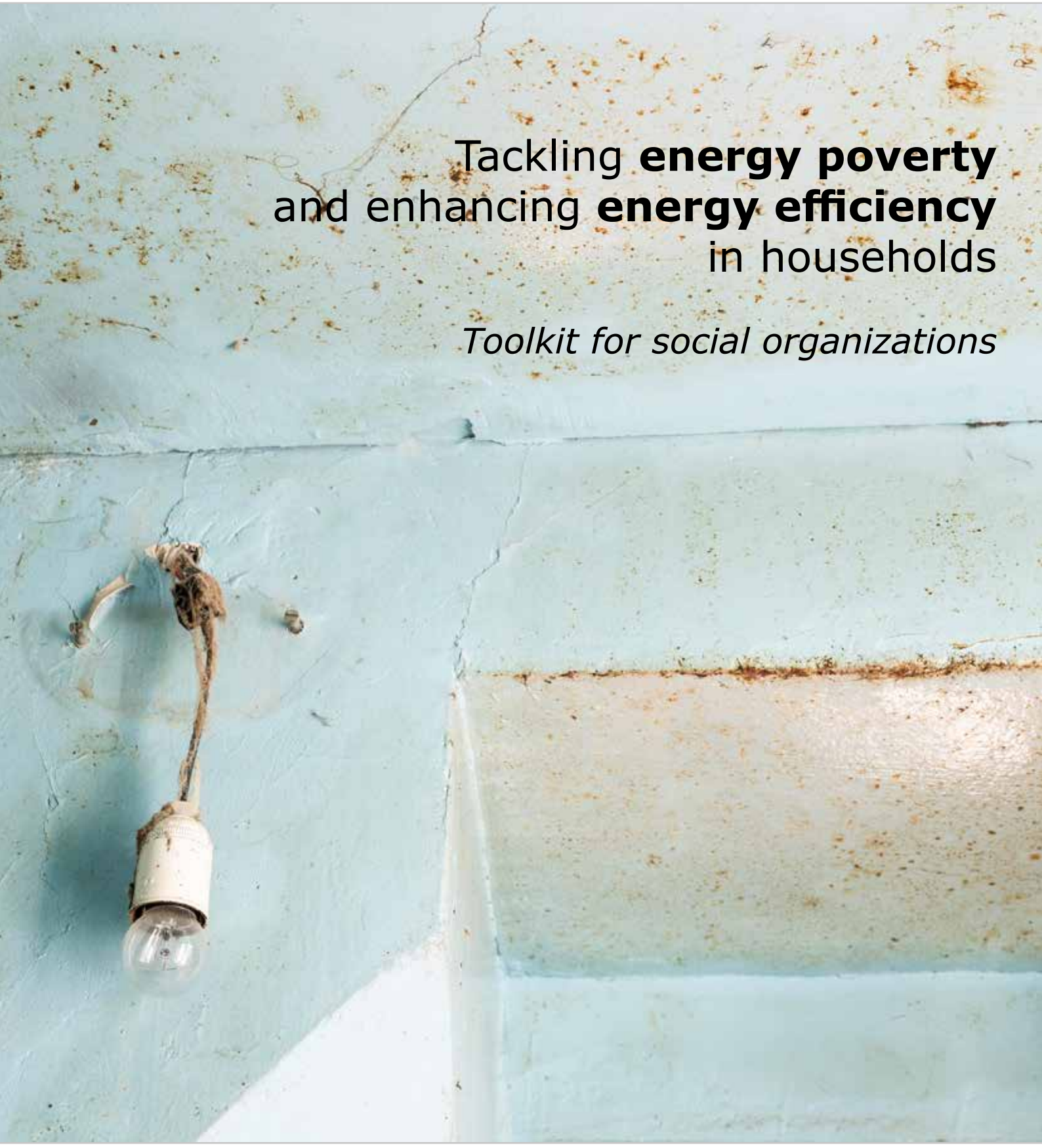
Erasmus+

GreenAbility
green abilities to tackle social issue



Tackling **energy poverty** and enhancing **energy efficiency** in households

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

HOW TO DETECT AND ADDRESS ENERGY POVERTY

1. Get in touch with the family and learn about their energy consumption and habits.

find out more on page 30

2. Help them understand their bill and switch providers if necessary

find out how on page 31

3. Help them save energy by using it more efficiently at home

discover the good habits in order to save energy on page 44

HOW TO DETECT AND ADDRESS ENERGY POVERTY

4. Contribute to designing, implementing and financing energy efficiency interventions in their homes.

4.1 find out the main steps of the renovation project management on page 29

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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. 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.

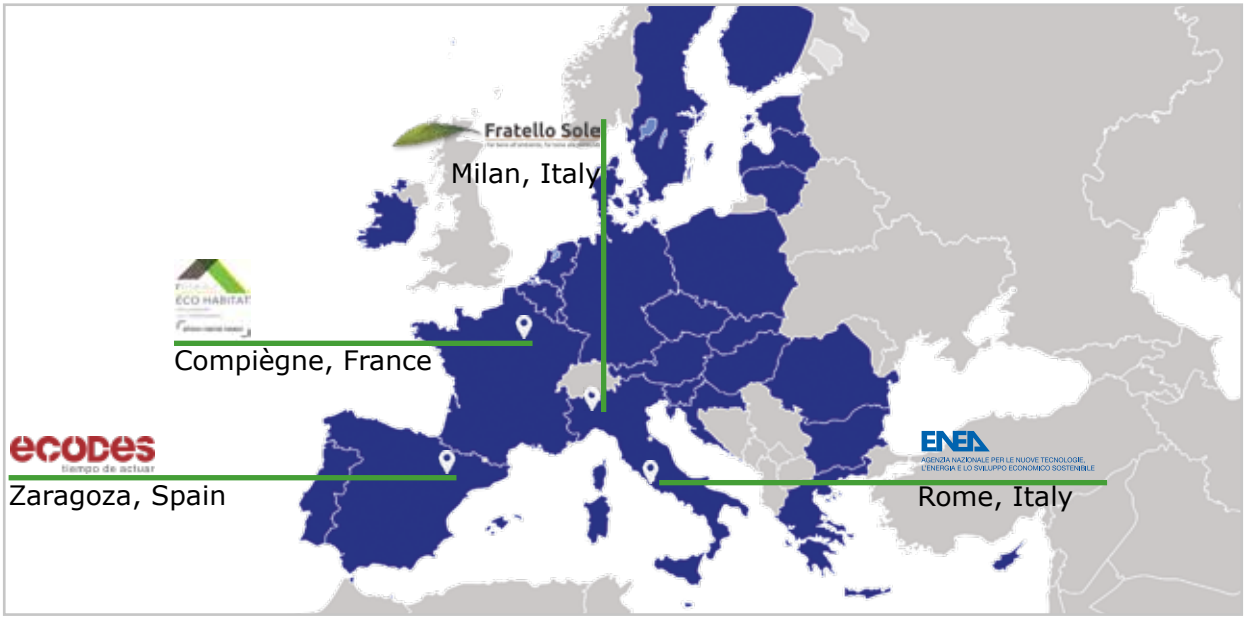
But **issues like energy affordability and thermal efficiency, financial support for energy efficiency and maintenance interventions, the purchase of more energy-efficient household appliances and the adoption of sustainable practices and behaviors, call for specific upskilling competences** which social 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 partners: 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
- **Réseau 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 an instrument for social operators.
Its aim is to provide information and knowledge on how to face energy problems from a social and behavioral point of view together with some technical advice.

In particular, **this specific toolkit is dedicated to social operator engaged in helping low-income households and persons in need**, affected by social problems and also by energy poverty as they fall behind on the payments of their utility bills.

Inside the document **social operators can find advice and information on how to manage a renovation both in condominiums and in single houses, good habits to save energy at home, micro efficiency measures and solutions to improve energy efficiency in households**. And also information on how to save money optimizing the energy contract.

The toolkit is the result of the elaboration and 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.

All the issues related to the development of this guide were discussed and approved within the GreenAbility Lab.

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

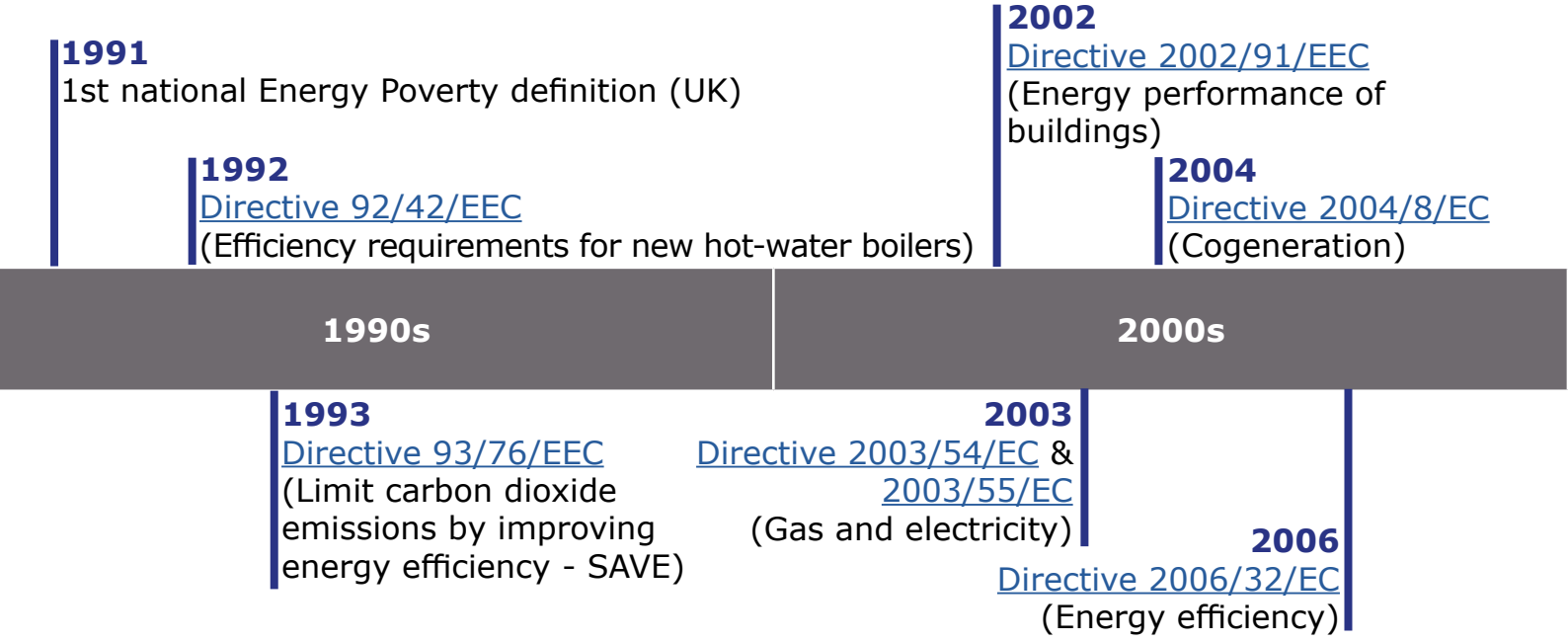


Fig. 2 European framework about energy poverty time line

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].

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 Commission guidance on relevant*

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

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. This recommendation considers energy poverty as the situation in which households cannot access essential energy services, including adequate heating, air conditioning and lighting and

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

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

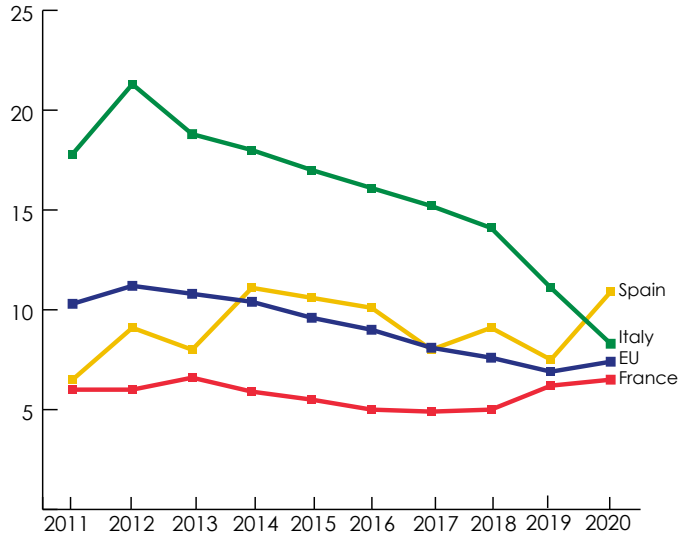


Fig. 3 Graphs about percentage of the population that is unable to keep home warm". Source: Eurostat on May 16, 2022.

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

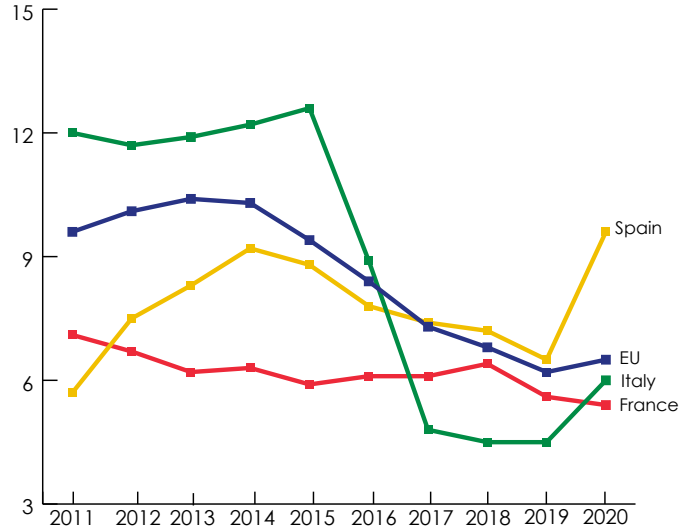


Fig. 4 Graph about percentage of the population that has arrears on utility bills. Source: Eurostat on May 16, 2022.

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%.

