ODYSSEE-MURE fit-4-55 (2022-2025)

ODYSSEE-MURE : Main features useful for the monitoring of the EED and the building Observatory

Dr Didier Bosseboeuf (ADEME France) coordinator of the ODYSSEE-MURE project
Dr Wolfgang Eichhammer (FHG-ISI)
Dr Bruno Lapillonne, Enerdata, adviser
Estelle Payan, Enerdata, ODYSSEE Database manager

ODYSSEE-MURE 2022-2025 work program in brief

- **Program** : LIFE-CET, **Topic**: Towards an effective implementation of key legislation in the field of sustainable energy policy

- **Duration** : 30 months, starting October 2022

- **40 partners** from 27 EU countries (mainly represented by energy efficiency agencies) and 9 EnCs, coordinated by ADEME with a technical coordination (Enerdata and FHG-ISI)

- The project relies on 2 data bases:
  - **ODYSSEE:** 260 energy efficiency indicators and 4 related facilities; 3 updates; new updating process, using more widely EUROSTAT data and horizontal sources
  - **MURE** : 3000 national energy efficiency policies and ex-post impact evaluation and related facilities

- Integration of a web-based Policy Assessment Tool Policy radar (based on AI/Web scraping methods)

- **Dissemination** : country profiles; sectoral profiles, national reports; newsletters; scoreboard; presence in social media

The ODYSSEE data base on energy efficiency indicators in Europe

ABOUT ODYSSEE

Database on energy efficiency indicators and energy consumption by end-use and their underlying drivers in industry, transport and buildings.

Learn more

KEY INDICATORS	MARKET DIFFUSION	DECOMPOSITION	COMPARISON	ENERGY SAVING

Key energy efficiency indicators are a

Towards an "officialization" of the ODYSSEE Data
new : a maximum use of Eurostat data

- The approach is to make a maximum use of **Eurostat** data and other "horizontal" sources (**EEA,** …) → about **2/3rd** of data are collected through these sources.

- As a consequence :
  - The share of "official and harmonized is increasing
  - Data collection for national teams is simplified
  - National teams can focus on complex data, or the ones bringing added value to the project
  - The quality control is improving , gathering and controlling more data, using harmonized process

ODYSSEE data base: new features

- Improvement of data in **buildings (on going)** :

  - Stock of dwellings with heat pumps for heating
  - Stock of dwellings by energy class A,B,C...
  - Floor area in service sector by energy class A,B,C
  - Number of dwellings refurbished
  - **Data on public buildings (floor area, refurbished area) (Article 5)**
  - Use of solar thermal energy by branch in services

- Improved data on stocks and sales of **electric and hybrid vehicles.** New indicators on efficiency of new electric vehicles.

- **Energy poverty indicators** added to the database

- **Energy sufficiency indicators** to be added soon

- Integration of EnCs: 6 countries published in September (Montenegro, Serbia, Kosovo, Bosnia and Herzegovina, Georgia, and Ukraine*) while 3 others (Albania, Moldova, and North Macedonia) will be published soon published with detailed data for 2022

*Bosnia and Herzegovina, Georgia, and Ukraine only with Eurostat data

New : Article 3: EF1P : Energy efficiency First Fuel – Final consumption

FINAL ENERGY CONSUMPTION AND SAVINGS - EUROPEAN UNION

Legend: Coal, Oil, Gas, Electricity, Heat, Biomass, Final savings
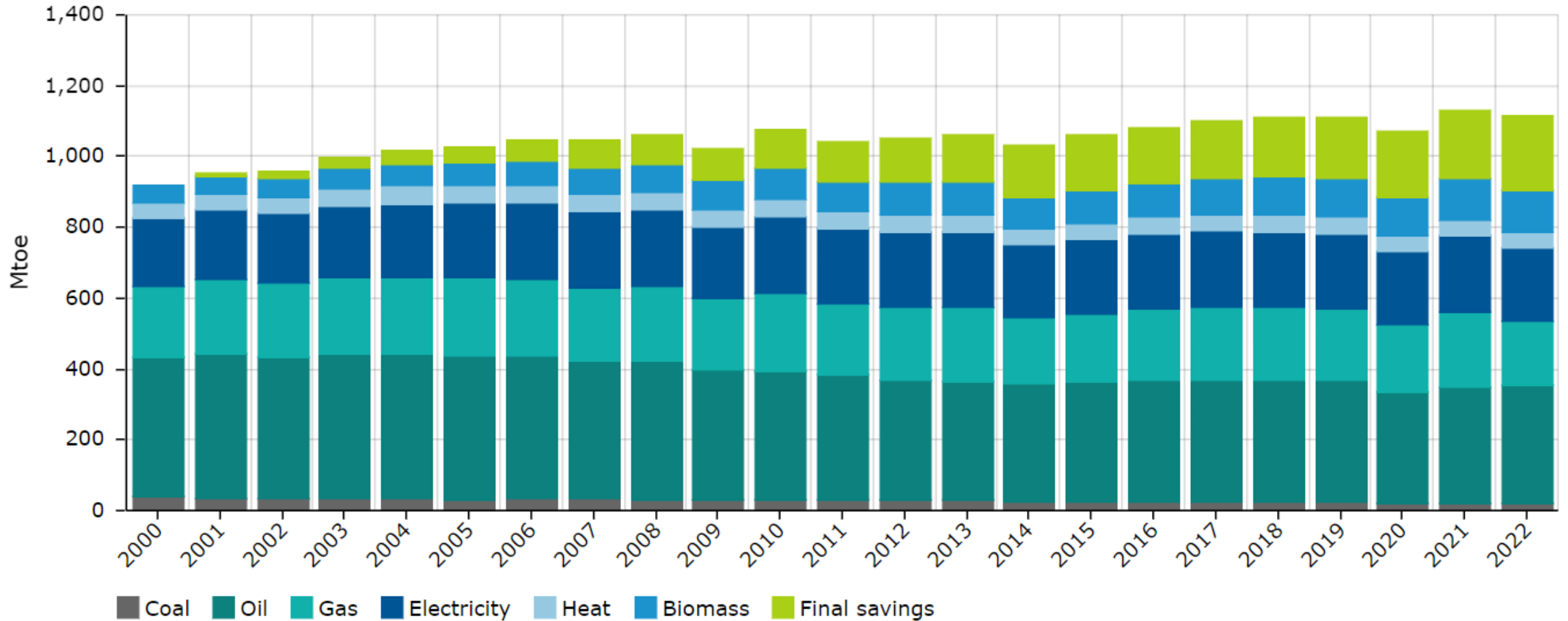
Article 3 (EE1P) : Monitoring the Implementation of the EE1 First Principle

An indicator approach was developed to assess the degree to which the Member States have implemented the EE1 principle in the preparation of their National Energy and Climate Plans (NECPs). The indicator consists of **5 dimensions**:

- Treatment of energy efficiency in the **Policy-making process**
- **Removal of barriers** to energy efficiency
- Treatment of **challenges** to energy efficiency (energy poverty, energy sufficiency)
- Integration of EE1 on the **regional and local level**
- **Monitoring** of energy efficiency

Each dimension consists of number of criteria, **which add up to 13 criteria in total**.

