



Development of the Guarantees of Origin Market (2009-2015) – Key Facts Report





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Authors: Leticia David
Markus Klimscheffskij

Grexel Systems Ltd.
Lautatarhankatu 6
00580 Helsinki
Finland
+358 9 4241 3167
<http://www.grexel.com/>

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1. ABOUT THIS REPORT

This report was written by Grexel® on request of RECS International and it brings an outlook of the Guarantee of Origin Market between 2009 and 2015. The analysis considers renewable electricity production volumes, issuing and cancellation volumes of Guarantees of Origin, production non –eligible for certification due to support schemes (e.g. Feed-in tariffs) and analyses how these variables have changed during the period in question.

31 European countries were selected for this analysis: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

The electricity production and consumption data came from detailed monthly production statistics from ENTSO-E¹. EECs issuing and cancellation figures are from AIB's statistics². In addition, national GO figures were collected from countries' national GO market reports, national contacts and from RE-DIIS's country profiles³ or, where not easily available, the national figures were estimated. Finally, renewable volumes non-eligible for certification came from local energy authorities' reports.

This is the second report in a series; a similar report was produced last year analysing the market development up to 2014. Compared to the previous report, some considerable improvements were made concerning German feed-in tariff volumes as well as national GO data of the UK and Greece. Also, Serbia was added to the list of countries analysed. Furthermore, compared to last year's report, less data was estimated due to sooner availability of AIB Q4 statistics for 2015 and Entso-e production statistics. It should be noted that when the report for 2014 was published, some of the data for 2014 was still unavailable and estimations were needed. This data is now updated, which along with the generic improvements, leads to differences in past year figures when comparing to the last year report.

Certain missing issuing and cancellations figures in the AIB statistics were estimated taking into account previous year's volumes for same period. In cases where public data on National GOs was unavailable, assumptions were made based on existing information and knowledge as well as through national contacts. Nonetheless, possible national GO statistics for Bulgaria, Latvia, Lithuania, Poland, Romania, Slovakia and Portugal are missing.

¹ Source: <https://www.entsoe.eu/db-query/production/monthly-production-for-a-specific-country>

² Source: http://www.aib-net.org/portal/page/portal/AIB_HOME/FACTS/Market%20Information/Statistics. Note: Issuing volumes came from production data and cancelation volumes from transaction data.

³ Source: <http://www.reliable-disclosure.org/documents/>

2. OVERALL MARKET DEVELOPMENT

The figure below displays issuing and cancellations volumes between 2009 and 2015, considering 1) EECS-GO and 2) national GOs, 3) production, which is supported and therefore not certified, and 4) the rest of the renewable production (Available). The following trends were identified:

- 2015 reached a new record in cancellations volumes: 557TWh of certified electricity, a 4% increase from 2014 (535Twh⁴). It is possible to see from the graph, however, that the growth rate decreased from the 20% between 2013 and 2014.
- On the other hand, issuing volumes remained stable, decreasing only 0,6%, from 545TWh in 2014 to 541TWh in 2015.
- The increase in cancellations together with the decrease in issuing volumes, created for the first time a shortage of supply in 2015. This scarcity of supply marks a turning point for the development of Guarantees of Origin, setting the market in a good state for 2016 and the years to come.
- In certain countries⁵, renewable energy support scheme (e.g. Feed-in tariff) is linked to the disclosure system so that supported volumes are allocated to the customer through the support system. No GOs are thus issued for this volume and it is marked as Supported – not certified in the figure below. The supported – not certified volume grew by 12,5% between 2014 and 2015 (from 192TWh to 216TWh).
- When comparing production, issuing and supported—not certified figures, there still seems to be a notable share of idle capacity. In 2015, 359TWh is still available for certification and represents 32% of total RE production, a higher share than previous years due to increase in RE production. It should be noted, however, that RE production also includes non-EECS countries.

