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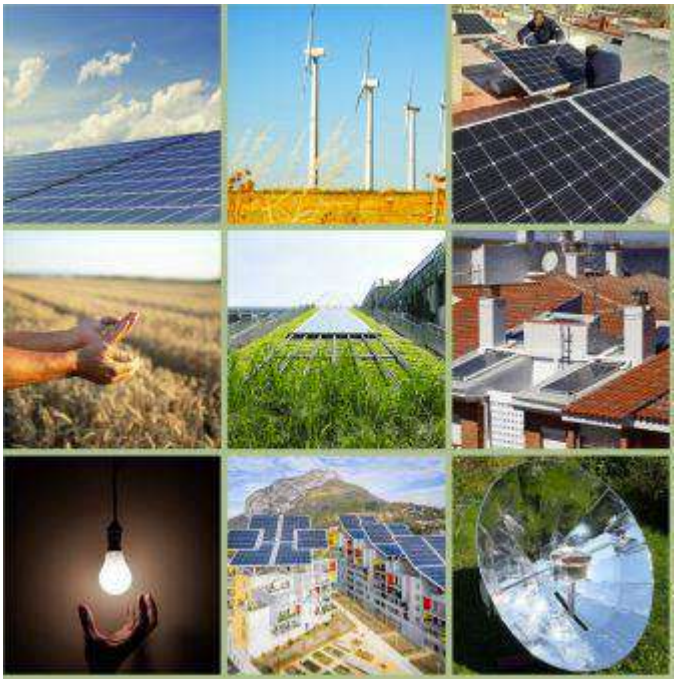
Renewable energies for vulnerable groups

STATE OF ART & SWOT ANALYSIS

Andalusia (Spain) – January 2020



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STATE OF ART: ENERGY POVERTY AND RENEWABLE ENERGY

Objective: to describe the starting scenario and the scope of energy poverty and renewable energy in your region, focusing on regional needs.

1. Brief Picture of the Region

The Autonomous Community of Andalusia is an extensive territory of 87.597 Km^2 in southern Spain that counts on a Mediterranean climate and vegetation. The region includes 8 provinces and 770 municipalities, making it the most populated region in Spain with more than 8.4 million people. Andalusia is a region of services. In fact, 64,7% of the total productive activity belongs to the service sector, with a huge importance placed on the tourism subsector (more than 25 million tourists visited the Autonomous Community of Andalusia in 2015, half of them from foreign countries); the industrial sector represents 15.4% of GDP, with emphasis on the growth of the agro-food and energy industries; the building sector is also of great importance in Andalusia representing 12,3% of the total economy; the primary sector, yet very important to the Andalusian culture, represents 7.6% (agriculture, stock-farming and forestry, fishing in a lesser regard).

Andalusia is a region of high potential in renewable energy sources, consisting of biomass (17% of the Andalusian territory is protected area under a legal figure), solar energy (the Andalusian territory has the greatest solar irradiation index in Europe), and wind energy; however, its potential for hydraulic energy is more limited than in other European regions.

2. Renewable energy sector. Brief Description

Andalusia is one of the regions with the greatest potential of renewable energies, which are also distributed throughout its geography. But there are many people who, for socio-economic and cultural reasons, cannot use them. In particular, those affected by energy poverty.

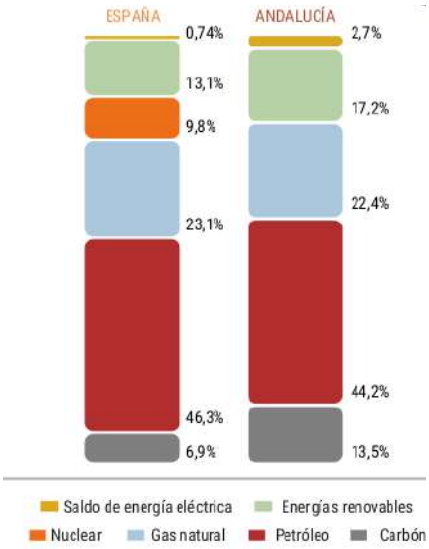
Andalusia aspires to decarbonise its energy system in the next decades, so it is an essential requirement that all citizens, regardless of their socio-economic and cultural level, can use renewable energies. For this, it is necessary to overcome many economic, normative, cultural and technological obstacles.

In addition to the high potential for the use of renewable energies (for climatic and geographical reasons), Andalusia is also favoured by the existence of a business sector of renewable energies which is experienced, diversified and distributed throughout the whole region, with the potential to innovate with solutions specially adapted to the vulnerable groups.

In recent years, Andalusia has been characterised by the establishment of a more sustainable and quality energy system, in which renewable energies have played a leading role. The configuration of its energy infrastructure allows the use of its autochthonous resources (almost all of them of renewable origin) and the access of energy to the citizens and the sectors of economic activity.

The evolution of the demand of primary energy sources[1] over these years has placed renewable energies, with 17.2%, as the third largest energy source in Andalusia (surpassed by oil, with 44.2%, and natural gas, with 22.4%), thus tripling its contribution in just 10 years, mainly from biomass and wind energy, and in recent years from solar thermal energy, which, together with photovoltaic energy, has experienced a notable ncrease in installed electrical power.

As can be seen in the following graph, Andalusia has a higher percentage of primary energy consumption than Spain.



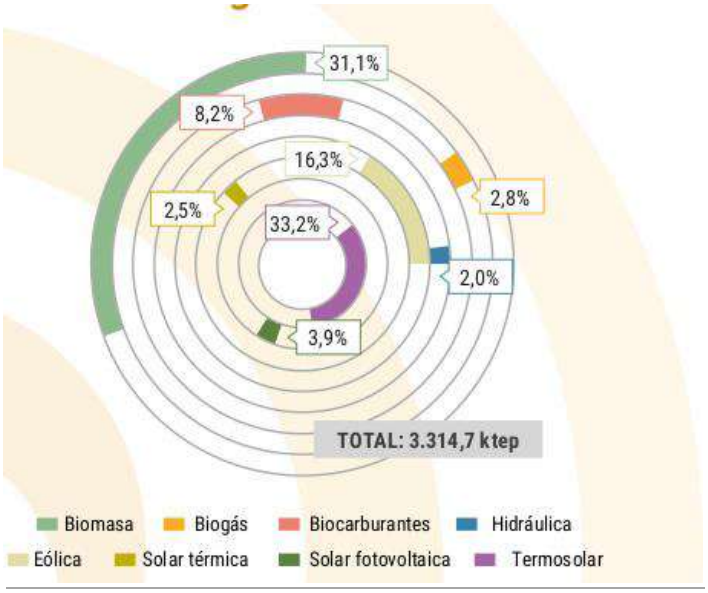
Primary energy consumption in Spain and Andalusia. Source: Andalusian Energy Agency

As previously indicated, renewable energies contribute 17.2% of the total primary energy consumed in Andalusia. Without including non-energy uses, this percentage rises to 18.5%. Biomass continues to be the source that contributes the most to the total consumption of renewable primary energy (42.1%), followed by solar energy with 39.6%

[1] Sources: Most of the data in this section has been taken from the publication Energy Data of Andalusia 2018 (Datos Energéticos de Andalucía 2018), of the Andalusian Energy Agency. When data has been taken from another source of information, it is expressly cited.

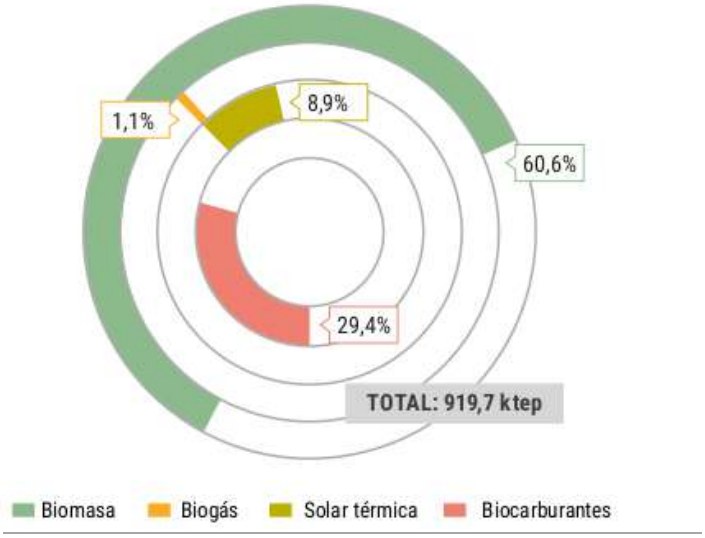
Unidad: ktep	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Biomasa	1.138,0	948,0	1.136,4	1.109,5	1.262,2	1.230,2	1.450,2	986,3	1.174,2	1.159,2	**1.031,3**
Biogás	30,7	41,2	44,7	52,5	21,7	21,7	23,2	22,3	22,4	22,5	**93,5**
Biocarburantes	98,0	166,7	228,7	275,4	364,0	135,2	155,9	167,9	180,8	215,1	**270,4**
Hidraúlica	41,6	70,1	126,7	103,7	61,8	111,9	81,6	50,3	62,8	44,9	**67,0**
Eólica	214,4	375,7	510,1	538,0	495,8	603,9	557,5	549,6	608,1	621,4	**540,6**
Solar Térmica	39,0	44,2	52,2	56,4	61,0	67,1	72,7	77,5	79,4	80,7	**82,0**
Solar Fotovoltaica	36,0	122,6	97,4	121,8	133,1	137,9	137,8	137,5	130,4	138,5	**129,0**
Termosolar	8,8	45,4	188,5	403,9	896,8	1.084,0	1.189,2	1.181,1	1.239,6	1.326,2	**1.100,9**
TOTAL	**1.606,5**	**1.813,8**	**2.384,7**	**2.661,3**	**3.296,5**	**3.391,9**	**3.668,1**	**3.172,5**	**3.497,7**	**3.608,5**	3.314,7

