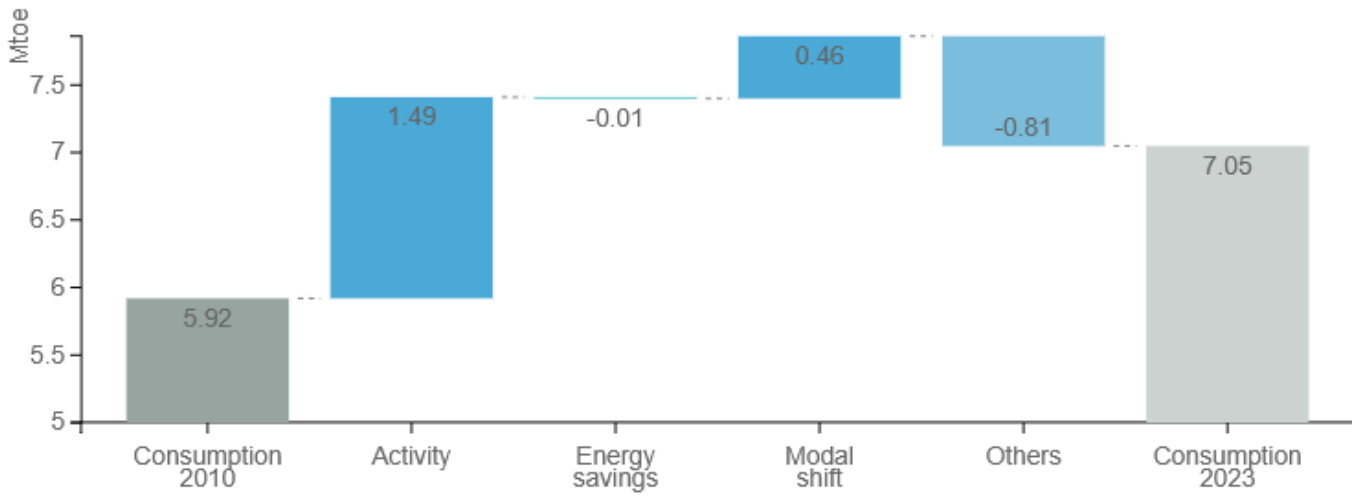
*Figure 18: Main drivers of the energy consumption variation in transport*




Source: ODYSSEE

There are two new programmes supporting energy efficiency of transport. Integrated Regional Operational Programme supports purchases of vehicles using alternative propulsion. Modernisation Fund supports modernisation of transport in business sector and of public transport. Support of public transport is important, because switch from public to road transport occurred in the Czech Republic during past years.

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

| Measures | NECP measures | Description | Expected savings, impact evaluation |
|---|---|---|---|
| Modernisation Fund 2021-2030 (part transport) | Yes | The Modernisation Fund in the Czech Republic focuses on investment aid for improving energy performance of non-residential public and state buildings as well as business buildings, improving energy performance of technological and production processes in industry as well as energy production facilities, and improving energy performance of transport. | 0.074 Mtoe |
| Integrated Regional Operational Programme 2021-2027 - SC 2.1 Sustainable multimodal | Yes | Investment support for the acquisition of public transport vehicles using alternative propulsion. | 0.046 Mtoe |