Category		Criteria	Level of priority	Weight
Policy-making process	1	Comparison of supply and demand	High	2
	2	Cost-benefit analysis	High	2
	3	Discount rates	High	2
	4	Multiple benefits	High	2
	5	Economic efficiency potentials	Medium	1.5
Market barriers	6	Prevention of distorted markets	Medium	1.5
	7	Access to information	High	2
	8	Access to capital	High	2
	9	Risk and certainty	Low	1
Challenges	10	Energy poverty	Medium	1.5
	11	Sufficiency	Low	1
Regional and local level	12	Regional and local level	Low	1
Monitoring	13	Monitoring	Medium	1.5

Article 3 (EE1st) : Monitoring the Implementation of the Energy Efficiency First Principle – Linking the MICATool on Multiple Impacts to the Odyssee-MURE datasbases

- Approach:
  - Multiple Impacts /Multiple Benefits of EE: according to Art. 3 / EED important criteria to support the EE1 principle.
  - Replacement of MB:EE Tool in Odyssee-MURE
  - Use saving data from ODYSSEE (top-down) and MURE (bottom-up) as inputs to the MICATool wizard (https://app.micatool.eu/) and display results in the MICAT results visualisation

Article 4 : Drivers of final energy consumption variation (EU 2010-2022)

In NECPR, MS should explain trends and variations of the energy consumtions , Overall and by sectors

- In 2022, final energy consumption decreased by 36 Mtoe.

- The **activity effect** contributed to increase final consumption by **26 Mtoe.**

- Energy **savings more than offset** the activity effect by reducing consumption by **28 Mtoe**.

- **Climatic variations** also largely contributed to this reduction, cutting consumption by **18 Mtoe** (half the total reduction).

- **Structural changes**, towards less energy-intensive branches in industry and towards more efficient modes in transport, further reduced consumption by **12 Mtoe**..
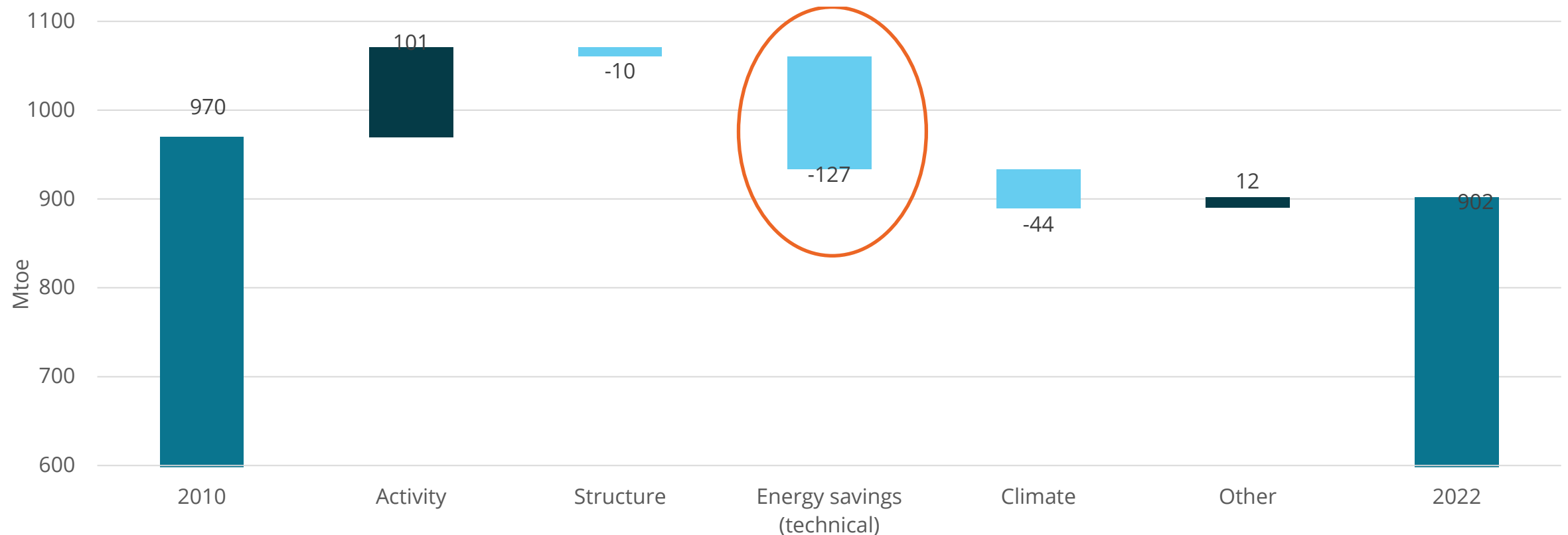
# Article 4 : ODYSSEE Short term energy efficiency indicators Methodology of detailed consumption based on early estimates

- **Industry**: estimate of energy consumption by branch from IPI by branch, assuming the same change in specific consumption by branch as for the whole sector (enable to account for structural changes).

- **Road transport**: consumption split by vehicle based on the specific consumption per car-equivalent* and the stock of vehicles at T-1.

- **Households**: consumption by end-use estimated at normal climate, then at real climate for electricity and for all other fuels separately.
  - water heating and cooking: water heating and cooking based on extrapolated unit consumption; space heating calculated by difference;
  - For electricity: space heating extrapolated from the share of space heating; other uses calculated with extrapolated unit consumption.
    -

*Equals total consumption of road transport divided by a stock of road vehicles, in terms of equivalent cars.