Evolution of primary energy consumption of renewable energies in Andalusia. Source: Andalusian Energy Agency

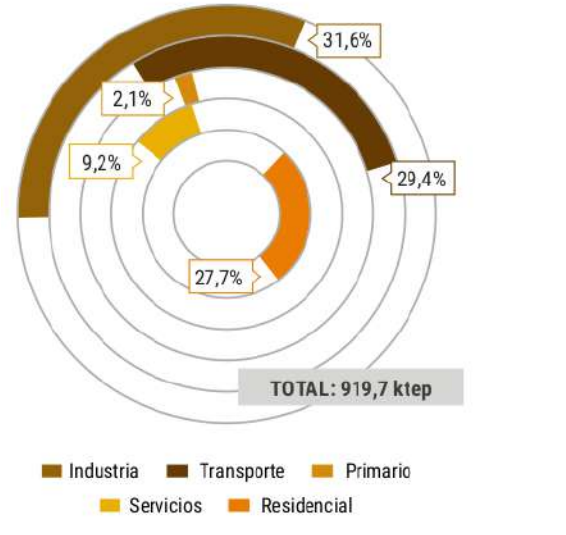


Structure of primary consumption of renewable energies in 2018. Source: Andalusian Energy Agency

The following graphs show how the final energy consumption is distributed by renewable energy source.



Structure of the final consumption of renewable energies in 2018. Source: Andalusian Energy Agency



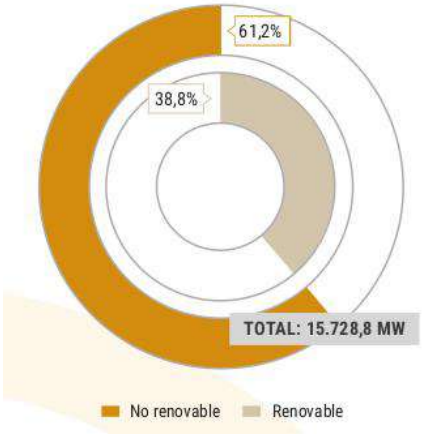
Structure of the final consumption of renewable energy by activity sector in 2018. Source: Andalusian Energy Agency

As shown in the graph above, 27.7% of final consumption of renewable energy is produced in the residential sector. Although there is a lack of specific data on the type and quantity of households that consume renewable energies, the socio-economic factors of vulnerable groups and the architectural characteristics of the homes of these groups (traditionally limiting access to the use of renewable energies), suggest that most renewable energy consumption in the residential sector occurs in homes belonging to non-vulnerable groups.

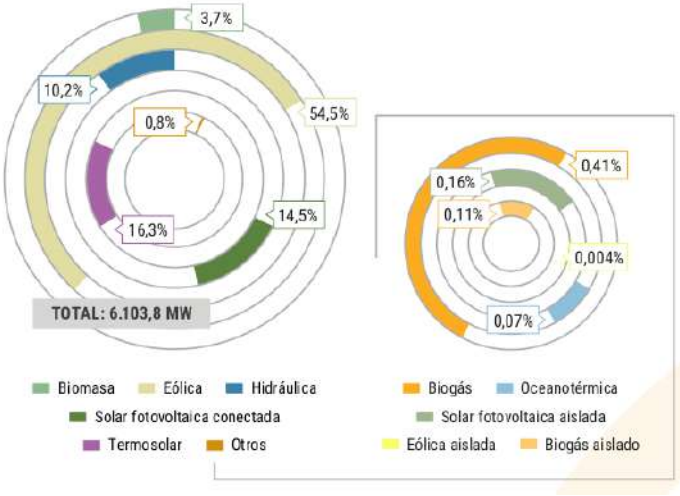
On the other hand, there is a variable distribution of renewable energy consumption throughout the Andalusian region, with higher consumption in areas with greater biomass resources (Jaén, Granada, Córdoba), as shown in the following table:

Province	Renewable energy consumption (toe)	Renewable energy consumption per 1000 inhabitants (toe/1000 inhabitants)
ALMERÍA	48.000	68,4
CÁDIZ	56.000	45,1
CÓRDOBA	142.000	176,4
GRANADA	134.000	145,3
HUELVA	75.000	144,0
JAÉN	205.000	306,4
MÁLAGA	110.000	67,7
SEVILLA	151.000	78,4

From the electrical point of view, the electrical power in Andalusia in 2018 rises to 15,728.8 MW and the renewable power accounts for 38.8% (6,103.8 MW) of the total Andalusian electricity generation park in 2018.



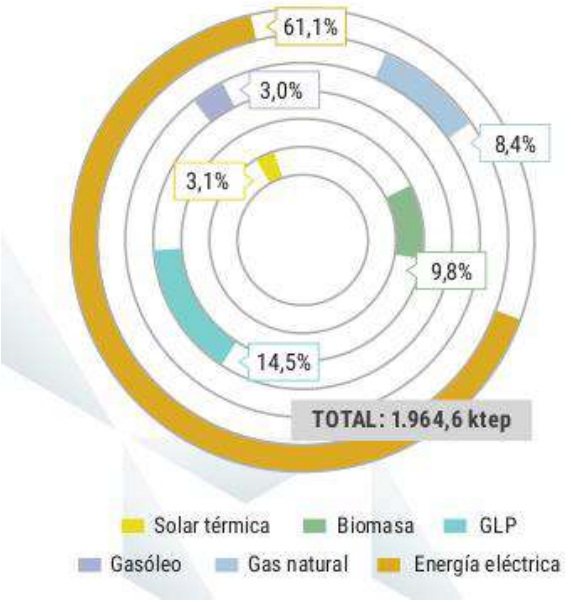
Structure of the electrical power installed in 2018. Source: Andalusian Energy Agency



Structure of renewable electric power installed in 2018. Source: Andalusian Energy Agency

The gross production of renewable electricity in Andalusia represents 33.9% of all the electricity generated in the region, which is equivalent to 35.2% of the region's electricity demand.

As regards consumption in the residential sector, it stands at 1,964.6 ktoe, equivalent to 0.23 toe per inhabitant and 0.59 toe per household. As a percentage of total consumption in this sector, electrical energy accounted for 61.1%, followed by LPG (14.5%) and biomass (9.8%). The remaining 14.6% was covered by natural gas, diesel and solar thermal energy.



Distribution of energy consumption in the residential sector in 2018. Source: Andalusian Energy Agency

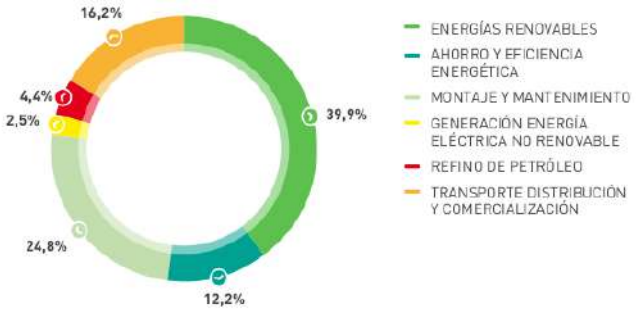
The economic sector of renewable energies in Andalusia

The Andalusian energy sector is made up of companies that are very different in size and activity (developers, engineering companies, installation and/or maintenance companies, energy distributors, generators, energy services, etc.). The great development of electricity generation from renewable sources has undoubtedly been the most important driving force for the transformation and emergence of a new business sector characterised by the existence of a significant number of companies of different sizes, many of which are owned by international groups.

In Andalusia, as of 31 December 2013[2], there were more than 6,500 companies carrying out different activities in the energy sector, almost 1,500 of which were working in the field of renewable energies. The activity of the energy sector in 2013 has associated more thann 110,000 jobs per year in Andalusia, 41% of which are direct jobs.

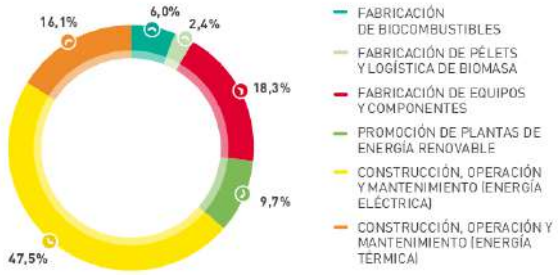
[2] Source: Information on the number of companies and jobs has been taken from the Energy Strategy for Andalusia 2020. Andalusian Energy Agency.

Distribution by activity of the business energy sector



Distribution by activity of jobs associated with the energy sector

The renewable energy sub-sector is one of the largest contributors in terms of the number of jobs generated. Thermal generation with solar energy and biomass has experienced substantial growth in the last 10 years. This has allowed the development of a business sector where companies specialised in renewable energies coexist with others that combine their activity with air conditioning, heating, solar energy and/or biomass, plumbing, etc



Distribution by activity of employment associated with the renewable sector

In recent years, new energy-related business sectors are also emerging in Andalusia. Thus, energy service companies are emerging as an opportunity to finance the development of projects related to improving energy efficiency, renewable energy and reducing the energy bill. These companies base their business on the completion of a complete project (management, engineering, construction and operation) according to the conditions established with the client in an energy supply contract, so that the recovery of the investment made and the costs associated with its operation are recovered through the energy sold.

