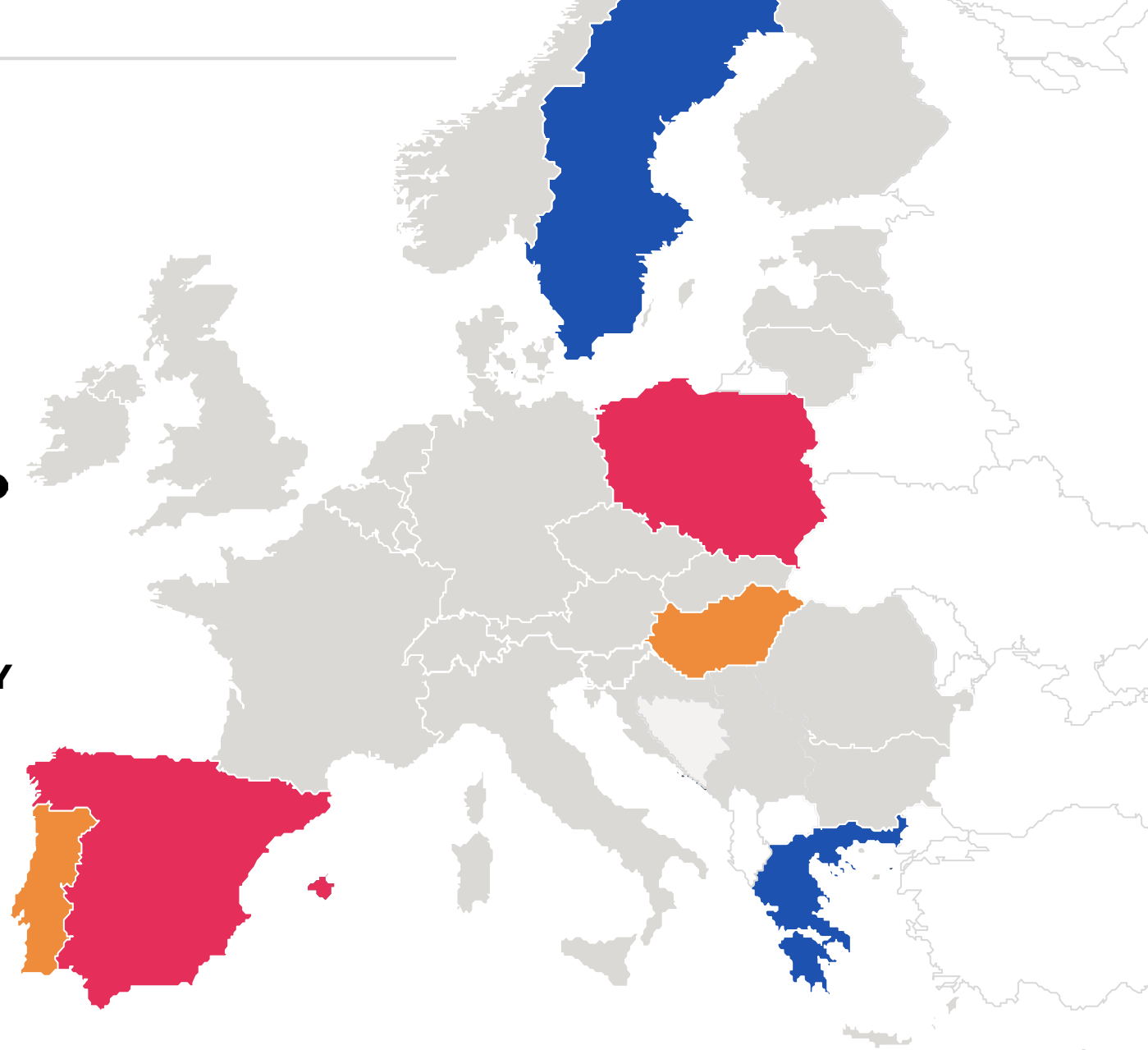


THiNK · RE

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 Greece, Hungary, Poland, Portugal, Spain and Sweden. 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 the countries analyzed, 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 markets for Guarantees of Origin in Greece, Hungary, Poland, Portugal, Spain and Sweden 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