⁴ Revised figures. The previous year report mentioned that 492TWh was cancelled in 2014. But as the previous report also noted, there was inaccuracies in that year's report especially for Q4 EECS Statistics.

⁵ Not all countries that have a support policy in place exclude supported production from GO certification. In this report it is assumed that, from the countries analyzed, only France, Germany, Ireland and Portugal have such practice.

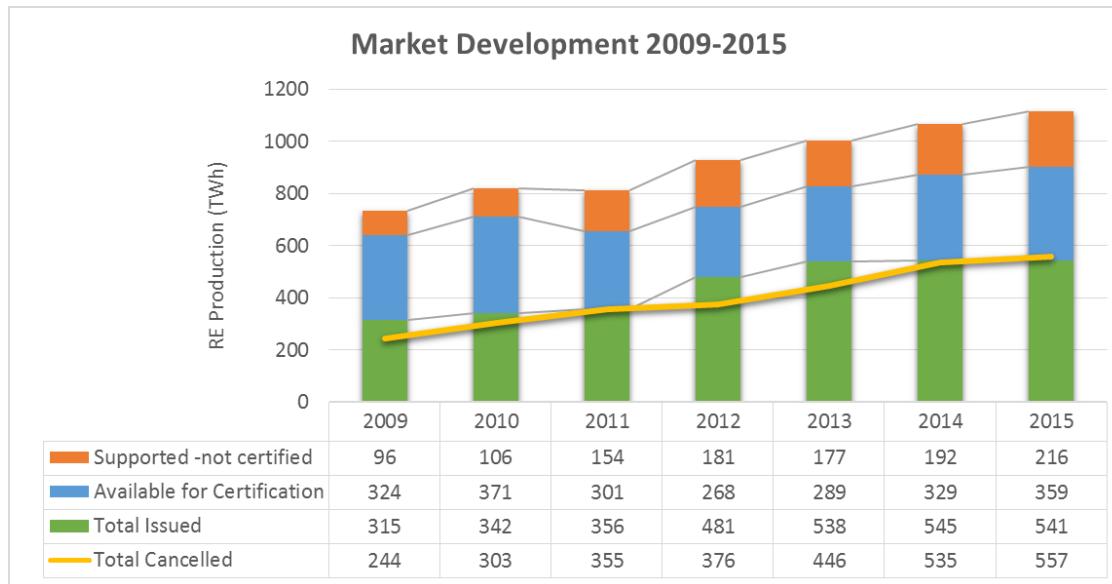


Figure 2.1 – GO Market Development

The Compound Annual Growth Rate ([CAGR](#)) between 2009 and 2015 brings an interesting perspective. CAGR is a smooth growth rate that reduces the effect of volatility between years. It better reflects the growth during a period of time that includes more than 2 years than a simple average. According to Figure 2.2, RES production has grown at an average of 7,2% a year, while issuing has grown at an average rate of 9,4% and supported non-certified at 14,5%. Finally, cancellations have grown at rate of 14,8%. This indicates that at a longer time interval the market is getting shorter even when considering increase in RE production.