Finally[3], it should be noted that Andalusia counts on the Association of Renewable Energies of Andalusia, CLANER, which acts as an **Andalusian renewable energy cluster.** Set up in 2012, CLANER is made up of groups of companies, official bodies, technology and research centres, universities and public foundations, among other agents, and its aims include the representation and defense of the Andalusian renewable energy sector, as well as the promotion of research, technological development and innovation of products, processes and services associated with this field

Currently, CLANER counts on almost 100 member entities, which represent 90% of the Andalusian renewable sector.

<u>Social economy: energy cooperatives</u>

In recent years, figures are emerging within the field of social economy in the form of energy cooperatives, which are becoming increasingly more important in the energy sector and, under the shelter of new regulatory developments at European and national level, will assume a leading role, through the so-called local energy communities or renewable energy communities.

[3] Source: information compiled from CLANER´s web page: http://claner.es/

By number of people, the energy cooperative **Som Energía** stands out, which currently (April 2020) counts on more than 65,000 members and manages over 112,000 energy supplies. In addition, Som Energía has its own renewable energy facilities that supply 17,000 MWh of electricity each year to an average of almost 7,000 homes. Some of these facilities are located in Andalusia, including the La Florida and Matallana photovoltaic plants located in the municipality of Lora del Rio (province of Seville), with a capacity of 1.5 MW and 2 MW, respectively, with a production equivalent to the consumption of more than 2,000 homes, and the 2.1 MW plant in Alcolea del Río (province of Seville), which supplies electricity equivalent to the consumption of more than 1,300 homes.

Another energy cooperative, **ZENCER,** is entirely Andalusian, although with a much smaller number of members.

Other figures such as non-profit companies are also to be highlighted, which are encouraging all citizens, including those with fewer resources, to participate economically in collective renewable energy facilities, contributing small amounts to promote and build new renewable energy plants. The reference company in this field is **ECOOO**, founded in 2005.

Finally, it should be noted that in recent times new cooperatives and citizen groups have been emerging, such as the **MUTI** association in the province of Huelva (municipality of Arroyomolinos de León), which aims to become a rural energy community.

3. State of Play of energy poverty in your region

Andalusia is one of the regions where energy poverty has the greatest impact. In the absence of a specific survey on energy poverty in Spain, and in line with the proposal of the European Observatory on Fuel Poverty (EPOV), the Environmental Sciences Association (ACA) has been evaluating energy poverty since 2012 through a battery of indicators based on the approaches of expenditure and income and household perceptions and declarations based on the surveys of the Spanish National Institute of Statistics:

- Family Household Budget Survey (E*ncuesta de Presupuestos Familiares (EPF))*
- Living Conditions Survey *(Encuesta de Condiciones de Vida (ECV))*

According to the latest assessment of the ACA association, and in accordance with the household perceptions and declarations, using data from 2016, a total of 6.8 million people at the national level, equivalent to 15% of the resident population in Spain, would be suffering from inadequate housing temperatures or delays in the payment of bills, or both. Of these, the

2.8 million persons who declared having two or more delays in the payment of bills in the last 12 months (6% of the population) stand out. Regarding the indicators based on the Family Household Budget Survey, the ACA association has assessed that 29% of the Spanish population (13.2 million people) would be in difficulties according to one of the two main indicators for the approach to household expenditure and income: (i) Percentage of population with energy expenditure disproportionate to their income (2M) and (ii) Hidden energy poverty (HEP).

The ACA association also concludes that certain socio-demographic conditions of the household confirm certain patterns of vulnerability previously detected and related to the level of education, the employment situation, the type of contract, the marital status or country of origin, the presence of persons in poor health and chronically ill persons or the perception of social benefits. Two categories of households are noted: single-parent households, in terms of the feminisation of energy poverty, and elderly people living alone, because of their age and increasing life expectancy as a result of the gradual ageing of the population.

On the other hand, in April 2019, the Spanish Government approved the National Strategy against Energy Poverty 2019-2024. This strategy has also evaluated energy poverty based on the same statistical information sources, corresponding to 2017. However, this strategy has chosen to refine and make the analysis more precise in some points, to measure specific circumstances of energy poverty that allows adapting the measures to the particularities of some groups or typology of consumers. Therefore, certain characterisation variables have been used to complement the analysis obtained from the information of both surveys, such as household size, household income quintile, activity status of individuals, type of household (with elderly people, adult with children, etc.).

Based on data provided by the Spanish National Institute of Statistics, this strategy indicates that in Spain 8.1 million people have an energy expenditure disproportionate to their income; 5.1 million people suffer from hidden energy poverty; some 3.7 million people spend the winter in inadequate temperatures and 3.5 million people have to face delays in paying their bills.

INDICADOR (% población)	2008	2014	2015	2016	2017
GASTO DESPROPORCIONADO (2M)	15,9	16,6	16,6	16,7	17,3
POBREZA ENERGÉTICA ESCONDIDA (HEP)	14,6	13,2	12,2	12,6	11,5
TEMPERATURA INADECUADA DE LA VIVIENDA EN INVIERNO	5,9	11,1	10,6	10,1	8,0
RETRASO EN EL PAGO DE LAS FACTURAS	4,6	9,2	8,8	7,8	7,4

Energy poverty data in Spain. Source: National Strategy against Energy Poverty 2019-2024

Energy poverty in Andalusia

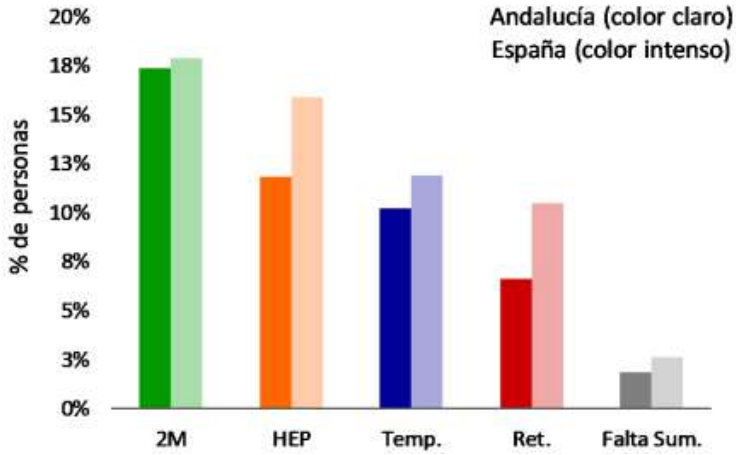
Below are the indicators for Andalusia from the last assessment of energy poverty carried out by the ACA association[4], with data corresponding to 2016.

		2M	HEP	Temp.	Ret.	Falta Sum.
Andalusia	Number of persons	1,490,000	1,320,000	990,000	870,000	220,000
	%	18 %	16 %	12 %	10 %	3 %
Spain	%	17 %	12 %	10 %	7 %	2 %

Indicator/methodology legend:

- ***2M:*** *Percentage of the population with disproportionate expenditures. Living Conditions Survey indicator that measures the percentage of the population for which actual household energy expenditures (as a percentage of total household income) are twice the median.*
- ***HEP****: Hidden energy poverty. HEP indciator that measures the percentage of the population for which total household energy expenditure is below half the national median.*
- ***Temp.****: Percentage of the population that declares itself unable to maintain the dwelling at an adequate temperature. Living Conditions Survey indicator*
- ***Ret.****: Percentage of the population declaring late payment of housing bills. Living Conditions Survey indicator.*
- ***Falta Sum.****: With a lack of energy supply due to economic difficulties.*

[4] Source: Tirado Herrero., S., Jiménez Meneses, L., López Fernández, J.L., Irigoyen Hidalgo, V.M., 2018. Energy poverty in Spain. Towards a system of indicators and a national strategy action. Asociación de Ciencias Ambientales, Madrid.



The Energy Poverty Strategy in Spain also offers regional data. The energy poverty data in Andalusia are (corresponding to 2017):

2017		2M	HEP	Temp.	Ret.
Andalusia	%	23.3 %	14.2 %	7.3 %	10 %
Spain	%	17.3 %	11.5 %	8.0 %	7.,4%

Finally, the disaggregation carried out by the Spanish Energy Poverty Strategy, in order to know in greater detail the groups of the society that suffer from a higher incidence of fuel poverty, is very interesting.

Temperatura inadecuada en la vivienda en invierno por tamaño del hogar (% de la población)	2017
Total	8,0
1 miembro	10,1
2 miembros	7,8
3 miembros	8,0
4 miembros	5,6
5 miembros o más	12,3

Temperatura inadecuada en la vivienda en invierno en función de la actividad de la persona principal (% de la poblaciónón)	2017
Total	8,0
Ocupados	5,4
Parados	17,9
Jubilados	5,4
Otros inactivos	9,6

Temperatura inadecuada en la vivienda en invierno en función del tipo de hogar (% de la poblaciónón)	2017
Total	8,0
Hogar con una persona de 65 o más años	8,4
Dos adultos sin hijos/niños dependientes económicamente con al menos uno de ellos de 65 o más años	6,5
Un adulto con hijos/niños dependientes económicamente	14,1

Temperatura inadecuada en la vivienda en invierno por régimen de tenencia de la vivienda (% de la poblaciónón)	2017
Total	8,0
Propiedad (total)	5,7
Propiedad sin hipoteca	6,0
Propiedad con hipoteca	5,2
Alquiler	17,0
Cesión gratuita	11,6

Temperatura inadecuada en la vivienda en invierno en función de quintiles de renta (% población)	2017
Total	8
Primer quintil	19,6
Segundo quintil	10,3
Tercer quintil	5,6
Cuarto quintil	2,9
Quinto quintil	1,6

Public entities in charge of this issue at national, regional or local level? Are there specific NGOs, associations or other entities tackling energy poverty in your region?

