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Summary of the main outputs and impacts of the ENEFIRST project

August 2022

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EXECUTIVE SUMMARY

The Horizon 2020 project ENEFIRST contributes to provide support to Member States and stakeholders in making the Energy Efficiency First (EE1st) principle operational, with a focus on buildings and their energy supply.

This report summarises the ENEFIRST outputs, and the monitoring of the stakeholder engagement.

The report starts by providing an overview of the ENEFIRST outputs that form a coherent set of resources. This overview makes it easy for the public to browse through and to get a quick and clear understanding of where and what information is available on the project and more broadly on the topic of EE1st. ENEFIRST outputs have enabled a variety of knowledge and resources to be extracted such as implementation maps, guidelines for integrated approaches, the Scenario Explorer and Report on quantifying Energy Efficiency First in EU Scenarios, Recommendations on how to operationalise EE1st implementation in the EU, An in-depth analysis of how to implement the EE1st principle in Germany, Hungary,and Spain and more!

This report also gathers information on the main stakeholder consultation activities and ensures there was a proper measurement of intangible results along the project. **More than 335 single participants** took part in at least one of the **ENEFIRST activities** (interviews, workshops, webinars, final conference). **245 subscribers** followed closely the project updated thanks to the project **newsletter**, and **155 members** registered to the **ENEFIRST Stakeholder Community**, to get invitations about the ENEFIRST activities. ENEFIRST has thus been successful in engaging stakeholders and experts.

Finally, the report highlights testimonies and feedback on the project from the stakeholders and experts who took part in the ENEFIRST activities and contributed to making the ENEFIRST outputs as useful and relevant as possible, by integrating stakeholders' and experts' views. Overall, they found the project very useful to them. Two outstanding points from their feedback are that ENEFIRST provided an ideal **platform to discuss why and how EE1st can be implemented in practice**, that the project provided a coherent and broad understanding of the principle from conceptual level to policy implications.

This was particularly timely in view of the update of the National Energy and Climate Plans (NECPs) due by the Member States in June 2023 (draft) and June 2024 (final). The process of the NECPs is indeed a major opportunity for getting EE1st further integrated in the strategy, planning and policies of the Member States.

INTRODUCTION

The ENEFIRST project and the key role of stakeholder engagement

"Energy Efficiency First" (**EE1st**) is a fundamental principle applied to policymaking, planning and investment in the energy sector, which is gaining visibility in European energy and climate policy and was officially adopted and defined in the Governance Regulation of the Energy Union ((EU) 2018/1999).

The Horizon 2020 project **ENEFIRST** contributes to provide support to Member States and stakeholders in **making the EE1st principle operational**, with a **focus on buildings and their energy supply**. Following the process presented in Figure 1, ENEFIRST's **main objectives** are:

- to define the principle of EE1st in practical terms,
- to assess how it has been applied internationally and how it applies to the EU context,
- to assess the value of applying EE1st across different policy areas for buildings' energy efficiency and to quantify the impacts of increased building energy efficiency for the future energy system in the EU, and
- to identify key policy areas for the application of EE1st and develop policy proposals for its implementation in the EU buildings sector.

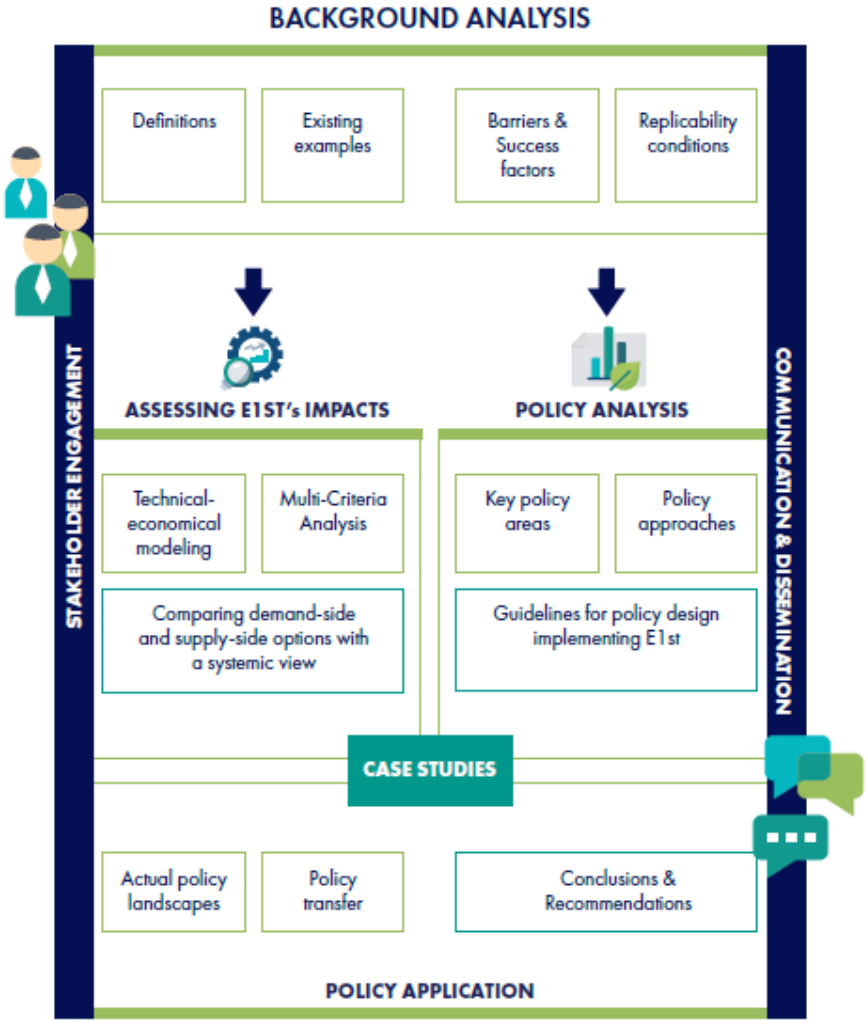


Figure 1. Process of the ENEFIRST project.

The project combined policy analysis and quantitative assessments about the implementation of EE1st, with a process of continuous exchanges with stakeholders (see also the ENEFIRST brochure).

Stakeholder engagement has indeed been a core element of the project, with the following objectives:

- to explore the **various relevant stakeholder perspectives** and thereby understand the best way to materialize the EE1st principle;
- to gather views and get **continuous feedback** to discuss the project methodology and results, and provide solutions from the stakeholder groups, back to back with the Experts Advisory Board;
- to help in **developing policy recommendations** that fit with stakeholders' needs, thus helping to ensure successful policy implementation.

Stakeholder engagement and project impacts

Stakeholder engagement has been an essential component of ENEFIRST, in the development of the project outputs and to define the best ways to materialize the EE1st principle taking into account the diversity in stakeholders' perspectives and capacities. The communication with key stakeholders has been planned through a two-way involvement: ENEFIRST sharing draft outputs with stakeholders who then provide comments in view of the final outputs. Stakeholders related activities and project impacts have been monitored through Key Performance Indicators (KPIs) that have been revised when necessary.

