ENSMOV PLUS

Lessons learned from the implementation of the Energy Efficiency Directive's energy savings obligation

October 2025

Co-funded by the European Union under project n°101076098. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Project Acronym	LIFE21-CET-POLICY-ENSMOV Plus
Project Name	Evaluation, Quantification and Strengthening of the Implementation of the Policies and EM&V under Article 7 of the EED
Project Coordinator	IEECP
Project Duration	1 December 2022 – 30 November 2025
Website	https://ieecp.org/projects/ensmov-plus/

Deliverable No.	D5.2
Dissemination Level (Private or Public)	Public
Work Package	WP5
Lead beneficiary	Regulatory Assistance Project
Author(s)	Samuel Thomas, Jean-Sébastien Broc, Gregor Thenius, Samuele Livraghi, Danai Sofia Exintaveloni, Frederic Berger, Solenne Toum
Reviewed by	Dario Di Santo, Mara Oprea
Date	November 30th, 2025
File Name	ENSMOVplus_D5-2_LessonsLearned

To quote this reference, please use:

ENSMOV Plus, 2025. Lessons learned from the implementation of the Energy Efficiency Directive's energy savings obligation. Deliverable D5.2 of the ENSMOV Plus project, co-funded by the LIFE programme. Available at: https://ieecp.org/projects/ensmov-plus/

Legal Notice

Contents

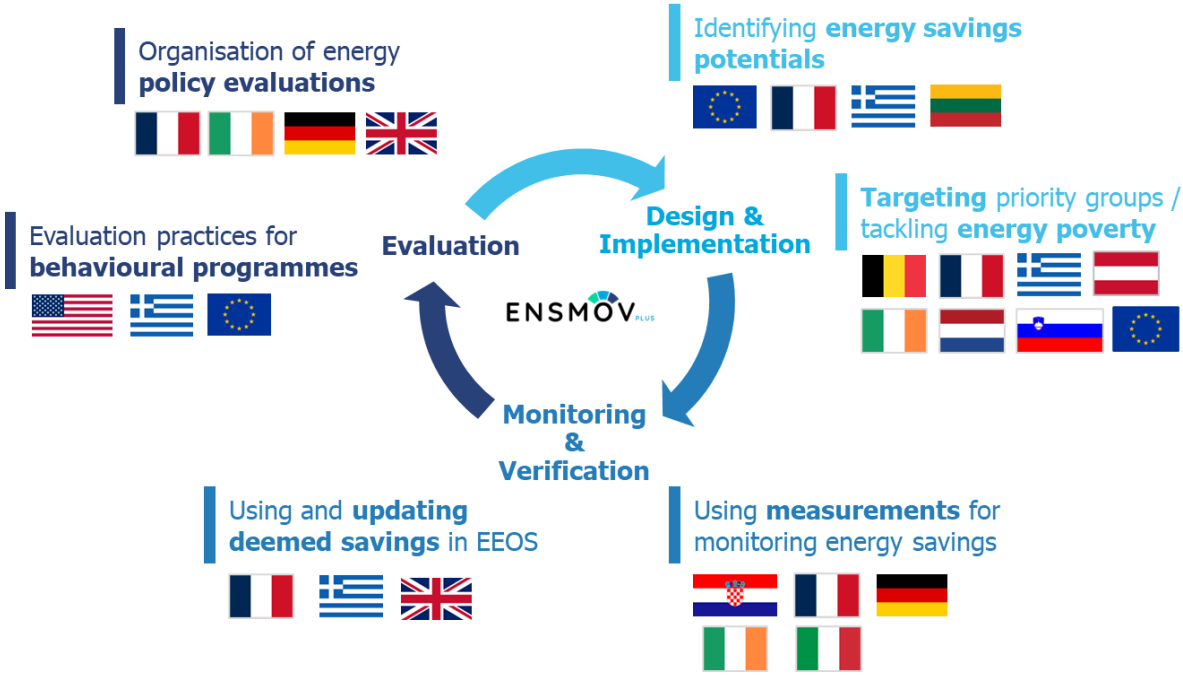
Abbreviations

EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
ETS	Emissions Trading System
EV	Electric Vehicle
FEC	Final Energy Consumption
ICE	Internal Combustion Engine
MRV	Monitoring, Reporting and Verification
MS	Member State
M&V	Monitoring and Verification
NECP	National Energy and Climate Plan
OP	Obligated Party
WhC	White Certificate

EXECUTIVE SUMMARY

This report provides a summary of the main lessons learnt from all ENSMOV Plus' resources and activities, following the three main stages of the policy cycle, in the context of **Member States' energy savings obligation** (Article 8 of the Energy Efficiency Directive EU/2023/1791): **Policy design and implementation** (cf. chapter 2); **Monitoring and verification** (cf. chapter 3); and **Evaluation** (cf. chapter 4). The report concludes with a forward-looking chapter 5, discussing factors that may influence possible re-design of energy efficiency policy measures.

All resources can be found at: **https://energysavingpolicies.eu/**



27 examples addressed **six key topics** selected from a stakeholder survey:

- The examples about **assessing energy savings potentials** go from behavioural studies to detailed technical assessments, and show the importance of linking such analyses to implementation frameworks. They underline the need for continuous updates, reliable data collection, and clear eligibility guidelines. A complementary workshop discussed further experiences about savings potentials and how it relates to the Energy Efficiency First principle.
- The examples about **targeting priority groups to tackle energy poverty** illustrate a wide range of national strategies: while most countries rely on income-based thresholds and building performance indicators, the design of their support instruments, implementation pathways, or monitoring systems differ considerably. This can be partly explained by different objectives (e.g. aiming at supporting as many households as possible vs. aiming at higher impacts per

intervention). A complementary workshop discussed the synergy between Member States' energy savings obligation and Social Climate Plans.

- The examples about **using measurements in monitoring energy savings** found that clear rules and well qualified professionals are important for an effective use, increasing confidence in reported savings, while keeping flexibility to adapt to changing circumstances. The deployment of smart meters and synergy with other purposes (e.g. process optimisation) increase the cases where metered data are already available, notably for large energy saving projects.
- The examples about **updating deemed savings** stress that a clear process and method help maintain an up-to-date catalogue in a structured way, anticipating regular revisions and being reactive when needed. Working groups are an important component of this process, increasing the legitimacy of the catalogue.
- The examples about the **organisation of policy evaluation** found a decentralised commissioning landscape. This may partly explain the differences in methodologies used. Greater transparency and harmonisation would improve credibility and usefulness of evaluations. Structuring data collection and management over time can be effective to provide robust and updated evidence. Moreover, wider impacts are still under-reported in impact evaluations, whereas they can represent major value dimensions of energy efficiency policies.
- The examples about **evaluating behavioural programmes** discuss the pros and cons of using experimental methods (such as Randomised Control Trials) or simplified methods (i.e. 'surveyed savings' in the EED terminology). Experience shows that a part of ex-post evaluation is needed in any case to assess the outreach and impacts of behavioural measures.

The topics above were complemented with **further exchanges and analyses**:

- Modelling of building stocks was used to simulate scenarios to guide the development of policy instruments tailored to regional implementation strategies in the residential sector. Such **bottom–up assessments** can inform the development of **strategic allocation of funds for maximising impacts**.
- A targeted review of **Energy Efficiency Obligation Schemes (EEOSs)** focused on the **use of substitution fees** (or buy-out price) and related key design and implementation issues: keeping flexibility to adapt the buy-out price, anticipating interactions between EEOSs and Alternative measures receiving the substitution fees (e.g. implementation delays, swings in amounts of fees), capping the use of substitution fees with an absolute amount per obligated party.
- Discussing the **feasibility of an EU-wide energy savings certification scheme** highlighted the diversity in existing national schemes that would be

challenging to unify, the positive learning effects from the possibility to compare different national schemes, and the political challenge of having one country's bill payers paying for actions done in other countries. As an alternative, an EU-wide tendering or auction scheme, funded centrally, could focus on the delivery of energy savings to tackle pan-EU issues (e.g., around tackling grid constraints that raise electricity prices at peak and act to hold back new grid connections).

- A review of the policy measures reported to Article 8 EED showed an increasing number of **transport measures**, but still representing a small share of the energy savings reported by Member States for 2021-2023. The discussions on transport measures were then focused on the case of support schemes for **electric vehicles** (EVs). EVs indeed represent a large potential for final energy savings. However, the way to consider the **additionality** of these national support schemes vs. the EU regulations on CO_2 emissions would need to be clarified, to recognise the complementarity of national support schemes to enable the EU regulations to be met.
- The various exchanges on **Monitoring, Reporting and Verification (MRV) practices** reminded how essential MRV is for ensuring the quality of the actions delivered, and thereby the actual impacts of policy measures. Public authorities and stakeholders highlighted the need for clear and transparent procedures, as well as on-going communication and information sharing. MRV requirements should be proportionate and not necessarily seen as an administrative burden only. Experience shows that additional MRV effort can bring significant gains in the functioning of schemes, and thereby in the energy savings delivered.
- An ad-hoc task about the **assessment of multiple impacts** of energy efficiency measures contributed to linking the MURE database to the MICATool, facilitating the assessment of multiple impacts from policy measures reported to Article 8 EED. A broader cost-benefit assessment can indeed boost measures' economic viability and provide tangible narratives beyond energy saving benefits. This also enables comparing various options in line with the Energy Efficiency First principle, to ensure a level playing field in energy planning decisions, and to design policies for covering the gap between private and societal perspective.

