



Rooftop Solar PV Country Comparison study

Country profiles

May 2022



Introduction

As part of the Rooftop Solar PV Country Comparison study report, these country profiles have been produced by CAN Europe and its member organisations in eleven Member States to compare each countries' good and bad policies and practices in regards to residential rooftop solar PV.

The eleven countries in focus are: Bulgaria, France, Germany, Greece, Italy, Latvia, Lithuania, Portugal, Romania, Sweden, and Spain.

The country profiles examines and scores six key areas:

- governance;
- incentives & support schemes;
- permitting procedures, energy sharing schemes;
- energy communities and;
- additional measures to support solar PV development.

Each area is scored by a "traffic light" system for each country:



Overall, the country profiles show that while some countries may be better performing in their rollout of residential rooftop solar PV than others, there are still significant barriers at national level which impede a higher uptake, and many Member States are still lacking the right regulatory framework and enabling environment.

For the full country comparison report and policy recommendations, follow the link below:

<http://caneurope.org/solar-rooftop-pv-comparison-report>



Bulgaria



France



Germany



Greece



Italy



Latvia



Lithuania



Portugal



Romania



Spain



Sweden




Rooftop Solar PV Country Comparison study

Country Profile Bulgaria



This country profile highlights the good and the bad policies and practices of solar rooftop PV development within Bulgaria. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
-  **Red = 0-1 points**

Governance aspects: 1

The Bulgarian integrated plan on energy and climate for 2021-2030 (the Integrated Plan) provides for the development of the RES sector to 27% of the gross end consumption and therefore the Bulgarian Government is expecting that PV installed capacity in Bulgaria will triple by 2030¹, but it does not set a meaningful roadmap or plan for rooftop installations, which are not mentioned much in the NECP. The purpose to create a one-stop-shop for rooftop-PV development is manifested but not implemented yet. The NECP also requires the creation of a new national RES potential assessment by 2022 / 2023, but it still has not started. There is currently no effective roadmap or strategy on how to develop the sector of rooftop-PV.

Incentives: 2

There is a Feed-in Tariff defined by the Regulator annually. When the energy is also used for self consumption, the excessive volumes dispatched to the grid are purchased at a price equal to the forecast market price defined by the regulator for such installations. However, there are not many small rooftop PV projects developed in recent years benefiting from FIT and most of the installations are developed mainly by professionals or people who have deep experience in the business. With regard to European funds, currently they are not widely advertised and easily accessible. Furthermore, the procedures with public authorities for EU funding is usually administratively burdensome and many businesses prefer to opt out of those.

Permitting and administrative procedures: 1

In general terms, a construction permit is needed. The procedure of grid connection is developed with the DSO, and the confirmation of the grid connection is needed to obtain the construction permit. The grid connection and construction permitting process may take about 6 months (when no obstacles occur).

Regulations are still seen as burdensome and administrative fees are excessive. Excise duty is considered disproportionate in the cases of self-consumption and (potentially) shared consumption between prosumers.

There are frequent negative grid connection statements by DSOs which are often ungrounded, which can be attributed to lack of transparency issues (Eclaeron, 2022, p.57).

Energy sharing or collective self consumption: 0

In Germany, the so called “Mieterstrommodell” explained above was introduced in 2017, which enables the plant operator in multi-apartment buildings to sell electricity to the tenants in direct proximity. This electricity must be supplied to and consumed by final consumers within the building or in residential buildings or ancillary facilities in a direct spatial relationship with this building, and it must not pass through the public electricity grid. However, this scheme has not been a success due to its numerous complications, so there may be changes to the regulation in the course of 2022. Energy sharing is not possible yet; but might change with new upcoming regulations according to the Coalition Agreement.

Energy communities: 0

Currently, there is no draft legislation for energy communities. Citizen participation in the energy sector is very new in Bulgaria.²

2. Bulgaria- REC/CEC definitions - REScoop

Additional measures: 0

There are no widely accessible training programmes, informational campaigns or public information from authorities. Practice shows significant delays due to lack of knowledge, training, and documentary organisation in the authorities. On the other hand, Bulgaria has not yet completed its Cost Benefit Analysis on the rollout of smart meters.³

3. Energies | Free Full-Text | Smart Metering Roll-Out in Europe: Where Do We Stand? Cost Benefit Analyses in the Clean Energy Package and Research Trends in the Green Deal (mdpi.com)

Engaging citizens and local communities in the solar revolution

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11 countries were chosen to be assessed and scored on their performance regarding the development of rooftop solar PV within their country.

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Rooftop Solar PV Country Comparison study

Country Profile France



This country profile highlights the good and the bad policies and practices of rooftop solar PV development within France. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
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-  **Red = 0-1 points**

Governance aspects: 3

The framework for developing photovoltaic policies in France falls within the long term National Low Carbon Strategy (SNBC, 2050 horizon) and the 10-year Energy Programme Decree (PPE). France's NECP incorporates self-consumption and energy communities as measures, setting a target of 200,000 PV sites for self-consumption in 2023, 50,000 of which are collective.¹ The current PPE in France, published in 2020, targets 3 GW to 5 GW per year of new capacity, to reach 20 GW by 2023 and 35 GW to 44 GW by 2028.² The government published an Action Plan in November 2021 to accelerate the development of photovoltaics. This plan includes a possible feed-in tariff for ground based systems under 500 kW on wasteland, 1000 projects on public land and buildings, a reduction in upfront grid connection costs and simplifications to administrative procedures.³

1. Government of France, "INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN for FRANCE," 2020. Available: https://ec.europa.eu/energy/sites/ener/files/documents/fr_final_necp_main_en.pdf.