The key target groups include policy officers and experts of ministries and agencies in charge of energy policies, of energy companies, representatives from professional organisations or NGOs involved in discussing energy policies, and researchers and consultants working on energy modelling and/or policy analysis. ENEFIRST mostly looked at the EU and national levels. Nevertheless, local stakeholders (e.g. policy officers and experts of regional or local authorities or agencies) were also invited when relevant (e.g. when discussing integrated energy planning).

Stakeholder engagement was structured in three levels.

The **first level** is about **information** of involved stakeholders through webinars and wide public events. This corresponds to the communication and dissemination activities done in Work Package 7 of ENEFIRST. These activities aim at raising awareness about EE1st, helping a broad audience to get a better understanding on how EE1st can be implemented, and raising stakeholders' interest in knowing more about and getting engaged in implementing EE1st. This is a first step in getting EE1st from theory to practice.

Figure 2. Three levels of stake-holder engagement.

The **second and third levels** include **consultations and co-creation** with the stakeholders, by collecting their views and inputs on specific issues, and by sharing and discussing with them ENEFIRST outputs. This has been essential in ensuring that ENEFIRST outputs are in line with stakeholders' reality. Consultations and workshops have been organised to gather stakeholders' opinions and inputs, for example for the identification of existing practices, risks, success factors, preconditions and other factors directly influencing the implementation of EE1st. All the exchanges with stakeholders along the project have been valuable inputs to finalize the ENEFIRST outputs, and particularly the final recommendations of the project.

1 OVERVIEW OF THE ENEFIRST OUTPUTS

1.1 Overview of the ENEFIRST outputs

BACKGROUND ANALYSIS

16 real-life examples (short stand-alone documents) illustrating the implementation of the EE1st principle (+ 18 further examples listed with references)	**REPORT**: Report on international experiences with EE1st	**DISSEMINATION**: Two webinars: "Putting Energy Efficiency First – Learning from international experience (with presentations from Ireland and UK)" "Putting Efficiency First into practice – Insights from the US and France" Broc, J.S., Pató, Z., Schmatzberger S., Rieke Boll, J. and Mandel, T. (2021). What does the energy efficiency first principle mean in practice? Paper presented at the World Sustainable Energy Days (25 June 2021).

Defining and contextualizing EE1st	**Transferability analysis**	**General barriers to implementing EE1st**
REPORT: Defining and contextualizing the EE1st principle **DISSEMINATION**: Conference paper: *Mandel, T., Pató, Z., Broc, J.S. (2021). Conceptualizing the "Energy Efficiency First" principle: from foundations to implementation. Proceedings of the ECEEE 2021 Summer Study.* Infographic introducing EE1st	**REPORT**: Analysis of transferability of global experience to the EU	**REPORT**: Report on barriers to implementing EE1st in the EU-28 **STAKEHOLDER CONSULTATION** Online survey about the barriers to EE1st (results included in the report mentioned above) **DISSEMINATION**: Webinar: "Putting Efficiency First into practice – Insights from the US and France"

ASSESSING THE IMPACT OF IMPLEMENTING EE1ST

Assessing 3 EU scenarios investigating what level of demand and supply-side resources should be deployed to provide the greatest value to the EU's society in transitioning to net-zero GHG emissions in buildings by 2050 See the **Scenario Explorer** that provides the results per country and main indicators	**REPORTS**: Quantifying Energy Efficiency First in EU scenarios: implications for buildings and energy supply (analysing the results of the 3 EU scenarios) Concept development for a model-based assessment of the EE1st Principle (describing the 3 EU scenarios) Review and guidance for quantitative assessments of demand and supply side resources in the context of the Efficiency First principle (review of possible modelling approaches to quantify the impacts of EE1st, and related challenges)	**STAKEHOLDER CONSULTATION and CO-CREATION**: Interviews with 18 experts (modellers and policy officers using modelling results) followed by an online workshop on modelling approaches (17 June 2020) Workshop presenting and discussing the results (23 February 2022) **DISSEMINATION**: Presentation of the modelling approach at the EMP-E (Energy Modelling Platform – Europe) 2021 conference (27 October 2021) Final ENEFIRST conference (01 June 2022)

5 model-based case studies #1 Balancing building insulation and heat supply #2 Building retrofits and district heating systems #3 Heat pumps: Efficiency, CO2 emissions and the value of flexible heat pumps #4 Strategic energy planning in commercial areas #5 The role of efficient electrical appliances for municipalities	**REPORT**: Model-based case studies for assessing the EE1st principle (detailed evaluation of demand- and supply-side resource options in different contexts of building types (residential, non-residential), infrastructures (electricity, district heating, gas) and local conditions (weather, costs, etc.)	**DISSEMINATION**: **Webinar series** presenting three of the case studies: District heating and deep retrofits of buildings: competing or synergetic strategies for the implementation of the energy efficiency first principle? (30 March 2022) Local energy planning for commercial areas: what role for the Energy Efficiency First principle? (13 April 2022) Energy Efficiency First: single stage vs stepwise renovation and the question of rapid energy saving actions (27 April 2022)

Integrating multiple impacts in the assessment How various impacts can be aggregated in the form of cost-benefit analysis (CBA), multi-criteria analysis (MCA) and other frameworks (e.g. indicator-based approaches) to inform decisions. How the evaluation perspective (societal, private, etc.) affects the selection of impacts that should ideally be taken into account. + Application on two categories of impacts	**REPORTS**: Energy Efficiency First and Multiple Impacts: integrating two concepts for decision-making in the EU energy system (Including the discussions about how to do it, and the results of assessing the impacts on air pollution and climate change impacts, and indoor comfort improvements, for the 3 EU scenarios)	**STAKEHOLDER CONSULTATION and CO-CREATION**: Experts Workshop "Multiple Impacts and Efficiency First: Uniting two complementary frameworks for decision-making in the EU energy system" (3 December 2021)

POLICY ANALYSIS

Screening of 7 policy areas relevant to EE1st in buildings and their energy supply Identifying the most important strategic and legislative documents where EE1st is relevant. Identifying policy approaches to implement EE1st in the priority policy areas.	**REPORT**: Priority areas of implementation of the Efficiency First principle in buildings and related energy systems (including the analysis about the following policy areas: buildings, power markets, gas markets, district heating, energy efficiency, climate, and EU funds)	**STAKEHOLDER CONSULTATION and CO-CREATION**: Interviews with 21 experts about identifying priority policy areas and policy approaches for EE1st **DISSEMINATION**: Policy brief: Energy Efficiency First for system decarbonisation

9 Implementation maps (short stand-alone documents summarizing how eac selected approach can implement EE1st, the main barriers to overcome and success factors)	**REPORT**: Implementation maps on barriers and success factors for EE1st in buildings (providing the 9 implementation maps at once, together with presenting the methodology)	**STAKEHOLDER CONSULTATION and CO-CREATION**: Workshop on implementation maps (15 April 2021) **DISSEMINATION**: Presentation of the implementation maps at the C4E Forum (22 September 2021)