The report concludes with discussing two major topics that should be increasingly considered in the design of future energy efficiency policies: electrification and affordability. **Electrification** is major source of final energy savings that can further align energy efficiency policies with climate objectives. But it requires considering when and where energy is saved, not only how much. **Affordability** is essential for fair policies. The context of high investment needs at a time of constrained public budget and fluctuating energy prices implies a renewed focus on cost-effectiveness, targeting and differentiating support according to target groups.

1 Introduction

The Energy Efficiency Directive (EED) **energy savings obligation** (Article 8 EED) requires Member States (MSs) to make energy savings from eligible national energy efficiency policy measures. Energy savings must be **additional** to what would have happened in the absence of the policy measures, taking account of EU law and market developments, as set out in Annex V EED.

The **revised EED (EU/2023/1791)** increased Member States' obligations by around 44%, required a proportion of energy savings to be made among priority residential sector groups and progressively excludes the possibility to report energy savings from the installation of fossil fuel combustion technologies and policy measures that support fossil fuel combustion technologies. The ENSMOV Plus report on the implications of the Fit for 55 Package on Member States' Energy Saving Obligations provides details on all the main changes to the EED and other EU Directives agreed as part of the Fit for 55 Package.

The **ENSMOV Plus** project facilitated and expanded knowledge and experience sharing among Member States for the design, implementation, monitoring, verification and evaluation of energy efficiency policy measures, developing a suite of tailored resources used to prepare this report.

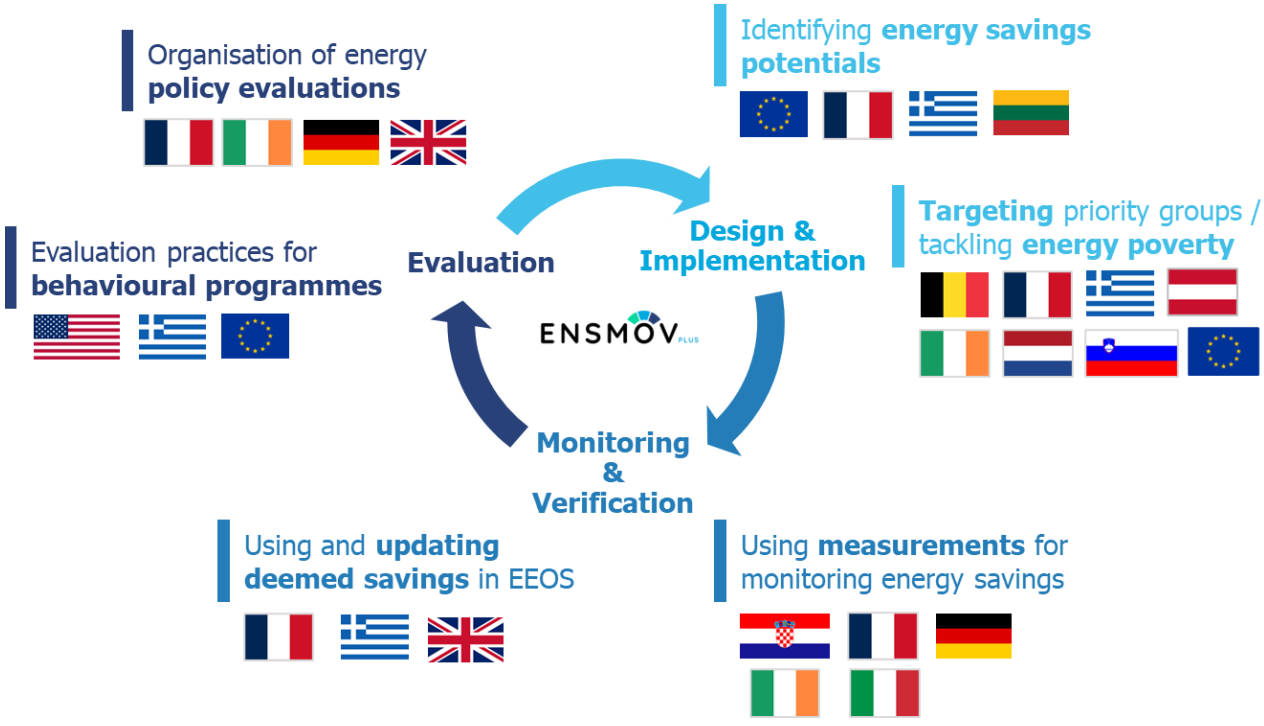


Figure 1. Overview of key topics addressed by ENSMOV Plus' resources and related country examples.

In addition to the 27 examples shown in Figure 1, published on the online platform and compiled in the set of resources, EU workshops further discussed these key

topics selected from the needs assessment based on stakeholder survey and the gap analysis based on the review of existing tools.

Complementary EU workshops shared experience more specifically about Energy Efficiency Obligation Schemes and Alternative Measures, as well as transport measures.

Experience sharing and policy review also occurred at national level. See the country summaries and country factsheets.

These experience sharing resources and activities were complemented with ad-hoc research and analysis:

- Bottom-Up Modelling Analysis of Renovation Strategies in the Residential Sectors of Greece and Croatia
- Assessing Multiple Impacts of energy efficiency policies
- Sustainable Cost-Effectiveness Assessment: Methodology for Energy Transformation Support Programs in Poland

All the resources, including the country examples, workshop proceedings, etc. can be found on the **online platform**: **https://energysavingpolicies.eu/**

This report provides a summary of the main lessons learnt from all these resources and activities, following the three main stages of the policy cycle as used to structure ENSMOV Plus' work (and shown in Figure 1):

- Policy design and implementation (cf. chapter 2)
- Monitoring and verification (cf. chapter 3)
- Evaluation (cf. chapter 4)

The report concludes with a forward-looking chapter 5, discussing factors that may influence possible re-design of energy efficiency policy measures.

2 Policy design and implementation

Two key topics about policy design and implementation were ranked by stakeholders as top priorities, in relation to the changes brought by the EED recast adopted in September 2023:

- **Identifying new or untapped energy savings potentials** (see section 2.1), as the revised energy savings obligation requires Member States to achieve about 44% more energy savings (on average).
- Tackling energy poverty, and more specifically **targeting and supporting priority groups** (see section 2.4), as the revised energy savings obligation now requires Member States to achieve a minimum share of energy savings among priority groups[1].

About the first topic, complementary modelling work was done to assess more in details energy savings potentials in the **residential sector**, and identify **cost-effective pathways to renovate buildings** and how it can inform policy design (see section 2.2).

Another sectoral focus was about **transport measures**, as they still represent a low share of the energy savings reported by Member States, compared to the share of transport in their total final energy consumption. The case of measures promoting **electric vehicles** was thus discussed during an ad-hoc workshop (see section 2.5).

The ENSMOV Plus workshops also included presentations about policy measures for the industry sector. In this report, the **industry** sector is discussed in the chapter about **monitoring and verification**, and more specifically the use of measurements (see section 3.1).

In parallel to the sectoral discussions, ENSMOV Plus continued being the main European forum for sharing experience among **Energy Efficiency Obligation Schemes (EEOS)**, being a major policy instrument used by about half of the Member States to meet their energy savings obligation. Section 2.3 summarizes more specifically the discussions on two key issues raised during the project: the use and design of **substitution fees** (or buy-out prices), and the feasibility of an **EU-wide energy savings certificates**.

[1] Including, but not limited to, people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing (cf. Article 8(3) EED).

2.1 Energy savings potentials

Identifying new or untapped potentials for energy savings was among the topics ranked highest by stakeholders surveyed in 2023. Understanding where and how to act is a crucial step for policy makers and implementing authorities in the context of the **increased ambition of Article 8 of the revised EED** (EU/2023/1791), which significantly raises the required amount of energy savings for Member States (by about 44% on average).

The ENSMOV Plus' case studies provide summaries of analysis carried out at EU and national level to assess energy saving potentials in different end-use sectors, using a variety of methodological approaches. Each case study sets out the objectives and scope of the analysis, the methods used, main findings and insights into the eligibility of the identified potentials under Article 8 EED.

