



ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA (ICAI)

MASTER IN THE ELECTRIC POWER INDUSTRY

**STATE-OF-THE-ART OF A SELECTION OF EU MEMBER
STATES ENERGY POVERTY INSTRUMENTS**

Author: Antonia María Siverio Royo

Supervisors: José Carlos Romero Mora and Pedro Linares Llamas

Madrid

July 2017

Master's Thesis Presentation Authorization

THE STUDENT:

Antonia María Siverio Royo

THE SUPERVISOR

José Carlos Romero Mora

Signed:



Date: 02/07/17

THE CO-SUPERVISOR

Pedro Linares Llamas

Signed:



Date: 02/07/17

Authorization of the Master's Thesis Coordinator

Dr. Luis Olmos Camacho

Signed:

Date: 04/07/17

AUTORIZACIÓN PARA LA DIGITALIZACIÓN, DEPÓSITO Y DIVULGACIÓN EN ACCESO ABIERTO (RESTRINGIDO) DE DOCUMENTACIÓN

1º. Declaración de la autoría y acreditación de la misma.

El autor D. Antonia María Siverio Royo, como estudiante del Máster de Máster Universitario en Sector Eléctrico de la UNIVERSIDAD PONTIFICIA COMILLAS (COMILLAS), **DECLARA**

que es el titular de los derechos de propiedad intelectual, objeto de la presente cesión, en relación con la obra *State-of-the-art of a Selection of EU Member States Energy Poverty Instruments*, que ésta es una obra original, y que ostenta la condición de autor en el sentido que otorga la Ley de Propiedad Intelectual como titular único o cotitular de la obra.

En caso de ser cotitular, el autor (firmante) declara asimismo que cuenta con el consentimiento de los restantes titulares para hacer la presente cesión. En caso de previa cesión a terceros de derechos de explotación de la obra, el autor declara que tiene la oportuna autorización de dichos titulares de derechos a los fines de esta cesión o bien que retiene la facultad de ceder estos derechos en la forma prevista en la presente cesión y así lo acredita.

2º. Objeto y fines de la cesión.

Con el fin de dar la máxima difusión a la obra citada a través del Repositorio institucional de la Universidad y hacer posible su utilización de *forma libre y gratuita* (*con las limitaciones que más adelante se detallan*) por todos los usuarios del repositorio y del portal e-ciencia, el autor **CEDE** a la Universidad Pontificia Comillas de forma gratuita y no exclusiva, por el máximo plazo legal y con ámbito universal, los derechos de digitalización, de archivo, de reproducción, de distribución, de comunicación pública, incluido el derecho de puesta a disposición electrónica, tal y como se describen en la Ley de Propiedad Intelectual. El derecho de transformación se cede a los únicos efectos de lo dispuesto en la letra (a) del apartado siguiente.

3º. Condiciones de la cesión.

Sin perjuicio de la titularidad de la obra, que sigue correspondiendo a su autor, la cesión de derechos contemplada en esta licencia, el repositorio institucional podrá:

(a) Transformarla para adaptarla a cualquier tecnología susceptible de incorporarla a internet; realizar adaptaciones para hacer posible la utilización de la obra en formatos electrónicos, así como incorporar metadatos para realizar el registro de la obra e incorporar “marcas de agua” o cualquier otro sistema de seguridad o de protección.

(b) Reproducir la en un soporte digital para su incorporación a una base de datos electrónica, incluyendo el derecho de reproducir y almacenar la obra en servidores, a los efectos de garantizar su seguridad, conservación y preservar el formato. .

(c) Comunicarla y ponerla a disposición del público a través de un archivo abierto institucional, accesible de modo libre y gratuito a través de internet.¹

(d) Distribuir copias electrónicas de la obra a los usuarios en un soporte digital.²

4º. Derechos del autor.

El autor, en tanto que titular de una obra que cede con carácter no exclusivo a la Universidad por medio de su registro en el Repositorio Institucional tiene derecho a:

a) A que la Universidad identifique claramente su nombre como el autor o propietario de los derechos del documento.

b) Comunicar y dar publicidad a la obra en la versión que ceda y en otras posteriores a través de cualquier medio.

c) Solicitar la retirada de la obra del repositorio por causa justificada. A tal fin deberá ponerse en contacto con el vicerrector/a de investigación (curiarte@rec.upcomillas.es).

d) Autorizar expresamente a COMILLAS para, en su caso, realizar los trámites necesarios para la obtención del ISBN.

d) Recibir notificación fehaciente de cualquier reclamación que puedan formular terceras personas en relación con la obra y, en particular, de reclamaciones relativas a los derechos de propiedad intelectual sobre ella.

5º. Deberes del autor.

El autor se compromete a:

¹ En el supuesto de que el autor opte por el acceso restringido, este apartado quedaría redactado en los siguientes términos:

(c) Comunicarla y ponerla a disposición del público a través de un archivo institucional, accesible de modo restringido, en los términos previstos en el Reglamento del Repositorio Institucional

² En el supuesto de que el autor opte por el acceso restringido, este apartado quedaría eliminado.

- a) Garantizar que el compromiso que adquiere mediante el presente escrito no infringe ningún derecho de terceros, ya sean de propiedad industrial, intelectual o cualquier otro.
- b) Garantizar que el contenido de las obras no atenta contra los derechos al honor, a la intimidad y a la imagen de terceros.
- c) Asumir toda reclamación o responsabilidad, incluyendo las indemnizaciones por daños, que pudieran ejercitarse contra la Universidad por terceros que vieran infringidos sus derechos e intereses a causa de la cesión.
- d) Asumir la responsabilidad en el caso de que las instituciones fueran condenadas por infracción de derechos derivada de las obras objeto de la cesión.

6º. Fines y funcionamiento del Repositorio Institucional.


La obra se pondrá a disposición de los usuarios para que hagan de ella un uso justo y respetuoso con los derechos del autor, según lo permitido por la legislación aplicable, y con fines de estudio, investigación, o cualquier otro fin lícito. Con dicha finalidad, la Universidad asume los siguientes deberes y se reserva las siguientes facultades:

- a) Deberes del repositorio Institucional:
 - La Universidad informará a los usuarios del archivo sobre los usos permitidos, y no garantiza ni asume responsabilidad alguna por otras formas en que los usuarios hagan un uso posterior de las obras no conforme con la legislación vigente. El uso posterior, más allá de la copia privada, requerirá que se cite la fuente y se reconozca la autoría, que no se obtenga beneficio comercial, y que no se realicen obras derivadas.
 - La Universidad no revisará el contenido de las obras, que en todo caso permanecerá bajo la responsabilidad exclusiva del autor y no estará obligada a ejercitar acciones legales en nombre del autor en el supuesto de infracciones a derechos de propiedad intelectual derivados del depósito y archivo de las obras. El autor renuncia a cualquier reclamación frente a la Universidad por las formas no ajustadas a la legislación vigente en que los usuarios hagan uso de las obras.
 - La Universidad adoptará las medidas necesarias para la preservación de la obra en un futuro.
- b) Derechos que se reserva el Repositorio institucional respecto de las obras en él registradas:
 - retirar la obra, previa notificación al autor, en supuestos suficientemente justificados, o en caso de reclamaciones de terceros.

Madrid, a 2 de julio de 2017

ACEPTA

Antonia María Siverio Royo

Fdo: 



ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA (ICAI)

MASTER IN THE ELECTRIC POWER INDUSTRY

**STATE-OF-THE-ART OF A SELECTION OF EU MEMBER
STATES ENERGY POVERTY INSTRUMENTS**

Author: Antonia María Siverio Royo

Supervisors: José Carlos Romero Mora and Pedro Linares Llamas

Madrid

July 2017

SUMMARY

The following document provides a review of the Energy Poverty related issues across a selection of Member States: Italy, France, Germany, UK and Spain, the official and unofficial definitions for energy poverty and vulnerable consumers, the different indicators to address this problem and the tackling instruments available (in terms of financial help, consumer protection or energy efficiency measures).

As a starting point, it is analyzed the role acquired by each Member States on the protection of vulnerable customers and scope of the term Energy Poverty and its coverage. Then, the support metrics for policy-makers are classified according to (Heindl, 2013) criterion: subjective and objective indicators depending on several factors such as living conditions, income or energy expenses. Some of the indicators presented correspond to the social bonus (discount on electricity or gas tariffs); Low Income High Costs (LIHC) indicator (ratio between energy expenses and income); or the Poverty Line (based on the minimum income standard).

With regards to current policies, these are characterized by their scope and some examples are: social tariffs (Italy, Spain and France), which are effective short-term financial helps to reduce the price of energy bills; and long-term policies in terms of energy efficiency programmes for buildings, inefficient appliances renovations through loans or incentives (StromCheck or Habiter Mieux). However, still the financial source is the key point of these instruments which place in a disadvantage position the non-eligible customers who usually pay e.g. tariff discounts through general taxation.

In order to analyze the problem more accurately it is necessary to collect information available from data sources and surveys, which are the bases for calculating indicators' thresholds and analyzing the impact of current policies. After the study of the whole figure of each country, it is done a revision of four proxy indicators (EU-SILC, 2015), namely, people at-risk-of poverty or social exclusion, arrear on utility bills, inability to keep home adequately warm, and dwellings with leakages and damp walls, to evaluate and compare the current status of energy poverty main drivers across countries.

Some of the conclusions are concerning to the available information mechanisms and accessibility for customers such as billing transparency rules; good price comparison instruments; or disconnection restrictions. For these reasons, it is proposed a higher degree of retailers relationship with customers. This can be achieved by means of close and customized services, as these companies are one of the key points for acquiring accurate information of household energy needs.

Co-operation between municipalities and retailers can create a major source of detailed knowledge of households that suffer energy poverty. Local institutions in partnership with social and energy organisations can collect more accurate amounts of data from a closer perspective of the poor areas where there is people with financial needs, poor levels of education and where buildings are most energy inefficient.

Contents

1.	Introduction	10
1.1.	Development of the subject.....	11
1.2.	Vulnerable Consumers	13
1.3.	Energy Poverty	14
1.4.	Drivers	16
1.5.	Indicators.....	17
1.6.	Policies.....	18
2.	Policies applied in the EU framework	20
2.1.	Italy.....	20
2.1.1.	Vulnerable Consumers and Energy Poverty definitions.....	21
2.1.2.	Indicators currently used: objective and/or subjective. Methodologies	21
2.1.3.	Data sources: surveys and statistics.....	24
2.1.4.	Programmes at the state level and if possible at the regional and local level....	28
2.2.	France.....	32
2.2.1.	Vulnerable Consumers and Energy Poverty definitions.....	34
2.2.2.	Indicators currently used: objective and/or subjective. Methodologies	34
2.2.3.	Data sources: surveys and statistics.....	37
2.2.4.	Programmes at the state level and if possible at the regional and local level....	41
2.3.	Germany.....	45
2.3.1.	Vulnerable Consumers and Energy Poverty definitions.....	46
2.3.2.	Indicators currently used: objective and/or subjective. Methodologies	46
2.3.3.	Data sources: surveys and statistics.....	47
2.3.4.	Programmes at the state level and if possible at the regional and local level....	50
2.4.	United Kingdom.....	54
2.4.1.	Vulnerable Consumers and Energy Poverty definitions.....	55
2.4.2.	Indicators currently used: objective and/or subjective. Methodologies	56
2.4.3.	Data sources: surveys and statistics.....	59
2.4.4.	Programmes at the state level and if possible at the regional and local level....	62
2.5.	Spain.....	66
2.5.1.	Vulnerable Consumers and Energy Poverty definitions.....	66
2.5.2.	Indicators currently used: objective and/or subjective. Methodologies	67
2.5.3.	Data sources: surveys and statistics.....	67
2.5.4.	Programmes at the state level and if possible at the regional and local level....	69

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

3. Comparison between the Member States' approaches	71
4. Conclusions	86
5. References.....	88

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

INDEX OF TABLES

TABLE 1: CATEGORIZATION OF THE DEFINITIONS OF VCS. SOURCE: INSIGHT_E, 2015.	14
TABLE 2: EXAMPLE OF THREE EXPENDITURE-BASED INDICATORS.....	17
TABLE 3: EXAMPLE OF THREE EXPENDITURE-BASED INDICATORS.....	18
TABLE 4: EQUIVALENT FACTOR SCALE FOR ISEE CALCULATION. SOURCE: INPS, 2015.	24
TABLE 5: ELECTRICITY BONUS FINANCIAL SUPPORT EVOLUTION 2014-2017. SOURCE: AAEGSI, 2017.....	27
TABLE 6: ACHIEVED ENERGY SAVINGS BY SECTOR, YEARS 2011-2015, AND EXPECTED FOR 2020. SOURCE: ENEA, 2016. .	28
TABLE 7: FINANCIAL RESOURCES DISTRIBUTION PER FAMILY MEMBERS. SOURCE: AAEGSI, 2017.	29
TABLE 8: COSTS AND CONSUMPTION CLASSIFICATION PER ENERGY SOURCE AND LIVING SPACE. SOURCE: WWW.CO2ONLINE.DE	53
TABLE 9: MAXIMUM CONSUMPTION INVOICED FOR CONSUMERS UNDER PVPC AND SOCIAL BONUS. SOURCE: BOE-A-2016- 12267.	69
TABLE 10: COMPARISON BETWEEN MEMBER STATES DEFINITIONS OF EP AND VCS.....	77
TABLE 11: COMPARISON BETWEEN MEMBER STATES INDICATORS AND DATA SOURCES.	78
TABLE 12: COMPARISON BETWEEN MEMBER STATES INSTRUMENTS (AFFORDABILITY ISSUES) AT STATE LEVEL.....	79
TABLE 13: COMPARISON BETWEEN MEMBER STATES INSTRUMENTS (ENERGY EFFICIENCY PROGRAMMES) AT STATE LEVEL (ITALY AND FRANCE).	80
TABLE 14: COMPARISON BETWEEN MEMBER STATES INSTRUMENTS (ENERGY EFFICIENCY PROGRAMMES) AT STATE LEVEL (GERMANY, UK AND SPAIN).	81

INDEX OF FIGURES

FIGURE 1: DIFFERENCE BETWEEN VULNERABLE CONSUMERS AND ENERGY POVERTY. 13

FIGURE 2: SHARE OF HOUSEHOLDS' EXPENDITURE ON DOMESTIC ENERGY SERVICES (AVERAGE VERSUS POOR HOUSEHOLDS).
SOURCE: WORKING PAPER ON ENERGY POVERTY, 2015. 15

FIGURE 3: DRIVERS OF EP AND KEY INDICATORS. SOURCE: INSIGHT_E, 2015. 16

FIGURE 4: DISTRIBUTION OF THE DIFFERENT TYPES OF FINANCIAL SUPPORT MECHANISMS. SOURCE: INSIGHT_E, 2015. 18

FIGURE 5: DISTRIBUTION OF THE DIFFERENT TYPES OF CONSUMER PROTECTION AIDS. SOURCE: INSIGHT_E, 2015. 19

FIGURE 6: DISTRIBUTION OF THE DIFFERENT ENERGY EFFICIENCY PROGRAMMES. SOURCES: INSIGHT_E, 2015 20

FIGURE 7: TAXONOMY OF EP MEASURES IN ITALY. SOURCE: BANCA D'ITALIA, 2015. 22

FIGURE 8: HOUSEHOLDS RELATIVE POVERTY INCIDENCE (PER 100 HOUSEHOLDS WITH THE SAME CHARACTERISTICS). SOURCE:
ISTAT, 2015. 25

FIGURE 9: DISTRIBUTION OF MONTHLY BONUS AND TOTAL INCOME BETWEEN THE EQUIVALENT-INCOME QUINTILES. SOURCE:
BANCA D'ITALIA, 2014. 26

FIGURE 10: SAVING IN THE ITALIAN ENERGY BILL AND ENERGY SAVING, YEARS 2005-2015. SOURCE: ENEA, 2015. 28

FIGURE 11: DISTRIBUTION OF HOUSE WORKS ACCORDING TO TEE RATE. SOURCE: ONPE, 2016. 38

FIGURE 12: REASONS WHY WORK LABOURS ARE DEMANDED. SOURCE: OPEN, 2015. 40

FIGURE 13: PROMOTION AND MOST KNOWN ENERGY EFFICIENCY DEVICES BY CRAFTSMEN. SOURCE: OPEN 2015. 40

FIGURE 14: EVOLUTION OF THE PERCENTAGE OF SOCIAL TARIFFS TPN AND TSS BENEFICIARIES. SOURCE: ONPE, 2016. 42

FIGURE 15: PROPORTION OF EXPENSES ON HOUSING RENOVATIONS. SOURCE: DESTATIS, 2015. 48

FIGURE 16: AT-RISK-OF POVERTY OR SOCIAL EXCLUSION POPULATION DISTRIBUTION. SOURCE: DESTATIS, 2015. 49

FIGURE 17: HOUSING ALLOWANCE'S GRANT DISTRIBUTION AMONGST GROUPS OF HOUSEHOLDS. SOURCE: DESTATIS, 2015.
..... 49

FIGURE 18: CLASSIFICATION OF HOUSEHOLDS INTO QUADRANTS DEPENDING ON INCOME AND ENERGY COSTS. SOURCE: FUEL
POVERTY METHODOLOGY HANDBOOK (2016). 57

FIGURE 19: DISTRIBUTION OF POPULATION AMONGST QUADRANTS. SOURCE: FUEL POVERTY METHODOLOGY HANDBOOK
(2016). 57

FIGURE 20: EVOLUTION OF NON-DECENT HOMES BY TENURE (2006-15). SOURCE: EHS HEADLINE REPORT 15-16. 60

FIGURE 21: DIVERSITY OF DAMP PROBLEMS BY TENURE (2015). SOURCE: EHS HEADLINE REPORT 15-16. 60

FIGURE 22: CLASSIFICATION OF ENERGY EFFICIENCY RATING BANDS BY TENURE (2015). SOURCE: EHS HEADLINE REPORT
15-16. 61

FIGURE 23: CLASSIFICATION OF BOILER TYPES (1996-2015). SOURCE: EHS HEADLINE REPORT 15-16. 61

FIGURE 24: EVOLUTION OF THE DIFFERENT INSULATION MEASURES (2008-15). SOURCE: EHS HEADLINE REPORT 15-16. . 62

FIGURE 25: PEOPLE AT RISK OF POVERTY OR SOCIAL EXCLUSION (% OF TOTAL POPULATION). SOURCE: EU-SILC INCOME AND
LIVING CONDITIONS, 2015. 72

FIGURE 26: DISTRIBUTION OF GROUPS OF HOUSEHOLDS AMONGST MS. SOURCE: EU-SILC INCOME AND LIVING CONDITIONS,
2015. 73

FIGURE 27: ARREARS ON UTILITY BILLS (BY HOUSEHOLD TYPE). SOURCE: EU-SILC INCOME AND LIVING CONDITIONS, 2015.
..... 74

FIGURE 28: INABILITY TO KEEP HOME ADEQUATELY WARM (BY HOUSEHOLD TYPE). SOURCE: EU-SILC INCOME AND LIVING
CONDITIONS, 2015. 75

FIGURE 29: TOTAL POPULATION LIVING IN POORLY ACCOMMODATION (BY HOUSEHOLD TYPE). SOURCE: EU-SILC INCOME
AND LIVING CONDITIONS, 2015. 75

1. Introduction

Currently, between 50 million and 125 million people in the EU are at risk of energy poverty (according to the Buildings Performance Institute Europe, using data from Eurostat). The main reasons are generally explained by low incomes, high energy prices and poor energy efficiency of the living space, market conditions and social environment. However, it is not a definition generally accepted, and so each Member State has its own definition. [86]

Until the moment, there are just five Member States: Cyprus, France, Ireland, UK and Slovakia, that have defined this phenomenon in their legislations. The definitions focus on identifying groups facing problems of affordability in maintaining necessary energy services, heating in particular, in their homes. Furthermore, these definitions include diverse energy sources such as electricity, gas and coal. [3]

In this regard, there is a narrower concept known as Fuel Poverty, which is used in some countries such as UK to refer to households' lack of access, affordability to modern energy services such as clean cooking facilities, fuels and stoves.

Regarding "Energy Poverty" (EP) concept, Member States should also take appropriate measures to protect final customers, in order to ensure that there are adequate safeguards to protect vulnerable consumers. So, they are obliged to define the concept of "Vulnerable Consumers" (VC) (Article 3 of the Electricity and Gas Directives). An explicit definition would be the criteria that defines vulnerability, such as personal or household characteristics, or specific economic conditions which are specified in national law. [3]

However, there is a high variability between Member States definitions as a consequence of socio-economic (income, age or health conditions) and energy use (heating system, fuel, building fabric, winter/summer thermal requirements or payment method) factors. Also, some members claim that the already defined eligibility criteria of existing national social protection capture the essence of this concept. But, these definitions are usually not even established by law. [3]

One of the issues discussed in the document is the misunderstanding between EP and VCs' concepts. Although, they are correlated, VCs are not indispensably energy poor and vice versa. On the one hand, consumer vulnerability is driven by consumer features such as age, number of dependents, health, ability to interact with the market, behavioural characteristics, employment, or access to shops or the internet. And, on the other hand, energy poverty, is promoted by poor energy efficiency of dwellings and high energy prices related with stuck or downward wages. [2]

So, this document will collect from a selection of Member States: Italy, France, Germany, UK and Spain, (1) the official and unofficial definitions for EP and VCs, (2) the different indicators to address EP problems and the tackling instruments available (in terms of financial help, consumer protection or energy efficiency measures). And, additionally, to do so it will be necessary to know what (3) data sources and surveys are used to calculate indicators' thresholds, (4) analyze the impact of current policies and then, (5) finally make a comparison between MS instruments impact.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

For instance, current subjective and objective indicators will be classified according to Heindl (2013) criterion (based on vulnerable consumers' preferences, income-expense ratios or dwellings conditions) in order to better understand the nature and extension of the different metrics that will later on support authorities in developing and improving target policies.

These policies can be directed to: alleviate affordability issues through financial interventions such as subsidies to support energy invoices payment or social tariffs targeted to well-defined groups; protect consumers via better information, training, legislation against disconnections, and possibility of debt-restructuring; setting minimum energy efficiency requirements to help consumers to improve accommodation conditions and to decrease energy consumption.

In order to complement each Member State measures, and analyze the results of their strategic plans implementation, we will study the several surveys that support these actions. And, finally, we will review four proxy indicators (EU-SILC, 2015), namely, people at-risk-of poverty or social exclusion, arrear on utility bills, inability to keep home adequately warm, and dwellings with leakages and damp walls, to evaluate and compare the current status of EP main drivers across countries.

1.1. Development of the subject

Regarding the Regulatory Framework at the EU, the first provision calling on Member States to protect VCs was the Second Energy Package in 2003. However, the Directives make no reference to the EP issue. The Commission recognised several energy consumer rights but, the provisions were incorrectly applied in some Member States and they opened 38 violation procedure against 19 MS who had infringed consumer provisions. [3]

In 2009, the roadmap of the provisions on VCs set by the Electricity and Gas Directives included in the Third Energy Package (Electricity and Gas Directives 2009/72/EC and 2009/73/EC), was the energy market liberalisation. [4]

These Directives proposed new elements identifying for the first time both problems. In addition to the protection of VCs and disconnections provisions obligations, Member States were required to define clearly the concept. Member States can refer, inter alia, to EP or prohibition of disconnection to such customers in critical times (Electricity Directive Article 3; point 7 - Gas Directive Article 3 point 3). And, energy regulators are in charge of monitoring the protection of VCs (Electricity Directive Recital 37; Article 36; point h – Gas Directive Article 40; point j).

The new term EP was acknowledged as an increasing issue and those Member States who were affected, were requested to provide appropriate safeguards to tackle the problem (Electricity Directive Recital 53; Article 3; point 8 – Gas Directive Recital 50; Article 3 point 4).

In order to meet this requirement, Member States must define the categories of customers who will be classified as vulnerable customers and energy regulators were given a specific role to monitor the protection of VC. Furthermore, they were asked to adopt adequate long-term policies such as replacing direct economic helps for those households with high energy invoices with support for energy efficiency of the dwellings. [4]

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

In terms of energy efficiency, up to 2020, the EU as a whole has the target to reduce total primary energy consumption by 20% below 2005 levels by 2020. The European Parliament and the Council introduced the Energy Efficiency Directive (2012/27/EU) on 25 October 2012. And, it has become a relevant tool for tackling this issue. The Directive advances measures to strengthen Member States' efforts to use energy more efficiently through the energy chain. Some of them are listed below: [2]

- Energy efficiency obligation schemes;
- Long-term strategies for the renovation of buildings;
- Promotion of energy audits;
- Requirements to boost consumer rights as regards free-of-charge access to useful metering and billing information;
- Enabling and developing demand response;
- Finding solutions to landlord-tenant split incentives;
- Informing smaller final customers.

The EED includes an energy saving target of 1.5% per year across all annual sales of energy to end customers, excluding transport. In addition, EED requires a 3% target for annual renovations of state buildings and a national strategy for the reduction of consumption in the existing building stock by 2020.

Under Article 7(7)(a) Member States may include specifications with a social aim in energy savings measures that they should implement as a priority in households affected by EP or in social housing.

Concerning to authorities' obligations, the Commission is just responsible for assessing complete and correct additions of the Electricity and Gas Directives, and the European Court of Justice is responsible for ultimate decisions on legal interpretation.

It also exists a platform called 'the Vulnerable Consumer Working Group' (VCWG) which is a stakeholder group headed by the European Commission and guided by industry, consumer organisations, Member States and regulators representatives and academia. They all together provide detailed discussions and policy measures' suggestions to put input practice in Member States. They are the creators of evaluations such as the Guidance on VCs and the Working Paper on Energy Poverty. [2]

Also, once a year London welcomes the Citizens' Energy Forum meeting. It was created first in 2007 by the European Commission and, it is organised with the support of Ofgem, the UK regulatory authority. The Forum's goal is to explore consumers' perspective and role in a competitive, 'smart', energy-efficient and fair energy retail market. The last meeting took place on 30-31 May 2017 and it was dedicated to the 'Clean Energy for All Europeans' legislative Package. [5]

This is also known as 'Winter Package' and it was published in November 2016. This document outlines the proposals to place committed and active consumers at the centre of the future

energy markets by allowing them to have more choice, better information and protection, as well as the possibility to produce and sell their own electricity, individually and collectively. Transparency, new technologies, products and services and a revision of the current regulatory framework will all together give more opportunities for the citizens to become more involved in the energy system and respond to price signals. [3]

Another complement to EU legislation is the ‘Unfair Commercial Practices Directive’, which regulates some aspects of unfair commercial practices in business-to-consumer transactions. The Article 5(3) of the Directive includes a fully harmonized concept of VCs. [4]

1.2. Vulnerable Consumers

The term “Vulnerable Consumers” (VC) usually appears connected to EP issues. And, although these two tend to be positive correlated, this is not always the case. VCs correspond not only to final customers, whose name appears on the bill, that need special support to pay their bills, but also other members of the household.

