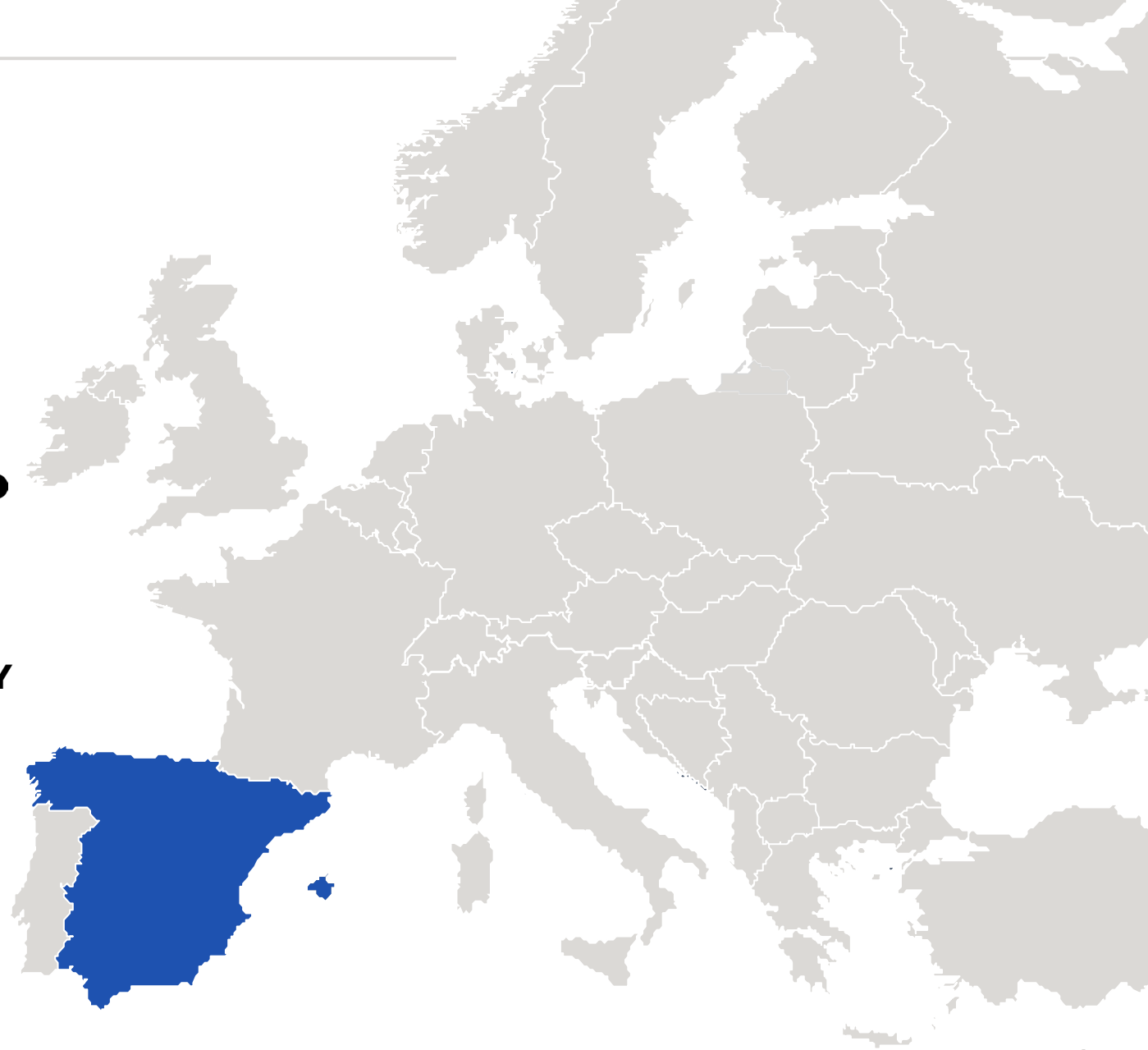


THiNK · RE

GUARANTEES OF ORIGIN – SALES STRATEGY

September 2022



INVESTIGATING THE MARKET FOR GUARANTEES OF ORIGIN

Introduction

Aim / Structure of the Study

This Study was developed by Think RE GmbH for investigating the Guarantees of Origin (GoO) market in Spain. Therefore, the document is divided into four chapters without registers and appendix.