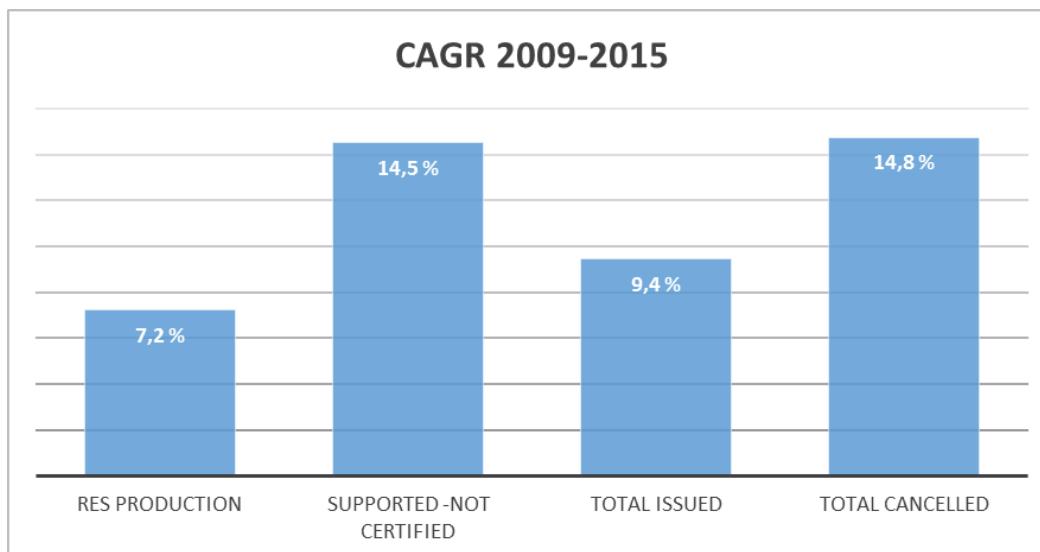


Figure 2.2 – Compound Annual Growth Rate (2009-2015)

As a rough estimation, CAGR rates may be applied to gain a future outlook of the market. According to Figure 2.3, assuming past growth rates, GO cancellations would reach the total available volume by 2021. This of

course presumes that the remaining available potential can be easily included into the GO system. Because much of the remaining potential is in countries outside the EECS system, and because increases in issuance have been slow during the past years, it is possible that scarcity of supply will become an increasing factor already in the coming years.

However, several reservations should be made on the simple analysis of Figure 2.3. Firstly, new EECS countries might temporarily shift the balance and make new supply available to the international market. For example, Spain joined the AIB in early 2016 and the effect of this remains to be seen. However, it is not possible to export Spanish GOs in receipt of feed-in tariff⁶, which reduces the possible effect that Spain might have on total EECS supply. Secondly, the analysis does not consider regulative developments, which play a major role in the GO market. For example, all energy sources might become eligible for GOs as proposed by AIB, or the volume of supported not-certified might undergo changes, both of which have fundamental effects on the market. After the revision of the RES Directive (expected in 2017), the future regulative environment for GOs will become clearer.