Article 4 : Energy efficiency trends of final consumers : soon ODEX EU 2022

- The overall energy efficiency progress **for final consumers** is evaluated as a weighted average of ODEX by sector for industry, transport, households and services and the share of each sector in final consumption.
- Energy efficiency, as measured with ODEX, has improved by **1.1%/year** since 2000 in the EU (i.e. by 22%). These improvements have accelerated **since 2019** (**1.4%/year**).
- Largest improvements for **households** (31%, i.e. 1.7%/year), followed by **industry** (24%, i.e. 1.3%/year).
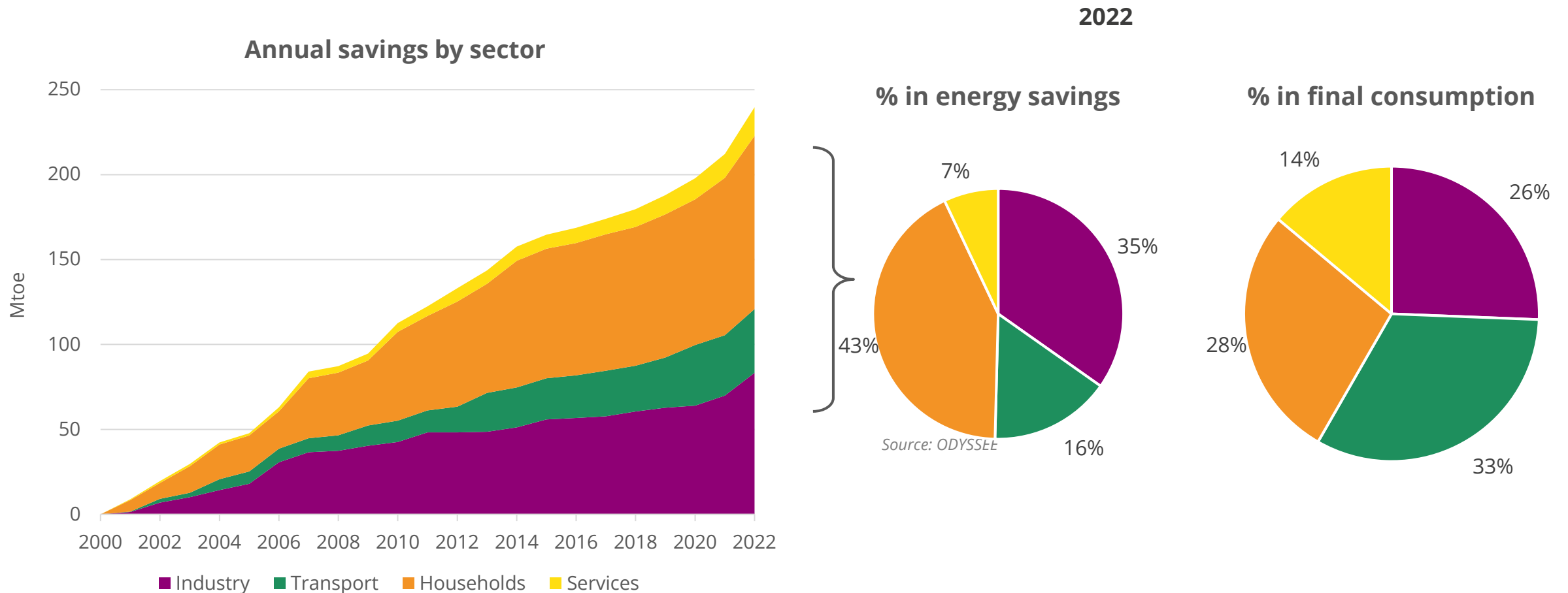- Transport and services are lagging behind (**0.7%/yr** and **0.6%/yr**, respectively).
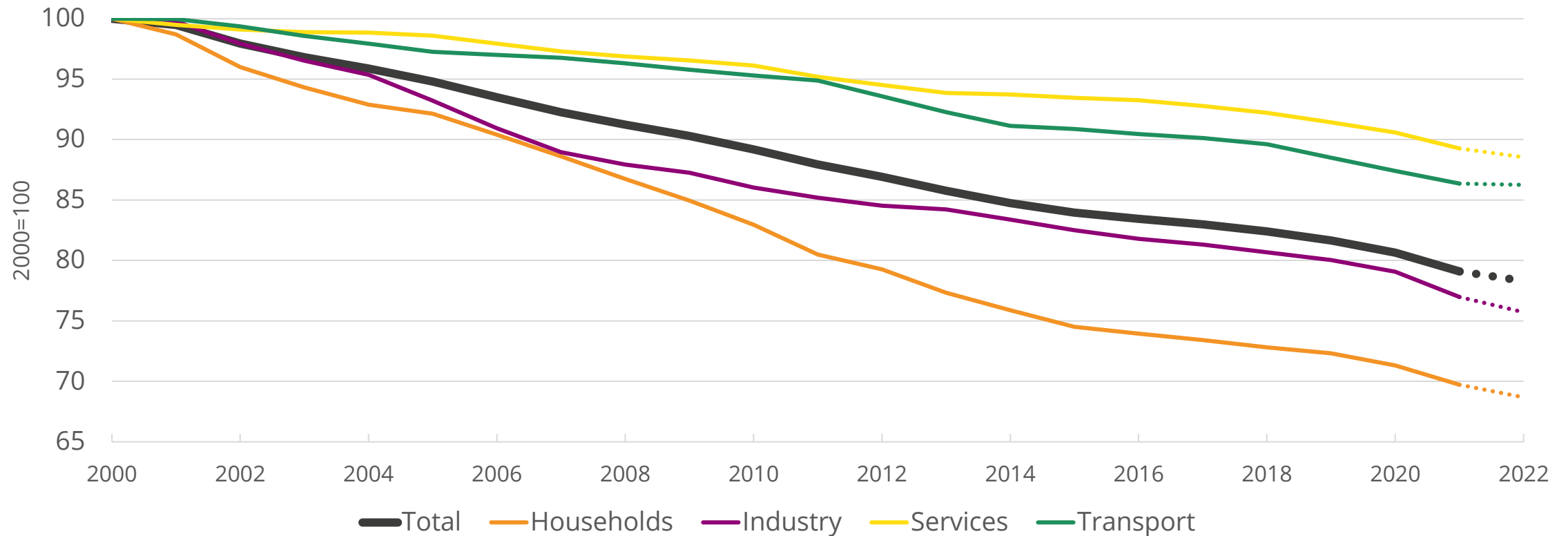
ODEX=78 in 2022 ➔ 22% energy efficiency improvement since 2000

# Articles 4 & 8? : Energy savings in transport lag behind

In 2022, total final **energy savings** reached **240 Mtoe** in the EU (i.e. 27% of final consumption): without these savings, final consumption would have been **27% higher**.

Together, **industry** and **households** accounted for **77%** of these savings while representing 53% of final consumption. Transport and services lag behind as they only accounted for 16% and 7% of savings, respectively, shares twice lower than their shares in final consumption .

