Co-funded by the Horizon 2020 programme of the European Union

European Energy Network

Monitoring of energy efficiency in Europe
The ODYSSEE-MURE project

Meeting EEA-ADEME
30th September 2020

Dr Didier Bosseboeuf (ADEME,project coordinator

Users of the ODYSSEE-MURE data bases

- **Europe/EC :** (DGEN, JRC, EEA, Eurostat, ECEEE, EnR club)
- **Others :**
  - IEA (EEUMD forle G20),
  - Latin America : UN-CEPAL (project BIEE& ROSE 25 countries , Mexico (AFD-CONUEE),
  - Africa (MEDENER 7 mediteranean countries, UN-Tunisia,
  - Asia : India (BEE)
- **ISO 500049**: Energy saving calculation at country, region and cities : Energy efficiency index, structural changes of energy intensities and decomposition analysis

The EEA-ODYSSEE-MURE cooperation

- **During 10 years close cooperation with EEA (Anca-Diana Barbu)**
  - Access to the Odyssee data base
  - Use of data in particular for building by end-uses
  - Exchange and use of the Decomposition analysis methodology
  - Review of the EEA report on the energy efficiency chapter
  - Invitation to EEA experts meeting (sometimes through infonet) and to ODYSSEE-MURE regional meeting (few venue)
- **Recently no more direct request from EEA on the ODYSSEE Data base**
- **Currrently 3 EEA's colleagues have access to the ODYSSEE data base**
  - mike.asquith@eea.europa.eu from 08/2018
  - lars.mortensen@eea.europa.eu from 10/2019
  - stephane.quefelec@eea.europa.eu from 08/2020
- **Currently , no particular feedback from EEA**

Outline

1. Monitoring EE: The ODYSSEE-MURE project

2. The ODYSSEE methodology
   - 2a Advanced EEIs
   - 2b The ODYSSEE facilities.

3. The MURE data base
   - 3aThe MURE facilities

The European project ODYSSEE on EE indicators
Project implementation

- 30 EU countries represented by energy efficiency agencies
- Decentralised data collection ⟹ legitimacy of the results
- Exchange on methodologies, interpretation through a routine of 50 workshops gathering 60 experts
- Harmonised data collection allowing data going « beyond the energy balance », Rapid updating (- one year), quality check
- Benchmark through adjustments for national circonstancies
- Dissemination process (free access to non-profit organisations, sectoral and country profiles, national reports)
- Communication tools (12 facilities for end users , A single website : . http://www.odyssee-mure.eu/.

ADEME
AGENCE DE LA TRANSITION ÉCOLOGIQUE

The ODYSSEE-MURE network : more than 150 experts mainly from energy efficiency agencies gathering staticiens and policy analysts

The objectives of the ODYSSEE-MURE Project
A combination of TD and BU evaluations

Good governance requires a monitoring and evaluation of EE policies impact. Public authorities should have an easy access to reliable and very well updated information regarding energy efficiency indicators trends (**ODYSSEE)**

1. **Evaluate and compare energy efficiency progress** by sector for EU countries and for the EU as a whole.
2. Contribute to the **evaluation of national EE P&Ms** in the EU and the dynamic of implementation over the 4 NEEAPs.
3. Provide a **monitoring approach for EU and national targets** on energy efficiency.

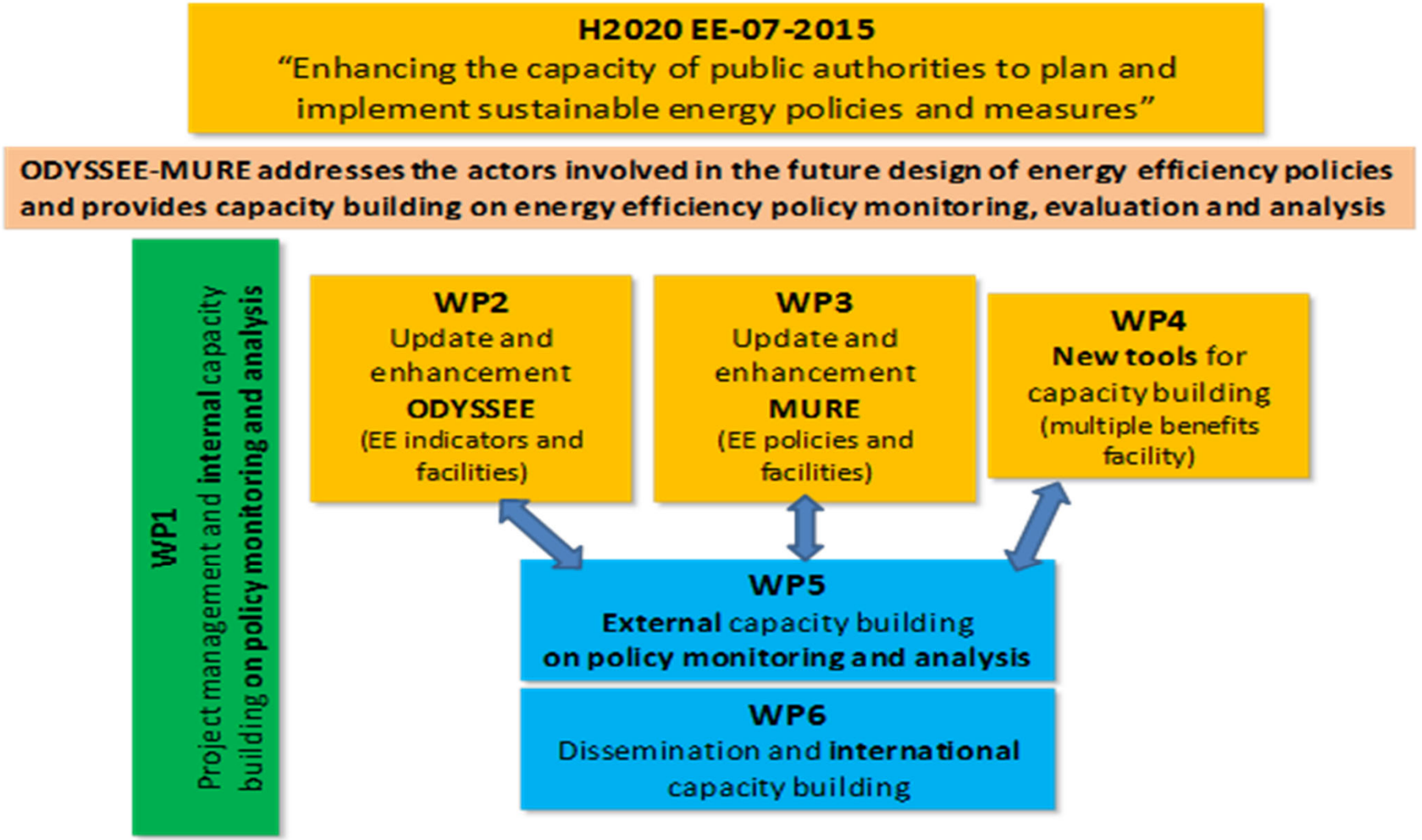
Cross-cutting objective : Develop **support "facilities"** to help ODYSSEE- MURE users in analysing EE trends .

The new proposal 2019-2022): main features

New general topic: LC-SC3-EE-16-2018-2019-2020: "Supporting public authorities to implement the Energy Union/ Supporting the delivery of EED"

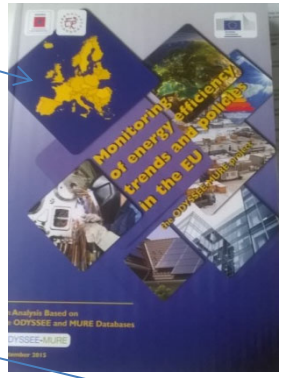
- New topical issues : Energy efficiency first fuel, fuel poverty, sufficiency, more updated indicators
- 30 months duration
- Similar budget (1,5-1,7 M€)
- 33 partners (New funded partners : Serbia and Switzerland; Technical coordination : ADEME (2); FHG-ISI (2) ; Enerdata (2))
- Based on the two data bases ODYSSEE-MURE
- New MURE data base software, new facilities (first fuel, industry)?
- 3 updating for ODYSSEE → one additional update to n-1
- Similar dissemination activities (Policy briefs; MOOC?)
- Management issues: 6 WPs; 3/4 regional meetings and 5 technical coordination meetings

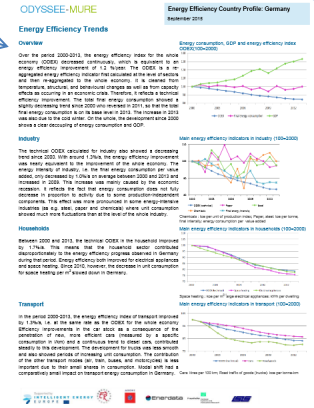
The new 2016-2018 ODYSSEE-MURE project
Project implementation



