



DEESME

National schemes for energy efficiency in SMEs

Deliverable 3.8 - Public Monitoring concept

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About

Improving energy efficiency is the most cost-effective way to reduce energy-related emissions, improve economic competitiveness and increase energy security. In the European Union, several pieces of legislation aimed at guiding states and companies, regardless of their size, on ways to improve their energy efficiency: one of them is the Energy Efficiency Directive, establishing a common framework of measures and requirements with the goal to remove market barriers and promote a more efficient use of energy in supply and demand. Article 8 of the Directive offers ways to achieve this, requiring Member States to promote and facilitate the implementation of energy audits and energy management systems. The audits are compulsory for large companies and recommended for small and medium enterprises (SMEs). National authorities should encourage both to implement the resulting recommendations.

Member States have all chosen different approaches to transpose the requirements into national laws and to support companies (trainings, websites, helplines and funding support schemes). SMEs have less workforce, technical and financial capacity to perform energy audits, and therefore rarely do so: making them aware of the multiple benefits that can derive from improving their energy efficiency and accompany them in the energy transition, with knowledge and funding from both the public and private sectors, is key. That is what DEESME, a Horizon 2020-funded project (September 2020 – September 2023), aims at.

DEESME enables companies, especially SMEs to manage the energy transition by taking profit of multiple benefits from energy management and audit approaches and provides national authorities with guidelines and recommendations to empower their schemes under article 8, using the multiple benefits' approach.

The project identifies and shares good practices from national schemes, EU projects, and other initiatives with national authorities and support them in developing more effective schemes dealing with energy audits and energy management systems. It assists SMEs to develop and test the technical DEESME solutions by organizing information and training initiatives, realising energy audits, and implementing energy management systems starting from international standard and adding the multiple benefits energy efficiency approach.

The project is built on a consortium of academics, research organisations, consultancies and government offices from Belgium, Bulgaria, Germany, Italy, the Netherlands and Poland, namely: IEECP (NL, coordinator), FIRE (IT), SOGESCA (IT), Fraunhofer ISI (DE), CLEOPA (DE), SEDA (BG), ECQ (BG), KAPE (PL), EEIP (BE).

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Executive Summary

Conducting energy audits and implementing energy management systems can be a source of many benefits for companies. Besides reducing energy costs, wider benefits include, for example, lower operating costs, increased productivity or improved working environment. As compared to large companies, small and medium-sized companies (SMEs) typically have less workforce, technical and financial capacity to perform energy audits, and therefore rarely do so.

Against this background, DEESME, a Horizon 2020-funded project (September 2020 – September 2023), aims at making especially SMEs more aware of the benefits from improving their energy efficiency and accompanying them in the energy transition. In its work package 3, the project assists SMEs to develop and test the technical DEESME solutions by organizing information and training initiatives, realising energy audits, and implementing energy management systems starting from international standards and under special consideration of the multiple benefits energy efficiency. In particular, the specific objective of the work package in Tasks 3.1 to 3.4 are:

- To raise awareness among companies of direct relations between energy efficiency and its multiple benefits
- To show to companies how to take profit of energy efficiency by assessing and managing the integrated aspects according to multiple benefits approach
- To develop several tools/reports such as case histories, template, methods, energy management procedures (see the WP deliverables) to allow the involvement of many companies in national schemes after the project.
- To obtain at least 50 audits, 25 energy management system based on ISO 50001 and multiple benefits approach in each country during the project, energy efficiency low costs and management solutions

Task 3.5 of this work package is about “Monitoring of WP3 quantitative and qualitative results”. Thus, it aims to monitor the results and impact of this work package. In particular, the number of energy efficiency measures triggered by the project in the companies, the corresponding investments and environmental impact (primary energy saved and GHG emissions avoided) will be monitored.

This deliverable (D3.8) describes a monitoring concept established during the first months of the project. It specifies how the successful use and application of the tools created under the DEESME approach will be monitored. It covers the following aspects (Figure 1):

- I. **Indicators and data requirements:** A description of key performance indicators, their operationalization and data requirements to determine them.¹
- II. **Data collection overview:** An overview of the data collection process.
- III. **Data collection templates:** A presentation of the templates used for data collection.

¹ see more details in sections 3 and 4.

- IV. **Roles and responsibilities:** A bundle of information on the practical implementation of data collection for each project partner.
- V. **Data assessment:** A description on how the collected data will be processed.
- VI. **Summary:** An overview of the schedule and responsibilities.

In addition, screenshots of the draft data collection templates are shown in the annex (VII).

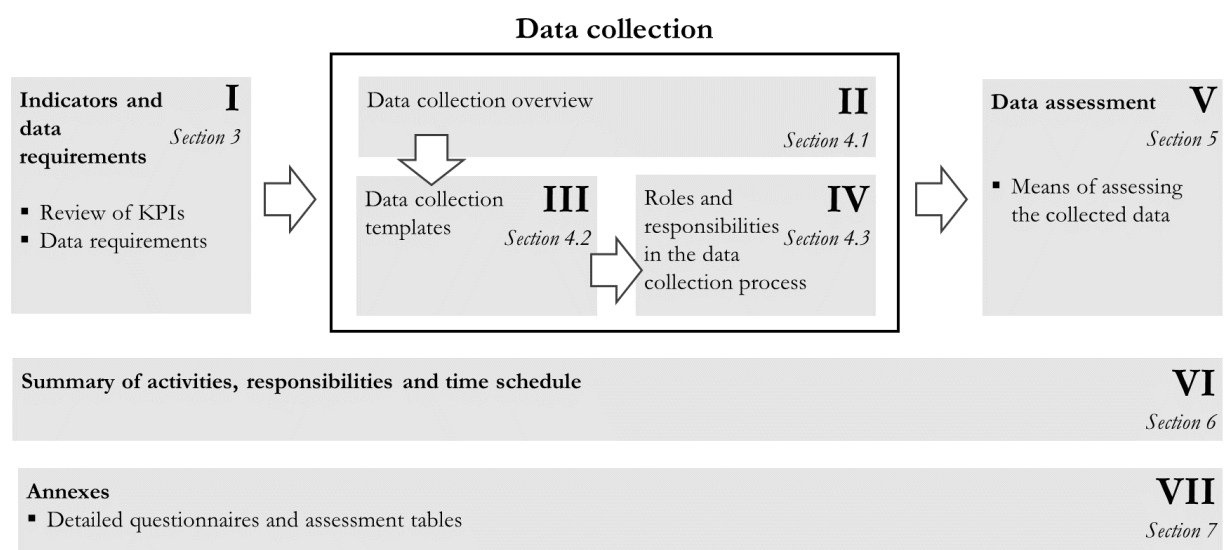


Figure 1: Overview of the monitoring concept

1. Introduction to the monitoring concept

According to the DEESME proposal, each work package (WP) includes its dedicated monitoring activities. Work package 3 (WP3) of the project aims at enabling companies to take profit of multiple benefits and energy management approach. For this purpose, energy audits and management systems will be integrated with the multiple benefits approach through the implementation and testing of models that will be developed within the project. In addition, companies will be mobilized through information and training activities. In particular, the specific objectives of the work package are:

