WE DATA EUROPE'S EED IMPLEMENTATION ANALYSIS ON SUBMETERING PROVISIONS ARTICLE 15, 16, 18, 32 AND ANNEX IX

The national legislation, transposing the legal requirements of Article 15, 16, 18, 32 and Annex IX of the Energy Efficiency Directive has been analysed in 15 countries (AT - BG - CZ - DE - DK - ES - FR - HU - HR - LU - PL - RO - SE - SI - SK). This document provides an overview of the implementation gaps and best practices in the aforementioned Member States.

OVERALL RESULTS

The implementation analysis showed that the transposition of Articles 15, 16, 19, 32 and Annex IX of the Energy Efficiency Directive in the countries studied is overall satisfactory. All studied countries have enshrined in their national legislation a mandate for the individual metering of heating and domestic hot water in multi-unit buildings, and the majority has implemented the obligation to provide final users with frequent information on their energy consumption in a satisfactory manner. Most Member States have, or are in the process of transposing and implementing in their legislation, the requirement to replace or render all individual heating, cooling and domestic hot water meters by 1 January 2027 to make them fully remotely readable.

The application of the submetering mandate is, however, sometimes limited by unclear or incomplete legislation on cost-effectiveness and technical feasibility, which provides opportunities to unlock the full benefits of the technology for building occupants and the environment. Furthermore, the existence of satisfactory national legislation does not necessarily translate into effective deployment. For example, in some countries, such as Poland, only around 50% of buildings are equipped with heat meters.

While once focussed on Southern Europe, cooling demand is now rising across Member States. Only few countries in scope of this implementation review have been found to have transposed satisfactorily the individual cooling metering provision in the EED. Member States would benefit in future-proofing their legislation to guarantee that collective cooling systems are as efficient as possible.

1 MANDATE FOR INDIVIDUAL HEATING, COOLING, AND DOMESTIC HOT WATER METERING (EED, ARTICLE 15)

EED, Article 15, 1), 2)

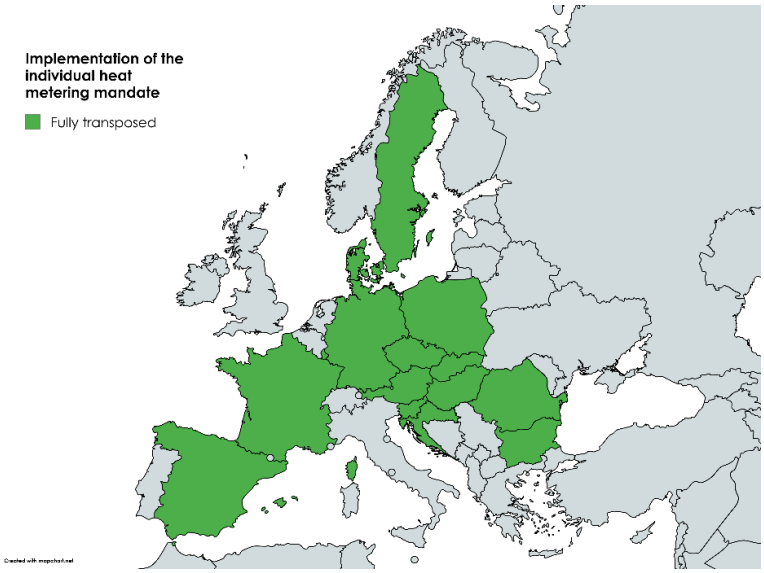
1. *In multi-apartment and multi-purpose buildings with a central heating or central cooling source or supplied from a district heating or district cooling system, individual meters shall be installed to measure the consumption of heating, cooling or domestic hot water for each building unit, where technically feasible and cost effective in terms of being proportionate in relation to the potential energy savings. (...)*

Transposition of the Provision in Member States

Definition of multi-unit buildings

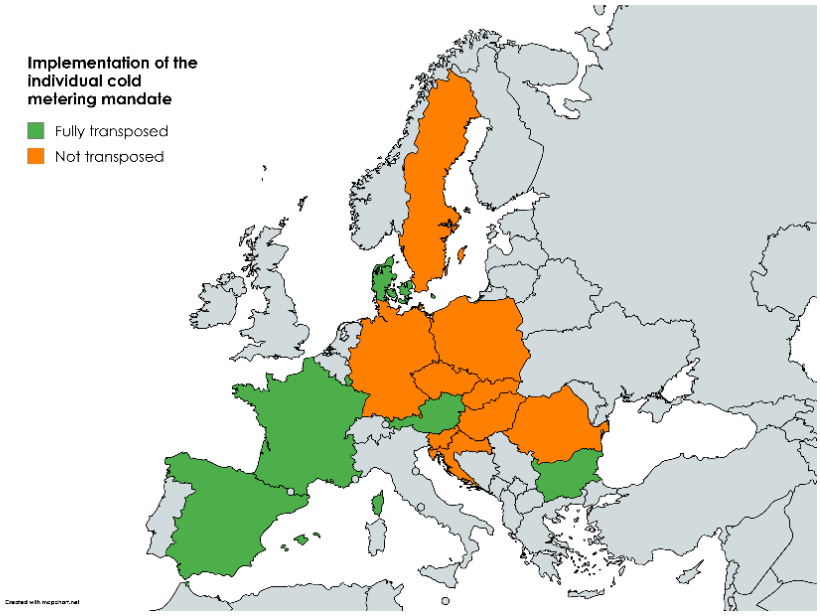
The threshold of what qualifies as a multi-unit building differs between Member States. In Spain, thermal installations serving more than one user within a building must be equipped with individual thermal metering system, if technically feasible and cost efficient. The number goes up to four in Austria. In Sweden, the mandate starts applying in buildings with at least three units where at least 50% of the area is residential.