Main deliverables of ODYSSEE all on the website http://www.odyssee-mure.eu

- ODYSSEE and MURE databases and 12 data facilities
- A printed **synthesis brochure** "Facts and trends on EU energy efficiency"
- **3 brochures** describing energy efficiency policies and measures (industry, transport, buildings)
- **Sectoral profiles** : set of 175 slides presenting energy efficiency trends by sector.
- **Country profiles** : 4 pages on main energy efficiency trends and policies by country in English and national language
- **Country reports** : detailed national reports on energy efficiency and policies by country





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ODYSSEE-MURE : A continuous effort in energy efficiency data collection at EU level and adaptation

- Deployment of EE indicators database at EU level for more than 2 decades (6 countries in 1993, 30 in 2016)
- Data collection is done at national level involving national experts team (most from EE agencies)
- Detailed data : 200 indicators and 1000 data /year/country, 2500 data on national EE policies and measures.
- Importance of quality check : automatic + expertise
- ODYSSEE MURE is essential for EE Directive monitoring and reporting. >10 000 connections/year on www.odysseemure.com
- Same methodology is now used in more than 60 countries (IEA, MEDENER, UN- CEPAL).

Data collection for EE indicators requires to go beyond the energy balance? But things are improving (Eurostat)

Type	Level
1. Energy intensities	by sector & sub sector
2. Adjusted intensities	final and industry
3. Specific energy consumption	by sub sector & end-use
4. Benchmarked specific	steel, cement, paper, heating
5. Energy efficiency indices (ODEX)	final and by sector
6. Energy savings	final, by sector and sub sectors
7. Indicators of diffusion	by sector
8. CO_2 intensities	by sector & sub sector
9. Specific CO2 emissions	by sub sector & end-use
10. Fuel poverty	**Households**
11. Sufficiency **12. Short term indicators**	**by sub sector & end-use**

ODYSSEE data template : Transport

- One dedicated sheet by sector, with raw data, integrated data controls and simple indicators directly calculated.
- Visualization of indicators through graphs.

Transport data

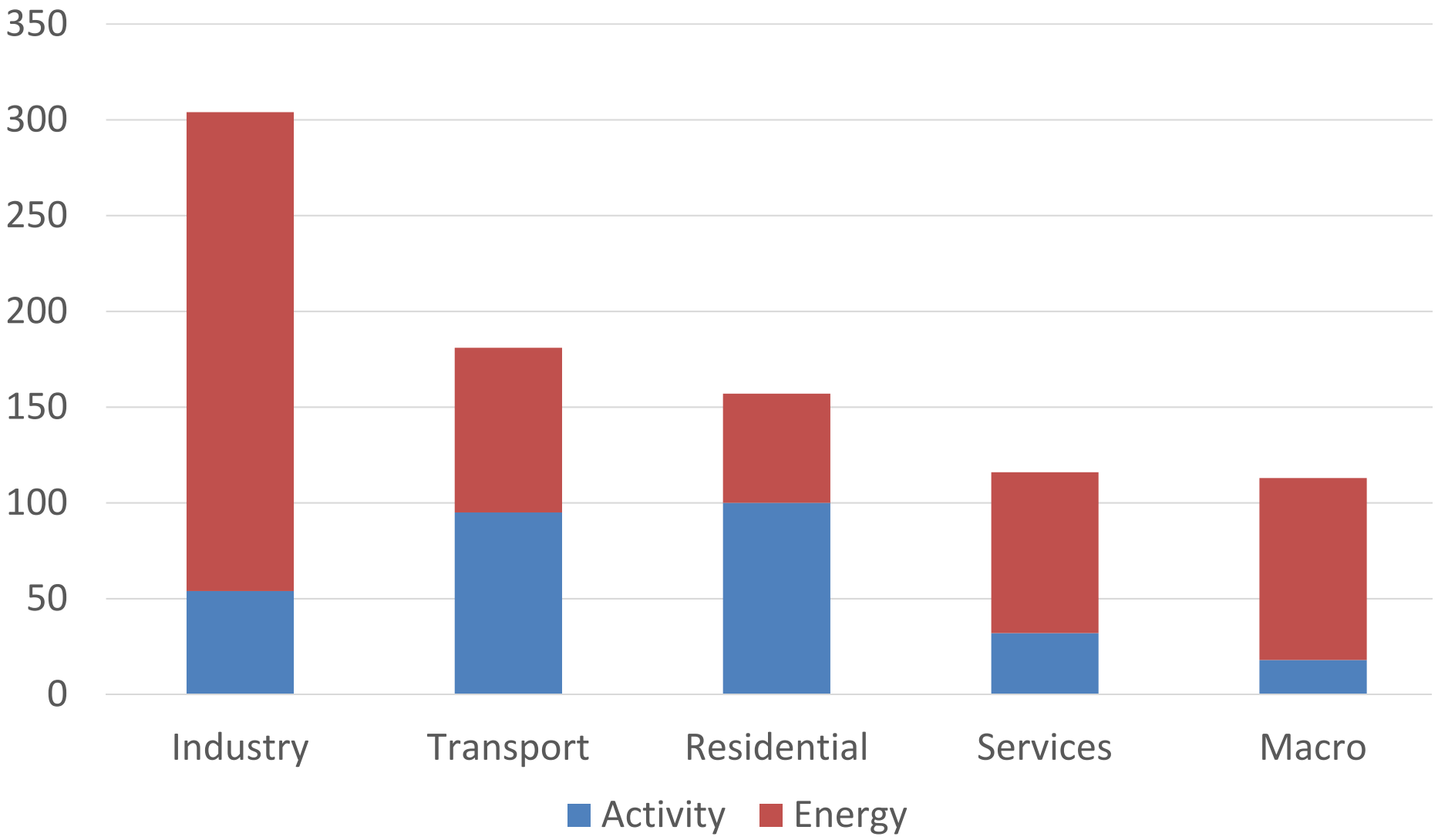
				43	44	45	46	47	48	49	50	51	52	53	54	
Stock of vehicles				2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
pkmbus	**Passengers tra**	fra	Mpkm	41861	43053	44075	44274	46884	50551	49562	50626	52000	52201	53165	54174	MEDDE
pasbus	Passengers traffic in buses (passenge															
pkmavd	Passengers traff	fra	Mpkm	13004	12723	12897	13181	13216	13090	12851	12718	13472	14023	14470	14140	MEDDE
pasavd	Passengers traff	fra	k	23060	22540	22850	23360	23250	22780	22060	21760	23170	23830	24340	23800	MEDDE
pasair	Passengers traff	fra	k	95770	101950	108140	114350	121390	123990	118700	120620	128870	132980	136450	140490	MEDDE
pkmflv	Passengers traffic in coasts and rivers															
Traffic of goods in tons and ton-km																
Traffic in ton kilometer																
tkmrou	**Freight traffic o**	fra	Mtkm	210210	218840	214771	220860	229473	217736	187150	196469	200594	188348	188119	182631	MEDDE
tkmfer	**Freight traffic i**	fra	Mtkm	48057	46348	40701	41179	42612	40436	32129	29965	34202	32539	32010	32217	MEDDE
tkmfergzl	Freight traffic in diesel trains (tkm)															
tkmferele	Freight traffic in electricity trains (tkm)															
tkmflv	Freight traffic in r	fra	Mtkm	6889	7314	7856	7950	7544	7504	7423	8060	7864	7830	7912	7752	MEDDE
Energy consumption of transport (energy balan																
Road transport																
gplcfrou	LPG (and CNG) c	fra	ktoe	182	165	152	142	129	122	108	126	139	126	112	100	SOES
esscfrou	Motor spirit consu	fra	ktoe	13076	12353	11668	10754	10028	9288	8759	8519	7920	7352	7058	6982	SOES
gzlcfrou	Diesel oil consum	fra	ktoe	28308	29074	29103	30087	30582	29472	29626	29933	30291	30528	30584	30596	SOES
elecfrou	Electricity consumption in road transpo															
enccfrou	Biofuel energy cc	fra	ktoe	336	340	403	710	1430	2284	2463	2418	2426	2680	2690	2960	SOES
glecfrou	Bioethanol energy	fra	ktoe	47	51	70	104	279	411	405	399	396	437	439	483	SOES
glgcfrou	Biodieselenergy (	fra	ktoe	289	289	333	606	1151	1873	2058	2019	2030	2243	2251	2477	SOES
toccfrou	**Total road consumptio**		ktoe	**41902**	**41932**	**41326**	**41693**	**42168**	**41166**	**40956**	**40996**	**40776**	**40686**	**40443**	**40638**	SOES
Rail transport				41902	41932	41326	41693	42168	41166	40956	40996	40776	40686	40443	40638	
gzlcffer	Diesel oil consum	fra	ktoe	245	222	201	196	184	188	172	162	165	159	157	157	SOES

... EUROSTAT recalcul conso RET Macro economy Energy balance Industry Transport Households Services EEA CO2 em ...