20 integrated approaches for EE1st, with implementation guidelines Guidelines on how EE1st can be treated in integrated approaches for energy planning, investment decisions, regulatory frameworks and related complementary approaches.	**REPORT**: Guidelines on policy design options for implementation of EE1st in buildings and the related energy systems (including the analysis of the policy approaches, key aspects for their implementation + a screening about how EE1st is embedded in the fit-for-55 package)	**STAKEHOLDER CONSULTATION and CO-CREATION**: workshop discussing the guidelines were discussed with stakeholders (October 2021) **DISSEMINATION**: Webinar Energy Efficiency First in practice: implementing integrated approaches (30 November 2021) Infographic about integrated approaches

Deep dive analysis on 3 countries Looking at the key policy frameworks in Germany, Hungary and Spain, with a focus on buildings and their energy supply (more specifically power and district heating sectors). Analysing the main policies relevant for EE1st implementation, their potential and gaps as well as national specificities in each country.	**REPORT**: Fit for Energy Efficiency First (EE1st)? An in-depth analysis of how to implement the EE1st principle in Germany, Hungary, and Spain (including the analyses of the policy landscapes of the three countries, and discussing how EE1st could be implemented further)	**STAKEHOLDER CONSULTATION and CO-CREATION**: interviews with 26 national stakeholders, followed by 3 national workshops in Hungary (29 April 2022), Germany (10 May 2022), and Spain (13 May 2022) **DISSEMINATION**: Boza-Kiss, B., Schmatzberger, S., Broc, J-S, Fernández Álvarez, X., and Ürge-Vorsatz, D., 2022. Energy efficiency first policy landscapes for buildings: case studies in Germany, Hungary and Spain. Proceedings of the ECEEE 2022 Summer Study

Policy recommendations Compiling all the findings from ENEFIRST into a set of 9 main recommendations.	**REPORT**: How to operationalize Energy Efficiency First (EE1st) in the EU? Key recommendations to Member States	**DISSEMINATION**: Final ENEFIRST conference (01 June 2022)

1.2 Achievement of the KPIs about ENEFIRST outputs

Table 1 Overview of the main KPIs about the project outputs

KPIs	Details / explanations (when relevant)
Understanding of relevant aspects linked to EE1st	
10 definitions of EE1st analysed	10 definitions analysed in the report Defining and contextualizing the EE1st principle that also includes the definition adopted for the project. The conceptual analysis about the EE1st principle has also been summarized in a conference paper and in a journal paper (see references in section 1.1).
16 real-life examples analysed about implementing EE1st (+ references about further 18 examples)	16 examples analysed in detail in the Report on international experiences with EE1st, with the references of further 18 examples gathered in the report. The 16 examples have been further analysed in the complementary report Analysis of transferability of global experience to the EU. The main findings from these analyses were presented at two conferences and in two webinars (see references in section 1.1).
Consideration and valorisation in modelling assessments & understanding impacts	
3 EU scenarios assessing the impacts of quantifying EE1st	Review of assessment methodologies in the report Review and guidance for quantitative assessments of demand and supply side resources in the context of the Efficiency First principle. 3 EU scenarios described in the report Concept development for a model-based assessment of the EE1st Principle, with results analysed in the report Quantifying Energy Efficiency First in EU scenarios: implications for buildings and energy supply and discussed during a stakeholder workshop, and available in a user-friendly way in the Scenario Explorer. Modelling methodology presented at a conference. Main findings from the EU scenarios summarized in two scientific papers (see references in section 1.1)
5 modelling case studies exploring the trade-offs between demand-side and supply-side options	5 modelling case studies described in the report Model-based case studies for assessing the EE1st principle, and presented in a webinar series. Two of the case studies have also been summarized in two scientific papers (see references in section 1.1).
Understanding impacts on the relevant sectors and markets	
Identification of Structural impacts in the sectors as a result of EE1st: **total energy system costs** and **multiple impacts**	The EU scenarios assessed the total energy system costs, including the costs related to energy supply (see Quantifying Energy Efficiency First in EU scenarios: implications for buildings and energy supply). The report Energy Efficiency First and Multiple Impacts: integrating two concepts for decision-making in the EU energy system brought complementary inputs by discussing the integration of multiple impacts in EE1st assessments, and analysing a selection of multiple impacts. The findings on multiple impacts will be presented at a conference (see references in section 1.1).
Analysis of approaches to **integrate multiple impacts in quantitative assessments**, and application	The report Energy Efficiency First and Multiple Impacts: integrating two concepts for decision-making in the EU energy system has discussed the possible ways to integrate multiple impacts in EE1st assessments (Cost-Benefit Analysis; Multi-Criteria Analysis; other frameworks, mostly indicator-based). The report also discusses **three main perspectives** to be considered in such assessments (societal perspective; private perspective; public budget perspective). Then the report includes an application on **two general categories of impacts**: air pollution and climate change impacts; and comfort and possible follow-up impacts. This complemented the results on total energy system costs about the 3 EU scenarios.

	The findings on multiple impacts will be presented at a conference (see references in section 1.1).
Understanding of the potential across the different policy areas and sectors	
Analysis of 7 policy areas	7 policy areas analysed in Priority areas of implementation of the Efficiency First principle in buildings and related energy systems, including 4 main policy areas (buildings, power sector, gas sector, district heating), 2 complementary areas (end-use energy efficiency, climate) and 1 cross-cutting (EU funding mechanisms).
Identification of **61 barriers and success factors** specific to **9 policy approaches** for implementing EE1st in buildings and their energy supply	9 implementation maps (3 about buildings, 4 about the power sector and 2 about district heating) analysed in the report Implementation maps on barriers and success factors for EE1st in buildings Each implementation map describes key barriers and success factors that were discussed and ranked with 48 stakeholders during a stakeholder workshop.
Understanding of the Interaction with other policy objectives, and Develop approaches for EE1st policy integration	
20 integrated approaches for a cross-cutting implementation of EE1st	20 approaches (15 policy approaches, 1 prerequisite approach and 4 complementary approaches) described in detail in the report Guidelines on policy design options for implementation of EE1st in buildings and the related energy systems, and discussed at a stakeholder workshop. Each approach is presented with a number of guidelines about policy design, implementation, monitoring and adaptation.
9 recommendations for implementing EE1st in buildings and their energy supply in EU Member States	9 cross-cutting recommendations presented in the summary report How to operationalize Energy Efficiency First (EE1st) in the EU? Key recommendations to Member States, based on all the findings and exchanges with stakeholders along the project, and especially the discussions during the national workshops (Germany, Hungary and Spain) and the final conference.
Stakeholder engagement and contributing to put EE1st on the policy agenda	
Active ENEFIRST Stakeholder Community	155 members registered to the ENEFIRST stakeholder community. 245 contacts subscribed to the ENEFIRST newsletter, and more than 335 single participants took part in at least one of the ENEFIRST activities (interviews, workshops, webinars, final conference). Overall the feedback from stakeholders and experts about the project has been very positive (see more details in chapter 0)
16 testimonies about the project	16 key stakeholders (from 12 different EU Member States) who took part in some of the ENEFIRST activities accepted to make a testimony about their experience with the project and what it brought to them. (see some extracts in chapter 7)
Moreover, ENEFIRST reports have been **quoted in the guidelines published by the European Commission** in September 2021.	
Contribution to the scientific knowledge base	
5 papers submitted to scientific journals, and **8 presentations at international conferences** (including 5 peer-reviewed papers)	3 papers submitted to the *Energy Efficiency* journal, and 2 to the *Smart Energy* journal. 8 presentations at international conferences (including 5 peer-reviewed papers): - 2 presentations with 1 paper at ECEEE 2021 Summer Study (7-11 June 2021) - 1 presentation with 1 paper at the World Energy Sustainable Days (Energy Efficiency Conference on 25 June 2021) - 1 presentation at the C4E Forum on 22 September 2021 - 1 presentation at the EMP-E (Energy Modelling Platform – Europe) 2021 conference (27 October 2021)

