

ODYSSEE-MURE

Evaluating energy efficiency policies in the EU

The MURE database for
energy efficiency policies

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July 2016



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 Fraunhofer
ISI

About Fraunhofer: Europe's largest Organisation for Applied Research

67 Fraunhofer Institutes in Germany

24 000 employees (mainly natural or engineering science training)

€ 2.2 billion research volume annually:

70% of income generated from contracts

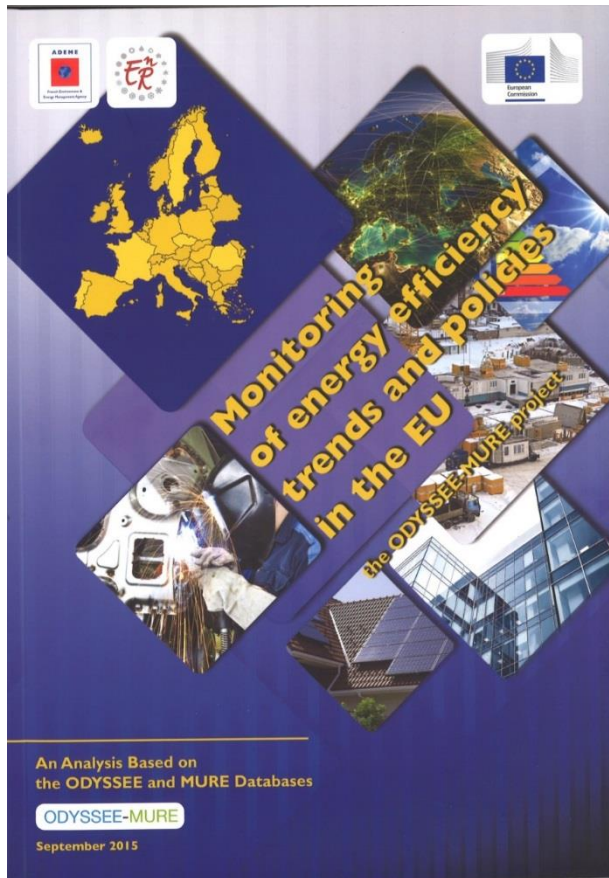
30% provided by the federal government and federal states as basic funding

International cooperation via affiliated offices in Europe, USA, Asia and in the Near East



The 2015 synthesis brochure

The following analysis is based on the 2015 ODYSSEE MURE synthesis brochure with energy efficiency up to 2014



The MURE data tools

<http://www.measures-odyssee-mure.eu/>

The screenshot shows the website interface for ODYSSEE-MURE. At the top, there are navigation links: Overview, Data Tools, Publications, News, and Contact. Below this is a main menu with sections: MUREII (with a description of MURE), DATABASE - QUERY, DATABASE - ADVANCED (with sub-sections RADAR GRAPHS and SUMMARY TABLES), and POLICY FACILITIES (with sub-sections POLICIES BY TOPICS, SUCCESSFUL POLICIES, POLICY INTERACTION, POLICY MAPPER, and POLICY SCOREBOARD). The footer contains logos for the European Union, ADENE, and ETR, along with a disclaimer and copyright information for ISIS (2001-2015).

<http://www.odyssee-mure.eu/publications/br/energy-efficiency-trends-policies-in-europe.html>

Content

- EU Energy Efficiency Policies
- Identify Successful Policies
- Policy Mapper/Policy Interaction
- Energy Efficiency Policy Scoreboard





EU Energy Efficiency Policies



Analyzing Energy Efficiency Measures in MURE

- HOUSEHOLD
- TERTIARY
- INDUSTRY
- TRANSPORT
- GENERAL CROSS-CUTTING
- ALL SECTORS

Search by text on measure type, title, reference

Search by text on measure description (PDF)

Mure II Database - Query - Household - Select your options and push the button Query

Country

- Countries
- European Union

Measure type

- Co-operative Measures
- Cross-cutting with sector-specific characteristics
- Financial
- Fiscal/Tariffs
- Information/Education
- Legislative/Informative
- Legislative/Normative

Targeted end-use

- Appliances
- Cooking
- Hot water
- Lighting
- Other targeted uses
- Space cooling
- Space heating
- Total electric cons.
- Total final cons.
- Total fuel cons.