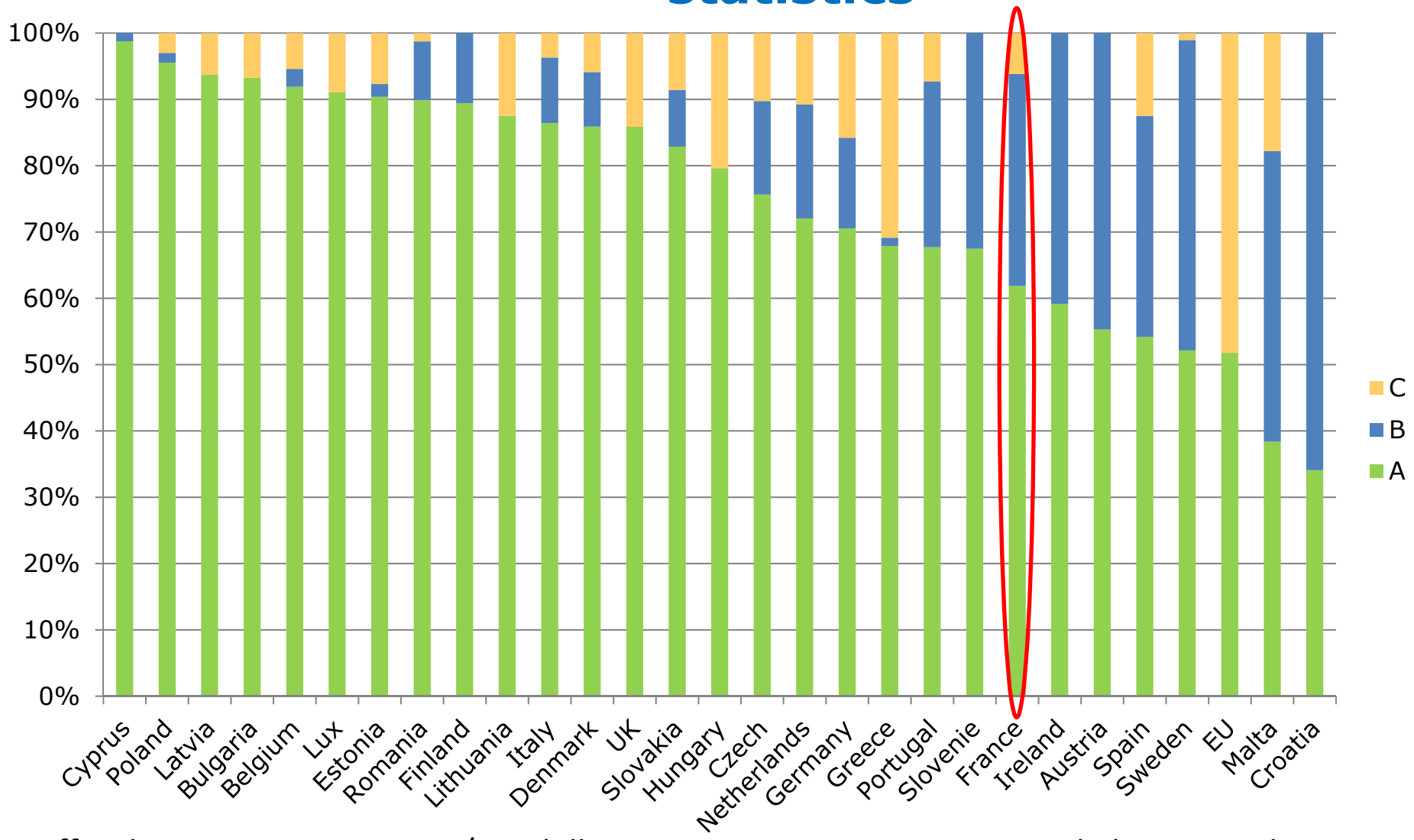
ODYSSEE database:

Aroud 900 datasets by country,

of which 65% energy related, 35% on activity



Distribution of data sources in ODYSSEE*: Half countries with over 80% official statistics

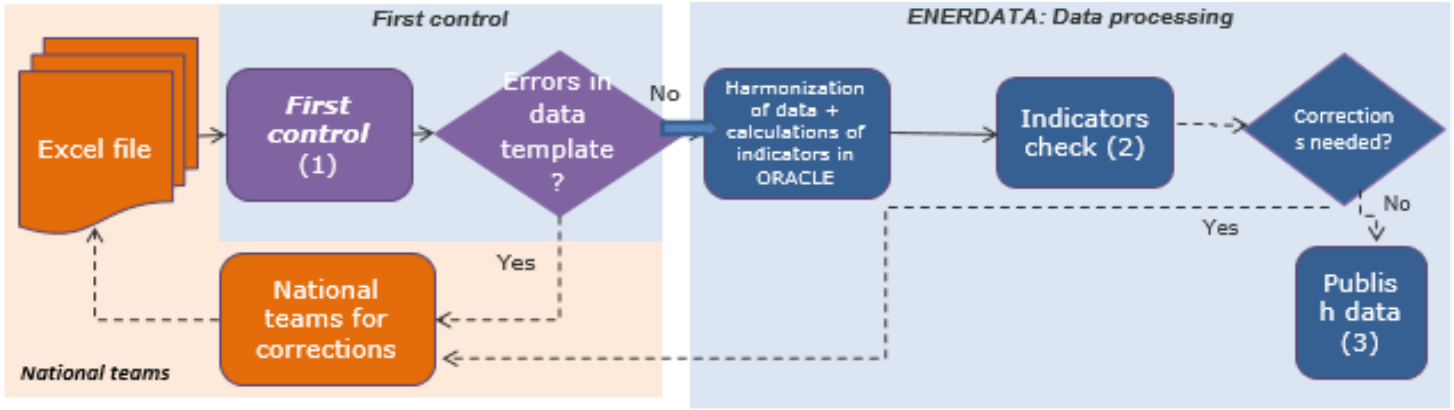


A: Official statistics **B:** Surveys/ modelling estimates **C:** Estimations made by national teams

*Results based on a selection of 100 datasets (December 2015)

Odyssee DB update

- Focus on data processing by Enerdata



(1)First control: **Excel template.**

- Same as done by national teams: internal consistency, consistency with Eurostat/DGMOVE, indicators' graphs;
- Existence of data sources, unit for each datasets
- Checking of annual variation for a selection of data/indicators;

(2) Second control: **indicator check.**

- Comparison of data and indicators compared to the previous update;
- Calculation of annual growth rate over the 3 last years;
- Visualization of a set of indicators through graphs;

