

Report D7.1-ES, March 2016

Implementation of Auctions for Renewable Energy Support in Spain: A case study



HORIZON 2020

Short about the project

Auctions for Renewable Energy Support: Effective use and efficient implementation options (AURES)

This project helps assessing the applicability of different auction types to renewable support under different market conditions. It also explores which auction types and design specifications suit particular requirements and policy goals in European countries. By establishing best practices and a knowledge sharing network, we contribute to informed policy decision-making and to the success of auction implementations across Europe.

Target-oriented analysis: Through analysis of empirical experiences, experiments and simulation, we will create a flexible policy support tool that supports policy makers in deciding on the applicability of auction types and certain design specifications for their specific situation.

Capacity building activities: We undertake specific implementation cases to derive best practices and trigger knowledge sharing amongst Member States. We strive to create a strong network with workshops, webinars, bilateral meetings, newsletters, a website that will serve as capacity building platform for both policy makers and market participants (including project developers, auctioneers, etc.). Wherever required, we can set up specific bilateral and multilateral meetings on specific auction issues and facilitate cooperation and knowledge sharing. Additionally, we offer sparring on specific implementation options, drawing from insights gained during the first phases of the project (empirical analysis of previous auctions in Europe and the world), conceptual and theoretical analysis on the applicability of specific designs in certain market conditions and for certain policy goals issues and facilitate cooperation and knowledge sharing. Additionally, we offer sparring on specific implementation options, drawing from insights gained during the first phases of the project (empirical analysis of previous auctions in Europe and the world), conceptual and theoretical analysis on the applicability of specific designs in certain market conditions and for certain policy goals.

Project consortium: eight renowned public institutions and private firms from five European countries and combines some of the leading energy policy experts in Europe, with an impressive track record of successful research and coordination projects.

This report deals with the planned implementation of auctions for Renewable Energy support in Spain from 2016 onwards. The report focuses on the implementation process and provides the necessary background information. Furthermore the planned auction design is described and discussed both from a policy maker's and an investor's point of view. Finally, main strengths and weaknesses are identified and the scheme is discussed according to several success criteria. The proposed design is related to the findings from AURES work packages 2, 3 and 4, which included the identification of success criteria, of appropriate auction formats and suitable design elements for RES auctions, as well as the analysis of past auction implementations.

This report forms part of AURES Deliverable 7.1, which is presented in six separately paginated parts:

D7.1-INTRO	Introduction to the task 7.1 case studies: case selection and methodology
D7.1-ES	Case 1: Spain
D7.1-PL	Case 2: Poland
D7.1-SK	Case 3: Slovakia
D7.1-HR	Case 4: Croatia
D7.1-NL/DK	Case 5: Netherlands – Denmark cooperation

The report contributes to the first of three tasks in work package 7 of the AURES project:

- T7.1 Identifying future implementation plans for auctions in Europe
- T7.2 Performing specific implementation cases of future auction implementation
- T7.3 Model based analysis of the specific cases



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Project deliverable:

WP7 – Future implementation possibilities for auctions in Europe.

Task 7.1 specific implementation cases

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Table of contents

1	Description of market conditions and RES auction status	3
	Country characteristics.....	3
	Electricity market characteristics.....	3
	Key figures for RES-E	6
	RES targets and technology focus.....	6
	Main pillars of current RES-E support policy	8
	Main challenges of current support policy and motivation for RES auctions.....	12
	Auction status.....	12
	General characteristics of the planned or proposed auction	13
	Specific design elements of the planned or proposed auction	15
	Additional information regarding characteristics and design elements.....	20
2	Similarities and differences of the planned or proposed auction to existing designs.....	20
3	Implementation process	21
4	Stakeholder opinions	22
	General stakeholder reactions until now.....	22
	Results from the interviews	22
	Stakeholder 1: Expert in the wind energy sector.....	23
	Stakeholder 2: Jorge Morales de Labra. GeoAtlánter S.L.	24
	Stakeholder 3: Iñigo Muniozguren, EGA (Wind Energy Association from Galicia)	25
	Stakeholder 4: Hugo Lucas, FactorCO2	26
	Stakeholder 5: Wind energy investor	28
	Opinions from other sources.....	28
	CNMC.....	29
	Government (MINETUR)	31
	Small Renewable Energy Association (APPA)	31
	AEE (Spanish Wind Energy Association).....	32
5	Preliminary expectations on the performance of the auction based on assessment criteria	33
	Policy Effectiveness	33
	Static Efficiency/Cost effectiveness	35
	Dynamic Efficiency.....	35

Actor variety and social acceptability	36
Compatibility with market principles and integration.....	38
Distributional effects & minimisation of support costs.....	38
6 Conclusions	38
Bibliography	40

1 Description of market conditions and RES auction status

Country characteristics

With its large size (504,000 km²) and population (47 million) Spain is the second largest and the fifth most populated country in the EU28. In 2014, its GDP per capita (PPP) reached 24882.3 \$ (World Bank, 2015) and is on a growing trend. As of January 2016, Spain is currently one of the EU countries with the highest GDP growth rates (above 3%).

As in other developed countries, the Spanish economy entered into recession at the end of 2008. The impact of this crisis on unemployment and GDP rates has been particularly detrimental. Between 2009 and 2013, nominal GDP fell by an accumulated 6.7%, the unemployment rate rose to a historical high of 25.7% in 2012 and household disposable income fell by 4.3% in nominal terms. Spain's electricity consumption amounted to 237.1 TWh in 2013. Demand peaked at 261 TWh in 2008, after decades of steady growth, declined by 5.3% in 2009 owing to the recession, recovered slightly in 2010 and has continued to fall since. In 2013, consumption was 5.7% higher than in 2003, but 9.1% lower than the peak of 2008.

Arguably, the economic crisis and the increase in prices are the two main factors behind the drastic reduction in electricity demand in the last years. Thus, residential electricity consumption increased at an average annual growth rate of 5% between 2000 and 2007 and decreased by 0.5% between 2008 and 2010 (Romero-Jordán et al 2014). With 5,231 kWh per person the country has a medium-low average electricity consumption level. The commercial and public services sector (including agriculture) and the residential sector are the largest consumers. The commercial sector accounted for 35.9% of demand in 2013, up by 36.8% compared to 2003. The residential sector consumed 30.6%, increasing by 33.7% over the same period. Industry's demand accounted for 29.5% of the total in 2013 (27.3% lower than in 2003), collapsing by 18.5% in 2009 and experiencing a steady decline since then. The energy sector, including coal mining, oil and gas extraction and refining, consumed 2.1% while transport consumed 1.9% of electricity; demand from both sectors has been volatile since the mid-2000s (IEA 2015, p.96).

Electricity market characteristics

The Spanish electricity sector is highly concentrated. There are five main power-generation companies (Iberdrola, Gas Natural Fenosa, Endesa, EDP - Energias de Portugal and E.ON) and four main electricity retailers in Spain. According to the National Commission for Markets and Competition (CNMC 2014), the five largest companies account for 90% of the sales to final clients and around 60% of the wholesale market. Market concentration, which had been falling for a number of years with the increase in smaller renewable energy generating companies, has remained stable in recent years. The largest generation company in Spain in 2012 accounted for a 23.8% of the total energy sold and there were five other companies that generated

more than 5%. The Herfindahl-Hirschman index (HHI, a measure for market concentration) in the power-generation market is 1,329, whereas the HHI in electricity retail market is 2,240.

The largest companies in terms of installed capacity in Spain are Iberdrola, Endesa and Gas Natural Fenosa. They hold around 75% of installed capacity, excluding wind and solar capacity. Hidroeléctrica del Cantábrico (EDP) and E.ON both have 5% to 6% of installed capacity. According to the National Commission of Markets and Competition (CNMC), market concentration in electricity generation is moderate, below that of other European countries. The CNMC calculates that if all technologies are considered, the HHI for generation was around 1 000 in 2013, implying a competitive marketplace. However, if only price-setting technologies (hydro, coal and natural gas) are considered, HHI rises to 2 300, implying a highly concentrated marketplace. Spain is also well connected with Portugal, but poorly connected with France, limiting competition across the border (IEA 2015, p.104).

Spain's retail electricity market consists of a free market price segment and a segment that can also opt for the electricity price called voluntary price for the small consumer, VPSC (PVCP in Spanish), only available for customers with a connection of less than 10 kW. Spain's electricity system had 27.6 million customers in September 2014, the latest month for which data are available (CNMC, 2015b). Of these, 13.9 million were on the regulated end-user tariff and 13.7 million on free market prices. In December 2013, a total of 162 retailers were active in the free market segment. The three largest retailers (Endesa, Iberdrola and Gas Natural Fenosa) supplied 67% of all electricity, down from 72% in December 2012, but a still significant concentration. The VPSC (PVPC in Spanish) segment had only five suppliers in 2013, designated by law: Endesa, Iberdrola, Gas Natural Fenosa, Hidroeléctrica del Cantábrico (EDP) and E.ON. All but E.ON are also among the main operators in the natural gas sector. Since 2014, three more reference suppliers for this segment have been nominated according to Royal Decree 216/2014, which regulates the methodology for the calculation of the VPSC (PVPC in Spanish).

The largest overall retail market share in 2013 was held by Endesa which had 40% of customers and supplied 37% of the electricity volume. Concerning the free market, Endesa is still the first supplier in terms of energy supplied with a share of 34%, though Iberdrola was the largest by number of customers (48% of the total).

Retailers not belonging to the five main operators are, however, gradually increasing their market share from 16% in December 2011 to 21% in December 2013. They mainly serve industrial customers, with a market share in December 2013 of 30%. On the other hand, new entrants only had a 3% share in the residential market in December 2013. Endesa, Iberdrola and Gas Natural Fenosa supplied 90% of the total electricity to the domestic segment. The rate of customers switching supplier has increased steadily over the past years, from 5.2% of customers in 2009 to 13.0% in 2013 (IEA 2015, p.85).

Regarding electricity prices, the average household retail price in 2014 was 235.7 €/MWh, considerably above the EU average (205.7€/MWh). In contrast, the average industrial retail prices (141.2€/MWh) were below the EU average (149.2€/MWh). According to IEA (2015, p.115), electricity prices in 2014 were relatively high by IEA standards. Spain ranked fifth regarding industrial prices (only behind Italy, Japan, Germany and Ireland) and also fifth regarding household prices (only behind Denmark, Germany, Italy and Ireland)). They have also increased significantly over the past decade. According to Eurostat, the annual average electricity price for medium-sized Spanish households increased every year over the past decade, from EUR 0.1079 per kWh in 2004 to EUR 0.2252 per kWh in 2014, or by 109%. Specifically, prices increased by 65% from 2008 to 2014.

