



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



ADEME



Agence de l'Environnement
et de la Maîtrise de l'Energie

ODYSSEE-MURE

ECEEE Industrial Energy Efficiency 2018
Berlin, 12 June 2016

Measuring Multiple Benefits for Energy Efficiency in the Industrial Sector

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Fraunhofer
ISI

MULTIPLE BENEFITS IN ODYSSEE-MURE

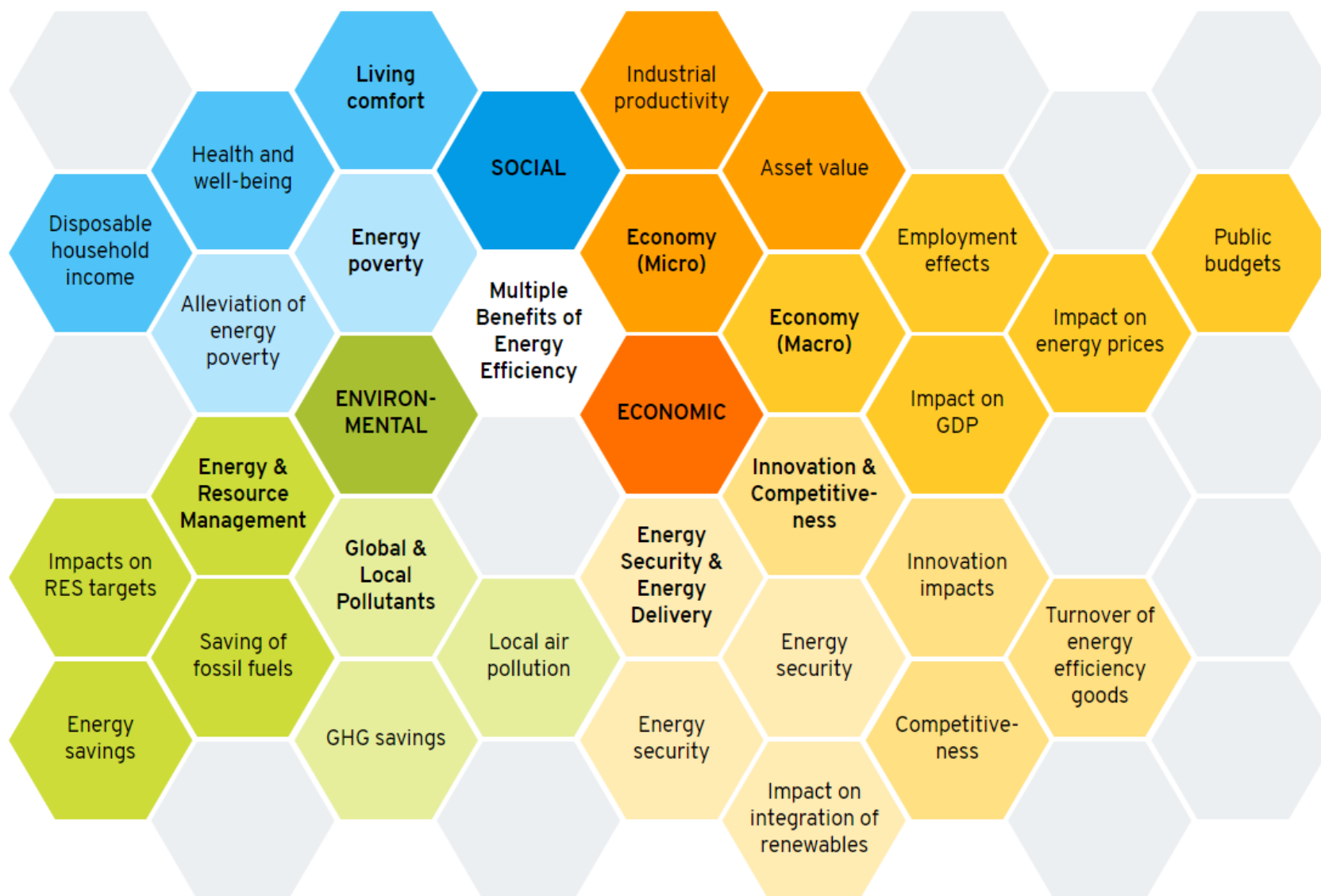
Aim:

- Improve capacity building on multiple benefits of EE (MB:EE)
- Set of 19 Indicators
 - 3 main groups: *environmental, economic, social*
 - 8 sub groups
- Application for 31 countries (EU28 plus Norway, Switzerland and Serbia) if possible
- For both bottom-up (MURE) and top-down (ODYSSEE) savings

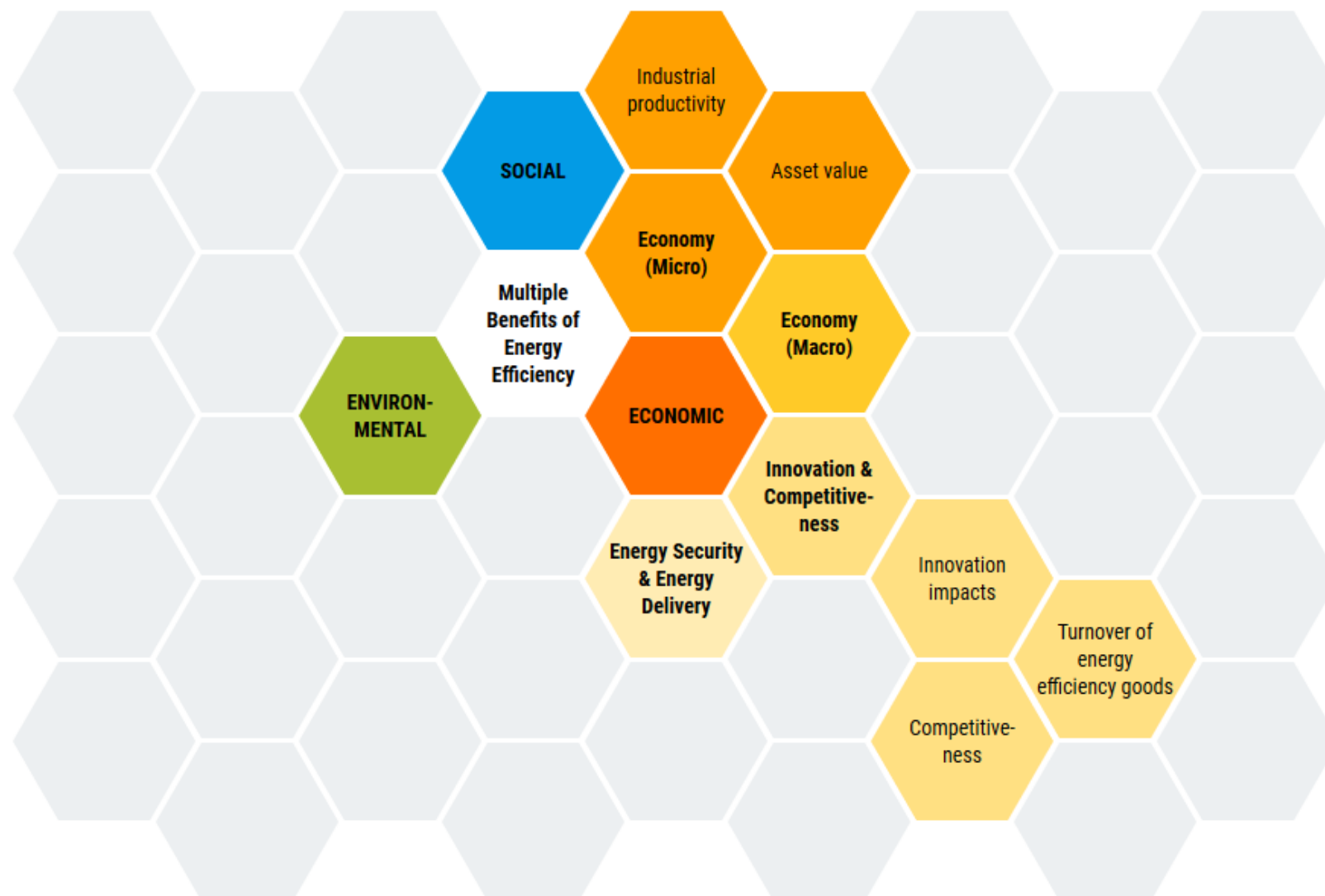
Multiple Benefits of Energy Efficiency



Multiple Benefits of Energy Efficiency



Multiple Benefits of Energy Efficiency



MB:EE – Competitiveness impact

- **Methodology:** Foreign trade analysis (UN-COMTRADE database)
- World Market Shares (WHA)