Table 1 summarises the cases reviewed. The **2021 study commissioned by the European Commission** confirmed that cost-effective savings alone could contribute significantly to the EU's 2030 climate target. **National examples** illustrate how countries are mapping and quantifying their energy saving potentials:

- In **France**, two complementary studies explored potential savings through the White Certificates scheme:
    - The first one covers the scope of the catalogue of standardised actions in **all end-use sectors** and is regularly updated, providing inputs for the discussions on the **target level** for next periods. It shows that, despite recent downward revisions of savings from standardised actions (implying obligated parties will offer lower subsidies), substantial potential remains, particularly through insulation and heating system upgrades.
    - The second one is focused on the **services sector**. It confirms that, where **regulatory obligations** exist, White Certificates can play a key enabling role, provided barriers such as financing and data transparency are addressed.
- In **Greece**, a combination of top-down benchmarking and bottom-up technical assessments identified high technical potentials in the **glass, chemicals and food processing sectors**. In the **tertiary sector**, the economic potential was significant, representing 43% of current energy use, with effective actions including heat pumps, insulation, and energy management systems. However, **not all potentials are eligible under Article 8 EED**, given the overlaps with Ecodesign and mandatory provisions of the Energy Performance of Buildings Directive (EPBD).

- In **Lithuania**, a survey among residents helped assess the impact of **information campaigns and advice** provided by energy suppliers. The study found that, while awareness is widespread, targeted and frequent communication remains key to triggering actual behavioural change.

Table 1. Summary of energy savings potential studies.

Study	Country	Sponsor	Sectors/Scope	Goal/use
Technical and cost-effective energy saving potentials across the EU27	EU level	European Commission	Residential, commercial, industry, and road transport	Technical input to the "Fit-for-55" package
Potential savings through the White Certificates scheme	France	ADEME (French energy agency)	All sectors	Decision-making tool used by the ministry for setting the energy savings target for the scheme at the beginning of each obligation period
How White Certificates can support the Tertiary Eco-Energy directive	France	ATEE and ADEME (conducted by Julhiet Sterwen)	Tertiary building	Inventory of financing means for investments in tertiary buildings, merit order for standardized actions
Analysis of the energy saving potentials in enterprises	Greece	CRES (Conducted by GIZ)	Industrial, tertiary and agricultural sectors	Compilation of the final National Energy and Climate Plan in 2019
Behavioural survey among residents	Lithuania	LEA (Lithuanian Energy Agency)	Residential (energy habits)	Assess the impact of information campaigns and advice provided by energy suppliers.

Taken together, these examples show the **diversity of approaches** that can be used to assess energy saving potentials, from behavioural studies to detailed technical assessments, and the importance of linking such analyses to implementation frameworks. They also underline the **need for continuous updates**, reliable data collection, and clear eligibility guidelines to ensure that

identified potentials can effectively support Member States in meeting their energy savings obligations.

Assessing energy savings potentials is also a prerequisite to the implementation of the Energy Efficiency First principle. The workshop on this topic was jointly organised with the ENEFIRST Plus project. In addition to the overview of the ENSMOV Plus case studies, complementary findings were shared from the experience of:

- the **Danish Technology catalogues**, developed by the Danish Energy Agency since 1983 to provide a basis for energy planning activities, and that has become over time a worldwide reference, with an active community contributing to regular updates and improvements.
- the **sEEnergies project** that used an innovative approach to assess energy efficiency potentials in all sectors and all EU Member States, also considering the energy system impacts (e.g. costs for energy grids).
- the **EU-MORE project** that investigated the specific potential of replacing inefficient electric motors in EU Member States, providing an open-access tool for comparing different scenarios at country level.

2.2 Ex ante assessments in the residential sector

The residential sector represents around 25% of total energy consumption and 20% of greenhouse gas emissions in the EU, while **around 75% of buildings are energy inefficient** and 85–95% of them are expected to remain in use by 2050 [2, 3, 4]. Retrofitting is therefore essential to achieve national and European energy efficiency targets, with public policy interventions playing a crucial role in directing investments, given the market failures and barriers to action in the sector. Additionally, the 2023 ENSMOV Plus survey ranked "Ex-ante assessment of energy efficiency measures (using modelling/simulation approaches)" as the third-highest priority in the policy evaluation domain, reflecting **stakeholders' demand for reliable, forward-looking tools** to support evidence-based decision making and strengthen the effectiveness of energy efficiency strategies.

[2] Koengkan, M., Fuinhas, J. A., Osmani, F., Kazemzadeh, E., Auza, A., Alavijeh, N. K., & Teixeira, M. (2022). Do financial and fiscal incentive policies increase the energy efficiency ratings in residential properties? A piece of empirical evidence from Portugal. Energy, 241, 122895. DOI: 10.1016/j.energy.2021.122895

[3] CE Delft (2020). Zero-carbon buildings 2050 https://cedelft.eu/wp-content/uploads/sites/2/2021/03/CE_Delft_190376_Zero_carbon_buildings_2050_Def.pdf

[4] DIRECTIVE (EU) 2024/1275 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 April 2024 on the energy performance of buildings. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401275&pk_keyword=Energy&pk_content=Directive

In line with these needs, ENSMOV Plus carried out modelling exercises to assess energy efficiency policies and measures in the residential sector through **bottom-up approaches**, providing evidence-based insights of added value. The conclusions and lessons learned presented below draw on **two application cases**:

- one for **Greece**, which examined different pathways to achieve the residential targets of the country's NECP (National Energy and Climate Plan), and
- one for **Croatia**, which analysed the budget allocation of a subsidy scheme for single-family houses, aiming at achieving greater energy savings.

Furthermore, insights from additional consultations and stakeholder discussions held throughout the modelling activities were also taken into account. The findings and insights have been structured into thematic categories to ensure their relevance extends beyond the countries examined, thereby providing guidance for others interested in undertaking similar assessments[5].

2.2.1 Availability of Data and Information for Modelling and Evidence-Based Policy Design

- **Availability of statistical data** can significantly improve the quality and robustness of modelling exercises and their results. In particular, our work revealed that the following data could be very useful but are often not available for all Member States:
    - Occupancy and use patterns: This includes information on building occupancy (e.g., permanent vs. seasonal use, household size) and patterns of space utilization that can facilitate more accurate estimation of energy demand.
    - Technological and energy system data: Data on the share of heating and cooling technologies, as well as the penetration of energy-efficient appliances and systems allow for a more realistic representation of household technologies and estimations of potential energy savings.
    - Building stock energy characteristics: Information on the energy class of buildings by climate zone and construction periods is critical for assessing the energy-saving potential of renovation measures at the national scale.
- **Information on the actual implementation of past policy programmes** (e.g., ex-post assessments) can provide valuable insights on measures implemented, revealing also consumers' preferences, and **actual savings** achieved that can inform future ex-ante assessments. However, detailed information is often lacking for many policy instruments.

[5] See full report at: https://energysavingpolicies.eu/materials/a-bottom-up-modelling-analysis-of-renovation-strategies-in-the-residential-sectors-of-greece-and-croatia/

2.2.2 Energy efficiency upgrades and (tailored) renovation pathways

- Significant energy efficiency upgrades in the residential sector are necessary to achieve ambitious national and European targets. Such upgrades are particularly crucial in countries where the **ageing building stock** is responsible for a high share of energy consumption.
- Both **building envelope** improvements and **heating system** replacements are needed and can deliver significant energy savings to achieve the national targets and improve the overall living conditions of the consumers.
- **Building characteristics**, such as construction period, and climate conditions prevailing in the area where the building is located, which influence the energy savings delivered from renovation actions, should be taken into account in the modelling exercises. This enables modelling insights to better guide the development of policy instruments tailored to regional level implementation strategies.

2.2.3 Policy design and governance challenges

- Bottom–up assessments that can inform the development of strategic allocation of funds and supporting mechanisms to modernisation actions that can maximise the energy savings delivered are crucial to **ensure higher impact**. They can also be used to complement top-down assessments and approaches that aim to ensure alignment in the national overarching objectives.
- **Effective coordination** among ministries and governmental departments, which are responsible for the implementation of different policy measures, is necessary to overcome fragmentation and strengthen the implementation of actions, monitoring and assessment of achievements.
- **Transparency** and the availability of publicly accessible information are essential both for enabling modelling teams to conduct more accurate and robust exercises but also for ensuring accountability and building trust in the policy process.

2.3 Energy Efficiency Obligation Schemes (EEOSs)

The European workshop done in Paris in December 2023 included a tour of eight out of the 13 EEOS implemented by Member States, providing an overview of recent achievements and developments, as well as upcoming challenges. Key issues discussed included how to adapt EEOS and white certificates schemes to the new ambitions of the EED recast, notably higher targets and minimum share of savings to

be achieved among priority groups. A special session restricted to public authorities focused on good practices to mitigate frauds.

EEOSs are also analysed in detail in the ENSMOV Plus' country factsheets updated in 2025, and including interviews with national experts.

These experience sharing activities were complemented by two deep dives on substitution fees and feasibility of an EU-wide energy savings certification scheme. Both analyses and discussions are summarized in the sub-sections below.