2. [Programmations pluriannuelles de l'énergie \(PPE\)](#), | [Ministère de la Transition écologique \(ecologie.gouv.fr\)](#)

3. [Solaire](#) | [Ministère de la Transition écologique \(ecologie.gouv.fr\)](#)

Incentives: 4

In October 2020, feed-in tariffs for systems up to 500 kW on buildings, greenhouses and parking canopies led to a 100% quarter on quarter increase in requests for grid connection. The new framework includes differentiated tariffs depending on system size and lump sums for smaller self-consumption systems as well as specific building integrated products.⁴ On the other hand, feed in tariff (FiT) for PV installations below 500 kW on buildings is subject to revisions every 3 months depending on the number of completed grid connections, which is perceived as a destabilising factor according to promoters, since they cannot have a clear idea of their payback period (Eclaeron, 2022, p.24). Furthermore, the ban on accumulating local aid with the feed-in tariff in the latest tariff decree of 6 October 2021 poses many risks for local project developers and is likely to put a major brake on the development of energy communities. A modulation of the tariffs according to the deposit could accelerate a balanced development of solar projects throughout France, the country with the highest sunshine differential in Europe.

As a positive note, there is an obligation to install solar panels on new or renovated buildings from 500 m² (compared to 1000 m² previously).

Permitting and administrative procedures: 2

Procedures could be simplified and made more fluid in order to make it easier for project developers to obtain the various administrative authorisations (town planning, connection, etc.)

Energy sharing or collective self consumption: 4

Solar PV systems have the option to participate in collective self-consumption projects and the use of the public grid for energy sharing is allowed. Furthermore, France has an absolute limit for CSC at 3MW and uses a spatial limitation of 2 km for its CSC scheme, with exceptions up to 20 km in rural areas with low population density and under specific circumstances, which is quite permissive compared with other countries (for instance, in Spain it is only 500 meters). Furthermore, the Collective can decide how to distribute electricity and dynamic coefficients are available. Electricity can be distributed on the basis of a combination of agreed percentages, for instance, proportional to the amount each member invested, and according to the demand/consumption that each of them have (McKenzie Banker, 2020, p.71).

[4.IEA-PVPS Annual Report 2021.pdf](#)

Energy Communities: 2

In December 2021, it was approved that the Decree that transposes the RED II Directive, which affects SolarPV, simplifies the current legislation and encourages the establishment of Energy Communities and agreements for collective self-consumption.⁵ They have adopted 2 different concepts for REC and CEC, with eligibility being the most differentiated aspect between them, so that there are no restrictions to participate in CECs while strong restrictions are imposed on companies to participate on RECs. The legislation lacks provisions on how REC and CEC should relate to each other.⁶ The EU criteria are well reflected in national legislation. A draft application decree elaborates which legal entities are allowed to become energy communities, including joint-stock companies, and cooperative societies.⁷ On the other hand, French legislation has not designated any authority to oversee the implementation of REC and CECs.

Additional Measures: 3

In France, there seems to be a lack of construction companies capable of supporting the growth of the sector. The question of training and employment are therefore becoming key issues. Nearly one in ten individual houses has one or more sections of roof equipped with photovoltaic panels, which demonstrate the inhabitants' commitment to the energy transition. The roofs of larger buildings are also increasingly being equipped with solar PV. But there is still a need for additional awareness raising campaigns to accelerate the development of photovoltaic development. Finally, in France, in 2020, there was a smart meter penetration of 76.4%.⁸

5. [IEA-PVPS Annual Report 2021.pdf](#)

6. [France - REC/CEC definitions - REScoop](#), accessed 12/4/2020

7. [France - REC/CEC definitions - REScoop](#)

8. [dso-facts-and-figures-11122020-compressed-2020-030-0721-01-e-h-6BF237D8.pdf \(eurelectric.org\)](#)

Engaging citizens and local communities in the solar revolution

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Rooftop Solar PV Country Comparison study

Country Profile Germany



This country profile highlights the good and the bad policies and practices of rooftop solar PV development within Germany. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

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-  **Green = 4-5 points**
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-  **Red = 0-1 points**

Governance aspects: 4



Germany has created a sound environment for rooftop solar PV. The new Coalition agreement 2021-2025 has set specific targets for solar: photovoltaic expansion is to be accelerated in the future, with the new government's stated goal of approximately 200 GW by 2030. This doubling of the previous goal would mean that approximately 140 GW of solar PV energy would have to be installed in Germany over the next years, corresponding to an annual expansion of 15 GW. In April 2022, there was a cabinet decision on the so-called easter package, which among plans to revise several energy laws, which among other things includes an amendment to the Renewable Energies Act (EEG). The opinions of various associations are integrated primarily via public consultations in the framework of legislative processes.

Incentives: 4

In Germany, an incentive system based on a state-guaranteed feed-in remuneration was probably one of the drivers of what we call the first boom in solar PV, and was very successful. However, reductions in the remunerations rates and policy tools like the “breathing cap”¹ have stifled the expansion of rooftop photovoltaic systems, being now the remuneration for the electricity fed into the grid too low. Although it is planned that remuneration rates for PV roof systems will increase again with the planned EEG amendment, there is still room for improvement. Also, higher bidding volumes for solar PV are needed. As positive notes, the EEG draft amendment foresees that solar projects up to 6 MW will no longer need to take part in the auctions but will receive fixed remuneration rates for the electricity they produce; and the EEG surcharge is supposed to be removed. The draft version also intends to offer more opportunities for local communities to receive financial support from operators of renewable energy plants.

As an additional incentive, the federally owned development bank KfW also finances the purchase of photovoltaic systems with low-interest loans.

There is currently no nationwide obligation of installing solar PV in new or renovated buildings. However, according to the New Coalition Agreement, this is to become compulsory for new commercial buildings and the common rule for residential ones. Some federal states have already introduced an obligation to install solar panels in new or renovated buildings or are planning to do so

Permitting and administrative procedures: 3

Rooftop solar PV must be registered in the “Marktstammdatenregister” of the Federal Network Agency (BNetzA) as well as with the respective network operator. BSW, a German solar association, argues that the abundance of disproportionate bureaucratic requirements are increasingly dampening the willingness to invest.² For instance, the federal tenant electricity promotion scheme “Mieterstrommodell” has been in place since 2017, but only about 1% of the annual budget has been claimed. The main barrier for the program’s success has been a complex set of legal requirements that cover duties of a tenant electricity supplier, customer base, size of PV systems, electricity measuring and billing, taxes and levies, and support schemes (Moser et al, 2021).³ In this process, the owner has to be registered as an electricity supplier which is a very long and burdensome procedure.