World trade for
technology j



$$WHA_{ij} = 100 * (a_{ij} / \sum_i a_{ij})$$

- Specialisation indicators established in a Revealed Competitive Advantage RCA

Export/Import
performance for
technology j



Export/Import
performance of the
country for all
technologies

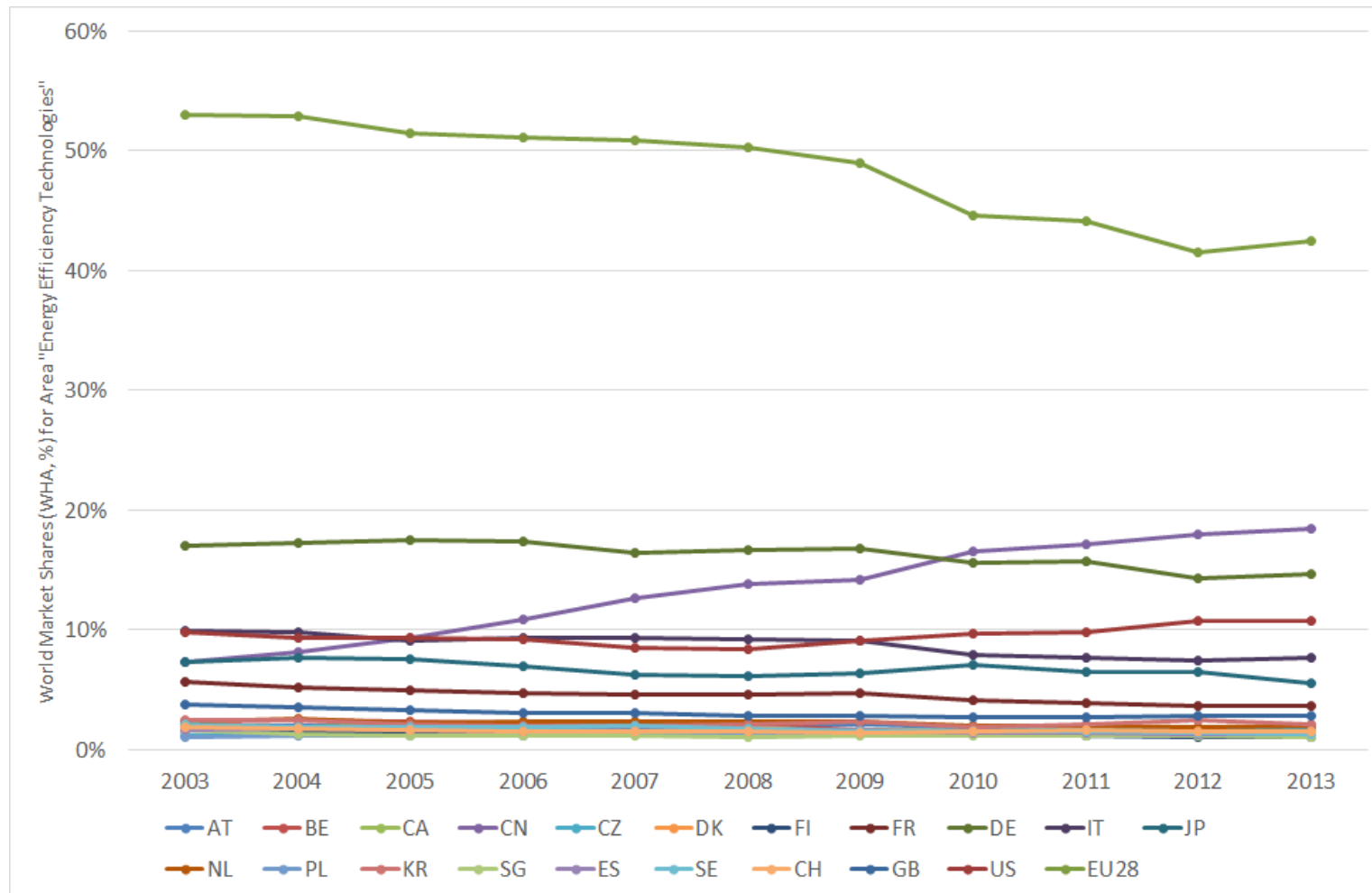


$$RCA_{ij} = 100 * \tanh \ln [(a_{ij}/e_{ij}) / (\sum_j a_{ij} / \sum_j e_{ij})]$$

