MICAT

Multiple Impacts Calculation Tool

Empirical Basis of Economic Impacts Turnover of Energy Efficiency Goods

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101000132.

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Executive summary

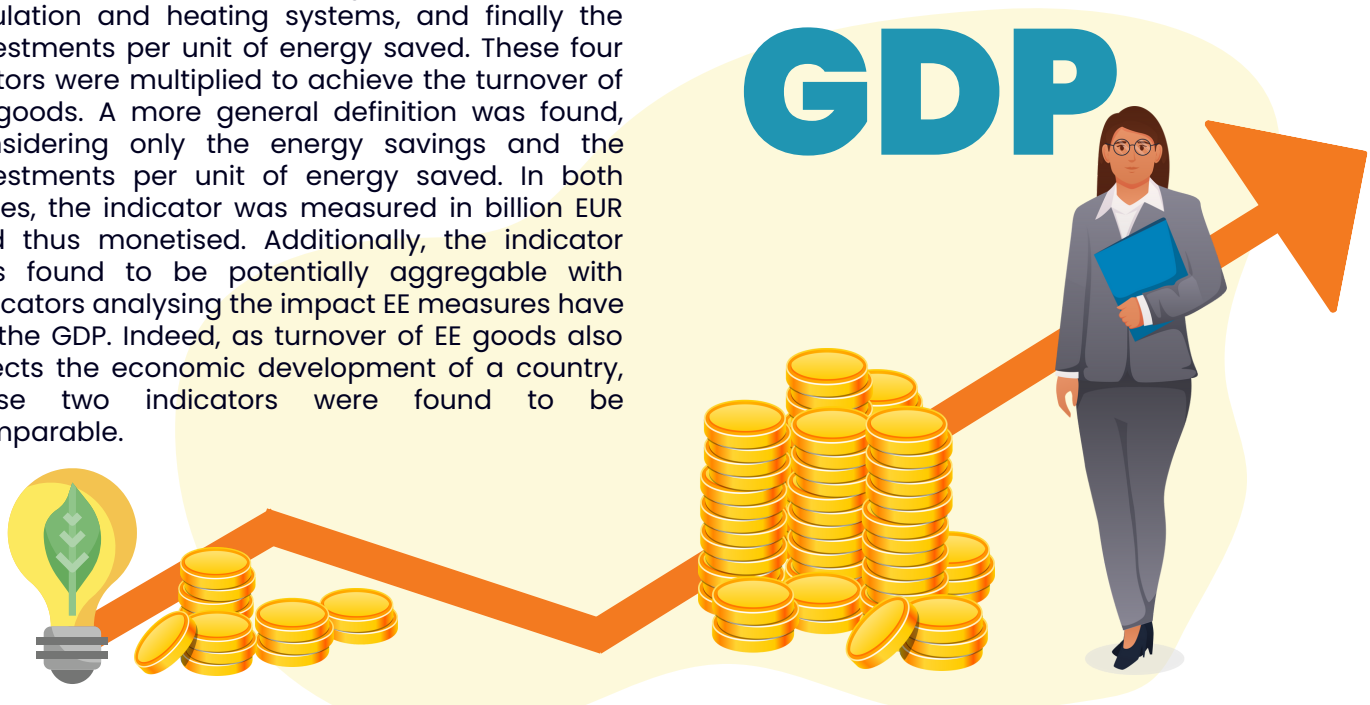
The turnover of energy efficiency (EE) goods is an economic indicator aimed at illustrating the amount of capital generated from investments in EE goods. This might be across a specific field/industry or in general, at a local/national/European level. The turnover of EE goods is expressed in billion EUR.

A higher turnover of EE goods can result in more technical innovation in the field, resulting in higher economic gains and ultimately being able to affect the economic development of a region/country/EU. Hence, it is relevant at various demographic levels but especially at a national level, as it can represent how EE improvements affect the GDP.

Two main methodologies to quantify the turnover of EE goods were found in the literature. Both consider energy efficiency in the residential sector. The first definition considered the energy savings, share of space heating in final energy consumption, share of savings due to improved insulation and heating systems, and finally the investments per unit of energy saved. These four factors were multiplied to achieve the turnover of EE goods. A more general definition was found, considering only the energy savings and the investments per unit of energy saved. In both cases, the indicator was measured in billion EUR and thus monetised. Additionally, the indicator was found to be potentially aggregable with indicators analysing the impact EE measures have on the GDP. Indeed, as turnover of EE goods also affects the economic development of a country, these two indicators were found to be comparable.

The turnover of EE goods could be considered as an impact factor itself, as it expresses in billion EUR how much capital is generated through EE goods (and potentially measures). Hence, converting such turnover in proportions of GDP (as a percentage) could be seen as a way to measure the impact factor of this indicator.

Availability of data represents the main challenge when calculating the turnover of EE goods. Indeed, these are rarely available at a national scale, with such measurements found in the literature only for Germany and the Netherlands. Whereas the energy savings per country are usually available for all European countries, data expressing the weighted average of investments per unit of energy saved are not. Therefore, the main obstacle when analysing the turnover of EE goods is the availability of data rather than the technical/mathematical difficulty in expressing the indicator.