Traditionally, at national and regional level, there have been no public entities that have dealt specifically with energy poverty. This fact may be motivated by the multidisciplinary approach that must be assumed to face this problem and the lack of experience in this matter, which leads to a difficulty in establishing effective measures. However, in recent years, energy poverty is starting to be addressed by different public entities, from different perspectives, each time with increasing dedication.

At regional level, public entities such as the **Andalusian Energy Agency** or the **Social Housing and Energy Rehabilitation Agency** are developing activities directly related to energy poverty.

It is also necessary to highlight the **subsidy programme for minimum vital supplies** (Decree-Law 8/2014 of 10 June on extraordinary and urgent measures for social inclusion through employment and the promotion of solidarity in Andalusia) through which the Andalusian Regional Government and Andalusian town halls have conceded subsidies to cover the electricity and water bills of vulnerable groups. Subsequently, Decree-Law 3/2017 of 19 December, which regulates the minimum income for social insertion in Andalusia, which repealed the previous Decree-Law almost in its entirety, focuses on the most vulnerable family units with difficulties in accessing basic services and rights, such as energy supply. This Decree-Law includes a series of measures aimed at alleviating the exclusion of the most vulnerable persons from both an economic and a social perspective and aims to regulate the economic benefit aimed at eradicating marginalisation and inequality and tackling social exclusion, known as the Minimum Income for Social Insertion in Andalusia, incorporating an itinerary through a Social and Labour Inclusion Plan.

On the other hand, the various **subsidy programmes for sustainable energy development and sustainable construction of the Andalusian Regional Government**, managed by the Andalusian Energy Agency, have made it possible to concede subsidies in energy efficiency and renewable energy to the Andalusian population, including vulnerable groups. Practically all of the subsidies that have been directed at these groups have consisted in energy efficiency measures (energy rehabilitation), which have been implemented in public social housing of the Social Housing and Energy Rehabilitation Agency.

More recently, the Andalusian Regional Government has begun to draw up the **First Strategic Plan for the Elderly in Andalusia 2020-2023,** which, among other matters, will analyse the incidence of energy poverty in the Andalusian group of elderly people and the actions to be developed to eliminate it.

The **Comissioner for the Poligono Sur distict of Seville**[5] has also begun to address energy poverty in this group of neighbourhoods in Seville, joining the European project POWERTY as a stakeholder to analyse measures to tackle energy poverty, in particular those related to renewable energies.

The role of the **Andalusian Ombudsman** should also be highlighted, who for years has paid special attention to energy poverty, and especially to power cuts for vulnerable groups and the low effectiveness of the social bonus, as stated in the 2008 report[6].

[5] The Commissioner for the Poligono Sur district of Seville has been constituted for more agile communication of the Andalusi an Regional Government with the Public Administrations with completences in the areas that affect the problems of social marginality, security, employment, social issues and housing – among others – which are present in this urban area of the city of Seville.

[6] https://www.defensordelpuebloandaluz.es/informe-anual-2018

At local level, collaboration agreements signed by the **Andalusian Federation of Municipalities and Provinces (FAMP)** with **ENDESA**[7] and **IBERDROLA**[8] in 2016 to tackle energy poverty by suspending electricity supply cuts, as well as providing information and advice on the social bonus, are to be noted. Many Andalusian local town halls have signed these framework agreements.

It should also be noted that some **Andalusian town halls** have launched different activities to mitigate energy poverty, with greater or lesser intensity, highlighting the programmes to tackle energy poverty of the City Hall of Cadiz or the legislative initiative promoted by about thirty municipalities to tackle energy poverty and ensure basic energy supplies.

Private entities and organisations

Several private organisations have been developing actions related to energy poverty for years, and under different perspectives and approaches. Some of these entities have a field of action which is not only regional (Andalusia), but also national (Spain). In the framework of this report, these are grouped in the following way, although there are entities that, taking into account the activities they develop, could be included in several categories:

1. **Entities in the field of analysis and knowledge**

a. **ACA**. **Environmental Sciences Association (Asociación de Ciencias Ambientales).** Together with ECODES, is one of the two Spanish support entities of the **EU Energy Poverty Observatory** (**EPOV**). At national level, it is one of the reference entities in the field of energy poverty, highlighting its studies, which are published every two years since 2012 and which offer a diagnosis of this phenomenon in Spain and in the different Spanish regions.

b. **ECODES**. Foundation for Ecology and Development, with extensive experience in the fight against energy poverty. It is one of the support entities of the **EU Energy Poverty Observatory** (**EPOV**) and has promoted one of the reference projects on energy poverty, called "No home without energy".

c. **ECOSERVEIS**. Energy consultant. Among other activities, they carry out dissemination at technical conferences, training courses and specific workshops, and propose solutions at the energy and social, consumption and health levels aimed at both the technical public, as well as families in a situation of vulnerability, and citizens in general. They are also co-organisers of the Catalan

[7] http://documentos.famp.es/documentacion/convenios/CONVENIO_FAMP_ENDESA.pdf

[8] http://documentos.famp.es/documentacion/convenios/CONVENIO-FAMP-IBERDROLA.pdf

congress on energy poverty, which in 2018 brought together more than 400 attendees and 100 national and international speakers.

d. **UNIVERSITIES.** From different approaches and perspectives, Andalusian universities have different departments and research groups that are analysing energy poverty.

2. NGOs Non Governmental Organisations

There are different social and welfare organisations that have considered energy poverty as a risk factor that must be addressed through specific measures. As a guide, the most representative NGOs are highlighted below:

a. **RED CROSS** has been recognising energy poverty as one of the difficulties faced by the households it helps for several years. The Red Cross has specific action programmes based on its experience and knowledge of vulnerability, and a vision of innovation as a way of intervening. In 2018, the Red Cross launched an extraordinary three-year appeal against climate change and energy poverty, *"Committed to people and the environment"*, which aims to promote the co-responsibility of the Red Cross, civil society and businesses on climate change and energy poverty. More than 29,000 vulnerable families have benefited from this extraordinary appeal since its launch in 2018. Through energy efficiency activities, the Red Cross achieved an annual financial reduction of 90 euros per year in household bills. The Red Cross aims to significantly increase the number of families assisted, with the express support of energy companies such as Naturgy and Endesa. The Red Cross also assesses energy poverty among those assisted. About half of the households have difficulty paying for supplies, 37% are unable to maintain an adequate temperature in their home in winter and 44% in summer. In other words, nearly 50% of the population assisted is in one or both of these situations. It also concludes that 73.1% have never received economical support for the payment of gas and electricity.[9]

b. **CÁRITAS**
As stated in its annual report, Caritas Sevilla urges the development of a sustainable energy system based on renewable energy, which provides active

[9] Red Cross. Bulletin of social vulnerability. Nº 17. December 2018.

measures to protect families against energy vulnerability and ensure a just transition towards a cleaner and sustainable energy model for the affected communities and groups. Caritas, through its various local and regional groups, has offered assistance to vulnerable households to pay their energy bills.

In addition, it should be noted that recently (February 2020), the FOESSA Foundation (Promotion of Social Studies and Applied Sociology)[10], created with the encouragement of Caritas Spain, has published a diagnosis of energy poverty, under the title "Violation of rights: Energy", based on the results of surveys carried out in 11,000 households, and applying the indicators and methodology of the EU Energy Poverty Observatory (EPOV).

c. Andalusian Engineering Association without Borders

3. <u>Energy entities, companies and cooperatives</u>

As described in previous sections, there are different entities that develop activities related to energy poverty, among which the following are highlighted:

a. Energy cooperatives and similar
   i. Som Energía.
   ii. Zencer.
   iii. Muti.
   iv. ECOOO.

b. **Energy companies**
   i. ENDESA
   ii. Eléctrica de Cádiz
   iii. NATURGY
   iv. Iberdrola.

4. <u>Consumer organisations</u>

a. FACUA
b. UCA-UCE
c. OCU

5. <u>Financing entities.</u>

[10] The FOESSA foundation (Promotion of Social Studies and Applied Sociology - Fomento de Estudios Sociales y Sociología Aplicada) was constitutedf in 1965, with the promotion of Cáritas Española to know objectively the social situation in Spain. The foundation was a pioneer in the introduction of research through reports on the social situation and change in Spain which indicates the importance to know the situation of our country through the analysis of the processes, the structures and the trends that mark the social evolution.

a. **TRIODOS BANK.** The reference bank in Spain within the so-called "ethical banking", which has financing products that extend the concept of responsible consumption to housing. At the same time, the Triodos Foundation has channelled donations from this bank's customers to offer financial aid to organisations that are working directly with energy poverty, such as ECODES and its project "No home without energy".

b. Coop57. Ethical finance cooperative. In collaboration with Som Energía, they are jointly promoting the "Social Germinator" initiative, a social innovation competition for energy transition, which aims to stimulate the creation of innovative models of social initiatives, renewable energy and energy efficiency, and help them to get started with the aim of promoting new local agents for energy transition. In addition, this cooperative offers funding for renewable energy projects.

