Coordination and Support Action

H2020-LC-SC3-EE-2019

Capacity Support Facility - Activity report

Deliverable D4.3

Version N°3

Authors: Christos Tourkolias (CRES), Argyro Giakoumi (CRES), Charilaos Andreosatos (CRES), supported by Elisabeth Böck (AEA), Kelsey van Maris (VITO), Erika Meynaerts (VITO), Nele Renders (VITO), Václav Šebek (SEVEn), Ivana Rogulj (IEECP), Erik Faassen (IEECP), Karolis Januševičius (LEA), Paula Fonseca (ISR), Matevž Pušnik (JSI), Gema Millán Ballesteros (CIRCE) and Nelson García (CIRCE)

@streamsaveh2020

www.streamsave.eu

@stream_save

contact@streamsave.eu

This project has received funding from the Horizon 2020 programme under grant agreement n°890147.

Disclaimer

The content of this deliverable reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

Document Information

Grant agreement	890147
Project title	Streamlining Energy Savings Calculations
Project acronym	streamSAVE
Project coordinator	Nele Renders, VITO/EnergyVille
Project duration	1st September 2020 – 31st August 2023 (36 months)
Related work package	WP 4 – Capacity Support Facility
Related task(s)	Task 4.2 - Capacity Support Facility to improve energy savings calculations for Priority Actions
Lead organisation	CRES
Contributing partner(s)	AEA, CIRCE, VITO, SEVEn, IEECP, LEA, ISR & JSI
Due date	31/03/2022 (intermediate); 28/02/2023 (final)
Submission date	01/03/2023
Dissemination level	Public

Table of Contents

List of figures

List of tables

Abbreviations and acronyms

Acronym	Description
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BACS	Building Automation and Control System
BEMS	Buildings Energy Management System
BU	Bottom-Up
CSF	Capacity Support Facility
EC	European Commission
EU	European Union
EED	Energy Efficiency Directive
EEOs	Energy Efficiency Obligation scheme
EPBD	Energy Performance of Buildings Directive
GHG	Greenhouse Gas
HDV	Heavy Duty Vehicle
IPMVP	International Performance Measurement and Verification Protocol
LDV	Light Duty Vehicle
MS	Member State
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
PA	Priority Action
ROI	Return on Investment
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group

Summary

The current report presents the assistance provided by the Capacity Support Facility to the 10 consortium Member States during the streamSAVE project. The Capacity Support Facility (CSF) has been established within the H2020 project streamSAVE aiming to streamline energy savings calculations according to Article 3 and 7 of the Energy Efficiency Directive (EED). The CSF provides one-to-one technical support to Member States facilitating the energy savings calculations for different Priority Actions (PA) by means of the real-case application and validation of the streamlined bottom-up calculation methodologies and related indicative values to further intensify their efforts to deliver energy efficiency improvements by 2030. Priority Actions are technical solutions with high energy savings potential and considered as priority issues by Member States.

The activities of the CSF were conducted from September 2021 until January 2022 for the first round of PAs and from June 2022 until January 2023 for the second round of PAs. The first round covered the following five actions: building automation & control systems, refrigeration systems, public lighting systems, electric vehicles and heat recovery. Similarly, the second round focused on the following five actions: small-scale renewable central heating, actions to alleviate energy poverty, replacement of electric motors, behavioural changes and modal shift for freight transport. In each involved country, concrete cases were selected and defined in a demand-driven way, and therefore in close contact with the public authorities.

The application of the CSF was facilitated by an **operational framework** to maximize the triggered impacts of the CSF and to collect useful lessons and feedback from policy officers on the improvement of the streamSAVE's guidance and platform. The main pillar of the operational framework was the PA Working Groups (WGs). The Working Groups gathered technical and country experts from the consortium, as well as the implementing authorities (and/or technical experts) from the consortium countries involved. The involvement of the policy officers into the WG was essential for facilitating the actual implementation of the various activities in the national context.

Generally, the technical support was provided by the conduction of phone/online workshop in combination with the provision of online/email support. The desk research conducted by the consortium constituted as a complementary approach for most of the involved countries, while the organization of in-country workshops and the peer-to-peer exchange of experiences between countries were less applied within the CSF.

Technical support for the Priority Action of **BACS** was provided to three countries (Austria, Lithuania and Slovenia). The compliance with Article 7 of the EED was considered a priority by all involved countries (and not Article 3 of the EED). Moreover, the data collection procedures and the estimation of the delivered energy savings through deemed savings methods were recognized as important technical aspects.

For the action of **electric vehicles**, the technical support was provided to four countries (Belgium, the Netherlands, Portugal and Spain). Again, the compliance with Article 7 was considered as a priority for the majority of the involved countries (Belgium, Portugal and Spain), next to the determination of the baseline, data collection procedures and the estimation of the energy savings through deemed savings methodologies.

The technical support for **heat recovery** was provided to three countries (Czechia, Croatia and Greece). The countries' needs were similar to the case of electric vehicles, although the assessment of cost-effectiveness was also considered important.

The CSF supported two countries (Greece and Portugal) for the promotion of **modal shift in freight transport**. The compliance with Articles 3 and 7 of the EED was regarded as a priority by the involved countries, while the determination of the baseline, the establishment of data collection procedures, the estimation of the delivered energy savings through deemed savings methods and the evaluation of the cost-effectiveness were recognised as the most crucial technical aspects.

Technical support through the CSF was provided to two countries (Austria, and The Netherlands) for the PA of **motor replacement**. The compliance with Article 7 of the EED was considered as a priority in Austria, while the need for streamlining the provisions between Article 3 and Article 7 was regarded as a priority in The Netherlands. The determination of the baseline, the establishment of data collection procedures and the estimation of the delivered energy savings through deemed savings methods were recognised as the most crucial technical aspects for the case of motor replacement.

The PA of **behavioural measures** was examined through the CSF in two countries (Lithuania and Croatia). Both countries considered the compliance with the provision of Article 7 as a priority, as well as the establishment of a data collection and assessment procedure, next to the calculation of rebound, spill-over and free-rider effects. In Lithuania, technical support was also requested for the determination of the baseline, the cost-effectiveness ratio and the estimation of the delivered energy savings through a deemed savings method. Two countries (Slovenia and Belgium) were involved in the support provided for the PA of **energy poverty**. The compliance with Article 7 of the EED was considered as a priority in both countries, while the determination of the baseline, the establishment of a data collection procedure and the estimation of the energy savings based on deemed savings method were recognised as the most crucial technical aspects. Special emphasis was put on the cost-effectiveness and the calculation of the rebound, spill-over and free-rider effects in Slovenia. It should be noted that the provisions of Article 3 were considered as crucial issues for the case of Slovenia.

Technical support through the CSF was provided to two countries (Czechia and Spain) for the PA of **small-scale renewable energy technologies**. The estimation of the energy savings based on deemed streamSAVE methods and the calculation of CO_2 savings were considered as a priority in both countries. The determination of the baseline, the establishment of data collection procedures, the cost-effectiveness and the behavioural aspects were only examined for the case of Spain. Moreover, the examined countries had different objectives in relation to the provisions of the EED. More specifically, the compliance with Article 7 was the most critical issue in Czechia, while in Spain emphasis was placed on streamlining the requirements of Articles 3 and 7.

Concerning **main lessons learned**, all the Bottom-Up (BU) methodologies developed by streamSAVE are considered useful by the involved policy officers as they provide substantiated estimations of savings, and support effective monitoring, control and verification procedures of the delivered energy savings.

For the Priority Action of **BACS**, all important elements were integrated into the developed BU calculation methodologies, such as indicative BACS factors in accordance with EN15232 (2018) and the provisions of Article 14 and Article 15 of the EPBD (European Commission, 2018b). Nevertheless, difficulties may arise in transferring the BACS methodology to national circumstances for non-residential buildings, emphasizing the need to develop specific data collection procedures for national reference values without neglecting the use of existing data sources.

The lack of standardized and robust data exchange procedures is highlighted for the PA of **electric vehicles**. The establishment of standardized data collection is considered as a prerequisite for effective design and implementation of these policies and measures. Furthermore, the comparison of the resulting savings based on the streamSAVE calculation methodology with the national ones, improved the reliability and accuracy of both savings methodologies. There should be more emphasis on the compliance with the additionality criterion and the promotion of soft modes of transport.

The application of the metered method for **heat recovery technologies** is feasible, despite the preference of policy officers for deemed methods (low administrative burden). Nevertheless, the potential application of a scaled method should be examined. For heat recovery, detailed explanation of the required control and verification procedures, as well as the specifications of the metering systems is a crucial ingredient to accurately and efficiently put the savings estimations into practice.

The development of a deemed method for the promotion of **modal shift for freight transport** is useful for minimizing the administrative costs and facilitating the calculation of the energy savings. Because the lack of data is perceived as one of the main constraints for applying the streamSAVE calculation methodology, it is recommended to establish a data collection procedure. Emphasis must be placed as well on the required control and verification procedures. Moreover the identification of the main drivers and barriers for modal shift through a targeted survey among transport operators, can facilitate the identification of the various parameters which influence the economic viability of modal shift for freight transport.

The developed streamSAVE calculation methodology can be used to calculate the delivered energy savings by **motor replacement**. The existing methodologies were adapted to national circumstances, by improving slightly both the calculation formula and the indicative values. Moreover, the indicative values can be used for the ROI calculation of anticipated motor replacement instead of using the conventional approach based on the payback period. It is recommended to extend the scope of the interventions beyond the single replacement of a motor by analysing its savings for other parts of the drivetrain as well.

The comparative analysis of the developed streamSAVE calculation methodology with existing methodologies at national level can be achieved since various MS have experience in quantifying the energy savings from **behavioural measures**. Generally, the proposed indicative values can be considered as EU-wide benchmarks, considering that 40 studies were assessed in terms of quality. However, it is difficult to compare the methodologies because they refer to different behavioural measures. Therefore, it is important to standardise the type of educational and counselling measures to determine uniform parameters for the savings calculation. Finally, more emphasis should be placed on specifying common values for the lifetime of the behavioural measures as well as on data collection procedures.

The developed streamSAVE calculation methodology provides useful insights for the utilization of reference values to estimate the impact of energy efficiency measures targeting **energy poor households**. More specifically, the streamSAVE calculation methodology can be used to assess energy savings of different types of measures, either technical or behavioural, which are implemented in buildings occupied by energy poor households. Nevertheless, the developed methodology requires data which are not easily available for the case of energy poor households, highlighting the need to establish appropriate data collection procedures. Finally, the number of energy poor households

targeted by the initiated policies and measures have to be monitored to facilitate their effective design.

The suggested streamSAVE calculation methodology facilitates the calculation of energy savings achieved by the installation of **small-scale RES technologies**, while it constitutes a solid basis for comparing the obtained results with existing methodologies at national level. Moreover, the comparative analysis of different small-scale RES technologies can facilitate the selection of the most cost-efficient technologies. Nevertheless, it is recommended to use national values for the savings calculations to obtain more accurate and representative results. Finally, the streamSAVE calculation methodology should be expanded acknowledging the lack of data about the cooling demand and the efficiency of existing and new cooling technologies.

In addition, some relevant **horizontal recommendations** can be formulated based on the lessons learned from the CSF. Indicatively, the BU calculation methodologies can improve the coordination of required monitoring, reporting and verification procedures and can facilitate the cooperation and communication of the different bodies being responsible for monitoring the implemented energy efficiency measures. Special attention should be given to the data collection procedure, which can indisputably improve the monitoring and reporting of energy efficiency policies and measures. In any case the establishment of a robust data collection procedure is considered as a precondition for the effective and high-quality application of BU calculation methodologies. Finally, the integration of the developed BU methodologies will spur both the obligated parties and the responsible authorities of alternative measures to design and implement energy efficiency measures covering additional savings actions.

The two cycles of the CSF can be assessed as successful, as in total the **CSF resulted in**:

- 30 policy officers have participated in the implemented activities, representing 18 public bodies or organizations in the first round of the PAs.
- 27 policy officers have participated in the implemented activities, representing 14 public bodies or organizations in the second round of the PAs.
- 31 workshops and 14 meetings have been organized during the two cycles of the CSF.
- 30 energy efficiency policies might be improved, covering all the examined PAs during the two cycles of the CSF.

The type of activities conducted within the CSF can be assessed as rather effective despite the difficulties imposed by COVID-19. Nevertheless, physical meetings are important for providing technical assistance to public bodies, while they have to be accompanied by the already conducted activities organized within the framework of the CSF in order to maximize their impact. Last but not least, the involvement of specialized experts within the CSF was imperative in some cases due to the complexity of the discussed issues.

Keywords

Deemed savings; bottom-up calculation methodologies for energy efficiency; energy savings calculations; costs of energy efficiency actions; GHG savings; Article 3 of EED; Article 7 of EED; capacity support; experience sharing.

Introduction

About streamSAVE

Energy efficiency is one of the five key dimensions of the Energy Union, and consequently of the Member States' National Energy and Climate Plans. The Energy Efficiency Directive sets the 2020 and 2030 energy efficiency targets and a series of measures that contribute to their achievement within the Union. The streamSAVE project streamlines energy savings calculations and provides the support needed to increase Member States' chances of successfully and consistently meeting their energy efficiency targets. The streamSAVE project specifically focuses on Article 3 and 7 of the EED which are devoted to energy efficiency targets and national energy savings obligations, respectively.

Given the importance of deemed savings approaches in Member States' EED reporting, streamSAVE focuses on streamlining bottom-up calculation methodologies of standardized technical actions. streamSAVE offers these savings methodologies in a transparent and streamlined way, not only to improve the comparability of savings and related costs between Member States (MS), but also between both EED articles. The savings actions are targeted at measures with high energy saving potential and considered as priority issues by Member States, the so-called *Priority Actions*.

More broadly, the project aims at fostering transnational knowledge and dialogue between public authorities, technology experts, and market actors. The key stakeholders will improve their energy savings calculation skills and ensure thus the sustainability and replicability of the streamSAVE results towards all European Member States.

Capacity Support Facility CSF

The establishment of the Capacity Support Facility within streamSAVE was meant to test the actual application of the streamSAVE "Guidance on standardized saving methodologies" (streamSAVE, 2022b) in 10 consortium Member States as well as to test the streamSAVE platform[1] for the 10 Priority Actions. Therefore, the CSF facilitated the introduction of bottom-up energy savings calculations within the involved countries to achieve untapped energy savings potential. Moreover, current Member States' reporting on the delivered energy savings of the Priority Actions can be improved based on streamSAVE's resources, by implementing and sharing expert knowledge and experiences regarding successful estimation methods to implement and report on Articles 3 and 7 of the EED.

The CSF activity report describes and analyses the support on country cases in the 10 involved countries, next to its main findings and results on the implementation of the streamlined calculation methodologies and related indicative values. The cases consist of actual or planned energy efficiency policies and measures, which are examined and improved within the framework of the CSF. The cases have been selected in close contact with the public authorities by using a demand-driven approach reflecting the needs to the involved countries and the current level of implementation and interest, while they have meaningful impact in terms of energy savings and a considerable replication potential towards other MS.

[1] https://streamsave.flexx.camp/training

Detailed information is provided about the CSF framework's definition, focusing on the specification of roles and responsibilities and on the assistance to partners in completing all required actions. The examined country cases are analyzed by presenting all the activities within the CSF for each PA separately: description of the support, the conducted activities and the key outputs and impacts per case. Finally, the main lessons learned are outlined for each of the energy savings actions based on the analysis of the performed activities within the CSF.

Chapter 1 Capacity Support Facility

In the Capacity Support Facility (CSF), actual support is provided to consortium or partner Member States (MS). The streamlined calculation methods and indicative values, which have been defined in the streamSAVE project (streamSAVE, 2022b), are hereto applied in concrete country cases (twenty in total). It should be mentioned that the streamlined calculation methodologies were developed taking into consideration the existing practices in all MS (streamSAVE, 2022a). The cases were selected based on a demand-driven process , and therefore, in close contact with the public authorities. The main objective of the CSF is to improve the implementation and reporting on specific energy efficiency policies and measures, which either have been implemented or are planned in the involved partner countries.

In the current chapter, the CSF is presented including a description of its objectives, the operational framework, the organized activities and its expected impacts. Furthermore, the scope of the country cases and the policies or measures targeted by the support are introduced.

1.1 Description of the Capacity Support Facility

The Capacity Support Facility CSF focused on technical issues of the energy savings actions providing the capability to each country to apply the savings methodologies for concrete policies or measures, as well as to test the Training Module of the streamSAVE platform for the selected Priority Actions. The main aim of the CSF was to improve MSs' obligations under Article 3 and Article 7 of the Energy Efficiency Directive, namely an improved implementation and reporting on EED policies and measures.

A guidance note was prepared within the framework of the streamSAVE project to facilitate the effective implementation of the foreseen activities and the fulfilment of the specified targets. More specifically, the main objective of the guidance note was to explain the procedure to establish, monitor and report on the progress and the outcomes of the CSF, the related PAs working groups and the testing/validation of the streamSAVE platform (Training module).

Detailed information was provided about the definition of the capacity building programme, focusing on the specification of roles and responsibilities and on assistance to partners to implement all the required actions. Moreover, guidelines were formulated for the establishment of working groups per PA, as well as the development of the strategy and related procedures to coordinate these. Finally, the timeline of all suggested steps in relation to the working groups and platform testing was described.