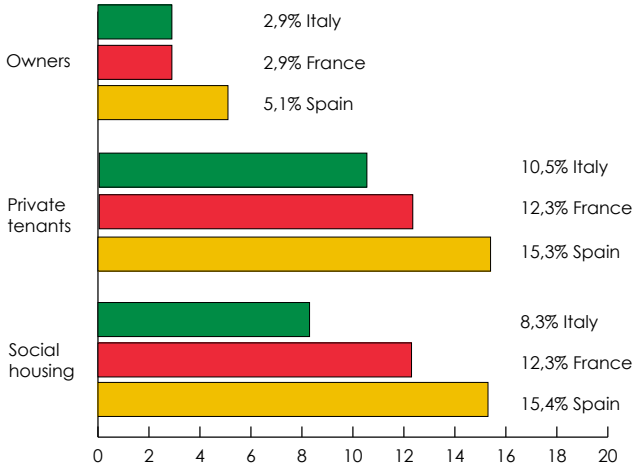
In Italy the share of the population with arrears on utility bills remains relatively constant between 2011 and 2015. It sharply decreased from 12.6% to 4.8% between 2015 and 2017 thanks to the introduction of dedicated bonus on the energy bill. In 2018 and 2019 the share furtherly decreased up to 4.5%.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

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

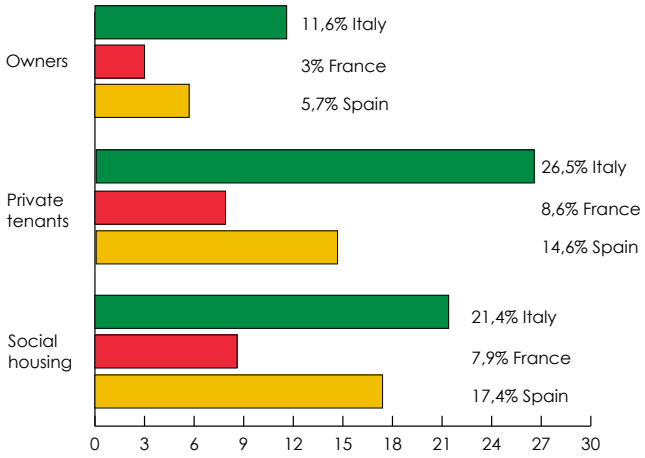


Fig. 5 Graphs about percentage of the population that is inability to keep home warm and percentage of the population that is Arrears on utility bills disaggregated by tenure type (disaggregated by tenure type)

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)**

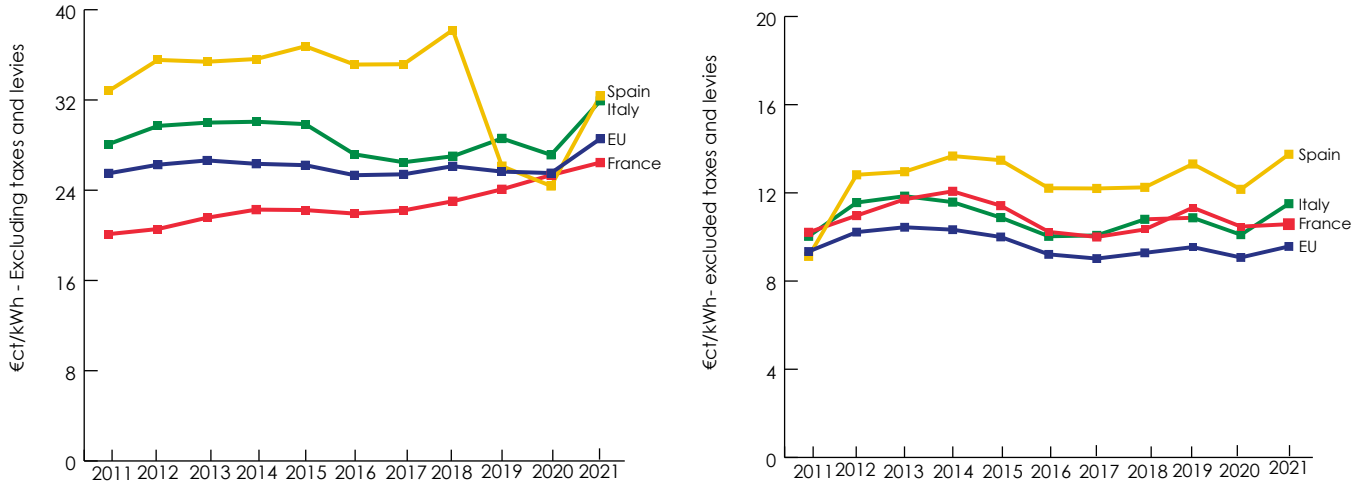


Fig. 6 Graphs about household energy costs (electricity and gas price). Source: Eurostat on April 19, 2022

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

An important European legislative document concerning the energy

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

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].

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.

The definition and the measures reserved for the vulnerable consumers' in France, Italy and Spain are described below:

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 do not 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
Financial help regarding arrears on energy bills	Energy bill support	Local government	Low-income households

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.

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)

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, circulatory, and cardiovascular

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

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, work and dependency on public transport. The quarantine (and future greater poverty and unemployment) is

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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

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 thereafter 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 domestic 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 moratorium 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 Spain 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. THE IMPLICATION OF SOCIAL ACTORS AS KAY TO TACKLE ENERGY POVERTY

Energy poverty is not always related to people or families who suffer another type of poverty or who already come from a situation of economic poverty.

Energy Poverty, being a multi-cause problem, its situation varies depending on which of the causes has more weight, although the final consequence is the same, not being able to cover the basic energy needs.

6.1 Detection & Support: The implication of social actors as key to tackle energy poverty

Due to this fact, there is what **is called "hidden energy poverty" and refers to those people who suffer energy poverty but who do not ask for help to social services or NGOs**, and rely on family networks or suffer directly the problem locked in their homes, making it very difficult to detect.

In the event that they request help, social services and NGOs are essential to detect these situations. To do this, they should collect information such as:

1. Average **amount of money allocated to energy bills** per month.

2. Monthly **family income** (if point 1 represents more than 10% of income, it would be an indicator that this family may suffer energy poverty).

3. Ask **if they can keep their home at a suitable temperature** in summer and winter.

4. Ask if they **have debts or are late in paying bills**.

Social operators are essential in detecting the problem, and in accompanying these people in the process towards improving their situation regarding this problem.

Many times, people who suffer from energy poverty find it difficult to recognize their problem and share it.

The position of trust that social perators have is very important to be able to detect and assist in the improvement of their situation.

Social operator roles:

1. Detection

Through interviews with people who come requesting aid.

2. Planning

Drawing up a roadmap to improve your situation that may include:

- Application of efficient consumption habits.
- Detection of energy efficiency needs in homes.
- Search for financing for the implementation of energy efficiency measures.
- Optimization of energy supply contracts.

3. Support

In the application of the previous recommendations.

Social operators are the people who, due to their position, have direct contact with people who may suffer energy poverty.

For this reason, it is essential to provide them with tools and technical training in environmental and energy efficiency aspects that allow them to provide a much more comprehensive and effective care with these people.

6.2 How to improve energy efficiency families

Household renovations to improve energy efficiency is crucial to tackle energy poverty in long term.

6.2.1 Management of a renovation project: from diagnostics to hand-over to owners

The first step to carry out an improvement of the energy efficiency of a house in a block, follows the following process:

1. Personal Interview

The first step is to conduct an interview with the family to find out their situation and needs.

In this interview, information about their energy consumption habits, energy supply contracts and deficiencies that they detect in their homes will be collected.

Tools:

- Interview form

2. Household energy diagnosis

Home visit for a data collection on the state of the enclosures and consumer equipment in order to detect inefficiencies.

Tools:

- form for data collection.
- photographic camera.
- energy consumption meter and temperature datalogger.

3. Analysis of the situation

Collection and analysis of the data and information collected, preparation of an energy diagnostic report.

4. Budget and technical aspect

With the energy diagnosis report done, make a visit to the household with a specialized technician to know the general situation of the house and contemplate which is the best solution. With this information, request budgets for the potential renovations proposed by the specialist.

5. Financing channels

Look for possible existing programs to finance the proposed changes. There may be aids of different types:

- international/European
- nationals
- regional
- municipal
- districts

In some cases, they can be combined between these and thus obtain a large part of the budget.

Consult some of the existing programs in the following sections.

6. Proposal of measures

Proposals for energy efficiency measures and rehabilitation measures.

With the deficiencies detected, and with the opinion of a specialized technician, a series of rehabilitations are proposed, which, in agreement with the family, will be carried out to solve the problem. In the next section we will see some of these measures in more detail.

Fig. 7 Management of a renovation project: main steps

7. ENERGY CONTRACTS

For the analysis of electricity contracts we have to take into account a variety of aspects.

The first of all is **to know what type of market we belong to**.

Generally, in most of the countries there are 2: regulated market and private market.

Here are the most important aspects of these markets.

7.1 Regulated market

The regulated tariff is a system to determine the price of electricity implemented by governments for all customers in the regulated electricity market.

Therefore, **there is no competition as all marketers offer the same rates and the same prices**.

In some countries you can only access discounts for income requirements or others in this type of market

7.2 Private market

In the private market tariff, **the conditions of the contract are set by the companies, therefore it requires the consumer to pay greater attention when contracting their rate** (since each one is adapted to a specific type of consumption) and, in addition, rates will be revised over time.

This type of market allows infinite options and contracting rates:

- Flat rates.
- Hourly rates.
- Fixed price rates.
- Ecological rates.

As there is freedom of rates, you can get a great price if you adapt to the type of consumption that costs you the cheapest according to your rate.

7.3 Energy bills

When choosing a market, regulated or private, you will have to study which case is more favorable for each household, also taking into account the different possibilities offered by the country in which you are located.

Relative to the other aspects:

- Power.
- Fixed cost.

Lowering the power means a direct monthly saving of about € 5 per kW.

It represents approximately 38% of the invoice.

Ability to turn on many machines at the same time.

Lowering the power can lead to a reorganization of household tasks: washing machine, cooking, oven, iron…

Going to the invoice we will have to understand the following aspects:

7.3.1. Power and energy

kW: it is **the unit of power that we have contracted**. Represents the ability to have many or few machines connected at the same time. **The more kW, the more equipment we can connect at the same time** without the limiter jumping (Power Control Switch: ICP).

kWh: it is the energy unit. It is the total energy that we have consumed throughout the billing period.

Once the above aspects are understood, we go to the invoice. The most relevant terms that appear are:

Power: it is a fixed part of the bill that we pay even if we do not consume.

Represents the ability we have in our home to connect several consumer equipment simultaneously.

Consumed energy: represents the energy we consume in our home.

This part **is approximately 40% of the final price**.

The price of kWh can be fixed (private market) or it can vary according to the time and day (regulated market.

The tolls or accesses to the Electric System, that exist in power and in consumed energy, **are the part of our bill destined to pay the costs of access to the electricity grid**, that is, the price to pay for the transport of energy to the supply points, and whether they are homes or commercial premises; and on the other hand there is the cost of the energy that each home consumes.

The tolls are part Regulated since the primary transport of electricity is done by a public organisim. There is a fixed part according to your power because the System must be dimensioned so that at any time any client can access the maximum contrated power in their home.

7.3.2 Taxes and meter rental

VAT: it varies depending on the country you are in, in some there is a reduced VAT for energy.

There is also in some countries the Electricity tax. It is a special tax like that of tobacco or alcohol. This tax, set by the Government, is applied to the sum of the amount of the Fixed Term and the Energy Term, including discounts, if any.

Equipment rental: electric meters to measure consumption are the property of the distribution company. For these measurement equipment, **a monthly rental price must be paid on the invoice according to the contracted rate**, an amount that is regulated by the Government.

7.3.3 Examples of electrical bills of different countries: France, Italy and Spain

In each appear some numbers that indicate the different parts of the bill.

The following appear:

1. Summary of the electricity bill, where the final price to pay appears.
2. Contracted power.
3. Energy consumed.
4. Price for the meter rental.
5. Taxes.

1 Discounts for special situations (rental requirements).

7.3.4 What power do I need?

The following table recommends power values depending on whether the domestic equipment is electrical or fueled (gas, diesel, butane etc.).

Heating	Hot water	Cooking	Power
			2,3 kW
			2,3 kW
			3,45 kW
			3,45 kW
			3,45 kW
			3,45 kW
			4,65 kW

Appliace	Power
Refrigerator	250-350 W (0,250-0,350 kW)
Microwave	900-1500 W (0,900-1,500 kW)
Washing machine	1500-2200 W (1,500-2,200 kW)
Oven	1200-2000 W (1,200-2,000 kW)
Glass-ceramic	900-2000 W (0,900-2,000 kW)
Television	150-400 W (0,150-0,400 kW)
Heating (electrical)	1000-2500 W (1,000-2,500 kW)
Heating (electrical, low compsuntion	400-800 W (0,400-0,800 kW)

Tab. 6 and 7 Power of domestic equipment

A quick and approximate calculation:

1. Add the highest power appliances
2. Divide the result by 3 (simultaneity).
3. Sum 0.5 kW for lighting and small electrical appliances.
4. Hire! Now you can contract any power value, although without having more precise information it is difficult to fine-tune.

There is also a more exact way to make this change, by consulting with the distributor in your area checking what has been your maximum energy demand in recent times.

7.3.5 Conclusions

Regarding energy, the way to save is by applying the good habits mentioned above.

In this way it will be as less energy consumption will be done.

We will also have to take into account the price we are paying for this energy, the kWh.

If you do not have a competitive price, no matter how hard we try to change our consumption habits, the electricity bill will continue to be high, therefore a study will have to be done to check where the cheapest prices are (they are always usually in the market regulated by the state)

Finally, it would be necessary to check if in the country you are in there is any kind of bonds or subsidies for the electricity bill that the family can take advantage of, in the case of meeting the necessary requirements of these.

How to find the most advantageous offer for your consumption

In many European countries there are online tools which, starting from the bill data, suggest the most advantageous energy supplier and commercial offer.

Italy - Portale Offerte

From 1 July 2018 the Offers Portal - managed by the Italian Regulatory Authority for Energy, Networks and Environment (ARERA) - has been online for the collection and publication of all offers on the electricity and natural gas retail market. On this public site, domestic customers, families and small businesses can compare and choose the electricity and gas offers in a simple and free way. The Offers Portal provides an easy-to-use search engine and offers a series of useful information on the electricity and gas markets and on the legal changes envisaged.

Link to Portale Offerte: https://www.arera.it/it/portaleofferte.htm

Spain - Portal del Consumidor del Comparador de Ofertas de Energía

The Comparador allows to consult the natural gas offers available for domestic consumers and SMEs and electricity offers for low voltage consumers.

The Portal is managed by the Comisión Nacional de los Mercados y la Competencia (CNMC). It became operational in 2013 with the aim to preserve the proper functioning of all markets in the interest of consumers and companies.

Link to Portal del Consumidor del Comparador de Ofertas de Energía: https://comparador.cnmc.gob.es/

France - Comparateur d'offres d'électricité et de gaz naturel

The comparateur is managed by the médiateur national de l'énergie. The mission of the national energy ombudsman is to offer amicable solutions when disputes occur with the companies of the energy sector, as well as to inform the energy consumers about their rights.

Thanks to the comparator, the French consumer can choose the criteria to classify the offers he wants and choose the offer that best suits his consumption.