2022

Annual savings by sector

% in energy savings

% in final consumption

Source: ODYSSEE

Industry   Transport   Households   Services

Article 4 : Scoring the efforts of EU MS in implementing energy efficiency policies – The European Energy Efficiency Scoreboard
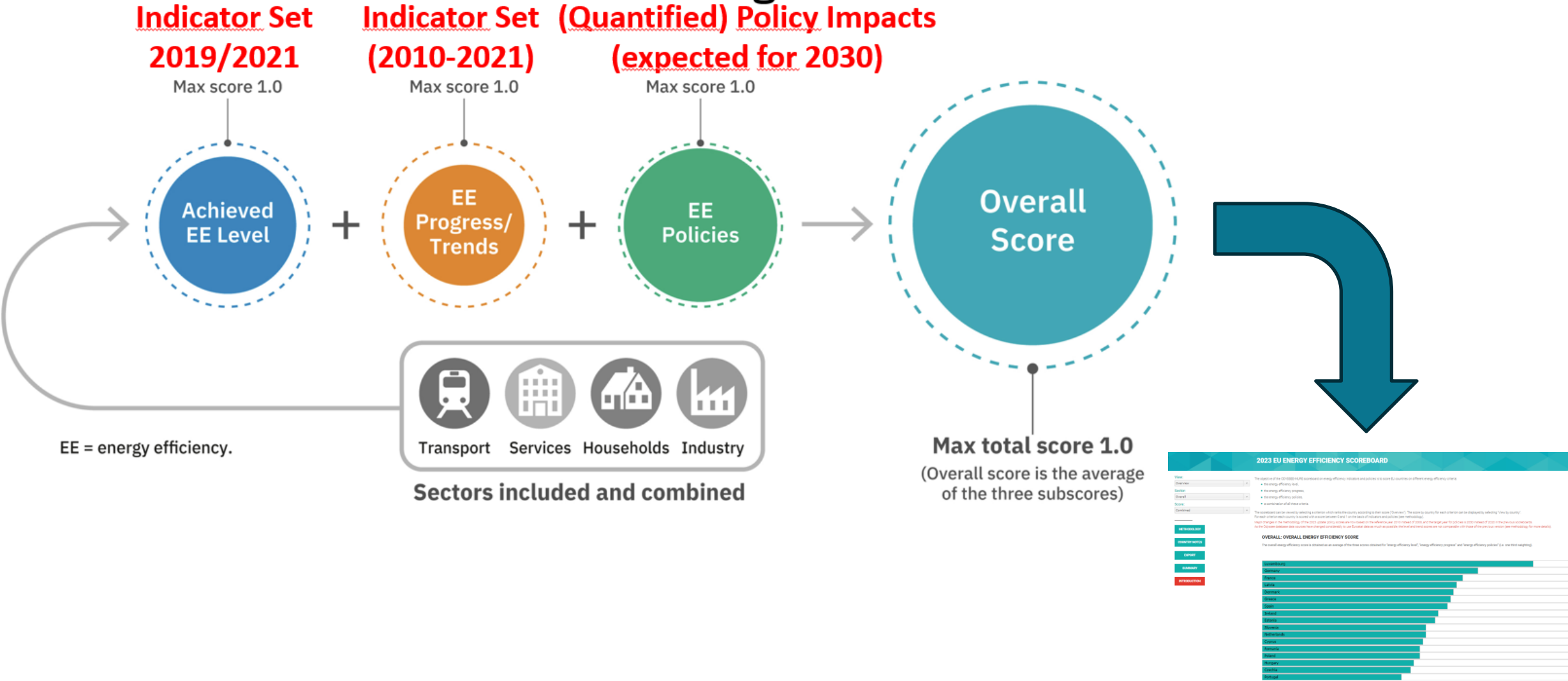
Article 4/8 (targets) : Supporting the EE policy analysis with the development of a web-based Policy Assessment Tool

- Links to the ODYSSEE-MURE database on energy efficiency policies and indicators. These in turn are updated by national teams in each EU MS and link to NECPs and Art. 8 (formerly Art. 7) measures

- Extracts information on measures and their impacts by EU MS.

- Adjustment factors to account for implementation, impact and interactions (need to be determined by interviews as done previously)

- Allows to compare with EU scenarios (reference and policy scenario), establishes what part of the gap is filled by measures and what part still needs to be filled

- Will be linked to Multiple Impacts of the EE measures

- Has a dashboard to consult those measures and allows to identify the important ones.

- Links measures to EU directives as far as relevant (will allow in future to analyse also the impacts of different EU Directives).

- Under preparation: a gap filling approach based on the evaluation of measures in the tool based on certain number of criteria and a ranking of the measures. Multiple benefits could also become part of that ranking.

New: useful for the analysis of Article 8: Energy savings calculation (Cumulated energy savings over a by period: Households EU (2/3)

- Energy savings can be cumulated over a period as the total cumulated amount of energy not consumed (as in Article 7/8 of EED) ("cumulated savings").

- For instance, in 2022, the total cumulated energy savings for households reached 477 Mtoe (red line); this should not be confused with cumulated annual new savings (blue bar) (64 Mtoe).

Advanced ODYSSEE indicators
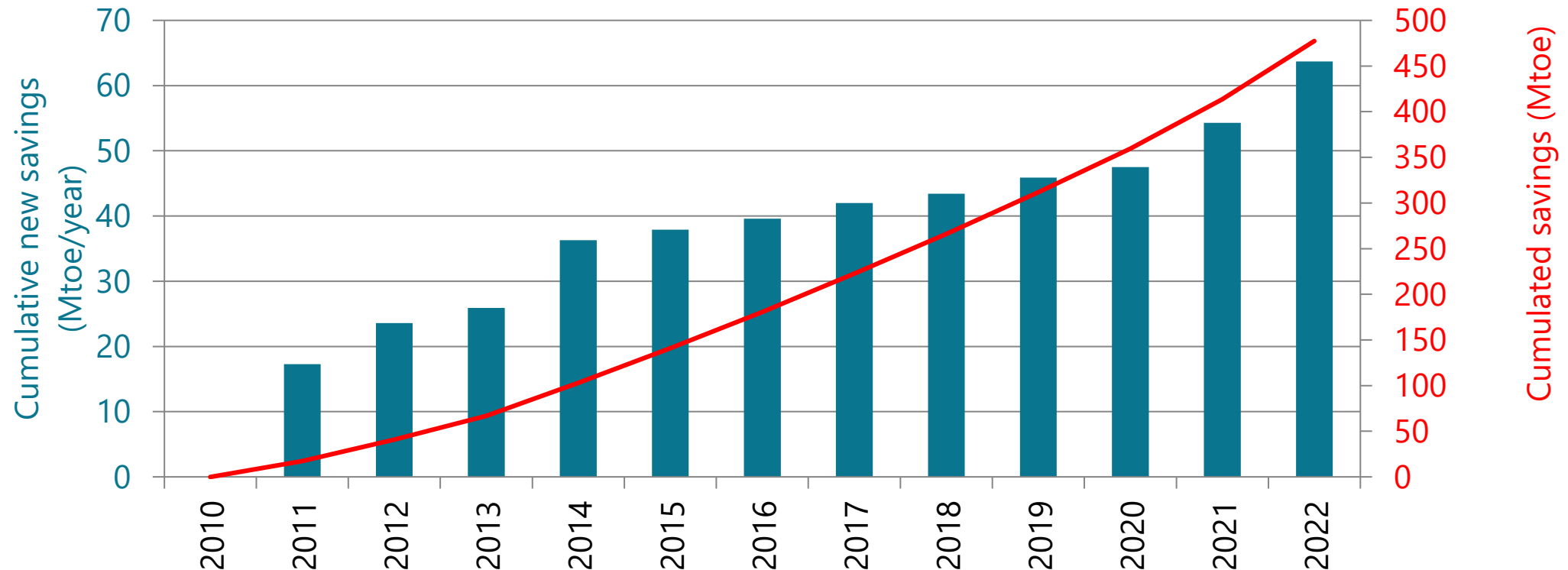
New : Useful for analysis Article 8 : Energy savings calculations : Cumulated energy savings (Overall EU (3/3)

- The energy savings tool provide cumulated energy savings, as defined in Article 8, either from the reporting of countries in NECPR (BU savings) or as cumulated savings from ODYSSEE (TD savings).

