Revised version of Blueprint model for the Sun4All programme

From Solar to All to Eurosolar to all (Sun4All)

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Abbreviations and Acronyms

ACRONYM	DESCRIPTION
AGN	Ageneal
ANAH	Agence Nationale de l'Habitat
ARERA	L'autorità di Regolazione per Energia Reti e Ambiente
CAC	Comunità di Auto Consumo
CCCS	Communauté de Communes de Cœur de Savoie
CEC	Citizen Energy Community
CMA	Câmara Municipal de Almada – Almada Municipality
CSC	Collective self-consumption
DGEG	National Energy and Geology Directorate
DSO	Distribution System Operator
EDF	Électricité de France SA
ELPPE	Estratégia de Longo Prazo de Combate à Pobreza Energética
ENEA	National Agency for Energy and Environment
EMD	Electricity Market Design
EP	Energy poverty
FCL	Federconsumatori Lazio
FTS	Forum Terzo Settore
GDPR	General Data Protection Regulation
GSE	Gestore dei Servizi Energetici
HERB	Holistic Energy Efficient Retrofitting of Residential Building
IDAE	Spanish Energy Institute
IEA	Individual Energy Advice
IMHAB	Municipal Institute of Housing and Renovation
ISEE	Indicatore Situazione Economica Equivalente (Equivalent Economic Status Indicator)
LTECV	Loi de Transition Énergétique pour la Croissance Verte
MIMIT MiSE/Mi	Ministero delle Imprese e del Made in Italy (ex Ministero dello Sviluppo Economico Rome)
NECP	National Energy and Climate Plan
NER	Renewable Energy Nucleus
NYSERDA	New York State Energy Research & Development Authority
OIPE	Osservatorio Italiano sulla Povertà Energetica
ONPE	National Energy Poverty Observatory
OPAC	Public Planning and Construction Office
OPAH	Housing improvement program
PAEs	Energy Advice Points
PCP	Primary Cabin Perimeter
PNIEC	Integrated National Energy and Climate Plan

RCP	Roma Capitale
RECS	Solidarity Renewable Energy Communities
RECs	Renewable Energy Communities
REN	Reddito Energetico Nazionale (National Energy Revenue)
RES	Renewable Energy Sources
SAP	Sapienza University
SECAP	Sustainable Energy and Climate Action Plan
SOLIHA	Solidaires pour l'habitat
SPD	Social Policies Department
Sun4All	Eurosolar for all: energy communities for a fair energy transition in Europe
UC	Use Case
TIAD	The Integrated Text for Widespread Self-Consumption
TURPE	Tarif d'Utilisation du Réseau Public d'Electricité

Executive summary

The Sun4All project aims to promote energy communities for a fair energy transition in Europe. This revised blueprint document provides an overview of the regulatory and policy frameworks, financial schemes, and business models for the Sun4All pilot projects in Almada, Barcelona, Communauté de Communes de Coeur de Savoie, and Rome.

Key updates in this version include information regarding:

- EU policies and initiatives on energy communities and poverty, such as the Clean Energy for all Europeans package, Repower EU plan, and new EU state aid rules.

- Detailed analysis of the legislative and regulatory frameworks for renewable energy communities (RECs) and collective-self consumption (CSCs) in France, Spain, Portugal, and Italy.

- Cross-sectoral comparison of the Sun4All pilot projects, highlighting similarities and differences in their approaches.

- Refined use cases and business models for each pilot, incorporating lessons learned from the initial implementation phase.

The blueprint serves as a comprehensive guide for developing and implementing energy community projects that address energy poverty and promote a just energy transition. It provides a roadmap for navigating the complex policy landscape, designing effective financial schemes, and creating viable business models that empower citizens and communities.

By sharing best practices and lessons learned from the Sun4All pilots, this blueprint aims to inspire and support the replication of similar initiatives across Europe, contributing to the EU's goals of increasing renewable energy production, reducing energy poverty, and fostering a more inclusive and sustainable energy system.

Please find also all the public resources on the project at the following link: https://sunforall.eu/resources

1.   Introduction

The Sun4All project is an experiment in the context of the European Union of the "Solar for All" program previously implemented in New York State.

The Solar for All program builds upon the extensive experience of community solar initiatives in New York, managed by the New York State Energy Research & Development Authority (NYSERDA). Community solar allows anyone in the vicinity of a solar power plant to subscribe and access clean, affordable power, with the benefits reflected on their energy bills.

The Solar for All program specifically targets low to moderate income households that may not have otherwise been able to participate in community solar projects due to investment or space limitations. The program is financed primarily through the New York state budget, which selects a company through a competitive bidding process to deliver the solar projects and sell the electricity to NYSERDA.

To be eligible, households must rent or own their home and meet certain income requirements.

The original Solar for All program was adapted to the European context, building on the growing momentum around energy communities and the EU's efforts to empower citizens and local actors in the clean energy transition.

The main differences between Solar for All and Sun4All are:

- Solar for All primarily focuses on bringing solar energy access to low-income households and communities in the United States, while Sun4All is a European project aimed at promoting energy communities across Europe.

- Policy Context: Solar for All operates within the context of U.S. energy policies and initiatives, whereas Sun4All is influenced by EU policies and initiatives.

- Regulatory Frameworks: Solar for All operates under different regulatory frameworks in the U.S., whereas Sun4All addresses the specific regulatory frameworks in the different pilots in France, Spain, Portugal, and Italy.

- Pilot Projects: Solar for All has specific pilot projects tailored to the U.S. market, whereas Sun4All has pilot projects in 4 European cities, each addressing local needs and challenges.

By adapting the original Solar for All program to the European context, Sun4All aims to provide a comprehensive guide for developing and implementing energy community projects that address energy poverty (EP) and promote a just energy transition. The following sections delve into the regulatory and policy frameworks, financial schemes, and business models underpinning the Sun4All pilot initiatives across Europe.

2.   Regulatory and Policy Framework

2.1. EU policies and initiatives on Energy Communities and Energy Poverty

The adoption of the Clean Energy for all Europeans package in 2018 and 2019 constituted the turning point for the regulation of energy communities at the EU level. As part of the package, two directives on the promotion of the use of energy from renewable sources ((EU) 2018/2001) – also known as REDII – and on common rules for the internal electricity market ((EU) 2019/944)4 – referred to as EMD (Electricity Market Design) in this paper – introduced at the EU level the concepts of renewable energy communities (RECs) and citizen energy communities (CECs) respectively. The EU is notably requiring Member states to establish dedicated enabling frameworks that fully consider energy communities' wider goals and specific needs. Member states had to transpose provisions on CECs by 31 December 2020 and provisions on RECs by 30 June 2021.

The Repower EU plan proposed by the European Commission in May 2022 in response to the disruptions caused on the energy markets by the war in Ukraine, increased some of the initial ambitions of the Fitfor55 package and strengthened EU's commitment to promote smaller decentralized and citizen-led energy production systems.

The acceleration of permitting for renewable projects and the mainstreaming of solar energy installations on buildings could be a game changer for RECs working with solar panels. The Energy Efficiency concept, also importantly introduced for the first time an EU-wide definition of energy poverty and recognises the role of energy communities in this fight.

The EU Solar Strategy, while not legally binding, also introduces an indicative target to set up renewable energy communities in all municipalities of 10,000 inhabitants and above. Under the new strategy, the EU also announced new earmarked funding under the LIFE programme, the Energy Communities Facility.

Lastly, the new EU state aid rules should also make it easier for energy communities to access funding at the national level.

In the framework of the Sun4All project, one regulatory framework report and three policy briefs were drafted to examine the policy context of energy communities and in particular those actively contributing to energy justice and the fight against energy poverty. Policy recommendations for the European, national, and regional/local levels were proposed in this framework.

2.2. France - Main characteristics of legislative/regulatory framework

The French electricity sector is highly centralized and centered around Électricité de France SA (EDF). Moreover, Climate and Resilience Law (2021) aims to develop citizen energy through energy communities.

The preferred mechanism for the sale of photovoltaic energy is the total sale at a price set by the French government. Individual self-consumption is a model encouraged by the State, but its technical and economic relevance is limited to certain consumption profiles. Collective self-consumption (CSC) is possible by law but still suffers from too much complexity in its implementation.