Link to Le comparateur d'offres d'électricité et de gaz naturel du médiateur national de l'énergie: https://comparateur-offres.energie-info.fr/compte/profil?profil=particulier

Bolletta Energia Elettrica
Fornitura Mercato Libero

Codice Cliente: 123456
Intestatario: MARIO ROSSI
Sede: VIA ITALIA, 1 - 00180 ROMA
Codice Fiscale: XXXXXXXXXXXXXXXX

MARIO ROSSI
VIA ITALIA 1
00180 ROMA

Fattura n. XXXXXXXX del 18/06/2020
Periodo di fatturazione: Aprile 2020 - Maggio 2020
Periodo di conguaglio: Gennaio 2020 - Marzo 2020

Consumi fatturati: 443 kWh

TOTALE DA PAGARE: 68,85 €
Scadenza: 08/07/2020

1

SINTESI DEGLI IMPORTI

Spesa per la materia energia	€ 37,21
Spesa per trasporto e gestione contatore	€ 17,53
Spesa per oneri di sistema	€ 18,53
Altre partite	€ 6,00
Ricalcoli	€ -0,02
Bonus sociale	€ -36,49
Imposte	€ 3,47
IVA	€ 4,62
Totale bolletta	€ 50,85
Canone di abbonamento alla televisione per uso privato	€ 18,00
TOTALE DA PAGARE	€ 68,85

Riepilogo IVA - Vedi box "Informazioni Imposte"

Aliquota IVA	Imponibile	Importo
10 %	€ 46,23	€ 4,62
RAI - 0 %	€ 18,00	€ 0,00

DATI FORNITURA

POD	IT1234567891011
Descrizione Punto	MARIO ROSSI
Indirizzo	VIA ITALIA, 31 00180 ROMA
Potenza Impegnata	3,00 kW
Potenza Disponibile	3,30 kW
Tipologia Cliente	Utenza Domestica Residente
Tipologia Offerta	FAMILY
Consumo annuo (kWh)	F1 754 | F2 769 | F3 979
Consumo annuo contratt.	3.000 kWh
Tensione	220 V
Opzione tariffaria	TD
Data attivazione fornitura	01/11/2014
Tipo misuratore	EF
Matricola contatore	00123456

MODALITA' DI PAGAMENTO

MAV

Alla data attuale le sue bollette precedenti risultano tutte pagate

INFORMAZIONI e RECLAMI

Per informazioni:
N. Verde: 800.00.00.00 | E-mail: clienti@energia.com

Per comunicazioni e reclami:
Energia Spa | Via Roma, 2 - 00180 - Roma - RM PEC: clienti.energia@pec.energia.it Fax: 06 123.456.78

Web: energia.com | Area clienti: clienti.energia.com

Numero pronto intervento per segnalazione guasti: 800000
Distributore: DISTRIBUZIONE S.P.A.

Fig. 8 Example of Italian energy bill

ALLEGATO DI DETTAGLIO
Fornitura di Energia Elettrica su Mercato Libero

Fattura n. XXXXXXXXXXXXXXX del 18/06/2020
Codice cliente: 123456 | POD IT1233567891011 | Sede:
123456 Tipologia Contatore : EF | Matricola : 12345678
Potenza Disponibile : 3,30 kW | Potenza Impegnata : 3,00 kW

SPESA PER LA MATERIA ENERGIA — 37,19 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Quota Fissa				16,31 €	
Prezzo di commercializzazione e vendita	01/01/2020 - 31/01/2020	5,426691 €/PdP	1 PdP	5,43 €	10 %
Prezzo di commercializzazione e vendita	**01/04/2020 - 30/04/2020**	**5,426691 €/PdP**	**1 PdP**	**5,43 €**	**10 %**
Costo aggregazione del servizio di misura	01/04/2020 - 30/04/2020	0,007000 €/PdP	1 PdP	0,01 €	10 %
Prezzo di commercializzazione e vendita	**01/05/2020 - 31/05/2020**	**5,426691 €/PdP**	**1 PdP**	**5,43 €**	**10 %**
Costo aggregazione del servizio di misura	01/05/2020 - 31/05/2020	0,007000 €/PdP	1 PdP	0,01 €	10 %
Quota Energia				26,33 €	
Energia F1	01/04/2020 - 30/04/2020	0,038480 €/kWh	79 kWh	3,04 €	10 %
Energia F2-F3	**01/04/2020 - 30/04/2020**	**0,036783 €/kWh**	**151 kWh**	**5,55 €**	**10 %**
Perdite di Sistema F1	01/04/2020 - 30/04/2020	0,038480 €/kWh	8 kWh	0,31 €	10 %
Perdite di Sistema F2-F3	**01/04/2020 - 30/04/2020**	**0,036783 €/kWh**	**16 kWh**	**0,59 €**	**10 %**
Servizi e dispacciamento	01/04/2020 - 30/04/2020	0,017874 €/kWh	254 kWh	4,54 €	10 %
Energia F1	**01/05/2020 - 31/05/2020**	**0,035349 €/kWh**	**67 kWh**	**2,37 €**	**10 %**
Energia F2-F3	01/05/2020 - 31/05/2020	0,033895 €/kWh	146 kWh	4,95 €	10 %
Perdite di Sistema F1	**01/05/2020 - 31/05/2020**	**0,035349 €/kWh**	**7 kWh**	**0,25 €**	**10 %**
Perdite di Sistema F2-F3	01/05/2020 - 31/05/2020	0,033895 €/kWh	15 kWh	0,51 €	10 %
Servizi e dispacciamento	**01/05/2020 - 31/05/2020**	**0,017957 €/kWh**	**235 kWh**	**4,22 €**	**10 %**
Acconto fattura 00123FT00012345 del 18/02/2020			-198 kWh	-5,45 €	

SPESA PER TRASPORTO E GESTIONE CONTATORE — 17,53 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Quota Fissa				3,40 €	
Tariffa TD	01/04/2020 - 30/04/2020	1,700000 €/PdP	1 PdP	1,70 €	10 %
Tariffa TD	**01/05/2020 - 31/05/2020**	**1,700000 €/PdP**	**1 PdP**	**1,70 €**	**10 %**
Quota Potenza				10,44 €	
Tariffa TD	01/04/2020 - 30/04/2020	1,740000 €/kW	3,0 kW	5,22 €	10 %
Tariffa TD	**01/05/2020 - 31/05/2020**	**1,740000 €/kW**	**3,0 kW**	**5,22 €**	**10 %**
Quota Energia				3,69 €	
Tariffa TD	01/04/2020 - 30/04/2020	0,007610 €/kWh	230 kWh	1,75 €	10 %
Componenti A, UC e MCT	**01/04/2020 - 30/04/2020**	**0,000739 €/kWh**	**230 kWh**	**0,17 €**	**10 %**
Tariffa TD	01/05/2020 - 31/05/2020	0,007610 €/kWh	213 kWh	1,62 €	10 %
Componenti A, UC e MCT	**01/05/2020 - 31/05/2020**	**0,000704 €/kWh**	**213 kWh**	**0,15 €**	**10 %**

SPESA PER ONERI DI SISTEMA — 18,53 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Quota Energia				18,53 €	
ARIM Rimanenti oneri generali	01/04/2020 - 30/04/2020	0,009768 €/kWh	230 kWh	2,25 €	10 %
ASOS Oneri generali relativi al sostegno delle energie rinnovabili e alla cogenerazione	**01/04/2020 - 30/04/2020**	**0,032049 €/kWh**	**230 kWh**	**7,37 €**	**10 %**
ARIM Rimanenti oneri generali	01/05/2020 - 31/05/2020	0,009768 €/kWh	213 kWh	2,08 €	10 %
ASOS Oneri generali relativi al sostegno delle energie rinnovabili e alla cogenerazione	**01/05/2020 - 31/05/2020**	**0,032049 €/kWh**	**213 kWh**	**6,83 €**	**10 %**

ALTRE PARTITE — 6,00 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Garanzia Cambio Piano	01/04/2020 - 30/04/2020	3,000000 €/PdP	1 PdP	3,00 €	10 %
Garanzia Cambio Piano	**01/05/2020 - 31/05/2020**	**3,000000 €/PdP**	**1 PdP**	**3,00 €**	**10 %**

BONUS SOCIALE — -36,49 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Bonus Elettrico - Fatt. distr. n. 12345678910 - POD: IT1234567891011 -				-12,57 €	
Bonus Elettrico - Fatt. distr. n. 12345678910 - POD: IT1234567891011 -				-11,35 €	
Bonus Elettrico - Fatt. distr. n. 12345678910 - POD: IT1234567891011 -				-12,57 €	

IMPOSTE — 3,47 €

	Periodo dal - al	Corrispettivi unitari	Quantità	Importo	IVA
Addizionale Erariale	01/04/2020 - 30/04/2020	0,022700 €/kWh	90 kWh	2,04 €	10 %
Addizionale Erariale	**01/05/2020 - 31/05/2020**	**0,022700 €/kWh**	**63 kWh**	**1,43 €**	**10 %**

DATOS DE LA FACTURA DE ELECTRICIDAD

IMPORTE FACTURA: 21,59 €
Nº factura: SMF201N0377283 emitida el 22 de febrero de 2022
Periodo de consumo: 21 de enero de 2022 a 19 de febrero de 2022
Fecha límite de pago: 14 de marzo de 2022

RESUMEN DE LA FACTURA

Por potencia contratada	8,48 €
Por energía consumida	42,99 €
Descuento por bono social	**-32,76 €**
Impuesto electricidad	0,15 €
Alquiler del contador	0,77 €
IVA normal	1,96 €
TOTAL IMPORTE FACTURA	**21,59 €**

XXXXXX XXXXXX XXXXXX XXXXX
XXXXX 1
12345 XXXXX
XXXXXX

1

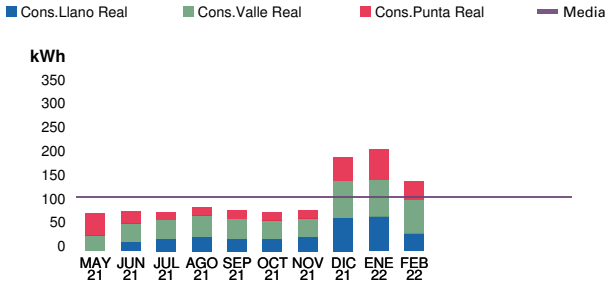
DATOS DEL CONTRATO

Titular del contrato: XXXXXXXXXX
Dirección de suministro: XXXXXXXXXX
Código unificado de punto de suministro (CUPS): ES0000000000
Tipo de contrato: **PVPC CON BONO SOCIAL (70%) - MERCADO REGULADO**
Peaje de transporte y distribución: **2.0TD** Segmento de cargos: **1**
Potencia contratada en punta: 3,300 kW Potencia contratada en valle: 3,300 kW
Referencia del contrato de suministro (Energía XXI Comercializadora de Referencia S.L.U.): 0000000000
Referencia del contrato de acceso (EDISTRIBUCION REDES DIGITALES): 500006719286
Fecha final del contrato: 22 de abril de 2022 (renovación anual automática)
Bono social válido hasta: 21 de abril de 2023
Nº de contador: 0000000000

INFORMACIÓN DE CONSUMO ELÉCTRICO

Su consumo en el periodo facturado ha sido 147 kWh.

Puede consultar su consumo horario en el portal web de su distribuidora
https://zonaprivada.edistribucion.com/areaprivada



Su consumo medio diario en el periodo facturado ha sido de 0,74 €
Su consumo medio diario en los últimos 14 meses ha sido de 0,66 €
Su consumo acumulado del último año ha sido de 1.161 kWh
Las potencias máximas demandadas en el último año han sido 1.9 kW en P1 (punta) y 3.1 kW en P3 (valle).
Consumo bonificado: 131 kWh Consumo sin bonificar: 16 kWh

Lectura actual (real) (19 de febrero de 2022)

Lectura en P1 (punta):	1.589 kWh	Consumo en P1:	39 kWh
Lectura en P2 (llano):	1.475 kWh	Consumo en P2:	38 kWh
Lectura en P3 (valle):	570 kWh	Consumo en P3:	70 kWh

Fig. 9 Example of Spanish energy bill

INFORMACIÓN SOBRE RECLAMACIONES

Atención al cliente (XXXXXXXX): 123456789 (gratuito)
Reclamaciones (XXXXXXXX): 123456789 atencionalcliente@xxxxxxx.com **Averías y urgencias** (XXXXXXXX) 123 45 6789 (gratuito)
Dirección postal reclamaciones (XXXXXXXX): XXXXX 12, 12345 Madrid **Dirección de la página web con información sobre reclamaciones:** https://www.xxxxx.com/tarifasreguladas

DESGLOSE DE LA FACTURA

Facturación por potencia contratada ("TÉRMINO FIJO")			**8,48 €**
Importe por peajes de transporte y distribución y cargos:			
P1 (punta)	3,3 kW x 27,958789 Eur/kW y año x (29/365) días		7,33 €
P3 (valle)	3,3 kW x 1,25856 Eur/kW y año x (29/365) días		0,33 €
Margen de comercialización fijo:	3,3 kW x 3,113 Eur/kW y año x (29/365) días		0,82 €
Facturación por energía consumida ("TÉRMINO VARIABLE")			**42,99 €**
Importe por peajes de transporte y distribución y cargos:			
P1 (punta)	39 kWh x 0,100756 Eur/kWh		3,93 €
P2 (llano)	38 kWh x 0,03374 Eur/kWh		1,28 €
P3 (valle)	70 kWh x 0,004351 Eur/kWh		0,30 €
Costes de la energía			37,48 €
Descuento por bono social:			**-32,76 €**
Descuento Potencia:	8,48 Eur x 70 %		-5,94 €
Descuento Energía (1):	42,99 Eur x (131 kWh/147 kWh) x 70 %		-26,82 €
Impuesto Electricidad (CIM):			**0,15 €**
Alquiler del contador:	(29 días x 0,026552 Eur/día)		**0,77 €**
IVA normal:	10% s/ 19,63		**1,96 €**
TOTAL IMPORTE FACTURA			**21,59 €**

El importe de su factura a PVPC previo a la aplicación del descuento por Bono Social, asciende a 57,75 €. De acuerdo a lo establecido en el artículo 12 del RD 897/2017, de 6 de Octubre, para los consumidores vulnerables severos en riesgo de exclusión social, el importe mínimo a financiar a efectos de lo establecido en el punto 1 del Artículo 12 del RD 897/2017, sería de 28,88 €.

