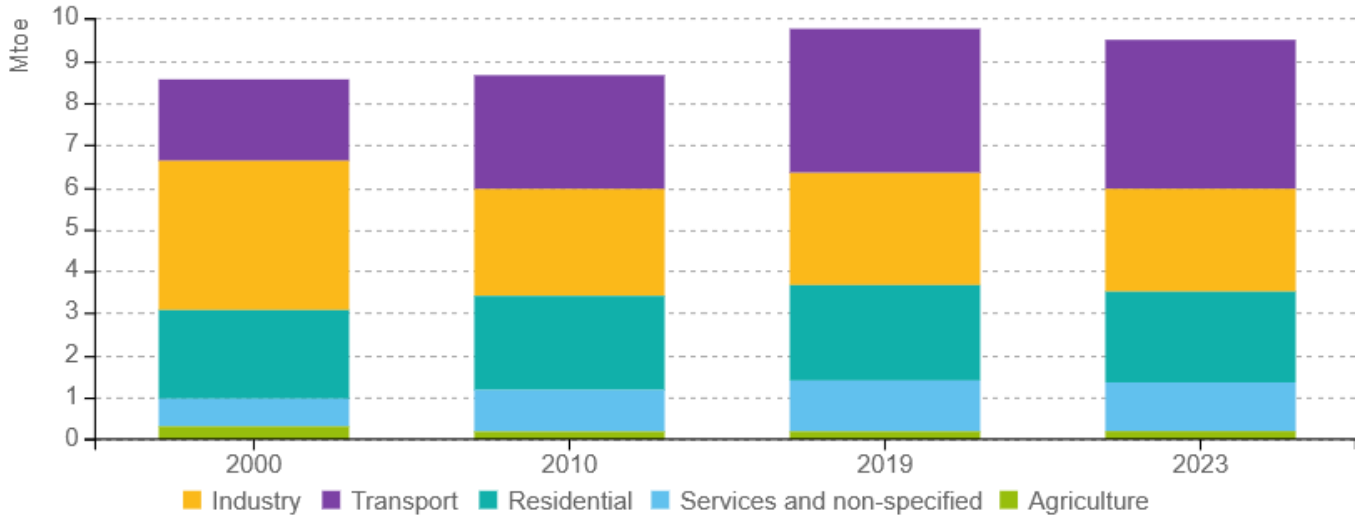
Energy efficiency trends and policies

Overview

Final energy consumption in 2023 with climatic corrections was only 11% higher than in 2000 despite significant GDP growth(108% at purchasing power parities) over the same period. The average annual growth of final energy consumption from 2000 to 2023 is 0.46%.Final energy intensity at purchasing power parities (with climatic corrections) in 2023 is 53% of the level in 2000.

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



Source: ODYSSEE

The evolution of final energy consumption across sectors from 2000 to 2023 reveals significant shifts in both absolute consumption and sectoral shares. Industry experienced the most substantial decrease in energy use (-31%), while transport saw the highest growth among all sectors (84%). Residential consumption grew modestly (2%), while services showed high growth (76%) and agriculture experienced the largest reduction (-37%).In terms of sectoral shares of total final energy consumption, transport increased its share from 23% to 37%, becoming the largest energy consumer since 2009. Industry's share decreased from 42% to 26%, no longer holding the position of the sector with maximal final energy consumption. Residential consumption slightly decreased from 25% to 23%, while services increased their share from 8% to 12%. Agriculture saw its share reduced by half, from 4% to 2%.

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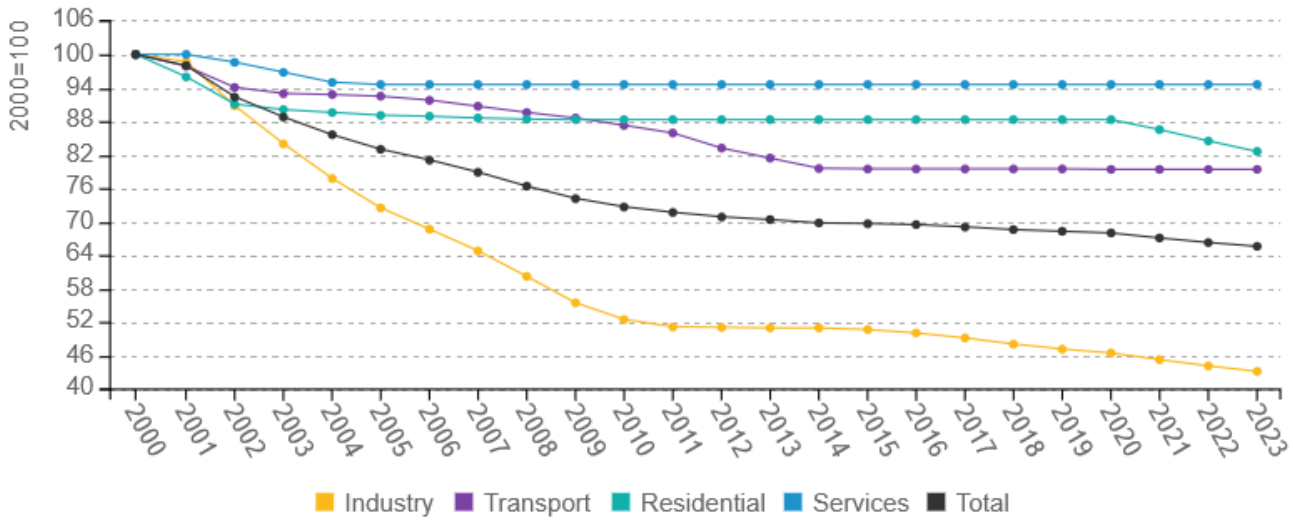
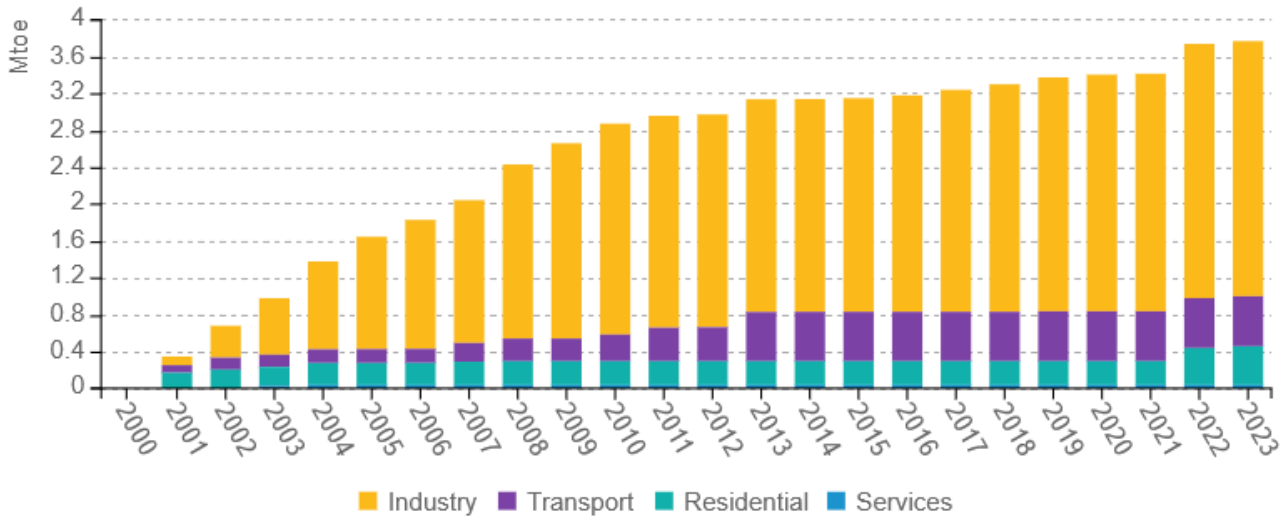
Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

Technical energy efficiency as measured by technical index ODEX improved by more than 34% from 2000 to 2023 or 1.8%/year on average. The highest progress was registered in industry (3.5%/year or 56% in total), followed by transport (1%/year, 20%), residential (1%/year, 17%) and in services (5%).