Then, it is a particular subject of study which should be individually addressed and not only focused on the relationship between the supplier and the customer. The following *Figure* shows the relationship between the concepts mentioned before:

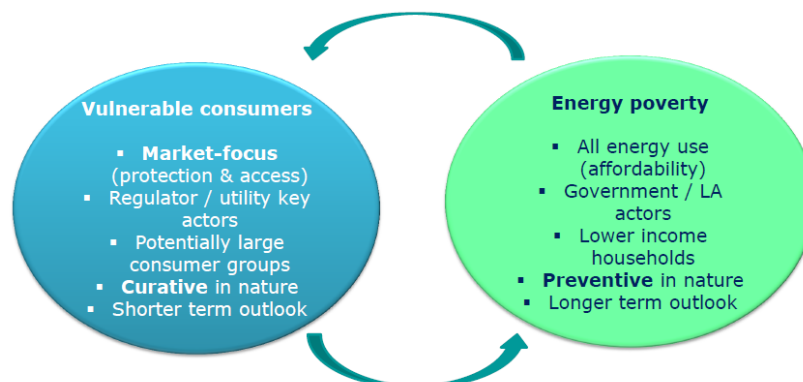


Figure 1: Difference between Vulnerable Consumers and Energy Poverty.

Then, in this document we will refer to the new definition of VCs formulated by the last European Commission report ‘Understanding consumer vulnerability’. In which they specify five dimensions of consumer vulnerability as it follows: [7]

“A consumer, who, as a result of socio-demographic characteristics, behavioral characteristics, personal situation, or market environment:

- Is at higher risk of experiencing negative outcomes in the market;
- Has limited ability to maximize his/her well-being;
- Has difficulty in obtaining or assimilating information;
- Is less able to buy, choose or access suitable products; or
- Is more susceptible to certain marketing practices.”

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

It takes into account that consumer vulnerability is situational, meaning that a consumer can be vulnerable in one situation but not in others, and that some consumers may be more vulnerable than others.

A classification method that is currently applied for grouping definition types (Insight_E, 2015) is shown in Table 1:

Definition type	Member State (MS)	No. of MS in category
Energy affordability (low income / high expenditure)	FR ² , GR, IE ² , IT, SE	5
Receipt of social welfare	BG, CY, DE, DK, FI ¹ , PT, HU, LT, LU, MT ⁴ , PL, HR, SL ³	13
Disability / health	CZ, NL, SK	3
Range of socio-economic groups	AT, BE, ES, RO, SL ⁶ , UK ⁵	6
Not available / Under discussion	EE, LV	2

Table 1: Categorization of the definitions of VCs. Source: Insight_E, 2015.

In addition to this classification method, ACER MMR has identified explicit and implicit definitions at the same level. Firstly, explicit definitions referring to household features or specific economic conditions which are specified in social security laws. And, secondly, implicit definitions that enhance the existing national social protection already capture the essence of this term. And, so VCs are supported through the social security net.

Member States can take different approaches to the Directives transposition obligation to define the term of VCs. And, the main reason why it is so important to enhance the identification of different groups of consumers is the need of providing clear and relevant forms of support. [1]

Regarding the measures applied to tackle this issue, safeguards against disconnections due to non-payments are the most frequent. Insight_E (2015) estimates that 20% of the Member States use this protection measure disconnection, which usually involve social support institutions and, barriers for suppliers and Distribution System Operators (DSOs).

In 2014, ACER MMR declared that the highest disconnection rates took place in Portugal (5.6% electricity and 4.0% gas) and Italy (4.0% electricity and 2.1% gas). [8]

Finally, one question that arises when Member States define VCs is its cost. The administrative cost of protecting them has been limited as many Member States choose to address this problem via their general welfare system. Then, the ratio between costs and benefits will depend on how adequately their concept captures vulnerability, the diverse kinds of protective measures, and the resources required to apply them. [3]

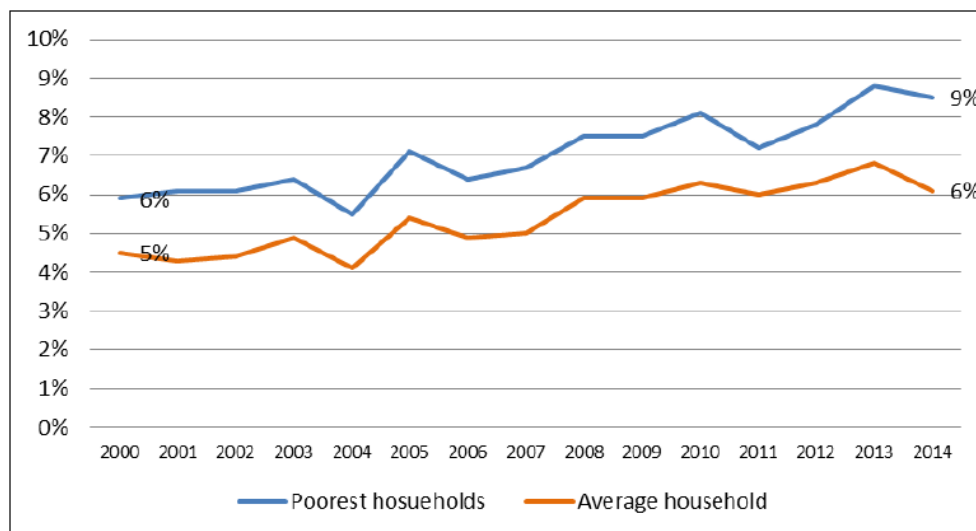
1.3. Energy Poverty

Over the last decade, EP has become a growing priority, as it increases systematically across the EU due to increasing energy prices, poor income and housing. Growing levels of this issue have

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

promoted strong political interest within the European Parliament, the Committee of the Regions, and the Economic and Social Committee, as well as broader stakeholder community including think tanks and consumer associations. [1]

Figure 2 shows the gap existent between the average and the poorest households in terms of between the share of expenditure spent on domestic energy services:



Source: National Statistical Authorities of EU Member States

Figure 2: Share of households' expenditure on domestic energy services (average versus poor households). Source: Working Paper on Energy Poverty, 2015.

In the graphic, at the beginning, low-income household, spent 6% more of their budget on domestic energy services for heating, lighting and powering electrical appliances, one percentage point more than the average household. And, in the end, in 2014, expenditure on energy services for the poorest households in the EU increased by 50% (since 2000), reaching almost 9% of their total income on average, as a consequence of energy prices rising faster than household disposable income.

Up until now, there are just five definitions in legislation of Cyprus, France, Ireland, UK and Slovakia focused on identifying groups facing problems of affordability in maintaining necessary energy services, heating in particular, in their homes. However, not having an official EP definition does not comply inactivity in target policies against these problems. The difference resides in the policy focus which can be classified as energy or social, and so the distinction of what ministry is involved in formulating and implementing measures. This is the example of Netherlands and Scandinavian countries, which have a social policy-focus, so these issues are treated as poverty indicators (due to low income). [1]

Regarding the costs and benefits associated with the execution of the provisions on energy poverty, depends on whether these are subsidised through general taxation (including the aid in the general state budgets) or passed on to consumers' energy bill (in the form of social tariffs). This last system is more publicly, as the main beneficiaries of the protective measures for VCs are those who qualify for the support. [9]

1.4. Drivers

Although there is not a unique way to measure energy poverty, Insight_E (2015) have collected some important factors (low income, high energy bills and poor energy efficiency) that capture the issue status, and the combination of those provide some key indicators that can be used as a metric to look for mechanisms to tackle this situation. The Figure 3 shows the classification: [1]

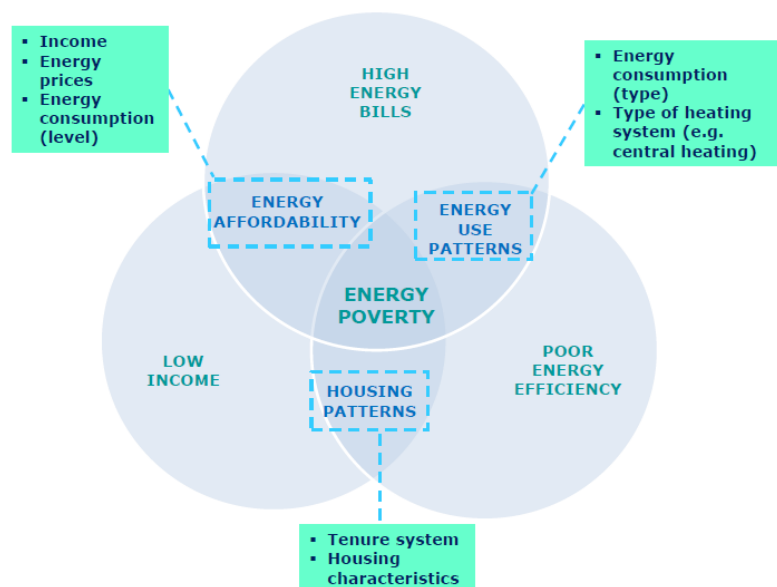


Figure 3: Drivers of EP and key indicators. Source: Insight_E, 2015.

These are usually performed using Eurostats and supplemented with local statistics within the projects: [1]

1. **Low income:** is not only a good indicator in terms of energy poverty, but also in general poverty terms. This key factor can be expressed as the disproportional of household monthly share of income that is spent on energy. As a matter fact, the huge dependency on energy as a basic consumer product, impacts on many poor families' inability to afford.
2. **Poor energy efficiency:** this indicator expresses the relationship between high energy consumption and price increases. However, there are many factors that influence a household consumption such as: climatic factors, income drivers, the kind of energy used for heating systems and energy efficiency of dwellings and appliances.
3. **High energy bills:** depends on whether prices are regulated or competitive, levels of taxation and costs of supply. Furthermore, high energy prices enhance the inability to afford from low income families.

The cost of fuel for each household also depends on household characteristics and their particular requirements that is for a family with children, an older person, a person with disabilities or long-term sickness who might need to heat their home for longer in the day,

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

or to higher levels. The truth is that most low-income families usually have very limited options in terms of type of fuels they can use, and so they are trapped in poor housing.

1.5. Indicators

In order to measure and monitor the extent and severity of the problem, a variety of EP indicators exist and are applied in several countries. This chapter aims to review these metrics that support authorities in getting a high-level understanding of the issue, which can then be used to develop and target policies. For which, we will identify the different metrics through different approaches: [10]

- Expenditure-based: focuses on household's expenditure in energy, usually compared to their income, and so it captures affordability. Table 2 collects three examples:

INDICATOR	DEFINITION
Energy expenditure above the threshold (%)	Ratio between income and energy expenses usually compared to a threshold.
Low Income, High Cost (LIHC)	Combination of two thresholds: income and costs. For example, in England, the first one is set at 60 % of median income, and the second one is a median modelled 'typical' bill.
Minimum income standard (MIS) as half the national median overall expenditure (Disposable income (income minus taxes) after energy costs is below or the same as MIS (after median housing and energy costs), where MIS = 50% of equalised national median per capita overall consumption

Table 2: Example of three expenditure-based indicators.

- Consensual-based: corresponds to metrics that identify people who declare to face difficulties in order to meet basic energy services and at risk of exclusion. Table 3 collects three examples:

INDICATOR	DEFINITION
Perceived Energy Poverty (PEP)	Number of households that declare financial difficulties in heating their homes adequately
% of households unable to afford to keep their home adequately warm	Survey variables initiative from EU Fuel Poverty Network
% of households in arrears on utility bills	

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

% of households living in dwellings with a leaking roof, damp or rot)	
---	--

Table 3: Example of three expenditure-based indicators.

- Outcome-based: metrics that come up as a result of surveys and statistics of the consequences of EP such as disconnections, mortality or debt issues in an area.

Then, the classification that will be used for this document distinguishes the next types of indicators (Heindl, 2013):

- **Subjective and qualitative studies:** based on the VCs' preferences.
- **Subjective and qualitative studies done by third-parties:** such as damp and mold incidents.
- **Objective and quantitative indicators** not based on income-expense factor.
- **Indicators based on income-expense factor.**

1.6. Policies

Policies can be grouped under the following sections: [1]

- **Financial interventions:** subsidies to support partial or full payment of energy bills or social tariffs with regulated prices limited to a well-defined group. These measures are focused on short term relief.

The next chart (Figure 4) shows the subdivision of economic measures which reflects how Member States' support to social policies is higher. This help is usually provided through general social welfare payments or direct payments to relief high energy prices.

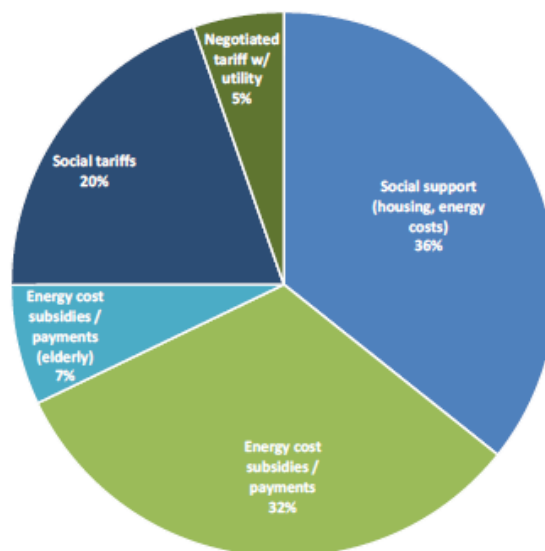


Figure 4: Distribution of the different types of financial support mechanisms. Source: Insight_E, 2015.

- **Consumer protection:** safeguards that provide protection for consumers using the retail markets i.e. against disconnections, possibility of debt-restructuring or provision of Pay-As-You-Go meters for a minimum quantity of energy.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

As it was mentioned before, disconnection safeguards are the most frequent mechanism used for protecting consumers, but in addition many Member States promote protection of consumers who are in debt, allowing for switching to other suppliers even if indebted. Hand in hand with this measure, energy companies' role has increased its relevance as it can be observed in Figure 5:

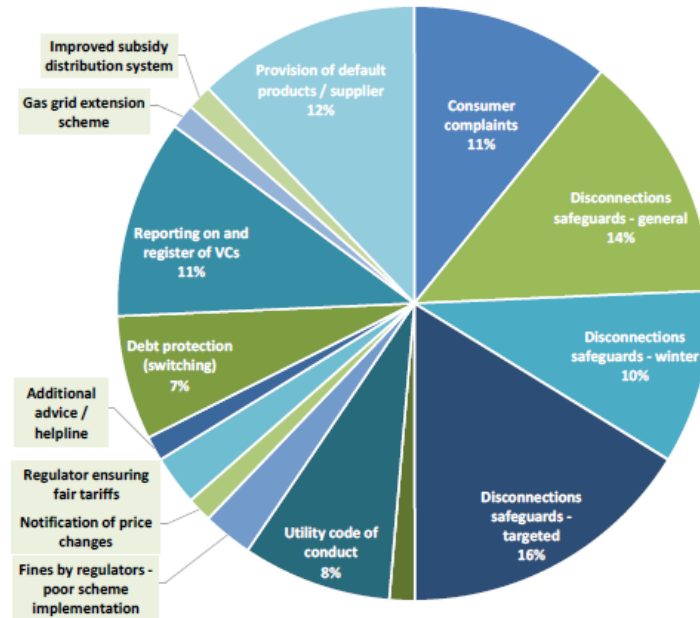


Figure 5: Distribution of the different types of consumer protection aids. Source: Insight_E, 2015.

- **Energy efficiency:** setting minimum standards of efficiency in building stock, energy using appliances or energy company obligations to invest in low-income and vulnerable households' areas.

The following chart represents the sub-division of energy efficiency programmes to tackle energy poverty, being the most frequently used retrofit grants:

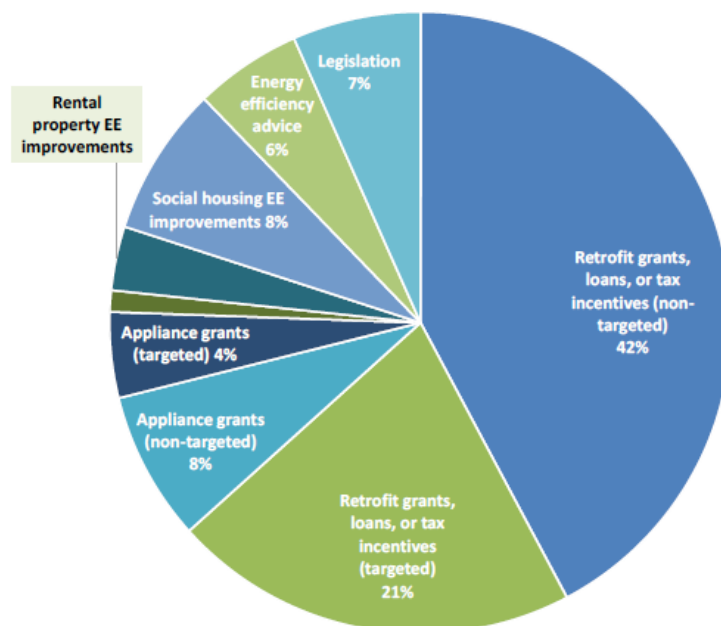


Figure 6: Distribution of the different energy efficiency programmes. Sources: Insight_E, 2015

- **Information provision & raising awareness:** campaigns and information dissemination to improve understanding of consumer rights and information on market tariffs and energy saving measures. Also, availability of alternative dispute resolutions such as National Regulatory Authority, European fuel poverty and Energy Efficiency (EPEE), Insight_E, Ombudsman or a consumer body and the existence of a supplier of last resort assigned according to competitive procedures.

There is a wide range of European research initiatives addressed to tackle energy poverty. For example, Smart-up Project in which France, UK, Spain, Malta and Italy cooperate enhancing the active use of smart meters and in-house displays by VCs, engaging 5,000 vulnerable households in those countries. And, so aims at training specific stakeholders that are in close contact with vulnerable households.

2. Policies applied in the EU framework

After a brief introduction on the working basis, this chapter studies the different definitions, indicators and policies applied across a selection of EU Member States such as Italy, France, Germany, the United Kingdom (England) and Spain.

2.1. Italy

In Italy, the number of people who are in a state of absolute poverty has increased in the last years from 1.8 million in 2007 to 4.5 million in 2015. As a result, there are more families who are not able to meet their energy expenses, ending up in EP conditions. One of the most worrying figures corresponds to 1.8 million families in 2013 who were threaten of supply disruption due to non-payments. [11]

However, in the EU framework, Italians' energy consumption per capita is lower than most other Member States. This can be explained by a warmer climate and less energy requirements.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Also, there is geographical price difference Regarding energy consumption and so forth to bill expenses. In the North, the expenses are higher than in the South, with a differential of over 400 € per year (which represents an increase of a 30%).

In order to contrast the effect of increasing costs for heating and electricity on vulnerable households the Government launched an energy discount for electricity and gas (“bonus gas” in 2008 and “bonus elettrico” in 2007). [12]

The electricity bonus depends on the number of components and it is independent of actual consumption, with the exception of the presence of electromedical appliances, where it is calculated on the ground of the electricity usage intensity. For gas, the discount is proportional to the family size and depends on the classification of the municipality according to its typical winter temperature and the declared use (hot water and cooking and/or heating).

Lately, a new initiative of Bank of the Energy against the EP has been launched, in collaboration with the Cariplo Foundation. This project will financially help the low-income households with their difficulties to pay daily expenses. The originality of this project resides in the possibility of giving donations through the energy invoice (customers of A2A Energy) who would be willing to participate by paying 19 € per year (this is the equivalent of two weeks of energy consumption for a middle family). [13]

Another relevant issue in Italy is energy efficiency renovation of buildings, as more than two thirds of the stock was built before 1976, the year of the first Italian law on energy performance of buildings. Then, energy saving interventions are characterized by a short payback period and their low-cost. [11]

2.1.1. Vulnerable Consumers and Energy Poverty definitions

In Italy, VCs are defined based on energy affordability (low income and high expenditure). Although there are no official definitions and measures of EP and consumer vulnerability, there is a specific tool for over five years to combat this phenomenon such as the "social bonus".

Then, the legal framework explicitly states that groups of customers are regarded as “vulnerable” and benefit from this bonus if their annual income does not exceed the threshold of 5% (set up by the law and certified by equivalent economic situation indicator, that takes into account income, assets, the characteristics of a family by number and type.

2.1.2. Indicators currently used: objective and/or subjective. Methodologies

The measures of affordability which are typically adopted in Italy are based on the next indicators: [14] [15]

- **Headcount:** quantifies the number of families which are in energy poverty. This means the lack of enough financial resources to pay the monthly bill and for this reason their expenses are above a threshold.
- **Intensity:** quantifies the economic resources needed by the families in energy poverty. And for this reason, the economic transfer required to alleviate these situations.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

The taxonomy of EP measures can be classified in Italy as the following Figure 7 shows:

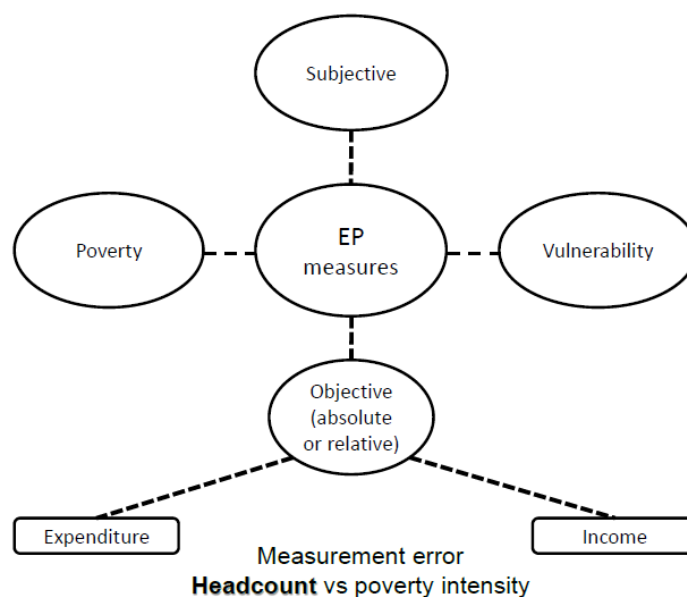


Figure 7: Taxonomy of EP measures in Italy. Source: Banca d'Italia, 2015.

As it can be observed above the measures can be classified according to the following criteria:

- **SUBJECTIVE:** relates the difficulty to access to the desirable quantity of energy and to pay the monthly bill with the consumer's personal preferences.

$$EP_i = \text{difficulty to keep the house in adequate conditions/to pay the bill}^*$$

(*) The reference invoice is theoretically calculated.

- **OBJECTIVE:** as a counterparty, this measure does not take into account the individuals preferences. In this case, we can distinguish between two different kinds of objective measures:
 - **Absolute:** if the conditions for being in EP do not depend on other consumers. Then, a family's energy expense is under a certain threshold, for example when his expense for heating is not enough to purchase the at least minimum amount of energy to have a healthy environment (18°C in the main rooms).
 - **Composed:** is associated with the general EP measures. For example: LIHC indicator adopted in the UK.
 - **Relative:** if the conditions for being in EP are compared to another "typical" Italian family. For example: the threshold of a family energy expenditure is connected with a statistic calculated for all the families (e.g. two times the average / median of the energy expense).

$$EP_i = \frac{\text{energy expenditure}_i}{\text{economic resources}_i} > \alpha$$

- **Cuasi relative:** a family is classified by his energy expense if it is above a certain threshold which is the amount of disposable resources of the same family (for

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

example: 10 % of the income or of the expense). The term “cuasi” is used due to the origin of this threshold (10 %) which comes from the double of the median of the energy expenditure of an average household in the UK in the end of the 80s.

At this point, we can differentiate between two ways to quantify the affordability incidence of energy spending as the share of total: *expenditure or income*. Although, these indicators cannot be considered equally useful as they depend on several factors such as: availability, quality and speed of the data release and the possibility of making comparisons with other countries. Then, in Italy, the energy expenditure related measures may be considered more accurate because there is more level of detail, less misreporting in the surveys and it is more adequate to assess consumption as a measure of standard of life (Atkinson, 2010).

However, in the international context it is normally considered better to use the indicators based on the notion of residual income. This is one of the reasons of non-uniformity between countries’ indicators. [14]

Even of the existence of all these kinds of measures in the different Italian studies, the eligibility of a household is determined by a combination of income, wealth, labor force participation and demographics. Then, Italy uses the following EP indicators: [17] [19]

- ISEE (Equivalent Economic Conditions Indicator) which combines information about three elements: income, real and financial assets and the composition of a household. In order to be eligible, the household's equivalent income indicator must not exceed 8,107.5€ unless the family includes more than three dependents, in which case the threshold is increased to €20,000.
- Household must be a domestic customer in its primary residence.
- Installed power must be 3 kW for up to four family members and 4.5 kW if more.
- If the household includes a person who needs essential electro-medical appliances, the maximum installed power defined is not applied.
- Non-dependence on actual consumption.

Regarding ISEE calculation procedure, this is done through the following equation: [18]

ISEE

$$= \frac{(\text{sum of the family members' net income}) + 20\% \cdot (\text{sum of the net patrimony of the family})}{\text{parameter of the equivalent scale}}$$

The equivalent scale is an increasing parameter with the number of family members, and for this reason it considers the economies of scale in the nucleus. And, it is increased by a factor dependent on the presence of some characteristics that may relief in that context: more than two dependent children, working parents, underage children (in particular if they are under 3 years old) and monoparental nuclei. In Table 4, it is shown the equivalent scale:

NUMBER OF COMPONENTS	PARAMETER VALUE
1	1.00
2	1.57

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

3	2.04
4	2.46
5	2.85

Table 4: Equivalent factor scale for ISEE calculation. Source: INPS, 2015.

And, the corresponding incremental factor depends on the following criteria:

- 0.35 for every family component.
- 0.50 for every disabled or non-auto sufficient family component.
- 0.20 in case of having 3 children; 0.35 if there are 4 children; 0.50 in there are 5 or more children.
- 0.20 if there are underage children in the family nucleus; raised to 0.30 in case at least one of them is under 3 years old or monoparental nucleus with underage children and unemployed.

In order to get this certificate, it is needed the DSU (Unique Substitutive Declaration), which is a document that contains the citizen's information registration, income and patrimonial necessary to describe the economic situation of the familiar nucleus. This information is essential for the National Social Security Institute to calculate the value of ISEE, which is returned 10 days after presenting these requirements.

ISEE certification is issued by:

- Any CAF/CAAF (Authorized Fiscal Assistance Centre)
- The Municipality (Comune) of residence
- The INPS (Italian Welfare Institute)

This indicator is used for different contributions and some of them are given during the whole year, such as healthy issues, electricity and gas bonus, and others are typically seasonal related to education resources.

2.1.3. Data sources: surveys and statistics

In order to address the stated aims of this study, it is relevant the use of survey methodology documents such as the ones described below.

First to mention, the Italian National Institute of Statistics (Istat) is the main independent provider of official statistics in the public service of citizens, traders and policy makers. In the national context, one of its roles is directed to coordinate and provide technical data within the National Statistical System (Sistan) and public administration, and in the international statistical system, Istat belongs to the European Statistical System and works with other organisations within this framework. [20]

Their core target is to publish and inform about results from analyses on Italy's economic, social and environmental topics, and to improve decision-making processes of private and public institutions. And, all surveys and studies are published in the National Statistical Programme (corresponding to Sistan), so forth Istat publications will be taken as a reference in this section. [21]

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Istat releases an annual report, most recently added for 2017, which includes results from the following surveys: [20]

- **Housing Budget Survey (most recent in 2015):** is carried out yearly and it analyses the evolution of household consumption expenditure depending on household and individual characteristics. In addition, it includes useful information for Istat calculations on relative and absolute poverty.

