



iBRoad2EPC

TRAINING MODULE FOR PUBLIC AUTHORITIES

2 - INTEGRATION OF THE STAGED RENOVATION APPROACH AND THE IBROAD2EPC CERTIFICATION FRAMEWORK IN NATIONAL, REGIONAL AND LOCAL ENERGY PLANNING AND MANAGEMENT



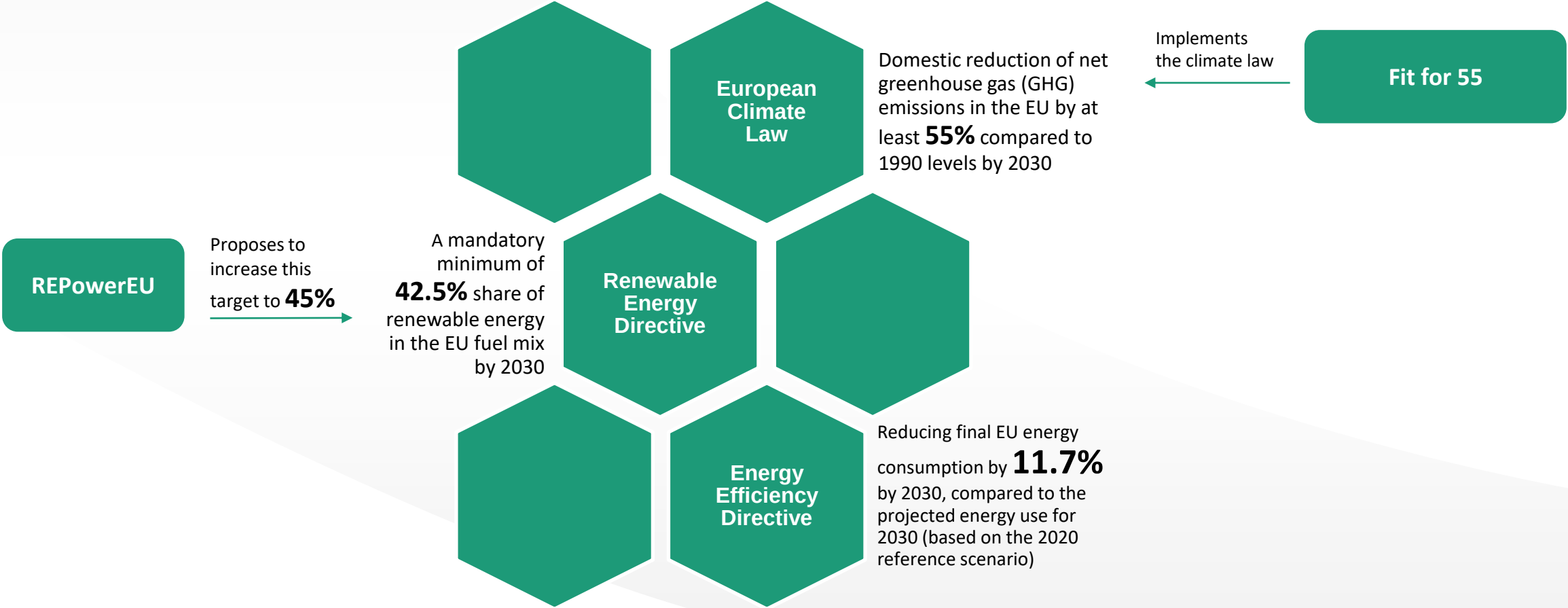
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EU AND NATIONAL REQUIREMENTS

Energy and climate planning, building renovation strategies and plans

EU policy framework

Energy and climate planning



EU policy framework

Energy and climate planning

Buildings will be included in the
EU ETS 2 beginning 2027 or 2028

EU Emissions Trading System (ETS)

A cornerstone of the
EU's policy to combat
climate change

EU Taxonomy

A cornerstone of the
EU's sustainable finance
framework

Technical Screening Criterion 7.2. identifies **renovation of existing buildings** as a sustainable activity when it leads to a reduction of primary energy demand (PED) of **at least 30 %** validated through an EPC and can be achieved through a succession of measures within a **maximum of three years**

! iBRoad2EPC can provide a list of measures to achieve the desired PED reduction in the appropriate timeframe

EU policy framework

Building renovation strategies and plans

EU level

Renovation Wave strategy: The EU launched the Renovation Wave strategy, which aims to double the annual renovation rate of buildings by 2030. The strategy focuses on making buildings more energy-efficient, decarbonising heating and cooling systems, and addressing other aspects such as circularity and digitalisation in the construction sector.

Energy Performance of Buildings Directive (EPBD): The EPBD sets out the framework for the energy performance of buildings in the EU. It includes provisions for energy performance certificates (EPCs), minimum energy performance standards (MEPS) and the promotion of zero-energy buildings (ZEBs). The EPBD has been revised and the recast version was signed in April 2024.

EU funding programmes: The EU provides funding programmes, such as the European Structural and Investment Funds (ESIF), to support Member States in implementing building renovation strategies. Funding is often allocated to projects that aim to improve energy efficiency in buildings.

EPBD Recast (2024)

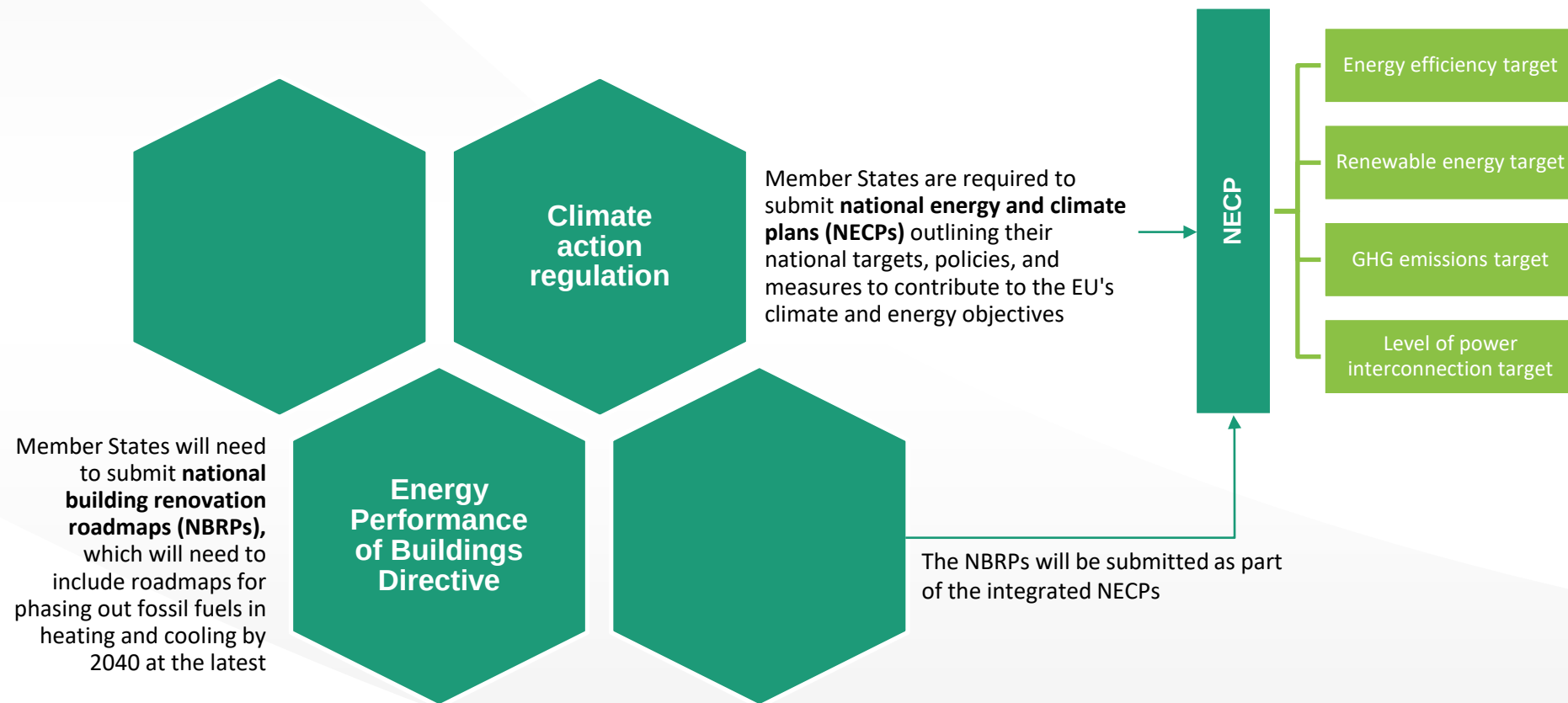
The legal framework for the implementation of EPCs and Renovation Passports

- ✓ **Minimum Energy Performance Standards (MEPS)**
- ✓ **Deep renovations and zero emission buildings (ZEBs)**
- ✓ **Progressive phase-out of fossil fuels in heating and cooling**
- ✓ **Indoor environmental quality (IEQ)**
- ✓ **Enhanced long-term renovation strategies (LTRSs), to be renamed national building renovation plans (NBRPs)**
- ✓ **Increased reliability, quality and digitalisation of EPCs with energy performance classes to be based on common criteria**
- ✓ **Definition of deep renovation and the introduction of renovation passports**
- ✓ **Ensuring new buildings are solar-ready (fit to host solar installations) where technically and economically feasible**



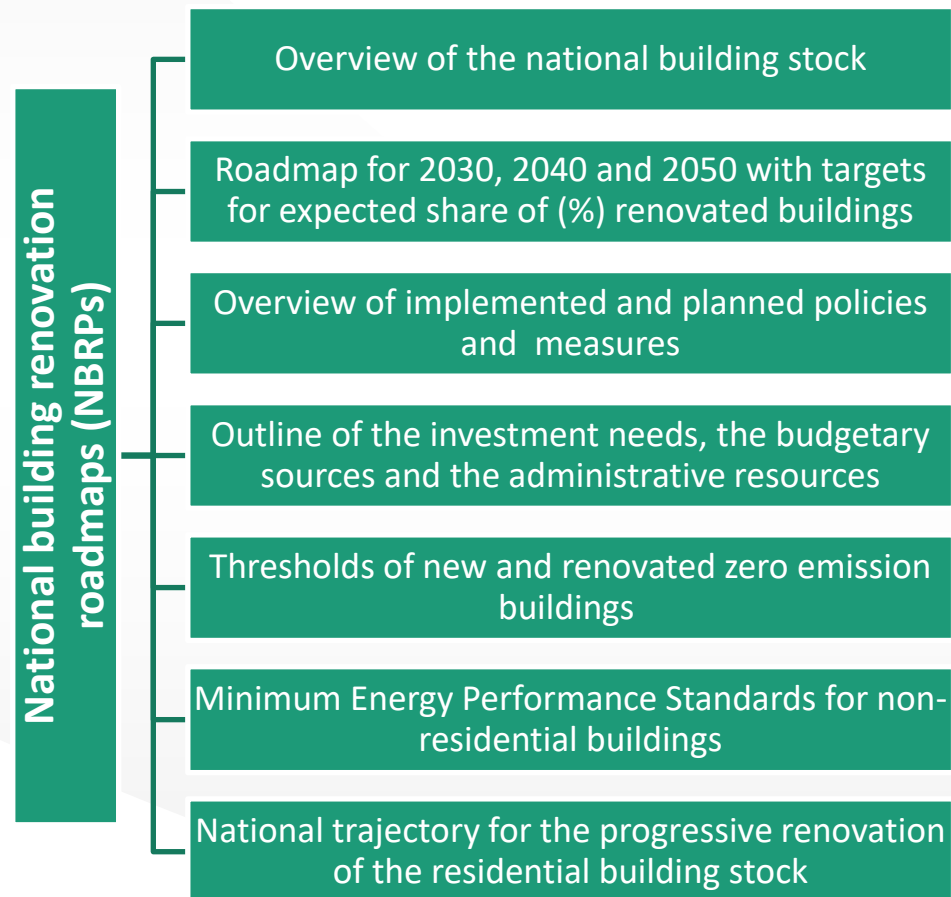
EU – National requirements

Energy and climate planning



EU – National requirements

Building renovation strategies and plans



! Recommendations in iBRoad2EPC are aligned with the NBRPs

EU – National requirements and support

Building renovation strategies and plans

Building codes and standards: National governments are responsible for establishing and enforcing building codes and standards that include energy efficiency requirements. These codes often set minimum standards for new constructions and may include regulations for retrofitting existing buildings.