2.3.1 Substitution Fees (Buy-out prices)

Substitution fees allow obligated parties to buy out all or part of their obligations at a price set by the scheme regulator. Buy-out prices act as **upper bounds on the costs to obligated parties** of complying with their energy savings obligations, thereby limiting the impact of the scheme on the costs that are passed through to energy consumers through their bills. If Member States rely upon EEOSs to meet their Article 8 EED energy savings obligations, the use of substitution fees transfers the requirement to make energy savings from obligated parties to Member State governments.

Not all EEOSs have buy-out prices, regulators relying instead on **other mechanisms to limit costs to obligated parties**, such as selling temporary energy savings certificates at times of tight supply (Italy), allowing obligated parties to stack their support with other subsidy schemes (France, Ireland), providing bonuses for priority actions (Croatia, France) and ensuring access to a liquid market of energy savings certificates (France, Italy, Spain).

Among the EEOSs that have substitution fees, the following lessons learned are useful for Member States (re)designing their EEOSs:

- Allowing buy-out prices to be set in **secondary legislation** strikes a balance between certainty for obligated parties and flexibility for regulators. Setting buy-out prices in primary legislation can lock in low prices that effectively make buying out the default action for obligated parties. As it is very challenging to define the "right" buy-out price at the beginning, **flexibility** in changing the prices (at least in the beginning) avoids being stuck with either too high or too low buy-out-prices.
- Collecting buy-out payments in an **Energy Efficiency Fund** ringfences resources to fill the gap in energy savings caused by the use of substitution fees by obligated parties. However, the use of substitution fees can vary significantly between years. Ensuring that the Fund has a predictable and larger source of revenue, mitigates against the risk to the operation of the Fund from **big swings in substitution fee payments**.

- When obligated parties buy out of their obligations, Member States are unlikely to be able to deliver equivalent energy savings through Alternative Measures in the same year. As the Article 8 EED energy savings obligation has a cumulative energy savings target for each period (currently 2021-2030), the value of energy savings to target achievement declines year-on-year within the period. Where Member States aim to set the buy-out price at the cost of achieving equivalent savings from Alternative Measures, the **temporal aspects** should be considered.
- Some obligated parties may find it more costly (per kWh) to comply with their obligations than others, because of their size. Limiting the use of substitution fees to an **absolute amount of energy savings per obligated party** allows all obligated parties to use it while removing a barrier to entry to energy markets for new small market players.

Table 2. Examples of substitution fees.

Country	Nature of substitution fee	Limitations	Fund
Croatia	Set at a price 50-100% higher than average cost of energy savings to obligated parties	None	Environmental Protection & Energy Efficiency Fund
Ireland	Different buy-out prices for each of the 3 sub-targets, set at cost of delivery through Alternative Measures	Available to all obligated parties up to a percentage limit of their obligations	None
Luxembourg	Introduced in current phase to encourage energy savings by obligated parties (soft penalties were too low in previous phase)	Available to all obligated parties up to an absolute kWh limit	Climate and Energy Fund
Slovenia	Set at a level that means it is rarely used	None	Ecofund

2.3.2 Scope for EU-wide energy savings certificates

In the context of its Affordable Energy Action Plan, the European Commission called to assess the feasibility of an EU-wide market for an energy savings certification scheme. Together with the streamSAVE+ project, ENSMOV Plus convened a European online workshop at which stakeholders discussed options for EU-wide certificates and market-based mechanisms more generally.

Table 3. Main options for a market-based mechanism.

Type	Buyers of energy savings	Energy Savings Certificates	Market
White Certificates	Obligated Parties (OPs); Other Eligible Parties	Issue by regulated authority or certified auditors	Exchange (spot market); Bilateral Trading
EEOSs	OPs	No certificates (verified compliance as a tradeable proxy)	Bilateral contracts between OPs and ESCos and between OPs
Tenders / Auctions	Scheme Administrator	No certificates	Competition to win contract

An EU-wide certificate scheme would confer benefits for governments and the energy efficiency sector, giving it more visibility, opening market opportunities for incumbents in existing schemes and new entrants, and driving down costs through competition across a larger market. The harmonisation of scheme rules, particularly around energy savings calculations and Monitoring and Verification (M&V), would be a foundational step in any joining up of existing white certificate schemes and would encourage cross-border competition, as well as spreading good practice in scheme design. However, the **various schemes in the EU** have varied and deeply entrenched ways of operating that would be **challenging to unify**. In addition, the fact that white certificate costs are borne by bill payers, with the costs passed through in energy prices, creates an additional challenge when considering cross-border certificates, if one MS's bill payers are paying for energy efficiency improvements in other MSs.

Tenders and auctions, such as the Portugal's PPEC scheme and Switzerland's ProKilowatt programme, also encourage competition in the provision of energy savings. An EU-wide scheme, funded centrally, could focus on the delivery of energy savings to **tackle pan-EU issues**, e.g., around tackling grid constraints that raise electricity prices at peak and act to hold back new grid connections. The scheme could offer funds from bidders offering to make electricity savings at peak through energy efficiency actions in grid constrained areas.

2.4 Targeting priority groups to tackle energy poverty

2.4.1 National Approaches to Targeting Priority Groups

The new requirements of Article 8(3) EED to achieve a minimum share of energy savings among priority groups have put on the agenda how policy measures can be designed to target priority groups and tackle energy poverty. The seven examples analysed in ENSMOV Plus revealed a wide range of national strategies to fulfil the requirement to prioritise vulnerable households, combining income-based targeting, clear eligibility rules, and local delivery. While most countries rely on income-based thresholds and building performance indicators, the design of their support instruments, implementation pathways, or monitoring systems differ considerably. This can be partly explained by differences in the focus or balance between mitigating distributional effects (and aiming at supporting as many households as possible) and providing support to the most vulnerable groups (and aiming at higher impacts per intervention).

The table below summarises key features in policy measures in Austria, Belgium (Wallonia), France, Greece, Ireland, the Netherlands, and Slovenia, stressing the diversity in approaches for eligibility frameworks, delivery mechanisms, as well as savings accounting.

Table 4. Approaches to energy poverty targeting.

Country	Target Group	Instruments assessed	Level of Support	Monitoring - Reporting	Reported Outcomes
Austria	receipt for social assistance or broadcasting fee's exemption	Subsidy to replace fossil-fueled space heating systems	Up to 100% (with a cost cap)	Data collected in the applications. Results reported to national monitoring agency	About 9500 heating systems replaced over 2022-2024
Belgium (Wallonia)	Progressive income brackets + modifiers for dependents, elderly, disabled; social housing tenants.	Housing Grants (up to 90%), Rénopack loans, MEBAR II, PAPE; CPAS plays key role.	Grants: 30–90%; loans up to €60,000; tailored support for low-income groups.	Applications matched with tax and land register data; audits and invoices required.	6.09 ktoe/year in 2021 targeting priority groups (7.5% of total savings).

France	Income threshold (updated yearly by household size and region); includes special rules for social housing.	Sub-obligation under White Certificate (WhC) scheme; standardised actions, bonus incentives; separate energy poverty registry.	"Energy poverty" target = 57% of general WhC; additional bonus for very low income (until 2021).	Separate registry; WhC recorded by priority group; avoids double-counting with other subsidies.	1,521 TWhcumac since 2016; ~480 TWhcumac in 2022–2023.
Greece	Dual condition: energy use <80% of minimum need and income <60% of median; EPC required.	"Energy Upgrade of Buildings" programme; subsidies + low-interest loans.	Up to 85% subsidy depending on income; special scoring for energy poor.	EPC-based pre/post audit; energy savings calculated via bottom-up method.	4.92 ktoe in 2021 for 2,321 energy poor households.
Ireland	At least one of seven qualifying welfare payments and main residence with Building Energy Rating (BER) D2 or worse; priority for BER E–G.	EEOS with 5% sub-target for energy poverty + Fully Funded Energy Upgrades (alternative measure)	Fully funded for eligible households; grants up to 50% for others; EEOS requires BER upgrade from ≤D2 to ≥B2.	Energy Credit Management System tracks all actions; pre/post BER data; PPSN used to verify eligibility; SEAI verifies data.	2023: 5,900 energy-poor homes upgraded; EEOS: 1.8 ktoe savings among priority groups (2021, 5% of EEOS total).
Netherlands	Property value below average + label D–G or ≥2 poorly insulated components; priority for households in debt.	SPUK LAI (Specific Allowance for Local Insulation Approaches) grant scheme; flexible municipal delivery; DIY upgrades.	Decided at the Municipality level.	Biannual reports; address-level tracking; deemed savings modelled with SAWEC.	7,997 homes insulated; €1.091 billion requested (2023–24).
Slovenia	Below poverty threshold + inefficient dwelling (e.g. >150 kWh/m²/year) or poor housing conditions.	ZER (energy poverty reduction) subsidy (100%); Eco Fund managed; local coordinator and energy expert visit required.	Max €18,000 per household incl. VAT; measures decided by expert.	Case-level tracking; deemed savings; results reported to Energy Agency.	392 households under ZERO500 programme; new calls expected to reach 8,000 households by 2030.