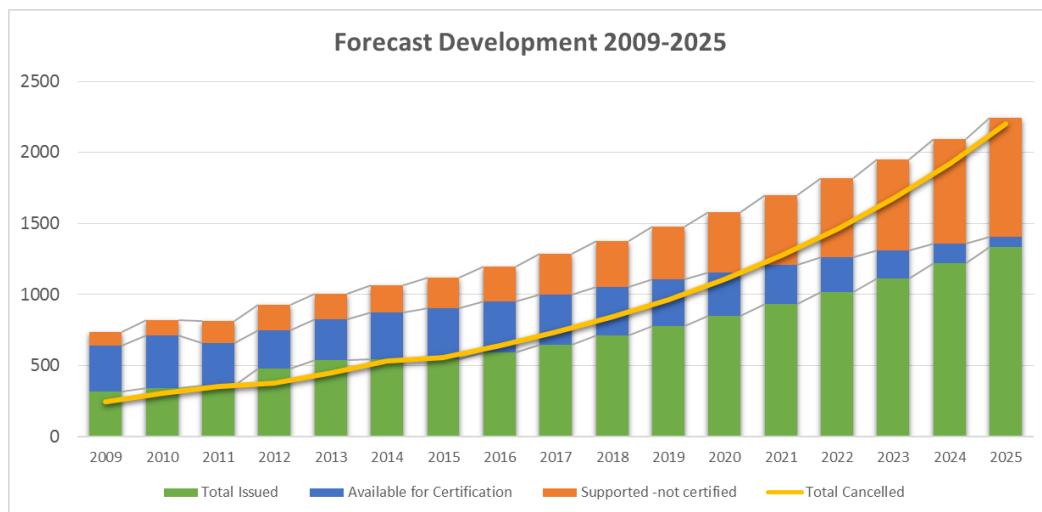


Figure 2.3 – Forecasted Market Growth

Figure 2.4 compares production and consumption figures (left bar and right bar, respectively). It is important to note that on the supply side, remaining potential is represented by the blue bar (RE production eligible and non-issued) whereas on the demand side remaining potential equals the whole light grey bar (uncertified consumption). Naturally, actual demand can never pass supply (as a cancelled GO needs to be issued), but the graph clearly shows that there is a shortage of supply potential (RE production) compared to the overall demand potential (electricity demand in Europe).

⁶ Source: http://www.aib-net.org/portal/page/portal/AIB_HOME/FACTS/AIB%20Members/Domain_Proocols/Domain%20Protocol%20EECS7%20-%20SPAIN%20-%202016%20Feb%202016%20v2%20-%20clean.pdf



Figure 2.4 – Production vs Consumption

3. COUNTRY OUTLOOK

As in the previous year's report, the study divides the countries analysed into 4 groups. This time the countries were divided based on AIB membership status and volume of RE Production: 1) Large EECS countries 2) Small EECS countries, 3) Large non-EECS countries, 4) Small non-EECS countries. Note that the categorization has changed from the previous report.

3.1 EECS COUNTRIES

The first country group contains EECS countries with high volume of production of electricity from renewable energy sources. These countries are Austria, Finland, France, Germany, Italy, Norway, Portugal, Sweden and Switzerland for which data shown in Figure 3.1 at the end of this section.

The second country group (Figure 3.2), contains EECS countries with low volume of production of electricity from renewable energy sources. These countries are Belgium, Croatia, Czech Republic, Denmark, Estonia, Iceland, Ireland, Luxembourg and the Netherlands.

The following observations were made on EECS countries:

- Norway, Germany and Italy stand out with RE production volumes over 100 TWh.
- In Austria, and the Netherlands 100% of RE production is issued. Sweden, Denmark and Norway follow close behind (their shares for 2015 are 98,1%, 94,07% and 91,2% respectively).
- Available volumes in Denmark, Finland, Norway and Switzerland increased slightly in 2015, but this might be due to not all 2015 generation being issued yet at the time when data for this report was collected. At the same time, the figure shows that in Iceland's issuing volumes dropped significantly from 2014.

- In some EECS countries a high share of renewable production is not issued a GO which, especially in Germany (and to lesser extent also in France), is due to the legislation preventing supported production from receiving GOs.⁷
- Between 2014 and 2015 the AIB lost and gained members. Czech Republic is no longer issuing EECS certificates or connected to the AIB HUB starting from late 2015. Portugal also resigned from AIB membership in 2015 due to a change of Issuing Body (but remains as a sizeable potential newcomer as the new Issuing Body might join the AIB in the future. On the other hand, in 2015 Ireland became an EECS member. As a result, the market lost less of 1TWh of supply (looking at Portugal and Czech Republic issuing figures) but gained close to 4TWh of new Irish certificates.
- Cancellation volumes give the best indication of the GO market in a country as they demonstrate actual demand. It is notable that the cancellation volumes in the countries of this group are relatively high compared to issuing volumes (apart from Norway). This means that the home market demand is strong in well-established GO markets, which might be due to a sound disclosure regime.
- Cancellations in Belgium and Netherlands are particularly high when compared to their RE production and issuing volumes. Still, it is worth highlighting that cancellations in Belgium, Finland and Switzerland have slightly decreased in the last year.
- In Germany, the home market demand is high and, due to the restriction in GO issuance, this demand has to be largely met with foreign GOs.
- Italy also had restrictions on production that receives support. But the Italian disclosure system underwent significant regulative changes in late 2013, dropping such restrictions what clearly had a positive effect on GO demand in 2014 and 2015, although issuing has dropped from 2013's level.
- The French situation is similar to Italy. France's Issuing Body changed in 2013 resulting in lower issuing and cancellations. However, 2015 shows small increase in cancellation volumes

3.2 NON-EECS COUNTRIES

Non-EECS countries are represented in the two last groups of this study. The first country group (Figure 3.3), contains Non-EECS countries with high volume of production of electricity from renewable energy sources. These countries are Romania, Spain and the UK and might cause a significant shift in the EECS market if/when they join the EECS market.