Financial incentives: Governments provide financial incentives, such as grants, subsidies, or tax incentives, to encourage building owners to invest in energy-efficient renovations. These incentives aim to offset the upfront costs associated with energy-efficient measures.

Public buildings: Most countries have specific requirements or programmes targeting energy efficiency improvements in public buildings. Renovating public buildings serves as an example and can encourage private building owners to follow suit.

Monitoring and reporting: Member States are required to monitor and report on the progress of their National Renovation Strategies, including data on the energy performance of buildings and the implementation of energy-saving measures.

EU – Regional and local requirements

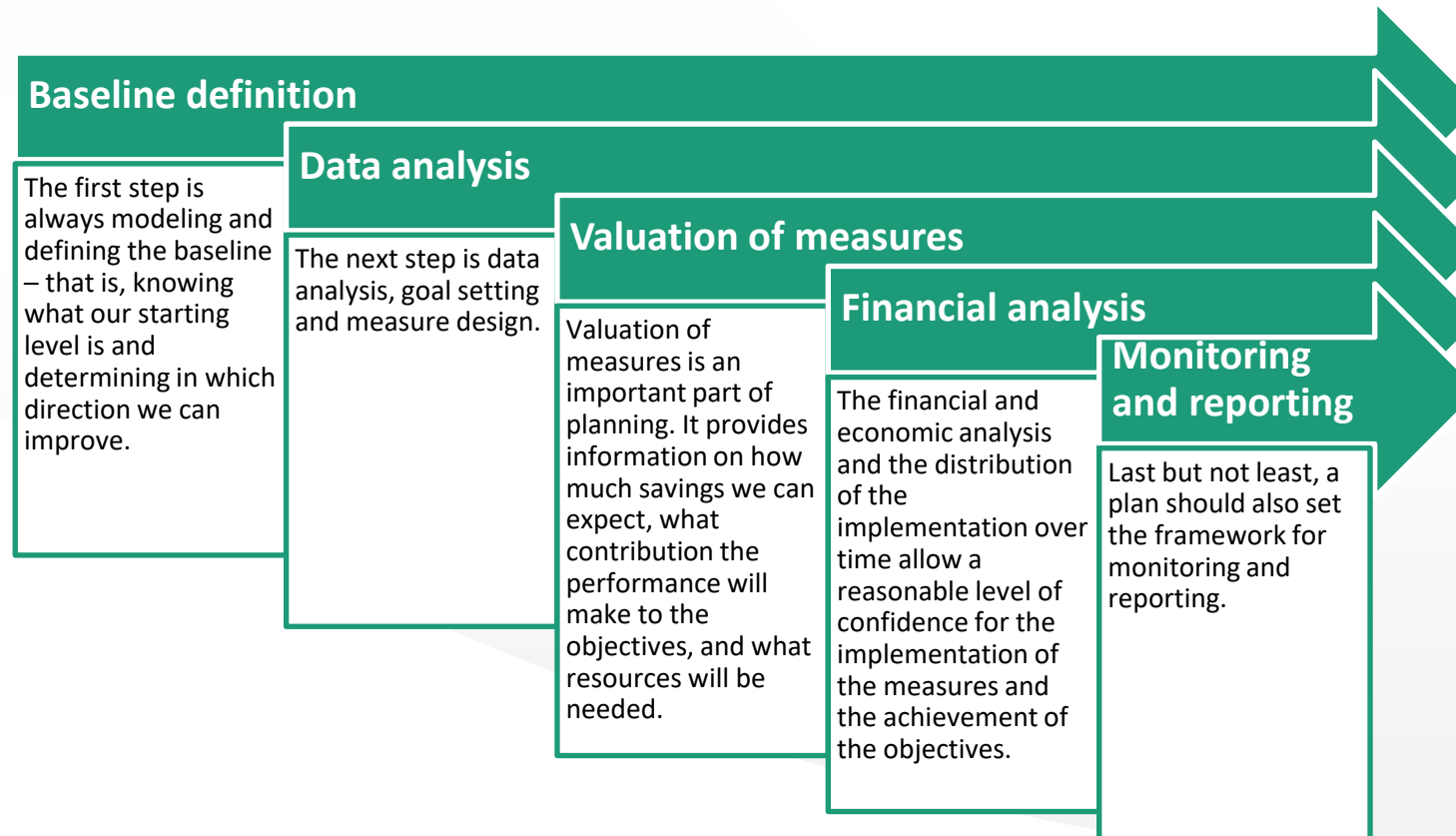
Building renovation strategies and plans

Sustainable Energy and Climate Action Plans (SECAPs): As commitments under the Covenant of Mayors, these are strategic documents developed at the local or regional level to outline a community or municipality's approach to sustainable energy and climate action. These plans are instrumental in aligning local efforts with broader national and international climate goals.

Municipal EE and RES programmes: Municipal energy efficiency (EE) and renewable energy sources (RES) programmes are initiatives undertaken by local governments to enhance energy efficiency, reduce carbon emissions, and promote the use of renewable energy in their communities. Where applicable, short-term and long-term documents are developed according to national legislation – but if there is a SECAP in place, this can fulfill the legal commitments of a local authority.

Planning at national, regional and local level

Main principles for building renovation planning at different administrative levels:



LTRS and iBRoad2EPC

Long-term renovation strategy:

Varies in different countries

Option 1:

Targets based on percentage of savings

Option 2:

Targets based on minimum requirements such as energy class, maximum energy consumption, or maximum CO₂ emissions generated during building operation

Option 3:

Other possible targets such as renovation of the worst-performing buildings



National building renovation plans

National building renovation plans:

Member States should establish national building renovation plans (NBRPs) to replace their LTRs.

The NBRPs should be closely linked with the integrated national energy and climate plans.

NBRPs will include renovation of the building stock, replacement of the technical systems, and installation of solar systems, electric vehicle recharging infrastructure, heat pumps, building automation and control systems.

New more specific plans and targets will be established with the NBRP.





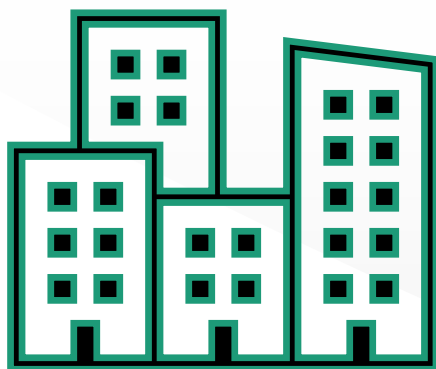
FINANCIAL MECHANISMS

and incentives for building renovations

Financial mechanisms and incentives

Building renovations

European Structural and Investment Funds (ESIF): Various funds – such as the European Regional Development Fund (ERDF) and the Cohesion Fund – may be used by Member States to support building renovation projects that contribute to energy efficiency and environmental sustainability. For example, programmes with national applicability aimed at urban development, including energy efficiency, are co-financed by the ERDF.

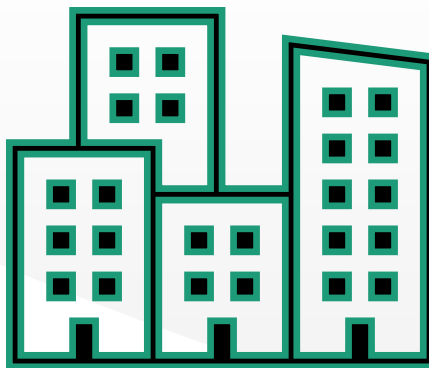


Financial mechanisms and incentives

Building renovations

NextGenerationEU and Recovery and Resilience Facility (RRF):

NextGenerationEU is an economic recovery plan which aims to build a more resilient and sustainable European economy. The plan includes various funding instruments and initiatives to provide financial assistance to EU Member States, with a focus on investments in areas such as digitalisation, green transition, healthcare, and job creation. The RRF focuses on investments and reforms that will contribute to economic recovery, enhance the resilience of national economies, and promote sustainable growth. Within the framework of the national plans, the first energy efficiency projects aimed at residential buildings, and also at public buildings of local and state authorities and those of businesses (such as SME and industry), are already being implemented.



Financial mechanisms and incentives

Building renovations

NextGenerationEU and Recovery and Resilience Facility (RRF): Energy efficiency in recovery and resilience plans

The 26 recovery and resilience plans approved so far include a significant number of investments dedicated to energy efficiency, reflecting the priority of decarbonising the building stock.

The estimated total of the investments in the energy efficiency of the building stock is EUR 65.3 billion (13.4% of the total expenditures outlined in the plans), out of EUR 72.5 billion invested in energy efficiency overall.

Most of the spending on energy-efficient renovations is going to schemes aiming to achieve medium-depth level renovation, with average primary energy savings of at least 30%. Energy efficiency measures supported by the RRF also ensure progress towards other environmental objectives, such as reducing air pollution.

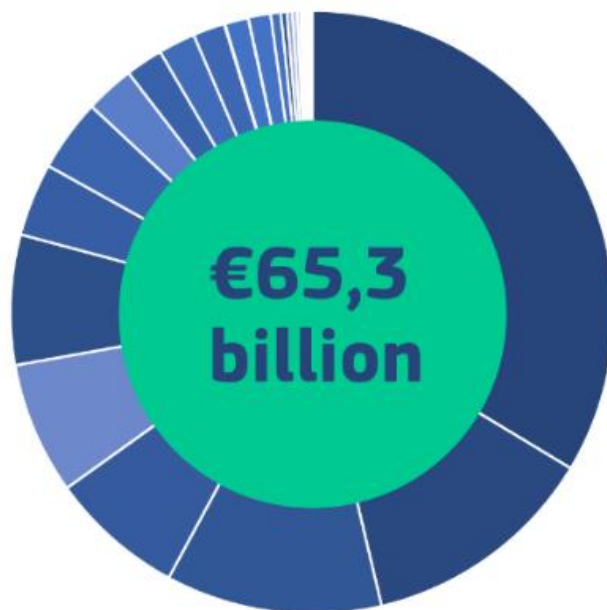
Financial mechanisms and incentives

Building renovations

NextGenerationEU and Recovery and Resilience Facility (RRF): Energy efficiency in recovery and resilience plans

Total energy efficiency expenditure in buildings per Member State

Expenditure in EUR millions per Member State



■ Italy; €22.001	■ France; €8.282	■ Spain; €7.576
■ Romania; €4.722	■ Poland; €4.633	■ Portugal; €4.555
■ Germany; €2.557	■ Greece; €2.540	■ Slovakia; €1.723
■ Czechia; €1.310	■ Bulgaria; €1.298	■ Belgium; €1.127
■ Netherlands; €849	■ Croatia; €778	■ Sweden; €356
■ Slovenia; €213	■ Lithuania; €185	■ Denmark; €168
■ Latvia; €111	■ Ireland; €90	■ Cyprus; €89
■ Finland; €70	■ Austria; €64	■ Malta; €54
■ Estonia; €47		

Source:
RECOVERY AND
RESILIENCE
SCOREBOARD
Thematic analysis
Energy efficiency in
buildings by
European
Commission

Financial mechanisms and incentives

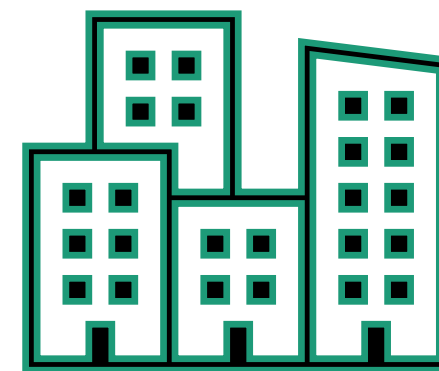
Building renovations

Horizon Europe: EU research and innovation funding programme with a budget of €95.5 billion until 2027. Also provides funds for research and innovation in sustainable building materials, technologies and construction methods that contribute to energy-efficient renovations.

