



REVERTER



**ΚΑΠΕ
CRES**

Tailored energy retrofit roadmaps used in four pilot countries (Greece, Bulgaria, Portugal, and Latvia)

Christos Tourkolias, CRES



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General framework of the REVERTER building renovation roadmaps

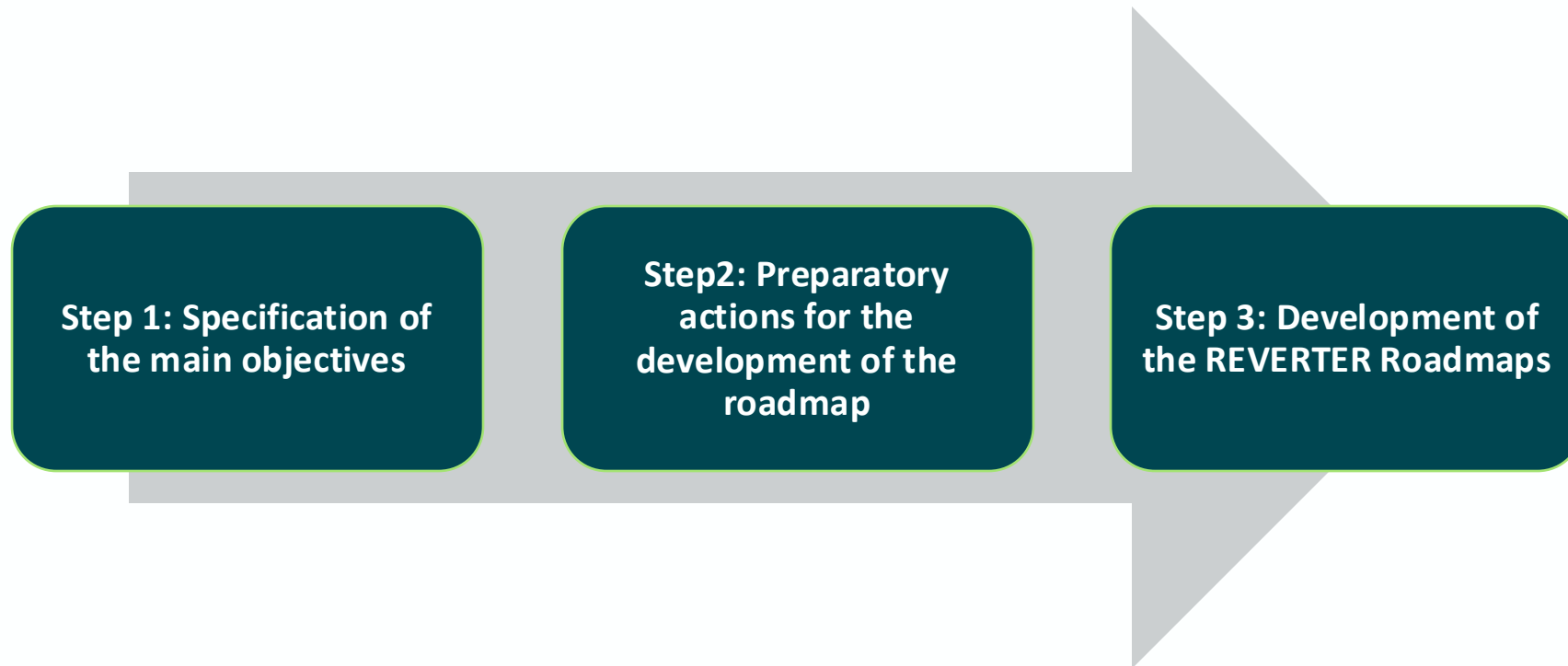
Combat energy poverty through the deep renovation of the dwellings occupied by energy vulnerable households

Be tailor-made to the characteristics of the building stock, the characteristics of the vulnerable households, the legislative framework and the climate conditions of each pilot

