Blueprint model for the Sun4All programme

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1. Executive summary

The following document is the first approach of the Sun4All project to the adaptation of the Solar for All programme to the European context. Solar for All, as detailed below, is a programme administered by the New York State which allows vulnerable consumers to be an active part on the energy transition by enabling their participation in community solar projects. The Sun4All project builds upon this experience and will deliver 4 different pilots where a similar methodology will be tested and implemented (Barcelona, Communes du Coeur de Savoie, Rome and Almada). By coupling this approach with direct energy advice to consumers and community involvement, an inclusive approach to energy transition will be attained bringing extra benefits and improving the living conditions of those involved.

This report is to be seen as a guideline for implementing the Solar for All programme in a European setting, by summarizing the main aspects of the US programme and the European and local frameworks where it will be implemented. It includes a cross-analysis of all these different scopes and typical use cases to be implemented and adapted. These will be further detailed as the project develops.

During the Sun4All project, the pilots and the Community of Practice Observer's Group, comprising 10 European observer cities, will reflect on these practices and this report will be updated and enlarged at the end of the project to be a generic guideline for any city/institution intending to implement a similar programme.

2. Solar for All programme

Solar for All builds upon the extensive experience on community solar in New York managed by the New York State Energy Research & Development Authority (NYSERDA). Taking advantage of virtual net metering facilities in place in the State, community solar allows for anyone in the vicinity of a solar power plant, to subscribe and access clean and affordable power and get tangible benefits on their energy bill. This approach benefits households that want to invest in solar projects but do not have the capacity due to investment limitations or space limitations in the rooftop. Using available areas in the region, community solar can also deliver scale benefits making the project's finance more attractive and adding benefits to subscribers. The projects can be financed by a private company and/or by the members/subscribers. Shared ownership is also a possibility as is the possibility of being a simple subscriber.

Given the fact that this approach has limitations regarding inclusiveness of all citizens, the New York State launched the Solar for All project. It does not differ substantially from Community Solar, but targets users that usually could or would not join these initiatives. This means that a large part of the investment is made by the New York state's budget which, after a competitive bidding process under New York State procurement rules, selects a company to deliver the project and sell the electricity. This is then bought by NYSERDA on behalf of low to moderate income households across the state. Households that qualify under the Solar for All scheme, will then receive the electricity at no cost which amounts for $5-15 dollars a month. To be eligible, households must rent or own their home and check income eligibility. The programme relies on voluntary application from customers and is boosted by significant on the ground outreach, extensive digital marketing, and support from local/regional partners such as housing providers or local community organizations.

The figure below explains the main concepts of both Community Solar and Solar for All programmes and highlights the differences between the two:

Figure 1: Community Solar and Solar for All programmes functioning schemes (adapted from the NYSERDA Sun4All workshop presentation)

The Solar for All programme was launched in 2018 and reached approximately 4,000 participants in 9 community solar projects by the end of 2020. Currently, a new version of the programme is being developed. In April 2021, NYSERDA and National Grid jointly proposed an "Expanded Solar for All" program. This partnership allows the development of one of the main upgrades to the previous programme: the automatic enrolment of 160,000+ National Grid low-income bill discount program participants. Approximately 600 megawatts of projects should be procured by NYSERDA and target savings of $10 per month for each customer are expected. The program has been proposed in mid-2021, a public consultation has been developed in July/August 2021 and the potential launch is expected in 2022 after the formal final decision.

3. From Solar for All to Sun4All – Solar Power to the People!

A fundamental part of the Sun4All project is the adaptation of the Solar for All scheme to the local context of the pilots and the European framework, as depicted in the next figure.

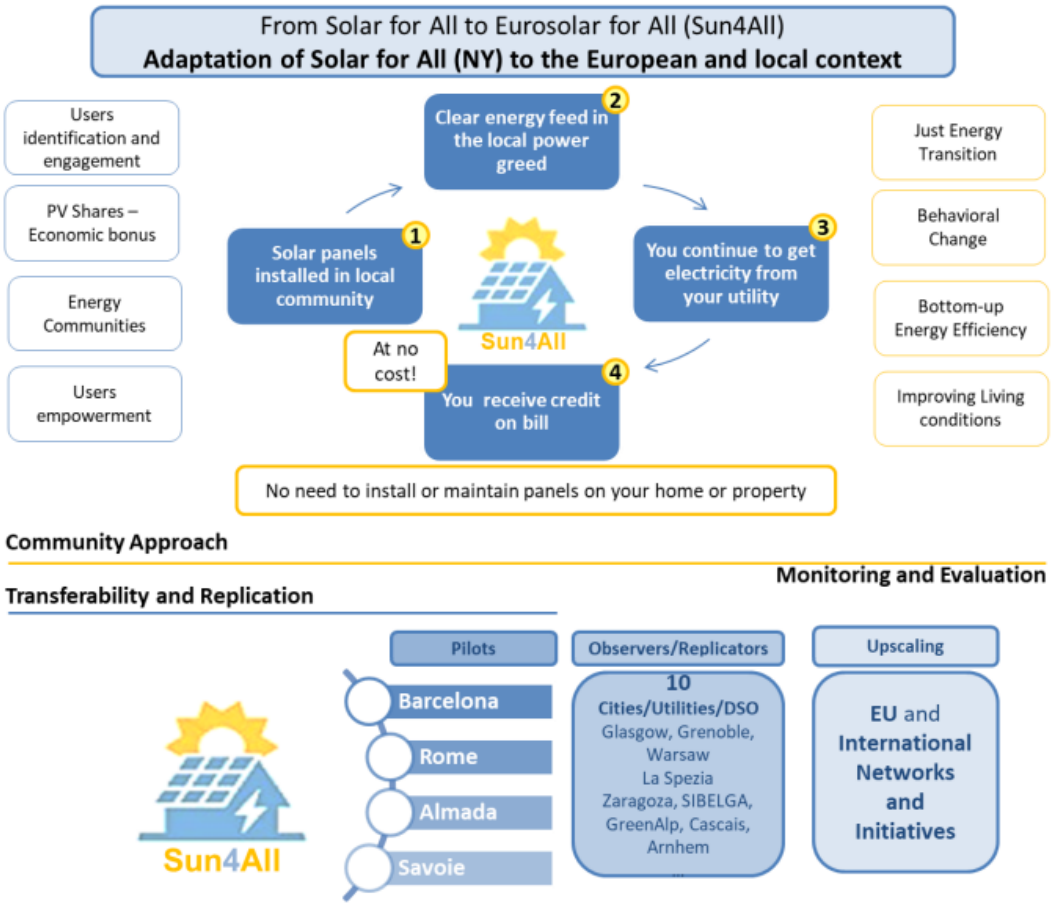


Figure 2: General concept for the adaptation of the Solar for All programme to the European Sun4All Solar Power to the People!

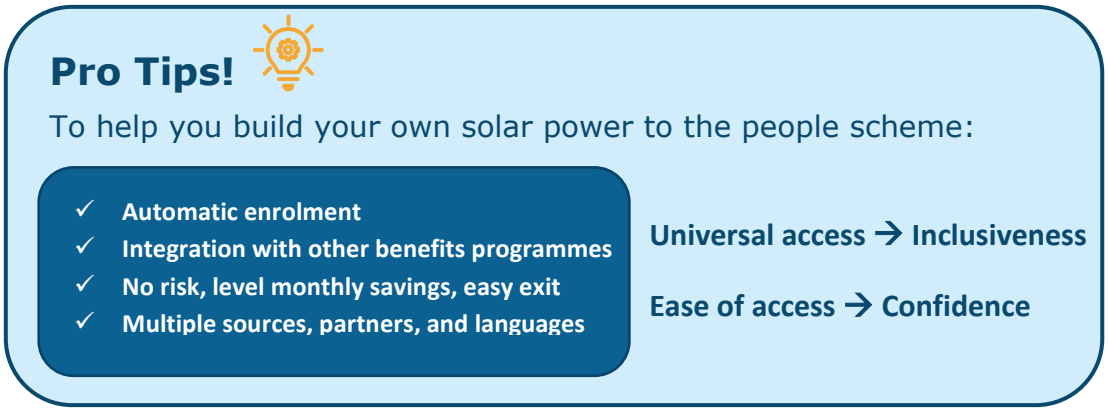
The adaptation process lies primarily on a direct liaison and peer learning process with NYSERDA. For that purpose, Sun4All has developed several interactions including a large webinar held at the beginning of the project. At this event, all partners and pilots had the opportunity to identify critical issues and pros and cons of the Solar for All Programme considering their local context. These peer learning activities also allowed the evaluation of shortcomings identified in the implemented program and the new strategies to address them. This process is fundamental to strengthening the pilot implementation plan and address some of the challenges with precautionary measures.