European Investment Bank (EIB): Offers financial instruments to support projects that align with EU policy objectives such as the EPBD.

ELENA (European Local Energy Assistance): ELENA is a technical assistance and financial instrument that supports energy efficiency and renewable energy projects.

ESCOs (energy service companies): Provide energy services and solutions to clients, typically focusing on improving energy efficiency, reducing energy consumption, and implementing renewable energy technologies. ESCOs offer a range of services including energy audits, energy-efficient upgrades, equipment installation, and performance contracting.



National-level incentives for building renovations

Bulgaria

Country	Name of the incentive	Type of incentive	Brief description
Bulgaria	Support for Sustainable Energy Renovation of the Residential Building Stock Phase II [ПОДКРЕПА ЗА УСТОЙЧИВО ЕНЕРГИЙНО ОБНОВЯВАНЕ НА ЖИЛИЩНИЯ СГРАДЕН ФОНД] for Multi-family building (MFB) owners in cities	80% subsidy 20% cofinancing	For SFB, municipalities apply in partnership with HOAs registered under the same law. After the implementation of energy saving measures (ESM), buildings should achieve energy class B and a minimum of 30% primary energy savings.) The total budget is BGN 282,470,400 including VAT.
	Regional Development Programme 2021-2027 [Програма "Развитие на регионите" 2021-2027] for owners of MFB and Singlefamily buildings (SFB	Subsidy	Funding will be based on Territorial Strategies developed under the responsibility of Territorial Authorities (10 municipal administrations) and the 6 Integrated Territorial Development Strategies for Level 2 Planning Regions focusing on the 40 municipalities developed under the responsibility of the Regional Development Council in the NUTS 2 region concerned, which will perform functions related to the pre-selection of project ideas. For financial instruments the budget is EUR 236.2 million, of which EUR 141.7 million is for financial instruments and EUR 94.5 million is for grants in one operation with financial institutes.
	'Immovable Property Tax' [Данък върху недвижимите имоти] for buildings	Tax exemption	This exempts from taxation buildings put into operation before 1 January 2005 of energy class B, and buildings put into operation before 1 January 1990 certified with class C, issued in accordance with the Energy Efficiency Act and the Regulation under Article 48 of the Energy Efficiency Act. Not applicable when renovation works are implemented with public funding

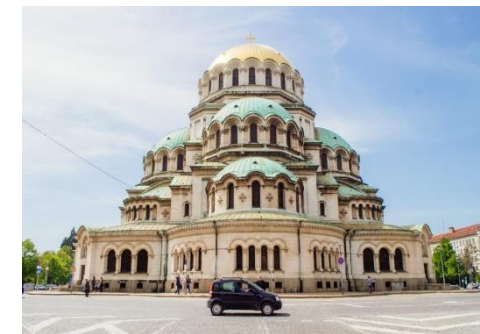


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National-level incentives for building renovations

Greece

Country	Name of the incentive	Type of incentive	Brief description
Greece	SAVING [Εξοικονομώ] 2023 scheme	Subsidy	For thermal modernisation interventions of home owners. The total budget for the 2023 cycle is EUR 300 million. It includes public funding of between 40% and 75% of the cost of energy improvements, depending on the income of the beneficiary and whether the property is owner-occupied or rented.
	SAVE-RENOVATE scheme for young people [Εξοικονομώ - ανακαινίζω το σπίτι μου - για νέους]	Subsidy	Specifically for people born after 1984 to cover renovation works: between 40-85% of the cost for energy savings, and 30% cost coverage for renovations. The total budget is EUR 300 million.
	ELECTRA [ΗΛΕΚΤΡΑ] scheme for public building	Subsidy	For public authorities that are using buildings for healthcare, education, offices and other types of public buildings such as cultural, athletic facilities, museums, buildings used by religious authorities etc. The total budget for this cycle (expected to close at the end of 2025) is EUR 640 million. Public funding is provided in the form of a grant ranging between 50- 95% of the eligible energy upgrade costs (the higher percentage is foreseen for buildings that achieve greater savings in the end)



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National-level incentives for building renovations

Poland

Country	Name of the incentive	Type of incentive	Brief description
Poland	Warm Flat [Ciepłe mieszkanie]	Subsidy	For SFB owners to replace solid fuel heating sources and improve energy efficiency. Subsidy amount depends on income level with part of the budget reserved for communities. The second phase has been opened in late 2023 with a budget of nearly PLN 63 million.
	Clean Air [czyste powietrze] programme	Subsidy and loans	This aims to improve air quality, change heating sources and improve energy efficiency. It has a budget of PLN 83,300,000 and PLN 20 billion as loans



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National-level incentives for building renovations

Portugal

Country	Name of the incentive	Type of incentive	Brief description
Portugal	Efficiency Voucher [Vale Eficiência] programme	Subsidy	Funding is accessed via an online platform and offers vouchers for beneficiaries of social electricity energy tariffs for measures of a maximum value of EUR 1,300. The overall budget is EUR 32 million.
	Support Programme for More Sustainable Buildings [Programa de Apoio a Edifícios mais Sustentáveis]	Subsidy	A subsidy for owners of residential buildings based on a reimbursement procedure. Costs are paid upfront. Up to 85% of costs can be covered, depending on the measure. The total budget is EUR 195 million with a recently opened new injection of EUR 30 million.
	Support Programme for Multifamily Buildings [Programa de Apoio a Condomínios Residenciais]	Subsidy	A subsidy for owners of MFBs and condominiums, financial capacity for the non-funded part needs to be proved. The budget is EUR 12 million, with a maximum of EUR 150,000 per application (funding covers 70% of the cost for traditional solutions and 80% for eco-materials).



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National-level incentives for building renovations

Romania

Country	Name of the incentive	Type of incentive	Brief description
Romania	Energy Efficient House Programme [Casa Eficienta Energetica]	Subsidy for single family home	Public funding of 40-60% (based on energy performance targeted, on one of three levels) but not more than EUR 8,000 (minimum level) to EUR 14,100 (maximum level) for SFBs.
	Energy efficiency in public buildings [Eficiență energetică în clădiri publice]	100% grant	Energy efficiency funds for moderate to deep renovation measures including thermomodernisation, change to efficient heating systems, installation of renewable energy systems and charging stations.



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National-level incentives for building renovations

Spain

Country	Name of the incentive	Type of incentive	Brief description
Spain	Programmed Renovation Residential Environment (ERRP) [Programa de ayuda a las actuaciones de rehabilitación a nivel de barrio]	Subsidy	Renovation programmes for the economic and social recovery of residential environments. Target is subdivided into three sub-programmes: i) existing multi-family buildings located in an ERRP; ii) multifamily buildings; and iii) SFBs.
	Programme for the Energy Renovation of Buildings (PREE) [Programa Rehabilitación energética de edificios]	Subsidy	This programme provides access to finance for the implementation of renovation measures such as the improvement of the thermal envelope, the replacement of fossil fuel based heating systems with biomass, geothermal, solar thermal and heat pump systems, the generation of renewable electricity for own consumption and the installation of efficient regulation and control technologies, as well as energy efficient lighting. In addition, the programme aims to support actions carried out by Renewable Energy Communities or Citizen Energy Communities and provides special support for vulnerable groups.
	Programme for the Regeneration and demographic challenge (PREE 5000) [Rehabilitación energética de edificios en municipios de reto demográfico]	Subsidy	The programme aims to boost sustainable buildings in municipalities with up to 5,000 inhabitants which face demographic challenges. Interventions can range from changes of thermal envelope, replacement of heat sources but even energy efficiency lighting. The programme also aims to promote action carried out by Renewable Energy Communities. Additional aid is given to owners that are granted a social bonus to tackle energy poverty.



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National level incentives for building renovations

Spain

Country	Name of the incentive	Type of incentive	Brief description
Spain	Programme to Promote the Renovation of Public Buildings (PIREP) [Programa de Impulso a la Rehabilitación de los Edificios Públicos]	Subsidy	This programme is financed under the Recovery and Resilience Facility (RRF) and aims to renovate at least 1,230,000 m2 of public buildings and achieve a 30% primary energy reduction. Measures cover improvement of water, materials, waste and climate adaptation, accessibility of buildings, removal of hazardous materials inside, and conservation of buildings. It is aimed at municipalities and local councils.
	OPENGELA	One-stopshop	The one-stop-shop helps building owners to overcome the initial barriers to renovation, acts as a contact point in the district, centralises renovation support measures and is complemented by official communication campaigns.
	ICO MITMA Rehabilitation of Residential Buildings	Credit guarantee scheme	Creation of financing instruments, through an agreement between the Ministry of Transport, Mobility and Urban Agenda and the Official Credit Institute (ICO), aimed at communities of owners to favour the renovation of their buildings, since they may have difficulties in finding such financing through ordinary channels.



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DEEP RENOVATION BUILDING PRACTICES

Awareness of smart building technologies,
building construction and architecture
principles regarding deep renovation.