Figure 3: Energy savings by sector



Source: Odyssee

Total energy savings from 2000 to 2023 are 3.8 Mtoe, with most of them registered in : industry (2.8 Mtoe or 72 % of the total). Other savings are as follows: transport 0.54 Mtoe, households 0.42 Mtoe and services 0.04 Mtoe.

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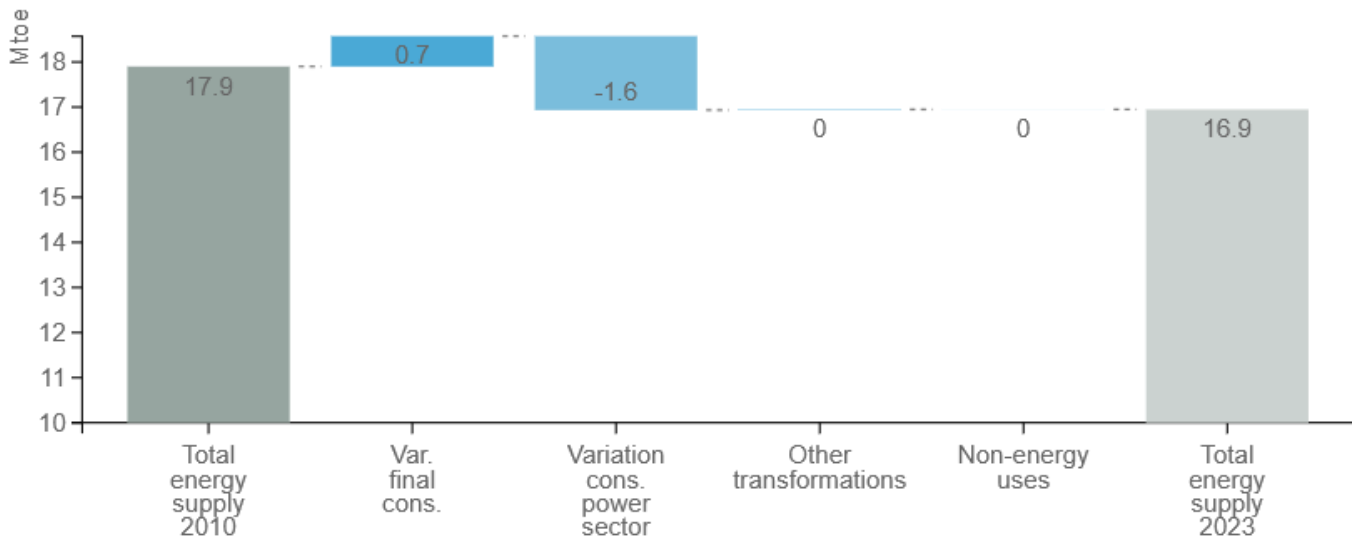
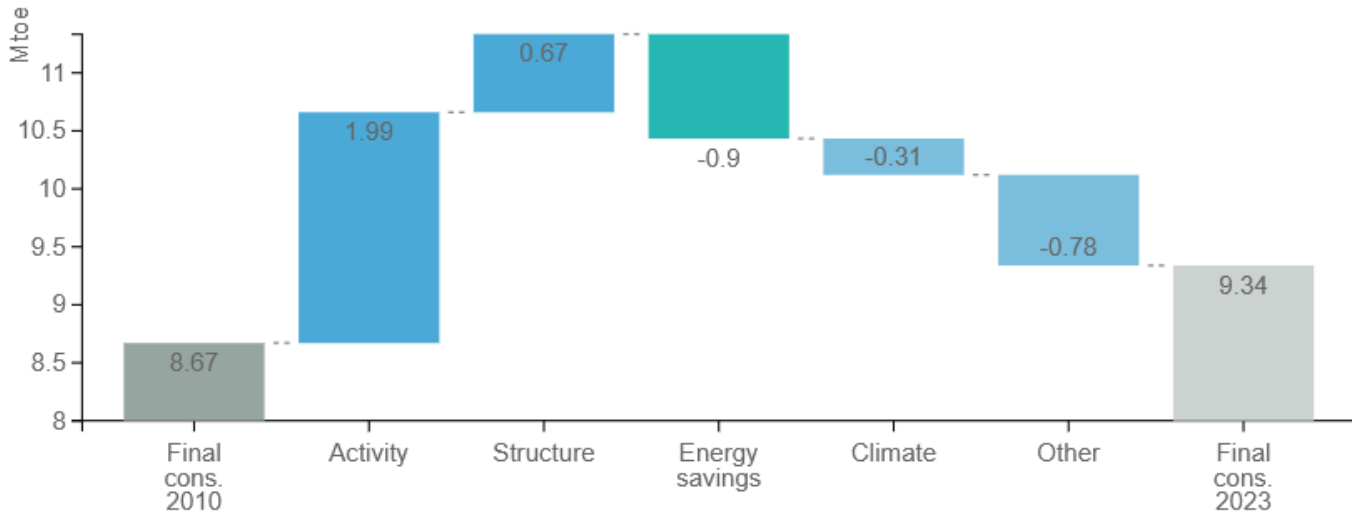
Figure 4: Main drivers of the total energy supply variation



Source: Odyssee

The variation of the total energy supply (-1.0 Mtoe) from 2010 to 2023 is explained by an increase of the final energy consumption for energy uses (+0.7 Mtoe) and a decrease of the consumption of the power sector (-1.6 Mtoe)

Figure 5: Main drivers of the final energy consumption variation



Source: Odyssee

The increase in the final energy consumption from 2010 to 2023 (+ 0.67 Mtoe) was driven by:- the growth in activity (+1.99 Mtoe) linked to a rise in value added in industry, services and agriculture, in traffic in transport, in the number of dwellings and appliances and in the size of dwellings;- structural effects (+0.67 Mtoe) which combine structural changes in industry and modal shift in transport. These drivers of energy consumption growth are partly offset by energy savings (- 0.9 Mtoe), climate (-0.31 Mtoe) and changes in other drivers (-0.78 Mtoe)

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that include various effects, such as behaviours for households, value of product in industry, labour productivity in services and industry.