Chap. 1 summarizes the results of the study in terms of the main price drivers, provides a brief overview of the current indicative prices in selected analyzed countries, and highlights strategic implications for the sale of Guarantees of Origin.

Chap. 2 discusses regulatory trends in the market for Guarantees of Origin. This chapter provides an overview of the most important regulatory market developments and briefly discusses future development opportunities.

Chap. 3 analyzes the general price drivers for Guarantees of Origin. In particular, environmental influences, RE technology and regulatory conditions in a market are identified as the main price drivers.

Chap. 4 covers the market for Guarantees of Origin in Spain in detail. The process of issuance, transfer and cancellation of GoOs is covered. Where the information is available, an overview of transaction volumes and prices is provided. Possible sales channels are identified.

INVESTIGATING THE MARKET FOR GUARANTEES OF ORIGIN

Introduction

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INVESTIGATING THE MARKET FOR GUARANTEES OF ORIGIN

Agenda

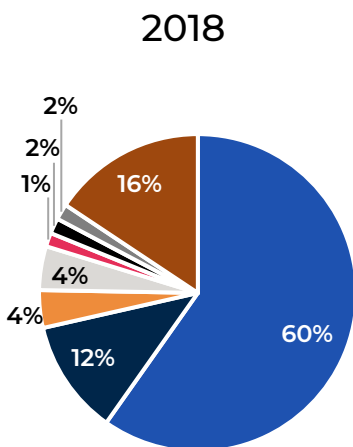
- 1** Management Summary and Strategic Implications Page 05
 - 2** Regulatory Tendencies Page 09
 - 3** General Price Drivers Page 20
 - 4** Country-Specific Analysis Page 32
- Abbreviation List Page 39
- Reference List Page 41

3. GENERAL PRICE DRIVERS

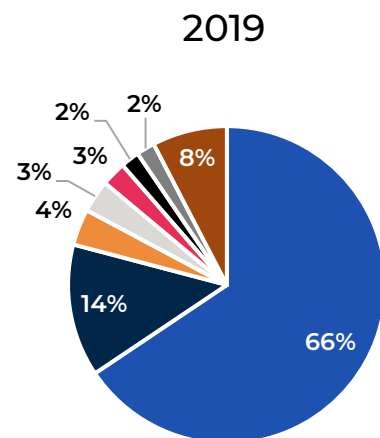
RE Technology

Shares of RE Technologies in the issued certificate volume 2018 – 2022

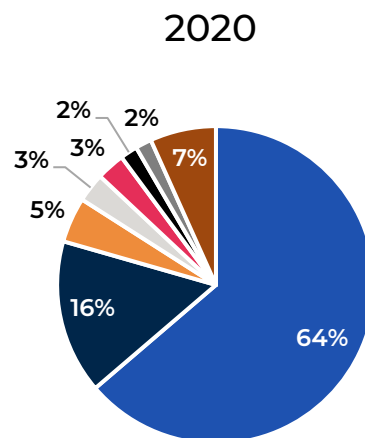
- Hydro/marine
- Wind - onshore
- Solar
- Wind - unknown
- Wind - offshore
- Gas - other biogas
- Geothermal
- others