The average price for medium-sized industry increased even faster from 2004 to 2014, from EUR 0.0538 to EUR 0.1185 per kWh, or by 120%. From 2008 to 2014, the increase was 30%. In contrast, wholesale prices in the Spanish market decreased from EUR 65.89 per MWh in 2008 to EUR 42.13 per MWh in 2014, or by 36%. Retail prices have therefore not risen because of energy costs, but because of taxes and network access tariffs. The access tariff has been used both to remunerate transmission and distribution network activities, and to pay for several kinds of subsidies, including on renewable energy, CHP, electricity supply in the extra-peninsular system, and interruptibility services. These subsidies increased fast from 2005 to 2013 and led to the burgeoning tariff deficit.

The power mix is relatively technologically diversified. The electricity demand coverage in 2014 was as follows: Nuclear (21.9%), Wind (20.4%), Coal (16.4%), Hydro (15.4%), Combined Cycle (8.5%); Solar PV (3.1%); Solar Thermoelectric (2.0%); Renewable Thermal (1.9%); Cogeneration and other (10.4%). The installed power capacity per technology was: Combined Cycle (25.1%); Wind (21.2%); Hydro (18.4%); Coal (10.6%); Nuclear (7.2%); Solar PV (4.3%); Solar Thermoelectric (2.1%); Renewable Thermal (0.9%); Cogeneration and other (9.9%). According to the electricity industry association (UNESA (2015)), the structure of generation in 2014 was: Coal (16.6%), fuel (2.4%), CCGT (9.2%), nuclear (20.5%), wind (18.6%), cogeneration (10.5%), solar (4.9%), hydro (12.8%), rest of renewable (4.5%).

In 2014, Spain's cross-border electricity trade amounted to 28 TWh, corresponding to around 11% of electricity demand in the country. With exports of 15.7 TWh and imports of 12.3 TWh, Spain was a net exporter of 3.4 TWh.

The country has been a net exporter since 2004, previous to which the volume of trade was lower and net trade was more volatile. Since 2004, net exports have doubled, mainly owing to increasing exports to Portugal, which was made possible through growing interconnection capacity. Spain is a net exporter to Portugal and Morocco and a net importer from France since 2011. In 2013, net imports from France were 1.7 TWh. The volume of Spain's cross-border electricity trade by country varies from year to year, mainly because of weather conditions (IEA 2015, p.96).

The liberalisation of the Spanish electricity market started in the 1990s in the framework of the EU energy market liberalisation. The legal basis was set in the Electricity Sector Act 54/1997, which was amended to transpose the EU directives concerning the common rules for the internal market. This process, started in 1997, involved the introduction of competition via structural changes such as vertical unbundling of vertical integrated companies to facilitate non-discriminatory access to monopoly networks and the establishment of independent energy sector regulators. In the retail market, the liberalisation process culminated in 2009 when standard regulated tariffs were abolished for high-voltage (industrial) customers – accounting at the time for approximately 50% of total electricity consumption – and a tariff of last resort was established for some specific low-voltage consumers (mainly households). Therefore, industrial consumers as well as a portion of the domestic consumers currently face the market price.

The evolution of the share of consumption supplied at the free market (starting with only 11% of households' consumption supplied at free market in 2009 and reaching 50% by 2013) suggests that the country is on the way towards a fully liberalized electricity market. In 2013, the spot market accounted for 74% of the total electricity consumed in Spain.

Key figures for RES-E

In the case of Spain, the implementation of different support policies for electricity from renewable energy sources (RES-E) has resulted in an impressive presence of electricity generation from renewable sources. With 50,481 MW – including hydro (19,897 MW) - at the end of 2014, Spain ranked fourth in the world in terms of RES-E (not including hydro), only behind China, the United States and Germany. It is first in concentrating solar thermal power (CSP) and fourth in wind power (REN21, 2014). Spanish RES-E generation has grown from 26 TWh in 2000 to 111TWh in 2014, when it represented 42% of total electricity demand.

Table 1: Overview of existing RES support schemes in Spain

Existing support scheme type/types	(see next section)
Renewable share on total energy production	Primary energy production (domestic): 33623 ktoe RES: 16782 ktoe Share of RES: 50% (3361 hydro, 7617 wind, solar and geothermal, 5804 biomass, biofuels and renewable wastes).
Renewable share on final energy consumption	Primary energy consumption (2014): 118413 ktoe Share of RES in primary energy consumption: 14.5% Share of RES in final energy consumption: 15%
Total energy production	33623 ktoe
Technology focus 2015-2020	RES will experience the main increase in 2013-2020. Within RES, wind and solar PV will experience the largest increase (see text) (Minetur 2015b)
Compliance with RES targets	RES share in 2013: 15.4%. Interim target for 2013/2014 (RES trajectory): 12.1%.

Source: MINETUR (2015a), MINETUR (2015b), EC (2015).

RES targets and technology focus

GHG reduction target in 2020: 20%, RES target 2020: 20% (Directive 28/2009/EC)

The NREAP sets a national 2020 target of 20.8% of renewable energy in gross final energy consumption. This target is lower than the 22.7% share in the initial 2010 NREAP, but still above the EU target of 20%. The

downward revision was motivated by the need to reduce support costs under Spain's general economic conditions (IEA 2015, p.128).

According to the European Commission progress report (towards 2020 targets) Spain is on track to reach its target (20%). The RES share in 2013 was 15.4%, when the interim target for 2013/2014 (RES trajectory) was 12.1%. The share has increased overtime, mainly as a result of increasing renewable electricity generation, but also as a result of increasing renewable energy use for heat and transport fuels and decreasing final energy consumption (IEA 2015, p.128).

Technology focus to achieve the RES target: According to the NREAP, the main technologies that will contribute to the 2020 target are (see table below):

- Regarding the absolute contribution in 2020 (MW): wind on-shore, hydro, solar PV and CSP (in decreasing order of importance).
- Regarding the absolute increase in 2010-2020 (MW): wind on-shore, solar PV, CSP and hydro (in decreasing order of importance).

Table 2: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology (electricity) in Spain to meet the binding 2020 targets

	2005		2010		2020		2020 (share)	Increase 2010 to 2020
	MW	GWh	MW	GWh	MW	GWh	%	MW
Hydro	18220	35503	18687	34617	22362	39593	29.6	3675
Geothermal	0	0	0	0	50	300	0.1	50
Solar PV	60	41	4021	6417	8367	14316	11.1	4346
CSP	0	0	632	1144	5079	15353	6.7	4447
Wind on-shore	9918	20729	20155	40978	35000	70502	46.3	14845
Wind off-shore	0	0	0	0	3000	7753	4.0	3000
Biomass (incl. biogas)	601	2653	752	4517	1587	10017	2.1	835
Tide, wave, ocean	0	0	0	0	100	200	0.1	100
TOTAL	28799	58926	44247	87673	75545	158034	100	31298

Source: Spanish NREAP

The contribution of those technologies as well as their relevance is confirmed in the more recent Energy Planning document (Plan for the Development of the Electricity Transport Grid 2015-2020), approved by the Ministry of Industry, Energy and Tourism (MINETUR) in 2015 (see table below). In this document, it is

expected that the conventional electricity generation sources will experience a reduction (oil and coal) or a small increase (natural gas and nuclear). RES will experience the main increase in 2013-2020 among the electricity generation technologies. Within RES, wind and solar PV will experience the largest increase.

Table 3: Evolution of electricity generation capacity (MW) according to the Energy Planning document

Electricity generation sources	2013	2020	Share	Increase 2013 to 2020
	MW	MW	%	MW
Coal	11857	10510	9.1	-1347
Oil	4029	3068	2.7	-961
Natural gas	32184	32547	28.3	363
Nuclear	7429	7895	6.9	466
Renewables	48267	56804	49.4	8537
Hydro	17284	17492	15.2	208
Wind	23006	29479	25.6	6473
Solar thermoelectric	2300	2511	2.2	211
Solar PV	4660	6030	5.2	1370
Biomass, biogas, SMW* and others	1018	1293	1.1	275
Other	2677	4202	3.7	1525
Total	106442	115025	100	8583

*SMW: Solid urban wastes. Source: MINETUR (2015b)

Main pillars of current RES-E support policy

Spain received worldwide attention in the early years of this decade because of high deployment levels of electricity from renewable energy sources (RES-E) between 2000 and 2009 and the implementation of measures to contain the costs associated to this deployment between 2010 and 2013. The government was certainly concerned about the substantial increase of RES-E support costs (see, e.g., Mitchell et al 2011).

Since 1998, the RES-E support scheme has been based on feed-in tariffs (FITs) and feed-in premiums (FIPs). RES-E generators could opt for the FIT or the FIP. Successive FIT reforms took place in 2004 and 2007, but did not lead to substantial changes in the basic structure of the scheme¹.

Until 2007, the trends of RES-E capacity deployment, triggered by the FIT, were gradual. However, a substantial increase was experienced between 2007 and 2008. In particular, from mid-2007 to September 2008 and as a result of RD661/2007, the Spanish PV sector experienced an investment boom, which led to a ten-fold increase in solar PV deployment. While this boom was circumscribed to the solar PV sector, it led to a substantial increase in RES-E support costs. Such a policy resulted in a gradual increase in the total costs of support until 2007, when it skyrocketed due to solar PV promotion (del Río and Mir Artigues, 2014). Support costs for solar PV escalated more than fifteen-fold from 215 M€ in 2007 to 3267 M€ in 2013. In addition to the economic crisis and some characteristics of the Spanish electricity market (the so-called tariff deficit, a declining electricity demand leading to excess electricity installed capacity and very limited interconnections with other countries), the concern of the government about the large increase in these support costs led to the implementation of several cost-containment regulations, which affected all renewable energy technologies². These included a cap on the electricity generation being eligible for support (Royal Decree Law 14/2010), a grid access charge (Royal Decree Law 14/2010 and RD1544/2011), a generation charge (Law 15/2012), a shortening of the support period (Royal Decree 1565/2010 and RDL 14/2010) and the updating of tariffs below the consumer price index (Royal Decree Law 2/2013)³.

One of those cost-containment measures was the sine-die moratorium on RES-E support which was implemented by RDL1/2012 and which entered into force on January 2012. This moratorium meant that plants installed later would not receive any support. It was announced that a new regulation on RES-E support would be approved, although no specific date was set at the time.

Several regulations approved in 2013 and 2014, including RD413/2014, have put an end to this moratorium. The new regulatory packaged for the promotion of renewable electricity is based on four pieces of legislation: a Royal Decree Law (RDL 9/2013⁴), a Law (Law 24/2013⁵), a Royal Decree (RD413/2014⁶) and a Ministerial Order (Order IET/1045/2014⁷). The new RES-E support scheme involves a substantial rupture with the pre-existing system.

