

# **DELIVERABLE: D5.1 Regulatory Analysis: Analysis of regulatory deficiencies and non-technical barriers for unlocking potential of smart energy services in the EU**

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**Building Up Next-Generation Smart Energy Services Offer and Market Up-take  
Valorising Energy Efficiency and Flexibility at Demand-Side.**

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## Notations, abbreviations, and acronyms

<b>AOE</b>	Appel d'Offre Effacement
<b>AIDEE</b>	Association Interprofessionnelle pour le Développement de l'Efficacité Énergétique
<b>ANAH</b>	Agence Nationale de l'Habitat
<b>ARERA</b>	Regulatory Authority for Energy Networks and the Environment
<b>B2G</b>	Building To Grid
<b>BAFA</b>	Federal Office for Economic Affairs and Export Control
<b>BEV</b>	Battery Electric Vehicle
<b>BIPV</b>	Building Integrated Photovoltaics
<b>BRP</b>	Responsible Party
<b>CAF</b>	Caisse des Allocations Familiales
<b>CAFT</b>	Accumulation and Photovoltaics Guild
<b>CEC</b>	Citizen Energy Community
<b>CEE</b>	Certificat d'Economie d'Energie
<b>CIEG</b>	Custos com a Intervenção no Sistema Eléctrico de Serviço Público
<b>CHP</b>	Combined Heat and Power
<b>CITE</b>	Crédit d'Impôt pour la Transition Énergétique
<b>CNB</b>	Czech National Bank
<b>CRE</b>	Commission de Régulation de l'Energie
<b>DC</b>	Direct Charger
<b>DENEFF</b>	Deutsche Unternehmensinitiative Energieeffizienz e.V.
<b>DR</b>	Demand Response
<b>DSO</b>	Distribution Service Operator
<b>EAN</b>	European Article Number
<b>EDC</b>	The Energy Data Centre
<b>EEG</b>	Erneuerbare-Energien-Gesetz
<b>EPBD</b>	Energy Performance of Building Directive
<b>ESCO</b>	Energy Service Company
<b>EV</b>	Electric Vehicle
<b>GEIG</b>	Gebäude-Elektromobilitätsinfrastruktur-Gesetz
<b>GSE</b>	Gestore dei Servizi Energetici
<b>IDAE</b>	Diversificación y Ahorro de la Energía
<b>KfW</b>	Kreditanstalt für Wiederaufbau
<b>NEBEF</b>	Notification d'Echanges de Blocs d'Effacement
<b>NZU</b>	Nová Zelená Úsporám
<b>OCA</b>	Organismes Certificateurs Agréés
<b>OSS</b>	One Stop Shop
<b>PHEV</b>	Plug-in Hybrid Electric Vehicle
<b>PNP2</b>	Portale Nazionale sulla Prestazione Energetica degli Edifici
<b>PPA</b>	Power Purchase Agreement
<b>PV</b>	Photovoltaic
<b>PVPC</b>	Precio Voluntario para el Pequeño

<b>REC</b>	Renewable Energy Community
<b>RGE</b>	Reconnu Garant de l'Environnement
<b>RITE</b>	Reglamento de Instalaciones Térmicas en los Edificios
<b>SME</b>	Small and Medium Enterprise
<b>TAF</b>	Tarifanwendungsfälle (tariff use cases)
<b>TICE</b>	Taxe sur la Consommation Finale d'Électricité
<b>TOU</b>	Time Of Use
<b>TRV</b>	Tarifs Réglementés de Vente
<b>TSO</b>	Transmission Service Operator
<b>TURPE</b>	Tarif d'Utilisation de Réseaux Publique de Transport D'Électricité
<b>UVA</b>	Aggregated Unit
<b>V2G</b>	Vehicle to Grid
<b>VAT</b>	Value Added Tax
<b>WEG</b>	Wohnungseigentumsgesetz

## 1. Introduction

### 1.1 Background and Objectives of the Research

Responsible for 40% of the energy consumption, the building sector has great potential to guide the EU's energy transition. Thus, the technical potential of prosumers, which can satisfy up to 70%<sup>1</sup> of the EU's electricity needs through solar and wind power, must be highlighted as an essential component of an independent, sustainable, and resilient energy system.

Although the number of prosumers has been growing over the years, these actors are still far from having a significant impact on the grid and in the consumption levels. This calls for a closer look at how to deal with the intermittent nature of renewable energy sources and, mainly, how to optimize their use. In this respect, leveraging the synergistic benefits of combining smart technologies and prosumer activities will not only decarbonize the power sector, but also increase consumer's control over energy flows and its economic benefits.

Thus, the BungEES project aims to contribute to consumer empowerment and, in broader terms, to the EU's climate ambitions through scaling up smart energy efficiency services (EES). In this context, this document looks at the enablers and barriers from a regulatory and market perspective that impact the scalability of smart energy efficiency services. This study provides recommendations for eliminating legal and market barriers at both European and national levels.

This report considers the regulatory framework and market conditions in Belgium, Czech Republic, France, Germany, Italy, Portugal, Slovakia, and Spain to assess the implementation of the integrated package of smart energy services to be considered by the BungEES project.

At this stage, it is necessary to clarify what we mean in this report by "Integrated Smart Energy Services". We refer to it as a comprehensive energy efficiency service that combines innovative modern technologies, data analytics and expert know-how to provide intelligent solutions for reducing energy consumption and increasing energy efficiency in various areas such as buildings, industrial processes, or infrastructure. These services leverage advanced technologies like smart sensors, automation, the Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning algorithms. In this way, it helps users identify energy-saving opportunities and reduce costs.

The term 'integrated' underlines our aim to offer these services as a one-stop shop package, ensuring comprehensive support for energy efficiency initiatives.

This analysis is in line with the objectives of Task 5.1 to analyse how the regulatory framework should be adapted to allow and incentivize smart energy services and to maximise their benefits for all players along the value chain of energy services and with the objectives of Task T5.2 to assess the structural and consumer aspects inhibiting an effective diffusion of contractual arrangements.

The present document is structured in the following chapters:

- Chapter 1 – includes the introduction to this Deliverable, background, objectives, and methodology used for the development of the present report.
- Chapter 2 provides country-by-country overviews of the regulatory background and market context. It explores the current picture of smart energy efficiency services namely, distributed generation, energy storage, electric mobility, energy community facility and the level of support provided to energy efficiency upgrades and one stop shops. The chapters look as well at the structural and consumer aspects that are essential for developing and implementing successful business models for smart energy services. We therefore examine the existing non-technical barriers and whether supportive policies and practices are in place to make smart energy services more attractive to consumers and energy providers at national level.

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<sup>1</sup> EEA (2022), "Energy Prosumers in Europe Citizen Participation in The Energy Transition "

- Chapter 3 suggests recommendations and best practices that need to be duplicated for more efficiency considering the main findings on national and EU level.

## 1.2 Methodology, and Criteria Selection

This research is focused on the residential sector in Belgium, the Czech Republic, France, Germany, Italy, Portugal, Slovakia, and Spain. The scope has been selected to be aligned with BungEES' business model, designed for residential users and pilot buildings tested during the project. Every country is analysed separately, in order to understand local particularities, draw comparisons and conclusions. The aim of this deliverable is to provide a comprehensive understanding of the existing legal and market conditions to identify the areas for improvement in order to support the adoption of smart energy services in these countries. Accordingly, this study encompasses the current state of the regulatory and market environment, within the limits of available information. Historical data has also been used to provide context and trend analysis, when relevant.

The research is divided into seven areas of investigation relevant to the diffusion of smart energy services in the residential sector. Each of the areas is key to the development and successful implementation of the BungEES business model. The following areas involve different aspects of energy consumption, production, and management:

- 1) Energy Efficiency Upgrades
- 2) Distributed Generation
- 3) Demand Side Flexibility
- 4) Energy Storage
- 5) Electric Mobility
- 6) Community Energy Facility
- 7) One-Stop-Shops

For each of these areas we selected a list of criteria and presented them to the project partners to be rated on a scale from 0 to 10. Only criteria with an average score of 7 or more were selected for detailed research. This ensures that the study focuses on the most important factors influencing the deployment and success of smart energy services. Here are a few examples of the criteria used in each area investigated:

- **Energy Efficiency Upgrades:** Financial incentives like tax rebates, government grants, and public incentives for PV acquisition.
- **Distributed Generation:** Existence of feed-in tariffs, the ability to feed energy back to the grid without penalties and selling energy.
- **Demand Side Flexibility:** Availability of demand response programs, use of dynamic pricing, and the rollout of smart meters.
- **Energy Storage:** usage schemes, participation in demand response programmes, and bi-directional charging capabilities.
- **Electric Mobility:** State incentives for electric vehicles and the provision of flexibility services through bi-directional charging.
- **Community Energy Facility:** Regulatory support for the rollout and operational management of energy communities.
- **One-Stop-Shops:** Government support, related fees, infrastructure requirements.

Certain criteria relating to demand flexibility, electric mobility and one-stop-shops are not covered in this document. These criteria concern consumer-related aspects and potential non-technical barriers, such as the perceived benefits of demand flexibility and the financial sector's reluctance to get involved. Similarly, public perceptions of electric mobility and the adoption risks associated with one-stop-shops were not investigated. Public perceptions of electric mobility and the adoption risks associated with one-stop-shops are also not covered within this report.

As these areas require direct end-user feedback to study these issues in depth, this research will be covered by the next deliverable, D5.2. This will involve a comprehensive survey targeting all relevant players in the energy sector, enabling a more effective exploration of these criteria.

Other criteria dealing with government programs for flex-ready appliances and the national approach to addressing interoperability of hardware systems and IoT protocols were waived due to significant gaps in available data. There was a notable lack of national strategies and resources to investigate the status of IoT communication in the energy sector. Similarly, there was insufficient information on national government programs for flexibility-ready appliances, which prevented an in-depth study of these topics in our current research.

In the country-by-country analysis in Chapter 2, the 25 shortlisted criteria across the 5 technologies, as well as the energy communities and the one-stop-shops are divided into 3 simple categories:

#### **Green**

The evaluation of the criterion in this country is mostly or entirely positive, with no significant regulatory or other hurdle expected to interfere in the deployment of the BungEES business model.

#### **Yellow**

The evaluation of the criterion is mixed, with certain positive aspects and/or recent improvements to address shortcomings. However, for a successful deployment of smart energy services further barriers would need to be removed or specific regulation put in place to enable those services.

#### **Orange**

Significant weaknesses exist in this country regarding the criterion. Answers marked in orange point to potentially critical barriers for the deployment of smart energy services, which would first need to be removed or resolved.

## 2. Identification of national regulatory and market enablers and barriers



### BELGIUM



#### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

Energy-efficient homes are eligible for a reduction in property tax from level E in Flanders<sup>2</sup>. Tax relief is also available for owners who renovate or rent out their building to a housing association<sup>3</sup>. In Wallonia, energy-efficient houses are issued with a certificate entitling them to tax relief by the authorities<sup>4</sup>. There are no similar incentives in the Brussels region.

*Are there any other government grants or subsidies for energy efficiency?*

A range of financial support is available to encourage households to improve the energy performance of their homes. Renovation work is exempt from VAT in Brussels. In Flanders, this exemption applies to the purchase of solar panels or home automation systems.

Subsidies for total or partial renovation are also available in the 3 regions, as well as aid to renovate the heating system or to install a heat pump. Similarly, low-interest loans are available for renovation, installation of heat pumps or PV systems.

Regarding PV incentives, a capacity tariff is made available to consumers since 2023 in Flanders. In fact, this tariff aims to shift peak demand to avoid grid congestion and affects the way grid fees are calculated. In other terms, consumers who achieve high peaks will pay more because than the consumers who differ their consumption over time. which means that spreading consumption over time reduces the fees to be paid. Although this tariff could not be considered as direct incentive for PV, it encourages however self-consumption in a way to be more independent from the grid.

For Brussels and for Wallonia a similar tariff does not exist.



#### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

<sup>2</sup> <https://www.vlaanderen.be/vermindering-van-de-onroerende-voorheffing-voor-energiezuinige-gebouwen>

<sup>3</sup> <https://www.vlaanderen.be/belastingvermindering-voor-verhuurders-die-renoveren-en-hun-woningen-verhuren-aan-een-woonmaatschappij>

<sup>4</sup> <https://energie.wallonie.be/fr/deductions-fiscales-basse-energie-passive-ou-zero-energie.html?IDC=8123>



**In Flanders:** The fit regime has been in place since 2021. The level of the tariff of electricity produced by local solar panels is defined by the utility. This tariff only applies to prosumers with smart meters<sup>5</sup>.

Moreover, prosumers have chosen between flat and peak/off-peak (day/night) tariffs<sup>6</sup>.

**In Wallonia:** The feed in tariff is called “injection tariff”. This tariff scheme started in 2024. According to the date of installation of the PV system, prosumers receive different remuneration:

- For facilities installed after 2024, the prosumers receive injection tariff.
- For installations carried out before 2024, prosumers receive compensation tariff until the end of 2030. They are also eligible for an injection tariff instead of the compensation, provided they have a smart meter. In any case, it is possible to switch from one scheme to another at any time<sup>7</sup>.

**In Brussels:** Net metering regime applies to energy injected from facilities under 5kWh. This scheme has been replaced from November 2021 by the injection tariff while maintaining the same conditions. Same as Flanders, the level of this tariff depends on the energy supplier and its application takes place when a smart meter is installed<sup>8</sup>.

#### *Is there the ability to feed back into the grid without penalty?*

Feeding back to the grid does not penalize prosumers in Belgium.

In Flanders, prosumers have even more options to choose with whom they would conclude the purchase contract as the legislation allows choosing a different utility than the one providing energy to the building.

#### *Is there the ability to sell/trade electricity to neighbours?*

**In Wallonia.** Energy sharing is only possible within an energy community, or within the same building for apartments<sup>9</sup>. The legislative framework for sharing energy between two different buildings on the basis of a contract has not yet been finalized<sup>10</sup>.

**In Flanders,** a prosumer and an association of owners are allowed to share the energy produced with a neighbour<sup>11</sup>. This same right is available to a building group that produces energy and sells it to another building group. In all cases invoicing is possible, no taxes or additional costs are levied for these operations by the utility.

In **Brussels,** peer to peer trade of energy is possible if both participants are prosumers<sup>12</sup>. Terms and rules are defined by the Sibelga DSO.

<sup>5</sup> <https://www.vreg.be/nl/veelgestelde-vragen/een-dynamisch-elektriciteitscontract-interessant-voor-mij>

<sup>6</sup> Smarten (2023)

<sup>7</sup> <https://www.engie.be/fr/contact>

<sup>8</sup> [Comprendre le tarif d'injection pour les panneaux solaires à Bruxelles \(engie.be\)](https://www.engie.be/fr/comprendre-le-tarif-d-injection-pour-les-panneaux-solaires-a-bruxelles)

<sup>9</sup> <https://www.ores.be/particulier/demarrer-partage-meme-batiment>

<sup>10</sup> <https://www.ores.be/particulier/pair-a-pair>

<sup>11</sup> <https://www.fluvius.be/nl/groene-energie/delen-en-verkopen-van-energie/persoon-aan-persoonverkoop>

<sup>12</sup> <https://www.sibelga.be/fr/raccordements-compteurs/energie-renouvelable/partage-energie/comment-demarrer-le-partage-denergie>

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus electricity into the grid?*

The surplus electricity injected to the grid is not charged with VAT in the three regions<sup>13</sup>. However, when prosumers from Wallonia<sup>14</sup> consume energy from the grid, they are subject to a “prosumer tariff”. This tariff is paid to the grid operator. The size of the tariff will follow the size of the prosumer’s production capacity. This tariff applies in Flanders for prosumers who did not install a smart energy meter<sup>15</sup>. In Brussels, a similar tariff does not exist.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

Wallonia and Flanders have both exempted photovoltaic systems with a capacity of less than 10 kWh from any authorization requirements if they are installed on the roof of non-historic buildings. In addition, these small systems benefit from short connection times. Similar benefits are also available to prosumers in Brussels, but for a lower capacity threshold for the system to be installed, namely 5 kWh. For large, visible installations, the complexity and permitting requirements vary from municipality to municipality.



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

The Belgian TSO and other aggregators such as TReStore, Flexcity and Next Kraftwerke, provide demand response programmes for households. Most programmes in the residential sector focus on controlling consumption and savings. Participation in explicit programmes is possible but usually attract manufacturers and large consumers<sup>16</sup>.

Thanks to the ToU (Time of use) mechanism, aggregators are enabled to have access to customers, reserve day-ahead and intra-day markets without involving energy providers<sup>17</sup>. They are also enabled to participate in the balancing market.

*Do DSOs use and pay for demand side flexibility?*

DSOs do not participate in demand response programs which explain the low interest in explicit DR. The reason hindering the participation is the lack of rules on the DR activation by DSOs and the use of non-certified metering data within demand response. The latter would expand the scope of eligible customers for demand response<sup>18</sup>.

<sup>13</sup> <https://vanpeteghem.belgium.be/nl/geen-btw-voor-particulieren-die-zonnestroom-doorverkopen> .

<sup>14</sup> [Tarif Prosumer 2024 : Montants et Explications \(otovo.be\)](https://www.otovo.be/tarif-prosumer-2024)

<sup>15</sup> <https://www.vlaanderen.be/prosumententarief-voor-eigenaars-van-zonnepanelen-windmolens-en-wkk-installaties-kleine-installaties-met-terugdraaiende-teller/berekening-van-het-prosumententarief>

<sup>16</sup> JRC (2022) “Explicit Demand Response for small end-users and independent aggregators”

<sup>17</sup> USE (2021) “Flexibility Deployment in Europe”

<sup>18</sup> JRC (2022)

DSO congestion management can be carried out through aggregators, distributed generation plants, battery storage systems, and through flexibility provided by energy communities and from residential customers<sup>19</sup>.

#### *Is dynamic pricing available?*

Only households in Flanders can obtain a dynamic price contract and be charged for their consumption per hour. That was implemented in March 2023.

#### *Is there a clear TOU tariff or other mechanism?*

TOU tariffs are available at distribution level. In Wallonia, DSOs fix this tariff<sup>20</sup>.

#### *Does the existing smart meter infrastructure meet BungEES requirements?*

Overall, the use of smart meters in Belgian homes is still low. The Flemish region is the furthest advanced in its implementation work, aiming to cover 80% of homes by the end of 2024 and 100% by 2029<sup>21</sup>. In line with this, households can only refuse to have these meters installed until early 2025. Wallonia and Brussels are following slowly, with the aim of reaching 80% by 2030<sup>22</sup>.



## BATTERY STORAGE

#### *How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

The acquisition of domestic batteries has been supported by subsidies only in Flanders since 2021. These subsidies have stopped in 2023<sup>23</sup>.

Energy storage assets are eligible for a federal tax discount; for physical persons the deduction on the taxable income amounts to 20% of the eligible investment amount, versus 13.5% for companies<sup>24</sup>. However, batteries connected to the grid are subject to double taxation<sup>25</sup>. This means that the economic benefits that can be derived from electricity storage are reduced by the taxes that apply when charging the battery and when feeding back the stored energy into the grid.

<sup>19</sup>ACER (December 2023) "Demand response and other distributed energy resources: what barriers are holding them back? Market Monitoring Report"

<sup>20</sup> ACER (January 2023) "Report on Electricity Transmission and Distribution Tariff Methodologies in Europe"

<sup>21</sup> Delta-EE (2022) "Belgium Consumer Flexibility Potential Final Report for Elia"

<sup>22</sup> <https://www.comparateur-energie.be/blog/quoi-s-attendre-avec-le-compteur-intelligent/>

<sup>23</sup> <https://www.batteriedomestique.be/prime>

<sup>24</sup> <https://www2.deloitte.com/be/en/blog/tax-alerts/2023/Belgian-federal-government-launches-Energy-Transition-Fund-call-for-2023.html>

<sup>25</sup> Smarten (2023) "V2X enablers and barriers Assessment of the regulatory framework of bidirectional EV charging in Europe."

Since the beginning of 2023, a capacity component in the network tariff has been introduced in Flanders, which will encourage consumers to manage and differentiate their flexibility.

Energy storage systems are eligible to participate in demand response services. However, they play a minor role in the day-ahead market BELPEX when it comes to ancillary services because of their limited capacity<sup>26</sup>.

#### *Is bidirectional charging and/or B2G enabled?*

Technically and legally, bidirectional charging is possible in Belgium.



## ELECTRIC VEHICLES

#### *Are there any public incentives for the purchase of Electric Vehicles?*

EV acquisition is exempt from acquisition and ownership tax in Flanders and subject to a reduced tax rate in Brussels and Wallonia. There are no national or regional acquisition subsidies. Currently, the fleet share of BEVs and PHEVs on national level is close to 1.41% and 2.67% share<sup>27</sup>.

#### *Is bidirectional charging and/or V2G enabled?*

V2G is allowed to participate in wholesale energy and balancing markets<sup>28</sup>. What's lacking, however, are rules to provide a framework for this activity and uniform charging standards for all charging stations. There are no explicit policy guidelines for V2G. From a technical and commercial point of view, V2G is currently being tested by TSOs.

For example, how to encourage companies to install charging stations, while guaranteeing that employees won't use this electricity to reduce their home consumption bills, remains a question mark. In that case, the company's electricity costs would rise drastically.

Even in the cases where this practice was tolerated by companies, this advantage would have tax consequences for employees. Its therefore clear that bidirectional charging will have a big impact on the extent of energy sharing and its mechanisms. This underlines the need for appropriate regulation to encourage adoption by consumers and market players.