These entities form part of the stakeholders group of the POWERTY project.

4. Link to the RIS3

The renewable energy sector is a priority for the RIS3 Strategy, being one of the eight smart specialisation priorities proposed in Andalusia. The opportunities considered in RIS3 are fundamentally based on the development of new innovative solutions for the distributed use of renewable energies (self-consumption) and their integration in the electricity networks.

5. Policy Instruments. Regional and National Plans and Policies on renewable energies and energy poverty

The Spanish Government, through the Ministry of Ecological Transition, has published in recent months two documents dealing with energy poverty and renewable energies:

1. **National Energy and Climate Plan (Plan Nacional Integrado de Energía y Clima) 2021-2030**

2. **National Strategy against Energy Poverty (Estrategia Nacional contra la Pobreza Energética) 2019-2024**

National Energy and Climate Plan (Plan Nacional Integrado de Energía y Clima (PNIEC))

This plan defines the objectives for the reduction of greenhouse gas emissions, the penetration of renewable energies and energy efficiency in Spain. It determines the lines of action and the path that, according to the models used, is the most appropriate and efficient. Maximising the opportunities and benefits for the economy, employment, health and the environment, and

minimising costs and respecting the needs for adaptation to the most CO_2.intensive sectors. The latest version of this plan has been delivered on 31 March 2020 to the European Commission, in compliance with EU Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

From the point of view of **energy poverty**, this plan devotes special attention to this phenomenon, addressing it from a comprehensive perspective and with a long-term vision. The effect of the measures foreseen in the plan is progressive, favouring to a greater extent lower income households and, especially, vulnerable groups

Among other issues, this plan incorporates measures in the area of just transition and energy poverty, in line with the Just Transition Strategy and the National Strategy against Energy Poverty 2019-2024, which establishes indicators and targets for a reduction of at least 25% in 2025. In this sense, it includes local participation in renewable energy projects, the promotion of renewable energy from biomass or the promotion of energy efficiency in the residential sector. Similarly, the plan proposes instruments to guarantee consumers the right to consume, produce, store and sell their own renewable energy through distributed generation, demand management, the promotion of local energy communities, as well as specific measures to promote the proactive role of citizens in decarbonisation. In this regard, this plan emphasises the potential for energy retrofitting of buildings and for self-consumption, especially shared consumption.

From a **renewable energy** point of view, this plan sets a renewable energy target for energy end-use in the economy as a whole of 42% in 2030 (30% in 2025). This value is obtained as a combined result of the presence of electrical renewables, thermal renewables in the different sectors of the economy, and as a consequence of the decrease in the amount of final energy due to the implementation of the energy savings and efficiency programmes foreseen in the plan. The level of penetration of renewable energies in the electricity generation sector will reach 74% in 2030, up from approximately 38-40% today. It is foreseen that by 2030, the total installed power in the electricity sector is expected to reach 161 GW, of which 50 GW will be wind energy; 39 GW solar photovoltaic; 27 GW combined gas cycles; 15 GW hydroelectric; 9 GW pumping; 7 GW solar thermoelectric; and 3 GW nuclear, as well as smaller amounts of other technologies.

Parque de generación del Escenario Objetivo (MW)				
Año	**2015**	**2020***	**2025***	**2030***
Eólica (terrestre y marítima)	22.925	28.033	40.633	50.333
Solar fotovoltaica	4.854	9.071	21.713	39.181
Solar termoeléctrica	2.300	2.303	4.803	7.303
Hidráulica	14.104	14.109	14.359	14.609
Bombeo Mixto	2.687	2.687	2.687	2.687
Bombeo Puro	3.337	3.337	4.212	6.837
Biogás	223	211	241	241
Otras renovables	0	0	40	80
Biomasa	677	613	815	1.408
Carbón	11.311	7.897	2.165	0
Ciclo combinado	26.612	26.612	26.612	26.612
Cogeneración	6.143	5.239	4.373	3.670
Fuel y Fuel/Gas (Territorios No Peninsulares)	3.708	3.708	2.781	1.854
Residuos y otros	893	610	470	341
Nuclear	7.399	7.399	7.399	3.181
Almacenamiento	0	0	500	2.500
Total	**107.173**	**111.829**	**133.802**	**160.837**

*Los datos de 2020, 2025 y 2030 son estimaciones del Escenario Objetivo del borrador actualizado del PNIEC.

Evolution of the instllaed electric energy power (MW). Source: National Energy and Climate Plan

The National Energy and Climate Plan plan has established new measures aimed at harnessing renewable energy and self-consumption to tackle energy poverty. In particular, measure 1.4. *Development of self-consumption with renewables and distributed generation,* recognises that self-consumption systems can be a tool to alleviate energy poverty. In this sense, this plan considers that government actions relating to the promotion of public housing stock, access to housing or the actions of social services, should take into account the potential of self-consumption to reduce electricity bills and the energy dependence of families and vulnerable groups. Likewise, measures to promote self-consumption should be aimed at making them accessible to society as a whole and in particular to vulnerable consumers who are excluded from self-consumption under market conditions without specific measures. On the other hand, collective self-consumption schemes and more dynamic energy management mechanisms allow Public Administrations or social entities to manage situations of energy poverty, not only through economic support but also through the allocation of a share in collective self-consumption promoted by these Public Administrations or social entities, which would directly reduce the electricity bill of consumers at risk of energy poverty. In this sense, the plan proposes as an action mechanism the promotion of self-consumption in vulnerable sectors, through the promotion of experiences that take advantage of the potential of self-consumption regulations to develop systems in which public or private self-consumers can share their generation surplus with vulnerable households, as well as other specific measures aimed at mitigating energy poverty.

National Strategy against Energy Poverty

This strategy was approved in 2019 and is the instrument that allows to tackle the phenomenon of energy poverty from an integral perspective and with a medium and long term vision. The strategy provides a definition of energy poverty and, linked to it, of the consumer in a vulnerable situation. This strategy has made an initial diagnosis and has characterised the problem through the design of official measurement indicators that coincide with those used by the EU Energy Poverty Observatory (EPOV), which will allow for comparison with other Member States. The indicators are available from the surveys produced by the National Statistical Institute (Household Budget Survey and Living Conditions Survey). The key indicators are:

1. Disproportionate expenditure: percentage of households whose energy expenditure in relation to their income is more than double the national average.

2. Hidden energy poverty (HEP): percentage of households whose absolute energy expenditure is less than half the national average.

3. Inability to keep the house at an adequate temperature.

4. Late payment of household utility bills.

Additionally, the analysis of these indicators is complemented with others derived from the climate zone, as well as by variables that characterise the selected populations (size and type of household, income quintile of the consumption unit, activity situation of the members of the household unit, etc.). The Institute for Energy Diversification and Savings (IDEA), a public business entity assigned to the Ministry of Ecological Transition, has been designated as the body responsible for monitoring and updating the indicators for measuring energy poverty in Spain.

This strategy also sets a target for each of the EPOV indicators: to reduce by at least 25% by 2025 and to reach 50% of their current values.

Indicador (%)	2017	Objetivo mínimo para 2025	Objetivo buscado para 2025
Gasto desproporcionado (2M)	17,3	12,9	8,6
Pobreza energética escondida (HEP)	11,5	8,6	5,7
Temperatura inadecuada de la vivienda	8	6	4
Retraso en el pago de las facturas	7,4	5,5	3,7

Energy poverty targets. Source: National Strategy against Energy Poverty

Through 4 main axes, the lines of action that materialise the operative plan of the strategy are outlined, specified in 19 measures. The axes in which the strategy is articulated are the following

- **I. Improve knowledge.** Periodic monitoring of the indicators through the annual updating of the four indicators by the National Institute of Statistics, which will provide specific information on their values disaggregated by climate zone. For its part, the Institute for Energy Diversification and Savigns (IDAE) will be the body responsible for publishing the results, as well as carrying out the comparative analysis with the rest of the European Union Member States and with the objectives set at national level.

- **II. Improve the response to the current situation.** The performance measures foreseen are key mechanisms for the short-term protection of vulnerable consumers, enabling them to meet payments for their energy supplies. Thus, the creation of a new social energy bond is envisaged, granted on the basis of available income criteria. The income thresholds established may be relaxed for certain categories of especially vulnerable consumers, paying special attention to households with children. The direct granting of aid may be considered for those groups receiving benefits whose granting is linked in advance to low income levels. The mechanism will be based on three principles:
    - 1. Universality of supply sources: the new assistance will be integral to all energy supplies, both electrical and thermal.
    - 2. Automation: process will be simplified by direct verification of the requirements by a public administration that collects information from all the bodies involved, avoiding the need for the consumer to process the application.
    - 3. Coordinated management with other Public Administrations in the implementation of the assistance in a coordinated manner and respecting the established distribution of competences. Social services will be involved and will have to apply the precautionary principle linked to the Minimum Life Supply, so as to prevent the supply of the most vulnerable households from being interrupted for a period of time.

  One of the measures foreseen will be to prohibit the interruption of energy supply in extreme weather conditions to vulnerable consumers.

- **III. Create a structural change for the reduction of energy poverty** This axis includes structural and energy efficiency measures, focused on achieving an improvement in the equipment and conditions of the buildings and homes of vulnerable consumers. They are a key element in tackling energy poverty because they seek a permanent change in households that reduces their dependence on other performance measures. Measures

such as improved energy efficiency and residential equipment, as well as self-consumption facilities targeted at vulnerable consumers, are included.