Moreover, the European workshops done in Paris and Budapest included **sessions focused on energy poverty**, that complemented experience sharing in this field.

2.4.2 Integrating Energy Poverty in the Social Climate Plans

An online European workshop complemented the topic about tackling energy poverty, by sharing experience about the **synergies between Article 8(3) EED and Social Climate Plans**, through the examples of Croatia, Lithuania and Slovenia.

Social Climate Plans aim at providing support to households likely to be affected by expected increases in energy prices due to the introduction of emissions trading in the buildings, transport and small industry sectors (ETS2)[6].

Croatia dedicates 30% of its Social Climate Fund's funding to energy upgrades for vulnerable households, including the renovation of 4,800 low-income homes and the creation of one-stop shops.

Lithuania's approach uses a "data sandbox" to identify around 25% of households as eligible, distinguishing between energy deprivation, as set out in the EED, and vulnerability, as set out in the regulation of the Social Climate Fund[6], to target a wider group.

Slovenia built on the experience of its National Energy Poverty Plan, offering full subsidies and integrating low-income groups into energy communities, although administrative capacity remains a constraint.

Despite this tangible progress, many Social Climate Plans lack a clear link to the new Article 8(3) EED targets, where stronger integration of data, monitoring systems, and governance is needed to ensure that Social Climate Plans contribute directly to quantifiable energy savings for vulnerable groups. As Member States are adopting distinct, yet converging approaches to target vulnerable groups, **local delivery structures** – such as the public social welfare centres (CPAS) in Wallonia, the Eco Fund in Slovenia, and municipal one-stop-shops – and **tailored monitoring systems** are emerging as effective ways forward.

The discussions about Social Climate Plans were complemented with a policy brief updating the overview about how Member States addressed energy poverty in their final updated National Energy and Climate Plans due by June 2024.

[6] The Social Climate Fund has been established to mitigate the adverse effects of ETS2, and its regulation provides the framework for the Social Climate Plans prepared by the Member States, see: https://climate.ec.europa.eu/eu-action/carbon-markets/ets2-buildings-road-transport-and-additional-sectors_en#social-climate-fund

2.5 Transport measures in the context of Article 8 EED

Transport (excluding international aviation and bunker fuels) comprises 32% of EU final energy consumption (FEC) with road transport accounting for 94% of the sector's FEC.[7]

The energy savings obligation set in Article 8 EED is cross-cutting. The minimum amount of cumulative energy savings is calculated based on Member States' final energy consumption, including the transport sector. And energy savings from transport measures are eligible, provided they comply with the requirements set in Annex V EED (cf. materiality, additionality and M&V).

Addressing the transport sector is essential for energy efficiency strategies to be comprehensive.

2.5.1 An increasing number of transport measures reported to Article 8 EED, but still a small share of the energy savings

An overview of transport measures reported by Member States to the EED energy savings obligation was presented at the European workshop in Budapest. Overall, transport remains a weak spot in many of Member States' mix of policy measures reported to Article 8 EED.

Nevertheless, the need to report more energy savings due to the EED recast has made that an increasing number of transport measures is reported: policy measures reported by Member States in their NECPRs in 2021 included 42 policy measures focused on transport, and 28 cross-cutting measures including transport in their scope. These figures increased to 67 and 43 in the NECPRs reported in 2023. In relative terms, the share of reported policy measures specifically focused on transport has remained stable (18% in 2021, 19% in 2023).

Barriers to the reporting of transport measures may include the difficulty to assess and monitor energy savings (compared to measures in other sectors), and policy objectives that may not explicitly include energy savings[8].

Still, the review of transport measures reported by Member States to Article 8 EED shows the diversity of policy measures implemented, that can be matched with the

[7] Eurostat (2025). Energy statistics – an overview. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview

[8] For example, some transport measures may be primarily focused on improving access to mobility. Or some taxation measures on transport fuels may be primarily decided to increase revenues for the State budget.

usual categorisation of transport measures according to the Avoid-Shift-Improve approach.

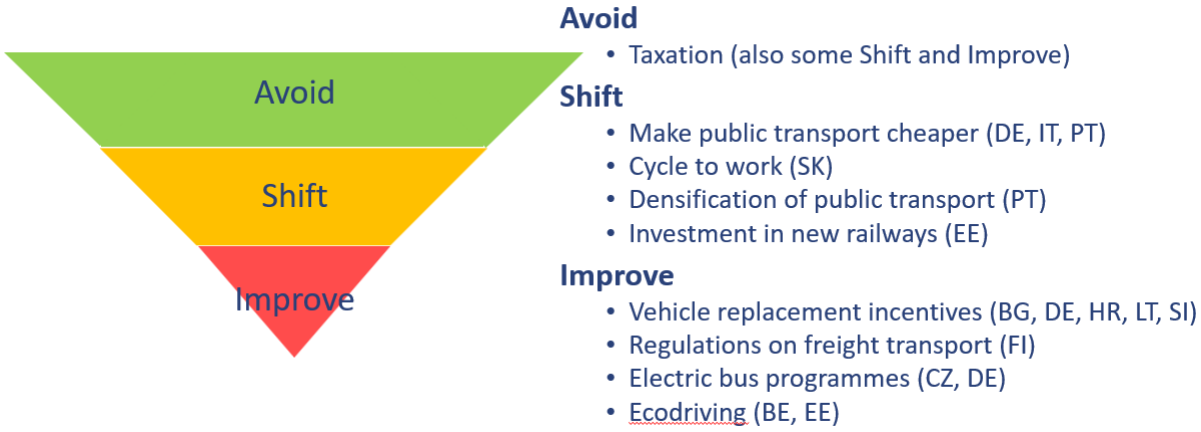


Figure 2. Diversity of transport measures reported by Member States to Article 8 EED, according to the Avoid-Shift-Improve approach.

Further examples of transport measures that may be eligible to Article 8 EED can be found in Appendix VII of the Commission Recommendation C(2019) 6621 final.

The share of energy savings reported from transport measures was about 12% of the cumulative savings over 2021-2023 reported in the NECPRs in 2025[9]. This remains a low share when compared with the share transport in EU's total final energy consumption (32%). However, this figure should be taken with caution, as most energy savings (67%) are reported from cross-cutting measures, and part of these cross-cutting measures may include energy savings in transport.

2.5.2 Energy savings from Electric Vehicles: need to clarify additionality of national measures vs. EU regulations on CO_2 emissions of vehicles

Within the road transport sub-sector, cars and vans account for between 70% and 90% of FEC in most EU countries and more than half in all countries except Latvia (44%).[10]

Electric vehicles (EVs) use around one third of the final energy needed to power equivalent internal combustion engine vehicles[11], enabling **large final energy savings**, if additionality and materiality considerations are accounted for. Policy

[9] See: European Commission (2025). Assessment of progress towards the objectives of the Energy Union and Climate Action. Commission Staff Working Document SWD(2025) 351 final
[10] Eurostat (2025). Final energy consumption in transport - detailed statistics https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=652642
[11] European Commission (2025). Electric Vehicles (webpage). https://transport.ec.europa.eu/transport-themes/clean-transport/clean-and-energy-efficient-vehicles/green-propulsion-transport/electric-vehicles_en

measures promoting EVs are therefore relevant to consider in the context of Article 8 EED.

The ENSMOV Plus' webinar organised on this topic identified **uncertainty over the energy savings calculation** as a key issue:

- Obtaining kilometre readings by end-users to verify deemed savings scores is challenging.
- More importantly, uncertainty over the correct way to characterise the counterfactual to vehicles purchased through Member States' support schemes is acting as an obstacle to setting deemed scores at all.

About this latter point, Appendix VII of the Commission Recommendation C(2019) 6621 final[12] recommended limiting savings to early replacement schemes, given the existence of the new vehicle CO_2 regulations applying to manufacturers' fleet sales, and explicitly mentioned in Annex V EED as part of Union laws to be included in the baseline for energy savings calculations. In parallel, the streamSAVE project has produced a method that enables savings to be reported at Member State's level[13], implicitly recognising the role of national schemes in driving actions that enable the EU new vehicle CO_2 regulations to be met by manufacturers.

$$TFES = (sFEC_{ref} - sFEC_{eff}) \cdot \frac{DT}{100} \cdot n \cdot f_{BEH}$$

TFES	Total final energy savings [kWh/a]
$sFEC_{ref}$	Specific final energy consumption of the reference vehicle [kWh/100 km]
$sFEC_{ref}$	Specific final energy consumption of the efficient vehicle [kWh/100 km]
DT	Average yearly distance travelled with the vehicle [km/a]
n	Number of efficient vehicles purchased [dmnl]
f_{BEH}	Factor for correction of behavioural effects [dmnl]

Figure 3. streamSAVE standardised savings calculation for electric vehicles.

Key to the above calculation formula is specifying the reference vehicle at national level. To do this, frequently collected sales and energy performance data are needed to ensure that the evolution of the vehicles market towards more efficient, electric vehicles is reflected in the reference values used in standardised savings calculations.

