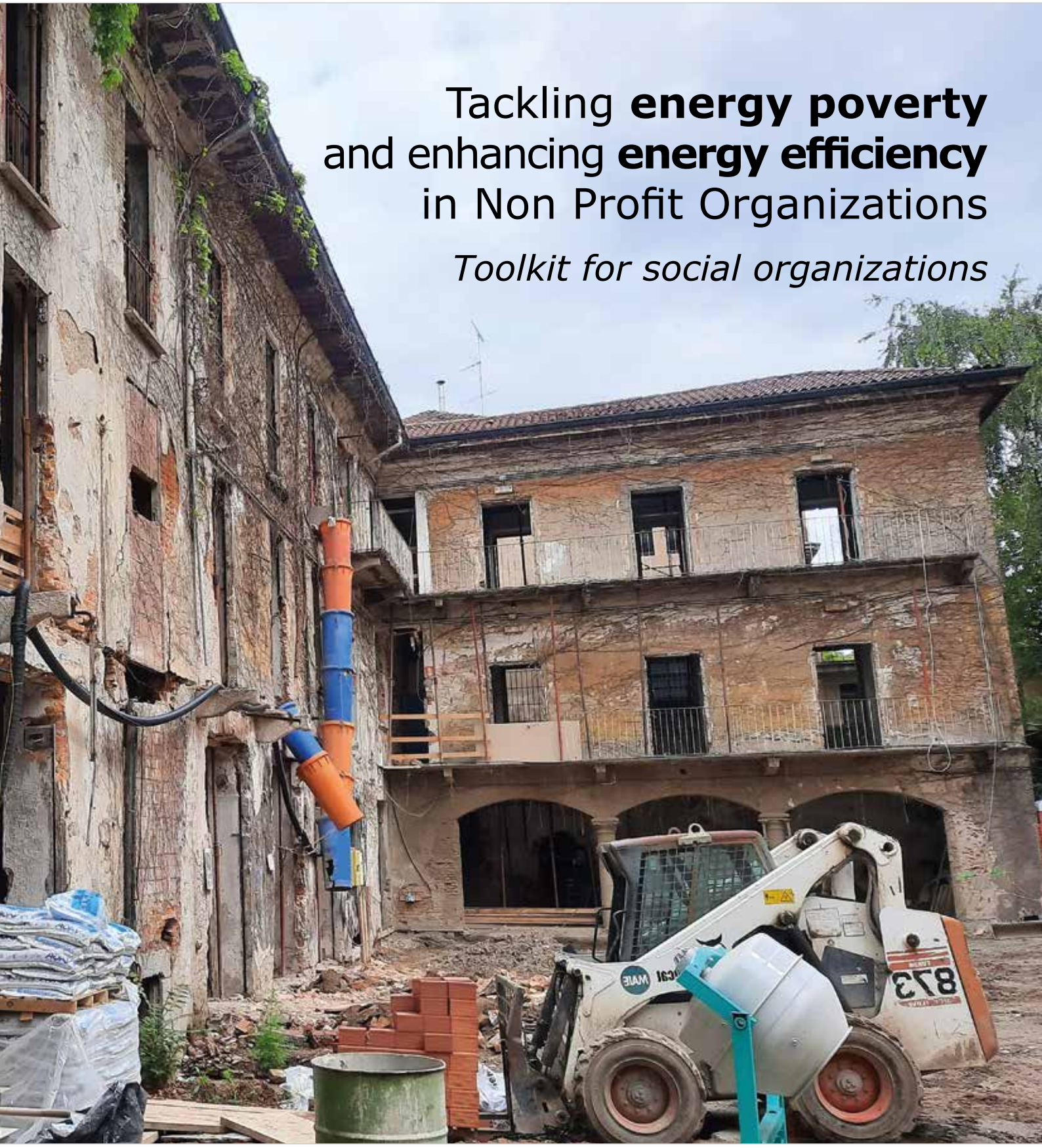
Erasmus+

GreenAbility
green abilities to tackle social issue

Tackling **energy poverty** and enhancing **energy efficiency** in Non Profit Organizations

Toolkit for social organizations



Fratello Sole
Far bene all'ambiente, far bene alle persone

ecodes
tiempo de actuar

réseau ÉCO HABITAT
RÉSEAU CARITAS FRANCE

ENEA
AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE

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Ecological divide: renewable, shared, participatory and inclusive energy to avoid war between peoples and with mother Earth

The connection between war and energy sources is well known but to really "experience" it, a war was needed in the heart of Europe. A conflict focused on Russian gas as a crucial element of our life and makes the criticalities linked to access to energy even more evident.

Energy dependence on fossil sources therefore challenges the issue of energy independence made from renewable sources as an exit from the conflict, to save the planet from environmental catastrophe and contribute to peace.

Survival of the planet, economic convenience, health are the evidence of irrevocable choices. But also democracy and inclusion. In fact, the energy transition decreases the economic power that is currently concentrated in the hands of the few and the rich, widening the range of energy producers to many who participate in production with their own roofs by capturing the energies of the sun, as in the Renewable Energy Communities promoted by the EU.

The issue of tackling energy poverty remains open, both from a technical and an economic point of view. Similarly to digital, where access is a barrier for the poorest and produces exclusion (Digital Divide), the same happens in the highly sensitive renewable energy sector.

This is why we must try to avoid barriers (Ecological Divide) that limit clean energy to those who know how to produce it and to those who have the money to pay for it. Moving towards a world where energy production is widespread, shared, participatory and inclusive is therefore an essential strategy to reduce this war risk factor even before being the best way to reduce health problems and climate emergency deriving from the management of sources of power.

The fight against energy poverty, through the insulation of unhealthy or dilapidated houses, is combined with the possibility of sharing clean energy produced from renewable sources that produces participatory and inclusive effects, generating community and solidarity.

1. THE GREENABILITY PROJECT
Tackling energy poverty

Energy poverty is an increasing socioeconomic problem affecting over 50 million households in the European Union and 1 out of 10 Eu citizens are unable to afford proper indoor thermal comfort and have difficulty to obtain the necessary energy to meet their basic needs because of inadequate resources or living conditions.

It has severe health and environmental implications which have an impact on both low-income households and on Third Sector Organisations (TSOs) providing social services for children, youths, the elderly, families, the disabled and the disadvantaged people, both at their home and inside dedicated structures like care homes.

To address the issue, four European organizations joined in the proposal **GreenAbility** which has been funded by the **EU program Erasmus+**.

The project consists of **an education program, based on collaboration and exchange among partners** - which are expert in providing social services, starting from an environmental approach - **and in facing these issues in relation to 2 places where vulnerable people are assisted**:

- houses where poor and low-income families live;
- buildings managed by TSOs, namely care homes, where social services are provided.

GreenAbility intends **to help managers, operators and volunteers of Third Sector Organisations (TSOs) to better understand and manage issues regarding energy in order to tackle energy poverty**.

Sustainability, even not a primary scope in social assistance, is more and more impacting on social welfare practices which are, for instance, affected by issues like those related to energy poverty and could take advantage of learning how to address household energy needs and target energy efficiency measures to low-income households living in energy inefficient houses and in care homes where there is a heavy dependency on the constant supply of energy to provide lighting, warmth and comfort to vulnerable individuals.

In most cases managers, operators and volunteers are not aware that becoming able both to detect and address energy poverty issues and negative environmental behaviors and choices, and proposing virtuous environment practices, they can obtain a positive social effect.

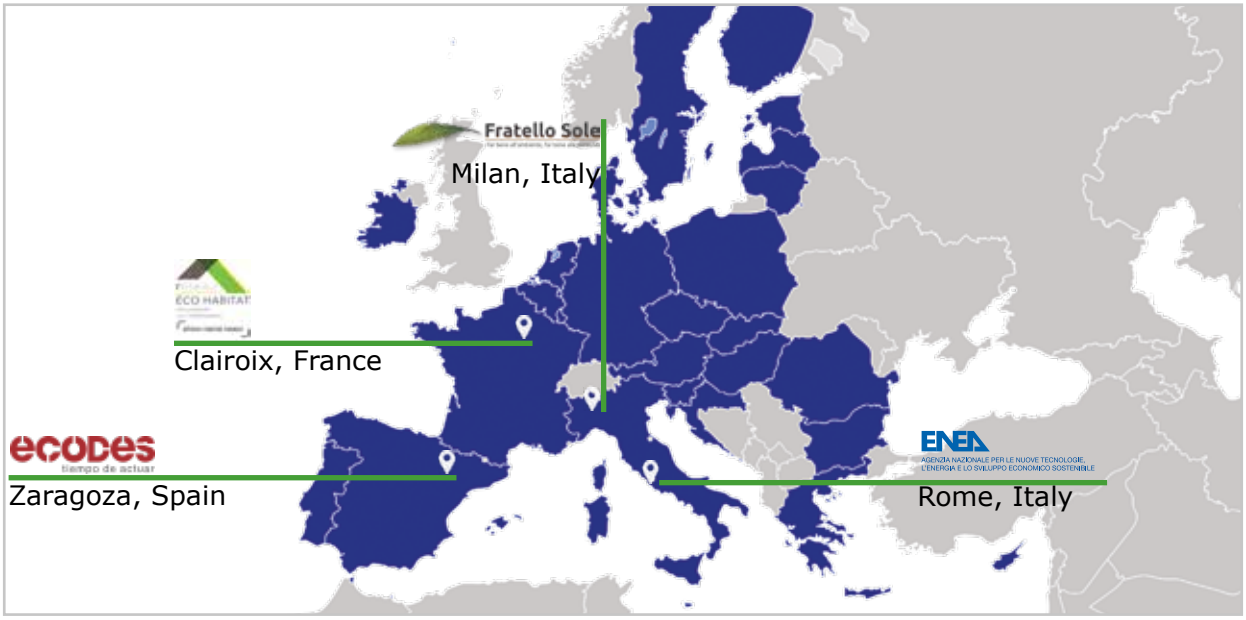
But **issues like energy affordability and thermal efficiency, financial support for energy efficiency and maintenance interventions, the purchase of more energy-efficient household appliances and the adoption of sustainable practices and behaviors, call for specific upskilling competences** which social operators, caregivers and volunteers can acquire to provide solutions, which, even not directly connected to the primary social assistance, could anyway integrate classic welfare activities.

By alleviating energy poverty, the project aims at enhancing the quality of life of people thus creating a more just and inclusive society.