One of the main challenges identified in the Solar for All Programme was the limited number of participants joining (around 4.000 when the initial goal was 10.000).

This result is somewhat counterintuitive given the fact that there was no upfront cost for customers and all the change they would notice was a visible reduction in their energy bill. Also, the Programme had extensive outreach and local partnerships to help in the sign-up and dissemination processes. Project procurement was also highly effective and did not cause any constraints on solar plants and processes in place to deliver the electricity credits to customers.

The development of the Solar for All Programme identified the main causes for this relatively low adhesion rate:

- Lack of familiarity with community solar schemes
- Application process was burdensome, especially its requirements for income verification is burdensome
- Past experiences with scams from predatory energy retailers generate disbelief on all energy programmes
- Possible language barriers especially relevant on low-income customers
- Some of the participants also reported some nuisance on the fact that energy bill credit was variable. They could not easily grasp the link between fluctuating solar energy production across the year and their energy credit bill. These caveats were also a trigger for the new Solar for All Expanded programme already detailed in the first chapter. The solutions to these challenges were incorporated in the new programme and can be seen as "Pro Tips" to similar programmes to be developed.



These four strategies/tips are best described in the next paragraphs:

The **automatic enrolment process** is a very effective way of dealing with constraints linked to applications procedures, income verifications and language barriers. This is especially important when dealing with vulnerable consumers where socio-economic factors play an important role in the possibility or willingness to enrol in such programmes. Besides the issues identified in the Solar for All process, there are known barriers such as the difficulty dealing with complex bureaucratic schemes, lack of motivation and even no willingness to make proof of poverty, which is also unfair to people already in vulnerable positions.

In the case of the Solar for All, the automatic enrolment process will be made in partnership with the electrical utility for customers already participating in other bill discount programmes. It is expected that roughly 160.000 customers can be automatically enrolled.

The importance of automatic enrolment has been also made clear in an initiative in Portugal. This made the "Social Energy Tariff" a true policy for delivering equitable services to everyone in need. The Social Energy Tariff had been in place but with a very low uptake rate of around 4% of the total households in Portugal, which was far less than the eligible households. In 2016, a national interoperability platform was set up which automates the tariff application process, crosschecking data from several government entities to identify the consumers who are entitled to the "Social Energy Tariff". Hence, instead of applying for the social energy tariff and to check eligibility criteria, everyone with social benefits that comply with the criteria, automatically get the energy bill discount. This meant that 20% of the households in Portugal now get access to this energy bill support. The scheme has been awarded with the "Best Practice" award, from the European Public Services Award, 2019 and the United Nations Public Service Award 2020, under the topic "Delivering inclusive and equitable services for all."[1].

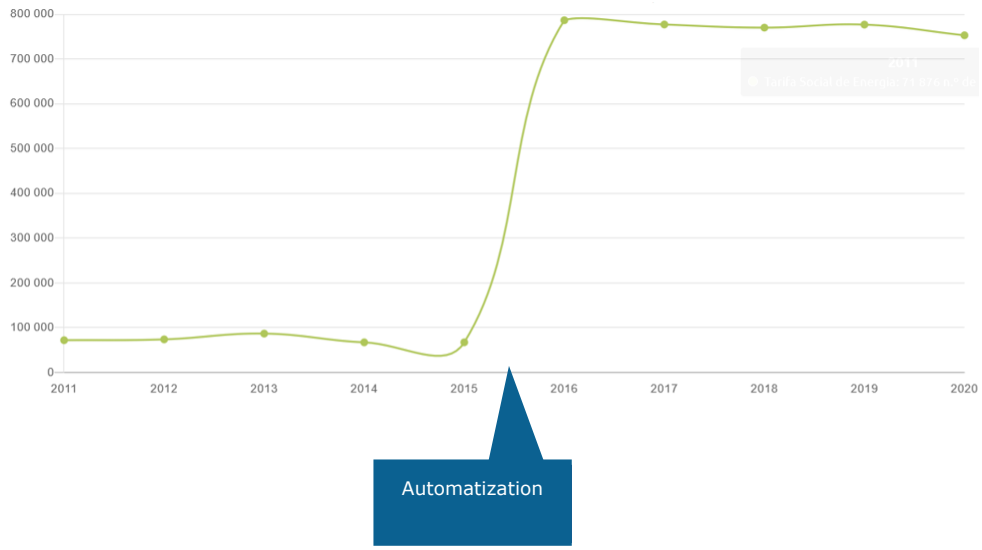


Figure 3: Evolution of the number of households with Social Energy Tariff in Portugal before and after automatization[2]

It is proven that automatic enrolment process is very effective in leaving no one behind, but there is no one-size-fits-all solution. It is extremely important when there is a large pool of possible candidates, but it may not be useful when the number of target users is small and strong community engagement is crucial for ancillary benefits to be achieved. This might be the case of the pilots in Sun4All

[1] https://publicadministration.un.org/unpsa/database/Winners/2020-winners/ASET
[2] https://www.observatoriodaenergia.pt/pt/energia-em-numeros/portugal/2011/2020/line/no-de-consumidores/2345-2346-2704

where the total amount of households is roughly 100 and ownership coupled with energy efficiency and community participation are crucial. Still, pilots and replicators should bear in mind and prepare in advance for a massive expansion where automatic enrolment is quite effective. This is what is expected from Sun4All: start with small pilots, test, expand and replicate.

The **integration with other benefits programmes** is a tool to be used to increase effectiveness, ease-up the enrolment and increase consumers' confidence. The fact that consumers are already familiar with existing schemes and that eligibility criteria have already been assessed is an advantaged to be used whenever possible. Referring to the two previous examples, the Solar for All Extended programme will use already existing low-income bill discount programmes managed by the electrical utility which is a main partner of the programme. In the case of Portugal, a new energy efficiency programme will establish the sole criterion of being beneficiaries of the Social Energy Tariff.

No risk, level monthly payments, easy exit – "no strings attached". In the case of low income and vulnerable consumers, and with electricity bill discount programmes it is extremely important that there is absolutely no risk of extra tariffs, side taxes, added services and increases in energy bill (even if coupled with extra benefits). Programmes must then be designed to simplify the credit bill or other forms of benefits, or they risk not being accepted by target users and generate distrust. This means that, whenever possible, the credits should be a fixed monthly value, being therefore predictable and not affecting any other part of the energy bill. Still, one of the main objectives of the Sun4All project is to make people part of the energy transition, understand why they are getting credits, feeling a sense of community and ownership of the solar energy production. Automatic enrolment processes and decoupling the energy bill credit from real energy production might hamper some of these objectives. When considering this kind of approaches, project managers must ensure that people within the programme have a sound understanding what is going on, which will be done in the community engagement processes, and are not simple passive receptors of credits.

To do this, one must be sure that there are **multiple sources, partners, and languages** – It is of utmost importance that outreach is a core activity of all energy inclusion programmes. Besides a strong support from local formal and informal associations, a clear link and partnerships with social institutions acting on the ground is of paramount importance. If the context for the project implies there are multiple ethnicities and nationalities, special relevance should be taken to ensure that all communication materials are translated in all languages, so no one feels put aside. Some extra strategies should be planned to proceed with a holistic approach to community engagement such as:

- The appointment of an independent facilitator that builds trust among the participants and potential participants, dedicated communication.
- Door-to-door, face-to-face meetings in cooperation with local associations/institutions.

- The development of community workshops to make sure the residents' community interests are considered.
- Delivering tailored energy efficiency advice to residents.
- Build up temporary or permanent energy advisory one stop shops.

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

4.1. Framework for Energy Communities in Europe

The Clean Energy for All Europeans package by the European Union stands today as a landmark in the new era of energy policies. It opens and promotes the existence innovative energy initiatives, especially those developed by citizens.

The recent European Directives in this area ((EU) 2018/2001 and (EU) 2019/944) have as one of the objectives, to facilitate the creation of new energy communities to promote self-consumption of electricity and facilitate decentralised activities in the sector, namely: producing, consuming, storing, sharing and selling electricity. Thus, two relevant figures are envisaged:

1) Directive (EU) 2019/944 'RED II' Citizen Energy Communities (CEC)", a legal entity:

    a) Based on an open and voluntary participation, which is effectively controlled by its members or by the holders of shareholdings who are natural persons, local authorities, including municipalities, or small enterprises,

    b) The main objective of which is to provide environmental, economic, or social benefits to its members or holders of shareholdings or to the local areas where they operate and not to generate financial profits, and

    c) May participate in production activities, including renewable energy, distribution, marketing, consumption, aggregation, energy storage, the provision of energy efficiency services, or charging services for electric vehicles or providing other energy services to its members or shareholdings.