- To raise awareness among companies of direct relations between energy efficiency and its multiple benefits
- To show to companies how to take profit of energy efficiency by assessing and managing the integrated aspects according to multiple benefits approach
- To develop several tools/reports such as case histories, template, methods, energy management procedures (see the WP deliverables) to allow the involvement of many companies in national schemes after the project.
- To obtain at least 50 audits, 25 energy management system based on ISO 50001 and multiple benefits approach in each country during the project, energy efficiency low costs and management solutions.

The monitoring activities in WP3 are to find out to what degree these specific objects have been reached and to identify opportunities for improvement the further - implementation of the project. In other words, task 3.5 (T3.5) is to monitor the results and impact of the work package (Figure 2).

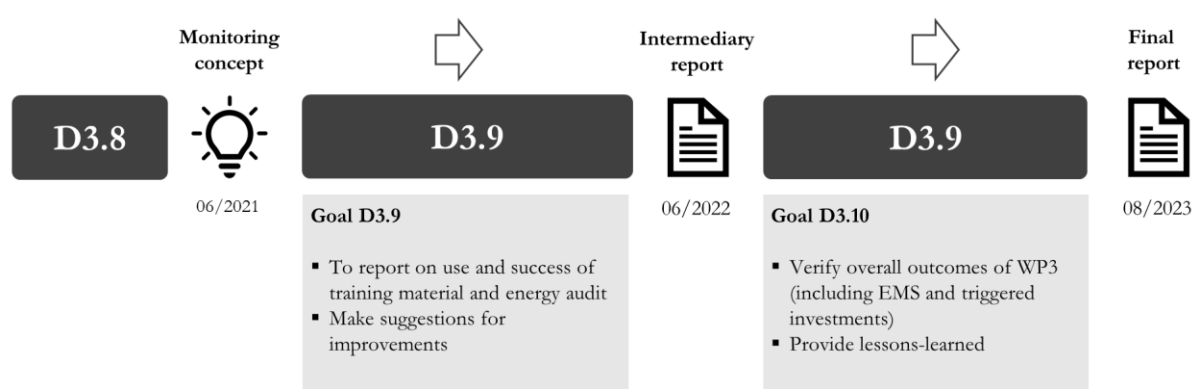


Figure 2: Overview of the deliverables in T3.5

This monitoring concept specifies how the successful use and application of the tools created under the DEESME approach will be monitored (D3.8). Based on this concept, two monitoring rounds will be carried out:

- An intermediary monitoring (D3.9) will mainly report on the use and success of the training material and energy audit and it will make suggestions for improvements that could feed



into further enhancements of the DEESME approach, particularly with regard to the campaign to be implemented in WP4 and to institutionalization in WP5.

- A second monitoring (D3.10) towards the end of the project will verify the overall outcomes of WP3 (energy management and triggered investments included). In that way, it will verify whether the key performance indicators relevant for WP3 have been accomplished and it will seek to provide lessons-learned for the exploitation of DEESME approach after the formal conclusion of the project.

The monitoring concept is crucial to establish a structured data collection process and to finally evaluate the DEESME approach for the SMEs developed in WP3. The monitoring concept can be considered as a guideline that contains information about what kind of relevant data shall be collected by whom and at what time.

The monitoring activities in WP3 are closely related to the forthcoming monitoring activities in WP4, which are dedicated to ensuring the effectiveness of the DEESME approach in mobilising the companies towards the energy efficiency.

2. The monitoring concept

The monitoring concept covers various items (Figure 3):

- **Indicators and data requirements:** First, the monitoring concept reviews the key performance indicators established in the proposal phase of the project for WP3 and describes how they have been operationalized and what data is required for monitoring them; in addition, further indicators are added to cover all aspects that need to be covered during the monitoring activities (section 3)
- **Data collection overview:** After the data requirements have been formulated, an overview of the different data collection steps is provided (section 4.1)
- **Data collection templates:** Thereafter, the structure and content of the data collection templates are presented (section 4.2).
- **Roles and responsibilities in the data collection process:** Finally, the practical organization of the data collection is described (section 4.3).
- **Data assessment:** This section describes how the actual assessment of the collected data will take place (section 5).
- **Summary of activities, responsibilities, and time schedules:** The last section of the concept contains an overview of all responsibilities including the schedule (section 6).
- **Annexes:** The annexes of this document contain an overview of the detailed questionnaires and assessment tables used for carrying out the monitoring activities in WP3 (section 7).

