D.T4.4.1 POLICY RECOMMENDATION AND ACTION PLAN

City of Udine, ENEA (Italy)

Version 1
04 2020

Objective of the report

The main objective of this report is to summarize policy recommendations and a strategy in each partner country to pursue for a widespread and homogeneous application of energy efficiency measures in school buildings based on previous activities and bilateral meetings with policy makers to foster the policy implementation.

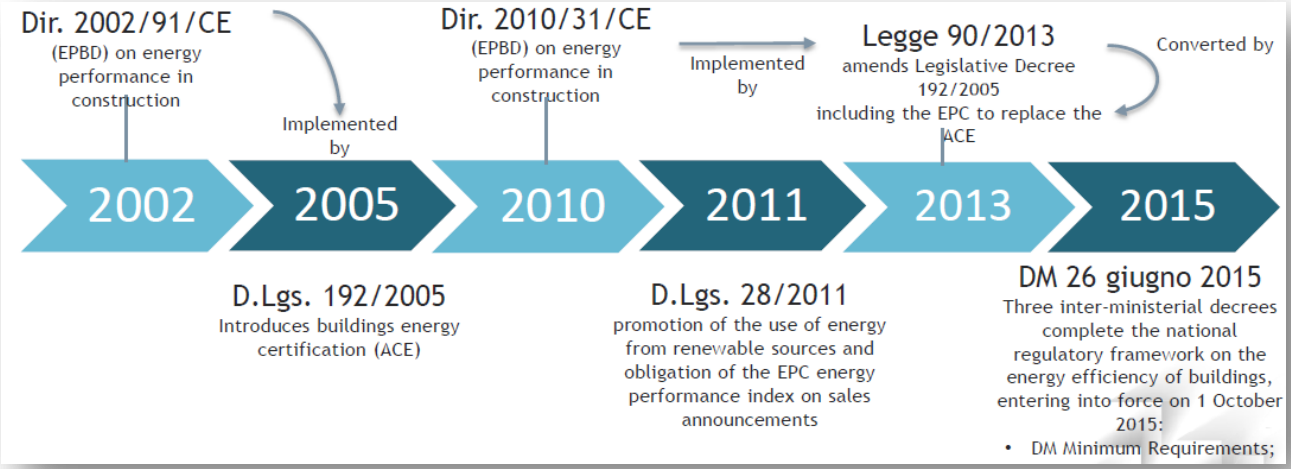
Target Users: *Local authorities, policy makers*

1. Current situation on energy efficiency in public buidlings

1.1. National legislation and provisions for public buildings

As regards the reference legislative framework, in this slide we have summarized the various legislative steps (EU Directives and national transpositions in Italy), regarding the energy performance certificates for buildings.

Figure 1 National legislation on Energy Efficiency and certification in Buildings



Starting from the EU Directives and the Legislative Decrees previously issued, three i*nterministerial* decrees complete the national regulatory framework on the energy efficiency of buildings, coming into force on October 1, 2015:

- DM Minimum Requirements;
- DM Guidelines;
- DM Technical Report.

Finally, the methods for calculating energy performance are regulated by the following standards:

- UNI / TS 11300 parts 1, 2, 3 and 4
- CTI 14/2013
- UNI EN 15193

The term NZEB derives from a specific European Directive, 2010/31 / EU.

In Italy the directive has been implemented through the Ministerial Decree June 19, 2017 amending Legislative Decree 192/2005 introducing, in particular, art. 4-bis which states that «as of 31 December 2018, new buildings used by public administrations and owned by the latter must be designed and built as almost zero energy buildings. From January 1, 2021, the aforementioned provision is extended to all new buildings».

Table 1 National legislation and provisions for public buildings

Provisions of EU directive	National documents and provisions
Article 3: National energy efficiency targets	National legislation on Energy Efficiency (D. Lgs. 102/2014), Italian Report on Energy Efficiency Strategy (PAEE-National Plan on Energy Efficiency, RAEE-Annual Report on Energy Efficiency)
Article 4: Long-term strategy for building renovation	PANZEB-National Action Plan to increase nZEB
Article 5: Exemplary role of public bodies' buildings	D. Lgs. 102/2014
Article 6: Purchasing by public bodies	D. Lgs. 102/2014, D.lgs 50/2016
Article 7: Energy efficiency obligation schemes	D. Lgs. 102/2014, D.M. 26/06/2015
Article 8: Energy audits and energy management systems	D. Lgs. 102/2014
Articles 9-11: Metering; billing information; cost of access to metering and billing information	D. Lgs. 102/2014, D.M. 26/06/2015
Article 14: Promotion of efficiency in heating and cooling	D. Lgs. 102/2014, D.M. 26/06/2015, Rules and Recommendations of Italian Authority for energy
Article 15: Energy transformation, transmission and distribution	Regional Law on Energy Certification (Emilia-Romagna)

The Italian legislation is very broad and specific and covers all the needs in a complete and precise way.

