

## **ELECTRICITY AND DATA CENTRES IN PORTUGAL: EVERYTHING EVERYWHERE ALL AT ONCE**

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In this report:

1. We provide an initial overview of the electricity industry in Portugal.
2. We go through the various market segments and discuss what could be the constraints to install large industrial projects in Portugal (such as data centres, among others).

From an investor's perspective, data centres face a double challenge. The first is connecting their projects to the electricity grid quickly, and the second is ensuring that these projects are powered by sustainable energy sources. The two are closely linked, as connecting to the grid is essential for achieving sustainability.

Demand for data storage continues to grow rapidly in the age of artificial intelligence. According to the International Energy Agency, data centres consumed around 415 terawatt-hours (TWh) of electricity in 2024 (about 1.5% of global demand) growing at an annual rate of 12% between 2019 and 2024.

This sharp increase in consumption is placing additional pressure on electricity grids around the world.

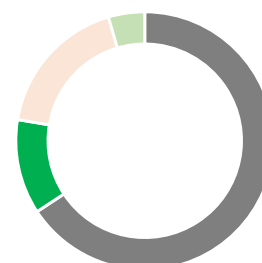
The Portuguese electricity industry is composed of four main segments: generation, transmission, distribution, and retail supply. In addition, a new prosumer & aggregator segment has emerged, driven by the rise of distributed solar and wind generation. The industry is valued at approximately €7.3 Bn in 2024.

Companies competing within each segment are typically distinct, with one exception: EDP, the former incumbent. EDP operates in generation under its main brand and in distribution through its subsidiary, E-Redes.

### **Generation**

Generation is a competitive segment in Portugal, meaning that regulation allows market competition. However, competition in electricity generation does not typically occur under regular market conditions due to the nature of the product.

Market Value: electricity in Portugal



- Generation (€ 4.8 Bn)
- Transmission (€0.9 Bn)
- Distribution (€1.3 Bn)
- Supply (€0.3 Bn)

**Total estimated value:**  
**€7.3 Bn**

*Sources: APENS based on data from DGEG, ERSE, OMIE and REN*



EDP remains the incumbent operator, an investment-grade, publicly listed company with major operations outside the country. EDP is the only investment-grade company in Portugal that operates in various electricity segments. As a result, the company effectively sets the terms for PPAs, being one of the few bankable offtakers.

This gives EDP some market power, as its size and the quality of its credit rating set it apart from its competitors in this market. EDP remains a highly strategic player for any Portuguese government, as it is often the largest source of capital expenditure in the national economy. EDP is a quoted company and its reference shareholder is China Three Gorges, a Chinese company. The Portuguese Government does not hold any shares in EDP.

Alongside EDP, Turbogás is another conventional electricity generation utility and there is a growing number of smaller renewable producers.

## Transmission

In recent years, Portugal has seen a rise in the number of data centres in operation. A large pipeline of new projects is currently placing significant pressure on the electricity transmission grid. At the same time, an increasing number of telecom cables from Africa and Latin America are landing along the Portuguese coast, and this trend is expected to accelerate by the end of the decade. Google's Nuvem cable, for instance, is scheduled to land in 2026.

**Electricity transmission in Portugal is a regulated monopoly operated exclusively by REN** — Redes Energéticas Nacionais (the National Transmission Network). REN is a publicly listed company and, like EDP, one of the few investment-grade companies in the country. However the comparison stops there, as REN is not as large as EDP in terms of revenues.

REN manages a network comprising of 9,661 km of transmission lines and 71 substations. REN was privatised from 2007 to 2012 and currently, the Government does not hold shares in the company (and no golden share either). The company is quoted in Euronext Lisbon and its reference shareholder is State Grid of China, the world's largest utility.

The Transmission System Operator (TSO) model, common across EU countries, grants REN the ownership, operation, and maintenance of the national grid as part of its exclusive concession.

**Portugal's urban development and economic activity are heavily concentrated along the coastline.** Major cities and industrial centres such as Lisbon, Porto, Sines and Aveiro are located along the coast, and this is where most electricity consumption occurs.

The country's interior, particularly near the Spanish border, is much less developed. While REN has a well-distributed transmission network, most of its infrastructure runs along the coast, parallel to the A1 and A2 motorways. There are lines connecting to the interior to account for the larger cities as well as to serve generation points such as wind farms and hydro plants, however the core Portuguese electricity network is primarily a north-south corridor.

One of the key challenges faced by data centre developers considering investment in Portugal is the lack of available capacity at REN's substations (and those of E-Redes, see below).

## Distribution

**Electricity distribution is a regulated monopoly** held by E-Redes, operating under several municipal concessions. Unlike transmission, these concessions are periodically re-tendered. EDP (through E-Redes) consistently retains them, reflecting their strategic importance to the company's core business.

## Retail suppliers

Electricity distribution on the one hand and retail supply on the other hand, are often confused in Portugal. These are distinct activities. Retail electricity suppliers relate directly to consumers and provide a range of services e.g. issuing bills.



**Under European unbundling rules, retail supply must be separate from transmission.** This means that REN, which operates the transmission network, cannot engage in electricity sales, billing, or customer collection. EDP, however, is allowed to supply retail consumers.

**Electricity retail supply in Portugal is a competitive activity.** There are currently 38 licensed operators on the open market registered with ERSE, the energy regulator, along with 13 suppliers of last resort. The latter ensure continuity of supply to economically vulnerable consumers, customers whose market-based supplier has been barred from operating, or in areas and segments where no offers are available on the market.