[12] European Commission (2019). Commission Recommendation on transposing the energy savings obligations under the Energy Efficiency Directive. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019H1658

[13] Boeck, E. et al (2023). Standardized saving methodologies. Energy, CO_2 savings and costs. streamSAVE D2.2. https://streamsave.eu/wp-content/uploads/2022/09/D2-2_PracticalGuidance_final_June23.pdf

3 Monitoring and verification

Monitoring and verification (M&V) are essential elements of all energy efficiency policy measures. They enable the accurate quantification of energy savings, providing **confidence** for policy makers, regulators and investors, while underpinning the evaluation needed to **optimise policy measure performance**.

Annex V of the EED provides for different ways of calculating energy savings, including the **deemed savings** approach (see Section 2.2) and the **metered savings** approach (see Section 2.1).

3.1 Measurement

The use of meters or other types of measurement is one of the options proposed by the EED to calculate energy savings reported to Article 8. Measurement is necessary to apply the metered savings approach but can also be used as a basis for improving deemed and scaled savings calculations (e.g. by doing measurements on samples). Introducing more measured elements in energy savings calculations can **increase the accuracy** of energy savings calculations and improve the understanding of the effects of energy efficiency actions. However, it also usually comes **at a higher administrative cost** than the use of deemed energy savings.

Five examples were analysed in ENSMOV Plus:

- **France**'s and **Italy**'s white certificates schemes
- **Ireland**'s EEOS
- **Croatia**'s public lighting programme
- **Germany**'s energy savings meter programme

These examples show that, in some cases, the deemed savings approach is not appropriate (this is particularly the case with **bespoke actions in the industry sector**). Elsewhere, the improved accuracy provided by ex post measurement was shown to be preferred as a way of achieving various objectives and overcoming different challenges (see **benefits of metered savings** in Figure 4 below).

In the context of EEOSs, building market **credibility** and **reducing the risk of fraud** are particularly important. The alignment of private incentives with public policy objectives, through the *ex post* allocation of savings (and associated remuneration) is particularly important when there is scope for variation in the installation and operation of energy efficient technologies, helping to secure the more efficient use of public funds, while the consistent use of measurement protocols reduces the burden on public administrations of ex post control.

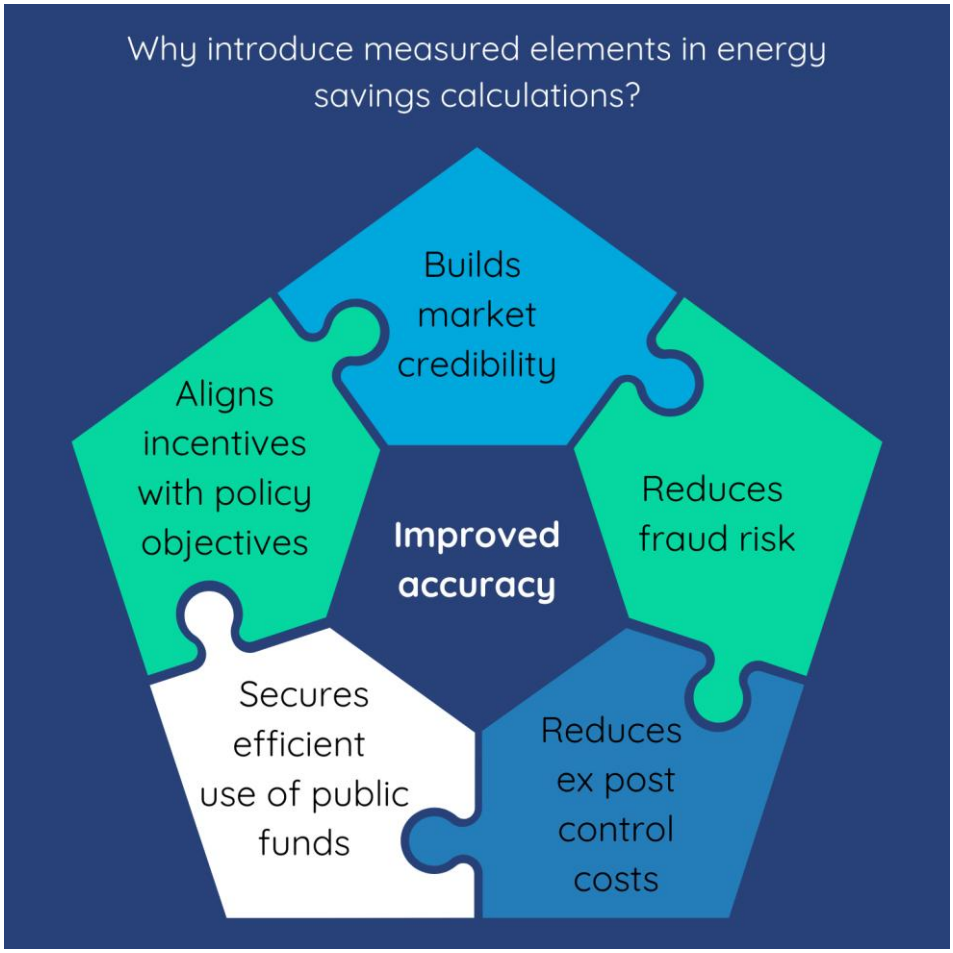


Figure 4. Benefits of metered savings.

To realise the advantages of measurement it is however important to take some aspects into consideration:

- For which actions in which sectors measurement is an option?
- Is full measurement needed? Or is sampling allowed?
- Clear rules for normalisation for the effects of external factors (e.g. weather conditions, production volumes) are needed.
- What are the requirements regarding meters applied?
- Are there existing standards or protocols to build on?
- Is an external verification of calculated savings necessary before submission?

Beyond general experiences, the main conclusions from the five examples analysed in ENSMOV Plus are:

- The metered or measured data can be used to verify or validate ex-ante calculations of energy savings. It also gives **confidence in reported savings**. This is especially relevant for a system that relies on the credibility of savings like an EEOS.
- Clear rules are necessary on the technical (e.g. meters) as well as the methodological requirements (e.g. normalisation) defined on a sound legal

basis. Still measurement is **flexible** and can relatively easily be adapted to changing circumstances and requirements.

- Measurement should be implemented and supervised by **well qualified personnel** in order to achieve the benefits associated with it.
- For some cases, using the metered approach is **easy to implement when data is already available** in the required format and correction/normalisation is not necessary (e.g. street-lighting). Also, the deployment of smart meters makes the measurement approach possible in more and more cases at lower costs.
- The main fields of application of measurement are **large industrial installations** and energy efficiency actions related to them.
- Measurement itself increases data availability and **can be used for other purposes** apart from the calculation of energy savings (e.g. quality management, process optimisation).

The five examples were further discussed in an online European workshop. And a complementary online European workshop provided in-depth experience sharing by companies using measurements for energy saving projects in industry in the context of France's and Italy's white certificates scheme.

3.2 Deemed savings

From the start of EED implementation in 2012, Member States were faced with the trade-off between accurate energy savings calculation and the associated costs of doing these calculations. For standardised energy efficiency measures (often in the building and household sectors), the application of deemed savings is a **cost-efficient method** to assess energy savings, because it assigns one savings value or ratio for each defined case[14]. The values used are usually based on existing studies and/or basic physical relationships (e.g. power and operating hours of an application).

It enables to monitor **large numbers of small to medium-size actions**. The average value or ratio defined per type of standardised action does not represent well the result for a given action. However, the underlying assumption done for deemed savings is that the number of actions monitored will be high enough so that the average value can be considered representative of this large group of actions (cf. statistical law of large numbers). For example, when a large number of roof

[14] Usually differentiating the value or ratio according to main parameters easy to monitor (e.g. type of building, building area, location / climate zone).

insulation is reported, it can be assumed that the average characteristics of the buildings where actions have been done will become closer and closer to the average characteristics of the whole building stock.

If the deemed savings approach is used to calculate energy savings, **ex post verification processes**, with requirements to correct for poor quality installation, are vital to ensure that installers do not take advantage of the *ex-ante* standardised approach. It is also important to keep track of the accuracy of defined savings values. Only up-to-date savings values secure the credibility of reported savings.

When applying the deemed savings approach the following issues should be addressed:

- Is there a **sufficient level of standardisation** in the implementation of the energy efficiency action? If not, another basic calculation method should be applied (e.g. scaled savings, such as using Energy Performance Certificates or energy audits).
- What information on each implemented action is needed to calculate energy savings? In most cases, **more than one piece of information is needed**, and the standardised values or ratios are differentiated according to main parameters. E.g. for heat pumps this could be the kind of heat pump (air, ground, water), the type of building (one-family, multi-family), the climate zone.
- Is the **data underlying** the definition of savings values reliable, e.g. based on scientifically sound analyses, on physically tested and proven values.
- Are the **MRV** and **quality assurance** regimes sufficient to dissuade installers from undertaking sub-standard actions?
- Is it possible to update the energy savings values over time? Is a process implemented for that?