Table 1: Sample of cross-cutting measures

Measures	NECP measures	Description	Expected savings, impact evaluation
National Energy Efficiency Cumulative Target 2021-2030 (Национална кумулативна цел за енергийни спестявания 2021-2030)	Yes	Legislative measure - An energy savings obligation scheme and alternative measures, is set up in order to help reach the national energy efficiency target, which should ensure achieving of a total cumulative target of energy savings in final energy consumption for the period from 1 January 2021 to 31 December 2030	35.00 TJ
Long-term National Strategy to Support the Renovation of the National Building Stock of Residential and Non-residential Buildings by 2050	Yes	National LTRS has been developed according to art. 2EPBD and it is the main National strategic document for the renovation of the building stock, incl. roadmap, strategic objectives, policies and measures, investments, financial instruments for building renovation, etc.	10.50 TJ
Energy Efficiency Obligation Scheme (Схема за задължения за енергийна ефективност)	Yes	Legislative measure - An energy savings obligation scheme is set in the Energy Efficiency Act	5.62 TJ

Source: MURE

Buildings

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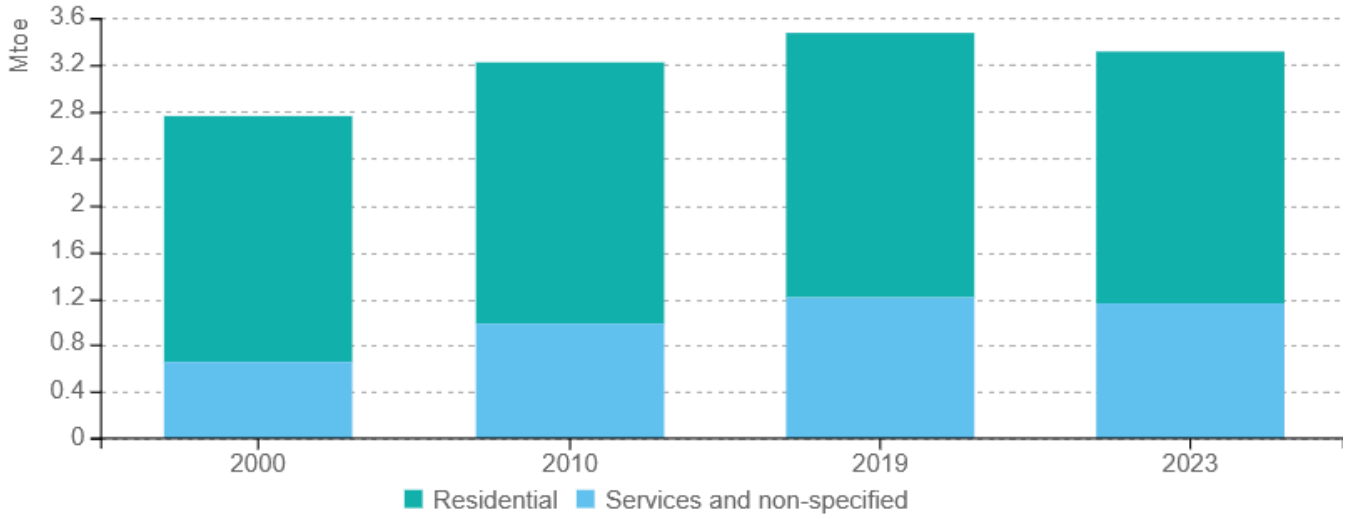
Final energy consumption of buildings increased from 2.8 Mtoe in 2000 to 3.3 Mtoe in 2023 (20%) or 0.8% average annual growth over the period. Residential buildings, which consume more energy than services (including non-specified activities), represented 65% of the total energy consumption in buildings in 2023.

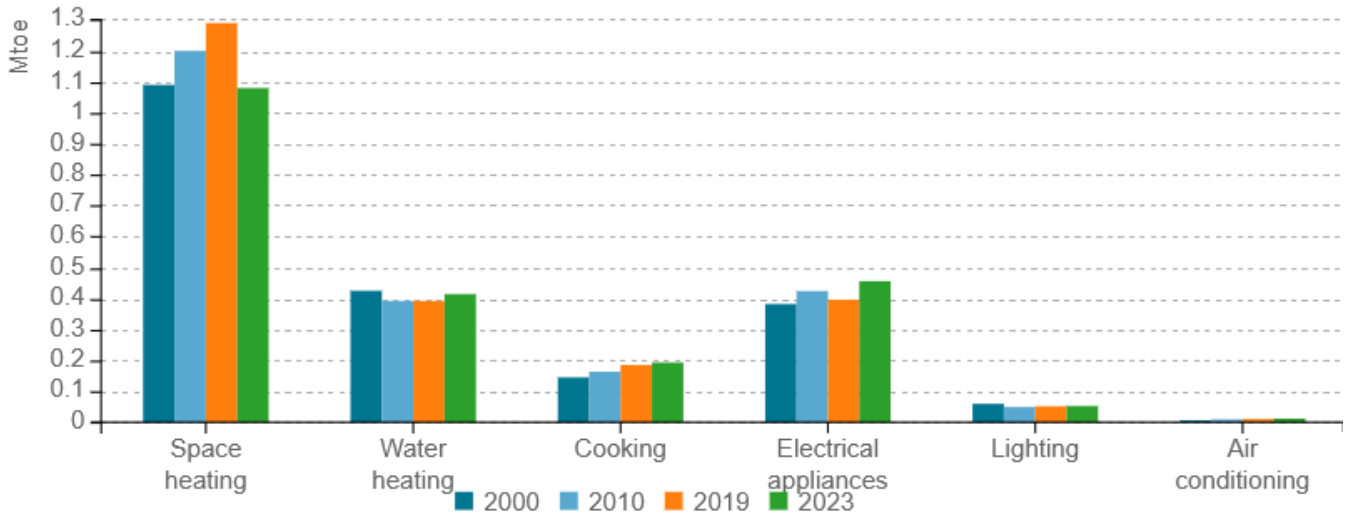
Figure 6: Final energy consumption in buildings (with climatic corrections)



Source: Odyssee

Total growth of final energy consumption in residential buildings is 2% , from 2.1 Mtoe in 2000 to 2.2 Mtoe in 2023 . Total growth of final energy consumption of services and non-specified activities is 76%, from 0.66 Mtoe in 2000 to 1.2 Mtoe in 2023.

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



Source: Odyssee

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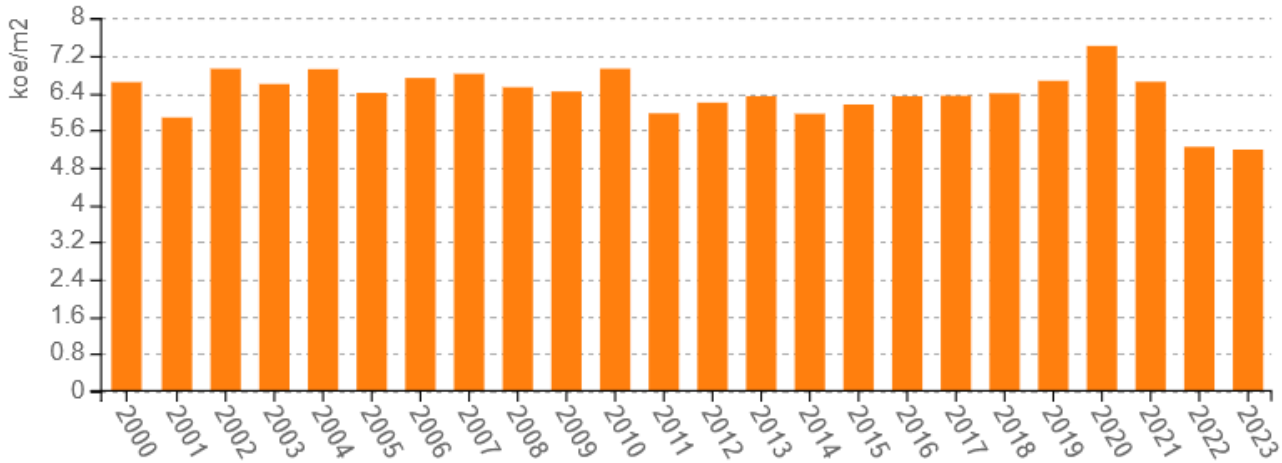
From 2000 to 2023 energy consumption for space heating in the residential sector remains practically unchanged at 1.1 Mtoe. Consumption increased for most other end-uses: for large electrical appliances by 19%, for cooking by 33%, for air conditioning by 80%; for lighting consumption decreased by 12%.