(1) **Descuento Energía:** Según lo establecido en el RD 897/2017 y RDL 15/2018, el descuento por Bono Social se aplica al importe de "facturación por energía consumida" correspondiente al consumo que no supera el límite con derecho a Bono Social:
Consumo del tramo: 147 kWh
Consumo de su factura con descuentos por bono social: 131 kWh
(Límite de consumo con derecho a bono social: 110 kWh = (1.380 kWh límite Consumo anual establecido en RDL 15/2018 / 365 días año) 29 días factura)
Consumo de su factura sin descuento por bono social: 16 kWh

Precios de los términos del peaje de transporte y distribución, de los cargos, del contador y margen de comercialización fijo según normativa en vigor PVPC calculado según Real Decreto RD 216/2014

INFORMACIÓN PARA EL CONSUMIDOR

Usted tiene contratado el **Precio Voluntario para el Pequeño Consumidor (PVPC) CON DESCUENTO POR BONO SOCIAL. No obstante, puede contratar también con cualquier comercializadora en mercado libre.** El listado de comercializadoras de referencia y de comercializadoras de mercado libre está disponible en la página web de la CNMC: www.cnmc.es

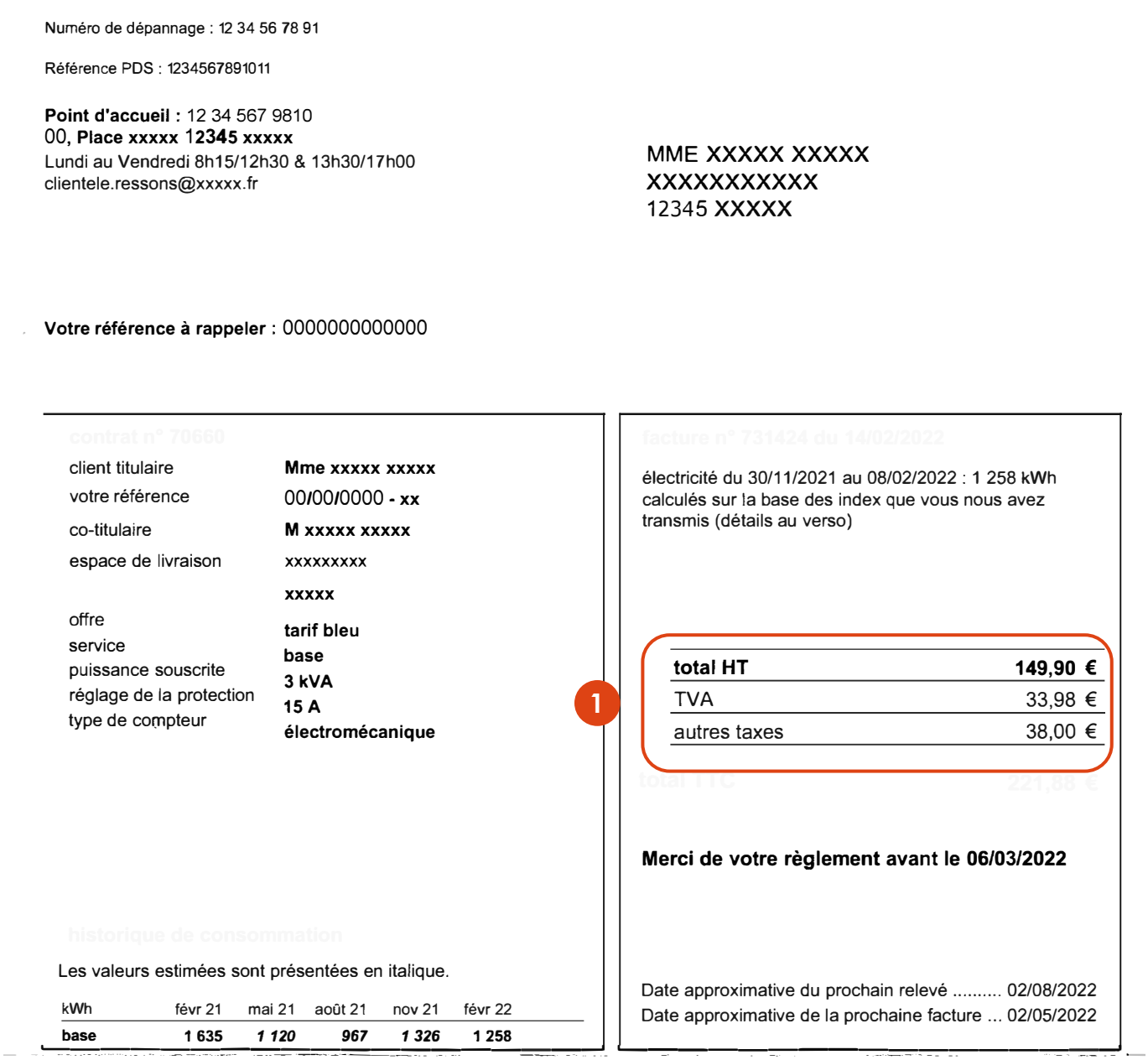
En el código QR o en el enlace https://comparador.cnmc.gob.es puede consultar y comparar las distintas ofertas vigentes de las comercializadoras de energía eléctrica en mercado libre

Si está recibiendo su factura en papel, puede solicitar en su lugar la factura electrónica en https://www.energiaxxi.com/factura-digital-mr

Siempre que no se produzca la pérdida de alguna de las condiciones que dan derecho a su percepción, el bono social tiene un periodo de vigencia de dos años, tras el cual deberá solicitar su renovación. En caso de familias numerosas, la vigencia se mantendrá hasta la caducidad del título de familia numerosa.

Para solicitar la renovación del bono social, podrá hacerlo presencialmente en nuestra oficinas o llamando al teléfono 800 760 333 Dispone de información sobre los requisitos que deben cumplirse en el teléfono 800 760 333 o en la página web https://www.energiaxxi.com/bono-social-mercado-regulado

Otra información de interés: Consumidores de energía e información sobre la factura: www.cnmc.es. Información sobre consumo eficiente y ahorro energético: www.idae.es. Información sobre PVPC: www.ree.es



Numéro de dépannage : 12 34 56 78 91

Référence PDS : 1234567891011

Point d'accueil : 12 34 567 9810
00, **Place xxxxx 12345 xxxxx**
Lundi au Vendredi 8h15/12h30 & 13h30/17h00
clientele.ressons@xxxxx.fr

MME XXXXX XXXXX
XXXXXXXXXXX
12345 XXXXX

Votre référence à rappeler : 0000000000000

contrat n° 70660

client titulaire	**Mme xxxxx xxxxx**
votre référence	00/00/0000 **- xx**
co-titulaire	**M xxxxx xxxxx**
espace de livraison	xxxxxxxxx
	xxxxx
offre	**tarif bleu**
service	**base**
puissance souscrite	**3 kVA**
réglage de la protection	**15 A**
type de compteur	**électromécanique**

facture n° 731424 du 14/02/2022

électricité du 30/11/2021 au 08/02/2022 : 1 258 kWh calculés sur la base des index que vous nous avez transmis (détails au verso)

total HT	**149,90 €**
TVA	33,98 €
autres taxes	38,00 €
total TTC	221,88 €

1

Merci de votre règlement avant le 06/03/2022

historique de consommation

Les valeurs estimées sont présentées en italique.

kWh	févr 21	mai 21	août 21	nov 21	févr 22
base	**1 635**	***1 120***	***967***	***1 326***	**1 258**

Date approximative du prochain relevé 02/08/2022
Date approximative de la prochaine facture ... 02/05/2022

Fig. 10 Example of French energy bill

part fixe					€ / an	montant en €
prime fixe du 1 novembre 2021 au 31 janvier 2022 (puissance souscrite de 3 kVA - 3 mois)					86,76	21,69

part variable					€ / kWh	montant en €
postes tarifaires	anciens index *en italique si estimés*	nouveaux index *en italique si estimés*	coefficients de lecture	consommations (kWh)		
du 30/11/2021 au 08/02/2022				compteur n° **X00000795509**		
base	48 733	49 991	1	1 258		
base - barème du 30/11/2021 au 31/01/2022				1 116	0,0974	108,70
base - barème du 01/02/2022 au 08/02/2022				142	0,1374	19,51
total HT						149,90

taxes et contributions	assiette	taux	montant en €
taxe communale du 30/11/2021 au 31/12/2021	567	0,00468 € / kWh	2,65
taxe départementale du 30/11/2021 au 31/12/2021	567	0,00332 € / kWh	1,88
taxe communale du 01/01/2022 au 08/02/2022	691	0,00468 € / kWh	3,23
TICFE du 30/11/2021 au 31/12/2021	567	[illegible] €	12,76
TICFE du 01/01/2022 au 31/01/2022	549	0,0[illegible]1 €	14,18
TICFE du 01/02/2022 au 08/02/2022	142	0,001 € / kWh	0,14
cta	14,43	21,93 %	3,16
tva réduite	24,85	5,50 %	1,37
tva	163,05	20,00 %	32,61
total TTC			221,88

communication

- part acheminement HT: 61,10 € est déterminé à partir du barème national des tarifs d'acheminement.
Une facture de frais ou de démensualisation peut vous être adressée avant la date approximative mentionnée au recto.
Pour connaître, précisément, la date de votre prochaine relève : www.sicae-oise.fr rubrique clients > relevé de mon compteur. Vos index peuvent être transmis jusqu'à 3 jours après votre date de relève, via "mon espace client" ou le formulaire d'autorelève.
La Contribution Tarifaire d'Acheminement (CTA), à compter du 01/08/2021, est calculée sur la base de 21,93 % de la part fixe d'acheminement. Le taux de la CTA est fixé par arrêté ministériel et est susceptible d'évoluer.
Cette facture ne vous dispense pas du règlement du montant antérieur dû à l'échéance précédemment fixée et ne tient pas compte d'un éventuel échéancier en cours.
Cette facture est établie sur la base des mouvements tarifaires décidés par les Pouvoirs Publics à la date du 01/08/2021. Les tarifs de nos prestations ont été actualisés à la date du 01/08/2021. Informations prix pratiqués par xxxx-xxxx : www.xxxx.fr rubrique notre offre ou par téléphone au 01 23 456 789. Service réclamation par courriel sur info@xxxxx.fr ou par courrier au 32, rue des xxxx - B.P 13345 **XXXXX**.
En cas de litige lié à l'exécution du contrat, si votre réclamation écrite auprès de **XXXXX** n'a pas permis de régler le différend dans un délai de deux mois, vous pouvez saisir le médiateur national de l'énergie en vous connectant sur le site www.energie-mediateur.fr ou par courrier postal à l'adresse Médiateur national de l'énergie Libre réponse n°59252 75443 Paris Cedex 09.Tout sur vos démarches, vos droits et les économies d'énergie : www.energie-info.fr, le service d'information des pouvoirs publics. N° Vert 0800 112 212 (appel gratuit depuis une ligne fixe). Vous avez, également, à votre disposition un comparateur d'énergie à l'adresse https://comparateur-offres.energie-info.fr
Client aux tarifs réglementés, vous pouvez souscrire à tout moment sans frais à une offre de marché chez le fournisseur de votre choix. Comparez gratuitement les offres sur energie-info.fr
Information sur la méthode d'estimation par téléphone au 01 23 456 789 (choix n°3) ou sur www.**XXXXX**.fr rubrique Clients > J'estime ma facture.
Aucun escompte n'est accordé pour paiement anticipé. Pénalités de retard : taux d'intérêt légal x 3 avec un minimum de perception de 7 euros.
Professionnels : En cas de retard de paiement, une indemnité de recouvrement complémentaire de 40 € est perçue.

En application de l'Article R333-10 du code de l'Energie, l'origine de l'électricité commercialisée en 2020 se répartit comme suit : 74,5 % Nucléaire, 9,9 % Autres énergies renouvelables, 7,7 % Gaz, 7.2 % Hydraulique, 0,4 % Fioul, 0,3 % Charbon.
La fourniture d'un kWh a induit en 2020 : l'émission de 40,54 grammes de dioxyde de carbone (CO2), la génération de déchets radioactifs (vie courte : 1,809 mg/kWh, vie longue : 0,201 mg/kWh)
Le mix de fourniture 2021 sera publié en septembre/octobre 2022.

Des aides exclusives **XXXXX** jusqu'à 4000 Euros, sous conditions de revenus, pour vous accompagner dans votre projet de rénovation de chauffage ou d'isolation. Conditions et informations : 03.44.92.72.06

Document à conserver 5 ans

références internes : 69 264 / 920

The ECODES method to address Energy Poverty and improve the Energy Efficiency of vulnerable households

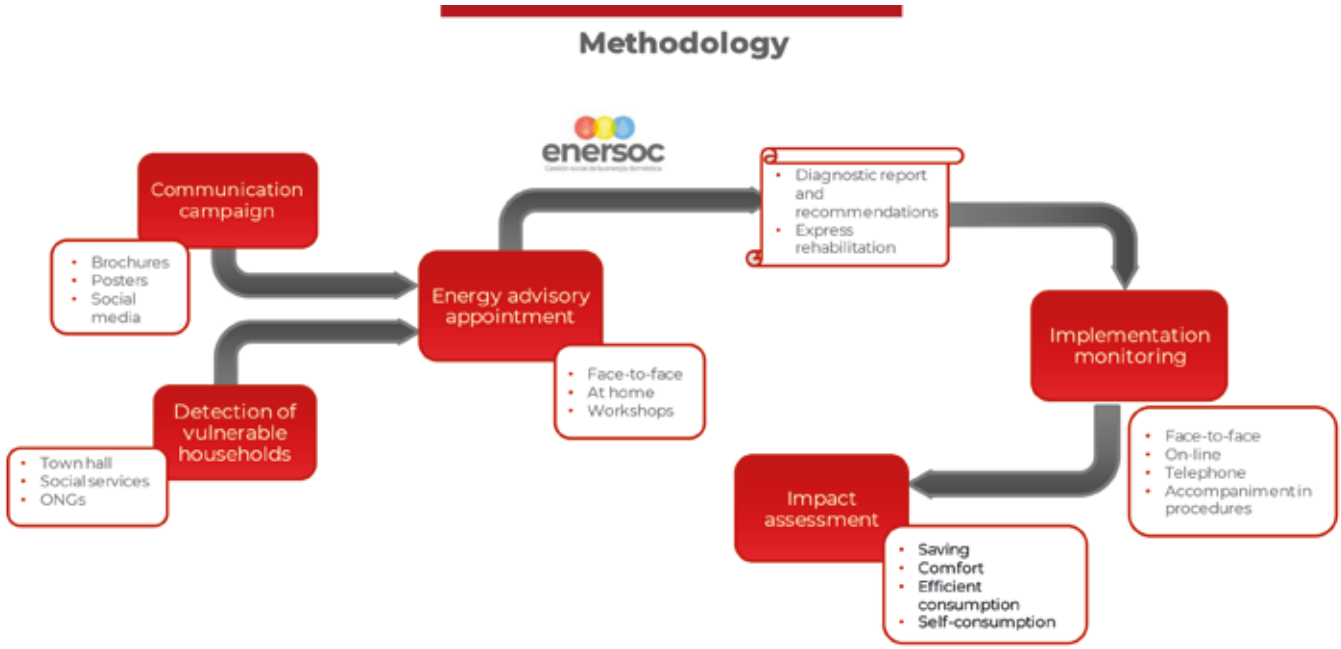


Fig. 11 ECODES method

In the first place, families come to the attention of ECODES through **communication campaigns** or **are sent to them by other entities** such as the City Council, Social Services or other NGOs.

After this first step, ECODES advises families on energy, providing them with **a personalized report with proposals for changes** in their energy contract, if necessary, and a group of tips on consumption habits that will help them save on the energy bill.