- ODYSSEE savings are in general higher as they correspond to a broader definition (include autonomous trends, price effects and policy savings, including from EU policies), whereas NECPR only report additional policy savings.

- For some sectors or country, the opposite could happen if TD savings are difficult to capture because of a lack of detailed data (e.g services).

ENERGY SAVINGS FROM ARTICLE 7-8 - FRANCE

Legend: Energy savings from Article 7 | Targets | Top-down ODYSSEE savings
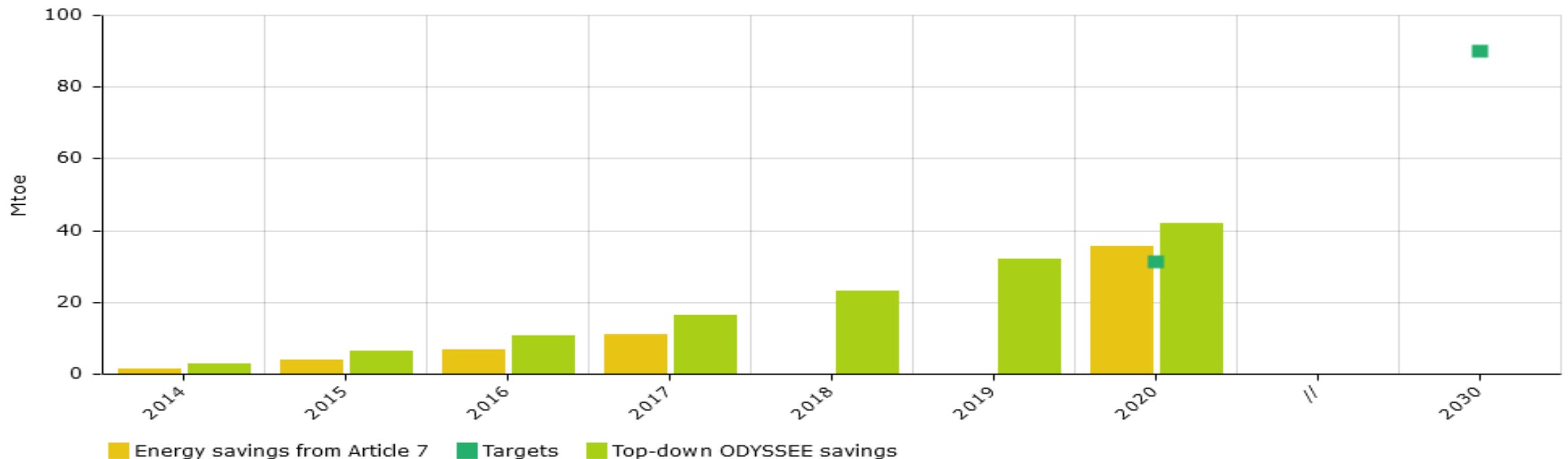
ODYSSEE Analysis tools : New features

- Further improvement of **Energy saving tool**:
  - Adding of Monetary savings item to show the cumulative monetary savings since 2000 due to energy savings, for households on the one hand and industry on the other hand
  - Comparison of energy savings breakdown by sector with consumption breakdown by sector

- New tool for **decomposing** variations in **CO2 emissions** (December 2024) (useful to quantify the contribution of EE in the decarbonization of the economy)

- Expanded version of country profiles which are standardised short reports on country's energy efficiency trends and policies.

Article 8 (policies EE) : Development of a policy radar to detect early discussion and EE policy developmentx

- Explorative research: detect early discussion and EE policy development
- Method: text mining in news print
  - investigation of different methods to select key words (e.g. from the existing measures in MURE)
  - selection of news print (Ireland, Italia, Georgia)
  - screening of measures under in development / in discussion over the last year (since 2023)
  - Language issues
  - Later stages: sentiment analyses (how are the issues discussed)

New : Article 24 and partially Article 8.3
Energy poverty indicators in the Odyssee database

- **7 indicators on energy poverty** in the household sector in the EU
- Based on Eurostat data, with additional treatment and calculations by Enerdata (focus on the lowest quintiles + analysis).

MURE Database
Integration of Energy Community Parties

- Integration of EnCs into the MURE : around 160 energy efficiency measures for 8 EnC published in July 2024 (Albania, Georgia, Kosovo, Moldova, Montenegro, North Macedonia, Serbia, Ukraine)

- Bosnia and Herzegovina is still in work

- Capacity building in the quantitative evaluation of measures for EnC
(important for the NECPs of those countries)

The methodology is robust enough to be the core of an ISO standard

ISO 50049:2020

Calculation methods for energy efficiency and energy consumption variations at country, region and city levels

This document gives guidelines for methods for analysing changes in energy efficiency and energy consumption, and for measuring energy efficiency progress, for countries, regions and cities. It is composed of three different calculation methods:

— evaluation of structure effects in the variation of energy intensity;

— calculation of energy efficiency indices;

— decomposition analysis of energy consumption variation.

This document is applicable to providing an aggregated statistical evaluation for a country, region or city. It does not apply to calculating changes in the energy consumption or in energy efficiency at the individual consumer's
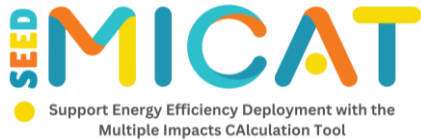
ODYSSEE-MURE fit-4-55 (2022-2025)

ODYSSEE-MURE
and the Link with other Important Projects in CET-LIFE

ODYSSEE-MURE connections with related EU-funded projects

 Focus on Article 8 EED (policy design & implementation – M&V – policy evaluation) https://energysavingpolicies.eu/

 Focus on assessing multiple benefits → MICATool +community of users (feel free to join it!) https://micatool.eu/

 Focus on bottom-up calculation methodologies in the context of the EED → first dialogue meeting on Tuesday 22 October about energy savings from deep renovations

 Focus on narratives to support the design and implementation of energy efficiency policies
https://www.energy-efficiency-watch.org/

Annexs

11 Types of Energy Efficiency Indicators in ODYSSEE

Type	Level
1. Energy intensity	Final, by sector and industry
2. Adjusted energy intensity	Final and industry
3. Specific energy consumption	By branch (industry&services) and end-use
4. Specific energy consumption benchmark	Steel, cement, paper, etc.
5. Energy efficiency indices (ODEX)	Final and by sector
6. Energy savings	Final, by sector or industry
7. Dissemination indicators	By sector
8. Intensity CO_2	By sector and industry
9. Specific CO2 emissions	By branch (industry&services) and end-use
10. Fuel poverty and sufficiency (New)	Residential and transport
11. Financial indicators (New)	Residential and transport