In terms of home usage, financial compensation does not seem very encouraging for subscribing to V2G services: households can receive an annual bonus of up to 1000 EUR and save between 20 and 120 EUR on their bill per year<sup>29</sup>. Added to that, this technology is still subject to double taxation when interacting with the grid.

#### *Is there a nationally backed charging infrastructure?*

<sup>26</sup> [Energy storage regulation in Belgium | CMS Expert Guides](#)

<sup>27</sup> Smarten (2023)

<sup>28</sup> Smarten (2023)

<sup>29</sup> EEA (2022) "Transport and environment report 2022: Digitalization in the mobility system: challenges and opportunities"

Around 36,000 public charging points have been installed in Belgium by the end of 2023. Although this infrastructure adequately supports existing demand, there is a significant discrepancy between regions in terms of the distribution of charging points, with almost 28,000 in Flanders, 5,000 in Wallonia and between 3,000 and 4,000 in Brussels.

It's also important to mention that all three regions have successfully transposed the EPBD's obligation to implement EV recharging points by 2022<sup>30</sup>.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

On a national level, Belgium has made several efforts to advance the deployment of fast chargers (DC). The country achieved growth of 275% from 2022 to the end of 2023 in terms of the number of charging points installed. This means that the number of public fast-charging stations reached 2,327 by 2023, with a ratio of 56.4 EVs per fast-charging station.

In terms of accessibility, there are 30,194 private stations implemented until the end of 2023 in car parks, hotels, private buildings and 14,117 charging stations in public locations.

Both Flanders and Wallonia have put in place similar provisions and conditions to ensure that both newly built and renovated multi-family homes are equipped with an infrastructure suitable for the implementation of an electric charging station. For Brussels, the obligation to install a charging station will apply from 2025 to every parking space where the occupant has an EV.



## ENERGY COMMUNITIES

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

The three regions have implemented a legislative framework that reflects the definitions and concepts introduced by European legislation.

In Wallonia, the Decree of 5 May 2022 distinguishes between Renewable Energy Community (RECs) and Citizen Energy Communities (CECS) and gives each its own rules and status. These concepts were introduced and explained in Flanders by the Flemish Energy Decree. The Brussels region has also adopted these classifications under the law of 20 April 2022<sup>31</sup>, while distinguishing a 3rd category Local Energy Community<sup>32</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

The sharing of electricity, as well as the DSOs obligations are described in the regulations adopted in each region. The DSOs are therefore committed to facilitate the exchange of data linked to these operations by guaranteeing dedicated platforms. They act as

<sup>30</sup> [Green mobility – Charging Infrastructure and Electric Vehicles in Belgium | Fieldfisher](#)

<sup>31</sup> Law of 23 October 2022 amending the Act of 29 April 1999 on the organization of the electricity market

<sup>32</sup> [Energy Communities Repository - Policy database - European Commission \(europa.eu\)](#)

intermediaries between the energy community, which notifies them of these activities, and the utilities<sup>33</sup>.



## ONE-STOP-SHOPS

*Is there government (e.g., through guarantees) or private sector (e.g. banks) support for OSS'?*

Wallonia has created a network of regional counters to provide households with experts to advise and plan renovation work. These agents are private technicians and associations selected by the government. In addition, this network allows citizens to obtain information on the financial aid available in each commune<sup>34</sup>. In Brussels, Renolution<sup>35</sup> Alliance, Homegrade ensure the provision of similar services.

The Flemish government, in collaboration with private players, has created BENOveren<sup>36</sup> and Energy House (Energiehuis), one-stop shops for renovation advice. Subsidies and renovation loans are also available through this platform. Households are also directed to private partners such as banks and insurance companies for advice on their offers in this context.

*Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?*

As mentioned earlier, private experts collaborate and provide support and advice through public one stop shops. Private initiative for home advice do also exist like Corenove cooperative in Wallonia, Centre de Renovation Urbaine association and Habitat Network in Brussels and Energiehuis WarmerWonen partnership in Flanders.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Prosumers pays the same connection and withdrawal charges<sup>37</sup> as regular consumers, except the injection charge applied only in Wallonia and Flanders<sup>38</sup>. Different grid fees apply when it comes to energy communities.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

In the three regions, the DSOs have the obligation to maintenance metering devices, as well as to ensure data communication to consumers and service providers. A framework

<sup>33</sup> <https://www.rescoop.eu/policy/belgium-brussels>

<sup>34</sup> [Facilitateurs Énergie - Site énergie du Service public de Wallonie](#)

<sup>35</sup> [Primes et soutiens financiers | Renolution](#)

<sup>36</sup> <https://www.mijnbenovatie.be/nl/wat-waarom/wat-is-benoveren/>

<sup>37</sup> Charge paid for electricity drawn from the grid.

<sup>38</sup> ACER (December 2023)

defining access rights for third parties is being considered at national level in line with art 23 and 24 the European Electricity Directive<sup>39</sup>.

*How is the quality control on installers (e.g., specific energy audits required)?*

The Brussels Homegrade one-stop shop offers regular training courses to ensure that high quality specialists remain on the market. Moreover, it is recommended that domestic installations be carried out by certified installers who are listed and audited by a control body. For green certificates, domestic installations must be approved by the OCA certification body.

The Walloon region strongly recommends that the installation be carried out by certified technicians and that these transactions follow the standard contracts proposed. The same quality requirement for technicians applies in Flanders. This condition becomes compulsory if the prosumer applies for financial support.

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<sup>39</sup> Economies FPS (2020) “Belgian electricity market- Final implementation plan”



## CZECH REPUBLIC



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

No

*Are there any other government grants or subsidies for energy efficiency?*

In the Czech Republic, subsidy programs and financial assistance are implemented and managed by the State Environmental Fund. Home and apartment owners can choose from several programs, such as the New Green Savings program<sup>40</sup>, aimed at helping reduce energy consumption of their buildings by covering up to 50% of the investment costs. Households benefit from bonuses if they combine several measures such as the installation of PV systems, heat pumps, charging stations, insulation, etc. Repair Grandma's House Program<sup>41</sup> is a similar subsidy program, offering the opportunity to finance insulation work in main residences and vacation homes. There are also subsidy lines for low-income households to encourage the installation of energy efficient electric boilers and heat pumps under the NZU Light program<sup>42</sup>.

Loans with favourable terms are also available to support the improvement of the buildings envelope, installation of PV systems and other energy-efficiency measures.

Under Repair Grandma's House program, beneficiaries borrow at a rate reduced to 50% of CNB (Czech National Bank) rates and repay over 20 years<sup>43</sup>.

Loans are also available from the State Housing Development Fund to cover up to 90% of the renovation costs for a period of up to 30 years<sup>44</sup>.



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

The existing legislation in the Czech Republic does not provide clear guidance on how the energy surplus should be treated. However, practice shows that the surplus renewable energy produced by a household can be remunerated according to two methods. Under feed-in premium (green electricity bonus), the prosumer sells electricity at the market price increased by a bonus. If the feed-in tariff is chosen, the prosumer receives the minimum

<sup>40</sup> <https://novazelenausporam.cz/zakladni-informace/>

<sup>41</sup> <https://www.sfzp.cz/tiskove-centrum/tiskove-zpravy/detail-tiskove-zpravy/?id=266>

<sup>42</sup> <https://novazelenausporam.cz/nzu-light/>

<sup>43</sup> <https://www.sfzp.cz/tiskove-centrum/tiskove-zpravy/detail-tiskove-zpravy/?id=279>

<sup>44</sup> [https://next.codexis.cz/legislativa/CR29641\\_2014\\_08\\_08](https://next.codexis.cz/legislativa/CR29641_2014_08_08)



guaranteed price defined in advance by the supplier. In addition, the transfer of electricity in this case must come under contract and electricity cannot be injected to the grid without a prior agreement with the utility because the status of prosumer is not recognized by law even with the latest revision of the energy act in 2023. In practice, this type of contract is not widely used, and prosumers simply rely on self-consumption<sup>45</sup>.

Since 2023, it became possible to obtain 2 EAN<sup>46</sup> code together with the photovoltaic power plant. Customer can then choose which supplier to conclude a purchase contract with and which one to buy the surplus.

*Is there the ability to feed back into the grid without penalty?*

As mentioned earlier, the existing legal framework does not allow prosumers to inject electricity in the grid without a contract with an off taker. It could be either a utility or an electricity trader<sup>47</sup>.

*Is there the ability to sell/trade electricity to neighbours?*

Electricity produced onsite by a prosumer cannot currently be sold to a private customer<sup>48</sup>.

The approved amendment to the Energy Act<sup>49</sup> will make it possible to share electricity from renewable sources between multiple consumption points. The aim of the amendment is to double the share of renewable energy sources by 2030. Community energy will operate in 3 modes:<sup>50</sup>

- **Active customer:** will have ability to generate electricity in one location and consume it elsewhere. It will be possible, for example, to consume electricity from photovoltaics produced at a cottage in a flat. Electricity can be shared at up to 10 consumption points, between different people and properties.
- **Electricity sharing in apartment buildings:** apartment building residents use solar energy produced by the PV system installed on the building's roof. This energy sharing will take place within a single "entrance/connection point". Unlike other forms of sharing, this scheme allows consumers to avoid the distribution charges (regulated charges) because the electricity is shared over the house's proper wiring.
- **Energy Communities:** the energy is shared between groups of up to 1,000 members. Participants could be private individuals, communities of owners, municipalities, and businesses.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

<sup>45</sup>Rafael Leal-Arcas, Brian Burstein, and Maria Eugenia Mattera (2021) "Electrifying the energy sector: The case of Slovakia and the Czech Republic".

<sup>46</sup> The European Article Number EAN code helps identifying consumption points

<sup>47</sup> <https://www.roedl.com/renewable-energy-consulting/markets/countries/marketing-models-czech-republic>

<sup>48</sup> <https://www.roedl.com/renewable-energy-consulting/markets/countries/marketing-models-czech-republic>

<sup>49</sup> Act No. 458/2000 Coll. Act on the Conditions of Business and the Exercise of State Administration in the Energy Sectors and on Amendments to Certain Acts (Energy Act)

<sup>50</sup> <https://www.souseded.cz/magazin/clanek/prodej-pretoku-z-fve-do-site-ma-smysl/1395>

Thanks to tax law 2016 income from feed in is exempted from tax as it is not qualified as business income. Energy generation in residential sector does not require a license. Moreover, no charges for grid access are required for micro production systems which means active and non-active consumers pay the same network fees<sup>51</sup>.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

A PV installation with less than 10kW and used for self-consumption is subject to a registration obligation and a permit provided by the DSO. A simplified procedure is provided for small facilities that are not connected to the grid<sup>52</sup>.



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

The ripple control was the only way for consumers to participate in demand response flexibility, available since 1960. In fact, DSOs can control appliances with high power consumption and reduce the consumption for SMEs and households. While this can be seen as positive because the concept of flexibility has become familiar to the wider public, the use of this outdated technique will not encourage people to migrate to explicit demand response programs or other more efficient options<sup>53</sup>. Moreover, the law does not allow aggregators in the market without a BRP agreement<sup>54</sup>.

*Do DSOs use and pay for demand side flexibility?*

DSOs use ripple control to reduce eventual investments in distribution system.

*Is dynamic pricing available?*

Thanks to the amendment to the energy act in 2023, any customers with an electricity contract has the right to have access to a dynamic price tariff contract with his supplier. Suppliers must also propose these contracts based on market prices if they serve more than 200,000 customers<sup>55</sup>.

*Is there a clear TOU tariff or other mechanism?*

<sup>51</sup> Technische Universitaet Wien and Fundacion Tecnalia Research & Innovation (2021) "Existing and Future PV Prosumer Concepts"

<sup>52</sup> Rafael Leal-Arcas (2021)

<sup>53</sup> JRC (2022)

<sup>54</sup> [Demand-side Flexibility: The Next Big Thing in CEE | Nano Energies: Let your business profit by helping the grid work efficiently](#)

<sup>55</sup> <https://www.mpo.cz/cz/rozcestnik/pro-media/tiskove-zpravy/moderni-energetika-a-ochrana-spotrebitelu--mpo-poslalo-do-mezirezortniho-rizeni-dalsi-novelu-energetickeho-zakona--276910/>

In the Czech Republic, the use of TOU tariffs in contracts in the residential sector does not exceed 20%<sup>56</sup>.

*Does the existing smart meter infrastructure meet BungEES requirements?*

The Czech Republic is one of the countries lagging in smart meter deployment. Implementation is scheduled to begin in mid-2024 for customers consuming more than 6MWh per year<sup>57</sup>. According to the updated NPEC for 2023, provisions for the deployment of smart meters and their conditions in the Czech Republic are currently being prepared.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

Grants are allocated for households when combining solar PV with a storage system. These grants are managed by the New Green Saving program and rise with amount of installed solar capacity. Grant amounts cover up to 50% of the costs. Nevertheless, the country did not implement any legislative framework defining storage services, its classification and revenue mechanisms do not fit into any existing rules or regulation on energy generation or distribution.

Most use cases of storage solutions are mostly found in the residential sector for self-consumption since large battery systems cannot be installed and connected to the grid according to the existing legislation. Moreover, the lack of adopted rules hinders the access for end-users and stakeholders to ancillary and capacity markets.

*Is bidirectional charging and/or B2G enabled?*

No information available



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

There are no effective support instruments to encourage natural persons to purchase electric vehicles in the Czech Republic. Only exemption from registration tax and financial aid for the installation of home charging stations are available to households. Subsidies for acquisition are only offered to companies<sup>58</sup>.

*Is bidirectional charging and/or V2G enabled?*

<sup>56</sup> ACER (December 2023)

<sup>57</sup> ibid

<sup>58</sup> <https://www.nrb.cz/produkt/elektromobilita/>

At present, the subject of V2G is not being addressed in any significant way, it is just discussed in expert's circles/groups. Policy and regulations cover any standards or incentives for V2G are not developed at the moment. It is expected that V2G will be considered after the transposition of the EPBD recast.

*Is there a nationally backed charging infrastructure?*

For 2030 the Czech Republic did not announce a specific target for charging infrastructure deployment. However, according to the IAE, the target should be between 250,000 and 500,000 charging points<sup>59</sup>.

By the end of 2023 the country has reached 4,664 charging points (private and public), of which 3,280 are publicly accessible.

In addition, the private installation at homes is supported by a subsidy of 30.000 CZK.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

The total number of DC fast chargers in the Czech Republic up to the end of 2023 is estimated to be around 1,252. According to CEZ Group, there are 22 charging stations per 100 electric vehicles in the Czech Republic, while the EU average is 15.



## ENERGY COMMUNITIES

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

The legal framework for energy communities is very recent, dating only from January 2024. The law distinguishes between citizen energy communities and renewable energy communities and reflects the vision and principles set out in the renewable energy directive. Participants in the Energy Community may use distribution and transmission systems to share electricity. Sharing of electricity within the community is not considered a sale and does not require a special licence (this only applies to sharing of electricity within the community)<sup>60</sup>.

However, the current framework can be further improved if some unjustified administrative procedures and barriers are eliminated<sup>61</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

In the Czech Republic, some areas are not ready for new grid connections, which could lead to delays and higher costs when setting up an energy community. In fact, the existing infrastructure in some high-density areas may not be able to handle the variable and

<sup>59</sup>IEA (2021) "Czech Republic 2021 Energy Policy Review ".<https://iea.blob.core.windows.net/assets/301b7295-c0aa-4a3e-be6b-2d79aba3680e/CzechRepublic2021.pdf>

<sup>60</sup> <https://www.rescoop.eu/policy/transposition-tracker/enabling-frameworks-support-schemes/czech-republic-2>

<sup>61</sup> <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/czech-republic>

decentralized energy such as photovoltaics. In response to these challenges, the Czech Republic's leading energy distributors have provided tools to help potential generators assess connection possibilities through an online map<sup>62</sup> displaying connectivity options for new power generation facilities<sup>63</sup>.



## ONE-STOP-SHOPS

*Is there government (e.g. through guarantees) or private sector (e.g. banks) support for OSS'?*

Regarding public involvement in one stop shops, the New Green Saving Program<sup>64</sup> can be seen as a one-stop shop providing information on available funding for energy efficiency measures, a comprehensive data set on manufacturers of eligible products on the market, and a list of recommended technicians and experts. The programme is administered by the Ministry of the Environment.

Litoměřice city was the pioneer in creating a municipal one-stop shop for building renovation in 2020. This one-stop shop provides homeowners with a primary energy assessment to identify potential measures. The one stop shop is financed by the municipal energy efficiency fund. An in-depth energy assessment, a renovation plan and costs estimation can also be provided by an expert to homeowners upon request. Homeowners can apply for a municipal grant from the Municipal Fund<sup>65</sup>.

*Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?*

The aforementioned one-stop shop initiatives do not implicate private bodies.

However, a similar private initiative is provided by the Centrum Pasivního Domu (Centre for Passive House) which is a Czech association that promotes energy efficiency measures and sustainable buildings in the commercial and residential sectors. The association focuses on providing knowledge and information on how to make buildings more efficient by offering expert consultation, project planning, webinars, and recommendations to certified technicians<sup>66</sup>.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

In the Czech Republic, one of the key problems for consumers using solar photovoltaic systems is the lack of a transparent system for verifying grid capacity. In general, project developers apply to connect to lots of capacity in different locations in the country to see where they can develop their projects.

<sup>62</sup> Mapa připojitelnosti EGD: <https://www.fotovoltssystem.cz/jak-vybrat/pripojitelnost-fotovoltaiiky-do-distribucni-site.html>

<sup>63</sup> [Legislative options and obstacles for energy communities ...](#)

<sup>64</sup> <https://novazelenausporam.cz/zakladni-informace/>

<sup>65</sup> [One-stop-shop Litoměřice - Energy Cities \(energy-cities.eu\)](#)

<sup>66</sup> [Co je pasivní dům? - Pasivnidomy.cz](#)

One of consequences of this reservation is that TSOs restrict connections for small rooftops. Prosumers in some cases are even forced to install very small systems to avoid any surplus generation a thus avoid feeding back to the grid<sup>67</sup>.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

The existing framework in the Czech Republic is still not entirely in line with the European Directive on electricity market design mainly when it comes to rules on access to end-customer data and the relevant procedures for obtaining data access<sup>68</sup>.

*How is the quality control on installers (e.g. specific energy audits required)?*

Beneficiaries of subsidy programs are recommended in most cases to subscribe to the services of certified companies and technicians. A database of professionals and products on the market is available to the public to help guide households. Websites of Ministry of Industry and Trade and New Green Savings provide recommendations on product selection and installation. These guidelines are drafted in collaboration with a private organization like the chamber of renewable energy and the Accumulation and Photovoltaics Guild (CAFT)<sup>69</sup>.

<sup>67</sup> [Grid issues plague solar's comeback in Czechia – PV magazine International \(pv-magazine.com\)](https://pv-magazine.com)

<sup>68</sup> ACER (Decembre 2023)

<sup>69</sup> <https://novazelenausporam.cz/tiskova-zprava/40>



## FRANCE



### ENERGY EFFICIENCY

#### *Are there any tax rebates for energy efficiency?*

Previously, the energy transition tax credit (CITE) enabled the deduction from income tax of part of the expenses incurred for work to improve home energy efficiency. This scheme was definitively abolished on January 1<sup>st</sup>, 2021.

Similar schemes exist today such like:

- The Denormandie scheme: this scheme is aimed at private individuals wishing to invest in an old building to rent out in certain defined zones. It is designed to encourage energy-saving works through a tax reduction.
- Property Deficit: the owner of a rental property can deduct charges related to the property from the property income. The property deficit results when charges exceed the income. The deficit can be deducted from overall income of the owner. The yearly deduction could reach up to €10,700. However, the amendment to the Finance Act for 2022 doubled this ceiling in the event of eligible expenses for energy renovation work, taking place until 2025. To qualify, the renovated home must be considered a “thermal sieve”, i.e., of energy class E, F or G. The work carried out must enable the home to achieve an A, B, C or D class<sup>70</sup>.
- Local aid: By special agreement, local authorities may offer partial or total exemption from property tax on residential buildings that have undergone major renovation.

#### *Are there any other government grants or subsidies for energy efficiency?*

The French government offers multiple programs to foster building upgrades in the residential sector. Tenants, owners, and co-owners can benefit from these incentives.

Some grants are aimed at a particular aspect of the renovation, such as the heating system renovation, where technologies like heat pumps and solar panels are recommended. Other grants cover comprehensive refurbishment to enhance the energy performance of a property.

- **Ma prime rénov'is** a program aiming to support owners in their renovation works. Since 2024, MaPrimeRénov' assistance became available in 2 components: The first is MaPrimeRénov' Parcours par geste offering assistance for insulation works, the renovation of the domestic heating or hot water system. The second component

<sup>70</sup> <https://www.effy.fr/magazine/impots-2024-puis-je-deduire-mes-travaux-de-renovation-energetique>

is MaPrimeRénov' Parcours accompagné, which targets large-scale works that will improve the building energy class <sup>71</sup>.

- **Energy saving certificates, CEE<sup>72</sup>**, are another scheme that encourages households to save energy. These certificates take the form of various types of assistance (bonuses, purchase vouchers, etc.) granted by energy suppliers following the completion of work to improve heating, insulation, etc.

The latter programs fall perfectly in line with the ambitions of the energy sobriety plan, under which the installation of a thermostat has become compulsory in all buildings from June 2023 to January 2027.

Families can also take advantage of interest-free loan, *Eco-PTZ<sup>73</sup>*, which can be combined with the above-mentioned grants to finance energy-efficiency upgrades. The social security office (CAF) offers households loans at 1% interest, amounting to 80% of the cost of renovation <sup>74</sup>.

For VAT, several renovation works are eligible to a reduced rate 10% or 5.5% if defined conditions are fulfilled.



## DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

Feed-in tariffs depend on the size of the facility whether the energy produced is sold entirely or as surplus after consumption.

This tariff applies to surplus production injected by installations with a power less than or equal to 500 kWh<sup>75</sup>. The mandatory revision of this tariff every four months limits the predictability of the payback period of the investment in PV systems for households<sup>76</sup>. In addition, this tariff cannot be combined with any other government subsidy or incentive received on behalf of the same installation that generates the energy covered by this tariff. This tariff is also limited to a maximum volume of electricity injected per year, equal to 1600h multiplied by the power of the facility. As a result, prosumers who exceed this threshold receive a remuneration of 50EUR/MWh.

*Is there the ability to feed back into the grid without penalty?*

There are no penalties applied to prosumers for injecting any surplus to the grid.

*Is there the ability to sell/trade electricity to neighbours?*

<sup>71</sup> <https://www.service-public.fr/particuliers/vosdroits/F35083>

<sup>72</sup> <https://www.service-public.fr/particuliers/vosdroits/F35584>

<sup>73</sup> <https://www.service-public.fr/particuliers/vosdroits/F19905>

<sup>74</sup> <https://www.service-public.fr/particuliers/vosdroits/F1616?lang=en>

<sup>75</sup> [L'arrêté tarifaire du 6 October 2021](#)

<sup>76</sup> CAN Europe (2022) "Engaging citizens and local communities in the solar revolution: Rooftop Solar PV Country Comparison Report"



Selling the excess energy produced directly in the electricity market is not permitted by French legislation. Thus, the prosumer is left with the 3 options:

- Inject this surplus with the feed-in tariff as compensation,
- Give it away for free to the DSO<sup>77</sup> if the generation facility is less 3kWp.
- Sell it via a 20 years' purchase obligation to energy supplier, this is only applicable to installations less than 100 KWh<sup>78</sup>. Additionally the prosumer receives a self-consumption premium<sup>79</sup>.

These same options are available to prosumers acting in the form of collective self-consumption. The economic gain realized by each prosumer is thus proportional to their contribution to the surplus.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

There is no direct tax or legal obstacle to deterring prosumers from feeding their surplus back into the grid. Indeed, this surplus has been exempted from the TICE "Taxe sur la Consommation Finale d'Électricité" consumption tax in the case of individual consumption. In addition, the Energy and Climate Law of November 2019 removed the restriction laid down in the Energy Code that obliges the developer to own the production facility, which limits the possibility of the installation being financed by a third-party investor. The law of 2019 has opened this possibility, provided that the third party is not independent of the grid<sup>80</sup>.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

A municipal notification must be made by a household intending to install photovoltaic panels on the roof, which will make it possible to assess whether the photovoltaic panels will alter the visible appearance of the building. If the building is in a protected area (classified historical areas), a longer procedure must be undertaken, requiring urban planning permit<sup>81</sup>. For larger scale solar projects, urban planning, connection, and several other authorizations are required.



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

<sup>77</sup> [Art L315-5, Code de l'énergie](#)

<sup>78</sup> <https://www.edfenr.com/guide-solaire/vendre-mon-electricite-solaire-avec-lobligation-dachat/>. Arrêté of 9 May 2017 sets the conditions for the purchase of electricity produced by installations installed on buildings using photovoltaic solar energy, with an installed peak power of less than or equal to 100 kW.

<sup>79</sup> An exclusive premium for photovoltaïque installations

<sup>80</sup> Art L. 315-1, Code de l'énergie

<sup>81</sup> <https://www.lefigaro.fr/maison/installer-des-panneaux-solaires-que-dit-la-loi-20220916#quelle-autorisation-obtenir-pour-installer-un-panneau-solaire-sur-le-toit>

France was the first country in Europe to authorize consumers to make the most of their DR by calling on a DR operator, without having to obtain prior agreement from their supplier.

To enable the development of DR potential, the authorities have gradually put in place a framework enabling DR operators to participate in the various existing mechanisms: balancing reserves, the NEBEF mechanism which makes it possible to sell load shedding on the electricity market, the capacity mechanism, and the DR call for tenders (AOE). In particular, the introduction of multi-year contracts since AOE 2023 has led to strong growth in DR capacity in buildings. Today, the greatest demand response potential lies in building with residential electric heating representing 40% of the national electricity peak (i.e., around 35 GW)<sup>82</sup>. However, there are still barriers to full participation in all markets, as an alternative to generation without discrimination or barriers to entry. Other constraints limiting DR in France is the NEBEF requirement that only one operator can be active on a site<sup>83</sup>. Other constraints limit DR in France is the NEBEF requirement that only one operator can be active on a site. This is a problem that limits customer access to the various flexibility services. As a result, if the only aggregator authorized to be active on a site provides a DR program for heating, for example, customers residing in that area cannot subscribe to a flexibility service for EV charging with another aggregator.

#### *Do DSOs use and pay for demand side flexibility?*

Enedis, the main DSO, relies on flexibility to provide congestion management in addition to the usual network planning and operation. To activate local flexibilities, Enedis uses services offered by market players via calls for tender<sup>84</sup>.

#### *Is dynamic pricing available?*

Dynamic pricing contracts are available to French consumers and represent an alternative to regular contract. Dynamic prices, as defined by the French Energy Code, follow variations in the spot market. However, the consumer pays subscription fees and taxes in addition to these. In addition, it exposes consumers to a sharp increase in their electricity bill. These contracts remain the least popular since no dynamic contracts are currently offered by local suppliers<sup>85</sup>. However, suppliers are obliged to offer dynamic price contracts if they cover at least 200,000 customers<sup>86</sup>.

#### *Is there a clear TOU tariff or other mechanism?*

<sup>82</sup> Ademe (2024) « Avis d'experts, Flexibilité du système électrique » <https://librairie.ademe.fr/ged/8635/Avis-d-expert-Flexibilite-electrique-vf.pdf>

<sup>83</sup> RTE (2023) « Règles pour la valorisation des effacements de consommation sur les marchés de l'énergie NEBEF 3.5 »

<sup>84</sup> <https://www.enedis.fr/co-building-dso-local-flexibility>

<sup>85</sup> [https://www.energie-info.fr/fiche\\_pratique/quest-ce-quune-offre-a-tarification-dynamique/](https://www.energie-info.fr/fiche_pratique/quest-ce-quune-offre-a-tarification-dynamique/)

<sup>86</sup> [Art L.332-7 du code de l'énergie](#)

Some electricity suppliers in France provide TOU tariffs to residential customers such like the Tarif Bleu offered by EDF with the option to choose Peak Hours/Off-Peak Hours tariffs<sup>87</sup>.

*Does the existing smart meter infrastructure meet BungEES requirements?*

Since 2015, France has been focusing on the importance of smart meters. With a roll-out rate approaching 92% of buildings in 2022, this advance is reflected in the obligation on DSOs to upgrade their electricity meters under the Energy Code<sup>88</sup>, which transposes the requirements of the European directive on common rules for the electricity market<sup>89</sup>.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

Public incentives do not cover home batteries. It's also worth mentioning that a PV system with battery can cost up to €30,000. As a result, households pay back their investment in at least 8 years, considering electricity prices, which discourages investment in storage solutions<sup>90</sup>

Added to that, the current framework does not specifically designate storage systems for supply and injection. Consequently, a storage installation that is not linked to a production facility would, according to the TSO, act as a consumer if it withdrew electricity from the network and as a producer when it feed in the grid.

In this way, the storage installation doubly submits the network tariff "TURPE"<sup>91</sup>. To this end, the CRE (Commission de Régulation de l'Energie) was keen to study the possibility of creating an ad-hock status for storage to foster the creation of an emergency energy storage market in France<sup>92</sup>.

For domestic battery storage systems, the energy produced by a photovoltaic installation, is still classified as consumption. Charging the battery in this case directly from the grid is not allowed. For energy surplus, prosumers must decide whether to use their storage system or reinject the surplus produced and take advantage of the feed-in tariff. In any case they are not subject to double network charges.

<sup>87</sup> <https://www.quechoisir.org/actualite-electricite-les-options-heures-creuses-et-tempo-d-edf-valent-elles-encore-le-coup-n116394/>

<sup>88</sup> Art L322-8 Code de l'énergie and Art 29 de la loi du 17 août 2015 sur la transition énergétique

<sup>89</sup> Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

<sup>90</sup> <https://www.pv-magazine.fr/2023/06/29/le-stockage-residentiel-en-france-un-marche-de-niche/> 27

<sup>91</sup> Tarif D'utilisation De Réseaux Publique De Transport D'électricité.

<sup>92</sup> Commission de régulation de l'énergie (2019) « Document de Réflexion et de Proposition : Le stockage d'électricité en France »

In terms of flexibility, the French TSO offers several options enabling a storage facility to be connected directly to the public grid or to be connected via an intermediary<sup>93</sup>.

*Is bidirectional charging and/or B2G enabled?*

Until now, there has been no specific legal framework to deal with the particularities of building to grid (B2G). However, the 2015 Energy Transition for Green Growth recognized the need "to put in place the necessary measures to ensure a controlled and secure deployment of installations to consume all or part of their electricity production". In practice, B2G applications can be seen in areas governed by self-consumption or community energy frameworks<sup>94</sup>.



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

When purchasing a new EV, households can take advantage of regional grants of up to €4,000 in 2023. This aid can be combined with an "ecology bonus" of up to €4,000. EVs are also exempt from registration fees.

*Is bidirectional charging and/or V2G enabled?*

The main shortcoming of V2G is the lack of specific rules to organize the activity: on the one hand, the eligibility criteria are complex and need to be made more flexible. The primary reserve is contracted each day for the 6 steps of 4 hours of the following day through a European tender process and it is compensated at the marginal auction price. The minimum bid is 1 MW, and the granularity is 1 MW. The primary reserve energy is activated pro rata of the winning capacities and compensated at the spot price<sup>95</sup>.

The aggregation of small production facilities is also a difficult procedure that prevents electric vehicles from contributing to grid flexibility. However, clear rules on permitting, its duration and conditions must be approved by the DSOs. Market rules to define the actual availability of the capacity service, mobile storage, as well as adapted metering and control methods must also be introduced<sup>96</sup>. Lastly, taxation linked to battery charging creates an economic disadvantage for consumers<sup>97</sup>.

*Is there a nationally backed charging infrastructure?*

The installation of recharging points in France is keeping pace with the growing number of electric vehicles being purchased. As set out in the multi-annual energy program's objectives, 96,676 public and private recharging points were installed until 2023<sup>98</sup>.

<sup>93</sup> <https://www.services-rte.com/fr/decouvrez-nos-offres-de-services/valoriser-vos-moyens-de-stockage-dans-le-systeme-electrique.htm>



<sup>94</sup> Smarten (2020)

<sup>95</sup> Commission de régulation de l'Énergies, (2023) « Les recommandations de la CRE pour accompagner le déploiement de la mobilité électrique »

<sup>96</sup> Avere (2023) « Pilotage de la recharge et Vehicle-to-Everything »

<sup>97</sup> Ibis, p 59

<sup>98</sup> <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/france/infrastructure>

<i>Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?</i>	
The installation of high-capacity and 4400 fast recharging points for long distances and optimizing the EV user experience by improving the after-sales service are among the priorities to be put in place by 2030 <sup>99</sup> . Until the end of 2023, 16,131 DC fast chargers have been installed.	
	<b>ENERGY COMMUNITIES</b>
<i>Energy Community Regulation enabling the rollout of Community Energy Facilities?</i>	
Prior to 2023, the status of energy communities remained unclear until decree no. 2023-1287 of 26 came into force. This decree defines the status of energy communities, the criteria and procedures for participation, the control procedures, and the geographical limits. Accordingly, energy communities can take two forms: renewable energy communities (RECs) and citizen energy communities (CECs). As regards the activities, energy communities can offer a range of services, including collective self-consumption, production, aggregation, and sale <sup>100</sup> .	
<i>Are there any connectivity issues for Community Energy Facilities?</i>	
No data available	
	<b>ONE-STOP-SHOPS</b>
<i>Is there government (e.g., through guarantees) or private sector (e.g. banks) support for OSS'?</i>	
When it comes to energy renovation, the government has set up the France Rénov' platform, a public housing renovation service run by the State in conjunction with local authorities and managed by the Agence Nationale de l'Habitat (ANAH). In addition to the website, there are 570 counters across the country where households can speak to advisers if they wish. These advisors can then refer the customer to a Rénov' Accompagnateur. The latter is a certified professional who can offer personalised support (definition of the renovation project, help with administrative formalities, advice on selecting contractors, etc.).	
Regarding financial aid, ANAH has set up a few schemes to help finance energy-related work, such as energy saving certificates, zero interest loans...etc. (mentioned at the start of the document). There is no finance support provided specifically by the one stop shops.	
<i>Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?</i>	

<sup>99</sup> Gouvernement Français (2023) « Déploiement Des Bornes De Recharge En Route Pour 2030 ! »

<sup>100</sup> <https://energie-partagee.org/quelle-est-la-difference-entre-autoconsommation-collective-et-communaute-energetique/>

The companies responsible for collecting energy saving certificates have set up AIDEE (Association interprofessionnelle pour le développement de l'efficacité énergétique - Interprofessional Association for the Development of Energy Efficiency), a non-profit organisation aimed at cutting buildings' energy consumption levels and making them more sustainable. The association offers grants to households and businesses planning to renovate their buildings. These grants can be combined with financial assistance from the ANAH.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Prosumers pay the same connection charge as regular consumers but different withdrawal charge in case of collective self-consumption<sup>101</sup>.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

The French Energy Code includes provisions requiring DSOs to implement metering equipment to ensure easy and transparent access to data by consumers and third parties. The technical and functional specificities allowing the interoperability of this system with other systems are defined by a decree<sup>102</sup>. Moreover, installed smart meters can communicate with supplier energy management systems thanks to IEC 62056-7-5<sup>103</sup>.

*How is the quality control on installers (e.g., specific energy audits required)?*

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<sup>101</sup> ACER (December 2023)

<sup>102</sup> [Art R341-6 and R341-4 Code de l'Énergie](#)

<sup>103</sup> Smarten (2022) "The Implementation of The Electricity Market Design to Drive Demand-Side Flexibility"

France has taken steps to guarantee the safety and quality of energy-efficient renovation work. To qualify for financial aid under programmes such as "Ma prime rénove" or "zero rate loans", installers must ensure that the work they finance is carried out by a technician with the RGE (Reconnu Garant de l'Environnement - Recognised as an environmental guarantor) label<sup>104</sup>.

These professionals undergo annual checks by an independent body in order to maintain their RGE qualification. Through this label, the government ensures that it is financing the most efficient work, but also ensures that a high level of competence can be maintained by professionals. Similarly, prosumers who sell the energy they have produced only benefit from the feed-in tariff only if the technician who installed the solar panels holds a specific qualification/quality label and an adequate certification<sup>105</sup>.

The quality requirements are extended to audit. Since 2023, energy audits have been compulsory for houses and buildings for sale classified as F and G<sup>106</sup>. This condition is also necessary to benefit from the assistance offered by certain programmes such as CEE renovation globale. The audit must in principle be carried out by a professional holding a certain qualification label or adequate certification.

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<sup>104</sup> <https://www.ecologie.gouv.fr/label-reconnu-garant-lenvironnement-rge>

<sup>105</sup> <https://mypower.engie.fr/conseils/energie-solaire/avantages-conseils-solaire/photovoltaique-pourquoi-contacter-une-entreprise-rge-qualipv.html#:~:text=Ainsi%2C%20pour%20b%C3%A9n%C3%A9ficier%20de%20la,la%20prime%20C3%A0%20l'autoconsommation.>

<sup>106</sup> <https://france-renov.gouv.fr/preparer-projet/dpe-audit>



## GERMANY



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

On the demand side, several energy efficiency measures such as insulation and heating system renovations are eligible for tax relief. Under this scheme, homeowners can deduct the costs of energy efficiency measures from their tax bill over a 20-year period<sup>107</sup>.

*Are there any other government grants or subsidies for energy efficiency?*

A few programmes and grants have been introduced to encourage German households to carry out renovation work. Firstly, the purchase and installation of solar panels from January 2023 is exempt from VAT. This is available for single houses and multifamily houses, with defined limits on the capacity of the system to be installed<sup>108</sup>.

Other forms of assistance are available, such as low interest loans from the federal funding programme for efficient buildings<sup>109</sup>. These loans can be used to finance part of the costs associated with the construction or purchase of an energy-efficient home, or to finance specific energy efficiency measures.

In terms of grants, support to improve energy efficiency or for expert advice is available from the Federal Office for Economic Affairs and Export Control (BAFA).



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

Since 2000 Germany has introduced feed-in tariff through the energy act to encourage renewable energy roll out. There are two tariff offers, depending on whether all or part of the energy produced is fed back into the public grid.

In all cases, the customer chooses between a fixed tariff and a direct offer:

- When a fixed tariff is chosen, the feed-in tariff decreases as the capacity of the generation system increases. This premium is fixed when the production facility is registered and maintained at the same level for 20 years. After this period, the prosumer is no longer entitled to benefit from this premium and sells his surplus at market price. In addition to the feed-in tariff, the prosumer receives an EEG subsidy

<sup>107</sup> <https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Schlaglichter/Klimaschutz/steuerliche-foerderung-energetischer-gebaeudesanierungen.html>

<sup>108</sup> <https://solarstone.com/blog/solar-subsidies-in-germany#zero-vat-rate-for-solar-modules-and-installation>

<sup>109</sup> <https://www.bundesanzeiger.de/pub/publication/5CPbjtpeQTYbfTH7XvW?0>



premium equal to the difference between the feed-in tariff and the market price of electricity.

- Otherwise, the surplus electricity is sold directly on the market by an aggregator using direct marketing: the premium model and "other direct marketing". These schemes apply by choice of the consumer or if the consumer has a capacity of more than 100 kWh and is no longer eligible for the feed-in tariff, provided that the data from the production system is accessible and can be remotely controlled by the aggregator so that it can estimate the injection capacity.
  - o Direct marketing « Direktvermarktung » (Section 20 EEG 2023) (Premium model) (Marktprämie): the surplus is sold through an intermediary, not the prosumer. The prosumer receives the market price with a premium if the price received is lower than the feed in tariff. The prosumer therefore wins in all scenarios.
  - o Other direct marketing: this model might involve other marketing tools like Power Purchase Agreements (PPAs) or bilateral contracts (Section 21a EEG 2023)

For apartments buildings<sup>110</sup> where the consumption and the management of the generation equipment are not done by the same person, the sharing of electricity is remunerated by two mechanisms:

- Full feed in all the electricity produced is fed back to the grid. This operation has no legal repercussions for the owner, or
- The "tenant model" (Mieterstrommodell): where the owner receives compensation from the consumer for the energy consumed, sometimes increased by a premium (Mieterstromzuschlag)<sup>111</sup>.

One of the first consequences of this model is reflected in the status of the owner. In fact, the Energy Industry Act (EnWG) and the Renewable Source Act 2017 give the status of "Utility" to any person operating an energy production facility and supplying it to third parties. As a result, the owner in the "tenant model" is subject to new obligations in terms of accounting and reporting, invoicing, registration, taxation and so on. As a result, the majority of implemented models are managed by independent companies so that the owner can avoid these legal consequences.

The tenant model implies that the owner no longer has the right to feed electricity into the public grid. On the other hand, he must commit to meet all the consumption needs. In cases where the PV system does not provide sufficient energy, each apartment will be supplied by the supplier chosen by the residents. As a result, the residents receive a single bill showing the energy costs from each source separately.

<sup>110</sup> The building should have at least 15 apartments or units.

<sup>111</sup> **Tenant electricity surcharge** was decided by the *Tenant Electricity Act 2017*. This premium is paid to landlords or operators of PV for 20 years to make renewable energy more accessible to renters. The surcharge compensates for the lower feed-in tariffs when electricity is not fed into the public grid but used on-site. (EEG 2017, Sections 19(3) and 21(3))

Thanks to the tenant model, they save at least 10% of the costs they would have paid by subscribing to a standard supplier, because the owner is obliged to offer prices that are at most 90% of the prices charged by suppliers in the same area.

The Renewable Electricity Act 2021 exempts electricity supplied to tenants from taxation. The Renewable Electricity Act 2023 introduced other measures to facilitate the implementation of this energy-sharing model<sup>112</sup>. These include allowing landlords to install two systems: one dedicated to the tenants under the tenant model and the other to serve the public network (full feed in).

The "Landlord-To-Tenant Electricity Premium" (Mieterstromzuschlag) is another premium paid by the DSO to the landlord under this model if the capacity of the PV system is between 100kWh and 1MW<sup>113</sup>. Once specific criteria are met, the amount received by the owner is calculated considering the feed-in tariff.

As for the taxes and charges associated with this model, the Landlord-To-Tenant Electricity Premium is subject to taxation. Tenants using solar energy always pay the EEG Levy, unlike self-consumers.

**Collective self-consumption:** CSC is restricted to the same building. System operators can agree to allow energy sharing via the public grid within 2km.

*Is there the ability to feed back into the grid without penalty?*

As part of the energy transition (Energiewende), prosumers are encouraged to feed the surplus electricity they have produced into the public grid. In return, they receive a feed-in tariff valid for 20 years from the installation of the production facility. After this period, the surplus is no longer eligible for this incentive. Prosumers in this case sell their production at market price or subscribe to other models such as the tenant model.

