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Budowanie potencjału administracji publicznej w celu sprostania wyzwaniom związanym z renowacją jej zasobów budowlanych.

Nr umowy gratowej: 2021-1-IT02-KA220-ADU-000035307

CaPABle

Podręcznik kompetencji

ANEKSY

Luty 2023

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Spis treści

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Abstrakt

Dokument zawiera aneksy do podręcznika kompetencji projektu Capable - **Budowanie potencjału administracji publicznej w celu sprostania wyzwaniom związanym z renowacją jej zasobów budowlanych.**

Aneksy zawierają między innymi opisy wybranych polityk i strategii związanych z renowacją budynków publicznych w krajach partnerskich projektu. W dalszej cześci znajdują sie opisy dobrych praktyk oraz studia przypadków dotyczących mechanizmów wsparcia finansowego, narzędzi i instrumentów dostępnych dla interesariuszy na różnych poziomach renowacji zasobów budowlanych administracji publicznej w krajach partnerskich projektu Capable.
Dokument w języku angielskim.

Annex 1: Snapshot of public building renovation strategies and generated challenges for PA

Italy

1. **Legislative framework, policies associated with public building renovation strategies in EU level (Examples of such EU strategies include: EPBD, EED, building renovation passports, Energy Performance Certificates, Digital Building Logbooks, Smart Readiness Indicators**

The Union is determined in its commitment to develop a sustainable, competitive, secure and decarbonised energy system. The Energy Union and the Energy and Climate Policy Framework for 2030 set ambitious Union commitments to further reduce greenhouse gas emissions by at least 40 % by 2030 compared to 1990, to increase the share of energy consumption from renewable sources, to achieve energy savings in line with Union-wide ambitions, and to improve the Union's energy security, competitiveness and sustainability. Directive 2012/27/EU of the European Parliament and of the Council as amended by Directive (EU) 2018/2002 of the European Parliament and of the Council, sets a headline target for energy efficiency of at least 32.5 % at Union level for 2030. Directive (EU) 2018/2001 of the European

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Parliament and of the Council sets a binding Union-wide target for energy from renewable sources of at least 32 % by 2030.

Buildings are key elements in the Union's energy efficiency policies, as they account for about 40 % of final energy consumption.

The 2015 Paris Agreement on Climate Change, resulting from the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21), encourages the Union's efforts to decarbonise its building stock. In view of the fact that nearly 50 % of the Union's final energy is used for heating and cooling, 80 % of which is used in buildings, the achievement of the Union's energy and climate objectives is linked to its efforts to renovate its building stock, prioritising energy efficiency, using the principle of 'energy efficiency first', and evaluating the use of renewable energies. With the Paris Agreement, the EU committed to reduce greenhouse gas emissions by at least 40 per cent by 2030, compared to 1990 levels. In 2021, the target was increased to at least 55% reduction by 2030 and to climate neutrality by 2050.

Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings ('Energy Performance of Buildings Directive') is the main legislation, together with Directive 2009/125/EC of the European Parliament and of the Council and Regulation (EU) 2017/1369 of the European Parliament and of the Council, on the energy efficiency of buildings in the context of the 2030 energy efficiency targets. The Energy Performance of Buildings Directive has two complementary objectives: to accelerate the renovation of existing buildings by 2050 and to promote the retrofitting of all buildings with smart technologies and a clearer link to clean mobility. In 2018, the Energy Performance of Buildings Directive was amended by Directive (EU) 2018/844 of the European Parliament and of the Council (EPBD III) to accelerate the renovation of buildings in the Union. The amendments to the Energy Performance of Buildings Directive create a clear pathway towards achieving a low and zero-emission building stock in the Union by 2050, modulated on national roadmaps with internal milestones and progress indicators, as well as supported by public and private financing and investment. Long-term national renovation strategies with a solid

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financial component in line with the requirements of Article 2a of the Energy Performance of Buildings Directive are needed to ensure the renovation of existing buildings to become energy-efficient and decarbonised by 2050, facilitating the cost-effective transformation of all existing buildings into nearly zero-energy buildings.

To ensure that financial measures for energy efficiency are best applied to the renovation of buildings, the revised Energy Performance of Buildings Directive requires that these financial measures be pegged to the quality of the renovation work, in light of the energy savings pursued or achieved by the renovation. It is necessary to transpose the requirements of Article 10 of the Energy Performance of Buildings Directive into national law to ensure that financial energy efficiency measures are pegged to the energy performance, the level of certification or qualification, an energy audit or the improvement achieved by the renovation, which should be assessed by comparing energy performance certificates before and after the renovation itself, using standard values or another transparent and proportionate method. High-quality data on the building stock should be acquired, some of which can be obtained from the banks of energy performance certificates that almost all Member States are setting up and managing. These databases can be used for compliance verification and the production of statistics on regional or national building stock. Measures are needed to implement Article 10 to enable the collection of data on the measured or calculated energy consumption of specific buildings and to make aggregated and anonymised data available. The Energy Performance of Buildings Directive leaves Member States wide discretionary powers in designing building regulations and implementing technical requirements for renovations, building certification and technical building systems in a manner best suited to climatic conditions and national building stock. This Recommendation aims to explain the substance of these technical requirements and the different ways to achieve the objectives of the Directive. It also presents the experience and best practices observed by the Commission among the Member States.

In 2021, the EU made climate neutrality, the goal of zero net emissions by 2050, legally binding in the EU. It set an interim target of a 55 per cent reduction in emissions by 2030. This target

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of zero net emissions is enshrined in climate law. The European Green Deal is the roadmap for the EU to become climate neutral by 2050.

The European Green Deal is a package of policy initiatives that aims to put the EU on the path to a green transition, with the ultimate goal of achieving climate neutrality by 2050; It supports the transformation of the EU into a fair and prosperous society with a modern, competitive economy; It emphasises the need for a holistic, cross-sectoral approach in which all relevant policy areas contribute to the ultimate climate goal. The package includes initiatives on climate, environment, energy, transport, industry, sustainable agriculture and finance, and to put in place new legislative initiatives to align EU legislation with its climate objectives.

The European Green Deal was launched by the Commission in December 2019 and the European Council took note of it at its meeting in December of the same year.

The main actions provided for in the regulation are as follows:

- define the pace of emission reductions up to 2050 to ensure predictability for businesses, stakeholders and citizens
- develop a system to monitor and report on progress towards the target
- ensure a cost-efficient and socially equitable green transition

The European Union is also promoting energy and digital efficiency in buildings by presenting the proposed revision of the Energy Performance Building Directive (EPBD). From 2030, all new buildings will have to be net zero. Not only that: to exploit the potential for faster action in the public sector, all new public buildings must be net zero by 2027.

As far as the existing stock is concerned, there is a push towards renovations that aim to have 15 per cent of the worst-performing buildings in each Member State upgraded from Energy Performance Certificate (EPA) grade G to at least one class higher (i.e. at least class F) by 2027 for non-residential buildings and by 2030 for residential buildings. The objective here is twofold: to maximise decarbonisation potential and alleviate energy poverty. In this regard,

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the Commission itself recalls that: there are more than 30 million building units in the EU that consume too much energy (at least 2.5 times more than the average building).

The European institution also intends to have clearer EPAs that provide better information. "The obligation to have an energy performance certificate is extended to buildings undergoing major renovation, buildings for which a lease is renewed and all public buildings," it specifies. He also points out that buildings or property units offered for sale or rent must also have a certificate, and the energy performance class must be indicated in all advertisements. 'By 2025, all certificates will have to be based on a harmonised scale from A to G'.

2. National Legislative framework and policies associated with public building renovation strategies at national levels.

In Italy, European directives have been transposed by means of *ad hoc* legislative decrees on various energy efficiency issues.

In recent years, various measures at EU and national level have focused attention on increasing energy efficiency in public administration buildings. As part of the 'Europe 2020' strategy and the 'Climate Package', which envisages a 30% increase in energy efficiency by 2020, starting in 2010, Europe has required Italy to set out on a path to reduce the environmental impact associated with public building consumption. European Directive 27/2012 on energy efficiency, transposed in Italy by Legislative Decree 102/2014, established that from 2014 until 2020 at least 3% of the air-conditioned usable covered surface area of central PA buildings must be upgraded each year. To achieve this goal, the government launched the Energy Requalification Programme for Central Public Administration (PREPAC), financed with public resources.

In the meantime, as stipulated in Directive 2010/31/EU (also called EPBD, Energy Performance of Buildings Directive), transposed into Italian Law Decree No. 63 of 4 June 2013, as of 1 January 2019 the obligation for all new PA buildings to comply with particularly virtuous energy standards was triggered. The strategy is defined by the nZEB (Nearly Zero Energy

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Buildings) project, i.e. 'near-zero energy buildings' in which very low or almost no energy requirements are covered to a significant extent by energy from renewable sources. From 1 January 2021, the obligation will apply to all new buildings.

In addition, Legislative Decree No. 48/2020 implements EU Directive 2018/844 on the energy performance of buildings by amending Legislative Decree 192/2005. It defines the criteria for the preparation of the long-term renovation strategy of the building stock and furthermore:

- introduces important novelties for the EPA
- changes the definition of a thermal installation
- excludes from the scope of Legislative Decree 192/05, buildings that have been declared uninhabitable or cooperative
- introduces obligations aimed at integrating electric vehicle charging infrastructure into buildings

Lastly, Legislative Decree No. 73/2020, is the 'Implementation of Directive (EU) 2018/2002' and amends Legislative Decree No. 102 of 4 July 2014. The Decree dictates a series of efficiency improvement measures aimed at the national energy savings target 'and contributing to the implementation of the European principle that puts energy efficiency first'.

3. Public building renovation targets/national programme targets and state of the art

In total, the public building stock for various uses is estimated at more than 65,000 units and about 60 per cent is made up of buildings constructed in the years before the first energy saving law (Law 373/76). As far as public office buildings are concerned, those used for administrative offices, there are about 13,500 buildings (3,000 those of the central PA) that involve an annual consumption of 4.3 TWh of energy (1.3 TWh electrical and 3 TWh thermal), corresponding to an expenditure of 644 million euros (data from Enea-CRESME, the Research Centre on the building sector, referring to 2013). Twenty per cent of these buildings are

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particularly energy-intensive, absorbing 1.2 TWh/year, for an expenditure of 177 million euros. Consumption that could be cut by 40% by intervening on the building envelope and systems, leading to savings of 73 million euro per year and a reduction in CO2 emissions of 130,000 tonnes (against a total investment calculated at around 1,000 million). The plant situation is rather 'dated': the most commonly used fuel is gas (62%), but diesel is still widely used (22%). Only 34% of buildings have a temperature control system for each room and only 46% of buildings have an air conditioning system.

4. Technical, legal, institutional and financial challenges faced by public authorities at national level, as defined by case studies, existing reports, experiences, etc.

Legal Barriers

From the overall analysis of the legal instruments available to the PA for the fulfilment of the obligation set forth in Article 5 of Legislative Decree 102/2014, some discrepancies emerge that are worth considering.

In the first place, two orders of contradictions emerge from the cited Decree: the first consists in the mismatch between the binding nature of the obligation to periodically requalify public buildings and the non-binding nature of the national energy efficiency target established by the central government and to which reference must necessarily be made, given that the public building stock requalification programme is aimed at complying with the minimum energy performance requirements identified therein. Therefore, the applicative force of the provision, which determines the ratio of the PA's obligation (to be qualified, in the light of both the national and supranational regulatory context, as an obligation of means rather than of result) on the basis of parameters having a merely programmatic value and not legally binding, is partially lacking. The second consists, instead, in the absence of a sanction guaranteeing the effectiveness of the requalification obligation.

Secondly, despite the benefits that the conclusion of an EPC generates for the PA, in particular because the economic risk of the intervention is borne by the contracting party, it is wary of

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using this instrument. This is due in particular to the lack of "expertise" of public offices in the contracting and monitoring phase.

Administrative and awareness barriers

The European energy efficiency found, which supports the financing of P.A. for energy requalification measures, states that half a billion projects proposed and approved were then blocked due to new elections and therefore the presence of a new mayor. In short, there is discontinuity between one legislature and the next. But there is more than that. There is often a lack of dialogue between managers, mayors and other offices dealing with building redevelopment issues, leading to a standstill of projects, which unfortunately remain stranded awaiting good management.

Often, however, the approach is wrong in that many public authorities do not put faith in initial investments that bring long-term results according to a cost-effectiveness logic, but prefer to invest in projects that do little to improve overall efficiency, but which have a very good return in terms of immediate economic returns and this More than a problem of competence, as many administrations do not know how to apply the principles of life-cycle cost analysis, in most cases we are faced with a problem of awareness of the usefulness of efficiency measures.

Technical barriers

The most significant technical barrier is the public administration's lack of technical expertise with regard to energy efficiency projects: public administration offices do not know how to quantify the savings in energy consumption and the revenue they will generate at the end of an intervention, nor do they know how to recover and quantify the costs of the initial investment.

Financial Barriers

Many of the obstacles are mainly due to high initial investment costs, frequent lack of awareness of potential savings, and difficulties in accessing incentives, which in fact burden both the end user and the credit/financing provider. These obstacles include:

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- administrative or investigative costs, to be made affordable and attractive to carry out the intervention;
- difficulties in obtaining loans from lending institutions, including through ESCOs, due to still very conservative lending procedures and concerns about cash flow projects or innovative incentives;
- risk of arrears in the case of interventions financed by ESCOs;
- high risk perception, high rates and poor financing;
- information asymmetries: barriers to the implementation of energy efficiency measures due to a lack of awareness of potential savings benefits and difficult access to incentives;

5. Available tools (technical, financial etc) for facilitating the implementation of the public building renovation and especially European Union funding

There are a number of instruments that make energy efficiency measures more convenient for both companies and public administrations, reducing the payback time of the investment.

White certificates

White Certificates, or Energy Efficiency Certificates, are negotiable securities certifying the achievement of energy savings through energy efficiency measures and projects (1 TOE, Tonne Oil Equivalent, of primary energy saved is equivalent to 1 TEE). The White Certificates system was introduced by the ministerial decrees of 20 July 2004, through which distribution companies were required to achieve minimum quantitative objectives to increase energy efficiency in the end use of electricity and gas. In PA they can be used for High Yield Cogeneration (CAR) in municipal buildings, schools and universities, hospitals, municipal sports centres, also in combination with district heating.

Thermal Account

The 'Conto Termico' is a non-repayable contribution (up to 65 per cent of costs) for efficiency measures that can be cumulated with any other type of public resource, on expenses for small

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efficiency measures on the envelope, and for the installation of systems for the production of thermal energy from renewable sources. The Conto Termico represents an opportunity for municipalities to initiate eco-sustainable energy practices. The annual allocation of resources for PA amounts to 200 million.

In detail, the refunds are broken down as follows:

- up to 40 per cent of costs for building envelope insulation and plant efficiency (replacement of lighting, replacement of heating system with condensing boilers, building automation systems);
- up to 55% with combined interventions on envelope and installations;
- up to 65% for the introduction of renewable energy sources (with heat pumps, biomass boilers, hybrid systems, solar thermal).

National Energy Efficiency Fund

Established by Legislative Decree 102/2014 and subsequently regulated by the MISE decree of 22 December 2017, the National Fund for Energy Efficiency is finally on the home stretch. This is a revolving fund that, through the involvement of financial institutions and private investors, will support energy efficiency interventions - with guarantees on loans or with subsidised loans up to 60% of the expenses - carried out by companies, ESCOs and Public Administration, on buildings, plants and production processes. The estimated endowment of the fund, as of 31 December 2020, is 320 million euro, of which 185 million already committed. Eligible interventions are those carried out by the PA in individual or aggregated/associated form through a programme agreement, a memorandum of understanding or a convention. Interventions must concern:

- improving the energy efficiency of public services and/or infrastructure, including public lighting;
- improving the energy efficiency of buildings owned by the public administration;
- improvement of the energy efficiency of buildings intended for residential use, with particular regard to social housing.

The rules for how to access the Fund were opened for consultation at the MISE in mid-January 2019.

EPC Contracts

Among the methods available to PAs to gain financial access to energy efficiency projects, the EPC (Energy Performance Contract) contracts offered by ESCOs, Energy Service Companies, which to date are still scarcely used by public administrations, deserve attention. The model of these contracts implies that the supplier carries out redevelopment interventions remunerated by a share of the energy savings generated by the interventions themselves, allowing PAs to make investments otherwise unsustainable due to economic constraints or lack of financial resources. In addition to reducing expenditure, public administrations can count on the technological evolution of plants and buildings and the guarantee of constant regulatory compliance. EPC contracts can be exploited both for simple interventions (redevelopment of heating, cooling and public lighting systems) and for more complex interventions such as the redevelopment of the building envelope.

Public-Private Partnership - PPP

One particular form of PPP is project finance: it lends itself to the implementation of transactions that make use of investments with a complex structure. The particularity lies in the fact that the financial technique used does not make use of public resources or at least only makes use of a small proportion of them. In fact, project finance consists of a complex long-term financing operation: first of all, a new company is created, the Special Vehicle Company or project company (SPV), which has the purpose of realising and managing the energy efficiency project; the SPV is then entrusted with a global contract that includes the design, financing, construction and maintenance of the efficient work. The operation is characterised by a first phase in which the Spv's intervention methods are determined and a forecast is made of the returns expected from the building's energy requalification. There is then a second phase in which the beneficiary PA evaluates the proposals presented by the Spv and finally a third phase, of an executive nature, in which the intervention is implemented. Finally, as far as financial resources are concerned, the Spv advances the sum to be invested

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in the project and thus assumes the economic risk of the implementation and management of the energy efficiency intervention, to be then remunerated by the beneficiary of the intervention through periodic payments determined on the basis of the energy savings obtained.

PNRR

Urban regeneration and redevelopment of public buildings is now possible thanks to the PNRR. The PNRR makes available substantial resources to boost all economic sectors and identify measures for the redevelopment of public buildings and urban regeneration. Italy aims to become greener, more digital and less energy-intensive. Let's find out how much money there is, how to apply for it, and which projects are eligible. The PNRR (National Recovery and Resilience Plan) is the document that each EU state must prepare to access Next Generation EU (NGEU) funds.

The NGEU package is the EU's extraordinary measure to overcome the economic crisis caused by the pandemic. It makes as much as €750 billion available and consists of both grants and loans granted to member states on particularly favourable terms.

DL 77/2021 then defines the implementation procedures of the NRP and identifies the implementing entities:

- the Regions;
- the Autonomous Provinces;
- local authorities (provinces, municipalities, unions, metropolitan cities, mountain/island communities, etc.)

It is these actors who are responsible for individual projects and their implementation.

It is therefore a matter of implementing the projects, in accordance with the modalities provided for by the national and EU regulations in force, identified for the individual investments/reforms by the Decree of the Minister of Economy and Finance of 6 August 2021 (published in the Italian Official Gazette General Series No. 229 of 24 September 2021).

There are many interventions envisaged by the NRP on public buildings and urban regeneration. Among these are several of considerable interest including:

- securing school buildings;
- social housing;
- integrated urban plans;
- urban regeneration.

The NRP introduces the implementation of a programme to improve the efficiency and safety of public and private buildings. Interventions on public property focus in particular on schools and judicial citadels.
In order to achieve the energy conversion of the public building stock, deep retrofitting and nZEB conversion of buildings
are to be facilitated in particular.

In order to achieve this ambitious goal, provisions have been made:

- economic measures for the private sector (Superbonus)
- programmes for energy efficiency in public buildings with the PREPAC.

PREPAC aims to contribute to the energy requalification of at least 3% per year of the air-conditioned usable covered surface area of the public building stock. Proposals are eligible for financing in the order of the annual ranking list, up to 100% of the expenditure incurred and remaining at the expense of the proposing Administration.

The interventions on public buildings with the NRRP allowed by the programme are:

- Casing insulation;
- Replacement of windows;
- Installation of shading and/or shading systems;
- Replacement of winter air conditioning systems with condensing boilers, heat pump systems or biomass generators;

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- Installation of cogeneration or trigeneration plants;
- Replacement of electric water heaters with heat pump boilers;
- Installation of solar thermal collectors;
- Redevelopment of lighting installations;
- Installation of thermoregulation and heat accounting systems;
- Installation of building automation technologies for thermal and electrical systems in buildings.

Project proposals must be submitted by 15 July each year and must concern

- Buildings owned and used by the PA.
- Energy efficiency interventions indicated in the APE or Preliminary Diagnosis. Interventions may be single, combined and/or included in larger upgrading projects.

Energy manager

High consumption can mean an underperforming building, but very often also 'bad habits'. To help PAs, there are specific professional figures, true 'energy experts': energy managers

Energy managers in PA are required by law, as stated in Law 10/91 and then in the MISE circular of 18 December 2014, when annual energy consumption exceeds 1,000 toe/year.

Being able to count on such a figure ensures several advantages for the PA, such as the reduction of energy consumption costs and the identification of appropriate measures to promote energy efficiency. It is a high-level profile with managerial, technical, economic-financial, legislative and communication skills that supports corporate decision-makers in energy-related policies and actions. An energy manager, as the term suggests, has the task of managing what concerns energy within a company or building, verifying consumption, optimising it and promoting interventions aimed at energy efficiency and the use of renewable sources. The energy manager verifies consumption, through ad hoc audits or, if available, through reports produced by remote management, remote control and automation systems. He or she is then concerned with optimising consumption through the correct regulation of systems and their appropriate use from an energy point of view, promoting energy-conscious

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behaviour on the part of employees and/or occupants of the facility, and proposing improvement investments, possibly improving production processes or the performance of related services.

6. Existing training provision/ capacity building programs in relative areas

An analysis of the state of staff skills in public administrations, conducted without taking into account the specific features of individual organisational units and their human resources policies, would constitute an exercise, at times arbitrary, of generalisation. There are, however, some structural and organisational elements that constitute, to some extent, the common denominator of a generally critical situation in which public administrations find themselves, which is clearly reflected in their performance and capacity for innovation. One of these elements concerns the common obsolescence of staff knowledge and skills, due to the average age of employees, on the one hand, and to the substantial disinvestment in training over the last ten years, on the other.

The depletion of the administrations' human capital - also due to the long years of the freeze on turnover - and the obsolescence of its staff's skills has not been countered/mitigated by adequate investment in training. In 2019, €163.7 million was spent on training the public administration; this is an investment that, although gradually rising compared to the previous two-year period, is still more than €110 million less than ten years earlier. The result - albeit with significant differences between the various branches - was that employees were given, on average, 1.2 days of training per year (barely ten hours). Added to this is the fact that training intended for civil servants was unevenly distributed among the categories of personnel, with training on legal subjects prevailing among the topics, while training for the development of decisive skills such as digital and green skills was residual.

ISTAT data on the public administration census show that public administrations have mainly offered their employees traditional training aimed at increasing and updating skills in technical-specialist subjects (45.2% of participants) related to the exercise of their institutional mission and legal-regulatory subjects (30.9% of participants) including compulsory training prescribed by specific regulations. Training in digitisation and greening involved less than 5% of participants. The contraction of expenditure on training and its characteristics, combined with other elements such as the hiring freeze and the delay in contract renewals, has contributed to damaging the quality of the human capital of public administrations in terms of failure to update professional skills and failure to develop new skills, starting with those related to digitisation and green processes, the negative effects of which have become more and more pronounced as employees age

and the simultaneous acceleration of processes of environmental and technological change.

In the course of 2021 - the second year of the pandemic, but also, above all, the year of the National Recovery and Resilience Plan (NRP) - the foundations were laid for a 'paradigm shift', entrusted with the definition of a broad and lasting people investment strategy, capable of performing two crucial functions:

a. close as quickly as possible the gap accumulated over the years that has gradually led to the depletion of people's skills in order to meet the challenges of this precise historical phase;
b. create the conditions to change the game plan in a structural manner, completely abandoning the idea of the 'old public administration' that traded low investment in skills for job security. The latter is not in question, but the attractiveness of public employment must also and above all be based on the pride of being able to put one's talents at the service of a great project to transform 'public affairs' and to see one's talents grow, expand, renew themselves and receive, for this, the right rewards in terms of career opportunities.

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According to a recent Inapp survey, less than a third of the institutional units prepare a training needs analysis and, of these, most of them carry it out in a partial manner; the training needs analysis is largely based on the examination of data on training carried out in previous years. Half of the units do not prepare a formalised document containing the outcome of the training needs analysis.