	- 2 presentations with 2 papers at ECEEE 2022 Summer Study (6-10 June 2022) - 1 presentation with 1 paper at Energy Evaluation Europe 2022 (28-30 September 2022) The abstracts of these publications and presentations are included in the ENEFIRST scientific booklet. In addition, 5 presentations at other international or national events: - Opening session of the H2020 project WHY (10 September 2020) - National roundtable on financing energy efficiency in Hungary (13 October 2020) - Concerted Action for the Energy Efficiency Directive (14 October 2020) - Joint session on EE1st with the sEEnergies and EERAdata project in the EUSEW 2021 extended programme (21 October 2021)
Coordination of 2 special issues about EE1st in scientific journals	ENEFIRST and the sister project sEEnergies have coordinated two special issues on the topic of EE1st: one initiated by ENEFIRST to be published in the Energy Efficiency journal, focused on the aspects related to policy analysis; and one initiated by sEEnergies to be published in the Smart Energy journal, focused on the aspects related to quantitative assessments and modelling. These special issues also include guest contributions from the projects Heat Roadmap Europe, Hotmaps, ODYSSEE-MURE, EERAdata and SENSEI, as well as from the study led by Ecorys for the European Commission to prepare its guidelines on EE1st.

2 STAKEHOLDERS INVOLVEMENT PERFORMANCE INDICATORS MONITORING STRATEGY

2.1 Introduction to KPIs about stakeholders' involvement

The previous part has described the achievement of the project operational objectives with an overview of the main outputs. This part summarises the review of the KPIs about stakeholders' involvement. Some of them are part of the impact indicators and already defining influence of the stakeholder involvement on the whole implementation of the project. Each KPI is connected to a specific aim of engagement, deriving from the project objectives it will monitor:

1) **To define the principle of EE1st in practical terms, assess how it has been applied internationally and how it applies to the EU context:**
   a) *To receive inputs from stakeholders on the definition of the EE1st and the implementation of it*
   b) *To work with stakeholders on the identification of the policy approaches for EE1st*
   c) *To increase awareness, understanding and interest of stakeholders in EE1st*

2) **To assess the value of applying EE1st across different policy areas for buildings' end-use energy efficiency and to quantify the impacts of increased building energy efficiency for the future energy system in the EU.**
   a) *To involve stakeholders in the identification of risk and success factors for the implementation of EE1st across different policy areas*
   b) *To consult with experts on the concept for quantification of the EE1st principle*
   c) *To validate with experts the quantification of the EE1st principle*
   d) *To increase stakeholders' interest in methodologies that enable assessing the impacts from implementing EE1st*
   e) *To stimulate scientific discussions and exchanges about methodologies to assess the impacts from implementing EE1st*

3) **To identify key policy areas for the application of EE1st and develop policy proposals for its implementation in the EU Buildings Sector**
   a) *To jointly identify the preconditions and the options for the application of EE1st principle*
   b) *To consult on the policy recommendation.*
   c) *To gather experts from different policy fields to discuss policy approaches that can implement EE1st*
   d) *To increase stakeholders' knowledge about possible policy approaches to implement EE1st*

2.2 Monitoring guidelines and actions

The monitoring of the ENEFIRST activities was designed to keep track of their implementation and to evaluate the involvement, the inclusiveness, transparency, engagement, co-creation and joint work, making future use of the results of EE1st more interesting and valuable to the stakeholders. It is important to go beyond monitoring the number of stakeholders involved, to assess also qualitative aspects about what the stakeholders get from the project and taking part in its activities. Therefore, the activities involving stakeholders have been monitored in two ways:

- Timely and successful implementation of the involvement activities
- Achievement of engagement impacts.

The sources through which the KPIs have been monitored in the "Stakeholder involvement KPIs tracker" include:

- The stakeholder involvement database;
- Short surveys before and after each activity;
- A general survey on expectations and feedback;
- Dissemination metrics (e.g. website publications, social networks, scientific publications).

Figure 3. Key figures about stakeholder engagement in ENEFIRST.

3 WEBINAR SURVEY RESULTS

ENEFIRST's webinars were organised throughout the project:

- **Webinar n°1**: Putting energy Efficiency First - Learning from international experience, 28 May 2020
- **Webinar n°2**: Putting Efficiency First into practice – insights from the US and the EU, 25 February 2021
- **Webinar n°3**: Energy Efficiency First in practice: implementing integrated approaches, 30 November 2021
- **Webinar series**: Operationalising the EE1st principle: insights into 3 modelling case studies;
    - **Webinar 4a**: District heating and deep retrofits of buildings: competing or synergetic strategies for the implementation of the energy efficiency first principle? 30 March 2022;
    - **Webinar 4b**: Local energy planning for commercial areas: what role for the Energy Efficiency First principle? 13 April 2022;
    - **Webinar 4c**: Energy Efficiency First: single stage vs stepwise renovation and the question of rapid energy saving actions. 27 April 2022.

The following sections present a summary of the results from the surveys done before and after each webinar, showing the overall feedback from the participants to the webinars.

3.1 The first expectation from participants was to learn about practical examples illustrating the implementation of EE1st

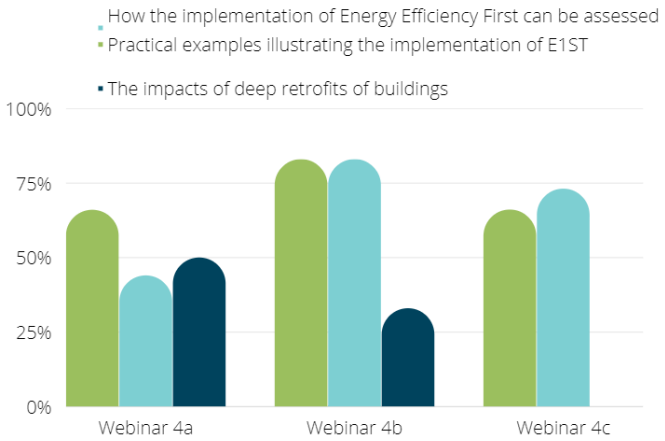


Figure 4. Expectations from respondents before the webinars.

When asked about their expectations before the webinars, the respondents showed the highest interest in learning more about practical examples illustrating the implementation of EE1ST (71% on average), how the implementation of Energy Efficiency First can be assessed (66%) and about the impacts of deep retrofits of buildings (60%).

These results are in line with the stakeholders' testimonies (see chapter 7) that also pointed the importance of getting examples about how EE1st can be implemented in practice.