The new regulation is guided by several principles: 1) To ensure the financial sustainability of the electricity system; 2) to provide “reasonable profitability” levels for RES-E plants (see below); 3) to adjust the support

¹ For a description and an analysis of RES-E policy in Spain before 2008, see del Río (2008)

²For a decade, the revenues (electricity prices for utilities) have been regulated and below the electricity system costs. This has led to a “Spanish anomaly”, i.e. an accumulated so-called “tariff deficit”, which reached 30000M€ in 2013.

³For a detailed overview of the cost-containment measures between 2010 and 2013, with a focus on solar PV, see del Río and Mir-Artigues (2014).

⁴Real Decreto-ley 9/2013, de 12 de julio, por el que se adoptan medidas urgentes para garantizar la estabilidad financiera del sistema eléctrico.

⁵Ley 24/2013, de 26 de diciembre, del Sector Eléctrico.

⁶Real Decreto 413/2014, de 6 de junio, por el que se regula la actividad de producción de energía eléctrica a partir de fuentes de energía renovables, cogeneración y residuos.

⁷Order IET/1045/2014, de 16 de junio, por la que se aprueban los parámetros retributivos de las instalaciones tipo aplicables a determinadas instalaciones de producción de energía eléctrica a partir de fuentes de energía renovables, cogeneración y residuos.

scheme to facilitate the participation of these technologies in the market. In particular, it is mentioned that the (previously) highly favourable support scheme as well as the reduction of technology costs led to deployment above expectations and made it necessary to correct the regulatory framework.

Under the new system, renewable energy operators are guaranteed a reasonable rate of return that is composed of the 10-year government bond plus a spread, which is currently set at 300 basis points (at least for the first regulatory period). This return is calculated on the asset base of a standardised facility over its lifetime, considering its investment costs, wholesale market income and operational costs during the regulatory lifetime. The standardised costs vary according to the technology and year of entry into operation, and are revised every six years, except for the initial investment value and the regulatory lifetime. The remuneration is the difference between the reasonable return and the wholesale market price. The remuneration is thus based on installed capacity, rather than on electricity generated, as in the past. Because the return is calculated over the lifetime of a facility, those facilities that in the past have reached a return higher than the one guaranteed now could experience lower returns in the future. Because the return is calculated over the lifetime of a facility, the income obtained in the past by existing facilities is taken into account to determine the value of future support. Therefore, standard facilities that will reach the guaranteed return, considering the support received in the past and the expected market income until the end of their regulatory lifetime, will face a cut in future support. The Electricity Sector Act 24/2013 also abolished the distinction between the special and ordinary regimes. Generators within the special regime (i.e. renewable electricity generators, excluding facilities above 50 MW) have had priority dispatch over the ordinary regime ones (conventional plants). Among special regime generators, preference was given to non-manageable renewables (i.e. wind or solar plants, as opposed to biomass or urban waste which were deemed manageable). Special regime generators had to deliver binding day-ahead bids and programming, and were responsible for their imbalances on even terms with the ordinary regime ones.

Under Act 24/2013, renewables and co-generation will participate in the wholesale market like any other technology. Renewables maintain priority access and priority dispatch (all market conditions being equal and subject to technical requirements for the safe operation of the system). Operators also remain responsible for their imbalances.

The methodology to review the spread (which is a component of the reasonable rate of return) is stated in Law 24/2013 of the Electricity Sector and Royal Decree 413/2014. The process of fixing the spread, in which the regulator CNMC is also involved, has to be passed in a law, taking into consideration the economic situation of the country, the electricity demand and the reasonable rate of return (IEA 2015, p.129, 133).

RES-E plants will receive the market price plus a “specific complementary remuneration” which will allow these technologies to cover their costs. The specific remuneration has two elements, a remuneration for the investment and a remuneration for the operation in the plant:

- The remuneration for the investment (R_{inv}) refers to a payment per kW that allows installations to recover those investment costs which cannot be recovered by the sales of electricity in the market.
- The specific remuneration for the operation (R_o) refers to a payment per kWh for those technologies whose operational costs are above the average wholesale electricity price.
- The wholesale electricity price since RES-E will be sold directly in the wholesale market.

Therefore, the specific remuneration for RES-E plants would be the total revenues received by the plant owner (which includes R_{inv} and R_o) less the revenues from the sales of the electricity sold in the wholesale electricity market.

The setting of both types of remuneration is based on several items (for a plant type), i.e., on the aforementioned retributive parameters of each plant type. Each installation is associated to a specific plant type. Each installation receives the market price plus the specific remuneration ($R_{inv} + R_o$) of the plant type, taking into account the aforementioned parameters and that the reasonable profitability level cannot be exceeded.

Auctions (or “competitive concurrence mechanisms”) will be used to provide support for new installations. According to Article 14.7 of Law 24/2013 of the Electricity Sector, the specific remuneration for the RES plants as well as the value of the initial investment will be provided through a competitive concurrence procedure. According to RD413/2014, a royal decree will set the conditions, technologies and group of specific installations which will be able to participate in the competitive concurrence mechanism. A ministerial order will set the retributive parameters corresponding to the plant types which are involved in the competitive concurrence mechanism.

The relevant regulations in auctions for RES are:

- RD 947/2015 (October 16th 2015), which sets a call for the provision of the specific remuneration regime to new biomass and wind installations.
- Order IET/2212/2015 (October 23rd 2015), which regulates the procedure for the provision of the specific remuneration regime to new biomass and wind installations.
- Resolution of the State Secretary for Energy on November 30th, 2015, which calls for the auction for the provision of the specific remuneration regime to new biomass and wind installations.
- Resolution of the General Directorate for Energy Policy and Mines (MINETUR), January 18th 2016, which clears up the auction for the provision of the specific remuneration regime to new biomass and wind installations.

However, it was not so clear initially that such allocation would be based on auctions. Indeed, the word “auction” was not mentioned in any of the 2013-2014 regulations and also not in RD 947/2015. The first time it was mentioned was in IET 2212/2015, where it was stated that “the allocation of the specific remuneration regime set out in this Ministerial Order and in RD 947/2015 will be undertaken through an auction procedure” (art. 3.1). This Order (IET 2212) develops the allocation mechanism of the specific remuneration regime, which will be based on an auction. However, although the IET contains some crucial details on the auction procedure, full details are left for a later “Resolution” (the Resolution on November 30th 2015, see above).

According to art 9.2 of the IET 2212, the auction will be called through a resolution of the State Secretary for Energy. In this resolution the procedure and the rules of the auction will be set. Such resolution will include, at least: a) the rules of the auction; b) the capacity volume which will be auctioned for each reference standard plant (RSP); c) the prequalification and qualification deadline, as well as the date in which the auction will take place; d) the information and documentation which has to be included in the submission for participation in the auction; e) the economic guarantees required to participate in the auction.

The 2013 electricity reform in Spain introduced a series of measures to ensure the sustainability of the electricity system, affecting mainly the transport and distribution activities and renewable electricity generation plants. All FiTs and FIPs provided to RES generation were abolished and replaced by a sum to be allocated based on the plant's installed capacity to compensate for investment-related outlays. Under this new scheme, RES generators will earn a rate of return based on the average yield of Spanish Government bonds over their lifetimes. For the existing RES facilities, the new regime introduced the possibility to receive an additional remuneration apart from the sale price of energy on the market. This additional remuneration will, if necessary, cover the investment costs that an efficient, well-managed company does not recover on the market. This additional remuneration to guarantee a 7.5% return on investment takes into consideration factors such as the standard income from the sale of energy generated valued at production market price, the standard operating costs, and the standard value of the initial investment. Auctions are the specific instrument envisaged to allocate the remuneration to new plants in the new regulatory package approved in 2013-2014 (see also above for further details)

Main challenges of current support policy and motivation for RES auctions

Making cost-containment compatible with further RES-E deployment seems to be the main motivations for RES auctions. Stakeholders (in interviews and the press) also mention the forthcoming general election at the time (on December 20th 2015). After years of stagnant RES investments due to unfavourable RES policies for investors, the government tried to show that it supported those investments by organizing an auction (see, e.g. Pérez 2015). Another motivation would be complying with the 20% target for RES in 2020, although most stakeholders being interviewed believe that the volume auctioned is too small for this (see below). The government considers this one as a pilot auction of others to come. According to the Ministry of Industry, Energy and Tourism (MINETUR), it will attract investments of up to 1270 M€ for wind and 600 M€ for biomass (Esteller 2015). Finally, one interviewee pointed out the “legality issue”. Given the auction thus designed (under the “umbrella regulation”), later revisions (every 3 and 6 years) of support cannot be considered illegal (for retroactivity reasons). As one interviewee pointed out, the auction was designed with the idea of being able to recalculate the remuneration in the future, avoiding this to be against the Law. In fact, the Constitutional court stated that the revisions envisaged in the “umbrella regulation” were legal.

Auction status

Auctions are regularly organised to set the price level in the wholesale electricity market. There is no experience with auctions for RES at the national level. The implementation process for auctions for RES is very recent (see previous section). However, auctions were used to grant the authorisations for wind energy plants in regional auctions (see Iglesias et al 2011 for further details).

In January 2016 the first RES auction was conducted including volumes for wind (500MW) and biomass (200MW), with the interesting result of zero investment remuneration for both technologies and all the standard plants. This is further described and analysed below.

General characteristics of the planned or proposed auction

The technology-specific auction took place on January 14th 2016 with a volume of 500 MW for wind and 200 MW for biomass. The auction was initially scheduled for November 26th 2015, but was later delayed to January 14th 2016.

The outcome of the auction is a discount on the standard value of the initial investment of the reference standard plant (RSP). This will allow to obtain the standard value for the initial investment of the standard plant (SP). From this last value, plus the rest of retributive parameters, the remuneration for the investment of the SP will be obtained (applying the methodology set in RD 413/2014). The capacity allocated to each participant for each technology will also result from the auction. This capacity will be inscribed in the Registry of the "specific retributive regime (in pre-allocation state)". The bids are confidential. The names of the winners, the discount and the allocated capacity are published.

The auction has four main stages (OMEL Diversificación 2015): 1) Pre-qualification; 2) Qualification; 3) Bidding; 4) Post-bidding processes.

The auction starts with the submission of bids. Those which are not submitted by a given deadline, are rejected. OMEL Diversificación does the balancing of the purchase and sale bids for each product auctioned and informs the participants on the results of the auction, after which participants may submit a complaint against those results. The CNMC confirms the results of the auction, which are published by MINETUR, specifically the Direction General for Energy Policy and Mines, DGPEyM. They are also published in OMEL.