In recent years, some of the retail supplier companies have folded, prompting a tightening of margin requirements and access conditions for retail suppliers.

## Prosumers and aggregators

**The newest segment in the Portuguese electricity market is the prosumer and aggregator segment,** which has grown significantly since the COVID pandemic.

Aggregators combine the excess production, storage and consumption of a number of producers and consumers and then supply these amounts to the grid or to direct clients. These are e.g. neighbourhood networks in which the electricity community supplies electricity to office buildings during the day, while residential users consume the power generated at the end of the day.

There are 58 aggregators in Portugal who act as intermediaries. There are reports that there are >100k producers–consumers in the country. This results, to a large extent, from the rise of decentralised solar and wind generation and the emergence of energy communities.

## Connection challenges: the grid awakens

In 2021, Portugal was emerging from the financial crisis and still coping with the effects of the COVID-19 pandemic. Industrial activity remained subdued, and both electricity generation and grid development were limited. Around that time, artificial intelligence really began to accelerate globally, while at the same time the EllaLink cable (together with other new undersea connections linking Portugal to Brazil and Africa) became operational.

This marked a turning point. A wave of data centre investors and operators entered the market, demanding large amounts of power within very short timeframes. The impact on the national electricity grid was sudden — akin to throwing a stone into a pond. As these projects advanced, developers soon discovered that connecting a large-scale data centre to the electricity transmission grid involved significant technical constraints. Moreover, environmental restrictions (particularly those related to the construction and operation of transmission lines) added another layer of complexity.

### **Challenge #1: Data centres need lots of electricity**

The promoter of a large industrial project that demands additional infrastructure (specifically a connection to the high voltage network) can ask REN to invest the Capex needed to connect the installation to the grid. REN will not take any Capex risk without government assurance that its costs will be recovered through the electricity tariff. This process depends on an investment plan called PDIRT (the Director Plan for Investment in the Electricity Network). The PDIRT is a planning mechanism which reflects the investments that are needed for the electricity network on a 10-year horizon (for the high voltage transmission network).

The PDIRT must be approved by Government and by Parliament, but it often goes unapproved. The current PDIRT in force is the 2022 version. The plan is issued by REN and then there is a public consultation period.

**Government and regulator need to manage the risk of failing to take into account the opinions of all the stakeholders** at planning stage and as a result, the PDIRT process begins with a public consultation involving all interested parties. Once completed, the plan is reviewed by Government and Parliament. Going back to 2022, Government reviewed the PDIRT and concluded that there was limited room to increase electricity tariffs. The PDIRT was approved however the Capex curve was too flat for the objectives of some investors. Government did respond to the need for additional electricity infrastructure but not at the required speed, from the investor's perspective. This was felt more even acutely south of Lisbon.



Therefore from 2021 to 2023, the national electricity transmission grid **did receive some additional investment, but not enough to meet the growing demand from data centre promoters**. One key reason was the Government's reluctance to raise electricity tariffs. At the same time the country was facing political instability. All in all, data centre developers faced two challenges to connect to the electricity transmission grid:

- Relatively lengthy approvals for additional electricity transmission capacity overall; and
- After approval, a potential long delay between requesting additional capacity and being able to connect to a working substation.

From the investor perspective, this could potentially make the lag between the project stage and the final investment decision higher than most principals were willing to consider. To foster investment into the country, the current Government took measures to simplify the approval process for new electricity infrastructure in 2024 and this year:

- Promoters have the right to build their own lines and substations. The property of these assets is then transferred to REN once the lines and substations are ready to operate and connect to the national electricity grid;
- The Government recently (03/10/2025) approved a decree that changes the special regime for the attribution of connection capacity to the national electricity network in regions of high demand. This is to improve the speed at which large industrial projects such as data centres are built. The regions of high demand are expected to be the Lisbon, Sines, Abrantes and Castelo Branco. The final version of the decree is expected to be published in the coming months.

For promoters with projects on the pipeline that involve a connection to the high voltage transmission grid, these two measures should make licencing simpler. This should also speed up the construction of the connection to the transmission grid.

### **Challenge #2: the environment and permitting**

APA, the Portuguese Environmental Agency, is a complex institution influenced by internal dynamics. Some of the challenges in building transmission and distribution lines or substations have little to do with APA itself. For example, the cutting of certain protected tree species is strictly prohibited, creating obstacles for infrastructure development. Data centre investors often face such environmental constraints, not because of what happens inside the data centre, but due to issues related to electricity supply. A project may be fully sustainable and efficient in terms of energy management, yet still struggle to obtain the necessary permits within a reasonable timeframe.

However, this can be managed through compensatory measures that promoters can adopt. To our knowledge, no promoter in Portugal has ever abandoned a project due to the presence of holm oaks or cork oaks, two of the most protected tree species in Portugal. It is simply an aspect that needs to be properly managed and mitigated.

### **Moving forward**

To conclude, while there are certain challenges to developing large data centres in Portugal, the Government has shown strong willingness to support such projects — particularly those promoted by investors committed to using sustainable energy sources and creating long-term value.

APENS is an association dedicated to promoting continuous improvement and knowledge sharing on sustainable energy across several industries, including electricity generation, data centres, and transportation among others. For further information and to get involved, please visit our website: <https://apens.pt> or email [apens@pm.me](mailto:apens@pm.me)