3.2 The webinars met the expectations of most respondents.

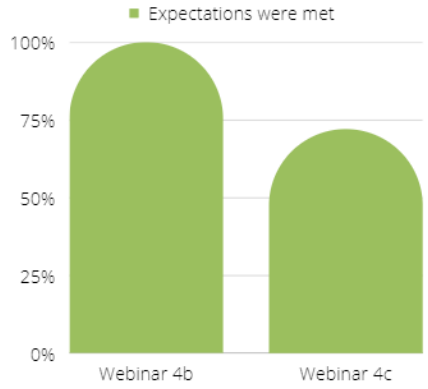


Figure 5. Did the webinars meet the expectations of the respondents?

On average, **86%** of the respondents said that the webinars met their expectations. The rate was even 100% for Webinar 4b "Local energy planning for commercial areas: what role for the Energy Efficiency First principle?".

This shows that the agendas of the webinars were clear enough for most participants to know what they can expect from them.

3.3 The respondents rated high to very high the quality of the webinars.

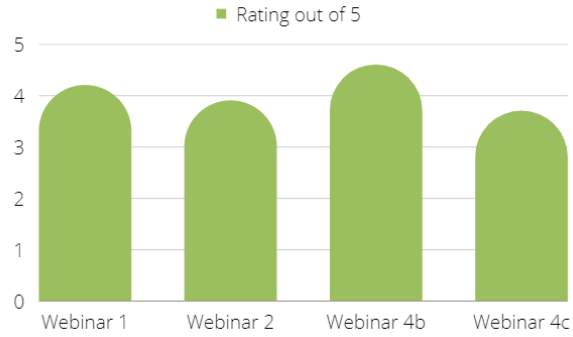


Figure 6. Quality rating of the webinars by the respondents.

The overall quality of the webinars was rated by the participants from 1 (very low quality) to 5 (very high quality).

Most of respondents to the feedback surveys found the quality of the webinars high to very high: the average rating of all webinars is **4.1/5** with the highest score of **4.6/5** for Webinar 4b: "Local energy planning for commercial areas: what role for the Energy Efficiency First principle?". These ratings show a high appreciation of quality and a rather steady satisfaction for all webinars.

3.4 Participants were increasingly familiar with EE1st along the project

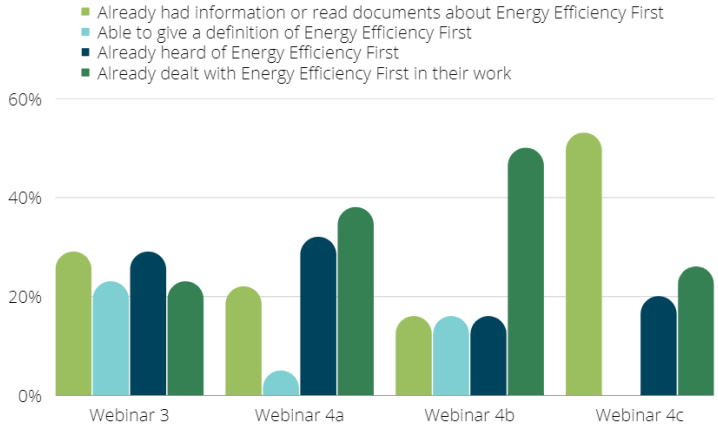


Figure 7. How familiar with EE1st the respondents were, before attending an ENEFIRST webinar.

The surveys done before the webinars enabled to see how familiar the participants were with EE1st before attending an ENEFIRST webinar.

The results show that along the project, the share of respondents having some kind of knowledge or practice with EE1st increased. This can be the result of the dissemination activities of ENEFIRST. This can also be due to the communications on EE1st published by the European Commission, as well as the activities of other projects (e.g. sEEnergies, EERAdata, ODYSSEE-MURE) that also dealt with EE1st.

3.5 Evolution of respondents' interest in EE1st

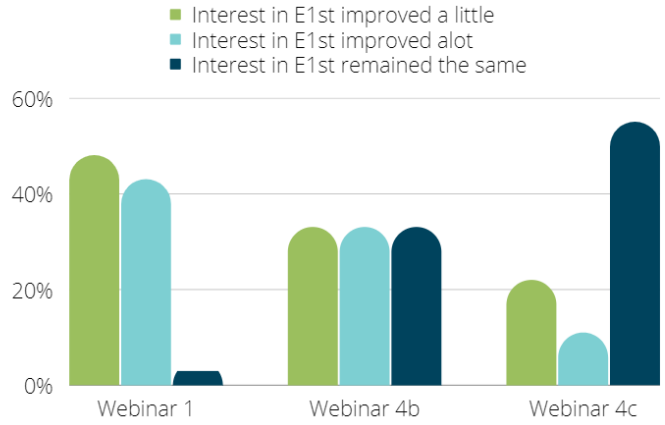


Figure 8. Evolution of respondents' interest in EE1st after the ENEFIRST webinars.

The feedback surveys asked participants whether their interest in EE1st increased or decreased after the webinars. While the first webinars stimulated an increased interest in EE1st among most of the respondents, the more we progressed with the project, the higher the share of interest remaining the same.

This is in line with the results shown above about the participants getting more familiar with EE1st along the project. Therefore, they already had a high interest in EE1st even before attending the webinars that came later in the project.

3.6 Evolution of what EE1st in energy modelling means to participants

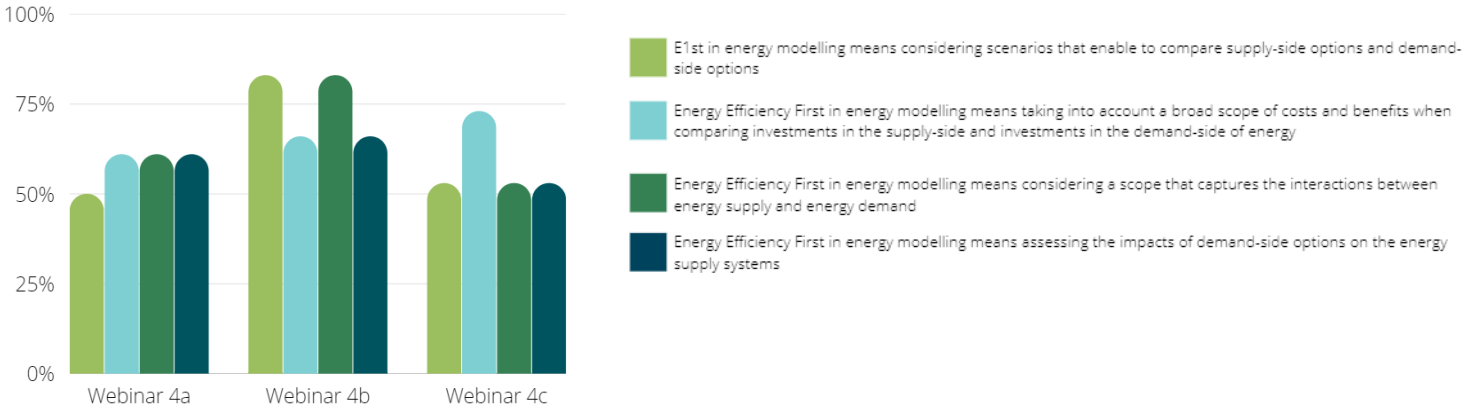


Figure 9. What does "integrating EE1st in energy modelling" mean.

