



# Development of the Guarantees of Origin Market

2017 Update





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## 1. ABOUT THIS REPORT

This report is the fourth guarantee of origin market monitoring report written by Grexel® on request of RECS International. It brings together the basic market development and balance outlook between 2009 and 2016. The analysis considers renewable electricity production volumes, issuing and cancellation volumes of Guarantees of Origin, production that is not eligible for certification due to support schemes (e.g. Feed-in tariffs) and analyses how these variables have changed over time.

In addition to the standard market development outlook familiar from previous years' reports, we have added an analysis regarding supported renewable electricity volumes. The EU Commission has published a proposal for the new electricity market package (Winter Package) in late 2016. According to the Commission proposal guarantees of origin shall either not be issued for the supported electricity at all or alternatively these GOs shall be auctioned by the government so that the producers would not benefit from selling the origin of the electricity on top of the government support.

It is unclear if Member states would be free to choose which approach to take. If all would select not to issue guarantees of origin for supported production, a great amount of GOs would vanish from the market causing a serious overdemand as compared to the current situation. On the other hand, if some of the big countries currently not issuing GOs for supported production would choose to release these GOs to the market via the auctioning mechanism, an even greater oversupply would disrupt the market.

By collecting, and estimating where data was not available, the supported volumes we aim at helping the readers of this report to build their own scenarios regarding the future supply/demand balance. For the purpose of this report, supported unit of production was interpreted as meaning electricity generation from renewable sources receiving production support in the form of feed-in tariff, quota obligation certificate, tax rebate or similar production volume based incentive.

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-E<sup>1</sup>. EECS issuing and cancellation figures are from AIB's statistics<sup>2</sup>. In addition, national GO figures were collected from countries' national GO market reports, national contacts and from RE-DISS's country profiles<sup>3</sup> or, where not easily available, the national figures were estimated. Finally, renewable volumes non-eligible for certification came from local energy authorities' reports. Support volumes were collected from country specific reports where available and estimated based on previous years' figures collected by the Council of European

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<sup>1</sup> Source: [https://www.entsoe.eu/data/statistics/Pages/monthly\\_domestic\\_values.aspx](https://www.entsoe.eu/data/statistics/Pages/monthly_domestic_values.aspx)

<sup>2</sup> Source: [https://www.aib-net.org/facts/market\\_information/aib\\_statistics](https://www.aib-net.org/facts/market_information/aib_statistics)

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

Energy Regulators (CEER)<sup>45</sup>. Furthermore, National renewable electricity targets percentages were collected from the National Renewable Energy Action Plans (NREAP)<sup>6</sup> of each country.

The EECS issuing figures used for the calculations were changed from production based to transaction based this year. The reason is that the accuracy of production based data is typically not very good at the time of data collection (April-May).

## 2. OVERALL MARKET DEVELOPMENT

The Figure 2-1 below displays issuing and cancellations volumes between 2009 and 2016, 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:

- Cancellations volumes regained momentum increasing by 8% during year 2016 to a new record of 603TWh cancelled electricity, after a slower year 2015 of 4% growth and 559 TWh of total volume.
- On the other hand, issuing volumes experienced declining growth rate, only 4,6% increase from 618 TWh to 647 TWh during 2016. (Issuing growth rate in 2015 was 13,5%)
- In certain countries<sup>7</sup>, 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 8,9% between 2015 and 2016 (from 218 TWh to 237 TWh).
- When comparing production, issuing and supported–not certified figures, there still seems to be a notable share of idle capacity. In 2016, the amount of RES production which is still available for certification grew slightly from 277 TWh to 282 TWh and now represents 24,2% of total RE production (24,9% in 2015).

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<sup>4</sup> [http://www.ceer.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Electricity/Tab4/C14-SDE-44-03\\_Status%20Review%20on%20RES%20Support%20Schemes\\_15-Jan-2015.pdf](http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/Tab4/C14-SDE-44-03_Status%20Review%20on%20RES%20Support%20Schemes_15-Jan-2015.pdf)

<sup>5</sup> [http://www.ceer.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Electricity/2017/C16-SDE-56-03%20Status%20Review%20RES%20Support%20Schemes.pdf](http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/2017/C16-SDE-56-03%20Status%20Review%20RES%20Support%20Schemes.pdf)

<sup>6</sup> Source: <https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans>

<sup>7</sup> 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 Croatia, France, Germany, Ireland, Luxembourg, Portugal and Switzerland have such practice.

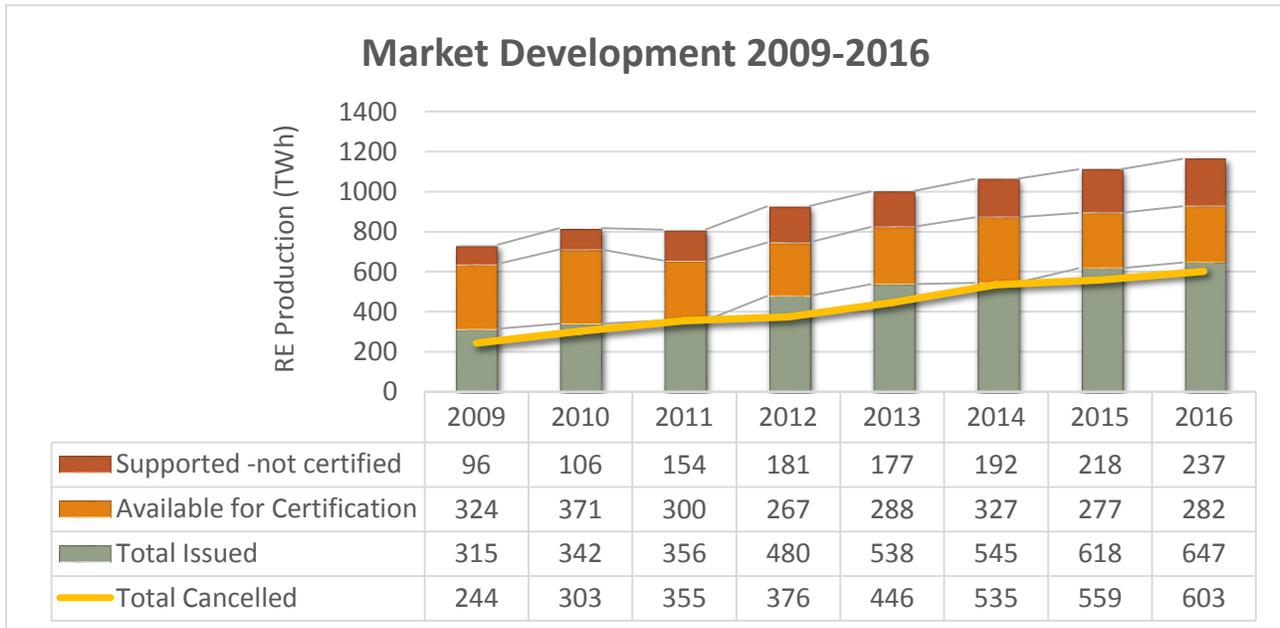


Figure 2-1 – GO Market Development

The Compound Annual Growth Rate ([CAGR](#)) between 2013 and 2016 brings an interesting perspective. CAGR is a smooth growth rate that reduces the effect of volatility between years. Compared to previous years, supported RES production was collected and is also now included in the CAGR figures. This also results in CAGR period being only 2013-2016 as support figures before that were too uncertain. According to Figure 2-2, RES production has grown at an average of 5,2% a year, which is divided to 9.1% growth in Supported RES production and 1,5% growth in not supported. At the same time issuing has grown at an average rate of 6,3% and supported non-certified at 10,3%. Finally, cancellations have grown at rate of 10,6%. This indicates that at a longer time interval the market is getting shorter even when considering increase in RE production.