1.1.1 Objectives

The "Capacity Support Facility to improve energy savings calculations for Priority Actions" aimed at building capacity in ten partner countries within the streamSAVE project. Hereto, the CSF facilitated the application of the standardized savings methodologies and the defined indicative values in the concrete cases. The application was facilitated by an operational framework enabling the evaluation of the triggered impacts of the CSF and providing useful lessons and feedback on the improvement of the developed calculation methods. Figure 1 presents graphically the relation of the CSF with the other streamSAVE activities.

During the CSF, the use and contents of the streamSAVE platform were tested and validated resulting in an improved and more user-friendly platform (streamSAVE, 2022c). Emphasis was placed on the Training Module, which has been developed and integrated into streamSAVE platform, including the indicative values and the BU calculation methodologies for PAs. Potential users have the opportunity to use the developed BU calculation methodologies as an online tool or can download an excel file to calculate their own estimates of energy savings delivered by one of the examined PAs.

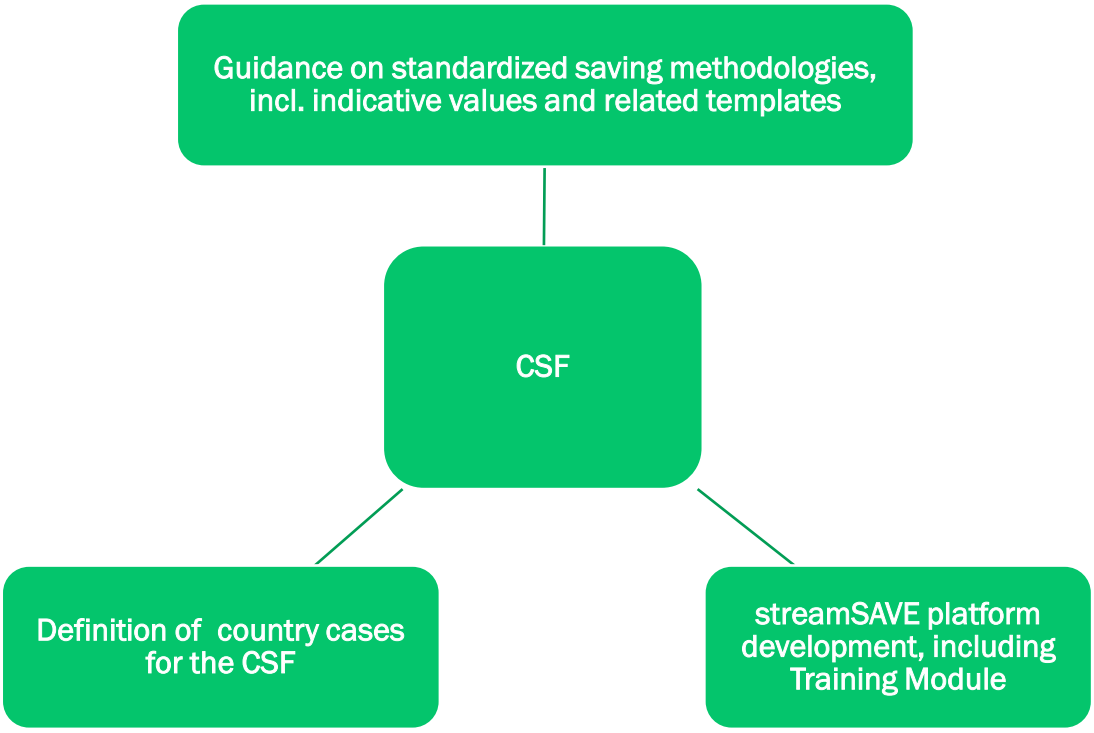

Figure 1: Relation of the CSF with the other activities within streamSAVE project.

1.1.2 Operational framework

The CSF provided support from September 2021 until January 2022 for the first round of PAs. A second round of support was provided by the CSF from June 2022 until January 2023 for five additional PAs. For both rounds of support, PA Working Groups (WGs) were established and led by the Technical PA leader, with the support of the PA co-leader.

The Working Groups gathered technical and country experts from the streamSAVE project, as well as the implementing authorities (and/or technical experts) from the partner countries involved. The involvement of the policy officers in the WGs was essential for facilitating the actual implementation of the various activities in the national context.

The WGs supported policy officers in each country on the identified cases in relation to the PAs. During each round of PAs, five different WGs were established according to the selected PAs, which are presented in Figure 2 for the first round and in Figure 3 for the second round.

Figure 2: Selected PAs in the first cycle of the streamSAVE project.

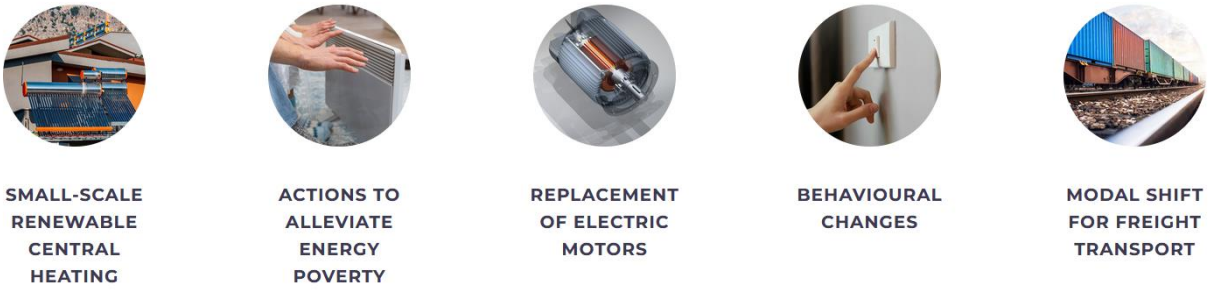

Figure 3: Selected PAs in the second cycle of the streamSAVE project.

Where needed, the PA leader and the country leader had the capability to identify and engage relevant technical experts at EU level and at national level. The streamSAVE partners could work directly alongside with experts from MS in-country, to address specific or ad-hoc issues or questions.

A graphical depiction of the WG's composition is presented in Figure 4.

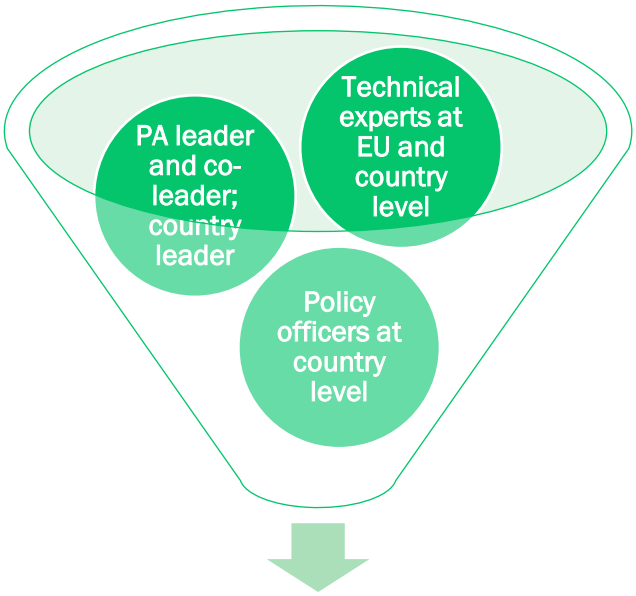

Figure 4: Members' composition of the WGs.

Within the CSF ten partner countries received technical support for the cases selected and the consortium supported on average 2 cases per country.

The cases were selected in a demand-driven way, and therefore in close contact with the public authorities. More precisely, at the start of the project, phone interviews were scheduled with the public authorities in the ten partner countries to detect possible cases.

The cases were further detailed while the streamSAVE output on savings methodologies became clearer and more straightforward for the involved policy officers. Information about the countries, the responsible streamSAVE partner and the selected PAs is provided in Table 1.

Table 1: Information about the countries, responsible partner and selected PA per CSF case.

Country	Responsible partner	Selected PA for the first cycle	Selected PA for the second cycle
Austria (AT)	AEA	BACS	Motor replacement
Belgium (BE)	VITO	Electric Vehicle	Energy Poverty
Czechia (CZ)	SEVEn	Heat recovery	Small scale RES
Croatia (HR)	IEECP	Heat Recovery	Behavioural changes
Greece (GR)	CRES	Heat recovery	Freight Modal Shift
Netherlands (NL)	IEECP	Electric Vehicle	Motor replacement
Lithuania (LT)	LEA	BACS	Behavioural changes
Portugal (PT)	ISR-UC	Electric Vehicle	Freight Modal Shift
Slovenia (SI)	JSI	BACS	Energy Poverty
Spain (ES)	CIRCE	Electric Vehicle	Small scale RES

(*) Note: France was originally foreseen as a country to give support, but given its long experience on savings methodologies, and as Croatia indicated a strong interest for support, it was decided to include Croatia instead of France.

The operational framework of the CSF is presented in Figure 5. At national level, the country leader facilitated the communication of the PA Working Group with the policy officers within their partner country. The PA leader, with the support of the PA co-leader, was responsible for the coordination and operation of each WG.

The country leader, who was appointed for each country separately, acted both as country expert and facilitator, as well as the point of contact with the PA leader. Moreover, the country leader arranged and undertook the support, testing and validation activities in the involved country with the actual participation of policy officers for each selected case.

The PA leader was responsible for solving technical issues, which were related to the streamlined calculation methodologies and the indicative values of the PA, while the PA co-leader was responsible for supporting the testing and validation of the streamSAVE platform, particularly regarding use and contents (i.e., user friendliness and testing of the Training Module).

The PA leaders and country leaders were responsible for informing CRES and CIRCE about the actions performed, to monitor the progress of the foreseen activities.

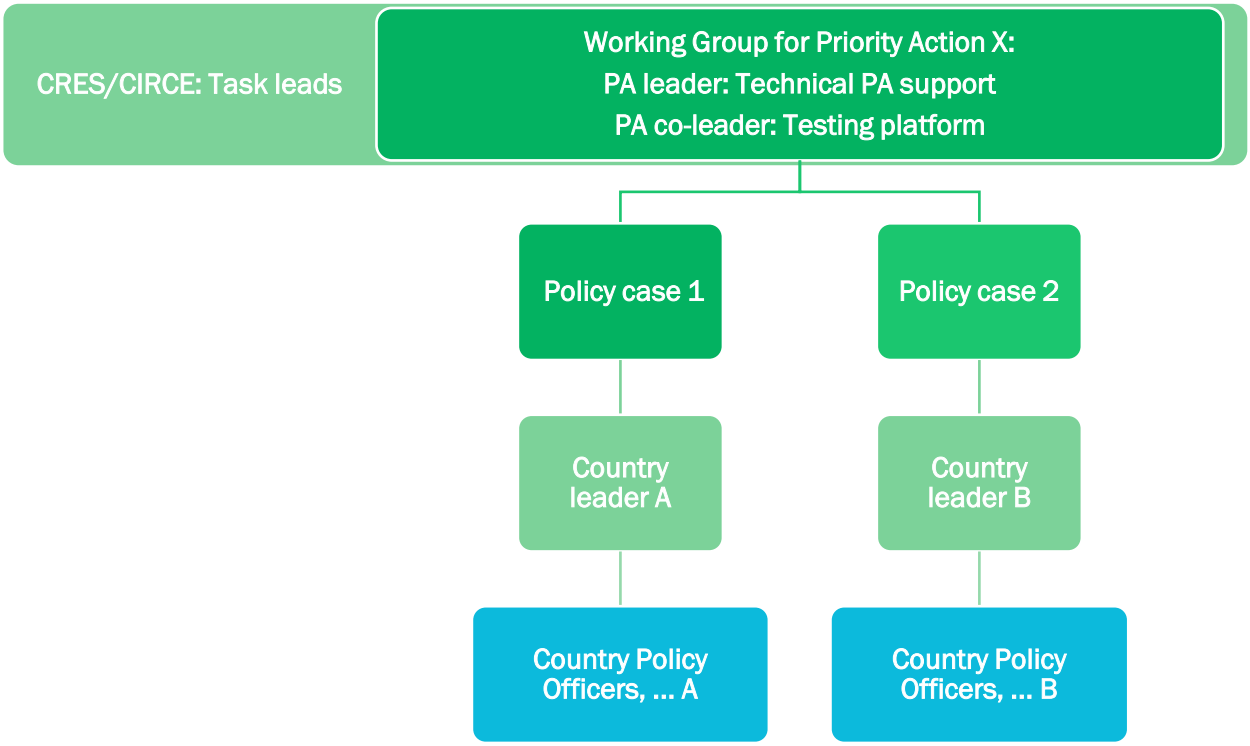

Figure 5: Operational framework of the CSFs for a specific WG.

Various recommendations, detailed guidelines and a specific reporting framework was established to produce interesting outcomes of the WGs, such as:

- Establishment of an explicit goal and clear communication to the participants to reach a mutual understanding.
- Effective completion of all the duties of the facilitator (country leader), such as arranging the meetings, ensuring that the meetings are effective, running on-time

and inclusive meetings, setting the agenda for each meeting in advance, fostering a productive environment for discussion by actively taking into account the positions of the participants etc.

- Definition of the rules for the operation of the WG and specification of the responsibilities and the roles of the participants, taking into account both their characteristics/capabilities and time and resource restrictions.
- Ensuring that all participants are equally involved and able to fulfil the assigned tasks.
- Creation of a realistic timeline with clear milestones providing sufficient time for the efficient completion of the foreseen tasks and activities.
- Transparent operation regarding the assigned tasks and activities, effective dissemination of the main findings and organization of an additional round for discussion in order to validate the results.
- Creation of trust to the participants and fulfilment of consensus through the fruitful discussion of all positions.
- Efficient management of potential conflicts aiming at their immediate resolution and reaching consensus before fulfilling all the activities.
- Keeping track of all the conducted activities.
- Continuous evaluation of the performed work of the WG and awareness about the participants' level of satisfaction.
- Moderating targeted discussion and eliciting recommendations by the participants for a more effective operation of the WGs.

1.1.3 Type of organized activities

The foreseen capacity building within the CSF was conducted through direct technical support to individual MSs to further improve energy savings calculations under Articles 3 and 7 of the EED. As noted, the operational objective of the CSF was the adaptation of the proposed BU calculation methodology and the indicative values to the national context of each involved country. The policy officers and other country experts were involved in the CSF through the following type of activities:

- Identification and documentation of a selected case for each round of the CSF being supported by the PA leaders and the country leaders.
- Participation in the planned in-country ad-hoc meetings (maximum of three meetings per round).
- Application of BU calculation methodologies for the selected cases supported by the PA leader and the country leader.
- Testing & validation of the streamSAVE platform being supported by the PA co-leader and the country leader.
- Participation of policy officers into the planned workshops on a voluntary basis.

The implementation of the calculation methodologies started through the application of the proposed BU calculation methodology to an existing or a planned policy measure in the involved country. Moreover, dedicated questions and requests for more specialized information were formulated, ensuring the actual involvement of the policy officers.

An introductory meeting was organised with the targeted policy officers at the beginning of the CSF to clarify the objectives of the CSF and presenting the developed calculation methodologies and the defined indicative values. The conduction of this meeting enhanced their understanding about the role of the CSF and increased their engagement.

The country leaders interacted directly with the public authorities via different means, such as email/online support, phone support, in-country meetings or workshops, as well as via peer-to-peer dialogue groups that were organized within the streamSAVE project.

The technical support provided covered a wide range of methodological support related to the PAs. Indicatively, the following topics were studied:

- Adapting countries' existing savings methodologies and defining a monitoring program for a new Priority Action covered by policies or measures under Article 7.
- Streamlining savings estimations of a Priority Action between Article 3 and Article 7 of the EED.
- Identifying and assessing monitored data within a country to improve savings estimations through the application a BU calculation methodology.
- Determining the baseline consumption for a Priority Action in relation to Article 7 and/or Article 3.
- Correcting estimated energy savings by including behavioural aspects, such as rebound effects.

Finally, the technical support resulted in multiple types of outputs per case, such as the:

- Meeting minutes of workshops and of (ad-hoc) meetings on improving savings estimations for a policy in the partner country.
- Excels/calculation sheets with the energy savings and CO_2 savings calculated for specific energy efficiency policies and measures.
- Compilation of supporting material, such as technical reports or memos on energy savings estimations and country specific assumptions.

All streamSAVE documentation was prepared in English including both the meeting minutes and the supporting material. Nevertheless, the in-country meetings or workshops were organized in national language, to facilitate participation and to improve the engagement of the national experts and policy officers.

1.1.4 Impacts

As described previously, the CSF is about going beyond the theoretical BU calculation methodologies to facilitate their application during and after the time horizon of the streamSAVE project taking into consideration the national context or circumstances, such as the limited availability of the required data, the promotion of specific technologies in frame of a policy measure, the difficulty to quantify behavioural change of the end-users etc.

Targeted performance indicators and means of monitoring were selected in order to assess and monitor the delivered impact by the conducted activities within the CSF. The expected impacts of the CSF are presented in Table 2 (considering two PA rounds).

Table 2: Impacts to be realized during CSF over the course of the 2 rounds of PAs.