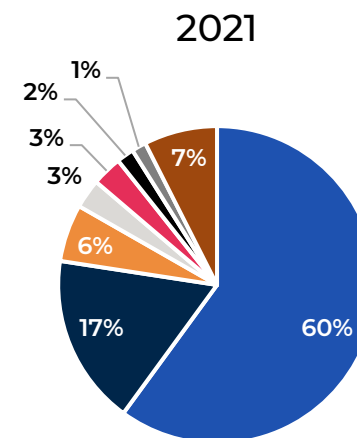
668,897,379 MWh



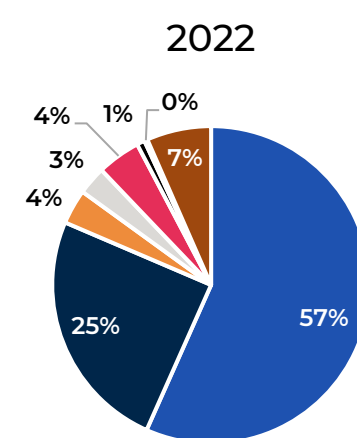
600,037,012 MWh



679,126,683 MWh



746,158,726 MWh



216,156,975 MWh

- Despite a declining share of the total number of certificates issued, the GoO market in Europe is still dominated by hydropower. Until mid 2022, its share of the total number of certificates issued was 57%.
- Due to the importance of the price for hydropower GoOs as a base price, precipitation levels, which influence the availability of hydropower, have an important impact on the general price development in the European market.
- From May and throughout the summer of 2018, drought as well as record-breaking and persistently high temperatures prevailed in northern and parts of central Europe. As early as June, the volume of water in Nordic reservoirs for hydropower fell well below normal, which, together with high fuel prices, resulted in electricity prices in July and August being the highest in 20 years. Due to the drought, comparatively few certificates were issued from hydropower (60%) leading to a slight increase in GoO prices (see the following slide).



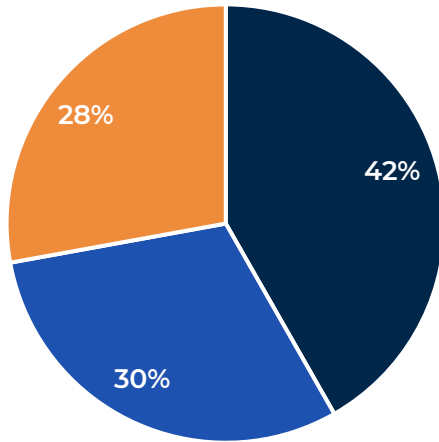
4. COUNTRY-SPECIFIC ANALYSIS

Spain

CNMC GoO Market – Statistics 2021 (2/2)

ISSUANCE

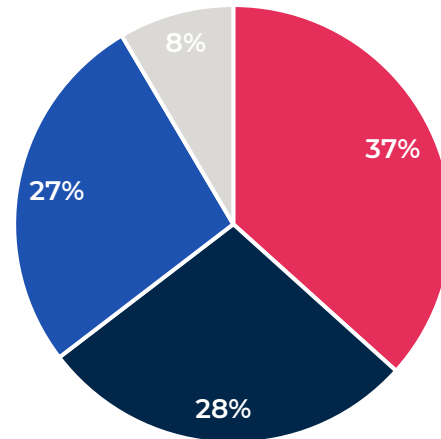
■ Wind - onshore ■ Hydro/marine ■ Solar



* Data without Fossil and Nuclear

CANCELLATION

* Data without Fossil and Nuclear



■ Biomass ■ Wind - onshore ■ Hydro/marine ■ others

- GoOs from wind and hydropower account for the largest share of issuance of certificates in Spain in 2021. In the same year, most of the cancelled certificates originated from biomass.
- An increase in drought periods due to climate change and the resulting decrease in electricity production from hydropower plants has a major impact on the supply volume of GoOs in Spain and thus the price.
- Currently, there are no publicly available price signals on the market, as the Spanish GoO market is characterized as an OTC market. However, according to discussions with Spanish market participants, the GoO price in summer 2022 was around 2.50 EUR/MWh, following the overall European price increase.