2.2.1.   Energy Poverty

- "Habiter Mieux", a programme of the ANAH (Agence Nationale de l'Habitat) implemented in 2010 which finances a set of renovation interventions aiming at realizing comprehensive thermal renovations of homes of low-income households.

- National Energy Poverty Observatory (ONPE), published in 2011: indicators to measure energy poverty.

- White Certificates: the LTECV ("Loi de Transition Énergétique pour la Croissance Verte") sets a specific energy efficiency obligation on energy suppliers to achieve energy savings to benefit households suffering from fuel poverty (determined based on household income).

- Energy voucher: a state aid for low-income households to pay energy costs in their homes (gas, electricity, heating fuel) and for some energy building renovations, a scheme that replaced the "tarif de première nécessité", or TPN ("basic needs" energy price).

- "Winter truce": This measure has been implemented since 2014. Energy suppliers are not allowed to disconnect households during the winter period (November - March) from electricity or natural gas provision. However, reductions in delivered power are permitted to a certain limit.

- Renovation vouchers or subsidies, which were implemented in 2020 and provide financial support for certain types of works linked to energy efficiency to low-income households.

2.2.2.   Self-consumption Energy

- Only Collective self-consumption is detailed (but CSC, in this case, includes the use of a public electricity grid and a legal entity).

- Tariffs: Collective self-consumers can choose between the standard distribution grid tariff (TURPE – national Distribution Grid Utilization Tariff) and a specific CSC TURPE.

- The Distribution System Operator (DSO) is obliged to supply smart metering.

- Since 2019, CSC's geographical scope was 2 km between the two most distant participants of the operation. Since 2020, it changed to 20 km, in areas with low population density.

- Cumulative power maximum for a CSC is 3MW (0,5 MW in non-interconnected areas).

2.2.3. Energy Communities

- In 2019, the Energy and Climate Law constituted the first step in transposing REDII with the introduction of RECs.

- In 2021, new pieces of legislation completed the French legislation on energy communities, notably introducing the concept of CECs and setting tariffs.

- November 2021: The French government announces 10 measures to promote citizen energy. The plan also sets the objective of 1000 new locally governed renewable energy projects involving communities and citizens by 2028. The players in citizen energy consider that this action plan cannot be implemented without involving more of the local players.

- France already adopted some of these measures. In 2022, France established a participatory bonus for locally governed projects in national calls for tender (Measure 4). In addition, the French government significantly lowered grid connection fees (Measure 9). However, the effective implementation of many of these measures will be actively monitored. There are also still missing pieces in the legislative puzzle, such as measures to increase accessibility to community energy projects for energy-poor and vulnerable consumers.

- Lastly, the law to accelerate the deployment of renewable energy adopted in March 2023, may have brought additional barriers for energy communities to be able to sell energy to final consumers. This raises concerns about France's future ambitions for these initiatives.

- In October 2023, the 2 km separating the two furthest participants in the operation has been increased to 10 km on the territory of Coeur de Savoie (based on the population density conditions).

Basic definition of RECs and CECs:

- Produce, consume, store and sell renewable energy, including through renewable electricity purchase agreements.

- Share, within the community, the renewable energy produced by the generation units owned by the community.

- Access to all relevant energy markets, directly or through an aggregator.

- Need to have a legal entity created.

- When a REC or CEC chooses to produce and sell renewable energy, it can benefit from funding schemes in two ways. A first possibility is to focus on FITs (purchase obligations). A second possibility is responding to calls for tenders launched by the French Energy Regulator.

2.3. Spain - Main characteristics of legislative/regulatory framework

2.3.1. Energy Poverty

- National strategy against energy poverty for 2019-2024 that aims to halve the number of energy-poor households by 2025 with a minimal target of at least 25% on all indicators used to measure energy poverty. This strategy is being updated this year.

- Social bonus for electricity (2009) and heating (2018), providing energy bill support, through a direct discount on the electricity bill.

- Barcelona Climate Emergency Action Plan 2020-2030: the city intends to achieve zero energy poverty by 2030.

- Royal Decree-Law 17/2021: beneficiaries of the social bond (discounted rate) have four months to pay unpaid bills. Companies must provide for these consumers for six months plus a comfort supply (minimum vital supply). Until February 28th, 2022, the ban on cutting basic supplies (water, electricity, and gas) for vulnerable households also remains in force.

- At the regional level, Catalonian Law (Lei 24/2015) prohibits companies from disconnecting vulnerable households from electricity and natural gas supply and obliges them to maintain energy services when households are facing economic difficulties.

- At a local level, Barcelona City Council has Energy Advice Points (PAEs) that offer help and information and intervene to prevent supplies from being cut off, as well as offering the general public information on reducing bills, improving energy efficiency in the home and the grants available for that, and installing solar energy systems in buildings.

2.3.2. Self-consumption Energy

- Collective self-consumption is a fully regulated activity under Royal Decree 244/2019 in the Spanish energy market. It does not require the establishment

of a legal entity when setting up a CSC; instead, a contract outlining the solar energy-sharing arrangement is sufficient.

- CSC can be managed in two ways: without feeding surplus energy back into the grid or by feeding the surplus into the grid. In the latter case, there are two scenarios: first, the surplus can be sold at a fixed price; alternatively, surplus energy can be fed into the grid with compensation, in this case, the electricity injected is deducted from the bill at approximately one-third of the retail cost. This last option is the most common, but it is only available for installations smaller than 100 kW from renewable energy sources.

- For CSC to be valid, one of the following three conditions must be met: the maximum distance between the production and consumption points should not exceed 2,000 meters or 500 meters for ground installations; the production and consumption must be connected to the same substation (Medium Voltage to Low Voltage); or they must be located within the same cadastral sector.

- A contractual agreement must be signed by all members involved, specifying the distribution of the electricity produced, which can be set either at a constant rate throughout the year or on an hourly basis. This agreement can be modified every 4 months. There is a need to have smart meters and bidirectional smart meters at the generation plant. This requirement is because CSC is implemented virtually by the DSO, with no physical cable connections between producers and consumers.

- Although the CSC scheme is intended to be fully regulated and implemented in Spain, DSOs are proving to be a significant barrier to its effective rollout. This is largely because there are no penalties for failing to meet the regulated deadlines or for violating citizens' energy rights.

- A basic definition of RECs has been established, but there is still no formal definition for CECs. In April 2023, the Spanish government drafted a Royal Decree addressing this issue and opened it for public consultation. However, due to the political elections, the final publication of the decree is still pending. Following the adoption of the two EU directives establishing CECs and RECs, Spain introduced the concept of renewable energy communities in its legislation, sticking mostly to the EU definition with few clarifications.

2.3.3. Energy Communities

- The Spanish legislation offers some favourable incentives to energy communities but lags in terms of the overall enabling framework. The incentives are provided through funding programs for energy community projects, covering up to 60 % of material expenses and managed by IDAE (the Spanish Energy Institute).

- The Spanish government took full advantage of its National Recovery and Resilience Plan and the National Energy and Climate Plan (NECP) to announce enabling measures for energy communities. For instance, in its NECP, Spain

also envisaged reserving an annual quota for citizen participation in renewable energy projects as well as accepting tenders that favour projects that take into account social elements, some regions like Catalonia or the Balearic Islands already have such measures in place. In Catalonia, they are required to open the projects for citizen participation to a minimum of 20% of local residents.

- Spain has already launched a funding program that had 4 different calls, specifically targeted at energy communities, incorporating social, gender, and local criteria. However, additional support measures are still pending. Unfortunately, the design of these programs has enabled corporate entities to capture a significant portion of the available funds, diverting them from their intended community-focused recipients.

2.4. Portugal - Main characteristics of legislative/regulatory framework

2.4.1. Energy Poverty

- "Social energy tariff": discount on the tariff for access to electricity and/or natural gas networks. Access to the benefit of the social tariff for electricity and natural gas is now carried out through an automatic recognition mechanism based on customer data and after verification of eligibility conditions.