*Is there the ability to sell/trade electricity to neighbours?*

That's not possible. Energy trading is only possible inside energy communities. One of the main issues blocking peer to peer energy sharing, is the ban of using the public grid to transfer electricity produced from private facilities.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

Prosumers are exempt from the Renewable Energy Act Surcharge (EEG-Umlage)<sup>114</sup>, a levy paid by consumers who draw electricity from the public grid, originally designed to finance feed-in tariffs and the renewable energy premium. However, the Easter package specifies that only capacity below 30kWp is exempt from this surcharge. In addition, the revenue collected from the sale of surplus electricity produced by these installations is exempt from taxation.

<sup>112</sup> <https://www.energie-experten.org/erneuerbare-energien/photovoltaik/direktvermarktung/mieterstrom#c18157>

<sup>113</sup> <https://www.bmwk.de/Redaktion/EN/FAQ/landlord-to-tenant-electricity/faq-mieterstrom.html>

<sup>114</sup> <https://www.bundesregierung.de/breg-de/aktuelles/eeg-umlage-faellt-weg-2011728>

The "Solar Package I" announced for 2023 has introduced several measures to facilitate the implementation of PV systems. For the residential sector:

- Less bureaucratic procedure for a quick commissioning of PV panels on balconies<sup>115</sup>
- Allows prosumers with a capacity more than 100 kWh to avoid direct marketing costs. Prosumers can feed their surplus production back to grid operator free of charge.
- Simplifies and speeds up the network connection procedure for private installations with a capacity up to 30 kWp<sup>116</sup>.
- Streamline the sale of surplus via a "direct marketing" aggregator: reduce the technical requirements to make direct marketing less costly for small PV systems with a capacity of less than 25 kWp<sup>117</sup>.
- The Solar Package has also made solar energy available to apartments via the "community self-sufficiency" framework. This means that apartments can be independent of the grid and share electricity between units within the building without being classified as an energy supplier<sup>118</sup>.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

According to the building code, the installation of small PV systems on private roofs requires authorization in general. There are, however, restrictions applicable according to state regulations, especially to solar systems.

In addition, it's the owner's responsibility to ensure compliance with building standards and norms<sup>119</sup>. In general, the required administrative procedure for solar development works well and does not present barrier to installation, except in the case of multiapartment units under the tenant model<sup>120</sup>.



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

No explicit demand response offer exists in Germany for the residential sector. Only implicit programmes are offered by energy suppliers or aggregators. The latter are allowed by law to access all the electricity markets.

<sup>115</sup> Bundesministerium (2023) "Überblickspapier Solarpaket"

<sup>116</sup> ibid

<sup>117</sup> Ibid

<sup>118</sup> <https://www.dgrv.de/news/bundesregierung-verbietet-kabinettsentwurf-zum-solarpaket-i/>

<sup>119</sup> <https://www.aceflex.de/magazin/pv-anlage-genehmigung-ist-sie-erforderlich/>

<sup>120</sup> Can Europe (2022)

Household participation in DR activities is low for several reasons: low offer, economic interest, and poor deployment of smart meters.

*Do DSOs use and pay for demand side flexibility?*

DSOs can establish flexibility contracts with households to control the consumption of their electric heating devices and heat-pump. EVs are also eligible to load control activities by DSOs<sup>121</sup>.

Participation of DSOs in wholesale and intraday market for DR aggregation is very weak unlike TSO. As an initiative to promote demand aggregation, an interruptible load program has been implemented. However, this program has been ended in July 2022 and no legislative or policy initiatives have been proposed up to now to support demand aggregation<sup>122</sup>.

DSO congestion management can be carried through aggregators, distributed generation, batteries, energy communities, distributed generation from residential customers<sup>123</sup>.

*Is dynamic pricing available?*

In theory, there is nothing to prevent consumers from subscribing to dynamic prices and flexibility programmes. However, practice shows that this is discouraged by several factors:

On the one hand, the structure of market prices:

1) The limited access of aggregators: these players are obliged by law to enter partnerships with electricity suppliers and cannot directly access consumers' appliances and consumption data.

2) The structure of electricity prices in which network charges, taxes and levies represent 75% of the market price between 2012 and 2021. The value reflecting the supply of electricity did not change significantly during the same period<sup>124</sup>. As a result, the historical prices applied did not reflect market fluctuations and the value added from flexibility. It is worth mentioning that electricity prices have risen significantly in 2022.

3) The lack of implementation of smart meters also explains the low take-up of variable price contracts<sup>125</sup>.

The latest amendment to the Renewable Energy Act in 2023<sup>126</sup> seems to be a further step towards making demand response more accessible. This update obliges grid operators to respond positively and quickly to connection requests from electric chargers, heat pumps, etc. and any other consumer devices to be controlled and integrated into the grid.

*Is there a clear TOU tariff or other mechanism?*

<sup>121</sup> Energy Industry Act of 7 July 2005, last amended by Article 1 of the Act of 13 May 2019

<sup>122</sup> Smarten (2022)

<sup>123</sup> ACER (December 2023)

<sup>124</sup> Agora Energiewende (2023) "Haushaltsnahe Flexibilitäten nutzen"

<sup>125</sup> ibid

<sup>126</sup> §14a EnGW 2023

Germany does not have operational Time-of-use (TOU) tariffs. Therefore, prosumers benefits translate only into avoiding costly consumption from the grid and paying less network usage tariffs<sup>127</sup>.

*Does the existing smart meter infrastructure meet BungEES requirements?*

Germany is one of the laggards in Europe when it comes to implementing smart metering systems with a penetration rate lower than 1% in 2022<sup>128</sup>. According to the Act on the Digitization of the Energy Transition (GDEW) "Gesetz zur Digitalisierung der Energiewende" 2020 smart meters installation for smaller facilities is not compulsory as long as the consumption does not exceed 6000 kWh, or the renewable energy production capacity is limited 7kW. When reaching these thresholds, these consumers should also benefit of dynamic prices and install smart meters starting from 2025.

The roll out target defined in 2020 aimed to reach a full roll out by 2023. However, the implementation of the targets and requirement set by the (GDEW) have appealed and slowed down due to negative results brought by a cost-benefit analysis of the implementation. In 2023, amendments have been brought to this act extending the delay to 2028 if the consumption is larger than 100.000kWh and renewable energy production is larger than 100kW. Consumers and prosumers with smaller level, should start the mandatory roll out of smart meters from 2025<sup>129</sup>.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

The use of storage systems in the residential sector is very much encouraged in Germany: in fact, the KfW (German Developing Bank) facilitates the purchase of batteries by offering reduced-rate loans<sup>130</sup>. The programme covers the development and installation of renewable energy systems and finances the combined installation of PV and storage solutions. Households benefit from the programme provided they feed part of the energy produced into the public grid<sup>131</sup>. Other advantages available to purchasers includes exemption from VAT from January 2023 and subsidies offered by municipal authorities and grid operators.

Storage systems benefit from their own status thanks to the Energy Industry Act (EnWG) and Grid Expansion Acceleration Act (NABEG). As a result, the battery is now considered to be an asset for which "*the final use of electrical energy is postponed to a later point in time than when it was generated*". However, this was not the case in the past. Storage systems were often considered as "consumers" when they were charged, which meant

<sup>127</sup> <https://metsolar.eu/blog/renewable-energy-trends-prosumers-expansion-europe-scenario/>

<sup>128</sup> Smarten (2023)

<sup>129</sup> [The Smart Meter Rollout in Germany and Europe - FfE](#)

<sup>130</sup> Interest rate between 4.03% and 10.49%

<sup>131</sup> [https://www.kfw.de/inlandsfoerderung/Unternehmen/EnergieUmwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-\(270\)/](https://www.kfw.de/inlandsfoerderung/Unternehmen/EnergieUmwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-(270)/)

that their users were subject to network charges and taxes twice<sup>132</sup>. When discharged to the grid, storage systems are considered as producers.

Batteries are allowed to participate in demand response activities. The Industry Act 2023 made batteries eligible for control by grid operators to ensure greater stability. The introduction of a TOU tariff is planned for 2025 for residential batteries as well as heat pumps and EV charging stations<sup>133</sup>.

*Is bidirectional charging and/or B2G enabled?*

As mentioned above, under section 21 of the Energy Financing Act, storage systems benefit from an exemption from all levies if their use is bi-directional, because of the "offsetting rule"<sup>134</sup>.



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

In 2020, German households benefited from a subsidy of up to €9,000 for the purchase of an electric vehicle. This aid was granted until December 2021.

From September 2023, the subsidy for the purchase of BEVs and FCEVs resumed, with a lower value of EUR 6,750, if the value of the EV does not exceed EUR 40,000. This aid has been planned until the end of 2024. However, the granting of these subsidies was postponed until December 2023.

*Is bidirectional charging and/or V2G enabled?*

In line with section 21 of the Energy Financing Act, the offsetting rule will apply at EV charging points, enabling them to participate in network flexibility and avoid double charges<sup>135</sup>.

EVs will also be eligible for the TOU.

Legislators need to tackle other non-financial issues to see a substantial development in bidirectional charging use. There is the question of metering and accounting if people load and unload their vehicles in different places. For this reason, a special definition for vehicle batteries seems necessary. In addition, actors in sectors such as utilities have expressed doubts about the profitability if consumers make more use of their PV systems for charging. The lack of a business case inhibits the development of commercial services for bi-

<sup>132</sup> <https://www.thesmartere.de/industry-news/eeg-2023-federal-government-promotes-energy-transition>

<sup>133</sup> Federal Ministry for Economic Affairs and Climate Action (2023) "Electricity Storage Strategy Fields of action and measures to ensure a persistent and dynamic expansion of electricity storage facilities and their optimal systems integration".

<sup>134</sup> Ibid, p11

<sup>135</sup> Ibid

directional charging in the German market. The lack of interoperability of V2X models and bidirectional charging infrastructures was also expressed as a barrier by market players<sup>136</sup>.

*Is there a nationally backed charging infrastructure?*

The Master Plan II is one of the fundamental measures to support electric mobility announced in 2022. The actions of these plans focus on multiplying and strengthening the electric charging infrastructure, as well as encouraging innovative business models and private investment in the sector.

This plan supports the legal framework of the Charging Station Ordinance (Ladesäulenverordnung). The latter is a legal framework that defines the conditions for charging infrastructure, technical criteria, and other aspects related to infrastructure management and consumers<sup>137</sup>. The country has successfully rolled out 127,530 public and private charging points until the end of 2023.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

To facilitate EV and encourage its uptake, the Fast-Charging Act (Schnellladegesetz) sets out Germany's strategy and objectives for expanding its charging infrastructure network. This act sets out the accessibility criteria for fast charging, the municipal targets, and the aid available, to encourage private and regional operators to invest in fast charging. In 2023, 20,904 fast DC charging stations are available across Germany<sup>138</sup>.

As far as homes are concerned, the latest version of the building electric Mobility Infrastructure Act "Gebäude-Elektromobilitätsinfrastruktur-Gesetz" (GEIG) of 2021, has implemented the obligation to install charging infrastructure in parking areas if a major renovation takes place in residential buildings<sup>139</sup>. In the case of apartment buildings, the German Condominium Act (WEG) Wohnungseigentumsgesetz of 2020 has made it easier for tenants to make decisions. Tenants can install charging points without waiting for permission from the owner or co-owner. They simply need to inform the owner or co-owner, and if he or she does not object within a certain period, this will be deemed to be consent<sup>140</sup>.

Besides facilitating the procedures linked to the storage infrastructure, several subsidies offered by the "Kreditanstalt für Wiederaufbau" (KfW) are available to householders to equip their buildings.



**ENERGY COMMUNITIES**

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

<sup>136</sup> Marvin Helferich, Josephine Tröger and Annegret Stephan (2023), "Smart Charging in Germany: Acceptance and Tariff Design"

<sup>137</sup> GIZ, "International Review on Integration of Electric Vehicles Charging Infrastructure with Distribution Grid"

<sup>138</sup> <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/germany/infrastructure>

<sup>139</sup> [The Building Electromobility Infrastructure Act \(GEIG\) - what do real estate owners, prospective buyers and project developers have to consider | Fieldfisher](#)

<sup>140</sup> [Condominium Amendment Act 2022 - CERHA HEMPEL Rechtsanwälte GmbH](#)

Once the energy communities had been created, they are managed according to the rules of the GenG Cooperative Act. This Act did not cover the specific features of energy production and management activities, but it allows the collective activities of citizens to be organized.

The term "citizen energy community" was introduced by the Renewable Energy Regulation, EEG 2021. The revision of the EEG in 2023 redefined "Citizen Energy Community" as a community of at least 50 people. Eligibility applies to photovoltaic and onshore wind projects. The definition also includes conditions related to voting rights and geographic distribution<sup>141</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

Reasons for low penetration of energy communities in Germany:

- Smart meter rollout still at < 1%
- Strict data privacy laws and complex grid regulations difficult to fulfil (more a question of feasibility than narrow connectivity)
- EU directives not fully transposed yet.
- Legal uncertainty over conditions for connectivity at the time of establishment.
- Especially for definitions and rules around "energy sharing"<sup>142</sup>.



**ONE-STOP-SHOPS**

*Is there government (e.g., through guarantees) or private sector (e.g., banks) support for OSS'?*

The federal contact point for energy efficiency "Bundesstelle Energieeffizienz" provides information on the services similar to a one stop shop. The goal is to facilitate the increase of energy efficiency in a cost-effective manner. This covers for example, information about which companies offer energy efficiency services, market analysis and data, home renovation advise, as well as financial support. The latter is generally provided by KfW bank or by the Federal Office for Economic Affairs and Export Control (BAFA).

*Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?*

In Germany, OSS' in the energy sector are mainly organized by the local city administration for building renovation purposes.

No commercial nor private sector have active OSS' encompassing energy efficiency services. The closest to offering integrated service packages to private households is the

<sup>141</sup> [https://energy-communities-repository.ec.europa.eu/energy-communities-repository-legal-frameworks/energy-communities-repository-policy-database\\_en#germany](https://energy-communities-repository.ec.europa.eu/energy-communities-repository-legal-frameworks/energy-communities-repository-policy-database_en#germany)

<sup>142</sup>

[https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2023/FACTSHEET\\_Energiegemeinschaften\\_in\\_Deutschland\\_und\\_Polen\\_deutsch.pdf](https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2023/FACTSHEET_Energiegemeinschaften_in_Deutschland_und_Polen_deutsch.pdf)



private company 1.5 Grad, which combines solar, heat pumps, battery storage, and energy management.

There is however a national association representing energy services companies (ESCO and other business models), called the DENEFF EDL HUB. It's a spinoff from the German business association for energy efficiency (DENEFF) for companies specializing in energy services. There is close cooperation between the EDL Hub and the Roadmap Energy Efficiency. The main technologies to support OSS' are electronic platform, electronic marketplaces, and cloud services.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

The regulations are not uniform across the country but depend on the responsible grid operator for a specific geographical location. There are separate fees for new grid connections, and smaller fees for changes or reinforcement (Baukostenzuschuss, i.e., prosumer must take over part of the cost for the construction measures, not the grid connection itself). The latter is capped at 70% of costs, so the prosumer and the grid operator share the costs.

It is relevant only for grid connections above 30kW. For new grid connections, the fees for a standard connection are in a range of 750 to 1000 Euros, with a large range beyond this depending on what exactly is technically required and in terms of construction work.

Prosumers pay the same connection and withdrawal charges as regular consumers<sup>143</sup>.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

Germany published a new data strategy in September 2023, which lays out a roadmap for the implementation of the multiple EU legislations related to data access and data governance. Further progress on implementation is expected by mid-2024.

Some smart meters gateways cannot consolidate information from different systems which hinders data interoperability: Although the importance of interoperability aspects was covered in the legal frameworks proposed by the EU and Germany, on a national level, the Tariff Use Case "TAFs"<sup>144</sup> 9 and 10 have addressed the interoperability aspect of smart meters. However, the smart meter gateways certified in 2019 by the Federal Office for Information Security failed to meet this requirement. According to Bergsträsser (2022), it will be difficult to implement solutions that will work on different systems and actors on a large scale and for cheap costs without<sup>145</sup>.

*How is the quality control on installers (e.g., specific energy audits required)?*

<sup>143</sup> ACER (December 2023)

<sup>144</sup> Tariff use case or TAFs is a function that determines the frequency and resolution with which the intelligent measurement system transmits its measured values.

<sup>145</sup> 4i TRACTION project, "National case study report: Germany's delayed electricity smart meter rollout and its implications on innovation, infrastructure, integration, and social acceptance"

To guarantee the efficiency of building renovation works, many public programs require the intervention of certified and listed technicians for energy advice and for the performance of the renovation works. This is the case for example for KfW programs, in which applicants can benefit from financial support program only if they hire a listed technician<sup>146</sup>. A wide list of energy experts that are certified/qualified and approved by the German government are available at a public platform “Energie Effizienz Experten”<sup>147</sup>.

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<sup>146</sup> <https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilie/Energieeffizient-Sanieren/Experte-f%C3%BCr-Energieeffizienz/>

<sup>147</sup> <https://www.energie-effizienz-experten.de/>



## ITALY



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

The tax reduction seems to be one of the most important advantages gained from renovation work in Italy. The Superbonus, also known as the Ecobonus, makes it possible to deduct 90% of the costs incurred to improve the building energy performance<sup>148</sup>. This scheme also covers the charges for PV installation. The Bonus ristrutturazioni and Bonus Casa<sup>149</sup> are also other schemes offering similar tax advantages.

*Are there any other government grants or subsidies for energy efficiency?*

Italian households can access a mechanism that grants support for the acquisition of generation technologies such as PV systems and also for heat pumps. These technologies can receive funding from a public grant under the Thermal Account mechanism (Conto Termico<sup>150</sup>). This subsidy is limited to 5000EUR per installation. Families with low income in some municipalities are also eligible to a grant provided by the national energy income fund<sup>151</sup>.

It should be noted that building regulations and support programmes are different at municipality level in Italy. For this reason and to accelerate the adoption of PV technology, Decree-Law no. 17/2022 categorises the installation of PV systems as ordinary maintenance, thus eliminating the need for any authorisation or permit applicable to general interest buildings<sup>152</sup>.



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

Prosumers who support the grid are subject to the net billing scheme ("Scambio sul Posto"<sup>153</sup>). The scheme applies to facilities with capacity under 500 kW but cannot be combined with the 110% Superbonus.

Eligibility for this scheme depends on the commissioning date of the generation system. In the case of systems commissioned up to the end of 2012, this benefit is no longer

<sup>148</sup> Deduction rate started with 110% in 2020, will be reduced to 70% in 2024 and 65% in 2025.

<sup>149</sup> [Home bonus - ENEA - Department of Energy Efficiency Units](#)

<sup>150</sup> [https://pnpe2.enea.it/conto\\_termico](https://pnpe2.enea.it/conto_termico)

<sup>151</sup> <https://biblus.acca.it/bonus-fotovoltaico-tutte-le-possibili-agevolazioni/#decreto-mase>

<sup>152</sup> CAN Europe (May 2020), "Engaging citizens and local communities in the solar revolution - Rooftop Solar PV Country Comparison Report"

<sup>153</sup> <https://www.gse.it/servizi-per-te/fotovoltaico/scambio-sul-posto>

applicable. The surplus produced can be sold through the “Ritiro Dedicato” scheme: either to the Italian Energy Service Manager GSE at a price fixed by decree or to the market <sup>154</sup>.

Net metering is also possible up to 2041 for systems commissioned since 2013<sup>155</sup>.

A feed-in tariff “Tariffa Onnicomprensiva” is an alternative to net metering scheme available for generation facilities with capacity under 250kWh. The tariff will reward prosumers not only for the energy injected to the grid, but also for the energy they self-consume<sup>156</sup>. This premium is available for 15 years starting from the commissioning of production facility<sup>157</sup>.

In the case of collective self-consumption in apartments and condominiums, the energy surplus is sold according to “Ritiro Dedicato” scheme.

Prosumers acting collectively or solely under the “Ritiro Dedicato” with installed capacity under 20kW should consider this premium as revenue and include it in the tax declaration<sup>158</sup>.

*Is there the ability to feed back into the grid without penalty?*

There are no penalties applied to prosumers for injecting any surplus to the grid. They pay the same connection and withdrawal fees as regular consumers<sup>159</sup>.

*Is there the ability to sell/trade electricity to neighbours?*

Peer to peer trade and selling energy to a neighbour is not allowed by the law.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

Prosumers and regular customers pay similar taxes, levies, and surcharges<sup>160</sup>.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

The photovoltaic installation is part of the building ordinary maintenance work interventions and does not generally require a permit<sup>161</sup>. However, this general framework is supplemented by the municipality building regulations, which can vary widely from one municipality to another. Therefore, local restrictions and authorizations must be checked in each case.

<sup>154</sup> <https://it.bluettipower.eu/blogs/news/vendere-energia-elettrica>

<sup>155</sup> <https://consenergy.it/impianti-fotovoltaici-il-ritiro-dedicato-2024-che-pone-fine-allo-scambio-sul-posto/>

<sup>156</sup> Smarten (2020)

<sup>157</sup> [Photovoltaic all-inclusive tariff: what is it? \(tagliabiolletta.it\)](https://www.tagliabiolletta.it/photovoltaic-all-inclusive-tariff-what-is-it/)

<sup>158</sup> [circular no. 46/E of 2007 of the Revenue Agency](https://www.agenziaentrate.gov.it/circulari/circular-no-46-e-of-2007-of-the-revenue-agency)

<sup>159</sup> ACER (December 2023)

<sup>160</sup> Ibid

<sup>161</sup> <https://www.nwgitalia.it/blog/fotovoltaico-vincolo-paesaggistico>



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

Demand response can participate in Day-Ahead and Intraday, Ancillary Services and Capacity Markets<sup>162</sup>.