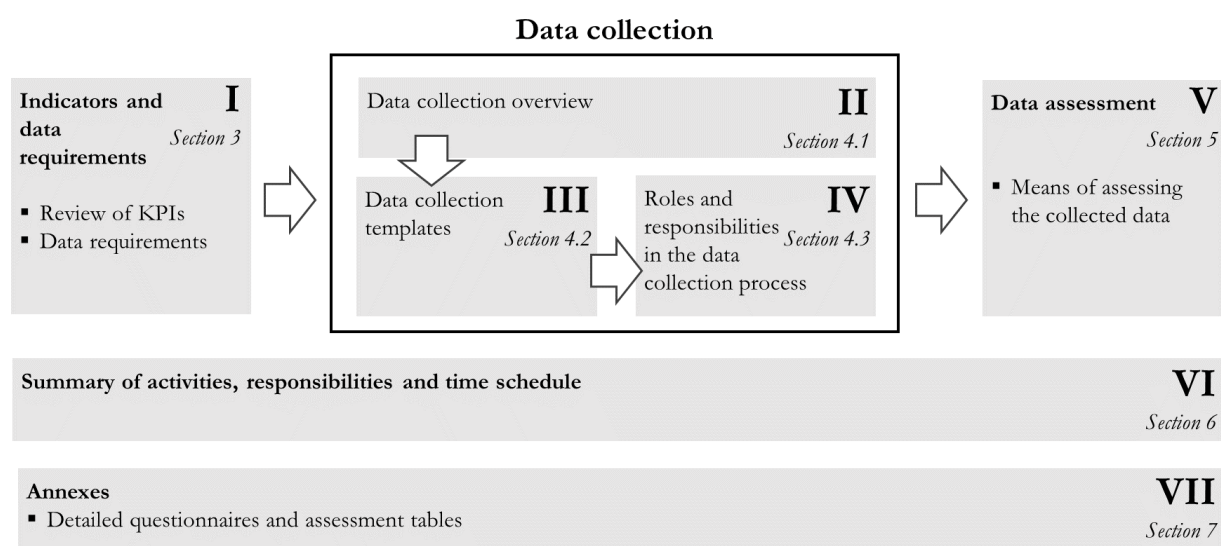


Figure 3: Overview of the monitoring concept

More information on the indicators is provided in the next section (see section 3).



3. Key performance indicators and data requirements

According to the project proposal, the DEESME project shall attain a set of different key performance indicators within and beyond its duration. The overall set of indicators addresses different parts of the project. Several of them relate to the activities in WP3 (Table 1: Project Performance Indicators for WP3). Many of them measure both expected impacts during project duration and 5 years after the project ends (i.e. until August 2028).

Project Performance Indicator		Quantification		Measurement unit
Indicators related to companies (savings, investments, number of companies involved)		within project duration	5 years after project ends	
#1	Companies informed and trained with enhanced energy culture with reference to multiple benefits and energy management	500 (at least 400 SMEs)	1,800,000	number
#2	Energy Audits with DEESME approach	50	800,000	number
#3	Energy management Systems also without certification	25	225,000	number
#4	Solutions adopted by the companies during the project	50	-	number
#5	Primary energy savings triggered by the project	10.87	64,200	GWh/year
#6	Investments in sustainable energy triggered by the project	1.5	8,000	million EUR
#7	Companies that will invest after the project thank to the DEESME approach	-	160,000	number
#8	GHG emissions avoided	3,228	19,067,400	tCO ₂ eq

Table 1: Project Performance Indicators for WP3

Next to verifying whether these quantitative indicators have been reached, one aim of the monitoring work package is also to report on the perception of the materials developed in the project including the aim of making suggestions for improvements. This aim cannot be achieved by merely analysing these quantitative indicators alone. An additional analysis of qualitative indicators relating to the developed materials is therefore required.

3.1. Operationalization of the quantitative KPIs

Prior to identifying the data needed to monitor the KPIs, it is important to understand how the target values for the KPIs have been estimated in the proposal. The next sub-sections show for each KPI how the original target has been set and serve as a basis to monitor the results of the project related to WP3.



3.1.1. Indicator #1: Companies informed and trained with enhanced energy culture with reference to multiple benefits and energy management

The target number of companies involved in informative and training sessions related to energy efficiency according to the DEESME vision has been set to 500.

The number of companies informed five years after the project ends has been determined as follows: The number of EU companies is almost 25 million². The large ones are 46,600; 22 million are micro companies (88%). After the DEESME project ends, all EU companies could receive information about the DEESME approach to energy efficiency by the national authorities. Considering that 20 of 28 national authorities (10 more than those already involved in the project) will adopt the technical solutions of DEESME, the potential target of the updated national schemes is made of almost 18 million companies (almost 16 million of which are micro companies). It is assumed that within five years, national schemes will be able to directly inform 10% of them, equalling 1.8 million companies.

3.1.2. Indicator #2: Energy Audits with DEESME approach

The target number of companies who conducted an energy audit with the DEESME approach is 50 by the end of the project.

Five years after the project, almost half of the companies informed by NAs are estimated to carry out an energy audit (800,000)

3.1.3. Indicator #3: Energy management Systems also without certification

The target number of companies who implemented the DEESME EMS approach is set to 25 by the end of the project.

Five years after the project, 225,000 companies are assumed to have implemented the DEESME EMS approach.

3.1.4. Indicator #4: Solutions adopted by the companies during the project

It is assumed that 50 of the participating companies implement at least one solution during the project duration.

3.1.5. Indicator #5: Primary energy savings triggered by the project

DEESME mainly addresses SMEs that are most of the EU companies (the large ones are only 46,600 on almost 25 million, while 22 million companies are of micro level). The estimations of primary energy savings triggered by the project were carried out by considering the typical medium investments made

² Annual report on European SMEs 2017/2018



by companies for the replacement of the air compressor, motors or pumps. According to the “DEEP platform”, the average amount of this kind of investment was approximately 30,000 EUR, considering installation, one-year maintenance and monitoring devices.

Investments of 30,000 EUR allow electric energy savings of 100 MWh per year according to the efficiency of old and new devices and the operational conditions (hours per years, etc.).

Considering that 50 companies implement at least one solution motivated by the DEESME project, the total electric energy savings are $50 \times 100 \text{ MWh} = 5,000 \text{ MWh}$ or 10.87 GWh primary energy savings (5,000 MWh electric energy = 935 TOE = 10,873 primary MWh = 10.87 primary GWh).

The triggered primary energy savings five years after the project ends has been determined as follows:

According to the EU Open data portal energy datasheets: primary energy consumption in the industry sector of the EU-28 countries (August 2018 update) was 276.8 million tons of oil equivalent (Mtoe) in 2017 (latest year data is available for). In 2015 and 2016, consumption was reported as 275.9 Mtoe and 276.1 Mtoe, respectively. Without new policies energy demand is expected to remain at similar levels in the future. So, the starting assumption is that the EU industry primary energy consumption is 276 Mtoe per year.

It is assumed that there will be no more than 5% of energy savings over a period of 5 years through the replacement of air compressors, motors, pumps, etc. It is furthermore assumed that the impact of the DEESME audits will be around 20% of the saving potential considering that most companies would make investments independently. This is equivalent to 1% of energy savings due to investments related to DEESME audits. 1% of savings equals 2.76 Mtoe or 32,100 GWh.