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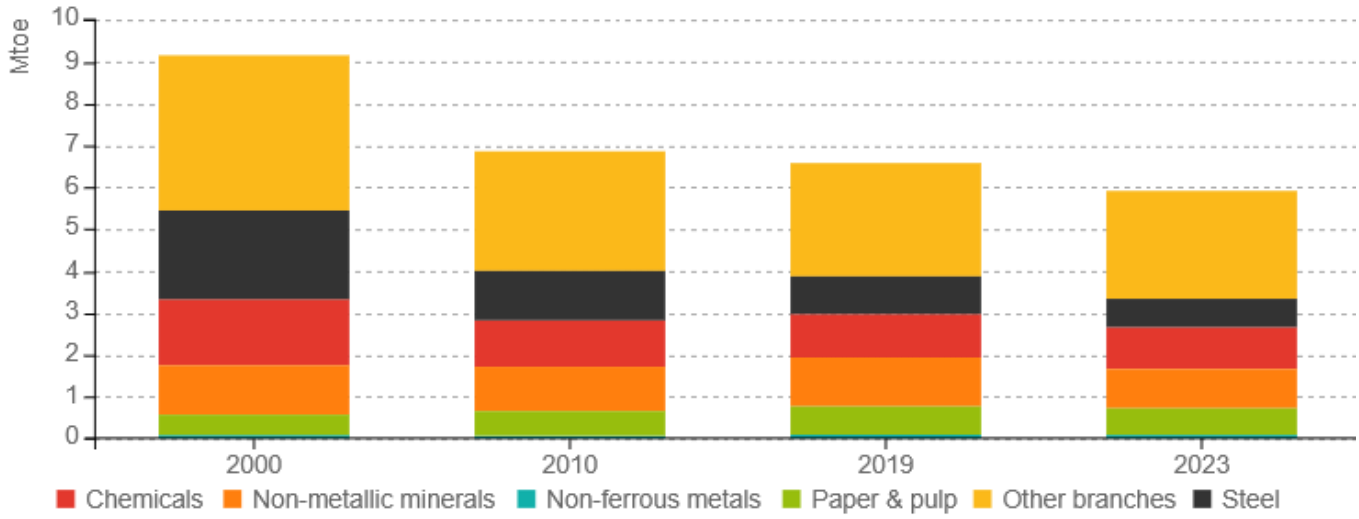
| | | | |
|---|---|---|---|
| urban mobility | | | |
| Promoting the ecodriving of cars | Yes | The measure aims to promote energy-efficient driving through financial aid for the organisations of educational activities in the field of energy-efficient driving. | 0.005 Mtoe |

Source: MURE

## Industry

The industry sector exhibits the fastest decline in the energy consumption. Its final energy consumption decreased rapidly by 1.9 %/year. The largest reductions were in steel industry (-1.44 Mtoe), other branches (-1.13 Mtoe) and chemical industry (-0.58 Mtoe).

*Figure 19: Final energy consumption of industry by branch*




Source: ODYSSEE

Steel industry exhibits a decreasing trend of unit consumption (-26% or -1.3%/year in the period 2000 – 2023). A rather opposite trend was observed for the specific energy consumption of pulp and paper production, which grew by 46% in the same period, with quite big fluctuations.