Table 4: Characterisation of planned or proposed auction

Characteristics	Description
Legal basis	(see above)
Name of auction scheme	Auction for the provision of the specific retributive regime for biomass and wind plants (REIBE auctions).
Objectives	<p>OBJECTIVE (stated, official aim of the auction):</p> <p>According to the Annex to the Resolution of November 30th 2015, the concrete "objective of the auction for the allocation of the specific retribution regime for biomass and wind installations will be to determine the percentage reduction of the standard value of the initial investment of the reference standard plant for new plants producing electricity from biomass (...) and wind energy as well as the value of the capacity allocated to the winning bidders".</p> <p>MOTIVATION (reasons behind the auction):</p> <p>The main motivation of the auctions is to end up the moratorium of support for new RES plants (in 2012) in order to comply with the Spanish target under the RES Directive for 2020 and do so at the lowest possible</p>

	costs for consumers. The emphasis on repowering suggests that allocative efficiency (minimisation of generation costs) is a relevant policy goal. In addition (according to Esteller 2015), fast construction of plants and low administrative costs was another goal.
Contracting authority	<p>Several institutions have a key role to play in the Spanish auctions.</p> <ul style="list-style-type: none"> • CNMC (Comisión Nacional de los Mercados y la Competencia) supervises the auction procedure and outcome. • OMI-Polo Español S.A. (OMIE), through its subsidiary OMEL Diversificación, is in charge of the management of the auction. • State Secretary for Energy, which is a body belonging to the Ministry of Industry, Energy and Tourism (MINETUR), is the regulator setting the rules of the auctions and passes the relevant legislation (through royal decrees, Ministerial Orders and Resolutions).
Main features	<p>Auction procedure for the provision of the specific remuneration regime to new biomass and wind energy.</p> <p>Investment-based support. The outcome of the auction is a discount on the standard value of the initial investment of the reference standard plant (RSP). This will allow obtaining the standard value for the initial investment of the standard plant (SP). From this last value, plus the rest of retributive parameters, the remuneration for the investment of the SP will be obtained (applying the methodology set in RD 413/2014).</p>
Technological diversity (focus and differentiation)	Technology-specific wind on-shore (500 MW) and biomass auctions (200 MW).
Year of introduction	<p>2015 (regulations)</p> <p>January 14th 2016: first auction.</p>
Lead time before auction	<p>November 5th 2015: Presentation to potential bidders in the REIBE auction. Draft rules.</p> <p>December 3rd 2015: Publication of the Resolution by the State Secretary for Energy leading to approval of the rules and opening of the pre-qualification and qualification periods.</p> <p>December 22nd 2015 and January 12th 2016: Auction test with pre-qualified bidders (from their plants)</p> <p>January 11th 2016: end of the pre-qualification and qualification period.</p> <p>January 13th 2016: test of connection of the qualified participant with the (electronic) bidding system.</p> <p>January 14th 2016: REIBE auction:</p> <ul style="list-style-type: none"> • Reception of bid offers (opening/closure): 9 a.m. to 11 a.m.

	<ul style="list-style-type: none"> Balancing (matching) process and publication of the provisional results: maximum limit of two hours after closure of reception of bids. Claim period for the provisional results: two hours after the publication of those results. <p>From the date of publication of the Resolution of the State Secretary for Energy in the national official journal (BOE) (on January 18th 2016), successful bidders have 45 days to inscribe in the registry of the RRE (specific retributive regime), together with the provision of economic guarantees.</p>
Periodicity/Timing of the auction	Periodicity not defined. According to the preamble of the Resolution, this will be the first (pilot) auction of others to come.
Auction Volume (What is auctioned?)	500 MW (wind) and 200 MW (biomass). Repowering is a main issue in the wind auctions, whereas biomass auctions are excluded from non-peninsular territories (Canary and Balearic islands, Ceuta and Melilla).
Budgetary expenditures per auction and per year	According to the Regulatory Impact Analysis Document (Memoria de Análisis de Impacto Normativo) of the proposals of Royal Decree and Ministerial Order the budgetary expenditures are 130 M€ for biomass and 21 M€ for wind (annually). However, as mentioned in the report of the CNMC on June 18th 2015, these costs could be reduced depending on the outcome of the auction. This would depend on the Rinv of each standard plant (SP) (see below), which is equal to or lower than the Rinv of the Reference Standard Plant (RSP), since the Rinv for the former is equal to the Rinv for the later multiplied by the discount achieved in the auction.
Size limits (Min./max. size of projects)	Auctions are not project-specific. The capacity allocated to winning bids can be built anywhere in the Spanish territory. No maximum size. Minimum size of the block: 1 kW

Specific design elements of the planned or proposed auction

Table 5: Key design elements for planned RES auctions in Spain

Design Elements	
Auction format (Single- or multi-item auctions)	Multi-item. Bidders bid for a given capacity, not for a given project /plant.

Auction type (static or dynamic)	Static, sealed bid, price-only, uniform pricing. Resolution (preamble): “the allocation of the specific retributive regime and the standard value of the initial investment of the standard plant (SP) will be determined through a sealed-bid, marginal system auction scheme”																					
Selection criteria	<p>Price-only auction (discount on the initial investment). Bidders offer a discount on the initial investments of the Reference Standard Plant (RSP). The starting initial investment considered by the MINETUR is 1.2 M€/MW from wind (with an average production of 2800 annual hours) and 3.35M€/MW for biomass. The discounts are then offered in the auction.</p> <p>As a result of the auction, the percentage reduction of the standard value of the initial investment of the RSP for each product is calculated. This will allow the calculation of the standard value of the initial investment of the Standard Plant (SP). Thus, the values of the retributive parameters of the SP are obtained from the values of the retributive parameters of the RSP (as published by the IET 2212) and the result of the auction. In other words, the RSPs have a set of retributive parameters. There are as many SPs as technologies and years although, for a given technology, several SPs share the same RSP. The parameters for the SP in a given year will be obtained from the RSP parameters (included in IET 2212/2015) and the result of the auction (discount). Recall that the auctioned capacity is not linked to a given plant. The plants being deployed will be associated to a given SP, depending on the year when they are inscribed in the Specific Retributive Regime Registry. This association of the plant to be deployed to a SP will depend on the RSP and the year when the plant is authorised to operate.</p> <p>Example: wind installation with an authorisation year for its operation in 2016. The corresponding SP is IT-4008.</p> <table><tr><th>Tecnología</th><th>Código de Identificación de la Instalación Tipo de Referencia</th><th>Año de Autorización de Explotación Definitiva «a»</th><th>Grupo (Art. 2 Real Decreto 413/2014)</th><th>Código de Identificación de la Instalación Tipo</th></tr><tr><td rowspan="2">Biomasa</td><td rowspan="2">ITR-0101</td><td>2015</td><td>b.6 / b.8</td><td>IT-04001</td></tr><tr><td>2016</td><td>b.6 / b.8</td><td>IT-04002</td></tr><tr><td rowspan="2">Eólica</td><td rowspan="2">ITR-0102</td><td>2015</td><td>b.2</td><td>IT-04007</td></tr><tr><td>2016</td><td>b.2</td><td>IT-04008</td></tr></table> <p>Source: OMEL diversification (2015).</p> <p>In Section 3 of the Annex to the IET a simplified formula to calculate the value of the investment remuneration for the SP is provided. This calculation is equal to the value of the investment remuneration of the SRP and the percentage reduction resulting from the auction.</p>	Tecnología	Código de Identificación de la Instalación Tipo de Referencia	Año de Autorización de Explotación Definitiva «a»	Grupo (Art. 2 Real Decreto 413/2014)	Código de Identificación de la Instalación Tipo	Biomasa	ITR-0101	2015	b.6 / b.8	IT-04001	2016	b.6 / b.8	IT-04002	Eólica	ITR-0102	2015	b.2	IT-04007	2016	b.2	IT-04008
Tecnología	Código de Identificación de la Instalación Tipo de Referencia	Año de Autorización de Explotación Definitiva «a»	Grupo (Art. 2 Real Decreto 413/2014)	Código de Identificación de la Instalación Tipo																		
Biomasa	ITR-0101	2015	b.6 / b.8	IT-04001																		
		2016	b.6 / b.8	IT-04002																		
Eólica	ITR-0102	2015	b.2	IT-04007																		
		2016	b.2	IT-04008																		

Participants will offer up to 40 tranches for each product (for which they are willing to bid).

A tranche is defined as a set of blocks which is offered at a given (the same) reduction percentage (discount) by a participant.

After the offers (bids) are provided, the bids will be ordered in descending order (from the tranche with the greatest discount to the tranche offering the lowest discount). The so-called “Aggregate Purchase Curve (APC)” is then built.

The uniform discount (percentage of marginal reduction for each product) will be, as a general rule, the percentage for which the APC intersects the so-called Sale Offer of the System.

As a result of the auction, the capacity allocated to each participant for each product is obtained, i.e., each participant will be allocated, for each tranche, the number of blocks corresponding to the product.

All the winners will receive the discount of the last bid being accepted, which will set such discount. The winners will have 45 days to inscribe the installation in the pre-register. They will inscribe the amount of kW that they have won, but those kW will not be associated to a specific installation. The required economic guarantees will need to be provided at this stage.

Requirements for the bids:

Tranches offered:

- Maximum of 40 Tranches for each product.
- Set of blocks (quantity) offered at the same reduction percentage (discount) by a participant. In other words, the tranches being offered will include a number of blocks as well as the reduction percentage (discount). There is a minimum number of blocks per offered tranche: one block, i.e., one kW.
- Two or more divisible tranches will not be allowed to provide the same discount.

Reduction percentage (discount):

- The discounts offered will be between 100% and 0% (with two decimals).
- The discounts will be strictly decreasing except in the case that there are N consecutive indivisible Tranches or a combination of N indivisible Tranches with one divisible Tranche.

Quantity of product (kW):

- Expressed as a possible integer.
- The aggregation of the Quantities included in the Tranches of one bid should not be above the maximum volume for which the bidder is qualified.