Mandate for individual heat metering



All countries analysed have enshrined in their national legislation a mandate for individual heat metering in multi-unit buildings supplied by a collective source of heat. However, this mandate is sometimes limited in its application by poorly defined technical feasibility criteria and cost-effectiveness assessment criteria, which are detailed in a further section. It should be noted that Poland does not set a clear deadline for compliance with the individual heat metering mandate.

Mandate for individual cold metering

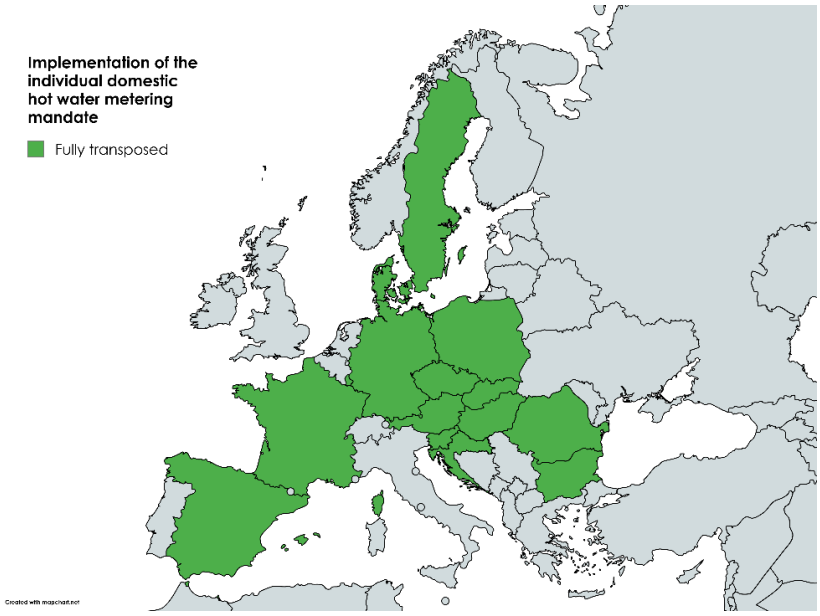


- Most Countries (CZ, DE, HR, HU, PL, SE, RO, SI, SK), do not have a legal mandate for individual cold metering.
- Only six countries (AT, BG, DK, ES, FR, LU) have enshrined in their national legislation a mandate for individual cold metering in multi-unit buildings.

Overall, individual cold metering is poorly implemented in the Member States studied. While this is an EED requirement, this can be explained by the fact that the demand for collective cooling solutions is growing but has been low in or inexistant in some geographical areas. While there are not yet use cases in all countries, this might be the case in the years to come and the legislation needs to reflect this change.

It should be noted that Croatia is currently preparing legislative amendments that should introduce an individual cold metering mandate.

Mandate for individual domestic hot water metering



All countries analysed have enshrined in their national legislation a mandate for individual domestic hot water metering in multi-unit buildings supplied by a collective source of heat. It is in most countries an old and established requirement, preceding the implementation of the EED.

However, the extent of this mandate is sometimes limited in its application by poorly defined technical feasibility criteria and cost-effectiveness assessment criteria, which are detailed in a further section. It should be noted that Poland does not set a clear deadline for compliance with the individual domestic hot water metering mandate.

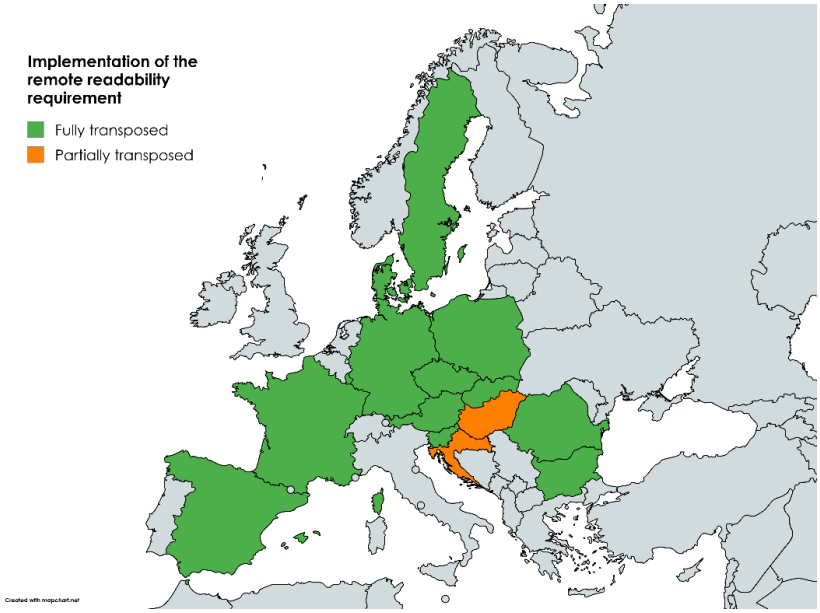
2 REMOTE-READABILITY REQUIREMENT (EED, ARTICLE 16)

EED, Article 16

1. For the purposes of Articles 14 and 15, newly installed meters and heat cost allocators shall be remotely readable devices. The conditions of technical feasibility and cost effectiveness set out in Article 15(1) shall apply.