In general terms, the potential of digitalisation should be further explored to improve bureaucratic procedures. There are also still specific hurdles with regard to the protection of historical monuments, which pose obstacles related to permitting procedures.

1. The idea is that at a time when the market is growing fast and when large numbers of renewables installations are being built, feed-in tariff rates will be reduced more quickly than at a time when the market is growing more slowly and smaller numbers of renewables installations are being built.

2. [5.3GW of German solar installed in 2021 - reNews - Renewable Energy News](#)

3. For more information: BMWK - [Frequently asked questions about landlord-to-tenant electricity \(bmwi.de\)](#)

Energy sharing or collective self consumption: 1

In Germany, the so called “Mieterstrommodell” explained above was introduced in 2017, which enables the plant operator in multi-apartment buildings to sell electricity to the tenants directly. This electricity must be supplied to and consumed by final consumers within the building or in residential buildings or ancillary facilities in a direct spatial relationship with this building, and it must not pass through the public electricity grid. However, this scheme has not been a success due to its numerous complications, so there may be changes to the regulation in the course of 2022. Energy sharing is not possible yet; but might change with new upcoming regulations according to the Coalition Agreement.

Energy communities 1

In Germany, at present, energy communities “follow the rules that apply for cooperatives in general under the Cooperatives Act and the rules that apply to all market actors for the development of RES projects under the German Renewable Act”⁴. So there has been no transposition yet targeting energy communities. There is a definition of CECs in the Renewable Act, but it is not in line with the EU definition.⁵

4. [Germany - REC/CEC definitions - REScoop](#)

5. [Germany - REC/CEC definitions - REScoop](#)

Additional measures 3

Germany is currently the largest solar market in Europe and has occupied that position for over the last 20 years according to SolarPower Europe (2020). A total output of 5300 MW of roof-mounted and ground-mounted solar power systems were installed in Germany last year, according to the preliminary results of the German Solar Industry Association (BSW). New figures show that approximately 240,000 new modules were connected to the grid in 2021, constituting a 10% increase in sales compared to the previous year. BSW said that around 10% of domestic electricity consumption in Germany is now covered by solar PV systems.⁶

However, there is further need for financing training programmes addressed to administrative staff, installers and technicians, as well as for the design of awareness raising campaigns that disseminate the benefits of solar PV and contribute to making solar PV easily accessible for citizens.

Smart meter rollout slowed down since the Higher Administrative Court in Munster interpreted a decision of the German Federal Office for Information Security (BSI) as unlawful and lifted the obligation to install smart metering systems by emergency order. This situation has created uncertainty with regard to the roll out of smart meters in Germany and a general discussion has started, which has been expanded to other topics such as privacy issues. However, later amendments to the German Metering Point Operation Act have led to the legitimization of the gradual smart meter system rollout in Germany.

6. [5.3GW of German solar installed in 2021 - reNews - Renewable Energy News](#)

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Rooftop Solar PV Country Comparison study

Country Profile Greece



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Governance aspects: 2

The latest Greek National Energy and Climate Plan (NECP, 2019) refers to the aim of ensuring the development of all forms of RES for electricity generation. The current target set is 1GW of installed capacity by 2030 from RES systems for self-consumption and net-metering, which will cover the electricity needs for 330,000 households. There is no roadmap or strategy at the time being, beyond the approval of NECP. Stakeholders' views are basically integrated via public consultation of laws.

Incentives: 3

In Greece, the old FiT scheme started in 2009 with a Special Photovoltaic Development Program for low power systems¹, with a very high tariff (0.55 Euros/kWh) for up to 10kWp rooftop PV. As this price was deemed not viable, it was reduced from 2013 and forward and led to reduced investment interest for the Fit scheme since 2013, and zero after 2014, when the net metering scheme was introduced. Currently, excess energy from a PV installed (could be on a rooftop) can be used later to offset consumption when PV generation is not available. The netting period is 3 years. For residential systems, the maximum installed capacity is 20kW. Even though such a net-metering scheme seems attractive, interest from residential consumers remains relatively low in Greece. This scheme can be also applied virtually only for public entities, professional farmers and energy communities. There is also a new program for small solar rooftop PVs (up to 6kWp) which was established in 2022 with a guaranteed price (of 0.087Euros/kWh), for a 20 year contract.

1. Official Gazette B' B'1079/04.06.2009

Permitting and administrative procedures: 1

Currently, probably the main reason that impedes solar development and that makes administrative procedures longer, including rooftop solar in Greece, is grid availability. Currently, in many areas in Greece, applications for solar rooftop PV are being rejected due to lack of electricity grid capacity. For PV, this time can mean two years in case of connection to the grid operated by HEDNO (as of 2019) and 9 months in case of connection to the grid operated by IPTO (Eclaeron, 2022, p.49).

Energy sharing or collective self consumption: 3

Collective self-consumption and energy sharing are implemented in Greece through energy communities by performing the virtual net metering scheme. Virtual net metering can only be used by public entities and professional farmers as single persons/entities. All others can use this scheme only by forming an Energy Community (civil cooperative). A significant drawback is that PV installations on shared ownership rooftops can be implemented only through an energy community. It is really troublesome for the residents of an apartment building to create a civil cooperative for that purpose and this option is not working out.