On the last bullet – the **update of deemed savings values** – ENSMOV Plus analysed three examples related to EEOS or white certificates schemes (**France, Greece and the UK**). The insights from these examples are:

- The **necessity for updating** deemed savings can emerge from (1) outdated or incorrect background data, (2) frauds and the need to update documentation requirements, (3) change of the baseline, e.g. the market average, (4) changes in norms or other legal minimum requirements that also change the baseline.
- A **clear process and method** should be established for how to update deemed savings values, determining (1) when updates must be made, (2) who is going to do what and who participates in the process, (3) what method will be applied, and (4) who decides on the new savings values.
- The installation of **working groups** consisting of a broad spectrum of stakeholders dedicated to the update of deemed savings values helps to

maintain a regular process. These groups can also secure the **legitimacy** of the adopted savings values.

3.3 Monitoring, reporting and verification

Interviewees of the ENSMOV Plus project reflected on the approaches to ensuring the quality of actions through monitoring, reporting and verification (MRV) processes. The following common themes emerged.

3.3.1 Clear and transparent MRV procedures

For EEOSs with standardised actions, well-functioning schemes employ **staged processes**. For example, in Cyprus:

1) The first stage involves a desk review of obligated parties' implementation reports to check for obvious errors and potential issues.
2) A second stage involves the selection of a representative sample for extensive verification procedures, based on the results of the first stage, the risk profiles of the various actions and a random group of actions representative of all actions.
3) In the third stage, thorough inspections are performed, together with requests for additional evidence and clarifications.

Other EEOSs follow similar procedures. For specific actions, **clear and transparent procedures** are also in place in the well-functioning schemes. For example, in Ireland, all specific actions must be accompanied by an M&V report which is reviewed by external evaluators. And guidance is provided on types of meters as well as calculation methods, without being overly prescriptive.

3.3.2 Ongoing communication and information sharing

Maintaining **open communication channels** with obligated parties and **supporting** them through information sharing and experience exchange are other important factors in a successful EEOS.

In Italy, for example, continuous support is offered to obligated parties during the qualification of projects and reports and through a set of working groups. Italy has also supported obligated parties through the provision of a database of approved projects, including type of action, brief description, baseline consumption, savings calculation algorithm, energy savings and costs. They also publish an observational study setting out the most common issues encountered by obligated parties and clarifications on how to overcome them.

Voluntary Agreements also require good communication between MRV authorities and participating enterprises. The Lithuanian Energy Agency has organised several productive seminars at which knowledge was shared on guidelines, selection and planning of actions and practical examples.

The dissemination of accurate information is essential, particularly when framework conditions (e.g. legal basis, rules, procedures) change to ensure that all concerned parties are aware.

3.3.3 Resources

The themes identified both imply the **effective use of administrative resources**. While no cost benefit analysis is available on options for administration, the experiences shared in ENSMOV Plus indicate that some additional effort can bring **significant gains in the functioning of schemes** and by extension the energy savings delivered.

In Luxembourg, the Klimabonus subsidy involves an advisor who comes onsite at households to provide direct advice before actions are undertaken. The State put in place training schemes for professionals to guarantee a good level of competence.

In the Netherlands, the energy saving obligation on enterprises has required a step up in supervision and enforcement. The government has provided additional resources to regional environmental agencies for this purpose.

At the same time, Member States have also looked to ensure that administrative burdens are minimised where possible and remain **proportionate**.

In Ireland, obligated parties in the EEOS are required to be ISO 9001 compliant or equivalent, ensuring that quality management is embedded in scheme participants and lowering the likelihood of errors being made in reporting.

4 Evaluation

4.1 Organisation of energy policy evaluations

Policy evaluation is a core stage of the policy cycle. It provides an **evidence-based** judgement of what a policy achieved, for whom, at what cost, and why. However, little is known about how energy policy evaluations are organised in practice in different European countries.

A review of practice in the United Kingdom, Ireland, Germany and France shows that governments frequently contract external experts to inform policy revisions. The **commissioning landscape** is decentralised: multiple ministries, regulators and implementing agencies run or commission evaluations within their respective mandates rather than through a single central evaluator.

Evaluation findings are shaped by **methodological choices** – which differ between and even within country evaluations. Decisions on baselines, counterfactuals, attribution and measurement approaches materially influence estimated results and cost-effectiveness. Greater **transparency and harmonisation** of these methods would improve comparability, credibility and the usefulness of evaluations for policy learning and revision.

Data being at the core of impact evaluations, **structuring data collection** and management over time can be an effective way to provide a robust and updated evidence base, as shown in the UK example with NEED (National Energy Efficiency Data-framework), Ireland's example with SEAI's approach to build comprehensive data and methodological resources, and France's example of the recently started PRODICEE programme (observatory of the white certificates schemes).

Across all four countries, impact evaluations focus primarily on energy savings and greenhouse-gas reductions, consistent with climate and efficiency objectives. However, **wider social, distributional and regional impacts**—such as health co-benefits, equity, or place-based effects—are rarely assessed systematically, leaving important value dimensions **under-reported**.

Evaluation practices were further discussed during an online European workshop.

4.2 Multiple Impacts

The consistent assessment of Multiple Impacts of energy efficiency measures across all EU Member States has been taken forward within an ad-hoc task of ENSMOV Plus. This was mainly done by linking assessed policy measures from the MURE

database (of which most are also reported to Article 8 EED) to the MICATool, allowing the assessment of their Multiple Impacts.

Multiple Impacts of energy efficiency (also known as multiple benefits, co-benefits, non-energy benefits or auxiliary benefits) describe the variety of accompanying effects of energy efficiency measures:

- **Positive impacts** include environmental aspects, such as reductions in greenhouse gas emissions or local pollutants, social aspects like energy poverty alleviation and health improvement, economic effects, inter alia enhanced energy security, macro-economic gains, and energy system effects, such as lowering the marginal cost of energy supply, relieving grid constraints and improving energy security.
- Yet, energy efficiency can, at times, also entail **negative effects**, such as increased dependence on critical materials (for instance when replacing ICE vehicles with electric vehicles), electricity savings in situations where renewable supply may be curtailed and flexibility solutions are not in place, and high transaction costs[15].

Thus, Multiple Impacts aim to cover all positive and negative externalities of energy efficiency. As a result, their **inclusion in cost-benefit assessments** often considerably boosts measures' **economic viability**[16,17]. Moreover, they often sweeten the pot of energy efficiency by providing **more tangible narratives** than the mere prospect of energy savings[18]. For instance, in the last few years, several energy efficiency measures across the EU have been promoted using co-benefits as main narrative (see Table 5 below).

However, given the EU's hike in ambition towards decarbonisation, the role of Multiple Impacts in energy policy has changed as well. At the concept's inception, energy efficiency's main (and preferred) alternative was upholding the fossil fuel-based status quo, a comparison where most externalities were in favour of the former. Nowadays, energy efficiency is often **compared with other decarbonisation options**, which often come with their own positive and negative impacts, not least because of the recast EED's **Energy Efficiency First Principle**.

[15] Mundaca, Luis (2007): Transaction costs of energy efficiency policy instruments. In: eceee Summer School 2007. Proceedings. European Council for an Energy Efficient Economy 2007. Available online.
[16] Thema, Johannes; Suerkemper, Felix; Couder, Johan; Mzavanadze, Nora; Chatterjee, Souran; Teubler, Jens et al. (2019): The Multiple Benefits of the 2030 EU Energy Efficiency Potential. In: Energies 12 (14), S. 2798. DOI: 10.3390/en12142798.
[17] Arnold-Keifer, Sonja; Hirzel, Simon; Rohde, Clemens (2025): Integrating the Assessment of Environmental Costs and the Non-Energy Benefits of Energy Efficiency into an Energy Demand Analysis of the Tertiary Sector. In: Energies 18 (9), S. 2354. DOI: 10.3390/en18092354.
[18] Fawcett, Tina; Killip, Gavin (2019): Re-thinking energy efficiency in European policy: Practitioners' use of 'multiple benefits' arguments. In Journal of Cleaner Production 210, pp. 1171–1179. DOI: 10.1016/j.jclepro.2018.11.026.

Therefore, the recognition and application of Multiple Impacts, not only of energy efficiency but also of the solution it is compared with, plays an increasingly important role to **ensure a level playing field** in energy planning decisions.

Moreover, it is crucial to take cost perspectives into account when alluding to Multiple Impacts: while several considered impacts are crucially important from a societal perspective, they are not of concern for the very private actors taking the relevant decisions. This split-incentive can be resolved through regulation, taxes, or subsidies **covering the gap between private and societal cost perspective**.

Table 5. Examples of energy efficiency policy measures that specifically address co-benefits of energy efficiency.

