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Implementation of early estimates of detailed energy consumption data by sub-sector and end-use : the European experience with Odyssee

G20 Energy End-Use Data and Energy Efficiency Metrics initiative
Fourth workshop: 29 October 2020 hosted by the Canadian government
“Rethinking end use data collection in the light of the global health crisis”

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ODYSSEE-MURE

Contents

- 1. Rationale**
- 2. Methodology**
- 3. Examples for Industry and transport**
- 4. EEUD and Covid for France**

- End-use surveys launched before March have been implemented ie Household panel (CEREN)
- **Face to face** end-use surveys previously planned during the confinement has been postponed or reset as internet or phone based surveys.  To preserve the health of the surveyors and to avoid bad welcoming. (ie The industry survey in Ceren)
- The household panel from INSEE (National statistical office has been postponed until September
- Surveys initially planned as **phone based surveys** have been not damaged (TREMI 100 0000 individual homes) but the response rate was lower than before (50%).
- Results for the **surveys on tertiary were worst even by emails** and answers by mail were less effective) and **choice of other priority**. To compensate a **hotline** was set up.
- Many surveys done by **private offices have been reoriented towards COVID** issues (ex impact on employment)
- They are also surveys launched by the **public sector which** have been postponed or modified. But a lot a new **specific** surveys have been set-up; Some of these surveys have been welcomed by the surveyed (ie: Epicov on Health impact, ACEMO COVID on employment in industry, came on household behaviour)
- Survey on impact of COVID on electricity system using
- COVID has pushed the data collection in hurry (new systems of collect (GPS, Credit card, google trend, etc.)

Why early estimates?

- When a government wants to communicate on the impact on a newly implemented Energy Efficiency Action Plan or any recovery plan or to comment on the factors explaining the latest energy balance changes, it mainly refers on the concept of **energy intensity** (TPES/GDP). This is due to the fact that this indicator can be easily and very fastly produced at least at T-1 (even on a monthly basis). However it is broadly shared among energy efficiency policy analysts that this indicator is a **very weak indicator** to properly monitor energy efficiency progress.
- Therefore, countries develop a set EEs which request detailed energy and activity data (EEUD). The European experience through the ODYSSEE project shows that to update the EEU data by sub-sector and end-uses, once a year when the necessary data are available, generally towards the middle of year T for the update at T-2. Therefore there is a **2 years delay** in the monitoring of the most recent energy efficiency trends, **which does not meet the need of policy makers**.
- Indeed, countries need to have up-to-date information on the most recent energy efficiency trends and on the interpretation of changes in final and primary energy consumption, especially in view of the **monitoring of the energy efficiency targets**.

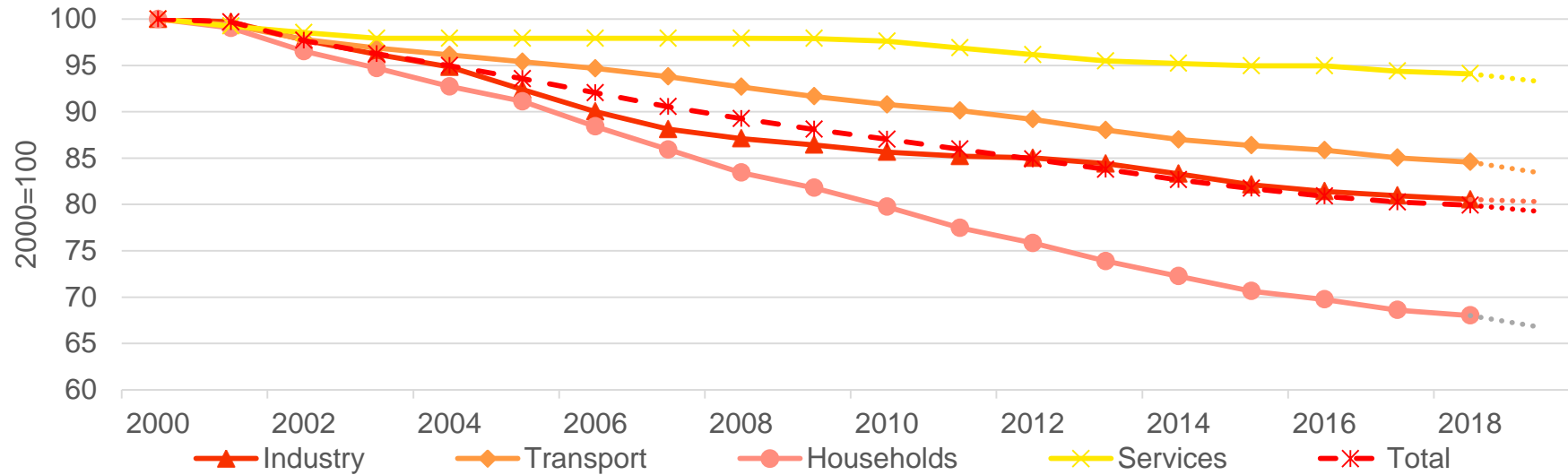
Objective of early estimates?