Number of public officers with improved capacities/skills on BU calculations according to Article 7 and Article 3	
Target group	Key stakeholders (public authorities) from 10 partner MS and (at least) 3 replication countries
Performance indicator: Output	On average 2 cases per partner MS will be supported by priority action working groups; and 1 case in replication countries
Performance indicator: Outcome	At least 15 public officers in 10+3 MS having improved skills/capacity due to streamSAVE, assuming active involvement of 1 or 2 public officers per MS and that 80% out of officers confirm their capacity was improved
Means of monitoring	– Monitoring of CSF by activity reports per MS case – Annual feedback surveys among key stakeholders to monitor priority action working groups and dialogue groups – Bilateral call with replication countries to evaluate training – Google analytics of platform downloads or visits per priority action
Number of policies influenced through the actions	
Target group	Policy makers in each MS and market players, expert in field of energy savings estimations
Performance indicator: Output	On average 2 cases per partner MS will be supported; and 1 case in replication countries
Performance indicator: Outcome	We expect all 10 partner MS to initiate/take into consideration 2 changes of their Art. 3 & 7 reporting or EED related policies on average; in total 20 adapted policies related to the Priority Actions
Means of monitoring	Annual feedback surveys sent to key stakeholders, in which MS also provide feedback about undertaken or planned amendments at the end of the project
Number of MS with improved implementation of Article 7 and Article 3, including improved MRV systems, through harmonized BU calculations	
Target group	Public authorities in each MS and market parties expert in field of energy savings estimations
Performance indicator: Output	At least 10+3 MS take part in the streamSAVE to improve their Art. 3 & 7 EED implementation On average 2 cases per partner MS will be supported in CSF; and 1 case in replication countries
Performance indicator: Outcome	Assuming 80% of the CSF cases will directly result in improved Art. 3 & 7 implementations, we can expect at least 18 initiatives within 15 MS on improved EED implementation
Means of monitoring	Annual feedback surveys sent to key stakeholders, in which MS also provide feedback about undertaken or planned EED amendments at the end of the project

1.2 Examined cases and improved policy measures

The main objective of the CSF was to improve specific policies and measures, which either have been implemented or are planned in the involved countries through the examination of the selected cases. In the following paragraphs, both the cases and the targeted policies and measures are presented separately for each country, including the improvements realised thanks to the support provided in the CSF.

1.2.1 Austria

First PA round

The CSF supported the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) and the National Monitoring Agency to quantify the delivered energy savings reported within the framework of Article 7 for the case of policies and measures which promote the implementation of BACS.

The main goal was to present the methodology on BACS that was developed within the streamSAVE project and then to adapt the methodology to the national circumstances. Emphasis was placed on the required data, while the final energy demand of the building was adapted according to Austria's reference buildings.

Moreover, the lifetime of the delivered savings was determined for estimating the cumulative savings, while the potential integration of additional technology areas of the BACS into the methodology and the required verification activities of the implemented BACS system were also discussed as important issues.

Specific improvements to the implemented policies and measures in Austria were fostered, while the potential introduction of the proposed BACS methodology and the specified indicative calculation values into the Austrian catalogue of BU calculation methodologies were examined.

Nevertheless, the actual inclusion of the methodology could not be ensured since it depends on various political processes going beyond the WG's capacity to influence (implementation of the new Energy Efficiency Act and supporting legislation). However, the methodology was picked up in various other activities as well, for example the estimation of savings to be achieved for the EED until 2030 as well as national emergency plans due to the energy price crisis in late 2022.

Second PA round

The CSF supported the National Monitoring Body through the presentation of the methodology developed within the streamSAVE project for calculating the delivered energy savings by anticipated motor replacement and the potential adaptation of the methodology to the national circumstances.

The streamSAVE calculation methodology can be utilized by the National Monitoring Body to quantify and report the delivered energy savings under both Alternative Measures as well as the Energy Efficiency Obligation Scheme in Austria.

The aim was to integrate the adapted methodology for motor replacement into the Austrian catalogue of BU saving methodologies. Nevertheless, the actual inclusion of the methodology cannot be ensured since it depends on various political processes going beyond the WG's capacity to influence (implementation of the new Energy Efficiency Act and supporting legislation).

1.2.2 Belgium

First PA round

The CSF supported the Federal Public Service (FPS) for Economy to quantify energy savings from the promotion of electric vehicles in the transport sector (fuel switch) within the context of two policy measures, which may be reported as alternative measures within the framework of Article 7 in the future.

Firstly, the FPS Economy and "Het Federaal Instituut voor Duurzame Ontwikkeling" (FIDO) were interested in calculating energy savings from the fuel switch in the federal car fleet. More specifically, data were gathered and a preliminary BU calculation methodology was developed, while specific questions were formulated concerning the validity of this methodology in the EU context (Clean Vehicle Directive). Moreover, a more concrete issue lied with the comparison of fossil and electric vehicles.

Secondly, they were interested in calculating the energy savings from the fuel switch of the company cars as from 2026 onwards fiscal deduction is provided for the case of leased company cars under the precondition that they are zero emission. Setting up a methodology to calculate the savings from this measure was considered as a very concrete case where the CSF could add value for fostering the implementation of this measure and providing technical support for the compliance with the criterion of additionality and the green character of the consumed electricity.

Concerning the expected changes, the aim of the CSF was to improve the planned policies and measures and most importantly, to introduce them into the alternative measures, which have been initiated for achieving the target of Article 7.

Second PA round

The CSF supported the Flemish Energy and Climate Agency (VEKA) to calculate the delivered energy savings by two different types of energy efficiency measures, targeting energy poor households, namely the energy renovation of the building envelope (with focus on roof insulation) and the replacement of the heating system with a RES installation (with focus on heat pumps).

The CSF focused on quantifying the resulted energy savings from energy efficiency measures targeting energy poor households, such as the "Mijn VerbouwPremie" programme. The latter one is a subsidy scheme, which was implemented in October 2022. All those, who are willing to invest in an existing house, apartment building or a non-residential building depending on the target group to which they belong, are able to apply for financial support for investments in energy efficiency (such as roof insulation, wall insulation, floor insulation, high-efficiency glass, solar boiler, heat pump and gas condensing boiler) and investments in housing quality (electricity and sanitary facilities, interior renovation, windows and doors). The CSF provided support exclusively for roof insulation and heat pumps.

The streamSAVE calculation methodology for renovation (insulation of roofs) and small-scale RES (heat pumps) in dwellings occupied by energy poor households was adapted to the Flemish context. Consequently, the adapted methodology can be used as a starting point for calculating the energy savings of the "Mijn VerbouwPremie" programme. Further assessment is required by the Flemish Energy Agency (including comparison with existing national methodologies) to conclude if the adapted streamSAVE calculation methodology can be applied for future reporting.

1.2.3 Czechia

First PA round

The CSF supported the Ministry of Industry and Trade (MIT), which is responsible for the promotion of energy efficiency and meeting the EED objectives and manages the available funds within the key operational programme OP TAC (Operational Programme Technologies and Applications for Competitiveness). The CSF assisted the MIT to quantify the energy savings delivered within the framework of the OP TAC. OP TAC provides financial support to energy efficiency projects of the industrial and commercial sectors, while the other OPs and national support schemes promote energy efficiency interventions in public or residential sectors. Therefore, the PA for heat recovery seemed capable of reinforcing the current level of knowledge for the implementation of energy efficiency projects in the industrial sector.

The eligibility of the specific energy efficiency measures was examined within the framework of Article 7 of the EED ensuring that the energy savings delivered with support of OP TAC complied with the provisions of the EED and could be included in the savings reported under EED.

Emphasis was placed on buildings renovation and the utilization of energy performance certificates, next to measures in transport sector and the water-energy nexus.

The main objectives comprised the implementation of effective verification procedures, the adoption of streamSAVE methodologies, the improved quality of the OP TAC funded projects, the increased efficiency of the allocated European Structural and Investment Funds (ESIF) and the facilitation of energy efficiency targets' achievement, i.e., synergies and mutual support of various EU policies (ESIF and EED in this case).

Second PA round

The CSF supported the MIT to examine the eligibility of the small-scale renewable heating technologies within the framework of Article 7 of the EED ensuring that the energy savings delivered by programmes financed by the operational programme OP TAC complies with the provisions of the EED and could be included in the savings reported under EED.

The CSF confirmed that the small scale RES heating technologies are eligible, and that the existing calculation methodologies and national values are valid for the potential utilization in the actual and planned OP TAC calls.

1.2.4 Croatia

First PA round

The CSF aimed at supporting the Ministry of Economy and Sustainable Development (MoESD) and Energy Institute Hrvoje Požar (EIHP) to quantify the delivered energy savings from policies and measures in the industrial sector. More specifically, the main objective was the development of a calculation method for the delivered energy savings and the avoided CO_2 emissions from the promotion of heat recovery systems in industry and other large potential facilities (e.g., data centres).

The main intention of the CSF was to add new calculation methodologies into the relevant regulation for the measurement of the achieved energy savings. Obviously, this indicates that the Croatian catalogue did not include similar methodologies before. All developed methods for heat recovery systems from streamSAVE could be adjusted to the Croatian context and added to the official Regulation of the catalogue with the available calculation methods.

Second PA round

The CSF supported the MoESD and EIHP to calculate more accurate energy savings from educational and counselling measures, to be implemented by energy supplies to their customers within the framework of the EEOs.

Even though multiple behavioural measures methodologies have been developed in Croatia, the calculation can be improved regarding the utilised factors and the definition of the baseline. Emphasis was placed on the proposed factors and values and as a result, the CSF supported the Croatian authorities by comparing the current methodology, mainly the existing energy saving factors, with the respective factors that were proposed by streamSAVE calculation methodology.

No direct changes in policy measures are expected from the CSF in the short-term. Nevertheless, the proposed streamSAVE calculation methodology can be adopted which means the indicative values would be more aligned with other countries, simplified and more aligned with recent research. Moreover, the considerations of adjusting the eligibility of measures and the alignment of the existing methodologies with the streamSAVE calculation methodology can lead to the potential modification of the implemented measures and savings calculations in the long-term.

1.2.5 Greece

First PA round

The CSF supported the Ministry of Environment and Energy (MoEE) and CRES to quantify the triggered energy savings reported within the framework of Article 7, as will be delivered by the promotion of heat recovery systems by the Energy Efficiency Obligation scheme as well as the alternative measures in industrial sector.

The CSF focused on the installation of heat recovery systems by presenting the methodology on heat recovery, which was developed within the streamSAVE project and adapting this to the national circumstances. Indicative values both for the potential exploitation of the excess heat and the installation of heat recovery technologies in industrial sector were specified (such as unitary energy consumption, energy saving factor etc.). Emphasis was placed on the specification of the unitary energy consumption for the definition of the baseline (i.e., kWh/industrial unit, kWh/tonne of produced products etc.), which can be used for the comparative analysis of the implemented policies and measures.

Furthermore, technical support was provided to determine the implementation cost of the foreseen technologies, the potential energy savings over the years, the lifetime for the different technologies and the procedure for controlling and verifying the implemented policies and measures.

The addition of a specialised equation for the promotion of the heat recovery in industrial sector into the Greek catalogue on BU calculation methodologies within the framework of the EEOs was decided. Other changes dealt with the use of the developed equation and the installation costs, provided by streamSAVE, within the planned Recovery and Resilience Fund programme to improve energy efficiency in the industrial sector.

Second PA round

The CSF supported both MoEE and CRES with the development of a methodology to quantify the energy savings delivered by the promotion of modal shift in freight transport.

Indicative values for different modes of transport were determined, such as the typical unit consumption and the tonne-kilometre, providing the opportunity to estimate the delivered

energy savings through a deemed saving method. Furthermore, technical support was provided regarding the development of the baseline, the calculation of the cost-effectiveness, the evaluation of the potential degradation of the delivered energy savings over the years, the determination of the lifetime for the different modes of transport and the specification of the required data for the verification of the implemented measures.

The streamSAVE calculation methodology can be used to quantify the delivered energy savings from the policies and measures, which are foreseen within the NECP. More specifically, M40, in the dimension of energy efficiency, aimed at elaborating the action plans and the construction of the required infrastructures to facilitate the shift of the commercial operations in freight transport.

It should be noted that the existing measurement protocol under the EEOs can be improved through the integration of the developed methodology within the CSF providing the opportunity to the obligated parties to deal additionally with policies and measures in freight transport.

Moreover, the developed methodology enabled the estimation of potential energy savings by the promotion of modal shift in freight transport at national level facilitating the identification of the most effective options to attain the target within the framework of Article 3.

Finally, it was agreed to integrate the developed streamSAVE calculation methodology in the Greek catalogue on BU savings calculation methodologies.

1.2.6 The Netherlands

First PA round

The CSF focused on the development of a BU calculation methodology for the delivered energy savings and the avoided CO_2 emissions from the further penetration of new and used electric vehicles for passengers, light duty and heavy-duty transport.

The CSF supported the Ministry of Economic Affairs and Climate Policy through the Rijksdienst Voor Ondernemend Nederland (RVO), also known as the Dutch Enterprise Agency, by quantifying the delivered energy savings from existing policies and measures to stimulate the introduction of electric vehicles, such as the following ones:

- SEPP Subsidy scheme electric passenger cars.
- SEBA Subsidy Scheme Zero Emission Company Cars.
- National Agenda on charging infrastructure.
- SEB subsidy scheme for electric non-mobile machinery.
- Fiscal benefits for zero emission vehicles (both for consumers and business).

Even though no direct changes in policies and measures were expected from the provided support within the framework of the CSF on the short term, the monitoring of the implemented policies and measures will be considerably improved through the potential changes on the long term. More specifically, the Electric Vehicles methodology and outcomes are to be continuously used to facilitate the comparative analysis with the RVO's internal calculations and to analyse potential deviations. Obviously, the created impact and the need for a follow-up discussion might arise, depending on the identified discrepancies.

Finally, the triggered impacts due to the replacement of typical means of transport with alternatives soft modes may lead to the introduction and development of a specialised program to stimulate the modal shift and to address problem with imports. It should be

highlighted that it is not easy to result in significant impacts since cycling is the main pillar of the Dutch strategy with the required infrastructure already available.

Second PA round

The CSF aimed at the comparison of the obtained results from the streamSAVE calculation methodology for the replacement of motors with the respective results of the Dutch pilot study, which was ran in collaboration with the Dutch Ministry and the RVO, with the support of TPA Advisors.

The objective was to compare the current approach, which is based on assuming a simple payback period of 5 years, with a detailed return on investment (ROI) calculation for replacement of inefficient drive systems. More specifically, the extrapolated results from the replacement of motor systems at company level were compared with the reported energy savings through the streamSAVE calculation methodology. The obtained results from the pilot study were very promising and detailed and were used in the development of the Dutch policy and regulatory approach. As a result, the importance was recognised of validating the results of the pilot study with the streamSAVE calculation methodology.

Therefore, the CSF supported RVO by comparing the current practice for payback period calculation used in inefficient powertrain system replacement with the developed StreamSAVE methodology. Extra consideration was given to the replacement of a larger set of motor systems and the potential optimization of the motor system. The obtained results can provide useful insights for the integration of mandatory replacement of these motors in the Dutch “energy conservation investigation obligations” (onderzoeksplicht), which mandates (larger) companies to implement energy saving measures with short payback periods (<4 years typically).

No direct changes in policy measures are expected from the CSF in the short term with the exemption of the monitoring procedures, which can be improved considerably. The streamSAVE calculation methodology can be adopted and used to influence/recommend future policy changes at national level through the productive collaboration between RVO and the Dutch Ministry of Infrastructure.

1.2.7 Lithuania

First PA round

The CSF supported the Ministry of Energy to quantify the delivered energy savings from the implementation of BACS systems in buildings. Consequently, the provided support will affect all the planned measures and policies for the further deployment of BACS systems.

The CSF facilitated the development of a deemed method for quantifying the delivered energy savings, the specification of the required input data as well as the related data collection procedures and the formulation of recommendations to comply with the requirements of the additionality criterion according to Article 7 of the EED.

Second PA round

The CSF provided technical support to the Ministry of Energy to calculate more accurately the delivered energy savings of educational and counselling measures. Moreover, the CSF provided information about different types of measures and the respective energy saving factors. Also, information about best practises was requested from other countries and other practical methodologies for calculating energy savings. Policy instrument EE6 “Agreements with energy suppliers on consumer education and energy advice”benefited from the applied streamSAVE calculation methodology as the support provided by the CSF aimed at:

- The development of a method for calculating energy savings and the identification of the necessary input data.
- The integration of the developed calculation methodology into the measurement mechanism and the legal documentation for the accurate calculation of energy savings and monitoring the reduction of the energy consumption.
- The provision of recommendations for a more effective application of educational and consultation measures and the establishment of a monitoring action plan.

1.2.8 Portugal

First PA round

The CSF provided technical support to the Directorate General of Energy and Geology (DGEG) and its National Energy Efficiency Action Plan (NEAAP) by presenting the methodology on electric vehicles, which was developed within the streamSAVE project, and adapting this general methodology to the national circumstances. The provided support covered the indicative values, such as the typical unit consumption, the mileage and the energy saving factor, providing the opportunity to estimate energy savings through a deemed saving method, aligned with the EED requirements (Article 3 and Article 7).

The adaptation of the methodology to the national context was achieved through the establishment of the baseline and the quantification of the delivered savings by policies and measures to promote electric vehicles (subsidy schemes and fiscal benefits for consumers), while the methodology was also adapted to include the lifetime for the different categories of vehicles. Moreover, the specification of the required data for the verification, as well as the provision of guidance and sharing practices about the indicative values for different types of private vehicles (bikes, motorcycles, passengers' cars, LDV, HDV, buses) and public e-vehicles (buses, train, tram, metro) were also addressed in the CSF to improve the effective reporting and to ensure the reliable evaluation of the delivered energy savings. Also, indicative values for the specific consumption of both conventional and electric vehicles and for the emissions factor according to the Portuguese mix were collected.