2. Meters and heat cost allocators which are not remotely readable but which have already been installed shall be rendered remotely readable or replaced with remotely readable devices by 1 January 2027, save where the Member State in question shows that this is not cost-efficient.

Transposition of the Provision in Member States



Deadline to install or replace existing meters with remotely readable devices

Most Member States clearly the installation or replacement of existing meters with remotely readable devices by 1 January 2027.

Only Croatia and Hungary have failed to establish a clear deadline for the replacing or retrofitting meters to render them remotely readable. Croatia is currently amending its legislation and should reflect this requirement in the coming months.

It should be noted that the definitions of “remotely readable meters” enshrined in Member States’ legislation do not clearly specify if drive-by or walk-by technologies qualify as remotely readable meters. Only Denmark and Sweden clearly provide that drive-by and walk-by technologies qualify as remotely readable.

Definition of heat cost allocators and use of non-remotely readable meters until 2027

Most Member States have implemented satisfactory definitions for devices qualifying as heat cost allocators. However, Hungary still allows evaporation meters to be in place, as well as using non-remotely readable meters after 2027 under certain conditions. Denmark has enshrined in its national legislation that all heat cost allocators and meters must be remotely readable by 1 January 2027, but evaporation meters can still be used until then.

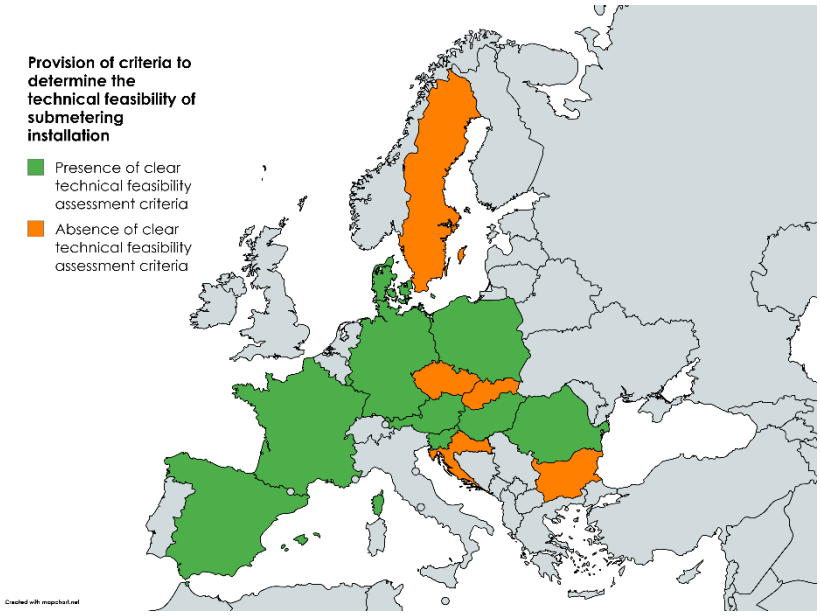
3 TECHNICAL FEASIBILITY AND COST-EFFECTIVENESS ASSESSMENT (EED, ARTICLE 15)

EED, Article 15, 1) Paragraph 2

1. *(...) The general criteria, methodologies and procedures to determine technical non-feasibility and non-cost effectiveness shall be clearly set out and published by each Member State.*

Transposition of the Provision in Member States

Technical feasibility criteria assessment



Most countries (AT, DE, DK, ES, FR, HU, LU, PL, RO, SI) have provided clear guidance in their legislation to determine the technical feasibility to install individual meters.

However, several countries (BG, CZ, HR, SE, SK) do not clearly define technical feasibility criteria to install individual meters, or do not have any rules in place to assess the feasibility of the installation. This lack of precision opens the door to interpretations that artificially exclude the implementation of the individual metering mandate in buildings that should have been covered.

In most countries, the installation of individual meters is conditioned to the possibility of regulating the unit's temperature, notably through the installation of thermostatic valves on each heat emitter. If it is not possible to regulate the unit's temperature, then the cost of the installation of thermostatic valves or any solution that allows regulation needs to factored in the calculation for cost-effectiveness of the measure.