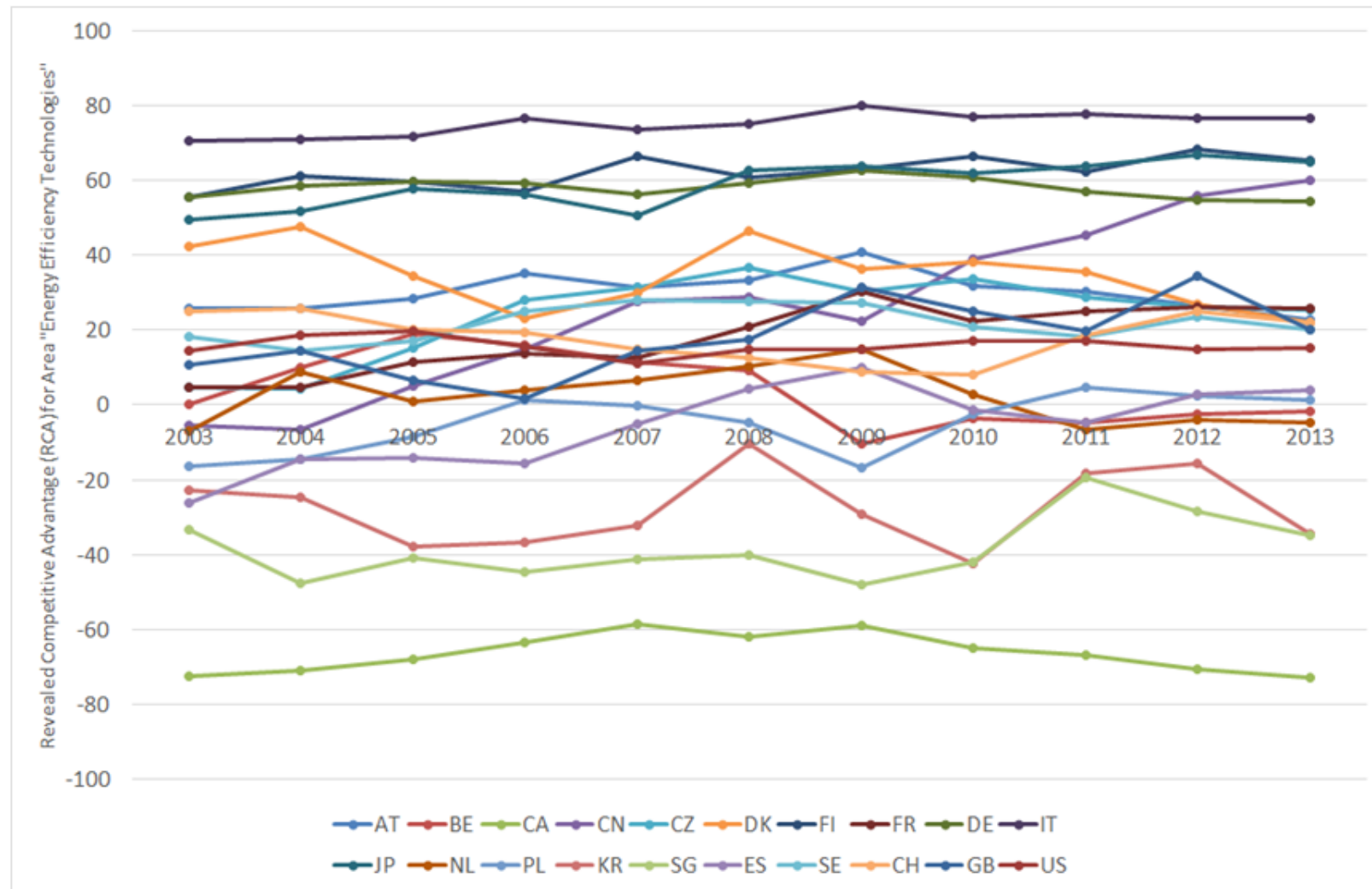
Definition of Energy Efficiency Technologies for Innovation and Competitiveness Analysis