In practice, the incentives and interest for explicit flexibility are low. Customers are active on the capacity market and in the Virtually Aggregated Units (UVAs) pilot project. This project was launched by Italian TSO Terna and has been opened up to prosumers with a capacity under 55 KW without hourly metering from 2020<sup>163</sup>. Thanks to the Virtually Aggregated Mixed Units (UVAs), demand and generation activities are capable to provide balancing services.

So far, this pilot project has been a success in promoting residential flexibility.

*Do DSOs use and pay for demand side flexibility?*

DSOs notify TSO when congestion or any other network support is needed. Flexibility is not used for this matter<sup>164</sup>.

Moreover, thanks to Resolution 352/2021, DSO are allowed to develop flexibility services through pilot projects<sup>165</sup>.

*Is dynamic pricing available?*

Dynamic pricing contracts are not available.

However, suppliers are free to offer dynamic prices to a customer if a smart meter is installed. The option is also possible for customers without a smart meter if an accurate measure of their consumption is possible<sup>166</sup>.

ACER report mentions that regulatory restrictions to implement dynamic contracts do not exist.

*Is there a clear TOU tariff or other mechanism?*

<sup>162</sup> JRC (2022)

<sup>163</sup> Smarten (2020)

<sup>164</sup> ACER (December 2023)

<sup>165</sup> Smarten (2023)

<sup>166</sup> Art 8 and art9, Decreto Legislativo 8 Novembre 2021, n. 210 : [Italy: New Legislation Liberalizes Domestic Electricity Market | Library of Congress \(loc.gov\)](#)

Flat tariffs were always the default choice for households until the implementation of time-of-use (ToU) tariffs in 2010. Different prices are offered in two periods<sup>167</sup>. These tariffs are the only option available for dynamic pricing<sup>168</sup>.

*Does the existing smart meter infrastructure meet BungEES requirements?*

Italy was one of the pioneers to introduce smart meters in 2007, thanks to ARERA resolution 292/06. The criteria for smart meters were updated to meet the conditions defined by the European Directive in 2014, reflecting the implementation of the 2nd generation of smart meters. In 2020, the introduction of the second generation was delayed, and the plan is to achieve full replacement by 2031<sup>169</sup>.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

The use of batteries in the residential sector is motivated by self-consumption.

Storage systems interact with PV with the possibility of feeding back the electricity to the grid when the battery is full during the day<sup>170</sup>. The resolution 109/2021 of National Regulatory Authority NRA helped batteries to avoid double network charges when feeding back to the grid<sup>171</sup>.

Batteries are still strongly encouraged by tax incentives. However, this remains unattractive to households, given the long payback period. In addition, the net billing system appears to be a cheaper and faster alternative that appeals more to end-users and energy service providers<sup>172</sup>.

The installation of a storage system combined with solar panels guarantees households an up to 50% income tax deduction and a reduced VAT. However, this benefit is only available under specific conditions linked to the expense amount and specific energy efficiency measures to be taken under the Renovation bonus<sup>173</sup>.

*Is bidirectional charging and/or B2G enabled?*

No information available

<sup>167</sup> Simone Maggiore, Massimo Gallanti, Walter Grattieri, Michele Benini (2013) "Impact of The Enforcement of a Time-Of-Use Tariff to Residential Customers in Italy"

<sup>168</sup> <https://navitasoft.com/en/news/new-dynamic-energy-pricing-flexible-electricity-tariffs>

<sup>169</sup> <https://www.otovo.it/blog/contatori-energia-smart-meter/#i-contatori-di-energia-che-usiamo-in-otovo>

<sup>170</sup> <https://casa.engie.it/magazine/accumulo-fotovoltaico/>

<sup>171</sup> Smarten (2022)

<sup>172</sup> SolarPower Europe (2020) "European Market Outlook for Residential Battery Storage 2020-2024"

<sup>173</sup> <https://www.finanza.com/finanza/bonus-fotovoltaico-2024-gli-incentivi-realmente-previsti-questanno>



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

EVs and Plug-in hybrid electric vehicles (PHEVs) are subsidized to an amount between €2,000 to €3,000 for natural persons.

*Is bidirectional charging and/or V2G enabled?*

In Italy, V2G technology is still in the pilot phase, which explains the absence of a legal framework for this technology. Nevertheless, under existing rules, V2G is exempt from double taxation on charging and discharging. V2G can participate in the wholesale and capacity markets. As for flexibility services, these will be possible for V2G and distributed generation sources from 2025 thanks to the Integrated Electricity Dispatching Act (TIDE) adopted in July 2023<sup>174</sup>.

*Is there a nationally backed charging infrastructure?*

In 2030 Italy aims to install 32,000 public high-speed and ultra-high-speed DC charging stations<sup>175</sup>. By the end of 2023 the country has reached 41,113 private and public charging points, of which 5,674 are DC fast chargers.

In addition, the private installation at homes is supported by a grant covering 80% of the expenses, up to a maximum of €1,500.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

In terms of the ratio of charging points per vehicle, Italy is close to the world average of 15.9, with a ratio of 17.9. However, the country needs to make a greater effort in terms of geographical distribution and the number of recharging points per kilometre. In this respect, Resolution 130 of August 2022 introduced for the first-time rules for the selection of operators of freeway recharging points<sup>176</sup>.



## ENERGY COMMUNITIES

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

Energy sharing is only allowed by law within the scope of energy communities. The framework for energy communities was introduced by decree 199/08.11.2021 for renewable energy communities RECs and by legislative decree 210/08.11.2021 for citizen energy communities CECs aligning with the RED II definitions and objectives.

<sup>174</sup> Smarten (2023)

<sup>175</sup> Smarten (2023)

<sup>176</sup> <https://evmarketsreports.com/charge-point-monitor/italy/>

The Italian Energy Service Manager GSE is planning to introduce a premium tariff to promote energy sharing and that would be available for installations under 1MW<sup>177</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

A significant concern faced during the operation of energy communities in Italy is ensuring an accurate and precise calculation of the shared energy. Considering the reduced number of installed smart meters, this might affect an efficient management of energy inside the community, as well as the billing system<sup>178</sup>.



## ONE-STOP-SHOPS

*Is there government (e.g., through guarantees) or private sector (e.g., banks) support for OSS'?*

The National Portal on the energy performance of buildings PNP2 is a digital one stop shop design to promote sustainability in buildings and support policies in the sector. The platform provides to household's information on available financing for home retrofitting and refurbishment related to energy efficiency, as well as on regulation and good practices to be applied for improving buildings. Requirement and rights under EPCs (Energy Provider Companies), white certificates and education material for professionals are also covered by this platform<sup>179</sup>.

*Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?*

The PNP2 Platform is run by the Italian National Agency for New Technologies, Energy, and Sustainable Economic Development ENEA. Private professionals do not contribute to its activities.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Prosumers pays the same connection and withdrawal charges as regular consumers<sup>180</sup>.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

<sup>177</sup> <https://www.rescoop.eu/policy/transposition-tracker/enabling-frameworks-support-schemes/italy>

<sup>178</sup> Anita Tatti, Sibilla Ferroni, Martina Ferrando, Mario Motta and Francesco Causone (2023) "The Emerging Trends of Renewable Energy Communities' Development in Italy"

<sup>179</sup> [PNPE2 \(enea.it\)](https://www.enea.it/it/tema/energia/energia-riprodotta)

<sup>180</sup> ACER (December 2023), "Demand response and other distributed energy resources: what barriers are holding them back? Market Monitoring Report"



Energy providers access the consumer data through the DSOs. In general, this information would be accessible and provided by the TSOs and DSOs on a monthly basis for third parties.

*How is the quality control on installers (e.g., specific energy audits required)?*

Technicians involved in the works that are under the thermal accounts<sup>181</sup> , Ecobonus<sup>182</sup> and the “Bonus ristrutturazioni” must sign declarations on fulfilling requirement set by law on qualification and energy savings in the interventions.

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<sup>181</sup> <https://www.gse.it/servizi-per-te/efficienza-energetica/conto-termico/modulistica>

<sup>182</sup> <https://www.fratellipellizzari.it/blog/110-bonus-ristrutturazione>



## PORTUGAL



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

Cost deduction impacting personal tax and property tax are possible. However, modalities and scope are different from municipality to another<sup>183</sup>.

*Are there any other government grants or subsidies for energy efficiency?*

One of the objectives of establishing the Environment Fund is contributes to national sustainability actions in buildings. The Sustainable Building Program (Programa de Apoio a Edifícios Mais Sustentáveis)<sup>184</sup> provides financing aids to different home and condominium renovation measures like thermal insulation, renovation of the heating and cooling system and the installation of generation technologies like Solar PV and heat pumps. The grants can reach 7500 EUR per building unit.

Bank loans to improve thermal insulation and installation of solar PV are also available for are provided to citizens with limited financial resources under the Efficient Home program 2020<sup>185</sup>.



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

The rules of self-consumption collective self-consumption are regulated by Decree-Law 162/2019.

For households, energy and not consumed in 15min period can be injected to the grid and remunerated according to net metering scheme<sup>186</sup>.

Another less common option is selling the surplus to an energy provider or a market trader. Due to prosumers small capacities, practiced prices, and the 10% penalty<sup>187</sup> to be paid, this option provides a low financial return<sup>188</sup>.

<sup>183</sup> <https://portalcasamais.pt/apoios-e-incentivos/>

<sup>184</sup> <https://www.fundoambiental.pt/apoios-prr/c13-eficiencia-energetica-em-edificios/05c13-i012023-paes-2023-1-aviso.aspx>

<sup>185</sup> <https://www.sgeconomia.gov.pt/noticias/programa-casa-eficiente-2020.aspx>

<sup>186</sup> <https://poupaenergia.pt/en/photovoltaic-for-self-consumption/>

<sup>187</sup> <https://poupaenergia.pt/en/photovoltaic-for-self-consumption/>

<sup>188</sup> <https://goldenergy.pt/blog/autoconsumo/venda-excedente-do-autoconsumo/>

Alternatively, a guaranteed off take from these aggregators of last resort can be provided to prosumers with capacity lower than 1MW<sup>189</sup>.

*Is there the ability to feed back into the grid without penalty?*

No tariffs are paid for feeding back to the grid. In the opposite, prosumers benefit of a 50% discount on CIEG tariff which represent a part of the grid tariff to the societal and environmental efforts. In case of collective self-consumption, this tariff is fully exempted<sup>190</sup>.

*Is there the ability to sell/trade electricity to neighbours?*

It is possible for prosumers to sell excess energy with neighbours and surrounding building thanks to provisions of decree-Law No. 162/2019<sup>191</sup>.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

There are no barriers to support the grid. Active and non-active consumers pay the same network charges. However, installation facilities with capacity greater than 100KW is subject of authorization from DSO and other fees even if feeding back to the grid is not planned<sup>192</sup>.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

The deployment of photovoltaic systems is subject to different administrative requirements depending on their capacity: the obligation to notify municipal authorities applies to capacities between 700W and 30 kW. Larger systems will be subject to control, registration, and a certificate of operation. For capacities of 1 MW and above, a production license must also be issued<sup>193</sup>. In general, PV installation procedures seem to be demanding for consumers with little expertise or time<sup>194</sup>.



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

Aggregated demand response services participate only in ancillary markets. Aggregators provide balancing services as well in the day-ahead and intraday markets<sup>195</sup>.

*Do DSOs use and pay for demand side flexibility?*

<sup>189</sup> JRC (2022)

<sup>190</sup> Energy Communities Hub - <https://energycommunitieshub.com/country/portugal/>

<sup>191</sup> <https://solvasto.pt/self-consumption-solar-power/?lang=en>

<sup>193</sup> [Solar Panel Mounting: Where Are They Installed? \(goldenergy.pt\)](https://goldenergy.pt/solar-panel-mounting-where-are-they-installed/)

<sup>194</sup> Can Europe (2022)

<sup>195</sup> JRC (2022)

DSOS are not allowed to provide flexibility services<sup>196</sup>.

*Is dynamic pricing available?*

In Portugal, dynamic tariffs are regulated but not yet implemented. The official information is that by the end of first semester of 2024 dynamic tariff will be available to consumers.

*Is there a clear TOU tariff or other mechanism?*

TOU tariffs have penetrated partially the residential sector (less 20%)<sup>197</sup>. Households have two TOU structures: peak and off-peak tariff and peak, off-peak and super off-peak tariff.<sup>198</sup>

*Does the existing smart meter infrastructure meet BungEES requirements?*

E-REDES, is key player in supporting Portugal goals in smart metering. Although, implementation actions started in 2019, Portugal has reached a penetration rate of 80% by the end of 2023. It is expected that a full roll out will be reached by 2025 in the country.<sup>199</sup>



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

The most cost-effective way of using stored energy is to consume it locally rather than selling it to the grid. This is because the feed-in tariff, which is 80% lower than the average consumer tariff, is not attractive enough. In addition, storage facilities are still subject to a double network charge when outside the scope of the energy communities.<sup>200</sup>

*Is bidirectional charging and/or B2G enabled?*

Portugal has no specific legislation on storage systems, so their use is covered by legislation on production and consumption.

The storage strategy can take follow two forms:

- Charging the storage system directly from the grid during periods when electricity prices are lower (during the night)

<sup>196</sup> Smarten (2022)

<sup>197</sup> ACER (Decembre 2023)

<sup>198</sup> Kun Wang, Xinyi Lai, Fushuan Wen, Praveen Prakash Singh and Sambeet Mishra (2022) "Dynamic network tariffs: Current practices, key issues and challenges"

<sup>199</sup>CAN Europe (May 2020)

<sup>200</sup> Smarten (2022)

- The use of a solar system, which can charge the storage systems directly or use the surplus energy not consumed in the building to charge the storage systems.



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

BEVs acquisition is eligible to a 3000 € subsidy and exempt from registration tax for private users. PHEVs and HEVs benefit from a reduced registration rate.

*Is bidirectional charging and/or V2G enabled?*

For the time being, there are no specific regulations for V2G, nor any tariff system allowing the electricity supplied by the electric vehicle's battery to be monetised on the grid. In the case of V2B, it is possible for the electricity injected to be consumed locally, but electricity can only be injected into the grid if the energy meter is combined with a solar system.

The feed-in tariff in this case is 80% lower than the price of the kWh consumed. In addition, there is only one model of electric vehicle currently on the market in Portugal with V2G capacity.

*Is there a nationally backed charging infrastructure?*

Portuguese charging infrastructure was established under Mobie Network programme since 2015.

This platform provided universal access for charging stations for different user groups. This translated into an average of 69 charging points per 100 km<sup>201</sup>.

For 2050 Portugal aims to install 42,000 charging stations<sup>202</sup>. By the end of 2023 the country has reached 7,322 private and public charging points, of which 1,647 are DC fast chargers<sup>203</sup>.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

EV charging points are being developed on a private and public scale. Public charging stations have been set up in most large and medium-sized towns, as well as in coastal regions.

Although there are fewer charging stations available in the inland areas, there has been a significant increase in the number of chargers installed in supermarkets and service stations, so it can be considered that there is now easy access to charging stations throughout the country. However, with the increase in the number of EVs, there is still a need to develop public charging stations in the future.

<sup>201</sup> <https://evmarketsreports.com/charge-point-monitor/portugal/>

<sup>202</sup> [PowerPoint Presentation \(mobie.pt\)](#)

<sup>203</sup> <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/spain/infrastructure>

Users benefit from various services through applications that help them obtain information on the type, location, and availability of EV chargers on the Iberian Peninsula<sup>204</sup>.



## ENERGY COMMUNITIES

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

The transposition of the framework for Renewable Energy Communities, RECs, is covered by Decree-Law no. 15/2022, of January 14. Collective self-consumption was however organized first by the decree-Law no. 162/2019, of October 25.

However, collective self-consumption was first regulated by decree-Law no. 162/2019, of October 25.

Although the legislation incorporates the definitions provided for in the European directives, the proposed text is considered superficial, since certain details are not clearly mentioned, such as REC autonomy, ownership issues and community governance<sup>205</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

Connectivity issues might rise when it comes to the application of the conditions on connection between RECs and end users and the technical requirements like low voltage distance. Moreover, a power transformer might be necessary in some cases to establish a RECs. The power transformer role is to “handle” the surplus electricity produced, and not consumed inside the RECs. While not presenting an important hurdle now, in the future with widespread adoption of PV systems, it may become an issue.

Finally, authorizations and an inspection by the National Directorate of Energy might be required depending on the REC size.<sup>206</sup>



## ONE-STOP-SHOPS

*Is there government (e.g., through guarantees) or private sector (e.g., banks) support for OSS’?*

So far, there is one one-stop shop that was direct government Portugal. This one-stop shop was established and is managed by the Portuguese Energy Agency - ADENE.

The one-stop shop is called *Casa Plus*, and it provides a wide range of services for the benefit of the public, from renovation consultancy and work budgeting to EPC-Energy

<sup>204</sup> <https://www.mobie.pt/redemobie/encontrar-posto>

<sup>205</sup> <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/portugal-rec-cec-definitions>

<sup>206</sup> <https://www.dgeg.gov.pt/pt/areas-setoriais/energia/energia-eletrica/producao-de-energia-eletrica/producao-descentralizada-autoconsumo-e-upp-mp-mn/autoconsumo-e-cer/3-enquadramento-legal/>

Performance contracting, referral of technicians, and identification of available subsidies and financing tools<sup>207</sup>.

The National long-term renovation strategies of 2020 recognized the importance of these structures to promote energy transition and citizens/ stakeholders' involvement and engagement. The creation of a virtual one-stop shops to act as information hub for citizen and promoters is being planned<sup>208</sup>.

Other OSS are currently being developed in Portugal by other entities (private associations, municipalities, etc.).

*Is it up to technology providers to maintain OSS? Are their national associations that could run and maintain them?*

One-stop shops are currently being developed by municipalities. In the future, in order to harmonize the one-stop shops concept in Portugal a national institution could be assigned to run these structures. Regarding private initiative for home renovation advise and support, private associations can offer these services. The national ESCO association, national Engineers Association, etc. are examples of entities that can play this role.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Prosumers and regular consumers pay the same connection and withdrawal tariffs. Moreover, prosumers participating in balances services have the same advantages as generators in terms of benefitting of exemption from access tariffs<sup>209</sup>.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

Energy suppliers and aggregators are defined as eligible party who are allowed by law to access customer's data<sup>210</sup>.

*How is the quality control on installers (e.g., specific energy audits required)?*

<sup>207</sup> <https://portalcasamais.pt/perguntas-frequentes/>

<sup>208</sup> 2020 long-term building renovation strategy: [Long-term renovation strategies \(europa.eu\)](https://ec.europa.eu/eurofin/long-term-renovation-strategies/)

<sup>209</sup> ACER (December 2023)

<sup>210</sup> Ibid

Usually, the installers need to have adequate certification/qualification to run their companies. This is regulated by each economic sector and by the market regulation authorities (National Directorate of Energy, Economic and Food Safety Authority, etc.). The necessary certification schemes are in place as required by European/National regulations. Furthermore, a certification from Portuguese environment agency may be required to benefit from financing assistance provided by public programmes<sup>211</sup>.

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<sup>211</sup> <https://www.deco.proteste.pt/casa-energia/aquecimento/noticias/reembolsos-programa-apoio-edificios-mais-sustentaveis-2023-ainda-estao-por-pagar#que-equipamentos-e-obras-podem-receber-apoio>





## SLOVAKIA



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

No

*Are there any other government grants or subsidies for energy efficiency?*

There are few incentives available in Slovakia to encourage households to improve the energy performance of their buildings. The *State Housing Development Fund* <sup>212</sup> is not explicitly targeted at improving the energy efficiency of buildings, but the program does provide favourable loans for the renovation of electrical and heating systems, as well as building insulation.

Granting is also available thanks to the Slovak Environment Agency. Households are reimbursed in a percentage of the cost of several energy efficiency measures like the installation of heat pumps, PV system, floor and ceiling insulation and home battery storage systems<sup>213</sup>. The installation of photovoltaic systems in single-family homes and apartment buildings can be financed by the Green Households project. These grants, awarded by the European Regional Development Fund and managed by the Slovak Energy Agency, are paid out according to the system's capacity. To qualify, households must hire the services of a listed technician, and the installation must comply with several technical criteria<sup>214</sup>.



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

Slovak prosumers receive feed-in tariff for the electricity injected to the grid.


Given the limited capacity of households and strict price structure of electricity, the last option does not provide an interesting financial return to consumers. The profitability will vary in each region according to the tariffs practiced by the DSO<sup>215</sup>.