- "Energy efficiency vouchers", it's a support program in its 2nd phase, with an average value of €1300 for each voucher and a maximum attribution of 3 vouchers per beneficiary. It is targeted to economically vulnerable families and those in energy poverty. This is a direct support mechanism that can be used in rehabilitation interventions, such as efficient windows, efficient domestic hot water systems, efficient heating/cooling systems, solar panel installation, etc, with specialized technical support promoting the adoption and/or replacement of systems and equipment for more energy efficient ones.

- National Long-Term Strategy to Combat Energy Poverty 2023-2050 (Estratégia de Longo Prazo de Combate à Pobreza Energética - ELPPE): with a horizon of 2050, it aims to:

  - Eliminate energy poverty by 2050 by safeguarding vulnerable consumers and actively involving them in a fair and democratic transition towards sustainable energy and climate practices.

  - Create a National Energy Poverty Observatory and establish regular decadal action plans (2030, 2040, 2050) to monitor progress.

  - Increase housing energy performance through targeted interventions to improve energy efficiency and building rehabilitation, incentives for changes in consumption patterns, and integration of renewable energy.

- Ensure universal access to essential energy services by providing mechanisms to facilitate and support access to energy for households in energy poverty.

- Reduce the burden of energy consumption through price support mechanisms and other measures to increase household disposable income.

- Strengthen energy knowledge and access to information to promote energy literacy and the adoption of energy efficiency measures.

2.4.2.   Energy Self-consumption

- The concepts of RECs and CSCs are detailed (collective self-consumption, in this case, can include the use of the public electricity grid).

- When the public grid is used there are associated tariffs but also exemptions or partial exemptions for some configurations temporarily (7 years), or in case of a pilot.

- No need to have a legal entity created when establishing a CSC. However, we need to have an entity responsible for the operational management of the self-consumption activities and the communication with the respective operators (which can be an external entity or one of the individuals in the case of CSC).

- Need to indicate the percentage of energy allocated to each member, sharing the electricity produced among the members according to what is agreed.

- Members must have smart meters and production plants need to have bidirectional smart meters at the generation plant (a 15-minute timestep is possible), supplied by DSO.

2.4.3.   Energy Communities

- Portugal adopted the objective to increase the installed capacity of decentralized solar energy to 2.3 GW in 2030 and 13 GW in 2050, with households and other small producers accounting for more than 20% of total electricity production.

- In 2019 and 2022 Portugal introduced a legal framework for individual and collective self-consumption and renewable energy communities, which transposes EU provisions on RECS and CECs (Decree-Law No 162/2019 repealed by Decree-Law No 15/2022). There is a need to have a legal entity created in the case of RECs.

- RECs are part of the CSCs definition and hence limited to generation and self-consumption of electricity, which limits "the ability of energy communities to exercise their rights more broadly across the energy sector".

- Establishment of RECs and CSCs limited to the same building and/or nearby geographical area (casuistic approach for each project subject to approval by the Directorate-General for Energy and Geology - same voltage level is a general requirement).

- Possibility to create special pilot projects for RECs that exempt partially the applicable legislation for innovative testing.

- The enabling framework for energy communities in Portugal is only available to RECs and remains incomplete. The Portuguese government addressed some of these policy shortcomings in the framework of its National Recovery and Resilience Plan and even more in its National Energy and Climate Plans (e.g. providing technical assistance including guidance to obtain funding for municipalities, reinforcing the current registration system, and creating an electronic information portal on self-generation and energy communities to inform customers and facilitate the installation process), but the implementation of these measures remains to be evaluated.

2.5. Italy - Main characteristics of legislative/regulatory framework

2.5.1. Energy Poverty

- Energy poverty in Italy was defined, for the first time, in the National Energy Strategy (SEN) of 2017, as "difficulty in purchasing a minimum basket of energy goods and services, or alternatively, in a sense of vulnerability energy, when access to energy services involves a diversion of resources (in terms of expenditure or income) greater than a normal value".

- The issue of energy poverty has taken on a leading role in Italy, both in terms of analysis and evaluation and in the identification of contrasting policies; for these purposes, among other things, an ad hoc Observatory was established at the Ministry of the Environment and Energy Security (National Energy Poverty Observatory). In the update of the PNIEC transmitted to the Commission in July 2023, to monitor energy poverty, reference is made to the indicator "Share of population that is unable to adequately heat the own home"; in 2022, in Italy, this share is equal to 8.8%.

- In the Integrated National Plan for Energy and Climate (PNIEC 2019), Italy defines energy poverty as the difficulty in purchasing a minimum basket of energy goods and services or as the condition for which access to energy services implies a distraction of resources (in terms of expenditure or income) higher than what is socially acceptable. This definition, in line with those adopted by the main Member states of the European Union, defines a perimeter of citizens that could largely coincide with that identified by the notion of poverty tout court.

- PNIEC 2019 sets the objective of reducing the total number of energy-poor households by 7-8% before 2030.

- To ensure institutional coordination of EP analysis and enforcement activities, and following the provisions of the PNIEC 2019, with Decree no. 131 of 29 March 2022, the National Observatory of Energy Poverty was established in Italy, an inter-institutional entity promoted and led by the Ministry of the Environment and Energy Security, which has among its tasks the monitoring of the EP phenomenon and the development of a counter strategy.

- A regulatory definition of EP has not yet been introduced in the PNIEC of June 2024; it is expected to formalize this definition in the national decree transposing the new Energy Efficiency Directive (EU) 2023/1791 of 13 September 2023. The definition of EP will certainly consider the indications of the European regulatory and programmatic framework.

- The OIPE (Osservatorio Italiano sulla Povertà Energetica) was established in 2018 and represents the main data source on the phenomenon. The 2020 Report counts more than 2.2 million households in energy poverty in Italy, equal to 8.5% of total households (http://oipeosservatorio.it/).

- In Italy, the position paper 2019 by ENEA (National Agency for Energy and Environment) presented a very complex set of measures, to contrast how energy poverty operates both for the tools used and for the division of responsibilities between the various levels of government of the territory. Among these measures, there is not only the bonus in terms of energy bill reduction but also the access to public incentives for energy rehabilitation of the households. It should be noted that incentives in the form of a tax deduction do not allow families in economic hardship to benefit, and it is also due to the difficulty of accessing bank credit to anticipate spending.

- The main tools for tackling energy poverty used in Italy - the Electricity Bonus and the Gas Bonus - (BONUS ENERGIA) have characteristics that make them equivalent to tools for combating poverty already in use in the country. These features are:

  - The beneficiary selection criterion, based on the same indicator of the beneficiary's economic situation gives access to other tools to combat poverty.

  - The form of the benefit paid which is substantially equivalent to a monetary transfer.

  - From 1 January 2021 all social bonuses for economic hardship, including electricity, are automatically applied to citizens/families who are entitled to them, without having to submit an application (Law 124/019, Law 157/2019).

- To date, there are some proposals for improvement or integration of the tools currently used in Italy to tackle energy poverty. The major problems that are

encountered in their definition are linked to the complex relationships of complementarity and subsidiarity with those specifically destined to tackle energy poverty. Such proposals were framed as follows:

- Support for bill payment

- Energy advice

- Direct incentives or interventions for the energy requalification of buildings.

- On 2 September 2021, as part of the European project ENPOR "Actions to Mitigate Energy Poverty in the Private Rented Sector" - in which the Energy Efficiency Unit Department of ENEA participates - the first Policy Forum was held in Italy, a meeting of the Advisory Board, which includes experts in energy poverty from Germany, Greece, Estonia, Italy, the Netherlands, Austria and Croatia.

- With the Decree of 8 August 2023 of the Minister of the Environment and Energy Security, Energy Income was introduced and the Reddito Energetico Nazionale (REN) regulation valid until 31 December 2024 was approved. Energy income is an economic contribution intended for families in financial difficulty (with low ISEE (Indicatore Situazione Economica Equivalente), for the construction of self-consumption photovoltaic systems. The measure is financed by the National Energy Income Fund which has an amount equal to 200 million euros for the years 2024 and 2025. To access the REN it is necessary to have an ISEE of less than 15,000 euros or 30,000 euros in the case of 4 or more dependent children. The photovoltaic systems, for which the decree allocates a capital contribution, must be built on roofs and surfaces, areas and appurtenances for which the beneficiary is the holder of a valid real right.