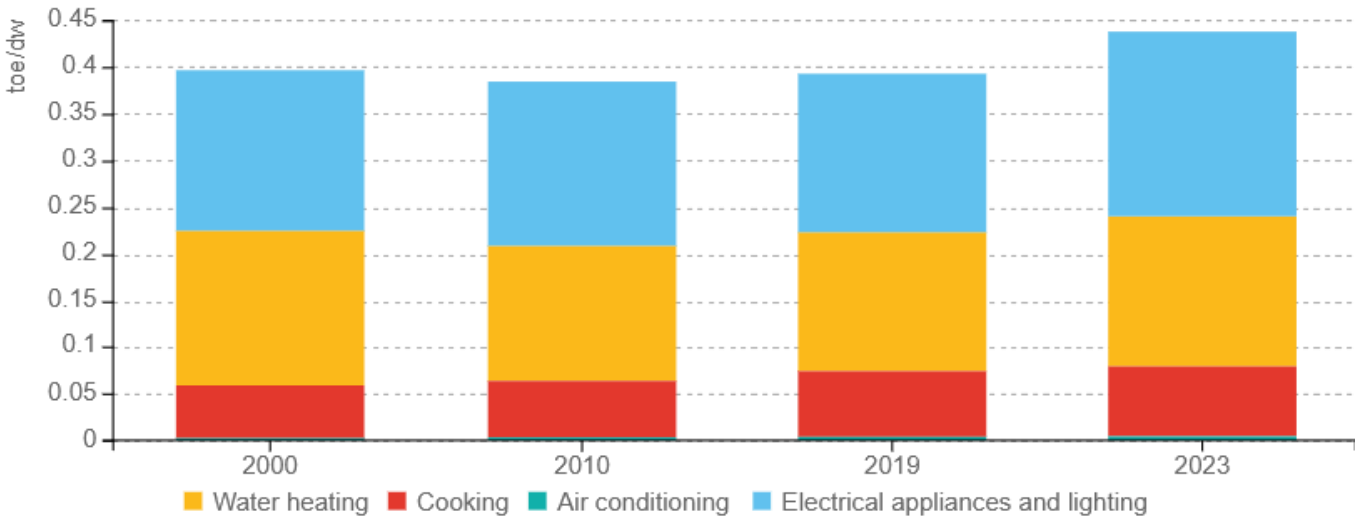
Figure 8: Energy consumption of household space heating per m2 (with climatic corrections)



Source: ODYSSEE

The variation of energy consumption of household space heating per m2 (normal climate) was substantial, from 6.6 koe/m2 in 2000 to 5.2 koe/m2 in 2023, or a 22% reduction over the period. Notably, there was a 30% reduction since 2020, influenced by a COVID-related spike in 2020 and subsequent sharp decline in 2023 due to elevated energy prices.

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



Source: ODYSSEE

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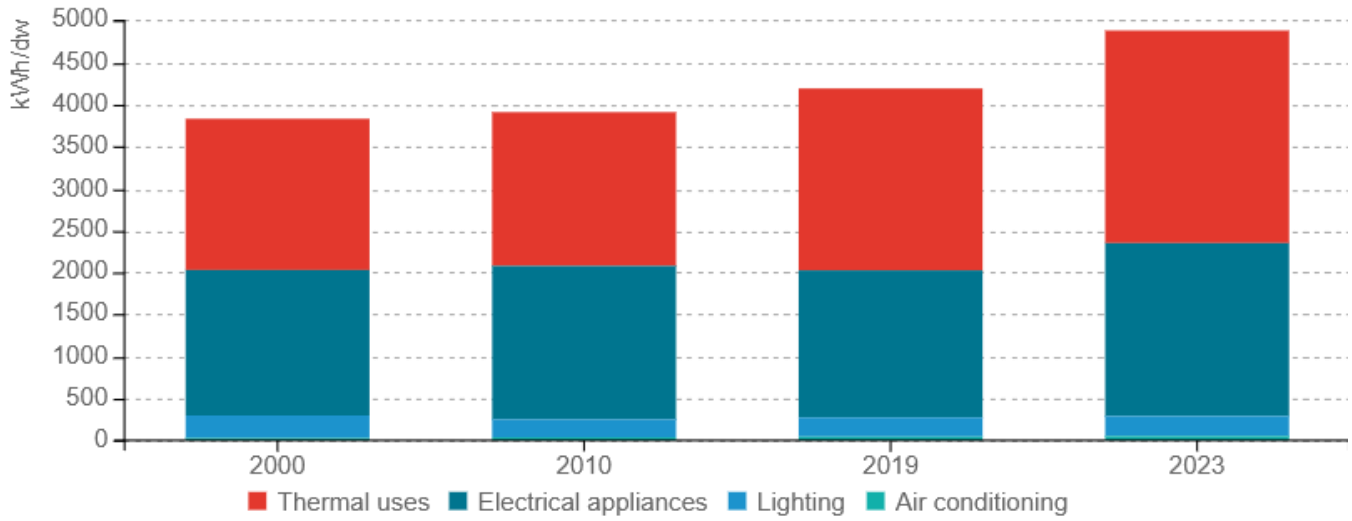
From 2000 to 2023, the energy consumption per dwelling rose sharply for cooking (+33%) and air conditioning (+79%), while the consumption for electrical appliances and lighting saw modest growth (+15%). Water heating was the only category to decline over the period(−3%).

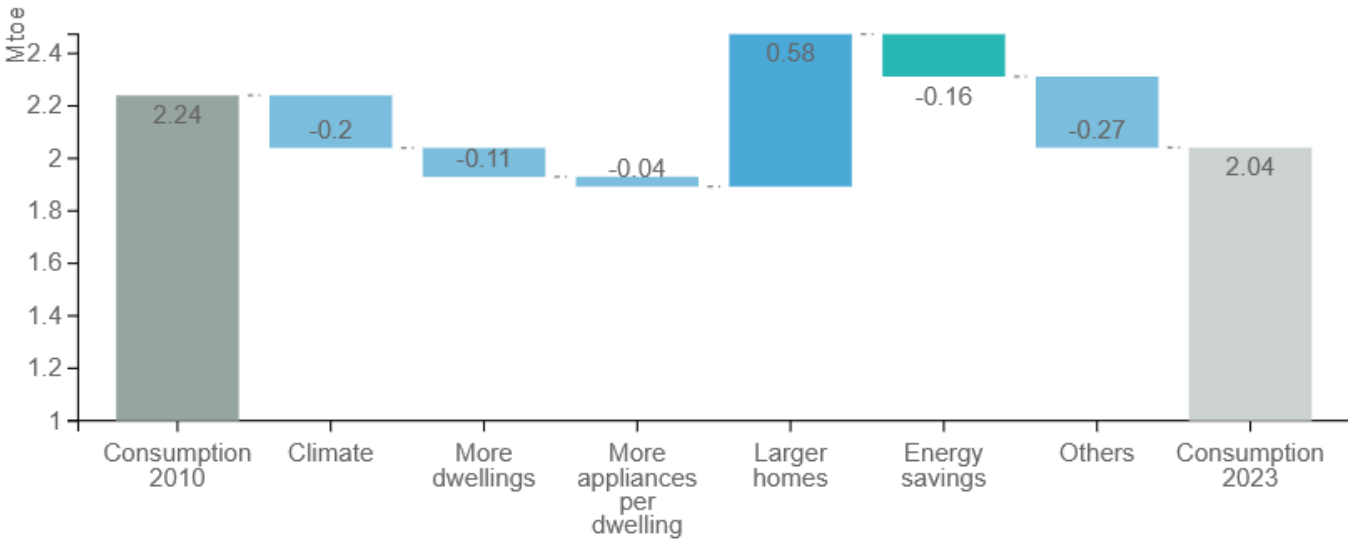
Figure 10: Electricity consumption per dwelling by end-use (with climatic corrections)



Source: Odyssee

The total electricity consumption per dwelling increased by 27% from 2000 to 2023, with the following variations by end-use (with climatic corrections):- thermal uses (+41%),electrical appliances (+19%), lighting (-12%) and air cooling (+79%).