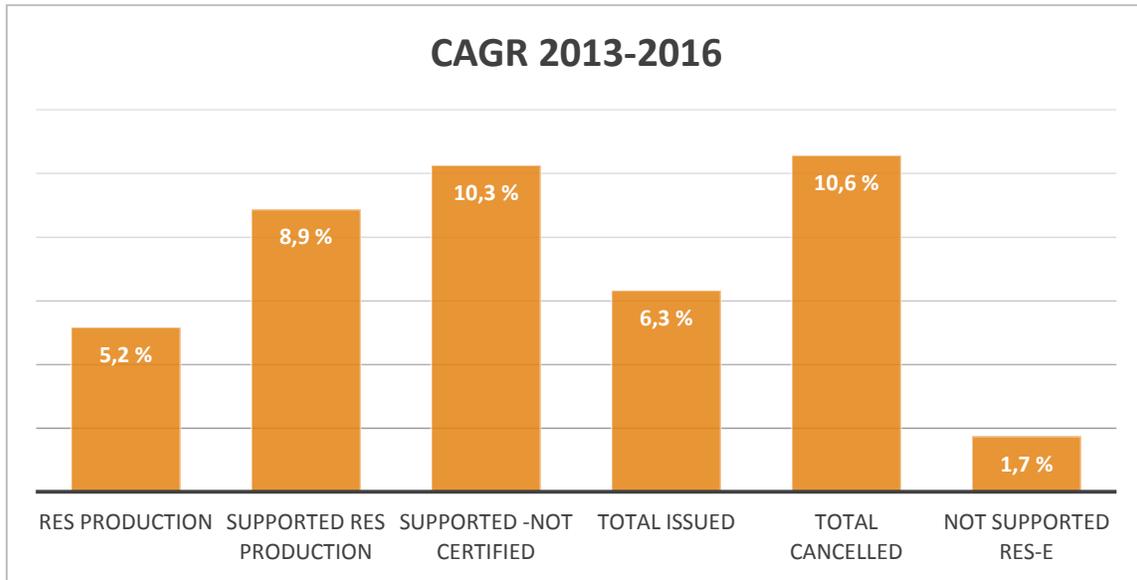


Figure 2-2 – Compound Annual Growth Rate (2009-2016)

As a rough estimation, CAGR rates may be applied to gain an outlook of the future of the market. According to Figure 2-3, assuming past growth rates (2013-2016 CAGR), GO cancellations would reach the total available volume by 2023. This of course presumes that the remaining available potential can be easily included into the GO system. Furthermore, the GO market is quite sensitive to many variables of which the new, proposed, European Renewable Energy Directive is the most prominent, as such this analysis by CAGR can only give very limited look on future.

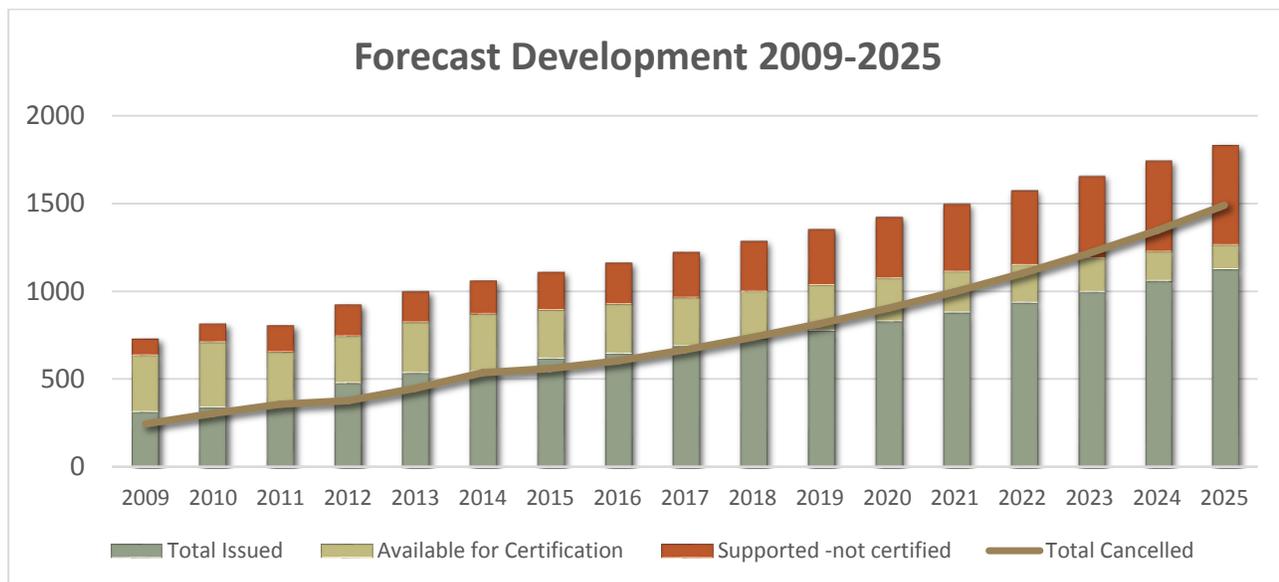


Figure 2-3 – Simple Market Forecast Assuming Stable Growth Rates

### 3. SUPPORTED PRODUCTION

Reliable information on supported volumes proved difficult to get hold of. Most countries publish very detailed figures on how much money was used in supporting renewable generation and who got this money but only a few publish what they have got for the money (RE Production). The supported production volume information is not collected by ENTSO-E, Eurostat, or the Commission. CEER has produced reports covering the subject but also there the newest data is from 2015. Some countries, like Germany, Spain, Norway and Sweden make accurate or accurate enough volumes available. Missing volumes have been estimated by extrapolating reliable historical values either linearly or in sync with up-to-date production figures.

Figure 3-1 shows that almost all new RES production in the selected countries is receiving production support. The volume of supported RES production has grown from 465 TWh of 2013 to 600 TWh of 2016 (GAGR 8,9%), whereas unsupported production volume has stagnated to less than 600 TWh (GAGR 1,7%). The same development is expected to continue for 3-5 another year, before significant production volumes start dropping out from 12-15 year support schemes.