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Scope of MI Indicator

Definition

The turnover of energy efficiency (EE) goods is an economic indicator that captures the amount of capital generated associated with the implementation/utilization of EE goods. The latter are products that contribute to the improvement of energy efficiency in general, be it of the product itself or of the whole network/system.

Relevance of EU, national and/or local level

The multiple effects resulting from the turnover of EE goods affect the collective value of companies and firms of a given industry. The effect that EE goods and their development will have on a determined field, such as the residential sector, can be represented at a European, national, and local level. Indeed, depending on the purpose of the analysis, the impact of EE goods could be calculated on a country level and thus considering the economic development of the latter, but also on a local or European level. This depends on the purpose of the study and, perhaps most importantly, on the data available.

Impact pathway figure

In Figure 1 the various impacts that follow from an improvement of the turnover of EE goods is illustrated. The figure summarises in a graphical manner the findings explained above. It differentiates between impacts at an industry level and societal level.

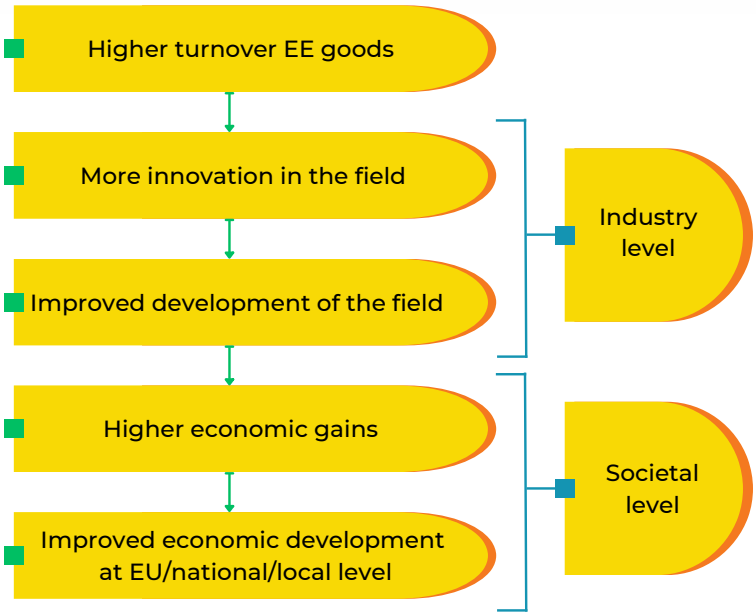

Figure 1: Impact pathway for the turnover of energy efficiency goods

Overlaps with other MI Indicators and potential risk of double counting

Whereas the turnover of EE goods will depend on the final energy savings, the latter are usually represented in scientific terms (GJ) and not in economic terms. Therefore, the risk of double counting in this case is rather low, as it is an economic indicator that depends on technical measurements.

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Quantification method

Description

In the literature there have been found two main quantification methods regarding the turnover of EE goods. According to Reuter et al. (2020), the latter can be quantified utilising the following formula:

$$TO = ES \cdot SH_i \cdot f_{in} \cdot IN_{tech}$$

Where *TO* is the turnover of EE goods, *ES* is the energy savings, SH_i s the share of space heating in final energy consumption of country *i*, f_{in} is the share of savings due to insulation and efficient heating systems and IN_{tech} the investments per unit of energy saved. Thereafter, the turnover of EE goods is measured in billion EUR. Such measurement applies strictly to the residential sector.

A more general way of quantifying this economic indicator is proposed by Eichhammer et al. (2018), namely multiplying the weighted average of investments in energy efficiency per unit (GJ) by the amount of energy savings (GJ). Such a quantification method was also proposed by an Odysee-Mure report availble on their website (2022). The investments in energy efficiency can be related for example to space heating, whereas the savings due to new insulation installations. The turnover is still measured in billion EUR.

Figure 2 illustrates the steps involved in calculating the turnover of EE goods by utilising the methodology explained in the present paragraph.

