MICAT

Multiple Impacts Calculation Tool

POLICY BRIEF: THE CONCEPTUAL FRAMEWORK OF MICAT AND ITS RELEVANCE FOR POLICYMAKERS

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Executive Summary

The MICAT project aims to develop a comprehensive approach to estimate Multiple Impacts of Energy Efficiency (MI) by providing a publicly available, easy to use, flexible, and scientifically sound online tool (MICATool) to enable holistic analyses of MI at the European, national, and local levels. The main target groups of the tool are policy makers and evaluators on the different governance levels seeking to make informed decisions on future activities or evaluate ongoing or terminated energy efficiency measures and scenarios. The MICATool will cover the most relevant indicators in the social, economic, and environmental impacts categories, which will be quantified based on impact factors or functions directly linked to specific input parameters of the scenarios or measures. Where feasible, MI will be converted into monetary values to allow for a comparison of their magnitude and to integrate them into Cost-Benefit Analyses (CBAs). The MICATool will finally enable policy makers and evaluators to comprehensively assess MI and gain a more complete overview of the real value of energy efficiency that is needed to inform policy decisions which provide the largest benefit to society.

Introduction

The EU H2020-funded MICAT project aims to develop a comprehensive approach and user-friendly online tool to quantify the Multiple Impacts of energy efficiency. Within the project, the development of the overall quantification and monetisation concept is central to its scope, as it lays the foundation for the actual quantification and monetisation of MI as well as for the MICATool, the project's online quantification tool. This policy brief summarises important elements of the conceptual framework of MICAT. Details are presented in the following two MICAT reports:

- Overall quantification and monetisation concept
- Cost-Benefit Analysis and aggregation methodology