Table 2 Energy Performance of Buildings Directive

Provisions of EU directive	National documents and provisions
Article 3: Methodology for calculating the energy performance of buildings	D.M. 26/06/2015
Article 4-8: minimum energy performance requirements	D.M. 26/06/2015
Article 9: Nearly zero-energy buildings	D.M. 26/06/2015, D. Lgs. 102/2014, Ministerial Decree June 19, 2017
Article 10: Financial incentives	D.M. 26/06/2015, D. Lgs. 102/2014, Financial laws
Article 11-13: Energy performance certificates	D.M. 26/06/2015
Article 14-16: Inspection of heating and air-conditioning systems	D.P.R.16/04/2013 n.74, D.M. 10/02/2014, Law 90/2013, Decree of the Minister for Economic Development 22/01/2008 n. 37

1.2. National Energy Action Plans and other planning documents

The national energy strategy (SEN) required an impetus for the realization of important investments, increasing the trend scenario with additional total investments of 175 billion by 2030, divided as follows:

- 30 billion for gas and electricity networks and infrastructures
- 35 billion for renewable sources
- 110 billion for energy efficiency
- Over 80% of the investments are therefore aimed at increasing the sustainability of the energy system, these are sectors with high employment impact and technological innovation.

Among the quantitative targets set by the SEN:

- energy efficiency: reduction of final consumption from 118 to 108 Mtep with savings of around 10 Mtep by 2030;
- renewable sources: 28% of renewables on total consumption in 2030 compared to 17.5% in 2015;
- reduction of the energy price differential: contain the cost gap between Italian and northern European gas and that on electricity prices compared to the EU average;
- cessation of the production of electricity from coal with an acceleration target to 2025, to be achieved through a precise infrastructure intervention plan;
- rationalization of the oil downstream, with an evolution towards biorefineries and an increasing use of sustainable biofuels and LNG in heavy and maritime transport;
- towards decarbonisation in 2050: compared to 1990, a decrease in emissions of 39% in 2030 and 63% in 2050;
- double investment in clean energy research and technological development: from 222 million in 2013 to 444 million in 2021;
- promotion of sustainable mobility and shared mobility services;
- new investments in networks for greater flexibility, adequacy and resilience; greater integration with Europe; diversification of sources and routes of gas supply and more efficient management of flows and peaks of demand;
- reduction of the energy dependence from abroad from 76% in 2015 to 64% in 2030 (ratio between the import / export balance of primary energy necessary to cover needs and gross domestic consumption), thanks to the strong growth of renewables and energy 'energy efficiency.

1.3. Local and regional legislation and provisions for public building

In Italy, every region has the possibility to legislate on energetic issues. The only constraint imposed by the central administration concerns the fact that regional rules must be the same or more restrictive than national ones. Emilia Romagna regulated with regional laws several aspects related to energy efficiency, according to the following tables:

Energy Efficiency Directive

Provisions of EU directive	**National documents and provisions**	**Regional/local documents and provisions**
Article 3: National energy efficiency targets	National legislation on Energy Efficiency (D. Lgs. 102/2014), Italian Report on Energy Efficiency Strategy (PAEE-National Plan on Energy Efficiency, RAEE-Annual Report on Energy Efficiency)	Regional Energy Plan (Emilia-Romagna)
Article 4: Long-term strategy for building renovation	PANZEB-National Action Plan to increase nZEB	Regional Energy Plan (Emilia-Romagna)
Article 5: Exemplary role of public bodies' buildings	D. Lgs. 102/2014	
Article 6: Purchasing by public bodies	D. Lgs. 102/2014, D.lgs 50/2016	
Article 7: Energy efficiency obligation schemes	D. Lgs. 102/2014, D.M. 26/06/2015	Regional Law on Energy Certification (Emilia-Romagna)
Article 8: Energy audits and energy management systems	D. Lgs. 102/2014	
Articles 9-11: Metering; billing information; cost of access to metering and billing information	D. Lgs. 102/2014, D.M. 26/06/2015	Regional Law on Energy Certification (Emilia-Romagna)
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Article 3: Methodology for calculating the energy performance of buildings	D.M. 26/06/2015	
Article 4-8: minimum energy performance requirements	D.M. 26/06/2015	
Article 9: Nearly zero-energy buildings	D.M. 26/06/2015, D. Lgs. 102/2014	
Article 10: Financial incentives	D.M. 26/06/2015, D. Lgs. 102/2014, Financial laws	
Article 11-13: Energy performance certificates	D.M. 26/06/2015	Regional law Emilia-Romagna

The regulatory framework of Friuli Venezia Giulia in the energy sector is outlined by the regional law of 11 October 2012 n. 19 containing "Regulations on energy and fuel distribution".

The Regional Law (LR) 19/2012 redefines the administrative functions and tasks assigned to the Region, the Provinces and the Municipalities, both in the authorization field, rationalizing the legislation relating to the authorization of renewable source plants and in the planning field defining which are the energy planning.

In summary, the contents of the articles of the regional law concern:

- the provision of the Regional Energy Plan (PER), replacing the one approved in 2007 (art. 5);
- the introduction of the Municipal Energy Document (DEC) as a local energy planning document (art.6);
- the identification of the interventions subject to a single authorization, the contents of the application, the procedure, the times and methods of the procedure (articles 12-15);
- the interventions that can be authorized through Communication to the Municipality and the simplified authorization procedure (Pas) (art. 16);
- the issue of water derivation concessions for hydroelectric plants in the unified procedure (art. 20);
- the municipal computerized cadastre of heating and renewable energy buildings (art. 25);
- the use of renewable sources for the production of energy in buildings (art. 26);
- administrative penalties for installation and operation of plants in the absence of the required authorizations (art. 28);

Table 3 Local and regional legislation

Local / Regional Regulation	Contents
Law on energy, energy efficiency, energy requirements	The regional laws give indications on all the energetic aspects and the minimum requisites to be respected. These indications may be the same or more restrictive than national laws. Not all Italian regions decide to make regional laws, in this case they respect the national legislation.