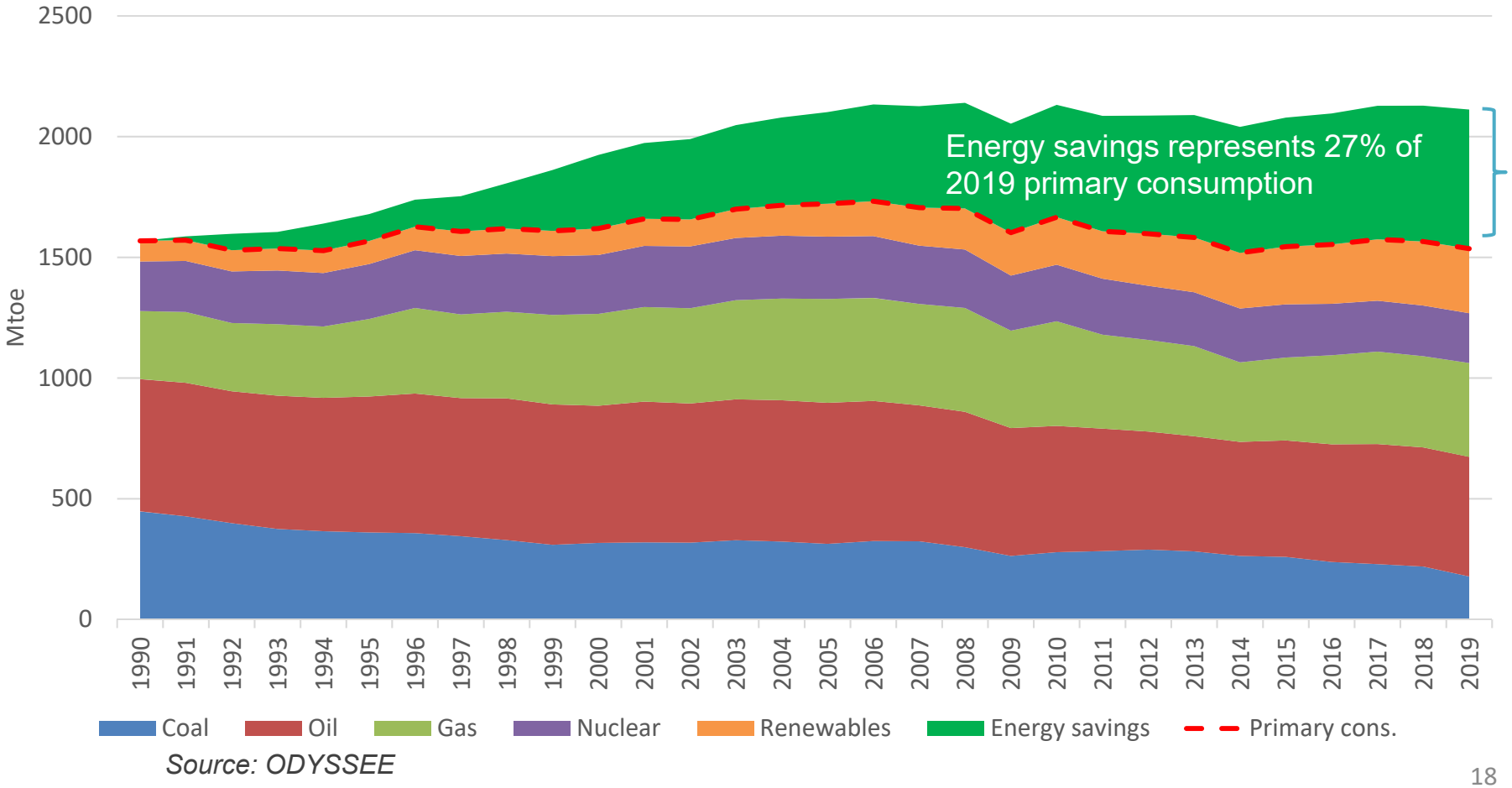
(3) **Last control before publication.**

- Test on the number of datasets, check of empty datasets

➔ **if some errors, the file is sent back to national teams for corrections.**

Energy savings first fuel in primary energy consumption

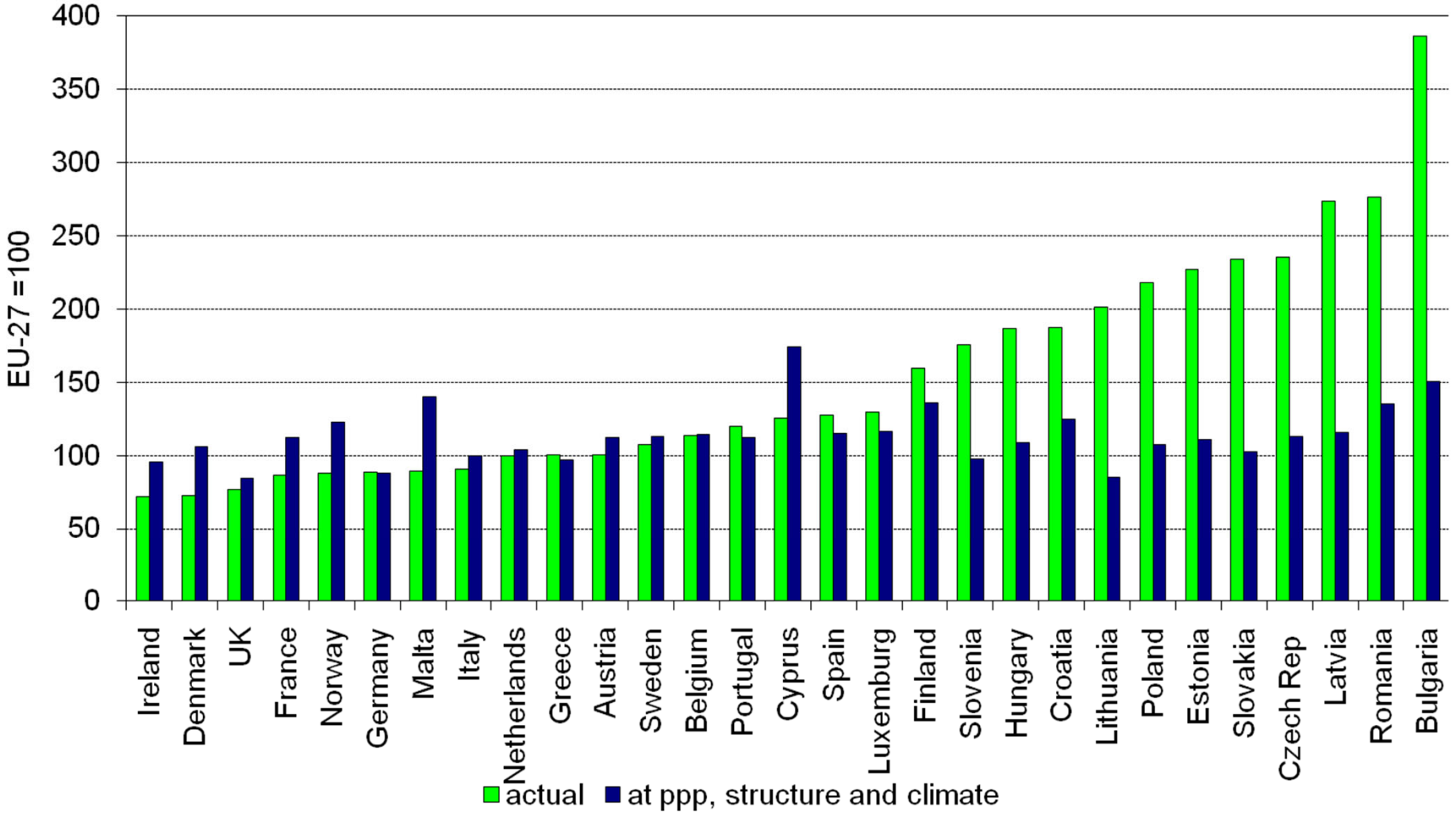
- Looking on a longer period, since 1990, energy savings have reduced primary consumption by around 580 Mtoe in 2019, i.e. the equivalent of 27% of that consumption.
- Energy savings is the first fuel in primary consumption in 2019 (4 points above oil with a share of 23%).



Source: ODYSSEE

Adjusted energy intensities: examples

Final energy intensities adjusted for differences in prices (ppp), climate and industry & economic structures narrow difference between countries



An energy efficiency index (ODEX) to measure energy efficiency progress at sector level

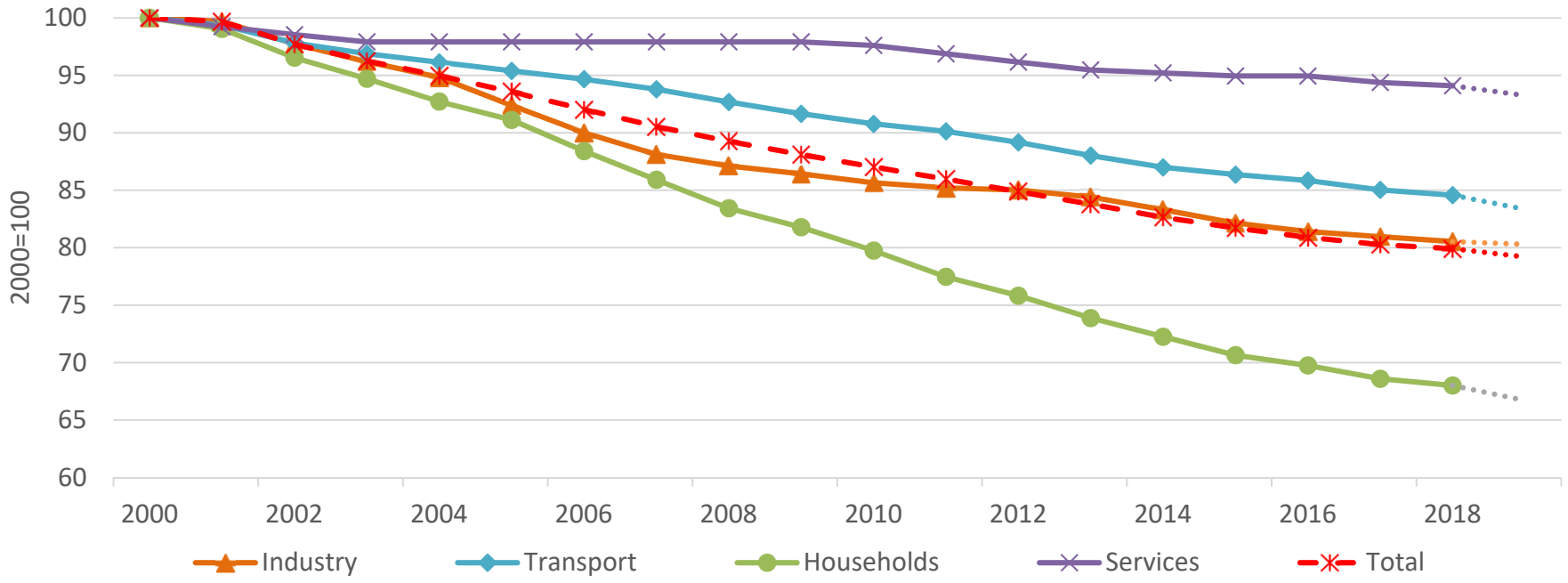
- In ODYSSEE, an energy efficiency index is calculated at sector level (i.e. industry, transport, households) and for all final consumers to assess energy efficiency progress.