- **IV. Consumer protection and social awareness measures** These are actions that seek to empower consumers, professionals and other actors linked to energy poverty through a better knowledge of rights, obligations, possibilities and alternatives in the field of energy consumption. The first element is the general awareness of the need to eradicate energy poverty as a situation existing in modern societies. It also consists of the elaboration of a protocol to detect situations of energy poverty by primary care professionals.

At the Andalusian level, it should be noted that the Andalusian Regional Government has set up the RoundTable for Self-Consumption in Andalusia (Mesa para el Autoconsumo en Andalucía) with the aim of establishing actions to promote the development of self-consumption in Andalusia. The main objectives are:

• To improve the framework for the development of self-consumption

• To disseminate among potential users the reality of the viability of self-consumption facilities

• To facilitate the change from consumer to electricity prosumer in Andalusia (from passive electricity consumer to consumer-producer)

• To improve the training of the business sector associated with this activity.

The Andalusian Regional Government has also drawn up several strategic documents that have promoted renewable energies and placed citizens at the centre of the energy system, paying special attention to vulnerable groups.

- **Energy Strategy for Andalusia 2020 (Estrategia Energética de Andalucía 2020).** This strategy proposed five objectives for 2020: reduce primary energy consumption by 25%, contribute 25% of gross final energy consumption with renewable energies, decarbonise energy consumption by 30% compared to 2007, self-consume 5% of electrical energy generated with renewable sources and improve the quality of energy supply by 15%. Work is currently underway on the new energy strategy for 2021-2030.

  Plan for the Sustainable Construction and Rehabilitation Sector in Andalusia, horizon 2020. (Plan Integral de Fomento para el Sector de la Construcción y Rehabilitación Sostenible de Andalucía, horizonte 2020) This is a planning instrument of the Andalusian Regional Government that includes 90 lines of action that contain the necessary measures, agreed with the construction sector, for the transition

from the current model of construction to a new model that is more sustainable in economic, social and environmental terms. Renewable energy and energy poverty actions are included within the 90 lines of action.

- **Housing and Rehabilitation Plan of Andalusia 2016-2020 (Plan de Vivienda y Rehabilitación de Andalucía 2016-2020).** In order to adapt the buildings and homes that make up the public residential park of Andalusia to the new conditions of habitability, the Andalusian Regional Government promotes actions to improve them through the incorporation of thermal and / or electric energy generation equipment which allows the use of renewable energy. Specifically, with regard to substandard housing, the housing and rehabilitation plan contemplates specific actions to transform these homes and provide them with adequate conditions of habitability, for which it has provided, among others, economic support for the provision of facilities for the use of renewable energy. In addition, the housing plan also provides for financial assistance for the rehabilitation of individual and collective housing, including the installation of renewable energies among the rehabilitation actions.
  The beneficaries of this plan must have an annual income below a threshold which depends on the Public Indicator of Income with Multiple Effects.

6. Legislation, Regulation

It exceeds the objective of this report to describe the extensive legislation on renewable energies, in its many typologies and competence frameworks. However, by way of summary, it should be noted that Spanish legislation currently facilitates and promotes the use of renewable energies by citizens, both individually and collectively, in line with Community guidelines in this area. Specifically, **Royal Decree 244/2019, of 5 April,** which regulates the administrative, technical and economic conditions for the self-consumption of electrical energy, regulates formulas that are unprecedented in Spain, such as **collective self-consumption, local self-consumption and simplified compensation for surpluses in** self-consumption facilities. These formulas facilitate the development of projects and initiatives for the supply of renewable energies to vulnerable groups.

Also noteworthy is **Royal Decree-Law 15/2018, of 5 October, on urgent measures for energy transition and consumer protection,** which seeks to provide an immediate response to ensure that the energy transition is fair, providing those vulnerable consumers who are least able to afford this scenario of high prices, with specific protection mechanisms. The aim of this regulation is to address, as a matter of urgency, the rise in electricity prices, to offer greater coverage to citizens in a situation of vulnerability and to increase consumer protection, with

measures that will make it possible to better adjust the tariff to consumption, reducing their electricity bill, and eliminating regulatory barriers that have discouraged self-consumption in Spain. Likewise, the regulation also adopts measures to accelerate the transition to an energy model based on renewable energies. Among other obligations, this Royal Decree requires the preparation of the National Energy Poverty Strategy, described above.

At regional level, the Andalusian Regional Government counts on two regulations that promote renewable energies and simplify the procedures:

Law 2/2007, of 27 March, for the promotion of renewable energies and energy saving and efficiency in Andalusia, a pioneer at the time, and meant that Andalusia assumed its commitment to sustainability, anticipating some of the requirements imposed years later by the European Union through its various directives on energy. The aim of this law was to create a more efficient, diversified and stable energy system, capable of responding to the need for energy development that respects the environment and is compatible with the fight against climate change. Among other relevant elements, the law recognised the primacy of renewable energies over the rest of the energy sources, established the obligation to incorporate renewable energies in the buildings and facilities of the Andalusian Regional Government and recognised the collective solidarity in the use of energy, which represents the shared responsibility of citizens, institutions, productive sectors and public authorities, regarding the use of energy in the way that best guarantees sustainable development, so that public authorities were obliged to promote, in relation to energy resources, the solidarity use of energy, promoting that social collaboration be real and effective.

- **Decree-Law 2/2018, of 26 June, on the simplification of energy regulations and the promotion of renewable energies in Andalusia.** This regulation incorporates measures aimed at simplifying the obligations in terms of energy savings, energy efficiency and use of renewable energy resources, both in the field of construction as well as business activities that take place in Andalusia. It also establishes measures to promote renewable energy projects in Andalusia, declaring the strategic nature of some of these investments.

7. Financial Support and Instruments

Assistance for sustainable energy development

For more than a decade, the Andalusian Regional Government has been granting economic assistance for the use of renewable energies within the framework of the **subsidy programmes for the sustainable energy development in Andalusia.** This assistance is managed by the Andalusian Energy Agency, and is co-financed by the European Regional Development Fund (ERDF).

The current programme is called *"Andalusia is more" ("Andalucía es más"),* and is regulated by the Order of 23 December 2016, of the former Regional Ministry of Employment, Business and Trade. The programme has three lines of assistance: Sustainable Construction, Sustainable SMEs and Smart Grids, and promotes energy improvement actions that facilitate households, companies and administrations to reduce their energy demand and use energy in the most intelligent and efficient way possible. The programme will run from 2017-2020.

Previously, the incentive programme "Andalusia A+" (2009-2015) and the programme to promote sustainable construction in Andalusia (2014-2015) were developed.

The current programme "Andalusia is more" provides for a budget of 180 million euros for the sustainable construction line, which establishes 38 types of eligible actions. Among these, the implementation of new thermal and electrical energy generation facilities for self-consumption through systems based on the use of renewable energies are highlighted.

This programme establishes a higher incentive percentage for actions carried out in social housing (up to 85%), in order to help mitigate energy poverty among vulnerable groups.

Assistance from the Andalusian Housing and Rehabilitation Plan

As indicated previously, the Andalusian Regional Government grants aid within the framework of the Housing and Rehabilitation Plan 2016-2020. Through different programmes, residential rehabilitation seeks to promote the rehabilitation of housing and residential buildings of collective housing that have deficiencies in their basic conditions. In this way, through the granting of subsidies through various calls, it contributes to the financing of various actions that are necessary to correct these deficiencies (including the use of renewable energy), favoring people with limited resources, the elderly or people with disabilities. Grants of up to 75% are considered. They are co-financed through the general budgets of the Andalusian Regional Government, contributions from the Spanish Government and the ERDF fund.

Assistance for mínimum life supplies

A few years ago, the Andalusian Regional Government launched the Extraordinary Programme for Minimum Life Supplies, in collaboration with the town halls (Decree-Law 8/2014, of 10 June, on extraordinary and urgent measures for social inclusion through employment and the promotion of solidarity in Andalusia). The aim of this programme was to create economic assistance for minimum life supplies and social emergency benefits, managed by the Andalusian municipalities. These were grants and benefits aimed at covering extraordinary contingencies in basic subsistence needs, both for reasons of survival and for a continuous lack of resources, for those persons or family units that cannot meet specific expenses. They were

of an urgent, transitory and punctual nature, in order to prevent, avoid or alleviate situations of social exclusion. Electrical energy was considered a minimum life supply.

This extraordinary programme has been replaced by the Andalusian minimum social insertion income, regulated by Decree-Law 3/2017 of 19 December, aimed at people living in poverty, i.e. those who do not have their basic needs covered, including energy supply. The Minimum Social Insertion Income in Andalusia consists of a monthly economic benefit of 78% of the Public Indicator of Multiple Effects Income (IPREM), calculated in twelve monthly payments.

8. Preliminary Good Practices

1. **Insertion of people in situation of social vulnerability in the renewable energy and self-consumption labour market.**

This good practice consists of integrating people at risk of social exclusion into the renewable energy and self-consumption labour market. The promoters of this action are the non-profit renewable energy company ECOOO, and the insertion companies Amoverse and El Zaguán. These two insertion companies have created a temporary union of companies (UTE) to provide ECOOO service, which provides its experience in the solar energy sector and the installation of self-consumption in buildings. The objective of the temporary union is to provide a service of a photovoltaic self-consumption installation in order for the people hired to broaden their professional profile with quality training in a growing sector and with great possibilities of insertion in the ordinary market. For its part, ECOOO is committed to carrying out qualified marketing and supervision. In this way, the three organisations seek the formation of a more just society, promoting the energy transition towards a sustainable and decentralised energy model and generating qualified technical employment for people in situations of social vulnerability.

