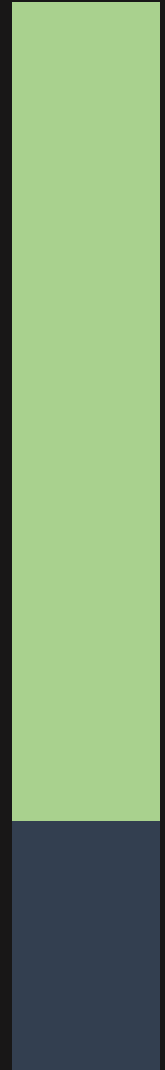


Guarantees of Origin

EU Market Analysis Report

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Introduction

A Guarantee of Origin (GO) is an electronic document which acts as a proof of production of electricity from a renewable energy source. This report is aimed at the analysis of the European GO market without going through in much depth of the market mechanisms.

Initially, the analytical methods used for evaluation of different parameters are identified and visualized. Later the most important market trends are listed and the differences in the evolution of different market price for GOs are discussed. Finally, author's view on the development of GO prices in the long and short term is presented at the end.

Analysis and Market Trends

In the first step of the analysis, the most important market players were identified based on the total volume of GOs cancelled, imported, exported and issued from the period 2001-2019, based on the data from AIB activity statistics Q3 2019. It can be seen from figure 1 that Norway is the largest producer of GOs with a total contribution of 30 % of total GOs present in the market. This is mainly due to the huge hydro capacity in the Nordics. While figure 2 shows that Germany is the largest consumer of GOs with a demand of around 100 TWh in 2018.

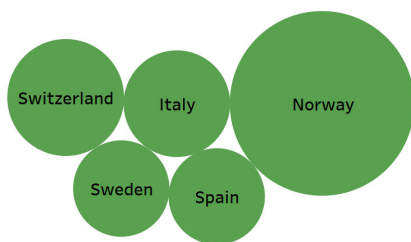


Figure 1: Top 5 producers of GO 2001-2019 (Source: AIB Activity Statistics, Q3 2019)

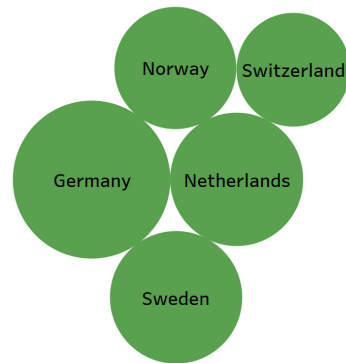


Figure 2: Top 5 consumers of GO 2001-2019 (Source: AIB Activity Statistics, Q3 2019)

There is a trend for increasing demand for renewable electricity in the market evident by the **“Expiration Rate”**. The expiration rate is the ratio of GOs expired to the GOs issued, which could be possibly used to assess if there is a surplus of renewable electricity in the market¹. A high expiration rate may indicate a low demand for renewable electricity and vice versa.

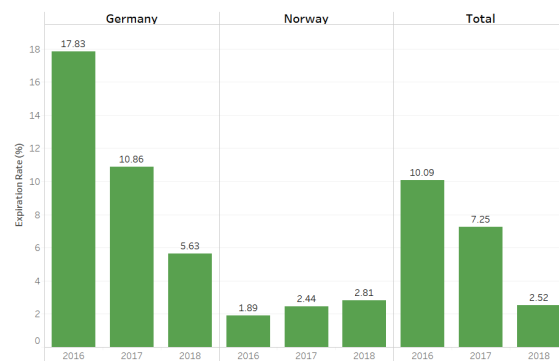


Figure 3: Expiration Rate 2016-2018 (Source: AIB Activity Statistics, Q3 2019)

Figure 3 shows the evolution of expiration rate for Germany, Norway and the whole EU GO market. The expiration rate falls sharply in Germany from 17% in 2016 to around 5% in 2018

¹ Performance of Markets for European Renewable Energy Certificates, 2018005-EEF, University of Groningen

indicating a growing demand of renewable electricity in market.

It is worthwhile to also look at the different technology attributes of the GO products. Figure 4 shows the increasing number of cancelled GOs for wind and hydro from 2015-2018. This arguably indicates a growing demand for wind of around 21 % (from 2017-2018) while the demand for hydro grew only about 3 %.