- 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).

Energy efficiency index (ODEX) for final consumers

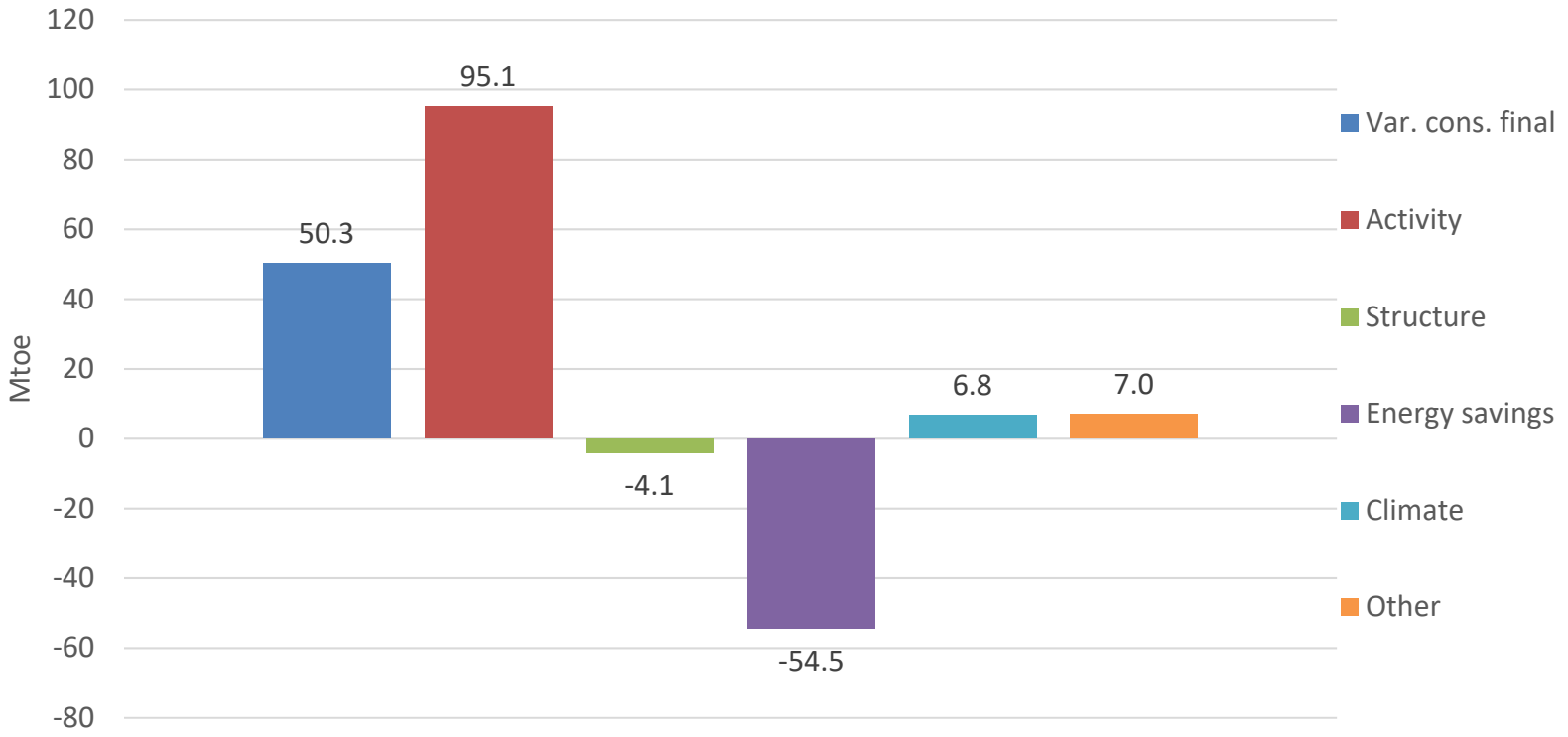
- Energy efficiency of final consumers improved by 1.2%/yr from 2000 to 2019, with a slow down in recent years (0.9%/yr since 2014).
- Larger gains for households (2.1%/yr since 2000), with a net slow down since 2014 (1.6 %/yr).
- Rate of improvement divided by more than 2 in industry, since 2007 (0.8%/yr compared to 1.8%/yr before).
- Regular but limited improvement in transport (1%/year).



ODEX=79 in 2019 ➔ 21% energy efficiency improvement or 1.2%/yr
Source: ODYSSEE

Drivers of final energy consumption variation: 2014-2019

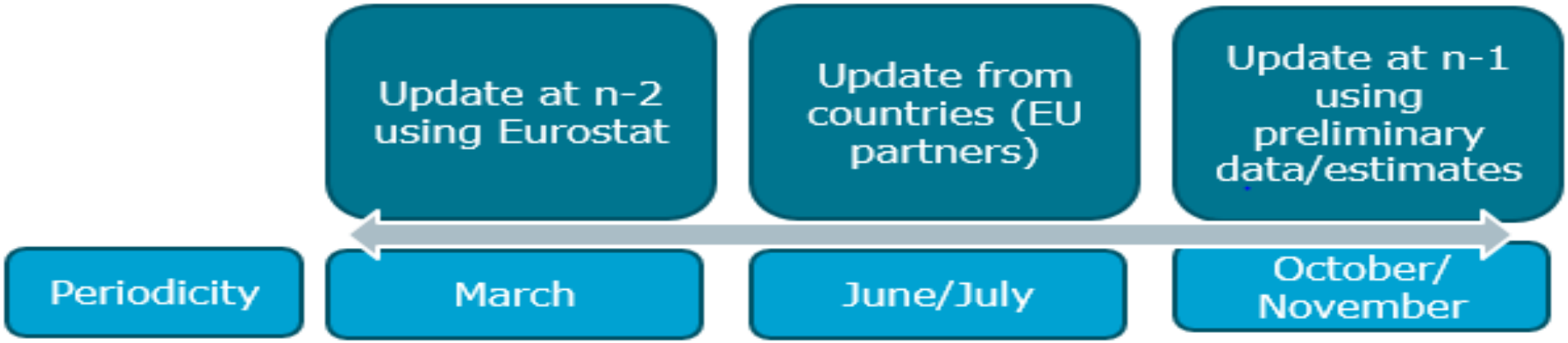
- Between 2014 and 2019, the economic and demographic growth ("activity") contributed to raise the final consumption by 95 Mtoe.
- Energy savings offset more than half of this activity effect by reducing consumption by 55 Mtoe.



Activity effect : mainly economic growth, plus demography and lifestyle changes (appliance ownership and larger dwellings).
Source: ODYSSEE; decomposition tool https://www.indicators.odyssee-mure.eu/decomposition.html

Early estimates of energy savings

updates a year with early estimates to be able to provide updated data earlier : key data and indicators available at n-2 in March, n and at n-1 in September/ November ➔ can be useful for the indicators for monitoring progress towards EU objectives.



Implementation of early estimates : A methodology will be developed to calculate early estimates for energy and non-energy data contained in the ODYSSEE database.

This methodology will depend on the available information for each country: energy balances from national sources, annual/monthly data from Eurostat, linear regression or pure estimates.