Regarding these concepts absolute poverty defines a monetary threshold for a household consumption expenditure to avoid social exclusion. To do so two indices are calculated. On the one hand, the proportion of poors (incidence), that is the ratio between the number of households (individuals) in poverty and the number of resident households (individuals). And, on the other hand, the mean poverty gap (intensity) is calculated measuring 'how poors are the poors', that is, in percentage terms, the difference between the mean consumption expenditures of poor households and the monetary value of the basket of absolute poverty.

Relative poverty is based on a poverty line (International Standard of Poverty Line - ISPL) that defines as poor a household of two components with a consumption expenditure level lower or equal to the mean per-capita consumption expenditure. To define the relative poverty line for different household sizes an equivalence scale is used (Carbonaro equivalence scale) to take into account different needs and economies/diseconomies of scale that can be achieved in bigger/smaller households.

The Figure 8 complements this information showing a high dependence of relative poverty incidence on the different kinds of households (absolute poverty results distribute equally amongst groups):

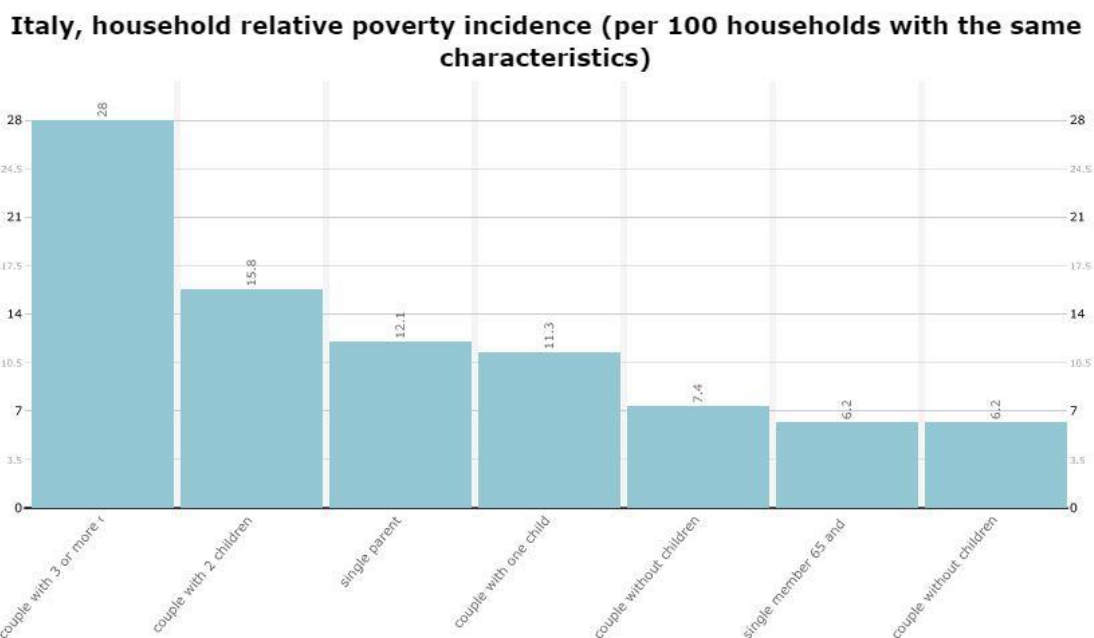


Figure 8: Households relative poverty incidence (per 100 households with the same characteristics). Source: Istat, 2015.

- **Monthly reports on Italian Economy (most recent in May 2017):** this press release analyses household economic conditions, industry, labour and prices amongst other relevant issues in Italy.

And, data published on the website on income distribution and social exclusion topics such as Households Economic Conditions and Disparities (housing costs, problems with the accommodation and arrears on utility bills amongst others) are obtained from EU-SILC data source, so these will not be discussed until the comparison between countries (Section 3).

- **Survey on Household Income and Wealth (most recent in 2014):** is conducted every two years by the Italian Central Bank (Banca d'Italia) and it collects data on households' economic and financial aspects. This organism has also published some interesting research documents on EP such as "La povertà energetica en Italia" (Faiella, I and Lavecchia, L, 2014). In particular, this document makes an analysis of diverse prototypes of indicators and its efficiency if they were hypothetically applied. [23]

Figure 9 covers the distribution of monthly bonus and the total income among the population divided into groups based on the equivalent-income quintile (in percentage, 2015):

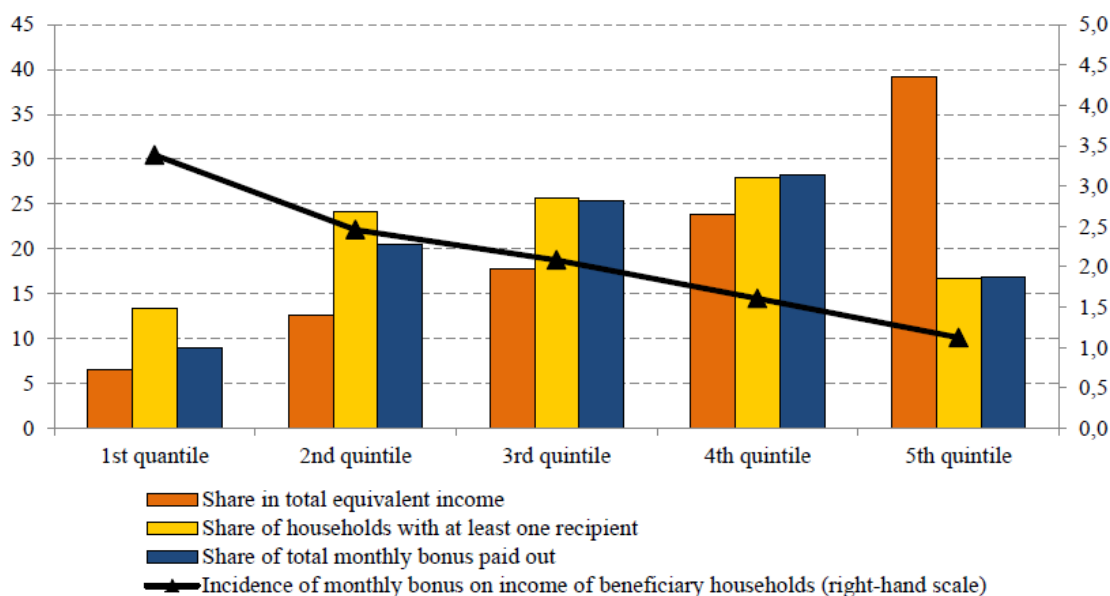


Figure 9: Distribution of monthly bonus and total income between the equivalent-income quintiles. Source: Banca d'Italia, 2014.

On the one side, almost 13 % of households from the lowest quintile (this means that their equivalent income is lower than approx. 9,000€) benefited from the bonus, receiving a bit less than 10% of the total bonus paid out. And, on the other side, there are 40 % households with an equivalent income greater than approx. 25,000€ (fifth quintile), 17 % benefited from the bonus, receiving 17 % of the total. In the rest of the groups the results were almost the same.

A key point is the pay-off proportion of the bonus on each opposite quintile: 3.4 % for the first quintile and 1 % for the wealthiest quintile.

- **"Il bonus elettrico e il bonus gas 2014-2016":** was published by the Italian Authority on Electric Energy, Gas and Water System (AAEGSI, in Italian), who monitors and analysis

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

the application of the electric and gas bonus. And, for example the following Table 5 show the evolution of the amount of financial support given with respect to the number of family members (data from 2014 to 2017): [24]

Numerosità familiare	2014 (20% spesa netta)	2015 (20% spesa netta)	2016 (20% spesa netta)	2017 (30% spesa lorda)
1-2 componenti	72	71	80	112
3-4 componenti	92	90	93	137
oltre 4 componenti	156	153	153	165

Table 5: Electricity Bonus financial support evolution 2014-2017. Source: AAEGSI, 2017.

- **“Bonus a sapersi”, survey on energy bonuses:** in 2016, 15 Consumer Associations cooperated in this project in order to find out how well this policy works and, to evaluate if the information is effective. Some of the results obtained were: [25]
 - 1/3 of the potential beneficiary families have already benefited.
 - 39 % of them declare that the request procedure is too complex.
 - 47 % of them affirm that information is not enough accessible.
 - 52 % of the people find the current ISEE threshold inadequate.
 - 1/10 citizens who appeal to consumer associations have arrears in the payment of bills.

These results confirm the raising need of providing additional measures against energy poverty; the special awareness on the coverage of the current ISEE threshold (8,107.5€) and the change requirement either to a higher amount 11,000€ or to a different calculation criteria.

- **Standard Eurobarometer Surveys:** are one of the main tools used by the European Commission to study public opinion and propose new policies. UniData is the official representative for this surveys in Italy and it provides an updated list of all Eurobarometer surveys carried out up to date and the Italian version of available enquiries. The original datasets are commissioned by the German Social Science Data Archive (GESIS). [26]
- **Italy’s Energy Efficiency Annual Report (2016):** is an annual release by the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), contains quantitative evaluation of achieved savings on National Energy Efficiency Action Plan (NEEAP) 2011 targets as it is shown in the next Table 6: [22]

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

	White Certificates	Tax Deductions *	Thermal Account	Legislative Decree 192/05*	Measures in transport sector *	Other measures*	Energy saving		Achieved target (%)
							Achieved in 2015**	Expected for 2020	
Residential	0.471	1.066	-	0.685	-	0.019	2.24	3.67	61.1%
Services	0.101	0.013	0.0008	0.036	-	-	0.15	1.23	12.2%
Industry	1.468	0.025	-	0.076	-	-	1.57	5.1	30.8%
Transport	-	-	-	-	1.01	0.038	1.05	5.5	19.1%
Total	2.040	1.104	0.0008	0.797	1.01	0.057	5.01	15.5	32.3%

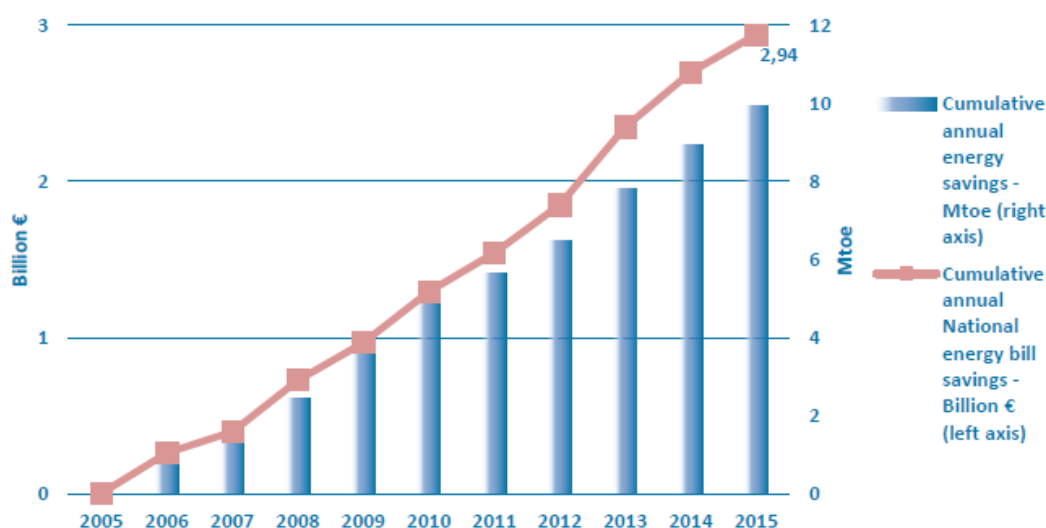
* Estimates for 2015

** Net of duplications

Source: ENEA elaboration

Table 6: Achieved energy savings by sector, years 2011-2015, and expected for 2020. Source: ENEA, 2016.

And, the final Figure 10 presents the cumulative energy bill and energy saving in the period 2005 to 2015, which amounts to more than 5 Mtoe/year on final energy saving (which represents almost one third of the target). Thus, 40% of such savings come from the White Certificates scheme. [22]



Source: ENEA elaboration

Figure 10: Saving in the Italian energy bill and energy saving, years 2005-2015. Source: ENEA, 2015.

2.1.4. Programmes at the state level and if possible at the regional and local level

Italy is experiencing the paradox that, although there is no official measure of energy vulnerability, there are specific tools for almost ten years to combat this phenomenon. These measures can be classified as it follows:

- ❖ **Affordability issues:** social energy tariffs and the aid for consumers that cannot pay their monthly bills (e.g. the Bank of Energy).
- ❖ **Efficiency of energy use:** local initiatives to promote energetic efficiency of social buildings.
- ❖ **Information and support for measures:** associations such as Caritas, housing operators, social workers and, at the national and regional level.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Firstly, the social tariffs came into force in 2007 with the "electrical bonus" and in 2008 with the "gas bonus". And, a recent document of the Italian authority for electricity, gas and water system (AEEGSI, 2014) fills in part this information deficit with a report on the development of support measures for vulnerable customers. [16]

Thereby this social bonus defined by the Government is set for the benefit of energy customers whose electricity bill exceeds more than 5 % their income (electricity bonus) and 10 % their income (gas bonus). This threshold is set forth by Law 205 of 23 December 2005, and then implemented through the Ministerial Decree of 28 December 2007 (electricity bonus) and the Law Decree 185/2008 (gas bonus). These are certified by equivalent economic situation indicator, that takes into account income, assets, the characteristics of a family by number and type. The legal framework explicitly states what groups of customers are regarded as "vulnerable" based on personal properties of customers, e.g. their age, disability, health, etc. So, this policy provides support to:

- households living in poverty - or on its margins;
- large households; and in case of electricity;
- households which include a disabled, or a critically ill person.

The social support program is an economic contribution to help consumers with the electric and gas bill. The discount of the bonus (20% in electricity and 15 % in gas) is applied directly in bill and it has validity one year.

So, the eligible consumers that can benefit from the electric bonus correspond to customers with contracted power up to 3 kW, and that comply the following conditions: [84]

- ✓ Economic difficulties: household nuclei with ISEE (Equivalent Financial Position Indicator) lower than 8,107.5 €; or household nuclei with more than 3 members and ISEE indicator lower than 20,000 €.
- ✓ Physical difficulties: households where there are family members with heavy healthy issues that accomplish the conditions for asking for the bonus.

On the one hand, concerning to the economic difficulties, the ISEE allows to measure the financial conditions with respect to a reference household expenses, taking into account their income and number of family components. Table 7 collects the financial resources set by the Energy Authority in Italy in 2017 with respect to the number of family members: [7]

Number of family members	Electricity Bonus (€)
1-2	112
3-4	137
>4	165

Table 7: Financial resources distribution per family members. Source: AEEGSI, 2017.

The amount specified in the Table above is discounted directly from the electricity tariff. But this is not a unique solution as it can be subdivided in several bills corresponding to the consumption of 12 months after requesting this bonus. Each bill brings back a part of the bonus proportional to the period that corresponds to the bill. What is more, the Energy Authority has created the web page <http://www.bonusenergia.anci.it> to allow consumers to monitor their bonus

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

compensation. After 12 months, if a family wants to renew the bonus they will have to repeat the application procedure updating all the indicators. [16]

On the other hand, Regarding the physical difficulties, it is necessary to have an ASL (Local Health Treasury) certificate in order to confirm the following requirements: need of electromedical equipment, type of equipment in use; address of the place where the equipment is installed; date since the person has been using that equipment.

In order to apply for the social bonus some of the documents needed are: ID, ISEE, ASL certificate, family nuclei components. And, the bonus is required through the next institutions:

- CAF/CAAF (Authorized Fiscal Assistance Centre) or;
- Municipality (Comune) of residence.

This program is funded through specific components (AS) in the transmission tariff and (TIT) in the distribution tariff, and (AG) in the gas distribution tariff (RTDG).

The potential end consumer of the measure the 31 of December were about 3.4 million familiar nuclei, figure which was reduced a year later by 2015 as a result of the reform of ISEE indicator. Then the familiar nuclei that applied for the electricity bonus due to economic uneasiness was 28 % in 2014 and 32.3 % in 2015.

Another recent initiative of Bank of the Energy against EP has been launched, in collaboration with the Cariplo Foundation. This project aims to financially help the low-income households in their difficulties to pay daily energy expenses. Its originality comes from the possibility of giving donations through the energy invoice (customers of A2A Energy), who would be willing to participate by paying 19€ per year (this is the equivalent sum of two weeks of energy consumption for a middle family). [13]

Regarding guarantee the minimum resources in housing and heating allowances for energy efficiency improvement, the policies applied across Italy vary according the regions and municipalities. The Italian Strategy for the energy renovation of the national building stock assesses an energy saving potential of almost 5.7 Mtoe/year at 2020. And, the corresponding level of investments in the residential sector is about 13.6 billion euros per year for interventions aimed at the overall renovation of buildings, and 10.5 billion euros per year for partial interventions (roof, facade, windows, heating system). And, for this matter, some of the existent projects are: [22]

- Energy efficiency obligation scheme or White Certificates.

They were introduced by Ministerial Decree July 20, in 2004 and they are tradable instruments giving proof of the achievement of end-use energy savings via energy efficiency measures and projects from companies. The economic value of the certificates, which varies depending on the cost of energy and as a function of market trends, was originally set at 100 € per Energy Efficiency Security. The certificates can be applied through different actions such as: electricity, natural gas or other fuel savings. The goal is set to more than 4.75 Mtoe/year of primary energy savings (equivalent to more than 4.38 Mtoe/year of final energy) expected between 2012 and 2020.

- Tax deductions for improving the energy efficiency of buildings.

It was introduced in Italy by the Budget Law for 2007 and are still in force. These mechanisms can be claimed by all taxpayers and it consists of reductions of IRPEF (personal income tax) and IRES (corporate income tax) in respect of expenses on improvements of existing building's energy efficiency. Some of the actions taken are: upgrade energy performance; improve the thermal insulation (replacing windows, including blinds or shutters, and insulating roofs, walls and floors); install solar thermal panels; replace winter heating systems (with condensing boilers or heat pumps); replace electrical water heaters with heat pump water heaters.

- The Thermal Energy Account (Heating and Cooling Support Scheme).

It was introduced by the Ministerial Decree of 28 December 2012, is an incentive scheme for the generation of renewable thermal energy, as well as promotion of energy efficiency actions in buildings and technical installations. It came into operation in July 2013 and it is applied to public authorities and private parties. The Authority for Electricity and Gas prepares the model contract between GSE (Energy Service Operator) and the beneficiary and defines the manner whereby the funding for the incentives will be drawn from the income from natural gas tariffs.

An expenditure threshold has been set for each type of action and the incentive is calculated as it follows: 1. Depending on the kind of action; 2. With reference to the increase in energy efficiency achievable in that specific building; 3. With reference to the amount of energy that could be produced by systems fired by renewable energy sources. The incentive covers part of the costs incurred and is paid out in annual instalments for a period from 2 up to 5 years according to the actions implemented.

- Less Energy More OpportuNities (LEMON) Project (applied in the Emilia Romagna Region).

It is a pilot project that will launch 15.29 M€ of energy investments in 622 private and public social housing dwellings to achieve 40% energy savings guaranteed by Energy Service Companies. The financing structure involves a combination of national and ERDF funds, the "Conto termico" incentive scheme, as well as Energy Performance Contract (EPC) and loans to be repaid. In some cases, it will be within the framework of "Energy Performance Tenancy Agreements", which will be developed specifically for the project. [27]

- EnerSHIFT Project (applied in Liguria).

This proposal aims to improve the quality of social housing buildings through retrofitting for the sake of low income people and to decrease energy consumption and related emissions while in the meantime boosting the local economy. As economic shortage and

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

public spending do not make it possible, a solution is the use of Energy Performance Contracting (EPC) in this location (as a basis for other locations or sectors). It will launch 14,59 M€ of energy investments with the retrofitting of around 43 social housing buildings. [27]

- Energy efficiency in Low-income housing in the Mediterranean (ELIH-Med) Project:

It is supported by the European Commission and brings together 7 countries (Italy, Spain, France, Malta, Greece, Cyprus and Slovenia) to improve energy efficiency and promote energy savings in low income housing in the MED area; analyze energy efficiency policies via pilot projects for retrofitting representative low-income dwellings in each partner country, and; applying innovative financing solutions. [28]

- European Fund By the European funds ERDF (European Regional Development Fund) and ESF (European Social Fund), the Italian Region Lombardia will use 80 million euro for measures of energy retrofitting in social houses: 580 households. [29]
- European Fuel Poverty and Energy Efficiency (EPEE) Project: brings together 5 countries (Belgium, France, Italy, Spain and UK) to refurbish old buildings for low-income households by identifying the most effective measures for the national context and highlighting EP as a priority focus. [11]

Some of the other measures in practice to protect VCs are: [22]

- Billing transparency rules.
- Commercial codes of conduct for energy selling to consumers in the free market.
- Price comparison instruments.
- Information on efficient use of energy through educational campaigns. <https://ec.europa.eu/energy/sites/ener/files/documents/ItalyNEEAP2014en.pdf>
- Unexpected high bills can be paid by instalments.
- No disconnection of customers who need electric appliances for health; available power reduction before disconnection in case of non-payment and no disconnection under 30€ nonpaid bill.

2.2. France

France is on the international spot due to its nuclear energy policy which affects directly in a large share of households with electrical heating. Moreover, renewables and natural gas are slowly substituting heating oil. What is more, energy prices have risen and, therefore household electrical invoices and household incomes below the poverty threshold too. [11]

With the Act of 17 August 2015 on energy transition for green growth, France committed fully to energy transformation in the 21st century. The Act not only provided tools for the energy transition, but also some targets focused on improving the social quality of life, a "zero waste" policy and EP provisions.

Regarding EP provisions, some of the measures are: [30]

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- Installation of smart meters for electricity (Linky) and gas (Gazpar) (11,000 new jobs).
- Introduction of an energy cheque for the 4 million poorest households. The decree was published on 10 May 2016.
- 30% of financing from energy-efficiency certificates will be used to prevent energy poverty.

The Grenelle Environment I Act and Plan for Energy Renovation in Housing (PREH) set out specific targets for energy savings in buildings (by 38% up to 2020) and reducing energy consumption in government buildings (by 40% up to 2020). France is behind its renovation targets for private dwellings, due to the complexity of renovations in buildings with central heating systems rather than stand-alone boilers, which are a vast majority of dwellings. [30]

France has conferred freedom to the way of assessing EP programmes in the different departmental authorities. This enables customized approaches data availability, networks, and methods to improve the overall efficiency and effectiveness of schemes such as the most known "Habiter Mieux" (Better Living) Program. [11]

In addition, France has a public energy efficiency agency called the Agency for Environment and Energy Management (ADEME in French), which is under the joint supervision of the Ministry of Environment, Energy and the Sea (MEEM in French) and the Ministry of Higher Education and Research (MESR in French). The Government has been supporting energy efficiency policies by setting some ambitious long-term targets such as reduction of energy intensity by 2.5% per year by 2030, white certificates and taxation schemes. [31]

Since 2010, it was created the National Observatory of EP (ONPE, in French) with the main objective of having a tool of continuous monitoring and analysis of the policies addressed for tackling this issue. The Observatory takes into account the social, energy, health and economic aspects of energy poverty. And, it also aims to define better and at bringing some change in the tools of observation, of analysis, of valuation and of intervention. [32]

Another important role is the independent administrative authority: The Energy Ombudsman who is appointed for six years by the Ministers. This figure reports regularly to Parliament on his work on all forms of energy for domestic consumption (LPG, domestic fuel oil, firewood and all other forms of heating energy). And, he is responsible for analysing consumer complaints, advising solutions for disputes between consumers and suppliers or DSO of energy, and taking part in campaigns to inform consumers about their rights. [33]

Since 2011, the French Energy Ombudsman has been part of the National Energy Ombudsman Network (NEON), which includes Belgium, Great Britain, the Spanish Division of Catalonia and Czech Republic. This association of institutions have the following aims:

- ❖ Promotion of the out-of-court settlement of consumption complaints (in compliance with Commission recommendations and Community directives);
- ❖ Protection and strengthening of energy consumers and their rights;
- ❖ Further relations with the groups involved in energy and consumer protection at European level;

- ❖ Cooperation between members through the exchange of information, experience and good practices.

2.2.1. Vulnerable Consumers and Energy Poverty definitions

The definition of VCs according to Insight-E document (2015) can be classified as an energy affordability (low income/high cost) based definition included under Energy Poverty's definition. Its legal framework explicitly states in what situations customers are regarded as "vulnerable" based on non-personal or situational circumstances such as unemployment, single parenthood, etc. [1]

Then, EP is defined according to article 11 of the "Grenelle II" law from 12 July 2010: [34]

"Is considered in a situation of EP a person who encounters in his/her accommodation particular difficulties to have enough energy supply to satisfy his/her elementary needs, this being due to the inadequacy of resources or housing conditions."

This definition is based on a minimum income threshold approach where anyone who faces basic energy requirements difficulties at home due to insufficient resources or housing conditions, is considered energy-poor. However, it is missing a quantitative threshold, being still non-sufficiently operational.

Given this definition there are special tariffs reserved for households with an income below or equal to a threshold of entitlement to supplementary universal health cover. These tariffs are available for both electricity and natural gas consumers. From the end of 2013, these social tariffs were further extended to cover all households with an annual reference fiscal income per unit (revenue fiscal de reference) lower than EUR 2,175. The number of households benefitting from the social tariff is expected to increase from 1.9 million to 4.2 million, equivalent to 8 million people.

2.2.2. Indicators currently used: objective and/or subjective. Methodologies

Although there is a widespread agreement on the concept of energy poverty, its measurement differs markedly. It is a phenomenon of which the determinants and the challenges are many, complex and often correlated. Then, in order to encircle these indicators as well as possible, the National Observatory of EP(ONPE) recommends developing four indicators which can be classified in two approaches: [34]

- 1. By objective difficulties:** there are three indicators concerned with the budgetary issues which quantify and characterize the energy unstable situation resulting from energy bills insupportable for the households;
- 2. By subjective difficulties:** it has the objective to quantify and characterize how households suffer from thermal discomfort.

These national indicators were built to characterize energy precariousness in the national level, starting from the data of Public Statistics. One of the challenges for the future is better to determine the phenomenon on the local level.

Now, hereunder it is described each kind of indicator as it follows:

1. *Indicators based on objective difficulties.*

❖ **The Energy Effort Rate (EER, or TEE in French): [official indicator]**

This indicator most frequently refers to the whole of the households. And, it retains that a household is in EP(EP) following the next equation:

$$TEE = \frac{\text{Energy expenses of households}}{\text{Total revenue of households}} > 10 \%$$

The “TEE_3D” is a version of the TEE which is based on the first three deciles of income to retain only the most VCs and mitigate the volume effect. And, it considers a household in situation of energy precariousness when:

- its energy expenditure is higher than 10% of its income. This threshold of 10% was defined by English approaches in 1988 and is currently questioned;
- its income per consumption unit (UC in French) is lower than the third decile of income per consumption unit which is 16,309 €/UC.

UC is the Consumption Unit which is a weighting coefficient to each member of a household in order to compare their standards of living with other household conditions depending on the size or different composition. For example, a couple with two children add up a coefficient of 2.1 which corresponds to the sum of 1 unit for the first adult and 0.5 for the second adult and 0.3 for each child who is under 14 years old. [32]

The condition on the household income makes it possible to target the households most precarious, alive in majority under the poverty line or slightly above. However, this indicator does not make it possible to seize the diversity of situations of households in EP for the following reasons: [34]

- It does not consider the behavior of auto-restriction;
- It is based on the gross income of a household. And, a recent study (Hills, 2010) invites to also include the energy expenses in the net income of a household.
- The threshold of 10% corresponded to the double of the median of the rates of effort noted in the United Kingdom in the 90s. France started using it at mid-2000 for the same reasons. So, there are many questions around this value choice.