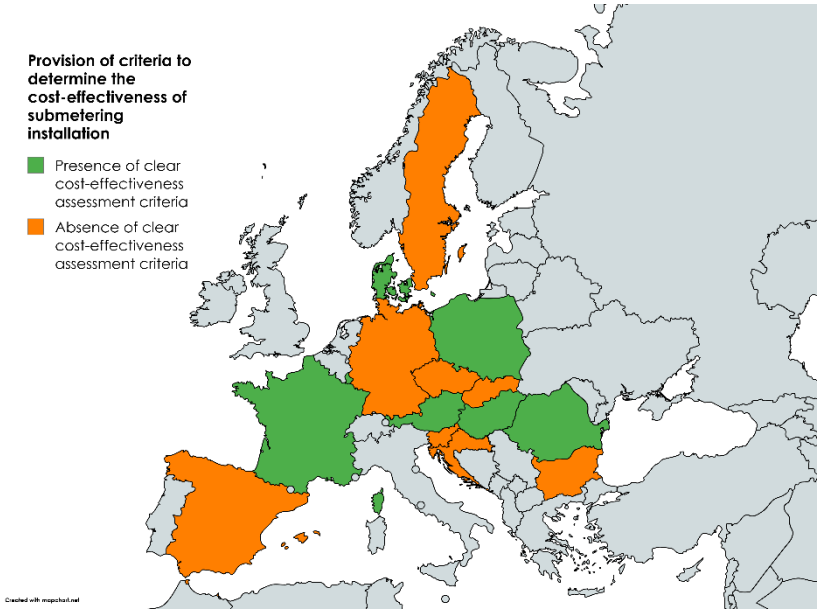
In general, the following situations are considered not technically feasible:

- When heating, cooling or hot water systems are decentralised
- When extensive reconstruction of the heating and pipping system is required
- When structural changes to the building are required
- When heat or cold is supplied through multiple vertical risers
- When heat emitters are connected in series

Best practices – Provision of detailed technical feasibility criteria

While it can be difficult to adopt an exhaustive list of situations where individual metering is technically challenging, some countries have equipped their legislation with detailed examples that leaves little room for interpretation. It is for instance the case of Austria, Denmark, Romania or Spain, who all provide an extensive list of examples to guide the performance of the technical feasibility assessment.

Cost-effectiveness assessment criteria



Most of the studied countries (BG, CZ, ES, HR, PL, SE, SI, SK) do not clearly define the cost-effectiveness of installing individual meters. Only 6 countries have been found to have implemented clear cost-effectiveness assessment criteria (AT, DE, DK, FR, HU, LU, RO). When cost-effectiveness assessment criteria are in place, the formula mandated by law must clearly estimate the range of energy savings that can be expected following the installation of individual meters, or following the retrofit to / installation of remotely readable devices.

However, where savings are clearly stated in the formula to evaluate the cost-effectiveness of submetering, it should be ensured that the energy and financial savings expected are not underestimated. In some countries, the savings in the formula are calculated from strongly subsidised energy prices, which often leads to negative assessments.

If the legislation does not specify any expected savings, it has been observed that property managers, or any person in charge of evaluating the cost-effectiveness of individual metering can artificially create a negative assessment by assuming a low energy savings potential of individual metering. This results in a poor penetration rate in the countries concerned by this issue.

Best practice – Clear indication of savings expected following the installation of individual meters

It is preferable for countries to clearly state an estimate of the energy savings to be expected following the installation of individual heat, cold, domestic hot water meters, and following the replacement or the installation of remotely readable devices. Clear energy savings estimates facilitate the determination of the cost-effectiveness criteria. It is the case for instance in Austria and Denmark.

4 ALLOCATION RULES AND CORRECTION FACTOR (EED, ARTICLE 15)

EED, Article 15, 3)

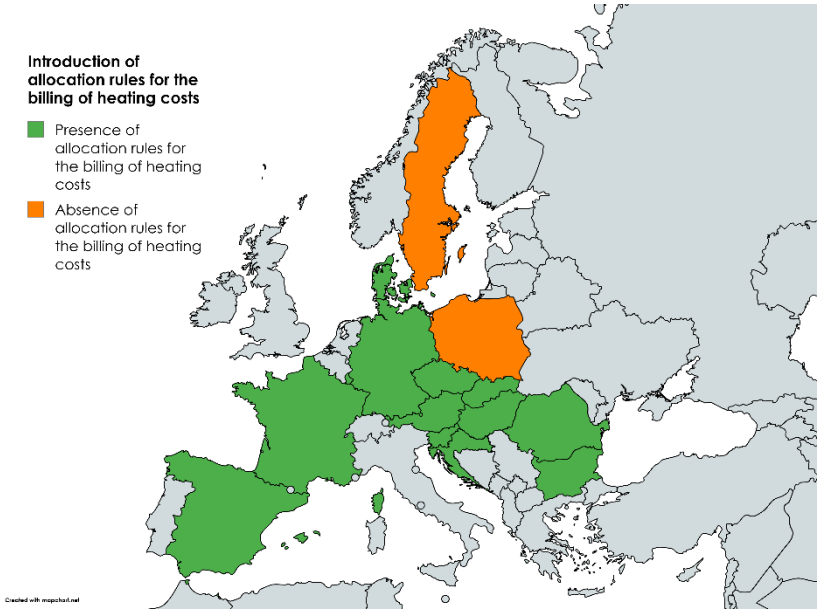
3. *Where multi-apartment or multi-purpose buildings are supplied from district heating or district cooling, or where own common heating or cooling systems for such buildings are prevalent, Member States shall ensure that they have in place transparent, publicly available national rules on the allocation of the cost of heating, cooling and domestic hot water consumption in such buildings to ensure transparency and accuracy of accounting for individual consumption. Where appropriate, such rules shall include guidelines on the manner in which to allocate cost for energy that is used for:*

   a) *Domestic hot water*
   b) *heat radiated from the building installation and for the purpose of heating the common areas, where staircases and corridors are equipped with radiators;*
   c) *heating or cooling apartments.*

Transposition of the Provision in Member States

Allocation rules of variable and fixed costs of thermal energy

Allocation Rules for Heating



- Most countries (AT, BG, CZ, DE, DK, ES, FR, HR, HU, LU, RO, SI, SK) have introduced allocation rules for the billing of heating costs.
- Only two countries (SE, PL) have not introduced allocation rules for the billing of heating costs.