When asked about what integrating EE1st in energy modelling means (in the surveys previous to the webinars), the two answers the most selected by the respondents were:

- "taking into account a broad scope of costs and benefits when comparing investments in the supply-side and investments in the demand-side of energy", and
- "considering a scope that captures the interactions between energy supply and energy demand".

These answers were selected overall by respectively 66% and 65% of the respondents when compiling the three surveys done before each webinar of the "modelling" webinar series.

The participants then had a common understanding of the general implications of EE1st for modelling approaches, as analysed in ENEFIRST.

4 WORKSHOP SURVEY RESULTS

The workshops organised along the project were essential moments of exchanges and discussions about the main outputs of the projects, to ensure that they took into account stakeholders' and experts' views. The workshops enabled a two-way communication, where the ENEFIRST partners presented their draft outputs and findings, and then get comments and suggestions from the participants.

The ENEFIRST workshops were:

- Workshop W1: How to account for « Energy Efficiency First » in energy system modelling, Wednesday 17 June 2020
- Workshop W2 (part 1): Quantifying Energy Efficiency First in EU scenarios: Implications for buildings and their energy supply, Wednesday 23 February 2022
- Workshop W2 (part 2): Multiple Impacts and Efficiency First: Uniting two complementary frameworks for decision-making in the EU energy system, Friday 3 December 2021
- Workshop W3: Policy guidelines to implement Energy Efficiency First in planning and investment schemes for buildings and related energy systems, Friday 8 October 2021
- Workshops W4: Implementing Energy Efficiency First in buildings and their energy supply: challenges and opportunities in Hungary (29 April 2022), Germany (10 May 2022), and Spain (13 May 2022).
- Consultation workshop: Risks and success factors for the implementation of the EE1st principle, 15 April 2021

4.1 The profiles of participants as regards familiarity with EE1st vary according to the workshops

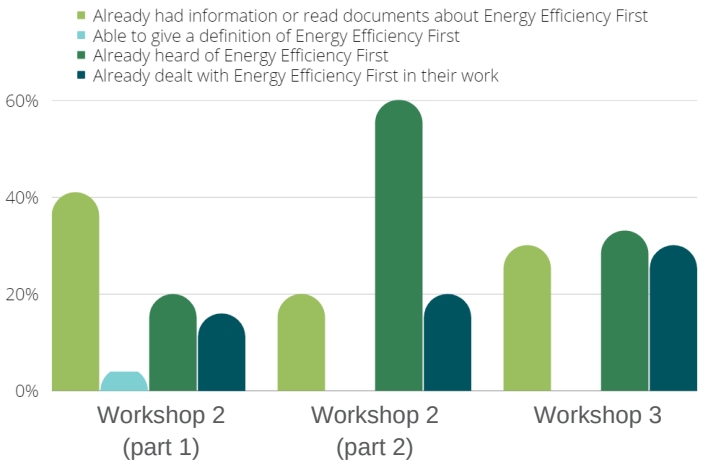


Figure 10. How familiar with EE1st the respondents were, before taking part in an ENEFIRST workshop.

Like for the webinars, the surveys done before the workshops enabled to see how familiar the participants were with EE1st before attending an ENEFIRST workshop. The possible answers that the respondents could select went from low familiarity with EE1st (information level) to high familiarity (already dealing with EE1st in their work).

The results varied according to the workshop, showing that the profiles of the participants also differed (as regards their initial knowledge about EE1st). This can be explained because some workshops were meant for experts (who already have a good knowledge about EE1st, like workshop 2 part 2), whereas other workshops were meant for both, experts and stakeholders, including stakeholders who were less familiar with EE1st.

4.2 The respondents rated very high the quality of the workshops

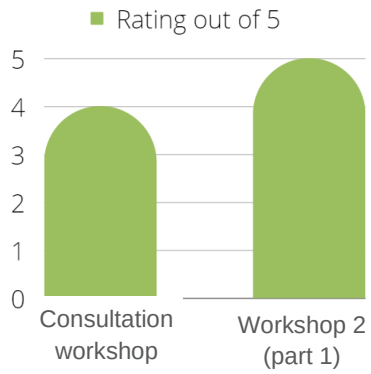


Figure 11. Quality rating of the workshops by the respondents.

Like for the webinars, the overall quality of the workshops was rated by the respondents from 1 (very low quality) to 5 (very high quality).

The average rating was **4.5/ 5**, showing a very high satisfaction about the workshops' quality.

4.3 The share of respondents who will likely use ENEFIRST in their future work varied according to the workshop but was high overall

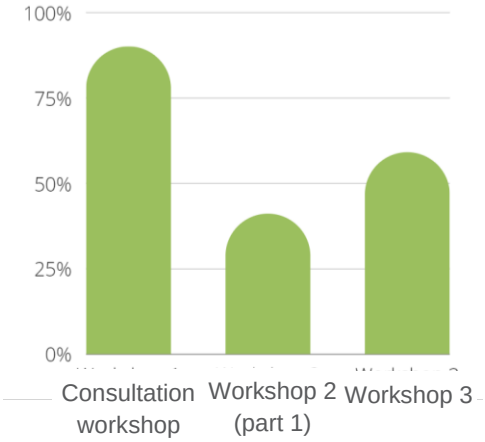


Figure 12. % of respondents that will likely use ENEFIRST in their future work.

On average, 63% of the respondents who took part in an ENEFIRST workshop said that they will likely use ENEFIRST ideas or information in their future work. This rate varied according to the workshops.

We can see that the consultation workshop had a very positive impact with 90% of the respondents saying that they will likely use ENEFIRST in their future work. This high rate can be because this consultation workshop was focused on discussing policy approaches to implement EE1st, in line with the expectations of most stakeholders to get practical examples about implementing EE1st.

4.4 High interest of participants in further ENEFIRST activities

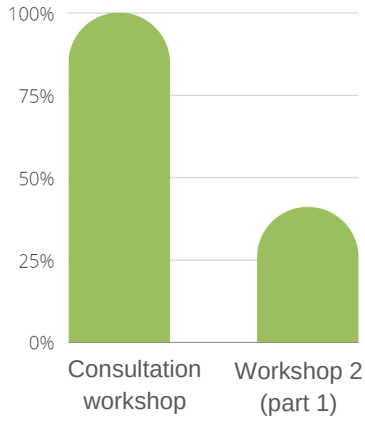


Figure 13. % of respondents interested in attending other ENEFIRST activities.

In the feedback survey after the workshops, participants were asked if they were interested in attending other ENEFIRST activities.

The interest in other ENEFIRST activities was high, even up to 100% of the respondents after the consultation workshop.

This rate was then much smaller when getting closer to the end of the project, with few remaining activities (as observed after the workshop 2 – part 1 organised in February 2022).

5 NATIONAL WORKSHOPS

The three national workshops aimed at looking more specifically at the challenges and opportunities for implementing EE1st in the three countries selected for in-depth analysis in ENEFIRST: Germany, Hungary and Spain. An overview of the current background in each country and a summary of ENEFIRST findings and proposals with a focus on the ones the most relevant for the country set the scene to discuss a selection of policy approaches and to what extent they could be transferable / replicable in the national context. The national workshops were designed with a different format according to the country, depending on the opportunities for discussions with the priority target groups (ministries and agencies in charge of energy).