This indicator could evolve in the future, the double of the median rates of energy effort currently accounting for 8.6%.

❖ **The Low Income High Expenditure (LIHE, or BRDE in French): [not official]**

It considers that a household is in a situation of EP if the two conditions of low income and relatively high energy costs are met. There are two indicators of BRDE: BRDE_UC points the relation of the energy expense with respect to the size of the household structure, described in the consumption unit and, BRDE_M² with the housing surface that needs to be heated). These correspond to the French approaches inspired by the English approach LIHE (J. Hills, 2012).

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

An interesting feature of the metric used in England and proposed by National Observatory of EP(ONPE) in France is that the two of them include a reference to above average energy consumption. Energy consumption can be observed or modelled. While modelling requires the gathering of data on the housing stock and the application of software (and necessary assumptions) to calculate the energy needs, it has the advantage of avoiding underestimating energy needs as a result of self-disconnection or under-heating.

Policies such as financial support aim at providing support for households to afford adequate energy services. It is important that this support is targeted so it can effectively benefit only those in real need to pay for their energy costs. For example, the energy cheques used in France can only be used to pay energy bills or to pay for energy efficiency renovations.

So, these indicators aim to locate the households whose energy expenses are not sustainable, such as households:

- whose real energy expenditure is higher than the median of the expenditure of energy;
- of which the net revenue (*reste-à-vivre* in French) (income - housing assistance - rent – charges + energy expenses) per UC is lower than 60% the median of net revenues.

This indicator is consistent with the definition of fuel poverty and improves our understanding of the phenomenon compared with the current measure. However, this approach will not give a precise identification of households that are pushed into poverty because of fuel costs. Moreover, fixing the energy cost threshold to the median is essentially arbitrary.

2. *Indicators based on subjective difficulties.*

❖ **The Cold Indicator (CI, or FR_FRECA_3D in French): [not official]**

It refers to the level of thermal comfort or the extent of budget constraint and, it is built from two questions resulting from the National Housing Survey (ENL in French) which are:

- “Did you suffer from cold in your household last winter?”
- If yes, “for which reasons did you suffer from cold?”

Then, there is a list of seven “cold sensation” reasons among which consumers in this situation can choose in order to explain their sensation of cold, and this list is given below:

1. Insufficient heating installation;
2. Poor or malfunction of the heating installation;
3. Bad insulation;
4. Financial reasons: limitation of the heating because of the cost;
5. Cut of the supplier due to an unpaid invoice;
6. Wrong adjustment or late startup of the installation;
7. Other reasons.

In order to quantify the share of households considered in unstable situation, the ONPE takes into account only the households if they comply the following two criteria:

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- If you declare “cold sensation” based on at least one of the five first conditions from the list above mentioned.
- By having an income per consumption unit less or equal to the first three deciles which is 15,712 €/UC.

2.2.3. Data sources: surveys and statistics

The aim of this section is to provide a comprehensive view of the latest statistical trends and analysis of EP in France. This information is quite relevant as it can then be used to clarify the role and impact of measures and, finally help to improve the existent target policies.

First to mention, INSEE is the Official Statistics Authority of France since the Economic Modernisation Law of 4 August 2008. And, its main goal is to ensure professional independence in the collection of data and design of economic, environmental, social and demographic studies. The Head Office is in Paris and there is a network of regional offices that carry an important weight on this matter. Some of their surveys related to EP drivers are: [35]

- **Housing Budget Survey (most recent in 2016):** it is an annual survey and, its main goal is to capture the nature of households’ expenditure (in the sense of monetary data) such as consumption of goods and services, taxes, insurances, home renovation and loan repayments.

The procedure follows two steps for data collection: 1. A questionnaire that records income information (amongst other socio-demographic, dwelling and financial parameters) over 12 months, and; 2. A self-completed diary which collects all members (over 14 years old) of a household expenses over a week.

- **Household Wealth Survey (most recent in 2014-2015):** it is done every 3 years in co-operation with the Banque de France and it is now part of a European framework as its information is used in the Household Finance and Consumption Survey (HFCS) supervised by European Central Bank (ECB). It provides information on the income and financial situation of families of all social categories at the national level.
- **Housing Survey (most recent in 2013):** it is done each 3-6 year and, it includes a more detailed figure of quality of dwellings, difficulties on housing expenditure amongst other issues related to a household habitat. It aims at giving a comprehensive view of the impact of housing policies. And, what is more important, it analyses the thermal housing sensation and its reasons, which is one of the most key factors linked to energy poverty. The Figure 11 shows the distribution of house works according to the TEE rate and the reason to declare cold sensation at home:

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

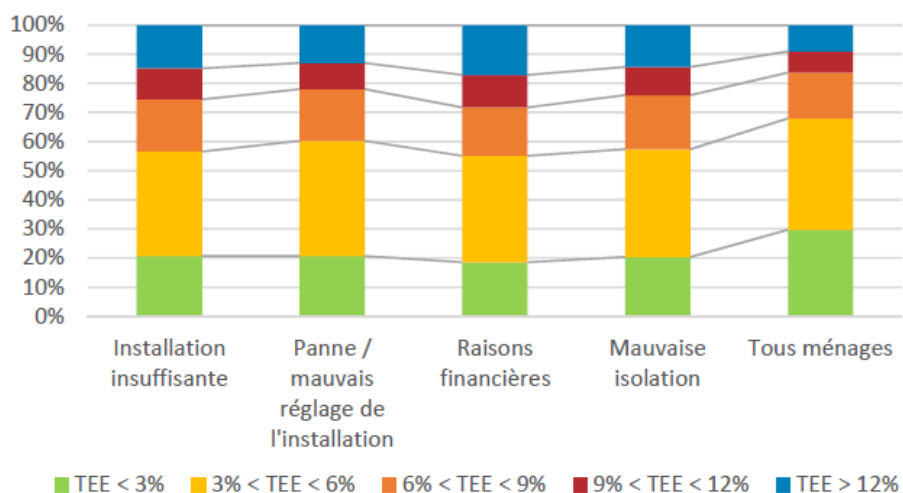


Figure 11: Distribution of house works according to TEE rate. Source: ONPE, 2016.

In the graph, it can be noticed that households with TEE rate over 6 % (orange, red and blue) declare sensation of coldness particularly due to financial reasons or insufficient isolation. It is also interesting to point out that approximately 20 % of them, whichever is the reason, has a TEE rate lower than 3 % of their income, which represents an alarming amount of 320,000 households in poor situation.

- **Observation of Prices in Industry and Services Survey:** it includes quarterly Price Indices of Maintenance and Improvement of Dwelling which quantify the changes in prices of construction and craft businesses for maintenance and renovation works of all kinds of buildings. [35]
- **Quarterly outlook survey on the rents of the social sector:** it collects information on the cyclical evolution of rents, and then it is integrated in the Consumer Price Index (CPI) calculation. [35]
- **Labour Force Survey:** is done quarterly and it measures overall unemployment rates by sex and age. [35]
- **Income and Living Conditions Survey:** it monitors annually poverty and exclusion indicators of French households, and it serves as a contribution for Europe statistics on these problems. [35]
- **Household Economic Outlook Survey:** it is done monthly in order to measure personal financial situation and disposition to save and spend. [35]
- **Social and fiscal localized incomes device (FiLoSoFi):** it is an annual set of indicators which measure the level of disparity and inequality in variables such as declared income by standard of living and consumption units, poverty and, by extension socio-demographic variables at local sub-departmental level. [35]

- **Annual Report (most recent in 2015):** for the first time, it includes decentralised data at the municipal level on disposable income and monetary poverty. It is the result of the project “FiLoSoFi” and, it a good initial approach to increase the collection of information on EP related issues and, also to provide a better overall knowledge of income distribution and standards of living at the State level. [36]

The following mechanism corresponds to Article L115-3 of the Social and Family Action Code modified by “Brottes” Law (15 April 2013) and the Energy Transition Law (17 August 2015), and it declares:

“Since 1st November from one year to 31st March of the next year, electricity, heating and gas suppliers are not allowed to proceed, in a main residence, to the disconnection, even due to termination of the contract, the supply of electricity, heating or gas to persons or families. Electricity suppliers are allowed to proceed, however, to the power reduction.”

In 2015, this intervention helped to diminish the number of power cuttings due to non-payments in a 7.4 % (which stands for 577,000) with respect to 2014. And, also to increase transparency as, since 2015, suppliers are obliged to inform the Regulatory Energy Commission and the French National Ombudsman of Energy (MNE, in French) on the measures taken on these regards.

Another, important source of information is the Permanent Observatory of Building’s Energetic Improvement (OPEN, in French). Their leading role is to monitor the evolution of thermal renovation of dwellings, the number and type of available measures through quantitative data and measure the penetration of energy efficient equipment in housing. It also studies the impact of the existent public targets via the following survey: [37]

- **OPEN 2015 Survey:** it was published in June 2016, but studies correspond to house works carried out between 2012 and 2014. It is released by the French Environment and Energy Management Agency (Ademe, in French). The 2015 Campaign analysis the households demand and the construction companies’ range of offers. The Figure 12, for example, collects the proportion of the different reasons why works are demanded by households depending on whether they aim at achieving a full renovation (in green, 63 % appreciate the most a better thermal accommodation), or they just want to renovate a device (in red, 47 % respondents most value replacing an old or broken device):

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

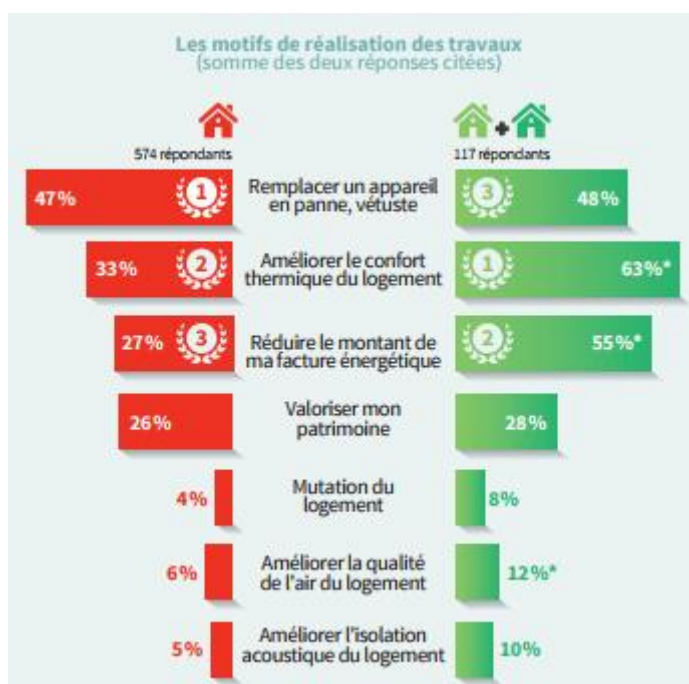


Figure 12: Reasons why work labours are demanded. Source: OPEN, 2015.

In addition, some of the most relevant results obtained in this survey are:

- 14 % of households that have carried out energy efficiency improvement labours, have an income lower than 19,000€ (however, this just represents 27 % of the total number of respondents).
- 54 % of households that should have carried out energy efficiency improvements labours did not have enough resources and 22 % considered insufficient the financial support mechanisms (however, 20 % of the respondents declared that these interventions became a determinant factor).

Regarding the available measures, Figure 13 shows, on the left, the most known energy efficiency devices by craftsmen, and, on the right, second the devices' order of promotion for customers:

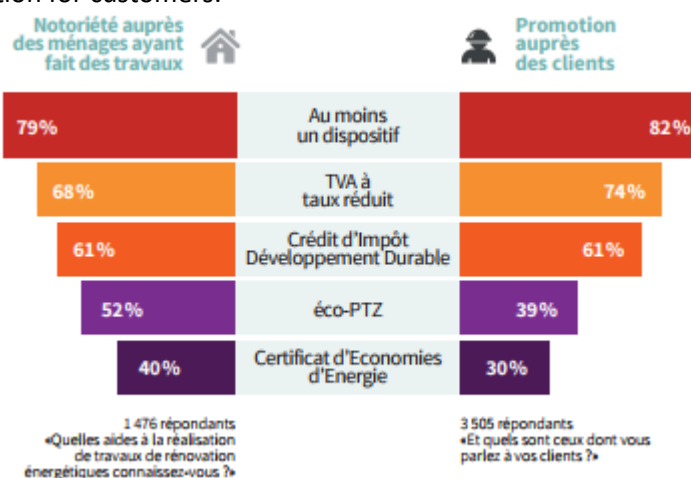


Figure 13: Promotion and most known energy efficiency devices by craftsmen. Source: OPEN 2015.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- 82 % of craftsmen inform at least about one of the financial support systems and 79 % of them do know about these measures. However, just 40 % of them know about the Energy Saving Certificates (CEE) which are the less promoted over clients (30 %).

Last to mention in relation with the efficiency of buildings, equipment, requirements and uses of energy, the Observation and Statistic Services (SOes, in French) from the Ministry of Ecological and Solidarity Transition worked on the following well-known survey:

- **PHEBUS (2012):** aims at capturing a complete and detailed figure of French household energetic conditions. In comparison with INSEE Housing Survey, although it is more detailed, the sample is too small. The main parts of this survey are: 1. Face-to-face interviews with residents of 5,405 different households that represent the French residential community; 2. Energy Efficiency Diagnosis (DPE, in French) from a sample of 2,389 households. [38]

2.2.4. Programmes at the state level and if possible at the regional and local level

The national authorities approved a set of measures to help households which were in EP situation, and these can be classified according to the next three categories:

- ❖ **Affordability issues:** is a mitigating measure, mainly the financial resources for helping households, in particular, the social energy tariffs and the aid for consumers that cannot pay their monthly bills.
- ❖ **Efficiency of energy use:** is a corrective measure related to the renewal of the installations such as the “Habiter Mieux” Program.
- ❖ **Information and support for measures:** associations as the Areas for Energy Info (EIE in French), housing operators, social workers and, at the national level, the national energy ombudsman.

The next list corresponds to some of the diverse measures existent in France:

- A Social Energy Tariff applied by suppliers for electricity or gas consumers;
- Assistance with the restauration of private residences of National Agency for Improvement of the Habitat (l’Anah) such as “Habiter Mieux” Program (Better Living Program in English) and Eco-PTZ.
- Financial aids for the unpaid invoices of energy from Solidarity Housing Funds for energy strand;
- Financial aids for the College Centre for Advising Services (CCAS);
- Financial aids from charity organizations (The French Red Cross, Catholic Aids,...).
- Supply obligations based on Article L115-3 of the Social and Families Action Code for energy cuttings, power reductions and contract terminations.

However, these measures just inform partially of the evolution of this phenomenon as there is not enough data and resources for assistance and, difficulties in identifying the “quiet poor” which might be in worst conditions than others. In these cases, they usually do not have sufficient information about how the available aids work and they prefer to manage themselves financially without depending on a social help or carrying out a complex procedure.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

This issue is concerning for the devices that aim to fight against EP and are not achieving totally their goal just as a matter of not being very known and/or complex. According to a study done in 2014 by the Living Conditions and Aspirations of the French (CRÉDOC in France), 19 % of the French States do not have profited from the existing assistances neither from the social tariffs, nor of any right to which they could claim during the last 12 months. [34]

In the first instance, there are two types of social energy tariffs for the occupants of the main households:

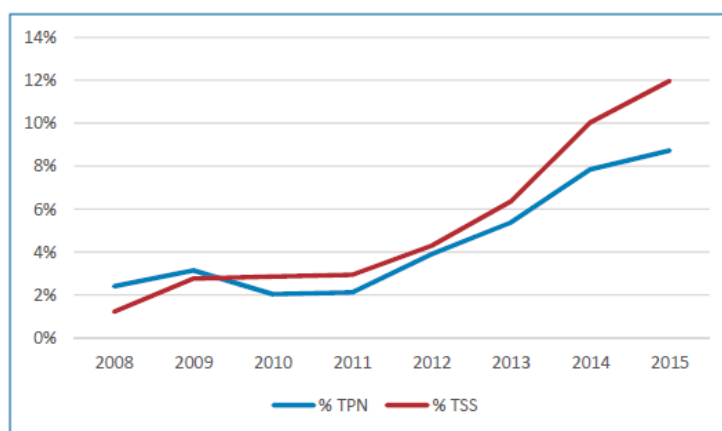
1. **Tariff of Basic Need for Electricity (TPN in French)**

Since 2005 is a standard discount applied directly to the invoice. And, it is calculated as a function of the number of members of the household and the invoice of the electricity bill. Its amount varies between 71 €-140 € per year.

2. **Special Tariff of Solidarity for Natural Gas (TSS in French)**

Set up since 2008, it is a standard discount which can be calculated as a function of the number of members of the household and the invoice of the gas bill. Its amount varies between 23 €-185 € per year. This reduction is applied directly to the invoice or embodied on a cheque for residences equipped with a collective heating with gas.

The benefits of these tariffs are automatic and cumulative. Figure 14 shows the evolution of the incremental number of beneficiaries from this measure in the period of 2008-2015.



Source : Ministère – Commission de Régulation de l'Énergie (CRE), calculs : CSTB / DESH

Figure 14: Evolution of the percentage of social tariffs TPN and TSS beneficiaries. Source: ONPE, 2016.

However, these measures will be replaced by the Energy Cheque as from the 1st January of 2018, as a result of the Energy Transition for Green Growth (TECV in French) in 2015.

The Energy Cheque consists on an annual help for the energy bill payment or with the payment of the new works by the Tax Credit for the Energy Transition (CITE). This is a credit of tax income for the expenditure carried out by a tenant, owner or occupant of a house when they renovate the environmental quality of the house. And, this house must meet the following conditions:

- It has to constitute their principal residence.
- The work has to be completed in more than two years.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

What is more, the equipment and materials for the work must be provided by a company or its subcontractor. And, some of the works eligible are related to: energy saving, equipment of energy production using a renewable energy source, thermal isolation and other expenses.

The measure focuses on the households whose Tax Income of Reference (RFR in French) is lower than 7,700€ per UC a year. For this reason, it identifies the most precarious with residences that are deeply degraded.

However, before its generalization in 2018 at the national level, this Energy Cheque has been tested in in 4 departments since 2016: Ardèche, Aveyron, Côtes d'Armor et Pas-de-Calais. It has benefited 173,266 people and its amount varies between 48€ and 227€ according to the Tax Income of Reference of the household and its composition.

Secondly, the National Agency for Improvement of the Habitat (Anah) has the role of implementing the national policy of development and improvement of the private residences. Given this objective, they provide subsidies to the modest (35% of HT) and to the most modest (50% of HT) owner or occupants of a very degraded and/or unsecure and/or with an unhealthy house for the rehabilitation works. This Program is known as "Habiter Mieux" (Better Living Program in English) and it was launched in 2010. And, since 2016 the occupying owners can subscribe to an eco-loan, Eco-PTZ, to better finance the rest of the works. [39]

The main condition related to housing in order to benefit from this subsidy is related to the period since the works have been on in the principal residence (at least for 15 years). The following list shows the conditions regarding the working area:

- Heavy work of rehabilitation aiming at solving a very poor situation of housing that makes it particularly indignant to live in such as:
- High degree of insalubrity or danger;
- Insecurity;
- Healthiness;
- Adaptation of a house due to the loss of autonomy, dependent on ageing or the handicap;
- Bad energy performance.

These rehabilitation works must cost at least 1,500 € (net value), except for the very modest household for whom there is no threshold. One of the main advantages is the freedom for local authorities to identify the energy poor in their communities and implement concrete measures. Data availability, networks, and methods on the local level can be different depending on the local specificities and this differentiated approach apparently improves the efficiency of the programme.

Another device for financing work rehabilitation, known as Eco-PTZ, it is a free loan lent by the principal French Banking Networks operational since 2016. The maximum amount the loan can reach is 30,000 € refundable over 15 years. [39]

The third mechanism available is related with the unpaid invoices of energy financed by the Solidarity Housing Funds (FSL in French). It was created in the 90s but, since 2005 the local

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

responsibilities transferred management to the Departmental boards. Then, in each department there are different attribution procedures and characteristics. [34]

However, the Energy Solidarity Fund (FSL) mechanism is not specifically directed to households in energy poverty, and so it is an obligation for utilities to support their customers.

What is more, every supplier is obliged to help customers saving a fixed volume of energy (kwh cumulated up to date) through the Certificates of Energy Saving. Then, they must justify their decisions and actions to achieve the reduction of energy set by decree. Each operation provided by the supplier is brought back one of the many kwh (cumulated up to date), but if they fail, they must pay a penalty to the State. [34]

Lastly, it must be mention some financial aids from the College Centre for Advising Services (CCAS) and from charity organizations such as The French Red Cross or Catholic Aids. On the one hand, the CCAS is a public administrative corporation that acts on the social prevention and development. For this reason, it is responsible for the following activities: [40]

- Domicile any person without a stable residence connected with the community for the benefit of the social security benefits (for example: the exercise of the civil and civic laws);
- Lead an analysis of the social needs on its territory;
- Take part in the instruction of the files of legal social security (medical assistance, RSA, APA,...).

On the other hand, the French Red Cross is highly involved in the energy aids. And, they can be distributed right after direct request from social workers or people in difficulties near the units and commissions of local attributions coming from social workers or representatives from the humanitarian movement. [41]

Another example, is the National Association Compagnons Bâtisseurs which aims to improve living conditions of the most vulnerable people through building improvements linked to professional training on refurbishment works and energy efficiency. And, its volunteers provide also social support to beneficiaries. It is present in 10 departments and some of them are: Ille de France, Bretagne or Aquitaine. [42]

Within this framework, is the National Federation of the so-called 'PACT Movement' (Fédération des PACT, in French), which is the first network of associations that aim at helping individual and families to improve their housing and living conditions. And, each year, its goal focuses on housing conditions for circa 70,000 families; securing work contracts worth 1 billion Euros such as 30,000 direct and indirect jobs in the construction industry, and; entering into agreements with 1,200 local authorities. [

Last to mention is the mechanism that comes out from modifying Article L115-3 of the Social and Family Action Code by "Brottes" Law (15 April 2013) and the Energy Transition Law (17 August 2015), and it declares: [34]

"Since 1st November from one year to 31st March of the next year, electricity, heating and gas suppliers are not allowed to proceed, in a main residence, to the disconnection, even due to

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

termination of the contract, the supply of electricity, heating or gas to persons or families. Electricity suppliers are allowed to proceed, however, to the power reduction.”

In 2015, this intervention helped to diminish the number of power cuttings due to non-payments in a 7.4 % (which stands for 577,000) with respect to 2014. And, also to increase transparency as, since 2015, suppliers are obliged to inform the Regulatory Energy Commission and the French National Ombudsman of Energy (MNE, in French) on the measures taken on these regards.

2.3. Germany

In Germany, 7.7 million people receive social welfare benefits, from which a total figure of approximately 350,000 households, in 2014, suffered power cut offs (although power was generally restored within few days) followed by high connection costs. This leads to a spiral of indebtedness, intensify poverty and social isolation: health impairment, existential impairment of everyday life, shame and exclusion. [43]

What is more, the German Energy Transition has become the key point for EP as a result of the increase of energy prices. The Federal Government of Germany has defined a number of policy targets that aim at reducing greenhouse gas emissions in Germany by 40% until 2020. And, while policies such as the German renewable energy feed-in tariff scheme (Erneuerbare-Energien-Gesetz, EEG in German) promotes subsidies for renewable energy, the resulting costs, which are partly born by households, and then are directly passed through to their electricity bills. [44]

For this reason, there is a strong relationship with social justice and the question of whether private consumers alone should have to face the entire cost of the energy shift and to renewable energy sources (IASS 2013). Besides this energy process increase, there are less possibilities to substitution that directly influence the low-income households; after all, on average they spend a higher portion of their income on energy needs and are the least capable to afford investments in energy efficiency such as energy renovations, efficient appliances and fuel-efficient vehicles.

In 2013, according to a survey done by the German Network Agency, private consumers were ranked third in Europe in terms of electricity prices (German Network Agency 2013, p. 166). And, for example, average electricity prices for a three-person household have risen by almost 68 % over the last 15 years. Another relevant issue is related with the high price differences between private and industrial consumers, as the first ones pay almost twice as much per kWh as businesses. So, the question is whether low-income households should bear the brunt of this increase despite the fact that electricity consumption often increases in proportion to income growth (Kopatz et al. 2013, p. 60).

Some of the successful measures applied in Germany are energy audits, offered to poor households in order to save in their energy consumption. At the same time, it should be kept in mind that even if EP is addressed correctly and low-income households' expenditure achieves a lower value than the 10 % threshold of their income on energy, this does not avoid social exclusion due to other reasons.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Therefore, Germany's position against EP itself is addressed directly through social policies, retirement plans and wages. And, they declare that their huge support to renewables and so forth clean power will not only help to mitigate global warming, but also help poor countries.

2.3.1. Vulnerable Consumers and Energy Poverty definitions

On the one hand, based on the EU-SILC, EP is less of an issue in Germany than on average in the EU. Germany's social legislation covers the concept of VCs; however, a specific definition of the concept of VCs in the energy field has not been introduced yet in the energy legislation.

On the other hand, there is no official or legal definition of EP and it is covered in their social legislation, this is so far a rather marginal topic in the political discussion. However, recently it has gained significant importance and more initiatives have been introduced to tackle this issue. [2]

2.3.2. Indicators currently used: objective and/or subjective. Methodologies

As Germany includes the EP issues in the social legislation, we can classify the injured parties as it follows: [45]

- Low wages households: income is too low to make a living above the **poverty line** but not enough to receive social transfers.
- Households receiving social transfers: even if they financially assisted for basic housing costs, the grants for energy expenses are often not enough.

Regarding the poverty line in Germany, basic income under the social security scheme (SGBII rates by the Social Code, Book II) is determined by a minimum income standard that reflects the average expenditure on several groups of goods of low-income households. The scheme is based on four components: [46]

1. A social benefit for employable people;
2. A social benefit for unemployable people or for those, who are no longer asked for being employed because they reached the retirement age;
3. A social benefit for asylum seekers, and;
4. An indemnification for an impairment occurred during military or civil service respectively for victims of violence.

In addition to that, there are tax exceptions for the minimum income and social security payments in case of the loss of income. The SGB II rate could be interpreted as the already known indicator MIS (Minimum Income Standard). Although they differ conceptually, they represent what is regarded as reasonable income under basic security.

Since 1st January 2017 the basic monthly assessed needs in Germany are:

- **409 €** for the first adult (25 years or older) in a household
- **327 €** for an adult 24 years or younger
- **368 €** for spouse or other life partner living in same household
- **237 €** for each child 5 years or younger

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- **291 €** for each child from 6 to 13 years of age
- **311 €** for each child from 14 to 17 years of age
- Plus cost of rent + heating (but not of electricity and water) of an apartment appropriate for family size.

If the monthly income of a family is lower than the sum of the rates above, the difference is made up by welfare.

Furthermore, there is a general statutory minimum wage that went into effect in 2015, establishing a lower limit for wages and employers should not pay less than this amount. This amount is set to 8.84 € per working hour and its goal is to protect workers in the low-wage sector from wage dumping and thus reduces the number of workers who are dependent on social benefits despite the fact that they have a full-time job. By doing so, it contributes to fair and effective competition and ensures greater stability in Germany's social security systems.

Last to mention, following the British example, another quantitative indicator used by measured the German government is the Ten-Percent Indicator, included in communications. However, there are no official legislation on this measure. (Schuessler, R., 2014).

