

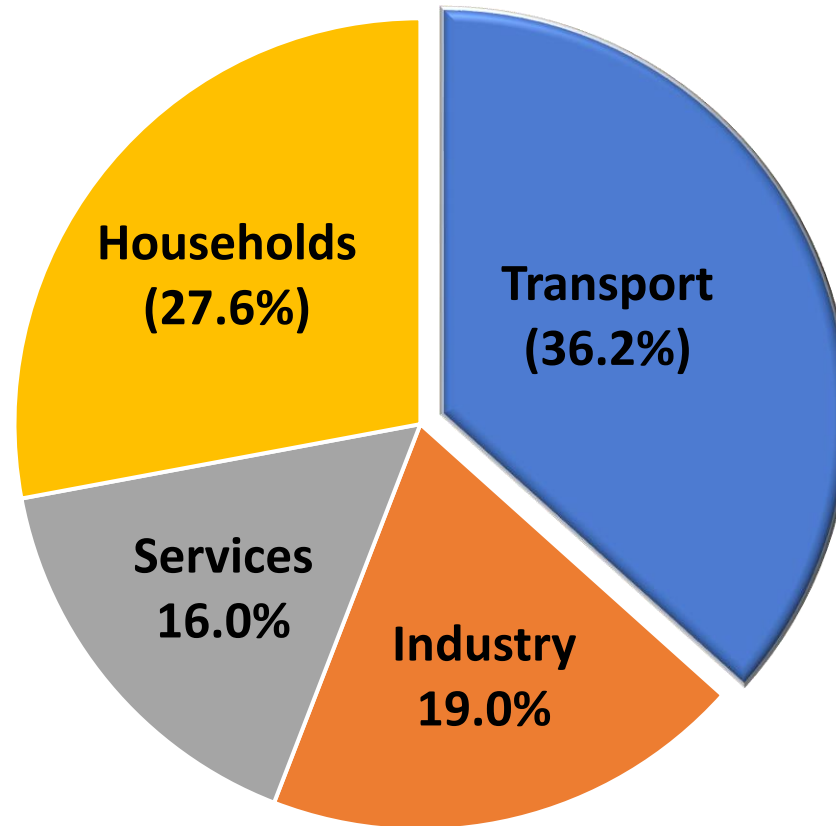
# Energy Efficiency Indicators for Transport and Industry Sectors

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# Final Energy by End-Use Sectors (2021)



Transport  
sector

Breakdown of Total Final Energy (TFE) by end-use sectors in Switzerland (SFOE, 2023)

# Introduction to Transport ODEX

**Transport ODEX:**  
*Aggregated using energy  
shares*

**Unit consumption indices**  
for transport modes:  
*Ratio of energy consumption and activity  
indicator (e.g., toe/pkm, toe/veh, toe/tkm)*

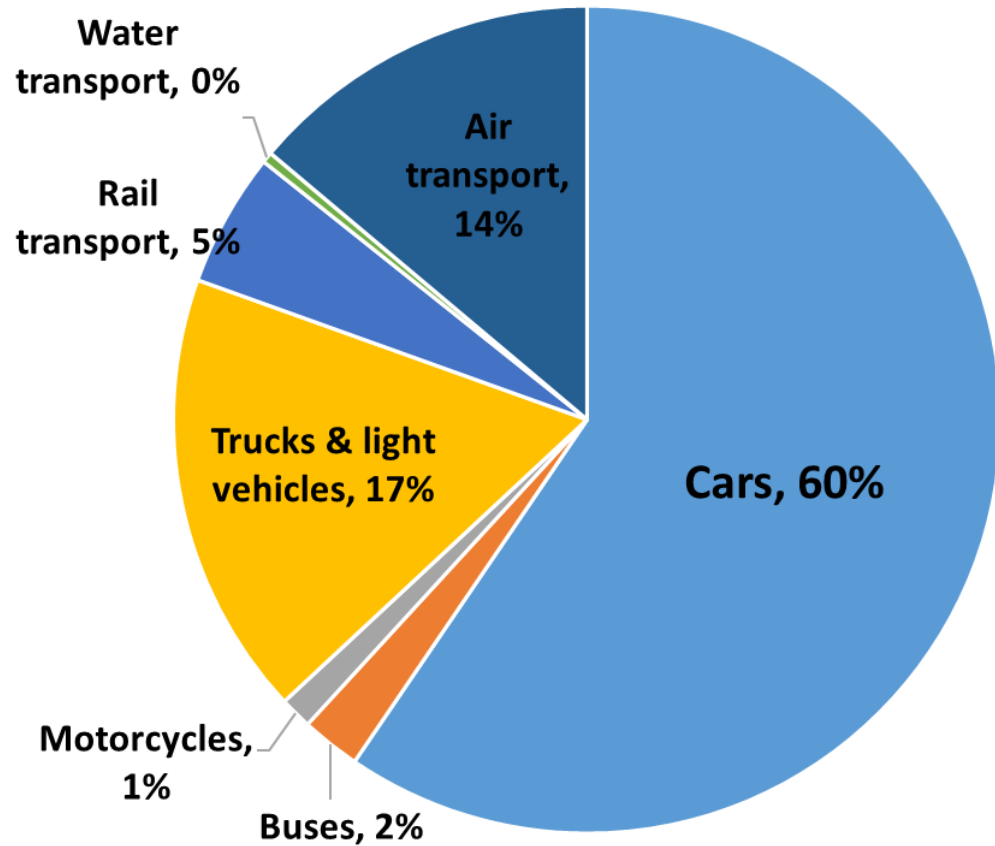
Data from national statistics:

- *Total final energy consumption*
- *Activity indicators: Passenger-km, Vehicle-km, tonne-km, number of vehicles, number of passengers*

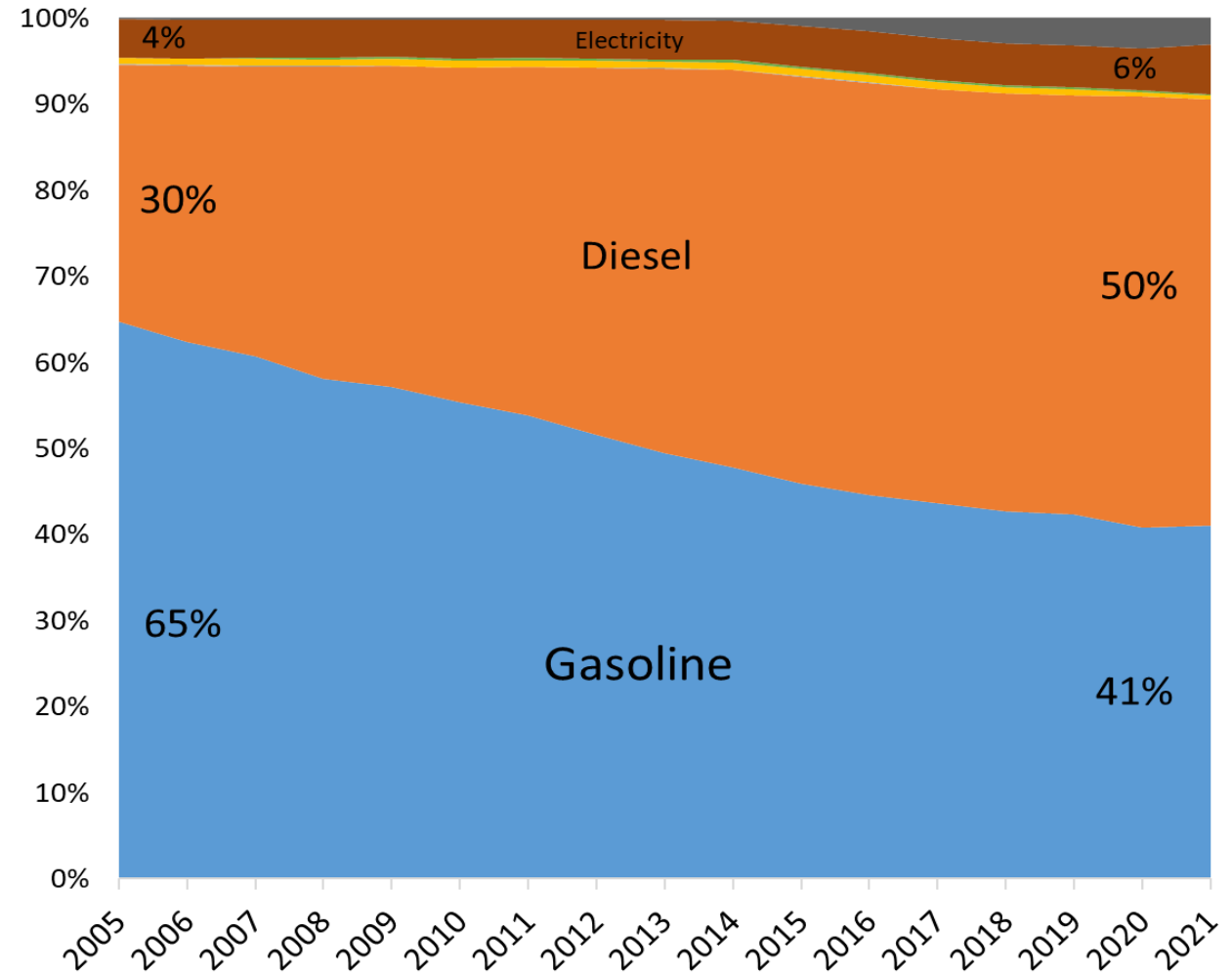
Transport (7 transport modes)

- Passenger transport: Cars, Buses, Motorcycles, Air transport, Trains
- Goods transport: Trucks, Light vehicles, Air transport, Trains