2) Directive (EU) 2018/2001 'Renewable Energy Community (REC)', a legal entity:

    a) Which, in accordance with applicable national law, is based on an open and voluntary participation, is autonomous and is effectively controlled by shareholders or members who are located in the vicinity of renewable energy projects which are the property of and developed by that legal entity,

    b) Whose shareholders or members are natural persons, SMEs or local authorities, including municipalities,

    c) The main purpose of which is to provide its shareholders or members or to locations where it operates environmental, economic and social benefits rather than financial profits.

4.2. Framework for Energy Poverty Action in Europe

Energy poverty represents one of the major residential challenges in building sector for the EU and its Member States. There is currently no commonly accepted definition of energy poverty in Europe. But the phenomenon can be defined as the situation of "*anyone who meets, in its housing, particular difficulties to have the necessary energy to meet its basic energy needs because of the inadequacy of its resources or of its housing conditions*". Energy poverty is a significant issue in the EU; before the COVID crisis, about 7% of the EU-27 population (accounting for around 34 million people) reported an inability to keep their homes adequately warm in 2019. The situation in the EU Member States varies. The largest share of people who said that they could not afford to keep their home adequately warm was recorded in Bulgaria (30.1%), followed by Lithuania (26.7%), Cyprus (21.0%), Portugal (18.9%), Greece (17.9%) and Italy (11.1%). This number is almost three times higher when we consider the population below the poverty line – below 60% of median equivalent income.

Despite EU Member States having different approaches to energy poverty (some consider energy poverty mostly as a social issue, while others see it as being also an energy policy concern), the EU has set a framework to fight energy poverty with legislation, best practice sharing and financing tools to support vulnerable households and improve energy efficiency. In the context of EU policies, since 2009, a large set of European legislation has laid the groundwork to define energy poverty.

With Directives 2009/72/EC and 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and gas, Member States had to define in their national law what a "vulnerable customer" is, which can refer to energy poverty.

Further steps in tackling energy poverty were taken with the publication of the 'Clean Energy for All Europeans' legislative package, published in the Official Journal of the European Union in June 2019 and which consists of four Directives and four Regulations (Energy Performance in Buildings Directive (EU) 2018/844, Renewable Energy Directive (EU) 2018/2001, Energy Efficiency Directive (EU) 2018/2002, Governance of the Energy Union Regulation (EU) 2018/1999, Electricity Regulation (EU) 2019/943, Electricity Directive (EU) 2019/944, Risk Preparedness Regulation (EU) 2019/941 and ACER Regulation (EU) 2019/942)). The package contains several measures on energy poverty, which aim to protect vulnerable consumers and to encourage energy efficiency investments. It also contains clear indications that 'energy poverty' means a situation in which a household cannot afford the essential energy services necessary for a decent standard of living.

Additionally, the 'Clean Energy for All Europeans' package states that:

- In their integrated national energy and climate plans (NECPs), Member States should assess the number of households in energy poverty, taking into account the necessary domestic energy services needed to guarantee basic standards

of living in the relevant national context, existing social policy and other relevant policies, as well as Commission indicative guidance on relevant indicators, including geographical dispersion, that are based on a common approach for energy poverty.

- In the event that a Member State finds that it has a significant number of households in energy poverty, it should include in its plan a national indicative objective to reduce energy poverty.

More recently in 2020, the European Commission presented its Building Renovation Wave (COM (2020) 662). The Renovation Wave aims to accelerate the deep renovation of buildings that can contribute to alleviating energy poverty. It aims to double annual energy renovation rates in the next ten years. These renovations will enhance the quality of life for people living in and using the buildings, reduce Europe's greenhouse gas emissions, and create up to 160,000 additional green jobs in the construction sector.

As part of the Building Renovation Wave, Commission Recommendation SWD(2020)960 (EU Guidance on energy poverty), accompanying the document Commission Recommendation (EU) 2020/1563 on energy poverty, emphasises the importance of a clear and harmonized energy poverty definition, as well as the use of a set indicators for measuring energy poverty, either focusing on the affordability of energy services (energy expenditure relative to income, self-assessment of adequacy to keep homes warm in winter and cool in summer, etc.) or other complementary indicators like the energy performance of building stock, general energy prices…). It also emphasises the fact that "*the Covid-19 pandemic has exacerbated energy poverty issues and is likely to accentuate pressure and demand for social and affordable housing*."

Apart from legislation, the EU launched the Energy Poverty Advisory Hub (EPAH), which is the leading EU initiative aiming to eradicate energy poverty and accelerate the just energy transition of European local governments. EPAH's mission is to be the central platform of energy poverty expertise in Europe for local authorities and all stakeholders interested in taking action to combat energy poverty in Europe by providing direct support, online trainings, and research results and by building a collaborative network of stakeholders interested in taking action to combat energy poverty in Europe.

EPAH was built upon the EU Energy Poverty Observatory (EPOV). EPOV was launched in January 2018 and was established with the aim of fostering transformational change in knowledge about the extent of energy poverty in Europe, and innovative policies and practices to combat it. The creation of an Energy Poverty Observatory was part of the European Commission's policy efforts to address energy poverty across EU countries.

The EU has also supported a variety of research and demonstration projects to test and validate innovative approaches to fight energy poverty and to promote good practices at national, regional and local level:

- POWERPOOR project aims to support programmes/schemes for energy poor citizens and encourage the use of alternative financing schemes (e.g., establishing energy communities/cooperatives, crowd funding). POWERPOOR will facilitate experience and knowledge sharing, as well as the implementation of small-scale energy efficiency interventions and the installation of renewable energy sources, increasing the active participation of citizens. Pilot energy poor support programmes/schemes will be designed, developed, and implemented in eight countries across Europe led by a network of certified Energy Supporters and Energy Communities. The results will be broadly disseminated, and synergies will be pursued with global and EU initiatives, such as the EPAH and the Covenant of Mayors.

- Solutions to Tackle Energy Poverty (STEP) is a project to develop a simple, innovative and replicable model of measures to address energy poverty. The project covers some of the countries with the highest rates of energy poverty in Europe. These are Bulgaria, Cyprus, Czech Republic, Latvia, Lithuania, Poland, Portugal, Slovakia and the United Kingdom. STEP's overall objective is to alleviate energy poverty by encouraging behavioural change and low-cost energy efficiency solutions among consumers in or at risk of energy poverty through trusted, tailored advice.

- POWERTY: Renewable energies for vulnerable groups. The general objective of POWERTY is to increase the use of renewable energies in vulnerable groups. New renewable energy installations will be facilitated to provide safe and clean energy to vulnerable households. In addition, companies supplying renewable energies will be encouraged through the project to offer technological solutions that are adapted to vulnerable groups, activating their corporate social responsibility. POWERTY will help to tackle energy poverty, promoting vulnerable households with adequate energy supplies, thanks to renewable energies. Social innovation measures will be promoted, based on greater participation, integration and empowerment of vulnerable groups.

A list of 46 European funded projects tackling energy project can be found here: https://cordis.europa.eu/

5. Regulatory framework and initiatives by partner country – Energy communities and Energy Poverty

The following chapter summarizes the main characteristics of the regulatory framework for energy communities and energy poverty in each partner country. It had as basis the work developed recently under the Compile project (Frieden *et al*, 2020)[3] and partner contributions for each country analysed.

According to data from a recently published paper by Frieden *et al* (2021)[4], Austria, Ireland, Belgium, Italy, Lithuania, Poland, Luxemburg, Slovenia, France, Finland and Portugal had adopted REC frameworks to different degrees of detail, while, Denmark, the Netherlands and Hungary had draft frameworks in place and Sweden at least a consultation document. Regarding CEC frameworks, Denmark, Belgium, Finland and France had basic frameworks in place, while Austria, Croatia, Italy, Romania, and Slovenia had draft legislations. In all other countries except Malta and Cyprus however legislative processes have started.

5.1. France - Main characteristics of legislative/regulatory framework

The French electricity sector is highly centralised and centred around EDF. Climate and resilience law (2021) aims to develop citizen energy through energy communities.

Photovoltaic Energy: 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.

Energy Poverty

- "Habiter mieux", a programme of the ANAH (Agence nationale de l'habitat) implemented since 2010 which finances a set of renovation interventions aiming at realising comprehensive thermal renovations of homes of low-income households.