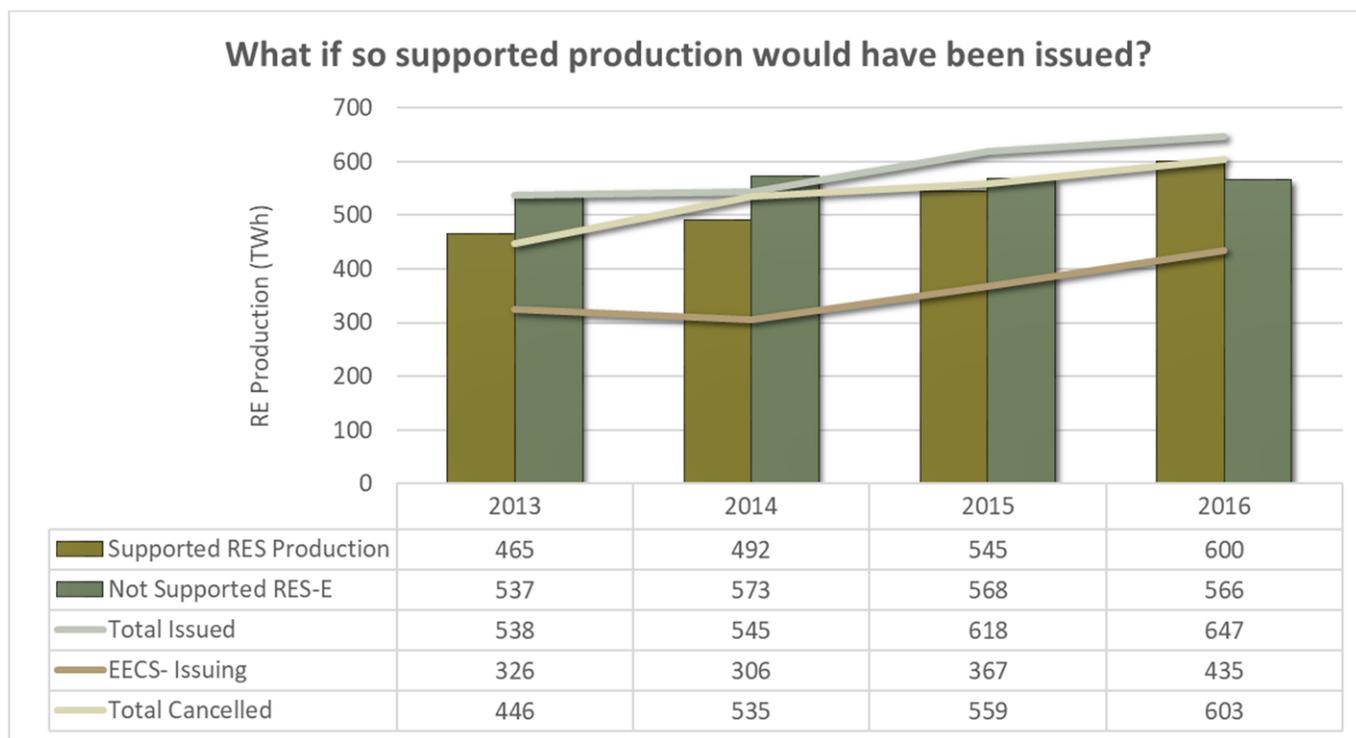


Figure 3-1 Development of Supported and Not Supported Production in Relation to Certificate Issuance and Use

Both the cancellation and issuance volumes already exceed the volume of unsupported production in the same area. If all supported production would, in a hypothetical scenario, suddenly be removed from the GO market the basis of the price determination mechanism would change causing probably a rapid surge accompanied

with a strong fluctuation of the market prices. If, on the other hand, all supported production would end up to the GO market via the auctioning mechanism, the prices would most probably drop close to zero because of a strong oversupply.

## 4. SELECTED COUNTRIES

Electricity users have not typically been part of the decision-making process of governments and local authorities when the topic is renewable energy. However, with the liberalization of power markets and with the advent of mechanisms to track energy sources from production to consumption, consumers are gaining more space in the process. In 2016, European consumers, for example, made the conscious effort to purchase renewables for more than 600 TWh<sup>8</sup> of electricity, equivalent to roughly 20% of all electricity consumption in Europe.

While it is relatively easy to find information on national renewable energy production, the same cannot be said about the other end of the chain, consumption. Available national statistics mostly ignore the choice being made by electricity consumers. National governments commonly have no way to monitor the collective action of their citizens and businesses and to know if they are actively purchasing renewable electricity on a large-scale.

If national governments expect that consumers play a more active role in their energy choices - and thus have a positive impact on the energy landscape - their renewable consumption should be more prominently acknowledged. Reporting the total, national consumption of renewable electricity, the amount of renewables that is collectively demanded, together with national production statistics can help to narrow the gap between policy initiatives supporting producers and policy initiatives which also support electricity consumers. This provides a more complete understanding of the national energy context and its relation to the target achievements in each country.

Last year this examination of Selected countries within Guarantees of Origin market was published as a separate report. This year the content is included in this overall GO Market Development review as it supports the overall view of this report. The aim of this part is to portray the renewable electricity generation as well as the electricity consumption for selected countries, giving a special attention to the electricity 2020-target attainment. For this year, one more country, Sweden, is included. The selected countries were Austria, Belgium, Germany, The Netherlands, Norway and Sweden.

At its core, the EU-wide national target attainment is measured by dividing the volume of national RE production by the country's total electricity consumption. This report shows the progress towards these national targets against the country's electricity consumption which is explicitly tracked using Guarantees of Origin (GOs) or other reliable mechanisms. It is shown that depending on whether production or consumption

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<sup>8</sup> Source: Chapter 2. Overall Market Development. This figure considers the total volume of Guarantees of Origin cancelled during 2016. It should be noted that, if included the amount of renewable energy that is allocated to consumers via support schemes (as in Germany) this number jumps to nearly 780 TWh.

is taken into account, a different picture can emerge than what is traditionally portrayed in national statistics. If the consumption of renewables based on GOs is considered for target attainment, some of the countries will come into a different light when it comes to their demand-side support for renewable growth. Such differences reinforce the importance of dual reporting and of ensuring that stakeholders are well informed of both the generation and consumption of energy resources in their country.

In the report, two graphs are created for each country: one shows the progress in absolute terms (per TWh) and the other, in proportion to the total volume of electricity consumption). In each graph, the vertical bars depict the RE generation divided into volumes of 1) unavailable for certification due to a support scheme (only in the case of the German Feed-in Tariff), 2) issued GOs and 3) available for certification (generation eligible for GOs, but for which no GO was issued).

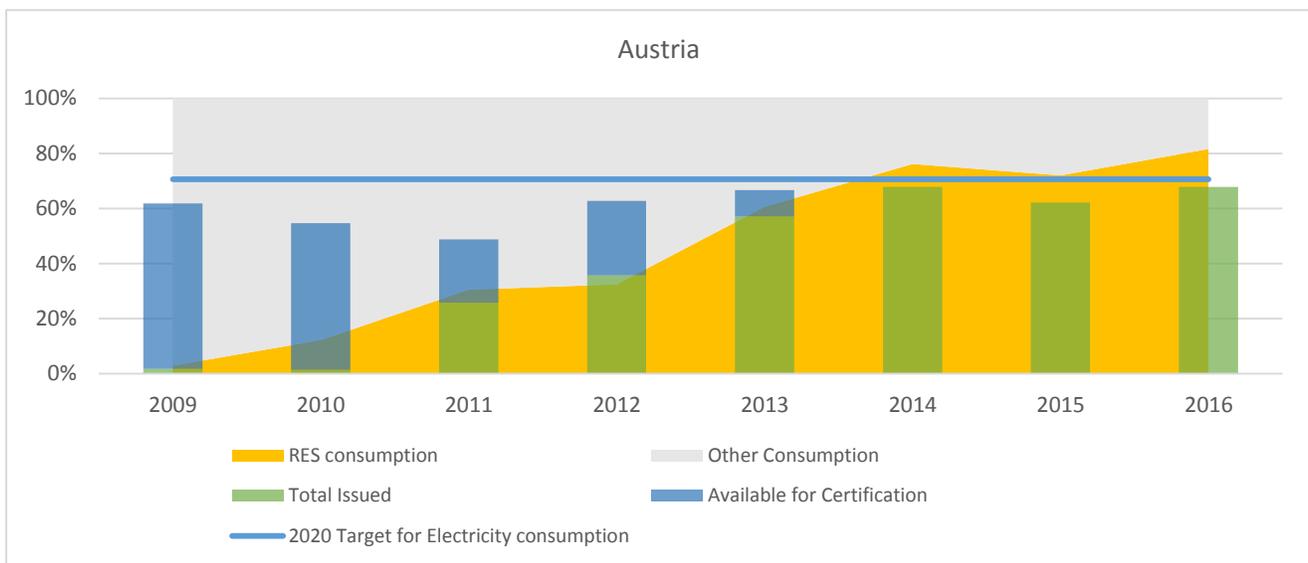
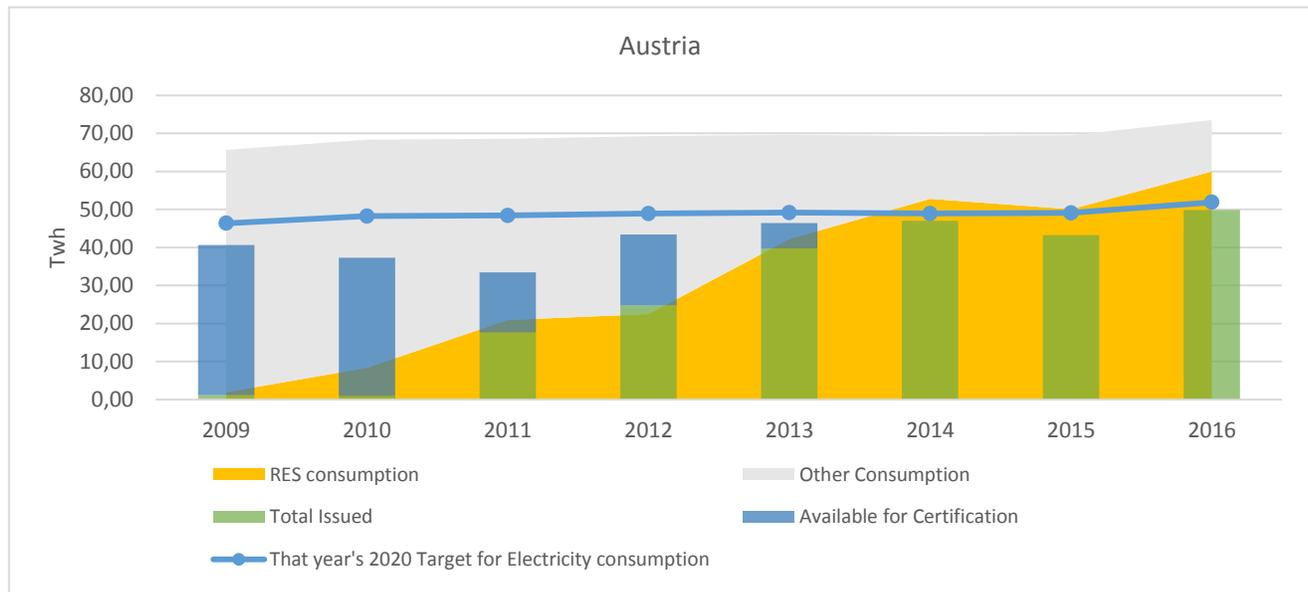
The areas on the background portray electricity consumption divided into volumes of 1) RES consumption (in the case of Germany this is divided between RES consumption through the support system and through GOs) and 2) untracked consumption. The total background area (grey plus yellow) therefore equals the total electricity consumption of the country. It is important to note that RES attributes may also reside on the grey area (through uncertified production, i.e. residual mix), but these attributes are not explicitly tracked as renewable consumption and are only implicitly allocated to consumers.