The GreenAbility project: a European partnership to promote energy efficiency in the Third Sector

- **Fratello Sole**
  An Italian Consortium of non-profit organization active in reducing energy poverty and operating in favor of TSOs – Coordinator of the project.
  www.fratellosole.org
- **Ecodes**
  A Spanish non-profit and independent organization acting in favor of sustainable development and running the initiative "No home without energy".
  www.ecodes.org
- **Rèseau Eco Habitat**
  A French non-profit organization supporting the poorest homeowners to improve their houses efficiency.
  www.reseau-ecohabitat.fr
- **ENEA**
  The Italian National Agency for New Technologies, Energy and Sustainable Economic Development, which is fully engaged in tackling energy poverty.
  www.enea.it

Fig. 1 The GreenAbility partners in Europe



2. OBJECTIVE OF THIS TOOLKIT

Support social operators to make energy cost savings

This toolkit is for managers of TSOs, social operators and volunteers working in buildings where they provide services for children, youths, the elderly, families, the disabled and the disadvantaged people.

It is intended to **support management and staff to make environmental and cost savings** by the inclusion of small, simple changes as well as understanding the need for larger investments in energy saving and efficiency.

This guidance document also aims to advise managers and individuals on how to take responsibility for their own energy consumption by empowering them to **make informed decisions on managing resource use**.

Operational costs of these structures - frequently related to energy and maintenance - represents an expenditure voice which has a strong impact on the budgets of TSOs themselves and in most cases is not properly managed, so to hinder, in some cases, the services or to cause financial problems.

Most of these organisations, which are focused on their daily social work, are not aware that they could realize social impact through energy costs control, more efficient management of the buildings and environmental education, which allows to recuperate money and spaces for social purposes while producing an environmental benefit.

In this toolkit they can find advice and information on energy efficiency interventions (on building and heating and cooling system), **tools for preliminary assessment of energy consumption and needs and financial instruments** (tax benefits, public notices, fiscal deductions or incentives, etc.).

The toolkit is the result of the elaboration end shared work of The **GreenAbility Lab**, a group including the project's partners and social operators and volunteers of NPOs.

All of them committed in bringing into the project their expertise in tackling energy poverty both in vulnerable households and in care homes.

3. ENERGY POVERTY
The European framework

In 2018, about 50 million European citizens declared to be in arrears on their utility bills. This condition reflects their inability to access to the essential services that underpin a basic standard of living and health. Energy poverty therefore remains a major challenge and lifting vulnerable citizens out of it is an urgent task for the EU and its Member States.

Energy poverty results from a combination of low income, high expenditure of disposable income on energy and poor energy efficiency, especially as regards the performance of buildings.

People in inefficient buildings are more exposed to cold spells, heatwaves and other impacts of climate change. Inadequate comfort and sanitary conditions in housing and work

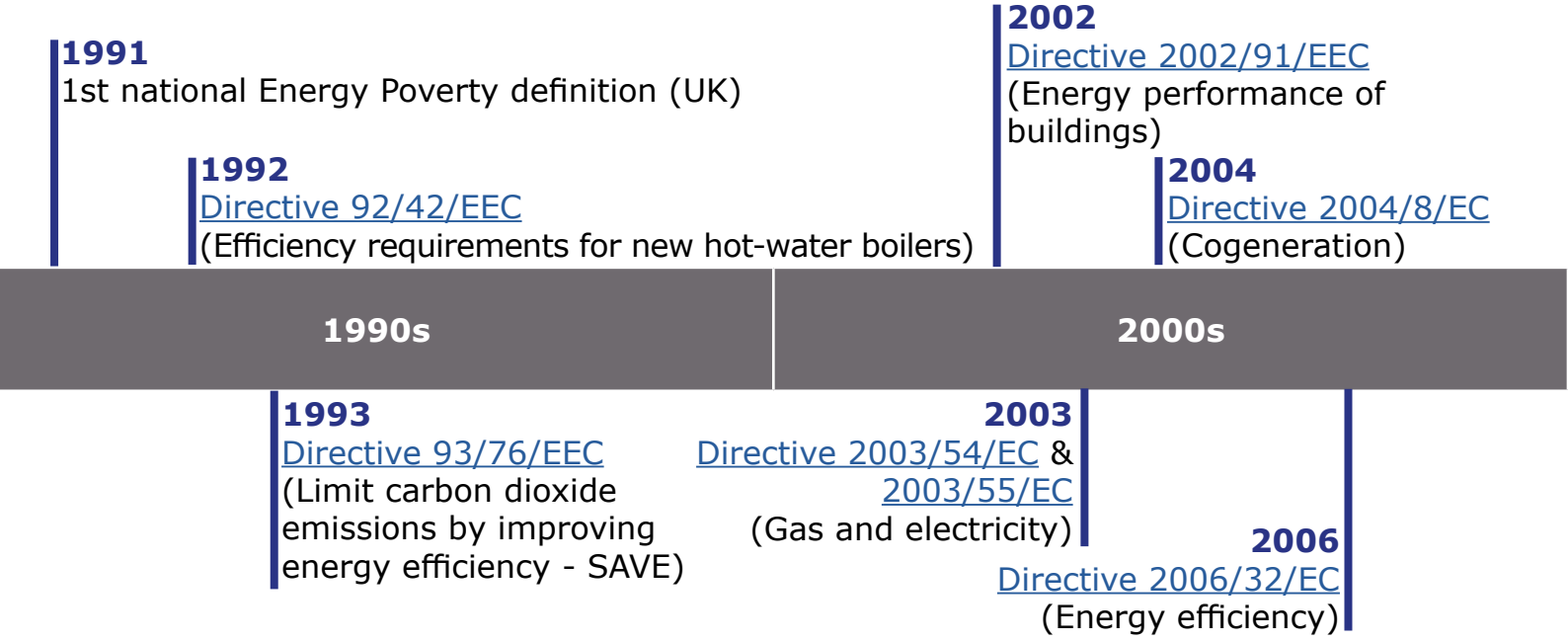


Fig. 2 European framework about energy poverty time line

environments, such as inadequate indoor temperatures, deficient air quality and exposure to harmful chemicals and materials, contribute to lower productivity, health problems and higher mortality and morbidity[1].

The Covenant of Mayors for Climate and Energy (CoM) defines energy poverty as "*a situation where a household or an individual is unable to afford basic energy services (heating, cooling, lighting, mobility and power) to guarantee a decent standard of living due to a combination of low income, high energy expenditure and low energy efficiency of their homes*"[2].

According to the "Leaving no one behind" principle of the Sustainable Development Goals (SDGs), "*Access to affordable, reliable and sustainable energy is crucial to achieving many of the SDGs, from poverty eradication via advancements in health, education, water supply and industrialization, to mitigating climate change*" (SDG 7)[3].

The assessment of energy poor and/or socially vulnerable households, as well as the policies and measures to alleviate the phenomenon need to be adapted to specific parameters, such as climate, housing quality, economy, the structure of energy costs, mobility patterns[4].

In fact, **energy poverty exhibits significant disproportions on a territorial basis, depending mostly on the presence of local differences in driving forces**. Tailored actions at regional/municipal level can thus be more effective compared to "one-size-fits-all" solutions at national/international levels[5].

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1 Link to the European Commission website page dedicated to energy consumer rights and energy poverty

2 Link to the Covennant of Major website page about energy poverty

3 Link to the Unated Nation website page about SDGs number 7

4 https:Link to the European Energy Poverty Observatory web page about guidance for Policy-makers

5 Pye, S.; Dobbins, A.; Baffert C.; Brajković J.; Grgurev I.; De Miglio, R. and Deane P. (2015) "Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures" - Link to the article

2009
Directive 2009/72/EC & 2009/73/EC
(Gas and electricity)
Directive 2009/125/EC
(Ecodesing)

2018
Directive (EU) 2018/2002
(Energy Efficiency)
Directive (EU) 2018/844
(Energy Performance of Buildings)
Energy Poverty Observatory

2010s | **2020s**

2011
Vulnerable Consumer Working Group

2015
Energy Union

2016
Clean Energy for all Europeans

2010
Directive 2010/30/EU
(Energy labelling)
Directive 2010/31/EU
(Energy performance of buildings)

2020
A Renovation Wave for Europe

2019
European Green Deal
Directive (EU) 2019/944
(Electricity)

2018
Regulation (EU) 2018/1999
(Governance of the Energy Union and Climate Action)

At the EU policy level fighting Energy Poverty is recognised as a cross-cutting challenge, specifically linked to the building environment and its energy efficiency, quality performance and refurbishment initiatives.

In 2007, the European Commission established the **Citizen's Energy Forum**, the aim of which is the implementation of competitive, energy-efficient and fair retail markets for consumers, as foreseen under the Third Energy Package.

A key working group established in 2011 is the **Vulnerable Consumer Working Group (VCWG)** gathering representatives from consumers, NGOs, regulators and relevant public bodies and industry.

The main VCWG's activities are ultimately to "*help reduce the number of vulnerable consumers, including those in energy poverty, and to prevent consumers from falling into energy poverty, where possible*" (VCWG 2013[6]).

The Clean Energy For All Europeans set out a new approach to protecting vulnerable consumers, requesting Members States "*to take energy poverty into account, by requiring a share of energy efficiency measures to be implemented as a priority in households affected by energy poverty and in social housing*"[7]

As specified in recital (24) of the Energy Efficiency Directive (EU) 2018/2002 "[...] *the cost-effectiveness of such measures, as well as their affordability to property owners and tenants, should be taken into account, and adequate financial support for such measures should be guaranteed at Member State level*"[8].

Under the revised version of **the Energy Performance of Buildings Directive** (EU) 2018/844, article 2(a) paragraph 1(d), "*Each Member State shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050 […] with […] an overview of policies and actions to target the worst performing segments of the national building stock […] and an outline of relevant national actions that contribute to the alleviation of energy poverty*"[9].

As for article 29 of the recast Electricity Directive (EU) 2019/944, it is established that "*when assessing the number of households in energy poverty […] Member States shall establish and publish a set of criteria, which may include low income, high expenditure of disposable income on energy and poor energy efficiency*".

Furthermore, according to point (d) of Article 3(3) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, "***Member States shall assess the number of households in energy poverty taking into account the necessary domestic energy services needed to guarantee basic standards of living in the relevant national context, existing social policy and other relevant policies**, as well as indicative*

6 Link to "Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures"

7 Link to "Clean Energy for All Europeans"

8 Link to Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency

9 Link to 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 guidance on relevant indicators for energy poverty"[10].

The European Green Deal will contribute to put the focus on energy poverty, as part of efforts to ensure a 'just transition', alleviating economic and social issues stemming from the transition. Indeed, "*The risk of energy poverty must be addressed for households that cannot afford key energy services to ensure a basic standard of living. Effective programmes, such as financing schemes for households to renovate their houses, can reduce energy bills and help the environment*".

The fight against energy poverty shall benefit also from the engagement of Member States "*in a renovation wave of public and private buildings. While increasing renovation rates is a challenge, renovation lowers energy bills, and can reduce energy poverty. It can also boost the construction sector and is an opportunity to support SMEs and local jobs*"[11].

The **Just Transition Mechanism (JTM)** is a key tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind. It provides targeted support to help mobilize around €55 billion over the period 2021-2027 in the most affected regions, to alleviate the socio-economic impact of the transition. The Just Transition Mechanism addresses the social and economic effects of the transition, focusing on the regions, industries and workers who will face the greatest challenges.

