

Setting up a MRV system

Step by step guidance

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ENSMOV Project

ENSMOV is an EU-funded project aiming to support public authorities and key stakeholders in 14 Member States represented by its consortium (Austria, Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Poland, Romania and the UK- and beyond addressing all 28 MS and accession countries) to monitor, revise, improve and complement the design and implementation of their national energy efficiency policies by developing resources on practical and strategic issues arising from the Article 7 EED. ENSMOV follows on from two other very influential projects that have helped to shape Member State policies to address Article 7 requirements of the EED – IEE ENSPOL (www.enspol.eu) and H2020 MULTEE (<https://multee.eu/>).

ENSMOV has the following strategic objectives that will deliver impacts beyond the duration of the project: a) To ensure that energy efficiency policies do not only promise, but also realize a major, long term contribution to the energy, environmental, economic and security goals of the EU and MS under the Energy Union; and b) To sustain an active platform and community for knowledge exchange of best practices in policy development and implementation of Article 7 EED policies, strengthening cooperation and improving the dialogue between national policymakers and stakeholders across the EU beyond the project period.

List of abbreviations

FAQ	Frequently asked questions
EED	Energy Efficiency Directive 2012/27/EU amended by Council Directive 2013/12/EU, Directive 2018/844, Directive 2018/2002/EU and Regulation 2018/1999/EU
EEO	Energy Efficiency Obligation Scheme according to article 7a of the Energy Efficiency Directive
ENSMOV	Enhancing the Implementation and Monitoring and Verification practices of Energy-Saving Policies under Article 7 of the Energy Efficiency Directive
MRV	Monitoring, Reporting and Verification
MS	Member State
NECP	Integrated national energy and climate plan according to chapter 2 of the Governance Regulation (2018/1999/EU)

Introduction

This report aims to give an overview of the contents to be considered when setting up a Monitoring, Reporting and Verification (MRV) system for Article 7 of the Energy Efficiency Directive (2012/27/EU – EED). It is based on the report on the parameters of an MRV system (Böck & Ploiner, 2020) and deals with the necessary contents of such a system in the form of a step-by-step guide. An MRV system in the course of the implementation of Article 7 means the demonstrable tracking of additional implemented individual energy saving actions to reduce final energy consumption.

Due to the very broad implementation options for the fulfilment of Article 7 EED, the report refers more to causal relationships than to implementation details of specific policy instruments, even though policy instruments are sometimes used as examples.

The requirements for Member States on MRV are defined in Articles 7, 7a and 7b as well as Annex V of the EED respectively. The recommendations of the European Commission as regards the implementation of the energy efficiency obligation in relation to the EED can be downloaded here: <https://eur-lex.europa.eu/eli/reco/2019/1658>.

Step 1 – Defining the purpose of monitoring

Before starting the design of a MRV scheme, it is important to clarify the aim of monitoring and how the data collected for MRV will be used. While the minimum requirement is the collection of data needed to ensure compliance with the EED, collection of additional data might be helpful for other purposes, for example:

- Monitoring of individual target fulfilment in the EEO / voluntary agreements
- Deeper analysis of the energy savings reported

- Statistical purposes
- Policy evaluation
- Improvement of policy design

It should be clarified upfront what data and what level of aggregation is needed for the above-mentioned tasks. For compliance with the EED, only data on the actual savings achieved and data needed for verification is relevant. Additional data like energy consumption of industrial processes, heat consumption of buildings or efficiencies of specific technologies can help to improve the level of detail of energy balances, or as a benchmark for determining savings potentials. Once the legal framework and technical specifications are set in place, changes are harder to implement and often raise additional costs.

Step 2 – Creating a sound legal basis

The next step of designing a MRV scheme is the preparation of a sound legal basis. All legal matters should be declared in a law (framework) or subordinate legal documents like regulations or decrees (implementation details). For each aspect in the legal framework, it must be considered whether and how quickly an adjustment may be necessary in the future. While basic specifications are to be laid down in the law, decrees would be more appropriate for contents that will constantly be adapted. The following topics should be defined in detail:

- Target groups
- Scope of monitoring
- Reporting processes (both on national and international level)
- Timeline for monitoring activities
- Enforcement of compliance
- Legal character of the communication between the monitoring body and parties reporting savings

Regardless of the topic, the wording should be clear and gaps should be avoided. For this purpose, it is advisable to define use-cases and check these use-cases against the proposed legal framework in order to ensure that the legal framework covers all relevant situations. The creativity of the obligated parties in finding loopholes in rules and regulations should not be underestimated.