Furthermore, the CSF analysed simplified BU calculation methods being used in other countries to calculate energy savings for modal shift of private cars towards cycling, walking and collective transport as well as for the extension of the public transport network. The performed analysis was based on Greek examples.

Therefore, the main objective of the CSF consisted of estimating the contribution of the promoted electric vehicles to the fulfilment of the targets under Articles 3 and 7 and utilizing the developed streamSAVE methodology and the indicative calculating values during the implementation of following programmes, which will be initiated according to the provisions of the Portuguese National Energy and Climate Plan:

- "Maintain and promote incentives for the purchase of 100% electric light vehicles, as well as the existing framework of tax incentives" programme.
- "Promote electric vehicles for urban micro-logistics" programme.
- "Promote the introduction and use of low emission vehicles and sustainable mobility in the state" programme.

Second PA round

The CSF supported DGEG to design and implement freight modal shift measures. Taking into consideration the lack of experience with modal shift measures and the

implementation of measures to promote goods transport by rail and sea within the framework of the NECP, the CSF focused on the eligibility of the developed streamSAVE calculation methodology for the planned measures in the short-term. As these types of measures have not been implemented yet in Portugal, the CSF supported DGEG firstly to understand the streamSAVE calculation methodology so they can apply the methodology in the future and assess the delivered energy savings.

The CSF aimed at the adaptation of the streamSAVE calculation methodology to the national context, the analysis of the indicative values for the different modes of transport, such as the typical unit consumption, the covered distances, etc., and the estimation of the energy savings through a deemed saving method, aligned with the EED requirements (article 3 and article 7), taking into account the national conditions (e.g.: small and peripheral country, looking at long distance deliveries, etc).

The primary objective comprised both the design of a methodology to evaluate the energy savings achieved by the promotion of modal shift measures for freight transport, as foreseen in NECP for 2030, and the assessment of their contribution to the fulfilment of the energy and climate targets.

Therefore, the following measures, which are included within the NECP under the priority "Promote goods transport by rail and sea", can be affected:

- Increase the competitiveness of railway transport
- Improve international connections
- Create conditions for railway interoperability

Even though the CSF provided valuable information for the overall design and evaluation of modal shift measures in freight transport, it is not expected that this methodology will be used officially since it can be considered as a top-down methodology rather than a BU methodology.

1.2.9 Slovenia

First PA round

The CSF supported the Ministry for Infrastructure (MzI) and relevant advisors from Jožef Stefan Institute (JSI) to quantify the delivered energy savings reported under the Energy Efficiency Obligation Scheme and the implemented alternative measures.

Even though the Slovenian catalogue has an existing method for estimating savings for energy management system implementation, it is difficult to evaluate energy savings delivered by BEMS or BACS systems accurately.

The methodology on BACS prepared within the streamSAVE project was presented including its adaptation to the national circumstances, which can improve the existing, Slovenian methodologies for estimating the savings achieved by the implementation of the energy management system.

Moreover, technical assistance was provided to prevent double counting of energy savings considering the guidelines for monitoring and reporting on the implementation of the NECP. Furthermore, the collection of appropriate data is also challenging for obligated parties (EEOs).

The objective was to integrate the developed streamSAVE methodology and the indicative calculation values into the national catalogue for quantifying the energy savings by energy efficiency policies and measures.

Second PA round

The CSF supported MzI and relevant advisors from JSI to quantify the delivered energy savings from measures to alleviate energy poverty. Currently, Slovenia does not have a dedicated methodological framework for assessing the energy savings delivered by energy poverty measures. Even though few programmes have been launched and monitored by Slovenian alternative measures Eco fund, more technical support was required for addressing the double counting issues and for specifying reference values for energy poor and low-income households to maximize the impacts of the implemented programmes. Indicatively, it was mentioned the introduction of the prebound factors for energy poor households into the existing national methodology for the calculation of the energy savings related to the refurbishment of residential buildings and behavioural changes.

Taking into consideration that Slovenia currently is developing the required legislative framework for energy poverty, along with the action plan including measures to alleviate energy poverty, the CSF facilitated the adaptation of the existing methodology so as not to target to the entire population, but to focus effectively on energy poor households according to their characteristics. The developed streamSAVE calculation methodology can be integrated into the Slovenian savings catalogue within the framework of the upcoming revisions.

1.2.10 Spain

First PA round

The CSF focused on the promotion of electric vehicles in Spain through the MOVES PLANs programme. More specifically, the streamSAVE methodology on electric vehicles was presented to the Instituto para la Diversificación y Ahorro de la Energía (IDAE) and the Ministerio para la Transición Ecológica y el reto demográfico (MITECO) were informed and adapted to the national circumstances.

Emphasis was placed on the determination of indicative values for the different types of vehicles. Since common interest was expressed for Spain and Portugal, the potential similarities between both countries were highlighted. Moreover, the support also included reference values on typical unit consumption, mileage, and energy savings factor providing the opportunity to estimate the energy savings delivered through a deemed saving method.

Beyond reference values or indicative values, technical support was provided on the development of the baseline, the requirements for complying with the additionality criterion in Article 7, the evaluation of the contribution of each factor to the resulted energy savings, the quantification of the impact of some factors, the assessment of the energy savings potential, the determination of the lifetime for the different types of vehicle categories and the specification of the required data to verify the implemented policies and measures.

Concluding, the CSF provided useful insights for assessing the already implemented measures and policies in Spain, which can be taken into consideration during the anticipated national mobility support programmes. More specifically, the planned programmes can benefit from the application of the methodology developed in the framework of the streamSAVE project addressing the problem that the current calculations are based on the non-adoption of the scrapping hypothesis. It should be noted that the adoption of the scrapping was considered for the case of the replacement of conventional passenger vehicles with electric ones, resulting in lower savings than those generated according to the existing calculation framework.

Second PA round

The CSF supported IDAE with the development of a methodology to quantify the energy savings delivered by small-scale RES central space heating (inc. hot water) and the adaptation of the existing plans to improve the energy efficiency of the buildings through the further deployment of small-scale RES technologies. Moreover, the existing methodologies were evaluated to align them with the proposed streamSAVE calculation methodology, to evaluate the applicability of the streamSAVE methodology at the national level and to recommend relevant adaptations.

The developed streamSAVE calculation methodology will support IDAE during the design of subsides for the promotion of heat pumps in residential sector and the accurate estimation of the delivered energy savings.

Even though no direct changes in existing policy measures are expected, the application of the streamSAVE methodology during the design of new subsidy scheme for heat pumps will facilitate the calculation of energy savings by increasing the accuracy and saving time for the involved policy officers.

Chapter 2 Analysis of activities within CSF

In this chapter, the performed activities within the framework of the CSF are presented for each Priority Action separately. The resulting impacts and the key outputs of this support are also explained.

2.1 Building Automation and Control Systems

Technical support through the CSF was provided to three different countries (Austria, Lithuania and Slovenia) for the PA of BACS.

2.1.1 Focus of support

Seven policy officers participated into the CSF's activities in the three countries representing five different organizations (Table 3).

Table 3: Involved policy officers and organizations within the CSF for the PA of BACS.

Metric	Austria	Lithuania	Slovenia
Number of involved policy officers	3	1	3
Number of organizations	2	1	2
Involved organizations	Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) Austrian Energy Agency (AEA)	Climate Change Management Group Ministry of Energy of the Republic of Lithuania	Ministry for Infrastructure (MzI) Jožef Stefan Institute (JSI)

The technical issues, which were addressed by the CSF, are presented in Table 4.

All involved countries gave priority to the compliance with Article 7 of the EED (and not Article 3 of the EED), while the estimation of the delivered energy savings through deemed savings methods was recognised as the most crucial technical aspect of BACS. Special emphasis was placed also on data collection or the assessment of monitored data by Austria and Slovenia.

Two countries (Lithuania and Slovenia) aimed at adapting or improving existing practices from the other MSs on calculation methodologies or indicative values.

Table 4: Addressed technical issues within the CSF for the PA of BACS.

Technical aspect	Austria	Lithuania	Slovenia
Baseline			X
Data collection or assessment of monitored data	X		X
Energy savings based on deemed streamSAVE methods	X	X	X
Cost-effectiveness			

CO_2 savings		X	
Behavioural aspects			X
Calculation of rebound, spill-over and free-rider effects			
Article 3			
Article 7	X	X	X
Streamlining between Article 3 and Article 7			
Screening and initial assessment of promising technical savings actions			X
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values		X	X
Reviewing existing calculation methodologies			
Other issues and targets	X		X

Additional technical issues were also discussed during the support, such as the lifetime and the calculation of the cumulative energy savings (Austria), the required documentation for verifying the achieved energy savings (Austria), the avoidance of double counting of energy savings (Slovenia) and the establishment of data collection procedures in consistency with the guidelines for monitoring and reporting the outcomes of implemented policies and measures (Slovenia).

2.1.2 Conducted activities

For the three country cases, the support comprised telephone support/online workshop in combination with online/email support (Table 5). In two countries (Austria and Slovenia) these activities were complemented by desk research, conducted by the consortium , while the organization of in-country workshop (due to covid) and peer-to-peer exchange of experience between countries were less applied for the CSF.

Table 5: Type of conducted activities within the CSF for the PA of BACS.

Activity	Austria	Lithuania	Slovenia
In-country workshop			X
Telephone support/Online workshop	X	X	X
Online/email support	X	X	X
Desk research consortium	X		X
Peer-to-peer exchange of experience between countries			
Other activities			

In **Austria**, the developed methodology for BACS was presented during the first workshop (on October 21st, 2021) including suggestions on the adaptation of the streamSAVE methodology to the national circumstances and the data collection for the verification of

the energy savings. BMK and AEA then prepared feedback and questions on the presented methodology and suggestions.

The CSF (via desk research) helped with the adaption of the indicative calculation values according to the national circumstances considering the obtained feedback. Hereto, the data of the Austrian catalogue with regards to the BU calculation methodologies (e.g., reference buildings) were studied.

Moreover, the CSF identified the data to be collected from the obligated parties for conducting the required verification activities. All these activities led to a strategy for reporting the delivered energy savings for the first year. The results were presented and discussed with the Austrian Institute of Construction Engineering (OIB) and AEA in a second workshop on January 24th ,2022. The final version of the suggested methodology was sent to the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology.

In **Slovenia**, the main objective of the first meeting (on October 19th, 2021) was to present the developed methodology for BACS, to formulate proposals for it's the adaptation to the national context and to define appropriate data collection procedures for conducting the required verification procedures.

JSI checked the compliance of the proposed figures within the developed streamSAVE calculation methodology for the different types of buildings with both the existing rules for determining energy savings and the Slovenian strategy for energy renovation of buildings in Slovenia by 2050. The streamSAVE platform was also presented to the stakeholders and tested for the PAs of BACS and heat recovery.

Moreover, the CSF supported (via desk research) the adaption of the national values, examined the possibility to adapt and improve the existing methodologies and proposed the data that should be collected from obligated parties. The results were presented and discussed with the Ministry (MzI) and JSI at the second national meeting (on January 21st, 2022).

Finally, the Slovenian Statistical Office also requested support on developing methodologies for monitoring and verifying the implemented policies and measures within the framework of the NECP. JSI presented the streamSAVE methodologies for the PA of heat recovery on January 14th ,2022 and agreed to support the development of the methodological framework for monitoring the installed heat recovery systems based on statistical data.

2.1.3 Key outputs and impacts

The CSF in **Austria** resulted into a ready-to use methodology for BACS, which can be integrated into the Austrian catalogue enabling:

- The specification of national calculation values for residential and non-residential buildings, in compliance with the requirements of Article 7.
- The establishment of verification requirements.

Considering the impacts, the above outputs will benefit the Austrian savings reporting through:

- The detailed and robust reporting of the implemented policies and measures due to less complicated reporting process via the standardized BU calculation methodology and the defined national calculation values.

- The increased quality in the calculation of energy savings delivered by the implementation of BACS in buildings.
- The improved awareness of obligated parties on BACS.

In **Lithuania**, the CSF activities facilitated the revision of the calculation methodologies and will consequently improve the procedures for the estimation of the delivered energy savings of BACS in buildings.

The possibility was discussed in **Slovenia** for the potential integration of the developed BACS methodology in the Slovenian catalogue, which can be beneficial for the estimation of the achieved energy savings.

The developed BACS methodology was adapted to the national context of Slovenia through the determination of national calculation values for residential buildings, the update of the energy carrier shares to be aligned with the strategy for energy renovation of buildings in Slovenia by 2050; and the specifications of the required verification procedures.

Other potential impacts comprise streamlining of the reporting process regarding the implemented policies and measures within the NECP; improving the existing awareness of the obligated parties on BACS; and support of the national Statistical Office on the monitoring of the savings methodology.

2.2 Electric Vehicles

In the CSF technical support was provided to four different countries (Belgium, the Netherlands, Portugal and Spain) for the PA of electric vehicles.

2.2.1 Focus of support

Sixteen policy officers participated into the CSF's activities in the four countries, representing eight different organizations (Table 6). The technical issues, which were addressed by the CSF, are presented in Table 7.

Most of the involved countries (Belgium, Portugal and Spain) gave priority to the compliance with Article 7 c , while the determination of the baseline was recognised by all involved countries as the most crucial technical aspect for the case of electric vehicles. Moreover, technical support was requested on data collection procedures and the estimation of the energy savings through deemed methods. Three countries (the Netherlands, Portugal and Spain) aimed at adapting or improving existing practices from other MSs on calculation methodologies or indicative values.

Table 6: Involved policy officers and organizations within the CSF for the PA of electric vehicles.

Metric	Belgium	the Netherlands	Portugal	Spain
Number of involved policy officers	5	3	5	3
Number of involved organizations	4	1	2	1
Organizations	SPF Economy – Directorate General Energy SPF Finance Defence Ministry Federal Institute for Sustainable Development	Rijksdienst voor Ondernemend Nederland (RVO)	Direção Geral de Energia e Geologia, Ministry of Environment and Energy (DGEG) Plano Nacional de Ação para a Eficiência Energética - NEAAP	Instituto para la diversificación y ahorro de la energía (IDAE)

Table 7: Addressed technical issues within the CSF for the PA of electric vehicles.

Technical aspect	Belgium	Netherlands	Portugal	Spain
Baseline	X	X	X	X
Data collection or assessment of monitored data	X		X	X
Energy savings based on deemed streamSAVE methods		X	X	X
Cost-effectiveness				X
CO_2 savings		X		X
Behavioural aspects				
Calculation of rebound, spill-over and free-rider effects				
Article 3		X		
Article 7	X		X	X
Streamlining between Article 3 and Article 7				
Screening and initial assessment of promising technical savings actions	X			
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values		X	X	X

Reviewing existing calculation methodologies		X		
Other issues and targets	X		X	X

Additional technical issues were covered by the CSF, such as the compliance with the additionality criterion to the Clean Vehicle Directive (Belgium), the specification of lifetime and the documentation requirements for verification (Spain). Furthermore, a methodology for the evaluation of savings from soft modes in transport based on desk research and sharing of experiences from other countries was discussed, going beyond the initial scope of the PA (Portugal).

2.2.2 Conducted activities

For the four country cases, the technical support was provided combining telephone support/online workshops, online/email support and desk research (Table 8). The organization of in-country workshops (due to covid) and peer-to-peer exchange of experiences between countries were considered as less popular approaches.

Table 8: Type of conducted activities within the CSF for the PA of electric vehicles.

Activity	Belgium	Netherlands	Portugal	Spain
In-country workshop				
Telephone support/Online workshop	X	X	X	X
Online/email support	X	X	X	X
Desk research consortium	X	X	X	X
Peer-to-peer exchange of experience between countries			X	
Other activities			X	

In **Belgium**, the developed methodology for electric vehicles was presented during the first online workshop (on October 14th, 2021). The Federal Public Service for Economy presented the examined policy programmes pinpointing the existing questions and bottlenecks. More specifically, the applied approach should comply with the Art. 7 additionality criterion for the two federal programmes, namely the federal car fleet and the zero emission company cars. The CSF examined the identified issues (e.g., data availability, calculation method, additionality to the Clean Vehicle Directive) and proposed potential solutions for addressing these.

For the case of the policy measure for the federal car fleet, the methodology and indicative values were adapted to the national context and a proposal was developed for the data collection procedure, which was presented in the second workshop (on November 25th, 2021). During the workshop, the excel calculation sheet for the federal car fleet was presented to highlight the required data for calculation of the energy savings at national level. Finally, the compliance with the additionality criterion to the Clean Vehicle Directive was discussed extensively. The discussion on the excel calculation sheet resulted in sufficiently concrete input for the policy officers of the SPF Finance on the data needs for calculating the energy savings from the zero emission company cars measure. After the second workshop, the required data was gathered, and another excel calculation sheet was developed to facilitate the calculation of these specific savings.

It should be noted that the required data for developing the calculation tool for the case of the federal car fleet, were collected by the FPS Economy, such as the distribution of purchased cars per year and per fuel type and the distance travelled. For the case of the zero-emission company cars, the collection of the required data was more difficult as relying more on scenario analysis and surveys of lease companies and company car users.

In the **Netherlands**, three online workshops were organised to discuss the developed BU calculation methodologies and to share good practices (kick-off on October 15th, 2021, on November 17th, 2021 and on February 4th 2022) enabling the review of the existing methods and data availability at the side of the RVO.

