

Empirical basis of Environmental Impacts on RES targets



Executive summary



Defined in the bloc's Renewable Energy Directive (RED), Member States are subject to binding targets regarding the share of energy originating from renewable energy sources (RES targets). By reducing total energy consumption with energy efficiency, necessary additional renewables capacities to achieve the RED's binding targets are reduced.

This indicator has mainly a relevance on the national level, since the binding targets apply to the Member States. Thus, they are responsible for their achievement and have an interest in facilitating it using energy efficiency.

In order to quantify this indicator, the gross available energy (GAE) from renewable energy sources (RES) is divided by the total GAE to assess the reference as well as the GAE from RES is divided by the total GAE minus the energy savings. The difference between both shows the impact of a given energy efficiency measure on the national RES share.

The considered RES energy carriers are in line with the RED and mainly consist of solar, wind, geothermal, biomass, and renewable waste.



Frederic to send the resource doc
of formulas

It is recommended to monetise the indicator and to aggregate it with other monetised indicators.

Scope of MI indicator



Definition

Defined in the bloc's Renewable Energy Directive (RED), Member States are subject to binding targets regarding the share of energy originating from renewable energy sources (RES targets). By reducing total energy consumption with energy efficiency, necessary additional renewables capacities to achieve the RED's binding targets are reduced.

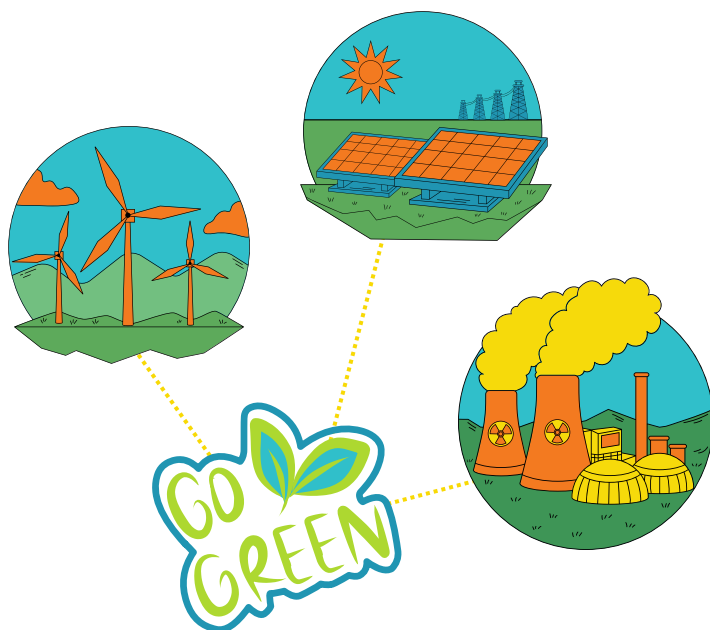
Relevance on EU, national and/or local level

This indicator has mainly a relevance on the national level, since the binding targets apply to the Member States. Thus, they are responsible for their achievement and have an interest in facilitating it using energy efficiency.

More generally, the EU as a global player striving to spearhead the global shift to a more sustainable economy might also be interested in assessing the potential of energy efficiency to increase the share of renewables in energy consumption.

Overlaps with other MI indicators and potential risk of double-counting

This indicator does not have any overlaps with other indicators. Thus, there is no risk of double counting.



Impact pathway figure

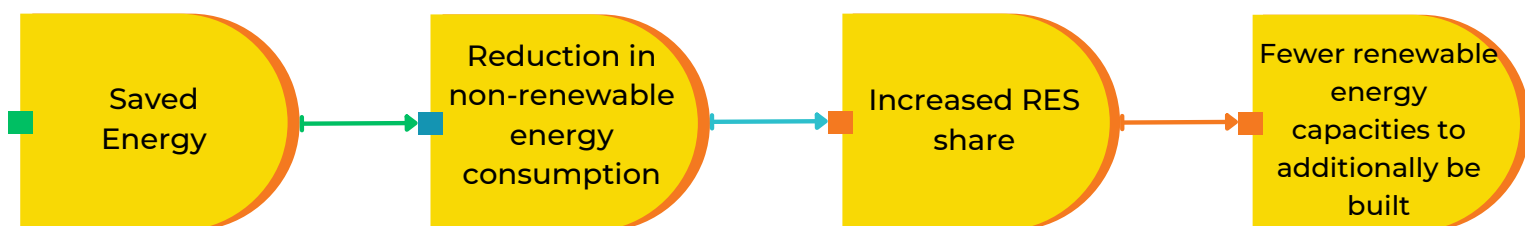


Figure 1: Impact pathway for impacts on RES targets

Quantification method



Description

In order to quantify this indicator, the gross available energy (GAE) from renewable energy sources (RES) is divided by the total GAE to assess the reference as well as the GAE from RES is divided by the total GAE minus the energy savings. The difference between both shows the impact of a given energy efficiency measure on the national RES share and is generally stated in percent.