The second country group (shown in Figure 3.4) contains Non-EECS countries with low volume of production of electricity from renewable energy sources. These countries are Bulgaria, Cyprus, Greece, Hungary, Latvia, Lithuania, Poland, Serbia, Slovakia and Slovenia.

The following observations were made on Non-EECS countries:

- Together, non-EECS countries account for more than 260TWh of renewable production in 2015, which is more than the RE production of Norway and Italy (2nd and 3rd largest RE producers) combined.

⁷ Though in France it is possible for the buyer of supported electricity to obtain a GO: http://www.aib-net.org/portal/page/portal/AIB_HOME/MEMBERS_SECTION/DOMAIN_PROTOCOLS/DPs_Approved/France/Standard-Terms-And-Conditions_France_20130410.pdf

- In 2015, Spain was the fourth largest RE producer in Europe (dropped one position since 2014). At the same time, the country has more than 75% of its RE production issued. Note that all GOs issued in Spain are assumed as cancelled because Spanish electricity disclosure legislation does not require a cancellation of GO for use in supplier fuel mix (the supplier simply has to hold the GO in its account on the disclosure deadline 31.3.). Therefore, all GOs in the Spanish registry are used for disclosure. As mentioned, Spain joined the AIB in early 2016, the effect of which remains to be seen although restrictions apply on export of supported generation.
- Renewable generation in UK has been growing rapidly and, should the country link its system with the AIB, a large amount of new supply and demand would enter the EECS market.
- Among smaller countries, some might join the EECS market in the newer future. According to the AIB's Annual report⁸, Greece is in the middle of a member application process, and discussion have progressed with Serbia, Hungary and Slovakia.
- Cancellations are very low or nonexistent in small non-EECS countries group. This might be resulting from infrastructure for GOs and electricity disclosure not being fully set up or being implemented only recently.

⁸ AIB 2015 Annual Report: http://www.aib-net.org/portal/page/portal/AIB_HOME/NEWSEVENTS/Annual_reports/2015_AIB_AnnualReport_F.pdf