The Friuli Venezia Giulia Region has approved the new Regional Energy Plan (P.E.R.) with resolution of the Regional Council n. 2,564 of 22 December 2015 which replaces the Energy Plan adopted in 2007 by decree of the President of the Region 21 May 2007, n. 0137 / Pres.

The P.E.R. in particular, it envisages the following initiatives for the buildings sector:

- **10a** Realize and finance an **energy inventory / cadastre of public buildings**, starting from the regional heritage, to establish regional objectives of energy requalification and financing priority of the interventions (art. 5 paragraph 16 of Legislative Decree 102/2014). In parallel, provide for the creation of a computerized regional system of data collection on the regional contributions granted in terms of energy efficiency, energy saving and use of RES and on the energy savings achieved (art.7 paragraph 7 of Legislative Decree 102/2014).
- **10c** Create an **abacus of technical data sheets with the description of "standard interventions" in the field of energy requalification (both for building structures and for plants)** available to public administrations. In this sense, prepare regional guidelines to

encourage and promote the use of GPP (Green Public Procurement) in the P.A. (art. 6 paragraph 9 of Legislative Decree 102/2014).

- **10d** Promote a **training and information program on energy management and energy efficiency**, both in technical and awareness-raising terms, **towards EELLs and schools of all levels, to stimulate behaviors that contribute to reducing energy consumption**.
- **24a** Introduce the **energy diagnosis of existing buildings**, through the establishment of lists of professionals from the professional registers, or ESCo accredited for economic and functional solidity, who carry out a first evaluation free of charge or at a reduced cost, financed by a specific regional fund, and insertion of diagnosis results in regional energy archives.
- **24b** Introduce an **incentive in new and existing buildings to implement an improvement in energy performance**, to install RES plants and micro-plants or to increase supplies from RES, compared to the minimum already established by national obligations. The incentives may be urban and building or targeted financial.
- **25b** Obligation for a **three-year plan for the public administration**, **for the renovation of public buildings** in order to respect the minimum levels of RES, and to incentivize them through an order of priority in the allocation of financial spaces.

1.4. Local action plans for public buildings

As already mentioned in D.T4.4.1, several Italian Municipalities and group of Municipalities have SEAPs/SECAPs according with the Covenant of Mayors initiative framework. Since energy efficiency and RES production on public buildings is a *key-sector* of SEAPs/SECAPs, each Action Plan contains energy planning for public buildings. Additionally, a small number of Italian Municipalities is certified according ISO 50001 International Energy Management System which is closely focused to the energy performance improvement on Municipality assets, including buildings. Moreover, several Municipalities plan the energy requalification of their buildings through PPP and EPC contracts through CONSIP[1] or by structuring public-private partnerships aimed at energy requalification, management and maintenance of the building heritage together with ESCOs.

Table 4 Sustainable Energy Action Plans and other planning documents

Local / Regional Plans	Contents
Does your municipality/region have SEAP or other plans that include energy efficiency targets and policies?	In Italy many Municipalities have SEAPs/SECAPs joined to Regional Energy Plans
Plans for public buildings	SEAPs are very different in the various Italian Municipalities and most of them contain indications on deep renovation and the achievement of nZEB.
Plans for schools	SEAPs do not usually report too specific indications on public buildings but only general indications. Regional plans dictate guidelines on public buildings and on transformation or new construction in nZEB

[1] Central purchasing department of the Italian public administration

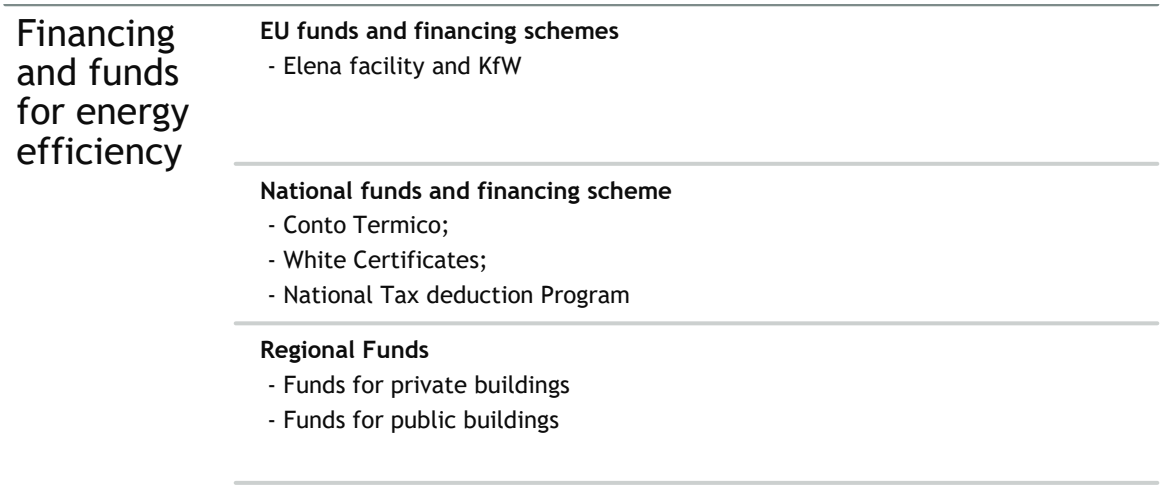
2. National, local and regional measures to stimulate energy renovation of public buildings

Those shown in this chapter are the forms of financing and the funds most used for energy efficiency and energy certification in buildings.