The five ODYSSEE facilities on indicators

ODYSSEE Data tools

In addition to the data base, indicators can be visualised in 6 data tools:

1. A "market diffusion facility" of energy efficiency and renewables end-uses technologies and practices.
2. A "decomposition facility" to display the factors behind changes in energy consumption (e.g. economic growth, structural effects, energy savings, ...).
3. A "benchmarking facility" to enable any country to compare its energy performance with the country of its choice.
4. An " energy saving facility ", compiling top-down energy savings, energy savings potentials and policy targets.
5. An "energy efficiency indicator scoreboard", to map out and score the energy efficiency position of countries, globally and by sector.

Article 7 of EED imposes a certain level of energy savings

- 5% of additional annual savings according to Article 7 of EED for final consumers over 2014-2020 (and 0.8%/year from 2021 to 2030).
- Energy savings from Article 7 as reported by MS reached 40% of 2020 target in 2017, our estimate based on indicators exceed the target but our savings are broader than Article 7 savings (as they include all types of savings: policy related and from autonomous progress).

Source: ODYSSEE
Savings target obtained by cumulating annual energy savings over 2014-2020

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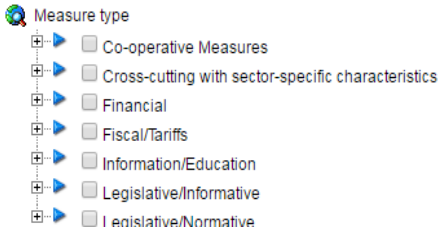
Geographical scope

- Coverage (region): EU (28 members) + Switzerland, Norway, Serbia
- Level of analysis: national (+ main regional P&Ms) + EU level

Type of P&Ms: All

- with 6-9 main types (de
- + many sub-types
- Status: on going…



Targeted sectors: 5 (by end-use sector + cross-cutting)

- And sub-sectors (end-uses)

Level of information:

- High
- Descriptive: general description, impact evaluation, financing, references
- Quantitative: impact assessment, etc.

Data collection process:

- by national energy agencies or ministries;
- Updates of database: continuous -up to 2017, with policies described from 70's.

Layout and facilities:

- Factsheets/Tables
- Radar graph
- Policy scoreboard (4 tools)
- Policy mapper: evolution of indicators + policies impacting the indicator
- Policies interaction evaluation
- Successful measures datamapper

Type of query: by countries; type; sector; period; topic; status; actor; target audience; impact.

Print screen: summary of measure description

Household - Measure Detail

Measure Code	HOU-GER94
Country	Germany
Title	KfW Energy-efficient Construction ("Energieeffizientes Bauen")
Reference	Germany's 2nd NEEAP Updated information:3rd National Energy Efficiency Action Plan (NEEAP) 2014 of the Federal Republic of Germany, 2014

Status	Issuing Date	Starting Date	Ending Date	Semi-quantitative Impact	European Measure	NEEAP Measure (1,2,3)	Article 7	Impact Evaluation
Ongoing	0/2009	2009		Medium	No	Yes (3)	Yes	Yes

Financing	€ from to
Types	21) Financial - Grants / Subsidies - For investments in new buildings exceeding building regulation
Actors	financial institutions
Target Audience	owner-occupiers
Targeted End Use	Total final consumption

View quantitative evaluation impact

View Detailed Measure Description

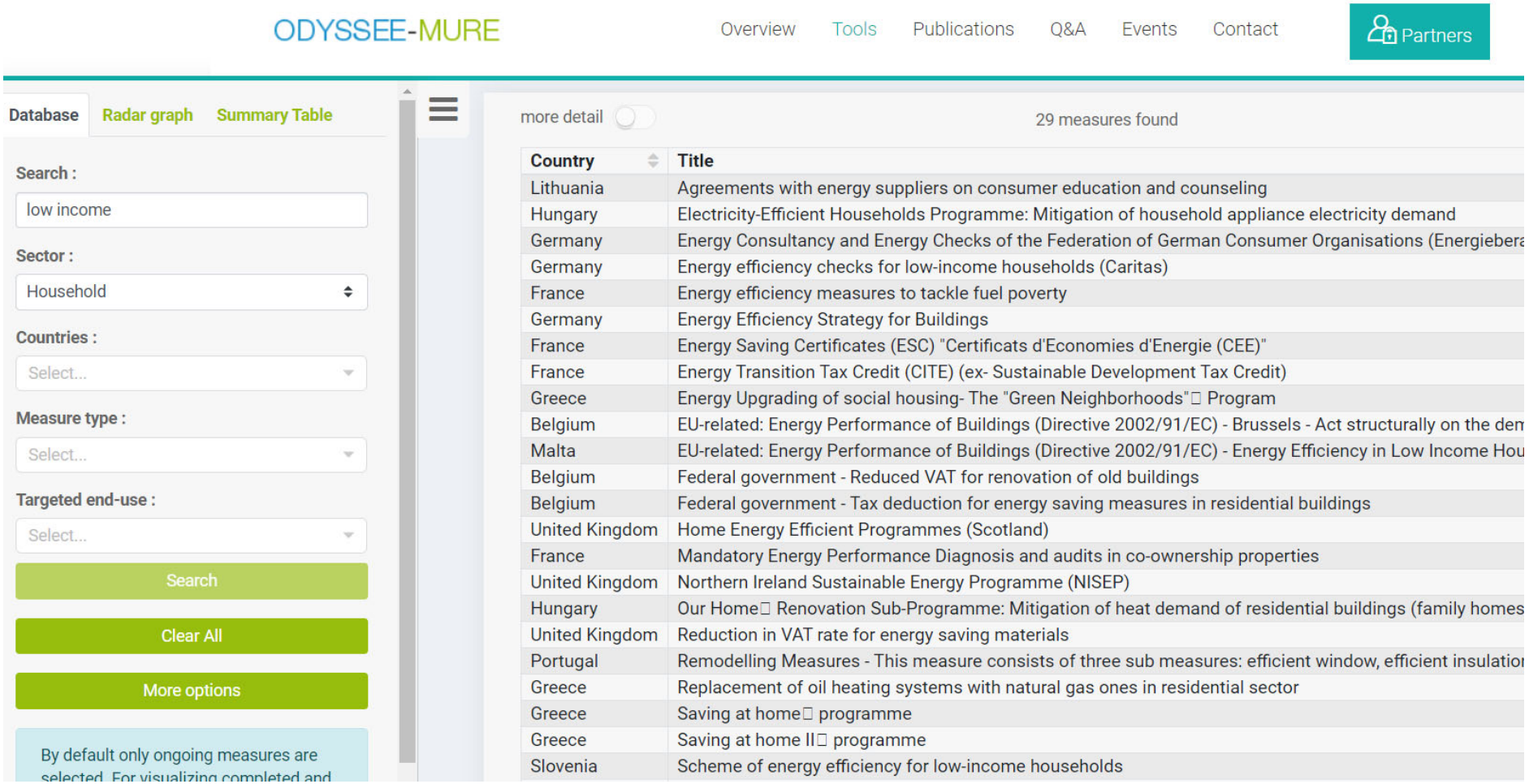
Quantitive impact evaluation (when available)