2. **Photovoltaic installation on a farm where people at risk of social exclusion work**

The project has consisted of a photovoltaic solar energy installation for an irrigation well on the agricultural property of the Bioalverde labour insertion company. Thanks to this new energy source, it has been possible to multiply by four the surface area of organic crops and, therefore, give opportunities to a greater number of people in need of employment and training.

The entities participating in the project have been:

- Cáritas Diocesana of Seville, who has carried out the general coordination.
- Bioalverde. Non-profit and insertion company promoted by Cáritas Diocesana of Seville, to achieve social and labour insertion of people in situation or risk of social

exclusion, as well as to raise awareness and increase fair and sustainable consumption. Its main activity is the management and agricultural exploitation of an ecological plot of 20 hectares, in the province of Seville (municipality of Dos Hermanas).

• Endesa, financing the project.

• Energía Sin Fronteras ("Energy without Borders") has coordinated the energy feasibility study of the project and has been responsible for the supply, implementation and assembly of the solar photovoltaic installation and accessories.

3. Subsidy programme for the energy development of Andalusia

As described previously, the Andalusian Regional Government, through the Andalusian Energy Agency, develops a subsidy programme to facilitate the use of renewable energies, among other energy improvement actions, offering a higher percentage of economic assistance to social housing. To facilitate the processing of these subsidies, this programme is developed in collaboration with the "collaborating entities", which are companies in the energy sector that help and represent the beneficiaries of the subsidies throughout the processing. These companies also carry out the material action that is the object of the subsidy (for example, assembly of a photovoltaic installation).

4. Andalusian Housing and Rehabilitation Plan

Complementary to the subsidy programme for sustainable energy development, the Andalusian Regional Government, through the Social Housing and Energy Rehabilitation Agency, offers financial assistance to people with low income to rehabilitate their homes, including renewable energy facilities.

5. Social Germinator

The Social Germinator is a competition promoted by Som Energia and Coop57 whose objective is to stimulate the creation of new projects that generate innovative models of social initiatives, renewable energy and energy efficiency within the framework of the social and solidarity economy, and which aim to achieve energy transition. This competition is open to initiatives within Spain that are recently created (less than 3 years old) and to those that already exist and are starting a new line of activity.

Three calls have already been held. In the last call, a special award was created in the field of energy poverty, rewarding projects that aim to mitigate the causes and consequences, structural and contextual, of energy poverty.

The awards consist of a non-refundable contribution to be distributed among the winning projects. This amount comes from the resources received through the voluntary donation of the electricity contracts of the members of the Som Energía cooperative. In addition, if a loan is granted by Coop57, it will have a 50% reduction in the associated financial cost during the first two years.

6. Self-consumption and collective renewable energies - ECOOO

The non-profit company ECOOO promotes collective and social self-consumption through different lines of action and strategies, in order to make it easier for citizens to benefit, directly or indirectly, from renewable energies. Among its lines of action, the Solar Wave programme is highlighted, in which ECOOO installs and manages PV solar energy installations in different locations. In Andalusia, in the town of Lebrija (Province of Seville), pv installations have been installed on the roofs of 11 municipal buildings, ceded by the Town Hall (public schools, a senior centre, a fire station, a sports centre, etc.). The 11 facilities, with a collection area of 7,200 m2, have a total peak power of 233 kW, with an annual production of 350,738 kWh, equivalent to the electricity consumption of 117 homes, which avoids the emission of 103 tonnes of CO2 into the atmosphere each year, equivalent to the emissions from driving 665,000 km. Citizens have been able to participate in this project from a reduced investment of only 100 euros, as a "co-participant" of the installation. More than 150 people have participated. The profitability obtained has reached 6% after taxes. ECOOO wanted to make visible the positive impact that the Lebrija Solar Wave installations has on the environment by sponsoring the plantation of cherry trees in Valle del Jerte (Cáceres). A total of 11 cherry trees have been planted, one for each photovoltaic installation in Lebrija, so that the citizens who participate in the Lebrija Solar Wave facilities, will collect the fruit from the cherry tress of which they will be co-owners.

7. Collective citizen financing for the photovoltaic installation of the Saint Agustí Convent

The Civic Centre of the Saint Agusti Convent in Barcelona is a municipal building with a solar energy panel for self-consumption that will be built with the investment of the citizens, through crowdlending. The project aims to encourage an active role of the residents in the evolution towards a new more sustainable energy model. The photovoltaic installation will generate 38,880 kWh, the equivalent of the electricity needed to cover the needs of seventeen homes, and will be used for self-consumption by the building itself.

This crowdlending is being developed through the ECROWD collective financing platform. A total of 166 people (investors) have participated and the total amount has been 105,000 euros.

8. Eléctrica de Cádiz and self-consumption

The public energy company, Electrica de Cadiz, develops a line of activity that facilitates households to have self-consumption installations. This public company offers turnkey projects, with financing tailored to its clients, from the design to the installation, legalisation and all the administrative procedures required.

Any citizen, whether or not they are a client of the public marketing company, and with a home anywhere in Spain, can opt for this service. Customers who contract this service will benefit from compensation for their surplus production, which will vary between 18% and 41% depending on whether the facilities are shared or contracted individually.

9. Energy Poverty Action Plan in Cádiz

The objective of the Cadiz City Hall's Energy Poverty Action Plan is to help families in a situation of vulnerability in the city to manage energy properly, solve energy problems and make their contracts cheaper. As part of this plan, training workshops have been held, in which more than 2,000 families have been trained in electricity billing and energy saving. In addition, energy advice has been given to more than 200 homes and domestic maintenance activities have been carried out (general and electrical).

This plan received the recognition of the association of energy agencies in Spain, EnerAgen, and was awarded the best performance in 2019 in the area of awareness and dissemination of renewable energy and energy efficiency.

10. Som Energía finances a photovoltaic project aimed at alleviating the effects of energy poverty

Som Energia has financed its first photovoltaic project in Lleida aimed at alleviating the effects of energy poverty. The project, called "Llars del Seminari", has been developed in collaboration with the Enre Tots i per al Bé de Tothom foundation, in a building of 19 houses in Lleida. This project allows 19 families in a situation of social or economic vulnerability living in this building to save around 30% in energy costs each year.

The project has been promoted by the initiative of the Lleida Local Group of Som Energia as a result of a power optimisation study carried out in these homes (Llars). The financing has been possible thanks to the voluntary contributions that can be made through the electricity bill. For an average use of a family (approximately 200 kWh / month), this represents a contribution of 2 euros per month (0.01 euros / kWh).

11. "No home without energy" ("Ni Un Hogar Sin Energía").

"No home without energy" (www.niunhogarsinenergia.org) is the ECODES´programme to promote energy efficiency among citizens (ODS 7), fight energy poverty (ODS 1) and contribute

to climate action (ODS 13). This initiative offers information and tools to understand and reduce energy supply bills, learn responsible energy consumption habits and learn about energy efficiency measures to be implemented in their homes, as well as financial assistance or programmes to finance them provided by national, regional and local public administrations. The information is transmitted to the population, and especially to the most vulnerable people, through different channels: web, on-line energy management tools, workshops, service points, home visits, publicity and dissemination, corporate and citizen volunteer programmes.

From its website, citizens can fill in the "I want to save" questionnaire with which they will receive recommendations on efficient energy consumption habits, energy efficiency and optimisation measures of their contract to reduce energy bills. All of this is done in a personalised way with respect to their family, work and economic situation and the state of their homes, equipment and private energy consumption. In addition, it allows them to know if they can benfit from (or not) the electrical social bond from the parameters stipulated in the legislation. If you do not have the bond, instructions are provided in order to obtain it, as well as the form from your reference marketer. In this sense, the “No home without energy” project has developed an online tool for the management of energy poverty (ENERSOC) with the objective of facilitating the diagnosis and attention to vulnerable people by social NGOs, city councils, consumer organisations and corporate volunteer programmes. Moreover, it allows the technicians to know additional information about the particular situation of the user that allows an exponential improvement in the treatment of other situations of vulnerability, either physical or material. This tool has received the support and collaboration of different companies, public administrations and non-governmental organisations.

“No home without energy” has been conceded the award as the Best Spanish Project of Social Innovation to Tackle Energy Poverty in the second edition of the Programme for Social Entrepreneurs "Social Innovation to Tackle Fuel Poverty" of Schneider Electric Foundation and Ashoka Foundation.

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SWOT analysis

TOPIC 1. INNOVATIVE RENEWABLE ENERGY TECHNOLOGIES AIMED AT VULNERABLE GROUPS, INCLUDING COLLECTIVE AND URBAN ENERGY SYSTEMS.

