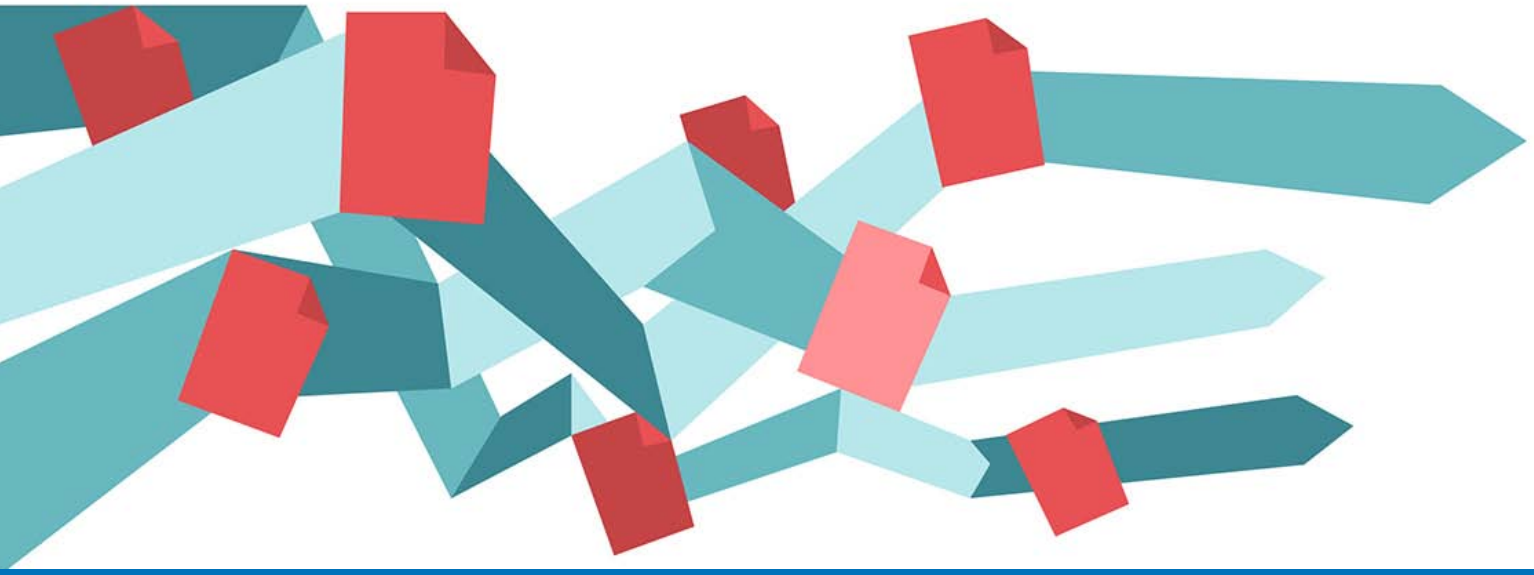
multEE
facilitating multi-level governance for Energy Efficiency



Policy Brief No.3

Definition of a data collection process for bottom-up monitoring

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Executive Summary

Efficient energy policies strongly rely on consistent and comparable data provided by a sound data collection process and decent monitoring and verification (M&V) procedures. Based on guidance regarding the proposed ideal data collection process, we develop 5 concrete policy recommendations to guarantee an efficient data collection process as well as a systematic M&V process of the measures:

1. Include relevant stakeholders when defining country-specific default values.
2. Keep the document with calculation methodologies user-friendly and offer the possibility to use project-specific energy saving figures.
3. Define the data collection process and the monitoring and verification process before implementing an IT-solution.
4. Consider the requirements for the IT-tool regarding data collection, data processing, reporting and subsequently M&V of data material.
5. Carry out the verification and control process at different levels and with different methods to increase its effectiveness.

