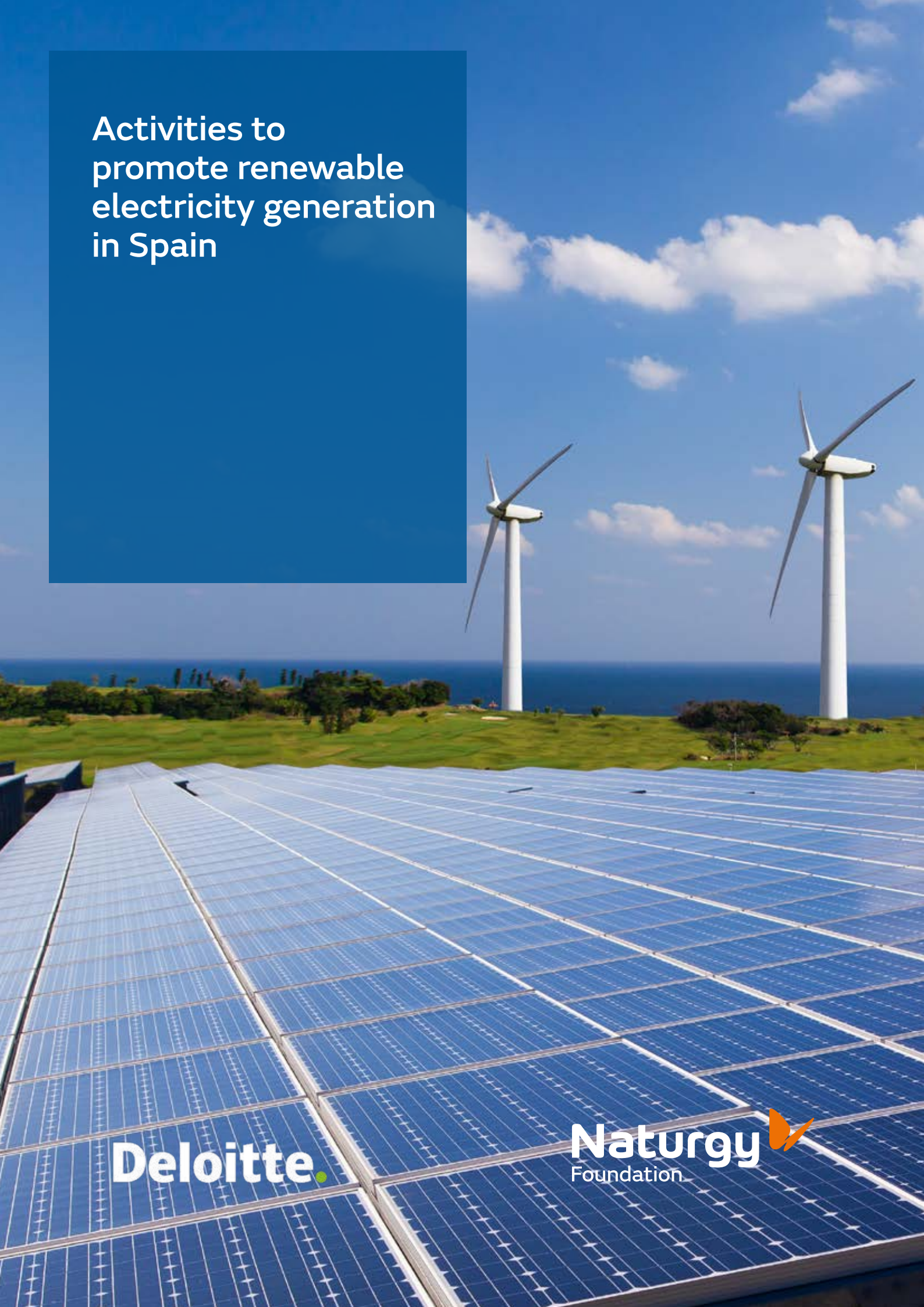
Activities to promote renewable electricity generation in Spain



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Executive summary

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Renewable energies are the key ingredient in the **double energy transition in Europe***

Europe is facing the challenge of a double energy transition: one related to decarbonisation objectives and, as a result of the war in Ukraine, another which must provide us with more accessible and secure energy. In both transitions, renewable energies will be key.