Energy Communities: 3

Greece was a frontrunner in establishing a new type of civil cooperative, the “energy community” (Law 4513/2018), including most of the criteria foreseen in the EU definitions (effective control, open and voluntary participation, local proximity, etc.), before the adoption of the EU definitions. Currently, there is no difference between REC and CECs, but legislation separates nonprofit and for-profit energy communities. With this regard, the experience of Greece has shown that a broad definition caused a phenomenon of hijacking and many energy communities were created by private investors and not citizens, taking advantage of the incentives provided for them², bypassing steps in environmental permitting, avoiding the competition with their peers while securing generous feed-in tariffs. Since 2018 many legislative changes have been made, in an effort to address the above-mentioned problems, thus creating an unstable environment for the development of energy communities.

On the other hand, Greece has established a concrete approach to incorporate vulnerable households, offering vulnerable consumers or citizens living under the poverty limit who live in the same district a right to be involved in virtual net metering.

² Greece - REC/CEC definitions - REScoop, accessed 12/4/2020

Additional Measures: 3

The tender for a massive smart meters roll-out needs to be published again in 2022; thus, no wide-scale roll-out has taken place yet.³ There has not yet been a massive national awareness raising campaign to disseminate the benefits of solar PV and additional training programmes for administrative staff, policy makers, installers and technicians who are needed to contribute to the uptake of rooftop solar PV in Greece.

3. Vitiello, S.; Andreadou, N.; Ardelean, M.; Fulli, G. Smart Metering Roll-Out in Europe: Where Do We Stand? Cost Benefit Analyses in the Clean Energy Package and Research Trends in the Green Deal. *Energies* 2022, 15, 2340. <https://doi.org/10.3390/en15072340>

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Rooftop Solar PV Country Comparison study

Country Profile Italy



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The scoring system is set out below:

-  **Green = 4-5 points**
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Governance aspects: 1

In Italy, there is no specific and integrated strategy that drives the implementation of solar photovoltaic systems beside the NECPs. The absence of a strategy is evident in terms of the lack of specific objectives and the development of appropriate tools to push for the installation of solar PV on roofs. There is also no policy for public buildings.

Incentives: 3

In Italy, "Scambio sul Posto" ("On-site Exchange") is a net metering scheme that considers not only the electricity injected, but also the energy withdrawn from the grid for consumption. In other words, it is a form of economic compensation between inputs and withdrawals. It establishes that if at the end of the year, the value of the energy introduced in the network is greater than the value of the energy withdrawn from it, the difference can be received in euros by the prosumer. Furthermore, the Italian Government offers very relevant financial incentives such as:

1. Credit transfer: transfer tax credit to ESCOs (Energy Service Companies), banks or companies, allowing households to reduce direct expenditure
2. House bonus: tax deduction (IRPEF) of 50% on the purchase of photovoltaic systems
3. Superbonus 110 %: beneficiaries who carry out these interventions can count on a deduction of 110% of the expenses incurred.

However, the history of stop and go policy regarding incentives for renewable energies deriving from continuously changing governments in recent years has harmed the confidence of the sector and its investors.

Permitting and administrative procedures: 2

The Italian legal framework concerning the installation of photovoltaic systems on roofs is complex. To regulate this activity there is not only the national legislation, which only provides a general framework, but there are mainly municipal building regulations, different for each municipality. In fact, the legal framework is scattered and the lack of unity can represent an obstacle to the development of rooftop photovoltaics. Moreover, one of the most frequent obstacles is related to the strict protection of particularly valuable assets (historical, cultural, landscape) that limits the installation of photovoltaic panels on certain buildings and in certain areas (e.g. historical centres). Law Decree no. 17/2022. simplifies the authorization process. In essence, the installation of these systems is now recognised as an intervention of ordinary maintenance and therefore, there is no longer any need to fill out long and tedious paperwork, but it still excludes buildings located in historic centers regardless of their real historical/cultural value.

Energy sharing or collective self consumption: 3

Italy allows the use of the public grid for CSC or energy sharing, mainly through energy communities schemes.

Energy communities are divided into two types:

- The Collective Self-consumption whose perimeter is defined by the building itself.
- The Renewable Energy Community whose perimeter is defined by the primary cabin electricity conversion from high to medium voltage that can reach 30/40 thousand users.

Energy communities: 4

Since 2020, energy communities are active in Italy, first in experimental form with the "Milleproroghe 2020" Decree and from November with the transposition of the European RED II Directive through the Legislative Decree no. 199/2021. Executive Decrees are still pending. The legislation defines RECs as non-profit legal entities whose objectives must be environmental and social in nature and identifies the entities that can be part of RECs and those that cannot, expanding the scope, compared to RED II, also to include non-profit organizations such as NGOs.

However, the geographical limit chosen for Renewable Energy Communities is the perimeter associated with the primary electricity transformation cabin, which can even reach 30/40 thousand users. The information on where this perimeter is located is not in the public domain, so the organisation of a REC could be complex. An alternative would be to identify the users that are part of the same REC through the use of postal codes, which are publicly known, as some Italian organizations such as Legambiente have proposed.

Additional measures: 3

Italy has reached a market penetration of almost 100% regarding smart meters. Additional measures are needed in terms of financing training programmes for installers and administrative staff, as well as designing public awareness campaigns that show the benefits and potential of solar PV in order to accelerate its uptake.

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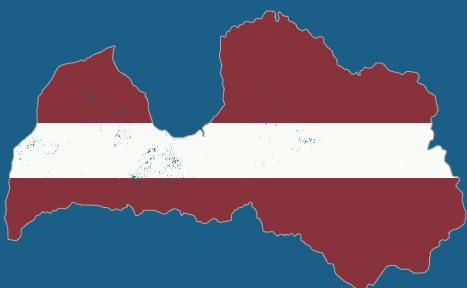
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Rooftop Solar PV Country Comparison study

Country Profile Latvia



This country profile highlights the good and the bad policies and practices of solar rooftop PV development within Latvia. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

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Governance aspects: 2

Latvia's NECP has set the goal to increase the share of RES to 50% in 2030. However, Latvia is the only country that does not include specific solar targets in its NECPs (Eclaeron, 2022, p.5). The general provisions for supporting solar deployment in the residential sector include transposition of the Clean Energy Package in national legislation and several funding programmes for multi-apartment buildings, private housing and future energy communities.