In addition, primary energy savings related to EMS are considered. According to several papers (examples³) and on-field experiences, it is assumed that effective energy management approach can save 10% energy in industrial companies compared to a baseline. Conservatively, EMS would trigger 1% savings of 2,76 Mtoe (32,100 GWh) in the project.

In total, savings expected during the five years period after the project end, are 5.5 Mtoe per year (64,200 GWh per year)

³ “Energy savings by energy management systems: A review”; DashengLee and Chin-ChiCheng; Renewable and Sustainable Energy Reviews - Volume 56, April 2016, Pages 760-777 “An introduction to energy management systems: energy savings and increased industrial productivity for the iron and steel sector - OECD Steel Committee meeting held the 12 December 2014 (report January 2015)



3.1.6. Indicator #6: Investments in sustainable energy triggered by the project

The typical medium investments made by companies for the replacement of the air compressor, motors or pumps are approximately 30,000 EUR, according to the “DEEP platform”⁴, considering installation, one-year maintenance and monitoring devices.

Assuming that 50 of the participating companies will implement at least one solution motivated by the DEESME project, the total benefits by the end of the project are 1.5 million EUR.

The triggered investments in sustainable energy five years after the project ends has been determined as follows:

Using the “DEEP platform”, we examined the relationship between value in euro and energy saving in GWh of some typical investments (€ / GWh / year):

- compressor replacement: 155,000
- engine replacement: 307,000
- heat recovery (without energy production): 153,000
- replacement of the pumps: 383,000

A conservative assumption yields a ratio of € 250,000 EUR / GWh / year.

This means that, to save 32,100 GWh / year, about 8 billion € investments must be mobilized by companies.

3.1.7. Indicator #7: Companies that will invest after the project thanks to the DEESME approach

It is assumed that 50,000 EUR could be the value of the investments (replacement of a compressor and some motors and pumps; the heat recovery from a compressor) that each company could sustain on average over the 5 years after the project, considering that SMEs are the main target and they don't invest large amounts. Given that 8 billion EUR is the amount of investments triggered after the project end (see previous subchapter), the companies that should be convinced to invest are about 160,000 that is almost 1% of the total number of companies in 20 MS and almost 10% of companies that were informed by NAs.

3.1.8. Indicator #8: GHG emissions avoided

To calculate the tCO₂eq in the project proposal. the EU28 average emission factor of 2017 related to electricity and heat production has been used (297 g CO₂ eq per kWh).⁵

⁴ <https://deep.eefig.eu/>

⁵ Fattori di emission atmosferica di gas a effetto serra settore elettrico nazionale e nei principali paesi europei – ISPRA 2018.



3.1.9. Summary of data requirements to determine the quantitative KPIs

This section provides a generalized overview of the data required to determine the KPI shown in the previous section. Details on the specific information that needs to be collected are given in the next section and in the later referred-to data collection templates in the annex. Various items of information need to be collected to determine the values of the quantitative KPIs. The necessary information from the participating companies includes:

- The number of EE measures triggered by the DEESME approach.
- The estimated energy savings (kWh/year final energy) and investments (EUR) of each energy efficiency measure triggered by the DEESME project.
- The impacted energy carrier in order to estimate the avoided GHG emissions, to be chosen from a pre-defined list of energy carriers.
- The type of energy efficiency measure triggered by the DEESME project, to be chosen from a pre-defined list of measures.
- Information on how far each EE measure was triggered by the overall DEESME approach, to be chosen from a pre-defined ordinal scale (from low to large extend).
- Related to that: information on how far the elements of the Multiple Benefits Approach were relevant in triggering the EE measure, to be chosen from a pre-defined ordinal scale (from low to large extend).

Furthermore, some information needs to be collected on the number of implementations:

- The number of companies informed and trained with enhanced energy culture with reference to multiple benefits and energy management.
- The number of Energy Audits with DEESME approach.
- The number of Energy Management Systems (also without certification) with DEESME approach.

3.2. Operationalization on the qualitative targets

Next to the previously mentioned quantitative indicators, a set of qualitative indicators shall serve in the evaluation of the developed materials in WP3. This evaluation shall in particular cover the perception of the developed approaches and materials.

Differently from the previous quantitative indicators, no specific indicators have been suggested in the proposal. Therefore, a new set and methodology is introduced here. This methodology for the qualitative evaluation covers two parts: A general evaluation part on the overall approach and an in-depth part dedicated to particular areas of the DEESME methodology.

The aim of the **broader general part** is to obtain a generalized overview of the performance of the entire set of material suggested in the project. It covers the following areas:

- **Ease-of-understanding:** How well does the target group understand the developed materials?



- **Ease-of-application:** How difficult is it for the target group to apply the developed materials?
- **Contribution:** To what degree does the developed material contribute to enhancing energy efficiency?
- **Cost-benefit-ratio:** What does the trade-off between the benefit from using the material and the effort to use them look like?
- **Perspectives:** Is the developed material likely to be re-used in the future by the company?
- **Recommendations:** What part was especially beneficial/not beneficial? What need for change to the developed materials is there?

The aim of the **specific in-depth part** will deal with particular building blocks of the DEESME approach. At the point of finalizing this concept, the specific approaches to be developed under WP3 were still in the design. A draft version of D3.1 made available on 18th June 2021, for example, included building blocks such as a “business analysis“, “environmental analysis“, “multiple benefits analysis” and “business sustainability development”. Additional work is forthcoming in other Tasks under WP3. Therefore, it is only possible to provide a general overview of the expected coverage of the questions which might have to be adapted as needed. To limit the burden for the participating companies, the specific evaluation covers a selection of the previous areas, but it is kept concise and includes the following areas:

- Ease-of-understanding
- Ease-of-application
- Cost-benefit-ratio
- Recommendations

To ensure a harmonized setup, all questions covering these areas should be based on a qualitative 5 -point Likert scale, ranging from “totally disagree” to “total agree”. Recommendations, on the contrary, should be in free text format.



4. Data collection

This section describes the design of the data collection process. More specifically, it starts by outlining the data collection process and describes at which points of time what data needs to be collected using data collection templates.