Deep energy renovations



- ✓ Adding sufficiently thick insulation
- ✓ Installing windows and doors with very high thermal properties
- ✓ Airtightness of the building elements
- ✓ Avoiding thermal bridges
- ✓ Mechanical heat recovery ventilation
- ✓ Highly efficient heating, cooling and DHW systems based on renewables
- ✓ Renewable electrical energy
- ✓ Long-term financial feasibility

Building envelope

Building envelope measures:

1. Thermal insulation

- a) Walls
- b) Roof
- c) Floor

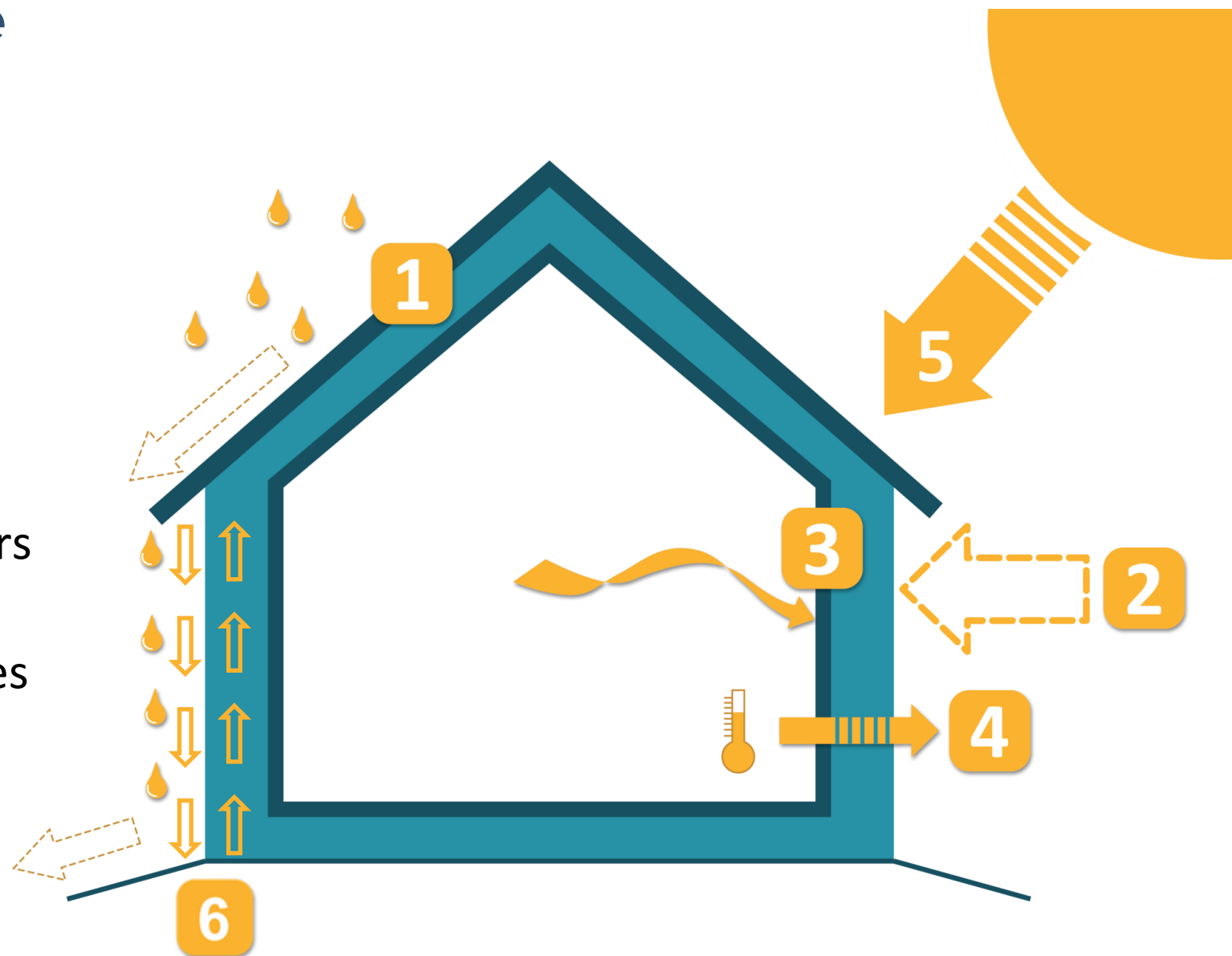
2. Changing windows and doors

3. Air tightening

4. Reduction of thermal bridges

5. Solar irradiation control
(shading or increasing winter solar heat gains)

6. Dynamic thermal envelope



Building systems

Types of measures:

1. Changing or improving heat generator (boiler or heat pump)
2. Changing or improving heating system (e.g. to work at a lower temperature)
3. Replacing or renovating ventilation system
4. Changing or improving generator for cooling system
5. Automatisisation of one or more systems
6. Smart building control
7. Monitoring
- ...and more



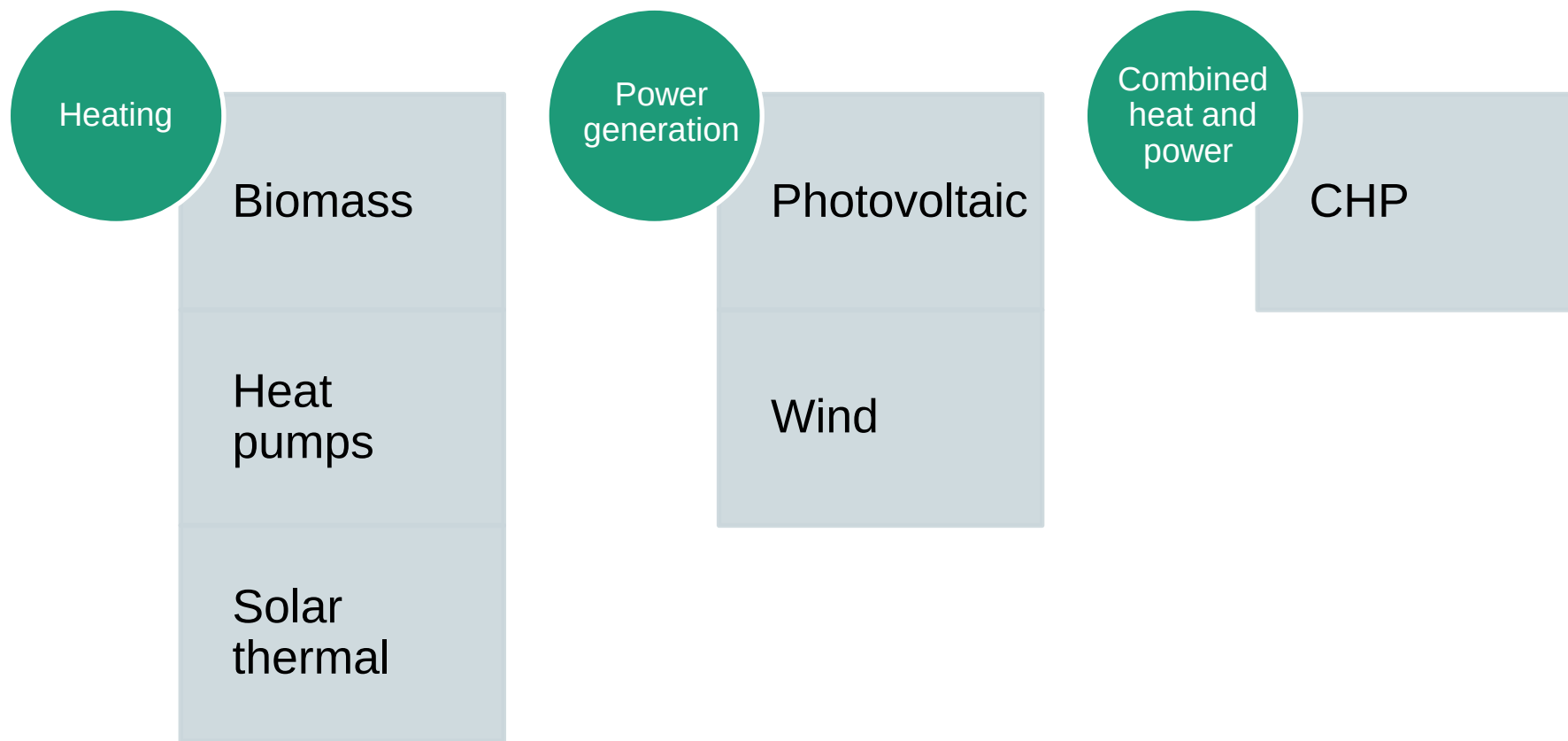
Renewable energy integration in building projects



- ✓ Renewable energy systems are the final step to reach (nearly) zero energy and emission goals.
- ✓ Once all possible measures to reduce energy demand have been deployed, renewable energy systems must be used to balance residual energy demand.
- ✓ The performance of renewable energy systems determines the success of nearly-zero energy buildings.
- ✓ Renewable energy systems can be integrated during the early design process as a part of the structure, or can be added as retrofits.

Renewable energy integration in building projects

Categorised according to usage (building level):



Smart building technologies

Smart building technologies encompass a variety of interconnected systems and devices designed to enhance the efficiency, sustainability and overall functionality of buildings. These technologies leverage information technology, sensors and automation to optimise building operations, improve the occupant experience, and **reduce energy consumption**.



Smart building technologies

Building automation systems (BAS): BAS is the backbone of smart buildings, controlling and monitoring various building systems including HVAC (heating, ventilation and air conditioning), lighting, security, and more. It allows for centralised control and automation, optimising energy usage and operational efficiency.

Energy management systems (EMS): EMS focuses on optimising energy consumption within a building. It monitors and controls energy-consuming devices, ensuring efficient use of resources and reducing overall energy costs. This can include features like demand response, load shedding and real-time energy monitoring.

Internet of Things (IoT) sensors: IoT sensors are deployed throughout a building to collect real-time data on various parameters such as occupancy, temperature, humidity and air quality. This data is used to inform decisions and automate responses for improved comfort and energy efficiency.

Smart lighting: Intelligent lighting systems use sensors and controls to adjust lighting levels based on natural light, occupancy, and time of day. This not only enhances energy efficiency but also contributes to a more comfortable and productive environment.

HVAC automation: HVAC systems can be optimised through smart technologies that adjust settings based on occupancy, weather conditions and user preferences. This leads to energy savings and improved comfort.

Smart building technologies

Security and access control: Smart building security integrates surveillance cameras, access control systems and alarms. Advanced technologies such as facial recognition and biometrics enhance security while providing convenient access for authorised individuals.

Occupancy management: Sensors and analytics can be used to monitor space utilisation, helping facility managers optimise space allocation, improve workplace efficiency, and reduce operating costs.