Country	Measure	Co-benefits	Description
France	*My electric lease scheme*	Mobility poverty alleviation	The scheme supports car-dependent low-income households in leasing electric vehicles (EVs). Thereby, it increases the share of efficient EVs among low-income households, while addressing the issue of mobility poverty.
Germany	*Federal funding for energy and resource efficiency in the economy*	Resource efficiency	While originally a pure energy efficiency funding scheme, it was later extended to prioritise measures also saving mineral resources.
Ireland	*Warmer Homes Scheme*	Energy poverty alleviation, health	The scheme grants fully funded energy upgrades for welfare recipients, improving the energy performance of the building by at least 100 kWh/m^2/year and from D2 or worse to B2 or better in terms of the MS's building energy rating system.
Italy	*Superbonus 110%*	Gross added value, employment	The Superbonus refunded up to 110% of the costs. Designed to support Italy's recovery after the COVID economic slump, which was swifter than in most other EU Member States, it also had budgetary implications owing to its popularity.[19]
EU	*REpowerEU plan*	Energy security	While not a policy scheme as such, the plan proposed increasing energy savings to boost the bloc's energy security.

[19] Balmer, Crispian; Fonte, Giuseppe (2024): Explainer: Why Italy's Superbonus blew a hole in state accounts. In Reuters. Available online.

4.3 Evaluation practices for behavioural programmes

Behavioural measures are an important part of energy efficiency strategies to optimize or reduce energy consumption or peak load. Evaluating the resulting energy savings raises **specific issues** compared to the evaluation of technical measures, notably because:

- The link between behavioural measures and changes in energy consumption is less obvious than in the case of technical measures. In the terminology of Annex V of the Energy Efficiency Directive, this means that the **materiality** of the energy savings should be demonstrated with clear evidence.
- The **lifetime** of energy savings from behavioural measures also requires a specific assessment, as behavioural changes are highly reversible.

Appendix VI of the Commission's recommendation (EU) 2019/1658 provides guidance about the calculation of energy savings from behavioural measures. It reminds these specificities, and based on the literature, it recommends the use of approaches based on **Randomized Control Trials (RCT)**, or when not possible, of **quasi-experimental methods**.

Annex V of the Energy Efficiency Directive nevertheless allows the use of '**surveyed savings**', "*where consumers' response to advice, information campaigns, labelling or certification schemes or smart metering is determined*". This simplified approach makes it possible to minimize monitoring and verification costs. However, the results have a large uncertainty, due to the various explicit or implicit assumptions made. The use of surveyed savings is therefore a default option that should be used with a lot of caution.

ENSMOV Plus analysed two examples to illustrate both practices.

The **US protocol** to evaluate behavioural measures in the residential sector provides guidance for the use of **RCT or similar approaches**.

This protocol is part of the The U.S. Department of Energy's Uniform Methods Project (UMP) that has established a set of model protocols for determining energy and demand savings that result from energy efficiency measures and programmes implemented through state and utility energy efficiency programmes in the US.

This protocol deals with the case of **residential behaviour-based programmes**, that include the various types of behavioural interventions (e.g. providing end-users with feedback on their energy consumption, energy efficiency education and tips,

rewarding end-users for reducing their energy use, comparing end-users to their peers, using games, etc.).

Evaluation of public awareness campaigns in **Greece** (as part of Greece's Energy Efficiency Obligation Scheme) provides an example of using **surveyed savings**.

The evaluation of public awareness campaigns in Greece was initiated firstly within the framework of the Energy Efficiency Obligation Scheme (EEOS) in the period 2017-2020. The public authorities developed a bottom-up methodology facilitating the calculation of energy savings resulting from behavioural measures.

This methodology makes use of a standardised approach, in compliance with the provisions of Annex V of the Energy Efficiency Directive (EED), with the purpose to minimize the administrative burden for all the involved parties (obligated parties and public authorities).

This example highlights that **implementing ex-post evaluation approaches is needed** in any case to assess the outreach and impacts of behavioural measures.

5 Factors influencing possible re-design of energy efficiency policy measures

5.1 Electrification

Electrification is at the core of the EU's decarbonisation strategy, with the **share of electricity** in final energy consumption **expected to double by 2040**.[20] Energy efficiency policy measures can play a key role in driving electrification, given the **big efficiency gains** associated with many electrification technologies. For example, replacing a gas boiler with a heat pump instead of a new gas boiler reduces a household's final energy consumption for space heating by around two-thirds, while a new EV will consume around one-third of the final energy of an equivalent ICE vehicle per km travelled. Policy measures that persuade energy users to switch from combustion technologies to efficient electrically powered alternatives should thus generate **significant final energy savings** to count towards Article 8 targets.

The **fossil fuel exclusion** specified in Annex V EED is aligned with this direction of travel and progressively removes the ability for Member States to report energy savings from fossil fuel combustion technologies. Most Member States interviewed for the ENSMOV Plus' country factsheets reported that they had already moved away from supporting fossil fuels or were planning to in line with the revised EED (2023).

Indeed, Germany reported that the energy crisis had acted as a driver to align energy efficiency policies with electrification. At the opposite, Hungary reported that gas heating was still the cheapest heating method and that removing subsidies for boiler replacements will adversely affect many households. The **affordability** of heat pumps, both in terms of up-front and life-time ownership costs, is a key issue discussed in the next section.

Another emerging role for energy efficiency policy measures is to **reduce peak electricity demand**. As end-use electrification and distributed energy resources (DERs) proliferate, grids need to be upgraded, at an estimated cost of €584 billion in this decade alone.[21] To relieve grid constraints holding back the connection of new DERs, or to delay or avoid the costliest grid upgrades, energy efficiency actions, saving electricity at peak in target areas could provide additional societal value.

[20] European Commission (2024). Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52024DC0063

[21] European Commission. (2023). EU action plan for grids. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023DC0757

On the other hand, actions that save electricity at times when electricity is abundant and demand is low might have very little value in reducing energy system costs and could very well do the opposite. In Germany, unconditional feed-in-tariffs have resulted in substantial price-insensitive photovoltaic (PV) capacity and an abundance of electricity and negative prices in sunny afternoon hours. Between January and August 2025, there were 457 hours with negative day-ahead electricity prices, already equalling the highest number recorded in any previous full year.[22] In this scenario, reducing daytime electricity consumption may create additional energy management costs. Policy design may well adapt, for example through the **weighting of electricity savings according to their value to the energy system** or specific policy measures focused on avoiding grid costs.

5.2 Affordability – implications for energy efficiency policy

Affordability is a key underpinning theme affecting future energy efficiency policy design in at least three ways:

- The COVID crisis led to **increasing public debt** as governments supported economies during lockdowns, reducing their ability to provide subsidies, including for clean energy projects, and highlighting the need to focus on the most cost-effective policy measures.
- The 2022 **energy prices crisis** stretched business and household budgets as gas prices soared and fell back to levels still significantly higher than those seen prior to Russia's invasion of Ukraine, emphasising the importance of policy measures that can reduce both energy bills and prices.
- Meanwhile, the EU's response to the climate crisis has entered a crucial phase with **investment** in clean, efficient technologies **needed by millions of households and businesses**, accentuating the role of policy in improving the affordability of electrically powered vehicles, heat pumps and building renovation projects more generally.

In this context, meeting increasingly ambitious energy efficiency targets implies a **renewed focus on cost-effectiveness**:

- identifying the most cost-effective energy savings potential,
- the most cost-effective ways of accessing it through policy measures, and
- the best way of achieving value for money for public subsidy programmes.

[22] Enkhardt, Sandra (2025). Rekord von 457 negativen Börsenstrompreisstunden aus Vorjahr eingestellt, PV magazine. https://www.pv-magazine.de/2025/08/25/rekord-von-457-negativen-boersenstrompreisstunden-aus-vorjahr-eingestellt/

Among the subsidies available to households, **targeting and differentiating** support according to target groups are key criteria for policy design: this may mean an increasing focus on target groups that are least able to afford energy efficient technologies and investigating options for spreading scarce funds more thinly among other groups, for example through low interest loans and equipment leasing.

The renewed **focus on affordable energy** may shift the emphasis of energy efficiency policy towards interventions that improve business productivity and reduce household bills, as well as policy measures that reduce the price of electricity, for example by reducing the need for high-cost generation at peak and delaying the need for grid upgrades.

The need to increase energy savings to meet more ambitious energy efficiency and climate goals will likely accelerate the shift towards support for the **electrification** of end-uses, including EVs, heat pumps and induction hob cooking. Energy and carbon taxes will likely become increasingly aligned with the objectives of subsidy regimes, with electricity taxes reduced to lower the payback periods of clean technology investments and allow Member States' subsidy budgets to achieve more. In the context of Article 8 EED, this would lead to reduced energy savings from electricity taxation measures in order to obtain more savings from non-taxation measures.

ENSMOV Plus Partners

OUR PLATFORM: https://energysavingpolicies.eu/

PROJECT WEBSITE: https://ieecp.org/projects/ensmov-plus/

LINKEDIN: https://www.linkedin.com/company/ensmov-plus/

Co-funded by the European Union under project n°101076098. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.