With its pledge to 'leave no one behind', while massively transforming the EU economy, the **European Green Deal (EGD)** sets itself a massive challenge, particularly in relation to production and consumption of energy. The EGD acknowledges the need to massively renovate the EU building stock to reduce energy demand and emissions while also upholding a 'just transition' by lifting people out of energy poverty.

To pursue this dual ambition of energy gains and economic growth, in 2020 the Commission published the strategy ***"A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives"*** (COM(2020) 662 final) to boost renovation in the EU. It aims to double annual energy renovation rates in the next 10 years. As well as reducing emissions, these renovations will enhance quality of life for people living in and using the buildings and should create many additional green jobs in the construction sector.

The Renovation Wave identifies 3 focus areas:

- Tackling energy poverty and worst-performing buildings
- Public buildings and social infrastructure
- Decarbonising heating and cooling

It can address the health and well-being of vulnerable people while reducing their energy bills – as outlined in the Commission recommendation on energy poverty (Commission Recommendation (EU) 2020/1563 of 14 October 2020 on energy poverty), also part of the renovation wave strategy.

In particular this recommendation aimed at the Member States to address the energy poverty situation in which many households find themselves. Europeans as a challenge to the Union.

10 Link to Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

11 Link to The European Green Deal

This recommendation considers energy poverty as the situation in which households cannot access essential energy services, including adequate heating, air conditioning and lighting and energy to operate appliances to preserve a decent standard of living and health.

In 2021 the **European Climate Law** (Regulation (UE) 2021/1119) writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050.

Climate neutrality by 2050 means achieving net zero greenhouse gas emissions for EU countries as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment. The law aims to ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part. The EU Institutions and the Member States are bound to take the necessary measures at EU and national level to meet the target, *taking into account the importance of promoting fairness and solidarity* among Member States.

The new geopolitical and energy market reality requires us to drastically accelerate the clean energy transition and increase Europe's energy independence from unreliable suppliers and volatile fossil fuels.

Following the invasion of Ukraine, the case for a rapid clean energy transition has never been stronger and clearer. The European Commission has presented in the 18 May 2022 **REPowerEU plan**, Europe's energy system will increase its efficiency and move to green energy sources at a faster pace than expected before the start of Russia's aggression against Ukraine.

There is a double urgency to transform Europe's energy system: ending the EU's dependence on Russian fossil fuels, which are used as an economic and political weapon and cost European taxpayers nearly €100 billion per year and tackling the climate crisis. By acting as a Union, Europe can phase out its dependency on Russian fossil fuels faster.

85% of Europeans believe that the EU should reduce its dependency on Russian gas and oil as soon as possible to support Ukraine. **The measures in the REPowerEU Plan can respond to this ambition, through energy savings (and reduction of energy bills), diversification of energy supplies, and accelerated roll-out of renewable energy to replace fossil fuels in homes, industry and power generation**.

In parallel with this Plan, the European Commission adopted the **External Energy Strategy** that facilitate energy diversification and building long-term partnerships with suppliers, including cooperation on hydrogen or other green technologies. This Strategy prioritises the EU's commitment to the global green and just energy transition, increasing energy savings and efficiency to reduce the pressure on prices, boosting the development of renewables and hydrogen, and stepping up energy diplomacy.

3.1 Poverty situation in France, Italy and in Spain

% inability to keep adequately warm - 2020

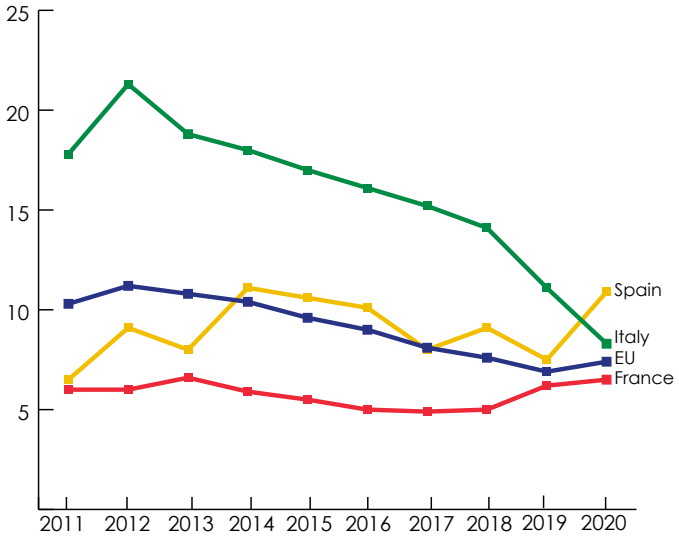


Fig. 3 Graphs about percentage of the population that is inability to keep home warm. Source: Eurostat on May 16, 2022.

In Spain, the share of the population unable to keep the home adequately warm increased to a peak of 11.1% in 2014. This increase may be attributed to the financial crisis. After 2014 it decreased up to 7.50% in 2019. In 2020 it increased up to 10.9% due the COVID-19 pandemic.

In France, the slight increase of the indicator between 2011 and 2013 may be attributed to particularly cold winters. After, it slowly decreased to around 5.0% between 2016 and 2018, with then a slight increase again in 2019 and 2020.

In Italy, the increase between 2011 and 2012 may be due to the financial crisis. Then, it gradually decreased up to 11.1% in 2019.

Spain is in line with the EU average data until 2019, France has always a lower share of population unable to keep the home adequately warm, while Italy always shows higher values.

% arrears on utility bills - 2020

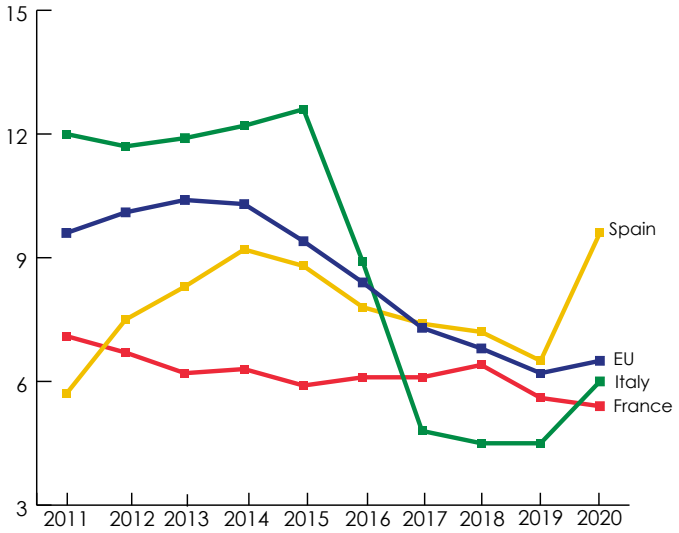


Fig. 4 Graphs about percentage of the population that is arrears on utility bills. Source: Eurostat on May 16, 2022.

In France, the households with arrears on utility bills decreased between 2011 and 2015 from 7.1% to 5.9%, then a slight improvement up to 6.4% in 2018. In 2019 it decreased to 5.6%.

In Italy the share of the population with arrears on utility bills remains relatively constant between 2011 and 2015. It sharply decreased from 12.6% to 4.8% between 2015 and 2017 thanks to the introduction of dedicated bonus on the energy bill. In 2018 and 2019 the share furtherly decreased up 4.5%. In 2020 it increased up to

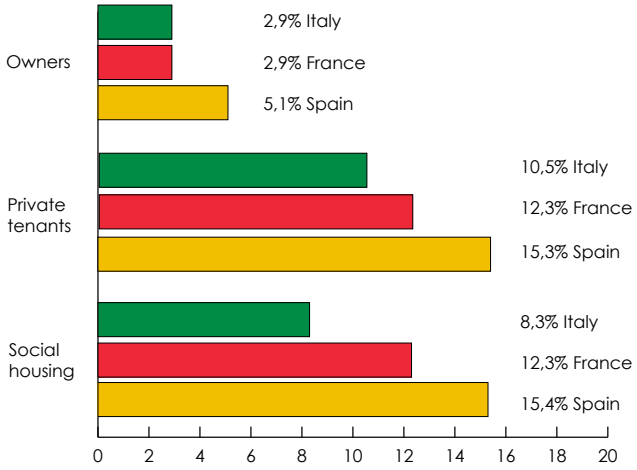
to

6.0% due the COVID-19 pandemic.

In Spain the value of the indicator increased between 2011 to 2014 (9.4%) and then it gradually decreased up to 6.6% in 2019. In 2020 it sharply increased up to 9.6% due the COVID-19 pandemic.

Compared to the EU average data, France and Spain show lower shares of the population with arrears on utility bills until 2019. While Italy has a peculiar path with the highest values until 2015 and then showing the lowest between 2017 and 2019.

% Arrears on utility bills and disaggregated by tenure type (owners, private tenants, social housing) - 2017



% Inability to keep home warm and disaggregated by tenure type (owners, private tenants, social housing) - 2017

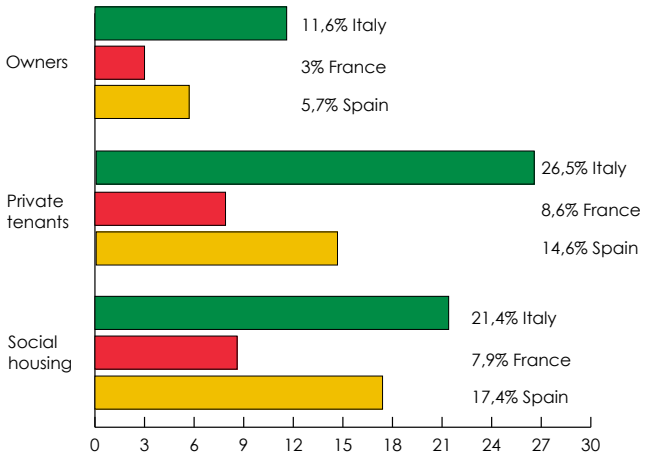


Fig. 5 Graphs about percentage of the population that is inability to keep home warm and percentage of the population that is Arrears on utility bills disaggregated by tenure type (disaggregated by tenure type)

In France, the energy poverty is highest for private tenants and the social housing sector and alike in 2017. The 8,6% of private tenants and the 7,9% of the social housing depend on inability to keep home warm. Both private tenants and the social housing depend on arrears on utility bills at 12,3%.

The energy poverty in Italy is highest for the private tenant sector in 2017, at 26,5% for inability to keep the house warm and 10,5% for arrears on utility bills. The social housing sector is the second most vulnerable tenure type.

In Spain the social housing sector in 2017 is highest in energy poverty, at 17,4% for inability to keep the house warm and 15,4% for arrears on utility bills. This is closely followed by the private tenancy tenure type.