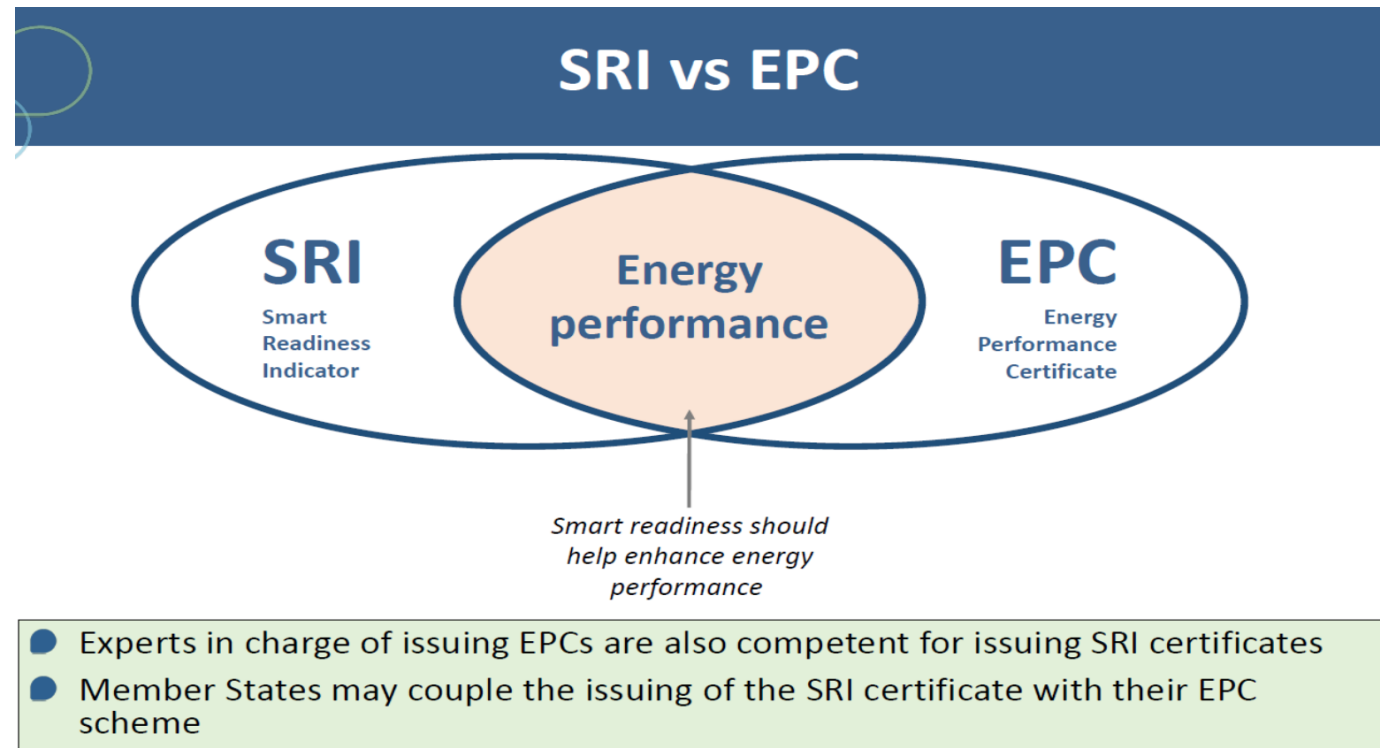
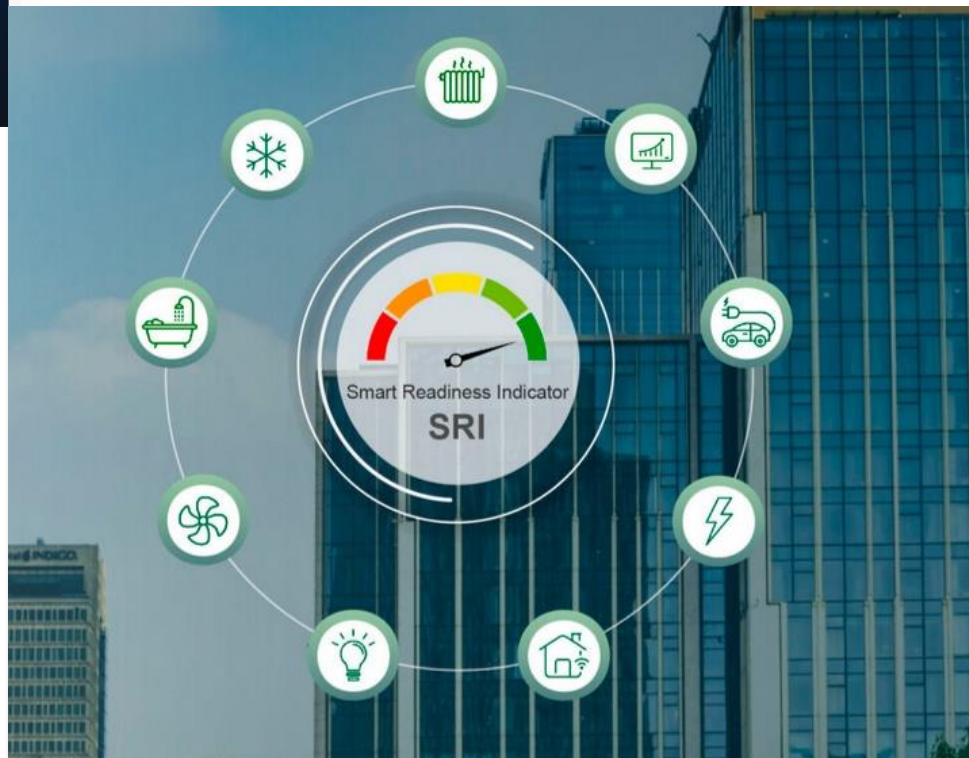
Building management software: Centralised software platforms enable building managers to monitor and control various systems from a single interface. This facilitates data analysis, decision-making, and the implementation of proactive maintenance strategies.

Cloud computing: Storing and processing data in the cloud allows for scalable and flexible solutions. Cloud-based platforms enable remote monitoring, data analysis, and the integration of third-party applications.

Augmented reality (AR) and virtual reality (VR): AR and VR technologies can be employed for training, maintenance and troubleshooting purposes. They enhance the efficiency of building operations and reduce downtime.

Green building technologies: Sustainable and eco-friendly building technologies – such as energy-efficient materials, renewable energy sources, and water-saving systems – contribute to the overall environmental impact of a building.

Smart building technologies



Opportunities for energy savings

Significant energy savings of 75-90% can be achieved even in existing buildings, for which the following measures have proved to be particularly effective:

- Improved thermal insulation (based on the principle 'If it has to be done, do it right')
- Reduced thermal bridges
- Considerably improved airtightness
- Use of high-quality windows
- Ventilation with highly efficient heat recovery
- Efficient heat generation
- Use of on-site renewable energy sources

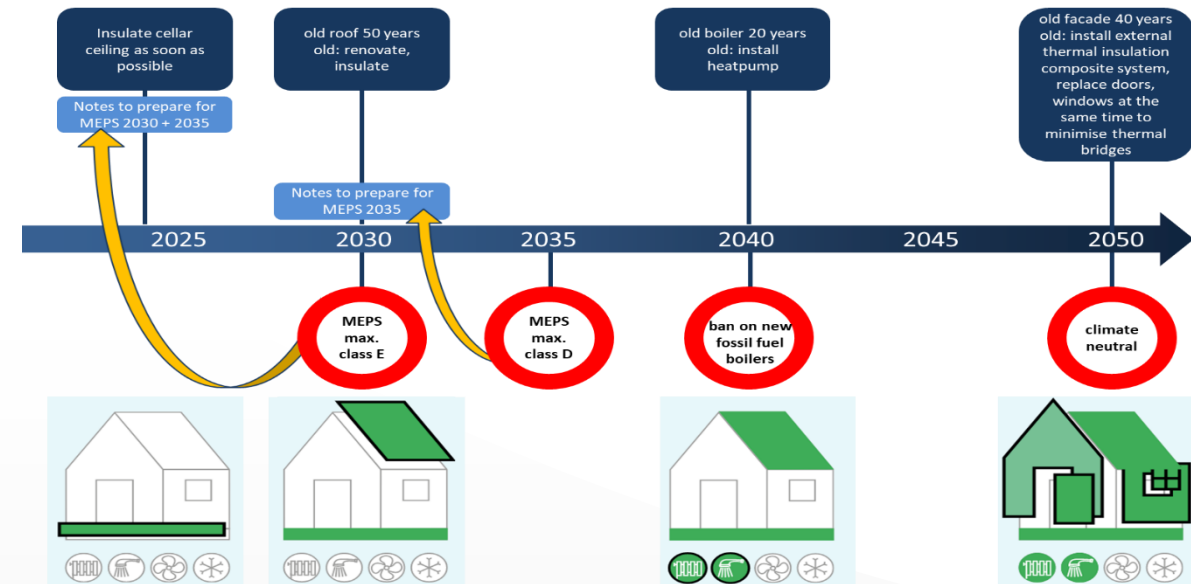
Opportunities for energy savings

Often, however, viable potential savings cannot be achieved due to a lack of budget.

In such cases, step-by-step renovations can achieve good results with smaller investments at the beginning and then new investments once savings have accumulated.

These investments should be made with future regulations and obligations in mind.

Step-by-step renovations based on future regulations are deeply embedded in the iBRoad2EPC approach.



Common difficulties encountered during the renovation of existing buildings

At the planning phase:

- This phase is when the measures prescribed in the energy audit of the building must be designed. It's extremely important that this happens, because any gap in the project documentation at this stage could lead to poor implementation in the renovation activities. In addition, this phase produces the key documents in which the conditions for the tenders for implementation are set out.



Common difficulties encountered during the renovation of existing buildings

At the construction phase:

Correct execution and effective monitoring during the construction phase of each project are crucial for the quality of the final product.



Common difficulties encountered during the renovation of existing buildings

Quality assurance in the renovation process covers:

- ✓ Materials used: Are they of the right standard, size, shape and material?
- ✓ Equipment: Will it work in the environment and is it safe?
- ✓ Agreed ways of measuring quality: What does 'good' look like?
- ✓ Project management: Timeframes, fair bidding processes, agreed budgets etc.
- ✓ Certificates and skills: Do your people have the right skills for the job?

Common difficulties encountered during the renovation of existing buildings

Verification and certification

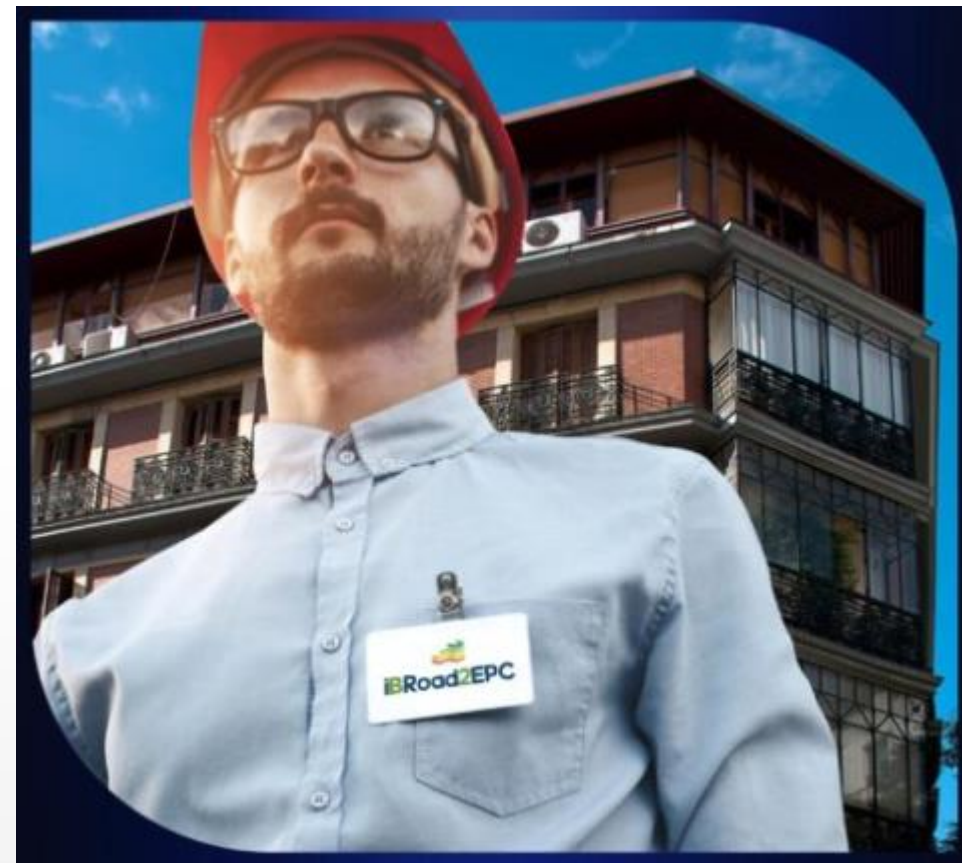
Very often, detailed inspections of projects that have just been 'successfully' completed find that the targeted results have not been achieved, and this can be due to a number of factors (poor construction, wrong equipment settings, inappropriate user behaviour, and even incorrect assumptions in the energy audit). For many of these factors immediate corrective action can be taken, but only if the causes are identified in time - and in some cases final payment to contractors should not be made until a solution is put in place.



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iBRoad2EPC approach

When EPC issuers have received in-depth training, and in light of the availability of pre-defined recommendations which also describe the relationships between the different individual energy saving measures, a large number of mistakes can be avoided during construction. When designers and construction workers understand the documentation and know the basic principles of step-by-step renovation, the process can be completed seamlessly. This is the essence of the training received by iBRoad2EPC construction professionals.



ENERGY ANALYSIS IN BUILDINGS

Energy performance assessment methodologies,
energy monitoring and data analysis tools, energy
consumption patterns in buildings

Energy monitoring and data analysis tools

- **Building energy management systems (BEMS)**
- **Energy management software**
- **Real-time energy monitoring systems**
- **Cloud-based energy analytics platforms**
- **Smart metering and advanced metering infrastructure (AMI)**
- **Demand response platforms**

Energy monitoring and data analysis tools

What is energy monitoring?