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



Source: ODYSSEE

The final consumption of residential sector decreased by 0.20 Mtoe over the period 2010-2023. The main driver to increase energy consumption are larger homes (0.58 Mtoe), with an increase of the average size of dwellings

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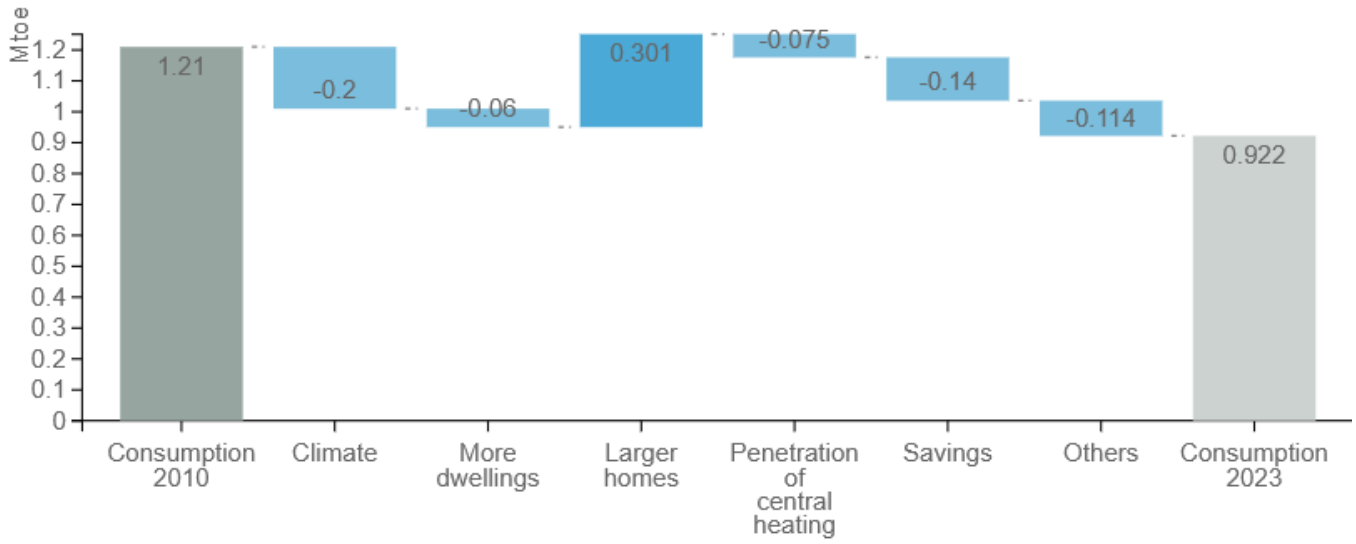
from 64 m2 to 83 m2. Several drivers reduced energy consumption in households over the period, including energy savings by 0.16 Mtoe, climate by 0.2 Mtoe and others effects by 0.27 Mtoe.

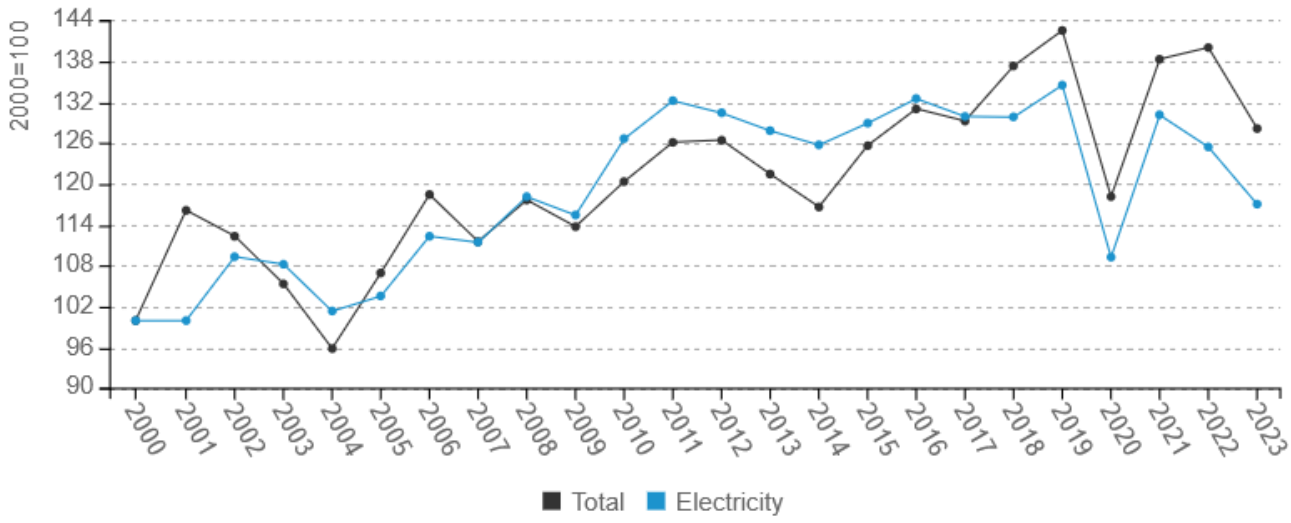
Figure 12: Main drivers of the space heating consumption variation of households



Source: Odyssee

The space heating consumption of residential sector decreased by 0.29 Mtoe, from 1.21 Mtoe to 0.92 Mtoe between 2010 and 2023. While larger homes increased consumption by 0.3 Mtoe, energy savings (−0.14 Mtoe), climate conditions (−0.2 Mtoe), and other effects (−0.11 Mtoe) collectively drove the overall reduction.

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



Source: ODYSSEE

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Energy and electricity consumption per employee in services sector increased significantly over the period 2000-2023. In 2023, energy and electricity consumptions per employee are 28% and 17% respectively higher than 2000 level.

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

Measures	NECP measures	Description	Expected savings, impact evaluation
Support for sustainable energy renovation of the residential building stock - NRRP (Подкрепа за устойчиво енергийно обновяване на жилищния сграден фонд - НПВУ)	Yes	Grant support for deep energy renovation of residential buildings under the National Recovery and Resilience Plan.	0.09 TJ
Financing program of standalone RES measures in single-family buildings and multifamily buildings (Програма за финансиране на единични мерки за енергия от възобновяеми източници в еднофамилни сгради и многофамилни	Yes	Grant support for photovoltaic systems and solar systems for domestic hot water supply under the National Recovery and Resilience Plan	0.10 TJ