<sup>212</sup> <https://www.siea.sk/bezplatne-poradenstvo/bezplatne-poradenstvo-pre-domacnosti/statny-fond-rozvoja-byvania-3/>

<sup>213</sup> <https://obnovdom.sk/opatrenia.php#B2>

<sup>214</sup> <https://www.siea.sk/zelena-domacnostiam/>

<sup>215</sup> JRC (2022)

A net metering regime is also available via a virtual battery service by the largest energy provider in Slovakia <sup>216</sup> .
<i>Is there the ability to feed back into the grid without penalty?</i>
No data available
<i>Is there the ability to sell/trade electricity to neighbours?</i>
Peer to peer trading of the electricity produced onsite is not allowed by law <sup>217</sup> .
<i>Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?</i>
Grid charges paid by prosumers are calculated according to their injection or withdrawal capacity <sup>218</sup> .
<i>Are there any administrative hurdles or delays regarding permitting of solar PV installations?</i>
<p>The installation of photovoltaic panels is generally subject to notification to the relevant building authority and requires a permit.</p> <p>When the facility is not used for commercial services, photovoltaic panels can be installed on the roof and in the facade only with a notification requirement. However, the owner must also ensure that the appearance of the building is not significantly altered. A building permit will be required if the installation of the PV system involves a change in the public infrastructure for connection purposes<sup>219</sup>.</p>
 <h2>DEMAND RESPONSE</h2>
<i>What are the available programmes and markets for Demand Response?</i>
<p>Slovak framework provides a definition for the term aggregator and allows to them to establish agreements with customers without the energy provider's consent. However, technical requirements and participation rules are still not fully defined yet<sup>220</sup>.</p> <p>Participation of market actors is open in the wholesale market and balancing market even though the latter is still just a theory because there are no active aggregators in the market. One of the issues of the current market structure is the high concentration of large market</p>

<sup>216</sup> <https://www.pv-magazine.com/2019/02/12/slovakian-utility-zse-launches-virtual-battery-for-residential-pv/>

<sup>217</sup> Frantisek Janicek, Jan Ponican, Matej Sadlo (2021) "Impact of the fixed and variable component of electricity price on the economic viability of a small-scale photovoltaic power plant"

<sup>218</sup> ACER (Decembre 2023)

<sup>219</sup> <https://www.asb.sk/zelena-obnova/je-vasa-strecha-vhodna-pre-solarne-panely-podmienkou-je-dostatocny-priestor-a-orientacia>

<sup>220</sup> JRC (2022)

players and the technology barrier that will make new comers less competitive in demand response market<sup>221</sup>. Moreover, the law does not allow aggregators in the market without a Balance-Responsible Party (BRP) agreement<sup>222</sup>.

*Do DSOs use and pay for demand side flexibility?*

No data available

*Is dynamic pricing available?*

Dynamic price contracts are available from energy providers. These offers are based on spot market at each hour<sup>223</sup>. However, a large dissemination of these contracts is still not possible due to the fact that the energy (commodity) component is only a minor part of the electricity bill, and thus only very small incentives can be achieved. In addition, there is still a widespread use of regulated prices for vulnerable customers and a rigid structure of network charges<sup>224</sup>.

*Is there a clear TOU tariff or other mechanism?*

Slovakia is one of the countries where TOU tariffs are applied less frequently, with an overall usage rate of less than 20%.<sup>225</sup>

*Does the existing smart meter infrastructure meet BungEES requirements?*

Smart meter deployment is still in an early stage. There is a big gap between the initial objectives and the actual progress of implementation. Slovakia is committed to making smart metering operational in 80% of buildings by the end of 2020<sup>226</sup>. Actual deployment has reached 15% in 2022.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

Storage operations in Slovakia are not treated as a separate subject with its own specificities within the implemented legislation.

The storage systems do not participate in the day-ahead, intraday, and balancing markets. Similarly, aggregators and active consumers cannot participate in the market through the

<sup>221</sup> European Commission (2021) « European Barriers in Retail Energy Markets Project: Slovakia Country Handbook 2021 »

<sup>222</sup> [Demand-side Flexibility: The Next Big Thing in CEE | Nano Energies: Let your business profit by helping the grid work efficiently](#)

<sup>223</sup> [718 sprava dynamicke ceny elektriny 11 2023.pdf \(gov.sk\)](#)

<sup>224</sup> European Commission (2021)

<sup>225</sup> ACER (December 2023)

<sup>226</sup> Ibid

energy stored in a battery system. However, the existing legislation offer the possibility to provide ancillary service by battery storage systems <sup>227</sup>.

A major obstacle, at present, remains the high cost of developing and using storage technologies. Moreover, the current legislation is unclear about energy surplus treatment, both in the case of batteries and for PVs, creating a legal uncertainty that will discourage self-consumption or commercial offers<sup>228</sup>.

*Is bidirectional charging and/or B2G enabled?*

B2G lacks any specific rules or guidelines in Slovakia. It is often difficult for buildings to obtain grid connection permits for batteries, due to unclear legislation. These problems are often encountered by energy communities, electric mobility operators or, simply prosumers. Similarly, there are currently no standards covering safety rules for the installation of battery storage systems. The significant cost of batteries and the long payback period are still the key barriers to B2G in Slovakia.



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

EVs are incentivized with a reduced registration charge if purchased by private persons. Subsidy programs are only available for companies.

*Is bidirectional charging and/or V2G enabled?*

Current regulations do not explicitly cover V2G, or flexibility services provided by electric vehicles in Slovakia. Due to legislative obstacles and the slow pace of the DSO, it is practically impossible to offer V2G services in Slovakia today, even though the fact that companies and end-users have expressed interest.

*Is there a nationally backed charging infrastructure?*

Slovakia is actively working to expand the country's public charging infrastructure. According to the national network of ultra-fast DC charging points (UFC), the country aims to have 4,500 public and private infrastructures in place by the end of 2026<sup>229</sup>. Recently, the country has reached 2,380 private and public charging points in the end of 2023<sup>230</sup>.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

The slow development of the electric vehicle market has not discouraged public initiatives to develop and expand electric recharging infrastructures. However, there are gaps in the deployment of these infrastructures across the country. Outside the big cities, the number

<sup>227</sup> Slovak Battery Alliance, Energy Storage (Es) In Slovakia, “Energy Storage (ES) in Slovakia” [Prezentácia programu PowerPoint \(energystoragenl.nl\)](#)

<sup>228</sup> Rafael Leal-Arcas (2021)

<sup>229</sup> [The updated plan for the support of e-mobility in the Slovak Republic also provides for subsidies for electric vehicles \(teslamagazin.sk\)](#)

<sup>230</sup> <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/slovakia/infrastructure>

of charging points is extremely low, which poses a major problem when it comes to the autonomy of EVs<sup>231</sup>. In 2023, the country has reached 618 DC fast chargers and 1,702 public AC chargers.



## ENERGY COMMUNITIES

*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

The amendment of Act 251/2012 by Act 256/2022 introduced energy communities into the Slovak legislative framework.

This framework was further developed following amendment 363/2022 the Act 309/2009 on support for renewable energy sources. However, this transposition was criticized for simply adopting the definitions and criteria of governance from the RED, without framing important details of the activity, such as the distribution of profits within the community and rules for citizen participation<sup>232</sup>.

*Are there any connectivity issues for Community Energy Facilities?*

Bureaucracy, the absence of regulation and the delay tactics of incumbent operators (DSOs) creates problems when it comes to obtaining connection authorizations.



## ONE-STOP-SHOPS

*Is there government (e.g., through guarantees) or private sector (e.g., banks) support for OSS'?*

The government does not support the establishment of one-stop shops. Similarly, these initiatives are not supported by the private sector.

Government-implemented one-stop shops are in fact channels for EU-funded subsidies such like The Green Home Project by SEIA to support the installation of renewable energy facilities<sup>233</sup>.

Generally, the services provided do not cover all aspects of renovation.

*Is it up to technology providers to maintain OSS'? Are their national associations that could run and maintain them?*

Of the existing one-stop shops, it's mainly the technology producers who manage and maintain these activities. Associations do not undertake these initiatives due to a lack of financial capacity.

<sup>231</sup> Rafael Leal-Arcas (2021)

<sup>232</sup> <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/slovakia>

<sup>233</sup> <https://zelenadomacnostiam.sk/o-projekte/harmonogram/>

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Connection fees are paid by the prosumer feeding the excess electricity to the grid. There are no efforts on the DSO side for splitting the fees, but some companies, although still few of them, used it as market opportunity for providing peer-to-peer services, or to aggregate flexibility by using user-friendly mobile apps. For the B2B market there are more sophisticated offers providing access to the energy market, but this is not subject of the study.

Red tape, missing regulatory tools and delay tactics on the side of incumbent players (DSOs) are hinder market development.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

Energy suppliers are the only party recognized as eligible to access consumer's data according to the current legal framework<sup>234</sup>.

The Energy Data Centre (EDC), operational since the end of 2023, is a central hub for data collection and analyses across residential, industrial, and commercial sectors run by the electricity market operator OKTE. Unlike other services offered by energy suppliers, this platform guarantees energy sharing in accordance with European legal standards<sup>235</sup>. Moreover, this platform will facilitate the participation of new players such as energy communities, flexibility providers and storage system operators in the electricity market<sup>236</sup>.

However, it's important to mention that there are no national regulations to govern services based on customer data and their interoperability across providers.

*How is the quality control on installers (e.g., specific energy audits required)?*

<sup>234</sup> ACER (Decembre 2023)

<sup>235</sup> <https://www.energie-portal.sk/Dokument/zdielanie-elektřiny-energeticke-datove-centrum-110741.aspx>

<sup>236</sup> <https://www.sepsas.sk/tlacove-spravy/energeticke-datove-centrum-zavadza-nove-cinnosti-a-akterov-na-elektřoenergeticke-trhu-agregacia-flexibility-zdielanie-elektřiny-a-akumulacia/>

Certification schemes have been implemented, as required by the EPBD and RED Directives, to ensure the development of skills in the sector.

When it comes to energy projects, compliance with labels and certification is required for both the project designer and the facility. For example, photovoltaic and heat pump installation needs to be carried out by a company or craftsman who must hold a valid professional license.

For photovoltaics, a post-installation inspection report is required to verify the functionality and accuracy of the installation. However, the technician in charge may be directly from the same company that carried out the installation, which can lead to a conflict of interest, and the rigor of the inspection may be affected by the work of the company employees or external/out-sourced suppliers.

Similarly, subsidy recipients should only hire certified companies to install heat pumps and photovoltaic systems. But here again, this does not ensure proper quality control. In most cases, installations are not checked once they have been approved.



## SPAIN



### ENERGY EFFICIENCY

*Are there any tax rebates for energy efficiency?*

Households are allowed to deduct the expenses incurred in renovating their home to improve its energy performance in their income tax. These deductions can reach 60% if the building achieves class A or B<sup>237</sup>.

*Are there any other government grants or subsidies for energy efficiency?*

The IDAE (Instituto para la Diversificación y Ahorro de la Energía - Institute for Energy Diversification and Savings) provides different types of support for people planning to renovate their homes. This support includes repairs and installation of energy efficient equipment in main residences, which is eligible for reduced VAT rate<sup>238</sup>. Moreover, upgrades to lighting systems, installation of thermal solar array and measures to improve the energy efficiency of buildings more generally can be financed with interest-free debt thanks to the PAREER II program<sup>239</sup>.

Furthermore, the ICO - Official Credit Institute has set up a guaranteed line to cover the risk of debt granted to households as part of the refurbishment/retrofitting of residential buildings. Several regional subsidy programs are also available. The grants can reach up to 8000 EUR per building for energy efficiency and sustainability improvements<sup>240</sup>.

Apart from subsidies, the installation of PV systems in residential buildings allows households to benefit from tax reductions. This advantage is not limited to PV systems but extends to several measures that improve the building's energy performance. The reduction also applies to the property tax, with rates varying from one municipality to another.



### DISTRIBUTED GENERATION

*Is there a feed-in tariff, and if yes, how does it work?*

Spanish prosumers are eligible for net metering scheme concerning the surplus of energy produced onsite and injected to the grid. However, depending on the PV system

<sup>237</sup> <https://www.transportes.gob.es/ministerio/proyectos-singulares/prtr/vivienda-y-agenda-urbana/avales-y-deducciones-fiscales-para-impulsar-la-rehabilitacion>

<sup>238</sup> <https://sede.agenciatributaria.gob.es/Sede/iva/iva-operaciones-inmobiliarias/que-tipo-se-aplica-obras-viviendas/obras-renovacion-reparacion.html>

<sup>239</sup> <https://sede.idae.gob.es/lang/modulo/?refbol=tramites-servicios&refsec=pareer-ii>

<sup>240</sup> <https://www.transportes.gob.es/ministerio/proyectos-singulares/prtr/vivienda-y-agenda-urbana/programa-de-ayuda-las-actuaciones-de-mejora-de-la-eficiencia-energetica-en-viviendas>



size/production it is necessary to take some points into consideration before proceeding into this scheme:

- The net billing is limited to the generation facilities with capacity up to 100kW. Beyond this limit, the energy needs to be sold to the grid but following different procedures with <sup>241</sup>. In general, this electricity is sold via a representative in the electricity market and supports the day ahead market at spot price<sup>242</sup>.
- The mechanisms and limits apply to collective self-consumption.

*Is there the ability to feed back into the grid without penalty?*

There are no penalties for prosumers who inject electricity into the grid. The administrative formalities and taxes paid will be the same as long as the capacity is limited to 100 kWh<sup>243</sup>.

*Is there the ability to sell/trade electricity to neighbours?*

Self-consumption is ruled by the Royal Decree 244/2019. The Decree allows energy sharing in the framework of collective self-consumption and energy communities. Energy trade is only possible on the electricity market by energy providers and aggregators.

*Are there any active barriers (taxes, penalties) that deter users from injecting surplus into the grid?*

After the abolition of the sun tax, which sanctioned prosumers who use the public grid, was considered a major step in removing barriers to solar adoption for small prosumers. The latter pay taxes, levies, surcharges like those supported by non-active customers<sup>244</sup>. However, if the generation facility has a capacity larger than 15 kW prosumers should ask for a connection point to benefit of net metering leading to extra costs.

*Are there any administrative hurdles or delays regarding permitting of solar PV installations?*

Installations with a capacity more than 10 kW qualify as a technical project, which needs to be submitted for approval to the municipality. For smaller plants, a technical report is sufficient. In addition, administrative, construction and environmental permits are only required for facilities with a capacity above 100 kW.

Once the facility is ready for commissioning, an installation and completion certificate must be submitted to the municipality. The plant will then be audited by a certified technician which is appointed by the authorized body<sup>245</sup>.

<sup>241</sup> <https://www.idae.es/en/technologies/renewable-energies/self-consumption-office/what-is-self-consumption>

<sup>242</sup> Smarten (2020)

<sup>243</sup> Daniel Dasí-Crespo, Carlos Roldán-Blay, Guillermo Escrivá-Escrivá, Carlos Roldán-Porta (2023) "Evaluation of the Spanish regulation on self-consumption photovoltaic" installations. A case study based on a rural municipality in Spain".

<sup>244</sup> ACER (Decembre 2023)

<sup>245</sup> <https://cuervaenergia.com/es/comunidad/construccion-e-instalacion/permisos-para-instalar-placas-solares/>



## DEMAND RESPONSE

*What are the available programmes and markets for Demand Response?*

The residential sector participates in flexibility through implicit programmes.

Aggregators are recognized by law thanks to the royal decree la 23/2020, which allowed prosumers to participate in balancing services in the electricity market.

*Do DSOs use and pay for demand side flexibility?*

Spain has not fully integrated DSOs into the procurement of flexibility services<sup>246</sup>. Moreover, there is no legal framework allowing DSOs to provide congestion management using residential flexibility<sup>247</sup>.

*Is dynamic pricing available?*

Dynamic prices contracts were introduced to customers thanks to the Royal Decree 216/2014. This scheme is known as PVPC (Precio Voluntario para el Pequeño Consumidor - Voluntary Price for Small consumer). Customers with a contracted power above 10kW are not eligible to this scheme. The charges of the PVPC scheme are calculated according to the energy prices per hour.

*Is there a clear TOU tariff or other mechanism?*

TOU tariffs are available for customers with contracted power under 15kW. The network tariffs do not necessarily consider time of use<sup>248</sup>.

*Does the existing smart meter infrastructure meet BungEES requirements?*

Spain has successfully implemented smart meters across the entire the residential sector in 2019. These smart meters allow data sharing with different platforms such as the central hub Datadis<sup>249</sup>.



## BATTERY STORAGE

*How can electricity storage be utilized (consumption, feed-in, flexibility...)?*

The Royal Decree 477/2021 was introduced to encourage the use of renewable energies and to promote storage systems in new buildings or major renovating. Grants are offered

<sup>246</sup> Smarten (2022)

<sup>247</sup> ACER (Decembre 2023)

<sup>248</sup> Kun Wang, Xinyi Lai, Fushuan Wen, Praveen Prakash Singh and Sambeet Mishra (2022)

<sup>249</sup> Smarten (2022)

to households to cover up to 65% of the costs incurred, with a maximum of €1,400<sup>250</sup>. Additionally, the injection charge has been eliminated for batteries thanks to Circular 3/2020.

Regarding storage system use, existing regulations on the electricity market allow participation in ancillary services but supporting regulations are lacking because batteries were not mentioned either for consumption or generation. For the secondary reserve auction market, participation would be limited due to low capacity and the adjustment measures that must be taken on the spot.

Moreover, grid operators might require a permit if the storage system is connected directly to the grid which complicates the process of implementation<sup>251</sup>.

*Is bidirectional charging and/or B2G enabled?*

In Spain the B2G concept is not developed at this moment. The B2G largest market barriers in Spain are the lack of knowledge, consumer awareness and regulation, as well as the initial cost and lack of government support (e.g., subsidies, loans, etc.). This matter is at the moment only a concept because Spain has still not developed this possibility.



## ELECTRIC VEHICLES

*Are there any public incentives for the purchase of Electric Vehicles?*

Private individuals can benefit from financial assistance of €2,500 and €7,000 for the purchase of a BEV, PHEV or FCEV from 2021 to 2023<sup>252</sup>.

*Is bidirectional charging and/or V2G enabled?*

To date, there is no policy or framework that encompasses the use and deployment of V2G. V2G is not even considered in resource adequacy assessments. Concerning storage systems, the circular 3/2020 abolished transmission and distribution network fees for energy storage batteries. Thus, consumers avoid paying two times network charges when withdrawing electricity from the grid and then feeding it back again. Regarding electricity prices, the implemented policies to limit the volatility of gas prices and the new method of calculating practical prices for small consumers PVPC in 2024<sup>253</sup>, leave little incentive for consumers to use arbitrage solutions. V2G can participate in the wholesale energy and balancing markets starting from 1MW bid size. For flexibility services, DSOs do not provide market-based procurement<sup>254</sup>.

*Is there a nationally backed charging infrastructure?*

<sup>250</sup> [For Renewable Energies in self-consumption, storage, and thermal in the residential sector \(RD 477/2021. PRTR\) | Idae](#)

<sup>251</sup> Yu Hu, David Soler Soneera, María Jesús Sánchez (2021) "Barriers to grid-connected battery systems: Evidence from the Spanish electricity market"

<sup>253</sup> PVPC stands for Voluntary Price for the Small Consumer under 10kW: [Voluntary price for the small consumer \(PVPC\) | Red Eléctrica \(ree.es\)](#)

<sup>254</sup> Smarten (2023)

Spain has set target of reaching 300,000 charging point by 2030. The country has reached 30,372 private and public charging points in the end of 2023, of which 5016 are fast DC chargers<sup>255</sup>. In addition, the private installation at homes is supported by a grant covering 70% of the cost of implementing home chargers.

*Is this infrastructure complete and is there easy access to (fast-) charging stations for long trips?*

Charging stations are mostly used for short trips. Private charging points in companies or at home are also the most widely used in Spain, with a ratio of 0.9 vehicles per charging point. In contrast, the ratio for public charging points is 13.4, compared with 15.9 worldwide. Among the problems often encountered in this field is the long period needed to obtain authorisation to connect to the network, which can extend to 2 years. As a result, almost 20% of the public charging points installed are still not operational<sup>256</sup>.



## ENERGY COMMUNITIES

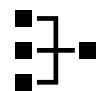
*Energy Community Regulation enabling the rollout of Community Energy Facilities?*

The royal Decree law 23/2020 takes up the definition of energy communities proposed by RED II and introduces them as new players in the electricity market. This framework is still under development since it does not deal with Citizen Energy Communities and Local Energy Communities<sup>257</sup>.

Furthermore, the legislation does not provide practical guidelines on the type of entities that can or should be used to structure and run an energy community.

*Are there any connectivity issues for Community Energy Facilities?*

No data available



## ONE-STOP-SHOPS

*Is there government (e.g., through guarantees) or private sector (e.g., banks) support for OSS'?*

The Instituto para la Diversificación y Ahorro de la Energía (IDAE) is the Spanish organization that promotes energy efficiency and the use of renewable energies. IDAE provides information and recommendations to improve the sustainability of buildings for households and professionals. It is a hub for relevant studies, statistics, and financial support for energy efficiency.

<sup>255</sup> <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/spain/infrastructure>

<sup>256</sup> <https://www.rolandberger.com/en/Insights/Publications/EV-Charging-Index-Expert-insight-from-Spain.html>

<sup>257</sup> <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/spain-rec-cec-definitions>

Moreover, One-stop-shops and renovation offices have been identified as key elements for achieving the objectives of the long-term strategy for energy renovation of buildings announced for 2020. These initiatives are included in regional programs and budgets.

As example of regional initiatives: Basque Energy Entity (EVE) and Fondo Geeve in Extremadura and the OIR Network (Oficinas de Información para la Rehabilitación - Renovation Information Offices) in Valencia.

*Is it up to technology providers to maintain OSS? Are their national associations that could run and maintain them?*

IDEA and the regional one stop shops services are run and provided by public bodies.

*How are grid connection fees set up, and is there a potential split between grid operator and prosumer?*

Residential customers with a contracted power typically up to 15 kW and SMEs pay “Tarifa 2.0 TD. This tariff has two periods (peak and off-peak), allowing consumers to benefit from lower rates during off-peak hours and encourage deferred consumption.

*How is the EU legislation on data access allowing interoperability between different service providers implemented?*

The SIPS central data platform ensures the exchange of consumption and supply data. This data repository is open to energy suppliers. Access by aggregators and service companies, on the other hand, is subject to the end customer's agreement, in line with the current legal framework, and is provided via the DSO website and not via the SIPS platform<sup>258</sup>.

*How is the quality control on installers (e.g., specific energy audits required)?*

IDEA provide technical guidance for some energy efficiency measures.

RITE (Reglamento de Instalaciones Térmicas en los Edificios - Regulation on Thermal Installations in Buildings) is a legislative framework defining the installation, maintenance and inspection criteria for heating, ventilation, and air-conditioning systems in buildings to be followed by technicians and professionals.