	<p>Condition for the divisibility of a product:</p> <ul style="list-style-type: none"> • It should be established whether a tranche is divisible or not. • An indivisible Tranche cannot be partially allocated. There is an upper limit on the quantity that can be allocated in an indivisible Tranche (40 MW for biomass and 50 MW for wind).
Pricing rule	Uniform pricing. All the winners receive the discount of the last bid being accepted, which will set such discount.
Price limits	Bidders bid on a discount. Initial remuneration for standard plants (to which the discounts offered by bidders apply). The upper "price" in this context is 1.2 million €/MW for wind on-shore. Minimum price: 100% discount (remuneration for investment, $R_{inv}=0$). Maximum price: 0% discount.
(Pre-)qualification criteria	<p>There are both pre-qualification criteria (phase 1) and qualification criteria (phase 2).</p> <p>PRE-QUALIFICATION CRITERION (Annex 10 to the Resolution): Pre-qualified bidders will be allowed to receive information on the auction, to participate in the training sessions (in case they are organised) and to ask for qualification. This phase is cost-free for the potential bidders. They are required to provide the following documents: basic information on the bidder (name of the firm, contact person, telephone, mail, etc.), submission of a certificate to access the bidding system, a commitment against collusion and a commitment for confidentiality.</p> <p>QUALIFICATION CRITERION (Annex 11 to the Resolution): Participants need to be "prequalified" in order to be "qualified". In order to participate in the auction, the potential bidders have to be "qualified". He/she will have to provide the following documents and information: a) maximum volume of qualification for each product. This is the maximum amount which the bidder will bid for each product in the auction. It can't be above the quantity to be auctioned for each product; b) document accepting the rules of the auction, c) document confirming the powers of the person acting as the legal representative; d) economic guarantees (20€/kW). Total amount (M€) = 10€/kW x maximum volume of qualification (kW).</p> <p>The economic guarantees can be provided in three manners:</p> <ol style="list-style-type: none"> 1. Cash deposit on the account of OMEL Diversificación: 2. Joint bank guarantee. 3. Certificate of a joint guarantee insurance provided by an insurance company located in Spain. <p>There is another economic guarantee: the amount of the economic</p>

	<p>guarantee is also a requirement for registration in the Registry of the "specific retributive regime (in pre-allocation state)" (IET 2212, p.16). The amount will be 20€/kW times the auctioned amount. This can lead to "overlapping" economic guarantees (Pérez 2015), i.e., the two economic guarantees may be coincidental for some time.</p>
Penalties	Bank guarantees of 20€/kW. In case of non-compliance by the agreed date (48 months), OMIE would enforce the bank guarantees.
Actor diversity (Exceptions from requirements for small plants/developers?)	No exceptions from requirements for small plants.
Remuneration type	Investment-based support (see above)
Other specific regulations (e.g. limits on maximum granted support per project)	No size limits
Transferability of support right	Fully transferable rights, raising concerns on speculative behavior in the secondary market (Pérez 2015).
Other	<p>ADMINISTRATIVE COSTS</p> <p>Successful bidders will have to pay 0.17 €/kW to cover the administrative costs (literally: "the costs related to the organisation of the auction") (art 5 of the Resolution of the State Secretary for Energy on November 30th 2015).</p> <p>DURATION OF SUPPORT</p> <p>20 years (wind), 25 years (biomass)</p> <p>SELLER CONCENTRATION RULES IN ISLANDS</p> <p>There is a limit on the bidders' size in non-peninsular territories (islands). According to RD947/2015 (art.2), "the specific retributive regime will not be provided to plants in the electricity systems in the non-peninsular territories which are owned by firms with a share of more than 40% of the installed electricity generation capacity in such a system".</p> <p>WHAT IF THE AUCTION VOLUME IS NOT COVERED?</p> <p>In case the auction volumes are not reached (500 MW for wind and 200MW for biomass), then the State Secretary for Energy may organise a new auction in order to reach those volumes (IET 2212, art. 9.4)</p> <p>DEADLINE (GRACE PERIOD)</p> <p>48 months (counting from the publication of the Resolution in the official government journal (BOE) whereby the winning bids are inscribed in the</p>

	<p>Registry of the specific retributive regime) (IET 2212 art. 15.7).</p> <p>SUPPORT FROM EUROPEAN FUNDS</p> <p>In case the plants receiving the specific retributive regime through the auction procedure also receive some type of aid or subsidy from European funds, the remuneration obtained through the specific retributive regime will be reduced. A Ministerial Order will regulate the terms under which such reduction will occur (IET 2212, Additional Disposition).</p> <p>LOCAL CONTENT RULES</p> <p>No local content rules.</p> <p>DIVERSITY</p> <p>Technological: only wind and biomass.</p> <p>Size: no differentiation between small / large bidders.</p> <p>Geographical: Auctions are not location-specific. Winners may build the capacity auctioned whenever they prefer within the Spanish territory (except in non-peninsular territories in the case of biomass).</p> <p>Actor: no differentiation of rules or requirements for different types of actors.</p> <p>Updating of remuneration over time: not applicable.</p>
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Additional information regarding characteristics and design elements

(see “other” in the table above)

2 Similarities and differences of the planned or proposed auction to existing designs

Based on the detailed description of the scheme above, the RES-E auction model in Spain seems to be very different to the approach followed by other EU (and perhaps non-EU) countries. The main reason is that the support is investment-based and the auction is implemented to provide a discount on such investment support.

On the other hand, the uniform pricing, price-only, sealed-bid elements have also been implemented in other countries.

The absence of a schedule for regular auctions in the future, as well as the very lax pre-qualification and qualification requirements may be different from other schemes.

3 Implementation process

The regulation on auctions is passed by the government, though the Ministry of Industry, Energy and Tourism (MINETUR) and, more specifically, elaborated by the State Secretary for Energy which is a body of MINETUR.

MINETUR has the lead responsibility for formulating and implementing energy policy. This includes approving the electricity network access tariffs, regulated components of electricity prices and level of access tariffs. The ministry, after due consultations with the autonomous communities, is responsible for establishing the National Electricity Network Development Plan. The plan is also evaluated by the National Commission of Markets and Competition (CNMC) and approved by the Congress. The national plan draws up the transmission network investments for six years. Integrated in MINETUR, the Directorate General for Energy Policy and Mines is the national competent authority responsible for facilitating and co-ordinating permit granting for European Union (EU) projects of common interest, including important interconnection projects (IEA p.19 and 97).

The main responsibilities of the State Secretary for Energy include (IEA 2015, p.19): issuing regulations concerning energy and mining matters, legislation on the tariff structure, prices of energy products, and levies and tolls, legislation to save energy, promote renewable energy and support new energy and mining technologies and legislation, if needed, to adopt measures to ensure energy supply. The regulations take the form of Royal Decrees, Ministerial Orders or Resolutions of the aforementioned State Secretary, i.e., they are the result of the executive power and do not need to be approved by the parliament. The exception is the Law of the Electricity Sector (Law 24/2013) which, as a law, required parliamentary approval.

OMI-Polo Español S.A. (OMIE), through its subsidiary OMEL Diversificación, is the company in charge of the management of the auction, including the matching of bids (supply and demand). A lot of information is provided in its website regarding its activities, competencies etc: <http://www.subastasreibe.omie.es/subastas-reibe/>

CNMC (the National Commission of Markets and Competition) is the supervisor of the auction procedure and its outcome. It has to issue a report in the same day of the bidding procedure validating the result of the auction.

CNMC is an independent organisation that ensures fair competition and regulates markets and all productive sectors of the Spanish economy in order to protect consumers. The CNMC was created in 2013 by merging the functions and powers of the Spanish competition authority and sectoral regulators for electronic communications, audio-visual, electricity and natural gas (previously the National Energy Commission, CNE), postal, airports and railways. The aim was to avoid an overlap of competences, to take advantage of the experience and knowledge acquired in the various regulated sectors and to provide an integrated view of the regulatory activity. The CNMC is the national regulatory authority (NRA) for the gas and electricity sectors. The CNMC is financed from electricity and natural gas tariffs and a levy on the wholesale of oil. It coordinates the work of the competition authorities of the autonomous regions. It is completely autonomous and fully independent from the government, the autonomous regions and the market players. In accordance with EU rules on the electricity and natural gas sectors, the CNMC has the power to approve the methodology used for

calculating the network access tariffs. The government, in turn, sets the tariffs for network access on the basis of the CNMC methodology. It also approves the CNMC methodology for calculating the charges of the electricity system and sets the level of these charges. System charges are used to cover system costs (including the remuneration for renewable generation). CNMC has the powers to set network access tariffs according to the methodology it develops. The government has the powers to set the rest of the costs in the electricity system (including the remuneration to renewable generation): this process includes a public consultation and a report by CNMC, providing a valuable forum for engagement (IEA 2015, p.20, 97, 127).

RD 947 was passed in October 2015. The first auction was held on January 14th 2016. No explicit timing of the different steps was made in advance (i.e., before October 2015). A schedule on the auction procedure was published in November in OMIE. The auction was going to be held in November 26th, but was then delayed to December 10th and, then, to January 14th.

First draft sent to the Consejo Consultivo de la Electricidad and CNMC in April 2015. Previous to that, the new regulatory package in 2013-2014 envisaged the implementation of auctions, without a specific date for implementation.

Stakeholders argue that they were not being consulted. However, stakeholders commented on a first draft of the regulation in the first quarter of 2015 and some changes were made later (for example, the financial guarantee of 50€/kW being reduced to 20€/kW).

4 Stakeholder opinions

General stakeholder reactions until now

Different types of stakeholders have been involved in the discussion on the design and outcome of the auction. These include energy experts, investors, generators, industry associations, and the CNMC. The collection of opinions is structured at two levels. First, one key source of views was the interviews to the stakeholders themselves. Second, some of the reactions from industry associations were included in newspapers, but also in the statements from these industry associations. Furthermore, the reports of the CNMC include the opinion of this institution, in addition to the allegations made by some stakeholders to a previous draft of the regulation. Finally, a press note from the government has also been included.

Results from the interviews

In order to collect views of different stakeholders, five interviews were carried out during the last week of January and the first week of February 2016. The people interviewed were: an expert from the wind energy sector, an expert on the electricity and renewable energy sectors (who is also the CEO of a firm which provides services for each stage of the electricity value chain), a representative from the Wind Energy

Association in the region of Galicia, a renewable energy expert and a wind energy investor. Interviews lasted between 35 and 85 minutes. Two of these interviews were carried out in person, and the other three were telephone interviews. They were semi-structured interviews in which interviewees were free to express their opinions about different aspects of the Spanish auction (design and outcome).

Stakeholder 1: Expert in the wind energy sector

This stakeholder argues that a single auction with a very small volume, 4 years after the moratorium has led to a very abnormal result. In addition, the auction may come too late to ensure compliance with the RES 2020 targets since, in case the projects are not built, the government has no time to react.

He claims that the auction scheme will not make RES investments more attractive in Spain. The main reason is that the regulatory parameters of the new regulation can be changed every 3 or 6 years.

The moratorium and resulting large pipeline of projects has led to an obsession to win the auction. Some of the projects were at an advanced stage of completion and were to be carried out nonetheless. This raises the question why they participated in the auction if they could build the projects with the revenues from pool prices? Some of them may have bid for a 100% discount, expecting that others would bid for a lower discount and the cut-off point (with the 500 MW) would result in less than a 100% discount. Furthermore, some bidders may have underestimated their costs resulting in underbidding.

According to the interviewee the government should have anticipated this result, since bidders could participate in 40 tranches (see Section 2) and many wanted to participate. Moreover, the volume auctioned was not very large, thus a low support level could be expected. However, the support level was much lower than expected. He argues (as others) that a 53.8% discount would have led to the “reasonable profitability level” of 7.5% (see Section 2). Any discount below that percentage would lead to a lower profitability level, thus it is suggested that discounts below 53.8% should not have been allowed.

The scheme is not considered attractive for repowering for several reasons. First of all, the 1.2 M€/MW initial investment was not attractive, secondly some wind farms built 15 years ago require a major work and new connections are needed, thirdly regional governments need to be involved and the regional contests are seen as barrier.