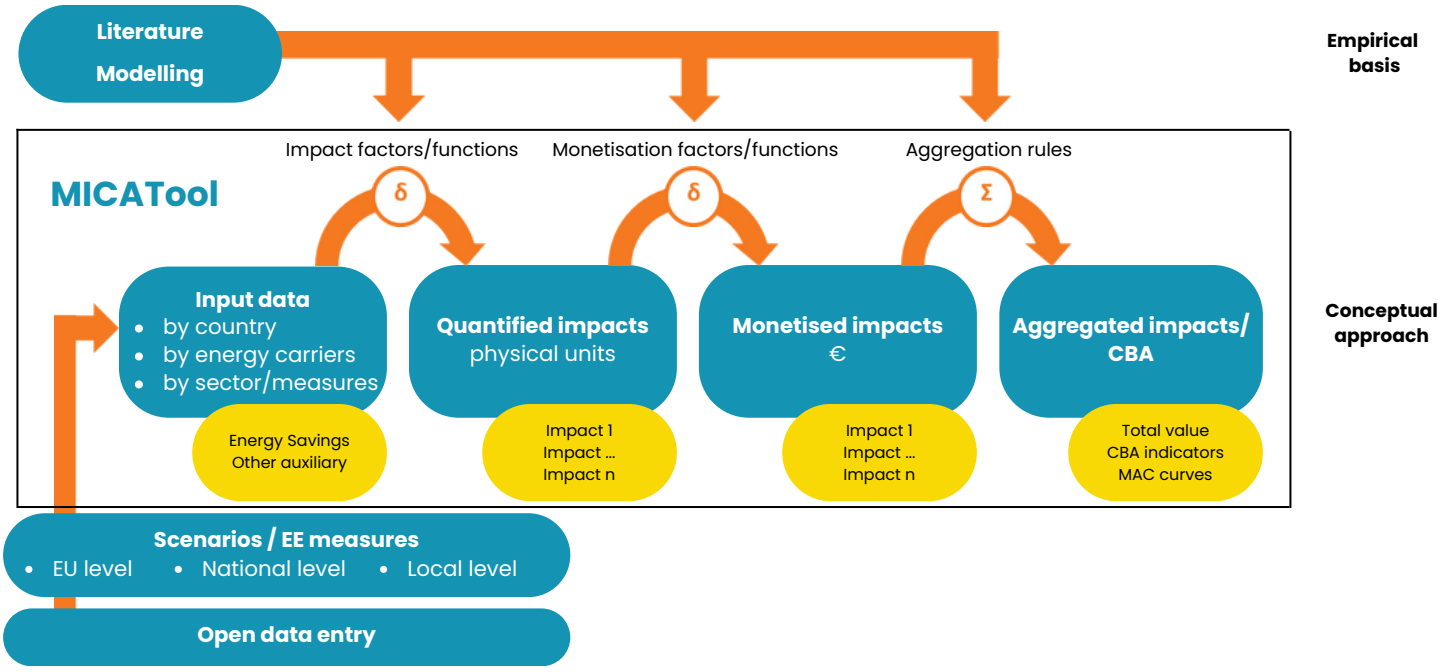
Overview of Impacts Quantified in MICAT

The MICATool will allow for the quantification of the most relevant indicators in the categories social, economic, and environmental impacts. Some of these indicators featured in the overview below will be further disaggregated in the online tool.

Social impacts	Economic impacts	Environmental impacts
Alleviation of energy poverty	Macroeconomic impacts (e.g., GDP, employment effects, impact on public budget, energy/EU-ETS price effects, turnover of EE goods)	Material resource savings
Quality of life (alleviation of inequality)	Microeconomic impacts (e.g., industrial productivity, asset value of buildings)	Impacts on RES targets
Human health due to improved indoor climate	Innovation & Competitiveness	Reduction in greenhouse gas emissions
Human health due to reduced air pollution	Energy Security & Energy Delivery (e.g., import dependency, energy security, impact on integration of renewables, avoided investments in grid and capacity)	Reduction in air pollution emissions

Overarching Quantification and Monetisation Concept

MICAT's conceptual quantification framework will allow for (I) an ex-ante quantification of future MI for various scenarios at the three governance levels (e.g., EU-level with the PRIMES model, national projections used in the framework of National Energy and Climate Plans (NECPs), local level scenarios); (II) an ex-post evaluation of already achieved MI; and (III) the assessment of MI for input data entered by MICATool users (flexibility to assess other use cases). The conceptual quantification framework is depicted in the graph below.



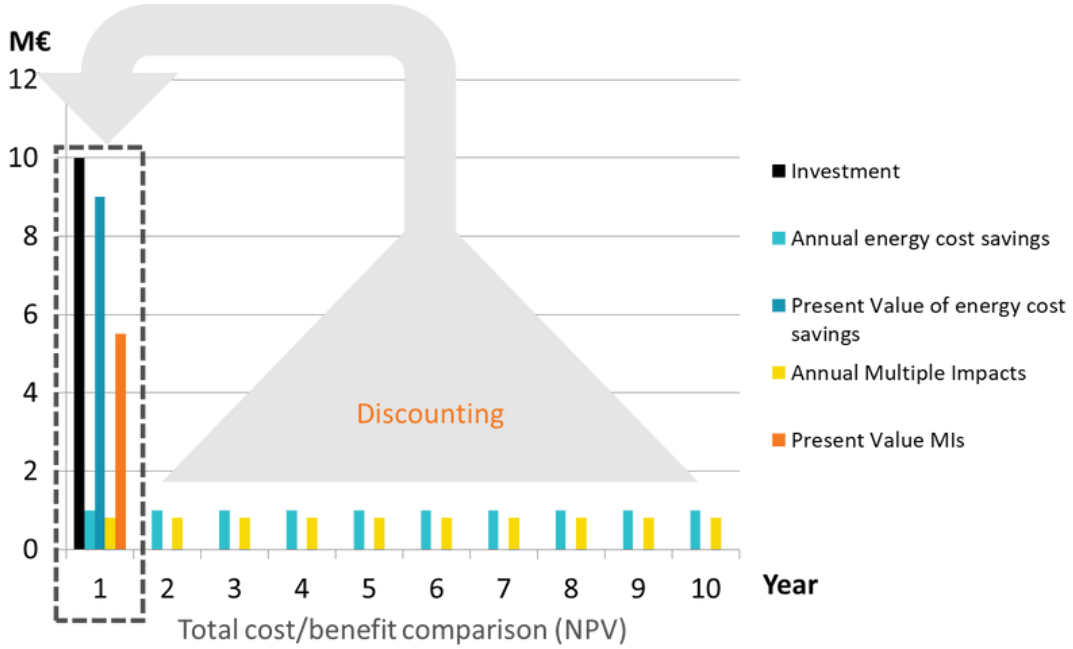
Due to the high flexibility required in MICAT, MI will be quantified based on impact factors or functions that are directly linked to specific input parameters (in particular energy savings) of scenarios analysed, measure evaluations or Energy Efficiency Improvement (EEI) actions. The quantification chain for MI in MICAT – from the input data to impact quantification, monetisation, aggregation and Cost-Benefit Analysis – is illustrated below.