Local governments have started to take a more active role in energy transition. For example, the capital city Riga has recently prepared its Sustainable Energy and Climate Action plan which entails a progressive vision on expansion of solar PVs through increased citizen participation, availability of rooftop space and technical assistance from the Riga Energy Agency.

Incentives: 3

Recent improvements in the metering system for private microgeneration (only applied to natural persons and effective from April 1, 2020) allow for the later retrieving of the unused solar electricity from the grid within one year.¹ Net-metering schemes are now exempt from the variable part of the mandatory procurement component (MPC) fee for electricity fed into the grid and taken back.²

There are two new programmes for private house owners which provide grants, guarantees and technical assistance for installing solar PV with more than 32 million EUR, with a maximum of 15,000 EUR for one project. In the near future, there will be EU funded programmes to combine energy efficiency measures with solar PV for multi-apartment buildings and support for energy communities. However, there are no tax incentives for self-consumption available (Eclaeron, 2022).

Permitting and administrative procedures: 2

From 2020, systems below 11.1 kW no longer need a permit from the Ministry of Economics.

A simplification was recently adopted in recent regulations, according to which the installation of solar panels (equipment) on the ground or on buildings do not require a permit from the building authority (there are applicable exemptions).³

Energy sharing or collective self consumption: 1

Housing associations may use solar PV for their collective consumption in the common premises but the option to distribute electricity to individual apartments is not yet available since solar PV installations can be connected to a single smart meter; but cannot be shared among the residents as individual clients. It is planned to develop a collective self-consumption regulation that will apply to residential units placed inside one building in the near future, but no practical ways of energy sharing and collective self consumption exist at the moment.

1. [PV policy developments in the Baltic states – pv magazine International \(pv-magazine.com\)](#), accessed 12/4/2022
2. [PV policy developments in the Baltic states – pv magazine International \(pv-magazine.com\)](#)
3. [Facilitates the construction process for the installation of solar panels | Ministry of Economics \(em.gov.lv\)](#)

Energy communities: 1

The transposition process is in progress and the CER and CEC definitions will be included by amendments to the Law on Energy and the Electricity Market Law respectively, but they have not been approved yet.⁴ A general definition for energy communities has been established and then the definitions of RECs and CECs have been included.⁵ The draft proposal establishes that the State Construction Control Bureau will run a register of energy communities, ensure its public availability and perform supervision of energy communities. A practical way of creating energy communities (collective self-consumption) was demonstrated in a recent EU funded project where rooftop solar PVs were installed on two multi-apartment buildings.⁶ However, changes in the legal framework and technical energy sharing provisions are required to launch further autonomous initiatives.

Additional measures: 3

In 2020, Latvia had a smart meter penetration rate of 73%.⁷

The rollout of smart meters will be completed by 2023 for 98% of residential and commercial connections.⁸ The Latvian DSO is implementing several digitalisation projects, including the national energy data hub, to increase the flexibility of the grid and enable a wider adoption of prosumerism. Recently, the DSO published the first open data set with anonymized smart metering data.⁹ From a broader perspective, Latvia's Recovery and Resilience plan will allocate EUR 80 million for modernization of transmission and distribution grids in order to adapt to the new requirements of e-mobility and prosumerism.¹⁰

However, training programmes and information awareness campaigns are needed for the uptake of solar rooftop PV, which is not yet an easily accessible option for all citizens. The share of solar energy in Latvia's renewable electricity generation is still very low (5 GWh in 2020;¹¹ 14 MW installed capacity for microgeneration in 2021).¹² Availability of professional staff for residential installations and increasing project costs are additional barriers for solar PV deployment in poorer communities.

4. [Latvia - REC/CEC definitions - REScoop](#), accessed 12/4/2022

5. [Latvia - REC/CEC definitions - REScoop](#), accessed 12/4/2022

6. COMERES project: [Good practice portfolio](#). Case of Co2mmunity at Mārupe, page 85, accessed 20/04/2022

7. [dso-facts-and-figures-11122020-compressed-2020-030-0721-01-e-h-6BF237D8.pdf \(eurelectric.org\)](#)

8. Development plan of the power distribution system 2020-2031, DSO "Sadales tīkls", accessed 20/04/2022

9. [Datasets for advancing innovations](#), DSO "Sadales tīkls", accessed 20/04/2022

10. [Latvia's Recovery and Resilience Plan](#), accessed 20/04/2022

11. [Electricity from renewables](#), Central Statistics Bureau, accessed 20/04/2022

12. [Overview of power sector 2021](#), DSO "Sadales tīkls", accessed 20/04/2022

Engaging citizens and local communities in the solar revolution

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Rooftop Solar PV Country Comparison study

Country Profile Lithuania



This country profile highlights the good and the bad policies and practices of rooftop solar PV development within Lithuania. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
-  **Red = 0-1 points**

Governance aspects: 3

Lithuania has no specific roadmap strategy for rooftop solar PV besides the general NECP. However, the government has established the following goal for total Solar PV: 1 GWp by 2025 and 2 GWp by 2030. Quarterly meetings between the minister of energy and solar PV business representatives and some NGOs are held to monitor solar policy.

Incentives: 4

In Lithuania, all producing customers are connected to the distribution network of AB Energijos skirstymo operatorius. The prices of services and the percentage for the use of electricity grids shall be fixed once a year for consumers producing electricity grids.¹ Taxes and fees are not high (~1-5 % depending on the size of solar PV).

Regular calls for solar PV subsidies are made each year. In the last call in Spring 2022, 39.5 million out of 48 million were allocated to Solar PVs on their rooftops. Up to 10 kW, each participant could obtain about 320 Eur/kW, so it is a very relevant incentive for the uptake of solar PV.