- The theme of energy poverty is one of the main themes, with specific strategies and objectives, contained in the SECAP (Sustainable Energy and Climate Action Plan) approved and adopted by the City of Rome in July 2020.

2.5.2.   Self-consumption Energy

- The Decree of the Minister of the Environment and Energy Security of 7 December 2023, n. 414 (CACER Decree), in force from 24 January 2024, defined the new methods for granting incentives, aimed at promoting the construction of systems powered by renewable sources inserted in configurations of energy communities, groups of self-consumers and remote self-consumers. The Integrated Text for Widespread Self-Consumption (TIAD), attached to ARERA (L'autorità di Regolazione per Energia Reti e Ambiente) Resolution 727/2022/R/eel, regulates the operating mechanism and the valorisation contributions that are due to self-consumed energy within the

permitted configurations. TIAD defines seven different types of possible configurations for widespread self-consumption:

- Groups of renewable energy self-consumers acting collectively

- Active customer groups acting collectively

- Renewable energy communities (REC)

- Citizen energy communities (CEC)

- Individual self-consumer of "remote" renewable energy who uses the distribution network

- Active "remote" customer who uses the distribution network

- Individual self-consumer of renewable energy "remotely" with a direct line (Source: https://www.gse.it/servizi-per-te/autoconsumo/gruppi-di-autoconsumatori-e-comunita-di-energia-rinnovabile at 1st July 2024)

- Self-consumption is the consumption of electricity contextual to its production and can take place in physical or virtual form. Self-consumption is physical when the energy production plants are connected to consumer users, but virtual when it uses the distribution network to balance the consumption and production of energy underlying the same portion of the electricity network but without coincidence between the point of the renewable plant feeding into the grid and the withdrawal point.

- Virtual self-consumption is at the basis of the configurations of widespread self-consumption and the subjects who are part of it, in any of its forms, represent a new economic model, based on the production of electricity with the renewable resources of the territory in which it is consumed and on using the network to share it.

- Comunità di Auto Consumo (CAC) and RECs are regulated by Decree-Law 162/19 (Article 42bis) and the related implementing measures, such as Resolution 318/2020/R/eel of ARERA and the Ministerial Decree of 16 September 2020 of the MiSE (Ministero Sviluppo Economico, currently Ministero delle Imprese e del Made in Italy MIMIT), then recently by the Law Decree n.119 8-11-2021, adoption of the RED II EU Directive.

- CAC focuses on condominiums: mainly residential users, members must not have energy exchange as a core business.

- End customers, prosumers, and consumers of electricity can now join together creating an association to include more buildings or using the legal entity of the Condominium to produce locally Renewable Energy Sources (RES), electricity necessary for their needs, then metering and "sharing" it.

- Subsidies for self-consumed electricity are a "premium tariff". The "shared" electricity benefits from an economic contribution recognized by the GSE

(Ministry of Finance Authority for incentives on renewables) through access to the GSE incentive application service.

- CAC Schemes imply virtual aggregates of consumers and prosumers (now under 200 kWp for each prosumer, after June 2022 up to 1 MWp).

- CAC Schemes imply virtual aggregates of units located in the same area (now under the secondary substation, after June 2022 under the same primary substation).

- Need to have smart meters and bidirectional smart meters at the generation plant and meters at the consumer level – 15 minutes up to 1-hour timesteps possible.

2.5.3.   Energy Communities

- In Italy, before the RED II directive, there were already many communities and energy cooperatives, focused on the sharing of energy, also renewable, among the associates. Located mainly in the area northern peninsula, some of them, were active already in the first decades of the twentieth century (Funes, Ewerk Park, COOP Elettrica Gignod, Soc. Elettrica di Morbegno, COOP di Melpignano, FTI, COOP Energia Positiva, COOP E' NOSTRA, Associazione Comunità Energetica).

- Starting with 8th April 2024 it is possible to submit REC proposal for public incentives (GSE portal): feed-in tariff based on shared energy, measured and incentivized for 20 years; (only for small municipalities < 5000 inhab) 40% of investments cost repaid by GSE.

The Italian regulation provides:

- DL 162/2019 Milleproroghe, later converted into Law no. 8/2020, which regulates the Energy Communities provided for by the European RED II Directive.

- Legislative Decree 199/2021 implemented the European Directive RED II, EU Directive 2018/2001, on the use of energy from renewable sources.

- The ARERA resolution 318/2020/R/eel of 4 August 2020 temporarily started the regulation of electricity shared in buildings or condominiums (Self-consumers of renewable energy acting collectively) and within renewable energy communities.

- With resolution 727/2022/R/eel of 27 December 2022, the Regulatory Authority for Energy, Networks and the Environment (ARERA) approved the Integrated Text on Widespread Self-Consumption (TIAD) which regulates the methods for valorising widespread self-consumption for the configurations provided for by legislative decrees 199/21 and 210/21, including Energy Communities.

- RECs peak power and area: Up to 200 KWp under the same DSO secondary substation, but in June 2022 limits were raised to under 1 MWp and the same DSO primary station.

- RECs receive 180 euro/MWh incentives (110 €/MWh for the shared energy, 70 for the energy injected in the grid). Only PV plants built after March 2020 can be included in the REC to obtain incentives.

- RECs must act as aggregators. REC legal entities (Association, Cooperative, Fondazione, Consorzio, ATI, etc.) must be non-profit and open to anyone in the area, consumers and prosumers, residential, commercial, public entities, and industrial.

- Public entities (i.e. municipalities) can promote RECs starting with a first PV plant on a public (i.e. school) roof, promoting the creation of the REC legal entity (i.e. Fondazione in Partecipazione) and extending the community to users around the building.

- Principles - Standing to the Regulatory Framework a Renewable Energy Community (REC) is a legal entity that:

  - Whose main objective is to provide environmental, economic, or social benefits at the community level to its shareholders or members, or to the local areas in which it operates, rather than financial profits.

  - Is based on open and voluntary participation, is autonomous and is effectively controlled by shareholders or members who are in the proximity of RES production facilities held by the REC.

  - Whose shareholders or members are natural persons, small and medium-sized enterprises (SMEs), local authorities, including municipalities, provided that, for private enterprises, participation in the renewable energy community does not constitute the main commercial and/or industrial activity.

  - Participation in renewable energy communities is open to all consumers, including those belonging to low-income or vulnerable families.

NOTE: Low-income and vulnerable residents (including those in energy poverty conditions) are favoured to enter the community by simple request, as no investment is mandatory for consumers, which will benefit from a minimum reduction on REC energy consumed and eventually other services.

- Recently, the legislation on RECs in Italy has undergone an important evolution. With the entry into force of the REC decree on 24 January 2024, measures are introduced aimed at further encouraging the development of self-consumption and energy communities. Among the main innovations, the decree provides for a non-repayable contribution of up to 40% for plants built by REC in municipalities under 5,000 inhabitants and a variable incentive tariff for

renewable energy produced and shared. Furthermore, the aim is to develop five gigawatts of production capacity from renewable sources.

3. Financial Scheme of User Benefits revised

3.1. Almada

Being responsible for leading the implementation of the energy support scheme, the municipality of Almada (CMA) installs the solar panels and establishes the energy allocation for the beneficiaries through fixed coefficients according to the household size and family size, limited to a certain amount per month per household.

Ageneal (AGN) is involved in supporting the Almada City Council in its responsibilities of managing the data and keeping the beneficiaries' list up to date at the collective self-consumption regulatory body. The municipality acts as an "intermediary" between the PV installation production and the end users/beneficiaries. The municipality and the DSO are responsible for collecting and managing the data to provide the corresponding benefits to the end users of the project, the vulnerable consumers.

This approach has been used for both the first and second pilots in Almada, with the municipality as the owner of the PV installation and the residents of a set of 10 municipal buildings as the target area/group.