Good practices and state-of-the-art calculation methods (deemed savings) were presented also focusing on the establishment of baseline/reference values and taking into account the different technical requirements, such as additionality, avoidance of double counting, lifetimes, import/export etc.

Vehicle data were collected for estimating the achieved energy savings in the transport sector. The required data were available through the cooperation of RVO with Netherlands Vehicle Authority (RDW), which is the Dutch authority for registering any motorized vehicles (amongst others).

Moreover, materials (such as documents/e-mails) were exchanged with hands-on advice and suggestions, while peer-to-peer knowledge on best practices for electric vehicles energy saving calculations was exchanged focusing on vehicle imports and fuel saving calculations of replacing buses and vans. It should be noted that another important topic was the promotion of soft modes of transportation (e.g., promotion of bikes, walking, other means of transport over motorized).

In **Portugal**, several contacts were made (email and telephone) with DGEG before starting the CSF. The CSF focused on policies and measures implemented under the scope of the NEEAP, which were evaluated by the EC for the period up to 2020.

The first workshop (on October 12th, 2021) focused on the presentation of the streamSAVE methodology for electric vehicles and identified how it could be applied for the Portuguese case. A preliminary assessment to identify the policies and measures for testing the methodology and validate the streamSAVE platform was carried out by ISR prior to the meeting (desk research), through screening the available public documents and legislation related to the Portuguese NEEAP. The first workshop also aimed at identifying the needs and the existing data sources at national level, investigating their robustness and availability and understanding the type of support to be delivered. Finally, specific recommendations were discussed on how the methodology could be adapted to the national circumstances and what data had to be collected for the required control and verification procedures.

The CSF provided continuous support upon request by the involved public officers. Some additional bilateral meetings were carried out (on November 3rd and on November 12th, 2021) and several emails were exchanged, mainly to discuss the robustness of the national values and the adaptation of the methodology to national circumstances, the identification of the most effective data collection procedures and the differences in the vehicle distances being used compared to the baseline consumption.

During the second meeting, the streamSAVE methodology for electric vehicles was tested in programmes, which have been implemented within the framework of NEEAP (promotion of electric vehicles to replace conventional vehicles) and are accounted for the achievement of the 2020 target. During this meeting, a full test of the streamSAVE platform

was conducted using streamSAVE indicative values as well as national indicative values for the case of electric vehicles. The obtained results were compared with current practices pointing to a small difference due to a smaller value of baseline consumption of existing vehicles. The analysis led to the conclusion that the used reference values can be revised taking into account the ongoing market developments.

Additional targeted meetings were carried out mid-November, which focused on the implementation of BU calculation methodologies to evaluate policies and measures for promoting soft modes (e.g., bicycles and scooters for replacement of conventional vehicles, as well as greater use of public transport, e.g., social pass). Hereto, ISR collected the best available information from other countries, among the consortium partners and via desk research. The provided data within the framework of the Eurobarometer surveys and the Urban Mobility Scoreboard were examined even if no useful data, nor any indicative values for energy savings evaluation were found.

Moreover, ISR also provided a translation, from German to English, of the Austrian methodology based on the EEOs catalogue. Given the particular interest in southern countries, like Greece, as there are similarities between Athens and Lisbon, CRES provided the utilised methodology to assess the delivered energy savings by the promoted e-bikes in Greece including the defined indicative values. A calculation sheet was distributed to facilitate the application of the developed methodology as an alternative approach.

Finally, it was decided that the representatives of the NEEAP would assess individually the streamSAVE Training Module both for lighting and electric vehicles and complete the feedback questionnaire.

In **Spain**, the developed streamSAVE methodology for electric vehicles was presented in the first workshop (on October 19th, 2021), including recommendations about its adaptation to the national circumstances and the required data for the control and verification procedures. IDAE explained the implemented programmes for promoting mobility (Sustainable Mobility – MOVES in its different editions) and the applied approach for addressing the before-mentioned technical issues.

The CSF supported IDAE with desk research to adapt the current national values considering the indicative values as proposed by streamSAVE. A detailed review of the existing sources was conducted, while the involved IDEA experts reviewed their existing data collection procedures to increase their effectiveness. IDAE provided indicative values for CO_2 emissions for different types of vehicles, while they specified the National GHG Inventory as the most reliable source of information for calculating GHG emissions within the framework of the UNFCCC for the potential revision of the streamSAVE calculation methodology.

Moreover, special guidance was provided on additional technical issues. The estimated energy savings of the streamSAVE methodology were, for example, compared with the existing ones identifying potential differences and assessing their effectiveness.

After a period of consideration, exchange of documentation and testing of the streamSAVE platform, a second workshop was organised (on January 19th, 2022). The objective of the second workshop was to evaluate together with IDAE the conclusions from the CSF activities and to share the experience with the streamSAVE platform. The experiences shared with the policy officers associated with the mobility department in IDAE and the lessons learned were analysed in order to integrate these into the new sustainable mobility programmes, which promote the purchase or the replacement of conventional vehicles (private as well as public) with electric vehicles.

Obviously, the current programme cannot be adapted, as it is already in progress, but the developed BU calculation methodology seems to be very useful and can be taken into account in the potential re-design of the programme. A potential improvement can be the exclusion of the scrappaging in the calculation of the delivered energy savings. Finally, IDEA assessed the streamSAVE platform as user-friendly and understandable.

2.2.3 Key outputs and impacts

In **Belgium**, the final output consisted of a ready-to-use calculation sheet (in excel) for each of the two affected measures. The developed calculation sheets facilitated the compliance with the following aspects:

- Data gathering of the relevant data types.
- Setting up of the baseline, in which the additionality criterion has been incorporated.
- Specifying national calculation values.
- Estimating the total annual and cumulative energy savings according to the requirements of Article 7.

For the measure of the federal car fleet, the discussion focused more on the additionality to the Clean Vehicle Directive and the impact on the baseline since the majority of the required data was available. For the measure of the zero emission company cars, the collection of the required data was more challenging, while it was considered as a good starting point for notifying this measure and calculating energy savings in frame of Article 7.

The impacts triggered by the activities of the CSF include the incorporation of the developed streamSAVE calculation methodology into the revised Circular 307septies and the planned notification of both measures within framework of Article 7.

In the **Netherlands**, the main outputs consisted of concrete suggestions for the development of a robust and cost-effective method for the calculation of Article 7 energy savings and CO_2 emission reductions using the data available covering the following issues:

- Advice on good practices to improve monitoring and data collection.
- Advice on parameters (such as reference values, lifetimes etc.).
- Addressing the impact of imports on energy savings calculations.
- Advice on dealing with soft modes for transportation replacing motorized equipment.
- Advice on baselines and standardized values for various means of transport (busses, trams, vans and ferries in particular).
- Quantification of the petrol energy consumption figures for vans (amongst other modes of transport).

Considering the impacts, the conduction of more accurate estimations of energy savings and CO_2 emission reductions triggered by the promoted electric vehicles as realized by the adapted RVO's monitoring practices and calculations is expected. Furthermore, more specific figures on different means of transport (busses and vans in particular) will become available, including a methodology for estimating accurately the impact of imports on energy savings calculations.

In **Portugal**, the key outputs included the specification of national calculation values for different types of private and public vehicles, the development of data collection procedure

guidelines and the enhancement of the control and verification requirements according to the provisions of the EED.

Moreover, a detailed assessment was carried out to identify the policies and measures included in the NECP for 2020-2030 horizon to promote electric vehicles and the consequent decarbonization of the transport sector. Finally, guidance was provided for calculating the energy savings for modal shift of private cars towards cycling, walking and collective transport as well as for the extension of the public transport network.

The achieved impacts in Portugal consist of the design and implementation of new energy efficiency measures (particularly soft modes) delivering new energy savings, the improvement of the reporting quality, the enhanced awareness of the involved parties on actions for the promotion of electromobility, the evaluation of the already implemented policies and measures through the comparison of the applied national methodology with the streamSAVE methodology and the potential adoption of the streamSAVE methodologies for programmes advocated in the NECP.

In **Spain**, the key outputs included the specification of national calculation values for different types of private and public vehicles (focus on emission factor for electricity), the establishment of data collection procedures, the fulfilment with the control and verification requirements and the determination of a factor of additionality for the case of scrapping.

The obtained outputs of the CSF resulted in considerable impacts, such as:

- Fostering the estimation of final energy savings.
- Improvement of the foreseen reporting of the implemented actions due to less complicated reporting process.
- Increase in the accuracy of the calculations for the delivered energy savings.
- Improvement of the awareness of the involved parties on actions for the promotion of the electromobility.
- Expansion of the framework for calculating the energy savings including those vehicles that are scrapped.

2.3 Heat Recovery

Technical support through the CSF was provided to three countries (Czechia, Croatia and Greece) for the PA of heat recovery.

2.3.1 Focus of support

Seven policy officers participated in the activities of the CSF in the three countries representing five different organizations (Table 9).

Table 9: Involved policy officers and organizations within the CSF for the PA of heat recovery.

Metric	Czechia	Croatia	Greece
Number of involved policy officers	2	3	2
Number of involved organizations	1	2	2
Organizations	Ministry of Industry and Trade (MIT)	Energy Institute Hrvoje Požar (EIHP) Ministry of Economy and Sustainable Development (MoESD)	Ministry of Environment and Energy (MoEE) Centre for Renewable Energy Sources and Saving (CRES)

The technical issues, which were addressed by the CSF, are presented in Table 10. All involved countries considered the compliance with Article 7 as a priority . Moreover, the definition of the baseline and data collection or assessment of the monitored data were identified as crucial technical aspects for the case of heat recovery.

Also, the estimation of energy savings based on deemed streamSAVE methods and the cost-effectiveness were considered as important aspects for the case of Croatia and Greece. Finally, the need to quantify the delivered energy savings within the framework of Article 3 was mentioned in two countries (Czechia and Croatia).

Two countries (Croatia and Greece) aimed at adapting or improving existing practices based on calculation methodologies or indicative values from other MSs. Moreover, screening and an initial assessment of promising technical savings actions were selected as well, highlighting the fact that insufficient knowledge is available for estimating the achieved energy savings by the promoted heat recovery systems.

Table 10: Addressed technical issues within the CSF for heat recovery.

Technical aspect	Czechia	Croatia	Greece
Baseline	X	X	X
Data collection or assessment of monitored data	X	X	X
Energy savings based on deemed streamSAVE methods		X	X
Cost-effectiveness		X	X
CO_2 savings		X	
Behavioural aspects		X	
Calculation of rebound, spill-over and free-rider effects		X	
Article 3	X	X	
Article 7	X	X	X
Streamlining between Article 3 and Article 7			

Screening and initial assessment of promising technical savings actions		X	X
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values		X	X
Reviewing existing calculation methodologies	X		
Other issues and targets			

Additional technical issues were discussed in the CSF, such as the procedure for controlling and verifying the achieved energy savings and the specification of the lifetime (Greece).

2.3.2 Conducted activities

For all country cases, the technical support was provided combining telephone support/online workshops and desk research (Table 11). Online/email support was provided in two countries (Czechia and Croatia), while the organization of in-country workshop (due to covid) and peer-to-peer exchange of experience between countries were less applied approaches.

Table 11: Type of conducted activities within the CSF for the PA of heat recovery.

Activity	Czechia	Croatia	Greece
In-country workshop			X
Telephone support/Online workshop	X	X	X
Online/email support	X	X	
Desk research consortium	X	X	X
Peer-to-peer exchange of experience between countries		X	
Other activities	X		

In **Czechia**, the MIT sent a set of questions related to articles 3 and 7 of the EED and the implemented policies and measures in order to preparate of the meetings and to define the scope of the CSF. The questions covered various fields, such as buildings, transport and cross-cutting issues; emphasis was placed on the energy saving calculation methodologies.

Three meetings and some additional informal exchange took place with the Ministry's representatives. The first contact was organised in October requiring specific clarification about the eligibility of the various measures, while the second meeting was conducted in December (on December 15th, 2021). It should be noted that the preliminary version of OP TAC Terms of Reference and the national energy savings catalogue, which has been drafted by the Ministry and is currently under review by the European Commission, was assessed.

The conclusions, the streamSAVE platform and the utilised methodologies were presented in the final workshop (on January 10th, 2022).

In **Croatia**, expert advice was provided on good practices and state-of-the-art deemed methods for the estimation of energy savings, establishing baseline/reference values and taking into account additionality, avoidance of double counting, lifetimes, import/export

etc. The first contact was arranged in September 2021 to discuss the most important technical issues and decide on the applied approach within the framework of the CSF.

The first CSF workshop was held on November 26th, 2021 as an online meeting. The challenges in Croatia regarding calculation methodologies were presented as none of the 33 existing EEO methodologies in the Regulation has focused on heat recovery. Therefore, the initial objective was to check whether the developed streamSAVE methodologies could satisfy the needs of the Croatian Regulation. Obviously, the developed streamSAVE methodologies could be used as part of the Guidelines during the revision of the existing framework.

The fruitful discussion on the methods was focused on the reporting data and factors, behavioural elements, assumptions etc. Finally, the streamSAVE platform was shown to the participants with the links to guidelines and the calculation excel, while it was requested to fill in the questionnaire.

A second meeting was organised (on February 16th, 2022) with representatives of EIHP in order to assess the lessons learned of the CSF activity and to explore the possibility to integrate officially the developed streamSAVE calculation methodologies into the national catalogue.

In **Greece**, the first contact with the representatives of MoEE and CRES took place by phone on September 17th, 2021. It was agreed that the first national workshop would be organized mid-October 2021 aiming at the presentation of the methodology for heat recovery developed within the streamSAVE project. Specific recommendations were given on how the proposed methodology could be applied in order to estimate the energy savings from the planned policy programme within the Recovery and Resilience Plan for improving the energy efficiency in the industrial sector. Emphasis was placed both on the required data for the calculation of the energy savings and the control and verification activities that have to be carried out after the completion of the policy programme.

The first workshop was organised online on November 3rd, 2021. The initial discussion focused on the developed methodologies for quantifying the delivered energy savings from the installation of heat recovery systems. In general, the development of a deemed method was preferred to facilitate the participation into the planned Recovery and Resilience Fund programme and to simplify the required control and verification activities.

Moreover, additional information was required for the specifications of the metering systems. A guidance was provided to apply the provisions of IPMVP and ASHRAE protocols.

In summary, it was agreed to assess:

- The applicability of the proposed methodologies with the responsible authority of the planned Recovery and Resilience Fund programme, including a preliminary estimation of the expected energy savings.
- The potential use of the reported data in the Energy Audit Registry for estimating specific indicators.
- The integration of the proposed BU calculation methodologies into the national catalogue of the Energy Efficiency Obligation (EEO) scheme.

After the organized workshop, the representatives of the Administrator for the Calculation, Monitoring, Control and Verification of the EEOs, in cooperation with the country leader, quantified the expected energy savings triggered by the planned policy programme identifying the appropriate input data and specifying the required data collection procedures after the initiation of the policy programme.

Afterwards, a teleconference was organized on November 17th, 2021 to present the streamSAVE platform to the representatives of the MoEE and CRES, elaborating different scenarios for all PAs. Moreover, it was decided that the representatives would assess individually the streamSAVE platform and complete the respective questionnaire. As a result, the streamSAVE platform was tested by MoEE (heat recovery and EV), and CRES (all PAs). The completed questionnaires were sent on November 29th, 2021.

The reported data in the Energy Audit Registry were analysed in order to estimate specific indicators for the case of heat recovery technologies in industrial units and to examine the possibility to develop a BU equation based on deemed savings. In total, 39 energy efficiency proposals were identified and analysed leading to the acquisition of useful statistics, such as the annual final and primary energy savings , the foreseen investments, the CO_2 reduction and the cost-effectiveness ratio as calculated by the division of the foreseen investments with the delivered primary energy savings and the CO_2 reduction on annual basis for each industrial unit separately. All the findings were summarized in the technical memo «Analysis of heat recovery technologies in industrial sector», which was prepared and distributed to the involved stakeholders in order to explore the possibility to develop a deemed method.

The obtained results were discussed with the representatives of the MoEE (phone call on January 9th, 2022) including the possibility to develop a BU equation. It was concluded that the development of a BU equation based on deemed savings is feasible. Nevertheless, an energy audit prior to the installation of the heat recovery technologies was preferred facilitating the collection and verification of the required data.

It was agreed to postpone the second national workshop until the appointment of the responsible authority for the administration of the Recovery and Resilience Fund programme. Moreover, the possibility will be explored for integrating the developed BUs into the national catalogue for assessing the delivered energy savings within the framework of the EEOs.

2.3.3 Key outputs and impacts

In **Czechia**, the CSF led to specific impacts on the OP TAC requirements by:

- Improving the quality of the targeted scheme for industry and services.
- Extending the existing project portfolio supported by OP TAC.
- Increasing the quality and comprehensiveness requirements on energy savings measures in the projects supported by OP TAC.

In **Croatia**, the key outputs triggered by the implemented activities of the CSF included:

- The formulation of concrete suggestions for the development of a robust and cost-effective method for the calculation of Article 7 energy savings and CO_2 emission reductions using the data available.
- The revision of the existing calculating methodologies.
- The provision of advice on good practices to improve monitoring and data collection.
- The definition of specific parameters (e.g., reference values, lifetimes etc.).