Also very significant are the financial resources from the state budget (EUR 50 million, fully operational from 2022), allocated by the Budget Law for 2022 with the aim of full digital, ecological, green and administrative training of public administration employees.

In this context, public administrations have proposed to intervene with training interventions to strengthen the skills of personnel in the acquisition of the necessary information to operate on the heritage respecting sustainable building criteria. These interventions aim to support technical offices that have real estate assets to manage and requalify to operate according to the required energy standards and the necessary quality level, framing obligations, deadlines, ad hoc financing possibilities and tax breaks. The topic has repercussions on the definition of tender specifications and the management of tenders for the purchase of services, not just works.

7. Identification of skills needs of the PA staff for better engagement with public building stock renovation by case studies, existing reports, existing experiences etc.

The civil servant will no longer be asked simply to possess theoretical notions, but also the ability to apply them to concrete cases (knowing how to do) and to maintain a certain conduct (knowing how to be). The ability to identify, measure and grow these dimensions will therefore become increasingly important.

Therefore, the civil servant must have a mix of knowledge that enables him/her to:

- knowing how to access incentives and conduct a financing file from start to finish

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- identify optimal solutions for the energy efficiency of existing assets
- know the characteristics of the various materials and know their techniques of use and/or application
- analysing the technical-constructive characteristics of historic buildings
- knowing how to carry out an energy diagnosis of existing buildings
- know the procedures for improving the energy efficiency of buildings
- knowing how to evaluate the effects of energy upgrading measures

Being able to implement an energy management system in an existing building.

Slovenia

1. **Legislative framework, policies associated with public building renovation strategies in EU level (Examples of such EU strategies include: EPBD, EED, building renovation passports, Energy Performance Certificates, Digital Building Logbooks, Smart Readiness Indicators**

All EU countries must establish a long-term renovation strategy to support the renovation of their national building stock into a highly energy efficient and decarbonised building stock by 2050.

The requirement for EU countries to adopt a long-term renovation strategy is set out in the Energy Performance of Buildings Directive (2010/31/EU), which was revised in 2018 (2018/844/EU). These strategies are part of EU countries' integrated national energy and climate plans (NECPS).

The long-term renovation strategies must include an overview of the national building stock policies and actions to stimulate a cost-effective deep renovation of buildings and target the worst performing buildings, split-incentive dilemmas, market failures, energy poverty and public buildings. An overview of national initiatives to promote smart technologies and skills and education in the construction and energy efficiency sectors is also a key part of these strategies.

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The strategies must also include a roadmap with measures and measurable progress indicators, as well as indicative milestones for 2030, 2040 and 2050. They also need to contain an estimate of the expected energy savings and wider benefits and the contribution of the renovation of buildings to the Union's energy efficiency target.

A solid financial component is key to underpin long-term renovation strategies, particularly through an effective use of public funding, aggregation and de-risking.

Building renovation plans

The Commission proposed in December 2021 to review the current framework within the revision of the Energy Performance of Buildings Directive (EPBD) and suggests to strengthen the long-term renovation strategies towards 'Building renovation plans'. These national plans should be submitted every 5 years, following the submission of a draft plan, and should have clear and specific chapters, based on a common template. The plans will include national targets (instead of indicative milestones) in a more unified and comparable approach, an outline of the investment needs for their implementation and an overview of policies and measures.

Building renovation plans will be aligned with the Governance Regulation framework but will be better synchronised with the national energy and climate plans.

The proposed revision of the EPBD is under consideration by the Council and the European Parliament.

National long-term renovation strategies 2020

The national long-term renovation strategies provided important input to the 'renovation wave' initiative, announced as part of the European Green Deal, aiming to take further action and create the necessary conditions to scale up renovations and reap out the significant saving

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potential of the building sector. They are available in national language and English in the table below.

Buildings' renovation makerspace

EC initiative produce knowledge, guidelines and policy recommendations to safeguard vulnerable buildings across the EU. Ageing buildings in Europe present an increasing challenge towards preserving public safety and account for a significant source of energy consumption.

In order to efficiently modernise our building stock, we present economical solutions that combine renovation activities to save time and resources in upgrades that protect our people and planet.

Seismic and energy renovation projects are key to the sustainable development of Europe. Resilient buildings protect our citizens equally, decrease natural resource consumption and buttress our economy.

The European pilot project 'Integrated techniques for the seismic strengthening and energy efficiency of existing buildings' provides open-access and timely information and data relevant to support renovation projects on ageing buildings across the EU.

In a policy context, it provides scientific advice to support the development of an action plan, which shall supplement existing European Union policies and initiatives in the field of building renovation. Crucially, the European Green Deal emphasises the need for a Renovation Wave, supported by the New European Bauhaus to create sustainable, inclusive and beautiful living spaces.

The project was initiated by the European Parliament and is conducted by the European Commission's Joint Research Centre.

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Ensuring safe and energy efficient buildings: How to implement integrated seimic and energy efficient renovations through the revised EPBD

In December 2021, the European Commission published its proposal to recast the Energy Performance of Buildings Directive (EPBD) with the purpose of aligning it with the more ambitious climate targets for 2030 and 2050. The recast EPBD intends to increase the rate and depth of renovation and introduces important provisions to phase-out the worst-performing buildings and to tackle fuel poverty. However, energy performance is not the only challenge faced by the European building stock. About 50% of European territory is earthquake prone. In the last 50 years, earthquakes in Europe have caused over 36.000 deaths and around 1.4 million people becoming homeless.

2. National Legislative framework and policies associated with public building renovation strategies at national levels.

"Act on the Promotion of the Use of Renewable Energy Sources" from 2021 transposing EPBD and EED

"Act on Energy Efficiency" from 2020 transposing EPBD and EED, requires Energy Performance Certificates

“Energy Act” from 2014, previously thre Act requiring Energy Performance Certificates

Public-Private Partnership Act

“Building Act “ from 2021

Digital Building Logbooks - not any initiative or regulation, still traditional form is required and both copies of the construction log shall be bound and sealed after the technical inspection of the building.

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In addition to the EPBD (2010) and its recast (EPBD, 2018), the Energy Efficiency Retrofit Wave Strategy and some other, including regulatory measures such as the carbon tax, have also been published recently. The consequences of covid19 also show some negative effects, which are also reflected in the housing sector, e.g. in the increased share of households that are not financially able to cover their heating costs (Renevation Wave, 2020).

A Renovation Wave for Europe

The Renovation Wave for Europe (2020) comprises key targets for the renovation of buildings up to 2030 and 2050, involving all relevant sectors and actors. The Renewal Wave puts energy efficiency of buildings and more efficient use of resources at the top of the agenda. Actions are mainly focused on decarbonising heating and cooling, tackling energy poverty and the least energy-efficient buildings, and renovating public buildings. The development of local approaches is important. Renovation also addresses health and environmental impacts. Aesthetic and architectural quality is also included through the New European Bauhaus initiative (2021), where design principles are respected and heritage and the wider public realm are preserved.

Inadequate comfort and sanitation in living and working environments, such as inadequate indoor temperatures, poor air quality and exposure to harmful chemicals and materials, which contribute to lower productivity, health problems and higher mortality and morbidity, are particularly highlighted. The Commission issued guidance on the energy efficiency principle in early 2021 to help public authorities properly take into account all the costs and wider benefits of investments in the built environment that could be practically applied in public procurement.

The Slovenian Long-Term Strategy for the Energy Renovation of Buildings up to 2050 (DSEPS)

Investment in energy renovation of buildings will increase significantly in the future, as all areas of activity need to significantly reduce greenhouse gas emissions. The Long-Term Strategy for the Energy Renovation of Buildings 2050 (DSEPS, 2021) aims to have 74% of single dwellings and 91% of multi-dwelling buildings energy renovated by 2050. This will reduce final

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energy consumption by 45% and CO2 emissions by almost 75% compared to 2005. Renewable energy sources have an important role to play in this. Two thirds of buildings are residential buildings, for which the DSEPS foresees new financial and other instruments. In multi-apartment buildings, the instrument of a 'building passport' shall be introduced by 2024 at the latest, defining the energy, fire and seismic aspects of renovation and providing guidelines for recommended and required measures for a progressively wider renovation. The DSEPS is moving from partial to full energy (nearly zero energy) buildings.

Despite the proven economic and environmental benefits, the rate of energy renovation of buildings in the EU is still well below expectations. An analysis of energy renovation projects (DSEPS, 2021) in public heritage buildings shows that investments in energy renovation of the façade envelope and roof tend to be smaller than in non-heritage buildings, while investments in window replacement are slightly higher. The reasons for this are mainly technical, linked to the boundary conditions of cultural heritage protection. Building owners and investors face various obstacles on a daily basis, key among which are limited access to finance and lack of knowledge. This is why the EU is proposing a system of step-by-step energy renovations through the Building Renovation Passport (BRP), which will facilitate the implementation of interventions and allow for more optimal results.

Action plan for nearly zero energy buildings

Article 331 of the Energy Act (EZ-1) imposes an obligation on the Government to adopt an Action Plan for Nearly Zero Energy Buildings (AN sNES), while also specifying its content and the way it is to be reported to the European Commission:

The Government, on a proposal from the Ministry responsible for energy, shall adopt and renew every three years an Action Plan for Nearly Zero Energy Buildings for the period up to 2020.

The Action Plan for Nearly Zero Energy Buildings shall include targets and programmes and measures to achieve these targets, as well as the human and financial resources to implement these programmes and measures. In this Plan, the Government shall also formulate policies

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and measures to promote the energy renovation of existing buildings to near-zero energy buildings;

Every three years, the Ministry responsible for energy shall prepare a progress report on the increase in the number of nearly zero-energy buildings and inform the European Commission thereof.

Guidelines for the implementation of energy efficiency improvement measures in public sector buildings through energy contracting

The Energy Efficiency Directive (2012/27/EU) establishes a number of measures, one of which is to give the public sector a leading role in the energy renovation of buildings. In this context, the Directive requires that 3% of the total floor area of buildings owned and used by public sector bodies be renovated annually from 1 January 2014. The Directive is transposed into Slovenian law by the Energy Act EZ-1 (Official Journal of the RS, No 17/14).

Energy renovation of publicly owned buildings with private capital in the framework of energy contracting represents a public-private partnership in the field of energy efficiency, which is still relatively underdeveloped in Slovenia. While the instrument provides the legal basis, it is hardly implemented in practice due to a lack of experience and a number of outstanding issues such as bookkeeping, accounting, risk transfer and transaction costs. The purpose of the guidelines is to introduce the instrument to owners/managers of public sector buildings and to show how it can be implemented.

In view of the ambitious commitments to renovate public sector buildings and the fact that fiscal constraints are tight, it is essential to involve private capital in the renovation of public buildings, which can be done by means of energy contracting. This way, the building can be renovated without additional public borrowing, as the investment is repaid from the savings achieved in energy costs. This will also have the additional effect of revitalising the market for energy service companies, which is particularly important in Slovenia, where this market is still relatively underdeveloped.

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Energy contracting is also one of the key actions under the Energy Efficiency Action Plan (AN-URE 2020) and the implementation of the Operational Programme of the European Cohesion Policy 2014-2020, as this way private capital is more involved in the financing of energy efficiency measures, thereby multiplying the public funds invested and achieving higher energy savings per unit of investment incentive.

Guidelines for the energy renovation of cultural heritage buildings

The Guidelines for the Energy Renovation of Cultural Heritage Buildings, prepared under the auspices of the Ministry of Infrastructure of the Republic of Slovenia, provide an overview of the state of the art and the proposed measures in this field. The aim is to provide technical support in the planning process of energy renovation and to enable owners of heritage buildings to be treated more equally in obtaining financial resources for renovation. The guidelines are also intended to assist professional services in advising building owners, in particular with regard to knowing in advance the constraints on the implementation of energy renovation measures and planning accordingly.

Energy renovation of Slovenian Modernist buildings

In 2014, the Ljubljana Association of Architects and the Association of Slovenian Architects' Societies, in cooperation with the Ministry of Culture and the Institute for the Protection of Cultural Heritage, produced a leaflet on the energy renovation of Slovenian Modernist buildings. The guidelines in this leaflet are intended to provide basic information on the maintenance and energy renovation of buildings from this period. It is aimed at architects, clients and contractors carrying out energy renovation of buildings identified as part of the cultural and built heritage. Energy savings must be achieved in such a way that the original architectural design and appearance of the building remains unchanged. Their proposals for renovation focus on the installation of thermal insulation, the renovation of the finishing layer and other elements of the façade, the renovation or replacement of the joinery, the renovation or replacement of the roof covering and the acceptability of the installation of external hardware units (e.g. air conditioning and heat pumps).

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Records of buildings owned and used by public sector entities

The Ministry responsible for energy has accordingly prepared a register, which is originally derived from the data of the national real estate register - the cadastre of buildings, which is kept by the Geodetic Administration of the Republic of Slovenia. The existing register has now been updated in cooperation with other ministries and other relevant government bodies. The inventory represents buildings owned by the Republic of Slovenia or by a legal entity that is assumed to represent the ownership of the Republic of Slovenia (ministries, funds, institutions,....) and for which a state property manager is registered in accordance with the Regulation on the manner of registration of property managers in the Land and Building Cadastre (Official Gazette of the Republic of Slovenia, No. 121/2006 and No. 104/2013). Of these buildings, only buildings for commercial use with a surface area greater than 250 m2 are included in the register in accordance with the provisions of the Directive.

MORE INFO national thematic MINISTRY WEB SITE

3. Public building renovation targets/national programme targets and state of the art

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4 Analysis of obstacles

As noted in sections 2.3.2 and 2.3.1, the binding annual energy renovation targets of 3% of the total floor area of buildings in the OJS are generally not being met, with the exception of 2018, and the target of comprehensive energy renovation of 127,116 m^2 of these buildings in the period 2014-2023 under the ENPI OP will not be met. The reasons for this are:

1. The programme/tasks in the field of energy renovation of buildings in the public sector, as defined in the AN URE[27] , the DSEPS, the OP ENP and the legislation, are demanding. It involves the long-term implementation of a targeted, substantially scaled-up implementation of comprehensive energy renovations in a relatively short timeframe. It also involves the co-financing of projects by private energy efficiency service providers and the contractual provision of energy savings, which are new to most actors in the public sector. The introduction of a comprehensive energy management system in this sector is also required. Although activities are identified in several strategic documents, there is no detailed implementation programme for the energy renovation of buildings in the sub-public sector, the tasks are nowhere properly structured and there is no provision for a standardised approach to energy management for each programme provider, i.e. all ministries. The timeline for the implementation of the tasks is also nowhere clearly defined.
2. The objectives of the renewals are defined at the level of the entire sub-public sector, but there is no binding definition of the objectives of the programme at the level of its responsible authorities for individual bodies. This is a problem, despite the centralisation in 2017 of the management of immovable property used by certain government departments and ministries, together with their constituent bodies, to carry out tasks within or related to their competences, as the tasks of property maintenance are not centralised.
3. The implementation structure of energy management/energy renovation in the public sector is not hierarchically defined anywhere (e.g. at ministry level: energy manager, programme implementation team, team leader) and is mainly based on the existing structure for building investment and maintenance. Such a structure is not sufficient to significantly improve the efficiency of energy management in the narrower public sector and to plan and execute in a timely manner the repeatedly increased scale of energy renovation required, as it relies on relatively limited human resources, which usually do not have adequate energy management skills, and therefore does not ensure the appropriate dynamics for the implementation of the renovations needed to achieve the defined national target on an annual basis.
4. Only the energy renovated area is set as a target, but no other relevant energy efficiency indicators are defined, e.g. reduction of energy use and GHG emissions, use of renewable energy sources and sustainable mobility at sector level, which would allow effective monitoring and evaluation of implementation, including at the level of the individual contractor. The plan for improving energy management across the public sector and at the level of the individual programme operator should also include the establishment of indicators and

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mechanisms for setting annual targets, and it should define the process for identifying and prioritising investment projects, plan for the coordinated preparation and implementation of investments, identify the necessary financial resources for energy renovations, define the process and activities for the coordinated provision of funds from different sources[28] for priority investment projects in a time-phased manner, while also specifically identifying the financial resources for project preparation and the human resources to carry out the tasks. In addition, evaluation and reporting on the indicators achieved, the system of corrective measures of the programme and the quality of the implementation of the projects, and the digitisation of data collection should be established. The establishment of a network of qualified programme implementers, including their continuous training and organised professional support (including in problem solving) and exchange of experience, is also crucial for the implementation of the programme.

5. The process of identification and prioritisation of investment projects is not implemented, is incomplete and the necessary support tools have not been set up and maintained (registry).
6. Cohesion funding from the current financial perspective has not been used optimally due to delays in the start-up of the public sector building energy renovation programme, inadequate organisation of the programme implementation in the narrower public sector and the failure to design the planned financial instruments. At the same time, the use of the 1.73 million EU ELENA technical assistance grant for 90% co-financing of the preparation of technical and economic documentation is also poor. The ELENA co-financing contract with the EIB has been extended for one year, until the end of 2021.
7. Dedicated public financial resources to implement all the necessary energy renovations in the public sector to ensure that at least the minimum energy efficiency requirements are met are insufficient in the long term or are tied to multiannual EU financial frameworks, so that the programme is not assured predictability and continuity at the end of each financial perspective.
8. The market for energy efficiency service providers[29] , which provide co-financing for only a limited number of energy renovations with proven good financial performance indicators over longer preparation and implementation cycles, is uncompetitive.
9. There are administrative obstacles to the inclusion of building energy renovation projects in the Development Programme Plan of the Budget of the Republic of Slovenia (NRP), which make it impossible to combine several buildings into a whole, through the institute of an integrated project or the understanding of a functionally complete whole. Coordination on how to prepare investment documentation and how to include projects in the NRP has had a significant impact on the time dynamics of operations, resulting in delays in the implementation of projects and, consequently, in the absorption of funds under the ENPI OP.
10. Obstacles were also identified in securing sufficient budgetary resources in time to cover the part of the investment costs that would be covered by the Cohesion Policy funds or the EU budget.

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could not be covered by private funding. These, the contractors' own resources, which are mainly from budgetary sources, are not planned in a consistent and timely manner in relation to the objectives of the programme. This is a major obstacle in cases of energy renovation without the use of the energy contracting mechanism and/or in cases of broader building renovations (e.g. earthquake retrofitting is needed in addition to energy renovation) or renovations of specific categories of buildings (heritage buildings). The problem is only slightly less when it comes to building renovations where a major part of the eligible costs is covered by incentives under the Cohesion Policy (EU and Slovenian part) and the private resources of the energy contracting provider.

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5 Conclusions and recommendations

Analysis of energy renovation projects for buildings in the sub-public sector has shown that they are falling behind targets and that cohesion funds are being poorly absorbed. The barriers identified range from administrative obstacles and lack of appropriate financial instruments to inadequate readiness and capacity of the sub-public sector to undertake large scale comprehensive energy renovation and the absence of more stable financial resources to implement these renovations. There are also obstacles in the planning and coordination of activities. The recommendations therefore focus on a comprehensive approach to reducing energy use and GHG emissions in the PSB by developing a specific energy efficiency implementation programme for this target group, increasing the scope of the project office's tasks, including through expert support to stakeholders in project preparation, and developing new financing models, including by providing a renewable financial source for priority energy renovation of PSB buildings.

RECOMMENDATION EPS-OJS 01/2020
A detailed energy efficiency implementation programme should be prepared for the public sector, covering the objectives, definition of the implementation framework and activities of the programme, the tasks of energy renovation of buildings, including the introduction of energy management, the design of support mechanisms for the preparation and implementation of projects, and the establishment of a system for monitoring the effects, reporting and continuous improvement of the programme. The programme should also define the process for identifying and prioritising investment projects and the responsibilities for this decision-making process. Mechanisms for the consistent and timely programming of financial resources (from different sources of funds) for priority investment projects should also be defined. All responsible actors should be involved in the preparation of the programme.
CONTRACTOR Mzl
In the context of the implementation of energy renovation of public buildings in the OP ENP, the narrow public sector has emerged as the most problematic. As the national target of renovating 3% of buildings in the OJEU remains binding in the period 2021–2030, and as we are lagging significantly behind this target in the period 2014-2020, it makes sense to design an implementation programme that will, on the one hand, encourage and support this target group and, on the other hand, oblige it to implement energy efficiency measures and thus also to achieve the national targets for reducing energy use and GHG emissions. The Programme and its activities should aim at removing obstacles, in particular in the areas of organisation and responsibility for project implementation and preparation, the establishment of support for project preparation and the timing of activities, and the coordinated provision of financial resources and human capacity to carry out the tasks set out.

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RECOMMENDATION EPS-OJS 02/2020
The tasks of the Project Office for the Energy Renovation of Public Buildings should also be extended in practice (as defined in the DSEPS) by identifying priority investment projects, providing expert support in the design of the implementation model of each project, providing expert support to stakeholders in the preparation of projects, preparing standardised documentation, tools and procedures for project implementation, implementing a programme of monitoring and evaluation of the effects of the implemented projects, and a quality assurance programme. In order to assume the role of system facilitator of projects and administrator of the quality programme, the project office needs to be adequately staffed. The Project Office should also ensure that there is an organised exchange of experience within the network of providers.
CONTRACTOR MoI, Project Office
The Project Office is an important centre of experience and expertise in the preparation and implementation of energy renovation of public buildings, and it is therefore reasonable to ensure its further development, both financially and in terms of staff, in order to ensure the implementation of the tasks already planned for it in the NEPN and the current 2050 DSEPS, and which will also be included in the 2050 DSEPS, which is currently under preparation. This would address a number of existing barriers to achieving the OJS building renovation target (see analysis of barriers in Chapter 4).
RECOMMENDATION EPS-OJS 03/2020
For the priority energy renovation projects in OJS buildings, long-term financing needs to be secured and therefore a renewable source of finance needs to be established. The renewability of the financial resource for energy renovations should be ensured through different financial sources (budgetary resources of the individual ministries within the approved budget, cohesion and other EU grants, and funds generated by energy savings of the implemented projects or on the basis of lower energy costs). To this end, the legal, technical and economic aspects of setting up such a financial resource should be examined in cooperation with the relevant stakeholders. The possibility of using initial start-up funding with a contribution from the European Cohesion Funds should be identified as part of the examination. The financial savings generated by the energy savings after the renovation of the individual buildings of the OJS can provide long-term and stable financing for further priority investments. The implementation of own-funded investments under the energy model should also be considered. contracting. The implementation of these projects by a public energy services company (public-public partnership) also represents an additional development option.
CONTRACTOR MoI, MoF, SVRK
Although sufficient funds are available in the current Financial Perspective to promote energy renovation of OJSC buildings, these resources are not guaranteed in the long term, which means that they are not stable and predictable. The analysis carried out on the energy renovation of buildings in this sector clearly shows that in order to achieve the binding national renovation target

Projekt LIFE ClimatePath2050 (LIFE16 GIC/SI/000043) je sofinanciran iz sredstev LIFE, finančnega instrumenta Evropske unije za Okolje in podnebne spremembe na področjuu Podnebno upravljanje in informacije in iz sredstev Ministrstva za okolje in prostor RS. Sklada za podnebne spremembe.
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long-term financial resources to make these investments and the appropriate and timely allocation of these resources at the level of the energy renovation programme providers. It is also necessary to ensure a consistent planning of funds from different sources (dynamics of allocation of incentives from earmarked sources and the contractor's own participation from the budget). The very poor implementation of the energy renovation of buildings in the OJJDP so far is mainly due to the lack of budgetary resources and at the same time to their dispersion within the budgetary spending rights of the individual ministries. In order to accelerate the energy renovation of these buildings, it is therefore necessary to secure a long-term and sufficient source of funding and to draw up an appropriate list of priority ministry buildings suitable for energy renovation, which, as instructed by the Government of the Republic of Slovenia, must be energy renovated. In the long term, this can only be ensured by creating a renewable financial source dedicated to the energy renovation of the buildings of the OJSC. This approach does not exclude the possibility of using a combination of private and own funds, a model that has been successfully applied in particular to the energy renovation of buildings in local communities (energy contracting with guaranteed energy savings, an established system of measurement and verification of the savings and a energy management).