Area	Technology Group	Technologies
Energy Efficiency Technologies	EE building technology	Efficient building components like insulation materials, insulation glassing, controlled air conditioning and ventilation, efficient conventional heating systems and heat pumps, building automation technologies. More difficult are system aspects in buildings such as low energy houses/passive houses
	EE electric technologies in buildings	Energy efficient lighting and energy efficient appliances
	EE processes in industry	<u>Iron/steel production, paper production etc.</u>
	EE industrial cross-cutting technologies	Heat exchangers, efficient electric motors, pumps, ventilators etc., efficient industrial furnaces and driers

World Market Shares (WHA, %) for the Area "Energy Efficiency Technologies" as a whole



Revealed Competitive Advantage RCA for the Area "Energy Efficiency Technologies" as a whole



MB:EE – Innovation impact

- **Methodology:** Patent analysis (applications at World Intellectual Property Organization WIPO)
- Share in world patents for a given technology
- Specialisation indicators established in a Relative Patent Share RPA (compared to all technologies)

Patent volume for
technology j



$$PA_{ij} = 100 * (p_{ij} / \sum_i p_{ij})$$

Patent performance
for technology j

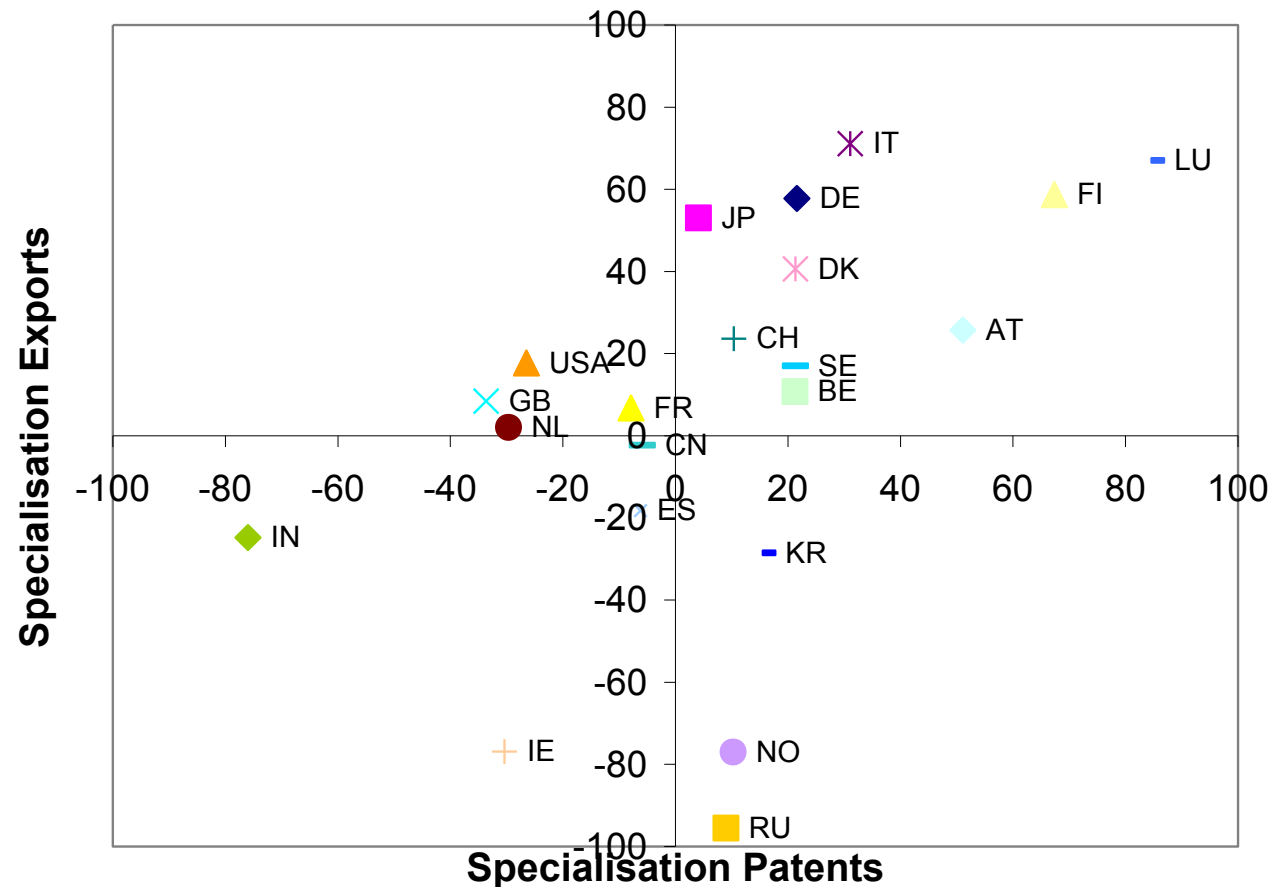


Patent performance of
the country for all
technologies



$$RPA_{ij} = 100 * \tanh \ln [(p_{ij} / \sum_i p_{ij}) / (\sum_j p_{ij} / \sum_{ij} p_{ij})]$$

MB:EE – Specialisation Profiles (Area "Energy Efficiency Technologies")

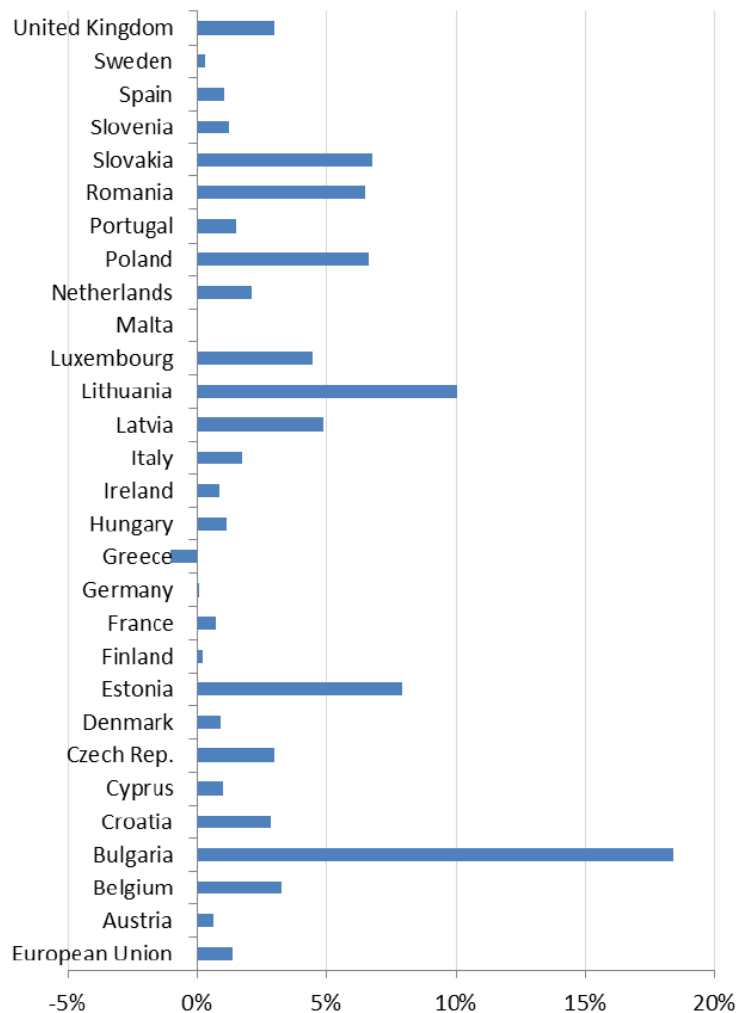


A country in the upper right quadrant is strong in both innovation and competitiveness for EE technologies