There are regulations that require installation of solar PV on renovated apartment houses (with area above 1500 m²) for common uses.²

1. [XIV-72 On the Eighteenth Government Programme of the Republic of Lithuania \(lrs.lt\)](https://www.lrs.lt/portal/legalAct/lt/TAD/TAIS.242058/asr)

2. <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.242058/asr>

Permitting and administrative procedures: 3

The administrative procedures are slow (it is taking several months) due to the lack of resources in the energy directorate. The sale of surpluses to the network requires excessive bureaucracy. However, on a positive note, there are no fees up to 30 kWp under the modality of self-consumption PV (installed on ground or rooftop). There is a registration fee and the need for an operating certificate above 30 kWp, and above 1 MW with an evaluation of the project required. Only installations bigger than 100 kW will need approval from the grid operator (which is a lengthy administrative process).

Energy sharing or collective self consumption: 3

There is no legal framework for collective self-consumption and energy sharing beyond the established framework for energy communities.

“Ignitis gamyba” AB – Lithuania's largest electricity generation company – initiated the remote solar platform Ignitis Saulės Parkai (Ignitis Solar Parks) in April 2020. It is a solar platform offering residents the chance to acquire part of solar power plants and become active remote prosumers and offering all solar park developers to place their offers. As a virtual net metering scheme, it enables customers who do not have their own roof space or which is not suitable, to buy or rent part of a solar park. However, about 20 MW were sold to prosumers and there is not enough solar parks to satisfy demand.³

Energy communities: 3

According to the REScoop transposition tracker, Lithuania has defined RECs “as non-profit-making legal entities who own and develop renewable energy production facilities and have the right to produce, consume, store and/or sell energy in installations”. The CEC definition has also been transposed. According to the tracker, “overall, the REC definition, at least on paper, can be considered a good practice”. The State Energy Regulatory Board will inspect, supervise and control the compliance of RECs. Notwithstanding, there are no RECs and CECs operating yet.

They are currently working on having REC and CEC models for apartment houses, but it is not operative yet.

3. [Saulės parkai | Saulės parkai \(saulesparkai.lt\)](https://www.saulsparkai.lt/)

Additional measures: 2

Lithuania had previously planned to roll out its €1.2 million smart meter installation project in 2021, with the aim of reaching its target by 2023 (Berg Insight, 2021). However, the rollout has been rescheduled in the second half of 2022 (to all users that use more than 1000 kW). It is expected that by the end of 2023, 80 % of all electricity will be accounted for by smart meters. There has not yet been a massive national publicity campaign to transmit the urgency to implement solar rooftop PV in order to meet renewable energy objectives and reduce emissions etc. However, the number of prosumers (electricity users with PV on their roof) is growing fast: at the end of 2021, 11,000 prosumers had solar PVs on roofs.⁴

4. [Beveik 7 tūkst. gyventojų tapo elektros energija gaminančiais vartotojais ir gavo kompensacinę išmoką – aplinkos projektų valdymo agentūra \(apva.lt\)](https://www.apva.lt/veikla/gyventoju_tapo_elektros_energija_gaminanciais_vartotojais_ir_gavo_kompensacine_ismoka_aplinkos_projektu_valdymo_agentura)

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Rooftop Solar PV Country Comparison study

Country Profile Portugal



This country profile highlights the good and the bad policies and practices of rooftop solar PV development within Portugal. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
-  **Red = 0-1 points**

Governance aspects: 2

Portugal has no specific roadmap strategy for rooftop solar PV, only the National Energy and Climate Plan (NECP) and the Long Term Strategy (LTS). The NECP points to 2,000 MW of decentralized solar PV in 2030, as opposed to 7,000 MW of centralised, whereas the LTS points to 13,000 MW for both centralised and decentralised in 2050 (26 GW in total). These objectives are far below the technical and economic potential of solar in the country. The NECP and the LTS had public consultations, but there is a lack of stakeholder's participation beyond this.

Incentives: 2

The legal regime applicable in Portugal is Decree-Law 15/2022, which also affects renewable energy communities, making the transposition into Portuguese law of the Renewable Energy Directive (EU) 2018/2001. There is no feed-in tariff or feed-in price applicable (surplus is sold at market price), which makes it difficult to make economically viable projects that use rooftops to sell to the network. Surpluses are paid at a variable price according to the market, but lower than the retail consumption price. On the other hand, solar PV on rooftops are difficult to run on self-consumption, some of the reasons being that net billing is in periods of 15 minutes (too short a time period to promote self-consumption), and surplus is not valued nor discounted in the bill (only real time production). There is in place a governmental fund (Environmental Fund), but only for individual units, which already have a short payback period; the fund does not cover collective self-consumption (CSC) and energy communities.

Permitting and administrative procedures: 3

The administrative procedures are slow (it is taking several months) due to the lack of resources in the energy directorate. The sale of surpluses to the network requires excessive bureaucracy. However, on a positive note, there are no fees up to 30 kWp under the modality of self-consumption PV (installed on ground or rooftop). There is a registration fee and the need for an operating certificate above 30 kWp, and above 1 MW with an evaluation of the project required. Only installations bigger than 100 kW will need approval from the grid operator (which is a lengthy administrative process).

Energy sharing or collective self consumption: 3

Portugal has a legal framework that allows the use of the public grid for CSC or energy sharing. It has not set a concrete geographical boundary, but the terms of neighborhood relationships and proximity of the project have to be respected and assessed individually in each case. The assessment will vary depending on where the transformation stations are located as well as additional factors: for instance, for low voltage, it is up to 2 km. Members of the Collective have to operate under the same voltage level, but there are no size restrictions in terms of installed capacity. However, procedures vary according to size (there is a registration fee and the need for an operating certificate above 30 kWp, while an evaluation of the project is required above 1 MW). In practical terms, developing projects over 30 kWp is much more complicated because of the administrative burdens, lack of clarity, etc. On the other hand, the energy shared between apartments pays network access tariff, which is a clear barrier for CSC. Dynamic tariffs are not allowed yet.