The above mentioned topics will be explained in detail in the following sub-chapters.

Target groups and roles

The target groups and associated roles are to be precisely specified in the legal basis. The following roles are conceivable in the course of fulfilling Article 7 EED:

- Responsible authority
- Monitoring authority
- Verifying institute
- Public bodies (e.g. funding agencies)
- Obligated parties

- Energy saving action implementer

The monitoring authority requires appropriate technical and legal knowledge of energy efficiency measures and their eligibility for Article 7. The monitoring activities can either be performed by the responsible authority or be outsourced to an external institution. In any case, it is important that the powers, tasks and responsibilities of the monitoring authority are clearly defined in legislation. This also includes data traffic regulations with other authorities (for example, with funding bodies or statistical offices reporting savings or other relevant data) so that all legal tasks can be fulfilled.

In case of alternative measures, the public bodies responsible for the implementation of energy saving actions shall be included in the legislation with regard to tasks and reporting modalities.

In the case of an Energy Efficiency Obligation Scheme (EEO), the conditions of an obligation shall be established, as well as the calculation formula for determining the respective individual obligation of each obligated party. The criteria for determining the obligation must be non-discriminatory, transparent, objective and verifiable. Also rules on the consequences of non-compliance (e.g. penalties) have to be defined.

The action implementer is relevant for the initial allocation of an energy saving action. The legal basis must specify whether the owner of a property or the incentive provider is the action implementer.

Scope of monitoring

The overall objective of energy efficiency monitoring is the demonstrable implementation of energy efficiency measures to reduce energy consumption. The individual targets of the different energy efficiency measures can differ significantly, as illustrated in the following target examples:

- Cumulative final energy savings in the years 2021-2030
- Annual final energy savings
- Number of energy services carried out
- Number/Performance of installed high-efficiency equipment
- Number/Performance of equipment subsidized

The measurability of the individual targets is an essential condition for an effective monitoring. Such targets are applied in different policy instruments (EEO, alternative measures) and can be used in combination. When determining the individual targets, it should be noted that in the end, they must be converted into cumulative final energy savings in accordance with Article 7 EED. In any case, the legal framework must clearly specify for all obligated parties which goals must be achieved, to what extent and how they can be achieved. In the legal framework, it is necessary to work out precisely which criteria apply to the crediting of energy-saving actions.

Some Member States provide standardized methods in the form of catalogues for assessing energy saving actions. The advantages of such standardized methods are the reduction of the evaluation effort for implementers, the improvement of legal certainty in the energy saving action market and the simplification of savings verification. A disadvantage of standardized assessments, on the other hand, especially when default values are provided, is the imprecise data collection for individual energy saving actions. When creating a catalogue, attention must be paid to practicability while at the same time taking into account various factors that might influence savings compared to the estimations

given. This includes – besides the need to carefully consider data sources when defining default values – to clearly define the conditions in which the default values can be applied (e.g. only for a specific building type, for applications up to a certain amount of power, etc.) as well as the consideration of behavioral effects which might occur.

Reporting processes

In reporting, a distinction must be made between domestic reporting and reporting to the European Commission.

The reporting of the progress of Article 7 EED to the European Commission is laid down in the Governance Regulation of the Energy Union (2018/1999/EU), which combines the reporting systems of different European Climate regulations. If not already legally established, it is advisable to set up a coordinating body to bring together the reporting of the five dimensions mentioned in the Governance regulation. The monitoring authority has to check the reported energy saving actions and summarize them for the preparation of the progress report.

Domestically, the various energy saving actions from an EEO as well as from alternative measures are to be reported to the monitoring authority. The reporting infrastructure depends on the number of reporters, their affinity with software or online tools and their technical knowledge related to the EED. In the case of alternative measures such as grants, many homogeneous energy saving actions are reported by only a few submitters (subsidy agencies). On the other hand, in the case of an EEO, the number of reporting entities can become significantly high depending on the design of the EEO. The reporting infrastructure may vary between policy instruments or target groups, yet the collection of energy saving actions within a single database is preferable. Other possibilities would be to collect data in the form of spreadsheets, especially in the case of homogeneous energy saving actions.