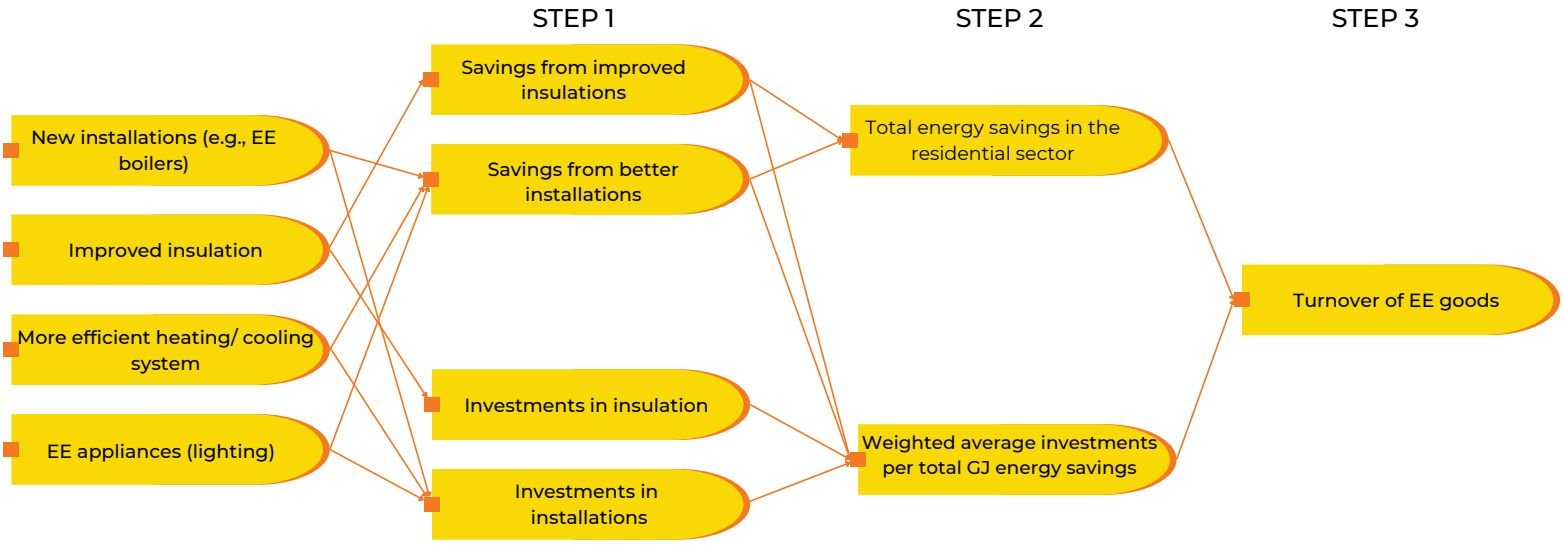

Figure 2: Steps involved in calculating the turnover of energy efficiency goods

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Methodological challenges

This indicator is mostly based on average calculations. As an improvement, such indicator should consider temporal and spatial changes occurring in the system being considered (Reuter et al., 2020). Other limitations include the lack of control data on where and how many investments are devoted to different types of technologies promoting energy efficiency, and annual fluctuations that may be occurring due to structural changes being insufficiently separated from savings in energy end-uses (Eichhammer et al., 2018). Essentially, such indicator is highly dependent on the available data. For example, Reuter et al. (2020) utilised data from the Netherlands to infer data for other European countries assuming a similar split of costs. The lack of availability of such data in other European countries may indeed hinder the importance of the discussed indicator.

Data requirements

According to the second quantification method, to calculate this indicator, the number of investments in energy savings per unit is needed (billion EUR/GJ); but also, the amount of energy saved (GJ). Similarly, according to the first proposed quantification method, the share of space heating per country will be needed, and the share of savings due to efficient insulation and heating systems. These are not always available per country and represent a serious obstacle to the quantification and measurement of the turnover of EE goods.

Impact factor/functional relationship

It could be argued that the turnover of EE goods is already representing in itself an impact that energy savings will have on the region's/country's/EU's economic performance in a particular field or in general. Nonetheless, to have a better understanding of the impact that the turnover of EE goods will have on one country's GDP, it is hereby suggested to perform a simple proportion, comparing the total turnover generated (in billion EUR) to the country's GDP.

Therefore, defining the turnover of EE goods as a percentage of the country's GDP. A similar comparison could be also performed at a local level, for example by comparing the turnover of EE goods as a percentage to a specific local industry's generated capital.

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Monetisation

As previously explained, turnover of EE goods can potentially have an impact on the country's economic performance and development. Additionally, the economic indicator is measured in billion EUR. Therefore, it is possible to monetise this indicator.

Aggregation

Turnover of EE goods could be potentially aggregated with an indicator calculating the impact of EE measures on GDP. Reuter et al. (2020), consider such an indicator in their study and quantify it as a percentage of GDP. This can be easily converted in billion EUR to make it match with the chosen unit of measure for the turnover of EE goods. Since it was previously explained how the considered indicator can potentially improve the national economic development, it could be also calculated how much of the increase in GDP resulted from EE goods. This would allow to thereafter aggregate the two indicators. Additionally, many EE measures aim at enhancing investments in EE goods, ultimately having a positive impact on the GDP, hence justifying the suggested correlation and aggregation of indicators.

Conclusion

After performing an extensive literature review, it was found that the main challenges related to analysing and calculating the turnover of EE goods are related to the availability of data. Indeed, data describing the investments performed in EE goods are rarely available at a national scale, whereas at a European level are not available at all. Nonetheless, data related to annual energy savings per country in the residential sector are available. Therefore, the challenge is rather in understanding the number of investments in EE goods and representing its trend. Indeed, the mathematical formulas to quantify the latter are available and are not technically demanding. Additionally, the impact such investments have on the GDP and the national economic trend in general could also be obtained. It is suggested to focus on the national level where possible, as local level involves various ramifications and is rather case-specific. Essentially, the local turnover of EE goods per given municipality/region would not provide the same impactful insights as at a national scale. Additionally, the availability of such data at a local level is also deemed to be another possible unknown.

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