The considered RES energy carriers are in line with the RED and mainly consist of solar, wind, geothermal, biomass, and renewable waste (the indices are specified in the section "Impact factor").

$$RES_y = \frac{\sum_{e=4}^5 GAE_{P,e,y}}{\sum_{e=1}^6 GAE_{P,e,y}}$$

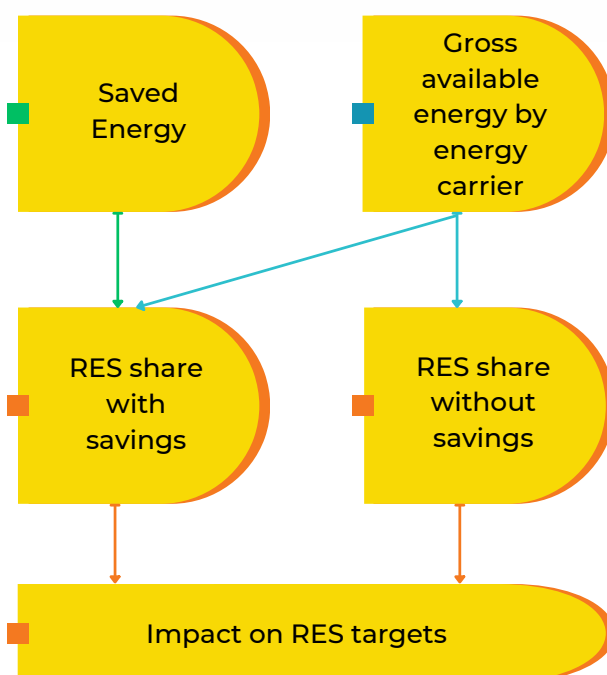


Figure 2: Calculation steps for impacts on RES targets

Methodological challenges

There are no methodological challenges.

Data requirements

The only necessary input apart from the energy savings (which are converted from final into primary energy savings in the indicator "Energy savings") is the gross available energy (GAE) disaggregated by energy carriers, which come from Eurostat and PRIMES.





Impact factor/functional relationship

$$\Delta RES_y = \left[\sum_{e=4}^5 GAE_{P,e,y} / (\sum_{e=1}^6 GAE_{P,e,y} - \sum_{e=1}^6 \Delta E_{P,e,y}) - \sum_{e=4}^5 GAE_{P,e,y} / \sum_{e=1}^6 GAE_{P,e,y} \right] \cdot 100$$

ΔRES_y = change in RES share in percent points

$\sum_{e=1}^6 \Delta E_{P,e,y}$ = saved primary energy due to energy efficiency

$\sum_{e=1}^6 GAE_{P,e,y}$ = total gross available energy

$\sum_{e=4}^5 GAE_{P,e,y}$ = gross available energy generated from renewables energy sources (Renewables and biomass + waste)

Monetization

There would be three approaches to monetise this indicator:

- » Looking at the effective investment costs linked to the alternative, a massive investment in additional renewable energies would be necessary. However, since the majority of Member States have not significantly reacted to missing the 2020 RES targets, it cannot be expected that there is a strong link between the RES share and effective investments in RES. Furthermore, this would constitute double counting with the indicator "Avoided investments in capacity and grid".
- » Looking at fines imposed in the framework of infringement proceedings for missing the RES targets. However, the missing of the 2020 RES targets does not seem to have entailed any infringement proceedings, despite a majority of Member States falling short.
- » A third and possibility would be monetisation via statistical transfer costs. This will be probably the first option proposed by the EC for achieving the RES objectives for countries where the level of RES is too low. A statistical transfer is the administrative purchase by one European Member State of a quantity of renewable energy from another member state that has achieved its target and has a surplus. The possibility to statistically transfer RES surpluses has been introduced in the RED in 2009.

As a result, it is recommended to monetise this indicator using the third method. In order to define a price of RES, past statistical transfers have been assessed in Table 1. Consequently, the average unit price (14.1 €/MWh) is used to monetise this impact. Since surplus capacity will be transferable, the monetisation encompasses sales (in case of surplus) as well as purchases (in case of shortfall) of statistical capacities.



Date	Onshore wind [€/kW]	Offshore wind [€/kW]	PV [€/kW]
12/2022 [1]	132 GWh	1.65 mio €	12.5 €/MWh
12/2022 [2]	208 GWh	2.04 mio €	9.8 €/MWh
11/2020 [3]	3500 GWh	50 mio €	14.3 €/MWh
11/2017 [4]	700 GWh	10.5 mio €	15 €/MWh
Sum/Average	4540 GWh	64.19 mio €	14.1 €/MWh

Table 1: Details of past statistical transfers of RES capacities

Aggregation

This indicator can be aggregated with other monetised impacts which relate to profits and not merely turnover.

Conclusion:

This indicator describes how energy savings affect the share of renewable energy sources in the EU's or the Member States' energy mixes. Thus, it shows how energy efficiency can help to attain the RED's renewable energy targets, requiring fewer additional renewable capacities to be installed to comply with the targets.

[1] <https://valtioneuvosto.fi/en/-/1410877/finland-and-the-brussels-region-agree-on-statistical-transfers-of-renewable-energy-finland-sells-surplus-for-eur-1.65-million>

[2] <https://balkangreenenergynews.com/slovenia-secures-statistical-transfer-of-renewable-energy-from-czech-republic/>

[3] <https://www.irishtimes.com/news/ireland/irish-news/ireland-to-pay-denmark-estonia-50m-for-statistical-renewable-energy-transfer-1.4418420>

[4] <https://renewablesnow.com/news/estonia-to-help-luxembourg-meet-2020-renewables-goal-report-590343/>