As part of the obstacles is the lack of a binding definition of the objectives of the programme at the level of its responsible authorities for each body, and as the implementation structure of the programme is not hierarchically defined and the human resources involved are limited and usually lack adequate energy management skills, we reiterate here the recommendations identified in this respect in the action in the focus *Organising for climate policy implementation*, which is also part of the *Climate Mirror 2020 (Volume 10)*. These are recommendations addressing good governance, the appointment of a responsible person and better management of human resources:

- Programme and implementation documents should address people's participation, responsiveness to their needs and to changes in their environment, make a clear distinction between effectiveness and efficiency, be open and transparent, be competent, open to innovation and long-term orientation, embrace diversity and accountability *(Volume 10: Good Governance Recommendation 08/2020)*.
- Programme documents should designate the head of each internal organisational unit of a government body (without name) as the responsible authority, not the ministry as such or another government body or its director *(Volume 10: Recommendation on the responsible authority 09/2020)*.
- In the area of climate change, there is a problem of human competence and a related problem of management in the public administration, which is often lacking. Competence and the number of appropriately qualified staff is as big, if not bigger, a problem than organisation (competent staff can change the organisation system); the knowledge and experience of experts is not sufficiently valued *(Volume 10: Recommendation on better management of human resources 12/2020)*.

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5. Available tools (technical, financial etc) for facilitating the implementation of the public building renovation and especially European Union funding

NATIONAL LEVEL

Financial tool

ECO FUND calls for public buildings: https://www.ekosklad.si/javni-sektor/pridobite-spodbudo/seznam-spodbud

- for the comprehensive renovation of public multi-apartment buildings, both credits and subsidies are available for measures, an Energy Contracting Pilot Call, a Reserve Fund Credit Pilot Call and a Reserve Fund Subsidy Pilot Call.
- for energy renovation of existing buildings both credits and subsidies are available.
- for district heating in public buildings, subsidies are available for stand-alone investment measures

ENSVET network of EE consultants across the state free of charge (with local offices): https://www.ekosklad.si/prebivalstvo/ensvet/svetovalec

MINISTRY calls for EE measures on public building stock:

- Call for tenders for the co-financing of energy renovation of publicly owned multi-apartment buildings (NOO_VSSVJL_2022) https://www.gov.si/zbirke/javne-objave/javno-povabilo-za-energetske-prenove-stavb-jp-ep-noo-2022/
- Call for proposals for the co-financing of upgrading of public technical building systems (NOO_TSS_2022) Portal Energetika - Javni Razpisi (energetika-portal.si)
- Call for tenders for the selection of a training provider for renewable energy installers for a period of five years Portal Energetika - Javni Razpisi (energetika-portal.si)

LOCAL LEVEL

- **Local energy agencies**

  In order to establish good cooperation between local energy agencies, to place them in national and international frameworks and to develop and implement common

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objectives in the local environment, the Consortium of Local Energy Agencies of Slovenia (LEAS Consortium) was established in 2007. The objectives and priorities of the Consortium are based on three programme pillars: energy management, energy database and information, and the promotion and dissemination of achievements and good practices.

The great importance of the Energy Agencies and the positive effects are reflected in the municipalities where they operate. Comparative data has shown that municipalities working with the agencies are more successful in implementing their energy concepts and more effective in attracting new projects and funding, both from the national and EU level.[1]

- **Financial tool**

  Calls for tenders for the award of concessions for the implementation of an energy contracting project (EPC) for the energy renovation of buildings owned by different municipalities.[2]

- **Technical tool**

❖ **Public expert events for stakeholders** (investors, contractors, craftman, facility managers, etc...) within public project IP CARE4CLIMATE. On thematic regional fairs, conferences and other events adn occations related with construction – various geographic locations![3] Topics: comprehensive renovation/retrofitting, EPC, sustainable buildings, energy management, quality of indoor air.

❖ **The Climate Café** is a series of travelling lectures, discussions or workshops based on the expertise of 15 partners, co-creators of the LIFE IP CARE4CLIMATE project. The Climate Café presents the content in a way that suits each place. Where it is invited. Its flexible design makes it a perfect fit for libraries, cultural centres or various foyers. In the relaxed warmth of the Café, we inform a wider audience about climate change,

[1] https://www.energetika-portal.si/podrocja/energetika/lokalne-energetske-agencije/
[2] Portal Energetika - Javni Razpisi (energetika-portal.si)
[3] https://www.care4climate.si/sl/dogodki/trajnostna-gradnja-in-ucinkovita-raba-energije-v-stavbah-in-podjetjih

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organise lectures and debates, bring together experts from different fields and answer questions that arise on climate issues.

- A special **Hub for sustainable building renovation and construction**, established by co-creators of the LIFE IP CARE4CLIMATE project.. The further activities of the Hub aim to improve the conditions for sustainable renovation and construction of buildings in Slovenia. Through these activities, we would like to support the relevant decision-makers to make the legal, financial and other conditions for building renovation more supportive of sustainable and integrated renovation. Furthermore, to achieve a real-time resolution of problems related to sustainable renovation and construction of buildings. Efforts will be made to share experiences and to ensure that considerations on actions are used in the design of future actions in the country.
- **Project state office for support**

  The Project Office (Office for Energy Retrofit of Public Buildings) is available for planned investments in the facilities of direct household users and to support the preparation of tenders and projects of the rest of the public sector under the technical assistance of the programme OP ENPI 2014-2020 as a coordinating body for the preparation and implementation of energy contracting projects or energy retrofit measures for buildings or individual building elements for the facilities of direct household users.
- **Many diplomas on topics related to the desk research** (more than 80 results found in the national database COBISS[4])
- **Exploting various project result (**project HAPPEN[5], "Developing cost-optimal packages of renovation solutions", Living Lab Target Groups (for clients, makersm influencers)

4 https://plus.cobiss.net/cobiss/si/sl/bib/search?q=prenova+javnih+stavb&db=cobib&mat=allmaterials&laf=slv&pdfrom=01.01.2020&pdto=31.12.2022&start=0

5 https://medzeb-happen.eu/wp-content/uploads/2022/05/HAPPEN_785072_D2.3_Material-for-general-training-in-Living-Labs-and-for-on-line-training-modules.pdf
https://medzeb-happen.eu/project-results/

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			Pilot Leaders	LL Facilitators	LL Trainers	Living Lab Target Groups										
						CLIENTS		MAKERS					INFLUENCERS			
						2	8	3				4	1	5	6	7
						Buildings owners	End-users	Solutions providers: Technological	Designers	Financial	Service	Manufacturers/Building	Policy	Sectoral Agencies	Civil Based Organization	Media
PHASES																
PILOT ACTIONS (WP6)	LIVING LAB (LL) (T2.1)	Set-up and training (LL-step A):														
		Inner training (internal training)	D2.1+SM			-	-	-	-	-	-	-	-	-	-	-
		Horizontal training (general training)	-			GI										
		Vertical training (segmented training)	-			SR	SR	SZ+SD	SZ+SD	-	SZ+SD	SZ+SD	-	ST	ST	ST
		HAPPEN incubators (LL-step C):														
		MedZEBinars (vertical training)	-	-	-	-	-	OS+FR+HP+PA					-	-	-	-
		AWARENESS CAMPAIGN (T2.2)	-	-	-	-	-	-	-	-	-	-	e-pills			

6. Existing training provision/ capacity building programs in relative areas

Targeted up-take for the transition to a low-carbon society CARE4CLIMATE

The field of non-formal education, including targeted training for the transition to a low-carbon society, is under-resourced and this is also recognised by the European Union Member States, as well as in various European Commission (EC) documents.The Jožef Stefan Institute - Centre for Energy Efficiency is responsible for the implementation of four different targeted trainings in the framework of the LIFE IP CARE4CLIMATE project, i.e.:

Targeted training on energy contracting;
Targeted training for energy renovation of buildings, aimed at energy managers in the public sector and industry, designers, maintenance and energy managers;
Targeted training for energy management in the public sector;
Targeted training for energy management in industry.
These trainings will be delivered over the lifetime of the project, i.e. until 2026, with the aim of making the non-formal training sector more organised and transparent. Those to be

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included in the targeted training will certainly include public administration employees, planners, building managers, supervisors, as well as industry representatives and other individuals interested in sustainable energy. From the above, it can be seen that the target audience is broad, but above all, there is a desire to provide knowledge to those decision-makers who are directly involved in the activities of energy renovation of buildings, especially the public building stock. The lecturers who will be involved in the targeted trainings are mostly from industry, public and private sectors and deal with energy related issues on a daily basis. More information is available at http://ceu.ijs.si/ciljna-izobrazevanja-v-okviru-life-c4c-za-prehod-v-nizkoogljicno-druzbo/.

EUREM Certified Training Programme by Jožef Stefan" Institute, Energy Efficiency Centre

The EUREM Certified Training Programme offers energy managers and related professionals the broad range of knowledge they need for their demanding work and encourages them to work together in a network of European energy managers.
EUREM training
The training programme "European Energy Manager - EUREM" was developed and certified in Germany in 1997. It is intended for all those who wish to gain a comprehensive overview of the fields of activity of an energy manager and the relevant knowledge for successful energy management, in particular those responsible for energy management in public and private sector companies, building managers, plant and production managers, process engineers. The training provides participants with the skills to analyse the energy situation of a company, to prepare and manage energy efficiency projects technically and organisationally and to present them properly to the company's management, to assess and ensure savings targets and to ensure continuous improvement in the company.
In Slovenia, preparatory activities for the implementation of the "European Energy Manager - EUREM" training programme started in 2006 in the framework of the EUREM.NET project, and the first EUREM training was implemented in 2008. Since then, the training has been successfully implemented by the Centre for Energy Efficiency.

So far, 12 EUREM trainings have been held in Slovenia and 244 European Energy Managers have successfully completed them. The total potential reduction in energy consumption resulting from the implementation of the measures contained in the project tasks produced by the trainees is estimated at 325 GWh/year or €25 million/year, and the reduction in CO2 emissions at 152 kt/year.

Slovenian energy managers have also been very successful at European level with their project assignments. Our energy managers have already won 16 awards at the annual European Energy Managers' Conferences. More information at https://eurem.si/.6

CCIS CCBMIS projects pilot training, free learning and teaching materials and tools- MOOCs:

GREEN GROWHT https://greengrowthproject.eu/

CONSTRUCTION BLUEPRINT https://constructionblueprint.eu/

GUPP https://gupp.gzs.si/

CONTINUING TRAINING under the auspices of the Chamber of Engineers of Slovenia (7-8 EQF level)[7]

The annual training programme also covers the subject of building renovation.

7. Identification of skills needs of the PA staff for better engagement with public building stock renovation by case studies, existing reports, existing experiences etc.

COMPETENCES RELATED WITH

- Energy indicators and challenges of the new generation of energy performance certificates
- Financing of energy efficiency project

[6] https://ceu.ijs.si/en/podrocja_dela/izobrazevanje-in-raziskave/

[7] https://e-izobrazevanja.izs.si/

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- Alternative ways of financing (EPC, donations, sponsorship, bonds, massive financing etc…)
- Targeted training for energy contracting
- Targeted training on energy management in the public sector
- Quality label in construction for more environmentally friendly windows and doors and other construction products
- Renovation of heritage (protected) buildings - practical examples and possibilities
- Concepts of integration of EE in buildings: via products or via end building performance?

Poland

1. **EU and national recommendations/directives/regulations on greening buildings, increasing energy efficiency, include:**

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 - Commission Recommendation (EU) 2019/786 of 8 May 2019 on the renovation of buildings - Long-term renovation strategy (LTRS): Member States must lay down plans to transform the building stock in the EU to reach nearly zero-energy performance levels by 2050. The provision includes a list of elements that should be included in the strategy, including measurable progress indicators, the possibility of using trigger points in the life of the building and building renovation passports, policies and actions to stimulate cost-effective deep renovation of buildings, to target the worst performing segments of the national building stock; national initiatives to promote smart technologies; and an evidence-based estimate of expected energy savings. LTRSs apply to the national stock of public and private, residential and non-residential buildings. LRAs can participate in public consultations on LTRSs and contribute to policy recommendations; establish high quality data on the building stock; draft local/regional LTRS for their building stock; lead by example; and identify potential pilot projects. - The European Union Framework Program Horizon Europe - the

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largest research and innovation program in the history of the Union. It promotes excellence and provides valuable support to the best scientists and innovators, thereby stimulating the systemic changes needed to make Europe green. The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges. It supports creating and better dispersing of excellent knowledge and technologies. It creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimises investment impact within a strengthened European Research Area. - A wave of renovation for Europe - a part of EPBD (Energy Performance of Buildings Directive2, article 2a,8,20) strategy that aims to significantly improve the energy efficiency of buildings (through thermomodernization, zero-emission heat sources, "smart home" technologies). The EC plans to gradually tighten regulations so that even old homes meet minimum energy efficiency standards. In line with Commission Recommendation (EU) 2019/786 of 8 May 2019 on the renovation of buildings (paragraph 15), Member States should have implemented by 10 March 2020 the laws, regulations and administrative provisions.

- Climate KIC Climate-KIC is a Knowledge and Innovation Community working to accelerate the transition to a zero-carbon, climate-resilient society. Cities were identified as the three major systems which have the most potential in realizing a climate resilient society and net-zero carbon economy. One of the KIC's Focus areas is thus focusing solely on cities – KIC provides expert advice to cities and districts on how best to transform urban environments into decarbonised and climate resilient urban areas3. - EIT InnoEnergy is spearheading the way to a decarbonised Europe by 2050 through the leadership of three industrial alliances: European Battery Alliance (EBA) for battery storage, European Green Hydrogen Acceleration Center (EGHAC) for green hydrogen, and European Solar Initiative (ESI) for solar photovoltaics.

- Other issues in Poland are undertaken on a need basis as for example Łukasiewicz-IMBIGS (Institute for Mechanisation of Construction and Rock Mining) is consulting frameworks for Digital Building Logbooks as a member of Build For People Partnership (Horizon Europe).

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- UN resolution 2030 Agenda for Sustainable Development. The resolution includes targets No. 11.6 By 2030 - reducing the negative environmental impact per capita of the city, paying particular attention to air quality and the management of municipal waste and other pollutants, and goal 11.B. - significantly increasing the number of cities and human settlements benefiting from the development and implementation of integrated policies and plans seeking to increase the inclusion and efficiency of resource use, climate change mitigation and adaptation, disaster resilience.

2. National Legislative framework and policies associated with public building renovation strategies at national levels.

Renovation, as one of the types of construction works, is governed by the Act of 7 July 1994, which governs activities involving the design, construction, maintenance and demolition of buildings and lays down the rules for the operation of public administrations in these fields. The implementing rules on OSH (occupational health and safety) construction sites place direct supervision of OSH in the workplaces in the hands of the manager and the master of construction (usually called a foreman) – according to the scope of duties.

The Act of April 20, 2021 amending the Energy Efficiency Act introduced changes that will expand the number of projects to improve energy efficiency and facilitate their implementation. The requirement for EU countries to adopt a long-term renovation strategy is set out in the Energy Performance of Buildings Directive (2010/31/EU), which was revised in 2018 (2018/844/EU). These strategies form part of EU countries' integrated national energy and climate plans (NECPs).

On February 2022 national Long-term Renovation Strategy for buildings was adopted (in line with Commission Recommendation (EU) 2019/786 of 8 May 2019 on building renovation, each country should develop one by 10.03.2020, so Poland had to wait for that document 2 years longer). In the meantime government has been implementing activities in line with the idea of the Polish wave of renovation for several years: the thermo-modernisation relief (relief for

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taxpayer depending on the thermomodernisation work done_, the “Clean Air” programme (co-financing replacement of heat sources and thermomodernisation);

The strategy defines the necessary measures to achieve high energy efficiency and low-emission buildings in Poland by 2050

The strategy assumes a scenario in which investments to improve the energy efficiency of buildings demonstrate the achievement of these goals:

- 236,000 buildings are planned to undergo renovation and thermal modernization in the period 2020-2030

- 271,000 buildings are planned to undergo renovation and thermal modernization in the period 2030-2040

- 244,000 buildings are planned to undergo renovation and thermal modernization in the period 2040-2050 4.

According to the strategy, by 2050, it is estimated that approximately 7.5 million thermal modernization investments will be completed, of which 4.7 million are deep thermal modernization projects, including as part of staged thermal modernization over time5.

State Environmental Policy until 2030 - It aims to improve the living conditions of local communities through the implementation of activities resulting in the achievement of the permissible and target levels of substances in the air. This corresponds to the goal in the area of "Environment" in the Strategy for Responsible Development (SRD))

Specific objective I: Environment and health. Improving the quality of the environment and ecological safety;

Specific objective II: Environment and economy. Sustainable management of environmental resources;

Specific objective III: Environment and climate. Climate Change Mitigation and Adaptation and Disaster Risk Management;

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2 horizontal objectives:

- Environment and education. Developing ecological competences (knowledge, skills and attitudes) of the society,

- Environment and administration. Improving the effectiveness of the environmental protection instruments.6

Net-zero builders can create value by investing in next generation technologies, replacing equipment with low-emissions models, and improving energy efficiency. Regulation of the Minister of Development of 16 September 2020 amending the Regulation on the technical conditions to be met by buildings and their location (OJ 2020 item 1608).

The need to raise qualifications in the sector of energy-saving construction and renewable energy sources was noticed in the EU already in 2010. As a result, a pan-European strategic initiative entitled Build-Up Skills was launched. As part of this project, each EU Member State has developed an analysis of the educational situation in the above-mentioned areas and formulated strategies to improve the qualifications of construction workers in the field of RES technologies and activities increasing energy efficiency.

Based on the experience of the Build-Up Skills project, Łukasiewicz Institute of Machine Technology and Operation ITEE together with the National Energy Conservation Agency, under the LIFE program, takes up the challenge of the Build Up Skills II project. The aim of the Build-Up Skills II Poland project is to develop a strategy for improving the qualifications of employees and candidates for employment in the construction sector at all EQF / NQF / SQF levels and as part of formal education (professions, qualifications, fields of study, entitlements) and non-formal education (training and market qualifications) in in the field of energy-saving construction technologies, especially those subject used for major renovation. Such a strategy would allow to change the energy efficiency level of 90% of existing buildings in the perspective of 2050 and to contribute to the achievement of climate neutrality by the Polish economy. Also the Association of Municipalities Polish Network “Energie Cités” has been running projects of national relevance aiming at the energy improvement of public and

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private buildings and increasing skills of the parties involved, just mentioning the three most recent ones: REBUS project financed from Interreg Europe programme (designing model Energy Renovation Path helping to overcome most typical barriers encountered during different phases of energy renovation projects: https://www.interregeurope.eu/rebus/), TOGETHER project financed from Interreg Central Europe Programme (promoting use of behavioural and analytical DSM measures; https://www.interreg-central.eu/Content.Node/TOGETHER.html) and GRAD financed from EUKI (promoting green roof strategies; www.strategiezielonychdachow.eu).

3. Public building renovation targets/ program goals in National levels and state of the art

At the moment, about 400,000 objects in the National Building Resource are public buildings. Therefore, the aim is to promote both the Long-term Renovation Strategy and the design of the training program and the development of training materials to raise the awareness of public administration employees about the ecological effects of activities aimed at increasing the energy efficiency of public building resources.

In June 2020, work began on the creation of the Sectoral Qualifications Framework. This draft was submitted for industry consultation in august 2020 At the moment, it contains, among others, a description of some industry qualifications such as:

- in terms of knowledge: energy efficiency, environmental and climate protection, circular economy, ecological certification,

- in terms of skills: limiting the impact of real estate on the environment8.

As a consequence of creating this framework, one should expect an increase in activities related to the improvement of qualifications of persons providing services in the field of administration and management of real estate, which are actively involved in the preparation and implementation of the thermal modernization process of buildings.

The final effect of the activities undertaken in this area will be the creation of conditions for the acquisition of the necessary skills by new employees, as well as for the continuous

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improvement and verification of the competences of all people working in the construction and energy efficiency sectors.

Construction is responsible directly or indirectly for almost 50 percent of global CO_2 emissions from fuel combustion and 27 percent of greenhouse gas emissions as a whole9, thermal modernization of public administration buildings is a good practice for increasing energy awareness of the public. In order to achieve Net-zero, it is necessary to raise qualifications of all concerned10.

It has been estimated that approx. 85,000 people11 employed in the construction industry were involved in thermal modernization, and accelerating thermal modernization could create additional 100,000 jobs.

4. Technical, legal, institutional and financial challenges faced by the Public Authorities in national level, as defined by case studies, existing reports, existing experiences etc.

Renovation is hampered by obstacles along the value chain, from the initial decision to renovate to the financing and completion of the project. For example, when considering renovation, the benefits of energy savings may be uncertain or insufficiently explained and understood, especially by end-users. They can be difficult to measure and their monetary value difficult to assess. Renovation can also be costly, difficult to organize and take a long time to complete. Obtaining funding can be difficult, especially at local and regional levels. Public funds are often sparse and difficult to combine due to regulatory obstacles and a lack of capacity in public administrations.

To start a wide-ranging and sustainable implementation of renovation across Europe, major barriers need to be removed at each stage of the supply chain.

Financial barriers

Thermomodernization is often a project that requires a large financial contribution and is characterized by a long payback period. For these reasons, thermomodernization is often not considered beneficial in terms of investment by private investors. Building owners, on the

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other hand, sometimes do not have adequate funds to undertake modernization measures themselves. People renting flats do not carry out thermal modernization, as the funds spent on this purpose will not have time to return during the rental period. There is also no long-term, easily available and low-interest crediting for thermal modernization works. In addition, when deciding on smaller renovation projects, the costs associated with starting activities and finding suitable contractors are disproportionately high.

In the event of a sudden acceleration of investments in thermal modernization, e.g. thanks to such funding programmes as “Clean Air”, “Stop smog”, “Warm apartment”, there is a risk of an increase in market prices for the necessary equipment, materials and services. This effect will wear off in the long run as the supply adjusts to the increased demand, however, it may lead to a slowdown in the implementation of investments in the short term. Counteracting this phenomenon requires actions both on the demand and supply side.

Technical barriers

In the case of old buildings, the poor condition of their structures often becomes a problem, which makes it impossible to take appropriate modernization measures - e.g. external walls will not support the additional weight of the insulating material, the roof (asbestos) does not allow the installation of a photovoltaic installation or collectors. It also happens that the low level of knowledge on the part of contractors (construction companies, architects, construction managers) translates directly into errors in the design and implementation of modernization activities, which affects the deterioration of building parameters.

The knowledge of the building and the materials used during its construction, as well as the analysis of the technical documentation will allow to determine whether the building contains asbestos-containing products, which should be immediately removed during the planned modernization works.

It is possible that for technical, economic and social reasons it is not possible to remove asbestos-containing products. It happens when sandwich panels made of asbestos-cement panels are used for the construction of external walls in multi-family residential buildings and

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public buildings, e.g. in hospitals, where it is not possible to find a replacement apartment for the duration of renovation. Then the only solution is to install asbestos-containing products so that their destruction and asbestos emission into the air do not occur.

A big technical barrier is the combination of modern renovation with widely understood computerization of both work and renovated buildings.

Another problem is the excessive thickness of classic thermal insulation materials (polystyrene, mineral wool), necessary to obtain the parameters of partitions in the case of deep thermal modernization. Modern, innovative thermo-modernization materials (e.g. aerogels), which could significantly reduce the thickness and weight of the insulation, are expensive. The problem is also the failure of some manufacturers to meet the parameters of insulation materials (e.g. density).

Many technical challenges are generated during the thermal modernization of buildings under the protection of the conservator. It should only take into account activities carried out on the basis of the least possible damage to historic values, defined in accordance with the Polish Act of 23 July 2003 on the protection of monuments and the care of monuments, which allows modernisation works based on solutions acceptable to the conservation services and in accordance with the guidelines of the General Conservator of Monuments12. As a result, it may not be possible to achieve high levels of energy efficiency in such buildings, especially in the case of partitions. An additional barrier in the case of historic buildings is the difficulty in obtaining funds and financial support from cross-sectional national and European programs in the field of energy efficiency due to the inability to achieve the required energy efficiency parameters.

Another technical obstacle, often standing in the way of the quality of renovation works, is the main criterion used for evaluating offers in a tender procedure for construction works, which is the price.