It is worth mentioning that this support scheme is part of the renewable energy nucleus set-up for the 3 Vales area, which includes other public owned equipment such as a pool, a library, a health centre, and four public schools, which will be using a part of the energy produced.

This simple approach provides a reduced electricity bill for the beneficiaries, who will be receiving regularly an energy consumption report from the municipality, indicating the savings achieved by participating in the renewable energy nucleus. The report will include information on the energy generated by the PV installation, energy-saving tips, and community activities such as specific workshops on energy efficiency and other related topics and events.

During a 12-month period, beneficiaries will receive energy advice and energy efficiency sessions, from the municipal environmental department and Ageneal technicians, to optimize their bills and improve their comfort.

Smart electricity meters are installed in all households by the DSO, which allows data access for measuring and communicating consumption and injection into the grid with a 15-minute resolution, in readings without the presence of the reader or the beneficiary at the installation, or carrying out other remote operations, such as changing the contracted power or activating and deactivating it.

To establish the fixed coefficients, that are limited to a certain amount of energy per month per household and according to the household size and family size, the municipality needs to create a specific support scheme regulation. This process involves the consultation of legal advisors, and submission of the regulation for

approval by the municipal assembly before it can be officially published and implemented.

		Maximum amount per household per month (kWh)		
Household size		2 bedrooms	3 bedrooms	4 bedrooms
Family size	1	70	80	90
	2	90	100	110
	3	110	120	130
	4	130	140	150
	5	140	150	160
	6	150	160	170
Common areas of the building		25		

Table 1: Fixed coefficients according to household and family size

For its implementation, the municipality communicates the fixed coefficients to the National Directorate for Energy and Geology (DGEG), which will then pass them to the DSO.

3.2. Barcelona

Barcelona's model is based on shared self-consumption in three social housing blocks maintained by the Municipal Institute of Housing (IMHAB). Sun4All beneficiaries will get their electricity from a solar photovoltaic system installed on the roof of their own building. The model's premise is that recipients will see the advantages directly on their bill, as solar energy output results in less usage on the grid. In addition, surplus energy is purchased by the electricity company, which also has an impact on the electricity bill.

IMHAB building Model is adapted from Use Case 4, from the first version of the Blueprint model for the Sun4All programme, although the owner of the PV facility is the Barcelona City Council, IMHAB is the owner of the buildings where Sun4All beneficiaries live. In this case, the financial flow will be managed directly between the Distribution/Utility company and the end-users, as they will see a direct discount on their electric bill, which will also include information about how much energy is generated thanks to their share of the PV installation.

The management of the data flows will be shared between the Distribution (DSO) and the Utility company. The utility company is given these data by the DSO, which is the stakeholder that monitors how much of the energy is self-consumed from the PV panels, and how much is sourced from the grid.

In the first version of the Blueprint model for the Sun4All programme, another model was described, which was "High Complexity Buildings". This approach was highly challenging and consisted of an energy community between the City Council and beneficiaries, in which the City Council rents beneficiaries' roofs to install solar energy and share benefits. This model was finally not feasible, as timings of the project were too tight to overcome all legal and procedure barriers.

A second option of energy community was foreseen, taking advantage of City Council solar PV installations in pergolas in public spaces. The reasons for not implementing this model were the same: timings did not fit to develop this use case properly in the Sun4All project.

3.3. Communauté de Communes de Coeur de Savoie

Regarding the first pilot, altogether, the operative PV installations will generate an average income of 20,000€ per year. All the revenue will be disbursed in the photovoltaic budget of Communauté de Communes de Coeur de Savoie (CCCS) and subsequently be used to finance Sun4All actions. The income of this solar PV plant will be updated every year (anniversary date of each installation) when CCCS receives financial compensation from EDF, the state institution buying the solar power.

For the second pilot, the investment for PV power plant is supported by Coeur de Savoie on a self-own building. A part of the investment is financed with the help of prefectorial subsidies dedicated to local investment support.

The solar power plant produces energy consumed by the building and then distributed to consumers/beneficiaries.

The distribution of collective self-consumption production for each consumer is relative to the consumption measured in each meter. For a period of 15 minutes (the default option under the self-consumption regulation), the energy allocated is proportional to consumption.

It is also possible to choose fixed coefficients that can be defined for each consumer, or that can be the same for all members and for all periods. However, it is the first proportional allocation system that is chosen.

In a preliminary study, INES predicted that the reduced expense would be 90€ per home per year. After 9 months of energy sharing with the collective self-consumption operation in Coeur de Savoie, the decrease per household ranged from 120€ to 180€ per year.

3.4. Rome

The Rome pilot has selected a third party, a non-profit organization, to act as an "intermediary" between the municipality and the end-users/beneficiaries. The municipality collects the monetary benefits from the RES plants, and transfers these to the Third Party once per year. With this revenue, the third party then provides adequate benefits (public transport discounts, vouchers, low-carbon devices such as bulb lamps, discounts for EE devices, etc.) to the beneficiaries of the project.

4. Cross-sectoral analysis: Sun4All pilots

To identify in detail the main characteristics of each of the pilots an iterative process was set up, having in mind the work developed with the definition of typical use cases, and the analysis for the data protection issues and eligibility criteria methodology, a set of relevant categories were identified to compare data across multiple sectors to identify common challenges and opportunities:

- **Target area** – Geographical scope of each pilot/project

- **Target users** – Typical profile for beneficiaries of the programme

- **Types of incentives** – Specific benefits delivered to target users

- **Legislative/regulatory issues** – Overall governance in the energy system (highly centralized ⇄ pilot/project autonomy)

- **Country/pilot specific constraints** - Framework in each pilot and possible constraints/opportunities

- **Main data issues** – Data management issues and categories alongside data protection rules relevant to the process

- **Main stakeholder categories** – Definition of other relevant stakeholders in each of the settings

- **Energy Utilities/Distribution Systems Operator role** – Billing processes, PV plant registration and operation, energy data and financial flows are strongly dependent on these stakeholders. Their main roles are detailed for clarity.

Category	Almada	Barcelona	Coeur de Savoie	Rome
Target area	10 buildings in the 3 Vales neighborhood of Monte da Caparica, Almada	Municipal social housing buildings from the Municipal Institute of Housing and Renovation (IMHAB).	1st pilot : All Coeur de Savoie area Existing PV plants 2nd pilot : Self-consumption project with targeted buildings in Saint Pierre d'Albigny New PV plant own by Coeur de Savoie (Jul. 2023)	The proximity criteria (municipal school with PV) have been integrated with the relevant role of the associations, that in each of the 11 territories hosted the group's events and workshops. Participation of beneficiaries and the development of the community groups were positively impacted by the Associations involved. The territories were reshaped based on this.
Target users	126 beneficiaries living in 10 municipal social housing buildings at 3 Vales (vulnerable consumers) 1st pilot: 10 families 2nd pilot: 90 families minimum	Municipal social housing residents in three buildings. Citizens who participate in the community workplan activities.	Vulnerable consumers criteria are incomes/bill amount/energy efficiency of the home 1st pilot: Owners and tenants 2nd pilot: Social housing residents	The 3-step selection process was impacted by the visibility of the associations hosting the Workshops' programme. The beneficiaries (186) decided to participate also on the base of their trust in the associations.
Types of incentives	Bill discounts based on family size and apartment size, and occasional rewards in the form of efficient light bulbs	Bill discounts on the electric bills. Energy kits. Capacity building – Individual energy advice sessions and workshops.	Energy advice sessions, Energy kits 1st pilot: complementary subsidies for renovation work for owners, Bill subsidies and energy advice sessions at home for tenants 2nd pilot: Bill reduction thanks to self-consumption of solar energy given away free of charge for tenants	Not yet membership of new RECS, but at least 3 groups going in this direction. The benefits delivered to the beneficiaries by Roma Capitale (RCP) have been proposed to simulate the future benefits coming from their participation to a formal REC. Italian incentive started finally on 8th April 2024 for formal RECs in the form of a 20-year "Tariffa Premio" granted to the REC, not directly to the members nor within their bills.
Legislative/ regulatory issues	National – licensing PV and activation of collective self-consumption;	Exclusive National/Regional regulation (no influence from the municipality	National definition of energy precarity (ONPE "office national de la précarité énergétique")	Finally, Sun4All recommendations arrived at the Work-Table on RECs (cross-departmental in RCP)