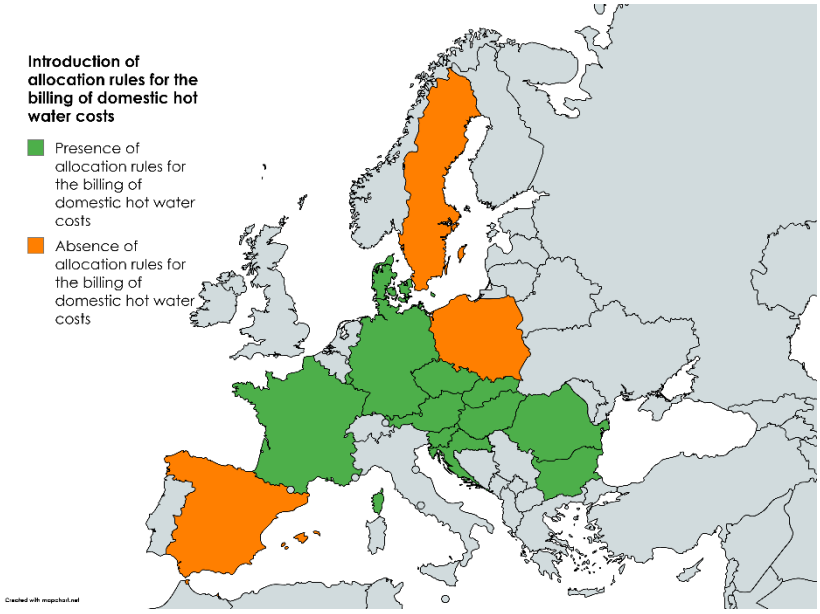
The majority of Member States have introduced mandatory cost allocation schemes for heating with a significant share (usually between 50 to 70%) based in variable costs, that is to say determined according to metered consumption.

In certain countries, for instance in Slovakia and Romania, the fixed costs are higher (set by default to 60% in Slovakia) than the variable costs.

Some countries, for instance, Sweden and Poland, do not have allocation rules in place and let the amount up to the co-owners. In Slovenia, while the allocation scheme for heating is mandatory, the repartition of costs can be modified upon agreement of all co-owners.

It should be noted that the allocation scheme in Bulgaria has been suspended is being amended at the moment, to include a default fixed costs of 30%.

Allocation Rules for Domestic Hot Water

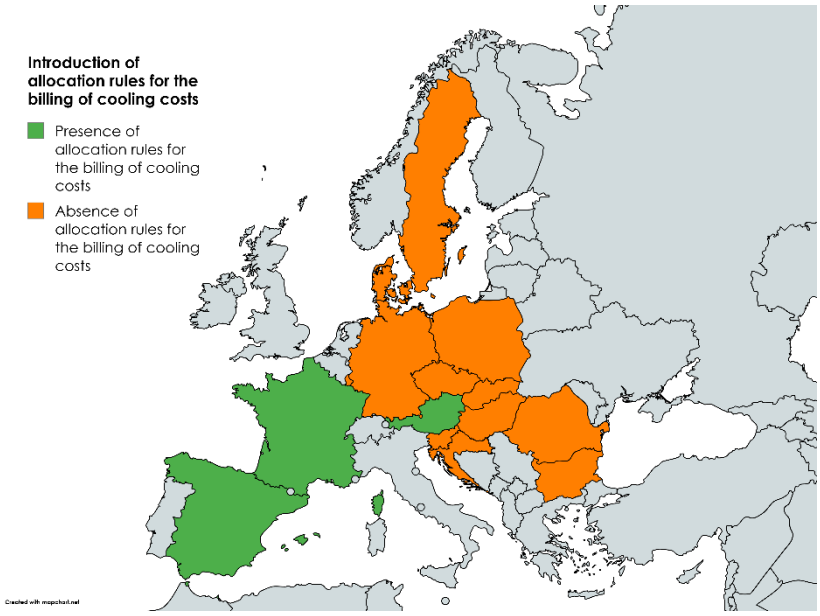


- Most countries (AT, BG, CZ, DE, DK, FR, HR, HU, LU, RO, SI, SK) have introduced allocation rules for the billing of domestic hot water costs.
- Only three countries (ES, PL, SE) have not introduced allocation rules for the billing of domestic hot water costs.

Where allocation rules are mandated, their amount is most commonly aligned with the allocation rules for heating. Some countries, for instance, France and Hungary, have opted for an allocation fully based on metered readings for domestic hot water.

In Croatia, different allocation rules have been introduced depending on the situation, some of them failing to reflect efficiency improvements of heating systems or not adequately allocating costs based on individual consumption.