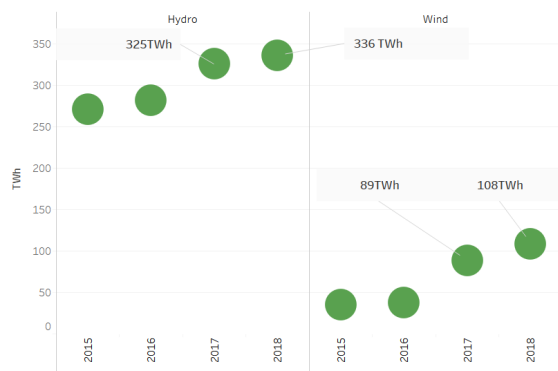


Figure 4: Overall Wind and Hydro GOs Cancelled 2015-2018 (Source: AIB Activity Statistics, Q3 2019)

Looking at the German market, there seems to be an overwhelming demand of solar GOs with a staggering annual cancellation growth rate of 300 % from 2016-2018 as indicated by figure 5.

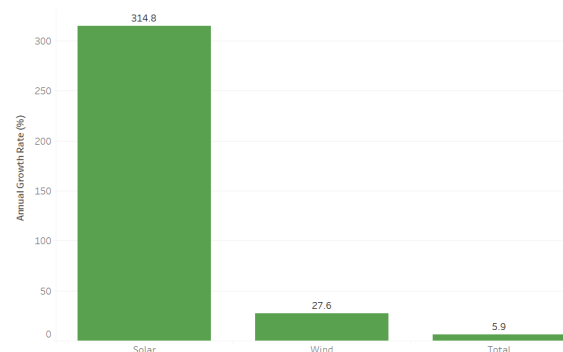


Figure 5: Annual Growth Rate of Cancelled GOs by Technology 2016-2018 (Source: AIB Activity Statistics, Q3 2019)

GO Price Differences

There are mainly two ways in which GO prices differ. One being the difference in prices of various GO products to the same consumer and the other being the difference in GO price of the same GO product in the wholesale and end user markets. GOs are inherently heterogeneous mainly due to people's perception of different renewable energy sources and their impact on environment. This gives rise to different attributes of GO products and hence different prices. For example, it is seen that Nordic hydro GO is priced lower than Dutch wind GO because of high local demand of renewable electricity produced from wind and an abundance of Nordic hydro production. Also, there is a relatively large difference between the wholesale and end user GO prices. This is mainly attributed to high marketing and admin costs for advertising the GO products in the end user market. Less resources are needed for wholesale trade whereas many need to be employed to market these products to the end user.

GO Price Future Analysis

Generally, in the short run, GO prices are mainly driven by demand whereas legislative changes and supply determines the price in the long run². To comment on the GO prices in the near future, it is important to have a look at the recent developments in the GO markets. There has been a spike in the Nordic hydro prices between 2018-2019 and the huge fall of Nordic hydro from 172 Eurocent/MWh in Jan 2019 to 20 Eurocent/MWh in Dec 2019³. The spike in prices could be linked mainly to the exceptionally hot summers of 2018 in the Nordics, causing a drop in Nordic reservoir capacity as shown by Nordpool's hydro reservoir data⁴.

² Analysis of the trade in Guarantees of Origin, OE Report 2017-58, Oslo Economics

³ Greenfact Public News

⁴ www.dynamic.nordpoolspot.com/marketinfo/rescontent/norway/rescontent.cgi

In 2019, after the reservoir capacity returned to normal, several factors stacked up to cause a decline in prices such as the inclusion of 3 more AIB members (Serbia, Slovakia and Greece) contributing more on the supply side rather than the demand side. In addition, the French authority's auction of subsidized assets in the GO market brought around 2-4 TWh every month for 2019⁵ driving a bearish sentiment in the market with a supply shock. In author's viewpoint, the aftershocks of this rare stacking of events would remain for a while and the prices for Nordic hydro GO are to remain low in 2020. While it is also interesting to note that the demand is continuously growing, mainly driven

by the suppliers defaulting to Green energy and big corporates going more environment friendly. The RE100 group of companies committed to 100 %renewable electricity are growing rapidly with around 155 in the beginning of 2019 to 211 by the year end ⁶. Another interesting trend to note is the increasing curiosity on "Climate Change" worldwide, which according to google trends statistics peaked around Sep 2019⁷. Quantifying demand remains rather challenging, but the continued growing demand on the residential and corporate side is expected to give a boost to the GO prices in the later part of the decade.

⁵ powernext.com/french-auctions-guarantees-origin

⁶ there100.org/re100

⁷trends.google.com/trends/explore?date=all&q=climate%20change