2.3.3. Data sources: surveys and statistics

The aim of this section is to provide a comprehensive view of the latest statistical trends and analysis of EP in Germany. This information is quite relevant as it can then be used to clarify the role and impact of EP measures and, finally help to improve the existent target policies.

On the one hand, the Federal Statistical Office (Destatis) provides a neutral and objective service for the German Parliament, the Federal Government and others by measuring economic, environmental and social parameters not only at the regional and national level, but also at the international level. It consists of seven departments across Germany and, it publishes an annual report, the most recent is "Statistical Yearbook 2016" (only in German), which contains the main facts and figures of the different subjects concerning the national situation. [47]

In general, surveys are most frequently done based on a random selection of homes, but there is a voluntary co-operation with the official statistical agencies called "Households Today". This survey aims at capturing households' housing conditions, economic situation, level of education, internet usage and employment status among other related issues with living conditions.

Some of the most relevant figures related to EP and, included in the last annual report come from the following two voluntary surveys such as:

- Annual **Continuous Household Budget Survey** (LWR, in German) and the five yearly **Survey on Income and Expenditure** (EVS, in German) with a coverage of approx. 60,000 households: both focused on income and consumption.
- Annual **Survey of Income and Living Conditions in the European Union** (EU-SILC): provides information on the risk of poverty or social exclusion matters.

As the data collection regarding risk of poverty comes from the EU-SILC database, this indicator will be better left to last section 3 (comparison between countries via the EU-SILC dataset).

However, in this section, we will analyse last results (2015) corresponding to the following EP related parameters:

Income, receipts and expenditure

- **Consumption expenditure:** in Germany, 36 % (which corresponds to an average 859 € per month) of households’ consumption budget was spent in housing, energy and maintenance of the dwelling in 2015. It is the largest percentage of expenditure and, as it can be observed in the following graph (Figure 15) it increases with the household size.

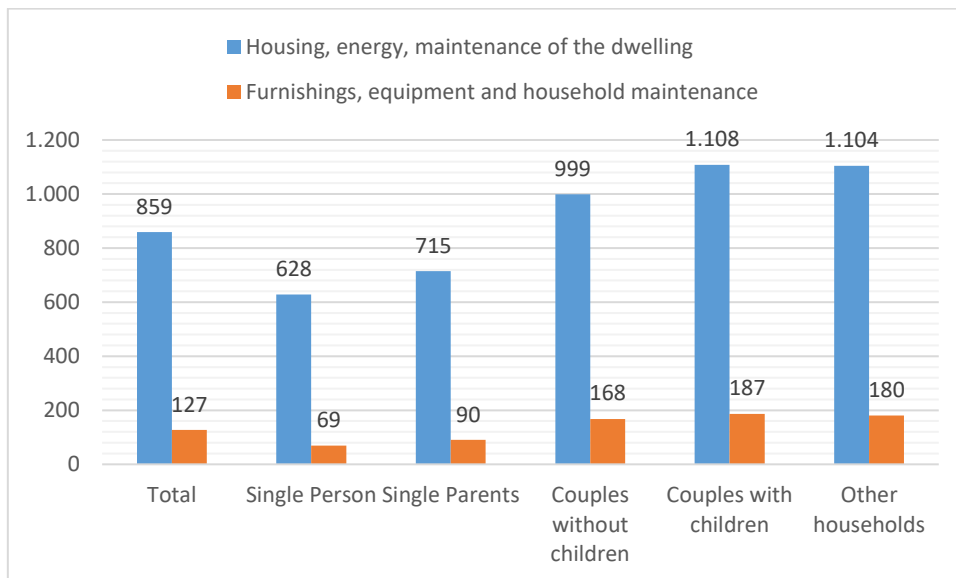


Figure 15: Proportion of expenses on housing renovations. Source: Destatis, 2015.

- **Living conditions, risk of poverty:** the most recent Figure 16 published by the EU-SILC captures the decrease in the percentage of people at risk of poverty or social exclusion from 20.6% in 2014 to 20 % in 2015 (16.1 million people).

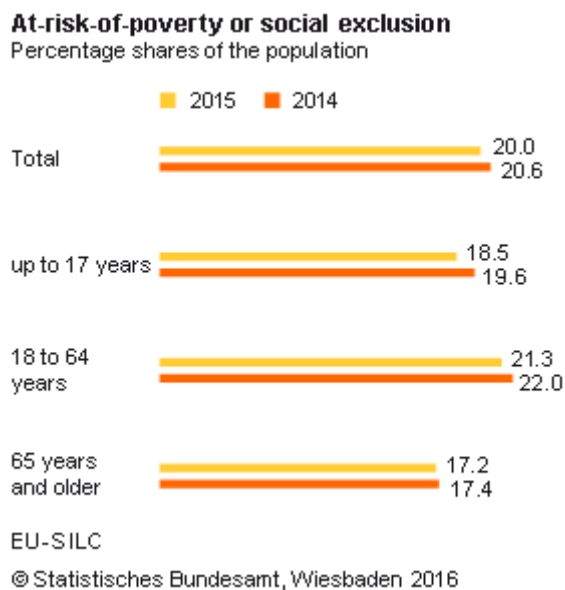


Figure 16: At-risk-of poverty or social exclusion population distribution. Source: Destatis, 2015.

Social statistics

- **Housing allowance:** is a subsidy funded by the Federation and the Länder in accordance with the provisions of the Housing Allowance Act. It is a support mechanism for low-income households, so that they can pay the costs of adequate housing that meets the needs of families. The Figure 17 collects the proportion of households that received this grant at the end of 2015, approximately 460,000 (which stands for 1.1 %). However, households in Germany received roughly 0.3 % more in 2014, which represents approximately 565,000 households.

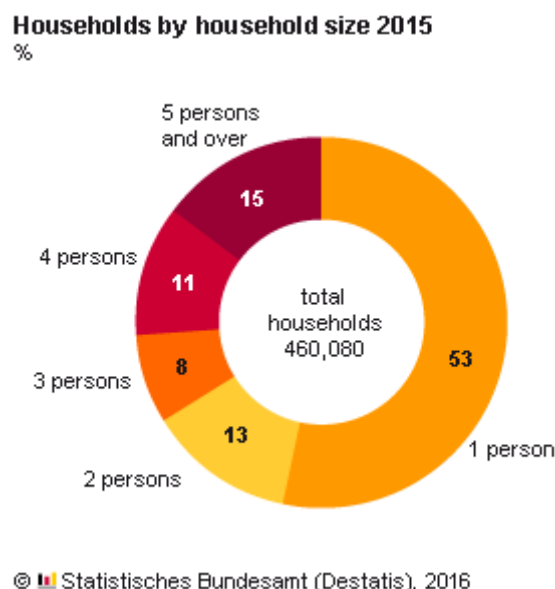


Figure 17: Housing allowance’s grant distribution amongst groups of households. Source: Destatis, 2015.

On the other hand, the German Network Agency (Bundesnetzagentur, in German) is one of the regulatory bodies' that monitors network operators' activities. They annually release a report on monitoring activities of electricity and gas sectors, and so it is interesting its results on

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

household customers, retailer's consumer protection behavior, tariff structures and billing options, and number of disconnections amongst other related issues. [48]

- **Electricity prices:** in 2015, there was a slight decrease to household customers, however, prices rose again in mid-2016. Default customers pay an average price of 30.63 ct/kWh for supply services, in contrast with non-household customers' price which has declined.
- **Disconnections:** under the StromGVV, if a default customer fails to meet payment obligations of at least 100 €, after giving them a notice, suppliers have the right to disconnect them. The results of 2015 analysis were 331,272 disconnections, which has decreased in approx. 20,000 since the prior year (this data collection is based on DSOs' meter points). The key point is the reinstating charge applied to household customers to a meter point which varies between 7€ and 154€.

At the same time, suppliers were asked to include in the survey all suppliers and results were surprisingly high: almost 6.3 million disconnection notices to household customers.

Last to mention, the **German General Social Survey** (ALLBUS) is conducted biennially (most recently published in 2016) by Leibniz Institute for the Social Science (GESIS, in German) in cooperation with the ALLBUS Board. This survey is focused on attitudes, behaviour, and socio-demographic characteristics of residents in Germany. And, its major distinction are face-to-face population interviews. [26]

2.3.4. Programmes at the state level and if possible at the regional and local level

Despite the fact that EP is a recent topic of study in Germany there exist some good instruments to tackle this issue through the provision of advice on reducing electricity consumption ("electricity saving check") and improving the efficiency of heating energy use. The next list collects the different measures applied in Germany classified according to, on the one hand, energy saving advice perspective and, on the other hand, improvement of the efficiency of heating energy use: [43]

- ❖ **Energy Saving Advice:**
 - Stromspar-Check PLUS is an Energy saving initiative by Caritas Germany;
 - Basic-Check-Consultancy by the Consumer Association;
- ❖ **Affordability issues:**
 - Federal Social Support System.
- ❖ **Efficiency of energy use:**
 - Campaign "Climates seeks protection" of co2online;
 - Mini Contracting for exchange of refrigerators;
 - Programs that support energy efficient modernization of housing;
 - E.ON Bavaria;
 - Smart Metering.

Firstly, in terms of energy saving, the German Federal Association of Energy and Climate Protection Agencies (eaD) in cooperation with the German Caritas Association (DCV) currently

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

offers "energy audits" in a nationwide project as part of the Energy Transition. The implementation of this Energy-Saving-Project is funded by the Federal Ministry for the Environment and the main goal is helping people, including those on welfare, to conserve power, heating energy, and water. Its first appearance was in 2008 and now takes place from April 2016 to March 2019 (corresponds to project phase VII). [49]; [50]

The procedure follows the next structure: 1. First visit of an energy auditor at home, free of charge, that analyses how much energy the household spends and tells them how they could save energy; 2. Second visit of the auditors' team and receiving some energy-saving products not only for power reduction but also for water consumption, such as compact fluorescent light bulbs, power strips with on-off switches, and water-saving showerheads, which worth up to 70 €; 3. Finally, a personal savings-plan that indicates the potential saving without affecting the quality of life of the consumer.

But, what makes unique this project is the fact that the "energy auditor" is a long-term unemployed person who has received training on energy topics. So, this instrument addresses electricity consumption ("electricity saving check"), as well as efficient heating energy use. And, it even provides an employment stimulus for long-term unemployed people who are trained and involved as energy consultants. The annual savings per household stand between 107 - 160€.

Another mechanism related to this focus is the consulting services provided by Consumer Centres. Customers can be helped with all their energy questions by around 670 consumer centre offices and local government offices, or via their online consultation tool, or calling the German Energy Agency hotline. These consultations are also free for low-income households. The Federal Ministry for Economic Affairs and Energy has been providing impartial energy advice to households since the late 1970s. And, it has expanded its programmes and plans to refine them further in 2015 as part of the National Action Plan on Energy Efficiency (NAPE). [51]

This instrument is very useful for consumers who are looking for obtaining an initial overview and some tips on how to save energy, as they offer a wide range of information on different devices and even at home.

In connection to affordability instruments, the Federal Social Support System approved in 2016 the housing benefit reform which started on January 1. With this amendment, low-income households above the basic security level receive fast, effective and tailored relief for housing costs. It is focused on adapting the housing benefit to the developments in rents and income taking into account the increase in utility costs and therefore the increase in total gross rents. It consists of three assistance approaches. [52]; [53]

Firstly, a basic allowance that includes a component for household energy (which stands mostly for electricity) is paid. Secondly, living expenses are paid for directly by the local authority and include payment of heating costs of low-income households. And, finally, there are provisions for cases with additional needs, such as cases where hot water is provided through individual electric hot water boilers which place additional burden on household budgets. [52]

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Ultimately, due to the EU Energy Efficiency Directives that aim to make an EU-wide primary energy saving of 20 percent by 2020, there are some projects under the Energy Efficiency Fund and the National Climate Initiative which play an important role in achieving these targets. Then, by implementing energy efficiency measures on a large scale, in the end energy demand will be reduced and so, prices. [52]

The Federal Environment Ministry, on the one hand, has supported a "PowerCheck for low-income households" since 2008 and since 2004 has supported the campaign of the co2online company entitled "Climate seeks protection".

Co2online is a non-profit organization that offers online advisory tools to help consumers to assess their energy consumption, both with regard to electricity and heat. What is more, they provide information on how to reduce energy consumption and thereby reduce CO₂ emissions. Some of the services available are: tips on how to change the everyday behavior to undertaking retrofits; suggestion of investments, pay-back times in reference to the given energy consumption. [54]

Their challenge is double as they aim to protect the climate and reduce consumers' energy bills when implementing their advices. And, on the other hand, the Federal Environment Ministry supports other projects such as the Municipal Heating Surveys (Heizspiegel in German) or the Energy Savings Account (Energiesparkonto in German) that also help to increase awareness and reduce energy consumption. [55]

The Municipal Heating Surveys are available in 45 cities and based on the calculation of a *Heating Mirror Comparison Value* through the following procedure: 1. Take your invoice of heating costs and look for the variables: energy source, the heating energy consumption, the heating costs and the heated surface of the building; 2. Calculate your comparative values dividing the heating costs of the heating energy consumption of the whole building by the building surface; 3. Search in the heating mirror tables the line that fits your result, depending on energy source and living space of the building; 4. Finally, compare your calculated value in Table 8:

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Energy Source	Living Space (m ²)	€ Cost (€/m ² year)				kWh Consumption (kWh/m ² year)			
		low	mid	high	sharo	low	mid	high	sharo
 Natural gas	100 – 250	bis 8,60	bis 13,10	bis 19,20	über 19,20	bis 97	bis 166	bis 261	über 261
	251 – 500	bis 8,20	bis 12,50	bis 18,20	über 18,20	bis 93	bis 160	bis 252	über 252
	501 – 1.000	bis 7,80	bis 11,90	bis 17,30	über 17,30	bis 89	bis 153	bis 242	über 242
	über 1.000	bis 7,50	bis 11,50	bis 16,80	über 16,80	bis 86	bis 149	bis 236	über 236
 Fuel oil	100 – 250	bis 8,50	bis 11,80	bis 16,30	über 16,30	bis 108	bis 167	bis 252	über 252
	251 – 500	bis 8,00	bis 11,20	bis 15,60	über 15,60	bis 104	bis 162	bis 245	über 245
	501 – 1.000	bis 7,60	bis 10,80	bis 15,00	über 15,00	bis 100	bis 159	bis 239	über 239
	über 1.000	bis 7,30	bis 10,50	bis 14,60	über 14,60	bis 97	bis 156	bis 236	über 236
 District heat	100 – 250	bis 10,40	bis 15,30	bis 23,00	über 23,00	bis 87	bis 143	bis 234	über 234
	251 – 500	bis 9,80	bis 14,50	bis 21,80	über 21,80	bis 83	bis 137	bis 224	über 224
	501 – 1.000	bis 9,40	bis 13,80	bis 20,80	über 20,80	bis 80	bis 131	bis 215	über 215
	über 1.000	bis 9,10	bis 13,30	bis 20,10	über 20,10	bis 78	bis 127	bis 209	über 209

Table 8: Costs and consumption classification per energy source and living space. Source: www.co2online.de

In the Table above, the classification of costs and consumption is driven by the “necessity of change” from lower level (households already climate protected), medium level (average households which may only need a few modernizations, high level (households that need some tips and some energy efficiency rehabilitation works for energy saving) and very high level (households that MUST take action on their energy efficiency to save energy).

Also, there are regulatory provisions for refrigeration equipment initiated under the National Climate Initiative. The instrument consists on the refrigerator-exchange action for low-income households. An eligible household gets 150€ towards the cost of a new highly efficient fridge. Within 2 years, the target exchanged number refrigerators is 16,000. [43]

Other policy that addresses dwelling’s energy performance is the Energy Conservation Ordinance adopted in 2002 (EnEV, in German) and in 2016 introduced the nearly-zero energy standard as required by the European Buildings Directive. Among other things, it sets minimum requirements for the quality of renovation steps, energy audits, and replacements for old heating systems. Concerning to the financial help for renovation of existing or construction of new buildings to meet specific standards, there are loans and subsidies available from the KfW bank. [56]

However, this instrument is usually accompanied by an increase in rent, and this is not compensated by benefits. And, as low-income owners or occupiers may often not have enough access to capital to provide a contribution to the refurbishment costs. Therefore, this instrument only has a limited impact on the alleviation of EP amongst German households.

Furthermore, the energy company E.ON Bavaria has introduced a similar scheme to the one applied in the UK in collaboration with welfare associations: monthly reductions of payment to authorized households and lotteries for efficient electronical devices. [43]

Ultimately, a technical solution is the use of smart metering systems to encourage efficient energy avoiding customers running up debts by too high consumption and so forth cut-offs.

2.4. United Kingdom

The UK has a strong experience on EP issues and so forth a clear definition that relies on households whose share of energy expenditure is greater than a certain threshold and those who limit their energy consumption to fit within their available income. There are many policies that have been targeted at low-income households in terms of energy efficiency, economic support to billing or income.

In 2014, approximately 2.38 million of households were in EP in England, which represented 10.6 % of the population. This corresponded to an increase of around 1.4 % with respect to 2013. And, regarding the average fuel poverty gap (the quantity required to address the fuel poverty threshold), it fell by 2.1 % in these consecutive years. [57]

Boardman (2012) estimates that less than a quarter of funds spent on UK fuel poverty policies are actually reaching the fuel poor and that the total volume of funds is far too small to reach the UK's 2016 national EP target. This is the result of the inadequate funding management and the lack of accurate data collection, monitoring and evaluation systems, which end up affecting the policies designed for tackling energy poverty.

Some of the characteristic factors that increase the likelihood of households to be fuel poor are: [57]

- Households with lower energy efficiency bands (i.e. in 2014, 6.8 % of fuel poor households had an energy efficiency rating Band C or lower);
- Old and large buildings, constructions with solid walls (worse than those with cavity walls), households with no boiler or a non-condensing boiler and no connection to the gas grid;
- Locational differences set off other factors such as age of the housing stock, climatic conditions, relative income levels across the country or rural areas;
- Household characteristics that include differences in income and/or energy requirements.

In addition, the UK has the figure of the Ombudsman which provides services to domestic or small business customers of an energy company after giving the energy company the reasonable opportunity of sorting out the complaint. [58]

Then, the types of complaints that they can deal with are problems related to:

- energy bills;
- energy sales activity;
- switching gas or electricity supplier;
- supply of energy to a home or small business (such as power cuts and connections);
- micro generation and feed-in tariffs (FITs), and;
- provision of services under the Green Deal.

2.4.1. Vulnerable Consumers and Energy Poverty definitions

Regarding Energy Poverty, the UK refers to a wider issue called ‘Fuel Poverty’. While EP concept refers to households’ lack of access to modern energy services (such as clean cooking facilities, fuels and stoves), the term fuel poverty, has a wider meaning related to energy expenditure. However, to ensure simplicity in the report, the term EP will continued be used. [81]

The United Kingdom (UK) is divided in four countries—England, Scotland, Wales and Northern Ireland have different approaches to this issue. The last three have devolved administrations, each with varying powers that affect individual policy targets, measures and outputs of EP (for example: energy efficiency programs) but not income or market conditions which directly influence fuel prices. Then, there exist different indicators based on diverse methodological assumptions. [60]

Despite this fact, Scotland, Wales and Northern Ireland have not changed the EP definition adopted once by England, which was the 10 % indicator, that still applies in those nations of the UK.

Under this definition, a household was defined as fuel poor if it needed to spend more than 10 % of its income on energy to maintain an adequate standard of warmth and was on a low income. Therefore, it is a measure that compares income with what the fuel costs should be and not what they actually are. The EP ratio is defined given the next expression:

$$\text{Fuel Poverty ratio} = \frac{\text{Modelled fuel costs (i.e. modelled consumption x price)}}{\text{Income}}$$

And, if this ratio is greater than 0.1 (10 %), then the household is considered to be fuel poor.

The 10 % definition of EP was previously used in England, from 2001 to 2011. But, in 2012, an independent review led by Professor John Hills, recommending a new method to calculate energy poverty, with a double indicator that calculate not only the extent, but also the depth of energy poverty. This is known as the Low Income High Costs (LIHC) indicator and has been used in EP statistics (published in 2013) since 2011, and was used before for long term trends tables since 2003. This indicator will be fully described in chapter 2.4.2.

Ofgem is the Office of Gas and Electricity Markets which is a non-ministerial government department and an independent National Regulatory Authority, recognized by EU Directives. Their main goal is to protect the interests of existing and future electricity and gas consumers. And, they have defined energy vulnerability as when a consumer’s personal circumstances and characteristics combine with aspects of the market to create situations where he or she is: [59]

- Significantly less able than a typical consumer to protect or represent his or her interests in the energy market.
- Significantly more likely than a typical consumer to suffer detriment, or that detriment is likely to be more substantial.

2.4.2. Indicators currently used: objective and/or subjective. Methodologies

We will focus our study on EP policies applied in England. For instance, the main indicator used in England is the Low Income High Costs (LIHC). Where a household is considered to be in energy poor conditions if: [61]

- they have required fuel costs that are above average (the national median level); and
- were they to spend that amount, they would be left with a residual income below the official poverty line.

Given this definition, it can be distinguished according to Heindl (2013) classification as an income-expense factor based as it compares households to the national income thresholds and the national median energy costs. Therefore, they both can reflect the contemporary national trends. [10]

This is a dual indicator as it includes important measures in two levels: [61]

1. The **extension of the problem** through the number of households that gather both factors: low incomes and high fuel costs (shown by the shaded area in the bottom left hand quadrant in Figure 18).
2. The **depth of the problem** by comparing these energy poor households. For this step, exists a “fuel poverty gap” (represented by the vertical arrows in Figure 18) which pictures the difference between the required energy costs for each fuel poor household and the nearest fuel poverty threshold. In addition, for each individual household, this fuel poverty gap is aggregated across all fuel poor households in order to produce a national total.

Then, the Figure 18 represents the combination of factors: household’s income, energy requirements and energy prices, that influence the indicator and they allow to classify households into one of the following quadrants:

1. Low Income High Costs (LIHC);
2. Low Income Low Costs (LILC);
3. High Income Low Costs (HILC);
4. High Income High Costs (HIHC).

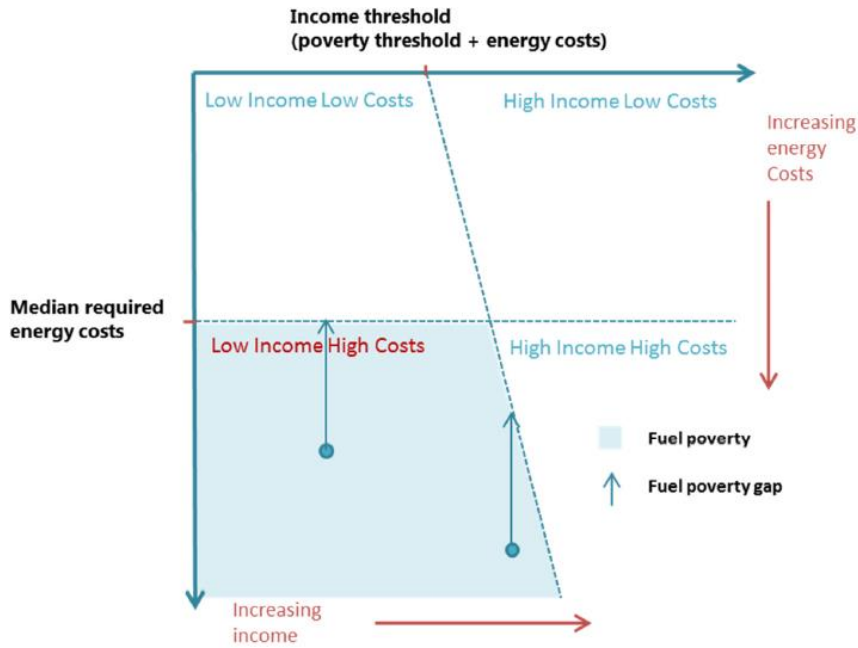


Figure 18: Classification of households into quadrants depending on income and energy costs. Source: Fuel Poverty Methodology Handbook (2016).

In the upper Figure, it can also be pointed out the “Income Threshold” that sums to the poverty threshold, the extra energy costs given by high energy requirements. As a result, there are some households which are included in the first quadrant of energy poor (LIHC) due to this reason.

Although, the fuel poverty gap can be reduced by decreases in the required energy needs within those fuel poor households, it might not move them out of the fuel poverty quadrant. This effect could decrease the energy needs of the population as a whole, leading to a less than proportionate reduction in the number of households above the median energy need. [61]

The Figure 19 shows the proportion of the population across each of the quadrants of the EP indicator in 2014 and, the resulting population on EP situation is assigned a 10.6 %:

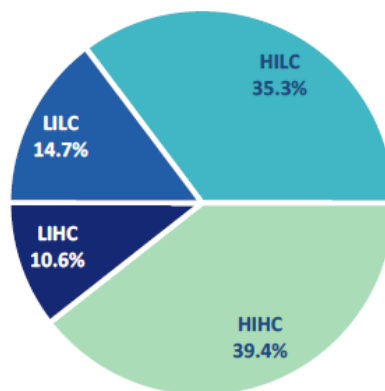


Figure 19: Distribution of population amongst quadrants. Source: Fuel Poverty Methodology Handbook (2016).

In fact, the key elements and drivers when determining whether a household is energy poor under the LIHC indicator are explained hereunder:

- ❖ **Household Income** will only affect EP if its changes are considerably larger for households with low income and high costs in comparison to those that are not considered in energy poverty.

LIHC is based on modelled incomes which can be calculated deducting housing costs (such as mortgage and rent payments) to obtain an after housing cost (AHC) income. Then, it is required an equivalisation process which is an additional income adjustment depending on spending (by household composition) and energy requirements (by number of people in the house). [57]

The factors used for the Equivalised AHC income calculations correspond to the same factors from the Department for Work and Pensions (DWP) Households Below Average Income (HBAI) statistics. They were developed by the Organisation for Economic Co-operation and Development (OECD), and currently are widely used across Europe.

- ❖ **Household Energy Requirements** captures four areas: space heating, water heating, lighting, appliance usage and cooking. In order to calculate this element, we need to model the energy costs which depend on household composition and energy set-up. Then, the next characteristics influence this calculation: [61]

- ✓ Dwelling size;
- ✓ Heating system and type of fuel(s) used, and;
- ✓ Lifestyle of householders, for example: economic situation, number of people who live there.

However, households' energy requirements may be overestimated with respect to the standard of warmth established as 21°C for the main living area and 18°C for the other occupied rooms.

- ❖ **Energy prices** are assigned to each household based on fuel type, location (as fuel prices vary regionally), choice of supplier, tariff and payment method (i.e. direct debit, standard credit or pre-payment). Then, the unit cost can be modelled and fuel costs are also equivalised depending on the number of people in the household, which influences directly the energy requirements. [61]

Finally, EP can be calculated as the comparison of each household's position with respect to both levels of the indicator LIHC. On the one hand, the median energy costs threshold can be calculated by grading households equivalised energy requirements and then, using the median value of the dataset. On the other hand, the After Housing Cost (AHC) threshold is calculated as the required energy costs deducted from the equivalised income and then, graded and assessing 60 % of the median value.