They are divided into different levels of government: European funds (European Investment Bank through the ELENA fund), national funds (incentives and tax deductions), regional funds (for civilians and public administration buildings).

Each of the tools (financial or funds) has its own functioning and certain rules to follow. At European level we are talking about loans with investment leverage effect on energy requalification. At a national level, we are talking about direct incentives (Thermal Account or White Certificates) or tax deductions. On a regional level, direct funds that offset investments related to energy efficiency and building certification.

Figure 2 Financing and funds for building certification and energy efficiency measures



2.1. Financing from regional/local budget

Many Italian regions publish regional calls (usually called POR-FESR - plans for regional development) with which they support both the public and private sectors in order to improve the efficiency of various buildings (condominiums, public buildings, school buildings and public administration offices). The calls make a budget available and the different proposals are evaluated and each one is assigned a score. A ranking of the best projects is created and these are financed until all the economic resources are exhausted.

Table 5 Local and regional government financing regulation - Schools

Local and regional government regulation	Contents
POR-FESR	Plans that support both the public and private sectors in order to improve the energy efficiency

The D.I. 44/2001 decree provides general instructions on the administrative-accounting management for educational institutions e.g. legal entity and autonomy. The financial management of educational institutions in terms of competence is based on criteria of effectiveness, efficiency and economy and conforms to the principles of transparency, annularity, universality, integrity, unity, truthfulness.

2.2. Funding from ERDF

At regional level, CF, ERDF and ESF are the base to finance European regional and urban development through a coherent regional policy over the whole territory. The main objective of these funding opportunities is financing investments or training. Due to low carbon economy is a priority for the European Union and its regional policy, these funds, can be used to finance energy efficiency improvements as well as the use of renewals in our municipalities. The three funds are managed firstly at national level and then at regional or local levels. This means that municipalities can apply for direct grants or soft loans either to the state or the regional governments, depending on the country. Intensity and conditions of the grants depend on the financing tool designed by the country.

Regarding the funds dedicated to energy efficiency in public buildings and in schools in Friuli Venezia Giulia Region, the "Call for the disbursement of funding for the reduction of primary energy consumption in school buildings" (approved with resolution of the Regional Council 128/2016) defines criteria, methods and terms for the submission of applications for access to funding under the Program Regional Operative (POR) of the European Regional Development Fund (ERDF) 2014-2020 "Investments for growth and employment" of the FVG Region, for the realization of investment projects within the entire regional territory aimed at reducing energy consumption in public school buildings built before the 1980s.

This is the first call for proposals on the POR FESR 2014-2020 of the FVG for school buildings and the financial envelope is € 10,000,000, divided into € 9,000,000 as ordinary resources of the call and € 1,000,000 as financial reserve for entirely mountain areas.

It is expected that, for the purposes of admission to funding, the minimum eligible cost of the project submitted under this Call will not be less than € 1,000,000 and the maximum eligible cost of the contribution may not exceed € 3,000,000.

Subsequently, other calls for a total of € 18 million will be issued to finance smaller projects.

The following table shows the framework of the announcement with respect to the articulation of the POR FESR 2014-2020:

A.1: POR axis	**3 - Support the transition to a low carbon economy in all sectors**
A.2: POR Action	3.1 - Promotion of eco-efficiency and reduction of primary energy consumption in buildings and public structures: renovation of individual buildings or complexes of buildings, installation of intelligent remote control systems, regulation, management, monitoring and optimization of energy consumption (smartbuildings) (Ref. Action 4.1.1. AdP)
A.3: POR Activity	3.1.a - Reduction of primary energy consumption in school buildings.
A.4: POR Intervention	3.1.a.1- School buildings
A.5: Type of transaction (CUP nature from PUC Context Table)	03 - Realization of public works (works and plant engineering)
A.6: Thematic objective (from EU Regulation No. 215/2014)	04 - Support the transition to a low carbon economy in all sectors
A.7: Investment priority	4c - Support energy efficiency, smart energy management and the use of renewable energy in public infrastructure, including public buildings, and in the housing sector
A.8: Specific objective (from Partnership Agreement)	4.1 - Reduction of energy consumption in buildings and public structures or for public, residential and non-residential use and integration of renewable sources
A.9: Field of intervention (from EU Regulation No. 215/2014)	051 - Educational infrastructure for school education (primary and general secondary education)
A.10: Form of financing (from EU Regulation No. 215/2014)	01. Non-refundable grant

2.3. National funding

For the first time, in May 2015 Italy established a three-year national program of school building interventions for the 2015/2017 period. To this were added, among other measures, the EIB loans for the financing of the interventions included in the regional school building plans and the "#scuolesicure" and "#scuolebelle" actions for the safety and standardization of buildings and for minor maintenance interventions, decoration and functional restoration of school buildings.