Timelines

There are different aspects to consider when defining a timeline for MRV. The Governance Regulation (European Union, 2018) stipulates the reporting procedure for Member States towards the European Commission: Article 17 (1) states 15 March 2023 and every two years thereafter as the reporting deadline for the status of implementation of the integrated national energy and climate plans (NECP). For the dimension of energy efficiency, this includes – among other – the savings achieved by national energy efficiency obligation schemes and alternative measures pursuant to EED Article 7a and 7b. Annex IX Part 2 (b) of the Governance Regulation further clarifies that for each given reporting year X, the cumulative amount of energy savings achieved through Article 7 EED in the years X-3 and X-2 have to be reported (European Union, 2018).

While the timeframe for national reporting should consider this deadline, other issues have to be taken into account. Most importantly, data availability and sufficient time to collect data needed for verification purposes has to be ensured so obligated parties or public authorities can comply with the reporting deadlines.

For the establishment of suitable reporting deadlines and processing times, it is recommended to draw a time axis in which, starting from the reporting deadline of the NECP, the serial interdependent

process steps are plotted with their respective durations, taking into account possible delays. Figure 1 shows process steps (boxes) and milestones (pluses) that typically occur in MRV on a dimensionless timeline.

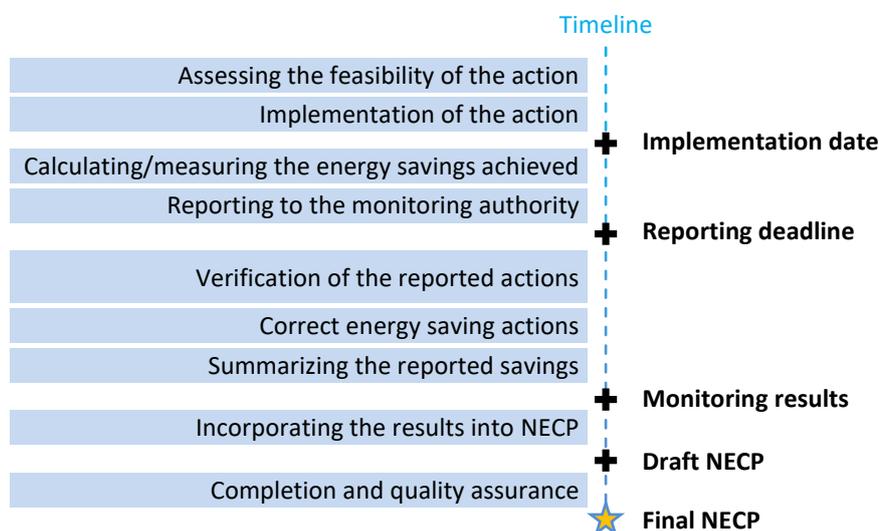


Figure 1: Sequence of process steps for reporting an implemented energy efficiency measure.

The first step, "assessment", is usually carried out to determine whether an energy saving action is economically suitable for implementation. In subsidy schemes, these pre-assessments are usually necessary to determine the grant eligibility of a project.

With regard to the implementation of energy savings, the date on which the savings begin to take effect is used. The implementation date is primarily relevant for the allocation of an energy saving action to the respective year. The reporting deadline for energy saving actions should be set in the year after the measure is implemented with a sufficient evaluation or metering period. If ex-post evaluations are allowed, a corresponding time between implementation and reporting is needed.

After the deadline for reporting, the monitoring authority has to check the reported measures for errors in calculation or non-alignment with requirements of the EED. Depending on the characteristics of the control mechanisms, a corresponding time slot must be provided for this purpose. Additional time slots, which should not be underestimated, are needed for the subsequent submission of proof of implementation and statements on saving evaluations. The time required for these tasks depends on the structure of the actors in the market (action implementer, obligated parties). At the end of the verification process, the savings are to be corrected accordingly.

The next step is to prepare the reported and verified data for the NECP. The time required for data preparation and data analysis depends on the degree of digitalisation of the reported energy saving actions. Some time is needed when it comes to quality assurance, especially in case several institutions are involved in the reporting process.

Compliance mechanisms

It is necessary to clearly define who is responsible for enforcing compliance. The relevant authority should be able to act based on appropriate, legally established power. Unclear definitions might lead to unnecessary legal complications both for the relevant authorities as well as reporting parties. Additionally, legal definitions should also include elaborations on appropriate sanctions in the case of non-compliance.