Category	Almada	Barcelona	Coeur de Savoie	Rome
	Renewable energy nucleus (NER) – local/neighborhood level self-consumption of energy	Broader scope for some regulatory framework More knowledge of the procedures between stakeholders involved	1st pilot: National subsidies framework/criteria 2nd pilot: Regulatory framework about self-consumption (administrative validation, distance of 2km change to 10km)	That is accepted to highlight the criteria of Energy Poverty Contrast among the requirements of the RECS supported by the Municipality & Districts. The complete regulatory framework foreseen some obligations: • Statute should include the social initiative purposes; • limiting the share of the incentives among members when they are companies/SMEs; • admitting REC associations could cover more PCP areas each one separated but managed (governed) by unique larger subject
Country/pilot specific constraints/ Opportunities	Constraints: Unprepared (lack of human resources) at the national energy directorate; Municipal regulatory framework needed for the benefits attribution; Lack of energy poverty knowledge by the social housing department; Low level of education of the beneficiaries; Citizens distrust regarding home interventions and participation in Sun4All. Opportunities:	A lot of time to legalize the PV installation; A lot of time to activate self-consumption; Issues with the billing - stop receiving bills; DSO requirements need defined paperwork in the regulatory framework; Internal coordination barriers with the stakeholders involved in the implementation of the financial scheme (ECO-ALEB-IMHAB)	Constraint: Rural area/dispersion Administrative procedures for self-consumption and contracting with the DSO Opportunities: Strong willingness for solar energy of local authorities (Existing PV plant and PV projects)	Both consumers and prosumers must be located in the same Conventional Area that now corresponds to the Primary Cabin Perimeter – PCP (larger than the secondary). Administrative and procedural barriers for public bodies to launch RECs. Concession of the roofs of public buildings for the construction of RECs is not simple. Opportunities: the creation of PV systems on the roofs of public buildings is an accelerator for the start-up and implementation of REC.

Category	Almada	Barcelona	Coeur de Savoie	Rome
	The first step for implementing a REC in Almada; Integration on Almada SECAP and NECP by September/2024; First steps on energy citizenship activities and energy poverty support.			
Main stakeholders' categories	Housing Department, Environment Department, Legal/GDPR Department, Energy Agencies, Local NGO's (CSPCR), Energy Utilities (E-Redes).	Municipality: Housing Department, Energy Agency, GDPR Department. Energy Utilities. End users (individually or as a community).	Savoie Department, Municipality and Coeur de Savoie : Housing service Dep., Social Dep., financial Dep., Energy transition Dep Social workers Local and social associations (such as work integration associations and companies) And users (tenants and owners)	Greater involvement of civil society by public bodies, regions, municipalities, etc., in decision-making processes where effective solutions can be found to combat energy poverty and improve energy efficiency
Main data issues	Access to historical energy data. New data and Privacy Issues. Socio-economic sensitive data.	A lot of paperwork with beneficiaries. Access to historical energy data. Inability to access energy production data. New Data and Privacy Issues. Data Sharing.	Privacy Issues (agreement with beneficiaries, GDPR) for data sharing. Data sharing between French partners and European partners (agreement between partners and sharing only redacted data) Access to socio-economic sensitive data (direct link with beneficiaries to gather information)	Need for a specific action to improve the use of ARERA / AU portal "portale del consumatore" where the users can find and download the hi-frequency (15') data on consumptions. This could help us to obtain a better IEA.
Energy Utilities' Role(s)	DSO: Energy distribution and monitoring; reporting on platform; Energy Utility: billing network energy only;	Energy distribution (legalizes installations and manages data collection) Energy retailer	1st pilot: no implication for those stakeholders 2nd pilot: Involment of Distribution System Operator – ENEDIS, due to French legal requirements.	It is desirable that common initiatives to contrast energy poverty (resulting in bills not paid), should be planned with DSO/vendors

Category	Almada	Barcelona	Coeur de Savoie	Rome
	Municipality: billing/reporting beneficiaries' solar consumptions.		Choice to offer energy to beneficiaries to simplify the billing process.	Some Vendors are proposing to finance for benefit first PV-Plant for relevant RECS.

Table 2: Final comparison matrix between Sun4All pilots

The comparison matrix highlights the main common characteristics between the Sun4All pilot's framework and also the relevant differences. Engaging vulnerable populations, utilizing renewable energy, and navigating regulatory frameworks are similar themes that emerge from the many approaches and problems that each city faced in putting the Sun4All project into action.

It is clear that:

1) **Target areas** are mostly defined on a building or neighbourhood scale.

2) **Vulnerable consumers** are a common target for all the projects in the analysis, with a tendency to focus on social housing residents. A detailed or stratified definition of "vulnerable consumers" could highlight more differences as the interpretation may vary across contexts, but this was not an objective of the current analysis.

3) **Municipalities** are strongly hampered by national/regional legislation.

4) There is a common need to include all relevant **in-house departments of the municipality** (housing, energy, and environment, social, financial, and Legal/GDPR are referred by all pilots).

5) The **energy utilities and DSOs** need to be deeply involved.

EU pilots need to deal with a strict national regulatory framework, which also opens the possibility to a more local and community-driven approach.

5. Blueprint for business model summary

5.1. Use Cases

To design an initial approach to data and financial flows, identify stakeholder roles, and build out each pilot use case (UC), typical use cases were constructed and discussed in the Blueprint model for the Sun4All programme, chapter 7 - Definition of typical use cases. To optimize the pilots' success and beneficial impacts, Sun4All partners either updated the use cases to better fit their requirements and framework or modified them to create unique solutions tailored to the specific environment of each location.

Each partner established their own set of modified use cases, taking into account the key findings from the legislative frameworks in the partner countries, the comparison matrix, and typical use cases that may be developed. If in the beginning stage of the Sun4All project, at least two use cases were selected by each partner to ensure that there was enough room for alternative options, in this later stage of the project, all pilots have already selected the use case (s), which will be illustrated in this chapter.

Almada, Barcelona and CCCS pilots have adopted an adaptation of "Use Case 1 – simple scheme" as the main business model, where Sun4All partners act as "intermediaries" between the PV installation production and the end users/beneficiaries. Also, Sun4All partners are responsible for collecting and managing the data and the financial flows to provide adequate benefits to the end users of the project, the vulnerable consumers.

A summary of the specific use cases developed for each pilot is depicted below.

5.2. Almada Use Case

The municipality of Almada has used the same approach for both the first and second pilots, with the municipality as the owner of the PV installation and the residents of a set of municipal buildings as the target area/group.
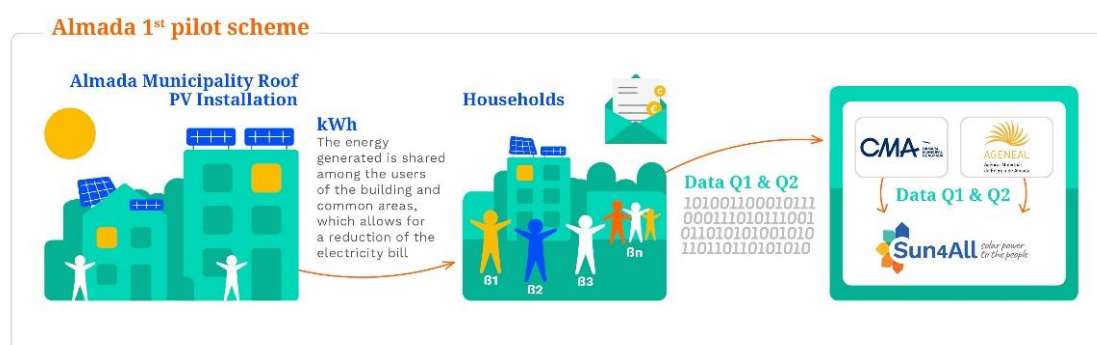

Figure 1: Use Case 1 adaptation to Almada pilot

Ageneal is involved in supporting the Almada City Council in its responsibilities of managing the data and keeping the beneficiaries' list up to date at the collective self-consumption regulatory body. This simple approach provides a reduced electricity bill for the beneficiaries, according to their solar energy consumption up to a certain monthly limit, established depending on the house size and family number.