- The objective is to estimate **some** data and **advanced indicators** for year T-1 (i.e. 2019 in 2020), i.e. to **gain one year** compared to the usual updates of EEU data by sub- sector and end-uses.
- More specifically early estimates are provided for the **data needed to update** by sector:
 - **an index of energy efficiency improvements**
 - energy **savings**
 - **A decomposition analysis** of the energy consumption variation to show the explanatory factors behind the variation of the energy consumption.
- The early estimates for year T-1 are prepared in October or November of year T.

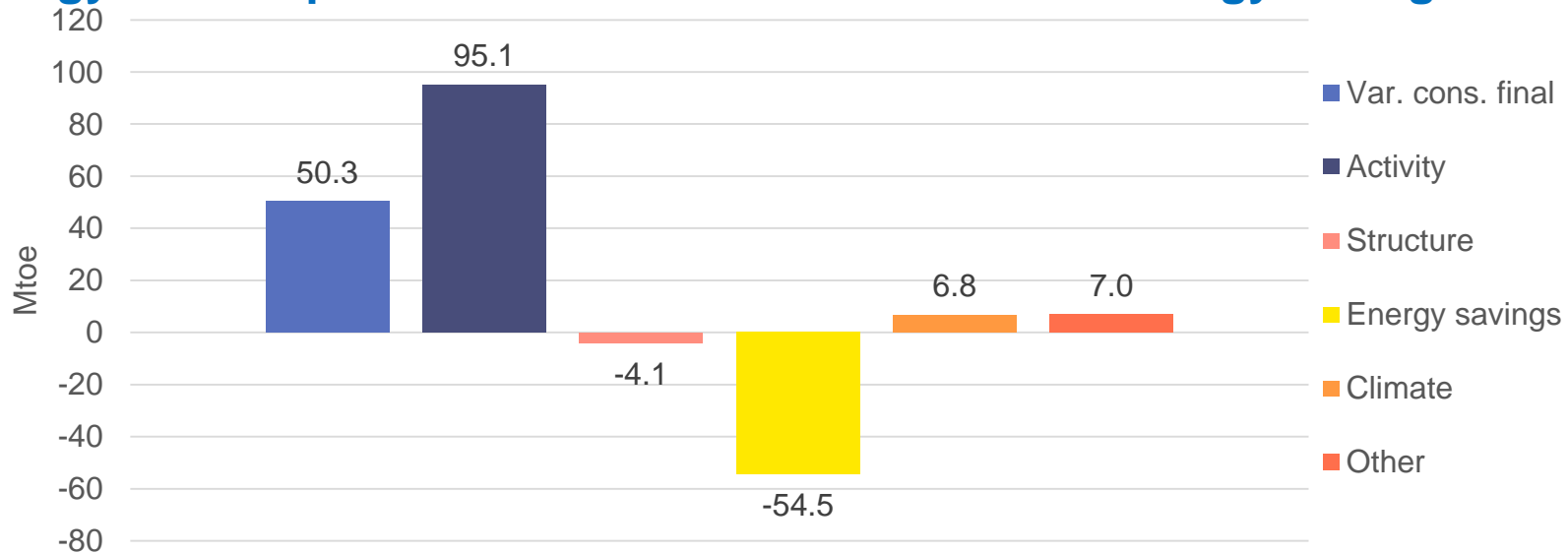
General methodology by type of data

- To calculate the key energy efficiency indicators, it is necessary to estimate at year T-1 detailed **final consumption data by sub-sector or end-use**.
- The methodology depends on the **sectors**.
- Three types of data are needed for the early estimates:
 - **Macro data**: population, GDP by sector, primary energy;
 - **Final consumption by main sector**, which are usually available at that time. If not they can be estimated from monthly data.
 - **Sectoral economic drivers** (e.g. stock of vehicles, traffic, production, index of production, number of households).

The Energy efficiency index for EU final consumers shows in 2019 a smooth restart compared to 2018