NEEAP Measures:

Article 7 measures:

EU related measures:

Impact evaluation:

Semi-quantitative impact:

Status:

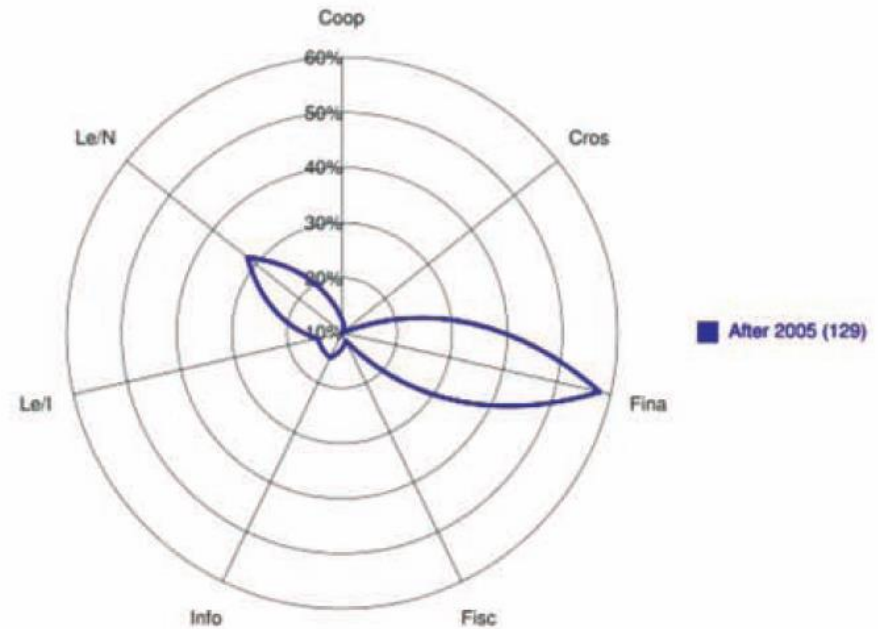
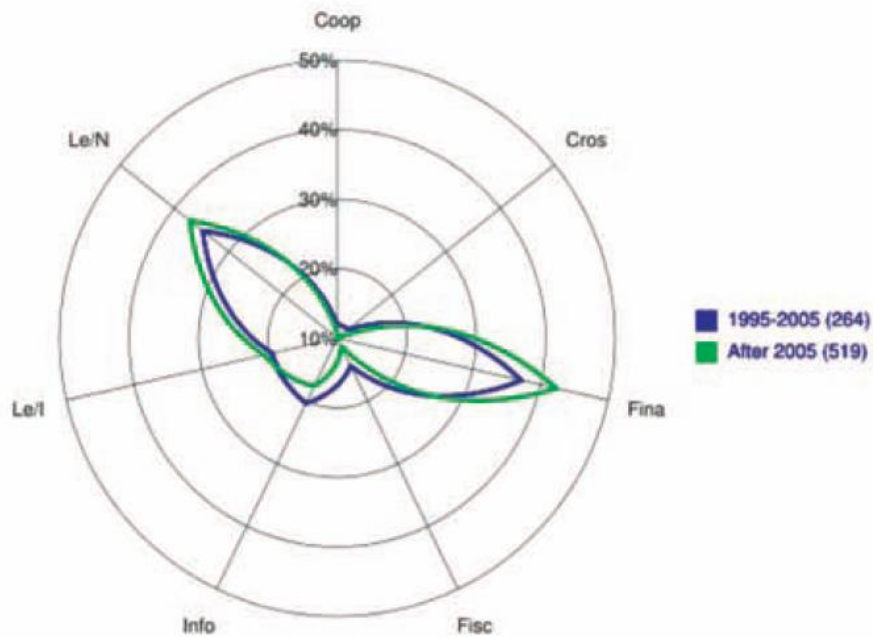
Starting year: From To