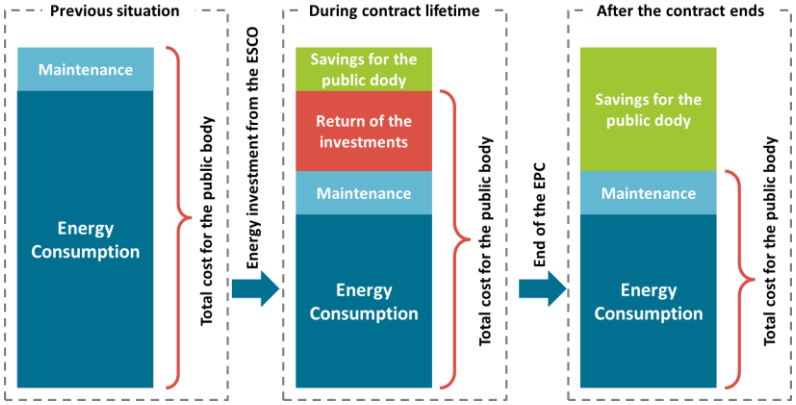
Table 1 National financing regulation – Schools

National regulation	Contents
The Good School - School Buildings	The school building fund has a budget of 3.9 billion for the safety, renovation and construction of school buildings.
The Good School - Energy Audit on School Buildings **Act n.107/2015**	The Act has authorized the expenditure of 40 million euros for the year 2015 to finance diagnostic investigations of school buildings.
NOP funds	Under the NOP (National Operational Program using the ERDF - European Regional Development Fund) 2007/2013, the Ministry has also financed school building projects with European funds. The interventions mainly concern energy efficiency, safety, accessibility, attractiveness and sports facilities. Within the new Pon 2014/2020 380 million of the ERDF will be used for the improvement of safety, energy efficiency, and usability of school environments.
D.L. n. 66/2014	The #scuolenuove project, aimed at new school buildings or the complete renovation of existing ones.
National planning for school buildings for the three-year period 2018-2020.	The available resources amount to a total of 1.7 billion euros. The regions will be authorized to take out mortgages, with amortization charges to be borne by the State, with the aim of favouring extraordinary restructuring, improvement, safety measures, seismic upgrading, energy efficiency of school buildings, as well as for the construction of new public school buildings.

2.4. EPC

The energy performance contracting (EPC) is nothing new. It had its origin in the 80's, in the American industries, to respond to the energy crisis of the 70's. Its success was based on aspects such as: strengthening of the concept of 'improving energy efficiency' in response to cost containment policies; diversification of activities: global energy services contracts as a turnkey system that provided enough technical credibility; transformation of a potential risks and competitive threats of the environment into new business opportunities. The main objective of the EPC is to get a 'creative financing' form for capital improvement which allows funding energy upgrades from cost reductions, without running the risk of investing in a new and more efficient technology.

Figure 3 Business model of an ESCO implementing an EPC



The EPC in Italy is struggling to find diffusion. It meets identifiable diffusion difficulties:

- lack of an adequate analysis of this contractual model and of the advantages it can bring in economic terms and environmental sustainability,
- regulatory uncertainty regarding the essential elements of the contract,
- uncertainty of results achievements,
- moreover, having to be consistent with the Italian Code of Public Contracts, its application and, consequently, its diffusion becomes more difficult.

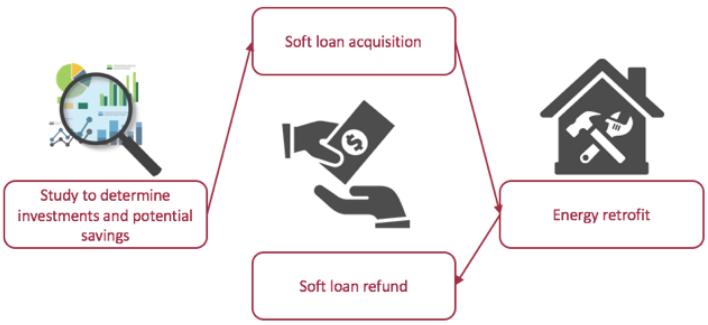
Despite the administrative and regulatory difficulties mentioned above, more and more municipalities are entrusting the energy requalification of their assets through EPC contracts with ESCOs. However, the still existing regulatory and administrative obstacles have not favored the application of this type of large-scale contracts in Public Administrations.

2.5. Loans

Loans and Soft loans have no interest or below-market rate of interest. They also may have lenient terms, such as extended grace periods in which only interest or service charges are due, and interest holidays. Soft loans are often used by states, regions or local authorities to encourage investment supporting energy policies. They are often complementary to subsidies of fiscal incentives. But soft loans are particularly suitable for citizens wishing to carry out energy renovation work in their homes, a pole that represents around 35% of a city's total energy consumption and therefore a great potential for energy savings.

The main objective of loans and soft loans in the context of energy and climate policies is to enable investment that would not be possible otherwise. Such investments may be large infrastructures such as trams, energy renovation of local authorities' legacy (public lighting, buildings, …), energy renovation of homes, etc.