The families during the attention also share with ECODES the imperfects that their homes have and from the organization they help them with express rehabilitations that improve the energy efficiency of the home and also the comfort of those who live in it.

During the process of the proposed changes and once they are finished, ECODES **monitors their implementation**, accompanying when necessary in the procedures.

Finally, they carry out **an impact assessment calculating**, for example, the savings or the improvement in comfort that the entire process described in the schedule has supposed.

ECODES also carries out activities such as training workshops and courses (families, social workers, volunteers), citizen and corporate volunteering programs and awareness campaigns.

Since 2013, it has offered information and tools to understand and to reduce energy supply bills, to learn habits of responsible energy consumption and to know energy efficiency measures to implement in their homes, as well as grants or programs to finance them.

The transmission of information to the population, and especially to vulnerable people, is carried out through different channels and solutions: web, online energy management tools, workshops, assistance points, home visits, awareness campaigns, corporate and citizen volunteer programs.

The multidisciplinary team of ECODES that develops the program is form by engineers specialized in energy and building sector, environmentalists, sociologists and political scientists.

Our Solutions

1. Online tools for information and management of Energy Poverty and Domestic Energy

- ENERSOC- Online tool for social management of domestic energy.
- Web: information and resources (Data, Agenda, library, news).
- Interactive map of aid and action programs against energy poverty.
- Online self-diagnosis energy questionnaire: "I WANT TO SAVE".

2. Programmes against Energy Poverty

- Information and Training workshops.
- Assistance Points and / or Home Visits for diagnosis and energy advice.
- Implementation of Energy Efficiency and Rehabilitation Measures at homes.
- Citizen and corporate volunteer programs.
- Awareness campaigns.
- Training for the promotion of green and social employment for energy advice to households.

3. Analysis of the Energy Poverty of a municipality or region

4. Lobby and networking to foster ambitious policies against energy poverty

Results

- We have helped about **6.000 homes in 50 Spanish provinces**.
- 25% average of energy bills reduction.

Achieved thorough:

- Micro energy efficiency measures.
- Habits of Responsible consumption.
- Change of contracts to adapt them to real needs.

BEST PRACTICE

ENERSOC: an on-line tool to have personalized recommendations to reduce energy consumption and energy bills

Enersoc is an on-line tool that **automatically develops a personalized energy diagnosis** so that anyone who works in the social sphere can give advice about energy recommendations without having knowledge of energy efficiency, or energy supply contracting and rates.

The tool has been developed as a result of our field experience in visits for diagnosisis and advice point for helping more than 10.000 households to reduce their energy bills and improve comfort in their homes through the proposal of efficient consumption habits, measures of energy efficiency and adjustments in energy contracts, achieving an average saving of 26% in energy consumption.

Enersoc guides the user through the tool to carry out an energy diagnosis of vulnerable families by collecting and recording data on the socioeconomic situation of the families, the conditions and equipment of the house, energy consumption and the type of energy contract. The tools can be used from a personal computer as well as from a mobile phone, allowing its use in the home of the person being treated.

Taking into account the data collected, **Enersoc automatically generates a personalized report with recommendations to reduce energy consumption and energy bills**. The report makes recommendations on efficient consumption habits, on the optimization of energy supply contracts and the application for the Social Bonus, and on micro-efficiency measures.

Enersoc is aimed at social entities and municipal social services that work with people at risk of energy poverty. It may also be of interest to other organizations that carry out corporate volunteering activities or act in the social sphere.

Milano Inclusiva to fight energy poverty in Milan

Milano Inclusiva is a pilot project promoted by Fratello Sole Energie Solidali, Cascina Cuccagna, the Municipality of Milan and the Caritas Ambrosiana Foundation that aims to reduce energy poverty in the South East area of Milan.

Through the project - which won the **Energia Inclusiva tender** promoted by the Snam Foundation and the Compagnia di San Paolo Foundation - **Cascina Cuccagna will become an energy efficiency model and an open-air laboratory** on this issue, but also **the place to create awareness and support families who are in a condition of energy poverty**.

There are three areas of intervention of the project:

- The **construction site - model** at Cascina Cuccagna.
- The **ecosociolab**, **training and awareness workshops**, with the different actors that work in this area (workers and volunteers of Cascina Cuccagna, Caritas volunteers, energy experts, administrators of condominiums, managers of Third Sector entities, etc.)
- The **desk**, **to provide help and advice** on access to energy bonuses and other concessions to people and families in need and to people who will be adreessed to the desk by Caritas and the Municipality of Milan.

In the South-East area of the city of Milan there are families who pay more for energy bills than for rent. Generally these people live in small apartments, use energy-intensive domestic technologies, do not know the help tools available to them and have composite and complex vulnerability.

The project, which will end in June 2023, also provides for the assessment of the impact of its activities using the **SROI - Social Return of Investment** method.

Here the link to the project video presentation: https://youtu.be/U9ZCyW_rEJc

Photo by Cascina Cuccagna Facebook page

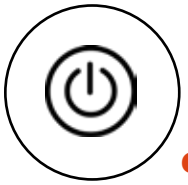
8. GOOD HABITS IN ORDER TO SAVE ENERGY

The role of social operators as promoters and awareness-makers of the efficient and conscious use of energy at home from the perspective of environmental and economic impact.

8.1 Bulb replacement

The appearance of new technologies, and the evolution of existing ones, has caused a significant improvement in the efficiency of the lighting alternatives that can be found on the market.

It is important not only to take into account the purchase price of each type, but also the energy consumption of each one, since in many cases, **more expensive and efficient options pay off in a few weeks with the savings they generate**.



8.2 Stand-by eliminators

When a device, such as the television, video or stereo, is turned off, the stand-by or sleep function is activated: the device does not turn off completely and continues to consume electricity.

These strips or adapters allow you to turn off all the devices that are connected to them with a simple gesture.

8.3 Timers

Clocks and programmers also help you control consumption.

They are capable of automatically turning off the light at a predetermined time, for example in corridors or in little-used rooms such as the garage or storage room.

There are also clocks that you can program to connect and disconnect the equipment you want at times that suit you.

It is very useful to reduce the amount of electricity bills, in the case of having contracted, a rate with hourly

discrimination, installing this equipment in the electric boiler, and thus forcing water to heat only during off-peak hours. At peak times, we will continue to have the hot water that has been stored in the tank.

8.4 Refrigerator

8.4.1 Regulate the thermostat appropriately

5 ºC for the refrigerator and / -18 ºC for the freezer.

Cooler temperatures, in addition to being useless to preserve food well, significantly increase energy consumption.

In the case of not having a temperature indicator, reduce to a minimum in winter and medium intensity in summer.

Clean the weatherstrip on the refrigerator door from time to time and make sure it is in good condition, and closes properly.

8.4.2 Separate it from the wall

It is recommended that the back of the refrigerator is at least 3 cm away from the wall. This will favor the exchange of temperature, improving the operation of the refrigerator.

8.4.3 Hot summers, energy-consuming refrigerators

In cities with hot summers where the temperature is so high, refrigerators need more energy to keep the cold inside, multiplying their energy consumption, especially in chests and freezers located outside.

8.4.4 Prevents ice or frost from forming

Since they act as insulators and force the motor to work harder to keep the temperature constant, triggering energy consumption.

A layer of just 3 mm in the freezer increases consumption by 30%.

8.4.5 Defrost in the refrigerator

If we want to defrost a food, we have a cold source that we cannot waste, put it in the refrigerator, so you will take advantage of the cold that the food to defrost gives off, and we will get the refrigerator to operate less times. We just have to remember to take it out of the freezer the day before.

A dishwasher uses an average of **10 liters of water per wash** and washing the same amount of dishes by hand uses between 10 and 20 times more water.

8.4.6 Let it cool before

Before adding a food that is still hot, let it cool down. This will prevent the refrigerator from operating so that it can return to the temperature it was in before placing the hot food.

8.4.7 Open it as little as possible

It takes just a few seconds to lose a good part of the accumulated cold.

A full refrigerator consumes less than an empty one.

This recommendation is based on the fact that air maintains much less cold than solids. If we have an almost empty refrigerator, every time we open the door, most of the cold will be lost. One possibility to better keep the cold is to put bottles full of water in the refrigerator.

8.5 Dishwasher

Most of the energy a dishwasher consumes is spent heating the wash water (90%), while only the remaining 10% is used to run the motor.

8.5.1 Do not use the hot air drying program

It is an unnecessary waste of energy and money. **The natural circulation of air when you open the door after finishing the wash dries the dishes quickly and saves you money**.

8.5.2 Clean the dishwasher filter frequently

The residues that accumulate hinder the flow of water and decrease the efficiency of the washing, in addition to forcing the operation of the appliance.

8.5.3 Try to run the dishwasher only when it is completely full

If you need to put it at half load, use the short or inexpensive programs. A full load wash consumes less water and energy than two half load washes.

8.5.4 Try to use the inexpensive and low-temperature wash programs

Reserve the long-lasting ones for the dirtiest dishes.

Between 80% and 85% of the energy consumed by a washing machine is used to heat the water.

8.5.5 Try to reduce the use of hot water

To do this, simply give the dishes a quick rinse right after use.

8.6 Washer

Between 80% and 85% of the energy consumed by a washing machine is used to heat the water.

8.6.1 Fully load the washing machine, but not overload

Use the washing machine when you have enough load to fill it completely. **A half load washing machine does not consume half the energy**. Avoid overloading it, otherwise the clothes will not be cleaned properly.

To check if it is overloaded, put your hand in the washing machine, if you cannot turn your hand it is overloaded.

8.6.2 Use the right soap

If we use more soap than necessary, we will need a longer spin to remove the soap, and therefore more water.

8.6.3 Cold wash

As we have said, between 80 and 85% of the energy consumed by a washing machine is used to heat the water. Most of the time, the clothes we wash are not dirty enough to need a hot wash, so whenever we can, we will wash cold.

If we have clothes with stains that need hot water, we will wait to have more clothes in these conditions to take advantage of the hot wash that we do.

8.7 Iron

8.7.1 Avoid turning on the iron for 1 or 2 garments

Any electrical appliance that its operation is based on heating, consumes a lot of energy. This is the case of the iron, where **a large part of its consumption occurs while it reaches the temperature necessary for its use**.

Therefore, avoid heating the iron to iron one or 2 garments and **wait until you have enough clothes**.

Iron clothes first more delicate when the

iron is still not very hot, and thus we will take advantage of that heat.

8.8 Kitchen room

8.8.1 Be careful with the oven!

The oven is one of the appliances that demands the most energy per hour, so it is recommended to use this equipment only if necessary.

When we finish using the oven, it still maintains a very high temperature. That heat that comes off is heat that has cost us money to generate, and that we are wasting, so if you decide to use it, do it in the most efficient way possible, and **turn it off 5 min before the cooking is finished**.

The temperature that it keeps off will be enough to finish cooking it, and will allow us to take advantage of that heat that we would lose in another situation.

8.8.2 Do not open the oven unnecessarily

Each time you do it, you will be losing a minimum of 20% of the energy stored inside.

Try to make the most of the oven's capacity and **cook the largest number of foods at once**.

8.8.3 The microwave, an efficient option

The microwave, despite being a high-power appliance, is a very efficient option due to the short time it takes to heat food.

8.8.4 Cook in large quantities

Heating a frying pan, a casserole, or the oven requires energy that involves a cost. Therefore, **it is advisable to cook fewer times but large quantities than many times in small quantities**. We can always reheat it in the microwave later.

8.8.5 Turn off the vitro for 5 min. before finishing

Like the oven, the ceramic hob keeps the heat even off after we finish cooking. **That heat that we are not using, it has cost us money to get it, do not waste it!**

Turn off the glass ceramic for 5 min. before finishing cooking, and thus we will take advantage of that heat so that the food finishes cooking.

8.8.6 Kitchen with lid

Cover the pans when you cook, especially if you want to boil water, so we will get to the boiling point much earlier.

8.8.7 The hood, only when necessary

Only turn on the hood when necessary, as much of the heat escapes through it.

8.8.8 Use casseroles of the correct size

The difference in consumption between the different hobs of the glass ceramic is large. Use in that corresponds to the size of your pan or saucepan. And not to the total size, but to the size of the base that is in contact with the glass-ceramic.

Boil water only if necessary, and in the right amount since it requires a great deal of energy to bring it to a boil. If we cover it, we will make it boil first.

8.8.9 Express Cooker, an efficient way to cook

Remember, **if we take less time, we use less energy**.

8.9 Hot water

8.9.1 Adjust the thermostat temperature to your needs

The electric water heater heats the water to a high temperature, which we then consume by mixing it with cold water.

The ideal would be to heat it to the temperature that we are going to consume it, but then we would need a water accumulator of hundreds of liters.

So what can we do? Ideally, the temperature at which we heat the water is the minimum necessary so that later, by mixing it with cold, we can satisfy our demand.

Recommendation, **reduce the temperature of the thermos a little every day**. When we see that we run out of hot water, we have reached the temperature limit for our demand, so we go up a couple of degrees.

This will allow us to save electricity by not having to heat the water to such a high temperature. In addition, the lower the temperature between the inside of the thermos and the outside, the less losses there will be, and the fewer times it will have to go into operation.

8.9.2 Unplug if you go on a trip

If you are going to leave home for more than 3 days, it is cheaper to **unplug or turn off the thermos than to leave it on**.

The consumption peaks necessary for the thermos to maintain the temperature of the water inside during those 3 days is greater than the energy required to heat all the water in the thermos from room temperature.

8.9.3 Install Aerator

This, in addition to helping us save water, will also help us save the energy necessary to heat the water that we stop consuming.

8.9.4 Insulate the pipes especially if they run outside the house

8.9.5 Place the mixer in the cold water position

Place the mixer of your taps on the cold water side, so when you open it, you will avoid starting the boiler, and wasting gas.

8.10 Humidity

8.10.1 Take a shower with the door closed

Whenever you are going to use hot water, close the door to prevent the steam from going to the rest of the rooms, generating humidity. At the end of the shower, if the bathroom has a window, open it for 5 min to allow the steam generated to go away.

8.10.1 Ventilate your home every day

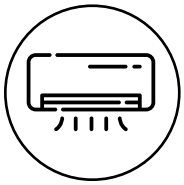
10 minutes to renew the air and reduce humidity concentrations.

8.10.2 Tends outside

Avoid hanging indoors, since the moisture that goes from the clothes is preserved in the home environment, and will end up condensing in the coldest rooms of the house.

8.10.3 Kitchen with the door closed

The kitchen is an important source of steam when we are cooking, so **always cook with the door closed**, and the extractor hood connected.



8.11 Air conditioning

8.11.1 Put reflectors on radiators

Place reflectors behind radiators that are on walls in contact with the outside, or with non-heated areas. **We will be able to reduce heat losses, improving the efficiency of the radiator by up to 30%**.