Data and related Energy Efficiency Indicators in ODYSSEE : Households

Data

- Number of households;
- Annual construction;
- Caracteristics of dwellings: number by fuel and end-use; floor area;
- Electrical appliances*: stock, sales; specific consumption;
- Efficient equipment (lighting, solar water heaters, refrigerators, heat pumps, air conditioners): number, sales (inc. by energy label);
- Energy consumption of households by end-use (space heating, water heating, cooking, electrical appliances, lighting, air conditioning)

Indicators

- Energy/electricity intensity;
- Energy/electricity consumption per dwelling (actual and climate corrected);
- Energy consumption per dwelling by end-use :
  - Space heating,
  - Space cooling,
  - Water heating
  - Cooking
  - Electrical appliances
  - Lighting;

- Equipment rate and heat production of SWH;
- Efficient equipment: lighting (LED and CFL), heat pumps, electrical appliances*

*Electrical appliances : Refrigerators, Washing machines; TVs; Microwaves; Electric water heating; Air conditioners, Fans

Note: for electrical appliances, we ask for sales by energy label (A or better, B) for refrigerators, washing machines and air conditioners.

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New : Useful for analysis Article 8: Energy savings calculation Energy savings in ODYSSEE (1/3)

- In ODYSSEE, energy savings are first calculated as annual new energy savings in reference to the previous year (green bar).

- These annual savings can be cumulated over a period (blue line). For instance, in 2022, "cumulative new energy savings" for households were close 65 Mtoe : this means that without savings since 2010, energy consumption would have been 65 Mtoe higher in 2022.

Different calculation of energy savings : case of households (EU)

Advanced ODYSSEE indicators
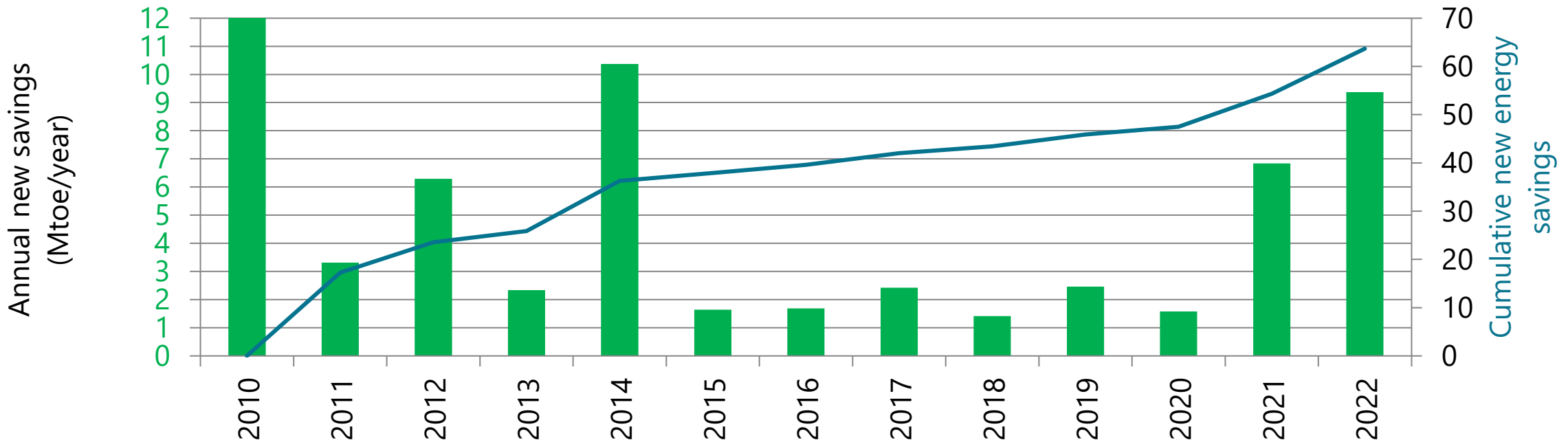
Article 4 : Drivers of the variation of the energy consumption in ODYSSEE: households (EU 2010-2022, Mtoe)

- Three factors contributed to increase the household consumption since 2010:
  - Increasing number of dwellings (18 Mtoe);
  - Increase in number of household appliances and dwelling size (9 and 5 Mtoe).
  - Other effects, i.e. behavioral effect (higher comfort, such as heating temperature).
- Energy savings lowered consumption by 50 Mtoe.
- Climate difference also reduced consumption (-32 Mtoe)
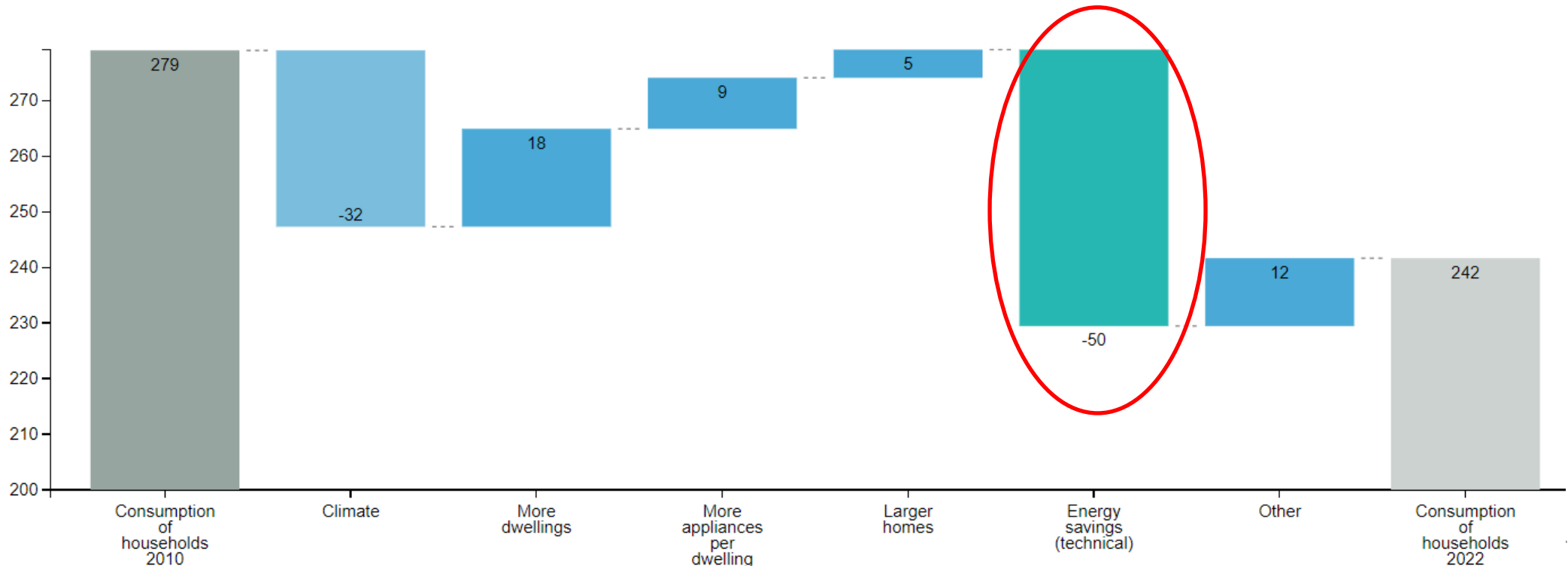
Article 8 : The energy efficiency index to assess the energy efficiency progress (ODEX)

- In ODYSSEE, an energy efficiency index is calculated at sector level (i.e. industry, transport, households) and for all final consumers to assess energy efficiency progress.