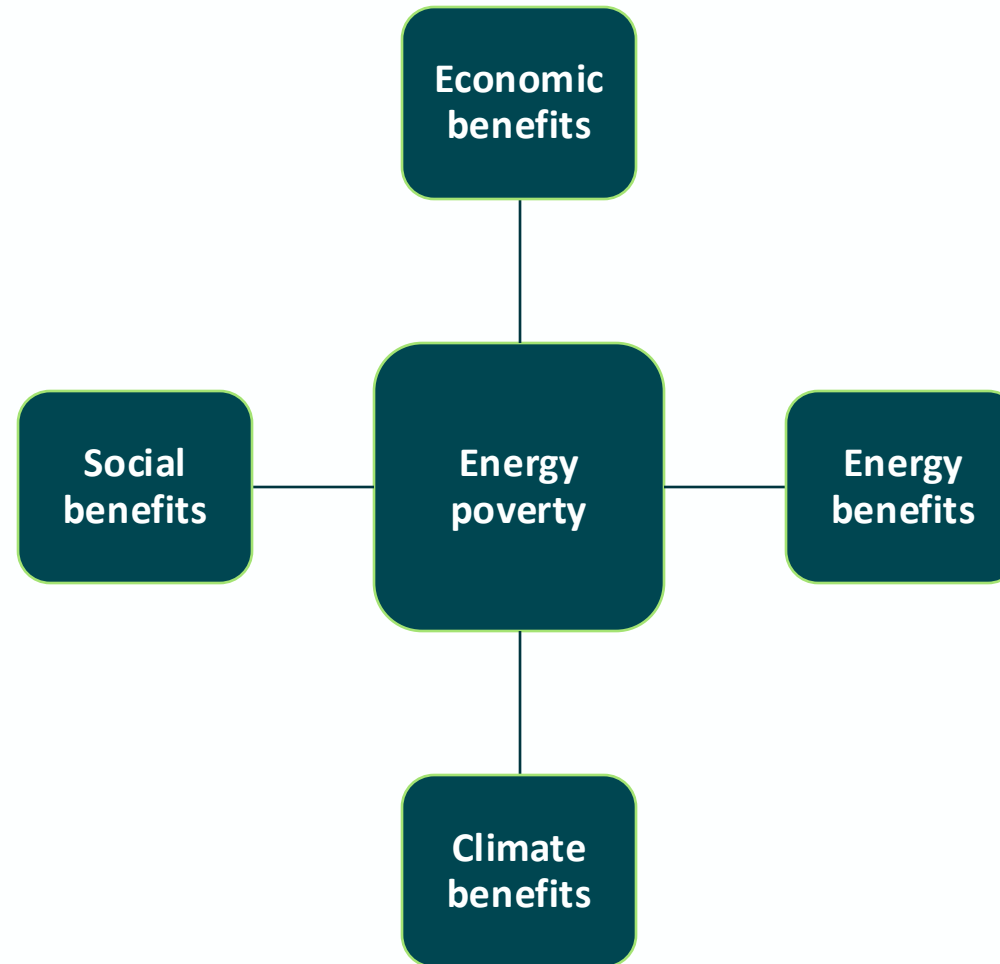
Cover a sufficiently cohesive group of cases that will allow for a larger-scale rollout and replication of the proposed actions to effectively analyse and tackle the energy poverty problem

Target the worst-performing homes first (worst first principle), cope with split-incentive dilemmas and address various market, information and behavioural failures