[3] Dorian Frieden, Andreas Tuerk, Camilla Neumann, JOANNEUM RESEARCH Stanislas d'Herbemont, Josh Roberts, REScoop.eu "Collective self-consumption and energy communities: Trends and challenges in the transposition of the EU framework - Working paper, December 2020", produced within the framework of the Compile project

[4] Frieden, D.; Tuerk, A.; Antunes, A.R.; Athanasios, V.; Chronis, A.-G.; d'Herbemont, S.; Kirac, M.; Marouço, R.; Neumann, C.; Pastor Catalayud, E.; et al. "Are We on the Right Track? Collective Self-Consumption and Energy Communities in the European Union". Sustainability 2021, 13, 12494. https://doi.org/10.3390/su132212494

- 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", 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 allowed to a certain limit.
- Renovation voucher, which was implemented in 2020 and provides financial support for certain types of works linked energy efficiency to low-income households.

Self-consumption Energy

- Only Collective self-consumption is detailed (but collective self-consumption, in this case, includes the use of 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 (Tarif d'Utilisation du Réseau Public d'Electricité)
- DSO obliged to supply smart metering.
- Since 2019, CSC geographical scope of 2 km between the injection and consumption points. Since 2020, exceptional 20 km in areas with low population density.
- Cumulative power of maximum 3MW (0,5 MW in non-interconnected areas)

Energy Communities

- December 2018: European Union drafts the "clean energy" package defining the energy communities
- 2021: France must establish a legislative framework consistent with European regulations. French government is very late on the subject.
- November 2021: The French government announces 10 measures to promote citizen energy. The players in citizen energy consider that this action plan cannot be implemented without involving more the local players.

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.

5.2. Spain - Main characteristics of legislative/regulatory framework

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.
- Social bonus for electricity (2009) and heating (2018), providing energy bill support.
- Barcelona Climate Plan 2018-2030: the city intends to achieve zero energy poverty by 2030.
- Royal Decree-Law 17/2021: beneficiaries of the social bond (discounted rate) have a period of 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 regional level, Catalonian law (Llei 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 local level, Barcelona City Council has set up Energy Advice Points (PAEs) that offer help and information and intervene to prevent supplies 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.

Self-consumption Energy

- Only Collective self-consumption is detailed (but collective self-consumption, in this case, includes the use of public electricity grid).
- No need to have a legal entity created when establishing a CSC, only a contract with sharing scheme of solar energy.
- CSC can be done without feeding surplus to the grid, feeding the surplus with remunerated electricity like the spot price (only for <100 kW RES productions installations) or feeding the surplus without any remuneration.
- CSC must be linked with the same substation (Medium Voltage to Low Voltage) and in the same sector under the cadastral reference.
- Need to indicate sharing of electricity produced within members and shares of ownership.
- Need to have smart meters and bidirectional smart meters at the generation plant.
- 500-meter geographical area.

Energy Communities

- Basic definition of RECs in place but no CECs definition.

5.3. Portugal - Main characteristics of legislative/regulatory framework

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", with an average value of €1300 each, to economically vulnerable families and in energy poverty as a direct support mechanism that can be used in rehabilitation interventions and renovation of buildings, in specialized technical support and in the adoption and/or replacement of systems and equipment for more energy efficient ones.
- National Long-Term Strategy to Combat Energy Poverty 2021-2050: with a horizon of 2050, it is intended to reduce from 18.9% (2019) to less than 1% the population living in households without the ability to keep the house

adequately warm. Also at that time, it is expected that less than 5% of the population will live in houses with problems of infiltration, humidity or rotting elements and that no family in Portugal will have an energy expenditure greater than 10% of total income.

Self-consumption Energy

- REC and CSC are detailed (collective self-consumption, in this case, can include the use of public electricity grid).
- When public grid is used there are associated tariffs but also exemptions or partial exemptions for some configurations on temporary basis (7 years)
- No need to have a legal entity created when establishing a CSC.
- 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 one of the individuals in the case of CSC or an external entity)
- Need to indicate sharing of electricity produced within members and shares of ownership.
- Need to have smart meters and bidirectional smart meters at the generation plant (a 15-minute timesteps is possible) supplied by DSO in principle.

Energy Communities

- RECs are defined but no CECs definition.
- Need to have a legal entity created in the case of RECs.
- RECs are part of the CSC definition and hence limited to generation and self-consumption of electricity.
- Establishment of RECs and CSC limited to 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 REC's that exempt partially the applicable legislation for the purpose of innovative testing.

5.4. Italy - Main characteristics of legislative/regulatory framework

Energy Poverty

- 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 which 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
- The theme of energy poverty is one of the main themes, with specific strategies and objectives, contained in the SECAP (Action Plan for Sustainable Energy and Climate) approved and adopted by the City of Rome in July 2020.
- The OIPE (Osservatorio Italiano sulla Povertà Energetica) was established in 2018 and represents the main source of data on the phenomenon. The 2020 Report counts for Italy more than 2.2 million households in energy poverty, equal to 8.5% of total households. (http://oipeosservatorio.it/)
- In Italy, the position paper 2019 by ENEA (National Agency for Energy and Environment) presents a very complex set of measures to contrast 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 bills 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 in fact allow families in economic hardship to benefit, also due to the difficulty for them to access 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 that 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.
- Law Decree No 4/2019: RdC ("Citizenship Income", Reddito di Cittadinanza), replacing the REI (Inclusion Income, Reddito di Inclusione). The RdC is a means-tested cash benefit that is targeted at poor and socially excluded households and conditional on participation in job-search activities.
- 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, Holland, Austria and Croatia.

Self-consumption Energy

- CSC 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, then recently by the Law Decree n.119 8-11-2021, adoption of the RED II EU Directive.
- CSC focus 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, RES electricity necessary for their needs, then metering and "sharing" it.
- Subsidies for self-consumed electricity is 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.
- CSC Schemes imply virtual aggregates of consumers and prosumers (now under 200 kWp for each prosumer, after June 2022 up to 1 MWp)

- CSC 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 consumers level – 15 minutes up to 1-hour timesteps possible.

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 COMUNITA' ENERGETICA).
- RECs (Renewable Energy Communities) and CSC (Collective Self-Consumption) are now regulated by the Law Decree n.119 8-11-2021, adoption of the RED II EU Directive.
- RECs peak power and area: Up to 200 kwp under the same DSO secondary substation, but after June 2022 limits will raise to under 1 MWp and under 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 no-profit and open to anyone in the area, consumers and prosumers, residential, commercial, public entities, 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:

    1. 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.
    2. Is based on open and voluntary participation, is autonomous and is effectively controlled by shareholders or members who are located in the proximity of RES production facilities held by the REC.

3. 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.

4. 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 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.

6. Cross-sectoral analysis: Solar for All vs Sun4All pilots

An iterative process was set-up to identify in detail the main characteristics of each of the pilots in confrontation with the Solar for All programme, having also as a cross-reference the national and regional regulatory framework. Having in mind the work developed in the next chapters 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:

- **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 with data protection rules relevant for 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.

	NYSERDA – Solar for All	Pilot Almada	Pilot Rome	Pilot Communes Coeur de Savoie	Pilot Barcelona
Target area	Region – up to 500 km	**Building Block/neighborhood** (city expansion on scenario B possible?)	Within Rome Municipality perimeter; **Buildings, Blocks and Neighbourhoods** selected by: Proximity to municipal schools with PV plants	All Coeur de Savoie area: 1. Already installed PV plants (5 installation 50kW each from 5 years). 2. Energy Community: Mid of 2022 3. New PV installations (2022-23) owned by Coeur de Savoie	**Building block** (high complexity buildings / municipal institute of housing) Vulnerable areas
Target users	Vulnerable consumers	**Vulnerable consumers** **Municipal social housing residents**	**Vulnerable consumers** 200 families selected among "Bonus Energia" beneficiaries (27.000) AND Volunteers in a call for interest in order to grant active engagement	**Vulnerable consumers** Elderly people **Municipal social housing residents** Owners	**Vulnerable consumers** **Municipal social housing residents**
Types of incentives	Bill credit Ownership	Bill credit Ownership Other benefits (municipal tax discounts,	Bill credits Or Bill Discounts (eventual) Membership of New Energy Communities	Ownership (roof renting) Fiscal incentives Energy advice Other benefits (via social services)	Ownership (roof renting) Bill discounts Other benefits (via social services)