Household energy costs (electricity) **Household energy costs (gas prices)**

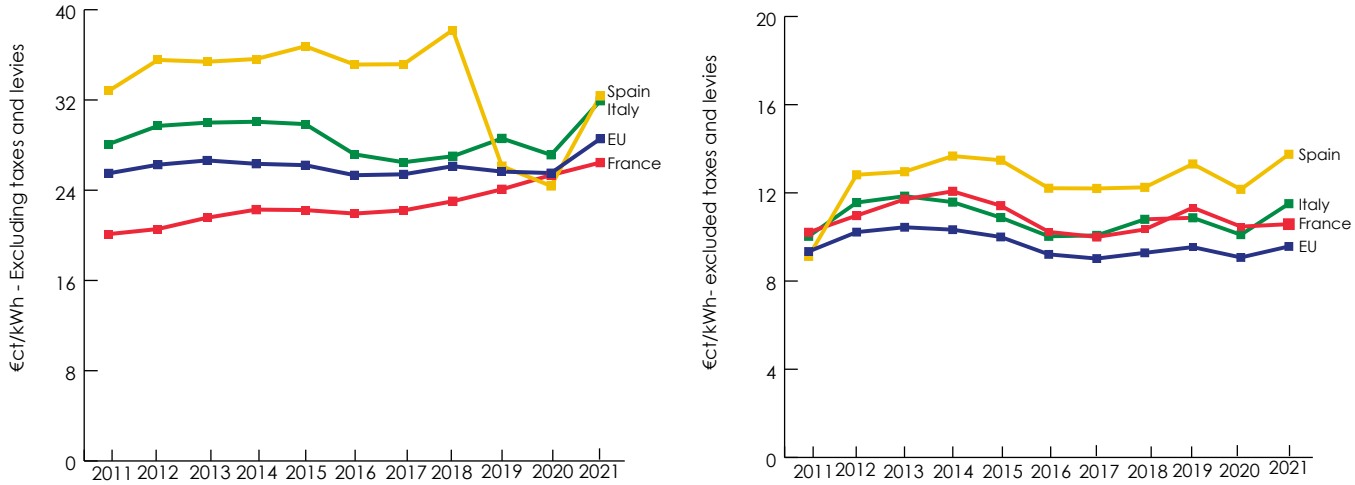


Fig. 6 Graphs about household energy costs (electricity and gas price). Source: Eurostat on April 19, 2022

In France, the household electricity costs has gradually increased, reaching a peak in 2014 at 22.28 €ct/kWh (excluding taxes and levies). Between 2015 to 2017 the electricity costs are stable and then increased up to 26.45 €ct/kWh in 2021. The highest gas price was recorded in 2014 at 12.07 €ct/kWh (excluding taxes and levies), the lowest in 2017 at 10.0 €ct/kWh. In 2021 the price was at 10.58 €ct/kWh.

In Italy, the household electricity prices grew up to 30.07 €ct/kWh (excluding taxes and levies) in 2014, with then some ups and downs, with a maximum at 31.92 €ct/kWh in 2021. The highest gas price was recorded in 2013 at 11.85 €ct/kWh (excluding taxes and levies), after it decreased up to 2017, and then it increased with a maximum at 11.51 €ct/kWh in 2021.

In Spain, the household electricity price increased between 2011 and 2015 up to 36.79 €ct/kWh (excluding taxes and levies). Then there were ups and downs of the prices with a maximum at 38.2 €ct/kWh in 2018 and a minimum at 24,38 €ct/kWh in 2021. The gas price increased between 2011 and 2014 up to 13.67 €ct/kWh (excluding taxes and levies) in 2014. After 2014 the gas price slowly decreased and between 2016 and 2018 it remained stable. Since 2019 it increased again with a maximum at 13.75 €ct/kWh in 2021.

Compared to the EU average, electricity prices are lower in France only, while all the three Partners countries show higher gas prices.[1]

1 * The impact of COVID-19 pandemic on Energy Poverty is not included in these charts.

4. ENERGY POVERTY & POVERTY
Relations and definition in Italy, France and Spain

According to EPOV, Energy poverty can be described as the combined result of the following issues:

- **inefficient buildings and appliances (IBA);**
- **high energy expenditure (HEE);**
- **low household income (LHI).**

These three characteristic features can be also read through the three dimension the "trilemma" encompasses, that are:

- the social dimension;
- the energy dimension;
- the economic/financial dimension.

The social dimension

Literature agrees upon the recognition of social adverse consequences of energy poverty on social exclusion and social cohesion, due to lower participation in social activities. **The consequent worsened quality of life, combined with associated indoor air pollution, causes physical and mental illnesses**, having implications on public health[1].

The energy dimension

The energy efficiency initiatives on built environment entails a wide range of positive impacts at different levels: from more performing and healthy dwellings, to global goals such as the reduction of energy consumption and human footprint, along with innovation in construction and data driven technologies to serve a better quality of life.

The economic and financial dimension

Thus, energy renovation multiple benefits mirror economic values in the investments' business plan, since may shorten their payback period, increasing the credit worthiness of low-income people, having limited financial means and lack of collaterals. Besides, poorest deciles of the population are those where retrofit actions are usually more urgent being more likely they live in non-refurbished homes with high fuel costs[2].

4.1 Vulnerable consumers

1 For an overview of the main studies on the topic see: EnR Position Paper on Energy Poverty in the European Union - January 2019

2 Schleich, J. (2019), Energy efficient technology adoption in low-income households in the

An important European legislative document concerning the energy market[3] includes in art. 3(3) "*Member States shall take appropriate measures to protect final customers, and shall, in particular, ensure that there are adequate safeguards to protect vulnerable customers. In this context,* ***each Member State shall define the concept of vulnerable customers which may refer to energy poverty***".

Lack of clarity and heterogeneous policy approach is also found in the approaches adopted for the definition and identification of vulnerable consumers, which the EU recommends to bridge to energy poverty and other form of energy deprivation.

Vulnerability in energy consumption refers to the possibility to have full access and protection within the market. It is largely influenced by cyclical variations and requires corrective solutions.

Energy poverty concerns the ability to afford a minimum level of energy services. It is often a structural problem and requires long-term, preventive approach.

Both are crucial, interlinked policy targets but require different solutions.

Across different Member States the vulnerable consumer definitions are classified in four categories[4]:

1. Energy affordability: whereby households with high energy expenditure and/or difficulties affording energy costs are classed as vulnerable.

2. Receipt of social welfare: which encompasses households receiving qualifying social assistance, e.g. unemployment-related cash transfers.

3. Disability/health: where health characteristics define vulnerability.

4. Range of socioeconomic groups: in which households are described as vulnerable based on income, age and/or health characteristics.

The distribution of Member States across the four categories is given below in the following table.

Definition type	Member State
Energy affordability (low income/high expenditure)	**FR, IT**, SE
Receipt of social welfare	BG, CY, DE, DK, EE, FI, HR, HU, LT, LU, MT, PL, PT, SI
Disability/health	CZ, NL, SK, IE
Range of socioeconomic groups	AT, BE, **ES**, GR, RO, UK
Not available/Under discussion	LV

Tab. 1 Vulnerable consumers definition across European Member States - Source: Pye, S.; Dobbins, A. (eds.). INSIGHT-E, Policy Report n.2, May 2015[5].

The definition and the measures

European Union – What is the evidence?, Energy Policy 125, 196–206

3 Link to the Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC

4 Pye, S.; Dobbins, A. (eds.). "Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures". INSIGHT-E, Policy Report n.2, May 2015.

5 Pye, S.; Dobbins, A. (eds.). "Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures". INSIGHT-E, Policy Report n.2, May 2015.

reserved for the vulnerable consumers' in France, Italy and Spain are described below in the following tables:

FRANCE

A definition of vulnerability is in place (eligibility for social tariffs) and France has a broad range of measures to tackle energy poverty, however, these measures to do necessarily target the most vulnerable energy consumers (e.g. tenants and those on low-incomes)[6].

Selected measures[7]	Type of measure	Organisation	Target groups
Energy voucher	Energy bill support	National government	Low-income households
Winter truce	Disconnection protection	Energy suppliers, National government	No specific target group
Financial help regarding arrears on energy bills	Energy bill support	Local government	Indebted households

Tab. 2 Vulnerable consumers French definition. Source: EPOV (2019)

ITALY

A definition of vulnerability is in place (socio-economic groups) and at present some measures are in place to tackle vulnerability.

Selected measures	Type of measure	Organisation	Target groups
Reduction of available power	Disconnection protection	Regulator	Indebted households
Financial assistance for heating costs	Energy bill support	Energy suppliers, National government	No specific target group

6 EPOV (2019). "Energy Vulnerability Across Member States. A guide for regulators and suppliers". July 2019.
7 EPOV (2019). "Member State Reports on Energy Poverty 2019". May 2020.

Financial help regarding arrears on energy bills	Energy bill support	Local government	Low-income households
Gas bonus	Energy bill support	Local government	Low-income households
Electric bonus	Energy bill support	National government	Low-income households, chronically/severely diseased

Tab. 3 Vulnerable consumers Italian definition. Source: EPOV (2019)

SPAIN

A definition of vulnerability is in place: "*An energy consumer (nb: specifically, a consumer of electricity or thermal use) that finds themselves in a situation of energy poverty who can be a beneficiary of established measures of support by the government*".

Selected measures	Type of measure	Organisation	Target groups
Social bonus for electricity	Energy bill support	National government	Vulnerable households
Disconnection protection Catalonia (Law 24/2015)	Disconnection protection	Regional government	Low-income households, vulnerable consumers
Energy Advice Points	Disconnection protection, information and awareness	Local government	No specific target group
Social Bonus for heating	Energy bill support	National government	Vulnerable households

Tab. 4 Vulnerable consumers Spanish definition. Source: EPOV (2019)

BEST PRACTICE

Ecological transition of the third sector entities for the contrast to energy poverty

Fratello Sole

Far bene all'ambiente, far bene alle persone

Fratello Sole is the first and only non-profit consortium company in Europe engaged in transferring sustainability to Third Sector Organizations. Its 12 partners serving every day thousands of vulnerable people in community homes, social and health service centers, soup kitchens and various workplaces.

It was created to actively support its Members to promote resource efficiency with the aim of **containing costs and thus allowing investments in social and welfare activities and supporting TSOs ecological transition**.

It's field of action is that of Energy Poverty referred to care facilities, that is buildings and premises where communities of people live, where social assistance is provided to vulnerable people.

Fratello Sole Energie Solidali, the first Energy Service Company (ESCo) for the Third Sector in Italy, it is the operational arm of Fratello Sole, carries out energy efficiency and sustainability interventions in the FS Partners' care facilities. The social and technical nature of ESCo is evident in its composition: 60% Fratello Sole and 40% IREN, one of the most important and dynamic Italian multiutilities.

How we operate

8 steps to multiply the results and involve the community

1

The energy efficiency project

The activity starts with the energy audit of the property to evaluate where and how energy is consumed. The energy audit is the basis of the feasibility study of the intervention which flows into the Executive Project.