8.11.2 Do not put anything in front of the radiators

Since we will hinder the flow of heat. Much less put wet clothes to dry, since we will increase the relative humidity in the environment, which can condense on window glass, walls or non-heated areas of the house.

8.11.3 Purge radiators once a year

This will ensure that there are no air bubbles that reduce its efficiency.

8.11.4 Roll down the blinds at night

With that we will improve insulation and heat loss through window glass

Put thick curtains and leave them drawn at night, it will act as a barrier against the cold that could enter through the windows.

8.11.5 Put thermostats on radiators

This will allow you to control consumption based on the needs of each area of the home, using only the heat you need.

8.11.6 Heating to the right temperature

Each degree that you increase the temperature will be consuming

7% more energy. 19ºC is more than enough.

8.11.7 If you do reform at home, install some thermal insulation on the walls and ceiling

8.12 Heat insulation

8.12.1 In summer, during the day, closed windows and closed blinds, at night, open windows

This way we will be able to isolate the house from heat during the day, and favor ventilation with fresh air at night.

Close doors and windows, especially those in rooms that are not air-conditioned. This way we will avoid losing the heat.

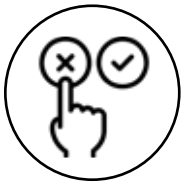
8.12.2 Air conditioning at the right temperature

Each degree that you lower the temperature will be consuming 8% more energy. 24 ºC is more than enough.

8.12.3 Use fans instead of air conditioning

Its energy consumption is less than 10% of that of a conventional air conditioning unit.

8.12.14 Put timers on devices that are usually connected unnecessarily at night



8.13 False myths

8.13.1 Washing dishes by hand consumes less than the dishwasher

Despite popular belief, the truth is that washing dishes by hand consumes a lot more water than doing it in the dishwasher. These appliances are prepared to be efficient in their task. And much more if you start it also in off-peak hours.

A dishwasher uses an average of 10 liters of water per wash and washing the same amount of dishes by hand uses between 10 and 20 times more water.

If we also use the 'eco' program, which, although it uses less energy for longer, the energy savings will be greater.

8.13.2 Heat loss through windows is residual

By simply insulating the windows correctly we can save around € 100/year, while an adhesive weatherstrip only costs around € 12.

That is precisely why homes with wooden windows or that do not insulate well from the outside are colder in winter and warmer in summer. This will ultimately translate into an increase in the cost of energy because we will have the air conditioning and/or heating in the house connected for more time.

8.13.3 Turning off the heating consumes more than keeping it at a constant temperature

There is an urban legend that it pays to have the heating on all day at a constant temperature. Instead, for example, of turning it off when leaving the house

and turning it on again when we arrive.

It is true that when we turn on the heating we will initially spend more energy until the room or house reaches a good temperature. But **having the heating connected 24 hours a day consumes even more**.

In summary, if we are going to be away from home for several hours, it will be more efficient to turn off the heating (or lower its temperature) and turn it on again when we return.

And we go further. **If we lower the temperature between 10 p.m. and 6 a.m., hours in which the heat is in the environment after all day, we could cut consumption by around 13%**.

Smart thermostats can help us with this optimization of consumption.

8.13.4 The electric stove spends less than the gas one

A totally false myth. Vitroceramic cookers consume more than gas cookers.

In fact, they consume up to four times more. So, in the case of opting for a glass ceramic, opt for an induction one. They are somewhat more expensive but much more efficient. In the long run it is more profitable.

But it is not only the consumption, but also the price of energy. **Keep in mind that electricity is more expensive than gas, which will also add to the expense**.

8.13.5 Appliances plugged in but not in use do not consume

We are talking about the so-called 'standby', phantom consumption. When we talk about stand-by we refer to those household appliances that are idle, even off, but without disconnecting from the light.

A 'standby' detector can be the device's red led dot. For example a television turned off that we can turn on from the remote control, it is in sleep or 'standby' and consumes while in this state.

Contrary to popular opinion, standby consumes much more energy than we think. According to IDAE, **the 'standby' represents 10,7% of total household consumption**.

The solution is in the hands of our habits. You can completely unplug these devices when not you are using them or, as we have seen, you can get yourself with strips with switches to make this task easier.

8.13.6 Leaving a computer on consumes less than turning it off and on again

If we leave the computer on, for example, overnight, the expense will be higher than turning it off and on again in the morning.

In the same way, leaving the computer with the screensaver or in sleep mode also implies energy consumption, so if we are going to spend several hours without using it, it is best to turn it off and unplug it.

8.13.7 Running the washing machine at night is cheaper

In this case it depends on whether you have contracted a constant rate for 24 hours. You have discrimination or PVPC.

With the constant rate, putting the washing machine will cost you the same at 4 in the afternoon as at 4 in the morning.

But if you have the Hourly Discrimination active in your rate, you can save if you put washing machines, dishwashers, etc. in off-peak hours (during the night).

This is a rate that actually suits more than 80% of households. If you have this type of rate, putting the washing machine at night, or any other appliance in off-peak hours, will help you save.

If it has a regulated PVPC rate, the price varies from hour to hour, so in addition to the hourly discrimination, you can save if you put your appliances into operation at the cheapest prices.

8.13.8 Short washer cycle helps save

Be careful with short programs, they are designed to save time, not energy.

The key to saving is to use cold water programs whenever you can. And in summer, program the washing machine with shorter spins because the sun will do the rest.

8.13.9 The higher the heating thermostat, the faster the room heats up

The reality is that **setting the heat higher will not make the room warm sooner**. Rather, we will spend more energy to reach that high temperature that we have set.

It is important that we **prevent possible heat losses** (windows, airing the house too long, etc.) to prevent the house from getting too cold, as well reheating it will take less time and we will achieve greater energy savings.

As well as cleaning the air conditioning filters and / or checking the heating circuits periodically to guarantee optimal operation.

8.13.10 We must preheat the oven before putting the food inside

This electrical appliance consumes a lot of energy since it reaches high temperatures in a very short period of time and it is not necessary to preheat the oven for cooking longer than one hour.

Another mistake is opening the oven while food is cooking. Each time it is done, a minimum of 20% of the accumulated energy is lost.

8.13.11 Leaving the fan on in a closed room cools the environment

The only thing that the fan does is move the air in the room but never cool or regulate the temperature.

Réseau Eco Habitat Supporting poor families throughout the renovation process: from diagnosis of energy poverty to implementing building works

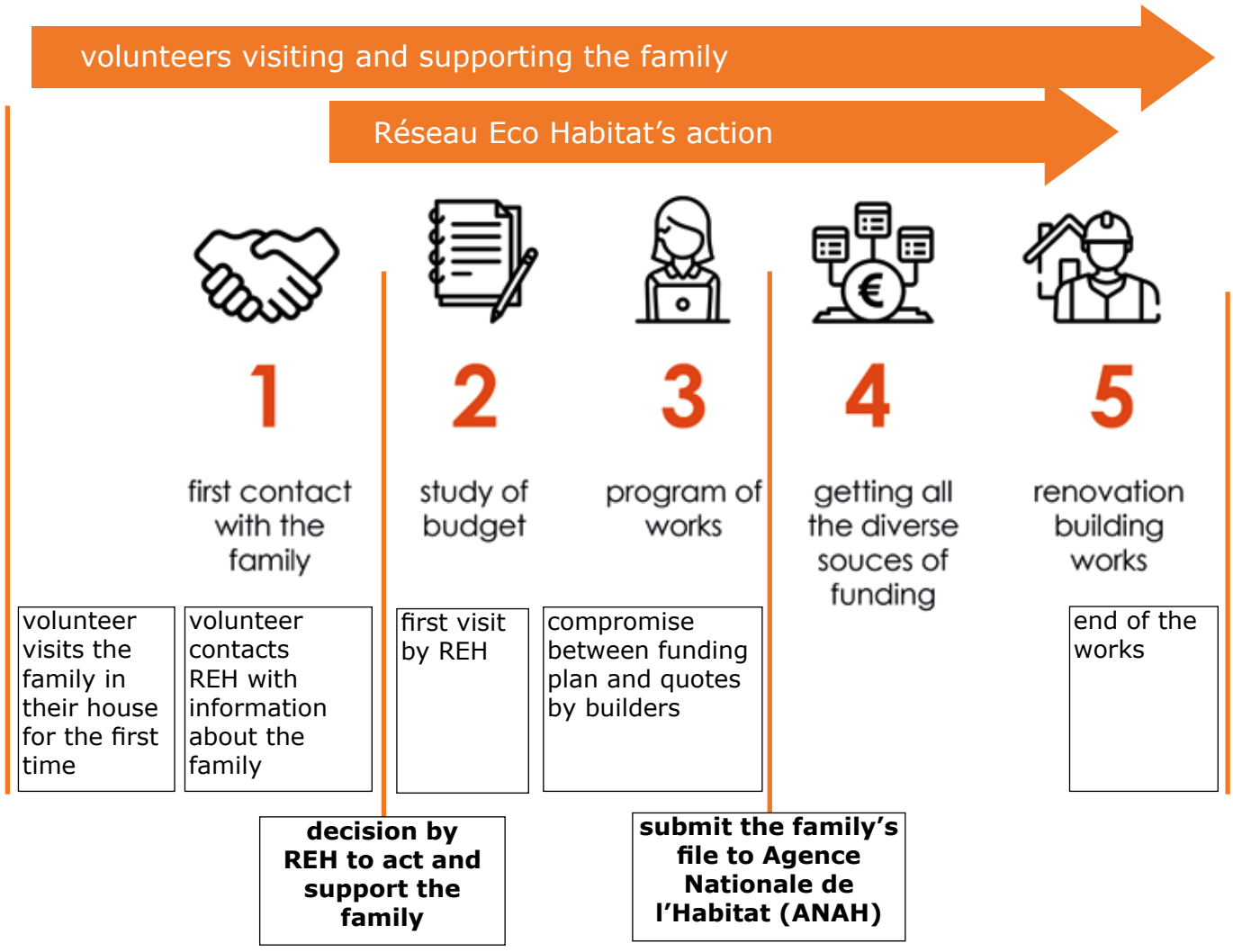


Fig. 12 Réseau Eco Habitat method

What we do at Réseau Eco Habitat (REH)

Réseau Eco Habitat is a French association helping the very poorest homeowners in France to start important energy efficiency renovation works in their energy leaking houses.

<u>Inventing new ways of fighting energy poverty</u>

A solution to energy poverty is to **propose renovation works that can structurally improve living conditions and decrease energy bills**

for lower-income households.

If government support for energy renovations exist at all, they are not specifically directed or designed for disadvantaged households and end up principally supporting middle-class households with less need.

Réseau Eco Habitat invented new ways of **engaging these "invisible" people, the poor homeowners who ignore they can get help for renovation**. By the creation of **a comprehensive social and technical guidance**, adapted to their specific needs, addressed the root causes of the various problems they encounter in terms of debts, quality of living, health, and self-esteem.

Giving local charities a new role of "disinterested, trusted third-party" in the fight against energy poverty

To overcome the initial challenge of identifying target beneficiaries and to engage them in the "scary" renovation process, **REH relies on local charities that vulnerable households are often already in contact** with for basic support (food, energy bills, social relations, etc.).

Beyond their critical outreach role, **the volunteers of local charities are also the ones who gain and maintain the households' trust throughout the renovation process and even after the work has finished**.

Creating a new profession of "local network coordinator" who specializes in renovation projects of low-income households

Réseau Eco Habitat coordinates **a lively ecosystem of trusted local actors** already involved in the housing sector, that seeks to answer to the right to decent housing of unprivileged, owner-occupied households.

Once identified by the local volunteers, REH connects them to social and technical experts belonging to his staff to help them navigate the complexity of the process, identifying different public and private aids available to them, and deciding the kind of work they should undertake.

They play a translator role both between the different public and private organizations delivering the subsidies and with the local artisans who will carry out the work, overcoming their fear to face insolvent clients.

Réseau Eco Habitat is currently urging the National Housing Agency (ANAH), the principal subsidies provider, to officially recognise a new category of operators for low-income households.

The results

After 7 years of existence, Réseau Eco Habitat has now established a solid proof of its concept by having accompanied the realization of more than **85 renovation projects** in the North of France.

Reaching out to **households with an average annual income per person of 7.914 euros** (vs 25.257 euros through traditional approaches). With an **average cost of renovation works of 54.250 euros** (vs 20.000 euros through traditional approaches).

And with significant impact in terms of:

- Heat comfort: 85% affirm they are less cold, and 100% observe the diminution of humidity and mildew.
- Energy savings: average of 55% additional savings (for families not in a situation of absolute heating deprivation).
- Health: 50% observed the reduction/ disappearance of chronic respiratory diseases and joint pain.
- Well-being and social inclusion: 100% have recovered their moral, and 80% have more visits at home
- Work: 30% found a job.

The story of Laure and Marie-Claire in Oise

Laure is a strong woman who faced several tough challenges in her life. The story began well: she settled with her husband and young child in a house in a little village in Oise, north of Paris. Then they had a second child, who was very ill and had to undergo a liver transplant at the age of 2. Then, they had their third child, but very sadly, her husband died of a heart attack.

From then, **Laure had to bring up her three children on her own**. Working as a nursing assistant in a hospital in Paris's suburbs, she earned very low wages. On top of that, her house had no proper insulation, and in wintertime electricity bills were so high that she could not pay them any longer.

Completely overwhelmed by her financial situation, Laure got in contact with a social worker, and ended up going to a charity food shop, held by Secours Catholique-Caritas France. **This is how Laure met Marie-Claire**, the Caritas volunteer running this local charity.

Marie-Claire: *"Laure's house looked alright from the street, but in fact, it was not at all fine. There was an old fireplace insert, that her husband had installed, and humidity every where in the house. The husband had projects to do improvement works, but he died too early "*.
Laure did call a building company to do works, but unfortunately they were crooks and took her money without repairing anything.

At this point, Laure was put into contact with the association "Réseau Eco Habitat". Réseau Eco Habitat performed a technical audit of the house and **estimated the necessary works (insulation of roof, walls, heating system, electricity, etc.) to approximately 50.000 euros**.
"Too expensive! That sounds impossible!" said Laure. But Réseau Eco Habitat explained that in France, there is a national public body called **"National Agency for Improvement of Houses" (ANAH) that can fund up to 50% of heavy energy renovation works for people who are houseowners**, and who are on very low wages.

Thanks to the trust between Laure and Marie-Claire, Laure accepted the help of Réseau Eco Habitat. So the association started working on getting all the possible fundings for Laure's project, starting with ANAH.

Unexpectedly, in beginning of 2019, Laure got a salary increase from her employer. Of course, she was very happy, and everybody was happy for her! Unfortunately, as regards the funding from the ANAH, her salary increase drastically changed the amount of help she could receive.

This meant that Réseau Eco Habitat had to find several other fundings (local government, local boroughs, caritative funds) in order to get 90% of the fundings for her project. As an example, Secours Catholique Caritas France gave 2.000 euros for Laure.