# Transport Sector: Overview

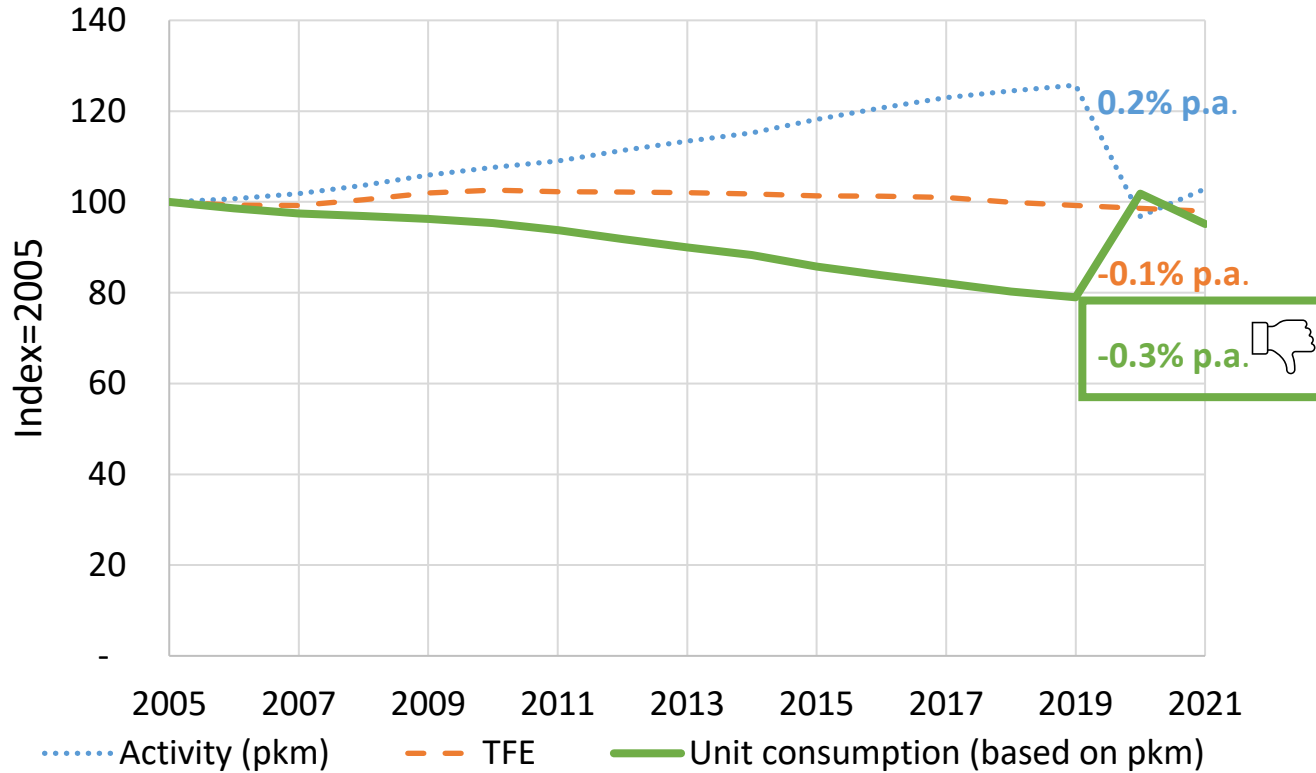


Share of transport modes within transport TFE in 2021 (SFOE, 2023)

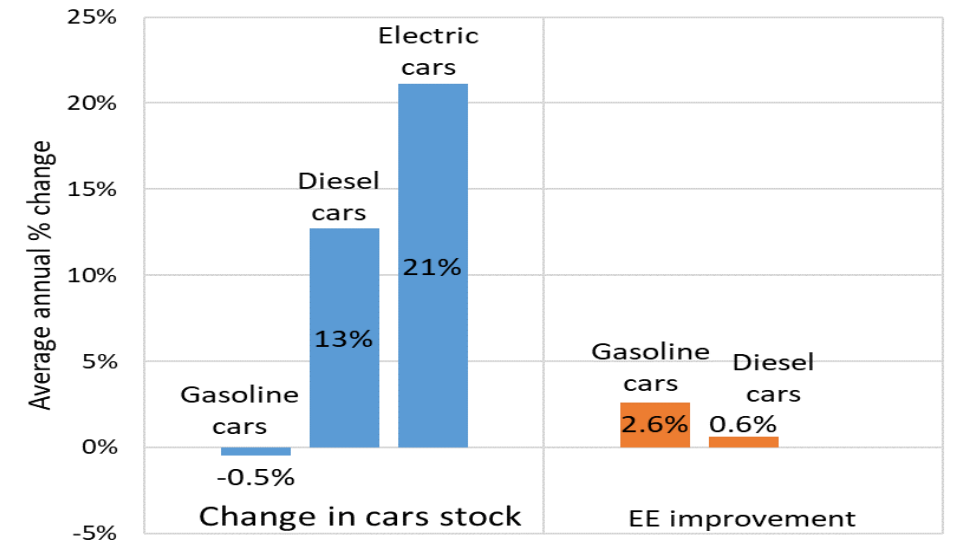
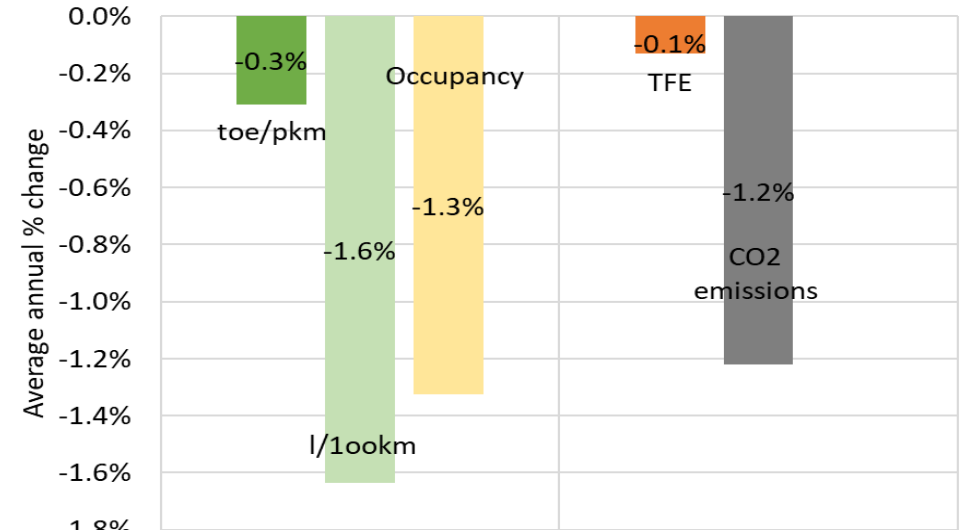


Development of energy carrier shares (Source: SFOE, 2023)

# Cars (60% of Transport TFE)



Time period 2005-2021

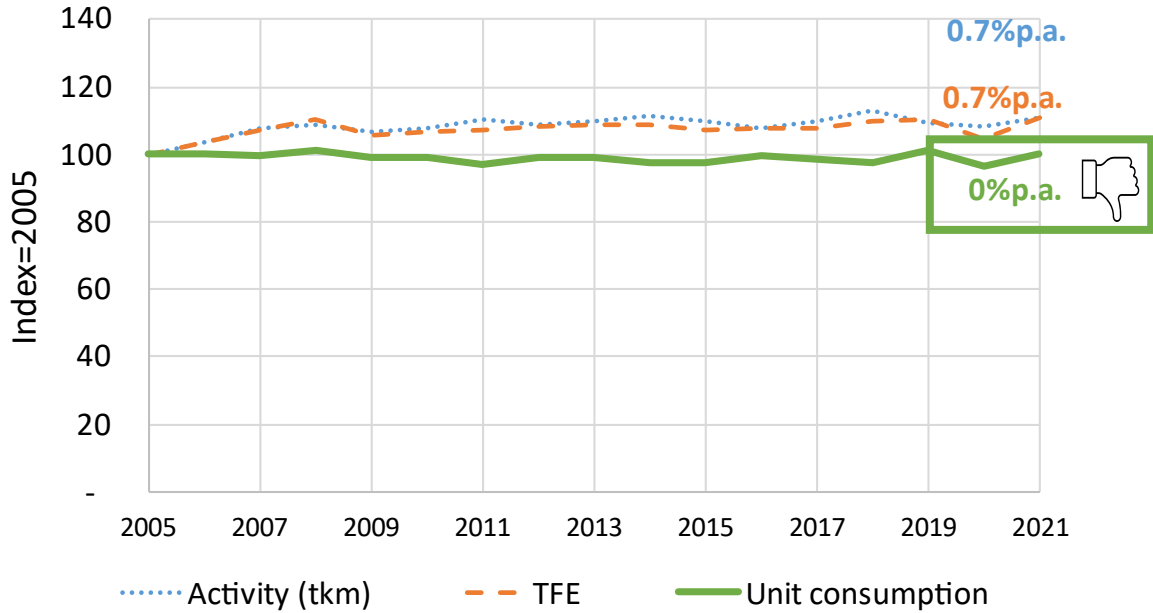


- Comparison of annual rates of toe/pkm and toe/km  
→ Change in car occupancy

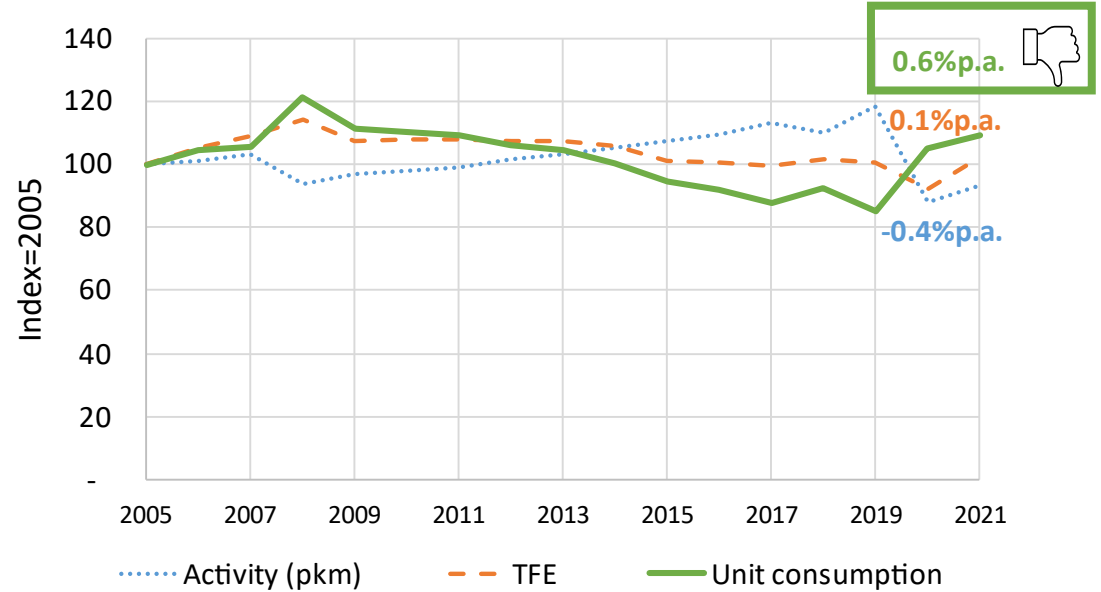
Sources: FEDRO, 2023; SFOE, 2023; EEA, 2023