MB:EE - Industrial productivity

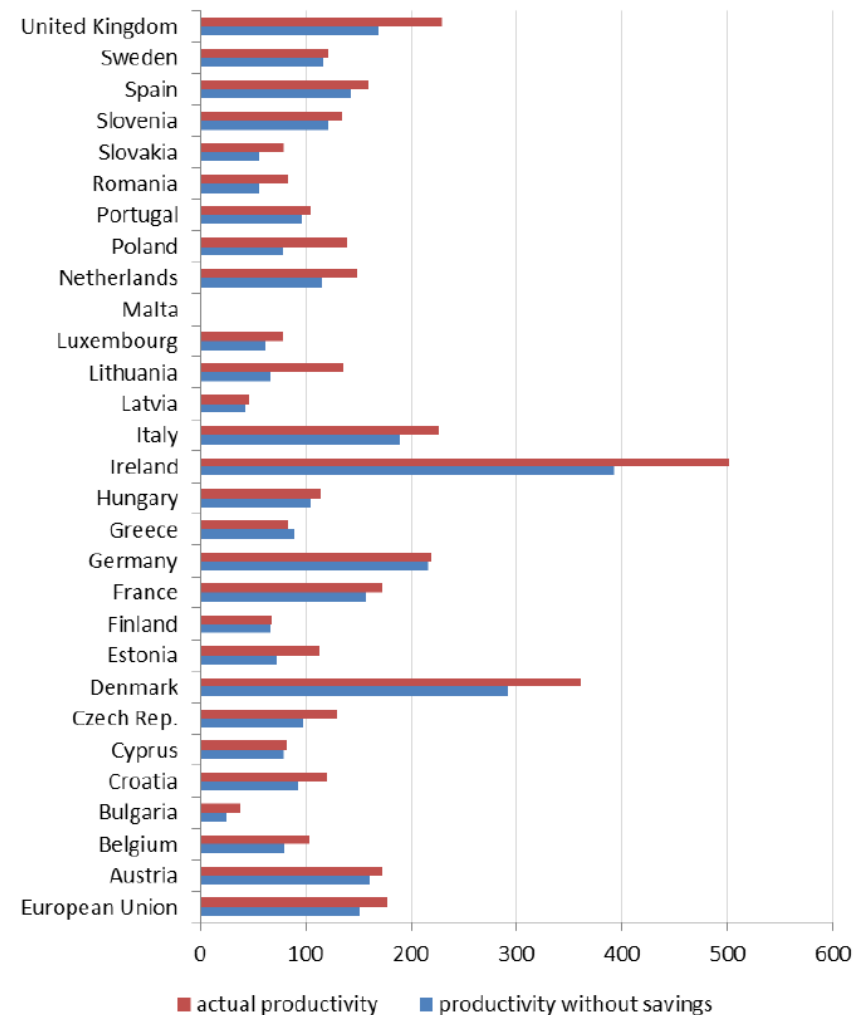
- **Methodology:** Link saved energy cost to value added of industry (energy as factor cost)
- Odyssee-MURE: saved energy (top-down/bottom-up) \Rightarrow avoided energy cost
- Indicator 1: avoided energy cost / value added
- Indicator 2: energy productivity (value added divided by energy used)
- **Critics:** Omission of investments

Indicator 1: saved energy/value added (%)



percentage of value added saved due to energy efficiency between 2000 and 2015

Indicator 2: energy productivity with/out savings



actual energy productivity and energy productivity without energy savings since 2000 in the manufacturing industry in Meuro/PJ in 2015

MB:EE – Turnover with EE goods

- **Methodology:** based on weighted average of the investments per unit of energy savings
- Odyssee-MURE: saved energy (top-down/bottom-up)
- Country case studies (e.g. Netherlands – annual monitor on energy efficiency)
- **Critics:** More data collection necessary on investments

Average turnover due to EE technologies produced for residential sector 2011-2015 in EU (million Euro/year)

Belgium	Croatia	Estonia	France	Italy	Latvia	Lithuania	Netherlands
323	311	119	3,910	2,428	89	154	2,538
Poland	Portugal	Romania	Slovakia	Slovenia	Spain	United Kingdom	
167	223	1,192	406	193	1,584	6,016	

MB:EE – Industry

- **Discussed: Operationalisation of...**
 - MB-EE Competitiveness impacts
 - MB-EE Innovation impacts
 - MB-EE Industrial productivity
 - (MB-EE Asset value)
- Ideas for further important industrial MB:EEs and how to operationalise them?

Web facility on MB:EE

Live demo in Browser

[LINK](#)

[Back up](#)

<http://bfig1.de/mbee/en/> (The MB-website is in the phase completion in the period December 2017-January 2018)
Later on this will be integrated into the official ODYSSEE-MURE website