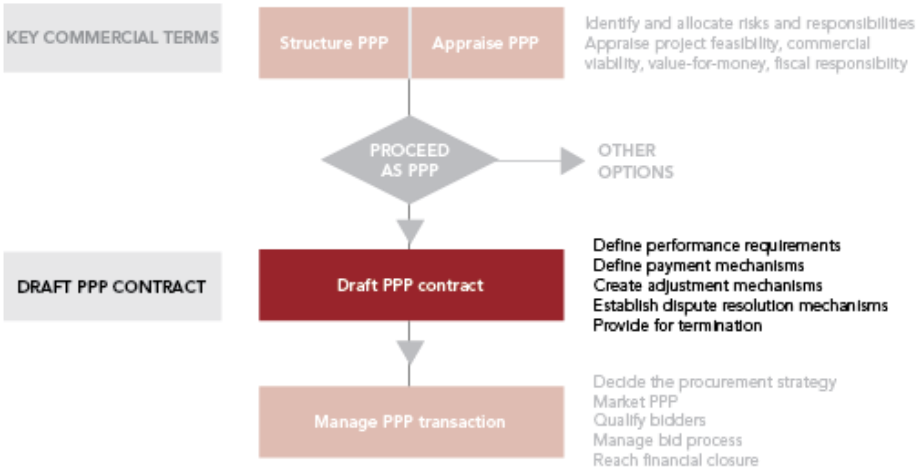
Figure 4 The different steps of a loans and soft loan



2.6. PPP financing

The public-private partnership (abbreviated PPP) is a form of cooperation between public authorities and private individuals, with the aim of financing, building and managing infrastructures or providing services of public interest. This form of cooperation with private entities allows the public administration to attract greater investment resources and skills not available within it.

Figure 5 PPP Contract Design Stage



The "Green Book relating to Public-Private Partnerships and to the Community law of public procurement and concessions" clarifies that, with this term, we generally refer to forms of cooperation between public authorities and the business world that aim to ensure the financing, construction and management or maintenance of an infrastructure or the provision of a service and which have the following characteristics:

- Relatively long duration of public-private collaboration (the partnership must normally also extend to the sharing of the project profiles of the activity to be carried out);
- Funding method substantially private (limited public participation is tolerated);
- Strategic role of the private and relevant in every phase of the project (the public partner focuses instead, mainly, on the definition of the objectives to be achieved in terms of public interest, quality of services offered, pricing policy, and ensures compliance monitoring of these objectives);
- Risk sharing of the activity between public and private entities.

2.7. Other measures

2.7.1. Conto Termico

The “Conto Termico” finances up to 65% of the costs incurred for maintenance on the building envelope and systems that increase energy efficiency.

The interventions that allow access to the incentives include:

- the improvement of the thermal insulation of the building envelope;

- the replacement of windows and glass panels with others with lower heat loss and introduction of shielding;
- the replacement of lighting systems with more efficient systems;
- the replacement of air conditioning systems with high efficiency technologies;
- the production of thermal energy from renewable sources;
- the introduction of advanced lighting and ventilation control and management systems.

For the transformation of existing buildings into **nearly zero energy buildings (nZeb)**, the contribution reaches 65% also for any demolition and seismic adjustment costs. In any case, the mechanism covers 100% of the costs of the Energy Diagnosis carried out to determine the interventions to be carried out and can be combined with other public funding (including state ones), provided that the sum of the public contributions does not exceed 100% of the cost of the interventions .

2.7.2. White Certificates

The white certificates mechanism, which came into force in 2005, is the main tool for promoting energy efficiency in Italy.

The white certificates are negotiable securities that certify the achievement of savings in the end uses of energy through interventions and projects to increase energy efficiency. A certificate is equivalent to saving an Equivalent Ton of Oil (TEP).

White certificates can be exchanged and valued on the market platform managed by GME[2] or through bilateral contracts. To this end, all the subjects admitted to the mechanism are entered in the Electronic Register of Energy Efficiency Certificates of GME.

The economic value of the securities is defined in the exchange sessions on the market.

[2] National Authority - "Energy Markets Manager"

3. Pilot projects findings

- *Number of audits held: 8*
- *Local specifications/problems with energy efficiency renovations (to nZEB standard)*

During pilot action activities energy audits in 8 schools (5 schools of Udine and 3 schools of Bologna) were performed, discussion with school managers on energy efficiency topic were held and the energy efficiency measures leading to nZEB standard were proposed and explained. The results of the energy audits were presented to school managers and respective local authorities, open lessons on energy efficiency with pupils in schools were organized.

It can generally be concluded based on the findings of above mentioned activities that FEEDSCHOOLS project addresses identified challenges with holistic approach considering financial, environmental and energy aspects of NZEB renovation of public buildings, training needs of local staff, behavioral change and policies influencing Sustainable Energy Action Plans. Its innovative approach supports Local Authorities and schools in all steps of designing a strategy for nZEB renovation using harmonized transnational tools and methods. Data collection provided by local pilot partners was significant in order to make it possible to understand the built situation of each building (climatic data, materials, HVAC system, energy bills,..). The strongest pilot activity consists in on site energy audit that was the basis of improvement options. Pilot schools have been visited and energy audits have been conducted. The participation of expert team in selected on site audits was the basis for transnational network of experts that will remain active beyond project end. Based on on-site energy audits results, improvement options have proposed energy efficiency measures so that nZEB standard could be reached. Furthermore, open lessons for behavioral change of school staff and students were an interesting and positive experience. Nine open lessons took place in the five pilot schools of city of Udine and 18 classes with 311 students were involved. Each open lesson consists of a short introduction about behavioural change aimed at energy savings in schools and two interactive games (“Energy alphabet” and “right or wrong”). Students were actively involved in the activities and participated with enthusiasm, showing an in-depth knowledge of some topics. Open lessons take place out of classes and in an unconventional way without textbooks so topics were easely fixed in student’s mind. Open lessons activities with school employees (teachers, technicians, managers) focus on the importance of energy savings and actions that improve them. Teachers can include energy information into lesson plans and repeat the activities for students in other classes. This can influence longer-term behaviour both at school and in the home.