The auction scheme would have created incentives for bidders to try to further reduce the costs of your RES technology if the auction had been a regular, not an isolated one. In this case, project developers would have been able to push down the costs and prices offered by the manufacturers and builders.

According to the interviewed stakeholder, the proposed design is not adequate / acceptable due to several reasons:

- 1) DG COMP has not given a green light on the Spanish scheme. The interviewee argues that, since providing incentives for investment on a continuous basis is not allowed under the Guidelines on State Aid, the Commission may reject the new system.
- 2) An auction schedule is needed. A single auction is not sufficient to cover the 8000 MW of RES-E needed up to 2020.

- 3) The auction design raises the question what is aimed at with the auction, as the government provides all the regulatory parameters and tell what should be the profitability?
- 4) It is not clear to him that pay-as-bid is better than uniform pricing.
- 5) Most importantly, the interviewee asks for stricter requirements for participation. The pre-qualification and qualification should not be so lax. The economic guarantees at 20€ are deemed enough if the wind farm is identified and the connection point has been provided, but is considered too small when no such requirements exist. This is the main point: the auction should have been based on projects in specific locations, with a connection point and deadline for construction before December 2019.

The expected realisation rate under the auction scheme is an ambiguous issue. On the one hand, it could be high, given that some projects were already built. On the other hand, the winners of the auction are outsiders who have bid at very low prices, they have got it wrong and, thus, projects may not be built.

Stakeholder 2: Jorge Morales de Labra. GeoAtlantar S.L.

The interviewee starts mentioning that the instrument could have been a very good way to promote renewables, but not in the way that it has been organized, given its very small volume and the product which has been auctioned and the bidding procedure.

Investors ask for some certainty, however, the remuneration received represents an imperfect hedge. The auctioned product should have been different: a long-term power purchase agreement (PPA), in other words: a fixed-price auction with high visibility.

In addition, the auctioned volume is negligible. It should have been much higher (hopefully resulting in a less than 100% discount) and adapted to the business initiative which exists in the country.

On the other hand, the importance of visibility is stressed as well as the relevance of periodic auctions.

Furthermore, he proposes a seller concentration rule, that is, the volume allocated to each participant should be limited (for example, to 10% or 5% of the auctioned volume), so that there are between 15 and 20 winning bidders.

He further argues that the auction should only be applied to large projects, including PV. The auction will be useful to identify the price which can then be used as the main input to set a FIT for the small projects.

The interviewee is strongly against setting a filter to discourage the participation of “outsiders”. In fact, he argues that anyone should be able to participate in the auction as long as the economic guarantees are provided.

According to the interviewee, the auction scheme will not make RES investments in Spain more attractive. This is mainly due to the uncertainty about the lead times for the provision of the connection point. The auction requires a connection point which does not depend on the project developer. There is a long lead time to gather the necessary permits, a process in which different actors are involved. This should be solved through administrative silence. He argues that the deadline for construction should be removed and, instead, a percentage of the budget should be presented up-front (for example, 50% in 12 months after the auction procedure) or a certification on the purchase of the material necessary to build the project.

He believes that all the bids have been serious and that the winning bidders are ready to build at the resulting discount. However, he cannot assure that the projects will be built.

Finally, he claims that the auctions should be technological. The reason is that many energy sources will be needed for reasons of manageability. Thus, technological diversity is an important issue. He does not understand why solar PV was not allowed to participate in the auction. According to him, the official reason was to promote projects which would lead to industry and employment creation in Spain (wind and biomass, respectively). However, solar PV can also create an industrial fabric if the auctions are regular ones.

Stakeholder 3: Iñigo Muniozguren, EGA (Wind Energy Association from Galicia)

The interviewee states that it is not very clear for him that price should be the only criterion to allocate capacity in an auction. He is not sure that auctions would be the best mechanism to promote RES.

In the specific case of Spain, the evolution of regulation has been perverse and the end result has been a mere retributive criterion with emphasis on the lower cost for the system. Other elements which led to the specific support for RES have been disregarded (internalisation of negative environmental externalities of conventional generation). The specific remuneration through the FIT has disappeared and being replaced by a scheme which does not ensure the aforementioned internalisation of costs. He argues that, in addition to a lower support level, the aforementioned internalisation as well as the impact on the supply value chain should have been taken into account. He criticises the introduction of the auction scheme since the previous conditions for its introduction were absent. Furthermore, the “electioneering” aspect has played an important role. The context of the auction is exceptional, since there has been a moratorium and a large pipeline of projects.

The volume in the auction has been very small. It is difficult for wind energy to compete on the basis of the market price and there is also a high legal insecurity, since the remuneration can be revised every 6 years. He mentions that this auction will not result in achieving the 6500 MW from wind required for 2020.

In addition to the negligible volume, the interviewee criticises the absence of a schedule for future auctions. The sector does not have the much needed visibility that the auction scheme will be consolidated.

According to the interviewee, the negligible auction volume will not ensure efficiency and effectiveness, i.e., the installation of the MW being auctioned is not guaranteed. In addition, it is not clear that the MW winning the auction are the most efficient ones. The auction has not been implemented to develop wind energy, but to have it at a low system cost. The auction does not ensure that the 500 MW will be deployed. If projects were not built the day before the auction (because it was not profitable to do so at market prices), why should they be built when the remuneration provided in the auction is zero? He believes that there has been a wrong calculation by the bidders when bidding. He argues that with a discount of 53%, a reasonable profitability of 7.5% would be achieved. With a 100% discount, a much lower profitability would be attained. Contrary to what it is widely believed, he thinks that the auction has not captured the attention of potential investors as it was expected. It is quite surprising that only 2500 MW have participated in the auction, when there are 10000 MW in the pipeline.

The auction has fundamentally aimed at repowering, whereby the winners exploit the current equipment.

The interviewee confirms that there is a greater risk for the small actors, since there are more entry barriers for these investors. The small ones do not have the same ability to compete only on price.

The level of the economic guarantees is deemed an appropriate one. But he criticises the absence of barriers which have nothing to do with the sector (i.e. “outsiders”).

He wonders whether the result of the auction should be a transferable right.

When asked if the long term risk in an investment project is supported by the auction scheme, he believes that the investment risk is high, but not specifically due to the auction, but due to the revisions of the remuneration every 3 and 6 years.

Regarding ideas for changes in the auction design which would make it more attractive for investors or better in general, he comments that the periodicity of the auction should be included in a visible path, that the auctioned volume should be increased, barriers to outsiders should be implemented and criteria in addition to price should be adopted in order to ensure the deployment of efficient installations and target achievement.

The interviewee does not consider the entry barriers (pre-qualification criteria) as too high, rather, the opposite is true. They are too low, which favours the entrance of outsiders to the sector. There is no sense in not having any type of limitation to participate in the auction to actors outside the sector.

Given that outsiders have won the auction, the realisation rate is likely to be low. But, on the other hand, some of the MW winning the auction could refer to projects at some stage of completion. The bids do not seem to have been serious. They are too low and not representative of the situation of the sector.

If the price is the single criterion in the auction, this may discriminate against large investors.

Stakeholder 4: Hugo Lucas, FactorCO2

When asked whether the auction scheme will make RES investments in Spain more attractive, the interviewee answers that the auction itself does not make the market more or less attractive. What is needed is to have medium and long-term deployment targets and, ideally, an auction schedule. He wonders whether more MW are needed (independently of using auctions or not) when there is electricity generation overcapacity in the system.

Regarding whether the long term risk in an investment project is supported by the auction scheme, the interviewee responds that in this particular design there is no risk since minimum revenues are guaranteed. The problem is the underbidding and the expected low rate of implementation.

When asked whether the idea to undertake auctions a good one, he answers that the implementation of auctions is conditioned by the EU, which pushes towards auctions. And also the current situation has certain features which point to the convenience to use auctions: the evolution of the remuneration schemes, the issue of “legality” (see below), the evolution of technologies, a single European energy market etc... The “electioneering” component should be added in the case of auctions, i.e., the current government has tried to show some activity in this context before the end of the legislature.

Regarding ideas for changes in the auction design, he comments that, in case there was not an overcapacity problem, or one problem which could be solved, two types of design elements would be needed: a schedule for the auctions and a greater capacity volume. If deploying more electricity generation capacity is not deemed appropriate, then the 2020 target can be achieved by resorting to the heat and transport sectors to a greater extent and less to the electricity sector. In this context, he proposes to encourage more renewable heat (biomass for heat and heat pumps) and the electric vehicle for transport.

The main goal should be taken into account: that the support scheme is legal. Its design is conditioned to the possibility to revise the remuneration of the deployed projects without having legal problems (i.e., without being retroactive). There were two additional goals: competitive prices and that the farms are actually built, but the later was not a priority goal as the other two.

With respect to filters and outsiders, he argues that filters should not be set for solar PV, i.e., restrictions for the participation of outsiders should not be set because they may build a good project. However, the greater the complexity of projects, the less the participation of outsiders makes sense and filters should be used to a greater extent. In wind energy projects filters make sense, but they should remain at an intermediate level. Participants should be required to measure the wind resource for two years, that the connection to the grid is ensured and that there are firm offers for the supply of wind turbines. Additionally, for biomass a supply contract for the raw material should be asked for.

When asked about whether all bids will be serious, he argues that the result of the auction was that more than 500 MW were offered at a 100% discount. Thus, the winning bidders said they could do the wind farm at zero investment costs and, therefore, that they don't need remuneration. He believes that it is most likely that the winning bidders have positioned themselves in the most optimistic scenario, with the best financing conditions, best wind resource, cheap supply of equipment, etc.). If expectations prove wrong, then they could have a serious financial problem which prevents the construction of the wind farms.

The interviewee argues that "(as you know) bidding under the cost could be motivated by: strategic bidding; political agenda; dumping; and marketing. Political agenda is not making sense in the case of wind in Spain, neither is dumping because this will not cause much damage to existing big players." He further suggests that strategic bidding is the reason behind this result. Allegedly, the companies were expecting the last accepted bid to be higher, that is, before reaching the 500MW someone will have asked for some remuneration greater than zero. The interviewee argues that it is illogical to assume that the wind farms can be profitable without support, because if they were then the project developers would not wait more than two years since the moratoria for FIT to get support – instead of waiting, they would just build. The wind project developers would also not risk their financial guarantees for projects that do not need support. The interviewee believes that without support these wind farms will not be built, and now the winning bidders will lose the financial guarantees.

He further argues that everybody in the sector agrees that, considering we have 3 years with no projects while 10GW in the pipeline and a mature wind sector in Spain, 500MW were too little. The sector is allegedly upset with the result, however, the interviewee waits to see if the Government sells it as a great success, saying RE can be done with no financial support. According to him, it will not be a successful case if the wind farms are not built, but this we will only know later. One interesting thing is that the winners are very small players. For instance Acciona did not participate in the tender.