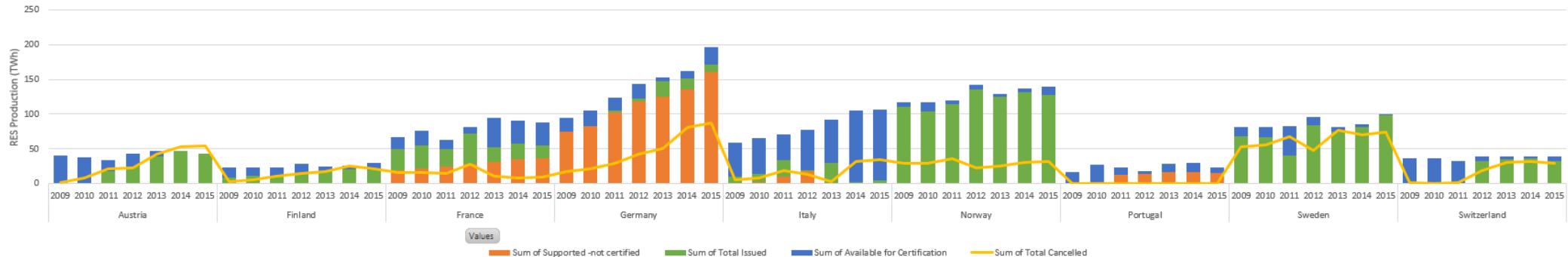


Figure 3.1 – Large EECS countries

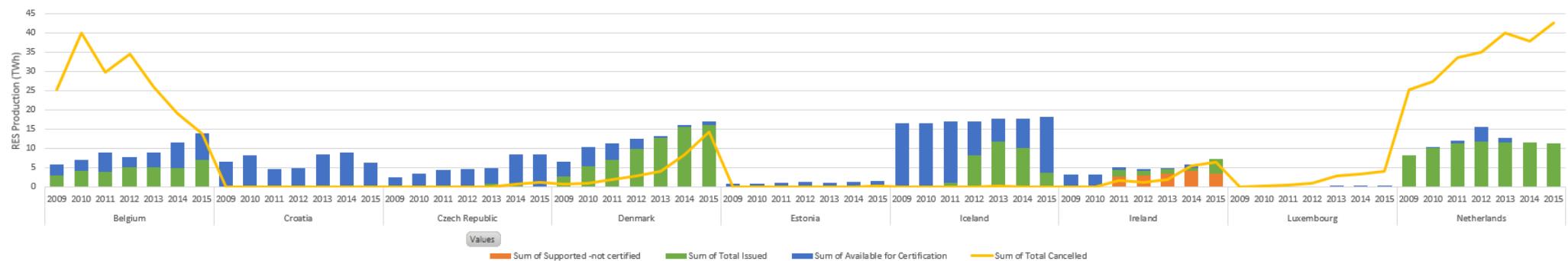


Figure 3.2 – Small EECS countries

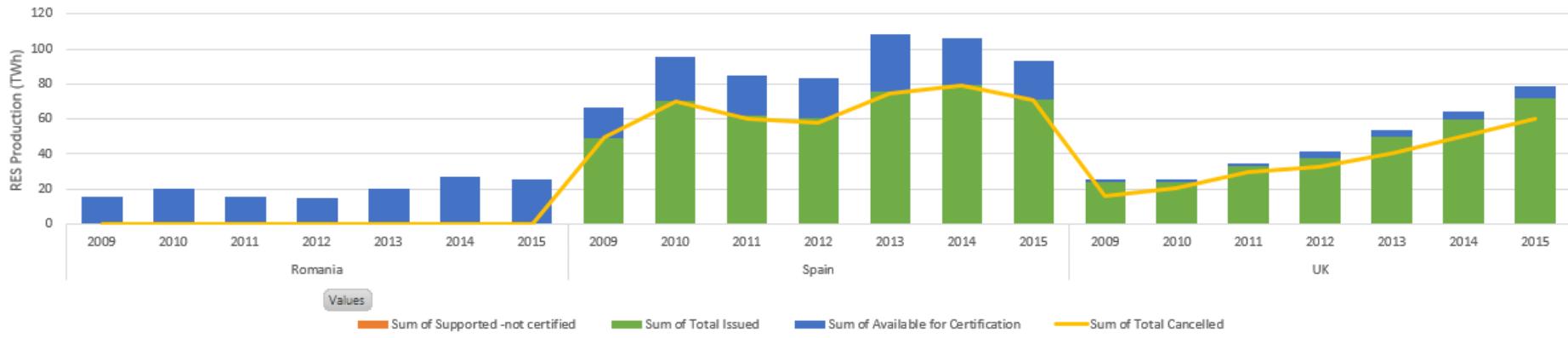


Figure 3.3 – Large Non-EECS countries

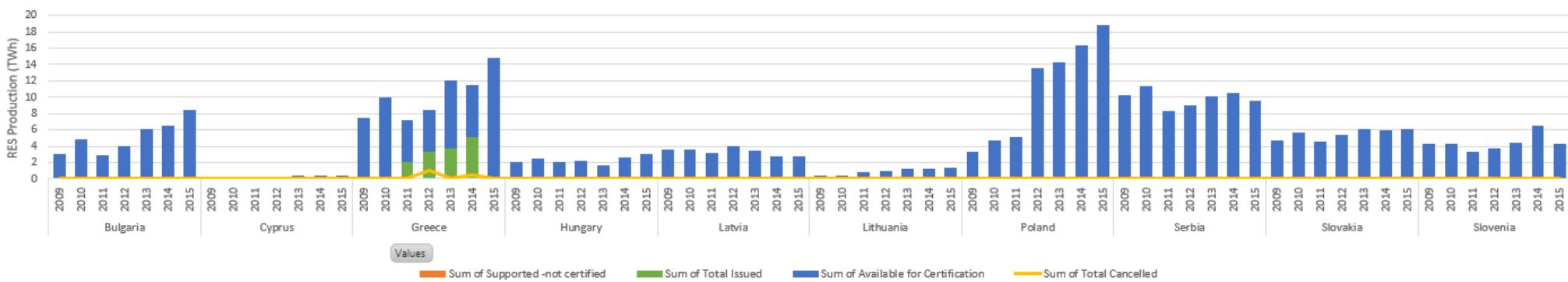


Figure 3.4 – Small Non-EECS countries

4. CONCLUSIONS

This report brings an updated outlook of the certificate market in Europe for the period 2009-2015. It is the second report in the series and it analyses volumes of renewable electricity production, issuing and cancellation of Guarantees of Origin (under EECS and National schemes) as well as amount of production not certified due to RE support schemes for 31 European countries.

Overall, the market continued to grow. Most importantly GO cancellations increased by 4% reaching a peak of 557TWh (half of RE production in Europe!). On the supply side, renewable production in Europe grew by 4,8%, but issuing volumes stagnated with a decrease of 0,6% from 2014, totalling 541 TWh in 2015. As mentioned, this is at least partly due to 2015 data not being completely available at the time of writing this report, which effects primarily issuing. As a result of increase in production and stagnated issuing, more production became unavailable for certificates as the supported – not certified volume grew by 12,5%. It should also be highlighted that 2015 was the first year in the history of GOs that the market saw a shortage of supply with cancellations surpassing issuing by 16TWh. Still, when comparing production and consumption, it was seen that there is a shortage of supply potential compared to the overall demand potential.