The blue line, in turn, represents the national target for RES electricity generation. In percentage, it remains stable during the years as it is a fixed percentage which is required as part of the binding 2020 target for RE consumption. However, in the absolute value graph (per TWh), it fluctuates because of the fact that it is calculated based on the current year's national electricity consumption. The gap between the top of the blue bar and blue line shows the amount by which the country is under/over its official target for RES electricity.

### 3.1 AUSTRIA

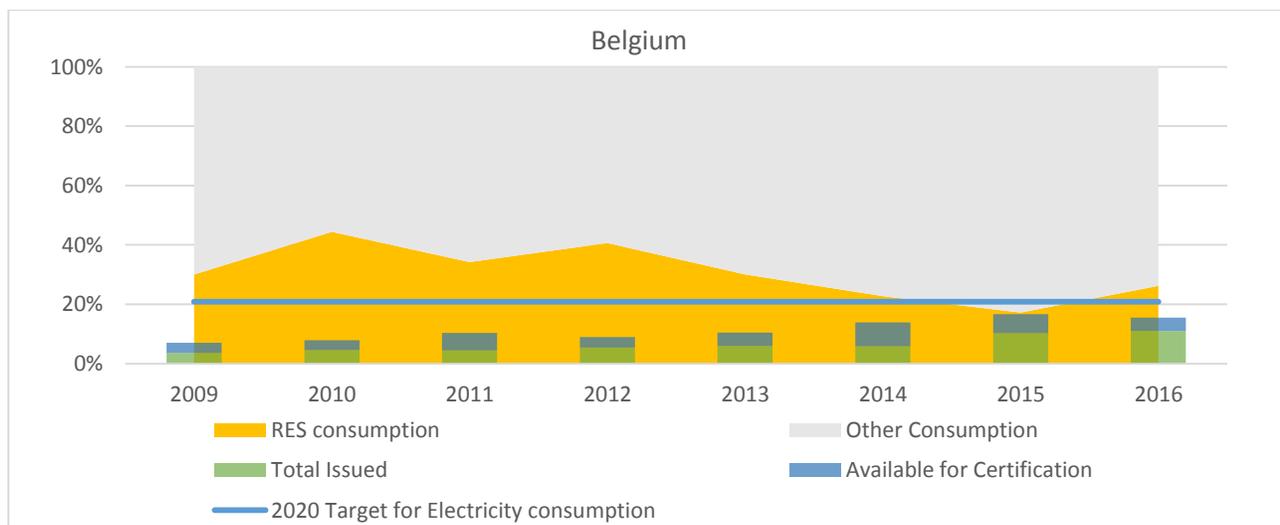
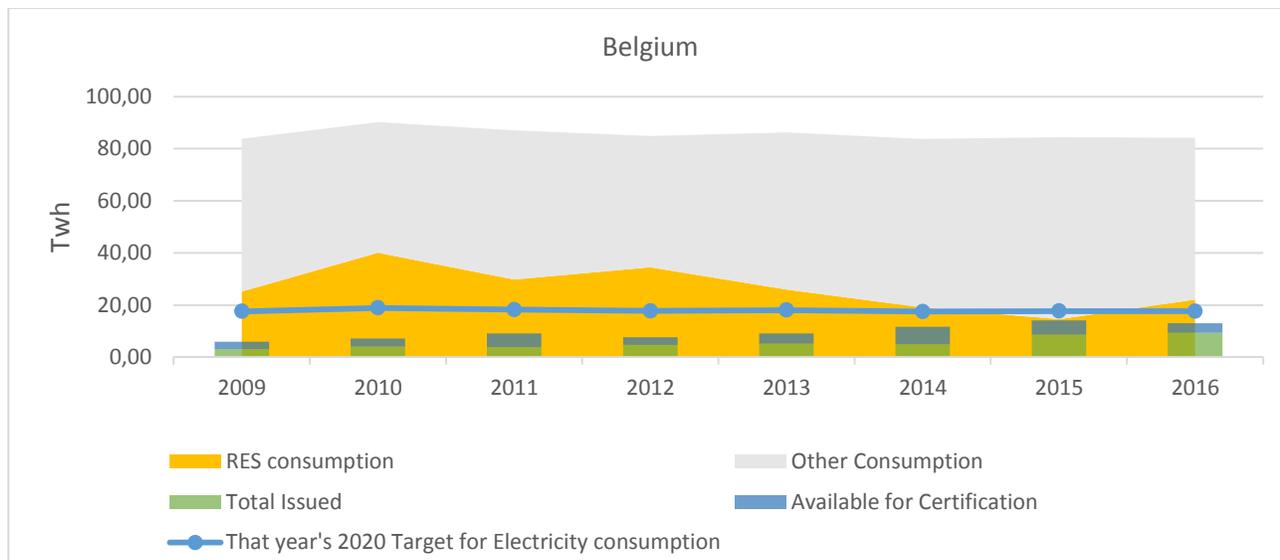
Austria is, in absolute volumes, among the ten largest producers of RE in Europe (approximately 50TWh in 2016). As can be gleaned from the graph, the res production has grown to a new record after the slump of 2015 which was caused by the lack of rainfall. Without the increase in total consumption, Austria would have reached the 2020 target already in 2016.

Similarly to RES production, the RES consumption is also back on growing track and almost reached 60 TWh during last year. Looking at the country's consumption, Austria would have already fulfilled its 2020 goal in 2014. Austria is one of Europe's frontrunners in electricity disclosure: the Austrian Competent Body verifies every suppliers' disclosure statements and the country has implemented "full-disclosure", meaning GOs must be cancelled for the volume of an electricity supplier's total sales regardless of technology.