	NYSERDA – Solar for All	Pilot Almada	Pilot Rome	Pilot Communes Coeur de Savoie	Pilot Barcelona
Legislative/regulatory issues	Local framework complies with national/regional legislation with strong autonomy	**Exclusive National/Regional regulation (no influence from municipality)** – but space for creativity and experimentation on innovative pilot projects – not envisaged on Almada's pilot	**Exclusive National/Regional regulation (no influence from municipality)** – but space for creativity and experimentation. Renewable Energy Communities (RECs) are regulated and incentivated by GSE (national authority)	**Exclusive National/Regional regulation (no influence from municipality)** – but space for creativity and experimentation	**Exclusive National/Regional regulation (no influence from municipality)** Very strict - Legislative/regulatory framework– low degrees of liberty
Country/pilot specific constraints	To be detailed	To be detailed	Formal Renewable Energy Community (REC) is limited to power meters located under the same secondary cabin (grid proximity) --- Informal Sun4All Energy Community requires active participation of members (engagement)	To be detailed	To be detailed
Main stakeholders' categories	Energy Utilities	**Municipality :** **Housing Dep.** **Social Dep.** **Environment Dep.** **Financial Dep.** **Legal/GDPR Dep.** Energy Agency NGO's Cooperatives **Energy Utilities**	**Municipality :** **Housing Dep.; Social Dep.** **Environment Dep.** **Financial Dep.** **Legal/GDPR Dep.** University Grassroot associations, LOS signed: **Local Energy utility (ARETI/ACEA),** Energy Efficiency incentives authority (GSE)	**Municipality :** **Housing Dep.** **Social Dep.** **Environment Dep.** **Financial Dep.** **Legal/GDPR Dep.** . Energy Agency **Energy Utilities** Energy communities End users (tenants or owners)	**Municipality :** **Housing Dep.** **Social Dep.** **Environment Dep.** **Financial Dep.** **Legal/GDPR Dep.** Energy Agency **Energy Utilities** End users (individually or as a community)

	NYSERDA – Solar for All	Pilot Almada	Pilot Rome	Pilot Communes Coeur de Savoie	Pilot Barcelona
Main data issues	Socio-economic sensitive data	Access to historical energy data New data and Privacy Issues Socio-economic sensitive data Lack of intelligent monitoring systems	Access to historical energy data New data and Privacy Issues Limited Access to socio-economic sensitive data Data sharing Access to PV plants production data (in terms of energy and incentives)	Access to historical energy data New data and Privacy Issues Access to socio-economic sensitive data Data sharing between French partners and European partners.	Access to historical energy data New data and Privacy Issues Access to socio-economic sensitive data Data sharing
Energy Utilities' Role(s)	Active stakeholder on Solar for All pilot Energy seller	**Energy distribution** (responsible for installing smart metering essential for the use cases) Active stakeholder on Sun4All pilot	**Energy distribution grid** **Local DSO (ARETI)** could be the activator of formal Energy Communities (CER) Active stakeholder on Sun4All pilot Are enabler of the social energy tariffs for beneficiaries	**Energy distribution grid** Active stakeholder on Sun4All pilot Access to social energy tariffs for beneficiaries	**Energy distribution (legalizes installations)** Energy seller Technology supplier (not always facilitator)

Table 1: Comparison matrix between the NYSERDA Solar for All programme and the Sun4All pilots

The comparison matrix clearly highlights the main common characteristics between the Sun4All pilot's framework and the Solar for All programme, and also the relevant differences between the US and European contexts.

It is clear that:

1) Target areas in the Solar for All programme are much bigger than in the possible European contexts: in New York's case, the distance between solar PV production and consumption can go up to 500 km. In the European pilots the target area is defined on a building or neighbourhood scale.

2) Vulnerable consumers are a common target for all the projects in the analysis. In Europe there seems to be a tendency to focus on social housing residents in addition. 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) In Solar for All there is a strong autonomy for defining the regulatory framework. In the European context, municipalities are strongly hampered by the national/regional legislation. This is also a direct outcome of the scale of the administrative units: the New York State, home of the Solar for All programme is more comparable to an "average" European country than to a municipality.

4) In the European case 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 DSO's need to be deeply involved both in the case of the European and New York case-studies.

To sum up, New York's Solar for All programme has a larger scale and a high degree of autonomy. On the contrary, EU pilots need to deal with strict national regulatory framework, which also opens the possibility to a more local and community driven approach. The following picture summarizes graphically these main conclusions.

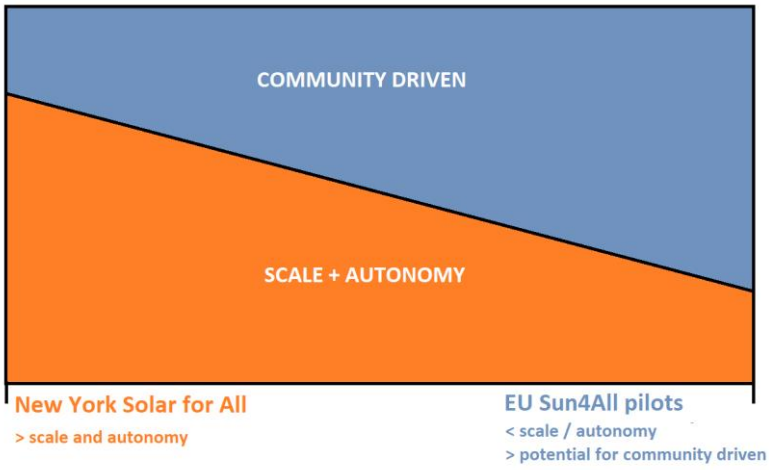


Figure 4: A schematic approach of the main differences between NY and European contexts

7. Definition of typical use cases

In order to set up each pilot use case (UC) and developing a first approach to data and financial flows and stakeholder's roles, typical use cases were developed and are described below. These can be used as an inspiration to build your own use cases adapted to your context. Sun4All partners will adapt the use cases that best fit their needs and framework, as well as adapt them to tailor made solutions that respond to each region's context, to maximise the success and the positive impact the pilots.

- **Use case 1: "Simple model".** Sun4All partners act as "intermediaries" between the PV installation production and the end users/beneficiaries. Sun4All partners will be responsible for collecting and managing the data and the financial flows to provide the adequate benefits (municipal discounts, tax benefits etc.) to the end users of the project, the vulnerable consumers.

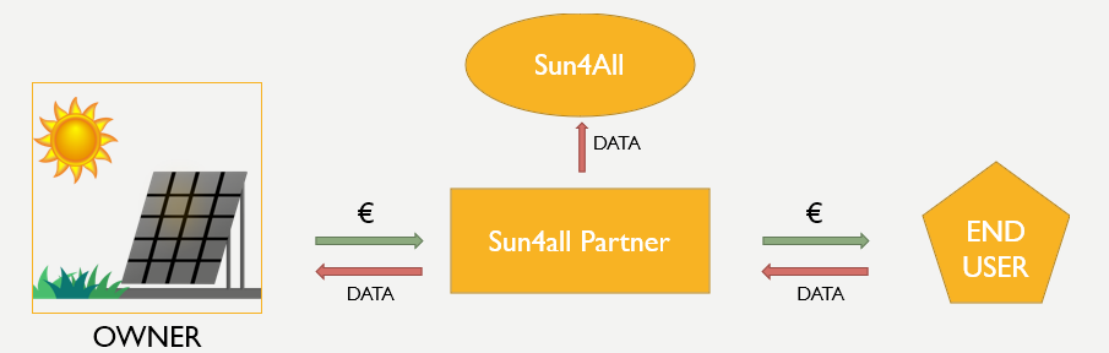


Figure 5: Use Case 1 - Simple module structure

- **Use case 2: "Energy Community".** A development of UC1, where Renewable Energy Communities are established between the vulnerable consumers, local/regional authorities and technical Sun4All partners. In the case of some pilots, due to the legislative framework there will be the need to create a legal entity responsible for the operational management of the self-consumption activities and the communication with the respective operator/distributor.