Allocation Rules for Cooling



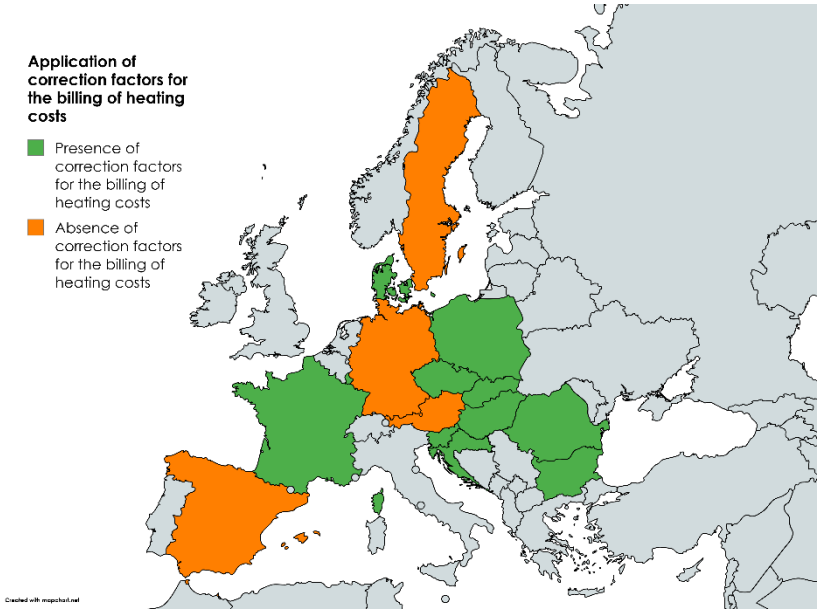
- Only three countries (AT, ES, FR) have been found to have introduced allocation rules for the billing of cooling costs.
- Most countries (BG, CZ, DE, DK, HR, HU, LU, PL, RO, SE, SI, SK) have not introduced allocation rules for the billing of cooling costs.

As it is still not common for Member States to have a mandate for individual cold metering, it is not surprising that only a few have introduced allocation rules for cooling.

They are aligned with the heating allocation rules in France and Spain. In Austria, the bill is mostly based on metered cold consumption (90%).

Application of correction factors to allocation rules

Correction Factors for Heating



- Most countries (BG, CZ, DK, FR, LU, HU, HR, PL, RO, SI, SK) have introduced correction factors for the billing of heating costs.
- Some countries (AT, DE, ES, SE) have not introduced correction factors for the billing of heating costs.

The application of correction factors is uneven between Member States, some choosing to make them mandatory at flat or even room level (Hungary, Romania), some choosing to not resort to them. They complement allocation rules and while not mandatory, offer best practices examples to promote fairness and incentivise the uptake of individual metering

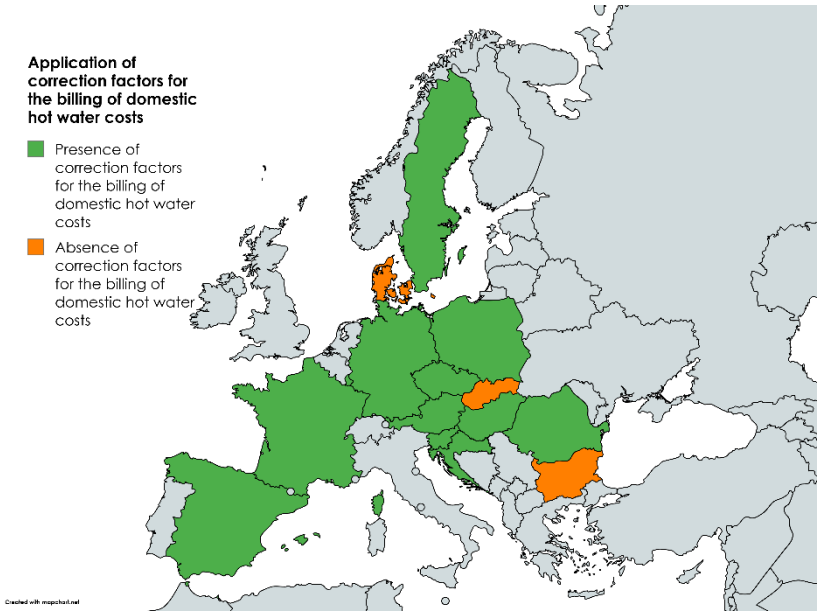
Best practices: Correction factors penalising absence of individual meters, tampering or refusal to access meters

Some countries have introduced correction factors that should be applied to the final allocation cost formula to penalise the units that are not equipped with individual meters, refuse meters reading or following tampering of meters values. It is the case for instance in Croatia, where correction factors do not compensate for unfavourable location of units, but applies a factor of 2 on the share of units without metering devices. The application of this principle is observed in several Member States, and the amount of the correction applied varies. For instance in Slovenia, following tampering, units are charged 300% the average heat consumption.