At the end of 2019, after the finances were finally settled, the heavy renovating works began.
Marie-Claire recalls that *"during the building works in her house, Laure was feeling high stress and very anxious because of her prior bad experience. So she kept calling me every day, she just needed to be reassured through the works".*

The fireplace symbol

The old fireplace insert was not working anymore, so Réseau Eco Habitat explained to Laure that it would have to be replaced with a new wood pellet stove, more energy efficient.
But Laure was strongly against the idea: the insert was a memory of her late husband, so she did not want to get rid of it.

Marie-Claire said calmly to Laure: *"If your husband was still here, I am sure he would much rather see you warm and safe with your children, rather than just seeing an old insert that does not work anymore".*

Laure cried for a long time. But after shedding tears, she found the strength to accept to get rid of the old insert.
Now, Laure lives in a warm and insulated house, and whenever she can, she invites Marie-Claire for a cup of tea, to say 'thank you', in front of the new wood pellet stove.

9. ENERGY EFFICIENCY

9.1 Management of a renovation project: from diagnostics to hand-over to owners

The first step to carry out an improvement of the energy efficiency of a house in a block, follows the following process:

9.1.1 Personal Interview

The first step is to conduct an interview with the family to find out their situation and needs.

In this interview, information about their energy consumption habits, energy supply contracts and deficiencies that they detect in their homes will be collected.

Tools:

- Interview form

9.1.2 Household energy diagnosis

Home visit for a data collection on the state of the enclosures and consumer equipment in order to detect inefficiencies.

Tools:

- form for data collection.
- photographic camera
- energy consumption meter and temperature datalogger

9.1.3 Analysis of the situation

Collection and analysis of the data and information collected, preparation of an energy diagnostic report.

9.1.4 Budget and technical aspect

9.1.5 Financing channels

9.2 Management of a renovation project: energy efficiency measures

9.2.1 Exterior insulation and finishing system (EIFS)

Insulation system on the outside, consisting of general for thermal insulation.

Where: Outside

Legenda[1]

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.

Conditions

Summer/ Winter

Climate area

All area

Operative

Allow user presence	✓
Limits future actions	✓
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist labout
Community of Neighbors Permission	Normally the permission is needed to put it
Owner permission	✓

Recommendations

Insulation from the outside **is the most effective system for improving the thermal behavior of the façade envelope**, it reduces heat transfers while maintaining the inertia of the construction on the inside and eliminating thermal bridges.

In some countries it will be necessary to carry out a project and request a building and scaffolding

9.2.2 Gypsum panel finish o drywall cladding

It consists of covering the internal part of a wall that faces the exterior or either of the two faces of an interior wall to improve its thermal insulation.

Where: Inside

Conditions

Summer/ Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Masonry
Community of Neighbors Permission	✗
Owner permission	✓

Recommendations

There are a variety of types of insulation for the interior, some simply require DIY and others will also require masonry. The most common cladding are:

- Self-supporting: system of laminated plasterboard, it is mounted on a galvanized steel structure and the thermal insulation is placed in the gap.
- Interior cladding with damp partitions, incorporating thermal insulation on the back
- Expanded polystyrene: internal cladding with laminated plasterboard system with incorporated expanded polystyrene thermal insulation.
- Rockwool: internal cladding with laminated plasterboard system with

built-in rockwool thermal insulation.
- Natural cork: interior cladding with black natural cork.

9.2.3 Foam insulation

It consists of injecting bulk insulation into the empty air chambers, distributing the insulating material throughout the chamber, obtaining an insulation system without thermal bridges that will prevent the free circulation of air, preventing the entry of cold or heat, towards the interior of the house, thus reducing energy losses.

Where: Inside

Conditions

Summer/ Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✗
Replenishment frequency	✗
Specialist labor specialization	Specialist labor
Community of Neighbors Permission	✗
Owner permission	✓

Recommendations

There are a variety of types of insufflated insulation; all of them need a specialist to do it. The most common are:

- Wood fiber insulation treated with borax salts.
- Cellulose insulation composed of 90% recycled paper (newspapers), 7% mineral salts, 3% boric acid.
- Mineral wool insufflated.
- Injected graphite EPS, with or without water-based adhesive.
- Expanded granulated cork insulation, 100% natural and recyclable.

9.2.4 Reflective insulation

Reflective aluminum insulation with a layer of polyethylene bubbles, to be placed on a vertical wall next to the radiator. Its high reflectance reduces radiation losses from the radiator.

Where: Inside

Conditions

Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

Said sheet must be mounted as smoothly as possible to improve the radiant behavior.

It improves performance in winter, but not in summer because it "retains" the heat generated indoors.

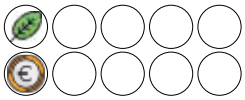
It is convenient that, between the facing and the aluminum, thermal insulation is provided for use or that the reflective insulation incorporates several additional layers to improve thermal insulation by conduction.

This solution is contemplated for its arrangement at the rear of the radiator.

9.2.5 Tapestry

Wool tapestry

Where: Inside



Conditions

Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

Ideal element for winter, being able to disassemble it in summer conditions, avoiding the loss of thermal inertia.

The tapestry-making workshops that are still preserved are artisanal and work with pure sheep's wool.

9.2.6 Vegetation

Extendable window support for placing pots and favoring evapotranspiration in summer conditions.

Where: Outside

Conditions

Summer

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Masonry
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

The presence of vegetation favors evapotranspiration in summer conditions.

9.2.7 Continuous coating

Continuous Coatings are made by layering with pastes obtained from various mixtures of binders, with the possibility of being colored or painted. Also know as **thermal paint**.

Where: Outside

Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✗
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Specialist
Community of Neighbors Permission	✗

Owner permission	✗

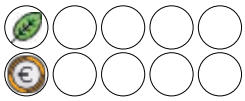
Recommendations

-

9.2.8 Solar control strips

Solar control strips that limits solar radiation gains in summer conditions. This type of film has maximum reflectance with good light transmission properties.

Where: Inside



Conditions

Summer

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Specialist
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

There are different types of solar control strips with different characteristics. Some of those that exist are:

- PET/PMMA: these have color range and transparency variable.
- Polyester, sealing need.
- Reflective: maximum reflectance with good light transmission properties. They modify the external appearance in a substantial way.

9.2.9 Glazing

Substitution of single glass for double glazing

Where: Inside

Conditions

Summer/ Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist
Community of Neighbors Permission	✓
Owner permission	✓

Recommendations

There are different types of glazing with different characteristics. Some of those that exist are:

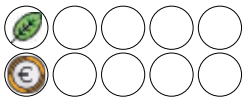
- Aluminum carpentry with thermal bridge break.
- Double Sliding aluminum carpentry without thermal bridge breakage.

- Substitution of single glass for double glazing with different sizes.
- PET and PE strip with acrylate adhesive, to be placed on existing carpentry and simulate the effect of double glazing.

9.2.10 Weather strip

Strip, commonly made of plastic material, that is placed on doors and windows to reduce air infiltration through them.

Where: Inside



Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✓
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

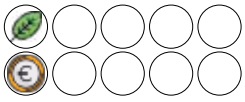
This solution is very effective both on windows, balconies and access doors.

There are different types depending on the type of joint, shape, number of chambers and material.

9.2.11 Curtain

Useful to isolate the interior of the house from the climatic conditions outside.

Where: Inside



Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

There are a variety of types with different characteristics adaptable to different situations. Some of this are:

- Thermal summer/winter lining of metallic threads.
- Blackout curtain. It would be convenient to have a double curtain to allow light to pass through during the day.
- Reflective curtain made of aluminum foil. This type of curtains limits thermal losses and gains due to its reflective characteristics.

9.2.12 Awning

Awning on exterior windows facing south and southeast. There are different types depending on the materials and movement systems.

Where: Outside

Conditions

Summer

Climate area

South Europe

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist

Community of Neighbors Permission	Normally the permission is needed to put it. This must comply with a specific aesthetic and colors
Owner permission	✓

Recommendations

Awnings limit thermal gains inside the building.

In function of the orientation, the height that the awning covers must be lower or higher to guarantee the least incidence on the glass.

It is important to separate the awning from the facade to allow circulation of air between the two and use light-colored fabrics that reflect solar radiation and allow the passage of natural light into the building.

Although very light tones get dirty with ease especially in urban environments.

A blind is a mechanical element that is placed on the outside or inside of a balcony or window to regulate the passage of light and control privacy. They also serve as an insulator from the outside, either cold or heat.

Where: Outside

Conditions

Summer/ Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist
Community of Neighbors Permission	✗
Owner permission	✓

9.2.13 Blind

Recommendations

To achieve good insulation with the blind, it is also important to insulate the drawer from the blind.

There are a variety of types, some of the most used are:

- Reflective insulation: solution consisting of placing a reflective self-adhesive sheet in the blind box to limit losses and gains due to radiation
- Thermal insulation (EPS, XPS, polyester, expanded cork etc.) to be incorporated into the inner front of the blinds drawer, also limit losses and gains through this element.

9.2.14 Shutter

Useful element for sun protection that can be placed depending on the type inside or outside the home. They exist in a variety of materials.

Where: Inside/Outside

Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Specialist
Community of Neighbors Permission	✓ ✗
Owner permission	✓

Recommendations

This solution provides sun protection in summer conditions and reduces thermal transfers from the hole in winter conditions. It can be placed depending on the type inside or outside the house.

Some of these varieties are:

- Metal canopy or wooden canopy (outside of the house), in these cases there is the possibility of mobility slats allows to regulate the entry of light and sun at all times of the year.
- Friars/shutters these are for the

interior of the house. This solution limits heat transfers, especially during winter.

9.2.15 False ceilings

It is a construction that is located at a certain distance from the true ceiling and due to the space between one and the other; the different facilities of the property are located, such as thermal insulation, water pipes, air conditioning or electrical installations.

Where: Inside

Conditions

Summer/Winter

Climate area

All area

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist
Community of Neighbors Permission	✗
Owner permission	✓

Recommendations

As in most elements, there are a variety of types with multiple characteristics, some of these are:

- Low forged insulation: thermal insulation mechanically fixed to a false ceiling slab.
- Incorporation of different materials insufflated into the existing false ceiling. Some examples of materials are: mineral wool, cork, wood fiber, cellulose, EPS etc.
- Insulation overwrought under cover.

9.2.16 Gypsum panel finish o drywall cladding

Consists of covering the internal part of a wall that faces the exterior or either of the two faces of an interior wall to improve its thermal insulation.

Where: Inside

Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself/ Masonry
Community of Neighbors Permission	✗
Owner permission	✓

Recommendations

There are a variety of types of insulation for the roof depending on the material,

the most common cladding are:

- Expanded polystyrene: internal cladding with laminated plasterboard system with incorporated expanded polystyrene thermal insulation.
- Rockwool: internal cladding with laminated plasterboard system with built-in rockwool thermal insulation.
- Natural cork: interior cladding with black natural cork.
- Wood chips.
- Cellular glass.

9.2.17 Solar fan

Solar fan powered by a photovoltaic solar panel

Where: Inside

Conditions

Summer

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

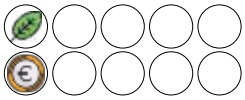
The arrangement of fans on the ceiling favors the movement of hot air in summer and improves comfort.

At the same time, the fact of supplying itself with renewable energy implies that it does not require energy consumption for its operation.

9.2.18 Painting on deck

Painted the deck surface with reflective white paint.

Where: Outside



Conditions

Summer

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✗
Replenishment frequency	✗
Specialist labor specialization	Specialist
Community of Neighbors Permission	✓
Owner permission	✗

Recommendations

Painted the outer surface with two or three coats of reflective paint. Reduces thermal loads in summer conditions, reducing thermal transfers through the roof to the top floor house.

This solution must be complemented

with an improvement in thermal transfer by placing insulation on the top floor so that performance in winter is not impaired.

9.2.19 False floor

It is a construction that is located at a certain distance from the true floor and due to the space between one and the other; the different facilities of the property are located, such as thermal insulation.

Where: Inside

Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✗
Limits future actions	✗
Possibility of elimination	✗
Replenishment frequency	✗
Specialist labor specialization	Masonry
Community of Neighbors Permission	✗
Owner permission	✓

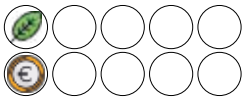
Recommendations

As in most elements, there are a variety of types with multiple characteristics, some of these are:

- Insulation on floor without lifting: insulation to be placed on existing pavement, compression layer and ceramic tile flooring.
- Insulation on slab: mineral wool insulation to be laid on a slab with reconstitution of the flooring.
- Floating floors: layout of laminate flooring on existing pavement.

9.2.20 Carpet

Where: Inside



Conditions

Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✗
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Do-it-yourself
Community of Neighbors Permission	✗
Owner permission	✗

Recommendations

This type of solution has an effect on improving the thermal sensation of the space where it is available. It is effective for winter conditions, having to be removed with the arrival of summer time.

9.2.21 Solar panel

A solar panel is a device that captures solar radiation and transforms it into energy.

Where: Outside

Conditions

Summer/Winter

Climate area

All areas

Operative

Allow user presence	✓
Limits future actions	✓
Possibility of elimination	✓
Replenishment frequency	✗
Specialist labor specialization	Specialist
Community of Neighbors Permission	✓
Owner permission	✓

Recommendations

The term, solar panel, includes solar collectors, usually used to produce domestic hot water through solar thermal energy, and photovoltaic panels, used to generate electricity through photovoltaic solar energy.

The story of Benoît and Hubert in Cambronne

At 50 years of age and following the death of his parents, Benoît lives alone in the house where he grew up, in Cambronne, a very small village in the French countryside, one hour north from Paris.
Four decades on, not much has changed. **The electricity wiring is dangerously old and with few outlets**, Benoît relies on a network of power bars to connect appliances and equipment like a TV and clock-radio. There is **a wood-burning stove**, but Benoît has been advised against using it because it produces dangerously high levels of carbon monoxide (CO). In fact, **the combination of poor insulation and air leaks have probably saved Benoît from CO poisoning**. There is no hot water system in the house. He relies solely on an electric heater. To keep costs down, he turns it on only at night – and only in the room in which he sleeps. **During the day, the indoor temperature of the house hovers around 9°C!**

One could hardly imagine that the exterior of the house visible from the street hides such a hell to live in. The Mayor of the village visited Benoît and advised him of the need to carry out works. Benoît did not disagree, but he saw no possible way to finance this, given the disconnect between the large scope of work needed and his personal finances, as **he is unemployed and has no financial resource**.

©Marylin Smith - ESRC Just Energy. Benoît (on the left) a vulnerable person in a very cold and leaky house, helped by Hubert (on the right) a volunteer from Secours Catholique-Caritas France, before the renovation works coordinated by Réseau Eco Habitat.