As a result, a household will be considered energy poor (regarding this indicator) if the household's required energy costs are higher than the median energy threshold and their equivalised AHC income is lower the income threshold.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

The duality and relative measure of the LIHC indicator makes the difference with the 10 % indicator, applied in the rest of the UK countries. As, firstly it integrates equivalisation factors for income and fuel costs and then deducts housing costs from the income. And, secondly, it compares households to the median fuel costs and income, inversely to the absolute nature of the 10% indicator.

2.4.3. Data sources: surveys and statistics

The aim of this section is to provide a comprehensive view of the latest statistical trends and analysis of EP in England. This information is quite relevant as it can then be used clarify the role and impact of EP measures and, finally help to improve the existent target policies.

In England, EP is modelled using the dataset provided by the English Housing Survey (EHS) (since 2008). It is an annually-based survey, commissioned by the Department of Communities and Local Government. And, it is a random sample of different types of households and homes' heating and energy requirements, including a household interview and a physical inspection. [61]

Then, the result of the interview survey by means of householder incomes, occupancy characteristics and the payment method for gas and electricity are then combined with the data from the physical survey on matters such as floor area, types of heating systems and other energy efficiency characteristics to calculate the main English indicator of LIHC.

Furthermore, there is an "Annual Fuel Poverty Reporting" published by the Department of Energy and Climate which provides additional classification in demographic and dwelling-level for EP studies. These data are very useful for local authorities, who combine it with their own database to improve the target schemes at the local level. [57]

Another important measure is, fuel prices for households. But this data is given by DECC Quarterly Energy Prices, ONS Consumer Price Index and Sutherland Tables.

Even if we are focused on England, the other UK countries' data sources are: [61]

- Scotland: The Scottish Housing Survey.
- Wales: The Living in Wales Survey, which is not annually done (most recent from 2008).
- Northern Ireland: The last Housing Condition Survey for Northern Ireland was run most recently in 2011. And, it is a relevant to borne in mind that this country has no statutory requirement on energy poverty.

Concerning to house condition and energy efficiency measures captured in the last EHS 2015 to 2016 headline report, the following results were obtained on: [62]

House condition

- **Decent Homes Standard:** corresponds to homes that meet the requirements enacted by the Housing Health and Safety Rating System; its conditions of age, size, layout, thermal degree of comfort and dwelling characteristics are in an acceptable state or ready for a reasonable repair.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

In 2015, 19 % or 4.6 million dwellings' homes failed to meet this standard. Figure 20 shows that across all occupants, the private rented sector had the highest proportion of non-decent homes. What is more, even if there has been a decrease on its percentage, it remained constant from 2014-2015.

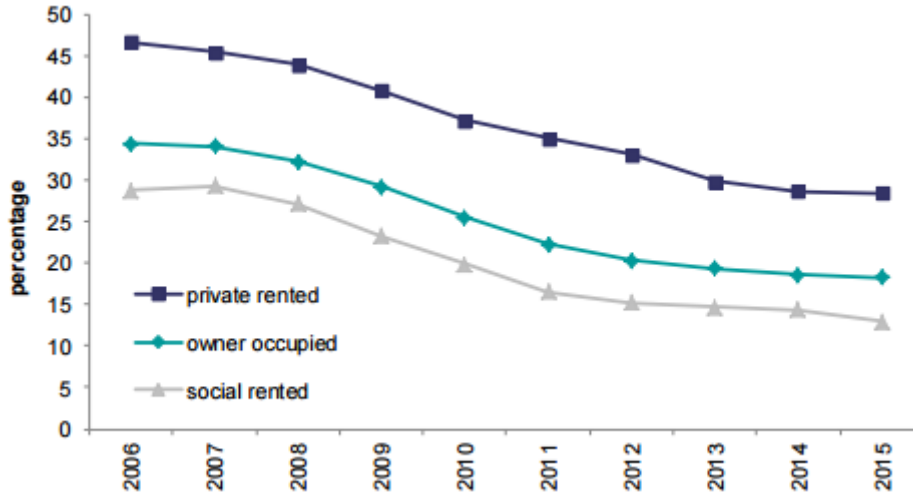


Figure 20: Evolution of Non-decent homes by tenure (2006-15). Source: EHS Headline Report 15-16.

- **Damp problems:** can be condensation and mould, penetrating damp and rising damp. Then, the Figure 21 captures these four issues by occupation type in 2015. In which, it is observed a higher incidence of condensation and mould affecting 586,000 homes (2%), and private rented were the most affected in all categories.

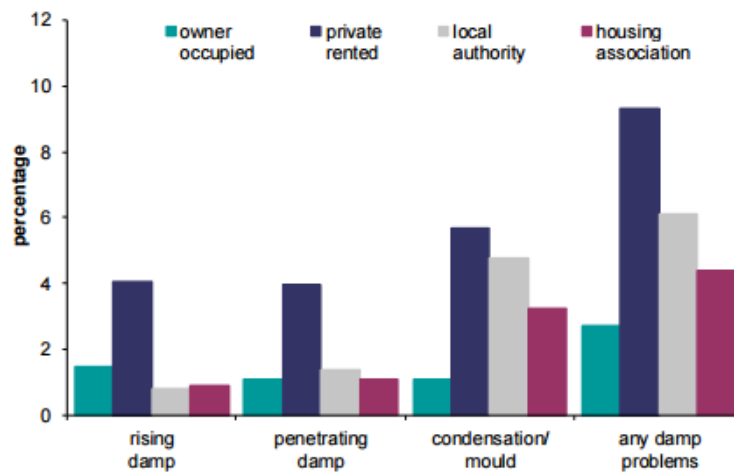


Figure 21: Diversity of damp problems by tenure (2015). Source: EHS Headline Report 15-16.

Energy Efficiency

- **Energy Efficiency Rating:** as it was already explained SAP calculation is used to control energy efficiency at homes. And, it is expressed on a scale from 1 (highly inefficient) to 100 (highly efficient which stands for zero energy cost). The Figure 22 shows the percentage of dwellings in each energy efficiency rate (EER) band (from A to G) per kind

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

of tenure in 2015. The clear majority of the three types of householders have EER bands of D and C and, concerning to owner occupied and private rented homes there is a higher proportion of EER band D.

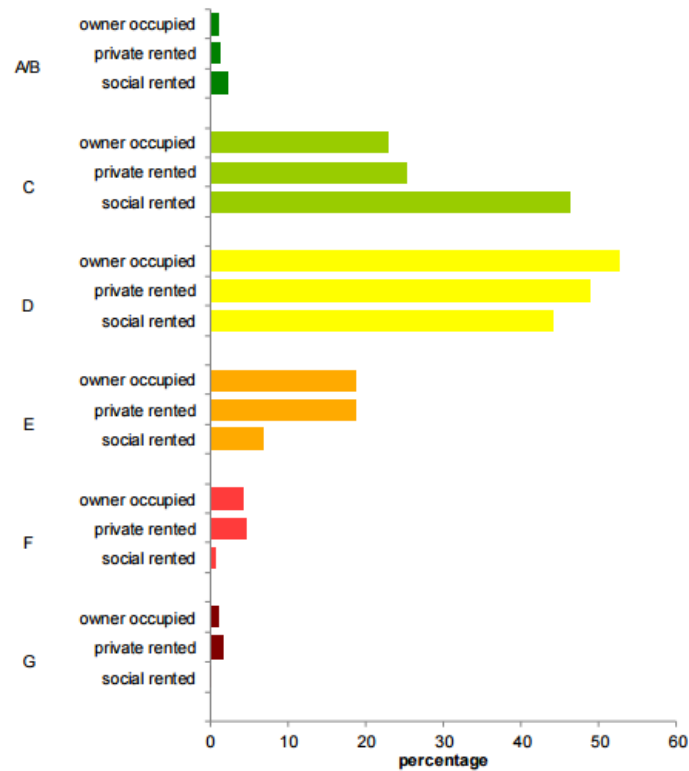


Figure 22: Classification of Energy Efficiency Rating Bands by tenure (2015). Source: EHS Headline Report 15-16.

- **Heating system:** this is one of the key points to improve energy efficiency by exchanging old and inefficient heaters such as room or storage heaters, which have decreased over the years 1996-2015 in a 2 % and 8 % respectively. In 2015 Figure 23, the main system used are condensing boilers which are now mandatory for new and replacements (since 2000) and, its proportion in English dwelling has arisen to 59 %.

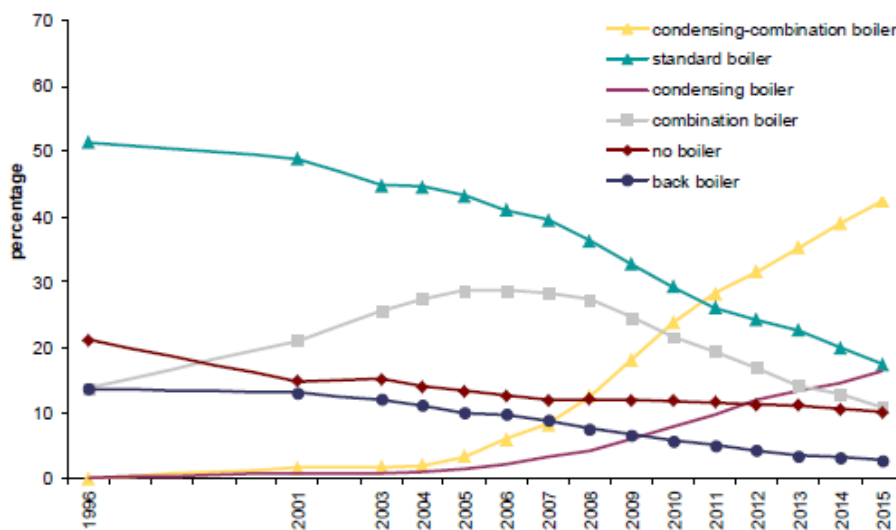


Figure 23: Classification of boiler types (1996-2015). Source: EHS Headline Report 15-16.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- **Insulation:** is another good solution for improving energy efficiency such as cavity or solid wall insulation, loft insulation and double glazing. In Figure 24, it can be observed a high increase in all these insulation upgrades as a result of the different targets set by the Decent Homes Programmes and awareness of energy efficiency issues. The most distinctive measure is the full double glazing (80 %), but cavity insulation has increased between 2008 and 2015 in an 11 %.

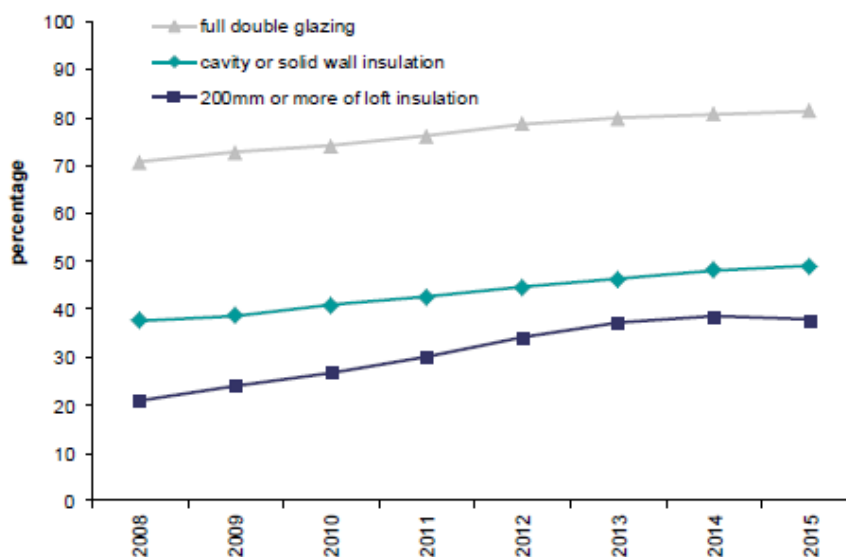


Figure 24: Evolution of the different insulation measures (2008-15). Source: EHS Headline Report 15-16.

Furthermore, smart meters are the newest technical device to directly help not only energy suppliers on a wider range of tariffs, but also customers on monitoring their use of electricity and gas. However, in 2015 just 6 % of households had an electricity smart meter.

With regards to affordability issues, the latest report published by the national statistics department on fuel poverty was in 2016. Although, figures stand for 2015, it is therefore better to analyse results released by the EU-SILC source then studied in section 3.

2.4.4. Programmes at the state level and if possible at the regional and local level

In this chapter, we will take as a reference the first report of the Committee on Fuel Poverty, published in September 2016. This is an advisory Non-Departmental Public Body sponsored by the Department of Business, Energy and Industrial Strategy, which supports the three Guiding Principles that the Government intends to deliver for setting an EP strategy. These are: [64]

- Prioritization of the most severely fuel poor;
- Supporting the fuel poor with cost-effective policies;
- Reflecting vulnerability in policy decisions.

Tackling EP is not only a legal obligation of the Government, but also energy suppliers should face their responsibilities with the low-income customers. Some of the policies and programmes available to act against this issue are based on the next challenges:

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- ❖ **Efficiency on energy use:** increase effective targeting of energy poor household through mechanisms such as the Affordable Warmth Scheme, the Energy Company Obligation or the Energy Efficiency Rating Methodology.
- ❖ **Affordability issues:** in order to improve the reach of support to low income households who have health conditions (e.g. linked to living in a cold home) or are not able to pay monthly bills.

Regarding energy efficiency improvements, the policies depend on the heating measures (such as boiler replacements and communal heating) and insulation measures (such as loft, cavity and solid wall). These are the measures applied:

- **Affordable Warmth Scheme:** replaced the Warm Front in January 2013 and it offers grants towards boilers replacement, cavity wall insulation and loft insulation for eligible low-income household. Some of these conditions are: to be a pension credit or child tax credit; to own a house or have a private rental agreement; to have an energy efficiency rating of E, F or G.
- **The Energy Company Obligation (ECO) Scheme:** helps low income areas and households to cut energy bill and reduce carbon emissions via the next two obligations: [66]
 - a. **Carbon Emissions Reduction Obligation (CERO):** some suppliers are obligated to enhance “primary measures” such as roof and wall insulation and connections to district heating systems. And, this obligation is also applied in rural areas.
 - b. **Home Heating Cost Reduction Obligation (HHCRO):** some suppliers are obligated to foster measures such as the replacement or repair of a boiler which improve the capacity of low income and VCs to warm their houses.

These obligations were launched in 2013, but since April 2017 some changes on the scheme have taken place. Currently, it has been updated the latest version of the scheme known as ECO2t and it will precede a long-term obligation running from 2018 to 2022. The reformed targets for the extension period are:

- ✓ Increase in the size of the **Affordable Warmth (AW) obligation** to £6.46bn and in the by the **Carbon Emissions Reduction Obligation (CERO) to 19.7MtCO₂** (15 % must be delivered to rural locations) by the end of September 2018.
 - ✓ Removal the old **Carbon Saving Communities Obligation (CSCO)**.
 - ✓ Increase of the **solid wall minimum requirement** (at a reduced level) to 21,000 per year which requires to insulate the around 32,000 additional solid walled homes;
 - ✓ Limit the number of qualifying gas boiler to 25,000 per year which corresponds to 37,000 replacements;
- **Energy Efficiency Rating Methodology:** is focused on ensuring that as many fuel poor homes as is reasonably practicable achieve a minimum energy efficiency rating of a Band C1, by 2030.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

In December 2014, through the Warm Homes and Energy Conservation Act in 2013, the Government introduced this long-term target for fuel poverty in England.

In addition, to support its implementation, the Government published 'Cutting the cost of keeping warm: a fuel poverty strategy for England', in March 2015. And, the strategy also set out other targets to lift fuel poor households to Band E by 2020; and Band D by 2025.

It is important to emphasize the fact that energy efficiency ratings are banded from G (lowest level) to A (highest level) as it is shown in Figure 22. And, the Standard Assessment Procedure (SAP) is based on assessing energy performance of dwellings, as shown on Energy Performance Certificates. A more detailed description can be found in version 9.92 of the SAP 2012 edition document.

This policy captures the fact that fuel poverty is different from general poverty and not all poor households are fuel poor, and some households would not normally be considered poor but could be pushed into fuel poverty if they had high energy costs. For this reason, fuel poverty is an overlapping problem for low income and high energy costs' households.

- **Energy Saving Allowances (LESA):** this policy applies for landlords and public agencies to take responsibility for improving the efficiency of heating systems. Some of these obligated actions correspond to the provision of an Energy Performance Certificate for the property. For example, since April 2018 the Energy Act 2011 declares illegal to rent a property below EPC rating E. [68]
- **Seasonal Health Intervention Network (SHINE) Scheme:** is a system focused on affordable warmth and seasonal health interventions which aims to reduce excess winter deaths and hospital admissions on vulnerable people (specifically people aged over 75 or with health diseases). It includes several services in terms of EP (advice on saving energy and grants available for heating and insulation and support with bills and energy debt), physiological (handyperson service), social (benefit checks, doctor home visiting) and environmental issues (fire safety checks, air quality alerts for those with respiratory diseases). [69]

Concerning to financial support for energy invoice payments, it depends on the value of the discount, core and broader group payments and the scheme budget. The measure applied in this section is:

- **Warm Home Discount:** delivers support through a direct monetary discount on the electricity bill of low income households which amounts to £140. The eligibility criteria are based on the following conditions: your electricity supplier is part of the scheme; your name or partner's is on the bill, and; you are getting the Guarantee Credit element of Pension Credit.

Concerning to the Pension Credit, it is a benefit compounded by two types of credits: the Guarantee Credit and Savings Credit. Firstly, the Guarantee Credit increases your weekly income in case it is below £159.35 (for single people) or £243.25 (for couples).

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

And, secondly, Savings Credits correspond to an extra payment for people who saved some money towards their retirement (a pension). [70]

If you meet the requirements specified before, then you automatically get the discount on your invoice. Another way of qualifying for this discount is by using a pre-pay or pay-as-you-go electricity meter. This measure helps over 2 million households per year.

There are also income support mechanisms applied to the different weather seasons. The measures applied in this area do not affect other benefits and they are:

- **Cold Weather Payments:** delivers a direct monetary support of £25 for each seven consecutive days if your area's average temperature is recorded or forecasted to be zero degrees or below. [71]

This payment is done automatically to the same bank or building society as your personal payments given the eligibility criteria, if you get: a pension credit, income support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance and Universal Credit.

- **Winter Fuel Payments:** it usually delivers automatically economic support to pay the heating bills of those consumers who were born on or before 5 May 1953 (it changes every year) and it varies between £100 and £300 tax-free. Another condition of the eligibility criteria is that the consumer must have lived in the UK throughout the week of 19 to 25 September 2016 (this period was the one applied for last winter). [72]

Regarding the Switching Programme Ofgem has come up with some interesting discussions on the 'Review of domestic debt objections' about payment methods differences and supplier switching by indebted customers. [73]

On the one side, the Citizens Advice noted that removing domestic debt objections might improve access to the energy market for low income disconnected customers. Nevertheless, if the reform was adopted they conclude that some practices like the rules on eligibility for prepayment meters, the debt repayment period and the best practice guidance on how suppliers should manage low income consumers should be reinforced.

And, on the other side, if every customer who had been debt blocked switched supplier, the number of switches would increase annually. And so, removing debt objections might encourage switching also consumers who have a debt but have not intended to switch.

However, none of these options are still on the track of the energy legislation in the UK.

Another example is the E.ON Energy Fund (since 2015), which helps any customer (of any company) who is struggling to pay monthly bills, replace household devices such as cookers, fridges, fridge-freezers, washing machines and gas boilers in England, Scotland or Wales. The eligibility criteria are based on the Energy Company Obligation (ECO) Scheme. [74]

2.5. Spain

Energy poverty is not legally recognised in Spain although indicators show that it is in fact a major problem. Spain should establish policy action to improve the situation of low-income households – in both the short and the long term. Long-term measures related to improving the energy efficiency of buildings and adapting heating systems are particularly necessary. [11]

There are some important studies from private research centres such as Economics for Energy (2014) [77] that releases a complete study of the situation of EP in Spain, definitions, current indicators and policies and compares them with other international references such as UK, France or Italy. For example, it analyses the current social bonus and proposes ways of improving it by including the influence of expenses on all the energy fuels; financing source transference to the national budget or even changing the eligibility criteria to focus on the most in need of this help.

Another relevant source of information is the Association of Environmental Sciences (ACA, in Spanish), which has been working on the study and resolution of social and environment related problems since 1997. According to the Third Energy Poverty Study presented in 2014 [79] more than 7,000 people died in Spain from causes associated with energy poverty. And, 11% of households in Spain, 5.1 million people declared to be unable to maintain their housing at a suitable temperature in winter. These high values correspond to an increase of 22 % in one year.

Some of their additional proposals to alleviate these concerning figures are: focusing on the renovation of buildings to enhance energy efficiency; provide more information and training on energy efficiency; or avoid supply cuttings through a legislation reform.

2.5.1. Vulnerable Consumers and Energy Poverty definitions

The concept of vulnerable costumers has only been defined so far for electricity customers.

Last 23 of December 2016, it was approved the Real Decree-Law 7/2016, that modifies the financial mechanism of the social bonus cost and increases the measures for vulnerable consumers protection. So, a VC will be the owner of a supply point in his/her main residence, who is under the voluntary price for the small consumer (PVPC, in Spanish), and who proves to be part of a family that fulfils any of the following conditions (Law 35/2006): [84]

- a. An annual income lower or equal to 1.5 times the IPREM (Public Indicator of the Income at Multiple Effects), in the case of no underage members in the family nuclei;
- b. An annual income lower or equal to 2 times the IPREM, in the case there is an underage member in the family nuclei;
- c. An annual income lower or equal to 2.5 times the IPREM, in the case of two underage members in the family nuclei;
- d. Numerous family title;
- e. All members from the household with income must be pensioners receiving a minimum level of pension.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

Additionally, if an electricity consumer proves to belong to a household nuclei in the following special conditions, the percentage of the income with respect to IPREM established in paragraphs a. and c., will be increased in 0.5 and it will be assigned the term severe vulnerable:

- If any of the family members has a recognized disability higher or equal to a 33 %;
- If any of the family members has been a victim of gender violence;
- If any of the family members has been a terrorism victim.

But, regarding EP there is no official definition due to political divergences. For this reason, we will focus on the proposals and approaches done by studies from Economics for Energy or Association of Environmental Sciences.

2.5.2. Indicators currently used: objective and/or subjective. Methodologies

Currently, the only official indicator available is objective and quantitative and they are a list of conditions to calculate the eligibility criteria for electrical bonuses on tariffs. This mechanism has defined the VCs provisional definition, and they must comply the following conditions: [76]

- ✓ Power contracted lower than 3 kW in the main residence.
- ✓ Customers over 60 or more years old, who receive a social pension, are in permanent unavailability and widow, and that receive minimum amounts in each period for those types of pensions.
- ✓ Household compounded by members in unemployment situation.

It covers the next factors: household type, age and power contracted. However, it is an insufficient indicator as it does not include affordability issues, neither the influence of high energy prices or dwelling conditions.

What is more, through this measure there are 2,3 million of households that benefit from the social bonus, 7 million people, that receive the exact same discount that does not distinguish levels of needs. But, this is about to change in the next legislation as the discount will depend on the level of income and four kinds of VCs:

- Ordinary customers: with better treatment from the retailing company and more capacity to compare between offers;
- Vulnerable customers: with a more defined concept according to its social situation and who will receive an additional financial help;
- More vulnerable customers: will benefit from a higher discount due to lower income;
- Extremely vulnerable customers: will be assisted by social services and the administration will be in charge of their unpaid invoice with an additional subsidy from the electricity company.

2.5.3. Data sources: surveys and statistics

The aim of this section is to provide a comprehensive view of the latest statistical trends and analysis of EP in Spain. This information is quite relevant as it can then be used to clarify the role and impact of EP measures and, finally help to improve the existent target policies.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

On the one hand, the National Statistical Institute (INE) is an independent administrative Autonomous institution assigned to the Ministry of Economy, Industry and Competitiveness via the Secretary of State for the Economy and Business Support. And, it provides statistical information on demographic and economic censuses, national accounts, demographic and social statistics, economic and social indicators amongst others. It publishes an annual report, the most recent is "Informe Anual 2015" (only in Spanish), which contains the main facts and figures of the different subjects concerning the national situation. [75]

Some of the most relevant surveys regarding the collection and analysis of households' housing conditions, economic situation, level of education, internet usage and employment status among other related issues with living conditions are:

- Annual **Household Budget Survey** 2016 (HBS): average expenses on housing, water, electricity, gas and other fuels were 8,706 euros (which represented 31 % household's average income).
- Annual **Continuous Household Survey (2016)**: source of information for households, disseminating annual information about the demographic basic features of the population, of the households and of the dwellings where they live.
- Population and census: population recount and knowledge of its structure.

As the data collection regarding risk of poverty comes from the EU-SILC database, this indicator will be better left to last section 3 (comparison between countries via the EU-SILC dataset).

However, in this section, we will analyse last results (2016) corresponding to the following EP related parameters:

Housing and consumption price indices

- **Consumer Price Index (monthly)**: measures the evolution of the level of prices of consumer goods and services acquired by resident households in Spain (at national and regional level).

Living conditions

- **Living conditions Survey (annual)**: studies the level of life, labour market conditions and social cohesion in relation with the information demand of the active policies of the EU in these areas and their effects on the population.
- **Quality of Life (irregular)**: measures the population quality of life, through a set of objective and subjective indicators grouped in nine dimensions, disaggregated by population groups and geographical scope. Evolution over time since the year 2004.
- **Urban Indicators**: additionally, collects statistical data with socioeconomic content that make it possible to know and measure the quality of life in a wide number of territorial areas.

Another data source is collected by the Spanish Bank: Families Financial Survey (EFF, in Spanish) includes a Statistical National Plan, and it has been most recently published in 2014. It complements the aggregated data from Spanish National Accounts and allows studies about

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

investment and financial decisions on Spanish families. So, they are an important key for better knowing the economy of the country and designing better policies. [80]

2.5.4. Programmes at the state level and if possible at the regional and local level

Although, Spain has no official legislation against energy poverty, there are still some instruments available to help low-income households, such as the Social Bonus. This tariff discount is only applied to electricity invoices to cover the difference between the current tariff value (PVPC, in Spanish) and a reference value known as the reduced tariff. [78]

The Social Bonus was defined most recently by RD 2166/2014, law in which it was defined the eligibility criteria for customers who could benefit from this discount, and so a provisional definition for VCs, and the calculation for the PVPC.

And, since new Law RD 968/2014, amongst other things, it has been fixed the difference to be covered by the social bonus to 25% of the PVPC. In the case of a severe consumer, the discount applied will be 40 %.

In both cases, the discount will be applied taking into account the maximum energy for the PVPC invoicing within the invoicing period established in the following Table 13. Above this limit, the bill will be invoiced under the PVPC, calculated according to the provisions of Article 8 of the Real Decree 216/2014, 28 of March, that depend on the family composition, collected below: [84]

FAMILY COMPOSITION	MAXIMUM CONSUMPTION (KWh/year and household)
Household without underage members	1,200
Household with one underage child	1,680
Household with two underage children	2,040
Numerous household	3,600
Pensioners (receiving minimum amount)	1,680

Table 9: Maximum consumption invoiced for consumers under PVPC and social bonus. Source: BOE-A-2016-12267.