Energy communities: 3

In Portugal, the Renewable Energy Communities definition copies the RED Directive concept and was introduced in the law on renewables collective self-consumption. A Citizens Energy Community definition was later incorporated in the law organising the electricity system in early 2022. In practice, its implementation is deficient for regulatory and procedural reasons. Although the first legislation dates from 2019, the first renewable energy communities are just starting to emerge.

Additional measures: 2

Portugal was a late starter to the rollout of smart meters, with installations beginning in 2019. By 2025, the country will have reached full coverage with 2.5 million smart meters installed.¹

Furthermore, there is a need for financing training programmes for installers and administrative staff and awareness raising campaigns that contribute to making solar PV easily accessible for citizens.

1. [Brochure Long.indd \(berginsight.com\)](#)

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Rooftop Solar PV Country Comparison study

Country Profile Romania



This country profile highlights the good and the bad policies and practices of solar rooftop PV development within Romania. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
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Governance aspects: 1

There is currently no effective roadmap or strategy on how to develop rooftop solar PV in Romania. The National Energy Climate Plan (NECP) establishes that the total installed power capacity is projected to increase to 22GW in 2025 and to 25GW in 2030. The largest growths in terms of installed capacity are expected from solar power (from 1.3GW in 2020 to 5GW in 2030) and wind power (from 2.6GW in 2020 to 5.3GW in 2030)¹.

Incentives: 2

As of 1 January 2019, Romanians can produce and inject into the grid energy produced by the sun and captured by means of a photovoltaic panel system (prosumers). Due to new legislative reforms, prosumers (physical persons) with a maximum of 400kW installed power are exempted from payment of taxes for the self consumed energy or for the energy which is sold to suppliers; and both companies and physical persons do not need to buy green certificates anymore. For prosumers under 200kW, net billing is being offered (only for the active energy, until December 31, 2030), and between 200–400 kW they get the average price on the energy market.

There is also a financing scheme addressed to citizens who want to become prosumers. The amount is generous: 4000 euro to cover 90% of an investment in a PV system of minimum 3kW.²

1. The Renewable Energy Law Review - The Law Reviews.

2. ADMINISTRATIA FONDULUI PENTRU MEDIU - CASA VERDE FOTOVOLTAICE (afm.ro)

Permitting and administrative procedures: 1

Although the overall environment (e.g. legislation, regulations) for prosumers has improved over the last 2-3 years, Romania still suffers from the problem of slow and bureaucratic procedures that pose delays on citizens. For instance, the above mentioned financing scheme addressed to citizens who want to become prosumers (4000 euros to cover 90 % of PV installation), produced only around 10,000 prosumers in 3 years, although it could have produced at least 3-4 times more, mainly due to multiple bureaucratic bottlenecks. The public institution in charge did not manage to use all the European funding available.

Energy sharing or collective self consumption: 0

There are no explicit legal regulations in this regard. With the current legal framework, it would be very challenging for a group of prosumers to share power between installations and consumption sites.

Energy communities: 1

The REScoop transposition tracker states for Romania that “the transposition legislation for the Electricity Directive simply copies and pastes the directive itself. As such, the EU level CEC definition serves as the de facto definition of CECs in Romania. This provides very little legal clarity and will require further precision in order to be able to be usable by stakeholders”.

Additional measures: 1

In 2020, Romania had a smart meter penetration rate of only 11,3%.³ Furthermore, there is a need for promoting training programmes oriented to administrative staff, policy makers, installers and technicians, and design of awareness raising campaigns that contribute to making solar PV easily accessible for citizens.

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Rooftop Solar PV Country Comparison study

Country Profile Spain



This country profile highlights the good and the bad policies and practices of Rooftop Solar PV development within Spain. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
-  **Red = 0-1 points**

Governance aspects: 3

A road map for self consumption was approved by the Spanish Government in December 2021 after pressure from NGOs and 2 years of delay. The National Energy and Climate Plan foresees the approval of a National Strategy for Self Consumption (the road map is a first step in this process). The Road Map includes more than thirty measures to promote self-consumption and "aims to identify the challenges and opportunities of self-consumption to ensure its massive deployment in Spain, as well as to eliminate existing barriers to its implementation and promote its development in all productive sectors".

Even so, there is a lack of ambition in the installed capacity targets for 2030 which have become outdated due to the high electricity prices (the CNMC, the Spanish energy regulator itself, warned the Government that the targets would be already reached in 2025). Furthermore, there are no initial or intermediate control dates for the elimination of each of the proposed barriers and the targets are not binding. A national round table for self-consumption will be set up with the participation of different departments from the National Government, the Energy Regulator (CNMC), Autonomous Communities and local entities. Also, a working group will be created with local entities where private associations will be allowed to participate. The focus of the working group will be the simplification of administrative processes. These 2 measures are foreseen in the Road Map for Self-Consumption.

Incentives: 2

The Royal Decree 244/2019 introduced a simplified compensation for generation surpluses which consists of a balance in economic terms of the energy consumed in the billing period with either the agreed price from a supplier or the market price; and exempted this modality of self consumption from all types of charges and tolls. The mentioned Royal Decree meant a radical change with regard to former regulations since surpluses are now compensated, but it did not include any type of feed-in tariff or premium. In this modality of self consumption, the maximum installed capacity is 100 kW and no remuneration of surpluses is possible, only compensation from the electricity bill.

From a financial perspective, Royal Decree 477/2021, approved the allocation of 660 million euros expandable to €1320 million to aid for the execution of various incentive programs linked to self-consumption and storage. PV support in these cases varies from 15% to 45% depending on the size and client (up to 50% for CSC). There is sufficient budget available and self-consumption is being encouraged to a large extent.