# Other road transport (19% of transport TFE)

## Indices for Trucks (17% of transport TFE)



## Indices for Buses (2% of transport TFE)

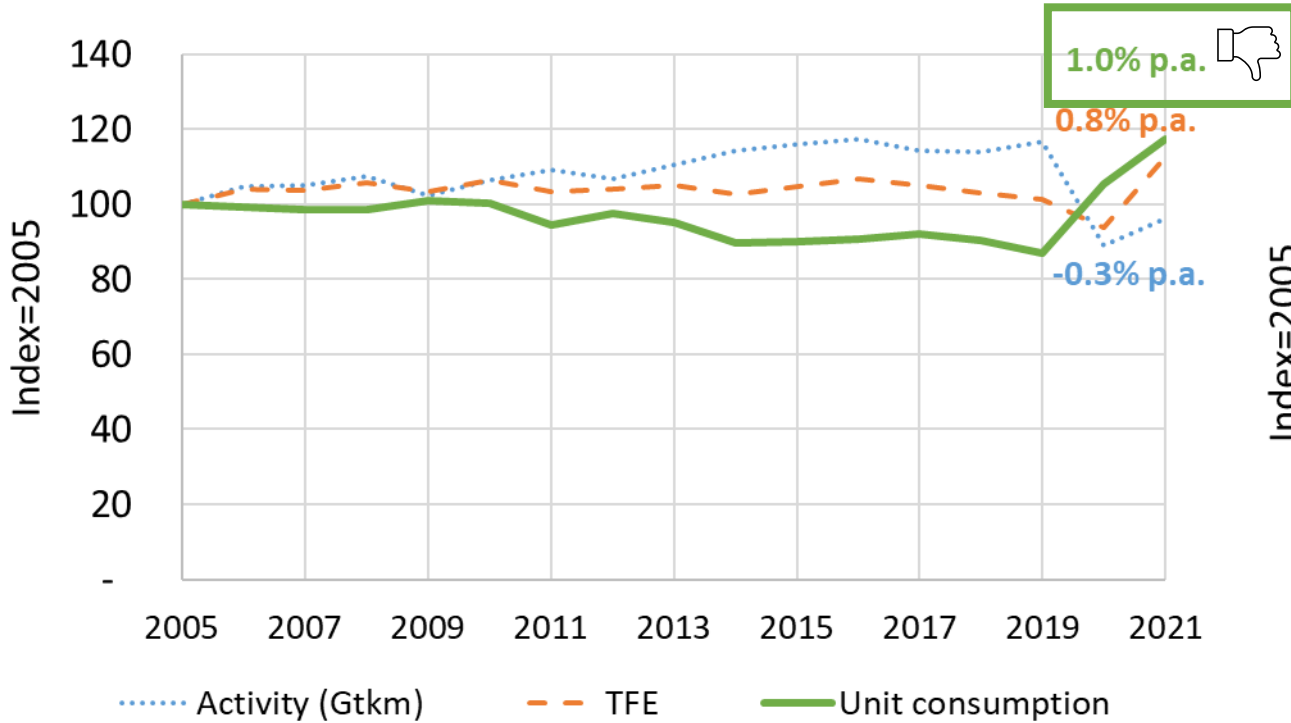


Time period 2005-2021

Sources: SFOE, 2023; EEA, 2023

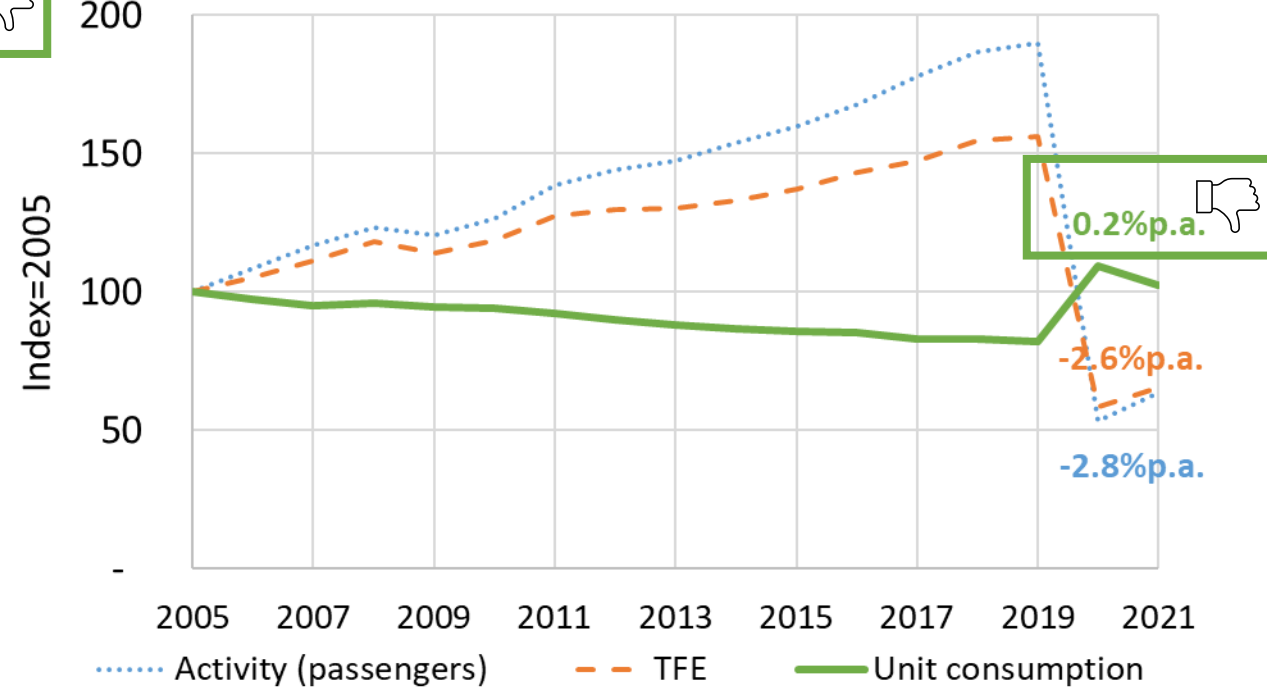
# Other transport modes (20% of transport TFE)

## Rail transport (5% of transport TFE)



## Air transport (14% of transport TFE)

Including international and domestic air transport

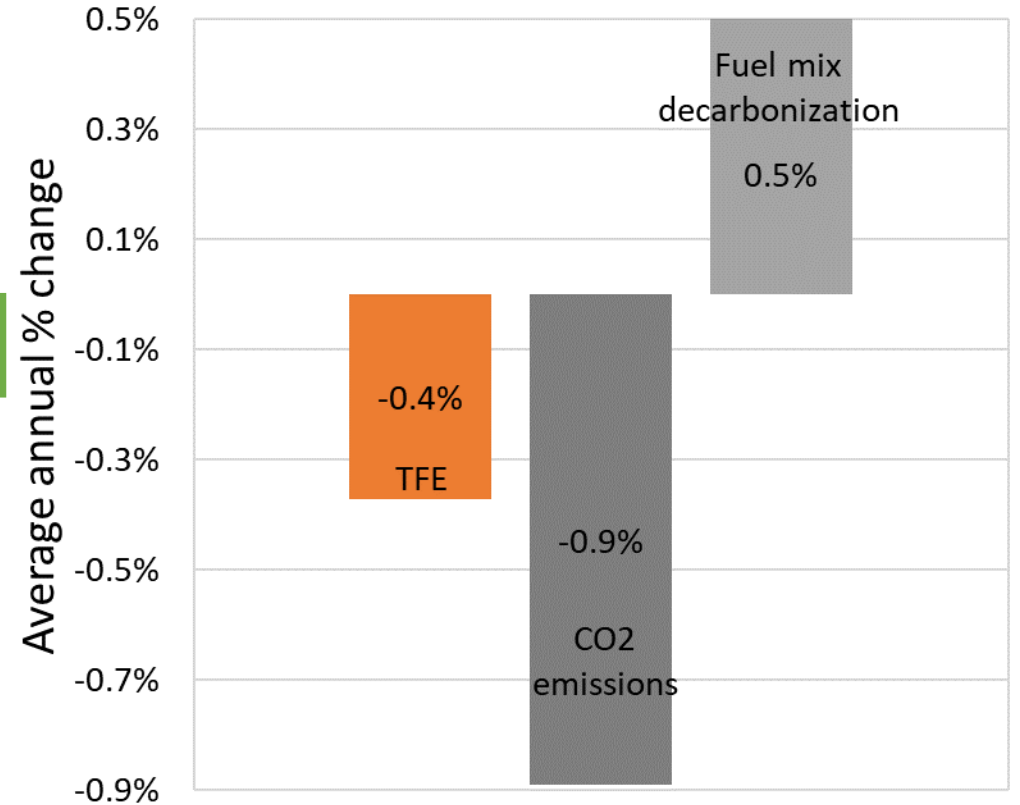
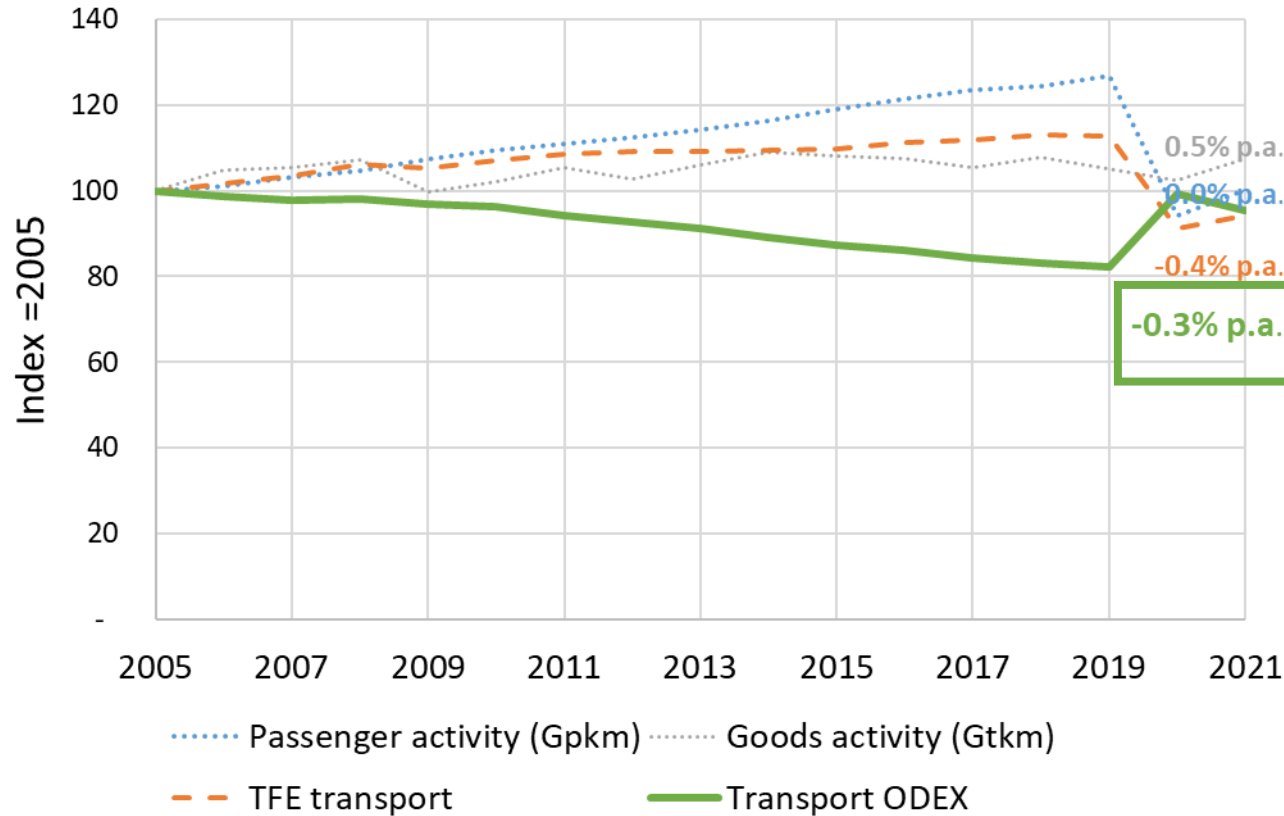