Information barriers

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Successful transformation of the renovation sector requires engagement from a wide range of stakeholders including the private sector, architects, civil society organisations, urban planners and private citizens as household owners and end-users. An important enabler for this engagement is the awareness of the potential benefits of deep renovations. The same applies to public officials who need to take the decision to renovate public buildings and financial investors. However, the lack of awareness of these potential benefits and limited understanding of energy performance were identified as important barriers, both for public and private clients, and investors. Consequently, difficulties associated with informing and educating relevant stakeholders about the potential benefits of deep renovation were identified as a particularly important challenge for the LRAs.

The problem of contradiction stimuli.

Public administration buildings may be less affected by this problem, but it may arise depending on local circumstances, resulting from a conflict of interest, e.g. when energy end-users are not responsible for paying the energy bill, when decisions are made collectively or when there is a high rotation in the use of the property.

Contradictory stimuli are observed primarily in the following areas:

Divergent energy efficiency interests exist where the end-user is responsible for the energy bills but cannot choose the technology needed to improve the energy efficiency of the premises and thus has limited ability to influence the reduction of the energy bills. Divergent use interests occur when the tenants of the premises are not responsible for paying the utility bills as the owner pays the costs. Therefore, tenants not only do not experience incentives to save energy, but also tend to use more of it. This type of divergent interest occurs, for example, in the hospitality industry.

Divergent interests when there are multiple tenants and landlords arise where the decision-making regarding possible improvements in the level of energy efficiency is distributed among many participants and is collective. In such cases, it becomes necessary to reach consensus, which can be made even more difficult if the costs and benefits of improving

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energy efficiency differ from one user to another. One of the methods of overcoming this type of barriers are housing communities where decisions are made collectively.

Divergent interests related to temporary use occur when there is a high rotation in the use of the property and therefore a high probability that the investment in improving energy efficiency will not pay off. In this case, improving energy efficiency associated with a high initial capital cost can be viewed as risky.

Among the types of contradictory stimuli characteristic of Poland, the problem of synchronizing the demand and supply of energy carriers, primarily district heat.

5. Available tools (technical, financial etc) for facilitating the implementation of the public building renovation

A list of national tools to support the renovation of buildings

Legislation and local law

- Ustawa o efektywności energetycznej / - The act on energy efficiency

- Ustawa – Prawo energetyczne / Act - Energy Law

- Prawo ochrony środowiska – programy ochrony powietrza i uchwały antysmogowe / - Environmental protection law - air protection programs and anti-smog resolutions

Planning and organizational tools

- Centralna Ewidencja Emisyjności Budynków (CEEB)17 / - Central Register of Emissivity of Buildings

- Plany zaopatrzenia w ciepło, energię elektryczną i paliwa gazowe18/ - Heat, electricity and gas fuel supply plans

- Plany gospodarki niskoemisyjnej19 / Low-carbon economy plans

- Plany działań na rzecz zrównoważonej energii i klimatu / Sustainable Energy and Climate Action Plans

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- Ogólnopolski System Doradztwa Energetycznego / Nationwide Energy Consulting System20

- Porozumienie Burmistrzów / Covenant of Mayors21

- Smart Citiec Information System SCIS22

- EU Building Stock Observatory23

E3P- European Energy Efficiency Platform24

Financial tools

Financial tools are used to obtain financing or co-financing in the field of thermal insulation, replacement of heating sources, installation of photovoltaic panels, assistance in establishing energy clusters at the level of local government administration or implementation of IT systems and networks helpful in green transformation. Some of them are:

- Energy Savings Program („Budownictwo energooszczędne. Część 1 Zmniejszenie zużycia energii w budownictwie25")

- Cleaner Air in Schools Program („Czyste powietrze w szkołach"). According to its 2019 findings, 1,000 Polish schools are to be transformed into climatic islands by 2025.26

- Renovation and Termomodernization Fund (Fundusz Termomodernizacji i Remontów). The primary goal of the Thermomodernization and Renovation Fund is financial aid for investors implementing thermomodernization and renovation projects and the payment of compensations.

Funds for thermomodernisation works in public buildings foreseen within the regional operational programmes for 2021-2027

Technical tools

Technical tools are indispensably connected with the widely understood computerization of work and buildings.

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National Smart Specialization – KIS - Intelligent technologies referred to in Directive 2010/31, a strategic national document to address the priorities of the Europe 2020 Strategy (support for investment in smart specialisations is also planned in the next EU financial perspective for 2021-2027).

KIS belongs to the group of prospective and strategic solutions that will bring the building sector in Poland closer to achieving climate neutrality. These include energy management systems and smart metering, smart buildings, smart grids and smart cities. Priority directions of research have also been defined at the voivodeship level in the **Regional Innovation Strategies (RIS),** taking into account their diversified research and development potential in individual areas.

Smart meters, smart grid - as part of the transformation of the power grid into a smart grid, the current activities focus on co-financing investments related mainly to the construction, modernization or reconstruction of power grids, power stations, enabling connecting RES energy generation units and installing smart meters and grid automation.

6. Existing training provision/ capacity building programs in relative areas

The Integrated Skills Strategy 2030 (ZSU), adopted by the Council of Ministers sets the strategic policy framework for the development of the skills necessary to strengthen human capital.

The design, installation and operation of circular and low-carbon solutions often require a high level of technical expertise. Specialists also need skills in the safe management of historic buildings and the protection of their values as cultural heritage. The transition to a climate neutral building stock will only be possible if existing jobs are transformed to include green and circular skills and if new professional profiles appear, such as deep renovation specialists, installers and high-tech solutions installers or a building information modelling managers. Only good informed professionals can play their potentially crucial role in offering end-users the latest technical capabilities available in the field resource efficiency and energy efficiency. To improve accessibility in renovation, these specialists should also be trained.

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The basis is the vocational education system. The vocational education system in Poland provides for the division of professions into 32 sectors. One of them is the construction industry. It comprises a total of 22 professions (26 qualifications in total), including 8 technical level– 4th level PRK and 16 professions at the level of vocational school of the 1st degree – III level of the PRK. In all professions, graduates receive the results of education on OSH and social competences defined in the core curriculum for a given profession. In addition, in the professions at the technical level, graduates are equipped with knowledge and skills regarding the organization of the work of small teams, which form the basis for the future work of a construction manager or foreman.

The qualifications of managers in Poland are defined as follows:

− higher education courses indicated in the legal regulations (construction or related to a particular speciality) + professional practice + permission (construction rights)

− professional title of technician or master + apprenticeship + permission (construction rights),

professional diploma/ diploma confirming professional qualifications in the profession taught at the level of technician + apprenticeship + permission (construction rights).

In addition to renewing formal rights, specificity of the work of the construction managers requires to refresh the knowledge on the law, the knowledge and skills associated with new technologies. As persons responsible to the investor and the building supervision inspector, they must take care of their mental condition and interpersonal competence (they manage staff on the construction site). Therefore, national and regional chambers of civil engineers offer a number of legal and organisational, technological and so-called soft training for their members.

Using the extensive experience of programs dealing with similar issues, below are examples of training courses and workshops organized by these chambers for managers and representatives involved in renovation works:

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- Duties and rights of the manager,

- Renovation of damp and salted buildings - rules of execution and details,

- Protection against surges of power supply installations,

- Classification, records and management of waste from the construction site,

- Construction works at historic buildings,

- Lightning protection and against surges of photovoltaic power supply systems,

- Management of own energy and attention,

- Performing an independent technical function in construction - actions protecting against claims of third parties,

- Constructive feedback and enforcement of tasks,

Training and workshops useful from the point of view of the project are also conducted by the Polish Chamber of Engineers and its local branches. These are training courses, e.g. in the field of geotechnics for the needs of construction.

Other training offered on the market for site managers administration staff:

- Effective enforcement of claims for defects and errors of construction,

- Safeguarding the interests of participants in the construction process,

- Management of team on the site,

- Waste management in the construction and renovation industry.

- EU funds for 2021-2027 with particular emphasis on the European Green Deal and the EU Climate and Environmental Policy

There are also many commercial certified training centres on the market, which offer training in the field of "Thermomodernization of public utility buildings in the PPP formula", “Urban Climate Adaptation Plan" or “Climate change mitigation in historic buildings”.

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BIM Education project (commercial offer for BIM coordinators):

− BIM Schools,

− Trainings BIM REVIT, REVIT MEP.

Strategic activities should also include training from outside the formal education system.

In the higher education system and in the out-of-school system, new qualifications, such as an energy auditor, or other qualifications related to the improvement of qualifications by people involved in thermal modernization, have developed.

The adoption of the 2015 Act on renewable energy sources (Journal of Laws of 2021, item 610, as amended) resulted in the creation of an out-of-school training and certification system for renewable energy installers, for which the UDT (Office of Technical Inspection) is responsible.

Photovoltaic specialists have the highest share in UDT certification (about 73%), the remaining 27% are geothermal installations, heat pumps and biomass boilers28.

There is no vocational training path in Poland that provides all the skills and competences necessary to be a construction master/foreman/team leader/manager. Some patterns have been identified: typically, people who have completed a 3-year vocational school of the 1st degree can be foreman/team leaders. The completion of SB I does not give complete preparation for the role of foreman, rather it is a first step in this direction. On the other hand, it is not unusual for people without formal education to become team leaders in construction sites. In turn, a 5-year technical school, as already mentioned, provides skills related to the management of small teams. However, these graduates relatively rarely work as foreman/team leaders.

Globally, the skills and technical knowledge of site managers and foremen must permeate and mix with the knowledge and skills of PA employees delegated to deal with renovation and thermal modernization projects for public buildings.

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The market offers a limited pool of training courses (continuing education) in the area of renovation, especially in terms of administration staff. They are most often informal training by a particular employer and there is a relatively small training offer on free market concerning management issues. The training may result in the confirmation of the skill certificate, entry on the list of experts, but only for the company organizing the training, etc. Masters in craftsmanship - there are optional courses on the market to prepare for the master's examination in construction professions corresponding to a given type of craft, conducted by chambers of crafts. Few courses preparing candidates for the position of foreman (or formally "construction master"), eg. the course "Master of construction - building a house step by step". The program contains 6 technical modules and the basics of labour law (and OHS), but there is no module related to people management or the development of interpersonal communication competences and assigning tasks. The course does not give any qualifications apart from the organizer's certificate.

Since 03.2017, the Sectoral Competence Council (SRK) for the Construction sector has been operating in Poland. The Council provides a forum for the exchange of experience between formal, non-formal and informal education, research entities and construction entrepreneurs involving social dialogue institutions, professional self-government and other stakeholders working for the development of the construction sector by raising awareness of its qualifications and professional needs.

One of the results of the Council's work is the Sectoral Qualifications Framework SRK-Bud, which organizes qualifications typical of the construction sector by means of the characteristics of the scope and complexity of the knowledge, skills and social competences required of persons with qualifications of a given level. The PRK covers 8 levels (similar to the European).

In order to identify key competences within the different sectoral determinants of the SRK-Bud, four contexts of impact were identified for the different phases of the investment process, including Development trends and innovative technologies in construction e.g. green construction or the production of energy-efficient buildings.

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1. **Identification of skills needs of the PA staff for better engagement with public building stock renovation by case studies, existing reports, existing experiences etc.**

The process of renovating buildings to improve their energy efficiency involves a wide range of people with different types of skills and qualifications. There are three levels of qualifications of employees working in thermal modernization, low, medium and high skilled. Employees of the first two levels deal mainly with the execution of works, and the highly qualified are auditors and managers.

To address education and skills development issues for sectoral cooperation in the field, the European Commission will launch a Skills Pact bringing together private and public stakeholders with the same goal of upgrading and re-skilling the European workforce in building renovation. The Commission encourages Member States to use Next Generation EU funds, The European Social Fund Plus and the Just Transition Fund. Apprenticeships and other forms of work-based learning facilitate young people entering the labour market. The Youth Employment Support Package was announced by the Commission on 1 July 2020 renewing the European Alliance for Apprenticeships. The React-EU program provides this type of assistance until 2027. With the support of the "Build Up Skills" initiative, which continues under the LIFE program, the state Member States can update their gap analysis and national training action plans.

The experience shows that for PA managers and staff, e.g. involved in renovation services, it is worth organizing training in the field of:

- termomodernization and reduction of the carbon footprint,

- integration of energy systems in RES devices,

- application of modern ICT/smart solutions

- demand side management using analytical and behavioural tools

- thermal renovation of historic buildings

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- modern construction solutions reaching beyond energy efficient construction (concerning e.g. sustainable buildings, healthy buildings, buildings resilient to climate change)

- obtaining funds from EU funds,

- EU funds for 2021-2027 with particular emphasis on the European Green Deal and the EU Climate and Environmental Policy.

- using alternative funding methods (PPP, ESCO, revolving funds, municipal bonds, etc.)

- green public procurement

- efficient tendering procedures and supervision of contractors

- monitoring and evaluation of results of conducted renovation works

- raising awareness of and engagement of building users.

In addition, there is a need for systemic solutions to raise the environmental awareness of PA employees and personnel. Generally, there are no training courses on the market to perform the function of a green leader of the thermomodernization team or courses intended ultimately for public administration, or the awareness of their existence is low. The closest to this form are the courses for the master's examination in construction professions carried out by chambers of crafts, but they also do not give any rights (although a person with such a professional title can, in combination with the relevant experience, take the examination for a construction manager to a limited extent).

The KIS is useful for identifying the skills needs of PA employees, in order to better engage them in the renovation of public building stock.

According to the Chamber of Engineers, the skills that should be demonstrated by public administration staff include, among others, the development of technical and economic assumptions, preparation and supervision of technical documentation, managing teams of contractors, investor supervision, control of the energy effect obtained or process management .

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2. **Potential impact of the national legislative framework, technical & normative, as well as managerial and organisational challenges and barriers on the role and functions of PA staff in building renovation in the partner country concerned.**

Due to the need to familiarize themselves with the issues of building renovation, new challenges arise for PA staff. This applies in particular to dooperation with companies wishing to provide services to public entities. According to the schedule, the introduction of the obligation to use BIM(Building Information Modeling) in larger tenders, i.e. with a value of over EUR 10 million, is possible as early as 2025. Earlier, from 2022, bid evaluation criteria related to the use of this methodology can be introduced. For all public procurement, BIM would be mandatory from 2030. Building Information Modeling is the cornerstone of digital inclusion in the architectural, engineering, and construction industries. This presents unique skills to the users of this system with training and learning new skills.

New national and EU recommendations/requirements for increasing the energy efficiency of construction works, introduction of NZEB (near-zero energy consumption) force construction workers to educate and know both the guidelines/ recommendations/ legislation themselves, as well as technical, technological and organisational solutions to meet the new standards. The knowledge of the same in this field must also apply to the administrative staff involved in the renovation of the PA buildings.

Growing responsibility in the field of OSH for managers.

More and more organizational / managerial tasks – the need for training in this field + soft training.

3. **Recommendations for the training paths to be developed as with the skills needs identified further to the desk research.**

The recommended educational paths for PA employees must necessarily intersect with vocational education in the construction areas related to the Green Deal. The knowledge of

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practitioners trained in the field of green replacement, through influences and exchange of experience, should increase the level of awareness of the general administrative staff and help in training managers selected for these tasks.

In the long run, it should also educate young professionals capable of administering the renovation of public buildings in the future.

The path could include: short practical training in the workplace (and at work) for active managers who administer public administration buildings, on-line training, theoretical modules, incl. on the legal framework, national and EU zero emissions policy and decarbonisation, with specific context of the renovation wave (and Polish DSR recommendations).

Training offer in the field of the so-called additional professional skills (DUZ), professional qualification courses (KKZ) and most of all trainings delivered by producers (!).

A network of non-formal training courses should be developed, providing additional qualifications and increasing competences in the field of thermal modernization, RES use, application of modern ICT/smart technologies for better demand side management.

Implement awareness-raising programs and trainings to ensure qualifications related to the preparation of applications for investment co-financing or investment management in the form of a substitute investor.

An important issue is balancing the needs of employees employed in the renovation of buildings with the inflow of employees from various forms of education. These balances should be kept mainly at the regional level and aggregated at the national level, which would facilitate the introduction of interventions to maintain the balance between supply and demand of those working in the renovation of buildings. It is wisely recommended to manage this type of work with the use of properly trained construction workers.

In addition, with regard to those working on the construction and installation of renewable energy sources, the following are important:

1. Adjustment and supplementation of training programs for PA staff,

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2. Creation of a new training system based on modified training programs, where everyone seeking certification would be subject to a mandatory examination and training could be provided by free market training entities.

Due to the great lack of awareness among the society and officials about the advantages of renovations and the method of obtaining funds and technical assistance, it is advisable to intensify educational activities.

One of the indicated solutions helpful in training and achieving the goals of the project is the involvement of the entire spectrum of possibilities, from virtual reality, through digital techniques to training in the workplace. It is also essential to familiarize stakeholders with the innovative resources and tools available to interested parties, as well as expand their knowledge in the field of solving technical and legal problems, financial mechanisms as well as raising their awareness of energy transformation policies and the benefits obtained through renovation.

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Greece

1. **Legislative framework, policies associated with public building renovation strategies in EU level (Examples of such EU strategies include: EPBD, EED, building renovation passports, Energy Performance Certificates, Digital Building Logbooks, Smart Readiness Indicators**

Energy efficiency ("EE") is at the cornerstone of the European energy policy and one of the main targets of the Europe 2020 Strategy for smart, sustainable, and inclusive growth adopted by the European Council in June 2010. This includes the objective of a 20% reduction in primary energy consumption by 2020. As energy-related emissions account for almost 80% of total EU greenhouse gas ("GHG") emissions, the efficient use of energy can make an important contribution to achieving a low-carbon economy and combating climate change.

Buildings account for approximately 40% of final energy consumption and over a third of CO2 emissions in the EU. Most of the buildings that will exist in the year 2050 are already built. Renovation of the existing building stock is therefore key to meeting our long-term energy and climate goals. In practice, however, this is very challenging due to a variety of technical, regulatory, and other barriers. Action is required, including more research, demonstration of innovative solutions, and facilitation of their roll-out into the mass market.

The EU is taking on this renovation challenge via policies such as **the Directives on Energy Performance of Buildings (EPBD) and on Energy Efficiency (EED**). The revision of the EPBD upgrades the existing regulatory framework to reflect higher ambitions and more pressing needs in climate and social action while providing Member States with the flexibility needed to take into account the differences in the building stock across Europe. The revised directive sets out how Europe can achieve **a zero-emission and fully decarbonized building stock by 2050.**

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In addition, action is being taken by research and innovation projects using the Intelligent Energy Europe (IEE) and 7th Framework Program (FP7) funds and, more recently, the Horizon 2020 program, as well as European Structural and Investment Funds (ESIF).

Furthermore, **the Renovation Wave** (part of EPBD Directive article, 2a, 8, 20), strategy and action plan published in 2020 presents available funding budget solutions that could support the renovation wave in different ways through direct investments:
by leveraging private investments, for research and innovation to address market barriers, and available technical assistance

Also, **The New European Bauhaus Initiative** launched in October 2020 provides a forum where Europeans can come together to share ideas on climate-friendly architecture. The initiative comprises 3 phases: co-design, delivery, and dissemination.

2. National Legislative framework and policies associated with public building renovation strategies at national levels.

Efficient funding projects to enhance the energy quality of residential buildings have been set to begin throughout the current programming cycle (**2021-2027**, and their operational structure will be duly updated by streamlining incentives to optimize energy gains, while at the same time helping disadvantaged households in terms of financing and energy.

The redrafting of the funding formula for energy upgrading actions has been completed in the case of public buildings, while in the case of other buildings in the tertiary sector, the emphasis will be on implementing emerging smart technology and attempts will be made to reach an optimum cost-benefit ratio to ensure fair access for all stakeholders.

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More specifically about the **Renovation policies** in the country, three different phases have been identified in accordance with the latest **National Energy and Climate Plan (NECP).**

1. The first one, covered the *year 2020*, where all regulatory aspects necessary for the required mechanisms and structures were developed.
2. The second – acceleration phase (*period 2020- 2040),* encompasses a further development of technological innovation of products and techniques, which are set to a gradual cost reduction of energy efficiency measures and a proper understanding of the additional gains of a total renovation.
3. Finally, during the third phase, or "stability" phase (*period 2040- 2050)*, the energy market of building renovation is anticipated to become mature enough to include mobilization of investments from the private sector as well (e.g., through Public Private Partnerships).

Further to the above, within the framework of the European **"Renovation Wave",** Greece, via the Recovery Fund, has launched the program *"Save II" in 2018* (continuation of the Save I program) along with the "Elektra" program and the "*Save at Home*", (law 4643/2019, initial budget EUR 558 million). As pointed out by Energy and Environment Minister "Elektra" program will provide for the implementation of investments of 500 million euros by 2026, for energy savings in public buildings.

Furthermore, with the **"Long-Term Strategy for the Renovation of the Building Stock"**, in the context of the implementation of the European Directive on the Energy Efficiency of Buildings (OEAK - 2010/31 / EU) and the implementation of the European Energy Efficiency Directive (2012/27 / EU), special emphasis is given / the importance of the energy sector of the building upgrade from residential and commercial buildings, public and private, with the aim of converting them into a **high-energy and carbon-free building stock by 2050**, facilitating the cost-effective conversion of existing buildings into buildings with almost zero energy consumption.

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Regarding the new buildings or building units, the Ministry of Environment and Energy in Greece has indicated in its **National Plan** that they should meet minimum energy performance requirements set out in the "**Regulation on the Energy Performance of Buildings"** as referred above. Combined with the obligation set in **Law 4122/2013** that describes the requirements for the Energy Efficiency of Buildings, these regulations ensure that every new building of the public sector, from 1 January 2019 should be Nearly Zero-Energy Buildings (NZEBs). This obligation is also applied also for all new buildings constructed after 1 January 2021. To this end, since 1 February 2021, **the Electronic Building Identity** has been launched by the Ministry of the Government (Gazette FEK 287 B/2021), as **obligatory for all old and new buildings**. This identity constitutes the complete electronic file of a building that includes all its information such as*: its building permit, floor plans, millimeter table, construction control certificate, energy efficiency certificate, declarations of subordination to arbitrary laws, et*c. In case the owner does not have any of the necessary supporting documents then (s)he must obtain them in order to be included in the database.

Within the same spirit and linked to the buildings' identity, in order to increase the number of buildings that not only meet the existing minimum requirements for energy efficiency but are also characterized by higher energy efficiency, national plans are currently being drawn up to increase the number of **Nearly Zero Energy Buildings (nZEB**).

Complementarily to the above national framework, on 8th February 2021 (K.Y.A. 14900/2021), the **Action Plan for Green Public Procurement** was approved and published which also includes guidelines for the procurement of large-scale renovation projects.

3. Public building renovation targets/ program goals in National levels and state of the art

The building sector, which is consisting of the residential and tertiary sector, **consumed 44% of the final energy in Greece in 2019**. From 2000 to 2019, the final energy consumption in households decreased by 10%. Although until 2006 the households' final consumption was steadily increasing, the households sector was one of the sectors which sustained the effects of the economic recession in final energy consumption. This fact, in combination with the

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energy efficiency measures that have been implemented since 2007, led to a decrease of the final energy consumption of the household sector. The technical energy efficiency index (ODEX) for the residential sector in Greece **decreased by 30%, between the years 2000 and 2019.**

According to Greece's **NECP,** in the case of **public buildings**, the redrafting of the financing model for energy upgrading actions has been completed, while in the case of other tertiary sector buildings focus will be given to adopting new smart technologies and an effort will be made to achieve an optimal cost-benefit ratio and ensure equal access for all interested parties. Meanwhile, alternative financing mechanisms, such as energy performance contracts, will be adopted. Upgrading the role of energy managers of public buildings is expected to make a significant contribution, as a relevant clause will be added in financing programs for the energy upgrading of public buildings.

The **electronic platform for monitoring the energy behavior of public buildings**, which has been completed, aims to assist energy managers in carrying out their functions.

The revision of the relevant regulatory framework aims to upgrade their role, in order to ensure the rational use of energy. Continued improvement of the energy efficiency of public buildings will also be strengthened through the implementation of the Action Plans for Sustainable Energy and the Action Plans for Energy Efficiency of Buildings, which must be drawn up by regions and municipalities, supported by targeted financing programs, according to Greece's **NECP**.