Steps for the preparation of the REVERTER building renovation roadmaps

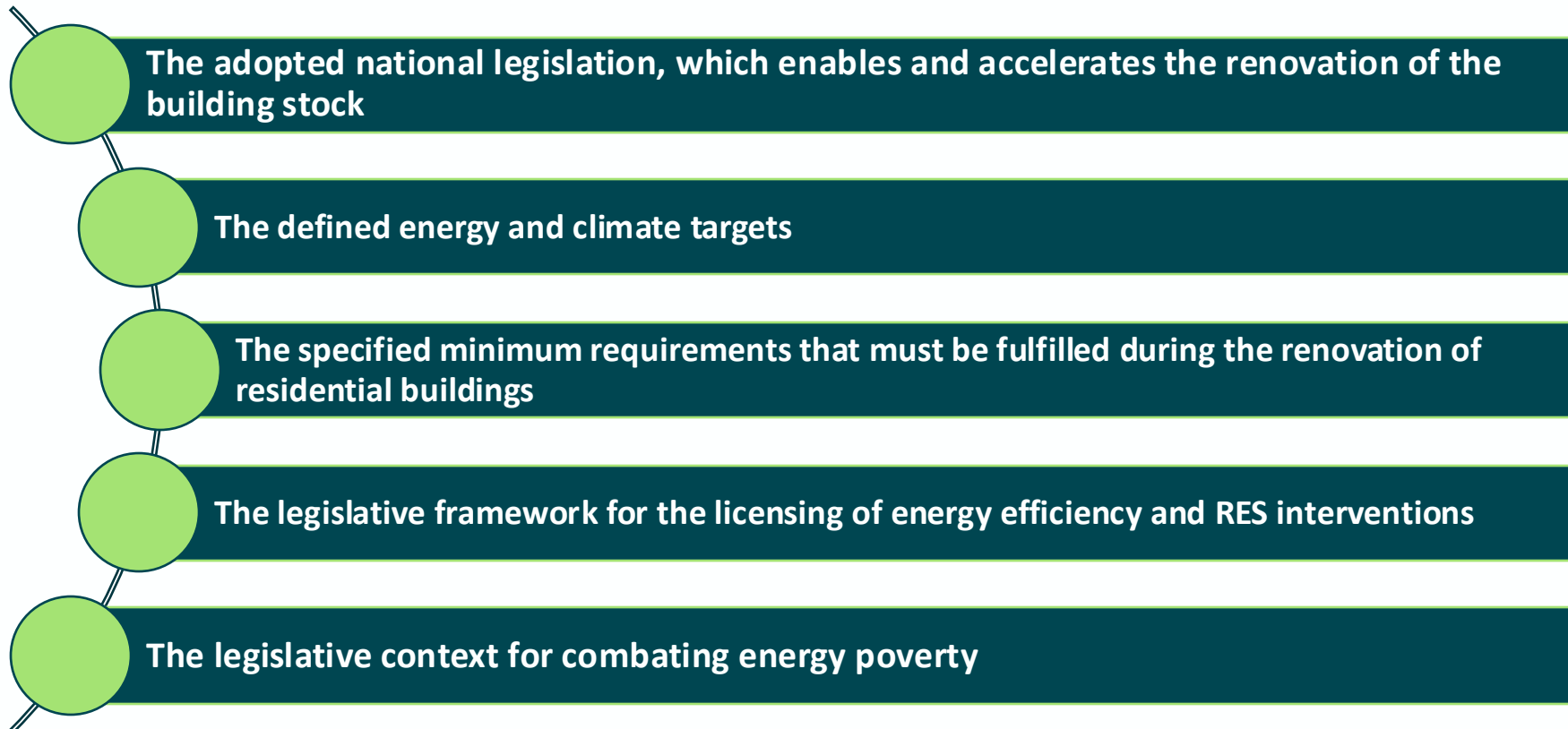


Step 1: Specification of the main objectives



Step 2: Preparatory actions for the development of the roadmap

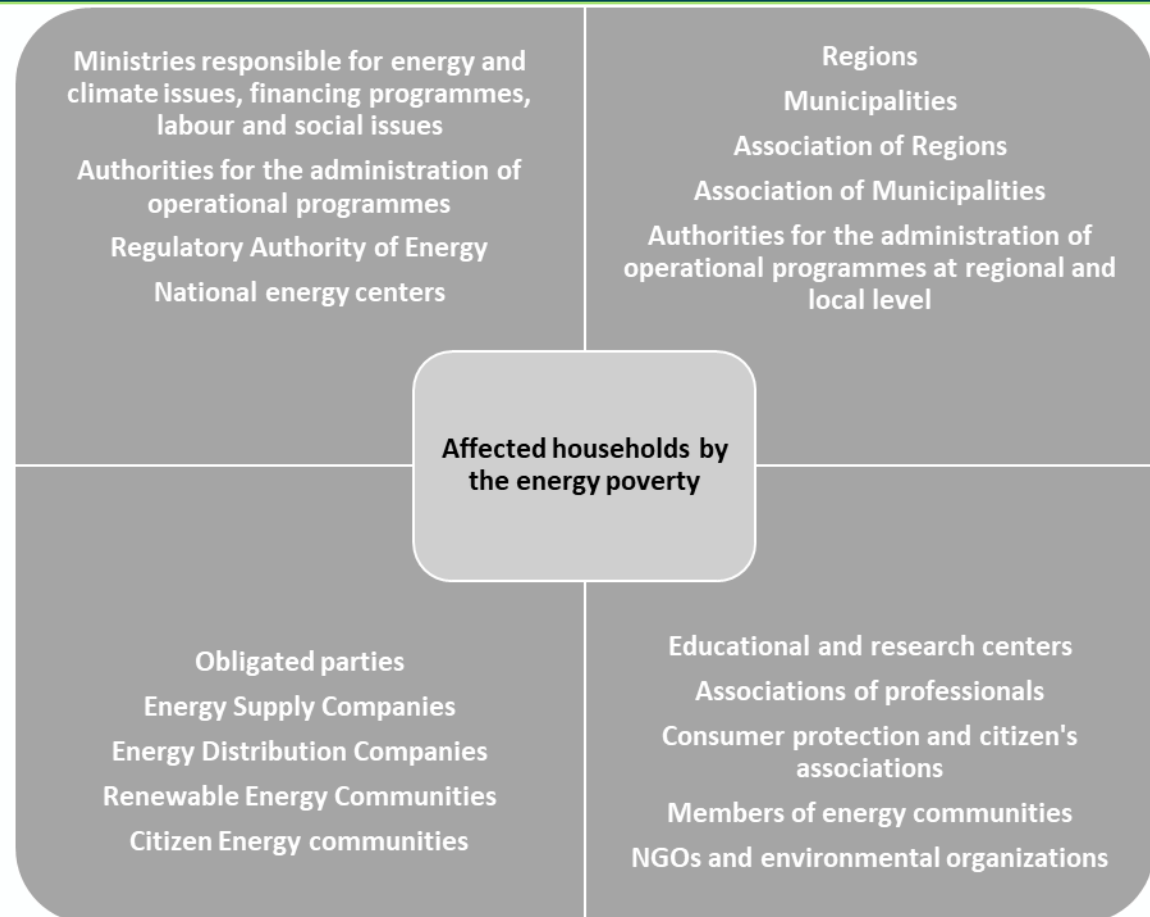
I. Legislative and policy framework



Step 2: Preparatory actions for the development of the roadmap

II. Identification of key stakeholders

- Mapping of the involved stakeholders.
- Development of a governance mechanism, which will facilitate the communication and cooperation of the entities involved.



Step 2: Preparatory actions for the development of the roadmap

III. Analysis of the current levels and characteristics of energy poverty

- A combination of energy poverty indicators can be utilised, both qualitative and quantitative, to capture all the parameters, which are related to energy poverty.
 - The collected data within the framework of primary social surveys could be used besides the data for administrative sources.
- Income
 - Energy expenses
 - Energy performance of the building
 - Characteristics of the building
 - Actual nature of energy access
 - Degree of choice and availability of energy carriers
 - Utilisation of technical systems and other equipment
 - Ownership of the building
 - Type and flexibility of the built environment (e.g. limitations to making modifications to the home due to tenancy status).
 - Inadequate dwelling conditions (e.g., leaking roof) or inadequate thermal comfort conditions.
 - Health impacts
 - Everyday practices and cultural habits