### 3.2 BELGIUM

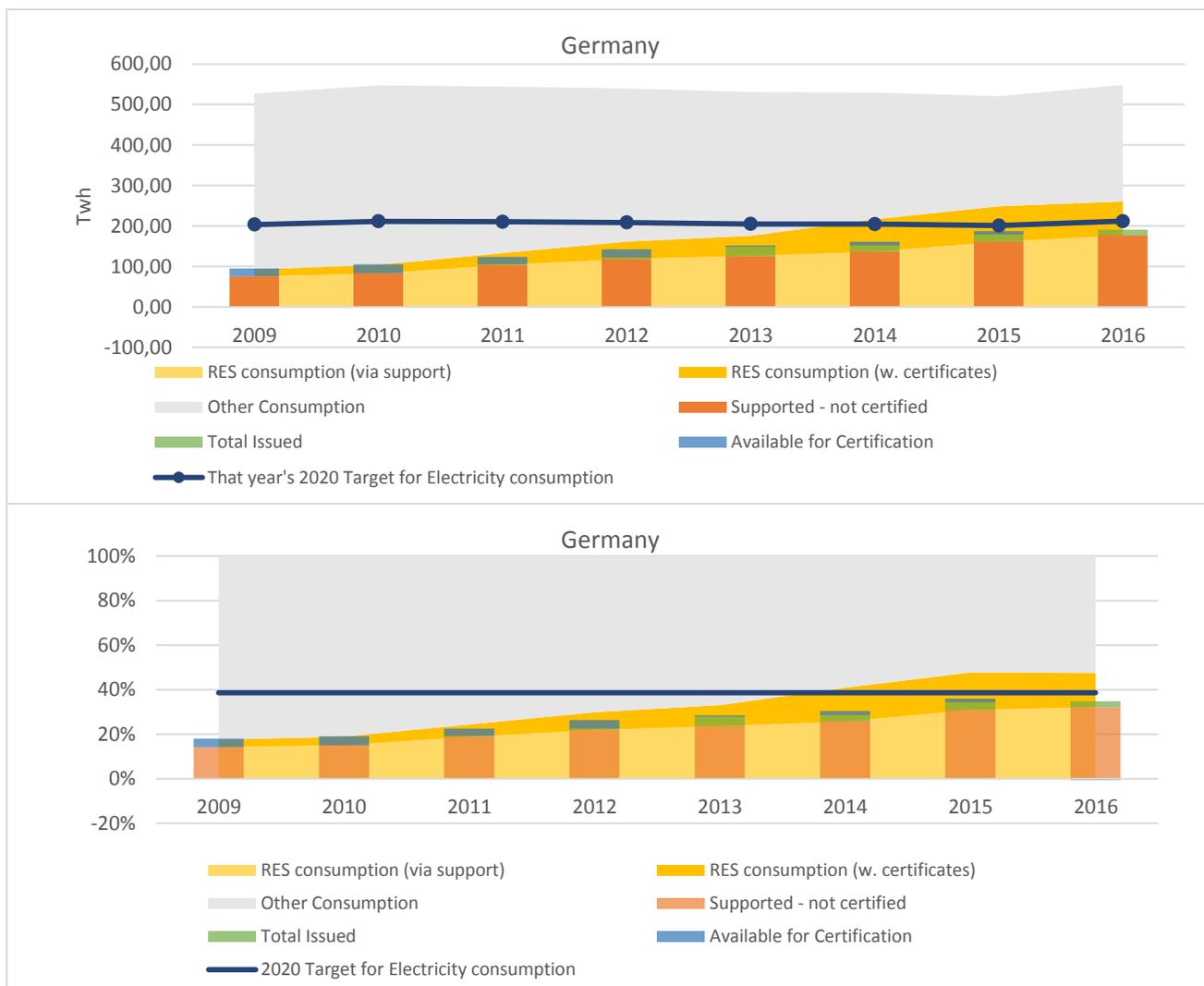
After very fast development of RES generation between 2012 and 2015, the growth stagnated in 2016 at 13 TWh (14TWh in 2015). Renewable consumption however turned to significant growth after declining trend of several years. The declining trend was triggered by a change in the federal tax exemption for green electricity.



### 3.3 GERMANY

Germany is the largest producer of RES electricity in Europe (188TWh in 2016). In terms of production, Germany almost achieved its target for 2020 already in 2015. However, the increase in consumption in 2016 widened the gap between the target and the RES production. After many years of impressive RES growth the development stagnated in 2016, growing less than half a percent from 187 TWh in 2015.

In terms of RES consumption, the German consumer can claim an even larger portion of renewables than they produce. A significant amount of German green consumption is derived from the support scheme which automatically allocates the green energy origin to the company buying the supported electricity. This is the reason that the light-yellow area and the orange bar are the same. But besides that, the share of GOs (dark yellow area) is also considerable as German consumers look to ensure they purchase 100% renewable electricity for their homes and businesses. However, as most of German RE production does not receive GOs (due to support through the feed-in tariff), the demand for GOs is largely met with non-domestic GOs. As a