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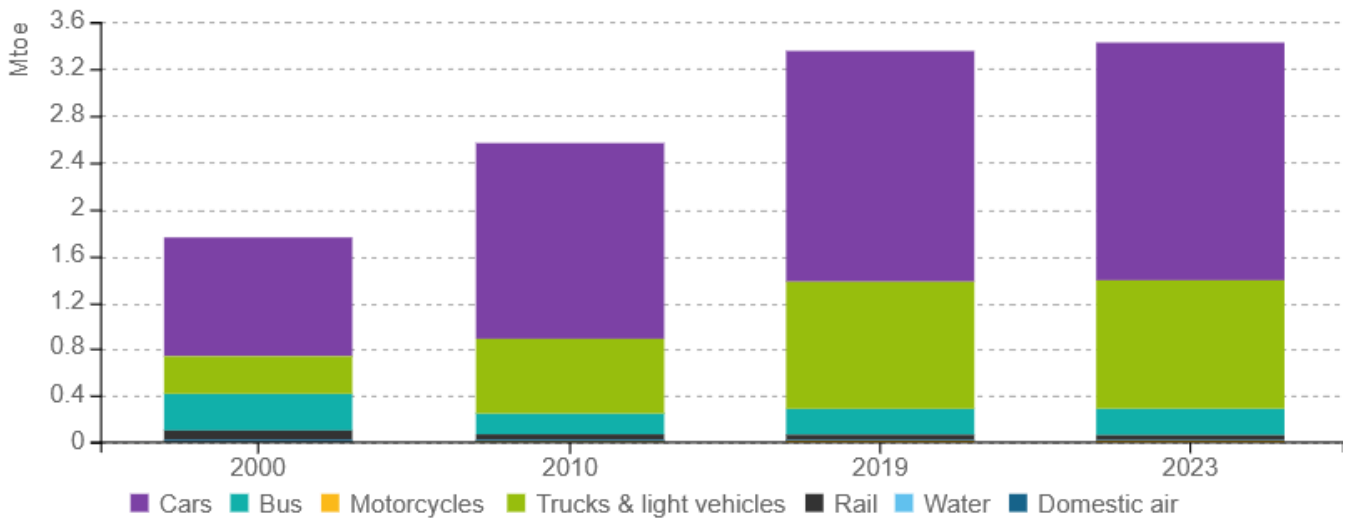
сгради)			
Replacement of inefficient solid fuel stoves (Замяна на неефективни отоплителни уреди)	Yes	Procedures for replacement of inefficient heating appliances by directly providing a grant.	0.30 TJ

Source: MURE

Transport

The transport sector energy consumption increased by 95% (or 3.0%/year) from 1.76 Mtoe in 2000 to 3.43 Mtoe in 2023.

Figure 14: Transport energy consumption by mode



Source: ODYSSEE

The share of the road transport in the transport energy consumption increased by 5 percentage points (pp), from 94% in 2000 to 99% in 2023 and the share of the rail transport decreased by 2.8 pp, from 4% to 1.3% over the same period. From 2000 to 2023 the energy consumption of road transport increased by 104%, while that of rail transport decreased by 46%.

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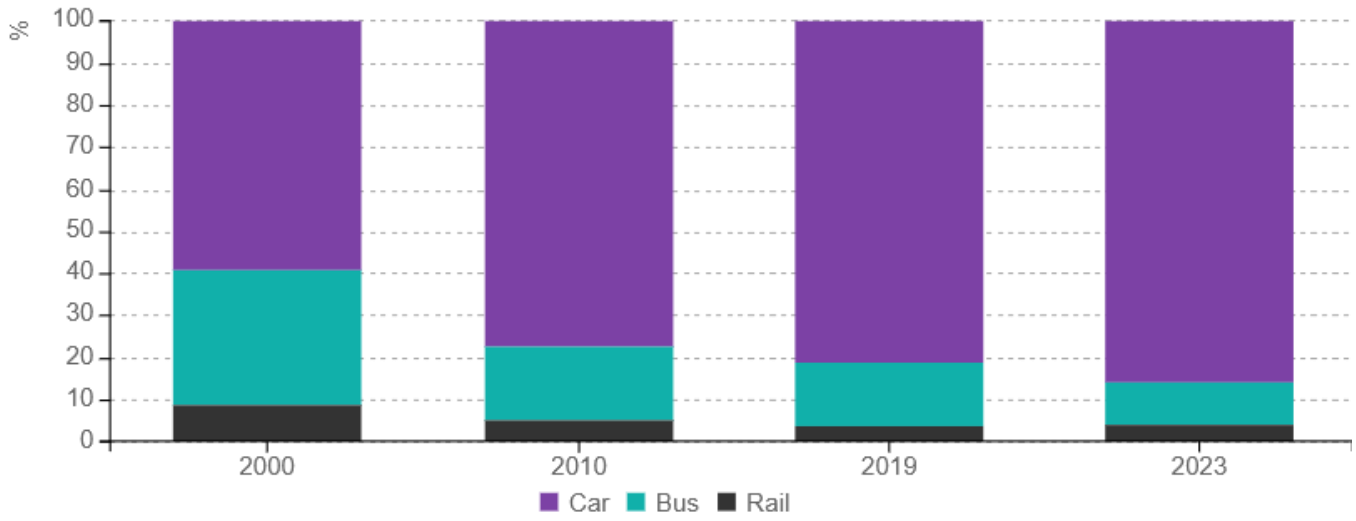
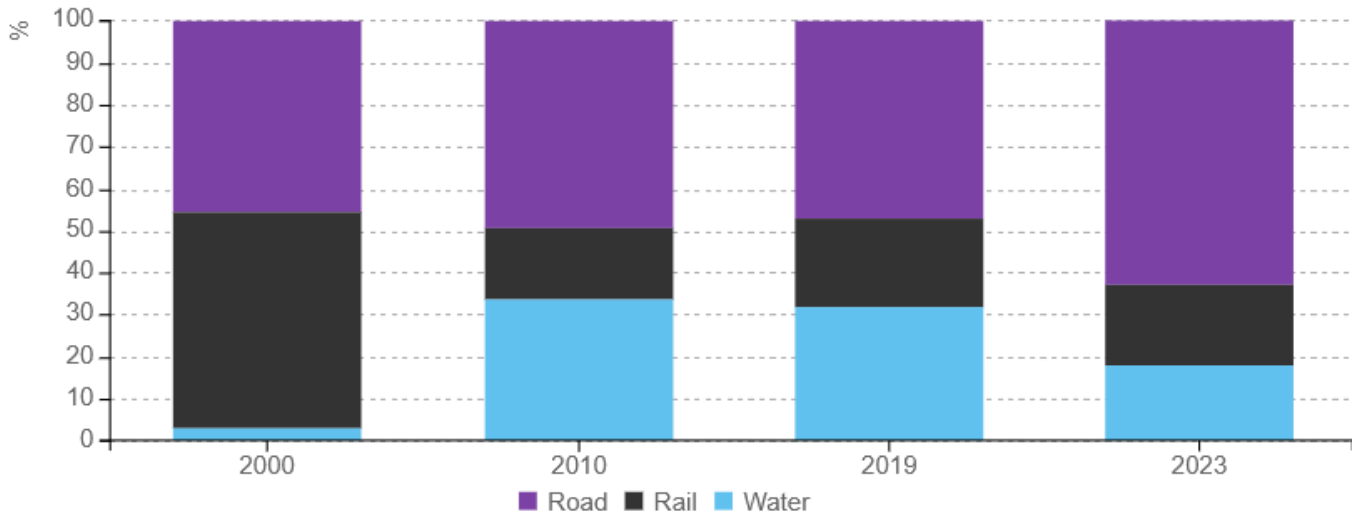
Figure 15: Modal split of inland passenger traffic



Source: ODYSSEE

The share of inland passenger traffic by road increased by 5 pp, to 96% in 2023 from 91% in 2000. The share of rail passenger traffic has been reduced more than 2 times, to 3.9% in 2023 from 8.6% in 2000.

Figure 16: Modal split of inland freight traffic



Source: ODYSSEE

The share of inland freight traffic by road increased by 17 pp from 46% in 2000 to 63% in 2023 The share of rail freight traffic has been reduced 2.5 times, from 51% in 2000 to 19% in 2023.