WEAKNESSES

- The energy consumption of vulnerable households is low, which decreases the economic profitability of renewable energy installations.
- Vulnerable groups are often unaware of renewable energy installations and equipment.
- The type and size of vulnerable households makes it difficult to install certain renewable energy equipment, in particular solar energy.
- A high percentage of the vulnerable population, especially in more depressed areas, maintains irregular electricity supplies, which entails risks for the neighbours, represents a significant energy expense for the supply companies and a waste of a basic resource such as energy.
- Investments in renewable energies are high for a group that has no economic savings to invest.
- There is obvious concern about the large number of illegal connections, especially in highly marginalised areas such as the Polígono Sur district in Seville

THREATS

- Companies may perceive that the segment of vulnerable groups is unattractive from the point of view of economic profitability, which discourages innovation and the generation of a technological offer adapted to this type of group
- No technological developments adapted to vulnerable groups have been identified in Andalusia.
- In general, energy installations in buildings are not usually collective, so there is no custom or experience in the Andalusian population, especially in the area of vulnerable groups.
- Few experiences in tackling energy poverty through renewable energies.

- The energy efficiency of housing is also a factor to be considered, in order to ensure a more effective and reasonable operation of new renewable energy installations. By focusing on renewable energy, energy efficiency can be neglected.

- Although there is a high potential for renewable energy in Andalusia, it must be taken into account that the use of low quality renewable energy is causing environmental and public health problems in some areas of Andalusia (in particular, Villanueva del Arzobispo).

STRENGTHS

- The versatility and flexibility of renewable energies allows tbeir adaptation to different environments and characteristics.

- The price of renewable installations is increasingly reduced, which favours their use by a greater number of people.

- Interest from users, since they can allow vulnerable households that previously did not consume due to inability to pay, to access consumption by improving their health, quality of life and opportunities. In addition, the "willing to pay" of these consumers is often higher.

OPPORTUNITIES

- High potential for renewable energy in Andalusia.

- Existence of a renewable energy cluster in Andalusia, in addition to other business associations such as AFAR that have been characterised by their dynamism and their ability to innovate in different fields.

- There is a large stock of public social housing owned by the Andalusian Regional Government, although in the field of energy, work has been done mainly on energy saving and efficiency, rather than on renewable energies.

- European policy establishes that the energy transition must be fair, and must also integrate all citizens, including vulnerable groups. Furthermore, it seeks to make the EU a world leader in renewable energies, including self-consumption facilities.

- There are companies and entities in the energy sector that are very sensitive to the problem of energy poverty.

- Actions to improve the energy efficiency of the homes of vulnerable groups have other benefits such as improving public health.

- The growing concern about climate change and environmental damage is fuelling a new awareness in favour of renewable energies, which generally favours and energises the renewable energy sector, including research and technological innovation.

- Corporate social responsibility of companies is an ideal instrument to implement renewable energy and energy poverty alleviation measures.

- Other forms of non-electric self-consumption should also be considered. Aerothermal energy is a form of renewable energy, which we also need to consider, particularly in hot climates such as Spain.

- The extensive stock of public buildings could house renewable energy facilities that supply energy, directly or virtually, to vulnerable groups.

- There are public initiatives already in place to support vulnerable groups such as the Plan for the Polígono Sur District in Seville (Commissioner for the Polígono Sur district in Seville) in which pilot programmes for the development of innovative renewable energy technologies can be articulated to promote the empowerment of vulnerable groups and encourage social innovation.
- Andalusia counts on the Andalusian Regional Strategy for Social Cohesion and Integration (Estrategia Regional Andaluza de Cohesión e Integración Social (ERACIS)), a project financed by the European Social Fund, which offers an extraordinary opportunity, within its framework, to have the support of the resources of the community social services, and of the social entities that benefit from this assistance, which have among their objectives the strengthening of itineraries of social and labour insertion, which will result in the standardisation of supplies and the possible improvement of installations, including innovative renewable energy technologies and the empowerment of vulnerable groups.

TOPIC 2. NEW FINANCING FORMULAS FOR RENEWABLE ENERGIES SUITABLE FOR VULNERABLE GROUPS.

WEAKNESSES

- Shows economic weakness on the part of vulnerable groups, in order to meet the costs of renewable installations, and even when they are subsidised.

- The energy consumption of vulnerable households is low, which decreases the economic profitability of renewable energy installations.

- Difficulty to access financing by vulnerable groups. Public aid has traditionally been complex to process for vulnerable groups, which tend to be dominated by people with little training or limited ability to access information.

- Normally, accessible financing is not 100%.

THREATS

- Companies may perceive that the segment of vulnerable groups is unattractive from the point of view of economic profitability, which discourages innovation and the generation of a technological offer adapted to this type of group.

- Public funding is insufficient to meet the energy needs of all vulnerable groups.

- The availability of specific funds for vulnerable groups is often directed to other basic and most urgent concepts (food, clothing, minimum life supplies).

STRENGTHS

- Andalusia is a region that still receives high European funding for energy improvement actions (sustainable energy development).

- Andalusia has extensive experience in the management of energy-related grant programmes (including renewable energies).

OPPORTUNITIES

- There is a growing trend of microfinance platforms (crowdfunding/crowdlending) such as ECROWD and FUNDEEN, which respond to public interest in investing in renewable energy.

- Although they are rare, "ethical banking" initiatives such as Triodos Bank, Coop57 or Fiare have existed for years.

- There are more and more financial instruments (investment funds, pension plans, ...) that take into account the environmental and social impacts of investments.

- In recent years, citizen energy cooperatives have been gaining in importance, often including the fight against energy poverty and the promotion of renewable energy.

- In the coming years, so-called "local energy communities" will take on a much more active role, which both the European institutions and IDAE are trying to promote and strengthen. In this regard, it is worth highlighting the strengthening of these communities in the latest review of the Spanish Government's National Energy and Climate Plan (Plan Nacional Integrado de Energía y Clima (PNIEC). In addition, existing experiences of rural energy communities should also be considered

- Economic savings for public health services resulting from a lower degree of energy poverty can facilitate public funding of actions to tackle energy poverty.

- Energy companies themselves with their corporate social responsibility can and are able to manage funds.

TOPIC 3 IMPROVEMENTS IN THE REGULATORY FRAMEWORK FOR RENEWABLE ENERGIES AND VULNERABLE GROUPS

WEAKNESSES

- Policy instruments of a regulatory or normative nature are often slow to change.

- All levels of the Public Administration and the regime of competences (European, national, regional and local) have to be considered.

- There are no tools for identifying and evaluating the most vulnerable groups, or the efficiency of the measure implemented, whether it be funding or improving energy efficiency.

THREATS

- Despite the existence of methodologies and indicators to quantify energy poverty at European level, it is still complex to measure energy poverty. So there is a risk that new regulatory developments will ignore segments of the population actually affected by this problem, even if they are not identified by the official methodology or indicators.

- Stoppage of some programmes because they are anchored in the quantification or detection of people in a situation of energy poverty.

- Programmes to detect and reduce energy poverty are not implemented efficiently. The most vulnerable groups are not usually recognised as such, and therefore do not receive

the assistance that they should receive according to their situation (whether monetary or to improve housing).

STRENGTHS

- Spain has developed the National Strategy for Energy Poverty, together with two other relevant strategies and plans (Just Transition and National Energy and Climate Plan).
- Andalusia counts on people and entities that are experts in energy poverty.

OPPORTUNITIES

- The new Community regulatory framework in the field of energy opens up a new favourable scenario for tackling energy poverty through renewable energies.
- The new Spanish regulations on self-consumption and renewable energies introduce several elements such as local self-consumption, collective self-consumption or administrative simplification, which will make it easier for vulnerable groups to benefit from renewable energies.
- Integrating renewable energies in the rehabilitation processes of buildings and neighbourhoods, in particular, facilitating urban energy systems
- Derived from the commitments of the Covenant of Mayors, the municipalities have to carry out measures to tackle energy poverty.
- Integrate the scientific and academic aspect that people from the research field could provide to the project.

TOPIC 4 EMPOWERMENT OF VULNERABLE GROUPS AND SOCIAL INNOVATION TO STIMULATE CITIZEN PARTICIPATION OF THESE SOCIAL GROUPS

WEAKNESSES

- Vulnerable groups are very heterogeneous: elderly people, unemployed people, single-parent families, immigrants, etc. This requires a different approach depending on the economic, social and cultural situation of each type of household, a factor that makes tackling energy poverty more complex.

- The socio-economic vulnerability of vulnerable groups is a serious difficulty in accessing these groups and promoting their participation. The lack of cohesion and structuring of the neighbourhood communities of vulnerable groups prevents the carrying out of maintenance and rehabilitation works and actions.

THREATS

- Traditionally there has been a separation between technological and social actors, which has made it difficult to adopt an integrated approach to tackling energy poverty.

- Lack of knowledge of the energy sector by social entities and services

STRENGTHS

- Public administrations, particularly local ones, have extensive experience in social services and are aware of the reality and idiosyncrasies of vulnerable groups.

OPPORTUNITIES

- There are already local networks in contact with citizens and vulnerable groups that can act as possible prescribers, generating participative processes and proximity to neighbours, which allow the detection of specific needs in each neighbourhood and the optimum orientation of actions.

- Public administrations, particularly local ones, have extensive experience in social services and are aware of the reality and idiosyncrasies of vulnerable groups.

- The insertion of vulnerable groups in the renewable energy labour market is a great opportunity to develop, as shown by some initiatives already launched in Spain (ECOOO, El Zaguán and Amoverse).

- Creation of the figure of the "social energy manager", which brings together the necessary knowledge and experience in both energy and social services.

- Existence of programmes to tackle the energy vulnerability of the energy companies and cooperatives themselves.

- There are already various collaborations between different stakeholders (FAMP, ENDESA, Naturgy, ECODES, Red Cross) which could strengthen and extend the work carried out in POWERTY.