Mure II Household - Targeted end use detail

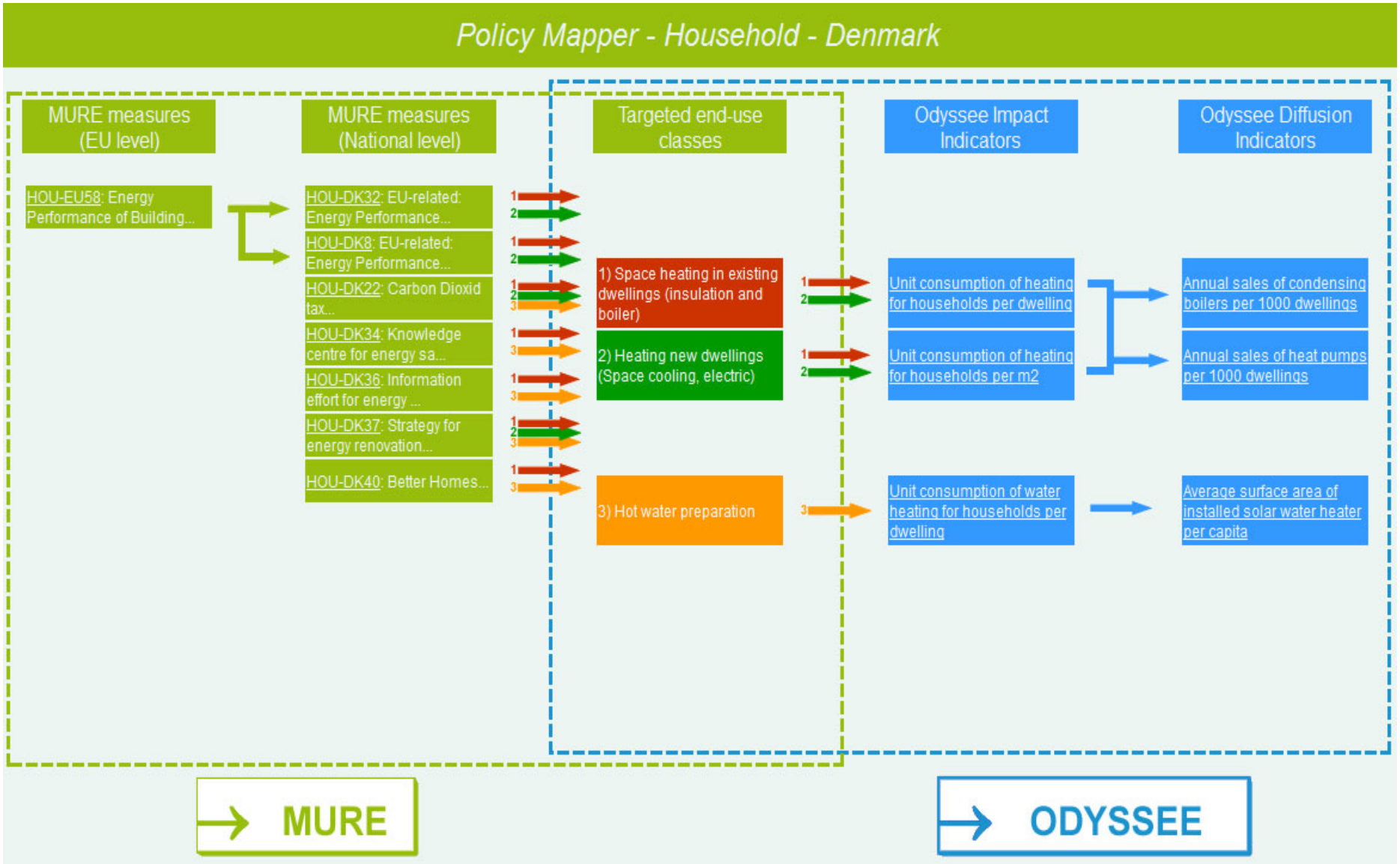
Targeted End Use	Type of impact evaluation	Impacts: saving determinated with respect to	Starting impact year	Evaluation method	Comments
Total final consumption	Ex-ante	Year: 2016 2020 Compare: Other Other PJ: 2.4 5.5 CO2: 0 0	2009	Deemed estimate unit savings	Yearly savings with lifetime (source:Prognos); Commulative savings (2009-2013):27 PJ (source:Article 7 notific); Commulative savings (2014-2020):22 PJ (source:Article 7 notific)

The five MURE facilities on policies and measures

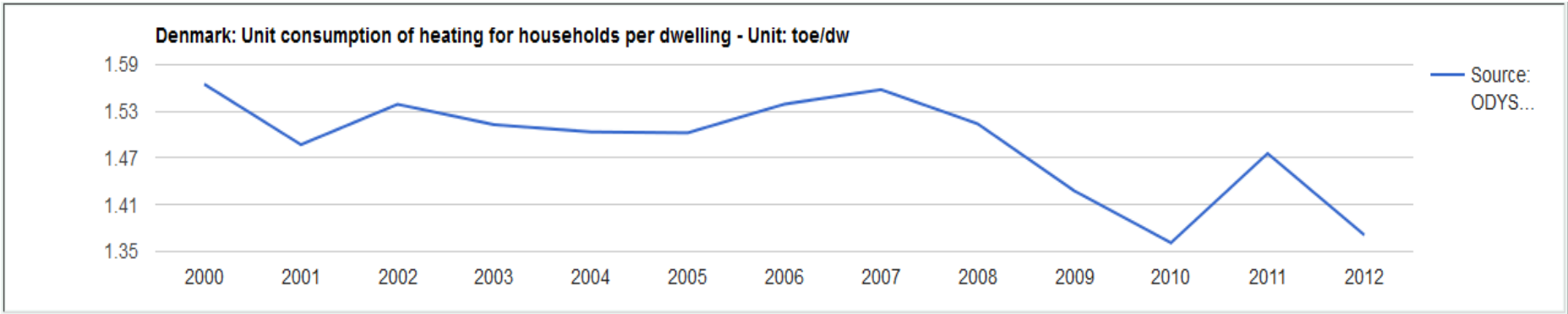
EE measures in low income households in MURE



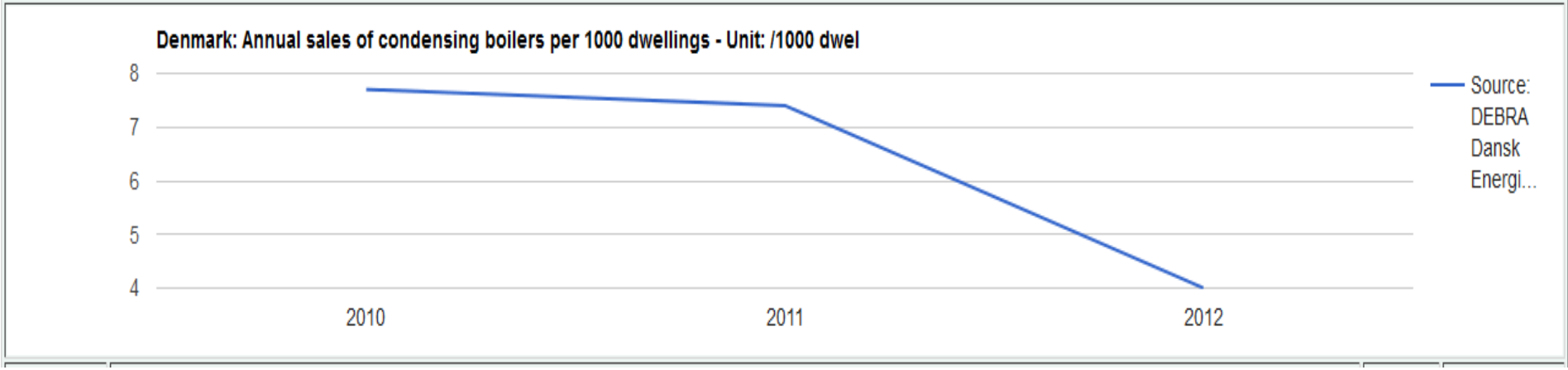
Improving policies through EE indicatorsù



Improving policies through E.E. indicators



Code	Title	From	Updated
HOU-DK22	Carbon Dioxid tax	1998	2014
HOU-DK32	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Energy Labeling of Buildings	2005	2014
HOU-DK8	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Building regulations	2006	2014
HOU-DK34	Knowledge centre for energy savings in buildings	2008	2014
HOU-DK36	Information effort for energy efficiency regarding end-users (sparenergi.dk)	2012	2015
HOU-DK40	Better Homes	2014	2014
HOU-DK37	Strategy for energy renovation	2014	2015



Scoreboard: Country ranking (1/2)

Ranking by sector. Only the 10 best performing countries* appear on the scale. Possibility to visualise indicators ranking by country (next slide)

* Decision of a vote with all the partners of the project.

Scoreboard: Country ranking (2/2)

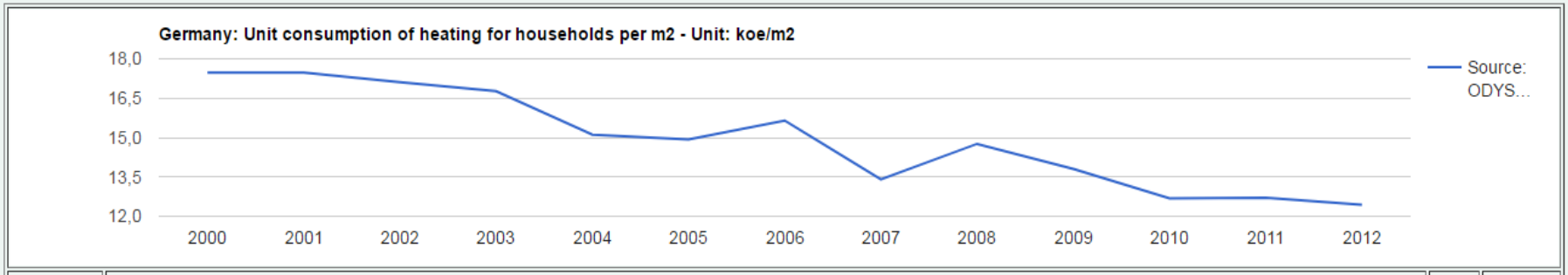
Visualization of the indicator rankings for the 5 top countries.
1 shows the 3 best ranking countries, 2 shows the next ones and so on.

