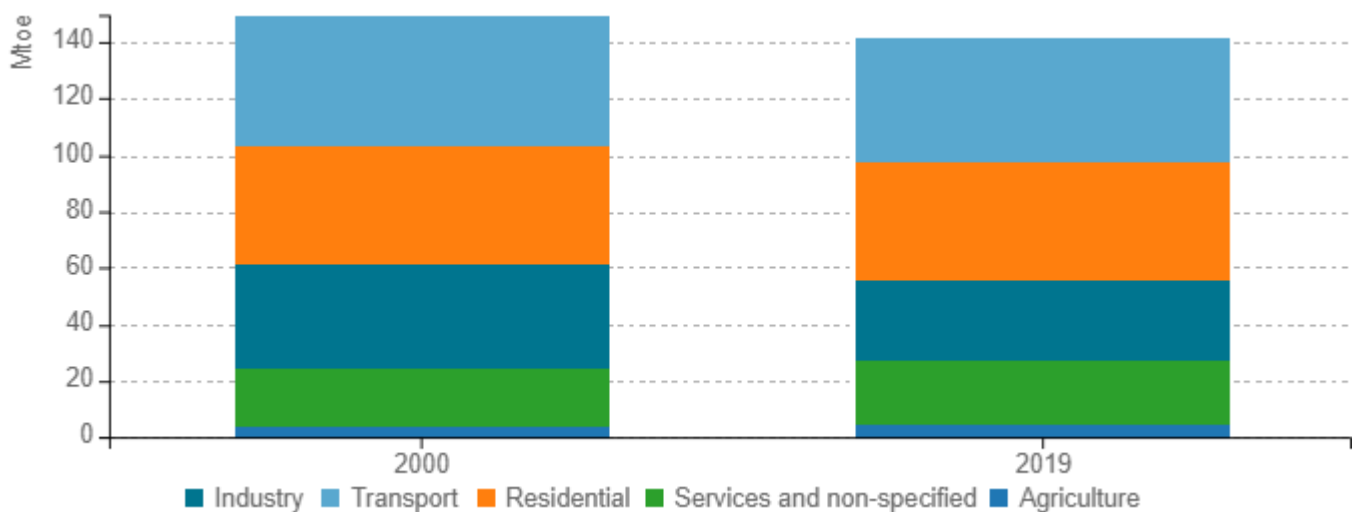


Energy efficiency trends and policies

Overview

In 2019, the final energy consumption in France was 141.7 Mtoe. Transport, the largest consuming sector, kept a steady share of almost 31% in total final energy consumption, from 2000 to 2019. Over the same period, the residential sector increased from 28% to 29%, services increased from 13.4% to 16%, while industry decreased its share by more than 4 percentage points from 24.6% to 20.4%. The final energy consumption in 2019 was slightly below its 2000 level (-5 %) while the activity has increased, which can be explained by the technological progress and energy efficiency.

Figure 1: Final energy consumption by sector (normal climate)

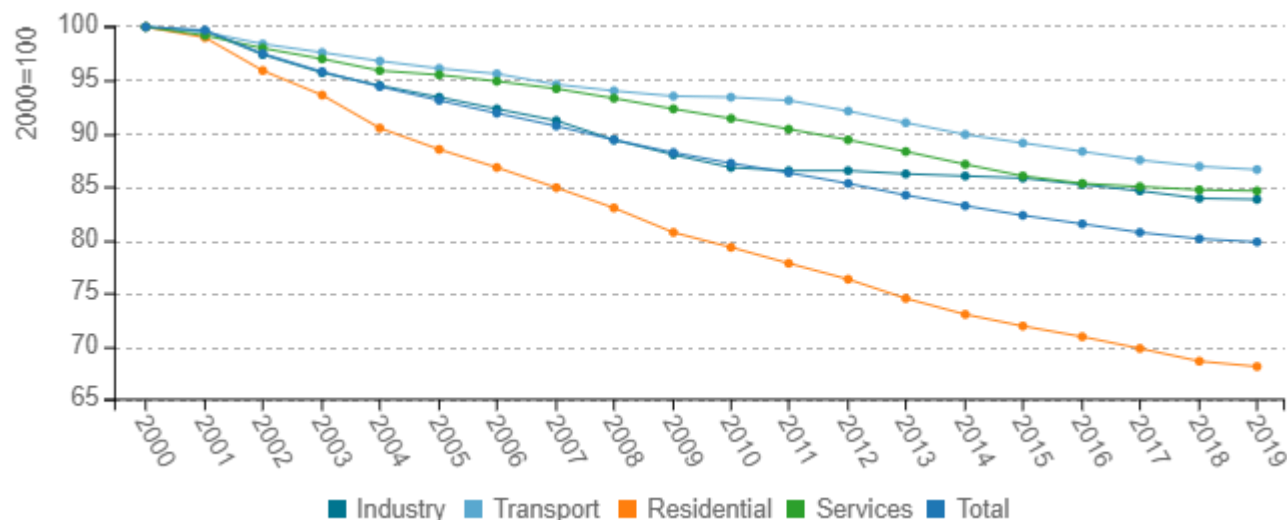


Source: ODYSSEE

Energy efficiency for final consumers, as measured by ODEX (an indicator which measures the energy efficiency progress by main sector and for all final consumers), improved by an average of 1.2%/year from 2000 to 2019 or 20% over the period. In the residential sector, despite the economic crisis, there has been steady progress and larger gains than in the other sectors (2%/year). This trend can be explained by the introduction of many policies affecting buildings and appliances. In services and transport, the pace of energy efficiency improvements has been steady (0.9% and 0.7% per year respectively since 2000). In industry, improvement has reached 0.9%/year. Since 2016, there is a slowdown of the gains at the global level and specially for industry and services.



Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

France adopted its third National Energy Efficiency Action Plan (NEEAP), which sets a final consumption target of 131.4 Mtoe in 2020. The energy savings measures are expected to save 20.5 Mtoe in 2020. The Energy Transition Act of 2015 introduced a provision aimed to have final energy consumption between 2012 and 2050. As part of the Transition Act, building renovations will be mandatory by 2025 for the least efficient dwellings (specific consumption over 330 kWh/m²). Governmental institutions will have to renew half of their vehicle fleet with low-emission cars; large companies (above 100 employees) will have to establish mobility plans. The 2005 Energy Law implemented energy savings obligations for energy companies, with the possibility of trading energy savings certificates. The energy saving target is 2133 TWhc ("c" for cumac: lifetime discounted cumulative savings) for the fourth period (2018-2021), which is equivalent to 12 Mtoe of annual energy savings. The 2021-2030 Integrated National Energy and Climate Plan (NECP) targets a 32.6% improvement of energy efficiency compared to European baseline scenario (PRIMES 2007: Primary energy consumption baseline), which corresponds to a final energy consumption target of 120.9 Mtoe in 2030.

Table 1: Sample of cross-cutting measures

Measures	NEEAP measures	Description	Expected savings, impact evaluation	More information available
Energy Saving Certificates (ESC)	yes	The ESC scheme obliges energy retailers and fuel suppliers to meet specified energy saving. Obligated parties meet these targets by encouraging their customers, mainly in the building sector, to reduce their energy consumption.	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/122



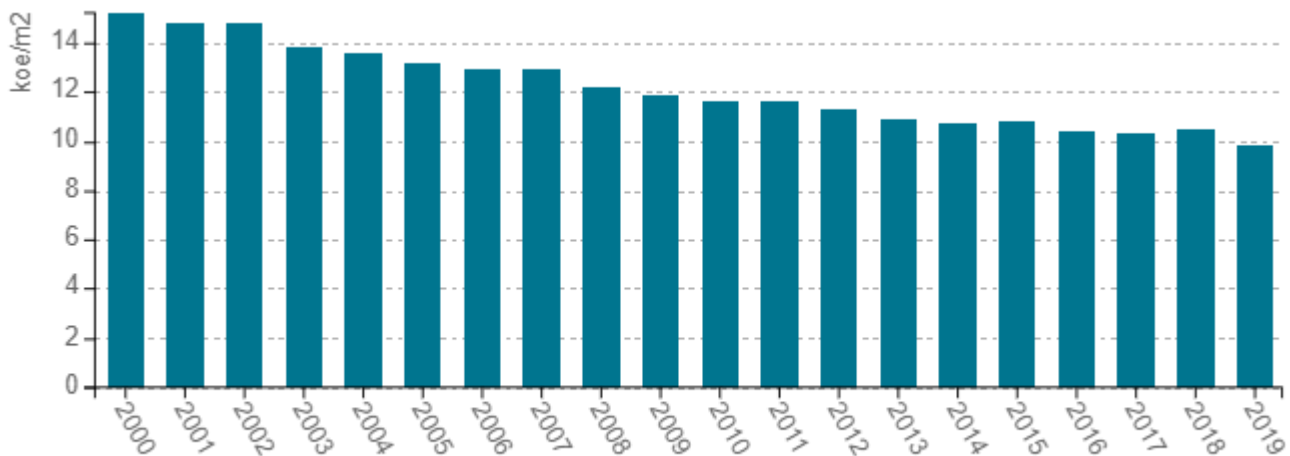
Heat Fund	yes	The Heat Fund supports the production of heat from renewable energies, as the development of the use of biomass (forestry, agricultural, biogas, etc.), geothermal energy (through direct use or by means of heat pumps), solar, thermal energy, recovered energies, and also development of heat networks using these energies.	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/143
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Source: MURE

Buildings

In 2019, space heating accounted for 65% of the sector’s consumption, electrical appliances for 19%, water heating for 10% and cooking for 5%. While electrical appliances consumption recorded an increase from 5.5 Mtoe to 7.7 Mtoe since 2000 (+1.8%/year), which can be explained by the increasing number of connected devices, space heating consumption share dropped by 8 percentage points over the period, thanks in particular to energy efficiency policies in existing buildings. Besides energy consumption of cooking and water heating decreased as well respectively by -0.9%/year and -0.2%/year. Since 2013, there has been a slowdown in energy efficiency progress for space heating, which consumption stands at around 10.5 koe/m².