Measure descriptors

- Actors
- Target audience
- Evaluation method of targeted end uses

Preferential energy efficiency measures households

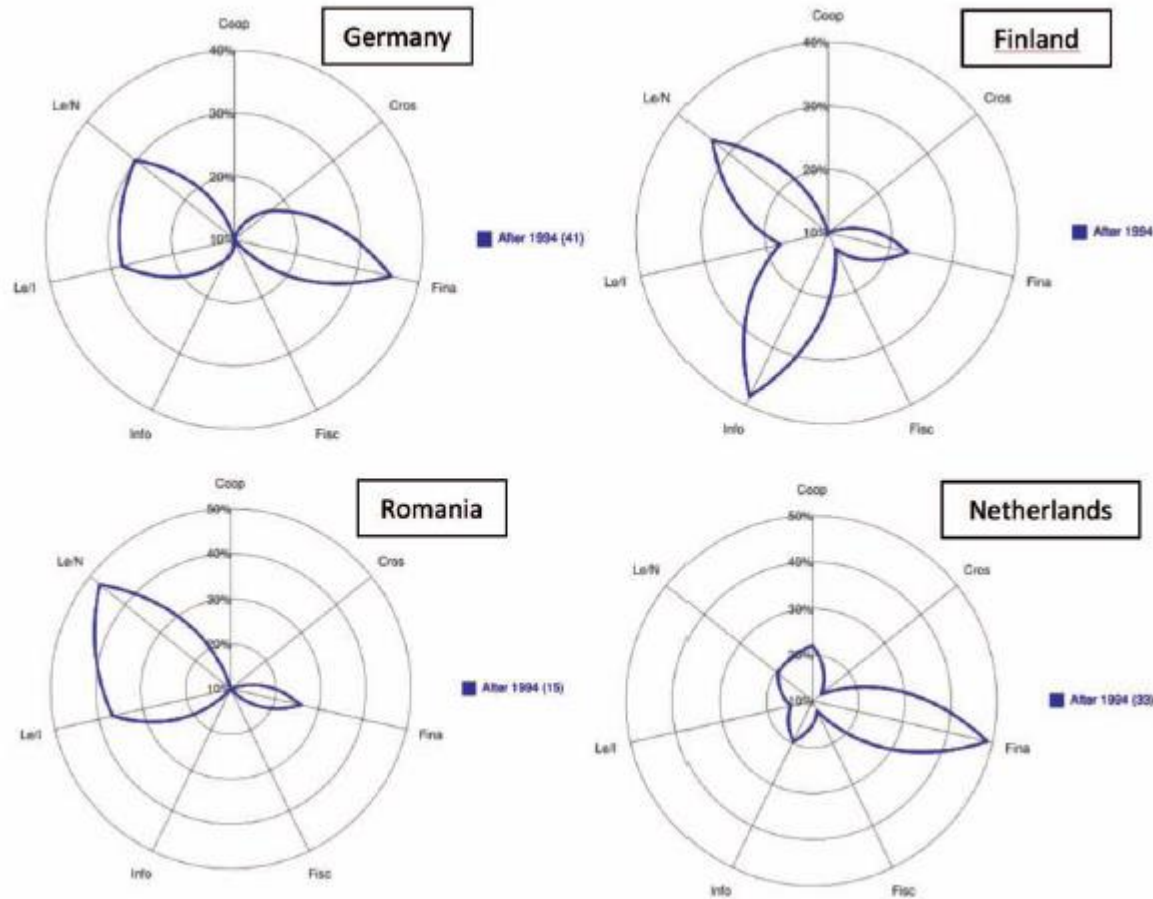
(left all measures from 1995, right NEEAP3 /Art.7 measures)



Legend for both graphs:
 Coop: Co-operative Measures
 Cros: Cross-cutting with sector-specific characteristics
 Fina: Financial

Fisc: Fiscal/Tariffs
 Info: Information/Education
 Le/l: Legislative/Informative
 Le/N: Legislative/Normative

Country-specific preferential energy efficiency measures households



Main EU energy efficiency policy measures and their impacts

Sector	Main objectives and regulations	Impact assessment
Cross-sectoral	Energy Efficiency Directive EED (Directive 2012/27/EU)	20% reduction of primary energy consumption compared to the PRIMES2007 baseline scenario, which is equivalent to a reduction by 368 Mtoe primary energy to a level of 1,474 Mtoe in 2020.
	Taxation of energy products and electricity (Directive 2003/96/EC)	Up to 92 MtCO ₂ reduction estimated by 2020 (depending on the chosen option).
	Promotion of the use of Energy from Renewable sources (Directive 2009/28/EC)	CO ₂ savings of 600-900 Mt/year by 2020.
Industry	Amended EU Emissions Trading Scheme (Directive 2009/29/EC)	Limited impact due to over-allocation.
Buildings + Appliances	Energy Performance of Buildings Recast (Directive 2010/31/EU)	60 to 80 Mtoe/year energy savings in 2020. 160 – 210 Mt/year CO ₂ savings in 2020.
	Ecodesign Recast Directive of Energy-related Products (Directive 2009/125/EC)	Estimated annual energy savings of 376 TWh (32.3 Mtoe) by 2020 (12 first implementing measures) or 150 Mt CO ₂ .
	Revised Directive of Labelling of Energy-related Products (Directive 2010/30/EU)	Energy savings of around 27 Mtoe by 2020. CO ₂ savings of 80 Mt by 2020.
	Energy Labelling Office Equipment (Energy Star)	Emission reduction of 3.7 MtCO ₂ . Estimated energy savings of 10 TWh (0.9 Mtoe) in 2015.
Transport	Emission Performance Standards for New Passenger Cars (Directive 443/2009/EC)	Cumulative savings of 624 – 638 MtCO ₂ for the period 2006-2020, which corresponds in average to an annual reduction of 45 Mt CO ₂ .



Successful Policy Measures



Criteria for Successful Measures (High Priority Criteria)

1. High impact / high number of applicants
2. Cost efficiency for the implementor / necessary administrative support
3. Potential for market transformation and for promotion of energy service market
4. Suitability to overcome barriers for energy efficiency
5. Ease and stability of re-financing
6. Persistency of the savings induced by the measure

Criteria for Successful Measures (Low Priority Criteria)