In Italy, the transformation of buildings into nZEB is well treated by the Italian legislation. There are defined characteristics and requirements to be reached, but in many cases, it is not possible to find the economic resources to implement the deep renovation, in fact without contributions or incentive mechanisms the payback period is too long. Others challenges and barriers to the implementation of energy efficiency renovations to nZEB standard are the following:

- lack of planning strategies;
- lack of coordination among public authorities, administrative offices, procedures, legislation and calls;
- high variability of Italian legal and technical framework on energy efficiency.

Only the central government can adopt structural solutions to these challenges, whereas local authorities have few and ineffective tools at their disposal. Nevertheless, the diffusion of a new widespread perception – from citizens to administrators, from technicians to politicians – might improve the management systems currently at place. At the same time, a new approach to energy efficiency should be promoted whereby the legislative framework and the planning and implementation procedures for implementing energy efficiency measures on existing public school buildings are synchronized.

4. Barriers and opportunities

During the Feedschools activities performed in *Italy* were identified following barriers obstructing more extensive growth of number of energy efficiency projects in schools.

4.1. Financial barriers

Barrier	Description	Opportunity
1-	Lack of coordination between different contributions (energy efficiency, seismic, asbestos removal, etc.)	Promote the publication of calls for tenders and funding that may include all types of building redevelopment.
2-	Timing of calls for disbursement of contributions that are too narrow and inconsistent (compared to the times required by the procedures for design and implementation)	Coordinate the timing of the calls with the execution times of the financed / financeable interventions
3	Budget restriction for Local Authorities, problems in doing debts Several funds introduced by State or Regions in these years were not used at their full potential. The impossibility of finding resources in the budget and the impossibility of indebtedness also impacts on the ability of Municipalities to access the Thermal Account , even in the version that provides a 65% non-repayable loan: the instrument is not fully usable as the incentives are deferred in five years and at best the GSE manages to anticipate only 2/5 of the contribution in advance	Allow local authorities to make investments with assured payback times

4.2. Legislation barriers

Barrier	Description	Opportunity
1-	Regulatory procedures, in particular the Code of contracts, too long and heavy	Streamline administrative procedures by making bureaucratic aspects less problematic
2-	Lack of coordination between the different legislative sectors (energy efficiency, hygiene and health standards, safety, etc.)	Promote a greater legislative coordination between different requalification needs: energy efficiency, safety and health of the environments
3	Complexity of the ownership of school buildings In Italy owners of school	Involve school directions in the requalification of buildings.

	buildings are in general Municipalities and Provinces. Users of buildings (school directions) are not the owners of the structures and they do not have direct means to improve the situation of their building: they do not pay for heating expenses nor have any economic advantage form energy saving, but on the other side students and school workers are the ones which suffers for no comfortable indoor conditions. This situation can lead to a sense of powerlessness instead of pushing for behavioural change	

4.3. Technical barriers

Barrier	Description	Opportunity
1-	Lack of a planning culture that identifies interventions and priorities in time	Define a register of improvement opportunities that takes into account performance, investments and payback times.
2-	Lack of methodologies and skills - in the P.A. - for the definition of the technical objectives and the subsequent evaluation of the solutions / products / materials	Staff training and EGE certification (Expert in Energy Management for Civil Sector)
3-	Constraints due to the age of the buildings	Promote the renovation and demolition of old buildings where necessary
4	Complexity of technical procedures for applying for financial incentives, LA understaffed	
5	nZEB: payback period is too long with the actual incentives As emerged also by pilot activities, payback period of energy refurbishment towards nZEB , based on existing incentives, is very long and do not stimulate actions in this direction	

4.4. Communication, information, knolwdge and organizational barriers

Barrier	Description	Opportunity
1-	Lack of information and training points on financial procedures and obligations	Schedule specific staff training related to specific aspects
2-	Difficulty of communicating shared standards to all operators in the school building market	Develop standard protocols and procedures for tender contracts and external assignment that guarantee the achievement of the expected energy performance.

4.5. Administrative barriers

Barrier	Description	Opportunity
1-	Obsolete buildings, lack of maintenance and difficulty in starting demolition and reconstruction works	Promote a direct dialogue with the national and local reference bodies for the demolition of stranded buildings or in which the cost of recovery exceeds the reconstruction costs from scratch
2-	Difficulty of procedural coordination between the various sectors (energy / seismic efficiency / etc.) and related offices	To encourage coordination between sectors by structuring a municipal building management group
3-	Human resources and skills (lack of training)	Structure a training program focused on the specific needs of the employees responsible for the energy performance improvement
4-	Administrative distance between the various Bodies (Region, Municipalities, Superintendency)	Promote coordination between entities in compliance with the skills and needs of the Local Authority.