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I Introduction

The aim of the multEE project is to introduce innovative monitoring and verification (M&V) schemes based on bottom-up data in order to ensure that the outcome of energy efficiency measures is correctly evaluated and useable for future energy efficiency planning. Parties participating in energy efficiency obligation schemes or alternative measures as introduced by the Energy Efficiency Directive 2012/27/EU of the European Parliament and Council (EED) have to report achieved energy savings on a regular basis. The requirements for participating parties concerning reporting of achieved energy savings therefore needs to guarantee the standardized measurement of energy efficiency savings within a country and a decent M&V process.

Assessing the impacts requires the collection of various data on implemented measures. This policy brief provides assistance on how this data collection process can be structured and implemented.

II Assessment of measures

To estimate achieved energy savings under the EED, different approaches are possible. Both top-down and bottom-up methods can be used.

Top-down methods use aggregated sectoral savings as a starting point for the calculation of energy savings. They need statistical indicators to quantify energy savings, for example the energy consumed by households for heating taken from national energy statistics divided by the residential area in square meters to obtain an average heating demand for households.

Bottom-up methods on the other hand calculate and add up energy savings of individual energy efficiency measures from different sectors, e.g. installation of an air-source heat pump in an existing building. To do so, the energy consumption before the implementation of the energy efficiency measure is compared to the energy consumption after implementation. The resultant difference between these two numbers is the energy saving. If there is no comparable energy consumption “before”, for example in case of the construction of a new building with higher building standards than demanded by the national building code, the actual heating energy demand of the building is subtracted from the heating energy demand a building with the standard defined in the building code would have to determine the energy saving. If there are no legal requirements on the energy consumption, average market values can be used as reference values to simulate the “before” situation of the measure.

As the multEE project aims to improve the quality of energy efficiency policy planning and effective coordination of energy policies on different administrative levels, the approach of bottom-up calculation was chosen. Bottom-up calculation methods benefit from the fact that they offer a more particularized view of the

impact of energy efficiency measures; they can be used to assess the impact of different energy efficiency measures and the cost-effectiveness in detail. Furthermore, more detailed analyses and forecasts are possible based on the energy efficiency measures reported by obliged and not obliged parties.

To assess the impacts of bottom-up energy efficiency measures, it is necessary to define general formulae for those measures and to determine country-specific calculation values, also referred to as “default values”.

Within the multEE project numerous formulae to assess energy efficiency measures were developed. Each formula follows roughly the same structure, comparing the energy consumption before implementation of the energy efficiency measure to afterwards. The specification of every single measure requires the definition of the containing default values. The definition of these variables ensures the evidence-based calculation of energy saving figures and facilitates the calculation of energy efficiency measures for the affected parties.

Default values have to be defined separately for each country, depending on the specific energy efficiency measure values such as lifetime of the measure, average final energy consumption, saving factor, efficiency of the relevant system, baseline and similar values. The reason why every country has to define its own default values are the different initial situations and conditions in different countries, like for example an efficient heating system in Greece is going to save less energy than in Austria, as the heating degree days differ. Default values can be determined through empirical national and international studies, national surveys, national figures regarding energy consumption in different sectors, efficiency factors, operating hours, state of the art techniques, market average concerning different products and many more. To provide sound default values, it is advisable to involve all relevant stakeholders as those parties often possess detailed sector-specific figures.

The following table illustrates the definition of country specific values by means of the energy efficiency measure *“Alternative vehicle technologies for passenger cars”*:

Alternative vehicle technologies for passenger cars	
Lifetime of the measure:	The lifetime may be determined based on national standard values or other national data on the average lifetime or usage of a car.
Final energy consumption of the reference car:	The average specific final energy consumption of the reference car may be calculated based on the national energy balance or be obtained from the national statistical office, the national Ministry of Transport or other institutions dealing with national transport data (e.g. national environmental office, transport associations).

Final energy consumption of the efficient car:	To calculate the average specific energy consumption for pure electric cars, electric cars with a range extender or plug-in hybrid drives, the standard specific consumption of a selection of available electric vehicles can be used for constituting average energy consumption. Figures for the available electric vehicles may be available at the national statistical office, the national Ministry of Transport or other institutions dealing with national transport data (e.g. national environmental office, transport associations), etc.
Average yearly mileage:	This value (in kilometers per year) may be obtained from the national statistical office, the national Ministry of Transport or other institutions dealing with national transport data. Furthermore, the average mileage could also be available from household or transport surveys. It should be based on observed annual data and should not be extrapolated, as it can fluctuate a lot from one year to the other depending on the economic situation and fuel prices.