Best practices: Correction factors charging for waste heat received by individual units equipped with individual heating systems

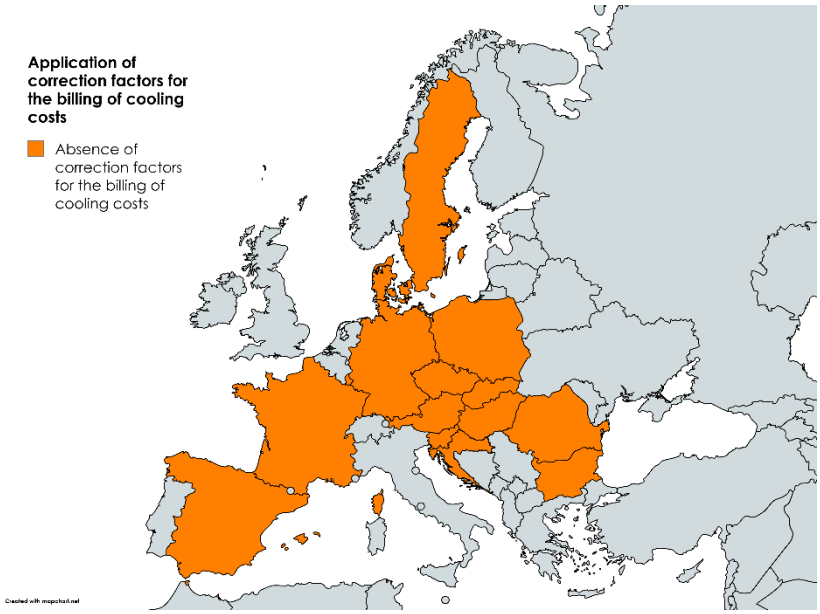
In Slovakia, the legislation accounts the case when individual units are disconnected from the collective heating system, but still receive waste heat from neighbouring units. As such, while they pay for their individual consumption of their individual heating system, they must also pay for the share of waste heat their unit receives, ultimately promoting fairness between residents.

Correction Factors for Domestic Hot Water



- Most countries (AT, CZ, DE, ES, FR, HR, HU, LU, PL, RO, SE, SI) have not introduced correction factors for the billing of domestic hot water costs.
- Only three countries (BG, DK, SK) have introduced correction factors for the billing of domestic hot water costs.

Correction Factors for Cooling



At the moment, no country has introduced correction factors for the billing of cooling costs, which is in line with the poor implementation of the individual cold metering mandate.

5 BILLING AND CONSUMPTION INFORMATION FOR HEATING, COOLING AND DOMESTIC HOT WATER (ARTICLE 18, ANNEX IX)

EED, Article 18, 1)

1. Where meters or heat cost allocators are installed, Member States shall ensure that billing and consumption information is reliable, accurate and based on actual consumption or heat cost allocator readings, in accordance with Annex IX, points 1 and 2 for all final users.

That obligation may, where a Member State so provides, save in the case of sub-metered consumption based on heat cost allocators under Article 15, be fulfilled by a system of regular self-reading by the final customer or final user whereby they communicate readings from their meter. Only where the final customer or final user has not provided a meter reading for a given billing interval shall billing be based on estimated consumption or a flat rate.

EED, Annex IV, 1), 2)

1. Billing based on actual consumption or heat cost allocator readings

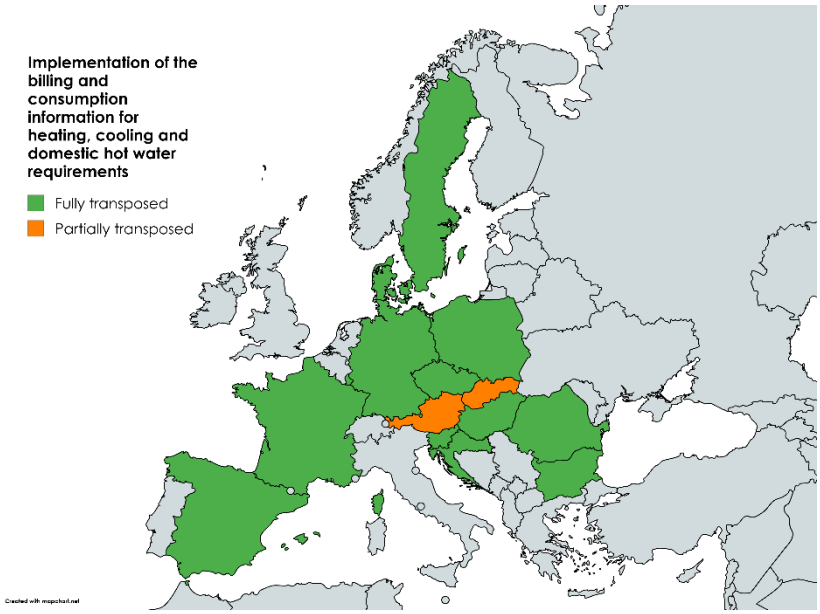
In order to enable final users to regulate their own energy consumption, billing shall take place on the basis of actual consumption or heat cost allocator readings at least once per year.

2. Minimum frequency of billing or consumption information

Until 31 December 2021, where remotely readable meters or heat cost allocators have been installed, billing or consumption information based on actual consumption or heat cost allocator readings shall be provided to final users at least on a quarterly basis upon request or where final customers have opted to receive electronic billing, or else twice a year.

From 1 January 2022, where remotely readable meters or heat cost allocators have been installed, billing or consumption information based on actual consumption or heat cost allocator readings shall be provided to final users at least on a monthly basis. It may also be made available via the internet and be updated as frequently as allowed by the measurement devices and systems used. Heating and cooling may be exempted from that requirement outside the heating or cooling seasons.

Transposition of the Provision in Member States



Member States have generally implemented this provision in a satisfactory manner and provide consumers with frequent information about their energy consumption.