- The energy efficiency index by sector combines the trends observed in the various indicators of specific energy consumption by sub-sector or end-use, by weighting indices of specific consumption by sub-sector (or end-use) with the share of each sub-sector in the sector's energy consumption.

- Indices are used to enable to express specific consumption by sub-sector or end-use in different physical units so as to be as close as possible to energy efficiency evaluation (e.g. toe/ton, toe/IPI for industry, toe per pkm or tkm in transport, toe/m2 or kWh/appliance for households).

Article 8 : Drivers of total energy supply variation (EU- 2010-2022)

Between 2010 and 2022, **total energy supply decreased more than final consumption**: **-171 Mtoe** compared to -24 Mtoe.

Half of this difference is explained by changes in the power sector:

- The **higher share of renewables** reduced total supply by 65 Mtoe.

- The **improved efficiency of thermal generation** (+2.6 pts), thanks to a shift from coal to gas and more efficient plants contributed to a reduction of 19 Mtoe.
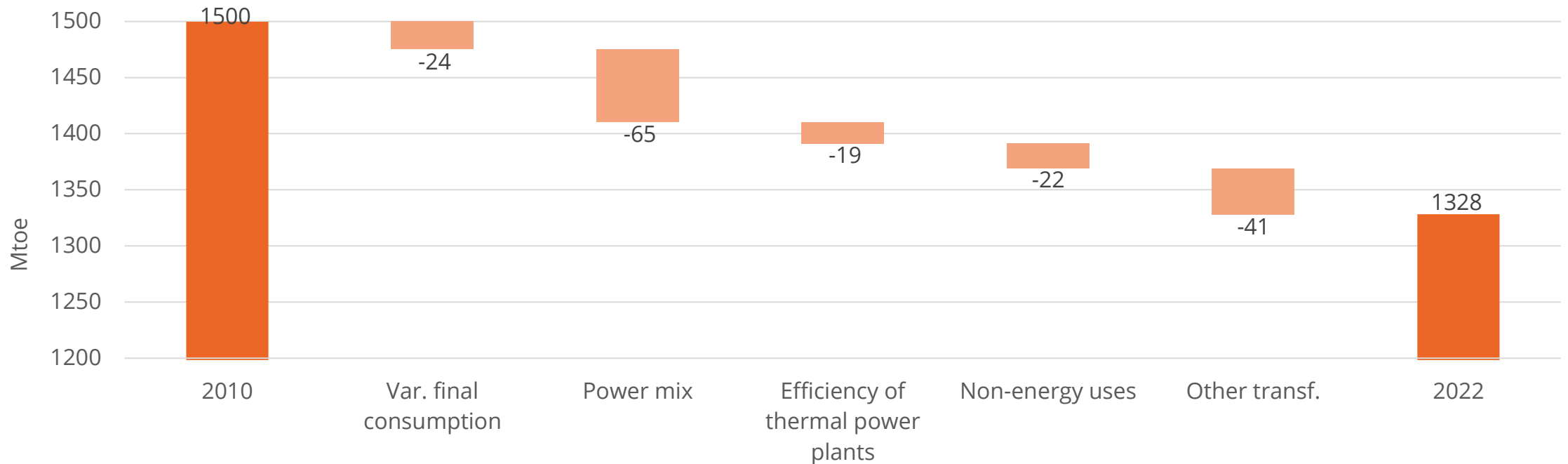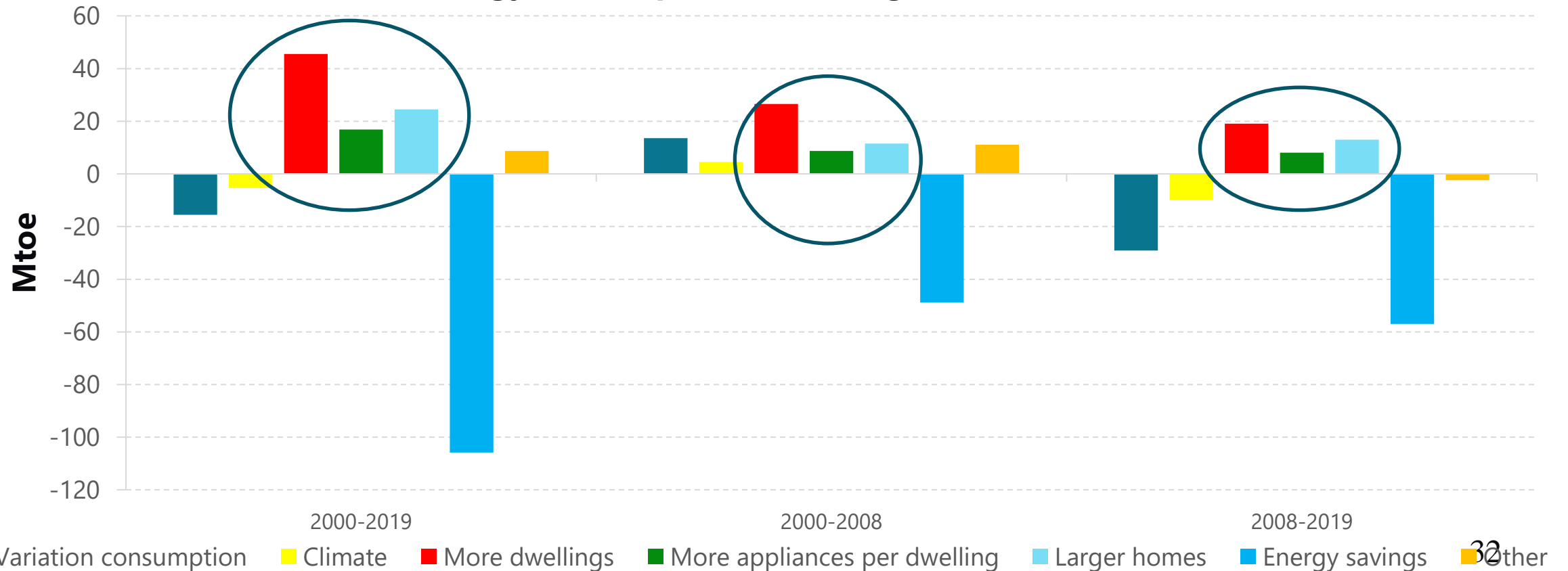
Selection of sufficiency indicators