Stakeholder 5: Wind energy investor

The interviewee argued that the criteria for participation in the auctions should prescribe seriousness of the bids and there should have been a previous filter. The absence of such a filter has led to a disastrous result both for the government and for the sector. An outsider, who is not a professional dedicated to building wind farms has slipped. The interviewee anticipates that this winning bidder will have problems to build the farms.

The auction scheme is unlikely to make RES investments in Spain more attractive, since the resulting remuneration has been very low and because there is not a regularity in organizing auctions, with a schedule of predefined rounds.

When asked about the long term risk in an investment project is affected by the auction scheme, he argues that, in the case of Spain we should differentiate between the “umbrella regulation” and the auction itself. The former generates uncertainty and a high risk due to the possible modification of the parameters in the regulatory and semi-regulatory periods (every 6 and 3 years, respectively).

When asked if the idea to undertake auctions is a good one, the interviewee states that auctions are an insurance with respect to FITs, since FITs suffer regulatory changes because they do not have an in-built cost-containment mechanism and may be unsustainable for the system. In contrast, since auctions are a competitive mechanism, they squeeze out the rents from the producer and this makes them more sustainable in the long-term. Other than that, auctions would not be the best alternative, since they have management problems, they do not make the sector a more professional one and they can be counterproductive for the sector in the long-term. The umbrella regulation is excellent, since in the short term it leads to short-term exposure of RES and it is a competitive mechanism. However, it cannot provide long-term security. The product that is won at an auction is highly diluted, it is not tangible.

When asked about special ideas for changes in the auction design which will make it more attractive for investors or better in general, the interview answers that there are mainly three problems in the auction which can be solved with an appropriate design: 1) the absence of a filter for participation; 2) the current regulation is not secure for investors; 3) the situation of the Spanish sector was so dramatic that it led to a non-rational behaviour of the actors and to very low prices in the auction.

Opinions from other sources

Different types of actors have published their views, including the CNMC, the government (MINETUR), the industrial associations (APPA, AEEE) and the economic press. Thus, different types of sources are considered in this section, including newspapers, statements and reports. The comments in these sources can be related to the design of the auction or to the outcome of the auction which took place in January 14th 2016 or to both of them.

CNMC

Report June 18th 2015 (CNMC 2015a)

According to the CNMC, the use of auctions for determining the percentage reduction of investment support is a suitable mechanism to reveal where the efficiency frontier is for each technology, once such a technology has reached a given degree of maturity, i.e., once the learning curve has stabilised and there are gradual efficiency improvements.

However, in its report, the CNMC argues that the standard value of the initial investment for wind energy is too low and would be closer to the costs of turbines than to the total costs of the project. Thus, it argued that the auction could be attractive for repowering of existing wind farms and hardly so for new installations. It also argued in favour of increasing such initial investment value. The government accepted to increase it from 1.1 M€/MW to 1.2 M€/MW.

In its report, the CNMC notes that the volume auctioned for wind is too low and for biomass too high (too ambitious) with respect to the already installed capacity of each technology, although "it is difficult to anticipate the existence of sufficient competitive pressure in the auctions". 200 MW represent 39% of the currently operative biomass capacity, whereas 500 MW represent 2.2% of the operative wind capacity. But, on the other hand, the CNMC considers that the volume of 200 MW might not be consistent with the 260 MW target for biomass in the current Energy Planning document.

Third, the CNMC doubts that the type of regulation being chosen (a Resolution of the State Secretary for Energy) has been suitable. It suggests that regulations with higher relevance in the juridical hierarchy (a royal decree, a Ministerial Order) would have been more appropriate.

Finally, the CNMC argues that the economic guarantee of 50€/MW is high enough. This was later reduced to 20€/MW. The CNMC argues that including additional requirements would limit the competition in the auction.

Comments from stakeholders

In addition to providing its own view, in this report the CNMC gathers the opinions of several stakeholders to the text of the RD and IET proposals sent on April 18th to the members of the Consejo Consultivo de Electricidad. The stakeholders responding included project developers (Acciona, EDP Renovables España, Enatica Energía, Enel Green Power España, Hidroeléctrica del Cantábrico (Grupo EDP)), Industrial Associations (Asociación Española de Valorización Energética de la Biomasa (AVEBIOM), Unesa (Endesa, GN-Fenosa, Iberdrola), REE en calidad de Transportista, Asociación de Empresas de Energías Renovables (APPA), Asociación Empresarial Eólica (AEE), Asociación Eólica de Galicia (EGA), Unión Española Fotovoltaica (UNEF) and Asociación de Comercializadores Independientes de Energía (ACIE)), regional governments (Andalucía, Aragón, Canary Islands, Catalonia, Castilla y León, Balearic islands, Galicia, Asturias and Murcia) and other (Agencia Española de Consumo, Seguridad Alimentaria y Nutrición (AECOSAN)).

A summary of the allegations from those stakeholders are summarised in the CNMC report. However, this report does not identify which stakeholder claims what. A summary of the main allegations to the proposals of RD and IET are provided below.

Allegations to the RD

Many stakeholders claim that both the RD and the IET should include a schedule for auctions, with dates and volumes auctioned. Some argue that the technological scope should be extended to solar, wind off-shore, small hydro and co-combustion (of coal with biomass). Others argue that the 500 MW volume for wind energy should be distributed between repowering and new installations. Limiting the scope of the auction to plants (both wind and biomass) in peninsular territories (i.e., not in islands) and to wind farms <50 MW was proposed by some stakeholders. Others argue that the volume for biomass should be removed or at least reduced because biomass would be “unnecessary or inefficient”. Yet others have the opposite opinion: the biomass volume to be auctioned is too low and should be increased to 300 MW or 350 MW. One stakeholder argued that the 200 MW auction for biomass would not result in sufficient competitive pressure.

Allegations to the IET

Some stakeholders claimed that the treatment of existing installations in the wind energy auction (repowering) is discriminatory, since the specific remuneration regime is provided for specific existing plants, whereas this is not the case for new plants (for which the remuneration scheme is not associated to a given installation). Another actor argues that a limit on this geographical flexibility for new plants should be adopted and that bidders should identify specific sites before going to the auction. Many stakeholders argued that the main features of the auction procedure should not be included in a later regulation, but in this one. Others argue that the economic guarantees should not be the only requirement to participate in the auction, but other requirements should be included, such as the degree of progress of plants in the administrative authorisation process. Several comments suggested that the deadline for construction should be increased from 36 to 48 months (this one was corrected in the final regulation). One stakeholder argued that the free transmission of the MW being allocated should be limited. Finally, some argued that the 50€/kW economic guarantee should be reduced to 20€/kW (this one was also accepted in the final regulation).

Report November 19th 2015 (CNMC 2015b)

In this brief report (7 pages), whose aim is to comment on the draft resolution of the State Secretary for Energy (later published on November 30th 2015), the CNMC states that the Proposal develops the rules of a sealed-bid auction with a marginal system in a coherent manner and is in line with other sealed-bid auctions of the electricity market in which OMI-Polo Español S.A. (OMIE) has participated as the manager of the auction. It provides recommendations to change the algorithm used to balance supply and demand in order to ensure that all the volume is allocated if there are enough bids. The comment is related to the fact that if the number of MW being offered in non-divisible blocks is relatively high, then the volume being allocated to the winning bids may be lower than the initial volume being auctioned (200 MW for biomass and 500 MW for wind), given the degree of discontinuity of the supply curve.

Government (MINETUR)

The MINETUR issued a press note on the following day to the auction. It emphasised the minimum cost of the consumer and the fact that the capacity volume of the bids submitted has been five-fold the amount of volume being auctioned "which confirms the interest of investors on the renewable energy sector in Spain". According to MINETUR, the 700 MW being auctioned will "contribute to ensure compliance with the 2020 RES target". The press note stresses that the auction will result in more efficient projects with a lower cost for the consumer and to more economically efficient installations for each technology. The auction has been undertaken in a "competitive, objective, transparent and non-discriminatory manner".

Small Renewable Energy Association (APPA)

In a press note published right after the auction (APPA 2016a), APPA has argued that the result of the auction adds more uncertainty to the renewable energy sector. It considers that there is a lot of uncertainty on the deployment of the MW winning the auction. APPA claims that the auction has been implemented in an improvised manner and with a short-term approach. It is rather a financial product and the winning bidders could have difficulties to develop the projects. Only the financial component has been taken into account with an economic guarantee being the only requirement to participate. Both the auction and the complex methodology to allocate the remuneration (included in the 2013-2014 regulatory package) have led to a surprising result. "The marginality contained in the auction was not the most efficient alternative in this sort of competitive mechanisms". It is quite surprising that the main project developers in the sector have not been allocated any capacity. Furthermore "the large concentration of the winning bids in a few hands raises concerns about the methodology being used". Finally, the allocated capacity is insufficient to contribute to the 2020 RES target.

APPA has also more specific comments on the biomass auction (APPA 2016b). It deems "an exclusionary, liable to speculation and included unrealistic conditions which makes it difficult that the projects will be deployed". It will be difficult to access financing for those projects. It also argues that a schedule for auctions should be adopted which allows the 2020 target for biomass to be achieved (1350 MW in the Energy Planning document, currently 800 MW). APPA had some comments to the first versions of the regulation. The participation of firms of the same group should be limited in order to prevent distortions in the result of the auction caused by "outsiders to the biomass sector". Otherwise, the capacity would be allocated to actors which would be unlikely to build the projects, which would lead to delays in the deployment of biomass in Spain. The auction is exclusionary for small and medium size biomass plants as well as for small cogeneration plants using biomass in the industrial sector. It is argued that these installations cannot compete given the differences in terms of economies of scale. It is also mentioned that the moratoria in 2012 left many biomass projects paralyzed. These projects were at different stages of completion (some were already in the final stage of grid connection). This has led many firms to participate in the auction offering very low prices (100% discounts). APPA also claims that the uniform pricing mechanism has also contributed to this. It is argued that, under a pay-as-bid method, the negative consequences of the auction in terms of too low support to build the projects (and thus, uncertainty on their final completion) would have been avoided.

AEE (Spanish Wind Energy Association)

Several press notes published by the AEE include some the concerns of this association regarding the design of the auction as well as its outcome.

Press note from April 21st 2015

In this press note the AEE claims that the proposed regulation has been proposed without the sector being consulted. It also argues that the 500 MW are below the 4553 and the 6473 MW that the Energy Planning document states are required up to 2020. It also criticises that the MINETUR does not specify neither the dates of the auctions nor the methodology that will be applied. The remuneration to the investment (R_{inv}) is set by MINETUR at 40000 €/MW, which is about 60% lower than the investment of farms installed in 2013 and 2014.