The European Green Deal is the roadmap for the first of these transitions and aims to make the European Union (EU) the first climate-neutral continent before 2050.

The European Climate Law has established the binding nature of this objective of climate neutrality, and has set an ambitious intermediate objective of reducing emissions by 55%, with respect to emissions in 1990, by the year 2030.

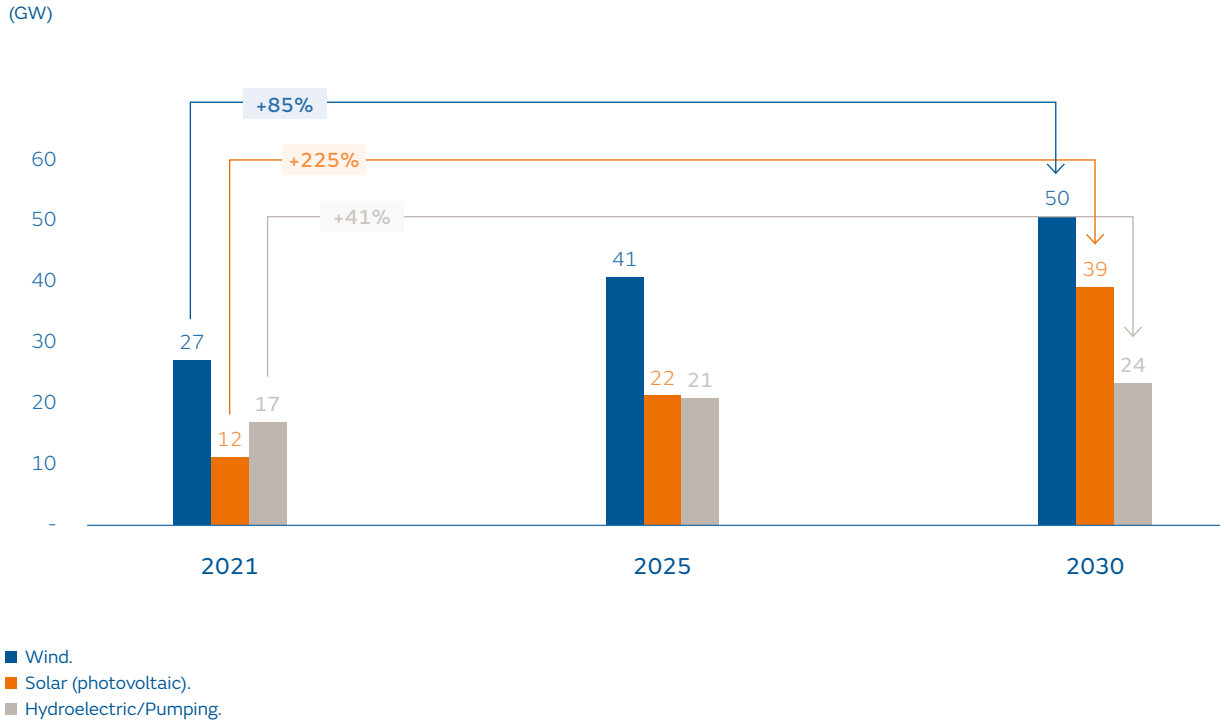
In this context, the Spanish Integrated National Energy and Climate Plan (INECP) foresees a significant growth in the market share of renewable energies in Spain, reaching at least 74% for electricity and at least 42% of end use energy by the year 2030. The INECP forecasts renewable electricity generation of 60% in 2025 and of 74% in 2030, which represents an increase of approximately 60 GW of renewable electricity generation capacity in the period 2021-2030. To put this figure into context, it will mean developing and putting into service over this decade production capacity approximately equivalent to one and a half times everything achieved in the field of renewable energy before. Reaching these levels of market share of renewable energy will require a significant investment effort which, depending on the final result of the "Fit for 55" package, may need to be increased even more.