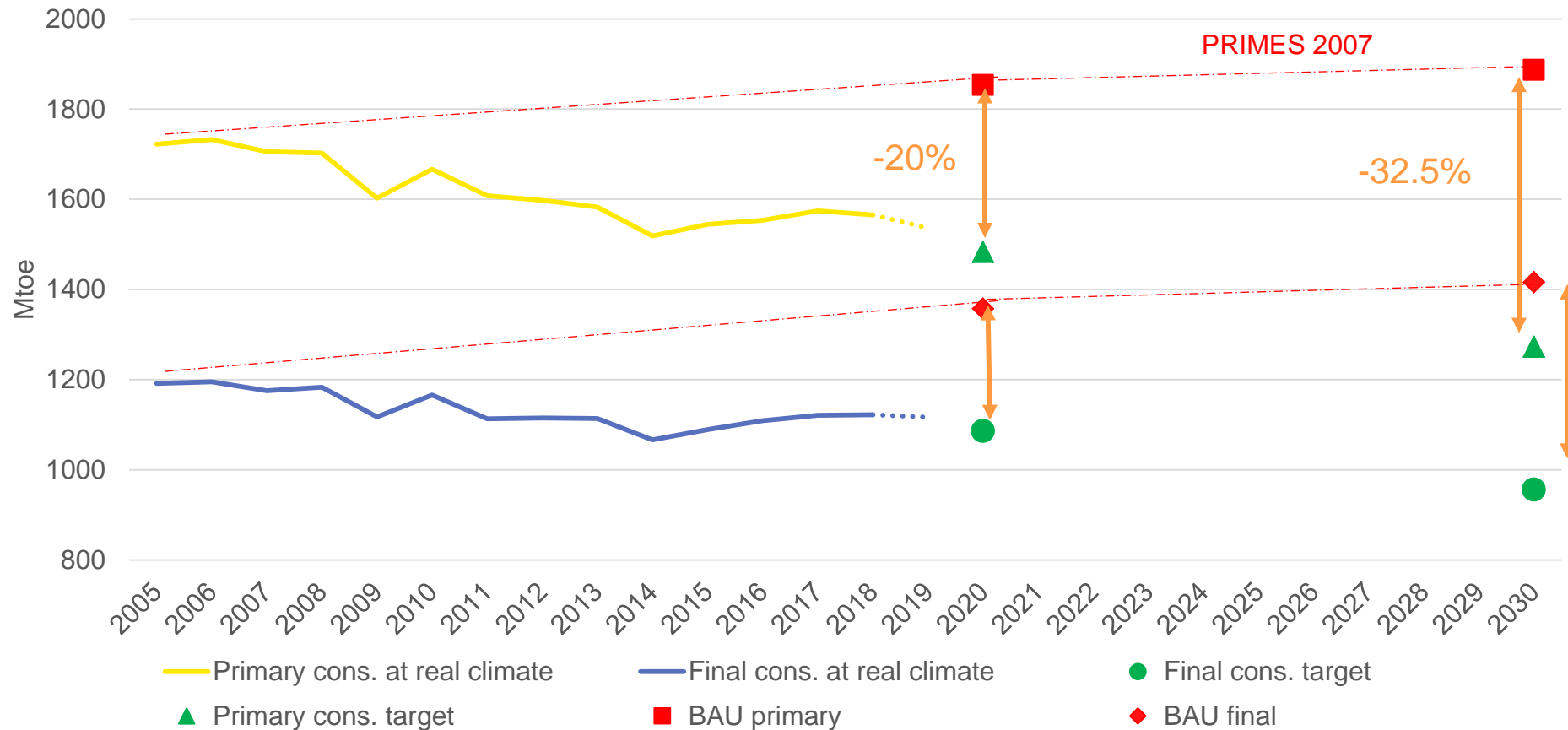


Drivers of final energy consumption variation between : 2014-2019 Energy savings offset the activity effect



Primary and final energy consumption targets

- In 2019, EU primary and final consumption were closed to the 2020 efficiency targets (around 4% and 3% above respectively).
- Warmer winters have helped achieving the targets (final consumption at normal climate 5% above target in 2019).
- Past trends do not enable to reach the 2030 targets.



Source: ODYSSEE

Methodology : final consumption by end-use or sub-sector for industry

- The energy consumption by branch is estimated by using the **Industrial Production Index (IPI)** by branch or **physical production (P)** for steel, cement, pulp and paper (professional associations) .
- For each branch i , a consumption at constant specific consumption is first calculated on the basis of the production level at T-1 (IPI or P_1) and the specific consumption at T-2:
- A fictive consumption of the whole industry at constant specific consumption is calculated at T-1 as the sum of branches.
- The consumption by branch is estimated at T-1 by scaling its consumption at constant specific consumption so as to get a total consistent with the observed consumption of industry at T-1 .
- This approach has the advantage to well take into account **structural changes**, but implicitly assumes the same rate of energy efficiency improvement for all branches at T-1.

Implementation for households (1/3)

- The following activity data have to be estimated
 - Consumption by end-use estimated at normal (corrigé) climate, then at real climate → need to start with estimate of consumption at normal climate.
 - The energy consumption by end-use is done for **electricity** and **all other fuels separately**.