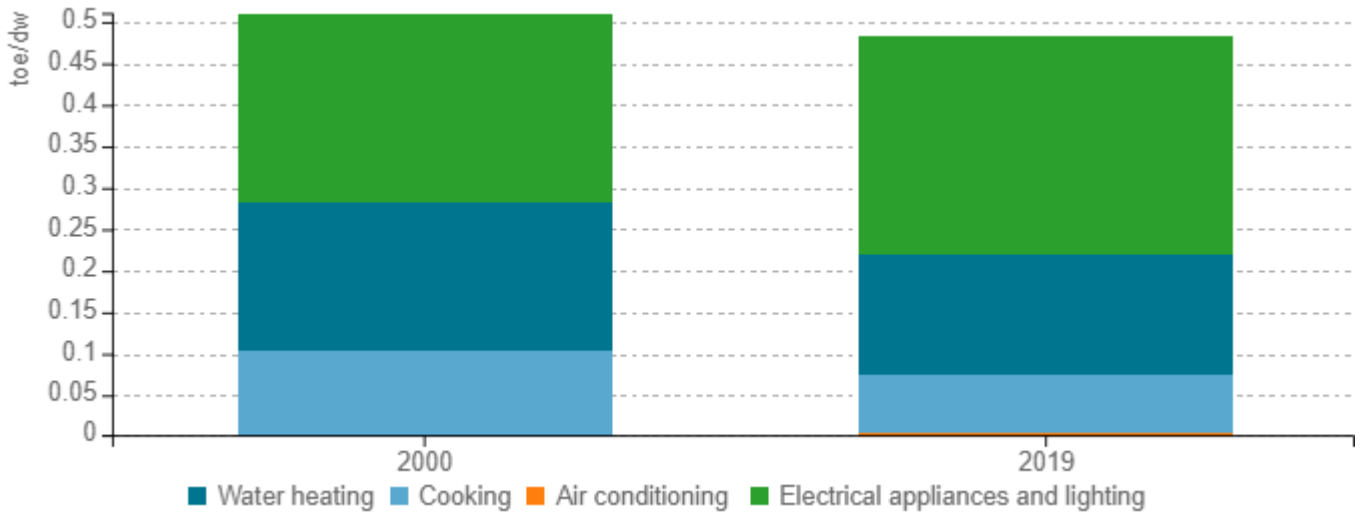
Figure 3: Energy consumption of space heating per m² (normal climate)



Source: ODYSSEE



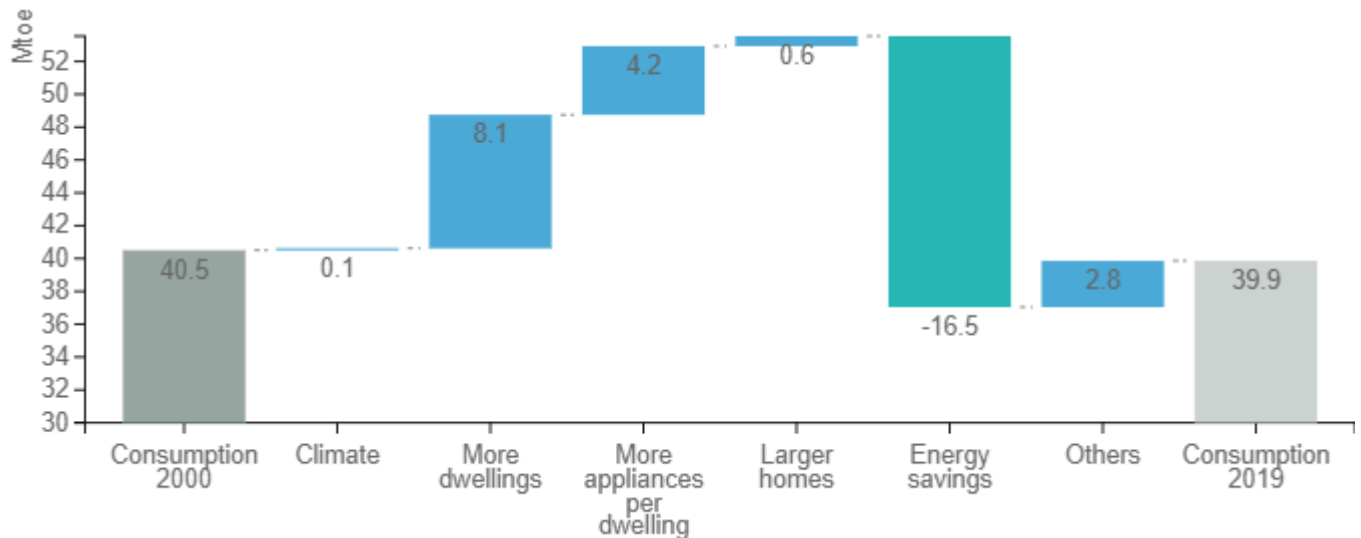
Figure 4: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

The final energy consumption of residential buildings was 0.6 Mtoe lower in 2019 than in 2000. On the one hand, two main factors contributed to increase energy consumption over the period – more dwellings (by 8.1 Mtoe) and lifestyles (4.2 Mtoe for “more appliances per dwelling” and 0.6 Mtoe for “larger homes”). On the other hand, energy savings (16.5 Mtoe) more than offset the effect of the drivers of consumption growth and explain the observed slight decrease in building sector energy consumption.