A system with a very high share of renewable energy also requires backup facilities. The INECP therefore plans to maintain currently installed capacity of combined cycles until at least the year 2030, in order to ensure sufficient backup power while other thermal power plants are closed and the installed renewable electricity production is increased. Another important challenge will be to provide these plants with a suitable regulatory framework that allows for them to remain viable.

In parallel to this, the crisis in Ukraine has led to a substantial shift in Europe's position regarding its dependence on Russian fossil fuels. Currently, the European Union imports more than 40% of the natural gas it consumes from Russia. This is in addition to approximately 27% of all European oil imports and 46% of imported coal. Reducing this energy dependency, and doing so as soon as possible, has become a new objective of European energy policy.

* Although this report is prepared with the information available in March 2022, the events and modifications proposed subsequently they only ratify the main conclusions of the document.

Forecast for the deployment of renewables in Spain (2030)



Achieving this objective represents a complex challenge and, once again, as outlined by the European Commission in its Communication REpowerEU,[1] in this second energy transition renewable energies will be key. Renewable gases, energy efficiency, electrification and renewable electricity generation, together with diversification of origins, should make it possible to replace the approximately 155 bcm of gas imported from Russia.

Development of renewable energies requires completion of a set of stages

A renewable project requires the completion of a set of steps that can be grouped into three stages:

(i) promotion and development stage,

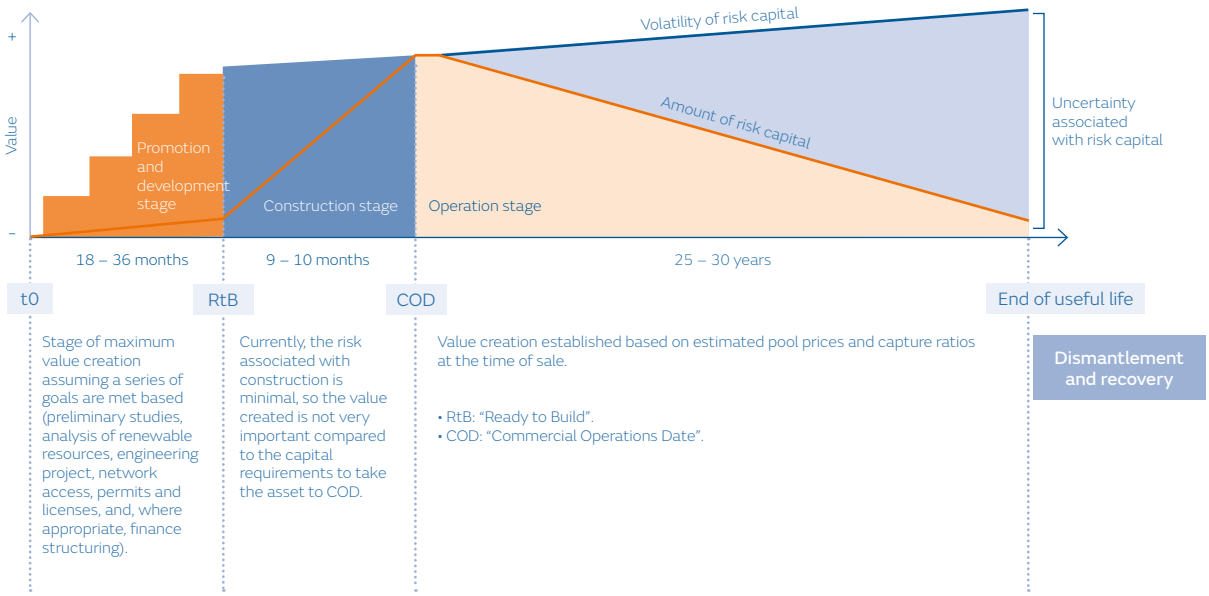
(ii) construction stage and

(iii) operation stage.

Projects in the first two stages are referred to as "greenfield" projects and those in the third as "brownfield" projects. After the operation phase, if there is no useful life extension, the installed equipment is dismantled and recovered.