5.1 Spain

This workshop was an opportunity for ENEFIRST partners to discuss ENEFIRST findings and policy approaches with experts of the ministry in charge of energy (MITECO) and the energy agency (IDAE).

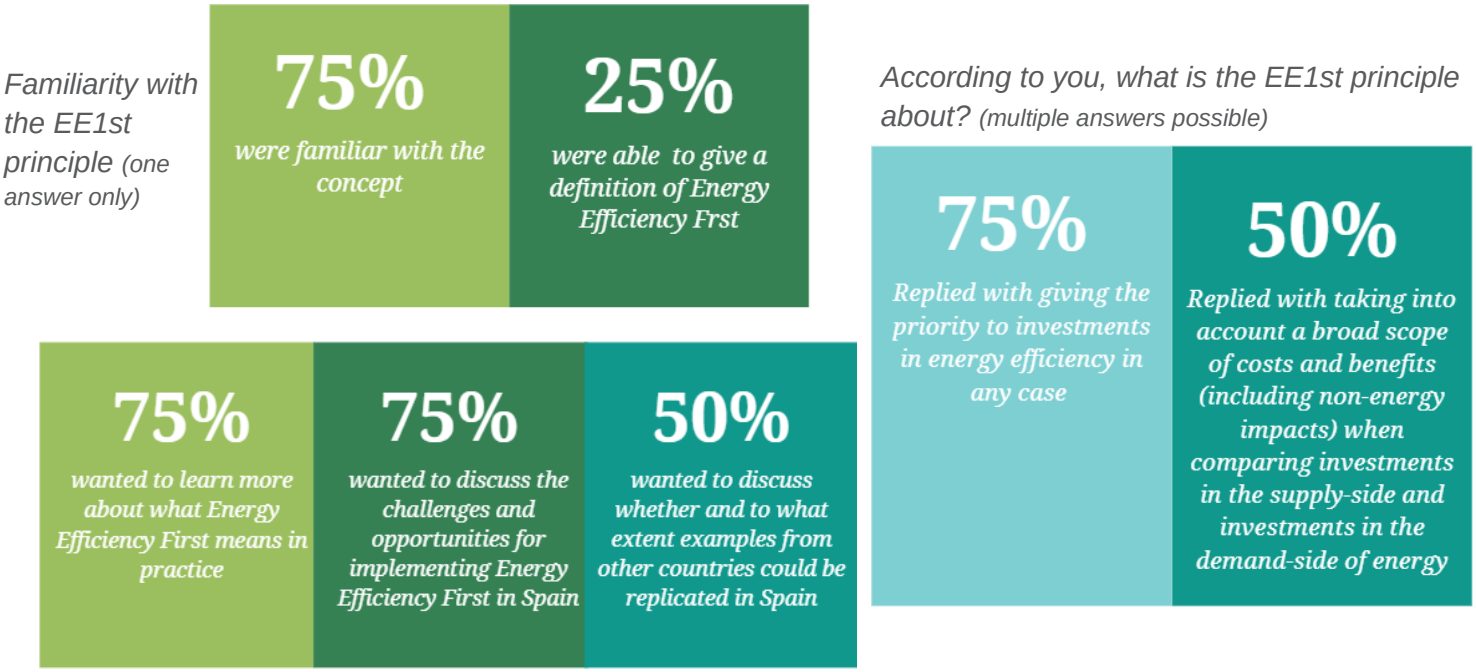


Figure 14. Profiles and expectations of the participants to the Spain's workshop.

As this workshop was restricted to experts of the ministry and agency, the participants were already familiar with EE1st, and were particularly interested in learning more about how to implement EE1st. The feedback from the participants to the Spain's workshop was very positive, as shown in Figure 15 below.

Figure 15. Main results from the feedback survey after the Spain's workshop.

5.2 Hungary

The workshop was organized in collaboration with MEHI (the Hungarian Energy Efficiency Institute), as an in-person public event. It aimed at looking at the burning double challenges of Hungary: a legacy of an obsolete building sector and the high dependence on energy imports. Both of these challenges affect the individual and the policy-making levels, and could be targeted with measures that embrace a number of other co-benefits, including energy poverty. These discussions are timely in Hungary, and the workshop participants were invited to participate in an active dialogue on how to strategically transform Hungary's energy system planning taking into account the opportunities and challenges that the building sector represents.

Figure 16. Profiles and expectations of the participants to the Hungary's workshop.

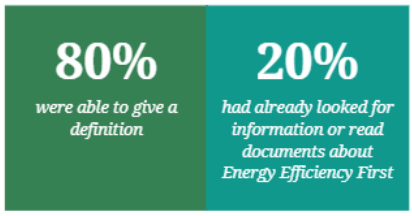
As the Hungary's workshop was a public event, the profiles of the participants were very diverse, with different levels of initial knowledge and practice about EE1st. The highest expectations were about learning or discussing the developments in the Hungarian policies. The feedback from the participants to the Hungary's workshop was very positive, as shown in Figure 17 below.

Figure 17. Main results from the feedback survey after the Spain's workshop.

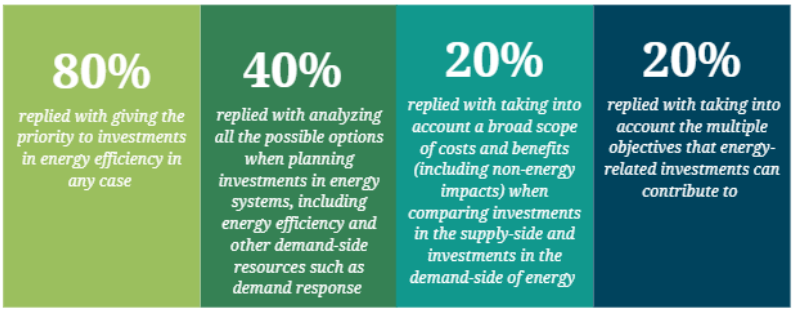
5.3 Germany

Germany's workshop was organised online, including an external presentation by DENEFF, the presentation of the main findings from ENEFIRST, with a focus on the analysis done about Germany, followed by a small group discussion. Unlike Hungary's workshop, the profiles of the participants to the German workshop were very unified as regards to their familiarity with the EE1st principle.

Familiarity with the EE1st principle (one answer only)



According to you, what is the EE1st principle about?
(multiple answers possible)



Do you know about examples of policy or decision framework(s) that have implemented EE1st in practice?
(only one choice possible)

6 SUMMARY LIST OF THE ENEFIRST RESOURCES

These resources are here to provide a concise and clear overview of the project's brochures, library and outputs. deliverables, reports, webinars and workshops.

ENEFIRST in a couple of visuals

- Infographic introducing the EE1st principle
- Brochure presenting ENEFIRST in a nutshell

What is the Energy Efficiency First Principle?