Step 2: Preparatory actions for the development of the roadmap

IV. Analysis of the building stock

- The existing building stock should be analysed based on data retrieved by **existing databases** (e.g. Census data, Energy Performance Certificate databases, etc.) or **in situ surveys** to determine the energy efficiency of residential buildings.
- The performed analysis should provide **quantitative information** for the building stock about the construction period, the climatic zone, the energy consumption and the utilised energy carriers for each end-use separately, the energy performance as outlined by the energy class of the issued energy performance certificates, etc. It should be noted that the calculated data should be estimated for each building type separately.
- Priority should be given to the collection of **actual or/and metered data**. In the case that actual data are not available, estimated data can be used alternatively with assumptions that will be based on valid and robust data sources.

Step 2: Preparatory actions for the development of the roadmap

V. Prioritisation in the context of the “worst first” principle

- The energy renovation of the **worst-performing buildings** should be prioritised.
- The identification of the worst-performing buildings will be carried out within the framework of the **analysis of the building stock**, as described in the previous step.
- Moreover, the **energy-poor and inefficient hotspots** should be identified in vulnerable districts, clusters of buildings with vulnerable residents and groups of buildings with common management to enhance the context of the worst first principle and complement the analysis of the building stock.
- The combination of the conducted analyses will facilitate the **association of energy poverty with the characteristics of the buildings and the area under consideration** (e.g. multifamily, private rented, social housing, income, etc.), in addition to the construction age, as well as with climatic data.

Step 2: Preparatory actions for the development of the roadmap

VI. Identification and confrontation of the barriers (PESTEL analysis)

Step 1: Speculate the PESTEL factors:

Collect and analyse information on the relevant political, economic, social, technological, environmental, and legal factors, which are related to the building renovation interventions.

Step 2: Identify and map all the relevant PESTEL factors

Map the PESTEL factors, identify and evaluate those that affect the building renovation interventions, by either representing a potential threat or opportunity.

Step 3: Assess the level of impact of PESTEL factors

Assess individually the level of impact of each PESTEL factor using the appropriate scoring system to better recognise the opportunities and challenges the building renovation interventions.

Step 4: Identify opportunities and threats

Identify the opportunities and threats that each of the PESTEL factors, which affect the effectiveness of the building renovation interventions.

Step 5: Select the most effective policies and measures

Identify the policies and measures, which are required to implement the results of the PESTEL analysis, along with the potential risks or threats and the required measures to mitigate or eliminate them.



Step 2: Preparatory actions for the development of the roadmap

VII. Establishment of OSSs

Facilitation model

Reinforce awareness about energy renovation benefits, inform about the optimal renovation works, advice for the different steps, etc. –
Adopted business model in REVERTER

Coordination model

Undertake the coordination of the involved market actors without having responsibility for the outcomes of the renovation nor supporting them in all renovation steps