In addition, the **implementation of energy management systems** will make a substantial contribution in this direction. In any case, a key priority for public buildings is based to promote measures and programs that are technically feasible and optimal in terms of social cost and result. The new minimum requirements will be incorporated in the revised Regulation on Energy Efficiency of Buildings and emphasis will be placed on increasing the

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number of near-zero energy buildings in accordance with the requirements *of Directive 2010/31/EU*. The adoption of new regulatory measures (also in the context of *Directive 2010/31/EU,* as amended by Directive (EU) *2018/844*) will aim both at elaborating an appropriate framework and creating incentives for maximizing the number of buildings which would exceed the minimum energy efficiency requirements.

For example, the following regulatory provisions will be promoted:

• After 31 December 2023, all buildings housing public authorities must be classified under energy category B or higher on the basis of the energy performance certificate.

• As of 1 January 2021, all new buildings or building units rented or purchased by central government bodies must be near-zero energy buildings (energy category A or higher).

• As of 1 January 2021, for each building or building unit that is available for sale or rent, the energy efficiency index shown in the energy performance certificate should be declared in all commercial advertisements.

4. Technical, legal, institutional, and financial challenges faced by the Public Authorities in national level, as defined by case studies, existing reports, existing experiences etc.

The long-term plan to renovate the building stock in Greece faces and must overcome the usual series of barriers and obstacles encountered whenever there is social/technical change. Similarly, action to attract investment based on cost-optimal renovations of buildings for residential and other uses (offices, hospitals, education, etc.) faces a series of interconnected barriers that must be overcome.

Institutional and technical barriers

There is still no established national standard for adequate and verifiable measurement of the actual energy consumption of buildings. The calculation method adopted in the KENAK is based on the asset method, rather than the operational method, and is therefore useless as a standard for recording actual consumption. The international community developed an International Performance Measurement & Validation Protocol at the beginning of the century in a bid to establish a standard method for conducting and verifying measurements for both energy and water savings.

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Greek buildings **lag significantly behind in terms of their energy behavior**. The introduction of **thermal insulation** is the most effective way to improve this situation, despite the difficulties encountered by the regulation in its implementation. To this end, renovation, and reconstruction of the existing building stock, calls for an update in the current skillset of the staff.

Despite this necessity, the **incomplete regulatory framework** and the absence of an implementation monitoring mechanism are the main problems relating **to the promotion of RES**, while **the need to obtain education/training** and to adapt to the technical requirements remains critical.

For example, in the case of geothermal energy, despite the existence of certain areas with a significant exploitable geothermal potential in Greece, the **lack of information and the technical difficulties** in implementing and developing the relevant district heating networks pose major challenges.

Furthermore, another **technical skills gap surrounds the use of BIM** (Building Information Modelling). According to Greek legislation, while BIM can be implemented in public construction project plans, there are no further requirements or guidance in place that ensure its application in practice.

In addition, another challenge concerns **the CDW management** in the country. It is identified that Greece (and the respective Greek construction industry) lacks the necessary readiness to respond to the skills needs resulting from the transition to a circular economy.

Additionally, the **large amount of bureaucracy** involved in various aspects of the process - procurement, project management costs, identification of additional activities, and administrative burden.

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Financial barriers

The non-contributory benefits generated by energy-efficiency renovations of buildings are often valued over time and are therefore considered uncertain due to a lack of reliable market data compared to other investments. In Greece in particular, which currently presents an enhanced country risk due to the economic crisis, the uncertainty of and the risk of return on long-term investments are even more acute.

Bank loans, which have traditionally been the main source of funding of consumer and investment demand in Greece, have been cut back and this has had a knock-on effect on investments in building renovations.

The economic barriers include the reduction in income and change to consumption habits in Greece over recent years **due to the recession**. Under such circumstances, investment in **energy-efficiency renovations is often not a priority**.

Lack of information, expertise, and awareness

These barriers are exacerbated by the shortage of skills and training of the persons responsible for applying new energy-efficiency renovation techniques and technologies. These shortages are seen in connection both with energy-saving technologies and with the renewable energy sources used as standard internationally for renovations. The lack of suitable and reliable information on the energy efficiency of deep renovation is delaying the application of new techniques to improve the building stock. The primary information available is of a general nature and it is impossible or difficult to adapt it to the circumstances of each investor in and/or user of a building. Information is provided sporadically, and investors and even individual users are unable to make an overall and complete assessment of the benefits of an investment in energy-efficiency renovations. Regarding Public Authorities there is a **significant gap** in expertise related to energy-efficiency renovation techniques and technologies.

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A lack of qualified PA staff at the national, municipal, and regional level (responsible for managing, and allocating structural funds among others) as well as high requirements often hamper the large-scale deployment of energy efficiency measures and effective use of available funding. Public authority staff in charge of the application processes for the financial support **need special technical support.** Municipal staff or **from remoted areas are facing fewer opportunities** in having access to training, information, and up-to-date energy consumption follow-ups. Especially in Greece where the **centralized administration is prominent**.

Universities and Technological and Vocational educational institutes urgently need to modify their curricula in various scientific and technological sectors to include the concept of energy savings through renovation, both building envelope and building systems and installations, and the behavior of users of the building stock in all disciplines.

5. **Available tools (technical, financial etc) for facilitating the implementation of the public building renovation and especially European Union funding**

In the public sector, the Ministry of Environment & Energy (YPEN) has issued numerous invitations to tender for public building renovation contracts under the Environment and Sustainable Development Operational Program, which includes the Bioclimatic Improvements to Urban Public Open Spaces program, the Green Roofs program, the Green Neighborhoods pilot programs, the Green Island program, etc. These are designed to improve energy performance, encourage viable local development, improve citizens' quality of life and create new jobs, thereby maximizing the added value of the programs and supporting local economies.

The 'Energy Savings in Households II (Eksikonomisi kat' Oikon II) program, launched by YPEN in 2018, provides financial incentives for implementing energy renovation measures in households. The eligible interventions focus on building envelopes, heating, and cooling systems as well as DHW systems.

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Save II program will not only have the dimension of energy saving, but also that of energy autonomy, through the production and storage of energy and the management of energy with "smart" systems". The program is set to cover 60,000 buildings per year. Along with the “Elektra” program”, they will improve energy efficiency for households and public buildings (Law 4643/2019 which introduced amendments to the program Electra allows energy service companies (ESCOs) to participate in the development and financing of energy upgrading projects). The program is launched in the autumn of 2020.

The ‘’First-Come, First-Served” Program is the brother of its successful predecessor launched between 2007 and 2013. The latter provided EUR 249 million in partially subsidized loans combined with non-repayable grants to address the reluctance of private investors to fund energy efficiency projects in residential buildings.

The Program is very popular as it encourages homeowners to finance energy efficiency. So far, out of the 64 637 applications accepted, 47 075 have been completed and 27 877 loans were signed”. The renovation works include thermal insulation of roofs and walls, replacement of windows and doors, upgrading of heating and ventilation systems, and installation of solar water heater systems and heat pumps. To be economically viable, the renovations carried out must achieve 40% of energy savings for lower-income homeowners and 70% for upper categories (says Katerina Proestaki is monitoring the program at the Ministry of Development and Investments).

Different types of schemes are planned and implemented across the EU to overcome financial and non-financial barriers and effectively invest in energy-efficient building renovation. Nevertheless, according to the Energy Efficiency Financial Institutions Group (EFFIG), there is a strong need to scale up investments and the use of financial instruments. The European Commission provides several funding streams and guarantees from the EU budget to support the objectives of the Energy Union and the Clean Energy Package.

EU Structural and Investment Funds (ESIF)

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Five European Structural and Investment Funds (ESIF) support EU countries in financing sustainable development and the transition to a low-carbon and healthy economy. The funds are managed by the European Commission and the Member States and are delivered via multi-annual programs at national or regional level. With the next program running from 2021-2027, the EU Commission plans to increase the climate-related funding to 25% of the Multiannual Financial Framework (MFF), accelerating their efforts to meet the climate goals set in the Paris Agreement. The €206 billion dedicated to climate-related funding under the current MFF would be increased to €320 billion. Over the period 2014-2020, €18 billion has been allocated to energy efficiency by the ESIF, especially the European Region Development Fund (ERDF) and the Cohesion Fund (CF). Each has allocated €13.4 billion for energy efficiency measures in public and residential buildings. The ERDF's investment priorities include support for energy efficiency, smart energy management, and renewable energy use in public buildings and the housing sector.

The Juncker Plan (European Fund for Strategic Investments)

The European Fund for Strategic Investments (EFSI) – the Juncker Plan – is a joint initiative by the European Commission and the European Investment Bank (EIB) to mobilize private funding for strategic investments. The EFSI is a €16 billion guarantee from the EU budget, complemented by a €5 billion allocation of the EIB's own capital, aiming to unlock additional investment of at least €315 billion over a three-year period. The aim is to de-risk development projects, accelerate private financing and maximize the effectiveness of the financial resources. From 2021 it has been replaced by the InvestEU fund covering the period 2021-2027.

The European Energy Efficiency Fund (EEEF)

It is another funding option in the form of a public-private partnership provided by the European Commission to assure the implementation of the Energy Union. The fund provides direct financing or channels resources through financial institutions by partnering with entities on municipal, local or regional levels. The instrument provides tailored financing (both debt and equity instruments) in particular for energy efficiency projects but also for renewable

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energy and clean urban transport projects. Beneficiaries are municipal, local, and regional public authorities or entities acting on their behalf. It was established in 2011 with a global volume of €265 million. Additionally, the EIB (European Investment Bank) provides framework loans to cities and municipalities to finance specific single large-scale projects exceeding €25 million.

The projects are mostly connected to infrastructure, energy efficiency, renewable energy, transport, and urban renovation and represent flexible funding options to municipal actors.

Another bank financing energy efficiency improvement at the European level is the European Bank for Reconstruction and Development (EBRD). The EBRD's Sustainable Energy Financing Facilities (SEFFs) provide long-term funding and integrated project development assistance to municipalities, especially in Eastern Europe. Since 2006, the EBRD has given out over 80,000 loans amounting to over €3 billion in 22 countries.

6. Existing training provision/ capacity building programs in relative areas

The existing training relative to building renovation **is considered as outdated but in the process of curricula update**. It includes both initial as well as continuous.

An indicative list is found below:

Title: Reuse of buildings and sets

Duration: 24 months

Type: Master's Degree

Level: 7

Institution: Department of Architectural Engineering of the Polytechnic School of the University of Thessaly

Objective: The aim of the program is to organize comprehensive theoretical and practical research in the field of:

- the utilization with new uses of existing abandoned and obsolete shells, complexes, and areas and
- their renovation, structural, and energy upgrades.

Structure: The structure of the program is as follows:

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Modern Architecture in old buildings and historical ensembles

Impression and documentation of buildings and sets

Energy saving in existing shells

Workshop: New Architecture in Historical Environment - Recovery Strategies

Seminar: Imaging tutorial with 3d scanner

Static adequacy and reinforcement of existing shells, E / M installations in existing shells

Workshop: Reuse of buildings of anonymous traditional Architecture

Workshop 3: Industrial buildings - new uses

Workshop 4: Lectures by guests on the topic of implemented reuse projects

Seminar 2: BMS (Building Management System)

Seminar 3: BIM (Building Information Modelling)

Validation: University degree

Title: Environmental Building Design (class)

Duration: 6 months

Type: Undergraduate degree

Level: 6

Institution: Department of Civil Engineering of the Polytechnic School of the University of Patras

Introduction.

- European EPBD directive and national legislation. The NZEB building.
- Regulation of Energy Performance Building and International Standards (ASHRAE, Passive House, etc.) / Introduction to Thermodynamics. Heat, Thermal Balance.
- Energy Planning. Climate Parameters / Thermal comfort - Calculations, Specifications, Standards, Regulations.
- Conventional, Bioclimatic Design, Renovation and Implementation Methodology.
- Building Fabric. Thermal insulation. Elimination of thermal bridges. Air tightness, implementation of ISO 13829.

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- Frames, Glass, Specification (ISO EN 673, ISO EN 410, ISO EN 10077-2) and placement.
- Heating and Cooling. Overheating during the Summer.
- Ventilation and indoor air quality, Mechanical ventilation with energy recovery.
- Energy balance. Software Calculations and Simulation. The use of RES in NZEB buildings.
- The cost of renovation & construction.
- Energy Retrofits in existing buildings: Regulations and Practices.
- Technical specifications for buildings energy efficiency measurements, Thermography, Air Tightness Test. Building certification. Application examples.

Validation: University degree

Title: Training and Certification of Employees in the Construction and Materials Industry"

Duration: 20 months

Type: VET program

Level: 5

Institution: Funded by the European Social Fund (ESF) in the framework of the Operational Programme “Competitiveness, Entrepreneurship and Innovation 2014-2020” (EPAnEK) and managed by Panhellenic Association of Engineers Contractors of Public Works (PEDMEDE)

Objective: The program aims at developing professional capacity of 1.200 employees of the construction sector, through providing training and certification in the areas of BIM and Electronic Procurement for Public procurement.

Structure:

A. "SMART" Project and Construction Management - BIM

- Importance of BIM for the study and construction of technical projects
- Models of the technical design and construction industry
- Areas of work that can affect BIM
- BIM as a tool for contractors

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- Process of developing a BIM model by a contractor
- Detection and reduction of design errors
- Estimation of quantities and costs for submission of tenders
- Construction analysis and design
- Integration of cost control, schedule, and other functions
- BIM as a lever for market change
- Steps of adoption of BIM in the process of production of components
- Software compliant
- Software environment
- Design steps
- 3d illustration

B. "SMART" Planning and Management of Buildings Through Application Networks

- The evolution and progressive development of "smart" energy devices and applications.
- Basic energy management concepts and requirements related to energy planning.
- Cost effective appliances and energy management standards.
- Communication network technologies.
- Local area networks - Internet of "smart" devices.
- Ways and procedures of controlling the installations of "smart" systems
- Building management system - BMS.
- Analysis of intelligent building project management (BMS) functions.
- Energy consumption and measurements.

Validation: Professional Certification

7. Identification of skills needs of the PA staff for better engagement with public building stock renovation by case studies, existing reports, existing experiences etc.

The process of renovating buildings to improve their energy efficiency involves a wide range of people with different types of skills and qualifications. Having shaped the national context

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regarding energy efficiency and building renovation context and following the research of current studies and official documents, it is evident that PA officers **have to face multiple challenges** is this emergent need of the public sector to lead by example by becoming an early adopter of energy efficiency improvements. PA officers **are key players** as they operate as decision-makers, planners, developers, regulators, advisors, motivators, energy users, and facilitators. Therefore, it is urgent to assist and equip them to bridge the skill gap and build competencies and enable behavioral change and prepare them to become true factors of change for reaching the EU environmental, sustainability and energy efficiency targets.

Appropriate needs and competencies for PA officers in Greece should include the following:

- Awareness raising in Building Energy Efficiency standards
- Energy renovation and energy-saving (new materials and methods)
- Introduction to ICT technologies, and systems (such as Building Information Modelling (BIM), Building Management System (BMS)
- Analyzing the new regulations on Green Public Procurement (GPP)
- Managerial, and financial mechanisms

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Annex 2:

Inventory of good practices & case studies introducing financial support mechanisms, tools, and technical capacity instruments available for public buildings renovations

Italy

BEST PRACTICE/ CASE STUDY No 1	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	"Green Hospital" in the formula of public-private partnership in Viareggio, Tuscany, Italy
Best Practice/ Case Study Type	☐ Financial support mechanisms for public buildings renovations ☐ Technical capacity instruments available for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which	2018 - ongoing

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the practice has been carried out (timeframe)	
Financial Sources	Public private partnership
Name of promoter organization	*Which organization promotes this initiate?* ASL North West of Tuscany
Countries/ Regions (if applicable) in the initiative	ASL North West of Tuscany, Italy
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* Azienda Usl Toscana Nord Ovest - Via A. Cocchi, 7/9 - 56121 Pisa https://www.uslnordovest.toscana.it
URL of the practice	*Where can one find the good practice on the Internet?* https://www.uslnordovest.toscana.it/trasparenzausl1/ASL%20Albero%20Trasparenza/www.usl1.toscana.it/upload/allegati/3155.pdf?seid=968&cw=3155 https://www.etribuna.com/aas/it/lavora-con-noi-sp-1373692469/45-area-agenzia-stampa/istituzioni-locali/72461-note-con-asl-toscana-nord-ovest-per-il-

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	finanziare-attraverso-intesa-sanpaolo-l'efficientamento-energetico-di-13-edifici-aziendali.html https://www.ilcuoioindiretta.it/in-azienda/2021/08/05/efficientamento-energetico-da-intesa-san-paolo-16-milioni-per-lasl-toscana-nord-ovest/102914/
Best Practice/ Case Study Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* ASL North East got 25 million euro from private investors in order to improve the energy efficiency of 13 Buildings, 6 Hospitals and 7 territorial health buildings
Best Practice/ Case Study Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter.* The call to subscribe the contract, that has a total amount of 115,3 million euros, was defined as envisaged by the European Directive 2012/27 / EU which establishes a framework of measures for the promotion and improvement of energy efficiency that contribute to the achievement of the national energy saving target, with particular reference to improving the energy performance of buildings in the national and regional PA . Public administrations promote the use of the instrument of financing through third parties and can act through the intervention of one or more ESCOs, with the definition and development of new contracts: Energy Performance Contract (E.P.C.)
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* 6 groups of international investors participated in the tender for a contract of 115,3 million, of which 25 paid by the private investor. The implementation of a contract of E.P.C. represents a "Win Win Strategy" with winning and optimal elements for both contracting parties: the P.A. increases the value of the assets and realizes an important budget saving on its annual management costs, the E.S.Co. they get the guarantee of important turnovers for medium-long periods of time.

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1. *the contract was drawn up according to the European directive, so this scheme must be applied in all the states of the union*
2. *Through the Energy Performance Contract it is possible to decrease the use of primary energy, with interventions on technologies, and to obtain greater efficiency through new regulation and management systems of the BMS type, also creating unique control rooms, for multiple buildings distributed over areas vast territorial, such as the provincial or new USL.*
3. *this contract was the first to be signed in Tuscany, and was made possible by the efficiency of management and the clarity of the rules: many other structures encounter great difficulties passing from theory to the practical application of the rules. and they can find in this experience a lot of ready-made material that will help them in their situations.*

The EPC energy performance contract represents a "genetic evolution" of the current "global service" or "facility management" contracts used in the P.A. The Energy Performance Contract (E.P.C.) of the Azienda USL Toscana Nord Ovest was made possible by the previous experience of Versilia Hospital
The main data of the Contract:

- 13 buildings including 6 hospitals and 7 territorial health buildings
- Total square meters around 250,000 and about 1,000,000 cubic meters
- A total consumption of about 87 Gwh / year of primary energy
- A total ordinary maintenance cost of 3.6 million euros
- A historical expense of the three addends (gas, electricity, and ordinary maintenance) of 10.5 million euros
- A total contract amount of 115.3 million euros
- In the first year (flat rate historical expenditure - 10%) the company completes all the efficiency improvement interventions, and in the following 10 years of duration the company puts in place the maintenance and the management of the buildings with a fee (max historical expense - auction discount) subject to performance verification

Results expected from the execution of the Energy Performance Contract (E.P.C.) of the Local Health Authority of Tuscany North West:

- An investment for compliance and new thermal and electrical systems and for new technologies for the regulation of € 25,062,000 to be paid by the private individual;
- A reduction of the current historical expenditure for electricity and gas utilities and for the maintenance of buildings of € 1,499,212 for each year for ten years;

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	• The construction of a single control room for all the buildings from which to manage monitoring and regulating the installations of 13 buildings distributed within a radius of 100 km • The activation of 75 operators, technical and operational for a ten-year duration. • A reduction in atmospheric emissions equivalent to the reduction of 6,500 vehicles circulating on the road.
Constraints	*What are the challenges/Barriers encountered in applying the good practice/case study?* The greatest difficulty is to form a group of public technicians who have the necessary skills to handle a complex problem such as that of the EPC contracts. The group of technicians of the North West USL has been formed over the years, starting in 1988, when the Viareggio hospital was built with innovative criteria.

BEST PRACTICE/ CASE STUDY No 2	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	"Behavioral change in Greve in Chianti" in the formula of public initiative by the municipality of Greve in Chianti, Tuscany, Italy
Best Practice/ Case Study Type	☐ Relative training and capacity building programs
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	2019 - 2020
Financial Sources	Public partnership
Name of promoter organization	*Which organization promotes this initiate?* Municipality of Greve in Chianti
Countries/ Regions (if applicable) in the initiative	Municipality of Greve in Chianti, Tuscany, Italy
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* https://www.comune.greve-in-chianti.fi.it

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URL of the practice	*Where can one find the good practice on the Internet?* *https://www.lanazione.it/firenze/cronaca/il-comune-di-greve-in-chianti-lancia-rebus-progetto-pilota-antispreco-1.5718940* *https://www.gazzettinodelchianti.it/greve-in-chianti/lenergy-team-del-comune-di-greve-abbatte-i-consumi-e-diventa-un-modello-di-pratiche-virtuose/* *http://met.provincia.fi.it/news.aspx?n=352565*
Best Practice/ Case Study Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* The Municipality of Greve in Chianti has always shown interest in improving the energy performance of its buildings, participating in call and courses aimed at this purpose. In Tuscany, 23 managers and technicians employed by public authorities were trained in the framework of the cycle of meetings "We Save energy" that took place in autumn 2019. The focus was on behavioral change and on means for planning, implementing and monitoring energy efficiency renovation works. The Local Council of Greve in Chianti (Tuscany – Italy) took part in these events and showed interest in putting in practice the learning achieved thanks to the cycle of meetings, with a pilot project launched in March 2020. Changes related to behaviour took place and were monitored between the 2nd and the 31st of March 2020.
Best Practice/ Case Study Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter.*

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	The Greve in Chianti Energy Team was formed between the technicians and employees working in a palace where the technical services are based. The Energy team was involved in the pilot action and assessed the status of the entire building comparing consumption related to March 2020 to March consumption of the previous five years. The consumption of electricity was studied by the energy team in the years from 2015 to 2019, cross-referencing the data with the external temperatures, since many consumption are due to electric heaters. Following the study of consumption, the Energy Team proceeded with a detailed examination of the energy waste detectable in the building, proposing to the workers how to avoid them. Signs were installed, meet-ups and technical meetings were held that accompanied all employees for the entire duration of the project.
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* Consumption decreases from 2015, 1939 KWH, to 2020, 1286 kWh. Thanks to the change in behavior, improved behaviour of building users led to savings amounting to 11,55% compared to 2019 (1286 kwh versus 1454 kwh) and 33,68% (1286 kwh compared to 2015, 1939 kwh). Following the results of the pilot, at regional level, an official document signed by the Regional Minister for Environment confirmed their interest in considering these outcomes in preparation for the 2021-2027 programming period. In Greve in Chianti, the pilot action was included in a broader framework of investments to be planned, implemented and monitored taking the Rebus learning into consideration. Thanks to the pilot, the Local Council of Greve improved their measures to make their buildings more efficient, save energy and contribute to the fight against climate change. This included the constructions of two biomass power plants; the

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	replacement of the windows of the municipal building; the executive project for the roofing and insulation of the municipal swimming pool and the executive project to make a local school more energy efficient. Following the successful test with their local offices, the Local Council of Greve has joined an Erasmus plus project (CAPABLE) on behavioural change led by Friends of the Earth involving their employees in training activities. According to the Mayor Paolo Sottani "The ability of employees to accompany the structural interventions we have begun in this new phase with their virtuous behaviour will allow us to take full advantage of the investments we have planned to replace windows and better insulate our schools and offices".
Constraints	*What are the challenges/Barriers encountered in applying the good practice/case study?* The greatest difficulty was in giving objective tools to the workers, who used for example the electric heaters, with the measurement of the actual temperature in the rooms. In short, it was a question of fighting some bad habits that had taken root over time, showing that it was not an insurmountable sacrifice.