[1] "REPowerEU: Joint European action for more affordable, secure and sustainable energy" (8th March 2022).

Stages of development of a project



Note: Valuation levels analysed for the Spanish market. Assumption of no tariff regulation.

The amount of capital that the stakeholders of a project have at risk varies from one stage of the project to the next. The certainty concerning the degree of success of the project also varies. In this way, some agents focus on completing certain stages, without intending to be involved in completing the entire project cycle. Therefore, there is a market for the sale of projects in the initial stages of development.

Poor design of the lifecycle of a project could lead to the emergence of speculative components that would increase the cost of project development.

The promotion and development stage usually includes different tasks closely linked to engineering studies and to procedures associated with official project procedures. Initially, it is necessary to obtain land usage and output transmission rights, then environmental authorisation for the project is required, and finally all the permits, licences and authorisations (PLAs) have to be obtained, together with all the rights necessary for the construction, operation and output transmission of electricity from the plant. At this point the project becomes "ready to build" (RtB). Once this point has been reached, the construction stage of the facility and its transmission infrastructure begins. Finally, once the project is ready to operate, on the "commercial operations date" (COD), the "greenfield" phase is over and the "brownfield" phase begins, with the plant coming online and becoming operable.

To achieve the objectives established, it will certainly be necessary to combine different mechanisms. Regardless of the mechanism through which income is generated, **regulatory stability is vital.** Modifications to the legal framework can affect the long-term vision of the stakeholders. Such changes include those introduced by the scheme for reducing the excess remuneration in the electricity market caused by the high price of natural gas on international markets, initially regulated in RD-Act 17/2021, of 14th September. That law introduced urgent measures to mitigate the impact of the increase in natural gas prices

on the gas and electricity retail markets, and has already undergone two modifications. Another example are the modifications to the specific remuneration regime for the production of renewable electricity, as indicated in RD-Act 6/2022, of 29th March, by which urgent measures were adopted within the framework of the National Plan to respond to the economic consequences of the war in Ukraine. In this sense, **it is crucial to manage specific situations in such a way that they do not affect the prospects of reaching long-term objectives.**

The evolution of prices and, in particular, of the electricity futures market, the result of new energy auctions, the appetite of consumers to buy electricity in the long term, and the capacity of financiers to understand and take greater risks will all be vital for the development of renewable energies.

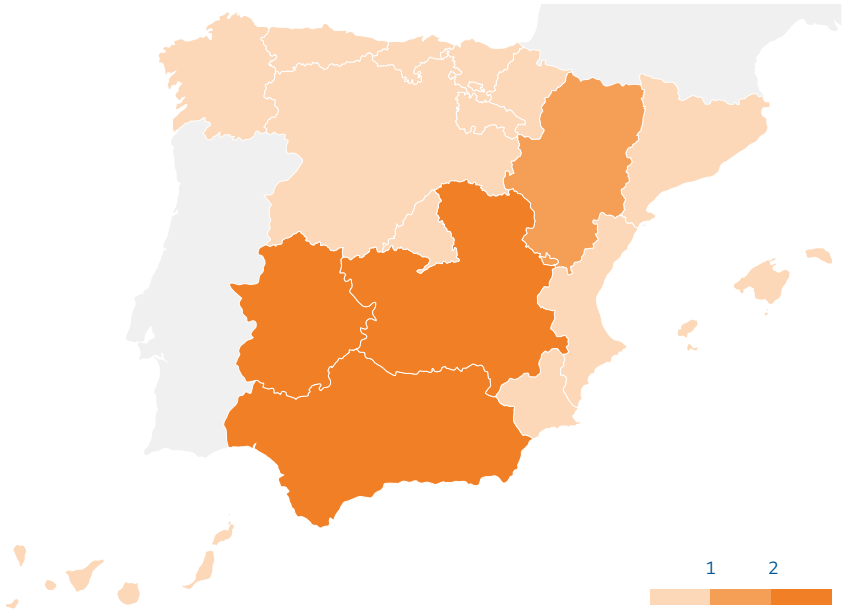
Currently there are a large number of projects in the early stages of development in Spain. Some of them do not have any guarantee of completion. In order to achieve the renewable energy targets, it is necessary to speed up project execution times. There are some bottlenecks at certain stages of project execution.