Permitting and administrative procedures: 2

The Royal Decree 244/2019 simplified bureaucratic procedures and introduced a modality of self consumption up to 100 kW in which no local tariffs or taxes for energy sharing are foreseen. There is no need to get administrative permission for connection to the grid regarding installations of 15 kW or lower in urban areas. However, for the other installations, the process of getting access to the grid is long and burdensome. Many municipalities may require a construction permit and the payment of the construction tax (usually 4% of the investment) which can take 6-8 months to obtain (Mckenzie Banker, 2020).

Fortunately, most of the Spanish Autonomous Communities have recently removed such requirements that imply significant delays and hurdles, and only ask for a prior notice or a declaration for start of activities, but the permit is still operative in some other Autonomous Communities. In general terms, the administrative procedure needs to be simplified and digitized. The communication processes between DSOs, energy suppliers and consumers are lengthy. There has been a massive delay in the billing system for prosumers due to the need to adapt IT systems to the new legal regime. This has affected consumer rights creating a huge amount of reclamations and delays with regards energy compensation. Significant updates are necessary with this regard.

Energy sharing or collective self consumption: 2

Power surpluses may be shared with nearby consumers in other buildings or fed into the grid. Collective self-consumption using the public grid is physically and geographically limited by fulfilling at least one of the following conditions:

- It is located within the low voltage distribution grid derived from the same transformer station;
- It is a maximum distance of 500 meters between production and consumption points;
- It is located in the same cadastral area.

The limit of 500 meters has generated a lot of criticism in Spain, particularly with regard to rural areas and industrial areas, since it clearly reduces the options for energy sharing and CSC. On the other hand, it is not possible yet to agree on dynamic percentages for the distribution of electricity. As a positive note, there was a recent modification of the Horizontal Property Law that simplified the required majority for approval of solar PV installations in buildings.

Energy communities: 1

In the RDL 23/2020, the national legislator introduces for the first time the figure of REC with the same wording given by RED Directive but no explicit reference is made to CECs. In November 2021, the Spanish Government opened a consultation process regarding the transposition of the Directive on local energy communities. However, no draft has been published to this date.

Additional measures: 4

The data registered by the Spanish Photovoltaic Union (UNEF) indicate that, in 2021, 1,203 MW of new photovoltaic power were installed in self-consumption facilities in Spain. This figure represents an increase of 101% compared to 2020, when 596 MW were installed. 32% was settled in the residential sector.

In Spain, the recently approved road map on self consumption has identified the following measures (not implemented yet) related to awareness raising campaigns and training of administrative staff and installers:

Measure 4- Publication of guidelines for municipalities to promote self-consumption

Measure 5- Publication of technical guidelines for professionals

Measure 6- Awareness and dissemination campaigns

Measure 7- Creation of the self-consumption office

Measure 8- Training courses to improve technical skills of professionals

Measure 10- Adaptation of training and curricula in vocational training courses, university diplomas, etc.

On the other hand, Spain has reached almost 100% of smart meter installations following a government mandate.

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Rooftop Solar PV Country Comparison study

Country Profile Sweden



This country profile highlights the good and the bad policies and practices of rooftop solar PV development within Sweden. It examines and scores six key areas: governance, incentives & support schemes, permitting procedures, energy sharing schemes, energy communities and additional measures to support solar PV development.

The scoring system is set out below:

-  **Green = 4-5 points**
-  **Orange = 2-3 points**
-  **Red = 0-1 points**

Governance aspects: 2

Sweden has set goals under its NECP not only for the next decade, but until 2045, based on its existing objectives under the Climate Act and Climate Policy.¹ Besides that, Sweden has not approved a roadmap or strategy on solar PV, but there are some reports by the Swedish Energy Agency including aspects on potential, barriers, roadmaps, etc.²

Incentives: 3

The initial PV market was based on an investment subsidy for small rooftop systems (<250 kW) from 2010, but it ended in 2020. Surplus PV electricity feed-in is currently compensated by market price (Nord Pool). It might be possible to get additional compensation in certain cases from some electricity providers. There is an (income) tax reduction of 0,6 SEK/kWh for feed-in electricity up to the amount that is bought, for connections up to 100A. There is also an (income) tax credit related to the installation cost for private persons, which is equal to an investment subsidy of the order of 10-15% of the total cost. Furthermore, rooftop solar PV smaller than 500 kW are exempted from tax on self-consumption.

1. [Sweden Renewable Energy Policy Handbook, 2022 Update \(globaldata.com\)](https://globaldata.com)

2. www.energimyndigheten.se

Permitting and administrative procedures: 3

Rooftop solar PV requires building permission in some cases, especially for large rooftops. It also requires DSO permission for grid connection. The procedure, compared to other countries, is relatively simple.

Energy sharing or collective self consumption: 1

In Sweden, collective self consumption is allowed via a separate direct grid between buildings with the same building owner, not through the public grid.

Energy communities: 3

Sweden has not yet proposed legislation transposing energy communities, but the national regulator has made recommendations on how to transpose the law. The Swedish regulator recommends that energy communities adopt the legal form of Economic Associations (the Swedish version of cooperatives) and adopt an overarching concept with two operative definitions: citizen energy communities and renewable energy communities. This should contribute to promoting a coherent approach.^{3 4}

Additional measures: 4

In Sweden, rooftop solar PV is fast growing but is not a fully mature market, as from time to time there is poor availability of trained installers. Even though there is big interest, there is a lack of knowledge among private individuals, so training programs and awareness raising campaigns are needed. In a more positive note, the government has promoted 2-year courses for designing PV systems within the Higher Vocational Education (Yrkeshögskolan) taught by some regional schools together with PV companies. Finally, Sweden has reached 100% of smart meter penetration, so it can be considered a frontrunner in this regard.

3. [Sweden - REC/CEC definitions - REScoop](#), accessed 12/4/2020

4. [Sweden - REC/CEC definitions - REScoop](#), accessed 12/4/2020

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