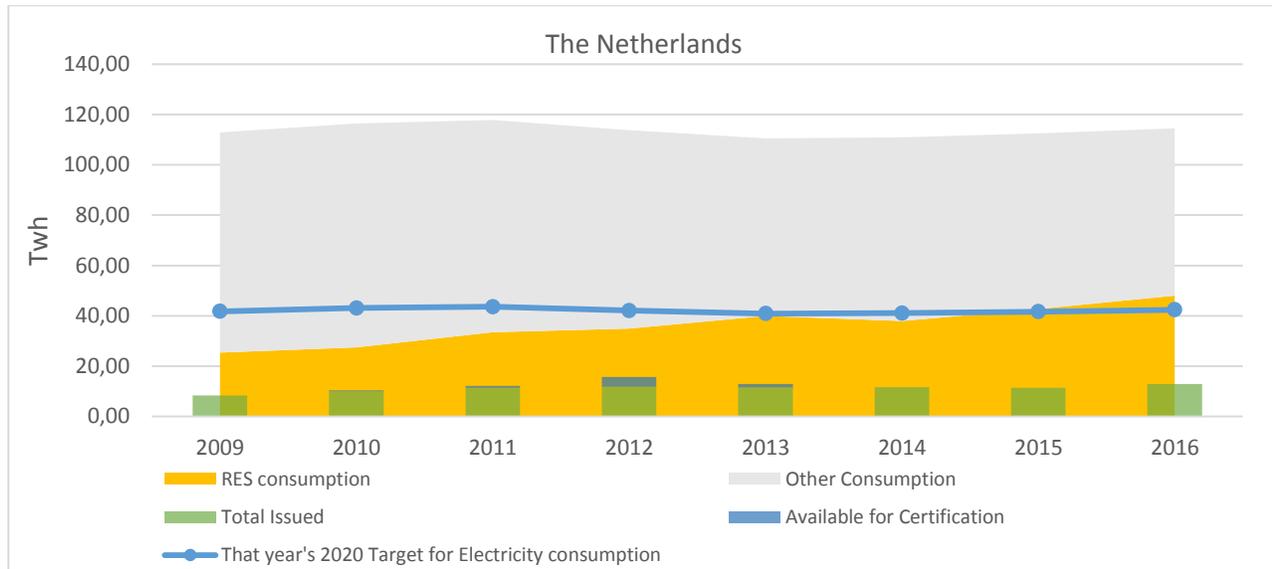


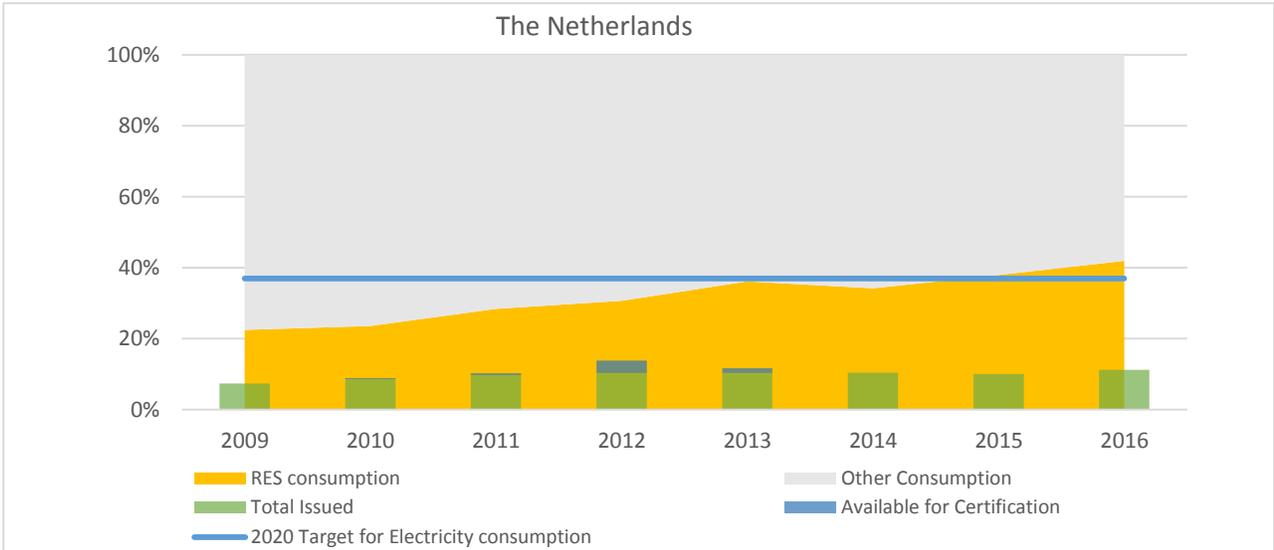
result, looking at consumption, 2020 targets have been reached by far.

### 3.4 THE NETHERLANDS

The Netherlands shows a larger amount of renewable electricity use by consumers even though the progress regarding renewables generation has been rather slow. The Netherlands is unlikely to meet its 2020 target with a total production of 12,4 TWh in 2016. In the same time-period, however, consumers in the Netherlands purchased a collective 48,6 TWh of renewable electricity products. Against the backdrop of a true consumption target it could be said that the Netherlands has already fulfilled its 2020-target mandates.

The high volume of renewable consumption in the country shows that The Netherlands has a well-functioning GO market. The country was one of the early adopters of the GO and the disclosure system has been well organized and operated for a number of years. This could lead to the strong demand for GOs we see today.

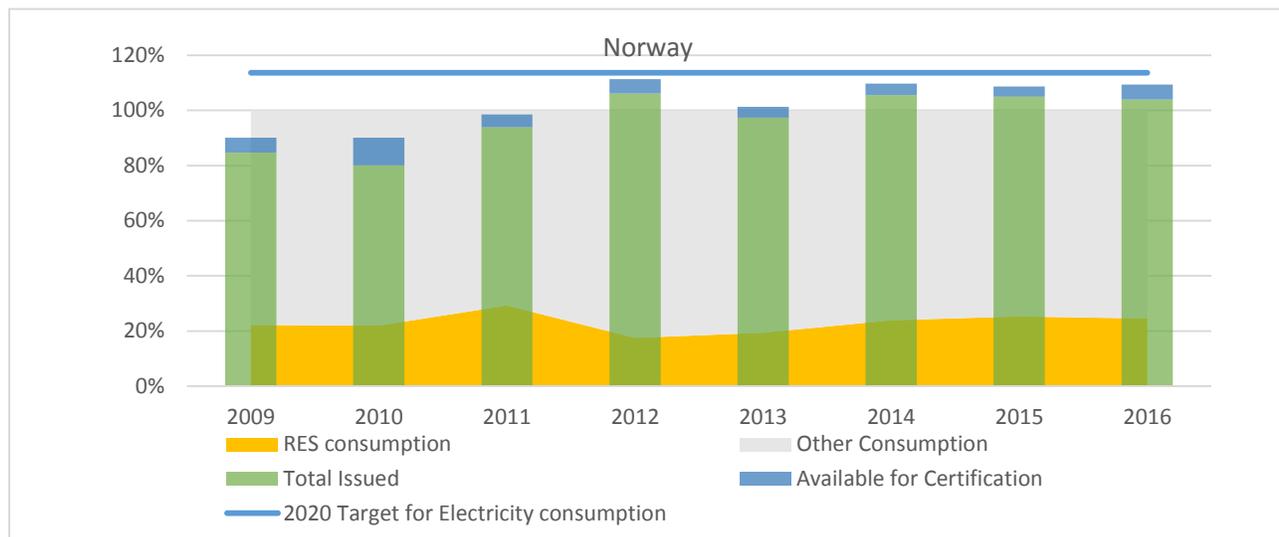
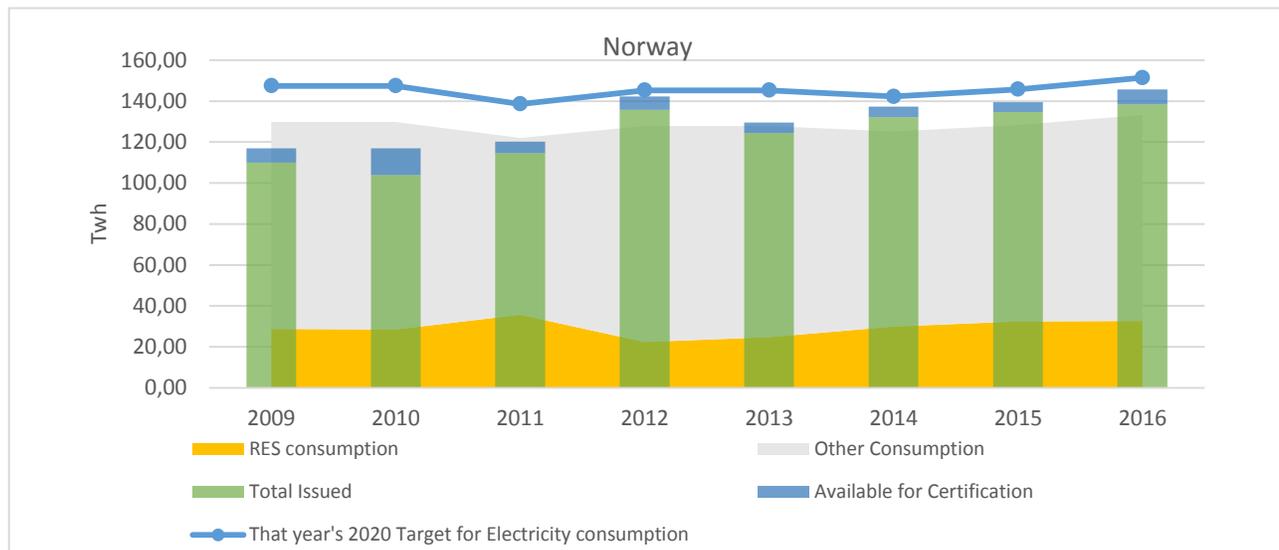




### 3.5 NORWAY

Norway's target for RES electricity production is larger than its total electricity consumption, as the country's production mix has historically been nearly entirely from renewable technologies. As the graphs show, this is not an unattainable target and seems that it will be met in the coming years as more and more renewable electricity is produced.