Additionally, it must be pointed out that **renewable generation facilities are not being developed and deployed at the same rate in all the different regions, or Autonomous Communities, of Spain. These differences are due to various factors, among which the availability of renewable resources is important but above all they are governed by the administrative complexity associated with the development of projects or the granting of access to grids.**

The installed capacity in Spain presents a clear geographical division according to type of technology, in the different Autonomous Communities. We find a predominance of wind power in the north, especially in Castile and León, Aragon and Galicia, and of photovoltaic generation in the south, especially in Andalusia, Castile La Mancha and Extremadura.

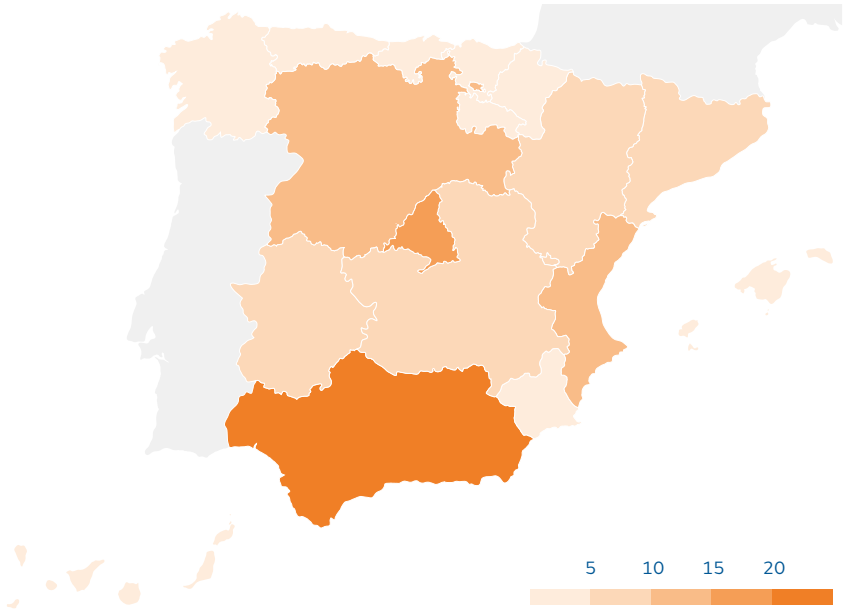
Installed photovoltaic power 2021

(GW)



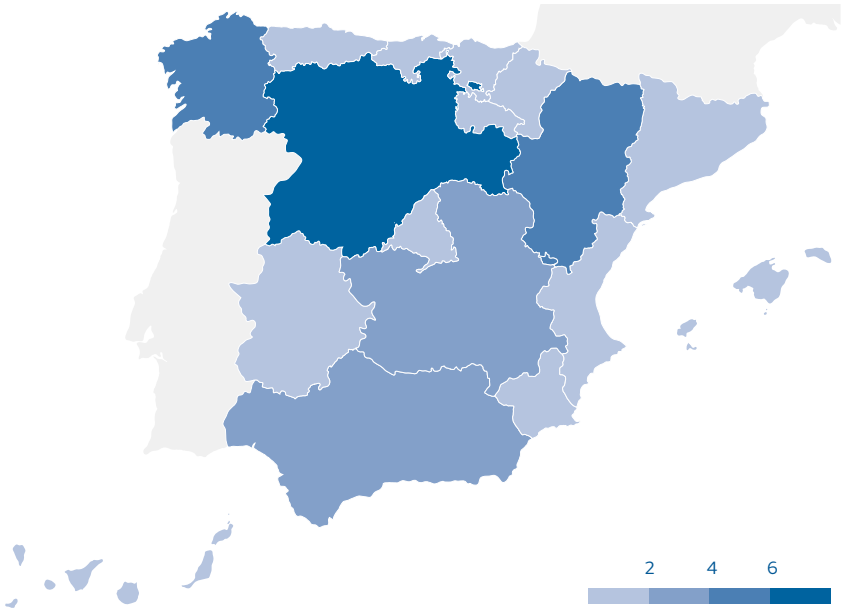
Photovoltaic capacity with permits 2021

(GW)