Detailed indicators for country ranking

		1 Austria	2 UK	3 Greece	4 Italy	5 Ireland
Car efficiency	Level	4	(1)	(1)	(1)	[3]
	Trend	[2]	(1)	(1)	[3]	(1)
Road freight per tkm	Level	5	14	16	15	16
	Trend	[3]	12	16	15	15
Air per passenger	Level	[3]	17	(1)	[2]	(1)
	Trend	7	13	(1)	5	4
% public transport	Level	[2]	15	9	5	[3]
	Trend	6	[2]	17	(1)	14
% rail & water (freight)	Level	[3]	14	17	12	18
	Trend	10	[3]	(1)	4	17

Print screen: policy mapper by country

Policy Mapper - Household - Impact Indicators - Germany

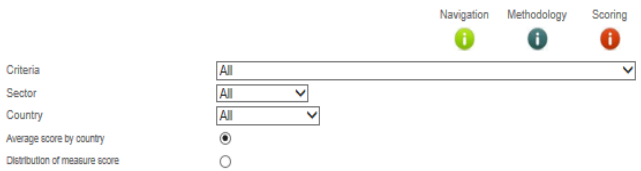


Code	Title	From	Updated
HOU-GER4	Energy Consultancy and Energy Checks of the Federation of German Consumer Organisations (Energieberatung und Energie-Checks der Verbraucherzentralen Bundesverband (vzbv)	1978	2017
HOU-GER11	Ordinance on Heat Consumption Metering (Verordnung über Heizkostenabrechnung)	1981	2014
HOU-GER9	On-site energy consultation (BAFA Vor-Ort-Beratung)	1991	2017
HOU-GER15	Small-Scale Combustion Plant Ordinance (Kleinfeuerungsanlagenverordnung)	1993	2012
HOU-GER28	Ecological Tax Reform (Energy and Electricity Tax) (Ökologische Steuerreform – Energie und Stromsteuer)	1999	2015
HOU-GER32	Market Incentive Programme for Renewable Energies in Heat Market (Marktanreizprogramm für erneuerbare Energien im Wärmemarkt– MAP)	1999	2015
HOU-GER34	Energy Efficiency Campaign (Initiative EnergieEffizienz)	2002	2012
HOU-GER6	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Energy Savings Ordinance (Energieeinsparverordnung - EnEV)	2002	2015
HOU-GER47	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Energy certificates for buildings (Energieausweise für Gebäude)	2008	2015
HOU-GER97	Energy efficiency checks for low-income households (Caritas)	2009	2017
HOU-GER94	KfW Energy-efficient Construction ("Energieeffizientes Bauen")	2009	2015
HOU-GER33	KfW Programme "Energy-efficient refurbishment" (former CO2 Building Rehabilitation Programme)	2009	2015
HOU-GER98	Replenishment of the KfW programmes for energy-efficient construction and renovation (Aufstockung KfW-Gebäudeprogramme)	2009	2015
HOU-GER72	EU-related: Revised Directive for Labelling of Energy-related Products (Directive 2010/30/EU) - Energy Consumption Labelling Ordinance – revised version (EnVKV - revised)	2010	2015
HOU-GER64	Smart Metering	2010	2013
HOU-GER99	Energy-Related Urban Renewal — Grants for Integrated District Concepts and Renovation Managers (Energietische Stadtsanierung – Zuschüsse für integrierte Quartierskonzepte und Sanierungsmanager)	2011	2015

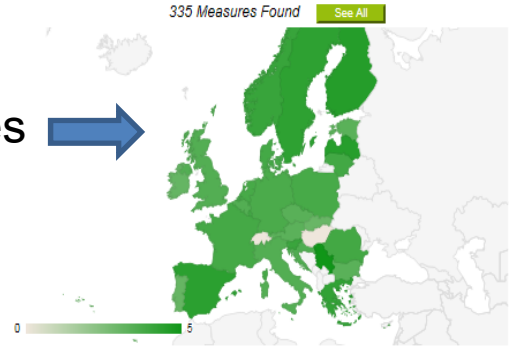
Successful Policies facility

This facility enables to identify successful energy efficiency policies:

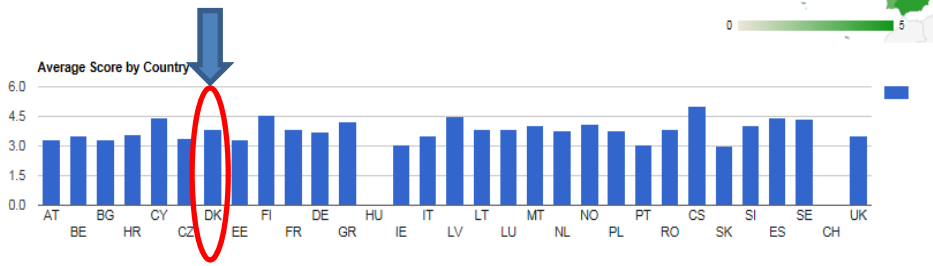
- 12 criteria to define success measures (6 “high” and 6 “low” priority criteria)
- Quantitative evaluation of each policy with a score between 1 (worst) and 5 (best) for each of the 12 criteria (expert evaluation)
- Selection by sector and/or country



335 successful policies

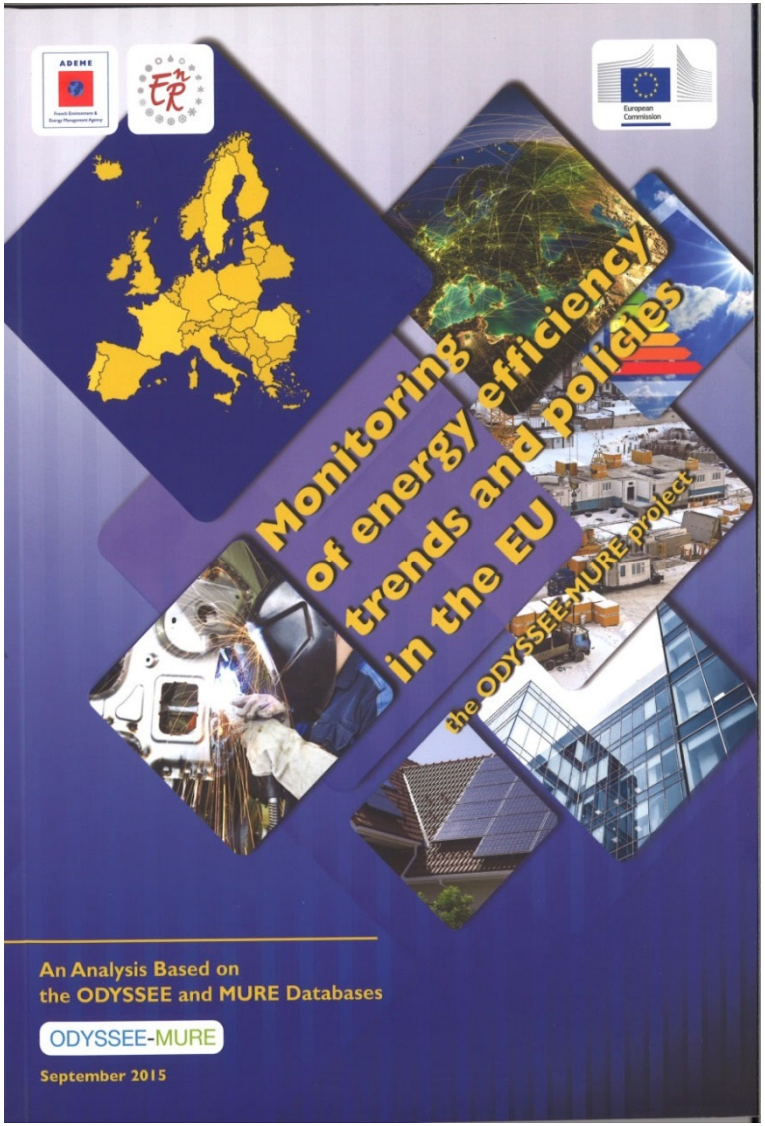


Average score Denmark: 3.8



The assessment criteria

C1	High impact / high number of applicants	
C2	Cost efficiency for the implementor / necessary administrative support	
C3	Potential for market transformation and for promotion of energy service market	
C4	Suitability to overcome barriers for energy efficiency	
C5	Ease and stability of re-financing (only relevant for financial measures)	
C6	Persistency of the savings induced by the measure	High priority
C7	Transferability between countries	
C8	Link other measures / policy packages	
C9	Some experience with measure	
C10	Avoidance of negative side-effects	
C11	Support of positive side-effects	
C12	Ease of acceptance by relevant stakeholders	Low priority



Thank you for your attention

For more information

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