This is when the association Réseau Eco Habitat entered the scene. Réseau Eco Habitat came in to evaluate both the house problems and the social situation of Benoît. They evaluated his situation to be eligible for various social assistance schemes, and for the financial help from the French Public National Agency for Improving and Renovating Houses (ANAH).

A good portion of the high costs for global energetic renovation (around €20,000 out of an average total of €50,000) **can usually be covered by the ANAH**.
But as it is insufficient funding for homeowners in poverty like Benoît, Réseau Eco Habitat has to work on **finding several other sources of financing: regional government, local government, social entities, and also private fundings**. For example for Benoît, €19,000 came from the French ANAH, and among other fundings, €9,000 came from the 'Communauté de communes' – which is a local government entity.

Once the fundings reach 90% of the total costs, Réseau Eco Habitat explains that **it is important that homeowners** - even if they are very poor - **participate in paying a small portion** (around 5 to 10%), in order to feel pride in their project. It often means getting a loan – perhaps for the first time in their lives. To assist with the loan, the volunteer help people prepare a household budget that can be shown to the bank.

Benoît's house before works

Benoît's house after works

The program of renovation for Benoît's house was heavy: **redoing the roof and insulation of the walls, changing the electricity system, heating and hot water system, transforming the two main rooms, at a total cost of €42,000**.

It took several months to gather all the different fundings necessary for Benoît's project. And Covid's crisis has added several months more of delays. Finally, the heavy renovation works on Benoît house were carried out in summer 2020, and lasted during three months.
Benoît was very nervous during the renovation works, and **he really needed a strong psychological support from Hubert**.

Two major transformations have happened in this process: **the transformation of the house has been total**. **Moreover, the transformation of the personality of Benoît is impressive too**: he went from being very introvert, to being able to open up to other people.

This text is adapted from a blog article by Marine Cornelis, Next Energy Consumer. Credit photos: ©Marylin Smith, ESRC Just Energy
Link to ESRCjustenergy "Local challenges & solutions for those living in vulnerable situations in the French countryside"

Réseau Eco Habitat – Exemple of financing energy renovation work

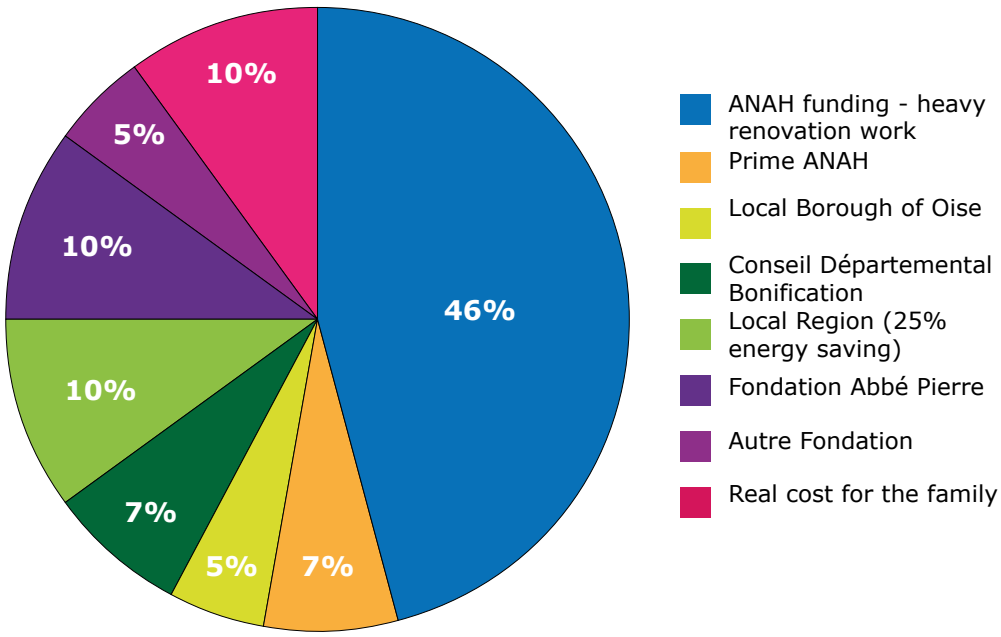


Fig. 13 Exemple of financing energy renovation work for a very modest family supported by Réseau Eco Habitat.

Example of financing plan Results: 35% energy gain	
Total cout travaux	**56.558,04 €**
Subventions	
ANAH 50% du HT estimé	25.000,00 €
Secours catholique/CIS déplafonnement	1.637,00 €
Prime ANAH	4.000,00 €
Conseil Départemental 60	2.500,00 €
Conseil Départemental bonification	4.000,00 €
Conseil Régional - 35% gain énergétique	5.750,00 €
Fondation Abbé Pierre	5.500,00 €
Autre Fondation Solinergy	2.500,00 €
Total subventions	**50.887,00 €**
Reste à charge famille	**5.671,04 €**
prêt CAF standard	1.067,14 €
prêt CAF standard	4.603,90 €
% participation famille	**10,03%**

Tab. 8 Example of financing plan

10. FINANCIAL INSTRUMENTS
Cases of Italy, France and Spain

10.1. 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.

10.1.1 Ecobonus

Main characteristics:

- Energy efficiency interventions for Private Buildings (residential and non).
- Deduction of 50%, 65%, 70%, 75%, 80%, 85% of eligible expenses (depending on the intervention/s that is/are carried out).
- Deduction from IRPEF (Personal

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

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.

10.1.2 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.

10.2 France

Over 29 million housings, 4.8 M (17%) are rated "high energy intensive" or "thermal sinks" (F or G rate according to the DPE- Energy Performance Diagnosis)

In high energy private homes, low-income families are over numerous.

But social public lodging is less energy intensive, and cheaper for low-income families

Renovation works are:

- complex because of technical hurdles, official regulation, and financial constraints.
- costly (from 5 k€ to 80 k€) leading to limited energy savings.
- with a long pay-back (10 to 50 years).

10.2.1 Subsidies to energy expenditures

a. The Energy Cheque (Chèque Energie)

Public subsidy to low-income families, aimed at helping them to pay their energy bills:

- Substituting the former "social rates" for energy (discount rates for low-income users).
- Granted to all occupants, owners or tenants, living in single houses or multi-families flats.
- Sent every year automatically to the recipients by the government services.

Can be used only to pay energy bills (oil, gas, electricity, wood, ect.)

Activites:

- Amount: from 48 € to 277 €, depending on the income and size of the household
- Total 2019 amount: 900 M€, for 4,5 M cheques

b. Solidarity Housing Fund (FSL)

Public social fund, managed by the district authorities.

Subsidies for the payment of energy expenses or water bills, aimed at supporting the families to stay in their homes.

Granted by the district social public services.

Activites:

- Amount: from 200 € to 500 €
- Total yearly amount: circa 200 M€

c. Local CCAS fundings

Public social services, managed by towns and urban communities.

Local social support.

Delivery of emergency social help, and support to the payment of energy bills.

10.2.2 Funding for renvation work

a. ANAH fundings

ANAH -National Public Agency for Housing Renovation, granting subsidies:

- To occupant owners.
- Under income conditions.
- Submitted to a minimum improvement of the energy performance (25%).
- Amount: up to 50% of the renovation cost, with an upper limit (circa 30 k€).

Activites

- 2019: 900 M€ granted for 117 000 operations.
- 2020: new program MaPrimRenov, extended to renting owners
- Total 2020 amount: 1300 M€ grant.

b. Energy certificates CEE

Financing by the energy providers, proportionally to their sales (up to 0,15 €/kWh)

Grant of subsidies to housing energy performance:

- Insulation of roofs or walls for 1 €.
- Boilers and heat pumps for 1 €.
- Specific bonuses for low-income households.

Activites

- Total 2018-2020 amount: 9 000 M€.

c. Other public subsidies

- Towns and urban communities.
- District.
- Region.
- National Family Welfare Fund (CAF).
- Pension funds: CARSAT, AGIRC, MSA, ect.
- Housing Promotion Fund (Action logement).

Activites

- Total amount per renovation operation: up to 10 k€.

d. Private fundings

- Fondation Abbé Pierre.
- Secours Catholique.
- Private corporate foundations: Leroy Merlin, Schneider, Saint-Gobain,etc.

10.3 Spain

10.3.1 ENOVE - Housing and Building Rehabilitation Plan

The main objectives of the Renovation Plan for Housing Rehabilitation are to increase the energy efficiency of homes and buildings, improve accessibility conditions, reinforce social cohesion and encourage job creation.

Reference: Governement of Basque Country

10.3.2 Caf-Accio

The purpose of this project has been to develop a sustainable and self-sufficient strategy to combat energy poverty, based on the joint action of neighboring communities and the City Councils, complemented with the support of networks of solidarity and the Self-Financed Communities.

To do this, the program has proposed adopting **the creation of community savings groups to invest in improving the energy efficiency of their home and community**, in order for this action to reduce the cost of their bills and, by therefore, its economic dependence with its network of relationships or with the help of the administration or social entities.

Reference: Ecoserveis

10.3.3 State Housing Plan (2018/2021)

This Plan includes different types of aid, among them are those intended for the rehabilitation of buildings and urban and rural regeneration and others intended for rent.

These grants favor the groups with the most difficulties: young people, the elderly, people with disabilities and the

most vulnerable families.

In general, **aid represents 40% of investment and 75% in households with low incomes**.

However, the quantities also vary epending on the type of dwelling and whether it is a whole building, among others.

Reference: Governement of Spain - Ministry of Transport, Mobility and Urban Agenda

11.3.4 PAREER II

Aid Program for the Rehabilitation of Existing Buildings.

The objective of the actions eligible for aid is to achieve a reduction in CO^2 emissions and the final energy consumption of buildings, by improving energy efficiency, so that the buildings where actions are carried out improve, at least, in one letter their energy rating. The cost should be between 30,000€ and 4,000,000€.

The buildings must have a minimum of 70% of their built surface destined for residential use and their year of construction must be prior to 2007, among others requirements.

Reference: Governement of Spain - Diversification and Saving Energy Public Institute (IDAE)

11.3.5 Local Energy Communities (Program to finance pilot projects)

The IDAE, in its role as a driving agent for the change in the energy model, has among its lines of action investment and financing in projects of energy interest that contribute to accelerating the energy transition process and that demonstrate the viability of new technologies, solutions or strategies.

Within the impulse to our strategies or forms of action are the local energy communities to which we want to pay special attention, supporting in this initial phase those pilot projects that meet technical and economic solvency requirements.

As a consequence, the possibility is opened for the promoters of these local energy communities to submit their project proposals to IDAE for evaluation, in accordance with certain conditions.

Reference: Governement of Spain - Diversification and Saving Energy Public Institute (IDAE)

11.3.6 Aid and subsidies to finance actions to improve energy efficiency and rehabilitation

These aids and subsidies, which exist in all regions but in different time frames, serve as financing channels to subsidize actions to improve the Energy Efficiency and Renewable Energies of buildings.

Their objective is to finance renovations of facades, roofs, electrical or gas installations, thermal and acoustic insulation of the building or new heating installations, among others. Normally, this type of works can be aimed at both individual homes and neighboring communities, for works that require actions on common elements of the building.

Reference:Government of Aragon (exists in more regions)

11.3.7 Aid and subsidies to finance actions to improve energy efficiency and rehabilitation

Zaragoza Vivienda, which is a municipal organization, has different programs to promote rehabilitation in the city.

Some of them are aids to carry out energy efficiency works:

- on buildings completed before 1980;
- in the building to communities of owners or owners of single-family homes with limited rents or who transfer homes to the municipal rent exchange;
- to improve energy efficiency in homes with limited incomes;
- inside the houses that are transferred or transferred to the municipal rent exchange.

Reference: Zaragoza City Council - Zaragoza Housing

CITIZENS AND RENEWABLE ENERGY COMMUNITIES IN THE EU*

Through the Clean energy for all Europeans package, adopted **in 2019, the EU introduced the concept of energy communities in its legislation**, notably as citizen energy communities and renewable energy communities.

More specifically, the Directive on common rules for the internal electricity market ((EU) 2019/944) includes new rules that enable active consumer participation, individually or through citizen energy communities, in all markets, either by generating, consuming, sharing or selling electricity, or by providing flexibility services through demand-response and storage. The directive aims to **improve the uptake of energy communities and make it easier for citizens to integrate efficiently in the electricity system, as active participants**.

In addition, the revised Renewable energy directive (2018/2001/EU) aims to strengthen the role of renewables self-consumers and renewable energy communities. EU countries should therefore ensure that they can participate in available support schemes, on equal footing with large participants.

Empowering renewable energy communities to produce, consume, store and sell renewable energy will also help advance energy efficiency in households, support the use of renewable energy and at the same time contribute to fighting poverty through reduced energy consumption and lower supply tariffs.

**from EU Commission website*

BEST PRACTICE

Barrio Solar®: sharing of renewable energies and solidarity in the community

Barrio Solar is an initiative from ECOCES aimed at **promoting shared self-consumption in neighborhoods in urban areas**, through the installation of photovoltaic plants for shared self-consumption in community buildings in the neighborhood.

Barrio Solar consists of **two photovoltaic installations of 50 kWp in two Municipal Sports Pavilions**. Businesses and neighbors that are located less than 500 meters from at least one of the two installations, they will be able to **participate by self-consuming solar energy without the need to carry out any work or installation in their home**, or change their electricity company.

In Barrio Solar, both residents and businesses that participate **without the need to make any investment, only paying a small monthly bill, with which they can benefit from savings of around 30% of energy** on their bills. Energy that they will now receive from the panels of the installation in their neighborhood.

Barrio Solar will generate renewable, local and supportive energy, promoting inclusion and environmental awareness in the neighborhood, including **the participation of people at risk of exclusion, facilitating their access to affordable and non-polluting energy**.

Barrio Solar is an initiative that wants to reach all the people in the neighborhood where it is installed, **a 10 % of the energy it generates goes to families in the neighborhood that are in a situation of Energy Poverty without having to pay any monthly fee**, simply benefiting from the savings on the bill that solar self-consumption generates. In addition, customers of any company can participate in Barrio Solar.

Besides, Barrio Solar empowers people with energy culture.
Barrio Solar Office carry out activities to increase the knowledge about energy of all residents of the neighbourhood, not just the participants. **Families in energy poverty will be advised to reduce their bills, advise on refurbishment of homes, self-consumption and energy communities.**

Thanks to all those who contributed to the realization of the document:

Marcos Boj
Jean-Luc Dechoux
Alessandro Federici
Catherine Ferrieux
Cecilia Foronda
Fabio Gerosa
Edoardo Pandolfi
Polliana Parodi
Carlos Pesqué
Laura Pizzi
Anna Cristina Pizzorno
Marc Valentin
Corinna Viola

Also thanks to the social workers and volunteers who participated in the G-Lab activities and allowed us to improve the document.

This document have been drawn up with attention to the indications of the Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 and Commission Implementing Decision (EU) 2018/1523 of 11 October 2018 regarding the accessibility of the websites and mobile applications.

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