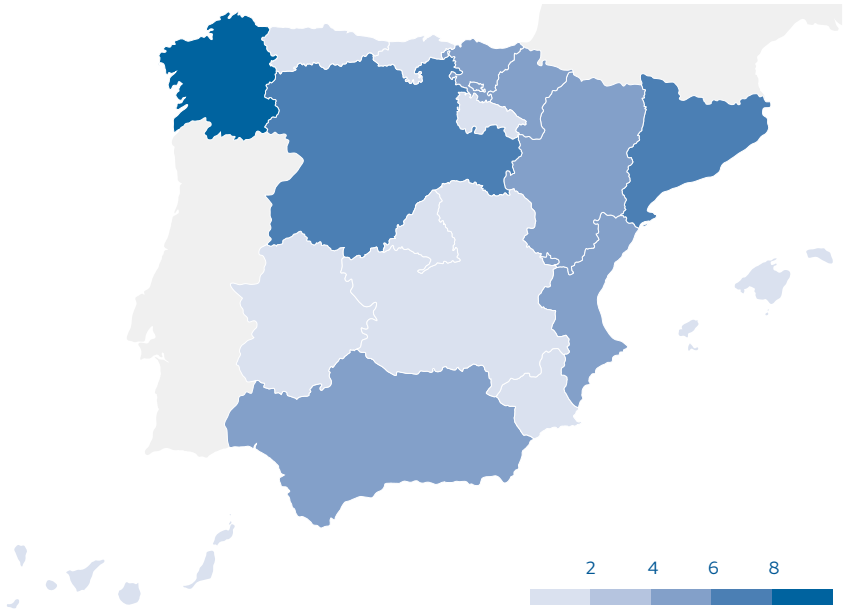
Installed wind power 2021

(GW)



Wind capacity with permits 2021

(GW)



Thus, some regional Autonomous Communities such as Castile and León, Castile La Mancha, Extremadura, Aragon and Andalusia have announced various measures to facilitate the promotion and development of renewable energies (creation of specific agencies, preparation of roadmaps, administrative improvements to speed up and simplify procedures, etc.).

In contrast, other Communities have very restrictive frameworks or are imposing new limitations on the development of renewable energies.

Undoubtedly, a simplification and standardisation of processes and procedures, learning from best practices, would help development to become more harmonious throughout the country. Also, the possibility of having single access points for official procedures, digitalising processes or the possibility of carrying out administrative processes in parallel with each other, could all help the process.

In this direction, the recently published RD-Act 6/2022 establishes certain **modifications in order to accelerate the deployment of renewable energies and generation for one's own consumption.** These measures include authorisation of an accelerated temporary procedure, effective until 31st December 2024, to determine the environmental effects and processing of new wind turbine installations of up to 75 MW and new photovoltaic installations of up to 150 MW. It will not be possible to locate these within the Natura 2000 designated areas; they will have to be in areas of low or moderate sensitivity, according to the established environmental zoning for renewable energies. Furthermore, 10% of the capacity of access to transport nodes will be liberated, so that they can absorb approximately an additional 7 GW from self-generation facilities, and the distribution companies are to expand their plans for investment in electricity grids, between 2023 and 2025, by a minimum of 10% to facilitate the transmission from new small-sized renewable generation facilities and self-generation facilities.