1. Energy metering:

The collection of data from all kinds of energy (electrical, fuel consumption, fuel generation etc.) into a common space that enables processing

2. Real-time energy analytics:

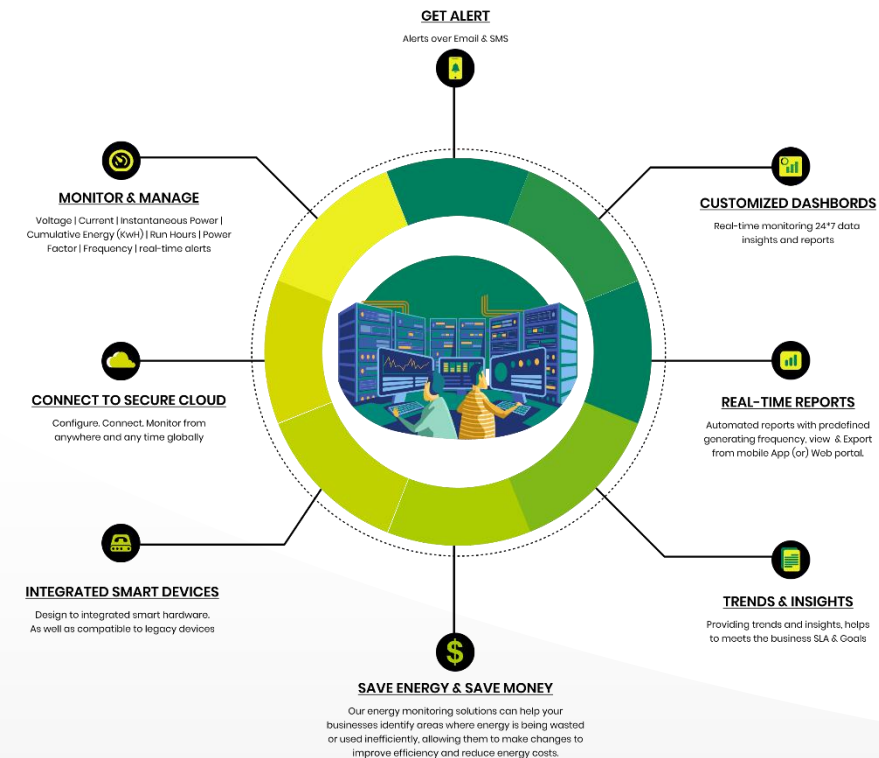
Instantaneous analysis of energy usage data in real time

3. Energy consumption data storage

Ability to store received data for further processing

4. Integration of smart devices:

Incorporating advanced technology to optimise energy usage and facilitate real-time monitoring and control



<https://www.6thenergy.com/what-is-energy-monitoring/>

Energy monitoring and data analysis

Opportunities?

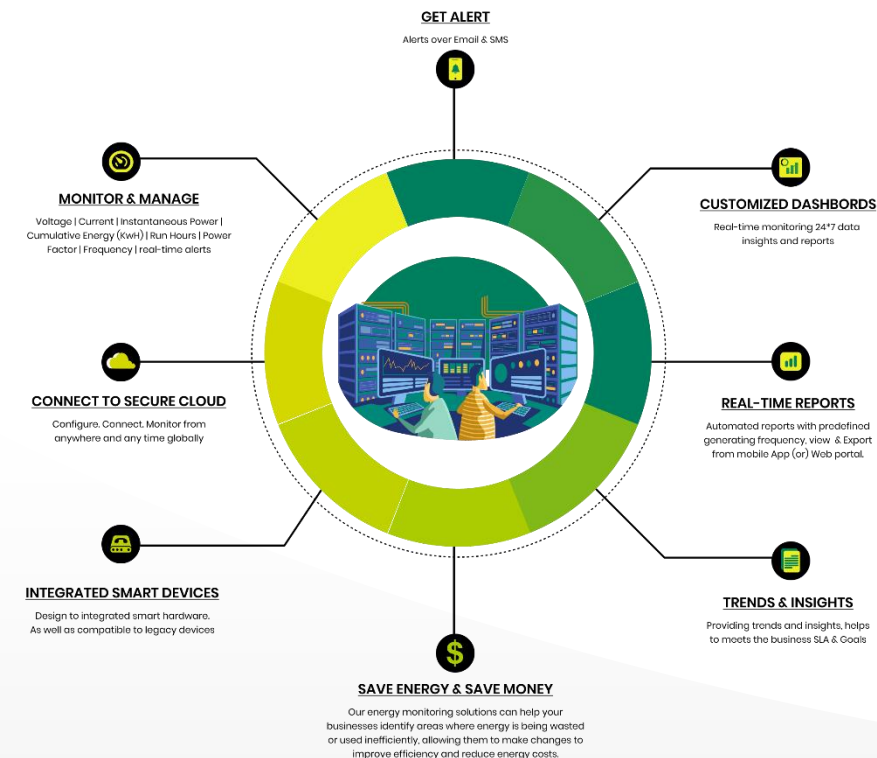
1. Real-time visualisation of problems in consumption:

Enhanced visibility of power consumption trends and patterns could reveal issues with energy generators, consumers or automatisisation

2. Analysis of energy consumption database

Enables the tracking of consumption trends and the exploration of opportunities for energy or financial savings

3. Ability to plan the most cost-effective energy efficiency investments, based on actual consumption of individual facilities and energy types



<https://www.6thenergy.com/what-is-energy-monitoring/>

Energy monitoring and data analysis

Benefits of energy monitoring and management tools



Optimise energy consumption



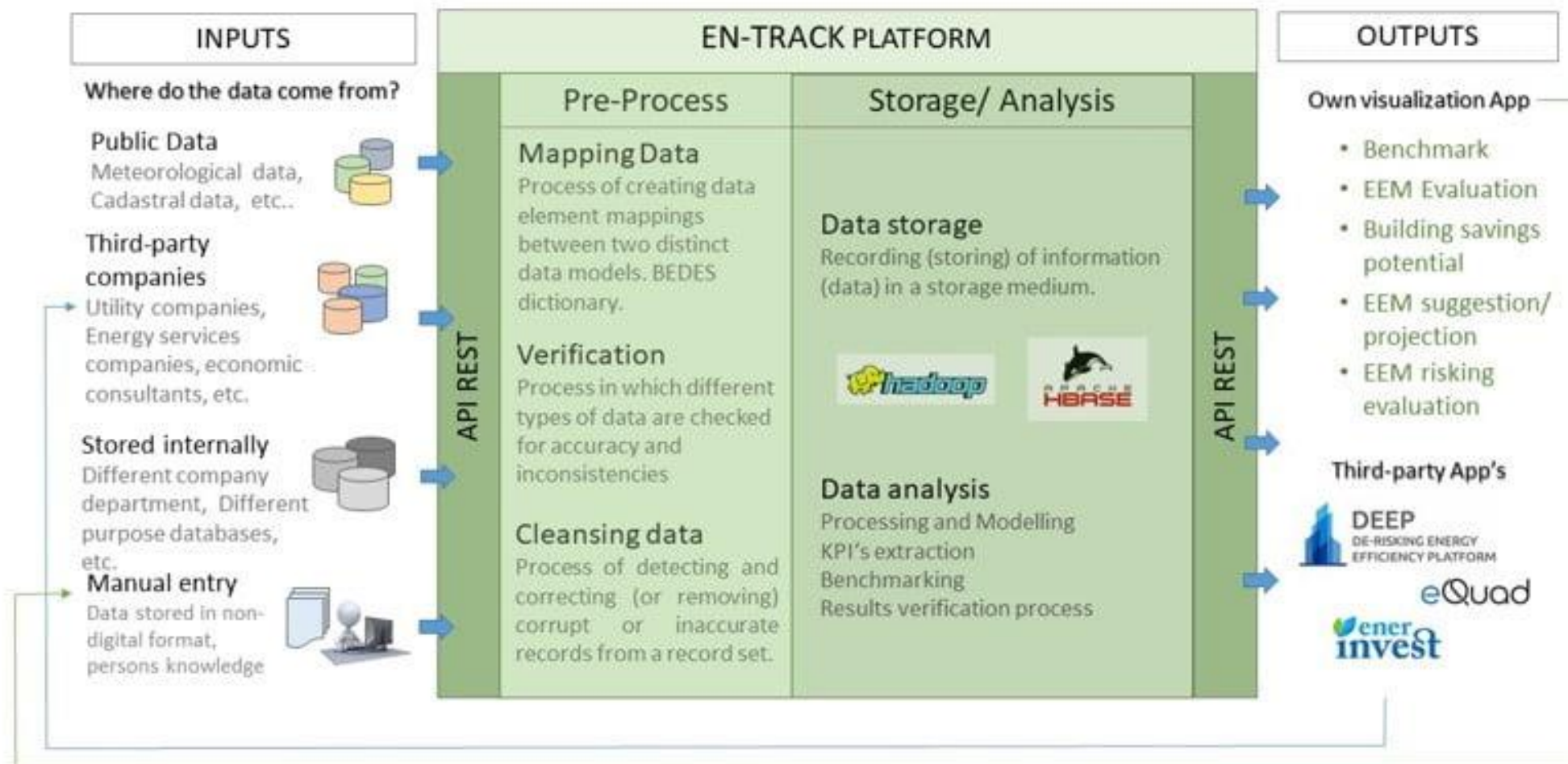
Enable data-driven decisions
on energy performance
improvement needs and
selection/substitution of
alternative energy sources



Attract financing

Energy monitoring tools

EN-TRACK DATA PROCESS



Who is EN-TRACK targeting?



Building owners/operators



- All information in one place
- Follow building energy consumption in real time
- Monitoring and verification
- Benchmarking
- Recommendations and support for decision-making

Financial institutions



- Benchmarking and risk assessment
- Assessment of investments and expected financial parameters of projects
- Assessment of environmental benefits

Policymakers

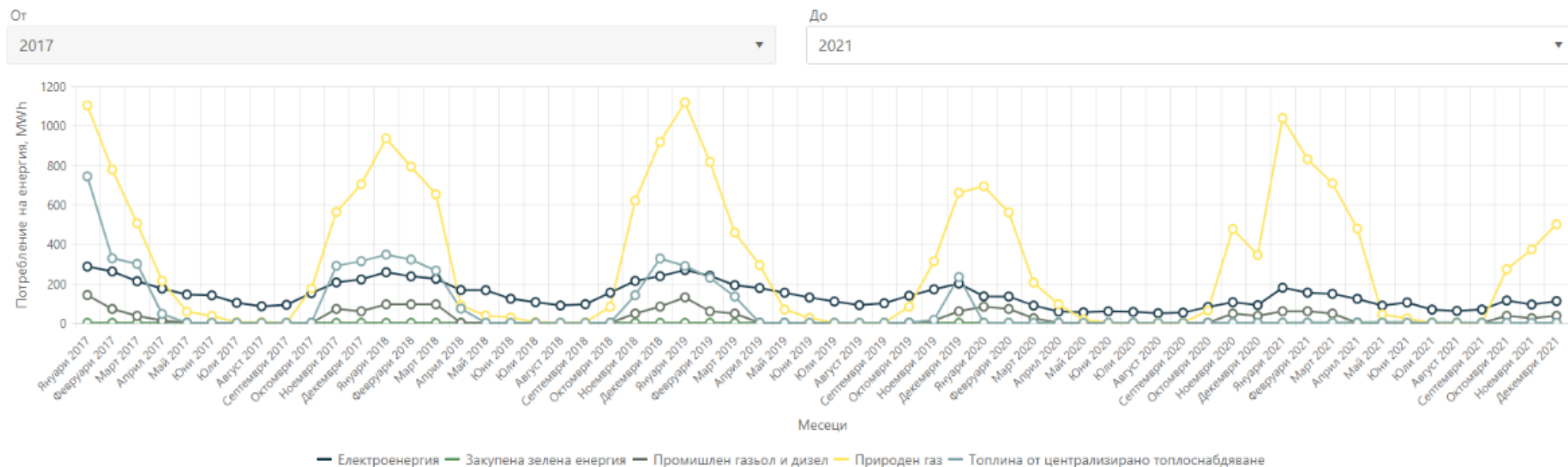


- Track energy performance of buildings, EE investments and environmental targets
- Data-driven support for development of policies, strategies and financial instruments