- Report about the operational definition of EE1st adopted in the ENEFIRST project, and the background analysis about EE1st
- Conference paper about What does EE1st mean in practice? :

Framework for operationalizing EE1st

- 16 real life examples illustrating how EE1st has already been implemented in various countries and policy areas (+ related report)
- Report about the transferability of these examples in the EU context
- Report about general barriers to the implementation of EE1st

Webinars

- Conceptualising EE1st and examples from Ireland and UK
- Barriers to EE1st and examples from France and California

Assessment and quantification of the impacts of EE1st

- Report reviewing possible modelling approaches to quantify the impacts of implementing EE1st
- Report describing the 3 EU scenarios assessed in ENEFIRST to quantify the impacts of implementing EE1st in buildings and their energy supply
- Report analysing the results of the 3 EU scenarios, and the Scenario Explorer to visualize the results per country and main output indicator ENEFIRST
- Report discussing how to integrate multiple impacts in the assessments, with an application on the EU scenarios for two categories of impacts
- Report presenting 5 model-based case studies investigating the trade-offs between supply-side options and demand-side options at local (urban or building) level

Workshops

- Discussing modelling approaches
- Discussing the results from the 3 EU scenarios

Webinars

- Webinar series presenting three of the model-based case studies

Policy options for implementing EE1st in the EU buildings sector

- Report on Priority areas for implementing EE1st
- Report on the implementation maps

- Report on Guidelines to promote integrated approaches for implementing EE1st across different policy areas within the energy system:

Workshops

- Discussing the implementation maps
- Discussing the integrated approaches

Webinar

- Webinar on the integrated approaches with examples from Croatia and Sweden

Policy application, synthesis and recommendations

- Report on in depth policy design analysis as a prerequisite for EE1st implementation
- Recommendations for implementing EE1st at EU and national levels

+ proceedings of the final ENEFIRST conference

ENEFIRST Library

- ENEFIRST Library of references relevant to the EE1st topic (on Zotero)

7 ENEFIRST TESTIMONIES

"EE1st principle is embodied in the EU energy policy and clearly stated in the EED. Despite this commitment, in practice energy efficiency is often not considered as a first choice as more attention in both energy planning and public discourse is usually given to the supply side of the energy sector. Therefore, the ***guidelines how to integrate the EE1st principle are highly needed****. And this is the most important benefit from the ENEFIRST project.*

It enabled a platform for energy efficiency and energy planning experts to exchange their points of view, explain the usual practices that boost or impede stronger implementation of EE1st principle and to come to the conclusions and recommendations how to ensure that energy efficiency is utilised to its ***full potential****.*

This exchange ***broadened my views on the possibilities to implement EE1st at our disposal****. I will for* ***sure use the recommendation of the ENEFIRST project on how to operationalize EE1st principle in my everyday day job*** *– supporting decision and policy makers to develop effective energy and energy efficiency policies that will ensure reaching the desired energy and climate targets."*

- Vesna Bukarica, Energy Institute Hrvoje Požar (EIHP)

"*I have closely followed the progress and outcomes of the ENEFIRST project. I have been able to get a gradual understanding of the depths of the energy efficiency first principle and the needs for its integration at various stages and levels of decision-making. Since,* ***I have started using the outcomes and knowledge gained from the project in nearly all of my outcomes****, be it research outputs, policy recommendations, as well as formal and informal discussions on many levels*".

- Michaela Valentova, Czech Technical University of Prague

"I have followed the development and results of the ENERFIRST project quite closely throughout 2021-2022. It has been a great help in my work for a number of reasons. Firstly, it ***has provided a space for discussing the implementation of the energy efficiency first principle*** *and because there are no other forums (to my knowledge) discussing the operationalisation in the same manner it has facilitated more in-depth discussions that I would otherwise have been missing. Secondly, the progression of the project – from taking a starting point in defining the principle, to making concrete examples of modelling frameworks –* ***has aided a more coherent and broad understanding of the principle from conceptual level to policy implications and ultimately the development of tools and methodologies****. (…)*

Ultimately, ***the project has provided me with a deeper understanding of the energy efficiency first principle, as well as a preliminary understanding of its operationalisation and implementation****. Due to the cross-cutting nature of the principle and its potential for broad implementation across several layers of government, there are still many questions remaining in regards to implementation and how to further operationalise the principle. However, the project has delivered a great introduction and an excellent starting point for more granular analysis at national level."*

- Rasmus l'Anglois-Nordgren, Advisor, Danish Energy Agency

*"**ENEFIRST is an important project with useful results**. Through the different formats of the project, more clarity about the Energy Efficiency First principle has been brought to important stakeholders. It gave good practice examples for the operationalisation of the principle but also showed that while operationalisation is key, it is not yet systematically implemented in the national context."*

- Henning Ellermann, DENEFF (Deutsche Unternehmensinitiative Energieeffizienz e.V.)

"***I think the studies of the project provide "enough" basis to convince EU and national politicians and regulators to prepare comprehensive package of strategies, planning and policy instruments and requirements, incentives across power sector**. Changing the general (present) position/attitude of energy industry experts (preferring new energy investments instead of energy efficiency measures and active demand response activity) really require strong "carrots and sticks" type of regulatory measures immediately. Otherwise, the present attitude of the power sector players would remain the same*."

- Dr. Gábor Szörényi, former General Secretary of ERRA, former Director of the Hungarian Energy Office

*"The project **gave me a clear picture of the different priority policy approaches and their possible impact on the implementation of energy efficiency in different contexts (…) and the possibility to better understand the priority policy approaches and, in the meantime, has highlighted their critical and success factors that may have a certain impact on their implementation.** The explanation of the case studies was very positive, just as the definition of the barriers and solutions proposed was very clear, but the real challenge in this context, in my opinion, is being innovative. It is necessary to define more specific implementation steps and understand how to be implemented, identifying more prescriptive solutions, without taking away flexibility.*

***It was very important to understand the challenges to face the energy efficiency first principle implementation**."*

- Italian policy officer

"*The concept and objectives pursued by the ENEFIRST project are **really interesting for all MS in the EU**. Its main strength is **the exercise of self-reflection that requires you to do before the first working session:** about what it means and how the EE1st Principle is being applied in your country, and the whole deployment and implementation work that still lies ahead.*"

- Susana Pérez Baelo, Energy Efficiency Area Head. Ministry or Ecological Transition and Demographic Challenge

"*ENEFIRST provided me with very useful information. What I most appreciate is the **arguments and implementation paths released by the Project, which are very useful to communicate the principle in business meetings and to teach my pupils in business schools I also work for**.*

*On top of that, the mere exercise of having to comment some Spanish Plans / Strategies with ENEFIRST staff, **drove me to the need of re-analyse those documents and realise there are many things to do, for example, at a local planning level, in the path of smart decarbonization**.*

*I felt good when I found that many implementation maps included guidelines that I had been recommending my clients for so long. **Implementation maps is a deliverable that I shared with colleagues, especially with other CEM (Certified Energy Manager), since I thought those maps will help them in their daily work**."*

- Guillermo José Escobar Lopez, Plataforma Tecnológica Española de Eficiencia Energética

*"The ENEFIRST project has helped in several ways. Mainly by **increasing the understanding of the possibilities with the EE1st principle**, not only focusing on hurdles. Also, **easy access to information worth sharing for inspiration and good examples on how to implement on different levels**."*

- Veronica Eade, Swedish Energy Agency