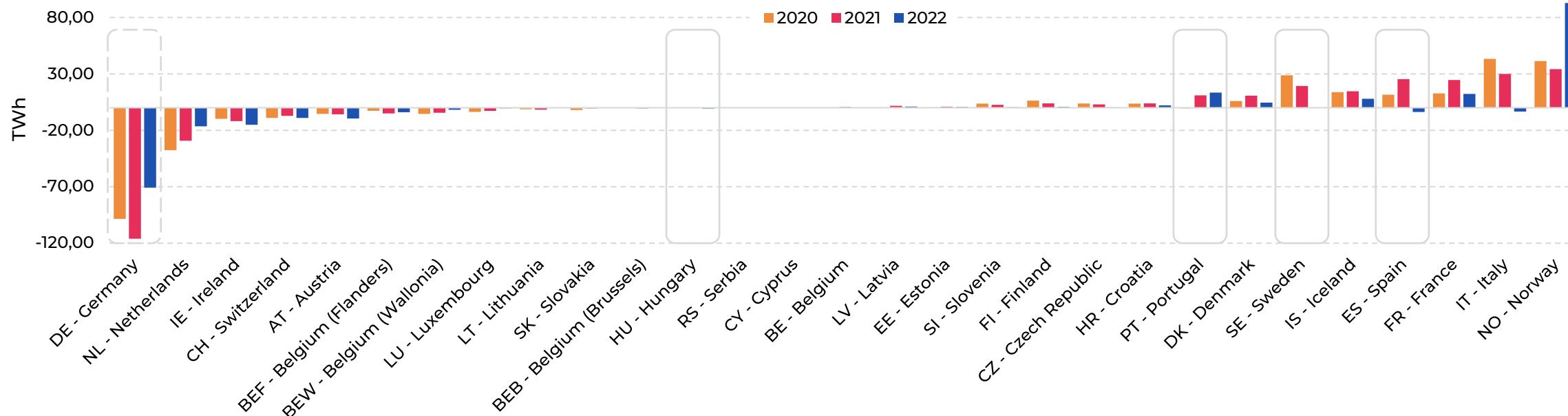
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3. GENERAL PRICE DRIVERS

Country of Origin

Net Importers and Net Exporters of GoO

*Data until May 2022



- In general, GoO prices are determined by supply and demand. The figure shows main importers and exporters of GoOs among AIB membership countries. Poland, as not an AIB member, and Greece, as not connected to the AIB hub, are not listed. Portugal, Sweden and Spain are ranked as net exporters among the AIB countries. Hungary was an importer in 2022. However, as the auction platform will not become fully operational until September 2022, it remains to be seen on which side of the scale Hungary will rank. In Germany, the largest net importer of GoOs in Europe, demand exceeds supply, leading to comparably high certificate prices.
- As the regionality of the sourced certificates plays an increasingly important role, GoOs originating from domestic RE producers can often achieve higher prices than imported GoOs.