Energy monitoring tools: energy consumers' capabilities

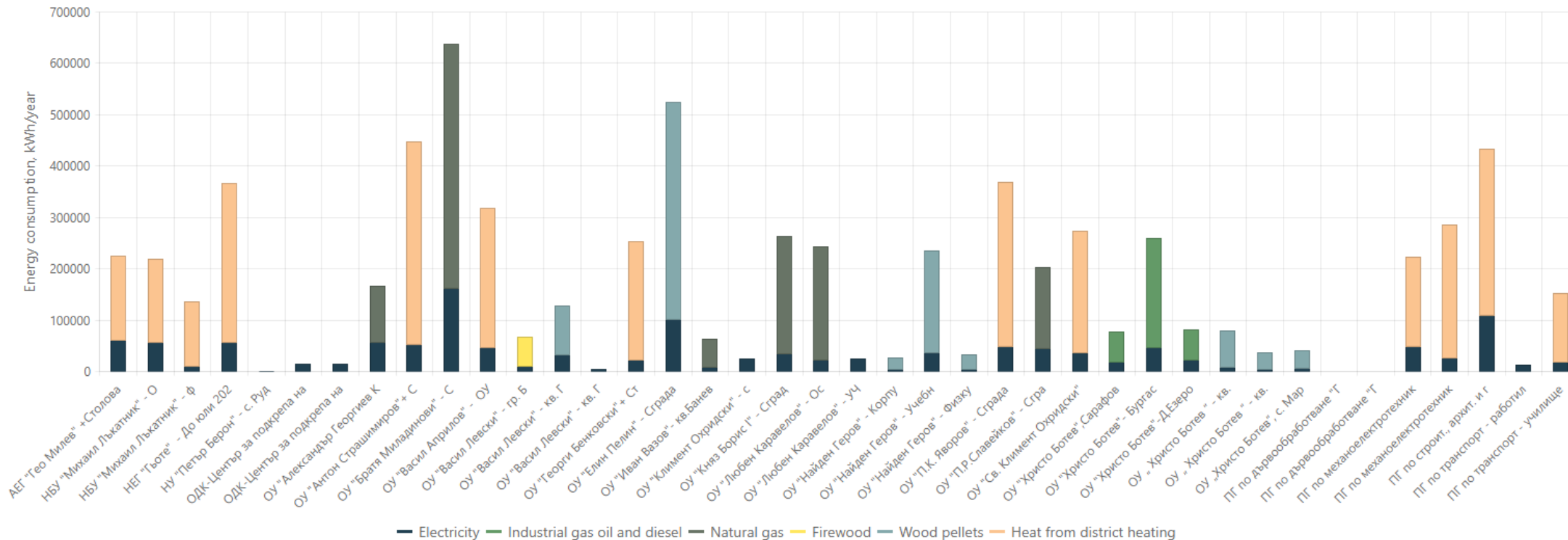
Monitoring the buildings of a municipality or institution enables the development and tracking of the institution's energy plans

Месечно потребление на енергия



Energy monitoring tools: choosing buildings to renovate

Comparison of actual final energy consumption in buildings
(graphics can be moved left and right with the mouse)



Energy management (ISO 50001)

ISO 50001

ISO 50001 Energy Management System

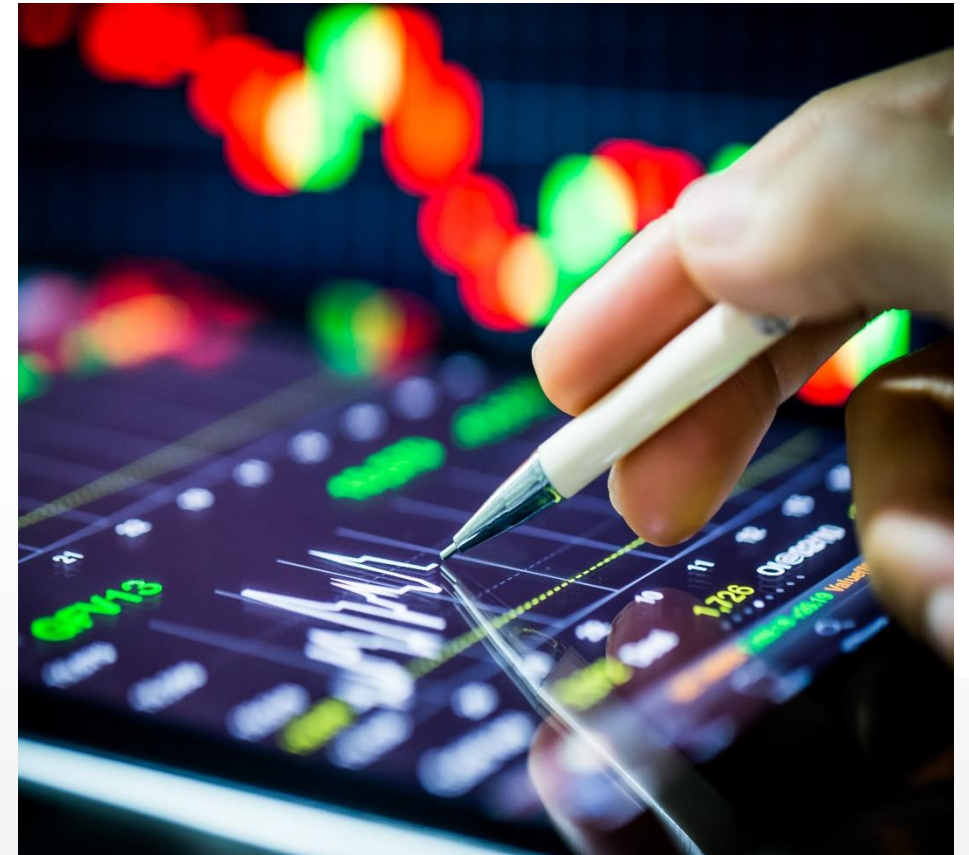


iBRoad2EPC approach

These approaches, together with staged renovations, can contribute significantly to the improvement of the energy status of the building stock.

Renovations together with monitoring systems guarantee both the quality of implementation and the reliability of results, not only for ESCO schemes but for all kinds of investments. It also guarantees that mistakes will not be repeated, and they will quickly be eliminated.

Data monitoring makes it possible to include additional triggers for executing the next step, or for shifting its timing.