1. Share of impermanently occupied homes (Activity)

2. Average floor area per capita in the stock of dwellings (Size)

3. Number of cars per person (Activity)

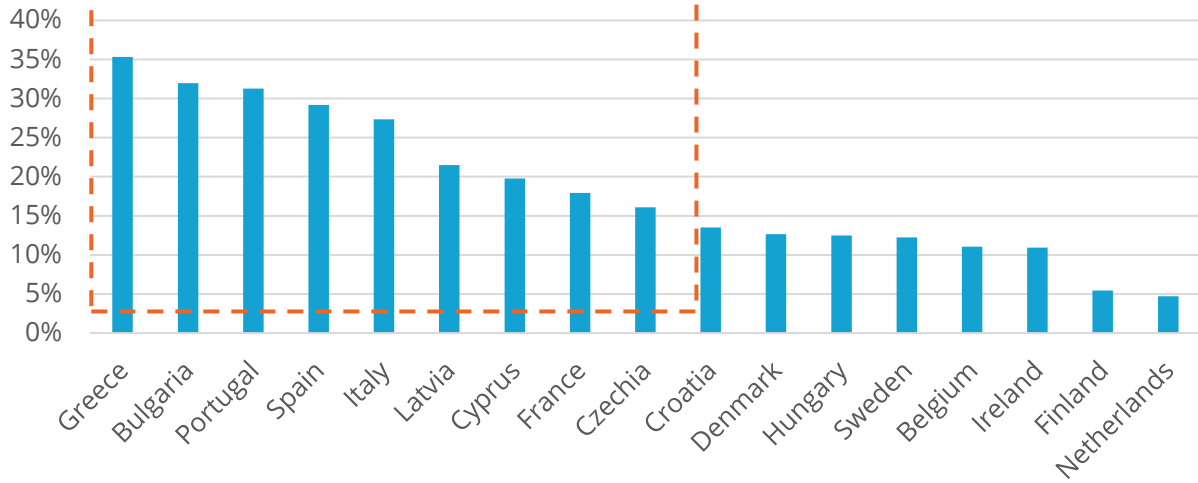4. Distance traveled by car per capita (Use)

- Between 2000 and 2019, the activity (More dwellings) and behavioural effects (more appliances per dwelling, larger homes) contributed to raise the final consumption by 87 Mtoe.
- Energy savings offset more than this increase by reducing consumption by 105 Mtoe.

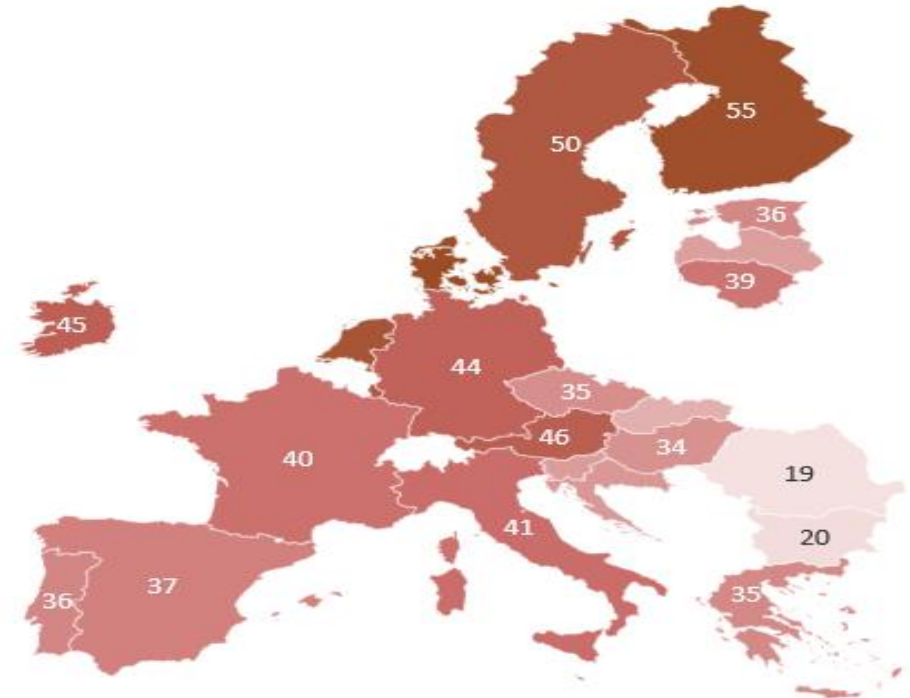**Drivers of final energy consumption in housing (EU 2000-2019)**

Legend: ■ Variation consumption ■ Climate ■ More dwellings ■ More appliances per dwelling ■ Larger homes ■ Energy savings ■ Other

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Selected « sufficiency » indicators (source ODYSSEE-MURE)

Share of impermanently occupied dwellings - 2022

Number of cars per capita (population above 15 years of age)

Source ODYSSEE ■ 2010 ■ 2016 ■ 2022

Average floor area per capita - 2022
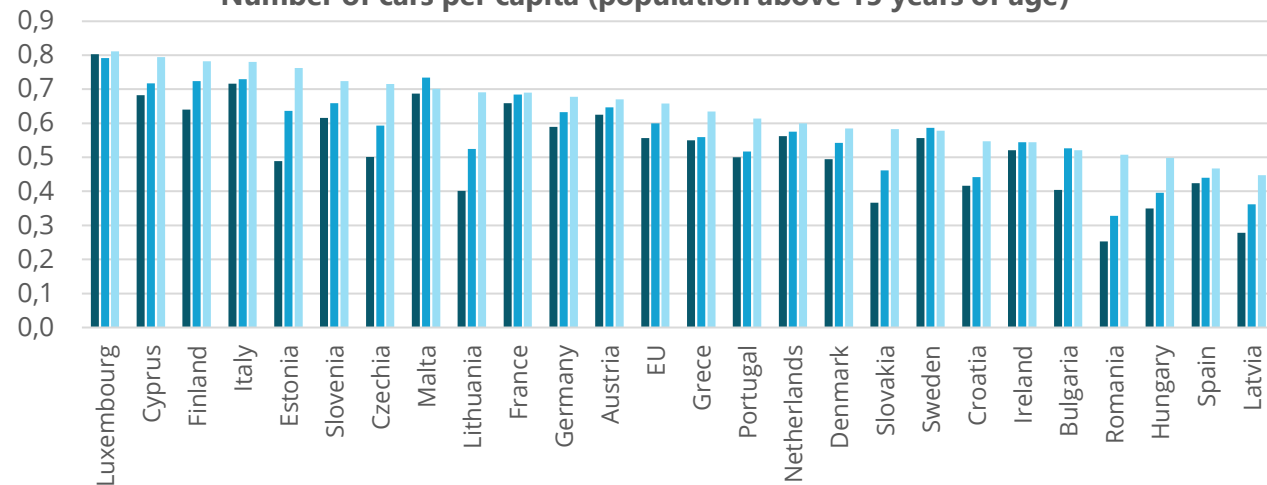
New: Energy efficiency First Fuel – Primary consumption (EU)