4.1. Overview of data collection

Regarding the quantitative impacts of the project, data regarding the implementation of EE measures before the project interventions (baseline) and shortly before the end of the project will be gathered. The assessment of the perception of the trainings and tools will require only one measurement, right after the trainings. Figure 4 provides an overview of the three interventions planned for monitoring. In total, the data collection activities encompass three assessment activities:

- **First measurement (before trainings):** This first measurement focuses on the status of implementation of energy efficiency measures in the companies before the trainings. This kind of initial assessment is based on the rationale to first analyse the status quo before the targeted companies come in further contact with the DEESME project. In particular, it focuses on the current perception of energy efficiency measures. Only after this initial status has been evaluated, the results and impacts of the DEESME project can be evaluated by the follow-up interventions.
- **Second measurement (after trainings):** This second measurement focuses on the perception of the trainings and tools and will be carried out after the trainings. The success of the materials developed for the enterprises will in particular be measured by questions in a survey conducted with the training participants.
- **Third measurement (February 2023):** This third measurement focuses on the final view of the targeted companies on energy efficiency measures and will be carried out towards the end of the project. For the energy efficiency measures, the number of planned or already implemented measures due to the DEESME approach will be accounted for. As well as those which were not considered before the training and are now intended to be implemented.

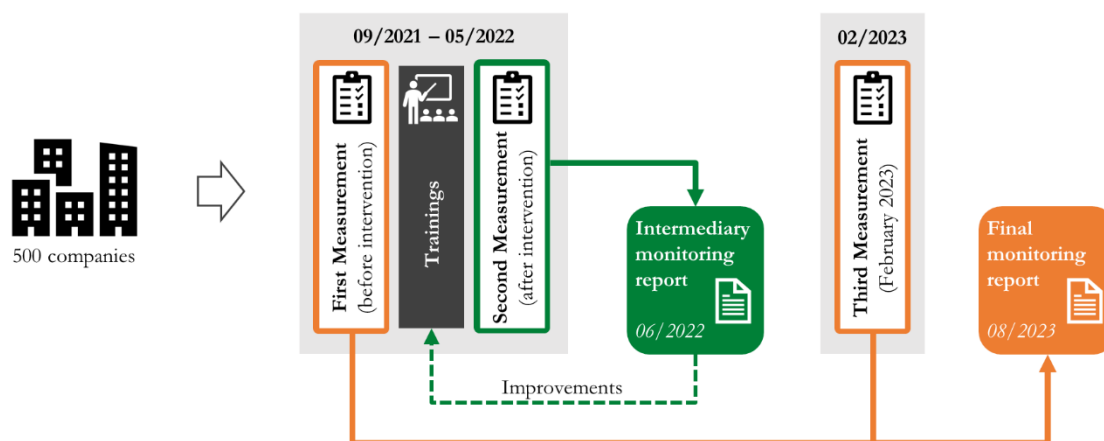


Figure 4: Key elements and process of the monitoring activities

The information collected during these three interventions will be used to the overall results and impact of the DEESME approach.

4.2. Data collection templates

To simplify and harmonize the data collection activities, a set of data collection forms are provided in a spreadsheet. These are to be included in the Annex of this document. This section provides an overview of these documents. Details on the use of the templates is also to be found with the templates and accompanying instruction which illustrates the collection process and explains colour codes used in the document. The DEESME partners involved in the data collection will get a detailed guideline describing all steps of the process (screenshot see Annex 7.2).

4.2.1. Sheet “General information”

The sheet general information serves to track information on the DEESME partner following up on the company and it contains information on the company (e.g. location, size and sector) as well as information on contact person (screenshot see Annex 7.3).

4.2.2. Sheet “First measurement”

This sheet specifies the information that needs to be collected as the first measurement, i.e. prior to engaging in the DEESME trainings. It covers information on the status of energy audits and/or energy management system in the company. The focus of this first measurement, however, is to collect information on energy efficiency measures that are currently under consideration within the company. For this purpose, some information on the measure should be provided and an indication of the implementation probability needs to be given (screenshot see Annex 7.4).



4.2.3. Sheet "Second measurement"

This sheet seeks to understand the perception of the DEESME trainings in general and of elements that have been developed for the trainings. Since the training concept is not fully established at the time of preparing this report, the perceptions for the specific parts are only indicated by a placeholder set. For the final evaluation, the sheet will be completed. The evaluation survey questionnaire itself consists of open and closed ended questions, which can be found in Annex 7.5.

4.2.4. Sheet "Third measurement"

This sheet contains a direct follow-up on the first measurement. While the first measurement serves to establish the point of reference, this third statement re-iterates about the current view of the measures after the DEESME interventions have been completed or near completion in February 2023. The sheet covers information on the type of intervention as well as the list of energy efficiency measures considered. The latter consists of measures that were proposed earlier during the first measurement, but it also includes measures that might have been added since them. For those measures that have a higher probability of implementation, further information about the costs, savings and the specific contribution of the DEESME project including the role of NEBs is collected. The same information is also collected for completely new measures (screenshot see Annex 7.6).

4.3. Roles and responsibilities in the data collection process

Crucial for the success of a monitoring and evaluation plan is a clear determination of roles and responsibilities for the data collection (for detailed information, see section 6). In this chapter, the major roles and responsible institutions for this process will therefore be defined.

The overview of the process for the three measurements is shown in Figure 5.