- For **non electric fuels**:
 - water heating and cooking calculated using a constant unit consumption if unit consumption rather stable over the last years or extrapolation of trend.
 - space heating calculated by difference

Implementation for households : Activity data (2/3)

- The following activity data have to be estimated:
 - **Stock of households**: estimation based on past trend on the number of habitant per households and population growth from Eurostat
 - **Annual construction of dwellings**: estimation based on past trend
 - Percent of dwelling with **central heating**: estimation based on past trend
 - **Average area** of dwellings: estimation based on past trend
 - **Equipment rates** of appliances and AC: estimation based on past trend

Implementation for household

Final consumption by end-use or sub-sector for electricity (3/3)

- For **electricity** :
 - The water heating and cooking consumption is calculated from the unit consumption, which is extrapolated from past trends.
 - The consumption for lighting, cooling and large appliances by type of appliance is calculated from the stock of appliances and a unit consumption, which is extrapolated from past trends.
 - For countries with a limited share of electric heating, the consumption of electricity for space heating is extrapolated from the share of space heating at year T-2 at normal climate.
 - For countries with a significant share of electric heating, the space heating consumption of electricity is calculated from a trend in unit consumption, again to account for the fact that existing dwellings are replaced by more efficient new dwellings and new dwellings are added to the stock .



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Thank you

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