The CSF can lead to the potential integration of the developed methodology into the national catalogue and will therefore motivate the obligated parties to implement such types of policies and measures. Moreover, additional impacts can be derived as the quantification of the delivered energy savings becomes feasible. Moreover, the awareness of the involved parties on actions for the further penetration of heat recovery technologies

will improve, as well as the compliance with the technical requirements of Annex V of the EED.

In **Greece**, the modification of the existing Greek catalogue within the framework of the EEO scheme constitutes the main impact of the CSF. More specifically, the integration of a specialized equation for promoting heat recovery in the industrial sector has already been applied, while the required data collection and control and verification procedures will be specified.

The preparation of the technical memo «Analysis of heat recovery technologies in industrial sector» is also a beneficial output, increasing the possibility to develop a deemed method for calculating the delivered energy savings by the installed heat recovery systems.

Finally, the application of the adapted methodology led to considerable impacts, such as the following ones:

- Improvement of the quantification of the delivered energy savings by programmes for the promotion of heat recovery technologies in the industrial sector.
- Increased accuracy of the calculations for the delivered energy savings.
- Calculation of the cost-effectiveness ratio to facilitate the evaluation of the implemented policies and measures.
- Increased awareness of the involved parties on actions for the further penetration of heat recovery technologies.
- Facilitation the effective compliance with the technical requirements of Annex V of the EED.

2.4 Modal shift for freight transport

Technical support through the CSF was provided to two countries (Greece and Portugal) for the PA of modal shift for freight transport.

2.4.1 Focus of support

Seven policy officers participated into the activities in the two countries representing three different organizations (Table 12).

Table 12: Involved policy officers and organizations within the CSF for the PA of modal shift for freight transport.

Metric	Greece	Portugal
Number of involved policy officers	3	4
Number of organizations	2	1
Involved organizations	Ministry of Environment and Energy (MoEE) Centre for Renewable Energy Sources and Saving (CRES)	Directorate-General for Energy and Geology (DGEG)

The technical issues, which were addressed by the CSF, are presented in Table 13.

The compliance with Articles 3 and 7 of the EED was considered as a priority by the involved countries, while the definition of the baseline, the establishment of data collection procedures, the estimation of the delivered energy savings through deemed savings

methods and the evaluation of the cost effectiveness were recognised as the most crucial technical aspects for the case of modal shift for freight transport.

Greece aimed at adapting or improving existing practices from the other MSs on calculation methodologies or indicative values, while the initial screening and assessment of promising technical savings actions was stated as the main objective in Portugal.

Table 13: Addressed technical issues within the CSF for the PA of modal shift for freight transport.

Technical aspect	Greece	Portugal
Baseline	X	X
Data collection or assessment of monitored data	X	X
Energy savings based on deemed streamSAVE methods	X	X
Cost-effectiveness	X	X
CO_2 savings		X
Behavioural aspects		
Calculation of rebound, spill-over and free-rider effects		
Article 3	X	X
Article 7	X	X
Streamlining between Article 3 and Article 7		
Screening and initial assessment of promising technical savings actions		X
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values	X	
Reviewing existing calculation methodologies		
Other issues and targets		

Additional technical issues were also discussed in Portugal, such as the eligibility and feasibility of the market structure, the compliance with the criterion of additionality and the specification of the lifetime of savings. Moreover, emphasis was placed on understanding the existing energy saving potential and indicative values in order to ensure the potential adoption of the streamSAVE calculation methodology to the national context.

2.4.2 Conducted activities

For the two country cases, the support comprised in-country workshop, phone/online workshop in combination with online/email support (Table 14). The desk research conducted by the consortium constituted as alternative approach in Greece, while the peer-to-peer exchange of experience between countries was applied in Portugal.

Table 14: Type of conducted activities within the CSF for the PA of modal shift for freight transport.

Activity	Greece	Portugal
In-country workshop	X	
Telephone support/Online workshop	X	X
Online/email support	X	X
Desk research consortium	X	
Peer-to-peer exchange of experience between countries		X
Other activities		X

In **Greece**, a physical workshop at MoEE was organised on 15th September 2022 to present the streamSAVE calculation methodology and the training module to the involved policy officers . Prior to the first workshop, several bilateral contacts took place at regular intervals. The presentation of both the methodology and training module raised a few discussions and considerations on, for example, how the methodology can be adapted to the national circumstances with the specification of national indicative values and what type of data must be collected for the required control and verification activities. Moreover, the participants raised questions on the possibility to take into account additional groups of products for all distance classes for the calculation of the total final energy savings (Article 7).

In line with the planned activities within the framework of the CSF, MoEE and CRES' representatives assessed the training module on the streamSAVE platform and completed the respective questionnaire for freight transport. However, after running several scenarios with respect to the share of electricity in freight transport (after implementation), it was decided not to proceed with the organization of a second workshop since the resulting energy savings potential, for using electricity at different percentages (share before and after implementation) in freight transport was not significantly high compared to Greece's target (7,299 ktoe) set within the framework of Article 7 of the EED. More specifically, it was calculated that the overall energy saving potential could reach 6.9 ktoe of annual savings assuming 75% share.

Furthermore, discussion was carried out about the calculation of the cost-effectiveness, the evaluation of the potential degradation of the delivered energy savings over the years, the determination of the lifetime for the different modes of transport and the specification of the required data for the verification of the implemented measures.

It should be noted that the cost-effectiveness seems to be competitive compared to the existing alternative measures. It is mentioned indicatively that the cost-effectiveness is equal to 1.7 million €/ktoe for the case of shifting dry bulk from road transport to rail transport in distances up to 149 km taking into account the fixed costs for a period of 30 years. Furthermore, it was concluded that the cost-effectiveness is rather competitive compared to the existing alternative measures.

Statistical data about the final energy consumption of the road and rail transport in Greece were retrieved by EUROSTAT's database. The calculation of the energy saving potential was implemented through the excel form "Freight Transport: modal shift potentials from road

to rail per Member State Overall potential", which was distributed to the involved policy officers in order to run additional scenarios.

In **Portugal**, the preparatory activities focused on the identification of energy efficiency measures, which could be interesting for applying the streamSAVE calculation methodology, for the promotion of modal shift for freight transport taking into account the expansion and improvement of the announced rail network connections and the inclusion of specific measures in the NECP for 2030. This information was crucial for the discussions about the concrete needs and the assessment of the potential energy savings that can be hypothetical achieved.

Due to the lack of available data (national indicative values) and robust data interchange system in Portugal, it was not feasible to run a comparative analysis between the national methodology and the streamSAVE calculation methodology. Consequently, the activities carried out were mainly about sharing experiences with Greece and Austria. Moreover, capacity building support was focused on the data collection procedures, the type of the required data and procedures for collecting them, as well as recommendations to exploit and use the streamSAVE calculation methodology.

The first online workshop was carried out on 30th September 2022, while a second online workshop was organised on 23rd November 2022.

An additional bilateral meeting was arranged on 16th December 2022 for testing the training module on the streamSAVE platform and filling in the feedback survey. DGEG highlighted the lack of available data at national data hindering the utilization of the training module and the accurate evaluation of the streamSAVE calculation methodology. Nevertheless, the training module was tested examining two different scenarios about the shift of the overall technical potential (assuming 25% and 50% shift).

The participants raised a question about the destination country when evaluating the energy savings of modal shift measures. The fact that the methodology does not take into consideration the destination country was pinpointed as the main criticism. It should be noted that the overall potential was quantified considering a total shift of the existing technical potential leading to an energy saving potential equal to 448 GWh.

Finally, information was requested about the cost-effectiveness of the planned measures and policies, which is an essential metric for the planned policy measures in the future. Nevertheless, some cost data is provided by the streamSAVE's Guidance D2.2 being based on a Dutch study.

2.4.3 Key outputs and impacts

The CSF in **Greece** resulted in the following key outputs:

- Development of a specialised measurement protocol based on a deemed method.
- Indicative values for the application of the developed deemed method.
- Establishment of data collection, monitoring control and verification procedures.
- Organisation of a workshop.

Moreover, the main triggered impacts include:

- Quantification of the delivered energy savings by the implemented policies and measures to foster modal shift in freight transport.
- Increased accuracy of the calculations for the delivered energy savings.

- Increased reporting of the implemented actions due to less complicated reporting process.
- Improvement of the existing Greek catalogue of the EEOs.
- Effective application of the required control and verification procedures.
- Compliance with the technical requirements of Annex V of the EED.
- Improved awareness of the involved parties on actions for promoting modal shift in freight transport.

In **Portugal**, the importance of the streamSAVE calculation methodology was recognised, highlighting the need for more consistency among the applied approaches in the MS and realistic estimates of the realized energy savings. However, DGEG does not expect to benefit from the streamSAVE calculation methodology, even if it is useful and meaningful, because it can be considered as a top-down methodology. Moreover, it was not possible to assess the validity of the streamSAVE calculation methodology despite the fact that the formulas and the assumptions were considered as valid and useful.

Nevertheless, the streamSAVE calculation methodology can facilitate the design of evidence-based policies and measures contributing to the promotion of modal shift for freight transport and fostering the decarbonization of the transport sector and the improvement of energy efficiency.

The CSF managed to raise awareness on the need to exploit the energy saving potential from modal shift for freight transport. The improvement of the rail network in Portugal has been examined several times, but the political agenda and the limited budget have created several obstacles hindering the implementation of targeted policies and measures.

Obviously, the streamSAVE calculation methodology can be a useful instrument to demonstrate the importance of modal shift measures to increase energy savings and to reduce the environmental impact of the transport and cargo sector, while the improvement of the rail network and the expansion of the existing network to other places can be supported also, as an excellent complement to sustainable mobility decreasing simultaneously the urban mobility.

2.5 Motor replacement

Technical support through the CSF was provided to two countries (Austria and the Netherlands) for the PA of motor replacement.

2.5.1 Focus of support

Four policy officers participated into the activities in two countries representing three different organizations (Table 15).

Table 15: Involved policy officers and organizations within the CSF for the PA of motor replacement.

Metric	Austria	The Netherlands
Number of involved policy officers	1	3
Number of organizations	1	2
Involved organizations	E-Control	Rijksdienst Voor Ondernemend Nederland (RVO; Dutch Enterprise Agency) TPA Adviseurs

The technical issues, which were addressed by the CSF, are presented in Table 16. The compliance with Article 7 of the EED was considered as a priority in Austria, while the need to streamline the provisions between Article 3 and Article was mentioned for the case of the Netherlands. The definition of the baseline, the establishment of data collection procedures and the estimation of the delivered energy savings through deemed savings methods were recognised as the most crucial technical aspects for the case of motor replacement. Special emphasis was placed on the cost-effectiveness ratio by the Netherlands.

The two involved countries aimed at both adapting or improving existing practices from the other MSs on calculation methodologies or indicative values and reviewing the existing calculation methodologies.

Table 16: Addressed technical issues within the CSF for the PA of motor replacement.

Technical aspect	Austria	The Netherlands
Baseline	X	X
Data collection or assessment of monitored data	X	X
Energy savings based on deemed streamSAVE methods	X	X
Cost-effectiveness		X
CO_2 savings		
Behavioural aspects		
Calculation of rebound, spill-over and free-rider effects		
Article 3		
Article 7	X	
Streamlining between Article 3 and Article 7		X
Screening and initial assessment of promising technical savings actions		
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values	X	X
Reviewing existing calculation methodologies	X	X
Other issues and targets		

2.5.2 Conducted activities

For the two country cases, the support comprised telephone support/online workshop, online/email support and desk research from the consortium (Table 17). Moreover, the peer-to-peer exchange of experiences between countries was preferred by the Netherlands.

Table 17: Type of conducted activities within the CSF for the PA of motor replacement.

Activity	Austria	The Netherlands
In-country workshop		
Telephone support/Online workshop	X	X
Online/email support	X	X
Desk research consortium	X	X
Peer-to-peer exchange of experience between countries		X
Other activities		

In **Austria**, the CSF started with an online kick-off workshop on 16th September 2022 to present the main objectives of the streamSAVE project and the streamSAVE calculation methodology. The discussion was focused on the detailed analysis of the proposed methodology and the potential adaptation necessary for inclusion in the Austrian catalogue of BU methodologies.

As a result, the methodology was translated and inserted in the template of the Austrian catalogue on BU methodologies. E-Control stated various requests, such as the combination of the two savings calculation formulas, while minor deviations in the indicative calculation values were also mentioned. Moreover, the methodology document was prepared in such a manner that the additional baseline for the early replacement of the motors could be taken into consideration.

The second workshop took place as an online workshop on 14th December 2022. After a short presentation of the current status of the project, the adapted methodology was presented. Additional feedback was requested by E-Control, while the streamSAVE feedback survey was announced. The methodology was sent to E-Control after the finalization of the requested changes.

It should be noted that the indicative values were very similar to the values defined in streamSAVE, with minor changes for the lifetime of savings. Furthermore, recommendations were asked for the data requirements to verify the delivered energy savings and the implemented measures and policies.

In **the Netherlands**, the performed activities focused initially on reviewing the existing methods and the data availability. Moreover, expert advice was provided on the following aspects:

- Good practices and state of the art methods on calculation methods (deemed savings).
- Establishment of a baseline/reference values.
- Comparison of the current simplified lifetime calculation approach with a more detailed return on investment (ROI) calculation methodology.

- Assessment of the possibility and the barriers of extrapolating the obtained results from the micro level to the national level.

The Dutch pilot study focused on a detailed analysis of several companies with regard to the delivered benefits from replacing motors and resulted in suggestions/recommendations as to where to prioritize interventions. The results of this pilot study were plugged into the streamSAVE calculation methodology using the proposed indicative values and a comparative analysis was occurred between the Dutch results at micro level versus the streamSAVE results at national level. Also, a (small) ROI analysis on the cost of implementation was carried out.

The performed activities were carried out through:

- The organisation of two online workshops (28th September 2022 and 10th November 2022) to present the tool and the underlying methodology and to share good practices.
- The exchange of materials (such as documents/e-mails) with hands-on advice and suggestions.
- The organization of regular meetings with leading experts to discuss the progress of the performed activities.
- Bilateral communications on various aspects of the CSF.

2.5.3 Key outputs and impacts

The CSF in **Austria** resulted into a ready-to use methodology for motor replacement and the installation of variable speed drives (VSD) in the industrial and commercial sectors, which can be integrated into the Austrian catalogue enabling:

- The specification of national calculation values for motor replacement and the installation of VSD
- The compliance with the verification requirements for the reported measures.

It is expected that the reporting of the implemented measures will be improved due to less complicated reporting process, while the awareness of obligated parties on motor replacement and installation of VSD will be enhanced.

In **the Netherlands**, concrete suggestions for the adaptation of a more robust and cost-effective method for estimating the delivered energy savings from motor replacement will be formulated. Moreover, the provided advice on good practices to improve monitoring and data collection and on the required parameters (such as reference values, payback periods, and lifetime) will benefit the involved policy officers, while the validation of the required inputs will increase the robustness and accuracy of the obtained results.

The delivered impacts include:

- Increased understanding of data gaps regarding the application of the simplified payback period calculation versus detailed ROI.
- Increased understanding of the potential impact on the business case economics (of ‘system optimization’ versus ‘motor replacement alone’.
- Confirmation of the currently used inputs for energy savings calculations and policy developments at national level in the Netherlands.

2.6 Behavioural measures

Technical support through the CSF was provided to two different countries (Lithuania and Croatia) for the PA of behavioural measures.

2.6.1 Focus of support

Four policy officers participated into the activities in the two countries representing three different organizations (Table 18).

Table 18: Involved policy officers and organizations within the CSF for the PA of behavioural measures.

Metric	Lithuania	Croatia
Number of involved policy officers	2	2
Number of organizations	1	2
Involved organizations	Climate Change Management Group Ministry of Energy of the Republic of Lithuania	Energy Institute Hrvoje Požar (EIHP) Ministry of Economy and Sustainable Development (MoESD)

The technical issues, which were addressed by the CSF, are presented in Table 19.

The establishment of a data collection and assessment procedure and the calculation of rebound, spill-over and free-rider effects were considered as a priority by the examined countries.

In Lithuania, technical support was requested also for the establishment of the baseline, the behavioural aspects, the cost-effectiveness ratio and the estimation of the delivered energy savings through a deemed method. The compliance with the provisions of Article 7 was stated as the most important objective of the involved countries.

The two countries aimed at adapting or improving existing practices from the other MSs on calculation methodologies or indicative values and reviewing existing calculation methodologies. Moreover, Lithuania expressed the interest for screening and initial assessment of promising technical savings actions.

Table 19: Addressed technical issues within the CSF for the PA of behavioural measures.

Technical aspect	Lithuania	Croatia
Baseline	X	
Data collection or assessment of monitored data	X	X
Energy savings based on deemed streamSAVE methods	X	
Cost-effectiveness	X	
CO_2 savings		
Behavioural aspects	X	
Calculation of rebound, spill-over and free-rider effects	X	X

Article 3		
Article 7	X	X
Streamlining between Article 3 and Article 7		
Screening and initial assessment of promising technical savings actions	X	
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values	X	X
Reviewing existing calculation methodologies	X	X
Other issues and targets		X

Additional technical issues were also discussed during the CSF in Croatia about the type of educational and counselling measures, which can be examined regarding the delivered energy savings with the proposed streamSAVE calculation methodology.

2.6.2 Conducted activities

The online/email support was selected by both the examined countries (Table 20). This activity was complemented with peer-to-peer exchange of experiences between countries and phone support/online workshop in Croatia, and the organization of in-country workshop in Lithuania.