What is more, these severe consumers group will be additionally protected against supply cuttings given Article 20: “The suspension of supply for consumers at risk of social exclusion or consumers in conditions of severe vulnerability under the last resort tariff (TUR, in Spanish), and assisted by social services of an autonomous or local administration, are subject to the provisions of Article 52.4.j) of the Law 24/2013, 26 of December, from the Electric Sector. On this basis, they cannot be suspended when the autonomous or local administration services are in charge of the 50 % of the invoice, before applying the social bonus discount, and the payment is accredited with the reference retailer within a period of five months from the date of the invoice.”[84]

This is the only official measure at State Level, but at the autonomous regions there have been developed several policies against energy poverty. Some of the most particular ones are: [77]

Comunidad Valenciana

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

The Law 3/2017 (Chapter II), presents policies to alleviate and reduce the effects of EP in terms of financial aids for bill payments and energy efficiency micro-policies. On the one side, it will be guaranteed a minimum access to water, electricity, gas and other energy fuels that ensure a decent life. And, so these helps will depend on the economic situation and household energy efficiency. Municipal Services are in charge of promoting the contract change to the social bonus one to every applicant that complies the vulnerability requirements. The priority of access to this financial help will be to those who are under a domestic intervention aimed at achieving energy efficiency improvements. [85]

On the other side, micro-policies in terms of energy efficiency correspond to every policy that is easy and not expensive to implement, that contributes and improves the reduction of energy expense in households in order to prevent and tackle energy poverty. The Future Valencian Energy Agency in co-operation with the corresponding counsellings will develop these micro-policies plan, and then it must be approved by the Generalitat. Some of instruments included in the plan will be: analysis of energy efficiency, energy routines, billing contracts and contract options of households, and then training on basic practices for promoting energy efficiency given its conditions.

Cataluña

The Law Decree 6/2013, that aim at modifying the Consumption Code Law in the region, was deterred by the central government in 2014. Its goal was based on not allowing any power, gas and water disruptions during the winter period (between November and March), and so to avoid aggravating the most vulnerable families (defined by the Decree) situation. [77]

Some of the most surprising claims were: introducing specificities regarding the concept of VC, which is related to the social bonus (at State Level); allowing the delay of bill payments (postponed to April-October), information exchange agreements and social prices with retailers, allegedly influenced negatively in national energy accounts, and; financial aids (Solidarity Energy Fund) came from a foundation compounded by four Catalanian departments, representing consumer associations, social organisations and energy companies.

Although, there were many legal hindrances, they kept on their shoes and finally approved another Law 20/2014, in this regard which defined a deeper EP concept and measures to avoid cuttings. However, it has not been approved by the central government yet.

Andalucía

The Social Inclusion Plan set by the Law Decree 8/2014 by the Junta de Andalucía, includes an Extraordinary Programme for minimum requirements and urgent social benefits (Title 3, Chapter 1).

The budget is confirmed as 6,5 m€, that will be transferred to city councils in order to cover: 1. Basic needs such as: energy, water, sewage and garbage expenses for those households with payment difficulties, and; 2. Urgent Social benefits such as comfort and household maintenance Works. However, there is no specific criteria to divide these subsidies and no evaluation criteria established to select the beneficiaries. So, it still needs to be studied in order to be really efficient and capture as many energy poor individuals.

País Vasco

Their Budget is 200,000 € dedicated to cover family needs in case they cannot pay energy invoices. However, they still have no specific criteria to select and distribute efficiently this financial aid.

Galicia

The Xunta de Galicia has launched a new call for its social ticket (electricity), which has a budget of 1,5 m€ and financial aids are 180 € for 2 adults with 1 or 2 children (under 18 years old), and 300 € for numerous families. A requirement for applying to this measure is that family income must not exceed 1.5 times IPREM. So, most of the beneficiaries are attained under RISGA.

Last to mention, the Environmental Science Association presents in co-operation with Obra Social la Caixa a new energy saving and energy efficiency improvement information point called Information Point for VCs (PICv, in Spanish). In which, customers will receive customized advice to save in energy invoices. [79]

3. Comparison between the Member States' approaches

First, in order to evaluate the current status of EP main drivers across countries, we will evaluate the four proxy indicators from EUROSTAT Survey on Income and Living Conditions (SILC, 2015/16), which are: people at-risk-of poverty or social exclusion, arrear on utility bills, inability to keep home adequately warm, and dwellings with leakages and damp walls.

The reason why the European Union Statistics on Income and Living Conditions (EU-SILC) has been chosen as the data source is due to its updated data collection on income, poverty, social exclusion and living conditions. And, since the opening phase of the Europe 2020 strategy in 2010, EU-SILC data is being used for monitoring the number of people under poverty and social inclusion to achieve a reduction of 20 million in 2020.

The next list of points corresponds to the analysis on the proxy indicators defined before, and most of them will depend whether on the type of household. The different options are: single parent, one adult over 65 years old, single parent with children, two adults under 65 years old, two adults with one child, two adults with two children, two adults with three or more children and three or more adults; or the level of income (five quintiles). Although, there are many other available distinctions such as age, sex, location, education, activity status or tenure amongst others which could be also used, this has been a personal choice as these two might represent the most general ways to compare more easily countries status.

1) **People at risk of poverty or social exclusion:** the Eurostat graph (Figure 25) covers 2015 proportion of population: [82]

- *at-risk-of poverty:* with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers), or;

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- *severely materially deprived*: living conditions constrained by a lack of resources (they must comply 4 out of 9), and some of them are: unavailability to pay rent or utility bills, keep home adequately warm or face unexpected expenses, or;
- *living in households with very low work intensity*: those aged between 0 and 59 years who live with adults (aged 18-59) that worked 20% or less of their total work potential during the past year.

People at risk of poverty or social exclusion Percentage of total population

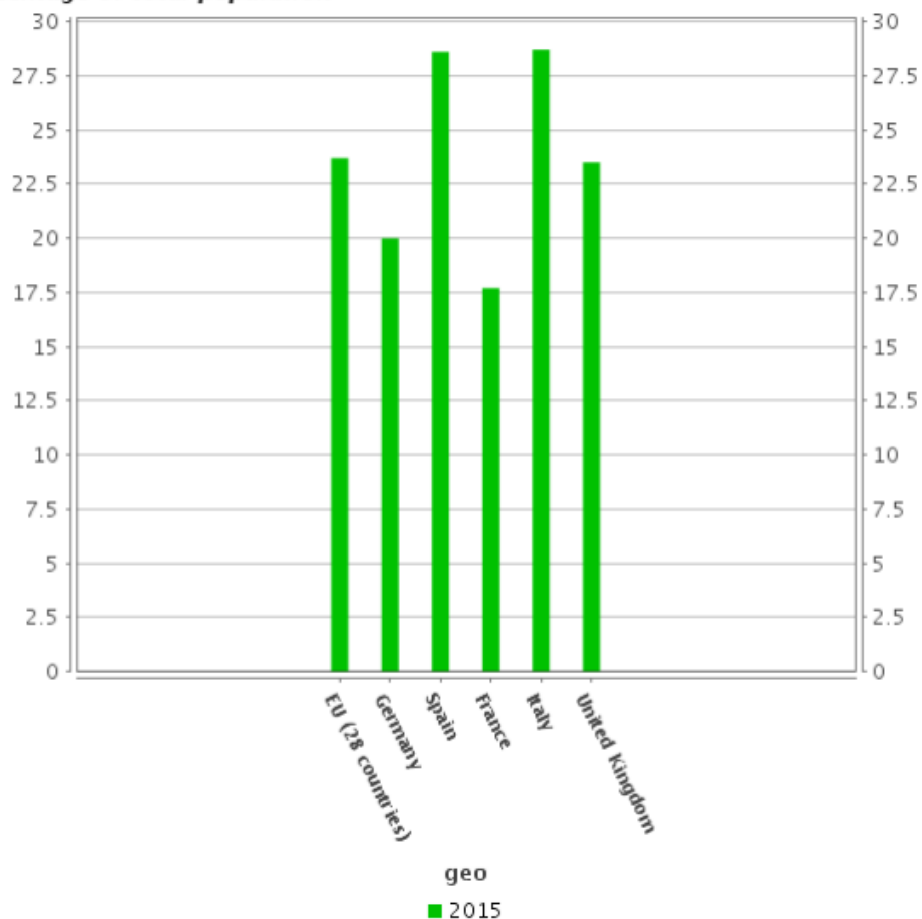


Figure 25: People at risk of poverty or social exclusion (% of total population). Source: EU-SILC Income and Living Conditions, 2015.

The most significant values correspond to Italy (28.7 %) and Spain (28.6 %) which are over the EU average (23.7 %), being in a less risky situation France (17.7 %). The main reason why these countries have a higher index is the economic situation of southern countries which have driven them to a worst situation after the crisis, and still are taking measures to promote employment and financial support mechanisms. And, also the historical economic situation of Spain and Italy with regards to Germany, UK and France which had already higher income values.

Concerning to the distribution of people by household type, the following Figure 26 serves as a reference of the differences between countries, which is important to keep in mind in further analysis:

Distribution of population (percentage of total population) - by household type and income group (2015)

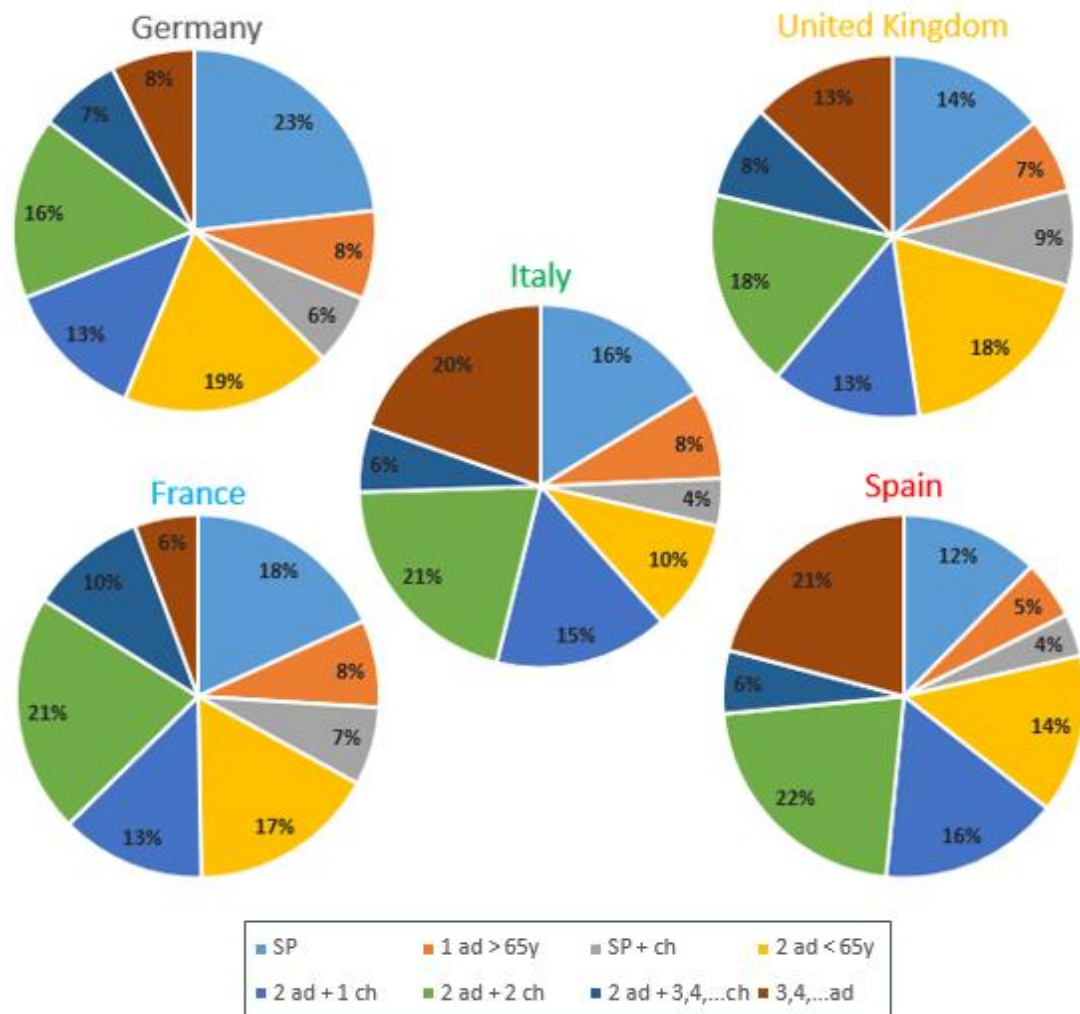


Figure 26: Distribution of groups of households amongst MS. Source: EU-SILC Income and Living Conditions, 2015.

Countries' distribution is quite homogeneous, except for two key groups, on the one hand, Germany's proportion of *single parents*, 23 %, is slightly higher than in other countries (average 16 %), and, on the other hand, Spain (21 %), Italy (20 %) and UK (13 %) of *three or more adults* living in the same household which is considerably higher with respect to values for Germany (8 %) and France (6 %). This could be due to the increasing number of student apartments existent in Spain and Italy.

However, the rest of the values are very similar, being the most numerous groups: *two adults with two children* (average 20 %) and *two adults under 65 years old* (16 %), and being the less numerous groups *one adult over 65 years old* and *single parent with children* (both average 7 %).

2) Arrears on utility bills:

Owed debts due to the unavailability to pay monthly energy invoices is one of the most used drivers of energy poverty. The rank across countries based on data from 2015 is: Italy, Spain, UK,

France and Germany. And, the most remarkable values are in households conformed by single parent with children (the UK holds the highest proportion: 25.2 %) and numerous families (Italy has the highest proportion: 24.2 %). These data is extracted from the Figure 27 below:

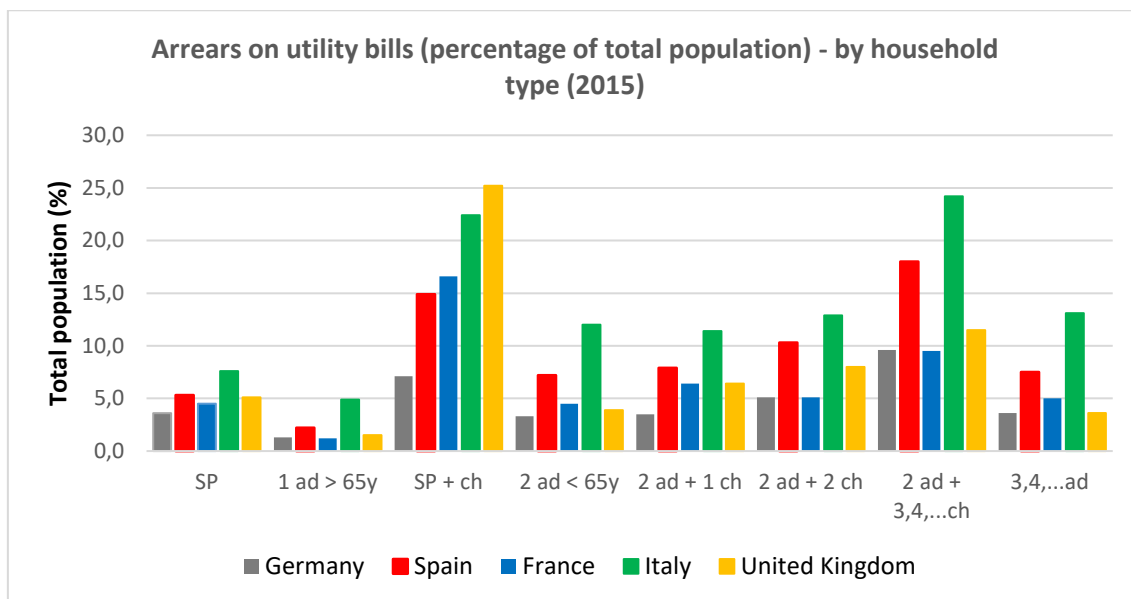


Figure 27: Arrears on utility bills (by household type). Source: EU-SILC Income and Living Conditions, 2015.

3) Unable to keep home adequately warm:

Concerning to these indicators, the countries ranking can be equally set as in the previous proxy indicators. So, dwellings insufficiency to keep adequate levels of energy efficiency policies, are strongly poor in the southern European countries. This is due to bad building facilities that have not been tackle yet and less necessity than the rest of the countries to warm household (due to higher average temperatures). Even if Italy and Spain have encouraged several energy efficiency programs, results show that policy implementations have not been sufficient.

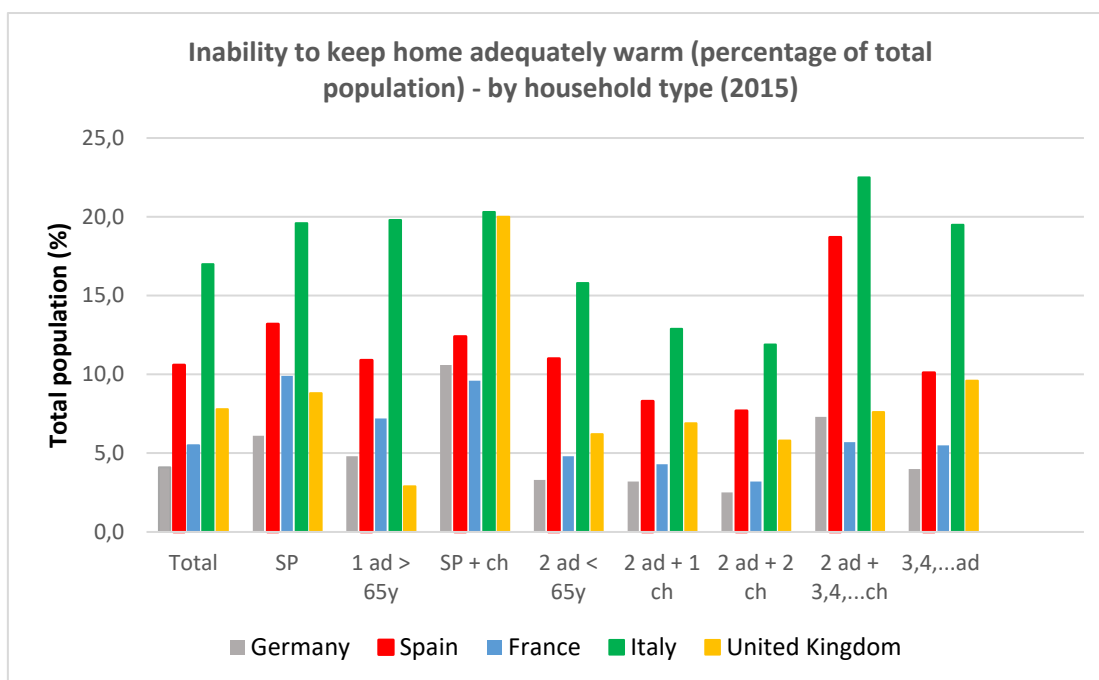


Figure 28: Inability to keep home adequately warm (by household type). Source: EU-SILC Income and Living Conditions, 2015.

4) Dwellings with leakages and damp walls:

Last indicator partially captures the positive impact of energy efficiency policies in countries. The best performance average results are 10% in France and Germany. These countries have mature policies such as Habiter Mieux for France and Strom-Check for Germany. These policies have been on track for a longer period of time, and promote sufficient subsidies to cover renovating labours in order to improve dwellings conditions. These approaches could be set as a reference for the other member states studied in this document.

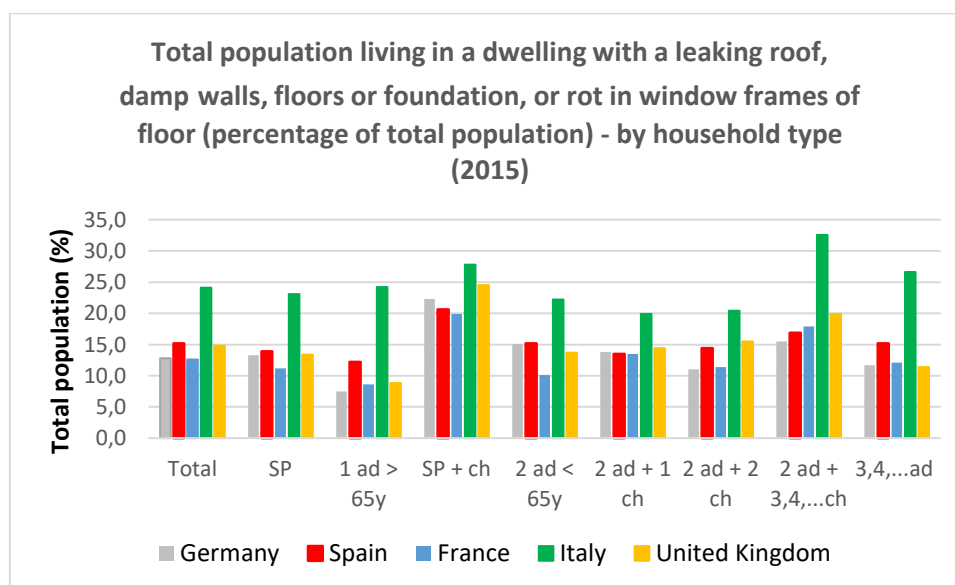


Figure 29: Total population living in poorly accommodation (by household type). Source: EU-SILC Income and Living Conditions, 2015.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

To sum up, the next Tables 10, 11, 12, 13 and 14 are an overview of the several topics covered in this document across Member States, and the final comments on the differences observed and the improvement possibilities are right below:

CONCEPTS DEFINITION	Italy	France	Germany	UK (England)	Spain
Does the Member State have an official definition for Energy Poverty?	NO	YES. Energy Poverty is defined according to article 11 of the “Grenelle II” law from 12 July 2010: Is considered in a situation of energy poverty “a person who encounters in his/her accommodation particular difficulties to have enough energy supply to satisfy his/her elementary needs, this being due to the inadequacy of resources or housing conditions.”	NO	YES. A household to be fuel poor if : 1. their income is below the poverty line (taking into account energy costs), and; 2. their energy costs are higher than is typical for their household type.	NO
Does the Member State have an official definition for Vulnerable Consumers?	YES. The legal framework defines “vulnerable” consumers based on non-personal circumstances such as energy affordability (low income / high expenditure)	YES. The legal framework defines “vulnerable” consumers based on non-personal circumstances such as energy affordability (low income / high expenditure)	NO. However, even if there is no official definition for vulnerable consumers in the energy field, they are eligible for support in line with the social security system.	YES. A more complete definition that addresses energy vulnerability when a consumer is significantly less able than a typical consumer to protect or represent his or her interests in the energy market, and; more likely to suffer detriment, or that detriment is likely to be more substantial.	YES. However, there is just a definition concerning electricity vulnerable consumers, who should fulfil at least one of the following criteria: a large family or a family where all members are unemployed; be low voltage consumers (less than 1 kV) with contracted demand lower than or equal to 3 kW; or a pensioner older than 60 years with a minimum level pension.

Table 10: Comparison between Member States definitions of EP and VCs.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

INDICATORS IDENTIFICATION	Italy	France	Germany	UK (England)	Spain
How are Member State measures classified according to Heindl (2013)?	Income-expense factor based	Income-expense factor based	Objective & quantitative	Income-expense factor based	Objective & quantitative
Which are the existent official methodologies for calculating the eligibility criteria?	<p>Social Bonus Eligibility Criteria: 1. ISEE (Equivalent Economic Conditions Indicator) combines income, real and financial assets and the composition of a household; 2. Household must be a domestic customer in its primary residence; 3. Installed power must be 3 kW for up to four family members and 4.5 kW if more; 4. If the household includes a person who needs essential electro-medical appliances, the maximum installed power defined is not applied; 5. Non-dependence on actual consumption.</p>	<p>Energy Effort Rate (TEE): calculates energy expenditure against total revenues (<10%) and “TEE_3D” which is a version of the TEE that is based on the first three deciles of income.</p>	<p>Poverty Line: basic income under the social security scheme (SGBII rates by the Social Code, Book II) is determined by a minimum income standard that reflects the average expenditure on several groups of goods of low-income households.</p>	<p>Low Income, High Costs (LIHC): is a dual indicator that captures: 1. Low-incomes and high fuel costs in households; 2. Comparison between these energy poor households through a “fuel poverty gap”.</p>	<p>Social Bonus Eligibility Criteria: 1. A large family or a family where all members are unemployed; 2. Low voltage consumers (less than 1 kV) with contracted demand lower than or equal to 3 kW; 3. A pensioner older than 60 years with a minimum level pension.</p>
DATA SOURCES	All the Official Statistical Organisations release an Annual Report that includes nature of households’ expenditure (from annual budget surveys) and income distribution, standards of living people and people at risk of poverty or social exclusion (from living condition surveys).				

Table 11: Comparison between Member States indicators and data sources.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

PROGRAMMES AT STATE LEVEL	Italy	France	Germany	UK (England)	Spain
Affordability issues	<p>Social Bonus: defined by the Government sets discounts for electricity customers whose energy bill exceeds more than 5 % their income. These are certified by equivalent economic situation indicator, that takes into account income, assets, the characteristics of a family by number and type.</p>	<p>Tariff of Basic Need for Electricity (TPN): a standard discount applied directly to the electricity invoice. It is calculated as a function of household composition and the electricity bill. Its amount varies between 71-140 €/ year.</p>	<p>Housing Benefit Reform (2016): directed to low-income households above the basic security level receive fast, effective and tailored relief for housing costs. It adapts housing benefits to the developments in rents and income taking into account the increase in utility costs and therefore the increase in total gross rents.</p>	<p>Warm Home Discount: is a direct monetary discount on the electricity bill of low income households which amounts to £140.</p>	<p>Social Bonus: is a discount on electricity tariffs (not in gas tariffs) which covers the difference between the current tariff value (PVPC) and a reference value. It is not a sufficiently operational measure. This is the only state level financial help.</p>
	<p>A2A Energy donations: the Bank of the Energy in collaboration with the Cariplo Foundation launched financial help through energy invoice donations of 19€/ year (equivalent sum of two weeks of energy consumption for a middle family).</p>	<p>Energy Cheque (2018): will substitute the social bonuses due to the Energy Transition for Green Growth (2015). It is an annual help for the energy bill or energy saving works by the Tax Credit for the Energy Transition (CITE). Households eligible: Tax Income of Reference under 7,700 euro/ UC a year.</p>		<p>Cold Weather Payments: delivers a direct monetary support of £25 for each seven consecutive days if your area’s average temperature is recorded or forecasted to be zero degrees or below.</p>	
				<p>Winter Fuel Payments: delivers automatically economic support to pay the heating bills, and it varies between £100 and £300 tax-free.</p>	

Table 12: Comparison between Member States instruments (affordability issues) at State Level.

PROGRAMMES AT STATE LEVEL	Italy	France		
Efficiency of energy use	<p>White Certificates: tradable instruments giving proof of the achievement of end-use energy savings via energy efficiency measures and projects from companies. The goal is set to more than 4.75 Mtoe/year of primary energy savings (4.38 Mtoe/year of final energy) expected between 2012 and 2020.</p>	<p>“Habiter Mieux” (Better Living Program, 2010): provides subsidies to the modest (35% of HT) and to the most modest (50% of HT) owner or occupants of a very degraded, unsecure or unhealthy house for the rehabilitation works. Min. subsidy: 1,500 euro.</p>	<p>Certificates of Energy Saving: every supplier is obliged to help customers saving a fixed volume of energy (kwh cumulated up to date). And, they must justify their decisions and actions to achieve the reduction of energy set by decree.</p>	<p>Social and Family Action Code by “Brottes” Law (15 April 2013) declares: “Since 1st November from one year to 31st March of the next year, electricity, heating and gas suppliers are not allowed to proceed, in a main residence, to the disconnection, even due to termination of the contract, the supply of electricity, heating or gas to persons or families. Electricity suppliers are allowed to proceed, however, to the power reduction.”</p>
	<p>Tax deductions: consist of reductions of IRPEF (personal income tax) and IRES (corporate income tax) with respect to expenses on improvements of existing building’s energy efficiency.</p>	<p>Eco-PTZ (2016): is a free loan for refurbishment works lent by the principal French Banking Networks. Max. Loan: 30,000 euro refundable over 15 years.</p>	<p>Financial aids from the College Centre for Advising Services (CCAS), the French Red Cross or Catholic Aids.</p>	
	<p>Thermal Energy Account (Heating and Cooling Support Scheme): it is an incentive for the generation of renewable thermal energy, as well as promotion of energy efficiency actions in buildings and technical installations.</p>	<p>Solidarity Housing Funds (FSL): finances unpaid invoices of energy by Departmental Boards. Then, in each department there are different attribution procedures and characteristics.</p>	<p>National Association Compagnons Batisseurs: most vulnerable people professional training on refurbishment works and energy efficiency. Its volunteers also provide social support to beneficiaries.</p>	

Table 13: Comparison between Member States instruments (energy efficiency programmes) at State Level (Italy and France).