A notable exception is Slovakia, where the legislation does not mandate the provision to multi-unit buildings occupants with monthly information about their heating, cooling or domestic hot water consumption.

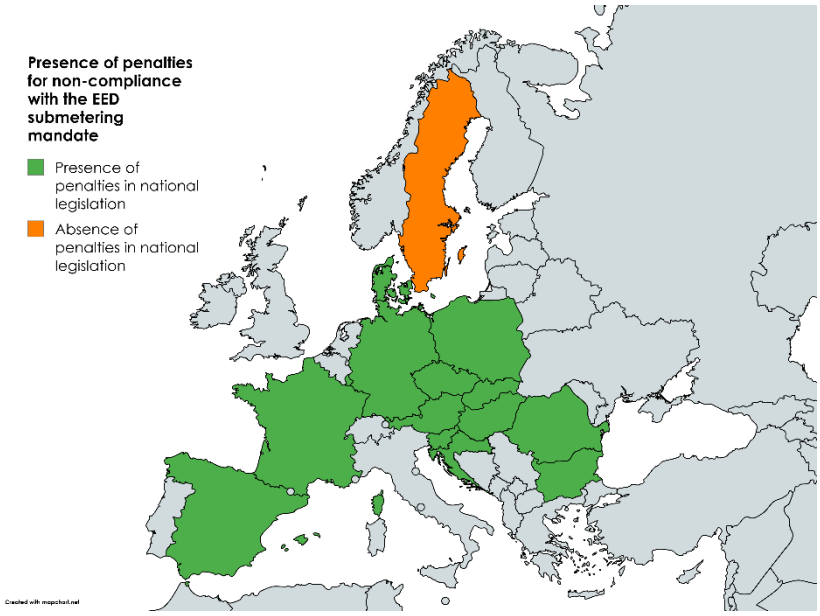
It should also be noted that in Austria, the legislation sets a limit for the storage of consumption data of only 28 months. This stops metering service providers from visually displaying to consumers (via an online platform for instance) their monthly consumption data compared to the consumption in the same month 3 years prior. This is in contradiction to the transparency and consumers empowerment objective of the legislation and could be improved with a more sensitive time-frame.

6 PENALTIES (EED, ARTICLE 32)

EED, Article 32

Member States shall lay down the rules on penalties applicable to infringements of national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented. The penalties provided for shall be effective, proportionate and dissuasive. Member States shall by 11 October 2025 notify the Commission of those rules and of those measures and shall notify it without delay of any subsequent amendment affecting them.

Transposition of the Provision in Member States



While Member States have generally transposed the obligation to impose fines or administrative proceedings to building owners, investors or tenants upon non-compliance with the individual thermal metering mandate, their dissuasive character can be discussed, as fine amounts vary widely (from about 500 euros to 20,000 euros) between countries. Sometimes, fine amounts are not specified in the legislation or not enforced in practice (for instance, in Poland and in Spain).

Furthermore, it is sometimes unclear if penalties will also apply upon failure to replace or retrofit existing meters to render them remotely readable by January 2027.

Best practice – Heat Efficiency Incentive Fee

Croatia does not impose fines upon non-compliance with the individual metering mandate, but a “heating efficiency incentive fee”. The amount is kept on a separate account for the co-owners and must be used within five years improving the energy efficiency of the building.

7 BEST PRACTICES ON THE USE OF SUBMETERING DATA

Some countries mandate the use of submetering data to detect anomalies in the energy performance of buildings as well as their collective source of heating, cooling and domestic hot water. Abnormally high energy consumption can trigger inspection of heating systems, metering systems or an audit of the entire building, to identify the cause and ultimately reduce its energy demand.

Some examples are listed below:

Bulgaria - Use of submetering data to detect heating systems and meters anomalies

For Heating Consumption

If more than 50% of the building's originally designed heating power is lost and waste heat becomes larger than consumption, a mandatory inspection of the system's technical condition is carried out.

For Domestic Hot Water

If the difference between the total volume measured by the main heat meter and the sum of all individual meter readings exceeds 30%, a joint inspection by the metering company, the heat supplier, and the condominium is required. All meters are checked, and the main water meter undergoes a metrological inspection.

If the energy required to heat 1 m^3 of water exceeds 150 kWh, an inspection of the heating system's technical settings must also be carried out.

Spain - Use of submetering data to alert on system malfunctions

For Heating, Domestic Hot and Cold Water and Cooling

In installations with a nominal thermal power greater than 70 kW, the maintenance company shall monitor the evolution of consumption and energy provided by the thermal installation with the highest possible level of disaggregation by use (heating, cooling and domestic hot water), as well as water consumption (if available) according to the available measuring devices, in order to be able to detect possible deviations and take the appropriate corrective measures.

Poland - Use of submetering data for energy audits and identification of worst-performing units

Poland is mandating the use of submetering data to identify worst performing buildings and mandate energy audits upon identification of high energy consumption over a 12-month period:

if in any 12-month period the amount of heat supplied to a multi-unit building exceeds 0.40 GJ per cubic metre of heated building volume or 0.30 GJ per cubic metre of prepared domestic hot water, the building's owner or manager is required to carry out an energy audit. The purpose of this audit is to identify the causes of excessive energy consumption and to propose corrective measures or adjustments to the contracted heat capacity in order to reduce the building's overall heat demand.

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