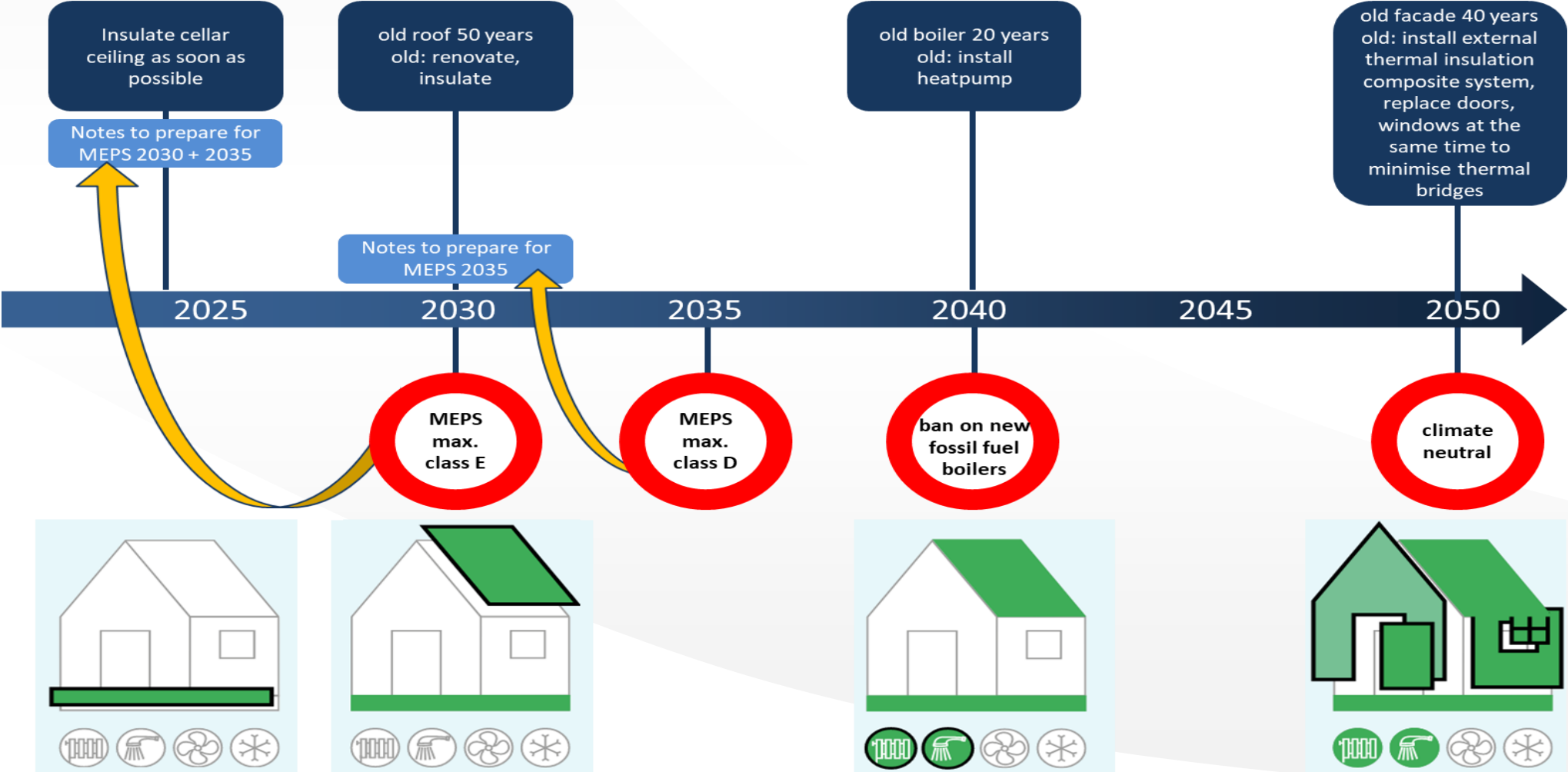




iBRoad2EPC

Technical and regulatory principles for
determining the individual steps

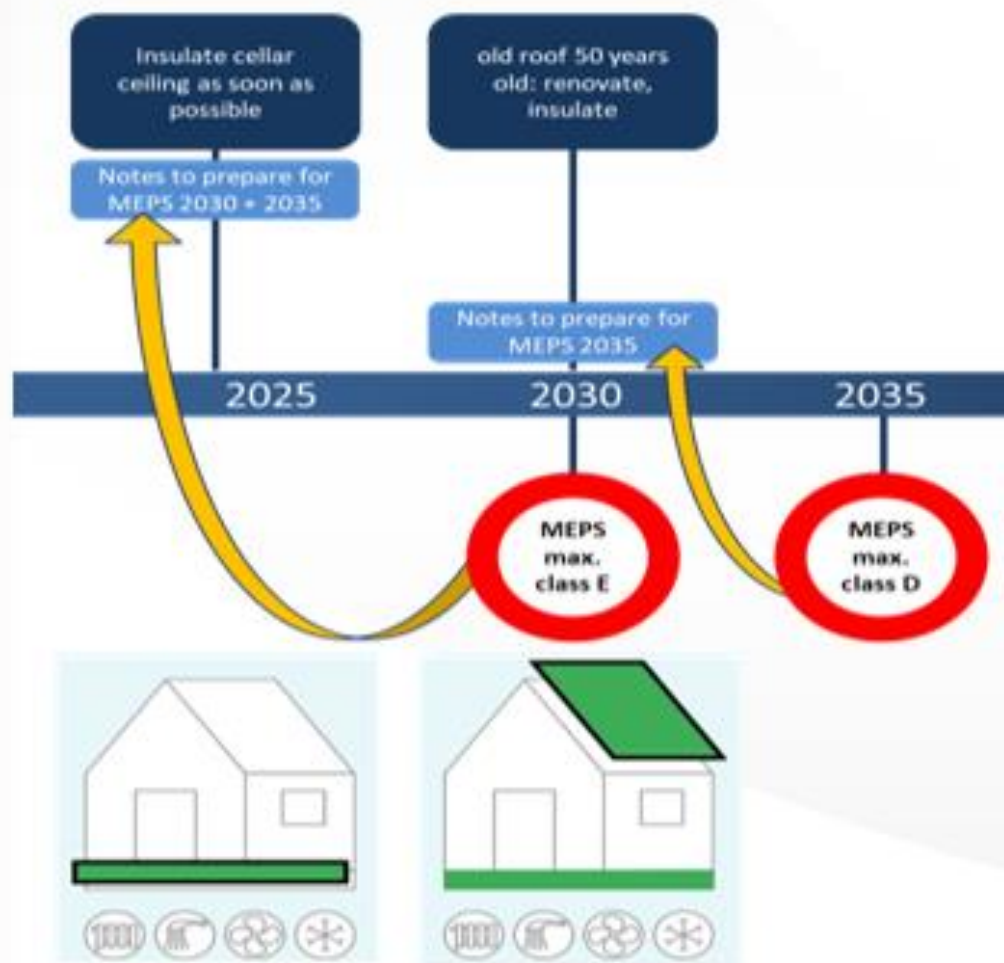
iBRoad2EPC concept



iBRoad2EPC



iBRoad2EPC approach



Triggers

Any legal change can be considered as a trigger for a building change.

e.g. The obligation for every building to be Class D by 2030

iBRoad2EPC approach



Triggers

Any imperative change in the building can also be a trigger for change.

The end of life of an old heating boiler is a good example of such a change.

iBRoad2EPC approach

Step 2 2030

13.000 € Maintenance Costs
+ 2.000 € Energy-related Costs

15.000 € Investment Costs

5.000 € Funding

Funding is rated in "Subsidies-EU"
www.subsidies-in-your-country.eu
(Status as of 24.11.2022)

Triggers

Starting a long-planned financial initiative can also be considered a trigger in some cases.

For example, if there is a long-term plan of an institution or municipality, the budgets set in it for various activities, including energy efficiency, can be a trigger

iBRoad2EPC approach

Step triggers

Legal change



Building maintenance



Financial initiative

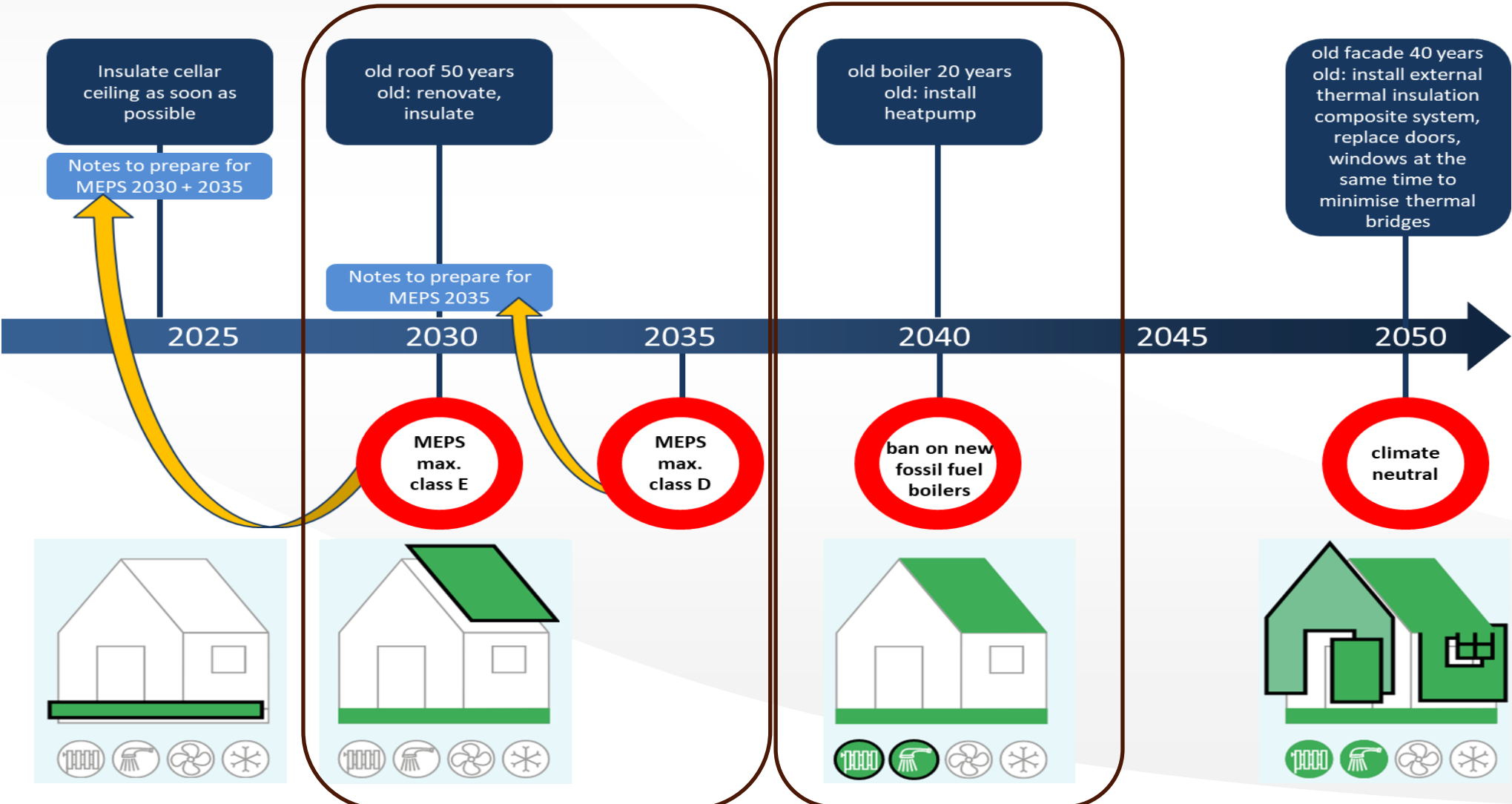


These individual triggers can be used, and it is recommended that they be used in any combination

iBRoad2EPC concept

Old roof + MEPS requirements

Old boiler + ban on fossil fuels



iBRoad2EPC in energy planning

Targets from EPBD, LTRS or NBRP, local planning, future changes etc.

Targets can be different in different building types (according to NBRP) or different regions (according to regional plans/neighborhood changes in future)

EPBD example:

MEPS will ensure that all non-residential buildings are below:

- 16% threshold by 2030
- 26% threshold by 2033

The average primary energy consumption of residential buildings should be reduced by:

- 16% by 2030
- 20-22% by 2035



iBRoad2EPC in energy planning

Example uses of iBRoad2EPC in municipal energy planning

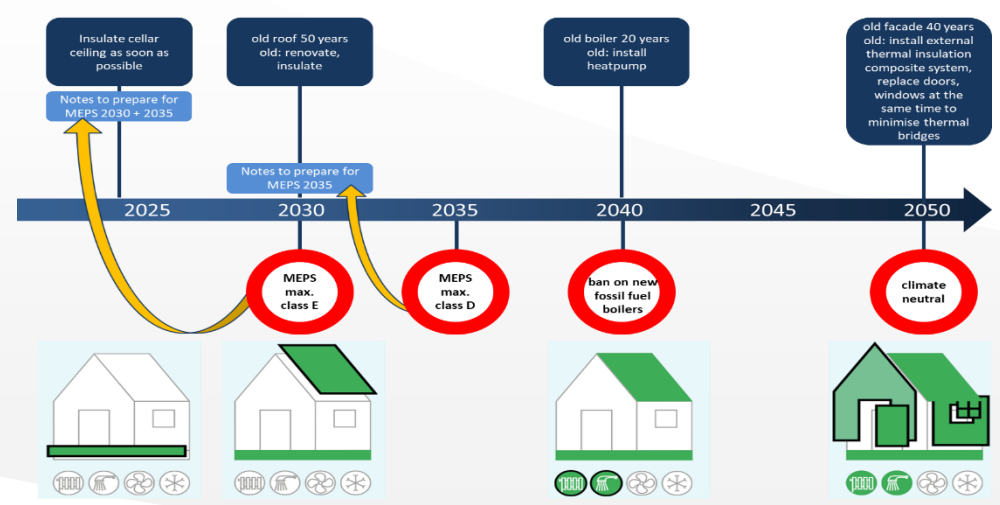
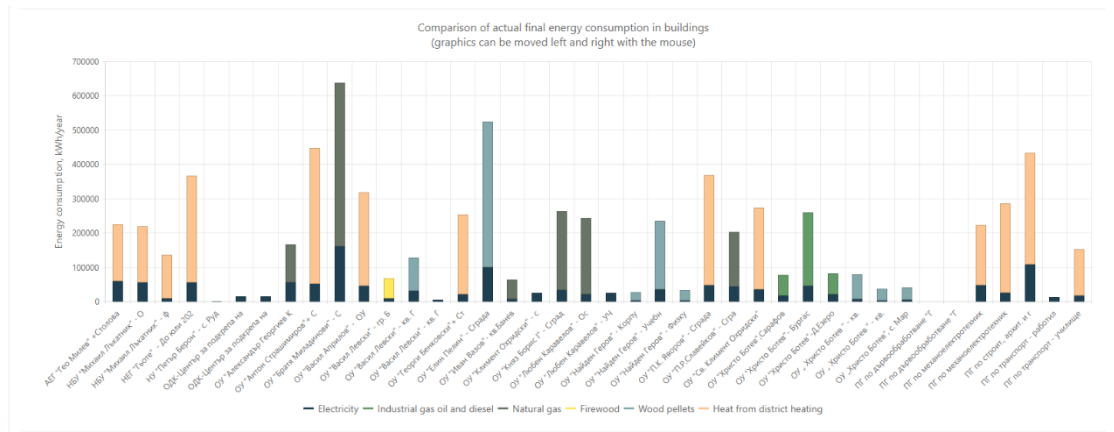
Municipal buildings:

- Administrative
- Educational
- Cultural
- Housing
- Others

Other buildings:

- Multi-family buildings
- Single-family buildings
- Offices
- Others

Changed based on municipal planning and national plans





Stay in touch with iBRoad2EPC at
www.ibroad2epc.eu

Address

c/o Sympraxis Team
Sina 10, 10672 Athens
GREECE

Phone & Email

+30 210 2113333
ibroad2epc@sympraxis.eu

Find us on Social Media