Table 20: Type of conducted activities within the CSF for the PA of behavioural measures.

Activity	Lithuania	Croatia
In-country workshop	X	
Telephone support/Online workshop		X
Online/email support	X	X
Desk research consortium		
Peer-to-peer exchange of experience between countries		X
Other activities		

In **Lithuania**, the CSF aimed at utilizing the developed streamSAVE calculation methodology to estimate the delivered energy savings from behavioural measures focusing on the data requirements and data collection procedure, the calculation formula and the imposed costs for the implementation of the educational and counselling measures.

The first online workshop was carried out on 25th October 2022 in order to present the streamSAVE calculation methodology for the estimation of the delivered energy savings, to discuss good practices in other countries and to outline the main challenges for Lithuanian Energy Efficiency Policy. The representatives of the Ministry of Energy of the Republic of Lithuania expressed their concerns, because the methodology is ready but has not yet been used in practice and the experience of applying the methodology is not yet clear. Moreover, the representatives of the Ministry of Energy of the Republic of Lithuania considered the methodology training modules useful, but they were sceptical about the fact that the modules may be difficult for users to adapt as they are already used to the existing

methodology. Concerns were expressed also about the steps for the actual implementation of the streamSAVE calculation methodology.

A second online workshop was organised on 18th November 2022 to discuss the possibility to apply the streamSAVE calculation methodology, to assess the potential positive and negative impacts and to identify the most crucial aspects for using the streamSAVE calculation methodology. According to the concluded remarks, the streamSAVE calculation methodology can be utilised by the energy suppliers on actual cases within the framework of the EEOs providing the capability to assess the potential advantages and benefits. After that, streamSAVE calculation methodology could be gradually legalized in the description of the procedure for calculating and monitoring the energy savings of energy efficiency measures. However, in the first stage, it was recommended not to change the existing methodology and to use the streamSAVE calculation methodology as an alternative one. After the streamSAVE calculation methodology has been tested and improved, its application can be mandatory in the long-term.

In **Croatia**, information about the existing methodologies was gathered from the Croatian catalogue and examined within the framework of the CSF to identify potential adjustments of the developed streamSAVE calculation methodology. More specifically, the need was highlighted to adjust the indicative values (mainly energy savings factor S, but also unitary final energy consumption and lifetime), while more support was requested regarding the eligibility of the different educational and counselling measures, which can be accounted as behavioural changes measures.

The first online workshop was organised on 4th November 2022 for presenting the developed streamSAVE calculation methodology and discussing various aspects of the methodology, such as the indicative values, the lifetime and the eligibility of the behavioural measures.

A question was raised regarding the possibility to find information on the policy measures' evaluation. As a result, the national contact point was invited to the streamSAVE dialogue meeting, where an international expert presented the policy evaluation of the calculated savings from behavioural measures.

2.6.3 Key outputs and impacts

In **Lithuania**, the main outputs of the CSF include:

- The application of the streamSAVE calculation methodology for quantifying the delivered energy savings.
- The organisation of two online workshops, utilizing supporting materials (presentation and documentation etc.).
- The in-depth review of the calculation template for the examined case.

The delivered impacts include:

- The quantification of the delivered energy savings through the implementation of education and counselling measures.
- The evaluation of the implemented measures by calculating their energy savings achieved and formulating proposals for their improvement.
- The potential monitoring of the implementation of measures.
- The improved understanding of policy measures facilitating their application.
- The more accurate estimation of the primary and final energy savings.

- The increased understanding of data gaps.

In **Croatia**, the main outputs of the CSF include:

- The organisation of an online workshop, utilizing supporting materials (presentation and documentation etc.).
- The in-depth review of the national values and lifetime from the perspective of the streamSAVE calculation methodology.
- Participation in the peer–to-peer learning events to adjust the calculation and eligible measures.
- Advice on good practices to improve monitoring and data collection.

The delivered impacts include:

- The evaluation of the existing measures and formulation of proposals for their improvement in the scope of indicative values.
- The shared understanding of policy measures facilitating their application.

2.7 Energy poverty

Technical support through the CSF was provided to two different countries (Slovenia and Belgium) for the PA of energy poverty.

2.7.1 Focus of support

Five policy officers participated into the CSF's activities in the two countries representing three different organizations (Table 21).

Table 21: Involved policy officers and organizations within the CSF for the PA of energy poverty.

Metric	Slovenia	Belgium
Number of involved policy officers	3	2
Number of organizations	2	1
Involved organizations	Jozef Stefan Institute (JSI, research institute) and Ministry of Infrastructure (MzI, implementation authority)	Vlaams Energie en Klimaat Agentschap (VEKA) (Flemish Energy and Climate Agency)

The technical issues, which were addressed by the CSF, are presented in Table 22.

The compliance with Article 7 of the EED was considered as a priority by all involved countries, while the establishment of the baseline, the data collection procedure and the estimation of the energy savings based on deemed method were recognised as the most crucial technical aspects for the case of energy poverty. Special emphasis was placed on the cost-effectiveness and the calculation of the rebound, spill-over and free-rider effects in Slovenia. It should be noted that the provisions of Article 3 were considered as crucial issues for the case of Slovenia.

Slovenia aimed at adapting or improving existing practices on calculation methodologies or indicative values from the other MSs.

Table 22: Addressed technical issues within the CSF for the PA of energy poverty.

Technical aspect	Slovenia	Belgium
Baseline	X	X
Data collection or assessment of monitored data	X	X
Energy savings based on deemed streamSAVE methods	X	X
Cost-effectiveness	X	
CO_2 savings		
Behavioural aspects		
Calculation of rebound, spill-over and free-rider effects	X	
Article 3	X	
Article 7	X	X
Streamlining between Article 3 and Article 7	X	
Screening and initial assessment of promising technical savings actions		
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values	X	
Reviewing existing calculation methodologies		
Other issues and targets	X	X

Additional technical issues were also discussed in Slovenia about the development of a specialised measurement protocol for energy efficiency interventions in energy poor households. Moreover, the presentation of good practices was requested in Belgium about the evaluation approaches (randomised controlled trials (RCT)) for behavioural measures targeting energy poor households.

2.7.2 Conducted activities

For the two examined country cases, the support comprised phone support/online workshop in combination with online/email support (Table 23). These activities were complemented by desk research by the consortium in Belgium and in-country workshop in Slovenia.

Table 23: Type of conducted activities within the CSF for the PA of energy poverty.

Activity	Slovenia	Belgium
In-country workshop	X	
Telephone support/Online workshop	X	X
Online/email support	X	X
Desk research consortium		X
Peer-to-peer exchange of experience between countries		
Other activities		

In **Slovenia**, the performed activities within the CSF started with the establishment of the appropriate contacts with the involved policy officers, while an initial kick-off meeting was held on 27th July 2022 with limited participation of the invited policy officers. The official kick-off meeting was arranged on 29th September 2022 to present the main objectives of the streamSAVE project and the developed streamSAVE calculation methodology.

The second workshop was organised on 15th December 2022 to discuss the obtained results from two different scenarios of calculations, while one representative of the implementing authority tested the training module for the PA of energy poverty.

In **Belgium**, the first online workshop was carried out on 14th October 2022 to present the main objectives of streamSAVE project and the developed streamSAVE calculation methodology. Moreover, the applicability of the developed methodology was discussed with the Flemish Energy Agency for existing and new energy efficiency measures for energy poor households. Other questions or challenges regarding article 7 were mapped and discussed as well. Based on this knowledge exchange, specific measures and methodologies were selected for the CSF, namely energy savings calculations for thermal refurbishment (insulation measures) and small-scale RES (heat pumps) for dwellings occupied by energy poor households.

After the first workshop, the relevant Belgian/Flemish datasets were identified, gathered and processed by VITO to determine national values for the baseline parameters (space heating demand, hot water demand, efficiency) and the shares of energy carriers for the reference heating system.

The following data/material were collected for the support provided:

- Efficiency of the reference heating system (residential – “new).
- Efficiency of the reference heating system (residential - “early replacement”).
- Space heating demand and hot water demand (residential).
- U-values of roofs (residential).
- Share of energy carriers for space heating and sanitary hot water for the reference heating system (residential).

Calculation sheets were developed by VITO for the insulation of roofs and replacement of heating system by heat pumps (early replacement and new) for dwellings occupied by energy poor households. The calculation sheets were presented and discussed in the second online workshop with the Flemish Energy Agency, which was organised on 5th

December 2022. The discussions led to the identification of the remaining data/knowledge gaps by VITO and VEKA.

The best practice on RCT from the US was shared with the Flemish Energy Agency, namely the Residential Behaviour Evaluation Protocol for determining energy and demand savings that result from specific energy-efficiency measures implemented through state and utility programs, developed within the Uniform Methods Project. The Flemish Energy Agency was invited to the dialogue meeting on Behavioural Change measures (15/11/2022) where the US experience with measuring energy savings from behavioural programmes was presented.

2.7.3 Key outputs and impacts

In **Slovenia**, the main key outputs include:

- The development of a deemed method for the quantification of the delivered energy savings in energy poor households.
- The specification of the required input data and calculation of the indicative values
- The determination of the required data collection, monitoring, control and verification procedures.
- The organisation of two workshops.
- The preparation of supporting material.

The delivered impacts include:

- The increased accuracy of the calculations for the delivered energy savings.
- The effective evaluation of the implemented policies and measures in energy poor households through the streamSAVE calculation methodology.
- The enhancement of the existing catalogue of the Energy Efficiency Obligation Scheme.
- The improved understanding of the rebound and pre-bound effects on energy efficiency interventions in energy poor households.

In **Belgium**, the following key outputs were derived by the conducted activities within the CSF:

- Development of energy savings calculation methodology and related calculation sheets in Excel for the insulation of roofs and replacement of heating system by heat pumps (early replacement and new) for dwellings occupied by energy poor households.
- Identification of knowledge/data gaps for calculating the baseline parameters and share of energy carriers in frame of the developed energy savings calculation methodologies for the insulation of roofs and replacement of heating system by heat pumps (early replacement and new) for dwellings occupied by energy poor households.
- Exchange of good practices on the evaluation approaches (e.g., RCT) for behavioural measures targeting energy poor households.
- Organisation of two online workshops.

The achieved impacts include:

- The adapted streamSAVE calculation methodology for renovation (roof insulation) and small-scale RES (heat pumps) in dwellings occupied by energy poor households to Flemish context, providing 2 calculation sheets with national (Flemish) values.
- The use of national/Flemish values for the baseline parameters and the shares of energy carriers resulted in lower estimates of the annual energy savings that can be achieved by replacing the reference heating system by heat pumps (-11% in case of "new" and -22% in case of "early replacement"), compared to the use of the (EU27) indicative values.
- The increased understanding of how to calculate the energy savings of energy efficiency measures targeting energy poor households and behavioural change measures.
- The increased understanding of the impact of behavioural aspects on energy savings calculations.
- The increased understanding of data/knowledge gaps to calculate energy savings for the insulation of roofs and replacement of heating system by heat pumps (early replacement and new) for dwellings occupied by energy poor households.

2.8 Small-scale renewable energy technologies

Technical support through the CSF was provided to two countries (Czechia and Spain) for the PA of small-scale renewable energy technologies.

2.8.1 Focus of support

Seven policy officers participated in the CSF's activities in the two countries representing two different organizations (Table 24).

Table 24: Involved policy officers and organizations within the CSF for the PA of small-scale renewable energy technologies.

Metric	Spain	Czechia
Number of involved policy officers	5	2
Number of organizations	1	1
Involved organizations	Ministry for the ecological transition and the demographic challenge	Ministry of Industry and Trade

The technical issues, which were addressed by the CSF, are presented in Table 25.

The estimation of the energy savings based on deemed streamSAVE methods and the calculation of the CO_2 savings were considered as a priority by all involved countries. The two examined countries also aimed at reviewing existing calculation methodologies, The definition of the baseline, the establishment of the data collection procedures, the cost-effectiveness and the behavioural aspects were only examined for the case in Spain, as well as screening and assessing technical savings actions and adapting or improving existing practices from the other MSs on calculation methodologies or indicative values.

Moreover, the examined countries have different objectives in relation to the provisions of the EED. More specifically, the compliance with Article 7 is the most critical issue in

Czechia, while in Spain emphasis is placed on streamlining the requirements of Articles 3 and 7.

Table 25: Addressed technical issues within the CSF for the PA of small-scale renewable energy technologies.

Technical aspect	Spain	Czechia
Baseline	X	
Data collection or assessment of monitored data	X	
Energy savings based on deemed streamSAVE methods	X	X
Cost-effectiveness	X	
CO_2 savings	X	X
Behavioural aspects	X	
Calculation of rebound, spill-over and free-rider effects		
Article 3		
Article 7		X
Streamlining between Article 3 and Article 7	X	
Screening and initial assessment of promising technical savings actions	X	
Adapting or improving existing practices from the other MSs on calculation methodologies or indicative values	X	
Reviewing existing calculation methodologies	X	X
Other issues and targets		

2.8.2 Conducted activities

For the two countries, the support comprised phone support/online workshop in combination with online/email support and desk research by the consortium (Table 26). These activities were complemented with in-country workshop in Czechia.

Table 26: Type of conducted activities within the CSF for the PA of small-scale renewable energy technologies.

Activity	Spain	Czechia
In-country workshop	X	X
Telephone support/Online workshop	X	X
Online/email support	X	X
Desk research consortium	X	X
Peer-to-peer exchange of experience between countries		
Other activities		

In **Spain**, the activities of the CSF started with the establishment of preliminary contacts with IDAE in June 2022. The technical support was provided through two online workshops and the provision of tailored made documents (based on already available support resources or materials) along with specialised remote support upon request.

The first online workshop, which was carried out on 6th October 2022, helped IDAE to understand the objectives of the second round of PAs within streamSAVE project and to evaluate which PA would be more interesting to them.

The second online workshop, which was organised on 24th November 2022 aimed at providing instructions about the utilization of the training module, guiding all the involved policy officers to calculate the delivered energy savings related to Article 3 and Article 7 and evaluating the received feedback from IDAE. Various questions were discussed, such as the specification of the value of f_{BEH} parameter and the installation of ground-source heat pumps.

After the completion of the workshops, bilateral communications were made with IDAE for providing clarifications and providing answers to specific questions that arose during the workshops.

It should be noted that some of the involved policy officers stated that various programmes have been launched for the promotion of heat pumps and it would be useful to utilize the streamSAVE platform in order to save time due to the utilization of standardized values.

In **Czechia**, the technical support was provided through the organisation of two workshops and desk research. The first workshop was organized on 29th September 2022 to define the scope of collaboration and agree about the next steps. The progress of the streamSAVE project was also presented along with the new set of PAs. It was agreed that the Ministry would prepare the list of all support schemes under its administration that include small-scale RES technologies in order to apply the streamSAVE calculation methodology.

The Ministry delivered the list and SEVEn analysed its compliance with Art. 7 and specified which of them could be quantified through the developed streamSAVE calculation methodology.

The second workshop was organized on 30th November 2022 to identify all the existing, open or planned OP TAC calls that include support for small scale RES, to check the cost eligibility conditions of the calls, to compare and eventually review used conditions and to test the training module on the streamSAVE platform. The discussion led to the conclusion that OP TAC supports small-scale RES technologies in numerous calls, while the conditions set by each call comply with the streamSAVE-calculation methodology. Moreover, various adjustments of the streamSAVE methodology were discussed (e.g., efficiency of biomass boilers of 0.92 is optimistic) and the training module was used for testing the calculations.

2.8.3 Key outputs and impacts

In **Spain**, the main outputs consist of:

- Demonstrating the need for a standardized method to calculate national values.
- Highlighting the need for using national and EU values at the same time for different parameters.
- Increasing the interest in heating/cooling systems for warmer climates.
- Quantifying the potential for the promotion of RES technologies in industrial sectors.
- Organising online meetings with supporting presentations and documentation.

The main impacts can result in:

- Improving the definition of the parameters, which are required for estimating the delivered energy savings.
- Ensuring a more realistic evaluation of the savings achieved in buildings with the use of different RES technologies.
- Increasing the understanding of the data gaps in regards the application of the additionally criterion.

In Czechia, the main output of the CSF was the review of the calculation template for the examined case. Regarding the expected impacts, OP TAC, the largest support scheme for the industry and services, will be improved ensuring the vis-à-vis compliance with Article 7 of the EED. The calls of OP TAC are currently being prepared and the Ministry aims to set the parameters of individual energy saving calls so that the implemented projects bring measures eligible under Czech EED obligations. In this respect, the OP TAC programme will be improved beyond the baseline scenario without the conduction of the CSF's activities.

Chapter 3 Lessons Learned

In this chapter, the most important lessons learned are presented based on the activities carried out in the context of the CSF. An overview of the main conclusions is provided for each of the examined Priority Actions. In general, it can be concluded that all developed BU calculation methodologies are considered useful and applicable for the involved policy officers as they can improve the existing estimation of energy and CO_2 savings, as well as monitoring, control, verification and reporting procedures.

3.1 Building Automation and Control Systems

The developed methodology for Building Automation and Control Systems (BACS) can be adapted to the national conditions facilitating the estimation of the delivered energy savings from the installation of the respective systems in all MS. Nevertheless, the adaptation of the developed BACS methodology to the national circumstances is easier in the case of residential- than non-residential buildings. This can be explained by the lack of data on the total floor area and the final energy demand for the different types of non-residential buildings. The non-residential buildings differ significantly across the various sectors of economic activity, while no information is available about the utilised technologies and equipment for all end-uses.