5. Policy recommendations and action plan

5.1. To overcome the financial barriers

- Available funds come from different sources (National sources and European ones assigned through regional tenders) and are often cumulative. A deep knowledge of financing mechanism is therefore required. Even in countries, as Italy, in which there are valid incentive systems, local administrations face overwhelming impediments to make energy efficiency interventions for the impossibility of finding resources in the Municipal budget and the inability to contract debts stated by national laws. For this reason several funds introduced by State or Regions in these years were not used at their full potential.
- Time consuming processes and complicated tendering procedures to access alternative funding, such as the funding from ESCOs and Banks discourage the use of these financing models. In particular the preparation, development and activation of EPC Contracts requires a strong political "commitment" and a considerable experience and ability to manage a contractual process not yet consolidated at administrative level. In addition, to ensure real independence, the Administrations need a minimum of resources to prepare the initial energy diagnoses and to structure the complex tender documentation. Although these costs will be repaid over the years with the economic savings that will be obtained, many Administrations, prefer not to venture on this road due to the risk of legal disputes when operating with not very widespread contracts
- To solve these aspects guidelines should be developed on critical aspects by national/regional governments and technical and legal support should be provided to Municipalities Promote the knowledge and the training of personnel on loan funds available for access and use.
- Simplifying the access of municipalities to credit for the energy requalification of schools outside the Stability Pact in cases where the local authority must advance the necessary funds

5.2. To overcome the legislation barriers

- Simplify the Project Financing process, contained in the Contract Code, to facilitate its use for public bodies.
- Make greater use of the institution of the "Conference of Services" as a procedure aimed at simplifying and reducing the approval times for complex projects, including those for the energy efficiency of buildings, equipment and public plants.
- Promote ISO 50001 (Energy Management System) standard certification in Local Authorities and evaluate the possibility of proposing PPPs for direct promotion of the A.P. ex art. 183, paragraph 1 of the Contract Code, also in order to encourage greater and homogeneous methods of comparison of the offers by the various promoters.
- Harmonization of laws and norms. Energy is a concurrent legislative matter in several countries, as both national and regional governments can issue laws and norms. Complexity increases when it comes to energy requalification of buildings in which each municipality must comply with its building regulations. As an example, definition of nZEB in Italy can change from one region to another according to specific regional legislation. This context, designed to give Regions freedom to define specific requirements according to local climatic conditions, is nevertheless confusing. In several debates emerged the need to have a unique reference body or at least a unique information portal that can simplify the technical, legal and economic requalification tasks to the staff of Municipalities, which in general own the school buildings. The problem is particularly perceived in case of Energy Performance Contracts (EPC) the use of which, within the national public procurement codes, often generates confusion and risks of legal disputes. In controversial cases, an authentic interpretation of the laws should be developed by national bodies

5.3. To overcome technical barriers

- Strengthen the correct management of skills in the use of monitoring technologies and, where possible, use Management Systems aimed at continuous monitoring of energy and environmental performance.
- Lack of technical advice to LA staff. Energy renovation of public buildings and the use of new contractual models as EPC requires strong technical, legal and financial expertise that is rarely available above all in small Municipalities. The need to overcome several critical aspects, from the fund raising, to financial design, the setting up of an efficient building data collection system as well as an efficient tender, requires a strong "political commitment" which can only be achieved by raising awareness at political level. Problem oriented systematic training should be provided to Municipalities staff on technical, legal and financial aspects of public building renovation.
- An experienced energy manager should be appointed in each municipality or at least in every union or small group of municipalities

5.4. To overcome communication, information, knowledge and organizational

- Plan and organize information campaigns for managers and users, which also involve teachers and training courses for municipal staff on regulatory requirements, examples of good practice, incentives and forms of financing. Structuring specific guidelines appropriate for standardizing training at national level.
- Involvement of schools staff. In most part of the partnership countries Municipalities and Provinces are the owners of school buildings. Users of buildings (school deans, staff, students) are not the owners of the structures and they do not have direct means to improve the situation of their building: they do not pay for heating expenses nor have any economic advantage form energy saving, but on the other side students and school staff are the ones which suffers for no comfortable indoor conditions. This situation can lead to a sense of powerlessness instead of pushing for behavioural change (a sort of a tenant approach which is not really interested in improving other people's property). A way to incentivize schools organizations sharing with them the economic savings (by, e.g., purchasing educational materials) due to an improved energy efficiency should be developed by Municipalities. A systematic training aimed at behavioural change is needed and it should be included in the normal environmental education programs from the first years of primary schools

5.5. Administrative barriers

- Administrative simplifications. Procedures for requesting public grants are too complicated and fit into a work environment, such as that of technical staff of Municipalities, which is already underpowered for the many tasks and the general hiring freeze applied in partnership countries. Administrative procedures in the context of energy renovation may take years before the actual implementation of elaborated projects, as often several agencies are involved in the evaluation process. The time required for the final approval of a building redevelopment project often exceeds the mandate of the mayors of the municipalities (which generally lasts 4 years), thereby decreasing the political interest in starting the process. The simplification of administrative formalities and procedures consists of a series of pragmatic and concrete measures designed to facilitate relations between the administration, companies and state agencies. A consultancy desk and expert support should be provided at regional or province, metropolitan cities level to support the technical services of municipalities in all the technical, legal and economic phases required for the preparation and management of a request for public funds. Promote the synergy between the staff of the body employed in the technical sectors and that in the administrative / procurement sectors, both during the planning and execution of the interventions
- Introduce the figure of the EGE in the energy diagnosis and perform Energy Audits according to UNI CEI EN 16247.