Appropriate sanctions require a balance between the effectiveness of the threat of punishment to ensure compliance with the obligations and economic viability, as it cannot be assumed that every incorrect declaration is intentional. In addition, adequacy means that the amount of the sanction depends on the relevant obligation, which can be divided as follows:

- Self-declaration on individual obligations (e.g. energy sales, employees)
- Reporting of energy saving actions
- Calculation of energy saving actions
- Formal errors (missing deadlines, incorrect optional information)
- Insufficient target fulfilment

Without appropriate penalties, EEO and voluntary agreements cannot function properly, as non-compliant parties would gain a competitive advantage.

Step 3 – Setting up the infrastructure

Before processing the monitoring tasks, the following preparatory work is required:

- Building up the human resources
- Setting up a reporting infrastructure
- Preparing information material for stakeholders

Preparatory activities require lead times that should not be underestimated and cause additional expenses that should be taken into account when setting up an MRV system.

Building up the human resources

Sufficient qualified personnel is needed for the preparatory work and at least for the following regular tasks:

- Dissemination of information material / explanatory work for stakeholders
- Verification of reported data (data to determine the individual obligation, energy saving actions)
- Analysis of reported data as well as the preparation of visualisations and reports

The development of standardised evaluation methods can be an additional task of the monitoring authority.

For the above-mentioned tasks, a build-up phase with increased time and resource requirements is to be expected in addition to the continuous and repetitive activities. In addition, reporting deadlines also cause peak workloads for the administrators in the monitoring authority.

The increased demand of human resources in the start-up phase can be smoothed out by longer lead times. The problem of peak loads can be eased by postponing other work that can be deferred.

Depending on the allowed energy efficiency measures for Article 7, technical knowledge is required in addition to detailed legal knowledge on the EED.

Setting up a reporting infrastructure

The design of the reporting infrastructure depends on several factors:

- Number of reporting entities (Reasonable costs for establishing)
- Expertise of the reporting entities (Complexity of application)
- Purpose of the monitoring (Level of detail of the requested data)
- Available tools/applications (Interfaces)
- Data protection requirements (Corporate secrets, personal data)

The more entities are obliged to report, the simpler the reporting interface should be designed. However, a user-friendly interface also means higher costs, because in addition to the extra effort for the design, security mechanisms (sanity checks, cross checks) have to be programmed for most input fields.

The reporting infrastructure ranges from spreadsheets to online databases. Spreadsheets have the advantage that they can be created and – if necessary – changed quickly. However, the greater the number of responses and the more detailed the reports, the greater the effort required to compile and evaluate such spreadsheets. Especially in case many actions or measures are reported, automatic detection algorithms can help to identify potential false entries more easily and therefore decrease the amount of time needed for verification.

Different reporting infrastructures can be set up for different policy instruments (EEO, Subsidy Scheme, Taxation, etc.). For example, online databases can be provided for individual reporting and spreadsheets for aggregated reports. However, in the end, the different formats have to be merged again with additional effort, which is why it is recommended to set up a single database to gather all reports. A majority of the MS have already established an IT-based tool for MRV which also helps to reduce double counting risks (European Commission, 2016, p. 40).

If reporting is done via an online database, it also makes sense to collect corresponding proof of implementation via this database. In return, however, this leads to a lot of company and personal data being stored in this database. As a consequence, this means that data protection must be given a very high priority when setting up an online solution. Data protection includes the security of data against access by unauthenticated persons, as well as the recording of data changes to prevent fraud and, last but not least, the safeguarding of data in the event of a physical breakdown (e.g. of the server).

The implementation of helpful features, such as automatic target achievement reports, can significantly reduce the burden on obligated parties. For a better understanding of the required functions in the reporting infrastructure, it is helpful if the reporting processes are tested (i.e. playing through use cases) in advance, if necessary in cooperation with the obligated parties.

The amount of data to be stored should not be underestimated. Both for an online database and for the distribution and collection of tables, large amounts of data have to be factored in.

Preparing information material for stakeholder

The preparation of easily understandable information material for stakeholders, ideally featuring exemplary cases leads to a reduction in the effort required for clarification, as well as reducing misunderstandings among obligated parties and the number of legal proceedings. The prepared info texts can also be used as standard answers for requests (FAQs). It is recommendable to structure the information material according to tasks and obligations, so that stakeholders can search for the desired content in a focused way.

It can be very helpful for stakeholders to directly refer to the legal basis in all texts describing the tasks and obligations.

Step 4 – Executing repetitive tasks

Once the infrastructure has been set up, the continuous and repetitive activities can be performed. These activities include informing stakeholders, analyzing and processing of reported data as well as enforcing the law.