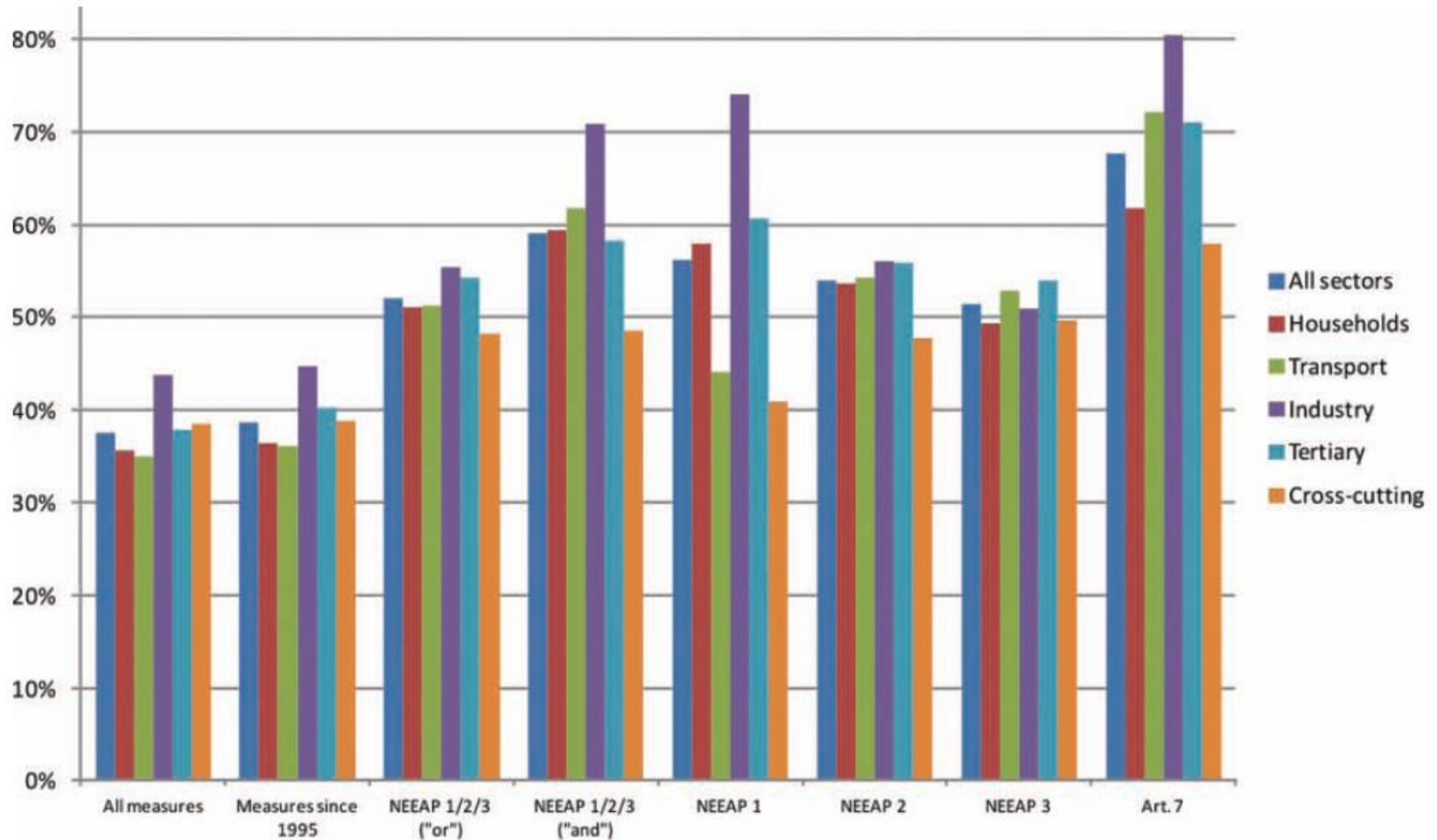
7. Transferability between countries
8. Link to other measures / policy packages
9. Some experience with measure
10. Avoidance of negative side-effects
11. Support of positive side-effects
12. Ease of acceptance by relevant stakeholders



Quantitative evaluation of each policy with a score between 1 (worst) and 5 (best) for each of the 12 criteria

Learning to evaluate through National Energy Efficiency Action Plans NEEAPs

Share of measures with quantitative impact evaluations (by sector)