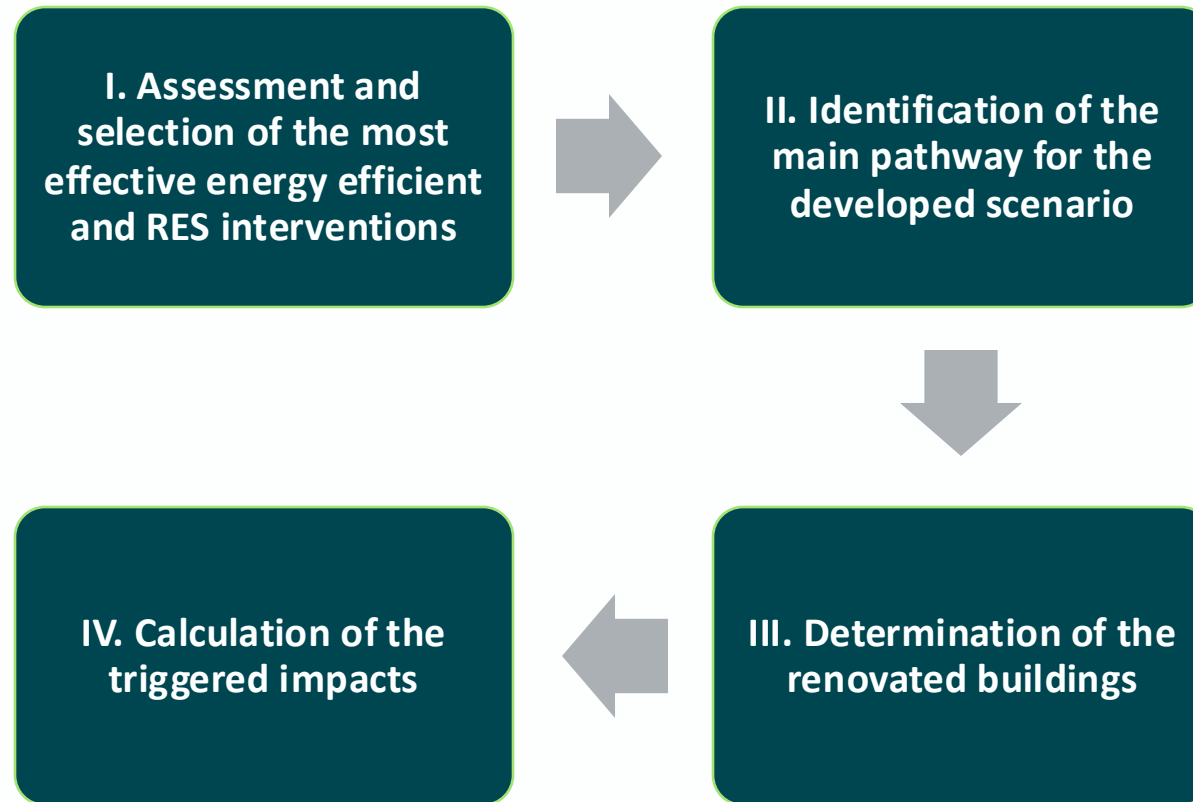
All-inclusive model

Provide full renovation packages undertaking the responsibility for the expected outcomes and supporting them in all renovation steps

ESCO-type model

Provide full renovation packages with guaranteed energy savings undertaking the responsibility for the expected outcomes and supporting them in all renovation steps

Step 3: Development of the REVERTER Roadmaps



Developed roadmaps

REVERTER project



Brezovo - Roadmap I (Single-Family Buildings Roadmap)

Brezovo - Roadmap II (Multi-Family Buildings Roadmap)

Brezovo - Roadmap III (Social Buildings Roadmap)

Athens Urban Area pilot - Roadmap I (Tenants)

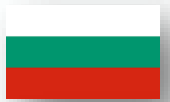
Athens Urban Area pilot - Roadmap II (Owner-occupied apartments in multi-family buildings)

Athens Urban Area pilot - Roadmap II (Owner-occupied apartments in multi-family buildings)

Riga pilot - Roadmap I (Multi-family buildings)

Coimbra pilot - Roadmap I (Social Multi-Family Buildings)

Coimbra pilot - Roadmap I (Social Single-Family Buildings)



Synopsis of REVERTER project

Results in the period 2025-2030

Pilot	Brezovo			Athens Urban Area			Riga	Coimbra	
Roadmap	I	II	III	I	II	III	I	I	II
Number of newly renovated buildings	48	24	2	61	186	28	13	32	9
Resulted cumulative final energy savings (GWh)	0.35	0.174	0.118	0.78	1.92	0.83	0.55	0.222	0.071
Resulted cumulative primary energy savings (GWh)	0.64	0.321	0.311	1.00	2.50	1.03	0.49	0.556	0.176
Resulted cumulative CO ₂ reduction (ktn CO ₂)	0.12	0.058	0.042	0.21	0.53	0.22	0.16	0.0336	0.0107
Resulted employment impacts (person-years)	30.3	9.4	12.8	28.33	79.81	19.65	21.39	4.9	0.9
Resulted cumulative multiple benefits (million €)	0.007	0.0037	0.0025	0.04	0.08	0.03	0.006	0.0135	0.0043
Required new investments (million €)	1.95	0.6	0.826	1.83	5.15	1.27	1.38	0.319	0.059