Time period 2005-2021

Sources: SFOE, 2023; EEA, 2023

# Total transport

Time period 2005-2021

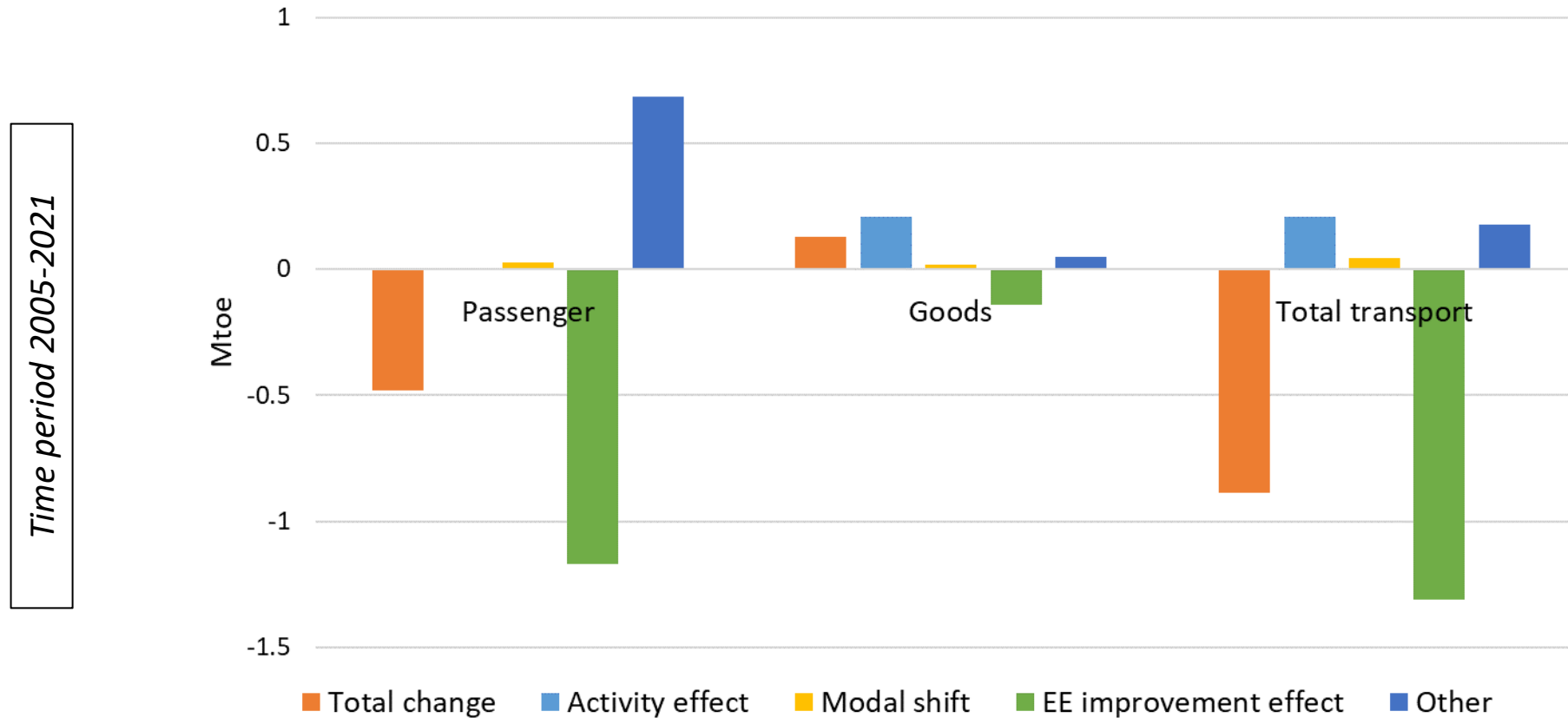


- Physical activity → Measured using pkm for passenger transport and tkm for goods transport.
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted/TJ of TFE consumed

International air transport is included



# Decomposition analysis: Transport TFE (2005-2021)



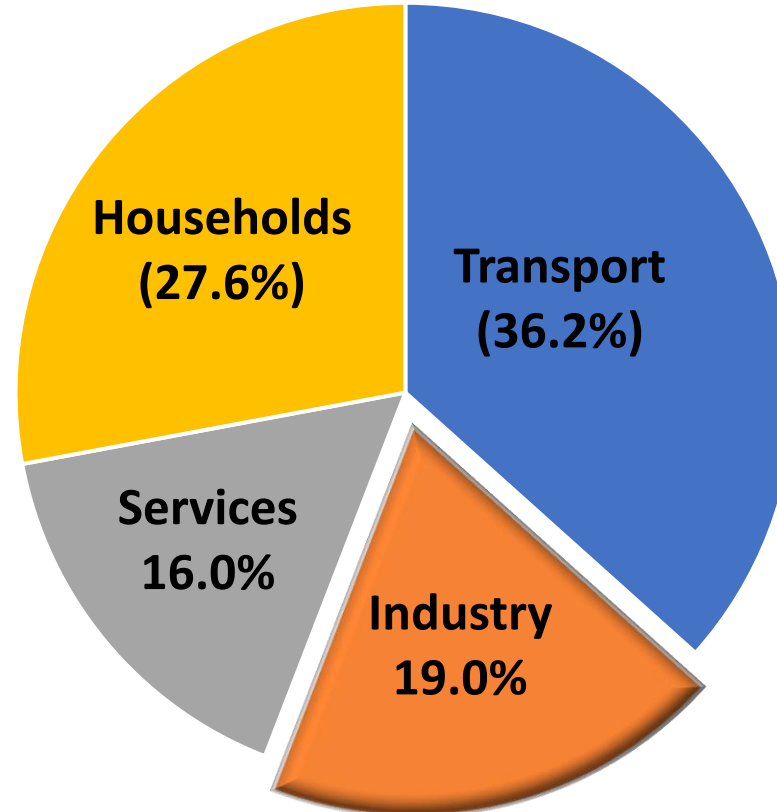
- COVID effect for activity for passenger transport close to zero (sliding average)
- Other in passenger transport (inefficient use of vehicles) → Low occupancy of cars

Sources: ODYSSEE-MURE Decomposition tool

A high-speed train, likely a TGV, is shown in motion on a track, moving from left to right. The train is white with a prominent red stripe along the top. The background features a scenic mountain range under a blue sky with scattered white clouds. The foreground is a green field. The text "Thank You!" is overlaid in a large, bold, blue font across the center of the image.

# Thank You!

# Final Energy by End-Use Sectors (2021)



Industry  
sector

Breakdown of Total Final Energy (TFE) by end-use sectors in Switzerland (SFOE, 2023)

# Introduction to Industry ODEX

**Industry ODEX:**  
*Aggregated using  
energy shares*

Energy efficiency indices for sub-sectors:  
*ratio of **energy consumption** and **activity**  
indicator*

Data from national statistics:

- **Total final energy (TFE) consumption**
- **Activity indicators: Physical production (homogeneous sub-sectors), production index (heterogeneous sub-sectors)**