Source: Document with general formulae of bottom-up methods, AEA

The document with general formulae of bottom-up methods offers the possibility to report standardized energy efficiency measures with default values or to use project specific values, if available. One example for such a project specific value is to insert longer operating hours for efficient lighting systems than in accordance with the default values. It is advisable to pay attention to the possible combination of default and project specific values as this might result in cherry picking, i.e. obliged parties could combine beneficial default values with project specific values regardless of the energy efficiency figures in the specific project.

Recommendation No.1

When defining the country-specific default values, include relevant stakeholders (e.g. energy suppliers, energy regulators, companies, etc.) in this process.

Austria

In Austria, companies and obliged parties have the possibility to propose new standardized energy efficiency methods in order to fulfil the energy saving targets of the Energy Efficiency Directive 2012/27/EU. Energy efficiency methods which are applicable for a large user circle are prepared by the National Energy Efficiency Monitoring Agency. This approach assures practice-relevant methods which are accepted and used by the obliged parties.

Recommendation No.2

Shape the document with the calculation methodologies for the energy efficiency measures in a user-friendly manner so that obliged parties can easily use it, but offer the possibility of using project-specific energy saving figures for those parties that have them.

To analyse energy savings based on bottom-up energy efficiency measures, solid calculation methods, the usability of the methodologies and an easy-to-use IT-application are necessary. Various people with different education and knowledge are going to use the calculation methodologies and the IT-solution to report the energy efficiency measures. Therefore, both approaches need to be user-friendly. A good usability assures a high degree of utilization regarding the calculation methods and the IT-solution which leads to a better quality of data. This approach is going to assure a wide acceptance of the standardized bottom-up formulae by the obliged parties. Moreover, it is advisable to offer the possibility to report project specific values as they are more precise and will increase the quality of the data entered as well. Project specific values need to be proven by the obliged parties by evidence, e.g. an energy certificate for retrofitted buildings. The evidence can either be obtained from actual measurements (measured value in the operational project phase – ex-post approach) or from the project design (estimated value from the project design phase – ex-ante approach)

III Responsible bodies & legal regulations

Due to the broad field of application for energy policies and obligations, in general several ministries are responsible for the implementation of obligation systems and the monitoring of energy saving targets. In some partner countries, national Energy Agencies were selected to undertake the tasks in conjunction with the EED. National Agencies with their expertise in the field of energy efficiency are often capable of carrying out the relevant tasks more efficiently and cost-effectively. Therefore, it is important to clearly define the responsibilities concerning the implementation of the obligation system and the monitoring of the energy saving targets between the involved ministries and/or commissioned bodies.

Croatia In Croatia, the Croatian Ministry of Economy is responsible for the energy efficiency policy. It has named the “Center for Monitoring Business Activities in the Energy Sector and Investments” as National Energy Efficiency Authority for the monitoring and the data collection process related to energy efficiency measures.

In order to prevent double counting, it is important to adopt clear rules for the acceptance, attribution and splitting of energy efficiency measures, for example

binding rules concerning the attribution of measures between public funding bodies and private funding bodies. In some cases energy efficiency measures can be funded by two or more funding bodies, these can be private funding bodies as well public funding bodies. This approach requires clarity concerning the reporting and accrediting of the jointly funded measure in order to prevent the duplicate reporting of the same measure and hence the falsification of the data material. That, of course, strongly depends on the special sort of obligation system.

Reporting cycles for energy efficiency measures are often given on EU level and in detail by the relevant EU Member State. At the national level, the review and the reporting related to energy efficiency measures is usually established on an annual basis.

IV Data gathering process

Recommendation No.3

Define the data collection process and the monitoring and verification process of the reported energy efficiency measures before you implement the IT-solution.