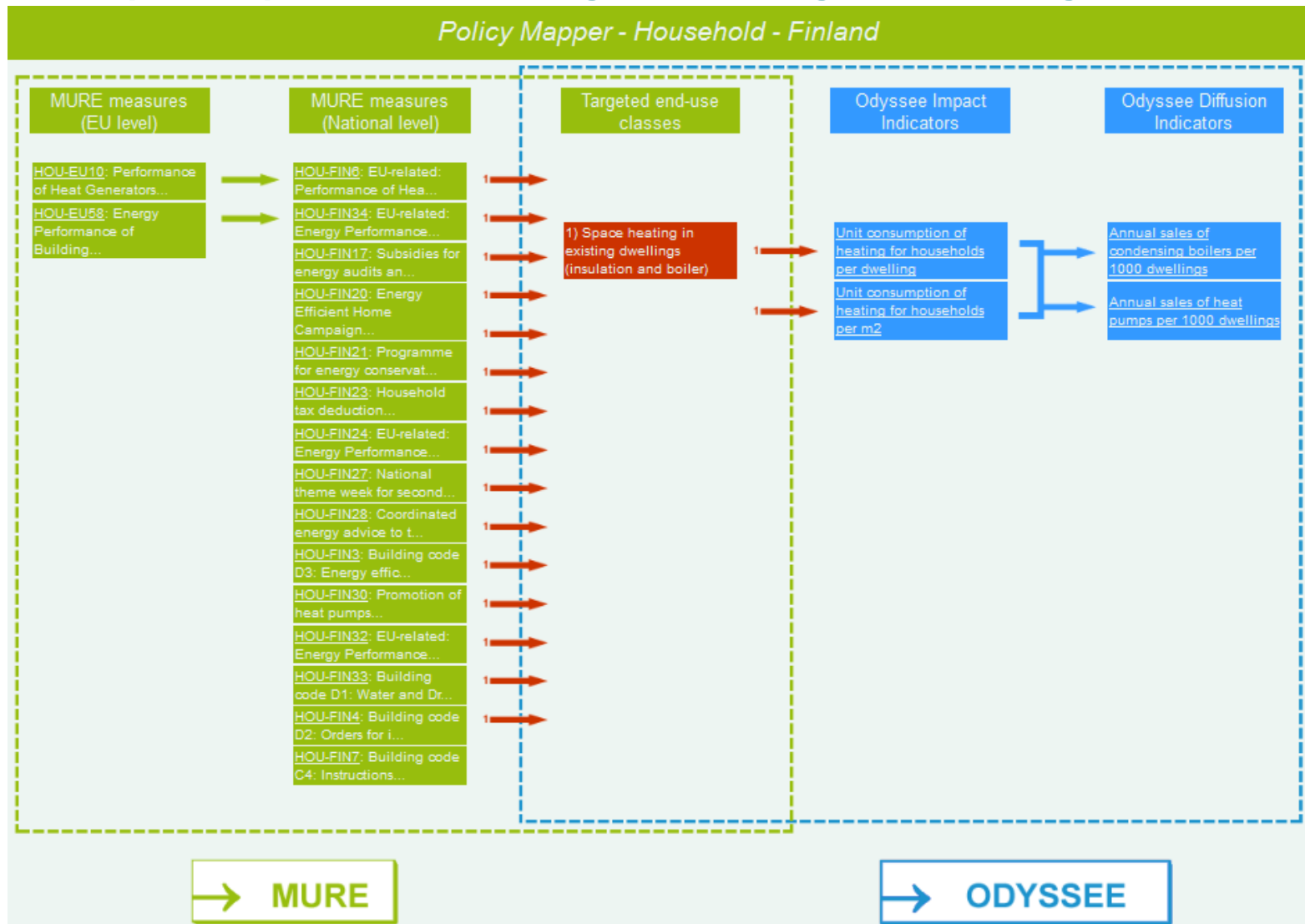


Policy Mapper / Policy Interaction



Policy Mapping

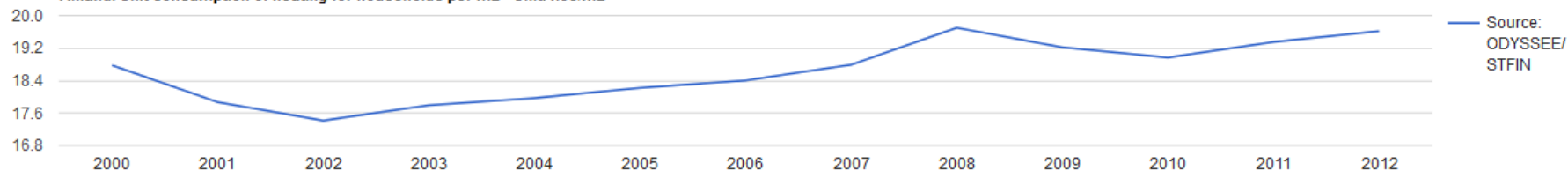
(Example Space Heating Existing Dwellings Finland)



Link Policies/Indicators

(Example Space Heating Existing Dwellings Finland)

Finland: Unit consumption of heating for households per m2 - Unit: koe/m2



Code	Title	From	Updated
HOU-FIN3	Building code D3: Energy efficiency of new buildings	1979	2016
HOU-FIN27	National theme week for second grade pupils	1996	2015
HOU-FIN6	EU-related: Performance of Heat Generators for Space Heating/Hot Water (Directive 92/42/EEC) - Building code D7: Orders for boiler efficiency	1998	2014
HOU-FIN23	Household tax deduction	2000	2011
HOU-FIN30	Promotion of heat pumps	2000	2015
HOU-FIN17	Subsidies for energy audits and energy efficiency improvements	2002	2014
HOU-FIN7	Building code C4: Instructions for thermal insulation	2003	2016
HOU-FIN4	Building code D2: Orders for indoor climate and ventilation in new buildings	2003	2014
HOU-FIN20	Energy Efficient Home Campaign	2005	2015
HOU-FIN24	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Periodic voluntary inspections of household boilers	2007	2011
HOU-FIN21	Programme for energy conservation in oil-heated buildings, the Höylä III Programme	2007	2016
HOU-FIN32	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Mandatory energy efficiency certificates for buildings (dwellings)	2008	2014
HOU-FIN28	Coordinated energy advice to the consumers	2010	2014
HOU-FIN33	Building code D1: Water and Drainage Systems for Properties	2011	2014
HOU-FIN34	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Decree on improving the energy performance of buildings undergoing renovation or alteration	2013	2014