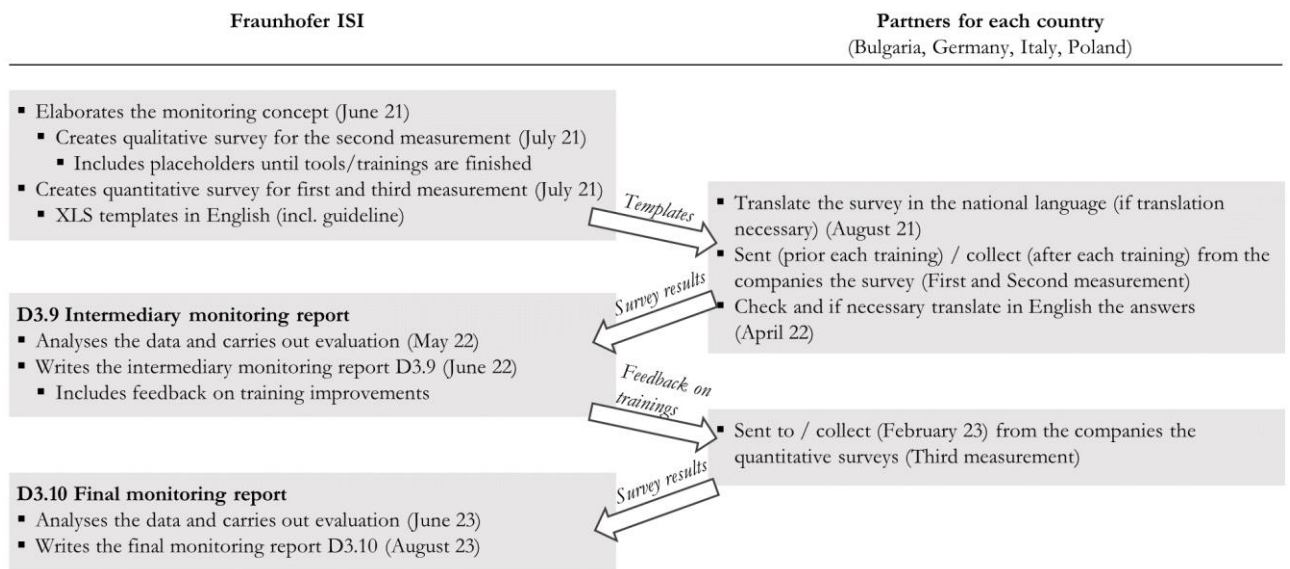


Figure 5: Overview of the data collection process

Detailed instructions on the process can be found in the accompanying Excel spreadsheet.



5. Data assessment

One major task within the evaluation of the project is the determination of the overall impact of the project along the KPIs.

5.1. Quantitative KPIs

In general, the analysis of the achievement of the quantitative KPIs during the project will follow the same methodology as established during the proposal phase of DEESME to avoid deviations due to methodological differences. However, as a rule, default assumptions made for determining the target values will be replaced by specific information obtained during data collection, where available. For example, the expected default savings of 100 MWh/a will be replaced by the actual sum of the savings that are attributable to the impact of DEESME.

The determination of the energy savings due to the DEESME interventions is one of the central KPIs. Triggering a primary energy savings potential of 10.87 GWh/year was set as a target for the project. This would contribute to avoid 3,228 tCO₂eq of GHG. To assess indicators as these, the main challenge is to identify the improvements triggered by the project. The improvements are not only those implemented due to and during the project duration but also those likely to be implemented due to the project interventions but after the end of the project.

In the first and third measurements, companies are requested to provide information regarding identified energy efficiency measures and the probability to implement them. This allows to point out measures already identified before the trainings and for which the implementation probability changed after the training. For the measures, information on the estimated investments as well as the energy savings is collected.

Based on the collected data and the above-mentioned approach, measures are considered as "triggered by the project" if they fulfil the following criteria:

- the probability of implementation increased between the first and the third measurement OR the measure is new
- AND: the "probability of implementation" is at least "middle" OR the measure is "already planned / in implementation"
- AND: the "impact of the DEESME approach on the current probability of implementation" is at least "middle"

As the "estimated savings" and the "energy carrier" for each measure is also known, it will be possible to estimate the primary energy savings as well as the GHG emission reductions. Furthermore, based on the "estimated investment" of each measure, the overall investments will be estimated.

In case the necessary information cannot be obtained, (e.g. company does not provide the third measurement), the default assumptions from the proposal phase will be used, but this will be pointed out and any differences between the average collected value and the assumption will be indicated.



The chosen approach is a pragmatic one to assess the intended impact triggered within the project duration, considering the context of the project. A similar one has been carried out in the H2020 INDUCE project.⁶

A limitation of the approach is that it does not allow a quantification of the impact 5 years after project ends, since no data will be gathered after the end of the project. However, based on the achieved levels of the KPIs, it will be pointed out how many additional companies will on average be needed to adopt the DEESME approach to achieve the targets for the 5 years after project end.

5.2. Qualitative KPIs

In contrast to the quantitative KPIs, the analysis of the qualitative KPIs is simple: For each question, the closed answers belonging to the same category will be counted and all of them will be illustrated in distribution graphs.

For questions with open answers, a set of common categories will successively be developed when reviewing the answers. The answers will be then attributed to one or several of these categories and the resulting count per category will be visualized along with representative answers to underline their meaning, where helpful.

⁶ Towards a sustainable agro-food INDUstry: Capacity building programmes in Energy efficiency | INDUCE Project | H2020 | CORDIS | European Commission (europa.eu)

6. Summary of activities, responsibilities and time schedule

The details of the monitoring plan, including activities, responsibilities, and time schedule are presented in Table 2.

Measurement /Deliverable	Responsible	What	By when
1	Fraunhofer ISI	Provides the first measurement XLS template in English	July 2021
1	Partner for Bulgaria, Germany, Italy and Poland	If necessary, provide the translation in national language of the Excel-template	August 2021
1	Partner for Bulgaria, Germany, Italy and Poland	Sends the first measurement XLS template to the company	4 weeks before the training
1	Partner for Bulgaria, Germany, Italy and Poland	Remind to participating companies to send back the survey	1 week before the training
1	Partner for Bulgaria, Germany, Italy and Poland	Check data validity to ensure that questions were answered correctly	latest by April 2022
1	Partner for Bulgaria, Germany, Italy and Poland	Translate completely filled template back into English and send it to Fraunhofer ISI	latest by April 2022
2	ISI	Provides the second measurement XLS template in English	July 2021
2	Partner for Bulgaria, Germany, Italy and Poland	If necessary, provide the translation in national language of the Excel-template	August 2021
2	Partner for Bulgaria, Germany, Italy and Poland	Sends the second measurement XLS template to the company	right after the training
2	Partner for Bulgaria, Germany, Italy and Poland	Remind to participating companies to send back the survey	2 weeks after the training
2	Partner for Bulgaria, Germany, Italy and Poland	Check data validity to ensure that questions were answered correctly	latest by April 2022
2	Partner for Bulgaria, Germany, Italy and Poland	Translate completely filled template back into English and send it to Fraunhofer ISI	latest by April 2022
1 and 2	Fraunhofer ISI	Analyses the data	May 2022
D3.9	Fraunhofer ISI	Provides an overall evaluation report including information gathered in companies during project	June 2022
3	Fraunhofer ISI	Provides the third measurement XLS template in English	July 2021
3	Partner for Bulgaria, Germany, Italy and Poland	If necessary, provide the translation in national language of the Excel-template	August 2021
3	Partner for Bulgaria, Germany, Italy and Poland	Send the third measurement XLS template to the company	January 2023
3	Partner for Bulgaria, Germany, Italy and Poland	Reminds to participating companies to send back the survey	February 2023
3	Partner for Bulgaria, Germany, Italy and Poland	Check data validity to ensure that questions were answered correctly	March 2023
3	Partner for Bulgaria, Germany, Italy and Poland	Translate completely filled template back into English and send it to Fraunhofer ISI	March 2023
3	Fraunhofer ISI	Analyses the data	April-June 2023
D3.10	Fraunhofer ISI	Provides the final report	August 2023