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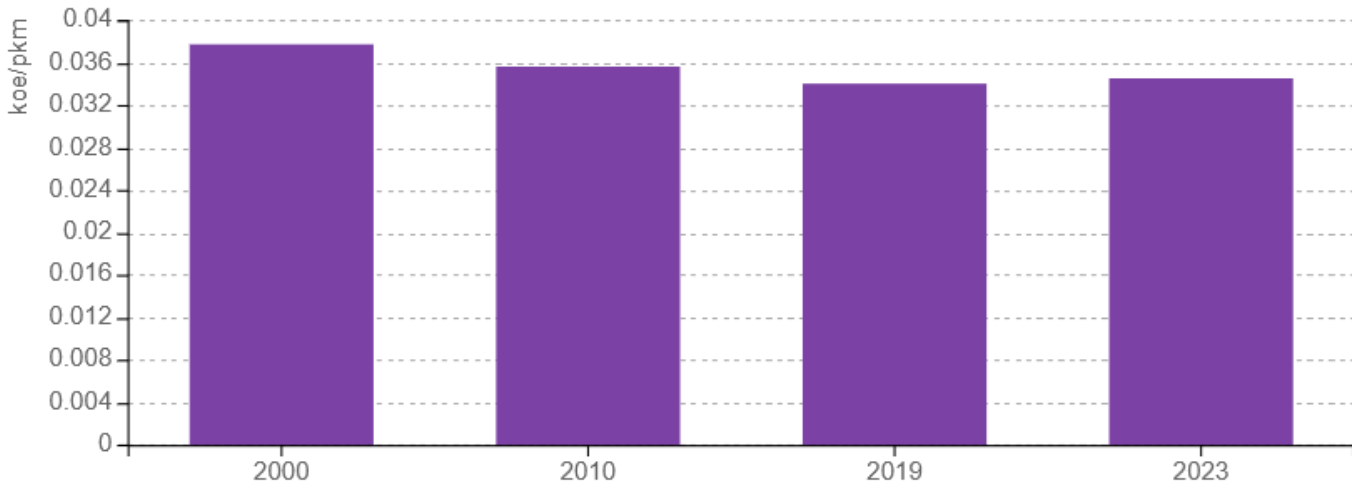
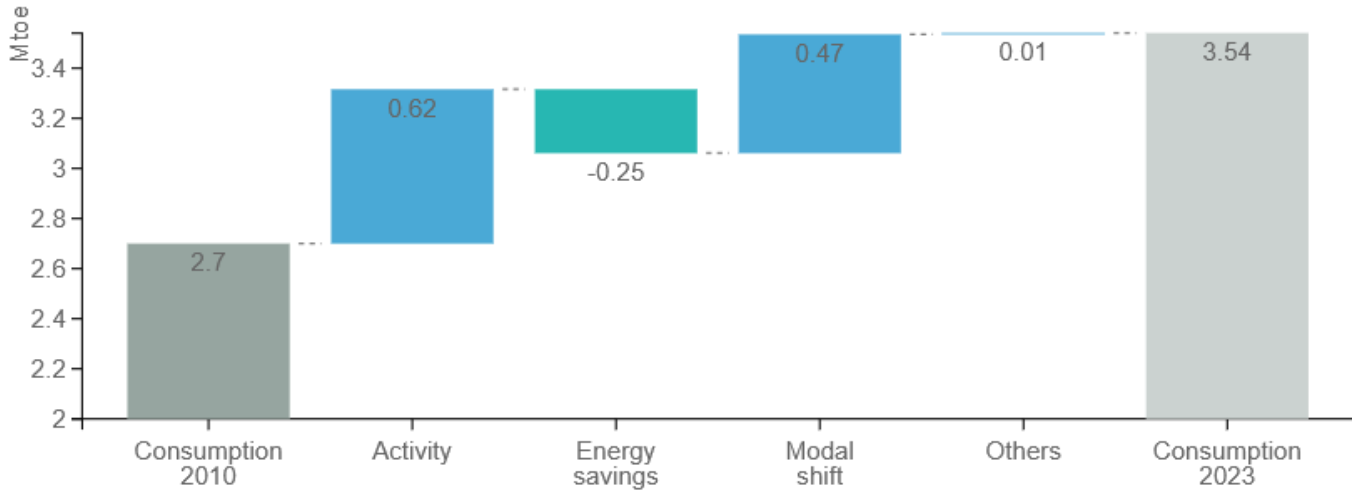
Figure 17: Energy consumption of cars per passenger-km



Source: ODYSSEE

Energy consumption of cars per passenger-km decreased by 9% from 2000 to 2023.

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



Source: ODYSSEE

Transport energy consumption increased by 0.84 Mtoe (31%) from 2010 to 2023. Energy savings contributed to decrease energy consumption by 0.25 Mtoe. On the opposite, the growth in passengers and goods traffic (+0.62Mtoe) and the modal shift effect (+0.47 Mtoe), more than offset the energy savings effect and explain the observed significant increase of the consumption.

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

Measures	NECP measures	Description	Expected savings, impact evaluation
"Green mobility" - support of sustainable urban mobility through measures for energy-efficient transport systems („Зелена мобилност“ - подкрепа на устойчивата градска мобилност чрез мерки за енергийно ефективни транспортни системи)	No	Project under Bulgarian Recovery and Resilience Plan - grant support for sustainable urban mobility through measures to develop ecological, safe, functional and energy-efficient transport systems.	0.43 TJ
Expansion of the metro network in Sofia (Разширяване на мрежата на метрото в София)	No	Project under Bulgarian Recovery and Resilience Plan - Ensuring sustainable transport connectivity through the construction of Stage 3 of Line 3 of the Sofia metro (3 km)	0.37 TJ
Introduction of Intelligent Transport Systems on the National Road Network and in	Yes	The projects for the introduction of intelligent transport systems of Operational Program Transport 2014-2020 are laid down in Priority axis 4 "Innovations in management and services - implementation of modernized infrastructure for traffic management, improvement of safety and security of transport"	0.43 TJ

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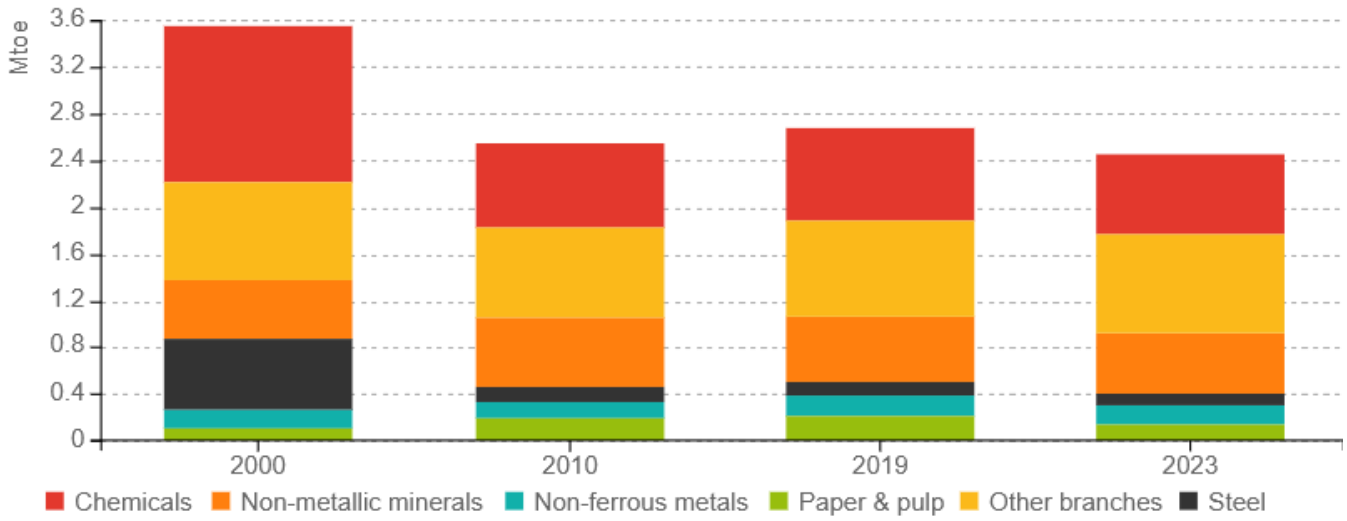
the Urban Environment (Въвеждане на интелигентни транспортни системи)			

Source: MURE

Industry

Energy consumption of industry dropped by 31% from 2000 to 2023, with a 84% decline in the steel sector.