At regional level, various certificates exist to prove that the professional is acting in accordance with best practices and standards. The Consta certificate is just one example of the certificates used in Catalonia for construction activities.

<sup>258</sup> ACER (Decembre 2023)

### 3. Evaluation and Key recommendations

		BEL	CZE	FRA	GER	ITA	POR	SLO	SPA
<b>Energy Efficiency</b>	Tax rebates	Yellow	Red	Yellow	Green	Green	Green	Red	Green
	Other subsidies	Green	Green	Green	Green	Green	Green	Green	Green
<b>Distributed Renewables</b>	FIT	Green	Yellow	Yellow	Green	Green	Green	Red	Green
	Penalty	Green	Yellow	Green	Green	Green	Green	White	Green
	Trade with neighbours	Yellow	Yellow	Red	Red	Green	Green	Red	Green
	Active barriers	Green	Green	Green	Green	Green	Green	Yellow	Yellow
	Permitting	Green	Green	Yellow	Green	Yellow	Green	Yellow	Yellow
<b>Demand Response</b>	Available programmes	Yellow	Red	Green	Yellow	Yellow	Yellow	Red	Green
	DSO	Red	Red	Green	Yellow	Red	Red	White	Red
	Dynamic pricing	Green	Green	Yellow	Red	Red	Yellow	Green	Green
	ToU	Green	Red	Green	Red	Green	Red	Yellow	Green
<b>Home Battery Systems</b>	Utilization	Red	Red	Red	Green	Yellow	Red	Red	Yellow
	B2G	Red	White	Red	Green	White	Yellow	Red	Yellow
<b>Electric Vehicles</b>	Public incentives	Yellow	Red	Green	Green	Red	Red	Red	Yellow
	V2G	Green	Yellow	Green	Green	Red	Red	Red	Yellow
	Charging infrastructure	Green	Yellow	Green	Green	Green	Yellow	Green	Green
<b>Energy Communities</b>	Fast charging	Green	Yellow	Green	Green	Green	Yellow	Green	Yellow
	Regulation	Green	Yellow	Green	Yellow	Green	Green	Yellow	Yellow
<b>One-Stop-Shops</b>	Connectivity	Green	Yellow	White	Red	Red	Yellow	Red	White
	Government support	Green	Yellow	Green	Yellow	Green	Yellow	Red	Green
	Technology provider	Green	Green	Green	Red	Yellow	Yellow	Red	Green
	Grid connection	Green	Red	Green	Yellow	Green	Green	Red	Green
	EU legislation implementation	Green	Red	Green	Yellow	Green	Green	Red	Green
Quality control	Green	Green	Green	Green	Green	Yellow	Green	Green	

Table 1: Overview of country-by-country readiness for the BungEES business model

Table 1 provides an overview of all research criteria for all 8 countries included in this study. This allows for a quick visual representation of the main bottlenecks and areas of improvement in order for the BungEES business model to be successfully implemented in these countries.

#### BungEES Business Model

BungEES offers a package of smart energy services. The project activities cover several aspects of buildings energy efficiency: The first step is to carry out detailed energy audits to identify areas for improving energy efficiency. After the audit, BungEES installs modern, energy-efficient equipment and technologies, such as energy-efficient lighting systems, solar panels, heat pumps, efficient heating and cooling equipment and building insulation. In addition, the package includes the installation of intelligent thermostats and control systems, for precise and efficient management of heating and cooling systems. The implementation of energy management systems and the installation of battery storage systems are also intended to optimise energy (self-)consumption and to store energy for use during peak demand periods.

Beyond these main services, BungEES is exploring the possibility of offering flexible tariff options, training programmes, financial support services and energy contract management.

This chapter will discuss the key findings for each service type separately, outline frontrunners and laggards in the respective areas, and includes key recommendations to enable more open, stable,

reliable, and attractive market, as well as regulatory conditions for integrated package of smart energy services.

### Energy Efficiency

Several countries provide tax rebates for energy efficiency improvements in the residential sector, and in all the countries included in this study, some form of public incentive for energy efficiency is provided. Public capital can be efficiently deployed to crowd-in private finance, due to enhanced risk mitigation and therefore lower the risk profile for the banks' credit committees.

#### **Key recommendation – Fungible Tax Credits**

*In article 30 of the recast Energy Efficiency Directive, and article 15 of the recast of Energy Performance of Building Directive, fiscal incentives and on-tax financing were listed as the financial tools that would boost investment in energy efficiency and for which Member States are encouraged to provide enabling measures. However, the EU has not a mandate oblige member state to implement any tool affecting the national fiscal policies.*

*The required size of these tax credits will depend on the financial capabilities of the population and the availability of other forms of public support or private financing. Tax credits should be introduced incrementally in order to avoid market shocks and disruptions. They should also be provided over a period of at least 10 years for market participants to fully and sustainably embrace the new mechanism. The tax credits must be robust, with the necessary measures in place to counter abuse and corruption (as seen in the case of the Italian 110% Superbonus scheme). A staggered approach of applying credits on a priority basis to the worst buildings, with additional credits for deep renovation projects, would set the right framework for public health, social cohesion, and environmental benefits. Lastly, tax credits will need to be simple to access and should be promoted through the One-Stop-Shops model.*

### Distributed Renewable Generation

Distributed renewable energy generation has by now been firmly established as a core component of the energy mix in most European countries. While throughout the last two decades various forms of public incentives have been tried, revoked, altered, and improved, a general trend towards market-based incentives can be observed in recent years. Utilising distributed generation on a microscale still brings a few key challenges, including penalties for the feed in of excess generation or the ability to trade excess energy with neighbours. However, the most active barriers have been removed in the 8 MS covered, and further improvements can be expected in the coming years. As a critical component for the more rapid uptake of solar PV in the residential sector, a faster and easier framework for permitting of PV panel installation is required in several Member States.

#### **Key recommendation – Accelerate Permitting**

*To enable faster permitting of solar photovoltaic (PV) systems in the residential sector in Europe, it is crucial to simplify the application process by adopting standardized procedures and documentation. Setting clear and uniform guidelines for installation standards and safety regulations can ensure consistency and transparency. Encouraging local authorities to adopt fast-track permitting for small-scale residential solar projects can also facilitate quicker approvals. Finally, many historical buildings are subject to strict regulations that can limit or complicate the installation of solar panels. To address this, policymakers could develop tailored guidelines that allow for the integration of solar PV while respecting the aesthetic and structural integrity of protected sites. Innovations in solar technology, such as building-integrated photovoltaics (BIPV), which blend seamlessly with traditional building materials, can offer viable solutions. Additionally, fostering collaboration between heritage conservation bodies and renewable energy experts can help to create adaptive strategies that*

*safeguard heritage values while facilitating sustainable energy solutions. Pilot projects demonstrating successful installations on historic buildings can also serve as models, showing that renewable energy and heritage preservation can coexist harmoniously.*

## Demand Response

France and Spain stand out as front runners in enabling both explicit and implicit demand response programmes and allowing customers also with small flexible capacity to participate in those. On the other end, the Czech Republic, and to a certain degree also Portugal and Germany still need to considerably improve the regulatory frameworks to level the playing field for all market participants when it comes to demand side flexibility. The inclusion of DSOs in the setup and provision of demand response services seems to be a particular challenge in most Member States covered. The absence of a meaningful smart meter infrastructure with the required capabilities in countries like Belgium, Czech Republic, Germany, or Slovakia represents an additional hurdle, as a separate metering infrastructure would need to be installed, leading to further costs and interoperability challenges. This is especially the case in countries where private-sector “behind-the-meter” metering is prohibited, and the DSOs and TSOs require a national smart meter standard. In other cases, such as in France, the installation and operation of a separate meter infrastructure is technically feasible and cost effective.

### **Key recommendation – Smart Meter Infrastructure**

*The deployment of smart meter infrastructure across Europe is a pivotal step toward achieving demand side flexibility and enhancing the efficiency of the electricity grid. Smart meters provide real-time data on energy consumption/production, enabling consumers to monitor and adjust their energy use patterns in response to price signals or grid demands. This granular data facilitates dynamic pricing models, where electricity costs vary based on supply and demand, incentivizing consumers to reduce or shift their consumption during peak periods. Furthermore, smart meters empower utilities to better manage and predict load on the grid, integrating more renewable energy sources by balancing supply and demand more effectively. They also support the development of innovative demand response programmes, where consumers can receive financial incentives for reducing usage during high demand periods (peak hours). By enabling higher consumer participation and engagement, as well as optimizing grid operations smart meter infrastructure, is essential for advancing Europe's energy transition and improving overall system resilience.*

*Added to this technical precondition, DR operators should have non-discriminatory access to all electricity markets, including balancing, capacity, and ancillary services markets. Their participation would be further be strengthened by providing enabling rules to smaller DR resources and creating incentives schemes to participation of new technologies like smart appliances and batteries.*

*In short, encouraging all smart meter deployment initiatives is essential for advancing Europe's energy transition and improving overall system resilience, as it allows for greater consumer participation and optimized grid operations.*

## Home Battery Systems

Of the 5 technologies included in this study, home battery systems, and their successful inclusion into an integrated energy service packages such as BungEES proposes, seems to be the most difficult issue. In the majority of countries, electricity stored in home batteries cannot be utilized for the full range of technical and commercial applications that the BungEES model would foresee. Only Germany appears to have the necessary rules and regulations in place to allow full utilization, including Building-to-Grid (B2G) operation with home battery systems in the residential sector.



**Key recommendation – Enabling B2G**

*A regulatory framework as Germany has put in place with section 21 of the Energy Financing Act ensures economically viable forms of participation of home battery systems in energy and flexibility markets. The B2G framework facilitates the creation of virtual power plants (VPPs), where multiple small-scale batteries are aggregated and managed collectively to function like a single, large power plant. This integration not only optimizes the use of renewable energy but also provides flexibility services such as frequency regulation and voltage support, which are critical for maintaining grid reliability and quality of service. Additionally, it offers economic benefits to participants through incentives and potential revenue streams from selling surplus energy or grid services. Coupled with public incentives for the purchase of home battery systems, these are the key enablers of the further uptake of this technology in the residential sector.*

### Electric Vehicles

Among the 8 countries covered, Germany stands out as being particularly welcoming to electric vehicles and their integration into flexibility services. It is the only country which already has clear rules of engagement for V2G – a major obstacle in most other countries. Given the significant additional capacity of EV batteries, a failure to accommodate meaningful monetization and business models around EVs will very likely hinder the deployment of integrated package of smart energy services on a residential level. On a positive note, charging infrastructure and fast charging are generally already well established or improving in all the countries covered.

**Key recommendation – Enabling VG2**

*Similar to B2G, Germany's rules of engagement regarding V2G can serve a best practice for other countries to follow. They are poised to significantly advance smart energy services by allowing EVs to interact dynamically with the power grid. Under this regulation, EVs can not only draw power from the grid to charge their batteries but also feed stored energy back into the grid during times of high demand (peak hours) or when renewable energy supply is low. This bidirectional flow of electricity transforms EVs into mobile energy storage units, enhancing grid flexibility and stability. EV owners can participate in demand response programmes, receiving financial incentives for providing grid support during peak periods. Furthermore, V2G regulation supports the development of smart grids, where real-time data from EVs can be used to optimize energy distribution and consumption patterns. This integration not only benefits the grid but also provides additional value to EV owners, potentially reducing the total cost of ownership through grid service revenues. Further attention needs to be given to standardization to address interoperability issues arising from the multitude of EV manufacturers and proprietary charging systems.*

### Energy Communities

The conditions for energy communities differ greatly across the countries included in this research. Belgium and France stand out for their progressive regulations around energy communities, including clear definitions and rules of engagement. Connectivity issues, as well as energy sharing on a local network level seem to be a major obstacle in several countries, and thus a critical barrier.

**Key recommendation – Energy Community Regulation**

*As a fundamental first step, all EU Member States should introduce a more clear and transparent regulation for Energy Communities into place. Clear regulation is fundamental to fostering energy communities by providing a structured and supportive framework that encourages collective action in energy production, consumption, and management. Well-defined regulations can address key aspects such as the establishment, operation, and governance of energy communities, ensuring they are legally recognized and have clear rights and responsibilities. This legal clarity reduces uncertainties and*

barriers to entry, making it easier for individuals and local entities to participate in and form energy communities.

Regulations can also standardize procedures for connecting distributed energy resources, like solar panels and Combined Heat & Power (CHP), to the grid, and for sharing energy within the community. By setting transparent rules for grid access, tariffs, and compensation mechanisms for surplus energy fed back into the grid, regulations ensure fair treatment and economic viability for community members. Additionally, clear guidelines on financing, subsidies, and incentives can attract investment and lower the financial risks associated with starting and running energy communities.

Moreover, supportive regulations can facilitate access to technical expertise and resources, enabling communities to adopt best practices in energy management and efficiency. They can also promote innovation by allowing pilot projects and providing a framework for scaling successful models. In essence, clear and consistent regulation empowers energy communities to thrive by creating a stable and predictable environment that encourages collaboration, sustainability, and local energy resilience.

### One-Stop-Shops (OSS)

Countries like Belgium, France and Spain already provide significant government support for one-stop-shops in the energy sector and have set in place a clear set of rules and standards for the deployment of OSS services. Other countries still fall behind, specifically on grid connectivity issues and the implementation of EU legislation regarding the interoperability of service providers in the sustainable energy sector.

#### **Key recommendation – Government Support in the setup of OSS**

*One-stop-shops can significantly support the deployment of sustainable energy by providing a centralized, streamlined resource for all aspects of planning, financing, and implementing renewable energy projects. These integrated service centres offer a comprehensive range of support services, including technical advice, regulatory guidance, financial consulting, and administrative assistance, which simplify the often complex and fragmented process of adopting sustainable energy solutions.*

Governments can better support one-stop shops for sustainable energy by implementing several key measures that provide financial, regulatory, and logistical backing to enhance their effectiveness and reach:

- **Funding and Financial Incentives:** grants, subsidies, and low-interest loans to establish and maintain one-stop shops operation.
- **Regulatory Support:** Simplifying and harmonizing regulations related to sustainable energy can help one-stop shops operate more efficiently.
- **Public Awareness and Education:** awareness campaigns about the availability and benefits of one-stop shops.
- **Technical Assistance and Training:** Providing technical resources and training on the latest technologies, best practices, and regulatory changes in the energy sector.
- **Collaboration and Networking:** Facilitating partnerships between one-stop shops and other stakeholders, such as financial institutions, technology providers, and educational institutions.
- **Performance Monitoring and Evaluation:** Establishing frameworks for monitoring and evaluating the performance of one-stop shops including guidelines for metrics and reporting.
- **Policy Integration:** Embedding the concept of one-stop shops into broader energy and climate policies can ensure they are a recognized and integral part of the national strategy for sustainable energy deployment.

## 4. Conclusions

This study has focused on a number of important regulatory and non-technical criteria to advance smart energy efficiency services in the residential sector. In our efforts to structure these services and see how they will be deployed, a close look was given at their current situation and the challenges they face, especially as the individual markets in the EU are at different levels of maturity, structure, and regulation. With this approach, this study reflects one of the goals of the project, which is to assess the barriers and enablers impacting uptake of smart energy efficiency services in Belgium, Czech Republic, France, Germany, Portugal, Slovakia, and Spain.

This study should be considered together with the Deliverables D2.1 - Draft Smart Energy Efficiency Concept Design, and D2.2 - Smart EES Service Model Prototype, which further elaborate the BungEES business model and thus serve as a backdrop to this Deliverable. Both D2.1 and D2.2 were delivered by BungEES partner SEVEN at the same time with this study.

As discussed in the Introduction chapter, further work in WP5 will include consumer aspects and contractual arrangements to be studied more specifically, with forthcoming Deliverables D5.2 and D5.3 building upon and complementing this current study.

## 5. Bibliography

- Avis d'experts, Flexibilité du système électrique. Ademe, 2024. Available at: <https://bibliothèque.ademe.fr/ged/8635/Avis-d-expert-Flexibilite-electrique-vf.pdf>
- Act No. 458/2000 Coll. Act on the Conditions of Business and the Exercise of State Administration in the Energy Sectors and on Amendments to Certain Acts (Energy Act). Available at: [458/2000 Coll. Energy Act \(zakonyprolidi.cz\)](https://www.zakonyprolidi.cz/cs/2000-458)
- Belgian electricity market- Final implementation plan. Economies FPS, 2020. Available at: [Template A4 \(fgov.be\)](https://www.fgov.be/et/themes/energie/2020-12-23-template-a4)
- Belgium Consumer Flexibility Potential Final Report for Elia. Delta-EE, 2022. Available at: [Belgium+Consumer+Flexibility+Potential+Final+Report+for+Elia.+Delta-EE%2c+2022&u=a1aHR0cHM6Ly93d3cuZWxpYS5iZS8tL21lZGlhL3Byb2pIY3QvZWxpYS9lbGhlLXNpdGUvcHVibGljLWVbnN1bHRhdGlbnMvMjAyMi8yMDIyMTAyOF9kZWx0YS1lZV9yZXBvcnQtcnRjX2JlX2ZsZXgtcHVibGlzaGVkLnBkZg&ntb=1](https://www.elia.be/sites/default/files/2022-12/2022-12-22-belgium-consumer-flexibility-potential-final-report-for-elia-delta-ee-2022.pdf)
- Czech Republic 2021 Energy Policy Review. IEA, 2021. Available at: [bing.com/ck/a?!&&p=309bd8eb69aba05cJmItdHM9MTcxNTY0NDgwMCZpZ3VpZD0yNmMzNzA3Mi05NGYwLTZmNDItMTU3OC02MDhkOTBmMDYxNGQmaW5zaWQ9NTE5OA&ptn=3&ver=2&hsh=3&fclid=26c37072-94f0-6f42-1578-608d90f0614d&psq=](https://www.iea.org/reports/czech-republic-2021-energy-policy-review)
- Demand response and other distributed energy resources: what barriers are holding them back? Market Monitoring Report. ACER, December 2023. Available at: [ACER MMR 2023: Barriers to demand response \(europa.eu\)](https://www.acer.europa.eu/MarketMonitoring/Documents/ACER_MMR_2023_Barriers_to_demand_response.pdf)
- Déploiement Des Bornes De Recharge En Route Pour 2030. Gouvernement Français, 2023. Available at : [dp bornes de recharge.pdf \(ecologie.gouv.fr\)](https://www.ecologie.gouv.fr/deploiement-des-bornes-de-recharge-en-route-pour-2030)
- DOCUMENT DE RÉFLEXION ET DE PROPOSITION : Le stockage d'électricité en France. Commission de régulation de l'énergie, 2019. Available at : [DocumentStockageElectricite.pdf \(cre.fr\)](https://www.cre.fr/Document/DocumentStockageElectricite.pdf)
- Dynamic network tariffs: Current practices, key issues, and challenges. Kun Wang, Xinyi Lai, Fushuan Wen, Praveen Prakash Singh, and Sambeet Mishra, 2022. Available at: <https://ietresearch.onlinelibrary.wiley.com/doi/epdf/10.1049/enc2.12079>
- Electricity Storage Strategy Fields of action and measures to ensure a persistent and dynamic expansion of electricity storage facilities and their optimal systems integration. Federal Ministry for Economic Affairs and Climate Action, 2023. Available at: [https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/electricity-storage-strategy.pdf?\\_\\_blob=publicationFile&v=4](https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/electricity-storage-strategy.pdf?__blob=publicationFile&v=4)
- Electrifying the energy sector: The case of Slovakia and the Czech Republic. Rafael Leal Arcas, Brian Burstein, and Maria Eugenia Mattera, 2021. Available at: [Microsoft Word - Electrifying Energy Final Edit.doc \(researchgate.net\)](https://www.researchgate.net/publication/358123100)
- Energy Prosumers in Europe: Citizen Participation in The Energy Transition. EEA, 2022. Available at: [Energy prosumers in Europe — Citizen participation in the energy transition — European Environment Agency \(europa.eu\)](https://www.eea.europa.eu/en/energy-prosumers-in-europe-citizen-participation-in-the-energy-transition)
- Engaging citizens and local communities in the solar revolution - Rooftop Solar PV Country Comparison Report. CAN Europe, May 2020. Available at:

- <https://caneurope.org/content/uploads/2022/05/Rooftop-Solar-PV-Comparison-Country-Profiles.pdf>
- Engaging citizens and local communities in the solar revolution: Rooftop Solar PV Country Comparison Report. CAN Europe, 2022. Available at: [report\\_V5.pdf \(caneurope.org\)](https://caneurope.org/report_V5.pdf)
  - European Barriers in Retail Energy Markets Project: Slovakia Country Handbook 2021. European Commission, 2021. Available at: [European barriers in retail energy markets - Publications Office of the EU \(europa.eu\)](https://publications.ec.europa.eu/publication-detail/-/publication/11111111-1111-1111-1111-111111111111)
  - European Market Outlook for Residential Battery Storage 2020-2024. SolarPower Europe, 2020. Available at: <https://www.scribd.com/document/579320766/EU-ResidentialBatteryStorage-Market-Outlook-Nov2020-SolarPowerEurope>
  - Evaluation of the Spanish regulation on self-consumption photovoltaic installations. A case study based on a rural municipality in Spain. Daniel DasiCrespo, Carlos RoldánBlay, Guillermo EscriváEscrivá, and Carlos Roldán, 2023. Available at: [Evaluation of the Spanish regulation on self-consumption photovoltaic installations. A case study based on a rural municipality in Spain - ScienceDirect](https://www.sciencedirect.com/science/article/pii/S0959652623000000)
  - Existing and Future PV Prosumer Concepts. Technische Universitaet Wien and Fundacion Tecnalia Research & Innovation, 2018. Available at: [pvp4grid.eu/wp-content/uploads/2018/12/D2.1 Existing-future-prosumer-concepts PVP4G-1.pdf](https://pvp4grid.eu/wp-content/uploads/2018/12/D2.1_Existing-future-prosumer-concepts_PVP4G-1.pdf)
  - Explicit Demand Response for small end-users and independent aggregators. JRC, 2022. Available at: [explicit demand response for small end-users and independent-KJNA31190ENN.pdf](https://ec.europa.eu/jrc/en/research-and-innovation/2022/02/2022-02-01-explicit-demand-response-for-small-end-users-and-independent-aggregators)
  - Flexibility Deployment in Europe. USEF, 2021. Available at: [Flexibility Deployment in Europe \(usef.energy\)](https://usef.energy/)
  - Haushaltsnahe Flexibilitäten nutzen. Agora Energiewende, 2023. Available at: [A-EW 315 Flex heben WEB.pdf \(agora-energiewende.de\)](https://www.agora-energiewende.de/en/publications/315-flex-heben)
  - Impact Of the Enforcement of a Time-Of-Use Tariff to Residential Customers in Italy. Simone Maggiore, Massimo Gallanti, Walter Grattieri, Michele Benini, 2013. Available at: [PDF Impact of the enforcement of a time-of-use tariff to residential customers in Italy \(researchgate.net\)](https://www.researchgate.net/publication/260111111)
  - Impact of the fixed and variable component of electricity price on the economic viability of a small-scale photovoltaic power plant. Frantisek Janıcek, Jan Ponican, Matej Sadlo, 2021. Available at: [PDF Impact of the fixed and variable component of electricity price on the economic viability of a small-scale photovoltaic power plant \(researchgate.net\)](https://www.researchgate.net/publication/350111111)
  - Les recommandations de la CRE pour accompagner le déploiement de la mobilité électrique. Commission de regulation de l'Énergies, 2023. Available at: [Rapport Recommandations CRE Deploiement Mobilite Electrique.pdf](https://www.cre.fr/rapport-recommandations-cre-deploiement-mobilite-electrique)
  - Pilotage de la recharge et Vehicle-to-Everything. Avere, 2023. Available at: [202311-Livre-Blanc-pilotage-de-la-recharge-et-V2X.pdf \(avere-france.org\)](https://www.avererapport.fr/202311-Livre-Blanc-pilotage-de-la-recharge-et-V2X.pdf)
  - Règles pour la valorisation des effacements de consommation sur les marchés de l'énergie NEBEF 3.5. RTE, 2023. Available at: [2023-09-01 REGLES NEBEF 6130 fr \(services-rte.com\)](https://www.rte.com/fr/2023-09-01-REGLES-NEBEF-6130-fr)

- Report on Electricity Transmission and Distribution Tariff Methodologies in Europe. ACER, January 2023. Available at: [https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER\\_electricity\\_network\\_tariff\\_report.pdf](https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_electricity_network_tariff_report.pdf)
- Smart Charging in Germany: Acceptance and Tariff Design. Marvin Helferich, Josephine Tröger, and Annegret Stephan, 2023. Available at: <https://publica-rest.fraunhofer.de/server/api/core/bitstreams/9a3d52dc-6feb-4c2e-a1c7-aad5331cd55f/content>
- The Emerging Trends of Renewable Energy Communities' Development in Italy. Anita Tatti, Sibilla Ferroni, Martina Ferrando, Mario Motta, and Francesco Causone, 2023. Available at: [Sustainability | Free Full-Text | The Emerging Trends of Renewable Energy Communities' Development in Italy \(mdpi.com\)](https://www.mdpi.com/2502-5207/13/1/1)
- The Implementation of The Electricity Market Design to Drive Demand Side Flexibility. Smarten, 2022. Available at: [smarten.eu/wp-content/uploads/2020/11/FINAL\\_smartEn-EMD-implementation-monitoring-report.pdf](https://www.smarten.eu/wp-content/uploads/2020/11/FINAL_smartEn-EMD-implementation-monitoring-report.pdf)
- The smartEn Map PROSUMERS 2020. Smarten, 2020. Available at: [The smartEn Map 2020 – PROSUMERS - smartEn](https://www.smarten.eu/wp-content/uploads/2020/11/FINAL_smartEn-PROSUMERS-Map-2020.pdf)
- Überblickspapier Solarpaket. Bundesministerium, 2023. Available at: [uberblickspapier-solarpaket.pdf \(kommunal.de\)](https://www.bmwi.de/SharedDocs/DEK/papier-uberblickspapier-solarpaket.pdf?__blob=publicationFile)
- V2X enablers and barriers Assessment of the regulatory framework of bidirectional EV charging in Europe. Smarten, 2023. Available at: [smarten.eu/wp-content/uploads/2023/12/V2X-Enablers-and-Barriers-Study-11-2023-DIGITAL.pdf](https://www.smarten.eu/wp-content/uploads/2023/12/V2X-Enablers-and-Barriers-Study-11-2023-DIGITAL.pdf)

Links:

- <https://www.mijnbenovatie.be/nl/wat-waarom/wat-is-benoveren/>
- [Primes et soutiens financiers | Renolution](https://www.primes.be/soutiens-financiers)
- <https://www.ores.be/particulier/pair-a-pair>
- [Faciliteurs Énergie - Site énergie du Service public de Wallonie](https://www.faciliteurs-energie.be)
- [Energy Communities Repository - Policy database - European Commission \(europa.eu\)](https://ec.europa.eu/energy-communities-repository/)
- [Green mobility – Charging Infrastructure and Electric Vehicles in Belgium | Fieldfisher](https://www.fieldfisher.com/en/energy-storage-regulation-in-belgium)
- [Energy storage regulation in Belgium | CMS Expert Guides](https://www.cms-expertguides.com/en/energy-storage-regulation-in-belgium)
- <https://www.comparateur-energie.be/blog/quoi-s-attendre-avec-le-compteur-intelligent/>
- <https://www.batteriedomestique.be/prime>
- <https://www.sibelga.be/fr/raccordements-compteurs/energie-renouvelable/partage-energie/comment-demarrer-le-partage-denergie>
- [https://vanpeteghem.belgium.be/nl/geen-btw-voor-particulieren-die-zonnestroom-doorverkopen](https://www.vanpeteghem.belgium.be/nl/geen-btw-voor-particulieren-die-zonnestroom-doorverkopen)
- [Tarif Prosumer 2024 : Montants et Explications \(otovo.be\)](https://www.otovo.be/tarif-prosumer-2024)
- <https://www.vlaanderen.be/prosumententariet-voor-eigenaars-van-zonnepanelen-windmolens-en-wkk-installaties-kleine-installaties-met-terugdraaiende-teller-berekening-van-het-prosumententariet>
- <https://www.sibelga.be/fr/raccordements-compteurs/tarifs/tarifs-utilisation-du-reseau/tarif-capacitaire>
- <https://www.vreg.be/nl/veelgestelde-vragen/een-dynamisch-elektriciteitscontract-interessant-voor-mij>

- <https://www.engie.be/fr/contact>
- [Comprendre le tarif d'injection pour les panneaux solaires à Bruxelles \(engie.be\)](https://www.engie.be/fr/contact)
- <https://www.ores.be/particulier/demarrer-partage-meme-batiment>
- <https://www.fluvius.be/nl/groene-energie/delen-en-verkopen-van-energie/persoon-aan-persoonverkoop>
- <https://www.vreg.be/nl/veelgestelde-vragen/een-dynamisch-elektriciteitscontract-interessant-voor-mij>
- <https://energie.wallonie.be/fr/deductions-fiscales-basse-energie-passive-ou-zero-energie.html?IDC=8123>
- <https://www.vlaanderen.be/vermindering-van-de-onroerende-voorheffing-voor-energiezuinige-gebouwen>
- <https://www.vlaanderen.be/belastingvermindering-voor-verhuurders-die-renoveren-en-hun-woningen-verhuren-aan-een-woonmaatschappij>
- <https://novazelenausporam.cz/tiskova-zprava/40>
- [One-stop-shop Litoměřice - Energy Cities \(energy-cities.eu\)](https://www.energy-cities.eu)
- [Co je pasivní dům? - Pasivnidomy.cz](https://www.pasivnidomy.cz)
- [Grid issues plague solar's comeback in Czechia – PV magazine International \(pv-magazine.com\)](https://www.pv-magazine.com)
- <https://novazelenausporam.cz/zakladni-informace/>
- <https://www.fotovoltssystem.cz/jak-vybrat/pripojitelnost-fotovoltaiiky-do-distribucni-site.html>
- <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/czech-republic>
- <https://www.nrb.cz/produkt/elektromobilita/>
- [Demand-side Flexibility: The Next Big Thing in CEE | Nano Energies: Let your business profit by helping the grid work efficiently](https://www.nanoenergies.com)
- <https://www.mpo.cz/cz/rozcestnik/pro-media/tiskove-zpravy/moderni-energetika-a-ochrana-spotrebitelu--mpo-poslalo-do-mezirezortniho-rizeni-dalsi-novelu-energetickeho-zakona--276910/>
- <https://www.roedl.com/renewable-energy-consulting/markets/countries/marketing-models-czech-republic>
- <https://www.roedl.com/renewable-energy-consulting/markets/countries/marketing-models-czech-republic>
- <https://novazelenausporam.cz/zakladni-informace/>
- <https://www.sfzp.cz/tiskove-centrum/tiskove-zpravy/detail-tiskove-zpravy/?id=266>
- <https://novazelenausporam.cz/nzu-light/>
- <https://www.sfzp.cz/tiskove-centrum/tiskove-zpravy/detail-tiskove-zpravy/?id=279>
- [https://next.codexis.cz/legislativa/CR29641\\_2014\\_08\\_08](https://next.codexis.cz/legislativa/CR29641_2014_08_08)
- <https://www.ecologie.gouv.fr/label-reconnu-garant-lenvironnement-rge>
- <https://mypower.engie.fr/conseils/energie-solaire/avantages-conseils-solaire/photovoltaique-pourquoi-contacter-une-entreprise-rge-qualipv.html#:~:text=Ainsi%2C%20pour%20b%C3%A9n%C3%A9ficier%20de%20la,la%20prime%20%C3%A0%20l'autoconsommation.>
- <https://france-renov.gouv.fr/preparer-projet/dpe-audit>
- <https://energie-partagee.org/quelle-est-la-difference-entre-autoconsommation-collective-et-communaute-energetique/>
- <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/france/infrastructure>
- <https://www.services-rte.com/fr/decouvrez-nos-offres-de-services/valoriser-vos-moyens-de-stockage-dans-le-systeme-electrique.htm>
- <https://www.quechoisir.org/actualite-electricite-les-options-heures-creuses-et-tempo-d->

- [edf-valent-elles-encore-le-coup-n116394/](https://www.edf-valent-elles-encore-le-coup-n116394/)
- [https://www.energie-info.fr/fiche\\_pratique/quest-ce-quune-offre-a-tarification-dynamique/](https://www.energie-info.fr/fiche_pratique/quest-ce-quune-offre-a-tarification-dynamique/)
- <https://www.ecologie.gouv.fr/bouclier-tarifaire-lelectricite-et-amortisseur-electricite#:~:text=Le%20bouclier%20tarifaire%20est%20calcul%C3%A9,%C3%A0%2015%25%20TTC%20en%20moyenne>
- <https://www.rte-france.com/actualites/appel-offres-effacement#:~:text=Annuellement%2C%20ORTE%20lance%20un%20appel,mai%20au%2031%20juillet%202023>
- <https://www.voltalis.com/economies-energie/quest-ce-que-leffacement-de-consommation-electrique-ou-gestion-active-de-la-consommation-2825>
- <https://www.lefigaro.fr/maison/installer-des-panneaux-solaires-que-dit-la-loi-20220916#quelle-autorisation-obtenir-pour-installer-un-panneau-solaire-sur-le-toit>
- <https://www.edfenr.com/guide-solaire/vendre-mon-electricite-solaire-avec-lobligation-dachat/>
- <https://www.service-public.fr/particuliers/vosdroits/F35083>
- <https://www.ecologie.gouv.fr/coup-pouce-renovation-performante-dune-maison-individuelle>
- <https://www.service-public.fr/particuliers/vosdroits/F19905>
- <https://www.service-public.fr/particuliers/vosdroits/F1616?lang=en>
- <https://www.service-public.fr/particuliers/vosdroits/F35584>
- [https://energy-communities-repository.ec.europa.eu/energy-communities-repository-legal-frameworks/energy-communities-repository-policy-database\\_en#germany](https://energy-communities-repository.ec.europa.eu/energy-communities-repository-legal-frameworks/energy-communities-repository-policy-database_en#germany)
- <https://www.energie-effizienz-experten.de/>
- <https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilie/Energieeffizient-Sanieren/Experte-f%C3%BCr-Energieeffizienz/>
- [https://www.kfw.de/inlandsfoerderung/Unternehmen/EnergieUmwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-\(270\)/](https://www.kfw.de/inlandsfoerderung/Unternehmen/EnergieUmwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-(270)/)
- [The Smart Meter Rollout in Germany and Europe - FfE](https://www.kfw.de/inlandsfoerderung/Unternehmen/EnergieUmwelt/F%C3%B6rderprodukte/Erneuerbare-Energien-Standard-(270)/The-Smart-Meter-Rollout-in-Germany-and-Europe-FfE)
- <https://metsolar.eu/blog/renewable-energy-trends-prosumers-expansion-europe-scenario/>
- <https://www.aceflex.de/magazin/pv-anlage-genehmigung-ist-sie-erforderlich/>
- <https://www.dgrv.de/news/bundesregierung-verbschiedet-kabinettsentwurf-zum-solarpaket-i/>
- <https://www.energie-experten.org/erneuerbare-energien/photovoltaik/direktvermarktung/mieterstrom#c18157>
- <https://www.bmwk.de/Redaktion/EN/FAQ/landlord-to-tenant-electricity/faq-mieterstrom.html>
- <https://www.bundesregierung.de/breg-de/aktuelles/eeg-umlage-faellt-weg-2011728>
- <https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Schlaglichter/Klimaschutz/steuerliche-foerderung-energetischer-gebaeudesanierungen.html>
- <https://solarstone.com/blog/solar-subsidies-in-germany#zero-vat-rate-for-solar-modules-and-installation>
- <https://www.bundesanzeiger.de/pub/publication/5CPbjtpeQTYbfTH7XvW?0>
- <https://www.gse.it/servizi-per-te/efficienza-energetica/conto-termico/modulistica>



- <https://www.fratellipellizzari.it/blog/110-bonus-ristrutturazione-PNPE2-enea.it>
- <https://www.rescoop.eu/policy/transposition-tracker/enabling-frameworks-support-schemes/italy>
- <https://www.finanza.com/finanza/bonus-fotovoltaico-2024-gli-incentivi-realmente-previsti-questanno>
- <https://navitasoft.com/en/news/new-dynamic-energy-pricing-flexible-electricity-tariffs>
- <https://www.otovo.it/blog/contatori-energia-smart-meter/#i-contatori-di-energia-che-usiamo-in-otovo>
- [Italy: New Legislation Liberalizes Domestic Electricity Market | Library of Congress \(loc.gov\)](https://www.congress.gov/libraries/congressional-library-of-education/energy/italy-new-legislation-liberalizes-domestic-electricity-market)
- [https://www.nwgitalia.it/blog/fotovoltaico-vincolo-paesaggistico-circular no. 46/E of 2007 of the Revenue Agency](https://www.nwgitalia.it/blog/fotovoltaico-vincolo-paesaggistico-circular-no-46/E-of-2007-of-the-Revenue-Agency)
- [Photovoltaic all-inclusive tariff: what is it? \(tagliabolletta.it\)](https://www.tagliabolletta.it/photovoltaic-all-inclusive-tariff-what-is-it/)
- <https://it.bluettipower.eu/blogs/news/vendere-energia-elettrica>
- <https://consenergy.it/impianti-fotovoltaici-il-ritiro-dedicato-2024-che-pone-fine-allo-scambio-sul-posto/>
- [Home bonus - ENEA - Department of Energy Efficiency Units](https://www.enea.it/it/energia/efficienza/contenitori/contenitori-energetici)
- <https://pnpe2.enea.it/conto-termico>
- <https://biblus.acca.it/bonus-fotovoltaico-tutte-le-possibili-agevolazioni/#decreto-mase>
- <https://www.deco.proteste.pt/casa-energia/aquecimento/noticias/reembolsos-programa-apoio-edificios-mais-sustentaveis-2023-ainda-estao-por-pagar#que-equipamentos-e-obras-podem-receber-apoio>
- <https://portalcasamais.pt/perguntas-frequentes/>
- <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/portugal-rec-cec-definitions>
- <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/spain/infrastructure>
- [PowerPoint Presentation \(mobie.pt\)](https://www.mobie.pt/powerpoint-presentation)
- [Solar Panel Mounting: Where Are They Installed? \(goldenergy.pt\)](https://www.goldenergy.pt/solar-panel-mounting-where-are-they-installed/)
- [https://solvasto.pt/self-consumption-solar-power/?lang=en](https://www.solvasto.pt/self-consumption-solar-power/?lang=en)
- <https://portalcasamais.pt/apoios-e-incentivos/>
- <https://www.fundoambiental.pt/apoios-prr/c13-eficiencia-energetica-em-edificios/05c13-i012023-paes-2023-1-aviso.aspx>
- <https://www.sgeconomia.gov.pt/noticias/programa-casa-eficiente-2020.aspx>
- <https://poupaenergia.pt/en/photovoltaic-for-self-consumption/>
- <https://poupaenergia.pt/en/photovoltaic-for-self-consumption/>
- [https://goldenergy.pt/blog/autoconsumo/venda-excedente-do-autoconsumo/](https://www.goldenergy.pt/blog/autoconsumo/venda-excedente-do-autoconsumo/)
- <https://www.gse.it/servizi-per-te/efficienza-energetica/conto-termico/modulistica>
- <https://www.fratellipellizzari.it/blog/110-bonus-ristrutturazione>
- <https://www.sepsas.sk/tlacove-spravy/energeticke-datove-centrum-zavadza-nove-cinnosti-a-akterov-na-elektroenergetickom-trhu-agregacia-flexibility-zdielanie-elektliny-a-akumulacia/>
- <https://www.energie-portal.sk/Dokument/zdielanie-elektliny-energeticke-datove-centrum-110741.aspx>
- [https://zelenadomacnostiam.sk/o-projekte/harmonogram/](https://www.zelenadomacnostiam.sk/o-projekte/harmonogram/)
- <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/slovakia>
- <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/slovakia/infrastructure>
- [The updated plan for the support of e-mobility in the Slovak Republic also provides for subsidies for electric vehicles \(teslamagazin.sk\)](https://www.teslamagazin.sk/the-updated-plan-for-the-support-of-e-mobility-in-the-slovak-republic-also-provides-for-subsidies-for-electric-vehicles)

- [Prezentácia programu PowerPoint \(energystoragenl.nl\)](#)
- [718 sprava dynamicke ceny elektriny 11 2023.pdf \(gov.sk\)](#)
- [Demand-side Flexibility: The Next Big Thing in CEE | Nano Energies: Let your business profit by helping the grid work efficiently](#)
- <https://www.asb.sk/zelena-obnova/je-vasa-strecha-vhodna-pre-solarne-panely-podmienkou-je-dostatočný-priestor-a-orientacia>
- <https://www.pv-magazine.com/2019/02/12/slovakian-utility-zse-launches-virtual-battery-for-residential-pv/>
- <https://www.siea.sk/zelena-domacnostiam/>
- <https://obnovdom.sk/opatrenia.php#B2>
- <https://www.siea.sk/bezplatne-poradenstvo/bezplatne-poradenstvo-pre-domacnosti/statny-fond-rozvoja-byvania-3/>
- <https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/spain/infrastructure>
- <https://www.rolandberger.com/en/Insights/Publications/EV-Charging-Index-Expert-insight-from-Spain.html>
- <https://www.rescoop.eu/policy/transposition-tracker/rec-cec-definitions/spain-rec-cec-definitions>
- [For Renewable Energies in self-consumption, storage, and thermal in the residential sector \(RD 477/2021. PRTR\) | Idae](#)
- [Voluntary price for the small consumer \(PVPC\) | Red Eléctrica \(ree.es\)](#)
- <https://cuervaenergia.com/es/comunidad/construccion-e-instalacion/permisos-para-instalar-placas-solares/>
- <https://www.idae.es/en/technologies/renewable-energies/self-consumption-office/what-is-self-consumption>
- <https://www.transportes.gob.es/ministerio/proyectos-singulares/prtr/vivienda-y-agenda-urbana/avales-y-deducciones-fiscales-para-impulsar-la-rehabilitacion>
- <https://sede.agenciatributaria.gob.es/Sede/iva/iva-operaciones-inmobiliarias/que-tipo-se-aplica-obras-viviendas/obras-renovacion-reparacion.html>
- <https://sede.idae.gob.es/lang/modulo/?refbol=tramites-servicios&refsec=pareer-ii>
- <https://www.transportes.gob.es/ministerio/proyectos-singulares/prtr/vivienda-y-agenda-urbana/programa-de-ayuda-las-actuaciones-de-mejora-de-la-eficiencia-energetica-en-viviendas>
- <https://www.effy.fr/magazine/impots-2024-puis-je-deduire-mes-travaux-de-renovation-energetique>
- <https://www.enedis.fr/co-building-dso-local-flexibility>
- <https://www.sousede.cz/magazin/clanek/prodej-pretoku-z-fve-do-site-ma-smysl/1395>

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