BEST PRACTICE/ CASE STUDY No 3	
Items to answer	**Answers / Short explanation**
Items to answer	**Answers / Short explanation**
Case study title	COHOUSING SANGIORGIO - FERRARA
Type of case study	☐ Private construction
Specify the field of application of the initiative	☐ Building sector
Practice period (time frame)	Investment in 2015
Financial sources	Sources from private investment

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Name of the sponsoring organization	Rizoma Architetture
Countries / regions (if applicable) of the initiative	Sangiorgio - Ferrara
Study URL	*Where can I find good practices on the Internet? (https://www.construction21.org/italia/case-studies/h/cohousing-sangiorgio---ferrara.html)*
Case study description	*What is the context (initial situation) and the challenge to be faced? What is the goal? Provide a brief description of the good practice addressed.* The COHOUSING SANGIORGIO was created after a careful evaluation of the services, green areas, the road network, cycle paths and transport systems in the southern area of Ferrara: the choice fell on a plot of 3500 square meters located about 2 km from the Estense Castle, located in the historical center of Ferrara. In the lot located along the river Po di Primaro, there was a greenhouse and some buildings in a poor state of conservation, for which the demolition was carried out, while the land was reclaimed. The cohousing building is spread over three floors, has an area of 820 square meters and hosts 7 families, for each of which a specific project has been made as a result of a participatory planning process. The structure of the building was built with X-LAM wood panels, both the perimeter walls and the inter-floor and roof slabs. All the materials used, with the exception of the cement for the foundations and the screeds, are natural and recyclable, mainly wood derivatives such as the thermal insulation of the coat, 20 cm thick, and of the roof, high density wood fiber and 24 cm thick. The south-facing solar pitch houses more than 100 square meters of photovoltaic panels, capable of producing over 15 kw. Clean energy is connected to the heat pump which produces hot and cold sanitary water, used for heating and cooling which takes place thanks to the radiant floor panels. Each real estate unit is equipped with controlled mechanical ventilation with a dehumidification system, able to clean and completely change the internal air 4 times a day. The windows are made of wood and have a value lower than Uw = 1.1 w / mqk, they are externally shielded by wooden

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	sunshades or adjustable aluminum slats. The expected consumption of the building is less than 10 KWh / sq m, placing the building in CLASS A + with values of the Net Zero Energy Building. A second structure of 130 square meters houses the garages and is detached from the main building by a lot on which a second residential intervention will be built.
Case study methodology	*Describe the methodology used to address the initial problem and lead to a positive result and ultimately to the good practice / case study. How the good practice / case study contributed to an innovation for the topic in question.* The project was carried out with private funds without the use of other grants (public, other financiers, etc.), therefore entirely self-financed by the owners. The project involved the construction of a compact building on three floors, with plaster finish and wood cladding, wooden windows and adjustable metal sunshades. The metal roof with three pitches, one of which is entirely photovoltaic. Once the civil works have been completed and the properties have been sold, the owner is responsible for the maintenance of the technical infrastructure and energy management services. The goal at the beginning of the project was to share a choice of life and time management, aimed at energy saving and reuse of all construction materials, as well as sharing in the choices of construction technology, interior spaces and finishes. The participatory project allowed all families to build their own dream to satisfy their own needs and that of the other components of cohousing.
Critical success factors	*Describe the main benefits of the initiative (significant results, functionality, replicability).* COHOUSING SANGIORGIO is an avantgarde complex that has used all possible solutions to achieve high energy performance. The SANGIORGIO cohousing was designed after a careful analysis of the project site. It is built with natural and recyclable materials and reaches the energy efficiency class A + (energy consumption below 10 kW / h sqm per year)

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	thanks to the thermal insulation made with wood fiber panels and the photovoltaic system on the roof. The cohousing could be an off-grid building: it has no connections to the natural gas network, wastewater treatment is provided on site and there is a wastewater collection system of 10,700 liters. The first phase cohousing building has a timber frame with X-LAM panels, is a compact three storey building and its shape has been designed to protect the windows from the sun during the summer months. The design solutions applied to COHOUSING SANGIORGIO made it possible to make an important investment in energy savings. It has become a project prototype also used in other Italian realities
Constraints	*What are the challenges / barriers encountered in applying the case study?* A very important challenge was to sell a product on paper before its realization and to respect the preventive costs without adding an additional burden to buyers while maintaining a high performance standard. Another very important challenge was represented by the bureaucracy and permits which in some cases slowed down the work schedule.

Slovenia

BEST PRACTICE/ CASE STUDY No 1	
Elements to be answered	**Answers/Brief Explanation**
Best Practice/ Case Study Title	Please provide the title of the Best Practice/Case study SOLAR POWER PLANT ON CCIS VET CENTER ROOF
Best Practice/ Case Study Type	☐ Relative training and capacity building programs ☐ **Financial support mechanisms for public buildings renovations** ☐ Technical capacity instruments available for public buildings renovations ☐ Other tools (please specify):
Specify the sector where the initiative is applied	☐ Construction sector ☐ **Building Sector**

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	☐ Other (please specify):
Period during which the practice has been carried out (timeframe)	The investment will be commissioned in 2020 and is expected to run for 25 years, with the first 14 years belonging to the investor (public company GEN-I), owned by the State of Slovenia, and the next 11 years belonging to the Chamber of Commerce and Industry, which has made the roof of its education centre available for the investment. In line with the ownership period, the period during which the monthly amount from the production of the solar power plant' can be used to reduce electricity consumption also runs.
Financial Sources	Specify the funding programme (if applicable) /
Name of promoter organization	Gospodarska zbornica Slovenije (GZS engl. CCIS) https://eng.gzs.si/
Countries/ Regions (if applicable) in the initiative	SLOVENIA
Contact details	Chamber of Commerce and Industry of Slovenia - CCIS Chamber of Construction and Building Materials Industry of Slovenia – CCBMIS Dimičeva street 13, SI-1504 Ljubljana, SLOVENIA zgigm@gzs.si 0038615898246 www.gzs.si/zgigm
URL of the practice	https://www.gzs.si/mediji/Novice/ArticleId/77869/soncna-elektrarna-na-strehi-zgradbe-gzs https://www.gzs.si/mediji/Novice/ArticleId/77869/soncna-elektrarna-na-strehi-zgradbe-gzs https://www.gen-i.si/novice-in-mediji/son%C4%8Dna-elektrarna-na-strehi-najve%C4%8Djega-predstavnika-slovenskega-gospodarstva/
Best Practice/ Case Study Description	What is the context (initial situation) and challenge being addressed? Organization green transformation and switch to more renewable energy source for electricity.

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	What is its objective? Lower monthly sums for electrical power of GZS organization Provide a short description of the good practice being addressed. The Investor: GEN-I (as the contracting party) https://gen-i.si/en/ The Client/Customer (as the contracting party): Chamber of Commerce and Industry of Slovenia (engl. CCIS, slov. GZS) https://eng.gzs.si/ The Manager and user of the client's property: The Chamber of Commerce and Industry of Slovenia – Institute for business education https://www.cpu.si/?lang=en Main funds: investment was made by GEN-I (public company) Size of the investment: not being public Technical detail of the energy investment: The projected annual electricity production from solar power plant is estimated at 125,525 kWh Location: Kardeljeva ploščad 27 a, Ljubljana Suppliers: solar panels BISOL (Slovenian company -panel producer) 
Best Practice/ Case Study Methodology	Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the

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	good practice/case study contributed to an innovation for the subject matter. **The solar power purchase agreements (PPA) - - shortly "SPPA" or "solar PPA"** A solar power purchase agreement (PPA) is a financial agreement where a developer arranges for the design, permitting, financing and installation of a solar energy system on a customer's property at little to no cost. The developer sells the power generated to the host customer at a fixed rate that is typically lower than the local utility's retail rate. This lower electricity price serves to offset the customer's purchase of electricity from the grid while the developer receives the income from these sales of electricity as well as any tax credits and other incentives generated from the system. PPAs typically range from 10 to 25 years and the developer remains responsible for the operation and maintenance of the system for the duration of the agreement. At the end of the PPA contract term, a customer may be able to extend the PPA, have the developer remove the system or choose to buy the solar energy system from the developer.
Critical Success Factors	Describe the key benefits of the initiative (significant outcomes, functionality, replicability) The long-term partnership will allow the chamber an easy transition to a carbon-free society. With the GEN-I energy contracting, the investment will ensure savings from electricity supply and guaranteed prices for the duration of the contracting. By optimizing the cost of electricity, they will become the owners of a renewable source with which they will optimize their electricity bills and secure part of their electricity from clean solar energy. Both the guaranteed price for green energy and the lower dependence on the volatility of the electricity market are additional benefits that the Chamber will receive. Today, PPA's are a key driver in the widespread deployment of utility-scale solar projects over the world. While there are trade-offs and varying risks among the types of power purchase agreements, a solar PPA requires no capital investment, carries no maintenance costs, and locks in

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	energy prices for up to 25 years. Renewable energy PPAs put clean energy into the electric grid, and the offtaker owns all the environmental benefits associated with its portion of the project. This is great news in a volatile energy market and for buyers looking to meet renewable energy and sustainability goals.
Constraints	What are the challenges/Barriers encountered in applying the good practice/case study? we may not use a solar power plant until the second half of its lifetime, when it is likely be less efficient. You may be able to save more with other financing options than with a solar plant PPA or a solar lease. Are you asking yourself whether a solar lease or a solar PPA is right for your business? It is important that you consider all the solar financing options available and get several quotes from different installers. Buying a solar system outright or taking out a solar loan will give you the best savings in the long run, and you can benefit from solar incentives and rebates. You should only consider solar leasing or a solar loan PPA if you do not have the wherewithal to buy a solar system or do not qualify for a solar loan. In this case, solar leasing and solar PPAs might be the best way for you to go solar.

BEST PRACTICE/ CASE STUDY No 2	
Elements to be answered	**Answers/Brief Explanation**
Best Practice/ Case Study Title	Please provide the title of the Best Practice/Case study ECO FUND GRANTS AND SOFT LOANS FOR ENVIRONMENTALLY FRIENDLY INVESTMENTS IN THE PUBLIC SECTOR (BUDGET USERS)
Best Practice/ Case Study Type	☐ Relative training and capacity building programs ☐ **Financial support mechanisms for public buildings renovations** ☐ Technical capacity instruments available for public buildings renovations ☐ Other tools (please specify):
Specify the sector where the initiative is applied	☐ Construction sector

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	☐ **Building Sector** ☐ Other (please specify):
Period during which the practice has been carried out (timeframe)	Continuously from 1994
Financial Sources	Specify the funding programme (if applicable) Based on public law.
Name of promoter organization	Gospodarska zbornica Slovenije (GZS engl. CCIS) https://eng.gzs.si/
Countries/ Regions (if applicable) in the initiative	SLOVENIA
Contact details	Chamber of Commerce and Industry of Slovenia - CCIS Chamber of Construction and Building Materials Industry of Slovenia – CCBMIS Dimičeva street 13, SI-1504 Ljubljana, SLOVENIA zgigm@gzs.si 0038615898246 www.gzs.si/zgigm
URL of the practice	https://www.ekosklad.si/javni-sektor https://www.ekosklad.si/informacije/o-skladu/poslovni-nacrt/rebalans-poslovnega-in-financnega-nacrta-eko-sklada-slovenskega-okoljskega-javnega-sklada-za-leto-2022 https://www.ekosklad.si/javni-sektor/novica/nova-javna-poziva-eko-sklada-namenjena-obcinam-oziroma-lokalnim-skupnostim https://ekosklad.si/javni-sektor/pridobite-spodbudo/objava/javni-poziv-90sub-snesls21-nepovratne-financne-spodbude-lokalnim-skupnostim-za-skoraj-nicenergijske-stavbe
Best Practice/ Case Study Description	
Best Practice/ Case Study Methodology	Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the

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	good practice/case study contributed to an innovation for the subject matter. **Calls issued for public sector organizations 2022** The national public organization, EcoFund, offers loans to legal entities at an interest rate of three-month EURIBOR + 1.3% in active public calls for credit for environmental investments, and to municipalities at an even more favourable interest rate of at least three-month EURIBOR + 1.0% for the same type of investment, and even at three-month EURIBOR + 0.0% for investments in the construction of nearly zero-energy buildings owned by municipalities, and other energy efficiency and renewable energy measures in buildings. The EcoFund also offers loans to legal entities at a rate of three months EURIBOR + 0.0% for investments in the construction of nearly zero-energy municipal buildings, and even at three months EURIBOR + 0.0% for investments in the construction of nearly zero-energy municipal buildings, and other measures for the efficient energy use and renewable energy sources in municipal and municipal energy efficiency and renewable energy sources. In view of the changing interest rates, the first step is to offer municipalities a fixed rate in addition to the variable rate, thus creating a more predictable environment for borrowing and making environmental investments which are legally required and have very long payback periods or are mainly a cost. The subsidised interest rates will be covered by the funds raised under the ZURE Act http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO8136. ECO-FUND is also launching a call for proposals for grant financial incentives to local communities for nearly zero-energy buildings. The subject of the call for proposals are non-repayable financial incentives for basic self-governing local authorities for new investments in the construction of nearly zero-energy buildings owned by municipalities in the territory of the Republic of Slovenia. The reduction of the energy required for the operation of the buildings is ensured by coordinated measures to achieve high energy efficiency in the building envelope and in the building technical systems, with the energy required being largely generated from renewable

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	sources on or near the site. Near-zero energy buildings offer low long-term operating and maintenance costs, a high quality working and living environment, a longer life cycle and lower environmental burdens. Thanks to an integrated approach to design, optimisation of energy efficiency and renewable energy measures on site, efficient project management, supervision and implementation, public funds are managed rationally and buildings meet the EU's recognised criteria for sustainable, low carbon footprint construction. Increasing the use of natural resources, renewable energy sources and improving the energy efficiency of buildings also reduces excessive PM10 air pollution and improves ambient air quality, contributing to the objectives of a low carbon and circular economy and increasing resilience to the impacts of climate change. The purpose of the call for tenders is to promote the sustainable construction of new nearly zero-energy buildings of general social interest, residential buildings for special social groups and public administration buildings, which are classified as: - 12610 Buildings for culture and entertainment, - 12620 Museums, archives and libraries, - 12630 Buildings for education and scientific research, - 12640 Buildings for health care, - 12650 Buildings for sport, - 11301 Residential buildings with sheltered housing, - 11302 Residential buildings for other special social groups, - 12201 Public administration buildings. The right to a non-repayable financial incentive can only be granted for a new investment. The start of implementation of the measures shall be deemed to be the start of the construction, craftwork and installation works, as evidenced by the municipality's invoices for those works.
Critical Success Factors	Describe the key benefits of the initiative (significant outcomes, functionality, replicability) Without supporting these green investments Slovenian green transition of the society will not be possible.
Constraints	What are the challenges/Barriers encountered in applying the good practice/case study?

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	Limited budget per year, funds have to be spent before the end of the year for a specific call. Calls are a little different each year and also changed when legislation is changed. Not related call with seismic safety (these construction works are not part of this organization call). Good management principles must also be applied when planning the energy renovation of buildings. This means carefully examining the needs and requirements, the possible technical solutions and their long-term cost aspects, so as to design a financially sustainable combination of measures. This may include repair of minor damage, prevention of waterlogging due to ingress of floor moisture or rainwater, static reinforcement and earthquake-resistant strengthening, and, of course, interventions on the building envelope and systems to improve energy efficiency. As responsible building owners, we need to be aware that in some cases other measures are more necessary and more important for the sustainability of the building.

BEST PRACTICE/ CASE STUDY No 3	
Elements to be answered	**Answers/Brief Explanation**
Best Practice/ Case Study Title	Please provide the title of the Best Practice/Case study CAPACITY BUILDING TRAINING OFFERED WITHIN THE PROJECT IP CARE4CLIMATE
Best Practice/ Case Study Type	☐ **Relative training and capacity building programs** ☐ Financial support mechanisms for public buildings renovations ☐ Technical capacity instruments available for public buildings renovations ☐ Other tools (please specify):
Specify the sector where the	☐ Construction sector ☐ **Building Sector** ☐ Other (please specify):

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initiative is applied	
Period during which the practice has been carried out (timeframe)	2019-2026
Financial Sources	Specify the funding programme (if applicable) LIFE+ programme
Name of promoter organization	Gospodarska zbornica Slovenije (GZS engl. CCIS) https://eng.gzs.si/
Countries / Regions (if applicable) in the initiative	SLOVENIA
Contact details	Chamber of Commerce and Industry of Slovenia - CCIS Chamber of Construction and Building Materials Industry of Slovenia – CCBMIS Dimičeva street 13, SI-1504 Ljubljana, SLOVENIA zgigm@gzs.si 0038615898246 www.gzs.si/zgigm
URL of the practice	https://www.care4climate.si/sl/o-projektu https://www.care4climate.si/en https://www.care4climate.si/sl/dogodki https://www.care4climate.si/sl/dogodki/vsi-dogodki/ciljno-usposabljanje-za-upravljanje-z-energijo-v-stavbah https://www.care4climate.si/sl/dogodki/vsi-dogodki/sejem-megra-%E2%80%93-dejavnosti-gradbenega-instituta-zrmk https://www.care4climate.si/sl/dogodki/vsi-dogodki/ciljno-usposabljanje-za-

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	upravljanje-z-energijo-v-stavbah https://www.care4climate.si/_files/1919/Upravljanje_energija_stavbe_marec_2023_Final_v_0.pdf https://www.care4climate.si/sl/dogodki/vsi-dogodki/sejem-megra-%E2%80%93-dejavnosti-gradbenega-instituta-zrmk https://www.care4climate.si/sl/dogodki/vsi-dogodki/mednarodni-hekaton-hack4climate
Best Practice/ Case Study Description	Boosting greenhouse gas emissions reduction by 2020 with a view to 2030 – promoting sustainable transport, energy efficiency, renewable energies and sustainable, climate protecting land use in the transition to low carbon society. Developing new knowledge and competences is a very important factor in the process of making a sustainable change and the transition to a low-carbon society, which is substantiated by international reports, analyses, strategies and documents. Therefore, Article 6 of the UN Framework Convention on Climate Change, Article 10 of the Kyoto Protocol and Article 12 of the Paris Agreement unanimously encourage education, training, providing information and raising awareness of the public about climate change. Even though most of the stakeholders are well aware of the urgency to adopt measures to mitigate climate change and support them, there is often a lack of motivation to take actual action as well as a lack of implementation capacities, especially a lack of interdisciplinary knowledge and competences in the key areas for the implementation of measures and projects. Therefore, it is essential to develop integrated and adapted training and education courses, as well as relevant mechanisms for monitoring progress in key areas. Accordingly, we cannot disregard the importance of the system that would facilitate individual's lifestyle changes and help them in their transition to a more sustainable way of life.
Best Practice/ Case Study Methodology	Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter. CAPACITY- BUILDING Short On national construction fairs – short (few hours) workshops , seminars, presentations , consultancies (Fair MEGRA, DOM) Long In premises of partners of the project: 3 days long capacity building for contractors

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	1 day long capacity building for construction inspectors 1 day hecaton for youth 1 day expert excursion

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Activity ID	Description of activity
C1.3	Raising awareness on climate change and its implications for Slovenia and the promotion of good practices of reducing GHG emissions
C2.1	Creation of a training plan for the transition to a low-carbon society and the establishment of a national qualification platform
C2.2.	The preparation, implementation and monitoring of targeted training courses in the field of energy efficiency, renewable energy and green energy technologies and the validation of acquired skills and knowledge
C2.3	Community engagement for the transition to a low-carbon society
C2.4	Capacity building on low-carbon society concepts in higher education
C2.5	Capacity building for public administration for the transition to a low-carbon society and the implementation of participatory processes
E1	Notice boards, the CARE4CLIMATE website and Layman report
E2	Communication strategy and visual identity of the project
E3	Networking with other LIFE and non-LIFE projects
E4	Media work, PR, disseminating results to wider public
E6.1	Engaging young adults about voluntary climate change mitigation actions
E6.2	Hackathon series on climate change mitigation
E6.3	Engaging target audiences on energy efficiency
E7.1	Informing policymakers and engaging at the EU level
E7.2	Up-take of the project results by students of political ecology and other students for their projects and dissemination of results
E7.3	International conference on GHG reduction achievements and path forward

https://www.care4climate.si/en/project/project-areas-and-activities/raising-awareness-and-capacity-building-for-the-transition-to-a-low-carbon-society

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Critical Success Factors	Describe the key benefits of the initiative (significant outcomes, functionality, replicability) Without supporting these capacity building programme also Slovenian green transition of the society will not be possible. Contractors, craftmen lack skills and budget for such cVET activities and active inclusion /participation.
Constraints	What are the challenges/Barriers encountered in applying the good practice/case study? Participants and their time, how to attract and actively engage participants for free training. Access of capacity building materials is restricted to participants only and not available for broader public, although it is funded by the EU.

BEST PRACTICE/ CASE STUDY No 4	
Elements to be answered	**Answers/Brief Explanation**
Best Practice/ Case Study Title	Please provide the title of the Best Practice/Case study RESOLUTION ON STRENGTHENING EARTHQUAKE SAFETY "LET'S GET AHEAD OF THE EARTHQUAKE"
Best Practice/ Case Study Type	☐ Relative training and capacity building programs ☐ Financial support mechanisms for public buildings renovations ☐ Technical capacity instruments available for public buildings renovations ☐ **Other tools (please specify):**
Specify the sector where the initiative is applied	☐ Construction sector ☐ **Building Sector** ☐ Other (please specify):
Period during which the practice has been carried out (timeframe)	2022
Financial Sources	Specify the funding programme (if applicable) ministry funds

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Name of promoter organization	Gospodarska zbornica Slovenije (GZS engl. CCIS) https://eng.gzs.si/
Countries/ Regions (if applicable) in the initiative	SLOVENIA
Contact details	Chamber of Commerce and Industry of Slovenia - CCIS Chamber of Construction and Building Materials Industry of Slovenia – CCBMIS Dimičeva street 13, SI-1504 Ljubljana, SLOVENIA zgigm@gzs.si 0038615898246 www.gzs.si/zgigm
URL of the practice	https://www.gov.si/novice/2022-03-03-ministrstvo-za-okolje-in-prostor-pripravilo-resolucijo-o-krepitvi-potresne-varnosti/
Best Practice/ Case Study Description	The Ministry of Environment and Spatial Planning (MESP), with the aim of improving earthquake safety, has, on the initiative of the older buildings in use and the responsibility towards citizens, prepared a draft Resolution on strengthening earthquake safety (the Resolution) for public discussion. The Resolution establishes an active policy to strengthen the earthquake safety of the building stock in the Republic of Slovenia, with which the country contributes to reducing the consequences in the event of an earthquake event. Weaker earthquakes occur frequently in the Republic of Slovenia, while strong earthquakes are less frequent. People's preparedness or awareness of the seismic vulnerability of the buildings in which they live is not good enough, and they tend to focus on other aspects of the suitability of their dwellings, such as appearance and energy efficiency, rather than on basic health and life protection. In recent years, a lot of money has been invested in the energy renovation of buildings. We recognise that the system should be complemented by a holistic renovation of buildings, including a healthy living environment and good structural condition of the building. A structurally sound building is one of the key conditions that protect human life and health. Most of the buildings that have been renovated so far have not been comprehensively addressed, and have not been subject to, among other things, seismic analyses and, consequently, any necessary structural strengthening.

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	In the coming years, it will be necessary to increase the proportion of buildings for which computational seismic resistance assessments have also been carried out and which are thus ready to undergo comprehensive renovation, provided that adequate sources of funding are secured. Strengthening earthquake resistance will increase the safety of the building stock and thus directly the safety of the population of the Republic of Slovenia. The resolution requires the preparation of implementation documents - action programmes to reduce the risk of earthquakes.
Best Practice/ Case Study Methodology	Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter. The main objectives of the Resolution are: Raise awareness: the public will be made aware of the risks posed by earthquakes and the measures that can be taken to reduce these risks to an acceptable level, which will contribute to raising awareness of the importance of earthquake safety; 1.Establish a systemic framework: a legal and systemic framework is put in place to regulate this area, ranging from possible adjustments to the normative framework to allow for more effective action, to the establishment of a central approach to the management and steering of a long-term strengthening project; 2.Train and educate: building professionals will be provided with additional skills. The aim is to provide designers with quality training to adequately address the seismic risk of buildings and to train building consolidation contractors in the use of appropriate building materials and methods; 3.Review the building stock: an expert survey of relevant existing buildings will be carried out and their level of vulnerability will be determined, which will form the basis for further action; 4.Securing funding: the possibility of securing funding for the renovation of buildings at risk of earthquake or for the reduction of earthquake risk will be explored; 5.Undertake the renovation of buildings at risk: design and implement the renovation of buildings at risk of earthquakes,

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	identifying priorities, using public funds wisely and renovating key buildings first; 6.Ensuring adequate quality of consolidation: expert support in the preparation and implementation of renovation.
Critical Success Factors	Describe the key benefits of the initiative (significant outcomes, functionality, replicability) Funds for its implementation and continuity of measures! Its approval and actual start and actors implementing it.
Constraints	What are the challenges/Barriers encountered in applying the good practice/case study? Complexity of the resolution goals.