The municipality acts as an "intermediary" between the PV installation production and the end users/beneficiaries. The municipality and the DSO are responsible for collecting and managing the data to provide the corresponding benefits to the end users of the project, the vulnerable consumers.

5.3. Barcelona Use Cases

Use case: IMHAB Buildings, is a development of Use Case 1, where Renewable Energy Communities are established between the vulnerable consumers, local/regional authorities, and technical Sun4All partners.
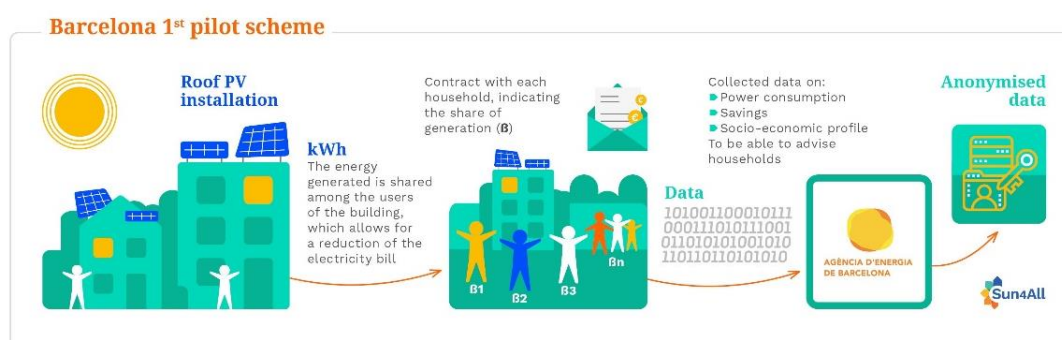
Figure 2: Use Case 1 adaptation to Barcelona pilot

The first year's model is based on shared self-consumption in two social housing blocks managed by IMHAB (Municipal Institute of Housing and Renovation), "Borrell" building (1st IMHAB building) and "Borrassà" building (2nd IMHAB building). Sun4All beneficiaries consume energy from a solar photovoltaic system on their roof. Until all the procedures were finished, photovoltaic energy was only used for the lift and staircase lighting. Beneficiaries see the benefits directly on their bill, as the production of solar energy means a reduction in consumption on the electricity grid. In addition, surplus energy is purchased by the electricity company, which also has an impact on the electricity bill. The difference between one building and the other is the state of the PV installation when the beneficiaries moved into the building. In the case of "Borrell" building, the beneficiaries already lived in the building and months later the PV installation was completed. In the case of "Borrassà" building, the beneficiaries moved in with the installation already completed. This made it possible to test two strategies of deception with the beneficiaries and also two different procedures for the activation of self-consumption.

The second-year pilot relies on the same model, one social housing block managed by IMHAB, the "Escolapi Càncer" building (3rd IMHAB building). Initially, the model to be replicated was planned to be the same as in the case of the "Borrassà" building, however, due to delays in the legalization of the PV installation, the beneficiaries began to live in the building without being able to activate self-consumption from the beginning, being a similar situation to that in the "Borrell" building. The financial scheme is the same in Borrell and Borrassà Buildings, which is a shared collective self-consumption from PV modules installed on the roof of the building. The first group of beneficiaries started living in the building between April and May 2023, and more beneficiaries accessed it during 2024. During the timeline of the project, it was not possible to have the installation legalized and therefore collective self-consumption could not be activated. So, once the solar PV installation is completed and legalized, the bureaucracy to activate the CSC will be carried out, following the procedures established and tested in the other buildings.

5.4. Communauté de Communes de Coeur de Savoie Use Cases

Two use cases and a financial scheme are implemented in the frame of the Sun4All project in the Communauté de Communes de Coeur de Savoie.

For the 1st Pilot, the energy produced and sold to EDF-OA from the 5 PV installations of Coeur de Savoie generates income. Once maintenance and credit are paid, profits are used to finance subventions to vulnerable households (there are no PV shares distributed).

The first household circumstance, called «J'écorénove», concerns vulnerable owners renovating their homes. They get 400€ to 600€ (as a one-time subsidy) to help them change their insulation or heating system allowing them to save on energy bills from a long-term perspective.

The second household circumstance, called «Eco'énergie», is dedicated to even more vulnerable households, tenants or vulnerable owners that cannot engage in renovation work. They get an "energy-free advice session" at home to help them make long-term energy savings and therefore on energy bills. They also get a 200€ subsidy/grant (as a one-time subsidy for the current year) to help them pay energy bills.
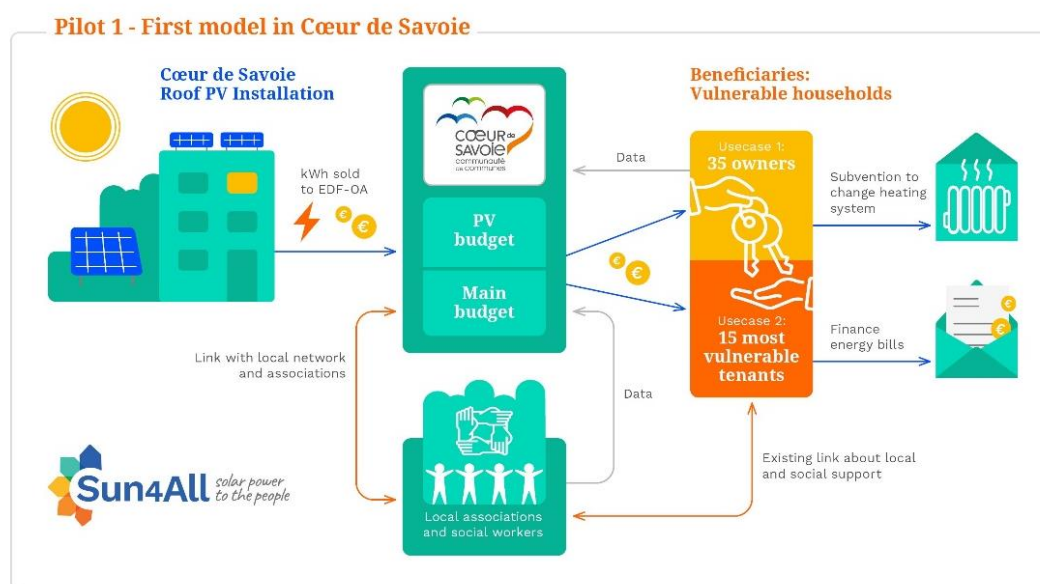

Figure 3: Use Case 1 adaptation to the CCCS 1st pilot

The 2nd pilot is based on a different technical and financial model than the 1st pilot.

It is a collective self-consumption solution based on a photovoltaic installation built by CCCS that was commissioned in July 2023. The collective self-consumption started on the 1st of October 2023.

The photovoltaic system (36kWc) was installed on a building owned by the Communauté de Communes. The collective self-consumption operation reduced

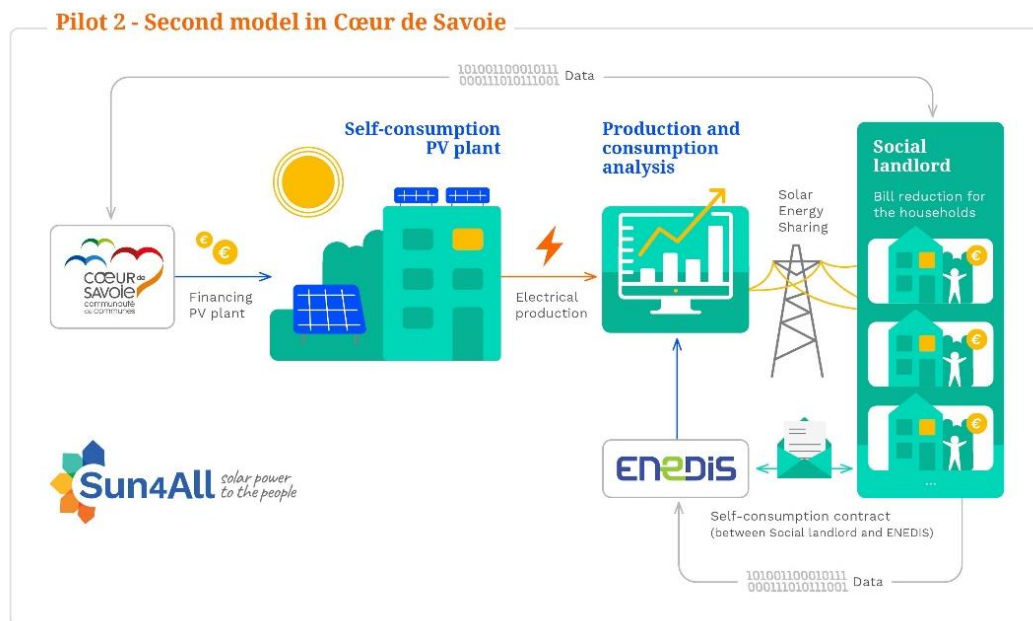the monthly electricity bills of the tenants of the social landlord by providing them with free solar energy.