Figure 5: Main drivers of the energy consumption variation of households

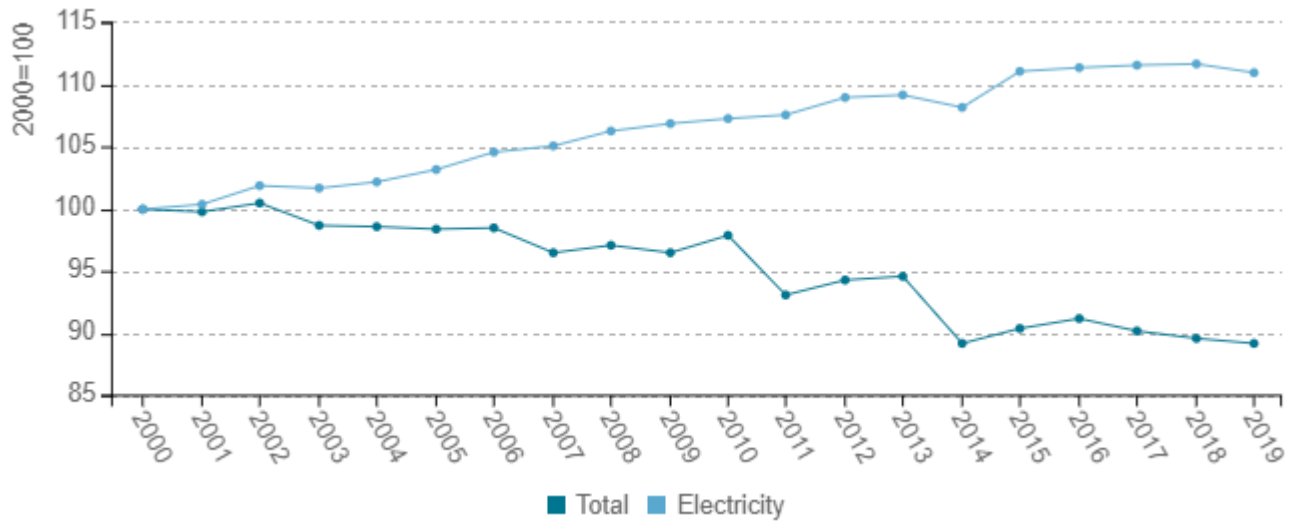


Source: ODYSSEE

In the service sector, the energy consumption per m² decreased by 0.6%/year since 2000. However, because of the diffusion of IT and electrical appliances in offices, the electricity consumption per employee has increased by 0.6%/year over the same period, despite the fact that most electrical equipment is more efficient.



Figure 6: Energy and electricity consumption per m² (normal climate)



Source: ODYSSEE

In France, the first thermal building code (RT) was implemented in 1974 and has been updated and strengthened seven times since then. The last update (RE2020) is particularly ambitious with a maximum consumption of 100 kWh/m² for all end-uses. Still, three quarters of the current building stock was built without building codes. As a result, and even with the great efforts made since year 2000, the average performance of the building stock in terms of energy consumption per m² is one of the worst in Europe. Today the potential for energy savings in these older buildings is huge while the building sector is one of the top priorities in the energy efficiency policy roadmap in the country. The specific building-related energy saving goals have been set in the Energy Transition Act of 2015: 28% reduction of final energy consumption in 2050 compared to 2012 level; retrofit of 500,000 existing dwellings each year, of which half should be occupied by vulnerable consumers. The French government offers a mix of policy regulation, incentives and support targeting both residential and commercial buildings, for instance:

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

Measures	Description	Impact	More information
Building codes “RE 2020”- new buildings	Requires all new buildings to produce more energy than it consumes based on the principle of positive energy buildings (PEB), (i.e., new residential buildings are required to have a primary energy consumption lower than a threshold 100 kWh/m ² /year of all end-uses, varying by climate zone).	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/615
Building codes -renovation	Asks that each building with a surface area more than 1000m ² meet a global energy performance target. Concerning other residential buildings, the element-by-element thermal regulation (called RT element) sets a minimum performance level for elements replaced or installed.	Medium	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4435