BEST PRACTICE/ CASE STUDY No 5	
Elements to be answered	**Answers/Brief Explanation**
Best Practice/ Case Study Title	Please provide the title of the Best Practice/Case study LOANS TO FINANCE PROJECTS FOR THE COMPREHENSIVE ENERGY RENOVATION OF PUBLIC BUILDINGS (EE)
Best Practice/ Case Study Type	☐ Relative training and capacity building programs ☐ **Financial support mechanisms for public buildings renovations** ☐ Technical capacity instruments available for public buildings renovations ☐ Other tools (please specify):
Specify the sector where the initiative is applied	☐ Construction sector ☐ **Building Sector** ☐ Other (please specify):
Period during which the practice has been carried out (timeframe)	2019-2023
Financial Sources	Specify the funding programme (if applicable) **SID Bank (SID – Slovenska izvozna in razvojna banka, d.d., Ljubljana) is a promotional development and export bank 100% owned by the Republic of Slovenia. With our banking**

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	and insurance services we promote sustainable development and improve the competitiveness of the Slovene economy. SID Bank was established in 1992 as Slovene Export Corporation (Slovenska izvozna družba, d.d., Ljubljana) with the aim of providing insurance and financing of export for Slovene companies. Since then we have grown and evolved in step with development of Slovene economy. SID Bank is the parent company of SID Bank Group, which provides its customers a wide range of services for promotion of competitiveness in international business cooperation. The operations of SID Bank are based on a clear strategy and business model deriving from long-term development documents of the European Union and the Republic of Slovenia. The Republic of Slovenia provides long-term stable operations for SID Bank to carry out its transactions and activities in order to pursue the long-term development orientations of the Republic of Slovenia and the European Union.
Name of promoter organization	Gospodarska zbornica Slovenije (GZS engl. CCIS) https://eng.gzs.si/
Countries/ Regions (if applicable) in the initiative	SLOVENIA
Contact details	Chamber of Commerce and Industry of Slovenia - CCIS Chamber of Construction and Building Materials Industry of Slovenia – CCBMIS Dimičeva street 13, SI-1504 Ljubljana, SLOVENIA zgigm@gzs.si 0038615898246 www.gzs.si/zgigm
URL of the practice	https://www.sid.si/en/about/about-sid-bank https://www.sid.si/obcine/posojila-za-financiranje-projektov-celovite-energetske-prenove-javnih-stavb-ee https://www.energetika-portal.si/javne-objave/objava/r/posojila-za-financiranje-projektov-celovite-energetske-prenove-javnih-stavb-ee-1213/
Best Practice/ Case Study Description	SID Bank's tender offers the following financing conditions: Credit from €100,000 to €15,000,000.

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	Financing up to 100% of eligible costs, including VAT. A contractual interest rate equal to the sum of the 6-month EURIBOR reference rate calculated on SID Bank's assets and a fixed mark-up. The fixed mark-up is the weighted value of the mark-up of the ECP assets, which is 0%, and the mark-up of the SID Bank's assets (the mark-up is composed of a maximum of 62,5% of the mark-up of the ECP assets and a minimum of 37,5% of the mark-up of the SID Bank's assets). Credit period from 5 to 25 years. Moratorium on principal repayments up to 1/2 of the loan maturity. Monthly repayments. Credit without collateral or only with a pledge on the object of financing. Other terms and conditions in accordance with SID Bank's programme and terms and conditions. You can obtain a loan if -The project consists of a set of measures for the comprehensive energy renovation of public buildings owned and used by public sector entities. -The project is designed in accordance with the applicable regulations and standards of the building profession and international and national guidelines for improving the energy efficiency of buildings. -The eligible costs of the project are in accordance with the Ministry of Infrastructure's Manual on eligible costs for the measure of energy renovation of public sector buildings. -The project will be implemented in the Republic of Slovenia. -The project has already started before the application is submitted but has not yet been completed.
Best Practice/ Case Study Methodology	Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter. You can also obtain a credit where the eligible costs of the project are already part-financed by a public grant from the competent ministry, provided that the credit does not finance

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	more than 100% of the eligible costs of the project and that there is no double financing. De minimis aid scheme: The scheme is based on a de minimis aid scheme, which may not exceed EUR 200 000 over three calendar years, or EUR 100 000 if the borrower is engaged in commercial road haulage. The de minimis aid is expressed in the form of a reduced mark-up on the basis of European Cohesion Fund resources. **We advise and finance:** We will provide funding under the credit for projects for the comprehensive energy renovation of public buildings, the eligible costs of which are defined in accordance with the Ministry of Infrastructure's Handbook on eligible costs for the measure for the energy renovation of public sector buildings, and include: -the cost of external services (consultancy, engineering, etc., up to a maximum of 12% of the total cost excluding VAT), -construction costs and purchase of equipment, -information and communication costs (maximum 1% of total costs excluding VAT), wage costs.
Critical Success Factors	Describe the key benefits of the initiative (significant outcomes, functionality, replicability) Credits from other foreign banks. Public sector financial capacity.
Constraints	What are the challenges/Barriers encountered in applying the good practice/case study? Credit period The term of the loan, including any moratorium on repayment, shall be a **minimum of five (5) years and a maximum of twenty-five (25) years. The principal repayment moratorium shall last for up to 1/2 of the term of the credit.** The repayment method shall be monthly. Interest rate The contractual interest rate shall be equal to the sum of the reference rate of 6-month EURIBOR, calculated on SID Bank's

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	assets, and a fixed mark-up. The fixed mark-up shall be the weighted value of the mark-up of the ECI assets of 0 % and the mark-up of the SID Bank assets (the mark-up shall consist of a maximum of 62,5 % of the mark-up of the ECI assets and a minimum of 37,5 % of the mark-up of the SID Bank assets).

Poland

BEST PRACTICE/ CASE STUDY No 1	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	"Green school" in the formula of public-private partnership in Piastów
Case Study Type	Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	Investment in 2019 - 2020, public-private contract period until 2041
Financial Sources	Public-private partnership
Name of promoter organization	Association of Municipalities Polish Network „ Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Piastów, Poland
Contact details	Piastów City Council 11 Listopada 2, 05-820 Piastów Email: sekretariat@piastów.pl Tel. 22 770 52 07
URL of the practice	In Polish: https://www.ppp.gov.pl/przebudowa-i-rozbudowa-liceum-ogolnoksztalcacego-im-adama-mickiewicza-oraz-budowa-hali-sportowej-w-piastowie-/
Case Study Description	The redevelopment and extension of the High School premises was a particularly important investment for Piastów. The city authorities are striving to make it more and more resident-friendly, becoming both a good place to live and providing an adequate range of top-quality public services. Education is one of the most important focuses of the local authority. The

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	redeveloped school building is set to become a permanent part of the sustainable building concept, benefiting owners, users and residents through reduced operating costs, improved indoor air quality and reduced energy consumption. This site is intended to be environmentally friendly and energy efficient.
Case Study Methodology	The initiative was implemented within public-private partnership (PPP), i.e. on the basis of a long-term agreement specifying the division of tasks and risks between the public entity and the private partner. Within the joint implementation of the project, the private partner committed to finance and execute construction works in the form of the reconstruction and extension of the Adam Mickiewicz High School and the construction of a sports hall together with landscaping and infrastructure. Once the civil works have been completed, the private partner is responsible for providing technical infrastructure maintenance and energy management services. The investment has not been subsidised by any additional sources. According to the financial assumptions of the project, the public entity will pay remuneration to the private partner in the form of a so-called availability fee. The final structure of the remuneration has been established in the course of the competitive dialogue.
Critical Success Factors	The modernised building and the new facilities make full use of renewable energy sources and meet high energy efficiency ratings. A PV system for electricity production and heat pumps for heat production were used, as well as modern ventilation with an air filtration system. The financing scheme applied in Piastów made it possible to carry out the investment, which otherwise - due to the numerous expenses of the local government - would not have been implemented in such a short time. PPP allows for a significant increase in the efficiency and effectiveness of public service delivery, even if there is shortage of the necessary public resources, so it is worth considering when planning the development of cities and municipalities. Polish Government Policy on the Development of Public-Private Partnerships (to 2030) assumes the use of PPP as an alternative, equivalent to traditional methods of

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	implementing public tasks. This document has defined the barriers to wider use of PPP in Poland, and as a result of this diagnosis, it includes specific actions aimed at eliminating these barriers. Ministry of Funds and Regional Policy coordinates and strongly supports application of the PPP formula: provides opinions on PPP projects, offers legal, financial and technical counselling at an expert level, introduces legal changes facilitating the implementation of projects in the PPP formula, maintains a database of PPP projects, creates guidelines, model agreements, collections of good practices, conducts free stationary, online and e-learning trainings, specialist workshops, webinars, national and foreign study visits.
Constraints	A major challenge is the preparation of an appropriate contract regulating the obligations of the parties. Ensuring appropriate provisions relating to, for example, increase of materials prices and the way in which the facility will be managed by the private party until the end of the contract. A serious problem for every local authority is the need to repay the value of the investment (construction and assembly works) and the repayment of the loan taken out for this investment by the private partner, which is passed on to the local authority (especially with the constant rise in interest rates and inflation). The city did not have any influence on the private partner's negotiations with the banks whose promise (promesa) was the basis for the negotiations with the public entity, related to the implementation of the task. It would be very helpful for the development of the PPP projects to include some form of guarantee, and some preference of the State Treasury for local governments (discounts in VAT, fixed interest rate on credit, etc.), which would give an additional incentive to undertake tasks in the form of PPP.

BEST PRACTICE/ CASE STUDY No 2	
Best practice Title	Implementation of thermal retrofitting in the municipality of Radzionków with PPP partner.
Best practice Type	Financial support mechanisms for public buildings renovations

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Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	Investment in 2010, public-private partnership agreement until 2020
Financial Sources	Public-private partnership
Name of promoter organization	Association of Municipalities Polish Network „Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Radzionków, Poland
Contact details	Radzionków Town Hall Meczenników Oświęcimia 42, 41-922 Radzionków Email: zamowienia@radzionkow.pl Tel. 32 388 71 06
URL of the practice	In Polish: https://www.ppp.gov.pl/kompleksowa-termomodernizacja-budynkow-oswiatowych-gminy-radzionkow-/
Best Practice Description	Rising energy costs and the poor condition of public buildings led to the Radzionków municipality's decision to enter into a public-private partnership. An important reason for this decision was the lack of financial resources that the municipality could use to cover this task. In the case of choosing the different financing scheme than PPP, the municipality could only afford to carry out a comprehensive thermal retrofitting of a maximum one object in a period of 2 to 3 years, because of its budget constraints. Whereas as a part of the PPP agreement, Siemiens carried out thermal modernisation of five educational buildings in the Radzionków municipality: Fr. L. Wrodarczyk Gymnasium, Primary and Junior High School Complex, General Secondary School, Primary School No. 2 and Kindergarten No. 3, as well as the implementation of modernisation measures to reduce the costs of thermal energy and utilities in the listed above public buildings. Within 10 years, the Radzionków Municipality repaid the thermal retrofitting investment from the savings made in the

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	modernised buildings. A report completed one year after the thermal modernisation was carried out confirmed that savings of as much as 55% had been achieved in relation to previous thermal energy consumption.
Best Practice Methodology	The technical condition of the buildings was far from satisfactory, which threatened the health and lives of its users. The buildings also had a high level of energy consumption, resulting in excessively high maintenance costs. Prior to the initiation of proceedings a project feasibility study was carried out in-house. In order to do this, data from the heat, gas and electricity invoices of the individual facilities was used. The technical condition of the buildings was examined in-house, using the reports of the relevant inspections (Sanitary Inspection Authority, fire brigade, building law inspections). In addition, for the proper preparation of the PPP procedure, the market for potential contractors was researched and analysed. Potential risks were assessed in-house, and potential utility consumption savings after thermal retrofitting were estimated. For the thermal modernisation project, a cost calculation of the task was made and costs were estimated without specifying the sources of financing. A public contract was prepared and won by Siemens. As part of the work, the company carried out thermal modernisation of the buildings, including the following: • Insulation of walls and roofs • Replacement of heat substation • Modernisation of lighting • Heat and lighting management system The contractor was also tasked with maintaining the facilities to an appropriate standard after thermal modernisation for a period of 10 years.
Critical Success Factors	The choice of a private partner ensured that the investment was made in full scope; within less than 15 years (expected municipality investment period). Moreover no own funds were required, and that the investment costs did not add to the public debt. As a result of this investment 2,042 GJ of heat energy and 30,800 kWh of electricity was saved, which reflected in the additional municipality profit of 119, 671 PLN.

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BEST PRACTICE/ CASE STUDY No 3	
Best practice Title	Energy retrofitting of the *Juliusz* residential estate in Sosnowiec
Best practice Type	Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	Investment in 2018, duration of PPP contract until 2026
Financial Sources	Public-private partnership
Name of promoter organization	Association of Municipalities Polish Network „Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Sosnowiec, Poland
Contact details	Municipal Facility for Housing Resources ul. Partyzantów 10A 41 – 200 Sosnowiec E-mail: mzzl@mzzl.pl Tel. 32 290 18 62
Website	In Polish: https://www.ppp.gov.pl/energomodernizacja-budynkow-na-osiedlu-juliusz-w-sosnowcu-/
Best Practice Description	The buildings on the *Juliusz* estate were built more than 50 years ago. Their poor technical condition and non-ecological heat sources used to heat them significantly contributed to air pollution. The city of Sosnowiec, wishing to improve the living comfort of its residents, decided to take action using the PPP (Public-private partnership) model. As part of the project in the *Juliusz* estate, 22 multi-family residential buildings and a nursery building were thermally modernized (for about PLN 8.5 million), hot water systems were provided to the flats, premises previously used as coal depots were renovated, and a district heating network was brought to all 500+ apartments.
Best Practice Methodology	The purpose of the project was the energy retrofitting of 22 residential buildings and a nursery building owned by Municipal Property Resources Company, located on the area

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	of the *Juliusz* estate in Sosnowiec. The project consisted of the construction and management of an internal central heating and hot water network, integrated into a single automatic thermal management control system, together with their thermal upgrading. The project was implemented under the provisions of the PPP Act and was based on the sharing of tasks and risks between the Public Entity and the Private Partner. The complete project documentation was developed. Upon completion of the investment, the Private Partner was assumed to be responsible for the management of the internal heating and hot water network integrated into a single (automatic) thermal management control system for a contract period of 8 years with the opportunity of extension. All technical, legal and financial assumptions for the implementation of the project, as well as the future conditions of energy management, were subject to arrangements as part of the competitive dialogue.
Critical Success Factors	As part of the investment, 967 coal-fired stoves were removed, which contributed to the reduction of harmful emissions, on an annual basis: • CO_2 – 8 033 tonnes, • Dust – 81 tonnes, • SO_2 – 36 tonnes, • NOx – 15 tonnes, • CO – 19 tonnes. Two years after the retrofit, the estate used 3.5 times less energy, the associated savings were 24% greater than these guaranteed by the contractor. After a full two heating periods, it can be unequivocally stated that replacement of heating sources and introduction of thermal energy management system, being a result of the energy modernization work carried out, has brought tangible benefits. Year after year there has been noted a reduction in the demand for thermal energy, a significant reduction in heat losses, lower costs for hot water preparation, and thus lower heat bills, as well as improved living conditions and comfort of residents.

BEST PRACTICE/ CASE STUDY No 4

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Best practice Title	Using the ESCO model for energy efficiency in Sosnowiec
Best practice Type	Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	Investment carried out in 2013, contract with ESCO company until 2023
Financial Sources	ESCO contract, city budget.
Name of promoter organization	Association of Municipalities Polish Network „Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Sosnowiec, Poland
Contact details	Sosnowiec Town Hall Aleja Zwycięstwa 20 41 – 200 Sosnowiec Email: um@um.sosnowiec.pl Tel. 32 296 06 00
URL of the practice	In Polish: https://pfrdlamiast.pl/baza-miejskich-innowacji/sosnowiec-wykorzystanie-formuly-esco-dla-efektywnosci-energetycznej-w-sosnowcu.html
Best Practice Description	A problem in Sosnowiec's educational institutions was the costly and inefficient heating system for school and kindergarten buildings. This resulted in their high operating costs, with temperatures in classrooms being either too high or too low at the same time. Therefore it was decided to undertake a complete energy refurbishment of the heating and lighting systems of school, nursery and day-care buildings in cooperation with a private entity in an ESCO formula. Renovation of 87 buildings took just eight months and resulted in a reduction of 30.83% in heating energy consumption and 25.17% in lighting electricity use. Within 10 years from the completion of the investment in 2013, Sosnowiec is expected to save as much as PLN 23 million on heat and energy consumption in school facilities, which will also partly cover the cost of the investment.
Best Practice Methodology	Sosnowiec City Hall was struggling to cope with the high cost of heating in educational buildings. However, despite the high financial expenditure to provide heat in schools and kindergartens, an outdated and inefficient energy

	management system made that the premises either too hot or too cold, which in both cases made it difficult for children to learn. The city undertook, in cooperation on the basis of a public-private partnership in ESCO model, the technical modernisation of 87 school and kindergarten buildings, with a ten-year savings period guaranteed in the contract. As part of an investment being carried out in Sosnowiec, a remote temperature monitoring and control system had to be built from scratch. The public contract was awarded following a competitive dialogue procedure. During the eight months following the signing of the contract, the contractor carried out an audit of the heating and lighting systems of Sosnowiec's teaching facilities, on the basis of which baseline year assumptions were prepared. Moreover he installed heating control systems and replaced lighting with energy-efficient one in 38 facilities. In addition, the Navigator energy monitoring system was introduced, which allows the overall energy consumption to be viewed remotely and, in facilities with a room system installed, the temperature in each classroom to be regulated.
Critical Success Factors	The modernisation work carried out has made it possible to eliminate the problem of poor thermal comfort in classrooms. Importantly, the contractor guaranteed a reduction in energy consumption in the 87 buildings of up to 30.83 percent for heat energy and 25.17 percent for electricity used for lighting. CO_2 emissions will also be reduced by 5220 metric tonnes per year compared to the baseline. Another important, tangible effect of the investment is the amount of 23 million PLN that Sosnowiec is expected to save on heat and energy consumption in schools, kindergartens and nurseries over a 10-year period. From the money saved, the city will pay the contractor 17 million PLN in monthly instalments to cover the project costs, and the remaining savings of 6 million will be credited to the city budget over a period of 10 years. In addition, the city received white certificates for the investment, i.e. energy efficiency certificates which can be sold on the Polish Power Exchange. This was made possible due to demonstrating energy savings on the basis of an energy efficiency audit carried out prior to the project and to financing the project without any subsidies.
Constraints	A challenge was that the schools could not have been closed for the duration of the project implementation, which made it

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	necessary to take the additional protective measures to avoid compromising the safety of pupils and teachers. The heating infrastructure in Sosnowiec's educational facilities is now largely upgraded, but it was degraded at the beginning of investment, which had created the additional barrier to the project's implementation.

BEST PRACTICE/ CASE STUDY No 5	
Best practice Title	Financing the modernisation of multi-family residential buildings and public buildings with municipal bonds - Walbrzych.
Best practice Type	Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	Bond issue in 2016 and 2017
Financial Sources	Revenue bond issue – city bonds
Name of promoter organization	Association of Municipalities Polish Network „Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Walbrzych, Poland
Contact details	Walbrzych City Hall Pl. Magistracki 1 58 – 300 Wałbrzych Email: um@walbrzych.eu Tel. 74 665 51 00
URL of the practice	In Polish: https://www.pb.pl/walbrzych-emituje-nietypowe-obligacje-940062 ; https://www.funduszeeuropejskie.gov.pl/strony/o-funduszach/rewitalizacja/modelowe-dzialania-pilotazowe/finansowanie-rewitalizacji/ ; https://urzad.um.walbrzych.pl/fr/node/3812 ; https://um.walbrzych.pl/fr/node/4362

Best Practice Description	In the past, Walbrzych, with a population of more than 140,000, was one of the most important mining and industrial centres in Lower Silesia. After 1990, as a result of the transformation, the mines and related industry began to be closed down. In addition to jobs in the coal industry, Wałbrzych also lost many important functions, which resulted in a decreasing number of inhabitants. Many municipal, public buildings were abandoned and their condition was deteriorating gradually, what had a significant impact on their maintenance and energy bills. The Municipality of Wałbrzych was one of the first in the country to adopt the *Municipal Revitalisation Programme of the City of Wałbrzych for 2016-2025*, based on the new Act on Revitalisation. This programme includes, among other things, measures to improve the energy efficiency of public buildings. In order to finance these actions, City of Walbrzych has issued municipal bonds, obtaining the necessary funds to carry out the investment. It was the first municipality in Poland which used this financial tool.
Best Practice Methodology	Municipal (revenue) bonds are issued by local governments and municipal companies. The funds raised from such bonds issue must be used to finance a specific purpose. In 2016, the city of Walbrzych raised 24.7 million PLN from investors. In 2017, after another issue, PLN 36 million was collected. The bonds were issued to carry out renovations in residential buildings and public buildings. The work included the renovation of administrative buildings of the City Hall, MOPS (municipal social welfare centre) building, the reconstruction of a building for the Children's Home (orphanange) and the thermal modernisation of municipal buildings. These are just some of the activities funded with this tool which made it possible to raise the necessary funds in an innovative way to achieve defined goals. The city of Walbrzych is a pioneer in the country in using the financing instrument of municipal bonds.
Critical Success Factors	All planned projects have been successfully implemented. Information on saved energy and fees are being analysed on an ongoing basis by the Municipality of Walbrzych and the company managing municipal buildings (MZB Sp. z o.o). In the case of the majority of implemented investments in

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	relation to residential buildings, the City has no influence on the amount of energy and fees saved by the users.

BEST PRACTICE/ CASE STUDY No 6	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	Hybrid financing for thermal modernisation of public buildings in Zgierz
Case Study Type	Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	Building Sector
Period during which the practice has been carried out (timeframe)	The investment was carried out from 2017 to 2019, the duration of the public-private agreement: until 2034
Financial Sources	Hybrid financing, a combination of EU funding and PPP
Name of promoter organization	Association of Municipalities Polish Network „ Energie Cités”
Countries/ Regions (if applicable) in the initiative	City of Zgierz, Poland
Contact details	Zgierz City Hall Jana Pawła II Square 16, 95 - 100 Zgierz E-mail: e-urzad@umz.zgierz.pl Tel. 42 714 31 12
URL of the practice	In Polish: (https://www.ppp.gov.pl/termomodernizacja-budynkow-oswiatowych-miasta-zgierza/ and https://www.ppp.gov.pl/termomodernizacja-budynkow-oswiatowych-miasta-zgierza-/
Case Study Description	The project aimed to carry out deep energy retrofitting of 24 buildings in the Zgierz city area and, as a result, to increase their energy efficiency. It was a hybrid project, implemented in the public-private partnership model. The implemented actions and investments contributed to the rationalisation of energy use and production in the buildings included in the project, resulted in reduced energy consumption and contributed to the reduction of air pollutants responsible for the phenomenon of so-called low emissions and greenhouse gas emissions, among others, through: insulating the buildings, replacing windows, external doors, heating sources,

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	internal lighting and carrying out all accompanying works which were part of the renovation and modernisation works.
Case Study Methodology	In the adopted model, the project was implemented on the basis of a PPP agreement, which covers the design, construction, financing and operation of the investment. The public entity, on the other hand, in accordance with the agreement, makes its own contribution in the form of co-financing received from the funds of the Regional Operational Programme of the Łódzkie Voivodeship for 2014-2020. The remaining part will be repaid over subsequent years as remuneration to the private entity in the form of an availability fee. It should be emphasised that the EU funds will be transferred to the private partner if, in accordance with the PPP agreement, it properly documents the incurring of expenditure indicated in the project application. Unlike the other models, in this case the investment expenses, which is reimbursable by EU funds, are covered by the private partner. This model, as the only one among the forms of combining a PPP project with EU co-financing, fully complies with the conditions specified both in the Regulation No. 1303/2013 and in the Act on the Principles of Implementation of Programmes within the Cohesion Policy financed in the financial perspective 2014-2020.
Critical Success Factors	Thanks to the PPP model, the municipality achieved a large improvement in the efficiency of public buildings in a short period of time, which would not have been possible if the municipality had carried out this investment on its own, due to limited budget resources. The buildings have become more energy efficient through the use of, among other things, an energy management system. An average energy saving of 43.5% was achieved for all facilities. The buildings have also become more visually attractive. One additional benefit of the investment was the stirring of the local economy, as the contractor employed local subcontractors who are familiar with the region. No municipality in Poland has carried out a similar investment using hybrid financing, which was a combination of EU and PP funding. Now other municipalities can learn from this example and prepare their investments.
Constraints	The investment was carried out in school, nursery and kindergarten buildings during the school year, and the contractor had to adapt the scope and timing of his work to the hours in which the buildings operated.