Figure 19: Final energy consumption of industry by branch



Source: ODYSSEE

In 2000, the chemical industry was the largest industrial energy consumer, accounting for 38% of sector demand. Though its consumption fell by 49% over the period, reducing its share to 28% in 2023, it remained the top consumer. Meanwhile, the non-metallic minerals sector became the second-largest consumer, increasing its share from 14% in 2000 to 21% in 2023 with a stable energy consumption.

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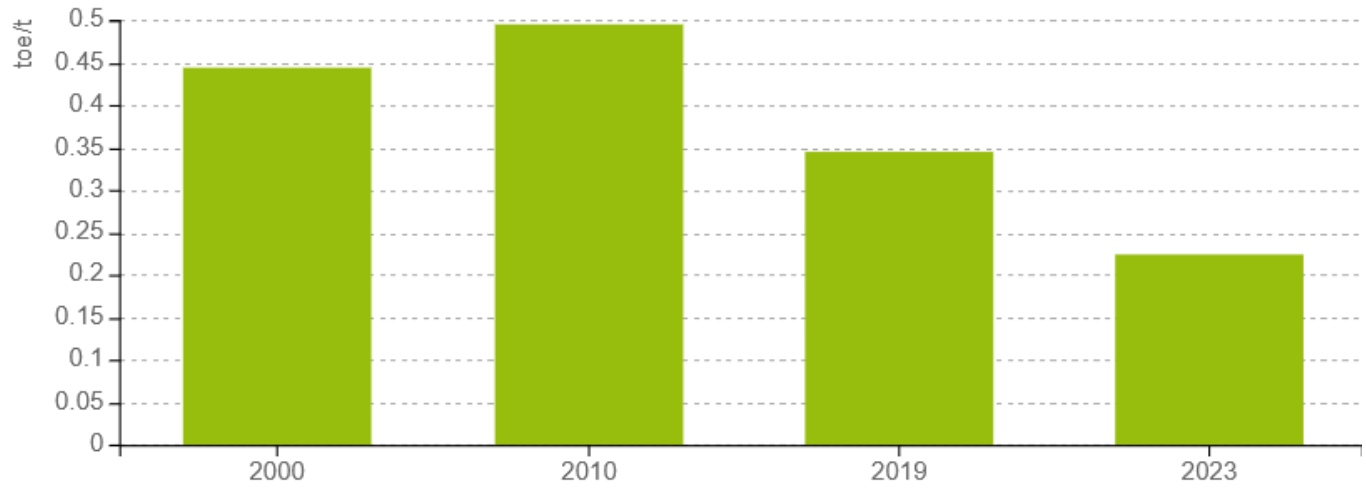
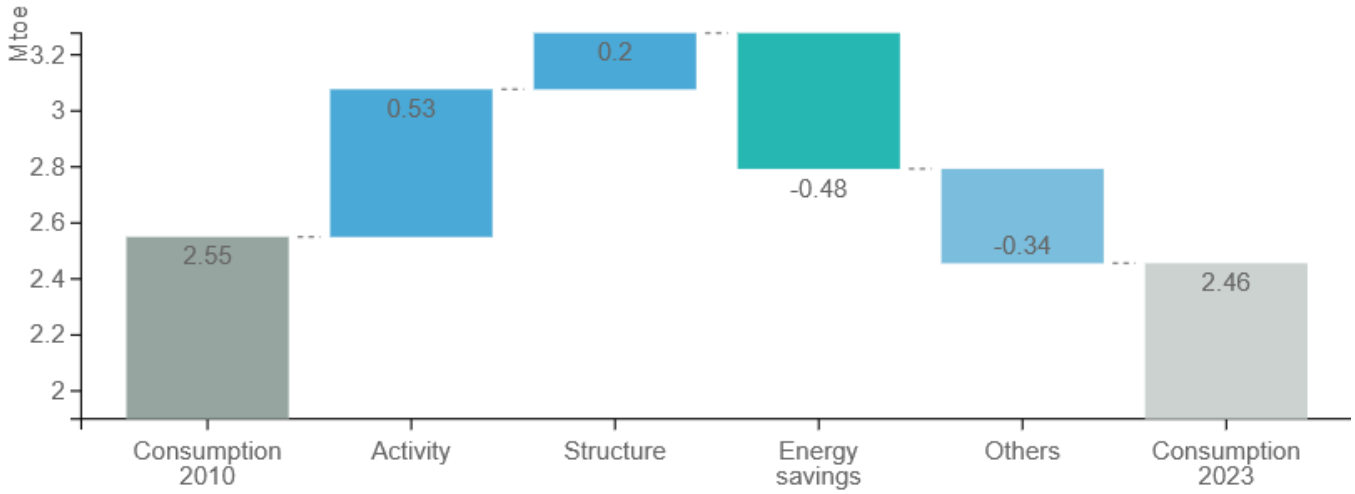
Figure 20: Unit consumption of paper (toe/t)



Source: ODYSSEE

From 2000 to 2023, paper consumption per unit decreased by 49%, averaging a 2.9% annual reduction.

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



Source: ODYSSEE

Energy consumption of industry decreased by 0.09 Mtoe, from 2.55 Mtoe in 2010 to 2.46 Mtoe in 2023.Technical energy savings (-0.48 Mtoe) and other effects (-0.34 Mtoe), which are structural changes within branches, more than compensated for the rise in activity (0.53 Mtoe) and structural changes between the main industrial branches (0.2 Mtoe)

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

Measures	NECP measures	Description	Expected savings, impact evaluation
Scheme to support green hydrogen and biogas production projects (Схема за подпомагане на проекти за производство на зелен водород и биогаз)	Yes	Project under Bulgarian Recovery and Resilience Plan - providing support for the development of projects enabling the introduction of green hydrogen and biogas with application in industrial production processes.	0.12 TJ
Program "Competitiveness and innovation in enterprises" 2021-2027 (Програма „Конкурентоспособност и иновации в предприятията“ 2021-2027)	Yes	The Program is directly aimed at achieving intelligent and sustainable growth of the Bulgarian economy, as well as the implementation of industrial and digital transformation - supporting SMEs in order to achieve better energy and resource efficiency and strengthen the transition to a green economy. Two instruments in the Program are directly aimed to EE: Debt instruments for circular economy, EE and RES in combination with grants.	0.59 TJ
Construction of new RES for own consumption in combination with local facilities for energy storage in enterprises (Изграждане на нови ВЕИ за собствено потребление в комбинация с локални съоръжения за съхранение на енергия в предприятията)	Yes	Procedure under National Resilience and Recovery Plan - Aimed at the construction of new renewable energy sources (photovoltaic systems) up to 1 MW for own consumption, combined with local energy storage facilities (batteries), which aims to encourage the transition of the private sector to eco-friendly activity.	0.59 TJ

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