Impact Monetisation and Aggregation

In order to aggregate outcomes of impacts with different physical units, compare their magnitude, and integrate them into Cost-Benefit Analyses (CBAs), a conversion into one common metric is necessary. For this reason, physical impacts will be converted into a monetary value applying an appropriate monetisation methodology (if feasible). For example, health impacts can be monetised by applying post-quantification factors such as "value of a life-year" (VOLY) or "value of statistical life" (VSL). The step of aggregating monetised impacts and performing a CBA in the MICATool by including the MI in monetary values is challenging due to interactions and overlaps between different impacts. In order to avoid a double-counting of impacts and resulting overestimation, interactions are identified and a decision is made regarding which indicators can be aggregated and included in the CBA. These are impacts that are a) quantifiable in monetary terms and b) not affected by double-counting. It is expected that around ten indicators can be considered in the CBA.

Cost-Benefit Analysis

The monetary value of MI of energy efficiency can be of substantial size and thus, can significantly change the results of Cost-Benefit Analyses. Previous research has shown that in many cases, the monetised value of MI significantly exceeds the direct energy cost savings. As such, neglecting MIs in CBA (implicitly valuing MI at 0) would thus reduce the cost-effectiveness of energy efficiency improvement (EEI) actions or energy efficiency focused strategies. This can bias policy decisions, leading to sub-optimal levels of energy efficiency for the economy and society.



Therefore, it is crucial for policy makers to have an aggregated overview of the various impacts, resulting in a "whole picture" view of MI of energy efficiency. As such, the MICATool will include the option to perform a CBA which considers MI as comprehensively as possible. The basic principle of how monetised MI feed into the CBA is shown on the left.

As the primary target groups of the tool are policy makers and evaluators at the European, national, and local levels, the CBA is conducted considering the societal perspective as being the most relevant to policy-making. This differs from an end-user or investor evaluation with regard to the discount rate used in the CBA and the specific benefit and cost components considered.

It is envisaged that different indicators will be available in the MICATool for aggregating the MI including total monetised value of MI, various CBA indicators (e.g., net present value, levelised costs of saved energy, cost-benefit ratio) and marginal abatement cost curves. Moreover, various options to assess the sensitivity of the CBA results are planned (by adjusting discount rates, lifetimes of energy efficiency improvement (EEI) actions, energy price levels and monetisation factors, and selection of different MI to be included into the CBA).

The outcomes of the CBA can, in principle, also be used to assess whether demand-side measures should be prioritised over energy supply-side options by comparing their cost-effectiveness (i.e., to operationalise the Energy Efficiency First (EE1st) principle). However, since MICAT focuses on energy efficiency, supply-side measures would have to be assessed independently (based on other studies and data sources).

Application of the MICATool

The MICATool will include core scenarios (e.g., PRIMES' REF 2020) and basic framework data (energy-related benefits and costs, discount rates, lifetimes of EEI actions) and will suggest several default values that can be used in the calculations such as energy prices and monetisation factors. At the same time, it allows target groups to easily replace the data and adjust the default values with their own data that more closely match the evaluation cases of interest. The measure intervention to be evaluated can, for instance, be the promotion of a certain EEI action (e.g., energy refurbishment of residential buildings) or a scenario (e.g., REF 2020 or NECPs). Therefore, the tool will be flexible enough to be adapted to the needs of each user.

The evaluation results can be useful for the planning and (re-)design, implementation, and comparison of a wide range of policy measures to improve end-use energy efficiency. It allows to assess and compare the cost-effectiveness of energy efficiency measures including all or just some MI and supports in identifying the most cost-effective energy efficiency solutions. The visualisation of results can also be used to communicate policy outcomes to the public.

In conclusion, **the MICATool will enable policy makers and evaluators on different governance levels to comprehensively assess the MI and get a comprehensive picture of the real value of energy efficiency.** This is paramount to enable policy decisions which provide the largest net benefit to society.

The MICATool is foreseen to be released in early 2023. To learn more about MICAT's conceptual framework or the MICATool, contact mara@ieecp.org.

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