Figure 4:Use Case 2 adaptation to the CCCS 2nd pilot

5.5. Rome Use Cases

The model is implemented based on local community work plans called RECS (Solidarity Renewable Energy Community).

The entire pilot project in Rome is divided into two phases (100 + 100 households), but the entire process was designed in the first pilot project and the selection process is carried out entirely in the first pilot phase.

Municipal photovoltaic plants generate income (coming from feed-in-tariff paid by GSE and from self-consumption savings), part of which is allocated to the beneficiaries of the Sun4All pilot project. Forum Terzo Settore (FTS) is the municipality's associate partner, which managed the distribution of economic benefits, provided as a direct offset to the cost of the energy bill for each RECS beneficiary.

This model promotes the transformation of the local initiative into the launch of an association registered as a REC, while the solidarity approach represents the reference framework. Existing municipally owned photovoltaic plants are adopted by communities and RECS energy sharing is simulated.

With this approach, the Rome Pilot had the opportunity to develop the social aggregation of the community groups and the simulation of the economic benefit

distribution among the members although until April 2024 the regulatory framework for the REC public incentive was not fully implemented.

- After April 2024 GSE national authority finally started collecting proposals by formal RECS, so within the Rome Pilot, those community groups (Quarticciolo, Corviale, Spinaceto, TorPignattara, and Montespaccato), who were more ready to start the process of establishing the formal entity of the local RECS, were accompanied and supported in this process by the Rome Partners cluster (SAP and RCP). Grace to the support of the new project SUN4U (with FEDERESCO, RCP, SAP, and ScenarioB) they were provided with legal advice for the definition and registration of the most suitable statute and regulation for each RECS. In the very last months of the Sun4All project almost half of the local RECS were registered, but to continue with the launch of the RECS experiences, further steps will be necessary, such as the search for a nearby roof where the PV plant can be installed and a financial source for the investment. Not all groups will be lucky enough to have one of the 15 new municipal facilities dedicated to RECS built in their local area. Furthermore, the recent legislation excludes the possibility of using pre-existing systems for RECS, like it was in the simulation phase implemented in Sun4All.

- That is why a second business model has been prepared (Fig.6), this time based on GSE incentives dedicated to RECs (20 years tariff for shared energy in the REC), which can also be developed thanks to the support of the SUN4U project until June 2025.

- Among the major critical issues that are being encountered, it is worth highlighting the difficulty in accessing credit to face the investment and the need to form RECS initiative groups that include different subjects, not only vulnerable families but also families with higher incomes and local business activities. In the post-project phase, the Sun4All beneficiaries will be supported to join other RECS initiatives starting in their area. The experience and knowledge acquired in the Sun4All project, represent for them a formidable empowerment that will allow them to integrate with other subjects and active citizens.

- The role of the Municipality and the Districts is fundamental, and a new municipal resolution is in preparation: both to finance a greater number of PV plants to be donated to the RECS, considering that in the Roman territory there are 76 conventional areas (REC proximity criterium), and to offer the REC for Solidarity some public roofs in free concession to install the PV systems.

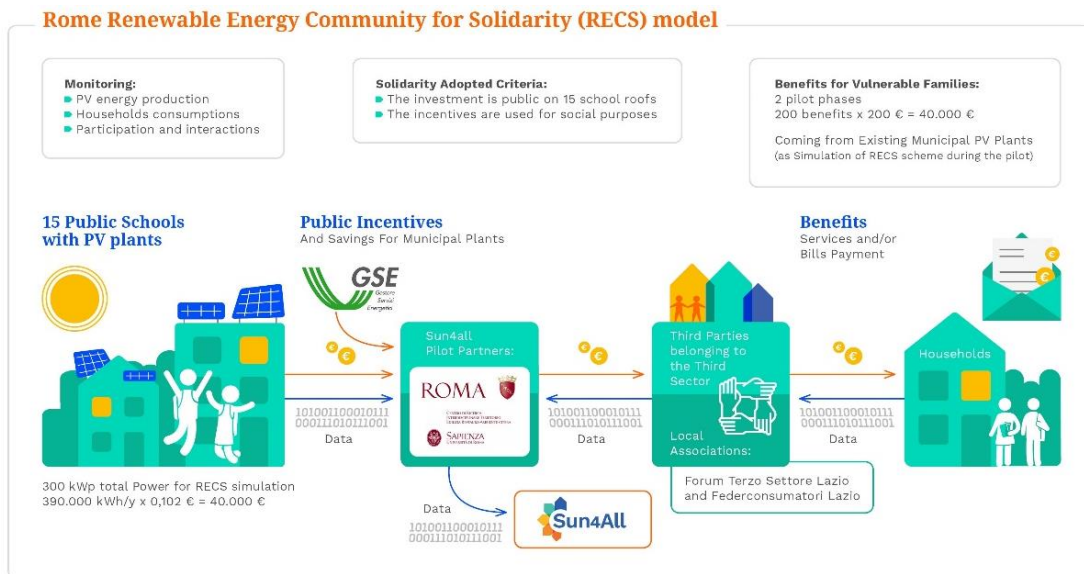The Rome Pilot REC(S) model is explained in Figure 5 and Figure 6.

Figure 5: Use Case – Rome – The business model is based on the reuse of the income from the existing municipal to simulate the future RECS for each community group
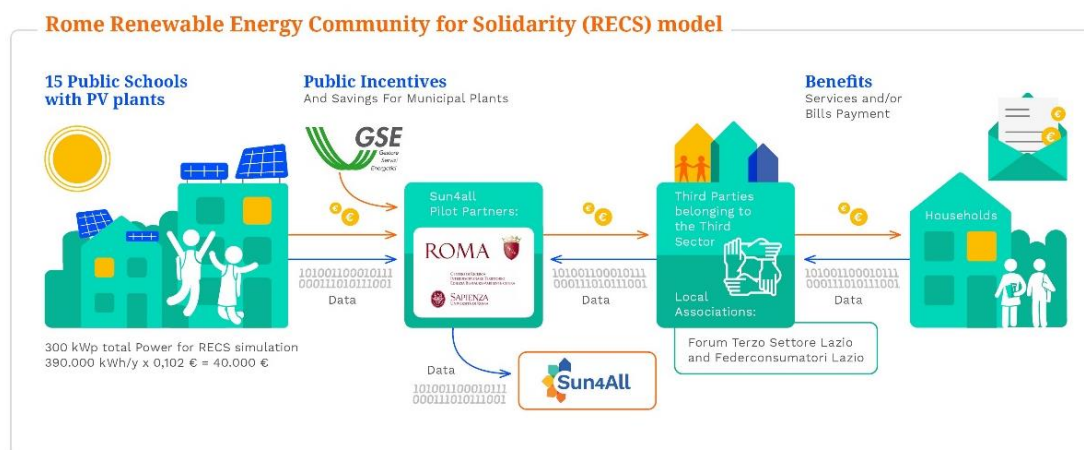

Figure 6: Use Case Sun4All post-project business model

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