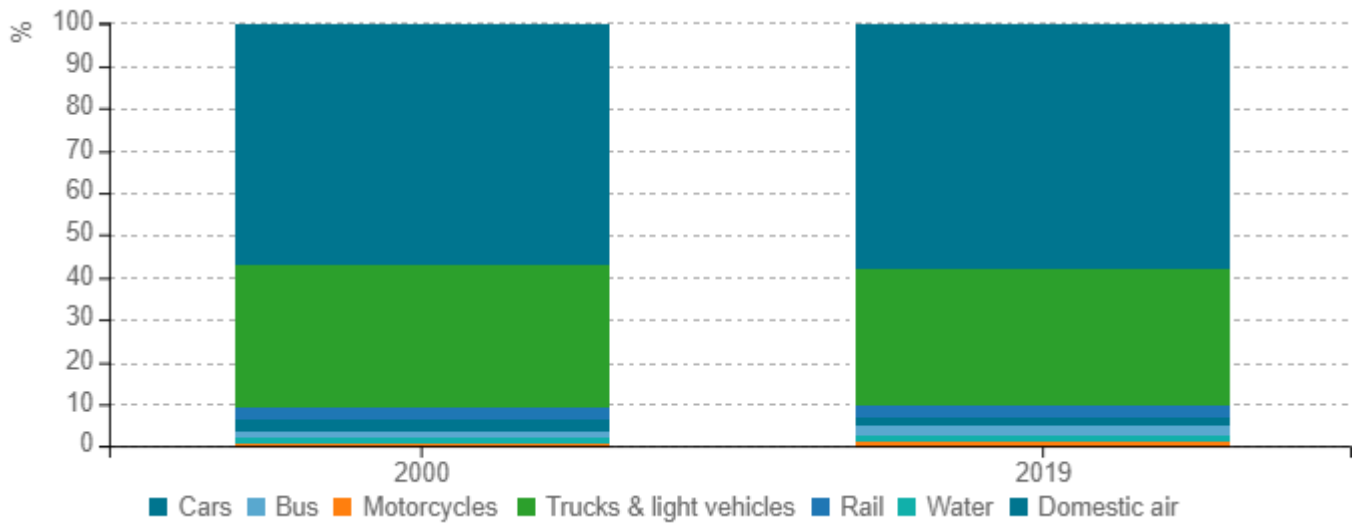
Source: MURE



Transport

Cars accounted for 58% of the sector's consumption and road freight transport for 33% in 2019. The remaining was split among rail (3%), bus (2%), domestic air transport (2%), motorcycles (1%), and inland waterways (1%).

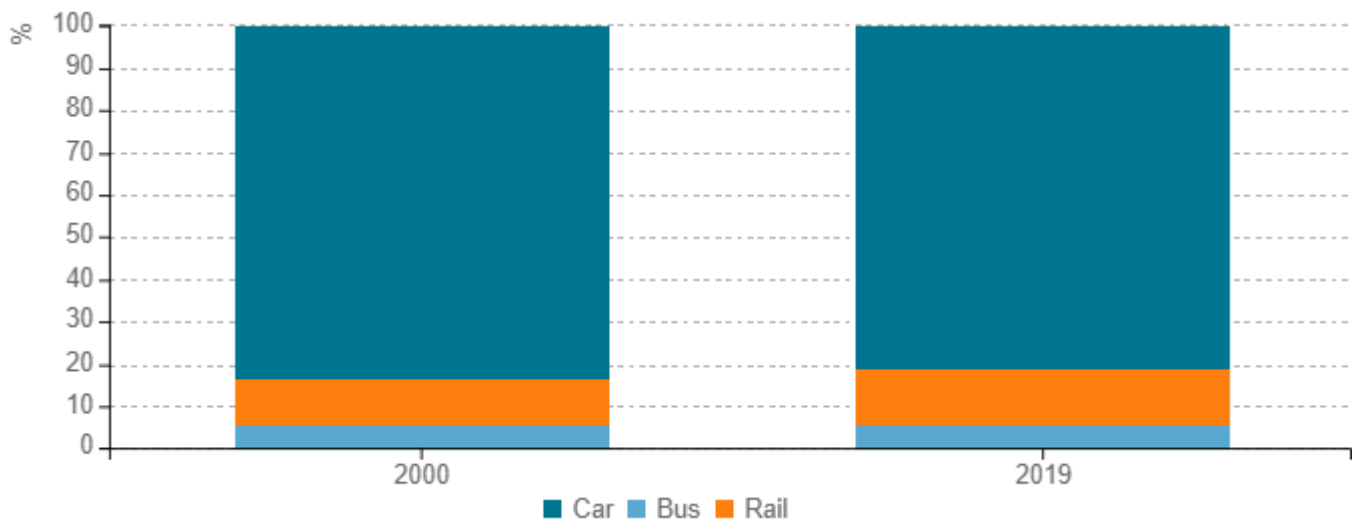
Figure 7: Transport energy consumption by mode



Source: ODYSSEE

The traffic of passengers has been slightly increasing since 2000 (by 0.5%/year). The increase in traffics has been higher in public transport (+1.7%/year for rail and +0.4%/year for buses) than for cars (+0.3%/year). This reflects a modal shift towards public transport.