Table 2: Detailed overview of the monitoring plan

7. Annexes

7.1. Overview of the tasks in Work Package 3

Task	Short description	Focus	Target	Start	End	Report
3.1	Developing energy audit and management system models integrated with the multiple benefits approach			9.2020	9.2021	6.2021
3.2	Mobilising companies: training activities and energy auditing	Energy Audits	500 trained 50 Energy Audits with MB tools	12.2020	08.2022	06.2022
3.3	Testing the Energy Management System integrated with the multiple benefits approach	EMS	25 EMS with multiple benefits tools	03.2021	09.2022	09.2022
3.4	Fostering investments	Investments analysis according to multiple benefits approach ⁷		09.2022	06.2023	06.2023
3.5	Monitoring of WP3 quantitative and qualitative results			03.2021	09.2023	06.2021 ⁸ 06.2022 ⁹ 08.2023 ¹⁰

Table 3: Overview of Work Package 3

⁷ 50% of companies are expected to recognize the added value of the DEESME approach, while 20% will find the motivation in such approach to develop efficiency measures.

⁸ D3.8 Monitoring concept

⁹ D3.9 Intermediary monitoring report

¹⁰ D3.10 Final monitoring report

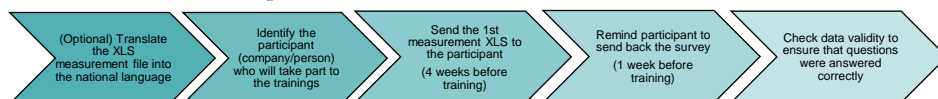
7.2. Guideline for the partners

DRAFT VERSION

Explanation for the project partners

This is the draft version - a final version will follow

First measurement: Before the trainings



- 1) Upon receiving this document: If deemed necessary, partner to translate the Excel files into the national language.
- 2) When participant register to **FIRST training**: Partner to collect contact details and add available information to the "General information" sheet.
- 3) **Preferably 4 weeks before the FIRST training**: Partners asks participant to complete the information on sheet "General information" and fill the sheet "First measurement" (no data to be entered on sheet "Second measurement" and "Third measurement")
- 4) **In case information not received 1 week before FIRST training**: Partner to remind participants to fill in the document.
- 5) **Upon reception**: Partners check data validity of the answers in the Excel file. If mistakes are detected, participants might need to be contacted again.

Second measurement: After the trainings



- 1) Directly after the **LAST** training of the participant: Partner asks participant to fill in the information in sheet "Second measurement".
- 2) **In case information not received 2 weeks after LAST training**: Partner remind participant to fill in the document.
- 3) **Upon reception**: Partners to check validity of the answers . If mistakes are detected, participants might need to be contacted again.
- 4) **Thereafter in case separate files were used**: Partner merges information of the second measurement in the file that contains the information from the first measurement.
- 5) **Thereafter**: Partner proceeds to translating any answers containing text to English.
- 6) **Latest until 04.2022**: Partner uploads a single file per company to a designated location (to be defined later), preferably named "M12_Country_CompanyName.xlsx"

Third measurement: January 2023



- 1) **January 2023**: Partner asks participant to fill in the information in sheet "Third measurement".
- 2) **In case information not received 4 weeks later**: Partner to remind participants to fill in the document.
- 3) **Upon reception**: Partner to check validity of the answers. If mistakes are detected, participants might need to be contacted again.
- 4) **Thereafter in case separate files were used**: Partner merges information of the file that contains the information from the first and second measurement.
- 5) **Thereafter**: Partner proceeds to translating any answers containing text to English.
- 6) **Latest until 03.2023**: Partner uploads a single file per company to a designated location (to be defined later), preferably named "M123_Country_CompanyName.xlsx"

7.3. General Information

General information

Time to fill: before the trainings

Information for the participants



- 1) No information needed in Part I. This is filled by the DEESME project partner.
- 2) In Part II, fill the blue shaded cells with your company information.
- 3) In Part III, fill the blue shaded cells with your contact information for further communication regarding the DEESME project.
- 4) Move to sheet "First measurement" and continue filling the information there.

Color coding

	To be filled in by the participant/company
	Pre-filled by the DEESME project partner
	Example

I. DEESME partner

Example

Institution		Muster AG
Name: Contact for questions		Sebastien Müller
Email: Contact for questions		claudia.ly@muster.de

II. Company information

Company name		Sample GmbH
Address		Blumenstrasse 20, 94204 Frankfurt
Country		Germany
Company size (number of employees)		50 < ... <250
Sector of activity		Construction: Production of samples
Homepage		www.sample.de

III. Contact person at the company

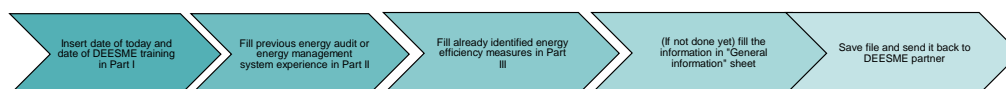
First name		Sebastian
Surname		Müller
Email address		sebastian.mueller@sample.de
Phone number		004912345689
Role		Energy manager

7.4. Template: First measurement

First measurement

Time to fill: before the trainings

Information for the participants



- 1) In Part I, fill the blue shaded cells with the date of today and the date of the forthcoming first DEESME training.
- 2) In Part II, fill the blue shaded cells with your previous experience with energy audits or energy management systems. If you performed an energy audit before, or if you are using an energy management system, then please indicate the (starting) time.
- 3) In Part III, fill the blue shaded cells with as many energy efficiency measures as you already identified (e.g. identified in previous energy audits). Please provide a short description of the measure, and the current probability of implementing it.
- 4) If not done yet, furthermore fill in your company and contact information on the "General information" sheet.
- 5) Save the file and send it back to the DEESME partner

here: Email of DEESME project partner

Color coding

- To be filled in by the participant/company
- Pre-filled by the DEESME project partner
- Example