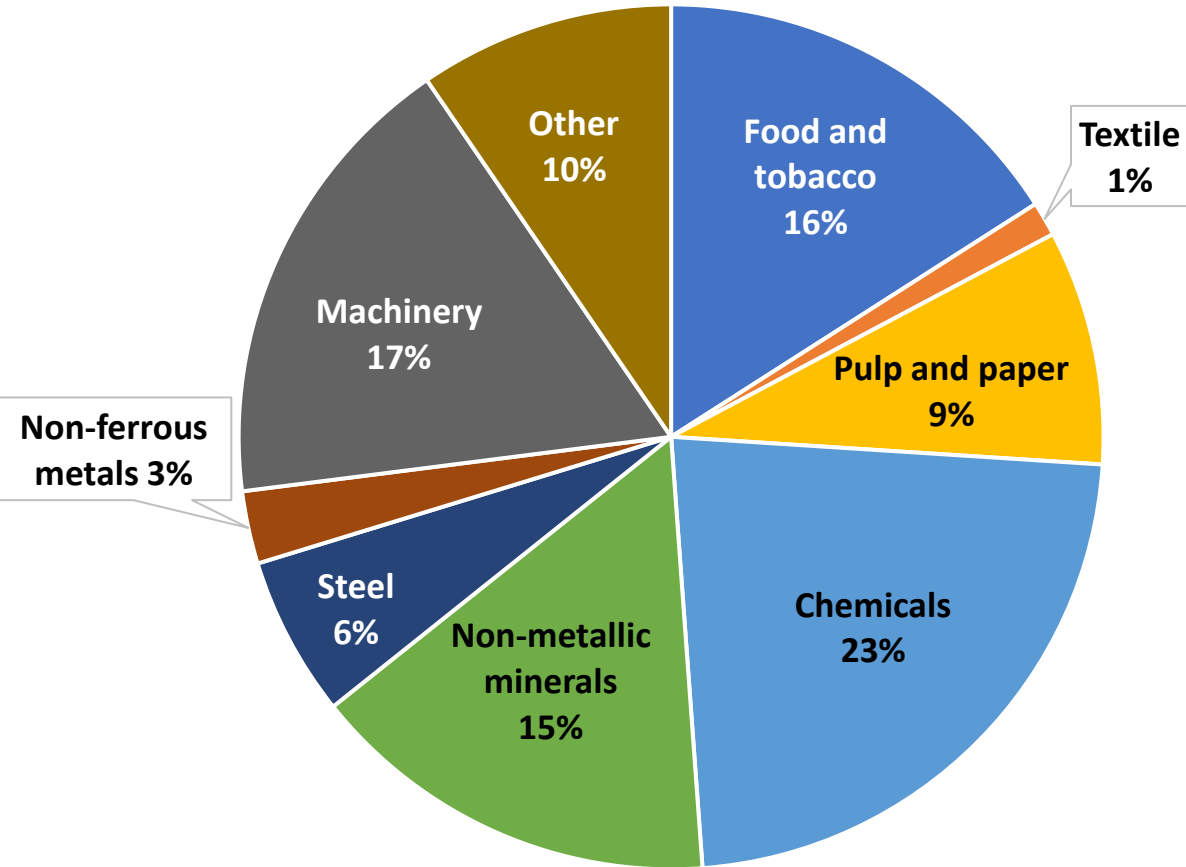
## Manufacturing (12 sub-sectors)

- Homogeneous: Cement, Iron and Steel, Pulp & paper
- Heterogeneous: Food, chemicals, electronics, machinery & fabricated metals, textile, non-ferrous metals, other non-metallic minerals, transport equipment, wood products, other manufacturing

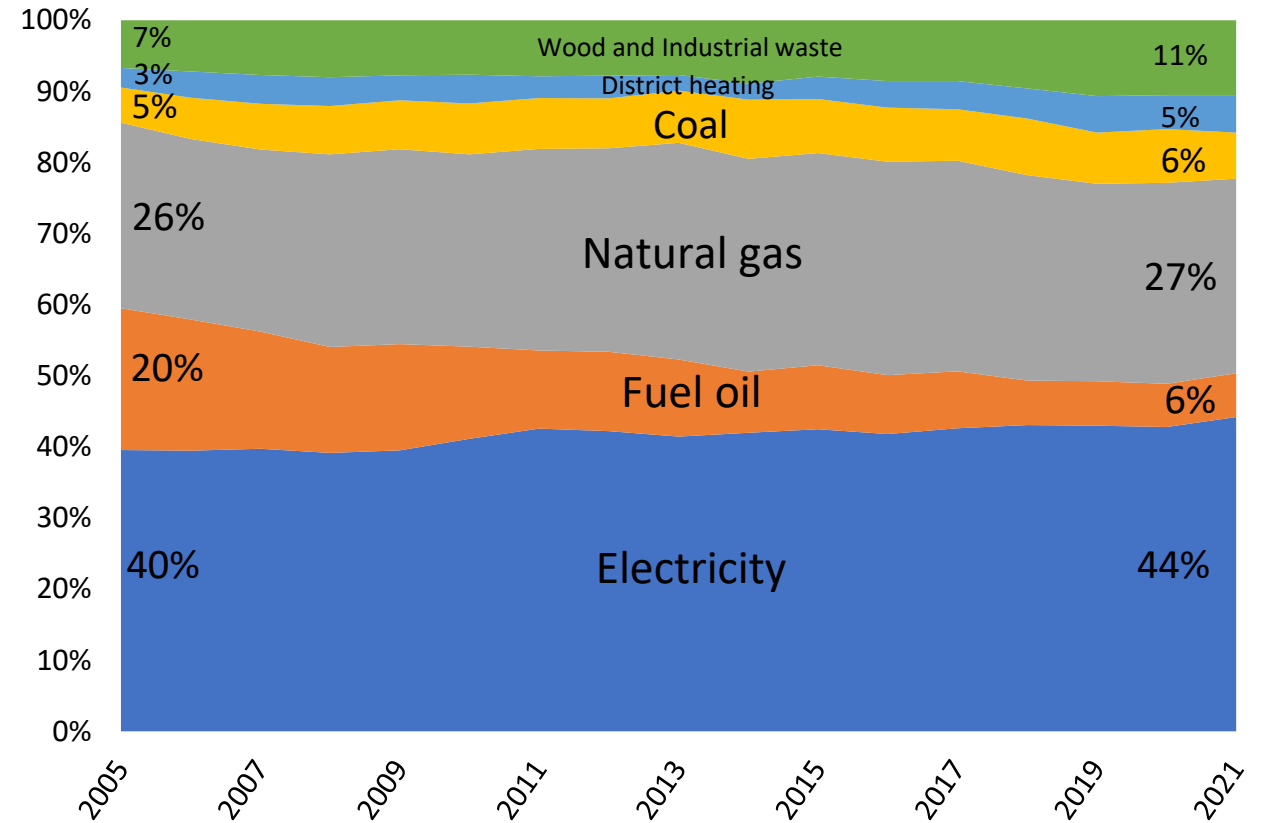
## Other industry (2 sub-sectors):

- Construction, mining

# Industry Sector: Overview

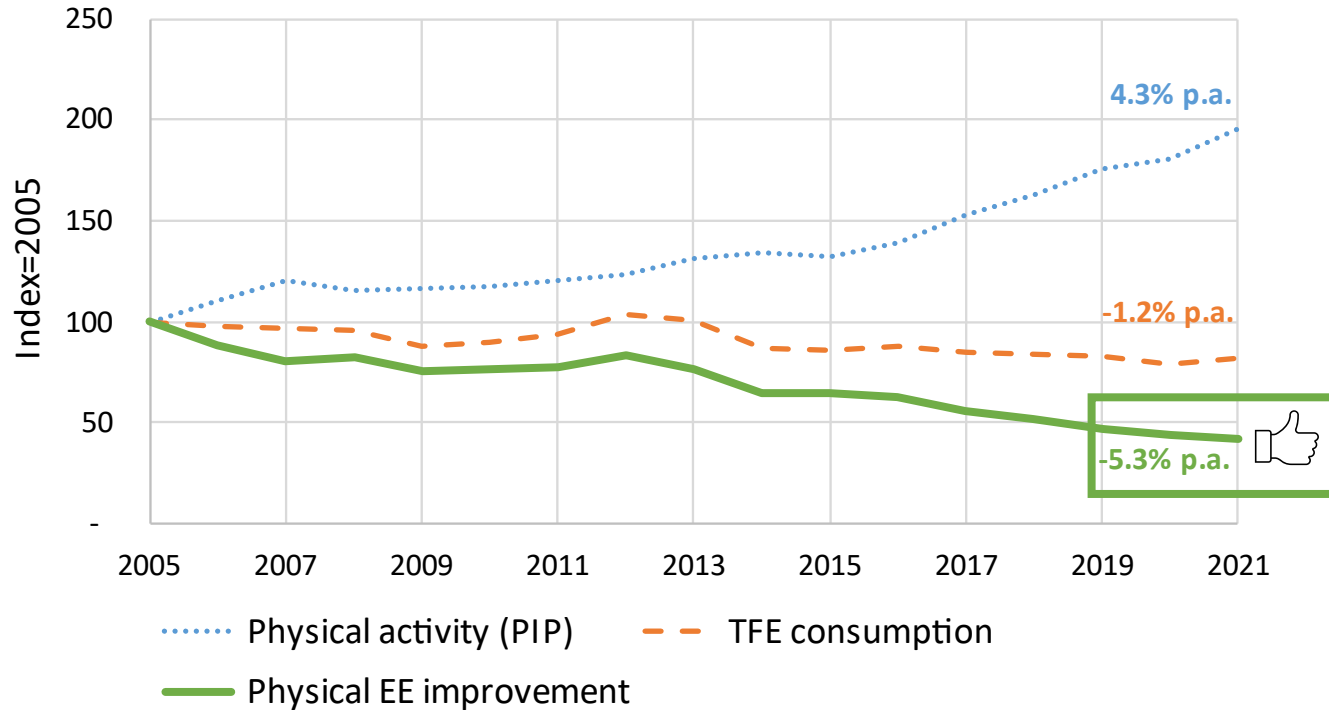


Share of industry subsectors within industry TFE in 2021 (SFOE, 2023)

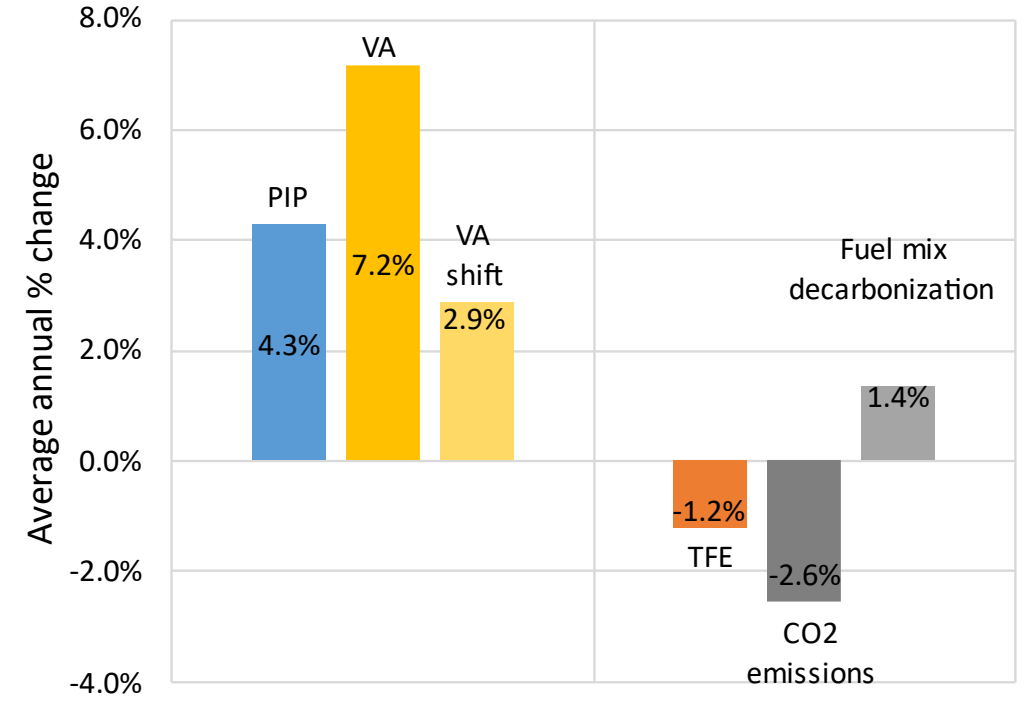


Development of energy carrier shares (Source: SFOE, 2023)