Figure 8: Modal split of inland passenger traffic

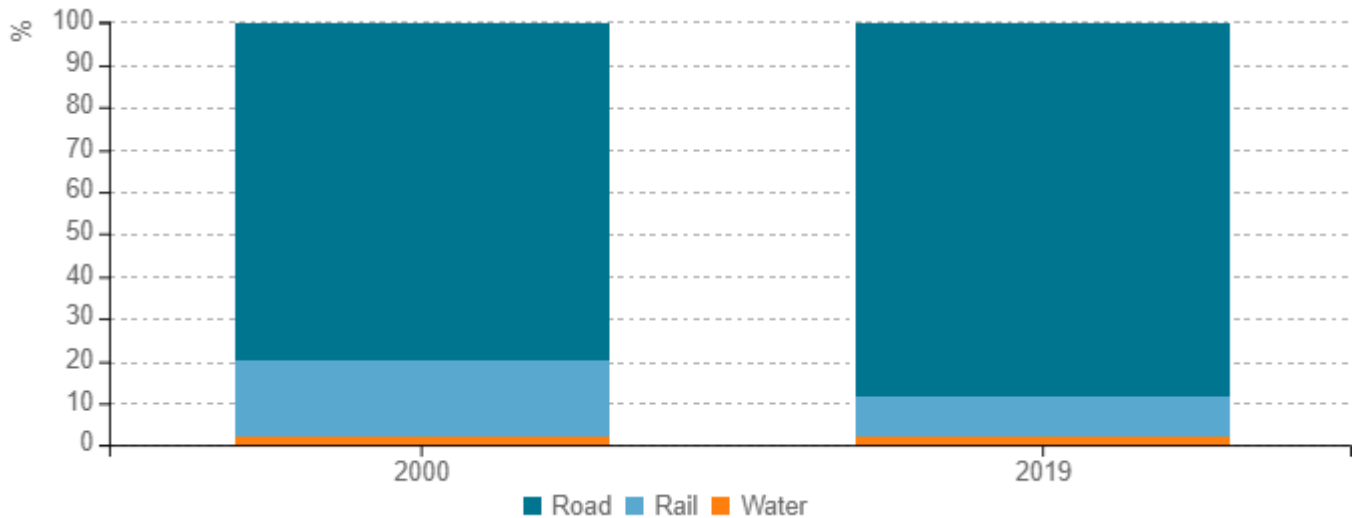


Source: ODYSSEE



On the contrary, the traffic of goods (measured in tonne-kilometre) increased by 0.3%/year from 2000 to 2019, with a significant decrease in rail traffic of goods (-3%/year), which led to a higher share of road in the total traffic (88% in 2019), i.e. a trend that goes against the expectation of policy makers.

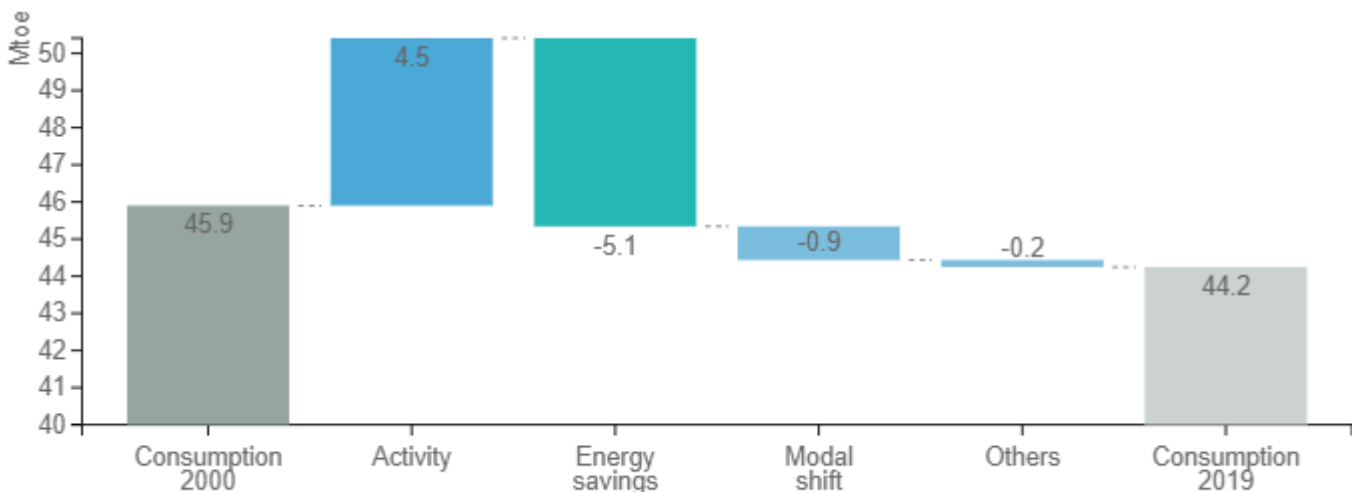
Figure 9: Modal split of inland freight traffic



Source: ODYSSEE

Transport energy consumption was 1.7 Mtoe lower in 2019 than in 2000. This trend is due to the fact that energy savings (around 5.1 Mtoe) and the effect of modal shift (0.9 Mtoe) counterbalanced the effect of the growth in traffic of passengers (4.5 Mtoe).

Figure 10: Main drivers of the energy consumption variation in transport



Source: ODYSSEE



In 2010, the National Engagement for Environment (ENE) enacted the accelerated development of non-road and non-air modes of transport. Ambitious objectives were set by this law: to reduce by 2020 the greenhouse gas emissions of the transport sector to the level recorded in 1990 and to increase the share of non-road and non-air modes to 25% by 2022 (from 14% in 2006). The policies implemented to achieve this objective are mainly based on two points: i) Support low emission means of transport (modal shift); ii) Improvement of the efficiency of the means of transport used.