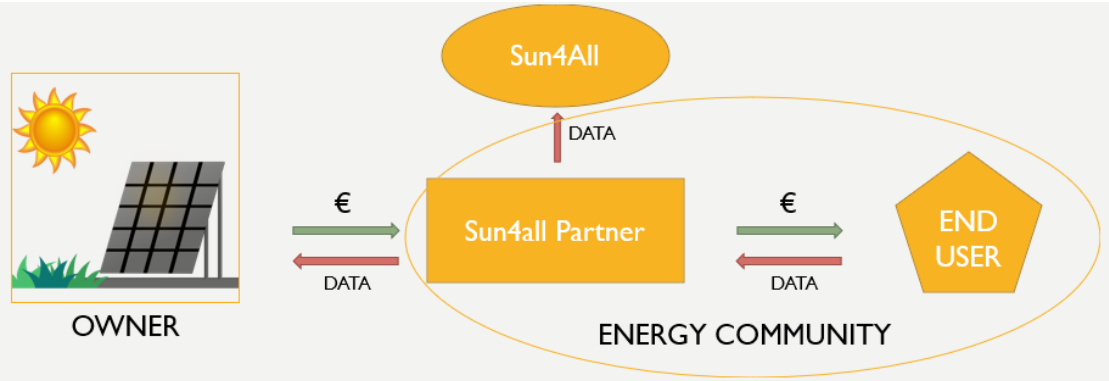


Figure 6: Use Case 2 - Energy Community structure

- **Use case 3: "Utility Company".** As in UC1, Sun4All partners act as "intermediaries" between the PV installation production and the end users/beneficiaries, but there will be also the involvement of the distribution/Utility companies in the collection/management of the data and financial flows. Sun4All partners will collaborate and liaise with the Distribution/Utility companies in order to calculate and distribute the financial benefits to the end users of the project, for example discounts in the energy bill.

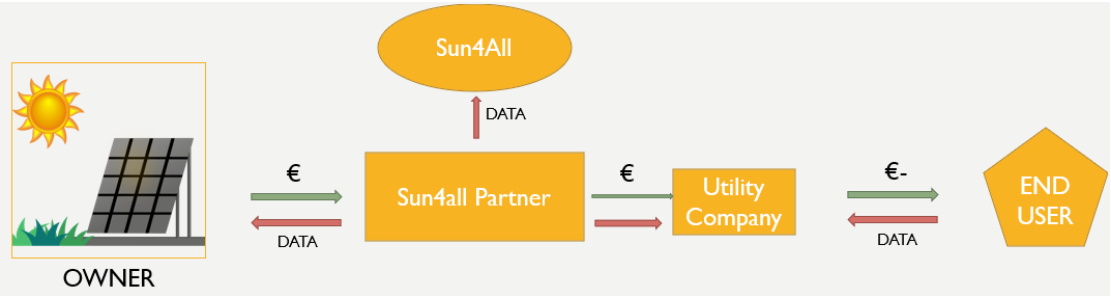


Figure 7: Use Case 3- Utility Company structure

- **Use case 4: "Third party".** Similar to UC3, but involving a third party which can be a private company (e.g., a supermarket), that will provide a link between the PV production and the financial benefits for the end users (which could be discounts, for example). Due to the sensitive nature of the information, data from end users will only be collected and managed by Sun4All partners.

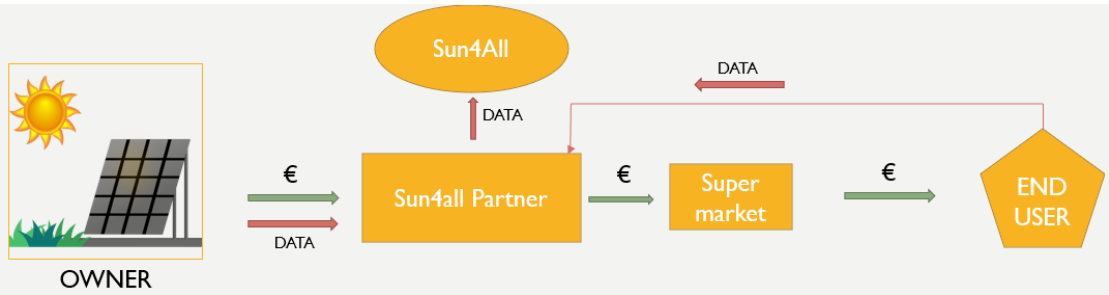


Figure 8: Use Case 4- Third Party structure

- **Use case 5: "Social money".** In this UC, the benefits from the PV energy production will be channeled to the end users though a Social Institution (Municipal Social Departments, grassroots organizations etc.). The beneficiaries will not receive financial benefits but instead this financial flow will be managed by the Sun4All partners directly to the Social Institution, which will in turn provide the non-monetary benefits to the vulnerable consumers. collection and management of the data from end users will be done by Sun4All partners in order to inform the Social Institution which are part of the pilot.

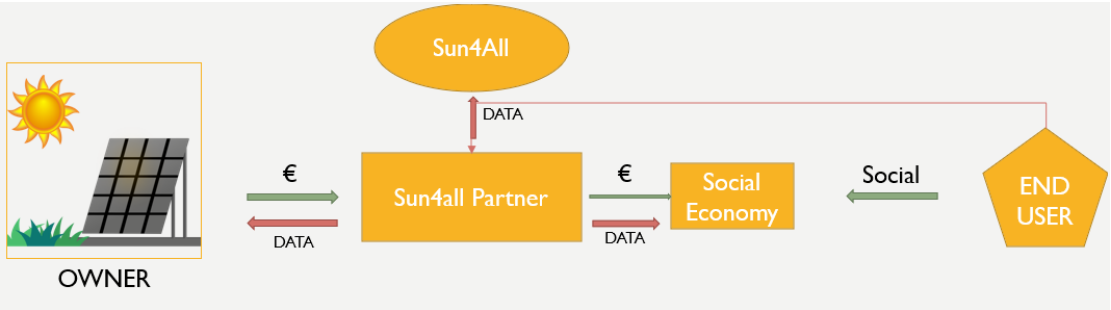


Figure 9: Use Case 5 – Social Money structure

- **Use case 6:** Any new use case to be developed by the partners that does not fit the previous typical use cases.

8. Blueprint for business model summary

Having in mind the main conclusions taken from the European and partner country regulatory frameworks, the comparison matrix and typical use cases with potential to be developed, each partner set up their own set of adapted use cases. At this stage of the Sun4All project, at least two use cases were selected by each partner to ensure there was enough room for alternative options if deemed necessary in later stages of the project. Still, all pilot projects have already pre-selected the most probable use case (s) which are illustrated in this chapter.

Despite the similarities in the target area scale in most of the pilots and the need for abidance to strict national regulatory frameworks, the final set of possible use cases turned out to have significant diversity. This is driven mainly by the prioritization of existing opportunities, stakeholders' involvement, and the characteristics of each PV power production plant and framework which are very specific for each pilot. Most pilots have kept "Use Case 1 – simple scheme" as a possibility of business model, but none have chosen it as a preferred or likely option. If such use cases are developed and given the fact that physical or billing links will be hampered, extra attention should be placed on the engagement and communication strategy to make sure the participants understand what they are part of.

A summary of the specific use cases to be developed for each pilot is depicted below. This definition is still a work in progress and would be refined during the preparation of the implementation plan. The final version of this deliverable (to be developed in the end of the project – M34), will include not only the detailed use cases developed but also lessons learned with the testing of the pilots.

8.1. Almada

Use cases under development:

- **Use Case "simple model"** (adapted from typical Use Case 1): It will be an alternative approach in Almada due to its simplicity (and if expansion of the PV installations already in place is not possible), where the owner of the PV facility is Almada City Council, and the target area/group will be the residents of a set of municipal buildings. There is the possibility of expansion (if not local, via a PV installation away from the community which is more likely to be in place in time for the project). AGENEAL will be involved supporting Almada City council as responsible for managing the data and financial flows. This simple approach can be a "true" energy community (although not complying with the legislative framework), but the benefits rather than financial ones need to be set up because there is not the possibility of providing beneficiaries with money or discount on electricity bill.
- **Use case "Utility Company plus third party"** (adapted from typical Use Case 3): Almada City Council is the owner of the PV facility, and AGENEAL will act as

Managing Entity for the Self-Consumption Community, liaising with E-Redes, Portugal's distribution system operator. Management of data and financial flows will be done by AGENEAL and Almada Municipality. For the operationalization of this Energy community, there is the need to develop some administrative and management procedures, namely the drafting of an internal regulation which also complies with GDPR, an established contract between AGENEAL and the end users due to this being the only possibility of accessing energy data, and also the involvement of the local Community Center as both an end user and a link to the beneficiaries.