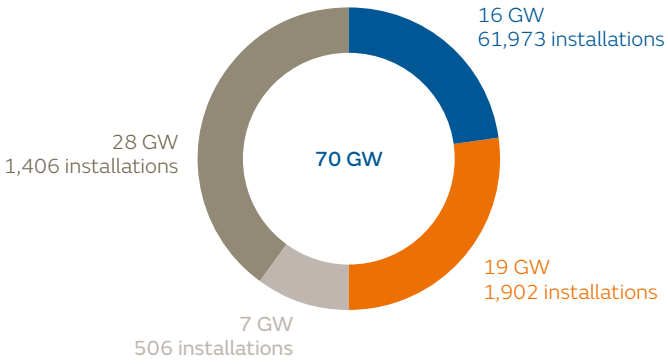
In Spain, many different companies are participating in the **development of renewable energies**

Spain has a broad ecosystem of companies that will take responsibility for the investment cycle necessary for the development of renewable energies. These companies have differing characteristics and objectives, which will have an impact on the way projects are developed. It is important to know these particularities in order to achieve the most efficient development possible.

To date, more than 65,000 renewable power generation facilities have been registered,[2] with a total installed capacity of over 70 GW.

[2] Definitive registration of installations.

Renewables projects in Spain



- Solar [(1)].
- Hydroelectric.
- Others.
- Wind.

[(1)] Includes both photovoltaic and thermal power.

Source: PRETOR (MITECORD) on 16th March 2022.

In addition, more than 1,600 renewable power generation facilities have received prior registration,[3] with an installed capacity of approximately 23.3 GW.

According to data from the Spanish Ministry of Industry, Commerce and Tourism, in Spain the renewable energy sector includes some 4,000 companies, of different sizes and with various activities, which directly and indirectly employ more than 80,000 people.

In the area of industry and technology, the companies situated in Spain cover more than 90% of the value chain of the wind sector and 60% of the value chain of the photovoltaic sector. In the field of off-shore renewable energies, the Spanish value chain, associated with wind energy and the naval sector, is a successful competitor at the global level for the supply of systems, equipment and services. We also have highly important capabilities in areas such as power electronics, thermal storage associated with solar thermal power plants, or recycling and second life for batteries.

Analysis of the latest data available from the Spanish National Institute of Statistics showing structural statistics for companies in the industrial sector of wind power generation activities[4] and other types of electricity generation[5] (other than production in conventional thermal and nuclear power stations) reveals the important contribution of these companies to the Spanish economy (figures in the table are in thousands of euros).

[3] Information from PRETOR (MITECORD) on 16th March 2022.

[4] Spanish national classification of economic activities (CNAE) 3518.

[5] Spanish national classification of economic activities (CNAE) 3519.

Structural statistics for companies in the industrial sector of wind power generation activities and other types

	Turnover		Production value		Value added at factor cost	
	2019	2018	2019	2018	2019	2018
Wind power generation	4,389,048	4,239,734	4,651,617	4,484,015	2,997,011	2,703,253
Other types of electricity generation	7,253,465	6,035,440	7,426,522	6,135,480	2,685,902	2,307,764

Figures in thousands of euros. Source: Spanish National Institute of Statistics.

The promotion and development, construction and operation of renewable generation facilities are all carried out by different agents. Based on their characteristics, these agents can be classified into several groups:

(i) large diversified electricity groups,

(ii) independent operators specialising in renewable energies,

(iii) developers and builders,

(iv) development processors,

(v) other energy companies and

(vi) investment funds.

Each of these groups is characterised by having different financial capacities, possibilities of achieving efficiencies through economies of scale, target returns and investment horizons. These characteristics condition their means of action and therefore their capacity to develop the different stages of a renewable generation project.

In this way, the groups with capacity to access lower capital costs, for a given level of risk (depending on the stage of the renewable project and its income generation model), are usually the ones that are in the best situation to finance the project costs associated with plant construction or to participate in asset rotations, once plants have been built. They are also best situated to participate in certain tendering processes required to develop large facilities where the cost of capital is a relevant factor.

In contrast, once plants have been built, large industrial groups specialised in the sector can typically obtain greater efficiencies in terms of plant operating costs (about two thirds of the total costs), both due to the effect of the scale of their operations (especially for those related to the maintenance and remote operation of plants) as well as for their specialist knowledge (which mainly affects the availability and production of the plants).

There are also other agents that specialise in aspects related to the administration and management of such projects, with no intention to participate in the construction or subsequent operation of the plants. Their objective is to complete certain stages in order to later transfer the project to other agents.