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

PROGRAMMES AT STATE LEVEL	Germany		UK (England)	
Efficiency of energy use	<p>Stromspar-Check PLUS: is an energy saving initiative by Caritas Germany based on an “energy auditor, who is a long-term unemployed person that receives training on energy topics. Annual savings per household stand between 107 - 160 euro.</p>	<p>Energy Conservation Ordinance: in 2016 introduced the nearly-zero energy standard as required by the European Buildings Directive. It sets minimum requirements for the quality of renovation steps, energy audits, and replacements for old heating systems.</p>	<p>Affordable Warmth Scheme: offers grants towards boilers replacement, cavity wall insulation and loft insulation for eligible low-income household.</p>	<p>Energy Saving Allowances (LESA): applies for landlords and public agencies to take responsibility to improve the efficiency of heating systems. Some of these obligated actions correspond to the provision of an Energy Performance Certificate for the property.</p>
	<p>Campaign “Climates seeks protection”: implemented by co2online non-profit company, offers online advisory tools to save energy consumption, and thereby reduce CO2 emissions.</p>	<p>Smart Metering: is a technical solution to encourage efficient energy avoiding customers running up debts by too high consumption and so forth cut-offs.</p>	<p>The Energy Company Obligation (ECO) Scheme: helps low income areas and households to cut energy bill and reduce carbon emissions via the Carbon Emissions Reduction Obligation and Home Heating Cost Reduction Obligation.</p>	<p>Seasonal Health Intervention Network (SHINE) Scheme: it includes several services in terms of energy poverty such as advice on saving energy and grants available for heating and insulation and support with bills and energy debt.</p>
	<p>Mini Contracting for exchange of refrigerators: an eligible household gets 150 euro towards the cost of a new highly efficient fridge.</p>	<p>Basic-Check-Consultancy: are free consultancies for low-income households by the Consumer Association Consumer Centres.</p>	<p>Energy Efficiency Rating Methodology: aims at achieving that as many fuel poor homes as is reasonably practicable achieve a minimum energy efficiency rating of a Band C1, by 2030.</p>	<p>Spain-Information Point for Vulnerable Consumers (PICv, in Spanish): Environmental Science Association presents in co-operation with Obra Social la Caixa a new energy saving and energy efficiency improvement information point. In which, customers will receive customized advice to save in energy invoices.</p>

Table 14: Comparison between Member States instruments (energy efficiency programmes) at State Level (Germany, UK and Spain).

DEFINITIONS

- Does Member States have an official definition for Energy Poverty?

France is one out of the two countries studied that does have a definition for EP since 2011, although it is not sufficient as it has no quantitative threshold in order to capture more precisely the eligibility of EP issues.

Concerning to the UK, it has two definitions. On the one hand, Scotland, Wales and Northern Ireland still apply the England's old definition of the 10 % energy bill expenditure threshold, and on the other hand, now England's concept is based on the Low Income, High Consumption quantitative metric which applies to fuel costs above the median level, and residual income net of fuel cost spend below the official poverty line. The UK is also, the only one that recognizes a wider concept which is Fuel Poverty.

France and the UK have both a National Energy Ombudsman and institutions like OFGEM and ONPE respectively, who address specifically EP problems.

The rest of the countries still do not have an official definition, and it is quite urgent the need of a concept for Southern Europe Countries, who suffer from higher levels of EP and the poorest housing conditions. An example, already seen in the proxy indexes analysed before, is Spain, which has the highest values in comparison with the rest of the countries. The main reasons are: low income, poor housing conditions due to bad insulation and inadequate heating systems. And, therefore unavailability to keep home adequately warm, especially in winter.

- Does Member States have an official definition for VCs?

The most remarkable position is Germany as there is no actual link between EP issues and energy legislation, in contrast to the rest of the countries analysed. Its approach is done through social legislation, and so their target policies are all included in the general term of poverty. The rising questions in this case would be: "Is it enough covering EP issues through poverty legislation? And if it worked, why other Member States are not applying the same approach?"

However, VC definitions of Italy and France are based on energy affordability, which is not the only reason why a customer can be facing a poor situation on this regard. These definitions are still not as complete as, for example, the UK definition which includes personal and non-personal factors, such as consumer protection in the energy market and the personal characteristics. Last to mention, Spain includes not only individual characteristics such as unemployment, but also maximum power contracted and minimum pension level for people over 60 years old. Although, it has a more extent eligibility criteria, it is too specific and not very helpful in order to capture the whole number of low income households.

IDENTIFICATION OF INDICATORS

- How are Member State measures classified according to Heindl (2013)?

Starting with the most used measure: income-expense factor based indicators in Italy, for example, it comprises

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

However, it is difficult to evaluate properly if they are useful as they depend on several factors such as: availability, quality and speed of the data release and the possibility of making comparisons with other countries. These are some of the reasons why the existence of non-uniformity between countries' indicators makes it very difficult to compare them in equal terms.

- Which are the existent official methodologies for calculating the eligibility criteria?

In Italy, the social bonus eligibility criteria are the only indicator existent and, it is calculated through the ISEE factor (which includes assets, income and household composition variables), and then compared to the current threshold 8,107.5€. To complement this factor there are some other conditions such as installed power and special treatments due to health problems. In my point of view, even if Italy is not in the best EP situation, this indicator includes important factors and, also there is clear and accessible information in websites in order to apply. However, after Miniaci or Faiella studies on the other possible indicators, it would be a good addition to include demographic factors which are quite relevant in Italy.

In France, there is one official indicators: TEE, which is quite similar to the English 90s version of LIHC, but it is used since mid-2000s. This is just one of the reasons why it might not capture the diversity of situations of households in energy poverty. Furthermore, it does not consider the behavior of auto-restriction and it is based on income per consumption unit (threshold 16,309 €/UC). This last one is a factor questioned by Professor Hill (2010), who invites to include energy expenses in the net income of a household.

But there are also two other indicators proposed by ONPE: BRDE (income-expense factor based) and the Cold Indicator, FR_FRECA_3D (subjective and qualitative). On the one side, BRDE is consistent with the French definition of EP and improves understanding the phenomenon in comparison with the current measure. However, this approach is focused just on poverty due to high fuel costs, which is not the only driver for identifying households. This is the exact problem of EP definition. And, what is more energy cost threshold is fixed randomly. On the other side, FR_FRECA_3D is a useful complement for the current indicator. Although, it could not be used individually to assess households in EP situation.

In Germany, as it was already mentioned the Figure is completely different an (energy) poverty is assessed under the social security scheme by calculating wages with respect to a Poverty Line in order to measure if they need social transfers or if they ones already received are not enough. In 2015, the minimum wage was set to 8.84 € per working hour in order to protect the low-wage sector. Although, by doing so Germany's government ensures more stability in social security systems, the Poverty Line threshold calculation just takes into account household members characteristics and expenses on rent and heating. But, expenditure on heating does not include water and electricity excessive costs. And, even with social transfers, these expenses cannot be covered easily, which is one of the most important reasons to ask for specific measures to address energy poverty.

In the England (UK), the LIHC indicator is based on income and expenses through a complete process that captures the extension of households suffering low incomes and high energy costs, and the depth of the problem by comparing these identified energy poor households to a national "fuel poverty gap". LIHC calculates income deducting housing costs and taking into

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

account adjustments in the formula given household composition and their specific energy requirements (dwelling size; heating system, and; lifestyle of householders, such as economic situation and number of people who live there). This duality and relativity makes the difference with the 10 % indicator which is applied in the rest of the UK countries.

In Spain, the current indicator is the social bonus eligibility criteria, which is objective and quantitative as it is based on household composition, contracted power and labour status. This is not a good approach as it does not measure enough EP drivers and so, the Government has recently declared that this methodology will change to an income-expenses factor based.

DATA SOURCES

Just to mention, some additional surveys that collect useful information in order to monitor the efficiency of current policy targets:

In Italy, the “Bonus a sapersi”, is a survey that analyses the impact of energy discounts in tariffs, and its results confirmed the poor coverage of the current ISEE threshold (8,107.5 €) and the requirement either to set a higher threshold (11,000 €) or a different calculation criteria. Another important analysis is done by ENEA and it is called “Italy’s Energy Efficiency Annual Report (2016)” which ranks, for example, white certificates, tax reductions or thermal account to measure energy saving target achievements until 2015. The highest value achieved are tax reductions at residential level.

In France, the 2015 OPEN Campaign collects results of the proportion of the several reasons why works are demanded by households depending on whether they aim at achieving a full or partial renovation. In most cases customers’ willing is to improve thermal accommodation or to renovate a broken/old device respectively. The other highlighted survey is the Housing Survey (2013), which analyses the thermal sensation which is a key factor linked to the unofficial Cold Indicator.

In Germany, there are no energy efficiency related surveys focused on household’s dwellings apart from the typical housing datasets. But there is an additional dataset from the German General Social Survey (ALLBUS, 2016), which is conducted biennially by GESIS and ALLBUS Board. It complements attitudes, behaviour, and socio-demographic characteristics of residents in Germany through face-to-face population interviews.

In the UK, the most important survey is the English Housing Survey (EHS, 2015) which is published annually, and collects data regarding particular issues such as Decent Home Standards (due to household requirements from the Housing Health and Safety Rating System); heating systems efficiency (59 % of them are condensing boilers which are now mandatory for new and replacements), and; insulation improvement measures comparison (due to energy efficiency targets set by the Decent Homes Programmes).

In Spain, INE is the most important source of data available, but it is remarkable another data source from the Spanish Bank: Families Financial Survey (EFF, in Spanish). As it complements the aggregated data from Spanish National Accounts and allows studies about investment and financial decisions on Spanish families. So, they are an important key for better knowing the economy of the country and designing better policies.

PROGRAMMES AT STATE LEVEL

In Italy, Spain and France there is a similar main political measure to tackle energy poverty: the social bonus. The Italian Government defined social bonuses (electrical and gas), and another innovative financial help recently launched by the Bank of the Energy and the Cariplo Foundation were donations of 19 €/year which is the equivalent sum of two weeks of energy consumption for a middle family.

In the case of Spain there is just a discount on electricity tariffs (not in gas tariffs). However, it was already mentioned that this provisional way to define VCs and the non-existence of a link with household's income in the eligibility conditions, makes this a poor addressing policy. Furthermore, there had been proposals in 2013 and 2014 to change these criteria, but they were not approved due to the distortion of politician interests. EP issues are a really demanding topic in the political agenda.

In France, the social bonuses (electric and gas) will be replaced by the Energy Cheque as from the 1st January of 2018, as a result of the Energy Transition for Green Growth (2015). Before its implementation at the national level, it has been tested in 4 departments since 2016. And, until the moment, it has benefited 173,266 people and its amount varies between 48 € and 227 € according to the Tax Income of Reference of the household and its composition. It is a wider approach that comprises the most precarious customers.

In the UK, there are two income support mechanisms applied to the different weather seasons: Cold Weather and Winter Fuel Payments which deliver automatically economic support to pay heating bills due to weather conditions on the geographical areas, and a great advantage is the cumulative aspect. These measures have not been implemented in the rest Member States studied.

Regarding energy efficiency policies to save energy, improve accommodation conditions and reduce the monthly invoice the most particular policies are:

In France, the "Habiter Mieux" (Better Living Program in English) is a subsidy for heavy works of rehabilitation houses which are particularly indignant to live in. It has the advantage of local authorities' freedom to identify the energy poor in their communities and implement concrete measures. As, data availability, networks, and methods at this level can be different depending on specificities and this differentiated approach apparently improves the efficiency of the programme.

In Germany, the German Federal Association of Energy and Climate Protection Agencies (eaD) in cooperation with the German Caritas Association (DCV) offers a unique measure based on energy audits: Stromspar-Check PLUS. This instrument addresses electricity consumption as well as efficient heating energy use. And, it even provides an employment stimulus for long-term unemployed people who are trained and involved as energy consultants.

Finally, in terms of information mechanism and accessibility the following approaches represent the key points: billing transparency rules; commercial codes of conduct for energy selling to consumers in the free market; good price comparison instruments; educational campaigns, and; disconnection restriction for customers who need electric appliances for health or available

power reduction before disconnection in case of non-payment and no disconnection under a threshold amount of nonpaid bill.

However, all these measures just inform partially of the evolution of this phenomenon as there is not enough data and resources for assistance and, difficulties in identifying the “quiet poor” which might be in worst conditions than others. In these cases, they usually do not have sufficient information about how the available aids work and they prefer to manage themselves financially without depending on a social help or carrying out a complex procedure.

4. Conclusions

This Master Thesis has provided a comprehensive assessment of the EP problem across five different Member States, and so a comparison between the degrees of protection of each policy. Some of the most outstanding questions related to the following subtopics are:

Conceptual issues

First to mention, one of the most remarkable differences between MS is the way of assessing energy poverty issues with regards to the general poverty problems. This is the case of Germany which does not treat EP as a separate problem due to the close link between people who receive low incomes and those who are energy poor. Even if they are strongly related, there is a key point which is energy efficiency characteristics of a household. If someone was unable to pay his/her energy bill in the same conditions of income, it will probably depend on dwellings characteristics, and so just in order to address more effectively EP problems it is better to separate energy related policies from social legislation.

Another important distinction is the definition used by the UK, Fuel Poverty, which has not been applied during this document. The reason is mainly due to its more limited scope, focused mostly in energy (in general) affordability questions and, also the reference to Energy Poverty term in EU Directives such as 2009/72/EC and 2009/73/EC (internal market in electricity and natural gas), 2010/31/EU (energy performance of buildings), or 2012/27/EU (energy efficiency).

Data collection and metrics

Therefore, it is very important to define officially EP concept and targeted vulnerable consumers, to cover more accurately and identify the households living in high levels of poor housing conditions which are worsened by low-incomes. In these regards, to obtain good measures it is important to collect detailed information on household status (living conditions, income, energy expenses,...) and evaluate them in order to extract the most accurate indicators that will be the base for targeted policies capable of decreasing the high amount of people in EP across Europe.

Current instruments

Regarding the most common instrument implemented in MS such as Italy, France or Spain, social tariffs are effective short-term financial helps to reduce the price of energy bills. However, still the financial source is the regulated part of the electricity tariff (via general taxation), which places, other consumers with higher rents, in a disadvantage position regarding the eligible

consumers. So, it would be a better way of providing these discounts through the national budget.

Long-term effective policies are related to energy efficiency improvements and, so all MS have different programmes for buildings, inefficient appliances renovations through loans or incentives. Germany, has in place StromCheck programme which includes training for unemployed people which is a particularly interesting way of including social aspects on energy saving measures. The 2010 Commission Staff Working Document considered these long-term measures the most effective for lifting people out of energy poverty. However, it is much more difficult as it requires investment and successful information, promotion and incentives to reach customers. So, good advertisement and training programmes directed to customers' improvement of energy consumption habits, decision on billing options, suppliers changing and transparent tariffs might encourage a better understanding of the available possibilities.

Proposals

Last to mention, with respect to retailer's services, it is important to have close and customized services, as these companies are one of the key points for acquiring accurate information of household energy needs. It could be a good solution to encourage co-operation between municipalities and retailers due to the following reasons: at the local level there are smaller amount of data collection needs and better knowledge of the poor areas with people have financial needs, poor levels of education and where are buildings most energy inefficient.

This is why improving the connection between municipalities, who are in charge of applying policy targets; retailers, responsible of discounting a percentage from energy tariffs; and, even social or energy related organisms, might improve the comprehensiveness of EP problems at local level, which in the end represents the whole country assessment efficiency.

5. References

Hereunder are listed the different articles used to help in the elaboration of this document:

- [1] Pye, S., Dobbins, A. (2015). EPand VCs in the energy sector across the EU: analysis of policies and measures.
- [2] VCWG (2013). VC Working Group Guidance Document on VCs, November 2013.
- [3] European Commission (2016). Clean Energy for All Europeans on the Evaluation Report covering the Evaluation of the EU's regulatory framework for electricity market design and consumer protection in the fields of electricity and gas.
- [4] European Commission (2009). Guidance on the implementation/application of directive 2005/29/EC on unfair commercial practices.
- [5] Citizen's Energy Forum (2017). Conclusions 9th meeting of the Citizen's Energy Forum.
- [6] VCWG (2015). Working Paper on Energy Poverty.
- [7] Jourová, V. Commissioner for Justice, Consumers and Gender Equality in the EC (2016).
- [8] European Commission (2016). Evaluation Report covering the Evaluation of the EU's regulatory framework for electricity market design and consumer protection in the fields of electricity and gas Evaluation of the EU rules on measures to safeguard security of electricity supply and infrastructure investment (Directive 2005/89).
- [9] Euroelectric (2017). European Commission's legislative proposal on common rules for the internal market in electricity.
- [10] European Commission, DG Energy (2016). Selecting Indicators to Measure Energy Poverty.
- [11] Schumacher, K., Cludius, J. (2015). How to end Energy Poverty? Scrutiny of Current EU and Member States Instruments.
- [12] AAEGSI (2014). Relazione in esito all'indagine conoscitiva sullo stato di attuazione della disciplina del bonus elettrico e gas.
- [13] A2A Energia website: <https://www.a2aenergia.eu/>
- [14] Faiella, I., Lavecchia, L. Banca d'Italia (2014). La povertà energetica in Italia.
- [15] Faiella, I., Lavecchia, L. Banca d'Italia (2014). EP in Italy. IEFE-FEEM Seminar, 18 September 2014.
- [16] Bonus Energia (Sistema di Gestione delle Agevolazioni sulle Tariffe Energetiche SGAta) website: <http://www.sgate.anci.it/?q=tag/bonus-energia>
- [17] Autorità per l'energia elettrica il gas e il sistema idrico (AAEGSI) website: http://www.autorita.energia.it/it/consumatori/bonus_isee.htm#

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- [18] N.verde dell'INPS: 803 164 (2015). La riforma dell'ISEE: maggiore equità ed efficacia nella valutazione della condizione economica della famiglia.
- [19] Istituto Nazionale della Previdenza Sociale (INPS) website: <https://www.inps.it/NuovoportaleINPS/default.aspx?itemdir=50088&lang=IT>
- [20] National Institute of Statistics (Istat) website: <http://www.istat.it/en/>
- [21] National Statistical System (Sistan) website: <http://www.sistan.it/>
- [22] Italian National Energy Efficiency Agency of ENEA (2016). Italy's Energy Efficiency Annual Report 2016 Executive summary.
- [23] Banca d'Italia, 2014. Supplements to the Statistical Bulletin; Household Income and Wealth in 2014.
- [24] AAEGSI (2017). All bonus elettrico e il bonus gas 2014-2016.
- [25] Unione Nazionale Consumatori. Bonus a sapersi. Promozione dell' accesso al bonus energia.
- [26] Leibniz-Institut für Sozialwissenschaften (GESIS) website: <http://www.gesis.org/en/home/>
- [27] European Commission (2015). Project development assistance for innovative bankable and aggregated sustainable energy investment schemes and projects.
- [28] Campiotti, C., Ciforelli, L. ENEA, 2016. Challenges facing EPin Italy: best practices and experinces.
- [29] European Commission. Regional Policy: ROP Lombardia ERDF. http://ec.europa.eu/regional_policy/EN/atlas/programmes/2014-2020/europe/2014it16rfop012
- [30] GOUVERNEMENT.fr. Energy Transition. Article: <http://www.gouvernement.fr/en/energy-transition>
- [31] French Environment & Energy Management Agency (ADEME) website: <http://www.ademe.fr/en>
- [32] Observatoire National de la Précarité Énergétique, ONPE website: <http://www.onpe.org/>
- [33] The National Energy Ombudsman. Activity Report 2015.
- [34] ONPE (2016). Les chiffres-clés de la précarité énergétique. Edition n°2-Novembre 2016.
- [35] National Institute of Statistics and Economic Studies (INSEE) website: <https://www.insee.fr/en/accueil>
- [36] Insee, 2015. Annual Report 2015.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- [37] ADEME (2015). Campagne 2015 OPEN.
- [38] Ambrosio, G., Belaid, F. (2015). Analyse de la précarité énergétique à la lumière de l'enquête PHEBUS.
- [39] Agence nationale de l'habitat (Anah) website: <http://www.anah.fr/>
- [40] College Centre for Advising Services (CCAS) website: https://www.ccas.fr/application_ccasfrv4.php
- [41] French Red Cross website: <http://www.croix-rouge.fr/French-Red-Cross>
- [42] National Association Compagnons Bâtisseurs website: <http://www.compagnonsbatisseurs.eu/>
- [43] Kalker, B. for Caritas Germany (2017). Policies and measures to address EPin Germany.
- [44] European Commission. Country Report Germany 2016.
- [45] Federal Minister of Labour and Social Affairs. Social Security at a glance 2017.
- [46] Bundesagentur für Arbeit. Unemployment Benefit II/Social Assistance.
- [47] Federal Statistical Office (Destatis) website: <https://www.destatis.de/EN/Homepage.html>
- [48] Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway (Bundesnetzagentur) website: https://www.bundesnetzagentur.de/EN/Home/home_node.html
- [49] German Caritas Association (2015). Caritas Cares Germany Report.
- [50] Stromspar Check website: <http://www.stromspar-check.de/>
- [51] Federal Ministry for Economic Affairs and Energy website. Energy consulting for household Article: <https://www.bmwi.de/Redaktion/EN/Artikel/Energy/energy-consulting-for-households.html>
- [52] Federal Ministry for Economic Affairs and Energy website. Energy Efficiency Article: <http://www.bmwi.de/Redaktion/EN/Dossier/energy-efficiency.html>
- [53] Federal Ministry for Economic Affairs and Energy website. What pertains to consumers? Article: <http://www.bmwi.de/Redaktion/EN/Textsammlungen/Energy/nape-verbraucher.html>
- [54] co2online organization. EnergiesparChecks. Website: <https://www.co2online.de/service/energiesparchecks/>
- [55] Bundesministerium für Umwelt, Naturshutz, Bau und Reaktorsicherheit. Heizspiegel. Website: <https://www.heizspiegel.de/heizspiegel/die-vergleichswerte-des-heizspiegels-fuer-deutschland/>
- [56] Morris, C., Pehnt, M. (2016). The German Energiewende Book.

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- [57] Department of Energy and Climate Change (2016). Annual Fuel Poverty Statistics Report, 2016. England.
- [58] Ombudsman Services (2017). About Ombudsman Services: Energy.
- [59] OFGEM. Consumer Policy and Insight. (2013). Consumer Vulnerability Strategy.
- [60] Secretary of State for Energy and Climate Change. (2015). Cutting the cost of keeping warm A fuel poverty strategy for England.
- [61] Department of Energy and Climate Change. (2016). Fuel Poverty Methodology Handbook.
- [62] Department for Communities and Local Government. English Housing Survey. Headline Report, 2015-16.
- [63] GOV.UK. Quarterly Energy Prices. Website: <https://www.gov.uk/government/collections/quarterly-energy-prices>
- [64] Committee on Fuel Poverty (2016). A report on initial positions.
- [65] Affordable Warmth Grants Website: <http://www.affordablewarmthgrants.co.uk/grants/warm-front-scheme.htm>
- [66] OFGEM. About the ECO Scheme. Website. <https://www.ofgem.gov.uk/environmental-programmes/eco/about-eco-scheme>
- [67] Department of Energy and Climate Change. (2014). Fuel Poverty Energy Efficiency Rating Methodology.
- [68] LESS Home Energy Service. (2016). Energy Efficiency Information for Landlords.
- [69] Best Climate Practices. International Center for Climate Governance. Seasonal Health Interventions Network (SHINE) (Contest 2014). Website: <http://www.bestclimatepractices.org/practices/seasonal-health-interventions-network-shine/>
- [70] DECC. Warm Home Discount Scheme Consultation 2016/17. Website: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/514324/Final_Warm_Home_Discount_consultation_for_publication.pdf
- [71] GOV.UK. Cold Weather Payment. Website: <https://www.gov.uk/cold-weather-payment/overview>
- [72] GOV.UK. Winter Fuel Payment, Website: <https://www.gov.uk/winter-fuel-payment/overview>
- [73] OFGEM. Switching Programme. Website: <https://www.ofgem.gov.uk/gas/retail-market/market-review-and-reform/smarter-markets-programme/switching-programme>
- [74] Energy Fund Application. E.ON Website: <https://www.eonenergyfund.com/>

STATE-OF-THE-ART OF A SELECTION OF EU MEMBER STATES ENERGY POVERTY INSTRUMENTS

- [75] Instituto Nacional de Estadística (INE). Website: <http://www.ine.es/en/welcome.shtml>
- [76] EnergyNews. Bono social: La renta será el criterio para determinar quién es vulnerable. Website: <http://www.energynews.es/bono-social-la-renta-sera-el-criterio-para-determinar-quien-es-vulnerable/>
- [77] Economics for Energy. (2014). Pobreza Energética en España. Análisis económico y propuestas de actuación.
- [78] Ministerio de Energía, Turismo y Agenda Digital. Bono Social. Website: <http://www.minetad.gob.es/energia/bono-social/Paginas/bono-social.aspx>
- [79] ACA. 3er Estudio Pobreza Energética en España. Website: <http://www.cienciasambientales.org.es/noticias/567-3er-estudio-pobreza-energetica-en-espana-nuevos-enfoques-de-analisis.html>
- [80] Banco de España. Encuesta Financiera de las Familias. Website: http://www.bde.es/bde/es/areas/estadis/Otras_estadistic/Encuesta_Financi/
- [81] Kang, L., Lloyd, B. (2014). Energy poor or fuel poor: What are the differences?
- [82] EU-SILC Income and Living Conditions Website: <http://ec.europa.eu/eurostat/web/income-and-living-conditions/data/database>
- [83] Comune di Cascina. Bonus Elettrico. Website: <http://www.comune.cascina.pi.it/index.php/sociale-casa-2/2013-08-23-13-50-37/bonus-elettrico-per-il-disagio-fisico>
- [84] Ministerio de Energía, Turismo y Agenda Digital. (2017). Proyecto de real decreto por el que se regula el consumidor vulnerable de energía eléctrica, el bono social y las condiciones de suspensión del suministro para consumidores con potencia contratada igual o inferior a 10 kW.
- [85] Agencia Estatal Boletín Oficial del Estado. (2017). Ley 3/2017, de 3 de febrero, para paliar y reducir la pobreza energética (electricidad, agua y gas) en la Comunitat Valenciana.
- [86] European Parliament. (2016). Energy poverty. Protecting vulnerable consumers.