Table 3: Policies and measures into force in the transport sector

Measures	Description	Expected savings, impact evaluation	More information available
Carbon tax	The 2014 fiscal law introduced a carbon tax on fossil fuels. The tax rate was raised from €7/tCO ₂ in 2014 to €44.6/tCO ₂ in 2018. The Finance Law 2018 set the carbon tax level at €56/tCO ₂ in 2020 and €100/tCO ₂ in 2030. However, its level remained unchanged since 2018 due to social protests. Revenues from the tax are used to finance the development of renewables	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/2127
Bonus malus	The bonus-malus scheme (called bonus écologique), based on the CO ₂ emissions per km, supports the purchase of vehicles with low CO ₂ emissions by giving bonus (up to €7,000) and penalizes the purchase of high emissions vehicles (more than 131gCO ₂ /km in 2021) by giving a malus, up to €30,000 (for cars with emissions higher than 218gCO ₂ /km).	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/2122
Mobility plans for companies	The mobility plan for companies aims at reducing GHG & pollutant emissions and reducing road traffic by optimizing and increasing the efficiency of employees' travel. It is mandatory for all companies with more than 100 employees on the same site.	Low	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/2146

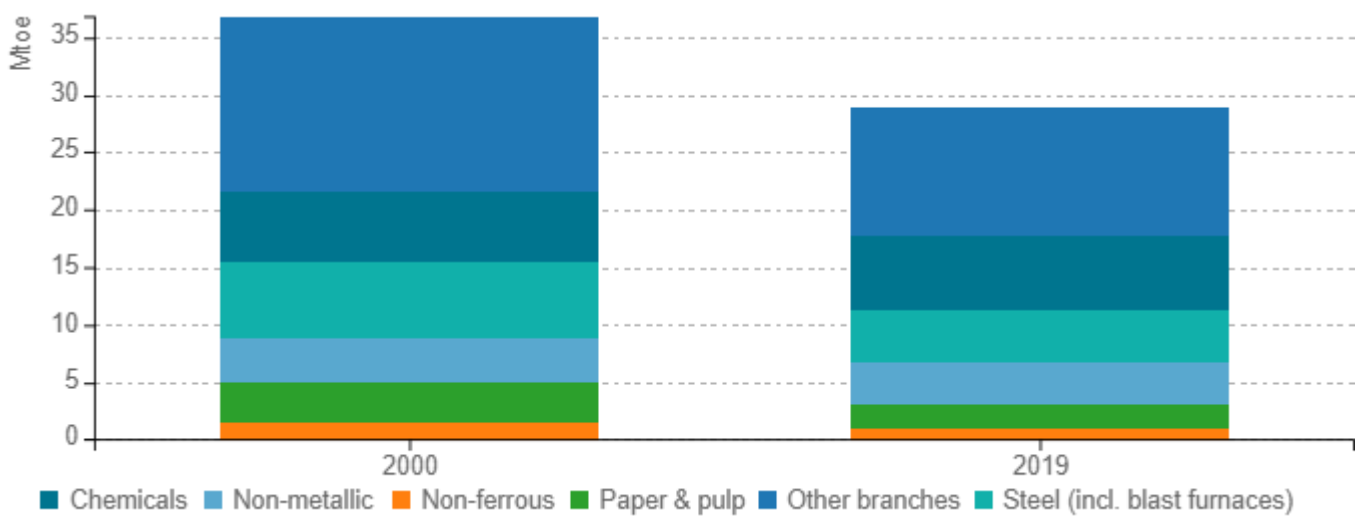
Source: MURE



Industry

Final energy consumption of industry decreased significantly between 2000 and 2019, by 1.3%/year on average, to stand at 28.9 Mtoe. Around 60% of consumption remain concentrated in 5 energy intensive branches, of which 23% in chemicals, 15% in steel industry, 13% in non-metallic minerals, 7% in paper and 4% in non-ferrous metals industries. Chemical industry showed the biggest raise in its share from 17% to 23% over the period, which can be explained by the development of the petrochemical industry and the intensification of the use of plastics.