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	The method of financing was innovative and required a lot of work and discussions between the parties to prepare the paperwork properly. In particular, it was crucial to establish a payment schedule and keep it updated. It was necessary to take into account the risk of delaying the payment of funding tranches, especially in the context of maintaining financial liquidity - both for the public and the private partner. The construction of the PPP contract itself was also a challenge. Experience has shown that in order to prepare it, it was important not only to use the institutions' own resources, but also the substantive support of dedicated external parties. In particular it is worth taking care of legal services, bearing in mind on the one hand that corporations wishing to realise multi-million investments use the services of specialist law firms, and on the other hand - a correctly conducted pre-implementation analysis and a well-structured PPP agreement largely determine the success of an investment project and reduce the risk of misunderstandings and disputes between the concrating parties. At the same time, bearing in mind that a PPP contract binds the parties for years, it is important to provide structures for constant dialogue and contact between the contracting parties.

Greece

BEST PRACTICE/ CASE STUDY No1	
Best practice Title	Heraklion Archaeological Museum's collections re-exhibited
Best practice Title	☐ Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	Programming period 2007-2013 Project duration 05/2010-11/2015
Financial Sources	European Regional Development Fund, Operational Programme 'Competitiveness and Entrepreneurship'

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Name of promoter organization	Heraklion Archaeological Museum, Ministry of Culture and Sports
Countries/ Regions (if applicable) in the initiative	Municipality of Heraklion, Island of Crete
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* Managing Authority General Directorate of Antiquities & Cultural Heritage Archaeological Services Ministry of Culture and Sports Address: 20-22, Bouboulinas Street 10682, Athens, Greece Tel.: +30 213 1322666, 1322284 https://www.culture.gr/en/ministry/SiteP... Beneficiary Archaeological Museum of Heraklion 2 Xanthoulidou str., 71002 Heraklion, Crete Tel:+302810279000 Email:amh@culture.gr https://heraklionmuseum.gr/
URL of the practice	*Where can one find the good practice on the Internet?* https://vimeo.com/heraklionmuseum https://www.culture.gov.gr/en/ministry/SitePages/viewyphresia.aspx?iID=1376 https://www.iefimerida.gr/news/336159/eyropaiko-vraveio-sto-arhaiologiko-moyseio-irakleioy-gia-ekthemata-kai-syghroni
Best Practice Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* The Heraklion Archaeological Museum is one of the largest and most important museums in Greece, and among the most important museums in Europe. It houses representative artifacts from all the periods of Cretan prehistory and history, covering a chronological span of over 5,500 years from the Neolithic period to Roman times. The singularly important

	Minoan collection contains unique examples of Minoan art, many of them true masterpieces. It is rightly considered as the museum of Minoan culture par excellence worldwide. The first display room was built in 1904-1907 over the remains of the famous Venetian monastery of Saint Francis, next to the Hounkiar Djami. The antiquities' collection was moved there after the addition of the second room in 1908. The construction of the current museum began in 1937 on plans by architect Patroklos Karantinos. During the Second World War the museum's antiquities were at great risk, but they were saved thanks to the exertions of Professor Nikolaos Platon. Platon supervised the re-exhibition of the museum's treasures, and the museum opened its doors to the public in 1952. The display illustrated the chronological development of Minoan civilization, the history of archaeological research and of the great discoveries on Crete during the early twentieth century (Knossos, Phaistos and Malia palaces etc), and the prevalent theories on Aegean Prehistory. In last few years new treasures and products were found during the extended archaeological excavations on the island and this brought into the light the necessity of the museum expansion and re-arrangements of collections. The technical conditions, display cases, humidity, ventilation, were far from satisfactory for the artifacts themselves and for the visitors.
Best Practice Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to innovation for the subject matter.* The Museum suffered from several serious environmental shortcomings in its extensive gallery spaces. The renovation and extension of the museum provided an opportunity to introduce measures to control temperature and humidity, which in many areas relied on natural ventilation, despite the poor air quality found in the urban environment of the island. The buildings also had a high level of energy consumption, resulting in excessively high maintenance costs. A PPP was prepared. Prior to the opening of the procedure, a series of studies were carried out:

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	- Energy analysis - Environmental design - Lighting design (including natural lighting) - Ventilation system and Humidity measures - Replacement of electrical, security and telecommunications systems. The **new exhibition philosophy** was organized according to modern museological standards. and combines a chronological axon with an enriched thematic narration. Spread across 27 galleries, the 8 000 artifacts are now arranged into thematic units integrated into a chronological narrative spanning seven millennia, from the Neolithic to the Roman period. **Digital media applications** launched on large video screens and touchscreens comprise thematically diverse interpretative video displays and interactive applications with 3D models as well as digital games, which offer an emotive approach to the exhibits. Investing in another parameter of the museum's vision to become a site for social inclusion and education, a specialized team has designed educative programs on iPads. **Strategies for audience development** were also enforced, including a series of musical concerts and other recreation events, specialized talks, thematic guided tours by archaeologists, temporary exhibitions, and heritage-based activities that promote connecting the past with the present. The PPP increased transparency in the use of finds, on-time delivery and enforces the monitoring system. Additionally, make sure that it meets all relevant legal, ethical, safety, equality, environmental, and planning requirements.
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* The extension and renovation of the museum **double the overall floor area and increases gallery space by 50%.** The impact is two-fold: it allows a larger part of the museum's collection to be on display and improves the back-of-house facilities including conservation workshops and the provision of improved archive space.

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	The height of the new extension was strictly governed by the height of the existing listed buildings which surround it. In order to maximize floor to ceiling height in the galleries, a solution was devised which pulled the services away from the ceilings and into the walls, **a design that became known as 'fat-walls'**. **Ventilation to the galleries** is provided from top-floor plant rooms with supply and extract ducts dropping vertically down the fat walls. The choice of a private partner ensured that the **investment was made in full; meets modern museological standards, and no other funds were required**. The Archaeological Museum of Heraklion has been awarded the EMYA European Museum of the Year Special Commendation in the annual competition of the European Museum Forum (EMF) in 2017. https://www.europeanforum.museum/en/
Constraints	*What are the challenges/Barriers encountered in applying the good practice/case study?* The integration of modern technologies into a building designed at the beginning of the last century, when such a provision was probably unthinkable, is an even more difficult task, a fact that is amply demonstrated by the experience of the first attempt to modernize the Heraklion Museum in 1985.

BEST PRACTICE/ CASE STUDY No 2	
Best practice Title	Green Roof of the municipality's Town Hall in Gournes-Hersonissos
Best practice Title	☐ Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	Programming period 2013 - 2015 Start date: June 2015 End date: June 2015
Financial Sources	European Regional Development Fund (ERDF)

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Name of promoter organization	Municipality of Hersonissos, Island of Crete
Countries/ Regions (if applicable) in the initiative	Gournes, Municipality of Hersonissos, Island of Crete
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* Municipality of Hersonissos, Gournes 70014 Crete Tel : +30 2813 404600 Email: dimos@hersonisos.gr www.hersonisos.gr Maria Apostolaki, Environmental Engineer Sofia Yfanti, Environmental Engineer
URL of the practice	*Where can one find the good practice on the Internet?* http://www.sedalp.eu/download/dwd/events/maira/05_presentazione%20E2STORMED.pdf https://www.up2europe.eu/european/projects/?q=E2STORMED https://projects2014-2020.interregeurope.eu/rebus/good-practices/ https://bora94.hu/web_h/wp-content/uploads/2018/10/Green-Roof.pdf
Best Practice Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* In June 2015 the roof of the old Town Hall of Hersonissos in Gournes has been transformed into a Mediterranean garden as it is hosting a prototype green roof covering a surface of 30m2. Essentially, with the term **"GREEN ROOF**", we call a roof that has been transformed into a garden and which is developed in controlled conditions with many environmental and economic benefits. During the implementation of the E2STORMED European project that deals with urban stormwater sustainable management, the Municipality of Hersonisos invested 4.000€ to implement the green roof project on the Town Hall. The Town Hall is an old and bad maintained building. Its roof

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	covers a surface of 30m2. Following the successful green roof implementation on the Treasury building of the Ministry of Financial Affairs in Athens – Greece, the project has been designed as a pilot application of a green roof to demonstrate the building insulation and landscape enhancement. The applied technique creates an environment with minimum to none management requirements and easily replicable to Mediterranean areas.
Best Practice Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter.* The design uses an innovative technique designed for Mediterranean climatic conditions, which constitutes of a **light-weight construction** – Greece, especially Crete has the particularity of frequent earthquake activity - even when wet that can keep water and maintain vegetation. This technique is a combination of **geo-membranes, soil and geocellular pillows,** which form the base of the green roof and upon which the plants, that are endemic aromatic species, are planted. The green roof is self-maintained, demonstrates significant energy saving, it has improved comfort conditions for the building users and is also used by the Municipality to disseminate the idea of energy efficiency to the public. The **short time of implementation (one month)**, as well as the **low number of human resources (one agronomist and two workers),** are among the positive elements of the Gourne's Green Roof. The Roof has improved comfort condition for the building users and is also used by the Municipality **to disseminate the idea of energy efficiency to the public, and as study case for the school education.**
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* • **Increase energy efficiency**: improvement of comfort conditions inside the building regarding heating and cooling • **Positive cost-benefit ratio:** approx. 20% reduction in the building's electricity consumption •**Plant photosynthesis** produces more oxygen in the atmosphere and **reduces carbon dioxide**

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	• **Raise awareness**: demonstration site that supports dissemination and public awareness on energy efficiency measures • Innovation: the combination of materials and measures that results in a low budget, self-maintained, and energy efficiency • **short time from design to implementation** • **easy to replicate to Mediterranean countries/regions**
Constraints	*What are the challenges/Barriers encountered in applying the good practice/case study?* The project was easily implemented without any difficulties.

BEST PRACTICE/ CASE STUDY No 3	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	Modernization & Completion of the Building Facilities of the Athens Conservatoire
Case Study Type	☐ Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	Programming Period 2014-2020
Financial Sources	European Structural and Investment Funds (ESIF) Ministry of Development and Investments
Name of promoter organization	Athens Conservatoire (Odeion Athinon) Performing Arts Educational institution

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Countries/ Regions (if applicable) in the initiative	Athens, Attiki, Greece
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* Rigilis & Vasileos Georgiou B΄17-19, 106 75, Athens Tel : 210 7240673 info@athensconservatoire.gr
URL of the practice	*Where can one find the good practice on the Internet?* https://kentrotexnon.athensconservatoire.gr/
Case Study Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* The completion and redevelopment of the Athens Conservatoire complex is a particularly significant investment for the Arts and the city of Athens. Its premium location at the heart of Athens and its iconic "Bauhaus" building, make it a unique and enviable cultural hub for various contemporary arts and cultural events. The building is designed by the famous Greek architect Ioannis Despotopoulos who holds a prominent position within the modernist architectural movement of the 1930s and the Bauhaus movement in which he actively participated. His work for the Athens Conservatoire is the only completed part of an ambitious large-scale cultural complex commissioned in 1959 by the then government for Athens, for which he earned the top architectural prize of its time. But due to economic and political circumstances the initial plan has never been completed. The main challenges were to respect the initial architectural plan and add new multifunctional venues and providing top -quality cultural and educational services. Education is one of the most important focuses of AC as in the late years is playing as significant role not only for Studies of classical music, but also Jazz, Drama, Dance, and Research and Documentation. The redeveloped AC building is set to become a permanent part of the sustainable building concept, benefiting to a growing number of students (approximately 700), teachers, guest lectures and visitors, through reduced operating costs, improved indoor air quality, architectural lighting, acoustics, and reduced energy consumption. The site is environmentally friendly and respects the urbanistic plan of the **historical triangle, Byzantine Museum, Aristotle's Lyceum, and National Portrait Gallery.**

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Best Practice Study Methodology	*Describe the methodology used to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to innovation for the subject matter.* The technical condition of the complex was far from satisfactory. Only the first floor and some ground-floor spaces were completed, poorly maintained, and few in daily use for teaching purposes. The buildings also had a **high level of energy consumption**, resulting in excessively **high maintenance costs**. Prior to the opening of the procedure, a feasibility study was carried out in-house. A series of actions and detailed studies were carried out, by experts related to **the modernization of lighting, acoustics, insulation of walls and heat and lighting management system.** The technical conditions of the complex were examined in-house using data and reports of the relevant inspections. The initiative was implemented as a public-private partnership (PPP), based on a **long-term agreement**. The AC is the higher public Musical Education Institution, bus it is Board has a legal status of non-profit since it's foundation on in 1871. When the current management of the Athens Conservatory took over the reins of this public benefit institution at the beginning of 2013, only 50% of the unfinished building was functional. The new administration set from the beginning as its goal the completion of the building and its modernization. The first step in this direction was the commissioning of a preliminary study for the redevelopment and the overall sustainability of the building, which was supported by a donation from the Association of Friends of Music and prepared by the Thymios Papagiannis & Co. This study led to a long-term and ambitious planning of the completion of the building in **three successive stages**, the first of which, the completion and modernization of the cultural infrastructure of the Athens Conservatory, was finally included in 2022. Additional studies were funded by Private Institutions, such as the Schwarz Foundation, the Stavros Niarchos Foundation, the Baroness Nina von Maltzahn, the Leventis Foundation, the Bodossaki Foundation, the Horn Foundation, and the Kostopoulou Foundation. Complete project documentation was produced. All technical, legal, and financial assumptions for the implementation of the project, as well as the future conditions of energy and infrastructure management, were subject to arrangements as part of the ongoing competitive dialogue. The renovated complex covers: • 13.000 sq total surface

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	• 5.300 sq completion spaces • 4 floors • 34 teaching classes • 1 auditorium (600 places) • 1 theatrical venue "Black Box'' • 6 events spaces • 1 Café/restaurant • 1 shop
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* -The modernized building and the new facilities **meet high energy efficiency ratings.** -The choice of **private partners ensured that the investment was made fully and in due time.** -Complete project documentation was produced -Ongoing competitive dialogues between all members involved
Constraints	*What are the challenges/Barriers encountered in applying the case study?* Due to the unfinished status of AC, the main challenge was to complete the original plan and facilities, **respecting the unique image of the complex as a ''Bauhaus'' prototype**. -To remove non-eco-friendly old construction elements and replace them with **new one's energy efficient.** -Remodelling the acoustic level and the music resonance purposes. -**Transformation of old facilities to new multipurpose spaces** covering the actual educational and cultural **needs of a modern educational hub**.

BEST PRACTICE/ CASE STUDY No 4	
Elements to be answered	**Answers/Brief Explanation**
Case Study Title	Renovation of the Benakio Institute: spearheading phytopathological research in Greece
Case Study Type	☐ Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	two phases: A and B covering programming periods 2007-2013 & 2014-2020 Project duration: 01/2013 - 12/2020

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Financial Sources	European Regional Development Fund Attica - ERDF/ESF (Thematic Objective: Strengthen research, technological development & innovation)
Name of promoter organization	Benaki Phytopathological Institute (BPI)
Countries/ Regions (if applicable) in the initiative	Kifissia, northern suburbs of Athens, Greece
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* **Managing Authority** Ενδιάμεση Διαχειριστική Αρχή Περιφέρειας Αττικής (Interim Managing Authority of Attica Region) **Beneficiary** Benaki Phytopathological Institute 8 Stefanou Delta Street, Kifissia 14561 , Athens, Greece Tel.: +30 210 8180207, 210 8180211
URL of the practice	*Where can one find the good practice on the Internet?* www.BPI.gr - BENAKI PHYTOPATHOLOGICAL INSTITUTE Παραδόθηκε ανακατασκευασμένο το Μπενάκειο Φυτολογικό Ινστιτούτο στην Κηφισιά - Ypodomes.com
Case Study Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* One of the most historic institutes in the field of plant protection and farmers' health in Greece, has completely renovated its infrastructure, opening new horizons in its operation. The Benaki Phytopathological Institute (BPI) was founded in 1929 (is a Legal Entity of the Public Sector, donated by the National Benefactor Em. Benakis). It operates under the supervision of the Hellenic Ministry of Rural Development and Food and was the first of its kind in Greece to specialize primarily in plant pathology or the study of plant diseases caused by environmental factors, pathogens, or other infections. At the same time, in collaboration with the Natural History Museum of the same name, it documents the evolution of species for the country's flora.

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	Historically, it cooperates closely with the Ministry of Rural Development and Food to ensure the safety and quality of agriculture in Greece and assesses the risks of agricultural chemicals and their impact on human health and the environment. In the last decades, his research projects have also focused on the natural environment, in collaboration with the Ministry of Environment. An institution with a history needs to adapt to new times and challenges. Therefore, its renovation was necessary and why those responsible have planned actions for its upgrading. Thus, the renovation of the buildings of the BPI provided for the complete upgrading of its structures and the addition of two basements to its existing facilities in Kifissia - Athens. The project involved the restoration and renovation of five of the original buildings and the redevelopment of the surrounding area. The project aimed to improve the Institute's capacity in applied research in the field of agriculture and environment and to strengthen the link between research institutes and the agricultural sector, and the development of small and larger businesses that contribute to enhancing the safety of the products and food produced.
Case Study Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter.* The project was implemented as a **public-private partnership** (PPP), i.e. on the basis of a **long-term agreement** specifying the division of tasks and risks between the public entity and the private partner. As part of the joint implementation of the project, the private partner undertook the following activities: • Ongoing provision of technical consulting services. • Preparation of a Technical Report on the newly built two-store building of the Institute in Kifissia. • Building delivered upon rectification of deficiencies detected. • Preparation of a **Technical Report on the interventions** required and **the related budget** for the renovation of the building infrastructure, the modernization and completion of the Institute's electromechanical installations, the overall upgrading of its appearance and suggestions for financing the works suggested.

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	• **Overall management of studies and permits** required for the renovation of five older buildings of the Institute and construction of a new building.
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* • The modernised building and the new facilities **meet high energy efficiency ratings.** • The facility's infrastructure was improved, and new, modern equipment acquired. This allowed its researchers to be more productive and boosted its development capacity to meet the needs and requirements of a 21st century scientifical complex. • The project set out to improve the institute's stake in applied research in the field of agriculture and environment and promote links between research institutes and the agricultural sector. It enables the latter to improve its production processes. • The area surrounding the institute's main buildings was renovated as well. • Power supply and network lines that interconnect the laboratories with the basements were installed and secured. • The project helped create 13 new research positions and 23 upgraded research position.
Constraints	*What are the challenges/Barriers encountered in applying the case study?*

BEST PRACTICE/ CASE STUDY No 5	
Case Study Title	Disused historical building in Patras to be renovated
Case Study Type	☐ Financial support mechanisms for public buildings renovations
Specify the sector where the initiative is applied	☐ Building Sector
Period during which the practice has been carried out (timeframe)	Programming period 2014 - 2020 Project duration 06/2016-12/2022
Financial Sources	Cohesion Fund

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	Transport infrastructure, environment, and sustainable development - ERDF/CF
Name of promoter organization	Special management Authority Ειδική Υπηρεσία Διαχείρισης Ε.Π. ΥΜΕΠΕΡΑΑ Municipality of Patras
Countries/ Regions (if applicable) in the initiative	
Contact details	*What is the address of the people or the institution to contact if you want more information on the best practice/case study?* ΕΜ – ΥΡΕΡΕRAA (Special Management Authority (ΕΠ-ΥΜΕΠΕΡΑΑ) 15 Koniari str, 114 71 Αθήνα Tel.: +30 210-6930155 e-mail: ymeperaa@mou.gr https://www.ymeperaa.gr/ Municipality of Patras 108 Maizonos str. 26221 , Patras http://www.e-patras.gr/
Website	*Where can one find the case study on the Internet?* https://pelop.gr/patra-zontantevei-to-palaio-arsakeio-i-istoria-tou-ktiriou/ https://dete.gr/patra-liftingk-sto-arsakeio-prochoroun-oi-ergasies-sto-ktirio-pou-tha-apotelesei-to-neo-dimarcheio/ https://explore.patras.gr/listing/ktirio-arsakeiou/
Case study Description	*What is the context (initial situation) and challenge being addressed? What is its objective? Provide a short description of the good practice being addressed.* The building of Arsakeio was built in 1935, to house the homonymous Girl's School of the Educational Society. The building complex has a P-shaped layout and occupies the building block bordered by four streets, with the configuration of a large outdoor space towards Maizonos Street. Reinforced concrete was

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	used in its construction for the construction of the load-bearing structure, and it has three floors and a basement. Its morphology is simple and serious, following the trends of the interwar architecture of public buildings. Since 2006, the building has been used to host youth festivals, cultural events and other activities such as student elections. Although the building is a protected monument, it was under-utilized and fell into disrepair. The main purpose of this renovation project is to reuse an old public building with municipal activities and services, **energy upgrading, reduce environmental footprint, increase the efficiency of the administration, and reducing operating expenses.**
Case Study Methodology	*Describe the methodology that has been used in order to address the initial issue and lead to a successful outcome and finally to the good practice/case study. In what way has the good practice/case study contributed to an innovation for the subject matter.* The project was funded by EU and carried out by the Municipality and contractors. Before the construction phase studies analysis were designated to achieve the project's main objectives. The work being carried out on the building ensured its structural integrity. Insulation, waterproofing and fire protection were installed, and all interiors and exterior walls were restored to their former glory. Elevators were built in the main stairwells and other features were installed to ensure the building is accessible to the disabled. The old windows frames were removed and replaced by 'Insulating Double Glass', that covers 700sq. With the losses of a building, from the windows to exceed 30% of the total that contributes decisively to the Energy Upgrade of the New City Hall. Renovating both public and private buildings is an essential action and has been singled out in the European Renovation Wave as a key initiative to drive energy efficiency while driving the clean energy and pursue economic growth. The project also includes the configuration of the surrounding area.
Critical Success Factors	*Describe the key benefits of the initiative (significant outcomes, functionality, replicability)* The renovated building is an advantage complex that has used all possible solutions to achieve **high energy performance without compromising its original character.**

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	The municipality achieved a large **improvement in the efficiency of public buildings in a short period of time,** which would not have been possible if the municipality had carried out this investment on its own due to limited budget resources. One additional benefit of the investment was **the stirring of the local economy**, as the contractor employed local subcontractors who are familiar with the region. Also, the Municipality of Patras has improved to **reduce its operating expenses and increase the efficiency of the administration.** It has also provided to its residents and **new multicultural space**. The project **combines the promotion of cultural heritage with the provision of services to residents**. **People will save time** by no longer having to travel as far to access municipal services that were previously scattered around the city. The model of this project can be replicable and adaptable.
Constraints	*What are the challenges/Barriers encountered in applying the good practice/case study?* The construction activities have been slightly delayed recently (08/10/22) for bureaucratic reasons, since the approval for funding has been accepted. This is the approval of the budget for the **extra work included** after the project was first funded, work such as on the building's drainage system and others. Of course, work is also to be carried out in the external, courtyard areas of the Arsakeio, **but this was not included in the original financial budget**. Therefore, they **were not included in the funding, which means that a new budget is needed to complete them.** The municipality is in the process of approving a new allocation of 600,000 euros in order **to fully complete all the works**. Therefore, these works are being implemented **at a slow pace as they cannot be paid for now.**

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