Informing Stakeholder

Standard activities include the continuous updating of explanations, FAQs and web pages, as well as an answering service (e.g. hotlines) for urgent requests. Further support for stakeholders can be the distribution of newsletters, press releases and participation in various events on the topic of energy efficiency.

Verification

The objective of the verification is to identify and to correct faulty reports. According to paragraph 5 of article 7a EED and paragraph 2 of article 7b EED Member States have to implement a verification of a statistically significant proportion and representative sample of energy efficiency improvement measures. It is important to decide whether a certain degree of inaccuracy should be allowed or whether 100% of all entries should be checked.

In addition to the verification of the reported energy efficiency measures, other declarations (e.g. energy sales) should be verified as well.

The monitoring of individual target achievement in EEO and voluntary agreements should also not be underestimated. As soon as the reporting deadline for energy saving actions has expired and a savings

deficit has been reached, an obligated party must be notified of corresponding sanctions. This action, in turn, triggers monitoring of progress towards sanctions compliance.

Verification can be roughly divided into the following categories:

- Desktop checks
 - Plausibility checks
 - In-depth checks
- On-site checks
 - Audits
 - Plant inspections

Desktop check use all data collected in the reporting infrastructure and compares this data with other data sources if necessary. While plausibility checks mainly identify scale and obvious errors, in-depth checks analyze all sources of error of an individual reported action (formal, eligibility, calculation methodology, data sources, evidence). Checklists can make in-depth checks more efficient and consistent.

On-site inspections should above all have a deterrent effect.

Legal dunning and law enforcement

In the event that incorrect entries are detected, as well as in the event of misreporting or non-compliance with targets, an appropriate reminding system and, if necessary, penalty prosecution are required. Accurate documentation should be emphasized at the beginning of verification activities so that less effort is required to investigate violations in the event of prosecutions.

Considering an opportunity to comment before initiating prosecution proceedings can significantly reduce the administrative burden, as misunderstandings can be cleared up in advance. For direct communication with the reporting entities, it is advisable to keep a contact list and keep it up to date.

If the monitoring authority has no powers to enforce penalties, then there needs to be a standardized procedure for reporting to the appropriate authorities as well as data traffic regulations.

Data processing / data analysis

The reported energy saving measures are to be aggregated and prepared for the reporting to the European Commission. For the purpose of reporting fulfilment of Article 7 EED, the reported measures are to be converted into final energy savings. The higher the requirements for visual representations of the results, the more working hours have to be calculated for the preparation of the reports.

In addition to the aggregation of reported savings, impacts of implemented measures on other policy interests (national energy consumption, national economy, renewable share, etc.) can be assessed.

If two or more energy efficiency measures target the same energy saving actions, any double counting must be cleared before the final energy savings can be reported to the European Commission. Double counting can be avoided in advance if the policy instruments prevent crediting in other instruments

(e.g. that energy saving action cannot use several support systems at the same time). Another option to clear double counting is to use a correction factor that makes deductions to the aggregated energy savings equal to the uncertainties.

Optional tasks

A Member State may provide the monitoring authority with other tasks that also serve to improve energy efficiency. Exemplary tasks can be:

- Compliance checks of the Energy Audit obligation
- Checking the energy service providers with regard to fulfilment of the qualification.
- Development and adaption of standardized energy saving calculation methodologies
- Pre-checks for planned energy saving actions
- Further evaluation of the reported micro data for national purposes (providing information for energy balances, policy design, potential analyses, ...)
- Improving reporting platform

Step 5 – Improving installed processes

The regular activities of the monitoring authority should include tasks for the improvement of various MRV processes. Not only for the direct processes in the monitoring authority but also for feedback to legislators or regulators. One of the objectives of the improvement should be to reduce the administrative burden.

Feedback from target groups regarding the processes and the reporting platform should be collected and analyzed at regular intervals and implemented if applicable and economic feasible. Significant changes may trigger additional budget requirements, especially in regard to IT-infrastructure.

It must be taken into account that obligated parties need sufficient lead time to be able to react to significant changes. Sometimes obligated parties are happy with non-optimal situations as long as they are stable.

In 2018, Austria launched a comprehensive evaluation process (BMK, 2018) on the EEO and the effectiveness of the Energy Efficiency Act. Several interactive workshops were held with different stakeholders to identify problem areas and possible solutions. The outcome of the evaluation process was that particular priorities were set for the amendment of the Energy Efficiency Act, such as reducing the administrative burden of providing evidence of energy saving actions.

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