Policies and measures

M1: Supporting the energy upgrade of the building envelope

M2: Supporting the installation of energy efficient technical systems and equipment

M3: Promoting nearly-zero energy buildings (nZEBs)

M4: Fostering the construction and energy renovation of buildings exceeding minimum energy requirements

M5: Enhancing the role of the energy performance certificates

M6: Overcoming split incentive barrier

M7: Promoting energy services and energy performance contracts

M8: Fostering the self-consumption of the produced electricity

Policies and measures/II

M9: Supporting the renewable and the citizen energy communities

M10: Organizing information and training activities

M11: Establishing one-stop shops

M12: Developing a scheme for the qualification, accreditation and certification of energy efficiency professionals

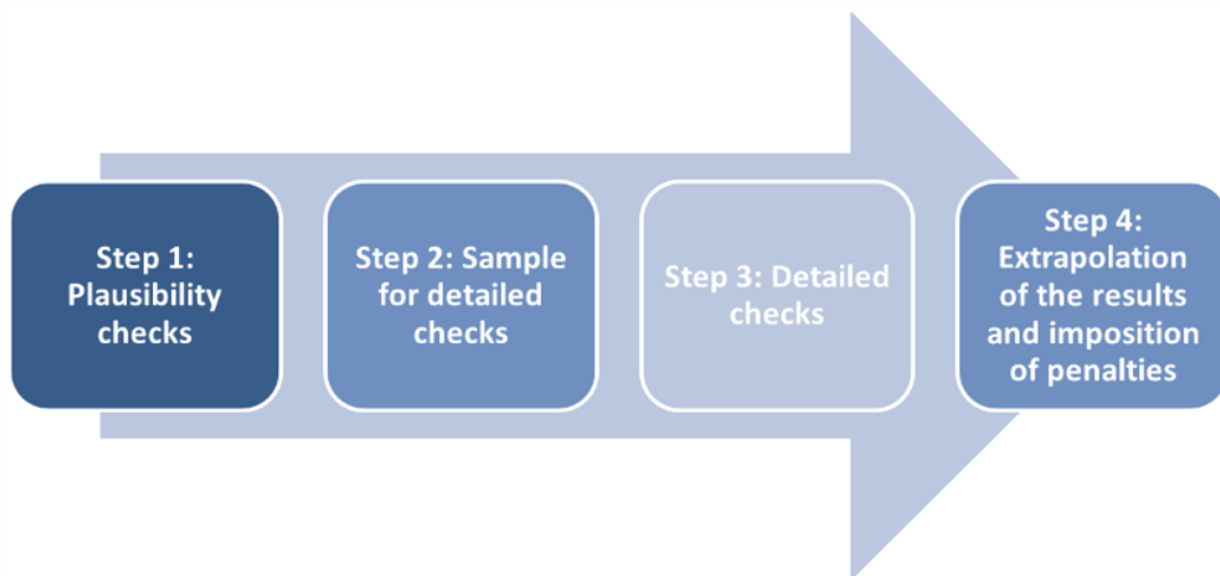
M13: Promoting energy audits in households

M14: Strengthening the technical and administrative capacity of the involved policy makers