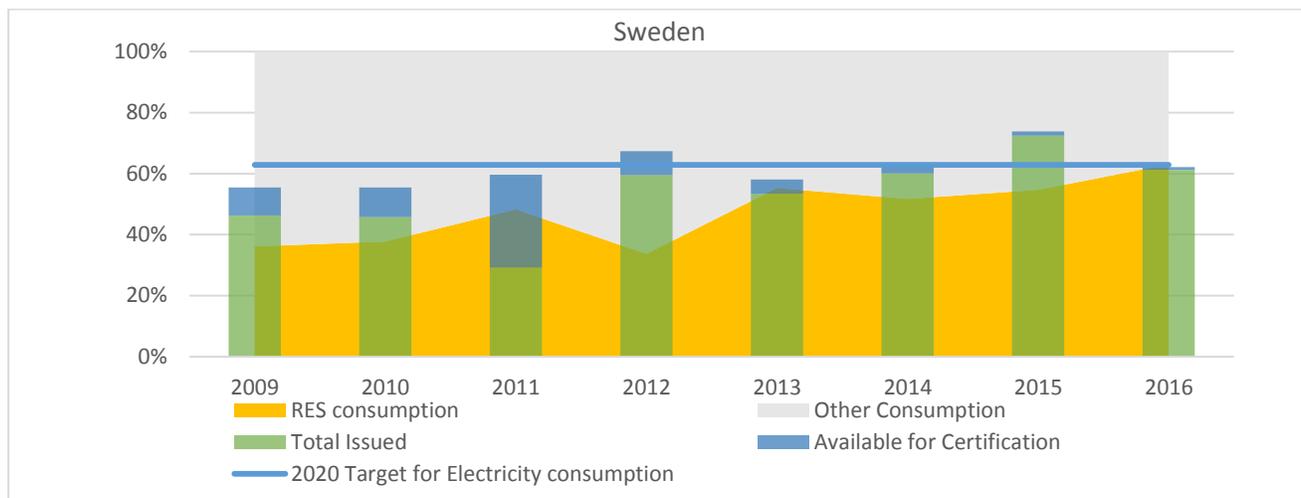
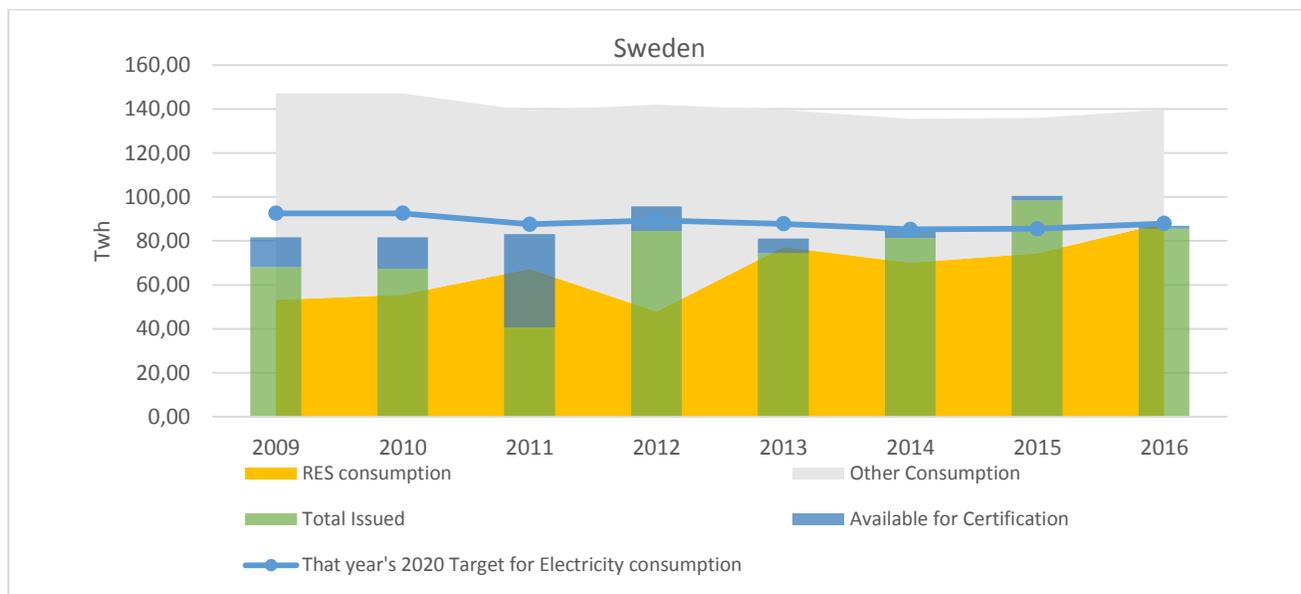
Norway's RES consumption steadily increased from 2012 to 2015, but stagnated in 2016 at 33 TWh. Furthermore, domestic demand for GOs is still far from the total RES generation. This combined with the fact that Norway is also a net exporter of physical electricity - given that the production of renewables in Norway is generally less costly than in other regions of Europe - ensures that Norway is a large exporter of renewable electricity. As a result, looking at the consumption based on GOs, Norway is far from reaching its targets.





### 3.6 SWEDEN

Sweden is one of the biggest RES electricity producers and consumers in Europe. RES production decreased to 87 TWh, because of smaller rainfall. Despite that, consumption continued to grow to 88 TWh. For the year 2016 production, consumption both practically met the 2020 target for Electricity consumption.



## 5. COUNTRY GROUPS

As in the previous years' reports, the study divides the countries into 4 groups. This time the countries were divided in a similar way as last year 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. Spain was moved from Large non-EECS countries to Large EECS countries, Poland from Small to Large non-EECS country, Slovenia move from small non-EECS to small EECS country, and Portugal from Large EECS to Large non-EECS countries to reflect recent developments.

### 5.1 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, Spain, Sweden and Switzerland for which data is shown in Figure 5-1 at the end of this section.

The second country group (Figure 5-2), contains EECS countries with low production volume of electricity from renewable energy sources. These countries are Belgium, Croatia, Czech Republic, Denmark, Estonia, Iceland, Ireland, Luxembourg, the Netherlands and Slovenia.

The following observations were made on EECS countries:

- Norway, Germany, Italy, Spain and the UK stand out with RE production volumes over 100 TWh, followed closely by France and Sweden.
- Austria, Switzerland, the Netherlands, Sweden, Norway, Denmark, and Estonia issue more than 85% of all RE production.
- Italy, France, Spain and Iceland still have considerable volumes available for issuing but the volumes are shrinking in all these countries.
- 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.<sup>9</sup>
- In 2016 Spain joined the AIB and Czech Republic regained its ability to import and export certificates. Especially the inclusion of Spain shows in the statistics as raised issuing and cancellation volumes.
- Cancellation volumes give the best indication of the GO market in a country as they demonstrate the 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. This might be due to a sound disclosure regime.

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<sup>9</sup> 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](http://www.aib-net.org/portal/page/portal/AIB_HOME/MEMBERS_SECTION/DOMAIN_PROTOCOLS/DPs_Approved/France/Standard-Terms-And-Conditions_France_20130410.pdf)

- The share of uncertified consumptions was below 50% in Austria, Switzerland, Luxembourg, and in Sweden, which shows a strong domestic demand for green power and/or full disclosure system (Austria and Switzerland).
- 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. Also, the Netherlands, Belgium and Luxembourg import large amount of foreign GOs compared to their domestic production and consumption.
- Italy has raised its issuance and export to a great extend following the decision to allow GO issuance for supported production in 2013.
- France saw a strong increase in issuance and cancellation in 2016

## 5.2 NON-EECS COUNTRIES

Non-EECS countries are represented in the two last groups of this study. The first country group (Figure 5-3), contains Non-EECS countries with high volume of production of electricity from renewable energy sources. These countries are Romania, Poland, Portugal, and the UK. These countries would cause a significant shift in the EECS market if/when they join the EECS market.

The second country group (shown in Figure 5-4) contains Non-EECS countries with low volume of production of electricity from renewable energy sources. These countries are Bulgaria, Cyprus, Greece, Hungary, Latvia, Lithuania, Serbia, and Slovakia.

The following observations were made on Non-EECS countries:

- Together, non-EECS countries account some 240 TWh of renewable production in 2016.
- 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 close future. These countries include at least Greece, Serbia, Slovakia and Lithuania.
- Cancellations are very low or non-existent 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.