2

The financial plan and fundraising

It is the financial engineering study that evaluates the intervention, considers their financeability and identifies actions for mitigate costs (specific calls, donations, subsidized loans, etc.).

3 

The Impact Assessment
It consists in measuring the impact generated in environmental, social and economic terms from the intervention of Fratello Sole. The method used is the Sustainable-ROI.

4 

Information, communication and education
Fratello Sole provides specific advice e materials for communicating the intervention with the objective to support the awareness of what it means, what it entails and what it produces.

5 

The Financial Evaluation
Fratello Sole assesses the financial impact of the intervention by defining the weight of tax benefits, public tenders and any other deductions or incentives. It evaluates the implementation of fundraising campaigns and create a plan for the residual portion.

6 

The Executive Project
It summarizes all the feasibility analysis, financing methods, impact assessment, information/communication/education activities.

7 

The intervention
The work begins. At the same time, the S-ROI evaluation and communication activities are being worked on, following the intervention right from the start.

8 

The post surgery
Once the work is completed, tests and certifications are carried out, as well as performance and consumption are measured. The post intervention also includes the training of internal staff and the communication of the S-ROI.

www.fratellosole.org

5. CAUSES OF ENERGY POVERTY

Social aspects

In recent years the increase of people in energy poverty has mainly been due to rising energy prices, low incomes and low energy performance of homes.

The following paragraph will be addressed on the social aspects that cause the phenomenon of energy poverty, the technical aspects will be taken into consideration in the paragraph dedicated to energy efficiency.

While a high at-risk-of-poverty rate is a combination of many factors (such as employment status, health of the economy, extent of public support, etc.), the high cost of trying to keep a home warm can be a considerable contributor (especially for low-income families).

Households in the bottom 20% of the income distribution have typically two to six times higher rates of energy poverty than national averages. The differences are starkest in Southern and Eastern Europe[1].

The consequences of the considerations mentioned above are:

- low-income and more vulnerable households are forced to sacrifice one essential good (basic food staples) over another, increasing their material deprivation and lowering their overall standard of living;
- countries that can devote more of their budgets to help low-income households covering the costs of housing and social exclusion often have the necessary resources.

Under a social point of view this problem exacerbates inequalities among Member States and within social groups threatening the very founding principles of the European Union.

More specifically, energy poverty affects and/or in its turn is affected by several social aspects.

5.1 Health

A not adequately warmed home, and the consequent poor indoor air quality leads to detrimental implications on respiratory,

1 The main reference of this paragraph "Social aspects", unless differently specified, is: CEB study on energy poverty in Europe

circulatory, and cardiovascular systems, as well as on mental health and well-being in the long-term[2].

Studies have shown that fuel poor households are more likely to use medical services (GPs, outpatient care, etc.) and children in such households are 30% more likely to visit a hospital or primary care physician (*Lidell 2008, Thomson 2011*).

5.2 Education

Education provides a long-lasting impact on literacy and social inclusion, thus increasing employment opportunities, thereby increasing the overall quality of life[3].

Secondly, modern, cleaner and affordable energy options can help create a more child-friendly environment that encourages school attendance and reduces dropout rates.

These barriers are exacerbated when the split incentives dilemma occurs: property owners see the improvement of healthy conditions of homes merely as a cost, as they do not benefit from cheaper energy bills, implying a general inaction towards the implementation of the needed structural energy efficiency actions[4].

5.3 Gender-gap

Due to their lower average income, **women are at a greater risk of energy poverty than men**. Clancy et al (2017) argues that by developing an energy poverty mitigation the gender-gap in society achieved[5] during the last decade, gender-based inequalities still need to be balanced at different levels and distinct areas[6].

Both in Organisation for Economic Co-operation and Development (OECD) and non-OECD countries, women continue to be disadvantaged compared to men in terms of employment conditions, representation in governing bodies and decision-making institutions, and exposure to unpaid reproductive and caring roles[7]

5.4 COVID pandemic

To these issues the expected impact of COVID-19 should be added.

The number of socially vulnerable and energy poor households is expected to increase due to COVID-19, which is going to (furtherly) hamper the social dimension of energy poverty[8].

Indeed, the health crisis (and the economic one that will follow) amplifies inequalities in terms of housing, health,

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2 Liddell, C., C. Morris (2010) Fuel poverty and human health: a review of recent evidence. Energy Policy 38, 2987–2997 & Liddell, C., C. Guiney (2015) Living in a cold and damp home: frameworks for understanding impacts on mental well-being. Public Health 129, 191–199

3 Link to ias "Energy, Poverty, and Development" - chapter 2

4 Bird, S. and Hernandez, D. (2012), Policy options for the split incentive: Increasing energy efficiency for low-income renters, Energy Policy 48, 506-514.

5 Clancy, J.; Daskalova, V.; Feenstra, M.; Franceschelli, N.; Sanz, M. (2017): "Gender perspective on access to energy in the EU". Study for the FEMM Committee, European Parliament, Policy Department for Citizen's Rights and Constitutional Affairs, DG for Internal Policies of the Union, December 2017, Brussels.

6 "Beijing 25+: the Fifth Review of Implementation of the Beijing Platform for Action in the EU Member States", EIGE, March 2020.

7 "Striving for a Union of Equality The Gender Equality Strategy 2020-2025". European Commission, March 2020.

8 Half a billion people face poverty after COVID-19 - by Benjamin Fox | EURACTIV.com

work and dependency on public transport. The quarantine (and future greater poverty and unemployment) is experienced well (or badly) depending on the quality of housing, and its level of comfort[9].

Besides, due to greater (forced) presence at home electricity and heating/cooling consumption will increase foreseeable difficulties in paying bills, with higher consequences for most vulnerable households, choosing among their basic needs, such as access to energy or food[10]. All these people will suffer durably due to the health crisis linked to Covid-19, together with the subsequent reduction in income in the coming months due to the greater difficulties in returning to work or finding work.

During the COVID-19[11] State of Alarm the EU Member States implemented relevant measures in relation to the right to energy and the guarantee of basic supplies.

Country	Cut-Off Ban	Other measures
France	Winter truce (November to March) is extended until 31/05/20 and the-reafter until 01/09/20.	Suspension of bills until 30/04/20 for small businesses (<10 employees).
Italy	Ban on water, electricity and gas cuts (10/03/20 - 17/05/20) - for do-mestic consumers and self-employed persons/ small businesses.	• Expansion of the state fund for energy and environmental services to 1.5 billion euros. • Reduction of the standard tariff (18.3% for electricity and 13.5% for gas). • Suspension of bills until 30/04/20 (11 municipalities in the red zone of Lombardy and Veneto). • Abolition of interest for late payments. • Two-month extension for renewal of social vouchers.
Spain	Spain Moratorium on cuts for all domestic consumers (31/03/20 - 30/09/20) and mora-torium on cuts only for vulnerable consumers (23/12/20 - 09/05/21)	• Extension of the period for renewing the bono social eléctrico until 15 September for those who had to do so during the State of Alarm. • Extension of the beneficiaries of the bono social eléctrico, including self-employed workers who have reduced their activity by 75%. • Regulated LPG and natural gas prices have to be reduced or maintained for 6 months from the start of the State of Alarm.

Tab 5. Summary of the most relevant measures that have been implemented in France, Italy and pain in relation to the right to energy and the guarantee of basic supplies during Covid pandemic[12]

9 Tackling energy poverty during the COVID-19 pandemic - William Baker Energy advice development lead, STEP project

10 Measures to tackle the Covid-19 outbreak impact on energy poverty. Preliminary analysis based on the Italian and Spanish - Carlos Battle

11 It has taken into account analyses of previous ESF reports, consultations with various institutions, entities, grassroots groups at EU member state level, as well as information published on ENGAGER Network website and assist2gether website.

12 Mònica Guiteras "The right to energy in the EU in times of pandemic" (2021).

6. CAUSES OF ENERGY POVERTY
Technical aspects

6.1 Energy Efficiency in the buildings of the Third Sector (TSB): the selection

In addition to the support of a team of specialized professionals, a Third Sector Organisation (TSO) refurbishing its building park, needs also to **achieve some basic skills, essential in choosing the best available options and in better looking after all the phases of planning, financing and implementation of interventions**.

It is necessary to **have clear the regulatory framework** in which TSOs operates and the legislative constraints to respect, from both the point of view of energy and seismic safety. It is also very relevant to **collect information on the structural and energy analysis of the building** as well as to know which technical evaluation tools are either already available or which to be equipped with, for an effective and conscious choice.

The first thing to establish is which buildings to upgrade: a choice neither simple nor obvious as it depends on many factors.

A right choice is based on three selection criteria to take as references:

6.1.1 Assigning priority to buildings with major available initial documentation

If you are aware in detail of the state of the art of the building, the renovation interventions will be more effective, faster and less at risk of unexpected and ongoing project changes.

The documentation collected is represented by two different kind of source:

- Structure origin: provide information on the structure of the building from the time of construction to the date of evaluation, and include interventions that have changed the structure (elevations, extensions, etc.) events that have partially or totally damaged the building, and the tracing of the intended use of the building over time.
- Energy origin: it provide information on energy installations and the envelope. They can be drawn from structural sources, energy bills, etc.

6.1.2 Priority to oldest maintenance buildings

Another criterion concerns the date of the last maintenance intervention of the building (envelope and structure) and the last replacement of the heating system.

In some cases, indeed, the building is selected because it needs immediate interventions as for safety reasons, such as the removal of plaster or coatings that could cause damage to the occupants.

6.1.3 Prioritising buildings where logistical aspects can be solved

In this case there are **two aspects to take into account: whether or not it is a historical building recognized as "cultural asset", and whether the designated use of the building self may effect the planning of the interventions**.

In the first case, the interventions will be bound to comply with the legislation on cultural goods and will probably be more expensive.

In the second case, the consistency between the interventions and the way in which the building is occupied must first be considered. In fact, we have many aspects to examine and they change in relation to whether the building hosts a school, office, nursing home or other.

6.1.4 Tools for action

Once carried out the appropriate assessments in relation to the buildings to be renovated, it is necessary to understand both the critical issues and the opportunities offered by the different possible interventions.
To this aims, two tools are available:

The Energy Audit: it is an in-depth tool that requires both documentary knowledge and activities on site.

The Energy Performance Certificate: it can be useful during the preliminary screening of the energy situation of the building.

The information provided by the EPC, unlike the Energy Audit, are not linked to the actual conditions of use of the building nor to the energy consumption drawn from bills, but they state the energy performance of the building under "ideal" conditions of use (standard).

6.2 Energy efficiency intervention

Once identified the most effective interventions in terms of cost-benefits, the actual phase of planning of the intervention follows.

To this end, it is essential a team of designers, with architectural and structural skills on seismic safety and resilience of the building to hydrogeological risks and sudden atmospheric events, as well as on energy and plant.