# Chemicals manufacturing (23% of industry TFE)



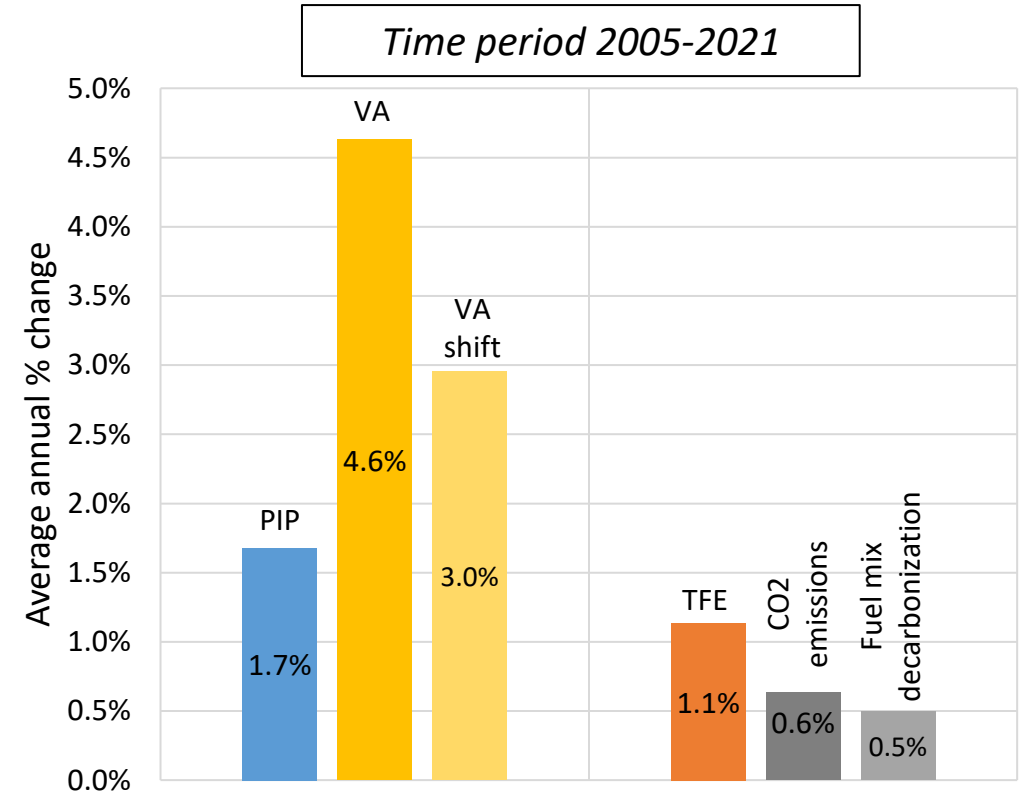
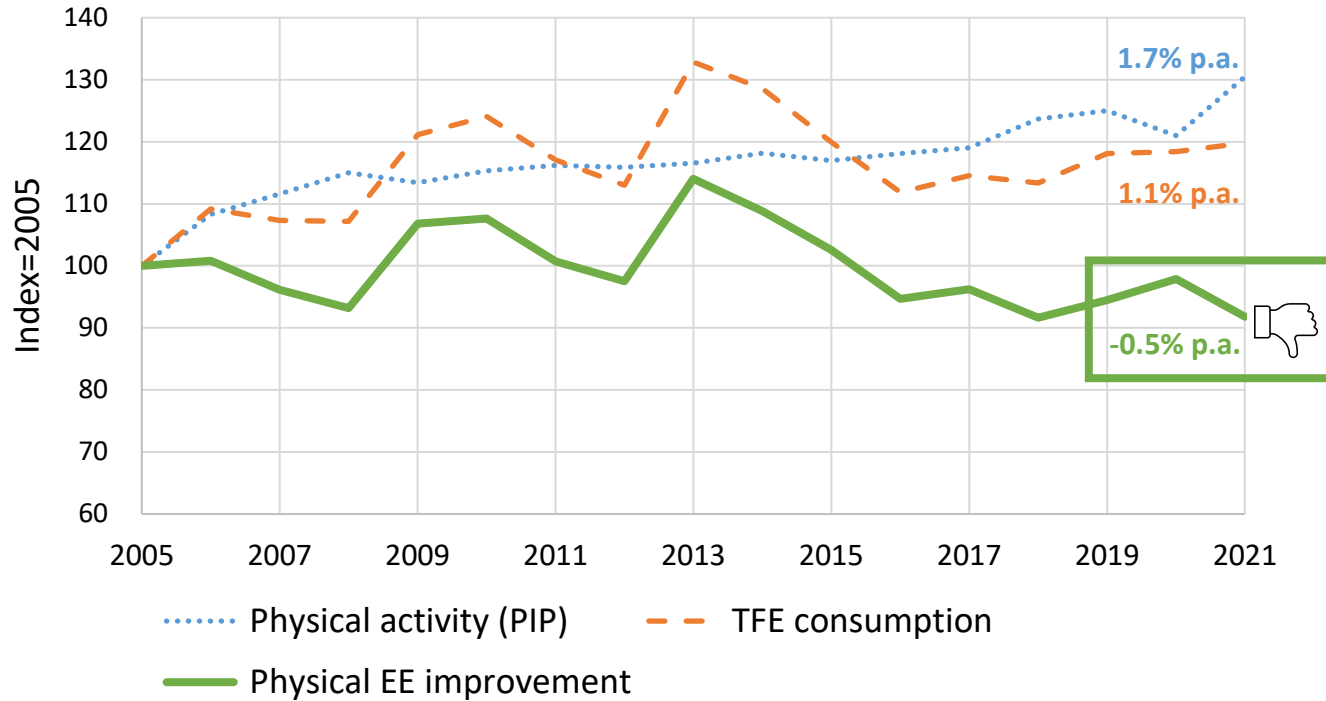
Time period 2005-2021



- Physical activity → Measured using production index proxy (PIP) estimated by deflating turnover using price indices.
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted per TJ of TFE consumed

Sources: FSO (2023), SFOE (2023), EEA (2023)

# Food and beverage (16% of industry TFE)

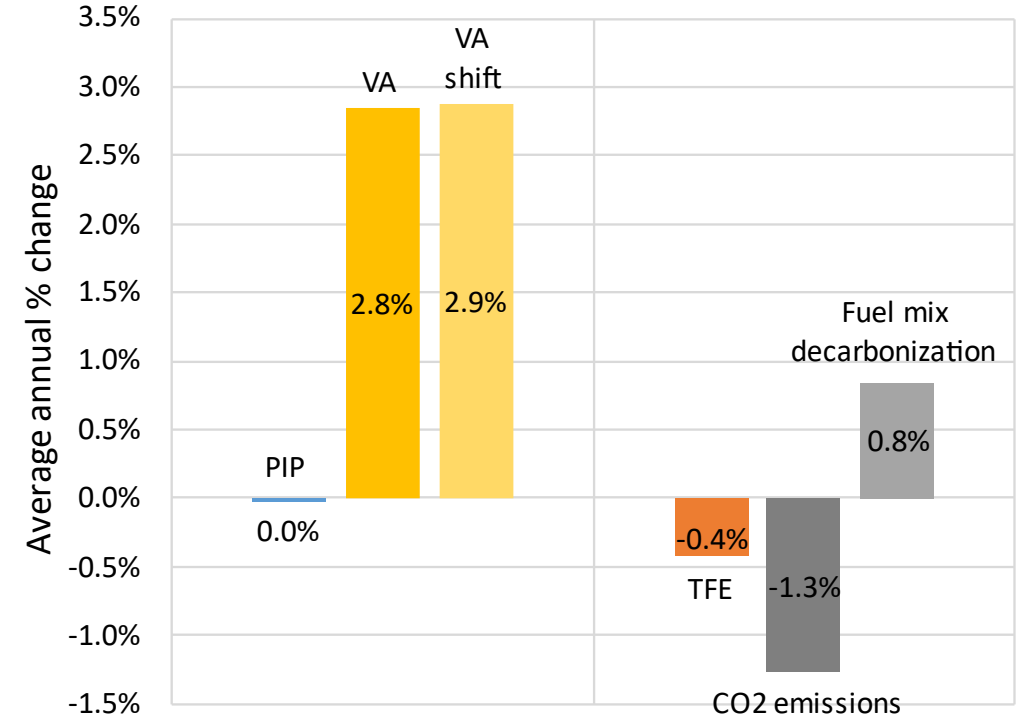
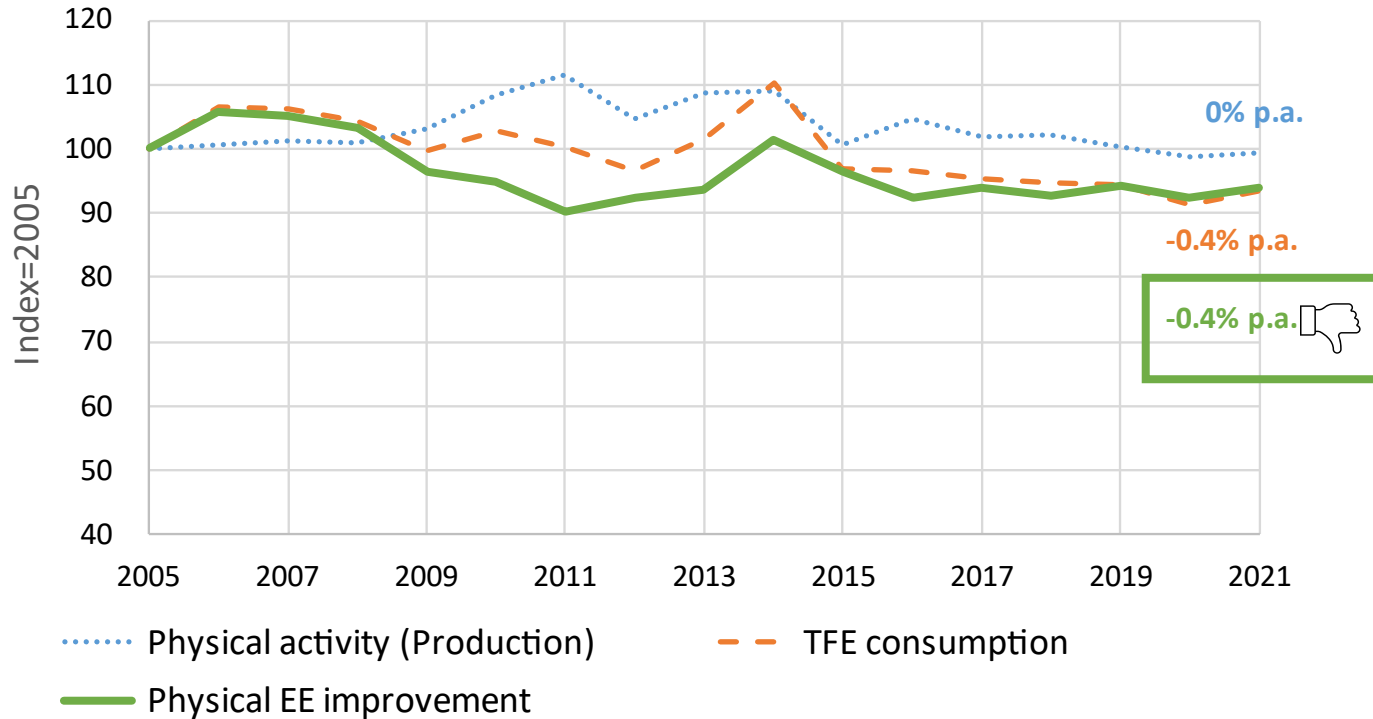


