MULTIPLE IMPACTS OF ENERGY EFFICIENCY
A comprehensive indicator approach

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Matthias Reuter, Fraunhofer ISI
**Overall Approach**

- Focus on the *multiple benefits / impacts* of energy efficiency (“MB:EE”)
- Developed as part of the ODYSSEE-MURE project
- Set of 20 indicators in 3 main groups (environmental, social and economic)
- Linked to both (ex-post) top-down and bottom-up savings
- Covering as many EU Member States as possible
- Indicators rated in 3 categories (A to C) based on coverage, methodology and data basis

- Available as an online tool
Introduction

Reuter et al. (2020)

(A) good temporal and spatial coverage within the EU as well as a solid methodological basis
(B) limited spatial and temporal coverage, while still being based on a good methodological foundation.
(C) limited spatial and temporal coverage and methodological limitations.

*second order (feedback loops)
**Example:** *Environmental - GHG emissions*

To assess the CO$_2$ emissions linked to the energy savings achieved we apply the following method:

- **Final energy savings per sector**
- **CO$_2$-emissions**
- **Sector specific emission factors**
- **Heating / electricity**

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Reuter et al. (2020)
**Example: Economic - Public budgets**

To measure the impact of energy efficiency measures on public budget (only income tax) we apply the following method:

1. **Final energy savings in buildings**
2. **IO-A**
3. **Change in GVA**
4. **Typical investments per energy saved**
5. **FTE per GVA**
6. **Avg. rate of income tax**
7. **FTE**
8. **Additional income tax**

![Graph showing additional income tax in 2010 (ME)](image)

Reuter et al. (2020)
**Methodology/Results**

### Example: Economic - Supplier diversity

- To measure the degree of supplier diversity of a country we use the Herfindahl-Hirschman-Index (HHI)

\[
HHI = \sum_i^{4} \left( \frac{\sum_j (MS_{ij})^2}{I_{tot}} \right) \cdot I_i
\]

Where \( MS_{ij} \) represents the share of the supplying country \( j \) in the imports \( I \) of energy carrier \( i \) (solid fuels, oil, gas, electricity) of the country considered, multiplied by the imports of the respective energy carrier.

- Assuming that the energy savings (expressed in primary terms) reduce the primary energy imports from the main supplier (i.e. minimizing the share of the dominant supplier).

- The impact of EE in supplier diversity is measured with the difference between the observed HHI (“actual HHI”) and a counterfactual HHI “without energy savings”
Results

Main results
- Strong evidence for multiple benefits of energy efficiency
- Comprehensive set of indicators covering all relevant aspects
- A good coverage of countries and indicators has been achieved

Limitations
- A few indicators (category C) have to be further developed to close caveats in the approach in the future
  - Extending coverage to all countries
  - Direct methodological linkage to energy efficiency for a few indicators
- Limited to ex-post data
- Limited to national level
Outlook

Future work

- The findings will be refined and incorporated into a H2020 project (MICAT, [https://micat-project.eu/](https://micat-project.eu/))
  - Aims to establish a quasi-standard online tool for assessing multiple impacts of energy efficiency
  - ex-post, ex-ante data (for both top-down and bottom-up evaluations)
  - on different spatial levels
    - EU,
    - National,
    - Local (municipalities)
Outlook

Multiple Impacts Calculation Tool
Outlook

Effect on GDP (modelling)

Effect on GDP (I/O analysis)

Effect on supplier diversity

Multiple Impacts Calculation Tool

Ex-ante

Ex-post

Top-down

Bottom-up

Level

EU national local

EU local

national

local
Thank you very much for your attention!

Matthias Reuter  
Competence Center Energy Policy and Energy Markets  
Fraunhofer Institute for Systems and Innovation Research ISI  
Breslauer Strasse 48 | 76139 Karlsruhe, Germany  
Phone +49 721 6809-651 | Fax +49 721 6809-272  
matthias.reuter@isi.fraunhofer.de  

MICAT  
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https://www.micat-project.eu  

ODYSSEE-MURE  
https://www.odyssee-mure.eu