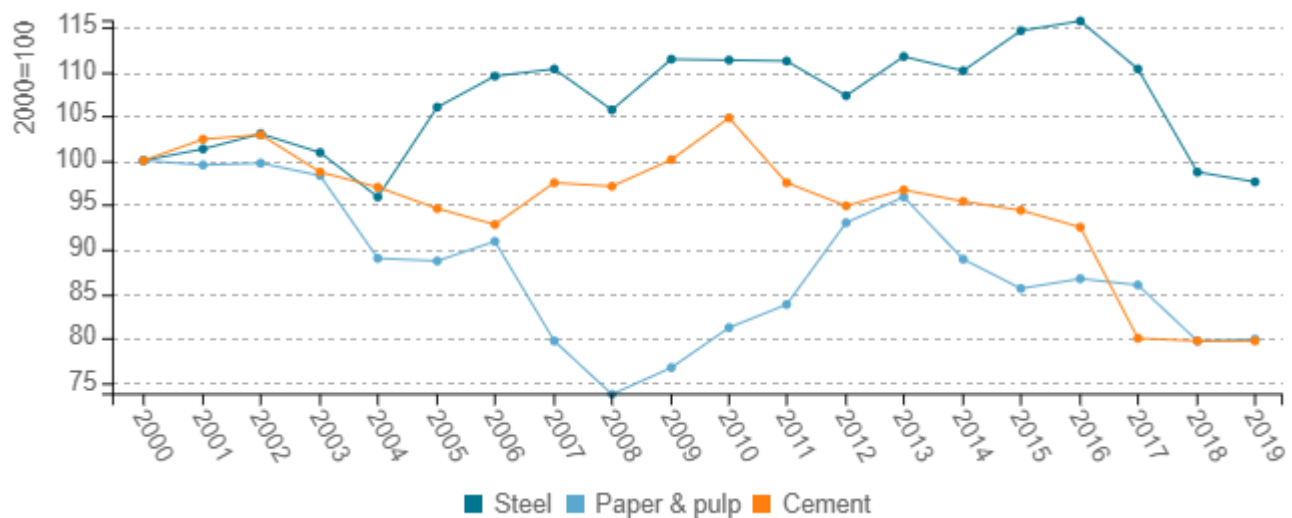
Figure 11: Final energy consumption of industry by branch



Source: ODYSSEE

Among the 5 energy intensive branches, the unit consumption of both cement and paper decreased by 1.2%/year. The steel industry, on the other hand, has experienced upward fluctuations, returning in 2019 to a level close to that of 2000.

Figure 12: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

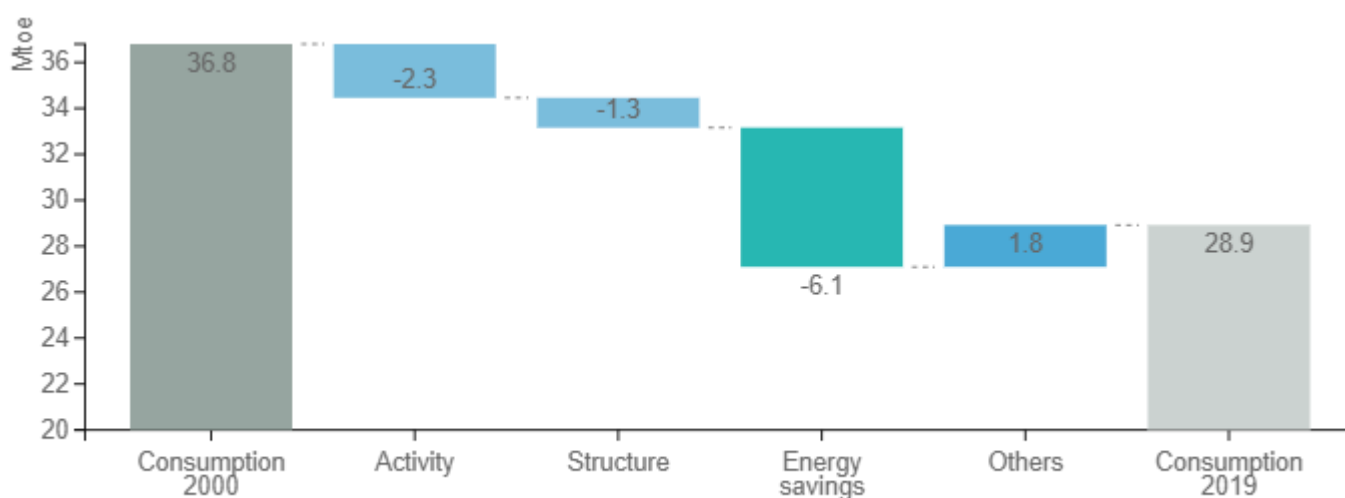


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Since 2000, most factors contributed to a decrease in industrial energy consumption (-7.9 Mtoe), of which the decrease in activity (-2.3 Mtoe), structural changes towards less energy-intensive branches (-1.3 Mtoe) and, mainly, energy savings (-6.1 Mtoe). These effects are partly offset by other effects (+1.8 Mtoe). Since the economic crisis in 2008, energy savings have had a much lower impact because of a lower renewal rate of equipment and inefficient operations.

Figure 13: Main drivers of the energy consumption variation in industry



Source: ODYSSEE

The French policy in terms of energy efficiency in the industrial sector focuses on five points: market instruments (in particular the EU emission trading scheme); financial incentive measures; regulatory measures, in particular within the framework of the transposition of the Energy Efficiency Directive (2012/27/EU); support to these normalisation procedures and qualification; support to the development of more energy-efficient technologies, in particular for the development of future investments systems.

Table 4: Policies and measures into force in industry

Measures	Description	Impact	More information
Loans for SMEs	This measure includes two kind of loans, "Energy saving loan" & " Green loan" which are available for SMEs which want to improve their energy efficiency (installation of efficient equipment eligible to ESC scheme, work to bring them up to standard...), and the second to improve the environmental performance of their industrial processes or their products.	Low	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/1122
Mandatory energy audit	Large firms (with more than 250 employees or revenues exceeding 43 million euros) are obliged to make energy audits every four years. It concerns around 5,000 firms in France.	Low	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/1124

Source: MURE