- Physical activity → Measured using production index proxy (PIP) estimated by deflating turnover using price indices.
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted per TJ of TFE consumed

Sources: FSO (2023), SFOE (2023), EEA (2023)

# Cement manufacturing (15% of industry TFE)

Time period 2005-2021

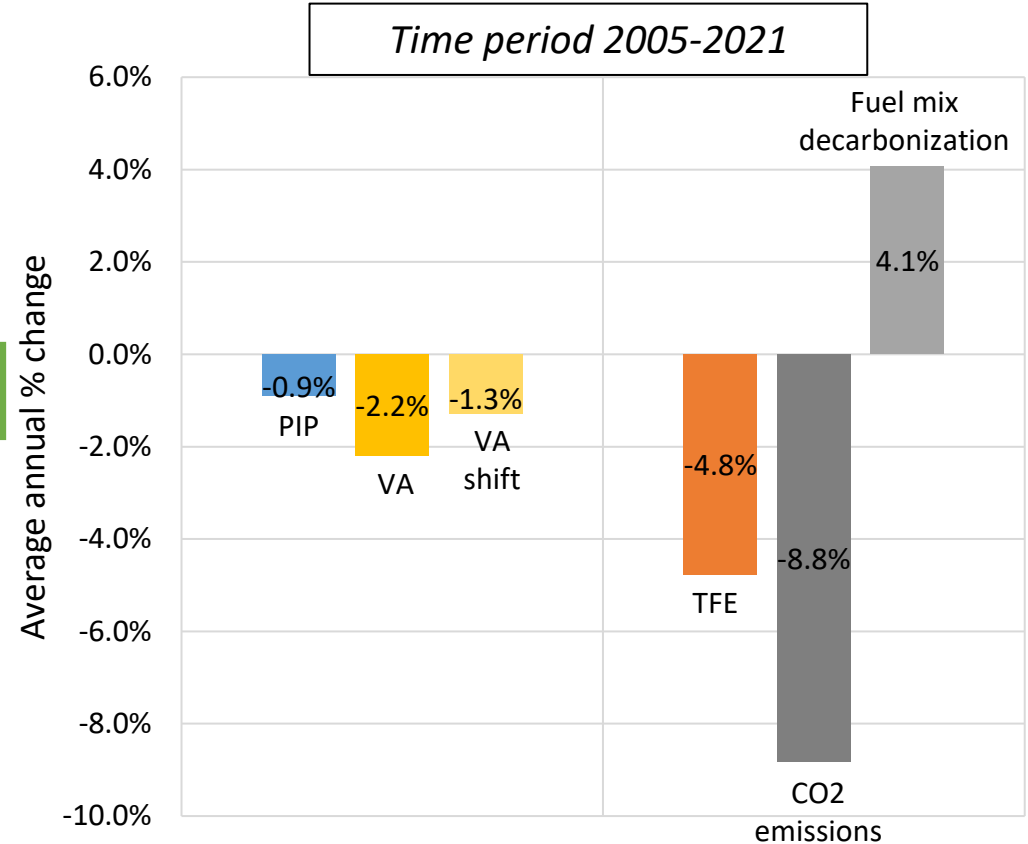
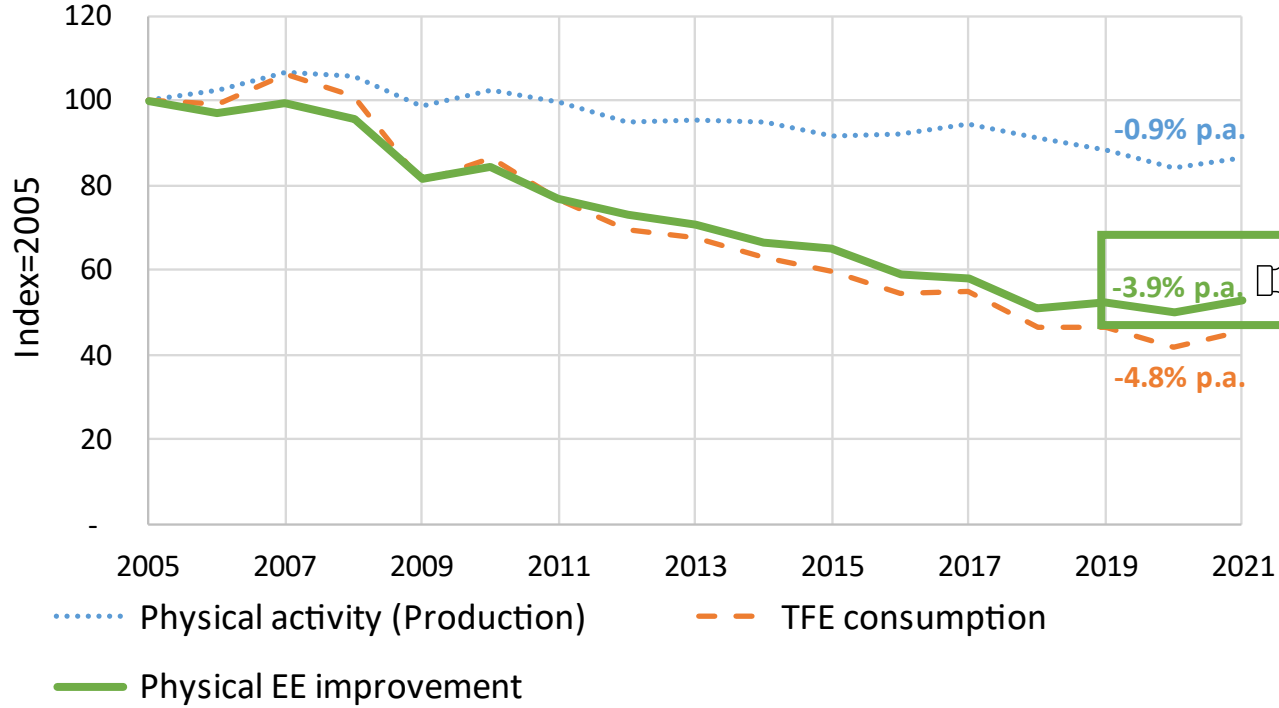


- Physical activity → Measured as variation in physical production (i.e., tonne of cement).
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted per TJ of TFE consumed

Sources: FSO (2023), SFOE (2023), EEA (2023)