Below is a list of the main energy efficiency interventions that can be undertaken on a building.

Interventions can concern only some components of the building - e.g. the boiler or lighting systems - **or involve its structure**, as in the case of interventions on the façade.

They therefore have very different costs and impacts.

In any case, all interventions must be carried out in compliance with current regulations.

6.2.1 Interventions on heating and cooling systems

Heating and cooling of an entire building implies significant costs for any Third Sector Organisation. In the case of a nursing home or a family home, "lived" along 365 days a year, 24 hours a day, the costs go up further.

Also in this case, the interventions on the systems are different in terms of characteristics and impacts and should always be assessed following a careful cost-benefit analysis.

BEST PRACTICE

Rey Ardid Rosales, specialized residence for Alzheimer's patients: the first of its kind in Spain to have obtained the Passive House certification

The Rey Ardid Rosales residence, specialized in comprehensive care for people with Alzheimer's and other dementias, ensures that care improves their quality of life.

The Rey Ardid Foundation is aware of the environment, which is why **the new Rosales del Canal residence has the Passive House certificate**.

A Passive House like the Rey Ardid Rosales has **5 characteristics**:
1. high level of thermal insulation;
2. triple glazed windows with high insulation performance;
3. limitation of thermal bridges;
4. highly airtight enclosure;
5. Controlled Mechanical Ventilation system to prevent the windows from opening.

To these characteristics Rey Ardid Rosales adds:
- the **photovoltaic system on the roof** of the building, built in collaboration with the University of Zaragoza for the production of energy and domestic hot water, which, at full capacity, **is able to cover 80% of the needs of the structure**.
- the efficiency of the lighting system covered **100% by low consumption LED lamps**.
- the use of **water saving technologies**.
- general attention to the **sustainability of the materials** and their life cycle (ease of maintenance and replacement).

The building and the common areas have also been designed to maximize living comfort: they are oriented to be protected from the wind and to fully enjoy the effect of the sun.

In the course of 2020, despite the limitations imposed by Covid (including, above all, the need to often keep the windows open to facilitate the exchange of air), **the building consumed 40% less energy than in 2019**.

Link to Rey Ardid Rosales website: https://www.reyardid.org/servicios-mayores/residencias/zaragoza/residencia-rey-ardid-rosales/

Photo by Fundacion Rey Ardid

Here we have the main interventions[1].

Replacement of the heat generator

The replacement of an inefficient heat generator with one of the latest generation allows reducing the consumption for the same heat production.

It is a simple but very effective intervention, recommended for boilers older than 15 years or that start showing signs of malfunction.

Systems with modular generators

Modular generator systems are composed of several heat generators in parallel, that intervene in sequence according to external conditions and maximize the efficiency of the system.

In practice, the system allows to trigger only the necessary components depending on the weather conditions and the pre-defined heat settings, thus considerably reducing dispersion and consumption.

Condensing boilers

This solution provides the best energy performance.

Unlike a traditional boiler, **a condensing boiler recovers and exploits the combustion gases normally expelled**. The gas is used to heat water and only later on it is transformed into condensation and released.

Hybrid systems

They partially or fully replace the winter air conditioning systems and **consist of a heat pump integrated with a condensing boiler that work in conjunction with each other**.

Depending on the external atmospheric conditions, the system activates one or both components, thus optimizing the consumption.

1 Legenda:

environmental and social impact: less exploitation of resources (energy, water, gas), reduction of polluting emissions, more well-being and health for the people who "live" the building, direct savings on the energy bills.

financial impact: the size of the investment to be carried out.

Heating and cooling implies significant costs for any Third Sector Organisatio. In nursing home or family home, "lived" along 365 days a year the costs go up further.

The hybrid system also recovers the latent heat of exhaust fumes with a further reduction in consumption in the bill.

Microcogenerators

Micro Combined Heating and Power (MCHP) are systems with power less than 50 kW, producing heat and electricity at the same time. In practice, the hot water produced by the boiler heats the gas, which, in turn, moves a piston that generates electricity. The latter, directly produced, is much cheaper than the one purchased from the grid with significant cost savings.

The small size of the systems makes them suitable to cover a household's needs.

Insulation of Heating and Hot Water Distribution Networks (OVD)

Losses in the heat distribution can affect even more than 20% on the consumption of a building.

To avoid losses, **it is possible to intervene in a simple way inside**

FATHER FRANCESCO MURGIA of Villa Speranza, San Mauro Torinese, beloging to the Congregation of Somascan Fathers

What were the main obstacles you faced to restructuring?
Before meeting Fratello Sole, an attempt had been made with another supplier who had proposed a different solution. But to an advanced stage of the work, the company went bankrupt, and brought to the Congregation significant economic difficulties. ***Main difficulty was precisely to find reliable interlocutors****, ablet to provide an objective analysis of needs and appropriate solutions.*

How important was funding in the renewal decision-making process?
It was fundamental for us. ***We had no funds, and we were in serious difficulty because we came from that previous negative experience****.*

What prompted you to renovate the building?
The correspondence between our expectations and the expected result pushed us.

After renovation and retrofitting the building, what you think are are the main benefits?
Certainly ***the reduction in consumption and the consequent economic savings, which we have quantified around 30/35% compared to previous costs****. The second advantage, no less important, is that it has allowed us to regularize a situation that from the point of view of the safety of the fire regulations was not yet in place.*

the thermal power plants and in the cellar distribution, which is in the "visible" piping sections (horizontal distribution grid).

The reduction of thermal losses along the pipes brings energy benefits throughout the year, affecting, in fact, also the recirculation of hot water.

In the process of removing the existing insulating material it is necessary to pay great attention to the presence of the asbestos, very frequent in the buildings built in the 60', and eventually activate all the procedures to safely work and dispose of the material.

Replacement of recycling systems and distribution pumps

The energy performance of a building depends on the efficiency of each individual component.

Some of these components consume energy along 365 days a year, 24 hours a day, such as distribution pumps, which serve to bring hot water into the heating and sanitary facilities.

The old-style pumps are directly connected to the power supply, at constant speed even when it is not necessary, without adapting to the requirements of the system.

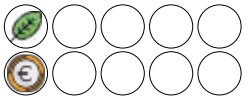
The introduction of a speed control system may reduce the water flow rate and, in an even more sensitive way, the power absorbed by the engine.

In addition, with variable speed pumps and circulators, the noise level of the system is significantly reduced.

Replacement of manual radiator valves with thermostatic valves

Thermostatic valves allow the flow of hot water to be automatically adjusted in order to keep the temperature constant in each room.

Thanks to a thermoregulation valve, it is possible to control the temperature inside the rooms (the control of the supplied thermal energy is the basis of energy saving) and make better use of the "free heat" due to the presence of people, lighting, sun etc.



6.2.2 Replacement of windows and doors

The replacement of the fixtures is

The replacement of the fixtures is a simple intervention that allows to achieve a reduction in heating energy consumption and improving the thermal comfort of the rooms.

BEST PRACTICE

VOCE: the renovation of the new volunteer hub in Milan in the name of energy efficiency

VOCE
VOLONTARI AL CENTRO

2.500 square meters of volunteer work, green actions and sustainable tourism in the heart of the Porta Nuova district in Milan. Five plans that will combine services to metropolitan volunteering, architectural sustainability, the incubation of new social entrepreneurship and "slow" tourism thanks to a hostel and a restaurant at km 0.

This will be VOCE at the end of the renovation.

The renovation project is based at the same time on respecting the historical value of the building and on innovation - architectural and plant engineering - and provides for important interventions aimed at reducing energy consumption.

Between these:

- Internal wall insulation, inserted in prefabricated drywall counter-walls, preferred to the external wall insulation for reasons related to the preservation of the image of the building;
- Groundwater heat pumps for heating and cooling the building;
- Heat recovery units integrated with air/air heat pumps placed on each floor for the exchange of air in the rooms;
- A technological center with high efficiency reversible heat pumps to improve the energy efficiency of the system;
- High-efficiency photovoltaic panels on the roof;
- A building automation system for the control of the plants capable of verifying all the information coming from the subsystems and better manage energy resources.

Info: link to VOCE website http://www.voce.milano.it

a simple intervention that allows to achieve a reduction in heating energy consumption and improving the thermal comfort of the rooms.

It can be designed to isolate a room or a heated area from the outside or from unheated parts of a building.

These interventions include the installation and installation of:

- windows;
- front doors;
- shutters, roller shutters, built-in roller shutter box (if integral with the windows) and accessory elements (simultaneously with the windows);
- sun awnings (north oriented);
- glass replacement.

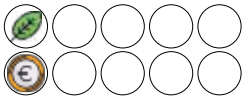
6.2.3 Interventions on lighting systems

The replacement of old light bulbs and light sources with high brightness and efficiency LEDs guarantees a reduction in energy consumption.

LED lamps produce great brightness with significantly less heat loss than traditional ones.

From an environmental point of view, **the biggest advantage of LED bulbs is their superior lifespan: after 50,000 hours they still maintain up to 70% of the initial emission and have an outstanding operational lifetime expectation up to 100,000 hours**.

Therefore, the frequency of changing LED bulbs is greatly reduced compared to traditional light bulbs, so fewer light bulbs will end up in the landfill and this means less waste.



6.2.4 Interventions on electrical equipment

Replacing household appliances with energy-efficient models leads to substantial savings on energy bill.

Between these:

- ovens;
- refrigerators;
- dishwasher;
- electric cooktops;
- washer dryer;
- washing machines;
- dryers.

6.2.5 Interventions on the building envelope

The energy efficiency measures on building envelope have a much greater impact on energy consumption than other above mentioned interventions.

They require a higher economic investment but generate significant economic and environmental benefits.

Even setting apart the costs of building envelope retrofitting, other variables can affect this choice, such as the general building state of conservation, the presence of environmental, cultural and aesthetic restrictions, etc.

Here below the most common energy efficiency interventions on the building envelope.

Thermal insulation of the pitched roof: under-tile insulation system

The intervention, recommended in

cases of inhabited attics, **involves the installation of thermal insulation panels under the tiles**.

The insulation of the roof **allows to reduce thermal dispersions up to 80%**, improves thermal and acoustic comfort, avoids the build-up of condensation and mold and protects from sudden thermal fluctuation.

Insulation of the pitched roof: intrados insulation of the attic

The intervention, recommended in cases of unheated attic above a heated room, can be done by simply laying insulating material on the attic floor.

The intrados insulation of the floor **allows to reduces thermal dispersion up to 70%** and improves thermal and acoustic comfort.

External insulation: external wall insulation system

The external wall insulation system is one of the best known and most practiced energy efficiency interventions.

It consists of an insulation board attached either adhesively or mechanically, or both, to the building wall structure; an integrally reinforced base coat; and a textured protective finish coat.