DEVELOPMENT OF THE GUARANTEES OF ORIGIN MARKET (2009-2016)  
 - KEY FACTS REPORT

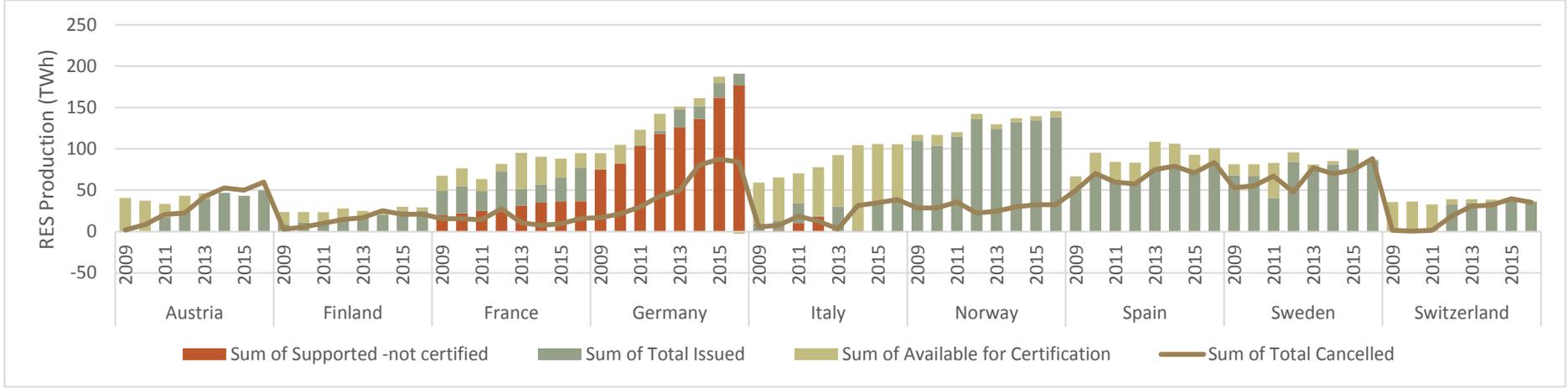


Figure 5-1 – Large EECS countries

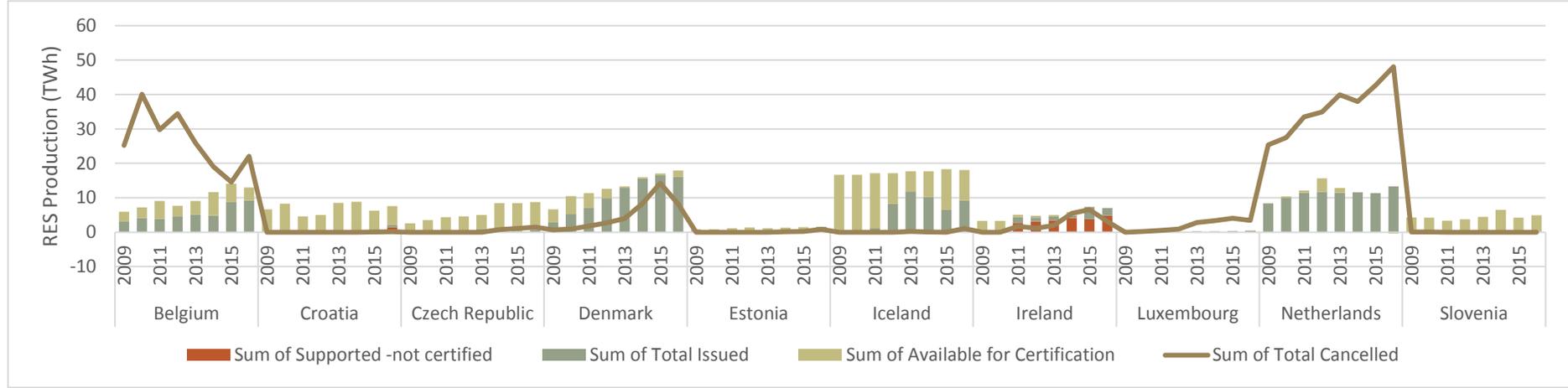


Figure 5-2 – Small EECS countries



Figure 5-3 – Large Non-EECS countries

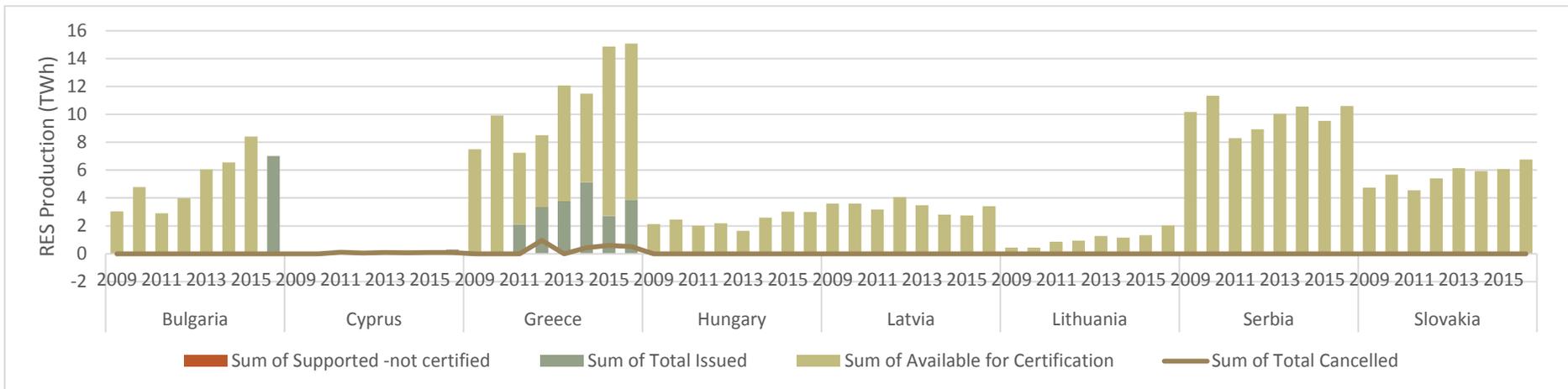


Figure 5-4 – Small Non-EECS countries

## 6. CONCLUSIONS

This report brings an updated outlook of the certificate market in Europe for the period 2009-2016. It is the fourth report in the series and 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. In this 2017 update also the analysis of supported electricity production, as well as one new Selected country, Sweden, is included in the report.

Overall, the market continued to grow. Most importantly GO cancellations increased by 7,9% reaching a peak of 603TWh (more than a half of RE production in Europe!). On the supply side, renewable production in Europe grew by 4,8% to 1 166 TWh (GO issuing volume 4,6% to 647 TWh). It looks like that the market is still oversupplied, or is it? As both the issuance and cancellation figures are growing and that GOs issued in year X are typically cancelled in Q1 of year X+1, it is important to look at what happened in Q1 2017 to understand the supply/demand balance. If we apply so called shifted transaction based approach to cancellations (2016/Q2-2017/Q1) we notice that the volume of cancellation is some 100 TWh bigger than using a strict calendar year based approach, which would translate in some 50 TWh or 8% overdemand of disclosure year 2016 GOs! On top of that some 30 TWh renewable GOs expired from the market. Similar difference between calendar year and shifted calendar year based calculations did not exist in 2015.

Supported RE generation volume grew by 10,1% in 2015-2016, whereas unsupported volume was not growing at all (-0,4%). The supply/demand balance as well as the high volume of both supported and supported-not-certified production make the market price mechanism extremely sensitive to whether supported production will be brought to or withdrawn from the market. The former would throw the market into production cost based pricing whereas the latter would cause a more value based pricing to emerge. Value based pricing might lead in considerably higher prices in markets where products are sold based on emotions<sup>10</sup>.

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 Spain, Portugal, Poland, Austria and the UK, whereas Bulgaria, Sweden and Switzerland saw a decrease in production. Cancellation rose rapidly in Austria, Belgium, France, Italy, the Netherlands, and Sweden, while it dove in Denmark, Germany, and Switzerland.

This report gave an overall picture of the market, relying in estimated data in the absence of real, without going deeper into specific countries. It also aimed at shedding some light on how the proposed auctioning mechanism proposed for GOs issued for supported production would affect the market. Depending on the discussion around the Winter Package, a good candidate for a closer look in the next year's report would be the support schemes and countries' plans regarding the treatment of supported production in the post 2020 era.

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<sup>10</sup> [https://en.wikipedia.org/wiki/Value-based\\_pricing](https://en.wikipedia.org/wiki/Value-based_pricing)