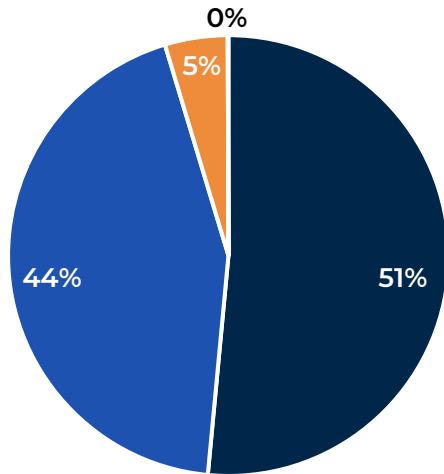
4. COUNTRY-SPECIFIC ANALYSIS

Greece

DAPEEP GoO Market – Statistics 2021

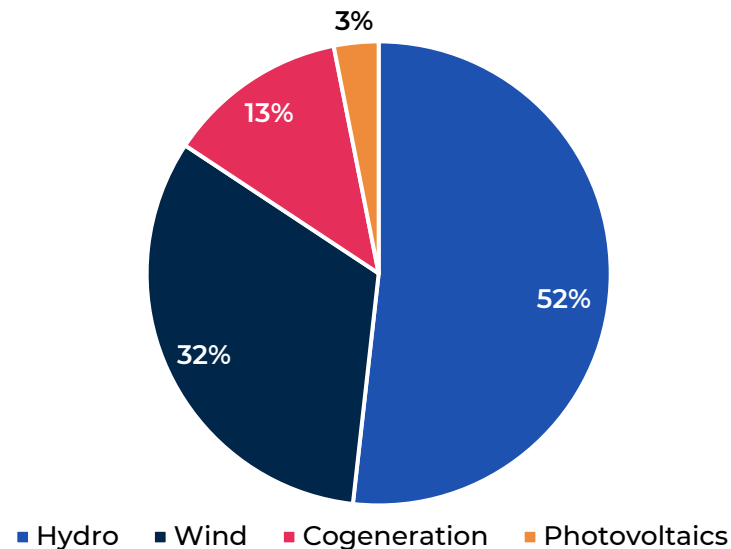
ISSUANCE

■ Wind ■ Hydro ■ Photovoltaics ■ Cogeneration



- The majority of the GoOs issued and cancelled in Greece in 2021 came from hydropower and wind power, respectively. Therefore, in the future, increasing periods of drought due to climate change will have a high impact on the quantity of GoOs offered in the country and thus on the price level.
- At the moment, there are no publicly available price signals on the Greek GoO market. According to a consultation with DAPEEP, the GoO price was around 1 EUR/MWh at the beginning of the year, which is relatively low compared to other European markets.

CANCELLATION ON BEHALF OF END CONSUMERS



- However, a significant price increase is expected with an ongoing institutionalization of the GoO market and rising demand from buyers. Greece plans to introduce an auction platform for trading GoOs. The first auction is expected to take place in April 2023. On the platform, GoOs from subsidized RE producers will be sold on a mandatory basis. The revenues generated will be used to finance the subsidies. It is planned that RE producers who do not receive subsidies will also be allowed to participate voluntarily leading to an increased institutionalization and transparency of the market and a reduction in transaction costs from the seller's perspective.

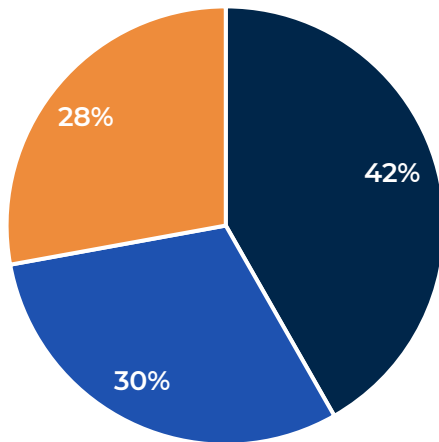
4. COUNTRY-SPECIFIC ANALYSIS

Spain

CNMC GoO Market – Statistics 2021 (2/2)

ISSUANCE

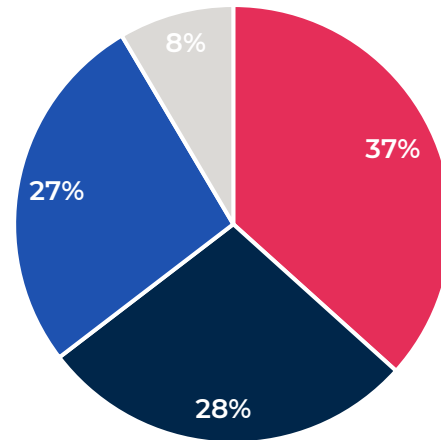
■ Wind - onshore ■ Hydro/marine ■ Solar



* 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.