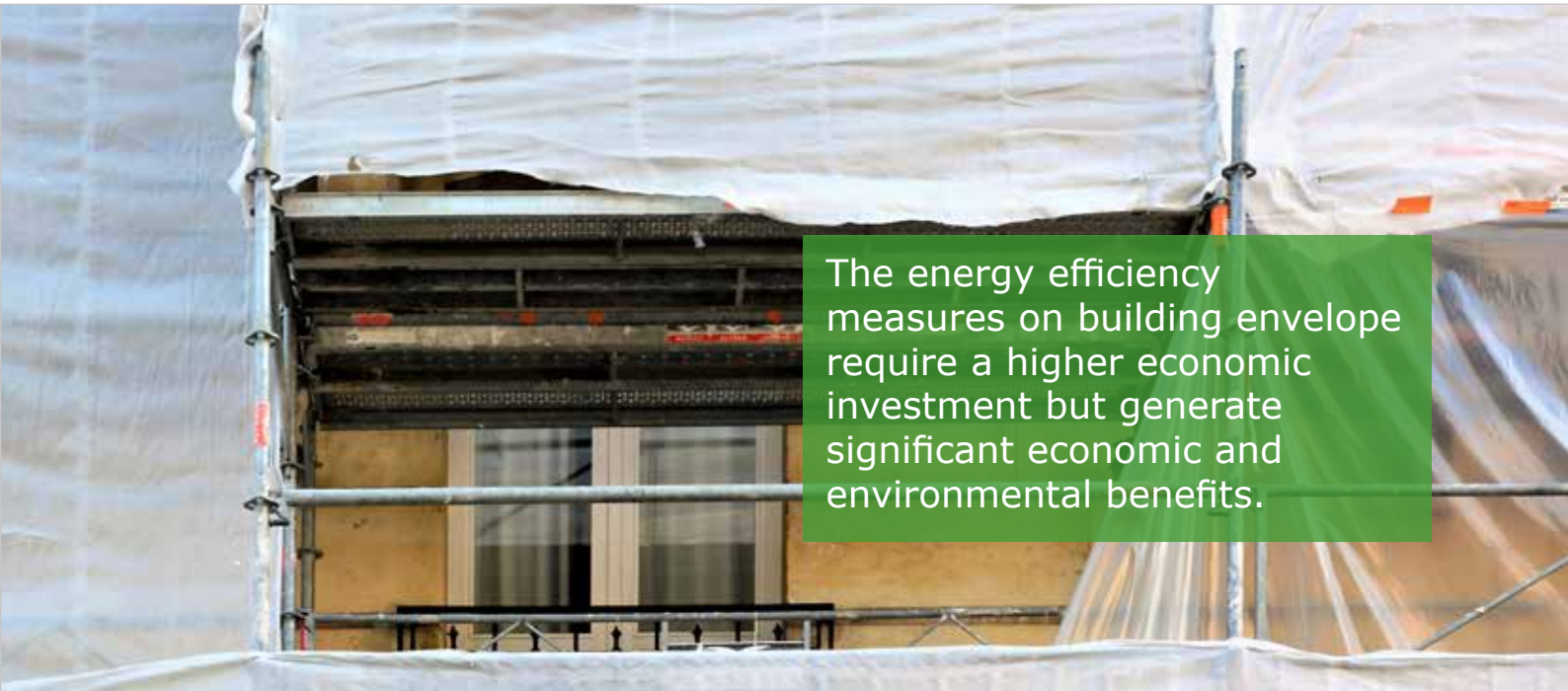
External insulation is particularly suitable when the external walls are made of solid or perforated bricks and /or concrete, but it is not feasible on historic façades with fine decorations.

It offers continuous insulation, avoids the build-up of condensation and mold and improves thermal and acoustic comfort of the internal rooms.

The external wall insulation is more affordable, and recommended, when the façade requires extraordinary maintenance work, such as the plaster reconstruction.

External insulation: rainscreen system or ventilated façade

A rainscreen system, or ventilated façade, **is a dry-built screen in which the interspace between the cladding and the wall allows the natural flow of air, this "chimney effect" reduces overheating and replaces mechanical ventilation with natural ventilation** outside the heating season.



The energy efficiency measures on building envelope require a higher economic investment but generate significant economic and environmental benefits.

The rainscreen system is also effective during the winter season: it retains heat for a long time.

It has a higher noise absorption effect, reduces water vapor in excess and improves the housing comfort.

If in terms of thermal insulation the benefits of the ventilated façade are slightly lower than those of an external wall insulation system, they are balanced by the advantages provided in the summer period.

This kind of intervention is not feasible on high quality finish façades.

Solar panels and solar thermal storage systems

The environmental benefits of photovoltaic systems and solar thermal storage systems are well known.

Photovoltaic cells use sunlight as a source of energy and generate direct current electricity for lighting and powering electrical appliances and household appliances; they allow to reduce air pollution and greenhouse gases and electricity consumption.

These effects are directly related to the size and power of the system.

Solar thermal collectors

Unlike solar panels, **solar thermal collectors are used for the production of hot water for domestic and industrial uses** or to cover the needs for hot water in swimming pools, sports facilities, nursing homes and schools.

The use of solar collectors allows to reduce air polluting hydrocarbons (CO^2, sulfur oxides, nitrogen, and PM10) and energy consumption.

It is an affordable technology (the simplest form consists of a black colored metal tube), **with low construction and disposal costs and high thermal efficiency.**

The solar thermal collectors and boilers must be guaranteed for at least 5 years (accessories and electrical and electronic components for at least 2) and must have the Solar Keymark certification and quality certification in compliance with UNI EN 12975 or UNI EN 12976 standards.

Shading with plants for solar control of buildings

The use of plants to shelter from the sun is a tradition in Mediterranean countries. The foliage of the plants is used for shading outdoor spaces, window surfaces, loggias and balconies.

It is a complex intervention from the design point of view, which requires constant maintenance and depends on the building characteristics, its position and the quantity/quality of the outdoor space.

In summer, thanks to the shielding of the plants, it is possible to obtain a reduction in the internal temperature up to 6° C. The greenery protects from the sun's rays and reduces the temperature of the air surrounding the building.

Usually deciduous plants are used: they allow to enjoy the sun during the winter months without using artificial lighting.

Efficiency of plant-shading clearly depends on the type of plants and how they are placed.

6.2.6 Building Automation

A building automation system (BAS) is an intelligent system comprising both hardware and software, and **providing automated control and monitoring of heating, venting, air conditioning and domestic hot water production, lighting, security and other systems**.

Through the installation of a building automation system is possible to quickly identify the critical areas in which it is necessary to intervene. In general, the objectives of building automation system are: improving housing comfort and reducing energy consumption.

6.2.7 Whole-building retrofit

The whole-building retrofit combines a set of interventions affecting the entire building and

BEST PRACTICE

St. Ilario Vescovo parish
Green oratory and new community of minors

The parish of Sant'Ilario Vescovo in Milan represents a concerted example of energy efficiency interventions on a building that has an important social function within its community.

The renovation - carried out by Fratello Sole Energie Solidali - has achieved a **double objective: consume less energy and allow people to enjoy spaces that are adequately heated in winter and cooled in summer**.

The intervention **concerned the oratory of the parish and the premises of the new community dedicated to unaccompanied foreign minors** managed by Caritas Ambrosiana, through a social cooperative. The social operators works every day to allow children to be concretely helped to integrate through language learning, vocational training, work orientation and sociability.

The energy efficiency interventions carried out:

- Thermal insulation of the roof and external walls.
- Replacement of windows.
- Replacement of the gas boiler with a new condensing boiler in the service of the Church.
- New heat pump generation system for heating and cooling.
- Solar panels on the roof for the production of hot water.
- Replacement of lighting fixtures with LED lights.
- Remotely controllable thermostatic valves.

The oratory and the the neighborhood near the church

7. TAX INCENTIVES & OTHER FUNDS

7.1 Spain

Main building renovation programs in Spain are:

- PREE- "Programa de Rehabilitación Energética para Edificios Existentes" Existing Building Energy Renovation Program.
- PREE 5000– "Programa de rehabilitación energética para edificios existentes en municipios de reto demográfico" Existing Building Energy Renovation Program in towns of demographic challenge (< 5.000 inhabitants).
- PRTR-Component 2 -Programs for residential renovation and social housing of the Spanish Recovery, Transformation and Resilience Plan (RD 853/2021) NPOs can access to PREE and PREE 5.000 to renovate their buildings and to PRTR component 2 if they are owner of households which need renovations.

7.1.1.PREE and PREE 5000

The **actors involved** are:

- Ministry of Ecological Transition and Demographic Challenge provides funds.
- IDAE- Spanish Energy Agency coordinates and follows the program.
- Regional governments launch calls and allocate funds.

Beneficiaries:

- Natural or legal persons of a private or public nature that are owners of existing buildings destined for any use.
- Communities of owners or groups of communities of owners of residential buildings for residential use.
- Operating companies, tenants or concessionaires of buildings, which accredit said condition.
- Energy service companies (ESCOs), or energy service providers.
- Local Entities and the institutional public sector of public administrations.
- Renewable energy communities and citizen energy communities.
- City councils, provincial councils or equivalent local entities and associations or groups of Spanish municipalities, councils and island councils, the administrations of the autonomous communities or of the cities of Ceuta and Melilla, and public bodies and public law entities linked or dependent on the aforementioned public administrations, which may act on behalf of communities of owners or other owners of buildings.

Elegible existing buildings

Complete buildings of the following uses:

- Single-family residential buildings.
- Residential collective housing typology buildings.
- Buildings for any other use (administrative, health, educational, cultural, etc.).

Eligible interventions:

There are three types of interventions:

1. Improvement of the thermal envelope

2. Improvement of energy efficiency of thermal installations, such as:

- Replacement of conventional energy with thermal solar energy.
- Replacement of conventional energy by geothermal energy.
- Substitution of conventional energy for biomass in thermal installations.
- Improvement of the energy efficiency of generation subsystems not previously included, such as the heat pump.
- Improvement of the energy efficiency of distribution, regulation, control and emission subsystems of thermal installations.

3. Improvement of energy efficiency of lighting

For PREE, buildings must have been built before 2007, and they must improve the Energy Performance certificate by at least one letter, measured on the carbon dioxide emissions scale (kg CO2 /m2 year), with regarding the initial energy performance certificate of the building.

For PREE 5000, buildings must justify a 30% reduction in non-renewable primary energy consumption and achieve a jump of one letter in carbon dioxide emissions with respect to their initial situation, through the EPC of the building in its current state and the achieved after the reform.

PREE Subsidies

- 35% of the cost of the intervention, except for lighting energy efficiency for which 15%.
- 15 % of additional funds if the intervention involves people in energy poverty situation.
- 15 % of additional funds if the interventions achieve EPC A or increase the EPC two letters.
- 20% of additional funding if the renovation integrates two or more interventions

PREE 5000 Subsidies

- 50% of the cost for improvement of envelope.
- 40% of the cost for improvemet of thermal installations.
- 20% of the cost for energy efficiency of lighting.
- 15% of additional funds if the intervention involve people in energy poverty situation.
- 15 % of additional funds if the interventions reachs EPC A or increase the EPC two letters.
- 25% of additional funding if the renovation integrates two or more interventions.