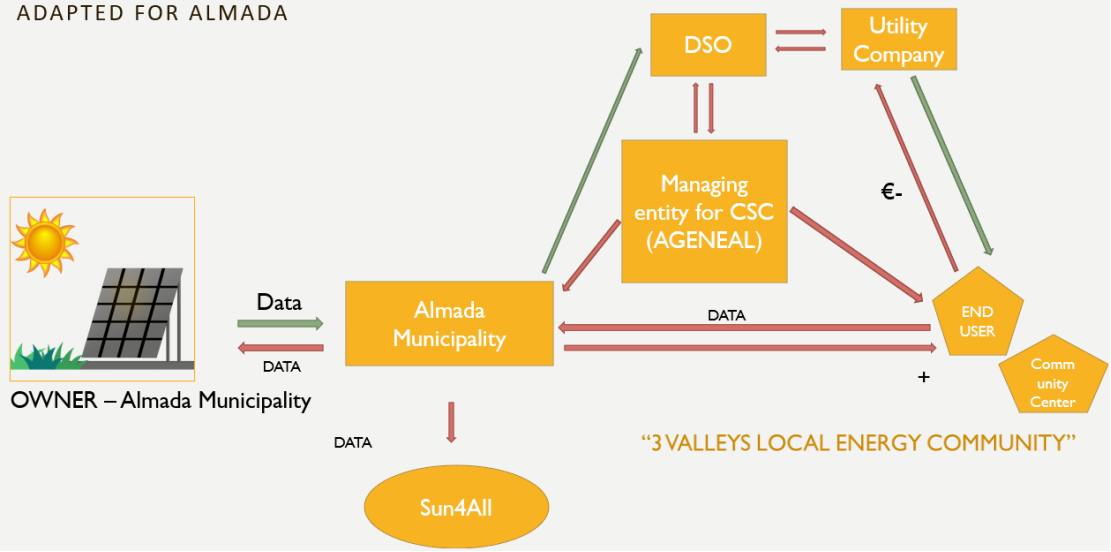


Figure 10: A schematic approach of Almada use case "Utility Company plus third party"

8.2. Barcelona

Use cases under development:

- **Use case "Shared PV facility"** (adapted from typical Use Case 1): The owner of the PV facility is Barcelona City Council which will also be responsible for liaison with the Distribution/Utility company and for managing the data flows and the financial flows with the end users, with the support from ALEB and ECOSERVEIS. This is the use case with the simplest approach because the PV installation is already in place.
- **Use case "Third party"** (adapted from typical Use Case 4): although the owner of the PV facility is Barcelona City Council, IMHAB (Municipal Institute of Housing) is the owner of the buildings where the Sun4All beneficiaries live. In this case, the financial flow will be managed directly between the Distribution/Utility company and the end users, while the management of the data flows will be shared between the Distribution/Utility company
- **Use case "High Complexity buildings"** (New use case): These buildings include a mix of uses apart from residential. This approach will the most

challenging, because the benefits obtained from the electricity produced by the PV facility owned by Barcelona City Council will be shared between the City Council (90% of the financial benefit) and the beneficiaries (10% but they also benefit from 50% of the City Council's financial benefits, which will pay to the neighborhood community for the renting of the roof). Distribution/Utility company will support ALEB, ECOSERVEIS and Barcelona City Council in the management of the data and financial flows.

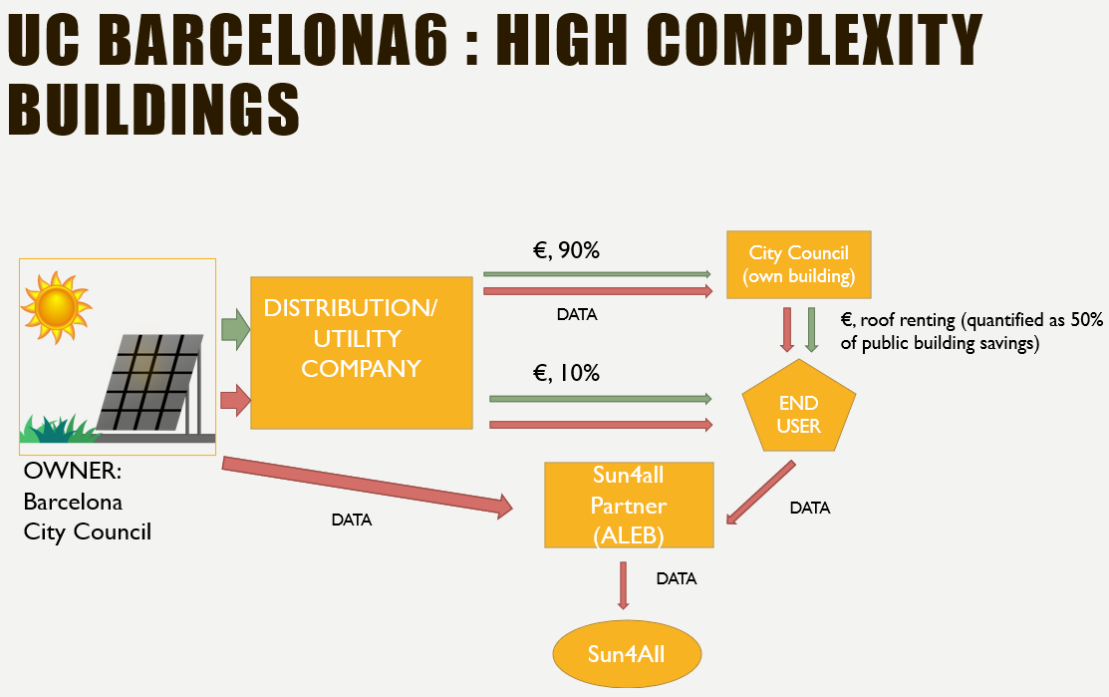


Figure 11: A schematic approach of Barcelona use case "High complexity buildings"

8.3. Communes Coeur de Savoie

Use cases under development:

- **Use Case "simple model"** (adapted from typical Use Case 1): the owner of the PV facility is CCCS and the target area/group will be the vulnerable citizens including residents of social housing buildings. CCCS with the support of INES will be responsible for managing the data flows and the financial flows with the end users in order to provide them with the benefits (fiscal incentives, energy advice, social services etc.).
- **Use case "Energy Community"** (adapted from typical Use Case 2): The pilot will benefit from already installed PV plants, as well as new ones planned to be built in the future. The owner of the PV facilities is Communes the Coeur de Savoie which will establish a Legal Entity during 2022 - an Energy Community – involving the end users/beneficiaries. CCCs with the support of INES will be responsible for managing the data flows and the financial flows with the end users in order to provide them with the benefits (fiscal incentives, energy advice, social services etc.).

- **Use case "Holistic approach"** (New Use Case): Sun4All program will be implemented in a logic of energy efficiency and renovation of buildings which will be crucial to markedly reduce long-term bills of vulnerable consumers and thus tackle energy poverty in the long term. Apart from benefitting from the PV production of electricity, end users will be helped in identifying short term goals to achieve concrete results in terms of energy consumption. The organization of the financial flow, as well as the financial (or other) benefits to end users still needs to be defined. Sun4All will establish itself as the channel for directing vulnerable citizens to the right organizations that already offer support tools (housing renovation, energy efficiency projects, education/capacitation)

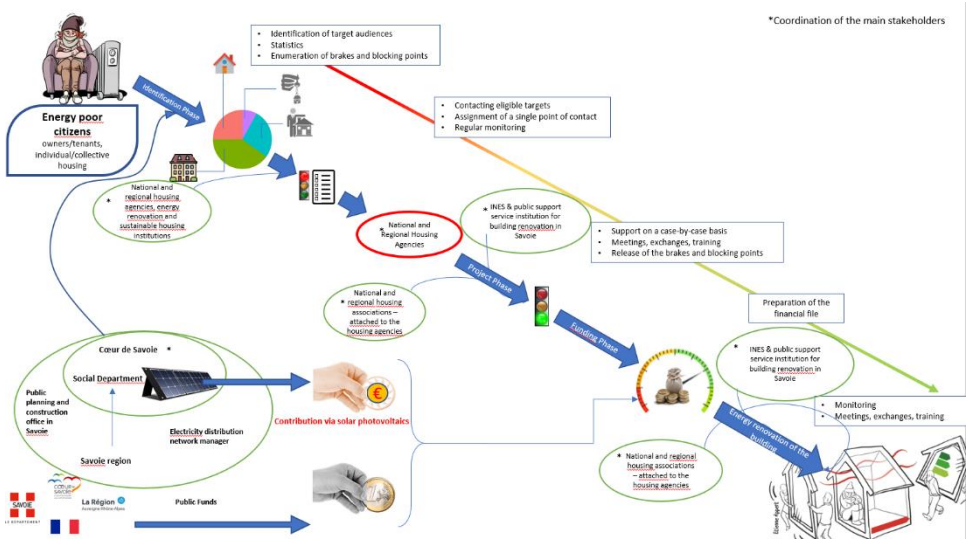


Figure 12: A schematic approach of CCC "French use case"

8.4. Rome

- The municipality of Rome manages approximately 160 photovoltaic systems installed on public roofs for a total power of over 2 MWp. The use cases are defined taking into account some specific eligibility criteria for places/roofs and areas for Sun4All:
- Social centre, the plant itself should be located at a site that is accessible, attractive for the local communities.
- Schools, involving the personnel and the municipal departments to promote the Sun4All initiatives
- Status of the pilot: 8 up to 12 plants, to be defined assessing the power/dimension of the PV plants in relation with the number of beneficiaries for each plant.