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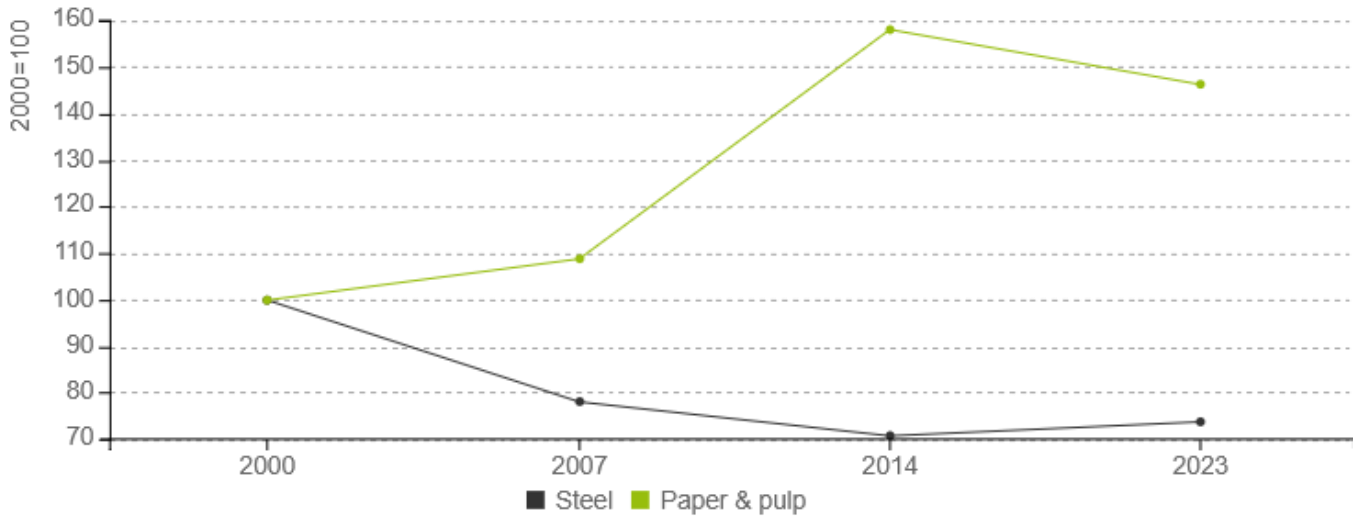
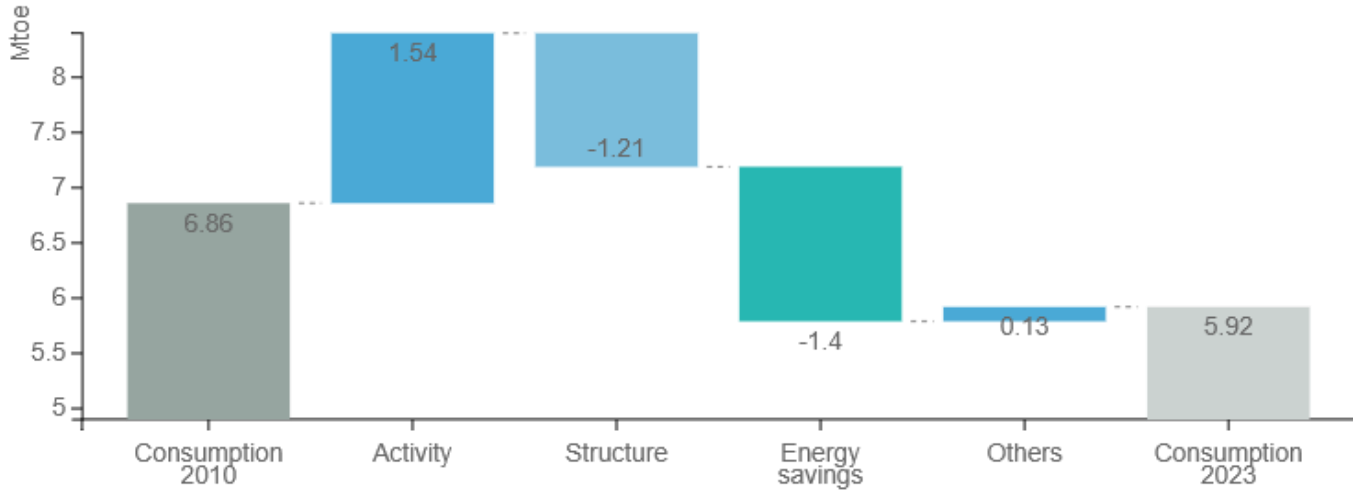
*Figure 20: Unit consumption of energy-intensive products (toe/t)*




Source: ODYSSEE

Between 2010 and 2023, the industrial sector achieved energy savings of 1.4 Mtoe. Additionally, significant structural shifts toward less energy-intensive industries further reduced consumption by 1.21 Mtoe. The increased industrial activity led to higher energy consumption by 1.54 Mtoe. As the gains from savings, structural changes and others were higher than the activity driven growth, the total energy consumption in industry dropped by 0.94 Mtoe.

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




Source: ODYSSEE

The Operational Programme Technology and applications for competitiveness remains one of important measures also in the period 2021 - 2027. It offers support to energy efficiency in industry through financial incentives (investment subsidies and low interest loans). Expected total cumulative savings are 0.035 Mtoe.

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However, the Modernisation Fund became the biggest source of subsidies in industry with expected savings of 0.14 Mtoe.

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

| Measures | NECP measures | Description | Expected savings, impact evaluation |
|---|---|---|---|
| Modernisation Fund 2021-2030 (part industry) | Yes | The Modernisation Fund in the Czech Republic focuses on investment aid for improving energy performance of non-residential public and state buildings as well as business buildings, improving energy performance of technological and production processes in industry as well as energy production facilities, and improving energy performance of transport. | 0.141 Mtoe |
| Operational Program Technologies and Application for Competitiveness 2021-2027 - SC 4.1 Energy efficiency measures (part industry) | Yes | ERDF financial mechanism providing investment aid for increasing the energy efficiency of technological and production processes in industry and on improving the energy performance of buildings intended for business. Implementing authority of the OP TAC is the Ministry of Industry and Trade. | 0.035 Mtoe |

Source: MURE

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