Nevertheless, the streamSAVE BACS methodology has managed to intercorporate various technical issues, such as BAC energy efficiency factors before and after implementation of an energy efficiency action according to EN15232 (2018), both for new installations and upgrades of BACS, and the provisions of Articles 14 and 15 of the Energy Performance Building Directive.

In any case, specialised data collection procedures should be established by the Member States aiming at effective data collection to determine national reference values, which are beneficial for the utilization of the developed BU calculation methodology.

Finally, emphasis should be placed on facilitating access to existing data sources, which are not easily accessible, to address the limited data availability both for the case of residential and non-residential buildings.

3.2 Electric Vehicles

Even though various approaches have been initiated to estimate the achieved energy savings by the promotion of electric vehicles, the lack of a standardized and robust data exchange procedure is prominent in most countries, while the existing data sources are not easily accessible.

Therefore, the establishment of a standardised data collection mechanism should be spurred based on a robust and independent monitoring and verification structure leading to the effective design and implementation of the required energy efficiency policies and measures for the further penetration of electric vehicles. The developed streamSAVE calculation methodology can be utilized for designing and developing such a standardized data collection procedure.

A comparative study on the differences and similarities between MS should be conducted, especially concerning practicalities, such as conversion to soft modes, hypotheses of scrapping and import percentages. The outcomes of this study can facilitate the standardisation of energy savings reported for different policies and measures across MS.

The comparison of the savings resulting from the streamSAVE calculation methodology with the national ones provides valuable insights about the reliability and accuracy of both savings methodologies. If the differences are considerable, it is essential to identify the parameters which contribute to these deviations so as to select the most effective approach.

More emphasis should be placed on the compliance with the additionality criterion and the promotion of soft modes of transport. It is recommended to examine potential discrepancies of the actual lifetime of vehicles with the theoretical ones as specified in the respective legislative framework.

Finally, the potential expansion of the measurement methodology with CO_2 emission reductions can provide a different perceptive on the selection of the most effective policies, facilitating the energy transition of the transport sector towards carbon neutrality.

3.3 Heat Recovery

The suggested metered savings method within the streamSAVE calculation methodology for the energy efficiency interventions in the industrial sector, including heat recovery technologies, is considered as an applicable approach by the involved policy officers.

The high preference for deemed methods was articulated to minimize the administrative burden and facilitate the calculation of energy savings. Nevertheless, the implementation of deemed methods is not easy due to the difficulty to specify indicative value for the different types of industrial units.

Moreover, the application of a scaled method (e.g., by utilizing engineering estimates for the calculation of the energy savings) can be examined as an alternative method.

In any case, the developed BU calculation methodology provides useful insights for different technical aspects, such as the calculation of the final energy consumption before and after the implementation of an action. During the support, more information was requested about the required control and verification procedures focusing mainly on the specifications of the metering systems, which are required for the estimation of the final energy consumption before and after the installation of the heat recovery technologies.

3.4 Modal shift for freight transport

The development of a deemed method is acceptable to minimize administrative costs and facilitate the calculation of the energy savings through the promotion of modal shift for freight transport. Even though the developed streamSAVE calculation methodology is more a top-down method than a BU method, the streamSAVE methodology can be used as an alternative for the design of targeted measures to reach the energy saving target.

The methodology to estimate the existing potential for modal shift measures, the formulas and the assumptions are assessed as valid and useful, but the lack of national data does not allow the actual evaluation of the developed methodology. In general, the lack of data is perceived as one of the main constraints for applying the streamSAVE calculation methodology and limiting standardized savings methodologies across Europe.

More support was asked about the required control and verification procedures, focusing mainly on the determination and approval of the shifted tonne-kilometres. It was concluded that the energy saving potential delivered by the promotion of modal shift in freight transport is rather competitive, taking into consideration the required costs and limited savings. Nevertheless, it is worth initiating specific measures for exploiting the energy saving potential delivered by the promotion of modal shift in freight transport. Finally, the

detailed approach allows to identify the economic activities which can contribute considerably to the exploitation of the available energy saving potential.

It is recommended to establish a procedure to collect data for assessing the delivered energy savings by the promotion of modal shift for freight transport, such as the consumed energy, the type and quantity of goods transported, the tonne kilometres travelled and other factors which may affect consumption.

Furthermore, it is recommended to take into consideration various parameters (e.g., by means of a multi-criteria analysis), such as various restrictions (route of the rail network) and the destination country and region in the country since these parameters may influence the economic viability of modal shifting. Finally, it is essential to understand the drivers and barriers through the conduction of a targeted survey to assess why logistic operators do not use rail or combine different means of transport and keep using mainly trucks. The transportation of goods is a complex business that depends on several variables. For example, an independent transport operator can only focus on a single transport mode. Consequently, the transport operator may not have information about, nor interest in understanding whether fluctuations in business may result from any modal shift.

3.5 Motor replacement

The developed streamSAVE calculation methodology can be used for calculating delivered energy savings. The results of the CSF led to the conclusion that the adaptation of existing national methodologies can be achieved by improving slightly both the calculation formula and its indicative values.

Moreover, the indicative values can be used for improving the ROI calculation for the anticipated motor replacement instead of using another conventional approach, such as the payback period. It is recommended to extend the scope of the interventions beyond the replacement of the motor (as per the title) and include careful consideration and analysis of other parts of the drivetrain.

Generally, the option of allowing the potential user to override the baseline with specific national parameters is considered as the most effective approach. The comparative analysis of the streamSAVE methodology with existing methodologies at national level led to similar results, while the observed deviations can easily be explained by the inherent differences between the national conditions and the European averages (costs, energy, CO_2 density).

The results of the CSF study show the ability to validate the existing national model for efficiency benefits of anticipated motor replacement, which allows for further finetuning the existing national model to better fit its national context.

3.6 Behavioural measures

The developed streamSAVE calculation methodology can be utilized in order to compare the obtained results with existing methodologies since various MSs have already developed BU equations for assessing the delivered savings from behavioural measures. Generally, the proposed indicative values for the Energy Savings Factor (S) can be considered as an EU-wide benchmark, as the factor was based on 40 studies. The comparison of the streamSAVE calculation methodology with the existing methodology in Croatia revealed minor differences, as the national energy saving factors ranges from 0.25% to 3% compared to the indicative value of 2% to 3.6%.

However, it is difficult to compare the methodologies since they refer to different behavioural measures. Therefore, it is important to standardise the type of the educational and counselling measures to be able to uniform parameters for the calculation of the delivered energy savings using a BU methodology

Finally, differences in the assumed lifetime of the measures were identified also highlighting the need to provide common values for all MS.

3.7 Energy poverty

The developed streamSAVE calculation methodology provides useful insights for the utilization of reference values and factors/specifics for energy poor households, which are not easily accessible and available.

Since no information was available about the targeted energy savings calculation methodologies for energy poor households, it was not feasible to compare streamSAVE calculation methodology with existing national methodologies.

Indisputably, the developed streamSAVE calculation methodology can be used to assess the energy savings for different types of measures (such as interventions in the building envelope and awareness-raising measures), which will be implemented in buildings occupied by energy poor households.

The developed streamSAVE calculation methodology requires the collection of data, which are not easily accessible and available for the case of energy poor households highlighting the need to establish appropriate data collection procedures. More specifically, the collection of specific data is problematic for the area of the improved building component, the space heating demand and hot water demand, the conversion efficiency of the reference heating systems and the U-values of the building components.

Finally, the number of energy poor households targeted by the planned policies and measures have to be monitored, while ideally, more income categories have to be identified (as the income segments are broad) and/or other parameters (than income) must be taken into account to classify the households into the category of energy poor households.

3.8 Small-scale renewable energy technologies

The suggested streamSAVE calculation methodology facilitates the calculation of the delivered energy savings by the installation of small-scale RES technologies. The provided European average values constitute a solid basis for comparing the obtained results with the existing methodologies at national level. Nevertheless, it is recommended to use national values for the parameters in the savings calculations to obtain more accurate results.

The suggested streamSAVE calculation methodology facilitates the comparative analysis of the different small-scale RES technologies. For instance, the replacement of conventional boilers by biomass boilers in buildings, especially in non-residential, leads to lower energy savings compared to heat pumps due to the lower efficiency.

Finally, the required energy for space cooling has not been taken into account due to the low cooling demand in most EU countries and the lack of data. Nevertheless, it would be useful to expand the proposed streamSAVE calculation methodology using typical values for the cooling demand and the efficiency of existing and new cooling technologies.

3.9 Horizontal considerations

Meaningful horizontal lessons were derived by the activities provided in the CSF.

Firstly, the BU calculation methodologies can improve the coordination of monitoring, reporting and verification procedures and streamline the cooperation and communication between the different bodies being responsible for monitoring the implemented energy efficiency measures. Obviously, the official definition and appointment of the duties and responsibilities for all the bodies involved, including the specification of the required time plan and activities, facilitates the coordination of the monitoring, reporting and verification procedures.

Special attention should be paid to the data collection procedures, which can indisputably foster both the monitoring of and reporting about the implementation of the energy efficiency policies and measures to reach the national targets within the framework of Article 3 and Article 7 of the EED.

The development of BU calculation methodologies is a fundamental pillar in the design and implementation of a holistic monitoring reporting and verification system, outlining all the necessary activities. As such, the development of streamlined BU calculation methodologies and indicative values at European level for all MS improves:

- The determination of the national calculation values, by highlighting which types of data and data sources can be used.
- The collection of the required data.
- The effective application of the monitoring, control and verification procedures and compliance with quality requirements.
- The compliance with the EED reporting obligations.

In addition, the developed streamSAVE BU calculation methodologies can enhance the understanding of policy officers on the technical requirements to measure the delivered energy savings, along with the facilitation of the data collection. The CSF highlights that the support provided addresses multiple barriers in MSs to estimate and report energy and CO_2 savings , such as the lack of skilful staff among policy officers, the continuous difficulty to comply with the technical requirements of the EED, the inability to ensure continuity due to rapid changes, etc. Generally, the involvement of specialized experts is imperative due to the complexity of the discussed issues.

Finally, the provided support by deemed BU calculation methodologies can motivate the responsible authorities and other involved parties to design and implement energy efficiency policies and measures targeting the technical Priority Actions, which still have considerable unexploitable energy savings potential. An assessment of the cost-effectiveness of planned and implemented policies and measures supports the selection of the most efficient and beneficial policies and measures as to meet the ambitious energy efficiency targets at national and European level.

Conclusions

The establishment of the CSF within the streamSAVE project seems to be effective for all the 10 involved countries as it addresses significant barriers, which hinder the effective implementation and reporting on energy efficiency policies and measures, next to the required monitoring, reporting and verification procedures.

The indicators monitored during the CSF show that the impacts triggered by the performed activities during the two rounds of PAs move beyond the original targets set (cf. Table 2).

Firstly, the CSF managed both to involve key stakeholders (public authorities) from 10 partner MS and to examine on average 2 cases per partner MS.

Secondly, during the first round of PAs, 30 policy officers participated in the activities, representing 18 public bodies or organizations. Similar results were obtained during the second round of PAs with the involvement of 27 policy officers and organizations (Table 27).

Table 27: Influenced policy officers by the activities of the CSF in the involved countries.

Country	1st round		2nd round	
	Number of involved policy officers	Number of organizations	Number of involved policy officers	Number of organizations
Austria	3	2	1	1
Belgium	5	4	2	1
Czechia	2	1	2	1
Croatia	3	2	2	2
Greece	2	2	3	2
Netherlands	3	1	3	2
Lithuania	1	1	2	1
Portugal	5	2	4	1
Slovenia	3	2	3	2
Spain	3	1	5	1
Total	**30**	**18**	**27**	**14**

Thirdly, in total, 18 policies and measures are affected by the conducted activities related to first PA round of the CSF. The second round of PAs managed to improve 12 additional policies and measures in the involved countries. Table 28 presents all the affected policies and measures for each country and round of PA separately.

Table 28: Influenced policies related to the PAs by the CSF activities in the involved countries.

Country	Round of PAs	Targeted policies
Austria	1st	I. Integration into the national catalogue
	2nd	I. Integration into the national catalogue

Country	Round of PAs	Targeted policies
Belgium	1st	I. Promotion of fuel switch in the federal fleet II. Promotion of fuel switch at the company cars
	2nd	I. Supporting policy officers with alleviating energy poverty II. Quantifying the delivered energy savings from energy efficiency measures targeting energy poor households, such as the "Mijn VerbouwPremie"
Czechia	1st	I. OP TAC (Operational Programme Technologies and Applications for Competitiveness)
	2nd	I. OP TAC (Operational Programme Technologies and Applications for Competitiveness)
Croatia	1st	I. Integration into the national catalogue
	2nd	I. Potential adaptation/improvement of the existing national catalogue
Greece	1st	I. Integration into the national catalogue of the EEOs II. Recovery and Resilience Fund programme for improving the energy efficiency in industrial sector
	2nd	I. Integration into the national catalogue of the EEOs II. Quantifying the delivered energy savings from M40 entitled "Elaborating action plans and construction of the required infrastructures in order to facilitate the shift of the commercial operations in freight transport"
Netherlands	1st	I. SEPP Subsidy scheme electric passenger cars II. SEBA Subsidy Scheme Zero Emission Company Cars III. National Agenda on charging infrastructure IV. SEB subsidy scheme for electric non-mobile machinery V. Fiscal benefits for zero emission vehicles (both for consumers and business)
	2nd	I. Potential policy changes at national level in the future
Lithuania	1st	I. Installation of BACS systems in buildings though the developed BU calculation methodology
	2nd	I. Improving the policy instrument EE6 "Agreements with energy suppliers on consumer education and energy advice"
Portugal	1st	I. "Maintain and promote incentives for the purchase of 100% electric light vehicles, as well as the existing framework of tax incentives" programme II. "Promote electric vehicles for urban micro-logistics" programme III. "Promote the introduction and use of low emission vehicles and sustainable mobility in the state" programme
	2nd	I. Enabling the design of evidence-based policies for the promotion modal shift for freight transport
Slovenia	1st	I. Integration into the national catalogue
	2nd	I. Supporting policy officers during the daily work for combating energy poverty

Country	Round of PAs	Targeted policies
Spain	1st	I. Next MOVE (sustainable mobility) aid programme
	2nd	I. Supporting policy officers during the design of programmes for promoting heat pumps
Total	1st	**18 policies related to the PAs**
	2nd	**12 policies related to the PAs**

Table 29 provides an overview of the workshops and meetings that were organised during the two rounds of the CSF for each involved country to facilitate the actual involvement of the policy officers and to improve their current level of knowledge and skills.

Table 29: Conducted workshops and meetings within the CSF in the involved countries.

Country	Conducted workshops and meetings		
	1st round of PAs	2nd round of PAs	Total
Austria	Two workshops	Two workshops	Four workshops
Belgium	Two workshops	Two workshops	Four workshops
Czechia	One workshop and two meetings	Two workshops	Three workshops and two meetings
Croatia	One workshop and two meetings	One workshop	Two workshops and two meetings
Greece	One workshop and two meetings	One workshop	Two workshops and two meetings
Netherlands	Three workshops	Two workshops	Five workshops
Lithuania	To be completed	Two workshops	Two workshops
Portugal	One workshop and two meetings	Two workshops and one meeting	Three workshops and three meetings
Slovenia	Three meetings	One workshop and two meetings	One workshop and five meetings
Spain	Two workshops	Two workshops	Four workshops
Total	**13 workshops and 11 meetings**	**17 workshops and 3 meetings**	**31 workshops and 14 meetings**

It can be concluded that the involved policy officers are willing to integrate the developed BU calculation methodologies into the national catalogues or use the methodologies to quantify energy savings from new policies and measures. This illustrates the success of the technical support provided on the selected PAs during the CSF.

Generally, the need to provide technical support to policy officers in Member states is imperative, while cross-country exchanges on calculation methodologies can further contribute to streamline existing practices or improve the overall coverage of calculation methods among Member States. The horizontal approach of the streamSAVE dialogue groups, where stakeholders discuss various essential methodological and techno-

economical topics, are indisputably beneficial and can be considered as a valid, supplementary tool to the CSF.

Finally, the establishment and operation of the CSF is considered effective, despite the difficulties, imposed by the restrictions due to COVID-19. Still, physical meetings are important for providing technical assistance to the public bodies, involving specialized experts, but preferably accompanied by the diverse activities organized within the CSF to maximize the expected impacts.

Bibliography

EN 15232, 2018. Standard Energy Performance of Buildings - Energy performance of buildings.

European Commission, 2012. Directive (EU) 2012/27 of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.

European Commission, 2018a. Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency.

European Commission, 2018b. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency.

streamSAVE, 2022a. Status of energy savings calculations for priority actions in European countries, available at: https://streamsave.eu/wp-content/uploads/2021/01/D2.1_StatusSavingsCalculationsEU-2ndRound_v3.pdf

streamSAVE, 2022b. Standardized saving methodologies - Energy, CO2 savings and costs, available at: https://streamsave.eu/wp-content/uploads/2021/08/D2-2_PracticalGuidance_SecondIntermediateVersion_final.pdf

streamSAVE, 2022c. streamSAVE platform, available at: https://streamsave.flexx.camp/login

CONTACT THE PROJECT

@stream_save

@streamsaveh2020

contact@streamsave.eu

www.streamsave.eu

This project has received funding from the Horizon 2020 programme under grant agreement n°890147.