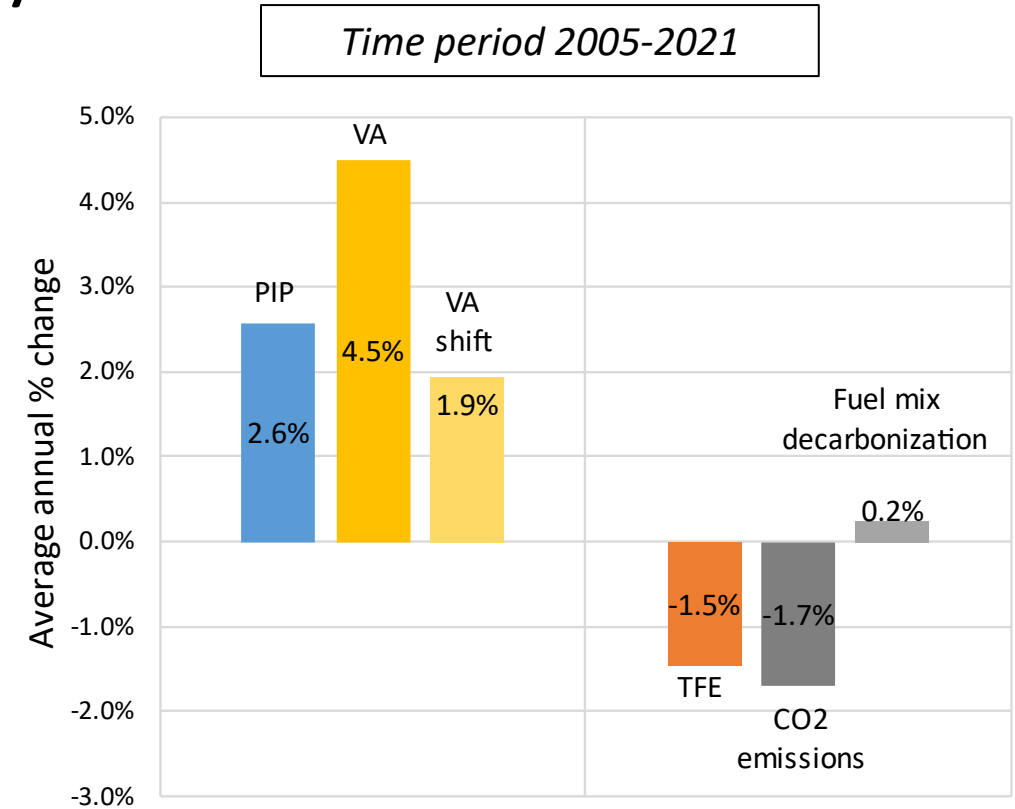
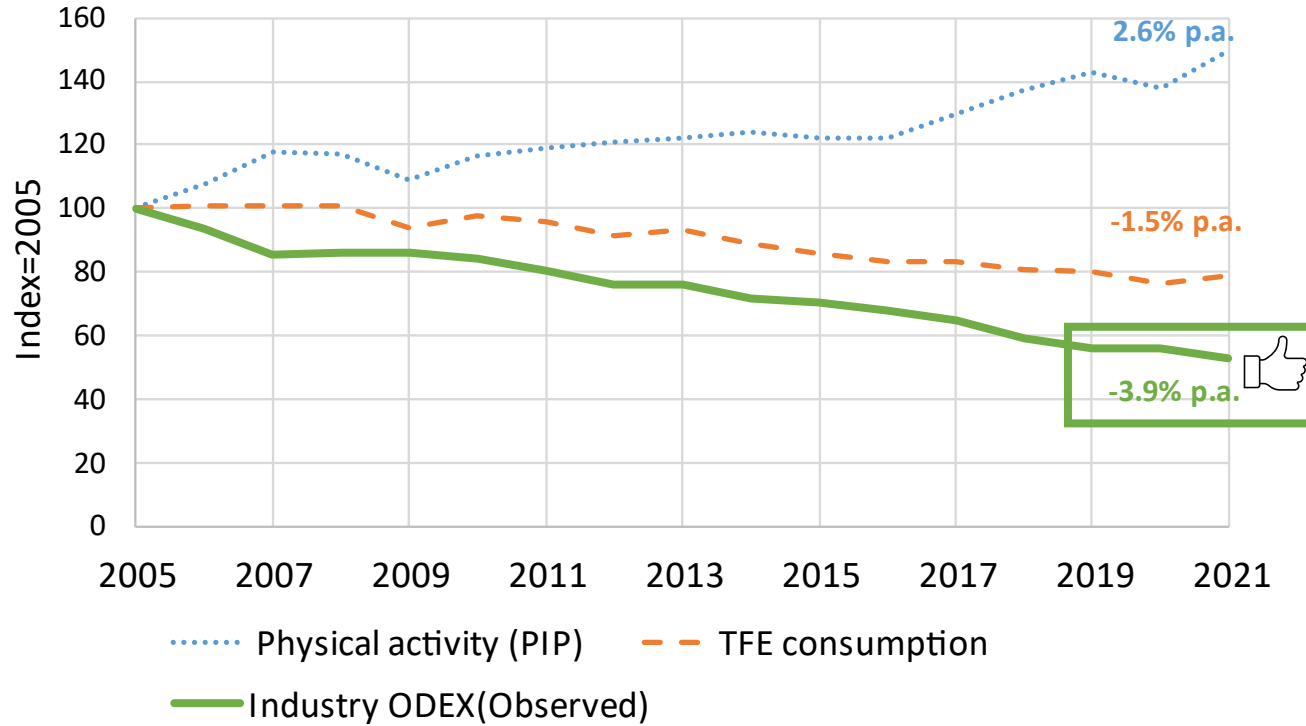
# Paper manufacturing (9% of industry TFE)



- Physical activity → Measured as variation in physical production (i.e., tonne of paper).
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted per TJ of TFE consumed.

Sources: FSO (2023), SFOE (2023), EEA (2023)

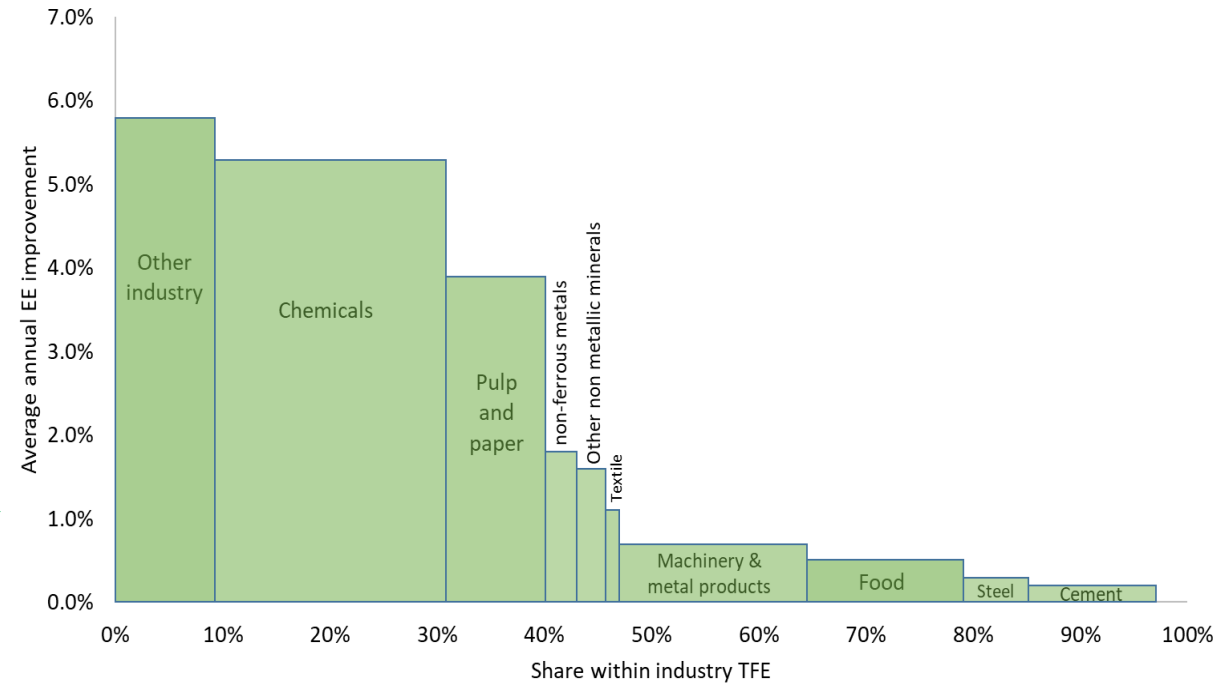
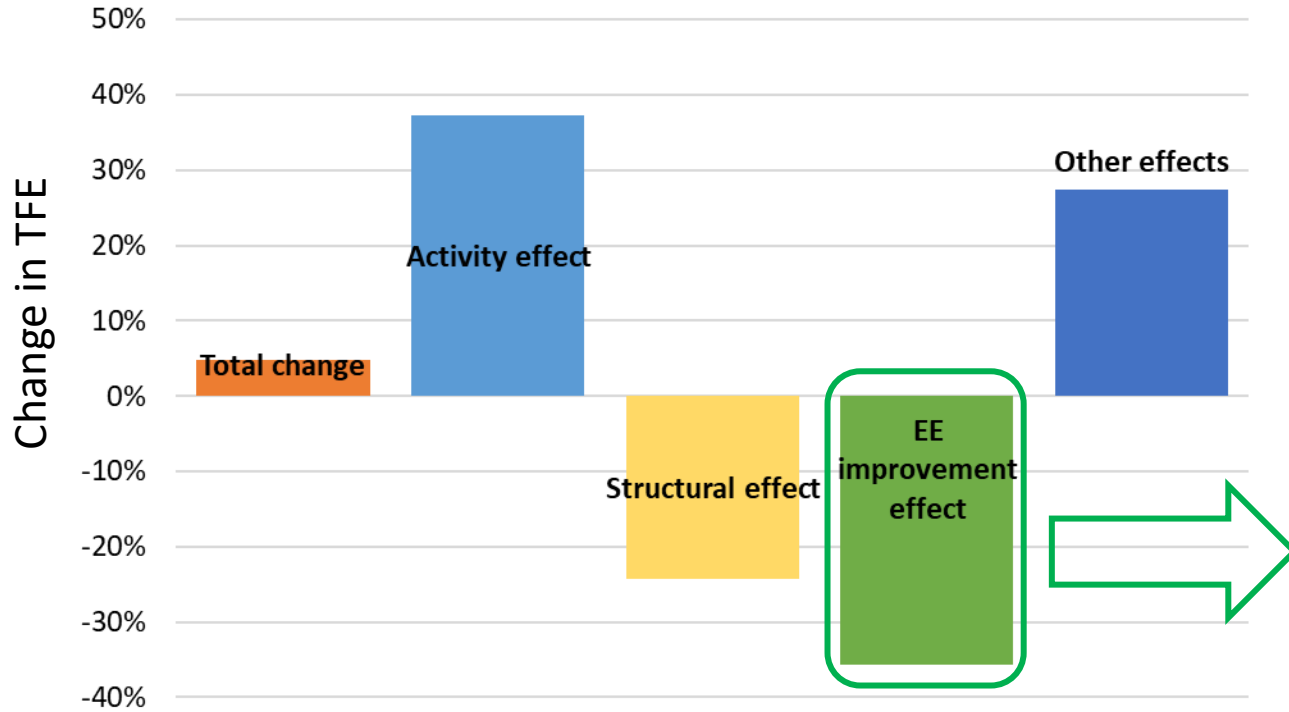
# Total Industry



- Physical activity → Measured using production index proxy (PIP) estimated by deflating turnover using price indices.
- Fuel mix decarbonization → Rate of change of t-CO<sub>2</sub> emitted per TJ of TFE consumed.

Sources: FSO (2023), SFOE (2023), EEA (2023)

# Decomposition analysis: Industry TFE (2005-2021)



Sources: ODYSSEE-MURE decomposition tool (2023)

# Thank You!



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**zhaw**

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