I. Date

Date (today) (DD.MM.YYYY)		01.01.2021
Date of the forthcoming first DEESME training (DD.MM.YYYY)		15.01.2021

II. Energy audits / management

Did your company carry out an energy audit?		Yes
If yes: When did the last audit take place? (MM.YYYY)		03.2021
Does your company have an energy management system?		No
If yes: Since when (MM.YYYY)	05.2021	03.2021

III. Energy efficiency measures already identified before the DEESME intervention

No.	Area of improvement	Short description of the energy efficiency measure	Current probability of implementation
0	COMPRESSED AIR (e.g. leakage removal, substitution of compressed air, pressure reduction)	Compressed air network split into a high pressure section (13 bar) and a standard pressure section (8 bar)	3. Medium
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

7.5. Template: Second measurement

Second measurement

Time to fill right after the trainings

Information for the participants

Dear Participants,

Thank you for taking the time to fill in our questionnaire. Within the evaluation of our study we would like to understand your perception of DEESME approach and its tools.

Below, you will find a set of questions. In some cases, we ask you to simply make a selection. In most of the questions, however, we ask you to indicate whether you agree with the suggested statement. The remaining ones are about adding some text as answer which shall help us to enhance our methods and tools.

Please fill in the cells shaded in blue, and then send the file back to:

john.doe@john.doe.org

Thank you and best regards,

The DEESME Project Team

Color coding

To be filled in by the participant/company
Example

0. How to indicate your answers

- 0.1 This is a sample to show how to indicate that this item is relevant
0.2 This is a sample to show how to indicate that the answer is not relevant

☐

Totally disagree
Tend to disagree
Tend to agree
Totally agree

- 0.3 This is a sample to show how to select an answer among multiple selections (here: "tend to agree")
0.4 This is a sample line where you should select one of several possibilities (scale indicated over the block)

☐

The presentation seemed quite helpful, but I could not follow content-wise on section 2 and in section 5, the text was too small to read.

I. About your trainings

1. In which trainings of DEESME did you participate?

- I.1 DEESME approach Basics
I.2 DEESME approach Advanced
I.3 DEESME approach in Practice

☐

II. General part: Perception of the DEESME approach and material

- II.1 The approach and materials are easy to understand
II.2 The approach and materials are easy to use for our purposes
II.3 The approach and material contribute to improving energy efficiency in our company
II.4 The benefits from using the approach and materials exceeds the effort to use it
II.5 The approach and material will likely be re-used in the future
II.6 In sum, the DEESME approach and material brought us new insights in energy issues
II.7 Was there any part of the approach and material that you found especially beneficial?
II.8 Was there any part of the approach and material that needs to be revised? If yes, what needs to be changed?

Totally disagree
Tend to disagree
Tend to agree
Totally agree

☐
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III. Specific part: <The specific parts will be replicated based on the final material used for the DEESME trainings. >

- III.1 The <specific part> is easy to understand
III.2 The <specific part> is easy to use for our purposes
III.3 The benefits from using the <specific part> exceeds the effort to use it
III.4 If I could wish for changes in the <specific part>, I would like to see the following changes

Totally disagree
Tend to disagree
Tend to agree
Totally agree

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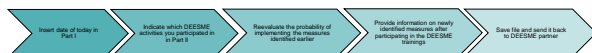


7.6. Template: Third measurement

Third measurement

Time to fill: February 2023

Information for the participants



- 1) In Part I, fill the blue shaded cell with the date of today.
- 2) In Part II, indicate in the blue shaded cells which DEESME intervention you participated in. Please also indicate in case you conducted an energy audit or implemented an energy management system without direct support of the DEESME project, between the first measurement and now.
- 3) In Part III, you are asked to reevaluate the probability of implementing the energy efficiency measures that you had already identified in the first measurement. If the probability increased, you are asked for further information (cells J6 to J9), otherwise these cells will be greyed out and do not have to be filled.
- 4) In Part IV, fill the blue shaded cells with all the energy efficiency measures you identified within or after the DEESME trainings, and provide further information on them.
- 5) Save the file and send it back to the DEESME partner

Save: Email to DEESME project partner

Color coding

- To be filled in by the participant/company
- To be filled by the DEESME project partner
- Example

I. Date

Date (index) DD/MM/YYYY: 16.02.2021

II. DEESME intervention

Which intervention did you take part in within the DEESME project?	Only the training/ workshop
Did your company conduct an energy audit on your own (without the support of DEESME) after the first measurement?	No
Did your company implement an energy management system on your own (without the support of DEESME) after the first measurement?	No
Did your company get support regarding "financing investments" within the DEESME project?	No

III. Energy efficiency measures identified before the DEESME training

Number	Type	Short description of the energy efficiency measure	Probability of implementation during first measurement	Current probability of implementation	Estimated investment (EUR)	Estimated final energy savings/year (MWh/year)	Mainly saved energy carrier	Contribution of DEESME for the implementation	Relevance of non-energy benefits on the current probability of implementation	Which non-energy benefit is most relevant?
0	COMPRESSED AIR (e.g. leaking circuit, substitution of compressed air, pressure reduction)	Compressed air network split into a high pressure section (3 bar) and a standard pressure section (6 bar)	3. Medium	2. High	50,000	20,000	Electricity	1. High	2. High	Reduced carbon footprint
1				4. Low						
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

IV. New energy efficiency measures identified after the DEESME training

Number	Type	Short description of the energy efficiency measure	Probability of implementation during first measurement	Current probability of implementation	Estimated investment (EUR)	Estimated final energy savings/year (MWh/year)	Mainly saved energy carrier	Contribution of DEESME for the implementation	Relevance of non-energy benefits on the current probability of implementation	Which non-energy benefit is most relevant?
0	Lighting (e.g. use of motion and brightness sensors, LED bulbs)	LED in the main production hall		3. High	4,200,000	1,000	Electricity	3. Low	2. High	Reduced waste heat
1										
2										
3										
4										
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