Case studies will be selected starting from spatial analysis on public databases. Mapping in web-GIS publicly owned PV plants in the regional area. This output has been delivered to GSE and Regione Lazio for further advancing the spatial mapping of the DERs (see the picture below).

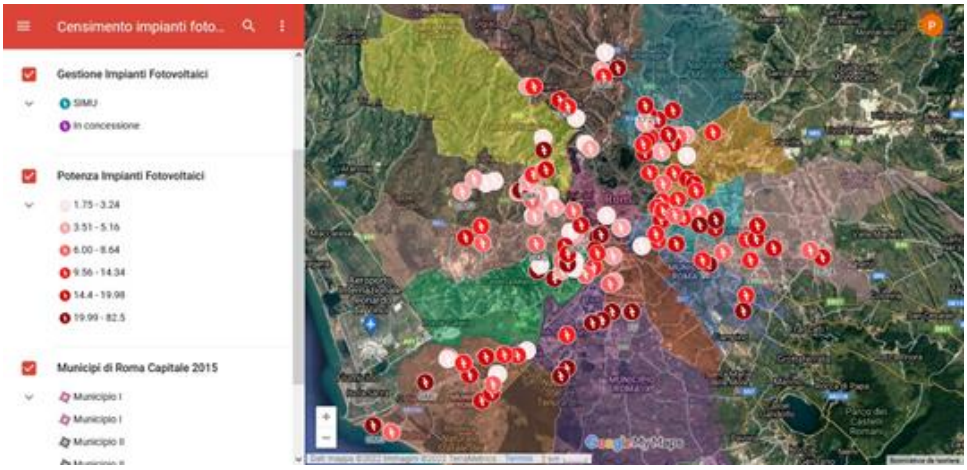


Figure 13: Map from publicly owned PV plants in the regional area of Rome

The Use Cases under development for the city of Rome are described below.

- **Use case 01: "DSO & UTILITIES Model".** DSO in Rome is ARETI (Group ACEA owned 51% by the municipality) and represent the privileged player to enable the Bonus Energia (Reduction in the Energy Bills of Vendors) in favour of the selected beneficiaries. The municipality can transfer the public incentives derived from the existing RES plants to the DSO. The DSO will move quotes to the Vendors that will reach the beneficiaries with the benefits and with focused communication. The formal REC is not necessary for this scheme and is not admissible, using existing PV plants built before March 2020. Energy Community are enabled through citizens engagement around the selected PV plant.

Figure 14: A schematic approach of Rome use case "DSO & Utilities"

- **Use case 02: "Third Party Model"** (adapted from typical Use Case 4): Pilot partners select a subject to act as an "intermediary" between the PV installation production and the end users/beneficiaries. Sun4All partners will be responsible for collecting and managing the data. The municipality collecting incentives from RES plants organize the financial flow toward the Third Party, once per each yearly cycle. The Third-party will then provide adequate money or benefits (transport discounts, vouchers, bulb lamps, discounts for EE devices, etc.) to the end-users of the project, the vulnerable consumers. The benefits are to be preferred to the money transfer due to the opportunity to highlight and promote sustainability and low carbon behavior, resulting in energy savings as an indirect impact. Third-Party could also take charge of activities of communications and citizen engagement.

Figure 15: A schematic approach of Rome use case "Third Party"

- **Use case 03 "Formal REC":** in this model, the Municipality will provide the investment and the management of the PV facility on the roof to enable the REC, to build the first plant (i.e., on the school roof). The financial benefits will be shared between the aggregated members and the Municipality. The REC legal entity (better if Fondazione in Partecipazione, independent entity promoted by the municipality) will accept members requesting to be either consumers or prosumers, residential or commercial, and will manage the financial flows to the end-users/beneficiaries. REC formally registered to GSE application will receive the public incentives. Simple consumers including vulnerable users will receive a reduction in energy bills and other agreed services. A "benefit" approach will raise the quote of vulnerable users as members and the services, material and immaterial, they will receive.

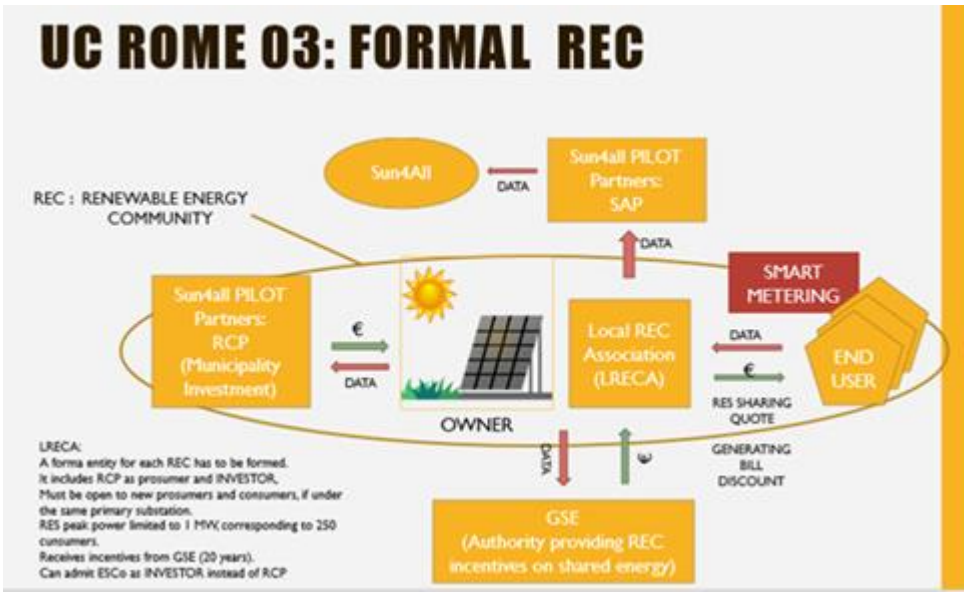


Figure 16: A schematic approach of Rome use case "Formal REC"

- **Use case 04 "REC with ESCO":** in this model, a company will provide the investment and the management of the PV facility on the roof to enable the REC. The ESCO will operate by providing a savings guarantee and risk management in the implementation of the pilot. The financial benefits will be shared between the private company and the Municipality, in general, receiving the energy for self-consumption. The REC legal entity will accept members requesting to be either consumers or prosumers and will manage the financial flows to the end-users/beneficiaries. REC formally registered to GSE application will receive the public incentives. Simple consumers including vulnerable users will receive a reduction in energy cost and other agreed services. A "benefit" approach will raise the quote of vulnerable users as members and the services, material and immaterial, they will receive.

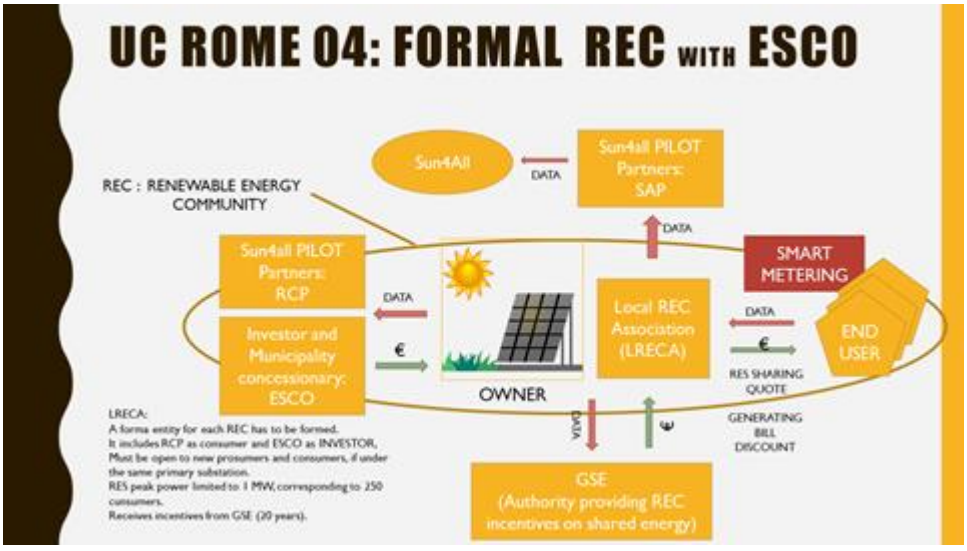


Figure 17: A schematic approach of Rome use case "Formal REC with ESCO"

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