To give a rough forecast of the market during the next decade, this report used the Compound Annual Growth Rate (CAGR) between 2009 and 2015. According to the CAGR, RES production grew at an average of 7,2% a year, while issuing grew at an average rate of 9,4%, supported non-certified at 14,5% and cancellations, at rate of 14,8%. The study showed that, if such growth pace is maintained, available volumes would become nonexistent after 2025. However, it is known that moderate barriers to entry for much of the remaining available volumes still remain (e.g. large RE available production is outside the EECS area), so actual scarcity might be much closer. It should also be noted that demand is very different, depending on the information on the GO (e.g. location and size of plant, energy source and received support), whereas this analysis was made only for total volumes. Furthermore, the analysis does not consider possible changes in the regulative environment such as the possibility of extending GOs to all energy sources. Follow up studies could consider adopting more reliable forecasting methods if the current quality of the data allows such.

When looking at the countries of the report, this study divided them into four groups, based on AIB Membership and volume of RE production. Growth in RE production was significant in Belgium, Denmark, Germany, Greece, Ireland, Sweden, Poland and the UK, while it decreased notably in Portugal. GO issuing volumes rose substantially in Belgium, Ireland, Luxembourg, Sweden and the UK, while it went down especially in Iceland. Finally, cancellations rose mostly in Denmark, Germany, Ireland, Luxembourg, in the Netherlands and in the UK, and decreased in Belgium, Finland, Spain and Switzerland.

2015 will be marked in history of the GO market as the first year of cancellations exceeding issuing in whole Europe. This report gave an overall picture of the market, without going deeper into specific countries, as well as rough estimates of the future. In future studies, a more specific outlook on individual countries might be considered to give deeper insights. Also continuous update and improvement of data quality should be sought to avoid remaining assumptions.