In relation to this point, it might be appropriate **to reflect on whether the model for the development of renewable energy facilities in Spain presents an adequate balance of risks and returns, for the different stages of the development of a project. And moreover, to reflect on what type of agents should be the most important in this investment cycle in order to maximise the benefits for society as a whole.**

The Spanish renewable energy financial market is very fluid, with more than 25 financiers involved. The source of funding for most closed transactions in the European renewable energy sector is non-recourse bank loans. Over the last 3 years, an average of 4,300 million euros per year has been financed via this type of non-recourse bank loan.

In addition to these companies, it is important to highlight the role of small consumers and local agents. Through self-generation facilities and according to the latest figures for local energy communities, these agents will play a role of increasing importance in the development of renewable energies.

In relation to this point, different regulatory measures are being taken to favour self-generation, such as the liberation of the capacity of access to nodes for these facilities, as noted above, established by RD-Act 6/2022.

There are **important challenges** before meeting the market share objectives for renewable energies can be guaranteed

Despite the fact that, at the end of 2021, more than 147 GW of photovoltaic and wind power had access permission granted (and there were more than 20 GW of additional requests being processed), **if we take into account that in Spain a total of approximately 113 GW has been installed, it seems logical to suppose that not all the facilities with access permission granted will be completed.**

Although it may seem contradictory, this large number of projects, some of which are not environmentally or economically viable, could hinder the development of the more viable

projects and aim of meeting the renewable energy share objectives. This is because they could lead to an overload of the public administration, resulting in delays and increased difficulties.

Development and deployment of renewable generation facilities is not taking place at the same rate in the different regional Autonomous Communities throughout Spain. These differences are not due solely to the availability of renewable energy resources. **The existence of important differences in administrative procedures, in material and human resources, and in the time taken to resolve issues and process paperwork, is generating a significant disparity in the development of renewable energy.**

In order to make a high level of renewable integration possible in the coming years, it will be necessary to invest in the digitisation of the grid as well as its technical adaptation. Moreover, it will be necessary to increase the connectivity of the Spanish electricity grid with the rest of Europe. Given this new setting, **proper management of grid access capacity will be essential to facilitate the integration of renewable energies.**

In such a scenario, **commitment to technological hybridisation, which allows the integration of different renewable technologies,** mainly photoelectric and wind, **to take advantage of the pre-existing electricity infrastructure, can greatly favour the management of network access capacity.**

From within Europe, the benefits of renewable power generation and the ecological transition over conventional power generation have been highlighted, due to the dependency on outside countries the latter causes and the emissions it produces. Emphasis has been placed on the advantages of renewable energies in terms of respect for the environment and the improvement in the security of supply they bring. However, **recently a phenomenon of social opposition to the implementation of renewable generation projects has emerged.**

These social movements do not question the benefits of renewable generation itself, but rather they mainly refer to hypothetical problems caused by the proximity of generation facilities to inhabited areas, the visual and acoustic effects they could have, the scale of proposed projects and the destruction of areas of increased ecological value or that are currently dedicated to farming.

The energy transition can only be successful if its benefits are perceived in the territory where the facilities are located. The energy transition must represent an opportunity for the rural world. Here, the incorporation of socioeconomic aspects in tenders associated with the development of renewable energies may prove to be crucial.

Transferring adequate information about projects to the social groups affected and promoting their involvement, creating spaces for dialogue and participation between those involved, can help to overcome the differences between the different parties.

Achieving the ambitious renewable energy development objectives will require the **development of a large set of measures**

European energy policies, together with Spain's commitments, have generated a favourable climate for the promotion of renewable electricity generation. However, the ecological transition continues to pose important challenges for the different stakeholders involved in different areas, such as those associated with administrative procedures (due to their complexity or the lack of resources in public administrations), **the situation of the different grids, social opposition to projects, the current situation of global supply chains and the possibility of obtaining equipment while incurring reasonable costs, and with legal certainty. If we are not able to overcome these challenges, and we do not do so soon, it will be difficult to comply with the path that has been sketched out.**

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