The implementation of an IT-solution regarding the energy efficiency measures is the elementary tool for the collection of energy saving figures and the basis for the analysis of the achieved energy savings. The IT-tool is the connecting link between the obliged (private or public) parties, the relevant public authority on national level and the EU on international level. It is created based on the standardized calculation methodologies for the energy efficiency measures and contains the defined country-specific default values. It will be used both by the obliged parties and the public authority and therefore has to serve different purposes. Obliged parties expect a user-friendly and self-explanatory IT-application and the public authority needs on the one hand the possibility for a cost-effective monitoring and verification process and on the other hand significant data material for the creation of analysis and reports determined for the national and EU level. It is important to consider the different requirements concerning the IT-tool before creating it.

Recommendation No.4

Consider the requirements for the IT-tool regarding data collection, data processing, reporting and subsequently the monitoring & verification of data material.

Based on the developed document for the standardized calculation of the bottom-up methods, an IT-solution that ensures the collection of high-quality data material as well as the possibility to monitor the entered data has to be programmed.

To frame the optimal data gathering process regarding the collection of the energy saving figures, several aspects such as which IT-solution to use, data security, access to the IT-solution, and which data material is necessary for the monitoring and verification procedure needs to be considered.

The IT-solution is going to contain sensitive data from obliged parties, hence data security has to be guaranteed. Definable access authorizations ensure the possibility for obliged parties to award personalized access rights for different employees. Depending on the complexity of the IT-solution trainings, manuals and a service hotline can support obliged parties when using the IT-tool and increase the quality of the reported data.

Adaptions of the IT-tool and changes of reported energy efficiency measures are usually time consuming and expensive, so how to deal with this matter should be considered before creating the IT-solution. Since the IT-solution provides the necessary data material for the preparation of national reports and reports at EU level, it needs to take into account the requirements for these reports. As the commitment system under the EED predetermined by the EU may vary from country to country, for some countries the combination of the reporting of energy efficiency measures with other obligations (e.g. energy audits) can improve the economic efficiency of the IT-tool.

V Verification & Control

Recommendation No.5

Carry out the verification and control process at different levels (plausibility check, detailed checks, on-site checks) in order to increase the effectiveness of the process.

The IT-tool is not only the elementary instrument for the allocation and analysis of the reported energy efficiency measures; it is also the main tool for the verification and control process of the measures. The relevant authority at the country level is usually responsible for verifying and controlling of the reported energy efficiency measures. To carry out a cost and time efficient verification and control process, the following points need to be considered: Sample sizes, plausibility checks, detailed checks and required evidence.

It is advisable to define the sample sizes for the controlling of energy efficiency measures as a significant sample. Although it has to be mentioned that sometimes, due to personnel or resource limitations, this might not be possible.

The rough calculation and review of the total amount of all energy efficiency measures reported should be carried out by plausibility checks. Plausibility checks

are generally executed to a large extent automatically and hence cost and time effective. An example for a plausibility check is whether the total amount of reported energy saving lamps in households exceeds the statistically possible amount of lamps used in households in a country. Further controls can affect the amount of reported energy efficiency savings (e.g. whether the amount of reported energy saving figures is reasonable), double counting (if the renovation of the same building is reported twice) or the correct completion of the required fields (if the address, the description and the evidence regarding the measure is correct), etc.

Besides the automated plausibility checks for all energy efficiency measures, a small sample of energy efficiency measures should be verified by means of in-depth checks. This sample usually contains desktop checks and on-site visits. Desktop checks refer to the detailed review of the reported energy efficiency savings regarding calculation, total amount of energy saving and documentation. On-site visit means the inspection of the physical existence of the reported energy efficiency measure.

VI Further Reading

multEE Report (D.2.3)

Data Collection Process for Bottom-up Monitoring

multEE Report (D.2.1)

Document with general formulae of bottom-up methods to assess the impact of energy efficiency

multEE Report (D.1.2)

Synthesis report on M&V Schemes and coordination mechanisms in EU countries

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