Measure Interactions

(Example Space Heating Existing Dwellings Finland)

Select the country, the targeted end-use class, then click on the button Submit to calculate the energy saving of the measures package

Finland

Space heating in existing dwellings (insulation and boiler)

Submit

Open
Guideline

Code	Measure Title	Types group	Qualitative Impact	En. Saving (PJ)	% of Saving
HOU-FIN34	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Decree on improving the energy performance of buildings undergoing renovation or alteration	Leg-norm/invest	High	1,311	0,70%
HOU-FIN3	Building code D3: Energy efficiency of new buildings	Leg-norm/invest	High	1,311	0,70%
HOU-FIN4	Building code D2: Orders for indoor climate and ventilation in new buildings	Leg-norm/invest	Low	0,187	0,10%
HOU-FIN32	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Mandatory energy efficiency certificates for buildings (dwellings)	Leg-norm/invest	Low	0,187	0,10%
HOU-FIN7	Building code C4: Instructions for thermal insulation	Leg-norm/invest	High	1,311	0,70%
HOU-FIN6	EU-related: Performance of Heat Generators for Space Heating/Hot Water (Directive 92/42/EEC) - Building code D7: Orders for boiler efficiency	Leg-norm/invest	Low	0,187	0,10%
HOU-FIN33	Building code D1: Water and Drainage Systems for Properties	Leg-norm/use	Medium	0,562	0,30%
HOU-FIN17	Subsidies for energy audits and energy efficiency improvements	Finan-fiscal/invest	Medium	0,562	0,30%
HOU-FIN23	Household tax deduction	Finan-fiscal/invest	Low	0,187	0,10%
HOU-FIN20	Energy Efficient Home Campaign	Inform/broad (center, etc.)	Low	0,187	0,10%
HOU-FIN30	Promotion of heat pumps	Inform/broad (center, etc.)	High	1,311	0,70%
HOU-FIN21	Programme for energy conservation in oil-heated buildings, the Höylä III Programme	Inform/broad (center, etc.)	High	1,311	0,70%
HOU-FIN24	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Periodic voluntary inspections of household boilers	Inform/broad (center, etc.)	Low	0,187	0,10%
HOU-FIN27	National theme week for second grade pupils	Inform/broad (center, etc.)	Low	0,187	0,10%
HOU-FIN28	Coordinated energy advice to the consumers	Inform/broad (center, etc.)	Medium	0,562	0,30%
Sum of impacts (without interaction)				9,551	5,10%
Combined impact (with interaction)				7,804	4,17%
Difference (combined impact - sum of impacts)				-1,747	-18,29%
Modify the impact values and click the button Calculation to make your own evaluation. Click the button Reset to restore the default values					
Some measure may be related to more then one types group, in this case you can select the one of primary importance from the related list box					
		Calculation	Reset		
Click on the button below to view and/or modify the measure types group interaction matrix			Click on the button below to select the measures to be included in the calculation		
Interaction matrix adaptations			Measure selection		

Measure Interaction Matrix



Measure types group interaction matrix - Finland

You can modify the values of the interaction matrix by choosing from the related list boxes, then click the button Confir

	Leg-norm/invest	Leg-norm/use	Leg-inform/focus (label)	Leg-inform/focus (label)	Finan-fiscal/invest	Market-instrum/invest	Finan-fiscal/info (a
Leg-norm/invest							
Leg-norm/use							
Leg-inform/focus (label)		Not interactir					
Leg-inform/focus (label)		Not interactir	Strong overl				
Finan-fiscal/invest		Some overla	Strong reinfo	Reinforcing			
Market-instrum/invest							
Finan-fiscal/info (audit)		Not interactir	Strong overl	Strong overl	Some reinfo		
Inform/focused-invest		Strong overl	Not interactir	Some overla	Not interactir		Not interactir
Inform/broad (center, etc.)		Some overla	Some overla	Not interactir	Some reinfo		Some overla
Coop/focused (VA-manufacturers)		Not interactir	Reinforcing	Not interactir	Some overla		Some reinfo
Coop/broad (VA-sector)		Overlap	Some reinfo	Some reinfo	Overlap		Some reinfo
Cross-cutting/taxes							