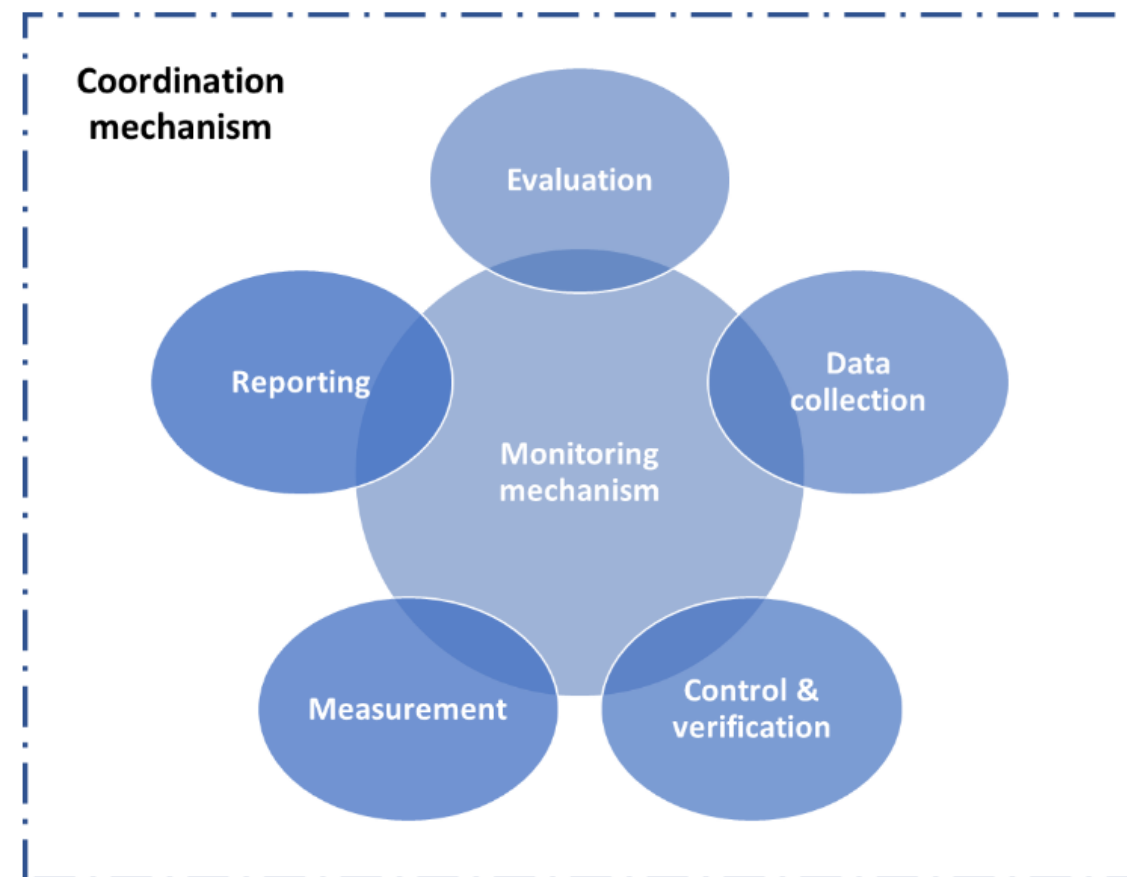
M15: Fostering the implementation of innovative financing mechanisms

Monitoring and evaluation framework

Steps for the conduction of the required control and verification activities



Overview of the sub-mechanisms within the established monitoring and evaluation framework



Communication plan

Step I: Analyse the communication environment, define the communication objectives and appoint the authority that will be responsible for the communication plan

Step II: Develop the communication materials taking into account the specified objectives and targets and the characteristics of the targeted audience

Step III: Identify the communication tools and utilise a combination of them to maximise the impacts

Step IV: Design and implement the communication activities in the short-term, medium-term and long-term horizon including accurate specification of the timeline and the required cost

Step V: Assess the communication activities through specific indicators, which will be quantified for each communication activity separately

Different means :

- Organisation of workshops/round tables
- Launch an officially open consultation procedure under the auspices of the responsible ministries

Lessons learnt from the renovation roadmaps

Establishing the appropriate data collection procedures

Initiating a combination of policies and measures for the renovation of the residential buildings

Identifying and launching the most effective financing schemes targeted for energy poor households

Assessing the performance of the implemented policies and measures

Adapting the implemented policies and measures and introducing new in the case of potential deviations



Thank you!

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the European Union**

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