7.1.2 PRTR- Component 2: Programs for residential building renovation and social housing

The **actors involved** are:

- Ministry of Transport, Mobility an Urban Agenda provides funds.
- Regional governments launch calls

and allocate funds.

There are 6 programs:

1. Renovations at neighborhood level.

2. Development of renovation one-stop shops.

3. Renovation at building level.

4. Improvement of Energy Efficiency at Household level.

5. Preparation of the renovation book of the existing building and drafting of renovations projects.

6. Construction of new social rental housing with energy efficiency criteria.

If a NPOs has residential buildings can ask for funding in programs 3 and 4.

Program 3: Renovation at building level

The purpose of this program, both in urban and rural areas, is to finance interventions in buildings for predominantly residential use in which achieve an accredited improvement in energy efficiency, with special attention to the building envelope in collective residential buildings, including all household, and in single-family household.

Beneficiaries:

- Natural or legal persons of a private or public nature that are owners of existing buildings destined for any use.
- Communities of owners or groups of communities of owners of residential buildings for residential use.
- Operating companies, tenants or concessionaires of buildings, which accredit said condition.
- Local Entities and the institutional public sector of public administrations.

Eligible interventions and subsidies:

Eligible actions are those which provide a reduction of at least 30% in the indicator of non-renewable primary energy consumption (Δ ep,nren), referring to the EPC.

The amount of the subsidy depends on the energy savings (Δ ep,nren)

Energy Saving	Max % of the total cost	Household	Locals for non-residential use
		Max € per household	Max € per m^2
30% < Δ ep,nren < 45%	40	6.300	56
45% < Δ ep,nren < 60%	65	11.600	104
Δ ep,nren < 60%	80	18.800	168

Program 4: Improvement of Energy Efficiency at Household level

The purpose of this program is to finance intervention to improve energy efficiency inindividual household, whether single-family or belonging to collective buildings.

Beneficiaries:

- Owners, usufructuaries or tenants whether they are natural persons or have legal personality of a private or public nature.
- Public administrations and bodies and other entities governed by public law,as well as public companies and commercial companies wholly or majority owned by the public administrations that own the properties.

Eligible households:

Households must be the habitual residence and of their owners, usufructuaries or tenants at the time of requesting the subsidy.

Eligible interventions and subsidies:

Eligible actions are those which achieve a reduction in the global annual energy demand for heating and cooling of at least 7% or a reduction in non-renewable primary energy consumption of at least 30%.

Interventions to modify thermal envelope to fulfil energy savings requirements of Technical construction code will also be considered eligible.

- The minimum cost of the intervention must be equal to or greater than 1.000 euros per dwelling.
- The amount of the subsidy will be 40% of the cost of the intervention, with a limit of €3,000.

7.2. Italy

The tax deduction for energy renovation of the existing building stock (Ecobonus) was introduced by National Budget Law 2007 (Law n.296, dated 27 th December 2006[1]) and has been reconfirmed every year by the annual National Budget Law. Until the last confirmation due to the National Budget Law 2021 (Law n.178, dated 30 th December 2020[2]).

The "Rilancio Decree" (Law Decree n.34/2020, converted in Law n.77/2020 on 17 th July 2020[3] 3) introduced

the Superbonus 110% Scheme "Tax deduction for energy renovation and anti-seismic interventions in private buildings".

The **actors involved** are:

- Ministry of Economy and Finance establishes the annual budget for the measure.
- ENEA manages the measure.
- Ministry of Economic Development defines technical requirements.
- Revenue Agency defines fiscal aspects and performs the audits.

Advantages from tax deduction:

- high rate of fiscal deductions;
- large spending limits;
- fiscal credit transfer;
- several eligible interventions;
- several eligible subjects;
- buildings of any real estate register category;
- increased comfort;
- property added value;
- reduction in energy costs;
- simplified documentation.

Advantages for the system:

- recovery of the existing building stock
- functional performance;
- seismic risk prevention;
- support for the construction industry;
- support of the production and of the employment of the sector:
- contrast to illegal work;
- alleviation of energy poverty;
- accelerating the diffusion of advanced technologies;
- environmental benefits, such as reduction of CO 2 in the atmosphere;
- energy savings.

7.2.1 Ecobonus

Main characteristics:

- Energy efficiency interventions for Private Buildings (residential and non).
- Deduction of 50%, 65%, 70%, 75%,

1 Law n.296, 27 th December 2006 - Link to the law
2 Law n. 178, 30 th December 2020 - Link to the law
3 Law n.77, 17 th July 2020 - Link to the law

80%, 85% of eligible expenses (depending on the intervention/s that is/are carried out).
- Deduction from IRPEF (Personal Income Tax) or IRES (Corporate Income Tax) Taxes.
- Deduction is made over 10 years.

Beneficiaries:

- Owners or holders, and tenants;
- Cohabiting family members;
- Public and private companies, only for instrumental buildings;
- Autonomous public housing institutes.

Eligible existing buildings:

- Belonging to any cadastral category (enlargement is therefore excluded).
- Heated (the shift from centralized to autonomous systems is excluded).

Eligible interventions:

- Global energy renovation of buildings.
- Building envelope (such as insulation, replacement of fixtures, solar shading).
- Installation of solar panels.
- Replacement of thermal systems (such as condensing boilers, heat pumps, biomass boilers, hybrid
- systems, micro-cogenerators, heating and domestic hot water (DHW) production plants).

- Building Automation Systems.
- Common parts of condominiums for interventions on the envelope.

7.2.2 Superbonus 110%

Main objectives:

- Restart the economy (after Covid-19).
- Revive the construction sector.
- Contribute to the renovation objectives of existing building.

Beneficiaries:

- Condominiums.
- Natural persons outside the business activity.
- Autonomous public housing institutes.
- Undivided ownership housing cooperatives.
- Buildings belonging to non-profit organizations, voluntary organizations and social promotion associations of the third sector.
- Non-amateur sports associations and clubs, but only for interventions relating to changing rooms.
- Renewable energy communities, for renewable source plants.

Eligible existing buildings:

- Condominiums: buildings consisting of 2 to 4 real estate unit (separately in the cadastral register) even if owned by a single owner or jointly owned by several individuals.
- Single family buildings.
- Functionally independent real estate units with independent access from the outside.

Eligible interventions:

- Thermal insulation interventions (refurbishment of at least 25% of the external surfaces).
- Replacement of the heating plants.
- Other energy efficiency interventions can be associated, which overall must improve the EPC (Energy Performance Certificate) of the building by at least two classes.
- Anti-seismic interventions.
- RES and infrastructures for electric vehicles.

If you do not have tax capacity, alternatively to the ability to take advantage of the 110% deduction, you

can opt for a discount on the invoice or for the credit assignment to other entities or banks, partially or for

the entire amount due.

Success factors:

1. High rate of deduction: the 110% rate provides for a full remuneration of the expenses incurred for certain types of intervention, including discount costs (Expenditures from 1 st July 2020 to 30 th June 2022).

2. Combating energy poverty with:

- Invoice discount.
- Credit assignment.
- Institutions for social housing and non-profit organization among the beneficiaries.

Social Energy Renovations (SER)
Maximising social impact and boosting clean energy investments in sustainable renovation

The third sector is composed of 28.3 million workers, representing 13% of the European workforce, and generates significant social impact.

Yet, it remains underserved by the financial industry making it challenging for non-profits to obtain the financing necessary to sustainably renovate their buildings.

The lack of financing has played a large part in the absence of third sector building renovations, as non-profit organisations typically do not have the means to fund renovations with their own resources or obtain cheap funding.

SER project - finenced by the European Union's Horizon 2020 - tackles current barriers to renovation for the third sector by offering **an integrated renovation solution that combines affordable financing and technical assistance**, thus enabling easy and accessible sustainable building renovations for non-profits.

This solution **involves people-centric stakeholder engagemen**t, standardised technical project design, impact monitoring, and up-front financing. The project aims to simplify renovation by digitising the renovation process and providing support through a streamlined ESCO service.

Finally, **SER enables a flow of private capital into the non-profit sector, thus maximising social and environmental impacts**.

The project Pillars:

- Innovative Financing Mechanism: design, set up, and implement **an innovative de-risking financing mechanism** in which energy service companies will be enabled to facilitate affordable sustainable building renovations in the third sector.
- Technical Assistance: SER provides improved **technical assistance services** through demand stimulation, standardisation, and digitisation. This promotes community training and development, data centralization, and audit standardisation.
- Social Assessment: assess and capture the multiple benefits of energy efficiency and renewable energy renovations to ensure that investments have a strong social and environmental impact.
- Scaling Across Europe: SER is focused on Italy, with **further scaling foreseen in Bulgaria and France, and exploratory roundtables in Germany, Czech Republic, Slovakia, and Poland**.

Info: link to SER website: https://www.ser4impact.eu/

A "GENTLE PUSH" TOWARDS SOLIDARITY ENERGY COMMUNITIES

"In the third sector we like the term "community" and, when we find it, we throw ourselves headlong. This key word, which is part of our history and our consistency (the third sector is a community par excellence and solidarity by birth), today is intertwined with the theme of energy and poverty. Few people in the Western countries know that the daylight is a privilege, and that many children lose their right to education as soon as the sun goes down. Few people know that many families cook with fires made from landfill residues (woods impregnated with toxic paints) just to cook: it is called "Clean Cooking" ... These realities are mostly unknown because they are distant from the Western world even if, sometimes, they are hidden also in the urban contexts. Energy bills are no longer sustainable for both families and non-profit organizations. The number of families in energy poverty is exploding as a new and uncontrolled phenomenon. In Europe before the 2022 crisis, over 50 million people were in this condition.
For this reason, the trinomial - community / solidarity / energy - takes on an overall value of the highest profile that deserves attention and support.

What can potentially be achieved is a production of renewable energy consumption through an intelligent action of linking and gathering families and people, small companies, local shops in the same area (the community) to create a system capable of keeping out of energy poverty those people with incomes at the limit of the poverty line.

Encouraging this line of development not only allows to boost the environment by decreasing the ecological footprint, but it is a "gentle push" towards building good relationships between people. We'll make it? Will these actions be able to implement an education in respect and care of the territory where we live? For example, bringing attention to waste recycling or the circular economy or other actions that each individual community will invent on its own territory?

Yes, of course!

And not because we have to be optimistic by force, but because these dimensions are generative and creative in themselves, they are "gentle pushes" towards a well-being of people and, therefore, of the community. Because "community" is not liked only by the Third Sector, but is constitutive of the human being.

Fabio Gerosa, President of Fratello Sole

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