Confirm

Reset

Most successful energy efficiency measures Germany

Code	Most successful energy efficiency measures in Germany	Avg score	Measure Type I)	Starting Year
HOU-GER33	KfW Programme "Energy-efficient refurbishment" (former CO ₂ Building Rehabilitation Programme)	3.9	Fin	2009
HOU-GER8	EU-related: Ecodesign Directive for Energy-using Products (Directive 2005/32/EC) Energiebetriebene-Produkte-Gesetz - EBPG	3.7	Leg/Nor	2005
HOU-GER6	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) Energy Savings Ordinance (Energieeinsparverordnung - EnEV)	3.5	Leg/Inf, Leg/Nor	2002
TER-GER35	EU-related: Recast Ecodesign Directive for Energy-related Products (Directive 2009/125/EC) Eco-Design of Energy-using products (Energiebetriebene-Produkte-Gesetz - EBPG)	3.8	Leg/Nor	2011
TER-GER29	Special fund for energy efficiency in SME's	3.6	Fin	2008
TER-GER32	Smart Metering	3.5	Leg/Inf	2010
IND-GER36	Special fund for energy efficiency in SME's	3.7	Fin	2008
IND-GER18	Voluntary agreement with German industry II	3.5	Co-op	2000
TRA-GER39	EU-related: Emission performance standards new passenger cars (Regulation 443/2009/EC) Accelerating technical development / CO ₂ strategy for passenger cars	3.9	Leg/Nor	2009
TRA-GER32	Improving the infrastructure for using bicycles	3.8	Fin	2002
TRA-GER2	Heavy goods vehicle toll charges	3.3	Fin	2005
GEN-GER29	National Climate Initiative (NKI)	3.7	EE/CC/RES, NMB	2008
GEN-GER19	National Energy Efficiency Action Plan (NEEAP) of the Federal Republic of Germany	3.6	EE/CC/RES	2008



Policy Scoreboard



Four main scoring approaches

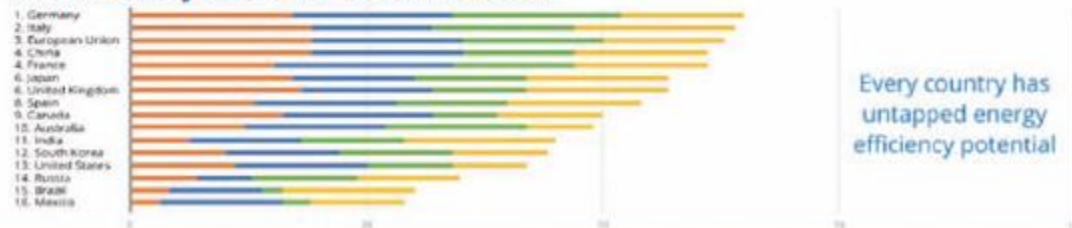
- Output-based scoring (based on energy savings)
- Output-based scoring (related to energy efficiency potentials)
- Output-based scoring (related to 2020 energy efficiency targets)
- Input-based scoring (based on financing volumes)

Input-based Scoreboard: ACEEE

2014 International Energy Efficiency Scorecard



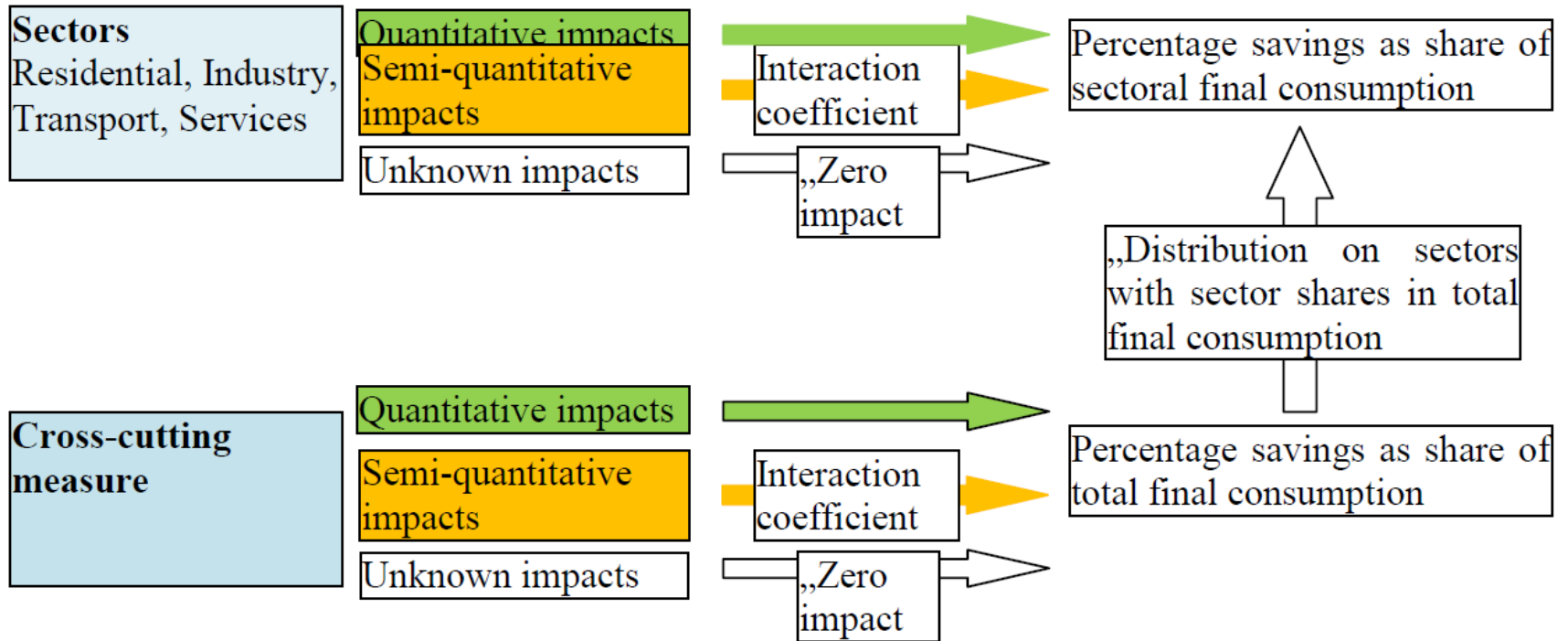
Overall country scores with sector breakdown



**THE US RANKS #13
OUT OF 16**

The United States – long considered an innovative and competitive world leader – has allowed other nations to surpass it.

Basic methodology for the Output-based Scoreboard



Combined Energy Efficiency Scoreboard presented in Germany

Tabelle 1

Deutschland steht beim Niveau der Energieeffizienz noch auf vorderen Plätzen...

Country	2012 Final Energy Intensity *	Rank
Malta	0,0717	1
United Kingdom	0,0746	2
Lithuania	0,0851	3
Germany	0,0884	4
Slovakia	0,0888	5
Hungary	0,0909	6
Spain	0,0925	7
Portugal	0,0930	8
European Union	0,0947	
Austria	0,0950	9
Poland	0,0964	10
Italy	0,1010	11
Netherlands	0,1021	12
Denmark	0,1027	13
France	0,1051	14
Czech Rep.	0,1053	15
Croatia	0,1060	16
Cyprus	0,1076	17
Ireland	0,1076	18
Greece	0,1096	19
Slovenia	0,1108	20
Romania	0,1135	21
Norway	0,1168	22
Latvia	0,1205	23
Bulgaria	0,1288	24
Belgium	0,1326	25
Estonia	0,1369	26
Finland	0,1488	27
Luxembourg	0,1584	28
Sweden	n.a.	

* Final energy intensity (koe/€2005p) adjusted for differences in industry and economic structure, as well as for climate differences (ppp, 2005)

Tabelle 2

...erzielte aber seit 2000 nur vergleichsweise bescheidene Fortschritte

Country	ODEX 2000-2012 *	Rank
Latvia	3,11%	1
Poland	2,79%	2
Romania	2,53%	3
Bulgaria	2,47%	4
Lithuania	2,02%	5
United Kingdom	1,89%	6
Netherlands	1,84%	7
Norway	1,81%	8
Slovenia	1,77%	9
Hungary	1,60%	10
Slovakia	1,54%	11
European Union	1,34%	
Denmark	1,24%	12
France	1,19%	13
Portugal	1,15%	14
Sweden	1,12%	15
Croatia	1,07%	16
Ireland	1,06%	17
Germany	1,04%	18
Cyprus	1,04%	19
Czech Rep.	1,01%	20
Austria	0,99%	21
Belgium	0,87%	22
Italy	0,83%	23
Estonia	0,75%	24
Greece	0,71%	25
Luxembourg	0,39%	26
Finland	0,34%	27
Spain	0,22%	28
Malta	0,10%	29

* Jährliche Energieeffizienzgewinne 2000-2012 (gemessen mit ODEX)

Tabelle 3

Ein guter Platz bei der Energieeff. politik könnte bei konsequenter Umsetzung erlauben, die Energiewendeziele zu erreichen

Country	Policy impact*	Rank
Bulgaria	56	1
Croatia	54	2
Germany	53	3
Ireland	48	4
Spain	48	5
France	46	6
Estonia	40	7
Finland	36	8
Latvia	36	9
Romania	34	10
Portugal	29	11
UK	27	12
Hungary	26	13
Belgium	25	14
Slovakia	25	15
Malta	25	16
Netherlands	23	17
Norway	21	18
Slovenia	21	19
Cyprus	20	20
Greece	20	21
Italy	20	22
Poland	15	23
Luxembourg	12	24
Czech Republic	12	25
Lithuania	11	26
Denmark	11	27
Austria	10	28
Sweden	10	29

* in energy efficiency base points (1 point = 0.1% of final energy consumption), based on impact assessments provided in the MURE database on energy efficiency policies 2000-2014

Status: left, trend: middle, energy efficiency policies: right

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Thank you for your
attention !