Allegations to the CNMC

According to the economic journal Cinco Días (2015), the AEE sent some allegations to the CNMC. The AEE asked the MINETUR to set a schedule for this auction as well as for future auctions up to 2020. They also ask for full publicity of the results of the auction (including participants, volumes offered and winning bids). The circumstances under which the auctions could be cancelled should be defined. The revisions every 6 years are also criticized, since it will not allow investors to know the profitability of new wind farms (the conditions for the winners in the auction could be modified in 2020). The 500 MW of capacity auctioned are deemed insufficient to comply with the 2020 RES target. Finally, the auction should not be focused on repowering.

Reactions after the auction

In a recent press note (AEE 2016), the AEE argues that the result of the auction is not significant because it does not reflect the reality of the sector. The auction has been an isolated one and, together with its scarce volume in a context in which the sector has been paralysed since the moratoria in 2012 has led to an unexpected result. After the 2012 moratoria, the 10 GW which had been allocated in the different regional contests, were paralysed. These projects are in different situations, some of them with already made investments. This has been reflected in the interest of the sector to participate in the auction and in the low bids. The exceptional character of those projects cannot be extrapolated neither to the portfolio of projects of most firms nor to the existing projects (which were installed with higher investment costs). Finally, the AEE defends that an auction procedure for the 5900 MW remaining (in order to comply with the 6400 MW envisaged in the Energy Planning document up to 2020) should be organized before summer 2016. This would allow projects to be on-line before 2020. Finally, the AEE calls for a stable and predictable regulation.

In an interview published before the auction, the president of AEE, argues that the auction will lead to wind projects, some of which will be built in 2018, but most will be so in 2019 and 2020. Thus, in order to have the 6400 MW which is expected by the Energy Planning document, auctions should be organized every three months. He also argues that the projects under the auction will be difficult to finance. He argues that this auction is fundamentally aimed at repowering (Díez 2015). In an interview after the auction the president of AEE argues that the fact that the 500 MW have been allocated without any incentive does not mean that the

sector is ready to carry out large-scale installations at electricity market prices. It rather means that there are some projects which are viable at those prices due to several reasons: their economic circumstances, their advanced stage of construction or the high number of hours of wind in the respective sites (Díez 2016).

5 Preliminary expectations on the performance of the auction based on assessment criteria

Policy Effectiveness

The results of the auction are provided below. The following table indicates the amount of investment remuneration (Rinv) for each standard plant. It can be observed that such remuneration is zero for both technologies and all the standard plants.

Table 6: Results of the auction (remuneration for the investment, Rinv)

Tecnología	Código de Identificación de la instalación tipo de referencia	Código de Identificación de la instalación tipo	Año de autorización de explotación definitiva	Valor estándar de la inversión inicial (€/MW)	Retribución a la inversión Rinv (€/MW) 2015-2020
Biomasa.	ITR-0101	IT-04001	2015	0	0
		IT-04002	2016	0	0
		IT-04003	2017	0	0
		IT-04004	2018	0	0
		IT-04005	2019	0	0
		IT-04006	2020	0	0
Eólica.	ITR-0102	IT-04007	2015	0	0
		IT-04008	2016	0	0
		IT-04009	2017	0	0
		IT-04010	2018	0	0
		IT-04011	2019	0	0
		IT-04012	2020	0	0

Source: DGPEM (2016). Available at: <http://www.subastasreibe.omie.es/subastas-de-energia-renovable/resultados>

Note: the first column indicates the technology (biomass or wind). The second column refers to the identification code of the Standard Reference Plant (SRP). The third column indicates the identification code of the Standard Plant (SP). The fourth column refers to the year of authorisation of the installation. The reference value of the initial investment (€/MW) is included in the fifth column. The sixth column refers to Rinv, or remuneration for the investment (€/MW).

The whole volumes auctioned in the wind (500MW) and biomass (200MW) bidding processes have been allocated. Regarding the wind auction, bids for 2.5 GW were submitted. It has to be taken into account that there were probably 10 GW in the pipeline, due to the moratoria in 2012. In contrast, the amount auctioned for biomass may have been too ambitious.

It is difficult to tell whether the auction will be effective or not until the projects are built and in operation. Winners have 4 years to complete the project and, in case they fail to do it, the economic guarantees would be confiscated (20€/kW).

However, the opinion of many stakeholders, taken from interviews and from the press, doubt that the wind energy projects will be built. The reason is that they believe the winning bids were too low to be profitable (see Section 4). Many in the sector mention that they do not understand how one can participate in the auction, give up this incentive and only receive the market price, when nothing prevents investors from going directly to the wholesale market. Indeed, participating in the auction with a 100% discount is the least profitable of all the alternatives because: 1) participants have to provide economic guarantees; 2) there is a 48 months deadline (Cinco Días 2015). For some stakeholders, the lax qualification and prequalification requirements have led to this result. Several reasons (not excluding ones) are given for the very low bids.

First, given the moratoria, there were so many MWs in the pipeline (at different stages of completion) that competition was high and many were desperate to have their wind farms receiving some remuneration. In this sense, the auction was a very exceptional case, which is difficult to extrapolate to other countries.

Second, the winners may not have calculated their bids correctly, and may have bid below their costs ('kamikaze attitude'). Although it is obviously hard for the winners to tell that they were wrong, they have declared that they know their costs and reject the hypothesis that they have bid below their costs. In particular, this could have been the case if the wind farms were already under construction and in places with very good wind resource.

Third, more likely, bidders may have bid low expecting that the cut-off point was not zero, but above it.

Finally, some even argue that some may have bid low in order to take others from the market. We do not know and, more importantly, there is no way of knowing.

There is uncertainty about whether the auction will contribute to compliance with the 2020 RES targets and with the National Energy Planning targets, also for 2020. The deadline to build those wind farms is 4 years. They should start to be built today in order to contribute to those targets, given the lead times involved in construction. According to some stakeholders, the requirements for connection to the grid might also lead to delays in feeding electricity into the grid. The revisions of the remuneration every 3 and 6 years (in 2017 and 2020) may add uncertainty to the process.

A main issue has been repowering. The regulation may have been initially devised to encourage repowering, especially of those wind farms built before 2004. In fact, the aforementioned CNMC report in June 2015 (CNMC 2015a) argued that, the initial parameters were only attractive for repowering. However, a couple of interviewees were very skeptical that the design and outcome of the auction would have made repowering an activity worth carrying out.

Static Efficiency/Cost effectiveness

According to some stakeholders being consulted, allocative efficiency was not a main goal of the government for the wind and biomass auctions. However, according to the press note on the closing of the auction by the Ministry (MINETUR 2016), “differently from the previous support scheme, the new would result in “more efficient projects which lead to lower costs for consumers”. The same note states that “the auction has led to the allocation of only the most economically efficient installations for each technology”.

Data on allocative efficiency are missing. This information is on the hands of bidders and is not publicly available. Therefore, we can only speculate on the results for this assessment criterion. Given the very low remuneration level, it can be expected that the projects are also low-cost ones. But this cannot be attributed only to the design of the auction, but to the aforementioned special context conditions (large pipeline of projects due to the moratoria). Additional (direct) system costs (as defined in Breitschoft and Held 2014) would probably be low regarding technology costs, since wind energy and biomass (to a lower extent) are not very expensive technologies compared to other RES-E alternatives. The level of the indirect system costs is difficult to envisage. However, given the relatively low capacity auctioned for wind, RES integration costs for the 500 MW are unlikely to be high. As mentioned above, the 200 MW for biomass are a relatively large quantity for this technology, but lower than for wind. In addition, grid integration and back-up costs of biomass should be much lower than for wind, since it is a non-intermittent technology. It should be taken into account that going from a scheme which remunerates electricity generation to another with investment-based remuneration may cause fewer distortions on the power market but also a lower incentive to deploy the plants in the sites with the best renewable energy resources (wind, solar radiation...), with negative implications in terms of target achievement.

Regarding the transaction costs, only one stakeholder commented that these could be substantial. Others did not provided information on this item.

Dynamic Efficiency

Regarding the dynamic efficiency criterion, it should be mentioned first that the impact of the auction on technological diversity is likely to be low. It is a very small auction for only two technologies. The exclusion of the solar technologies (PV and CSP) is particularly striking and has not been motivated. Recall, that the Energy Planning document expects (see Section 1) quite a relevant role for other technologies besides wind and biomass in a 2020 horizon.

With respect to the impact on innovation, this impact has at least two main aspects (see del Río 2012 for further details): market creation, the existence of a profit margin which can be reinvested in innovation and competition between equipment suppliers. All are relevant for technological innovation. The market prospects for both technologies as a result of the auction are not very bright. First, a small amount of capacity has been auctioned, and more importantly, there is no schedule for future auctions. Furthermore, the revisions every 3 and 6 years create considerable uncertainty. This makes investments in the supply chain unattractive. Regarding the profit margins, the very low support as a result of the auction procedure is unlikely to result in

considerable resources being devoted to private R&D by the firms. Finally, competition between equipment suppliers may be higher with low support levels, as those of these auctions. But it remains to be seen whether this effect offsets the other two.

Finally, the absence of other criteria apart from the price may make it difficult to encourage a solid supply chain on wind energy and biomass technologies, in short a technological system on these two technologies. It is not clear, however, what the degree of influence of local content rules on technological innovation is. But a greater impact on the supply chain could be expected from those rules than the price-only auctions as the single criterion.

Actor variety and social acceptability

A priori, a greater risk due to the auction could be expected for small actors, given the higher entry barriers (economic guarantees) and their lower capacity to compete only on costs in a price-only auction (economies of scale). However, the results of the auction for wind (table 6) show that this has not been the case, with the winners in the auction being mostly small actors, and with the larger firms either not participating in the auction (ACCIONA) or not being awarded contracts (the largest three utilities, Iberdrola, Endesa through Enel Green Power y Gas Natural Fenosa). The reason might be, again, related to the special context conditions of this auction, to the relatively lax prequalification and qualification requirements (which have not precluded small actors from participating) and the very small auctioned volumes (which limits the advantages in terms of economies of scale for the larger participants).

In fact, some of the winners are outsiders to the wind energy sector. This has been criticised by some stakeholders (lack of professionalism...) and praised by others (democratisation of energy provision...).

The concentration of the winning bids in the hands of only two of these “outsiders”, with family ties between each other (Forestalia and Jorge Energy) raises the concern of some stakeholders about the effective construction of their wind farms (see “effectiveness” criterion above).

Foreign participation has been limited. Only Electricidade de Portugal (EDP) Renovables España (a Spanish subsidiary of the Portuguese EDP) has been awarded contracts. The wind farms of Forestalia will be built by GEDI (a Chinese company).

Regional diversity is unknown, since the product being auctioned is not a specific project, but kW's which can be built anywhere in the Spanish territory and data on where they will be built have not been made public. In this sense, there might be some competition between the different regions (or Autonomous Communities, CCAA), which have different fiscal regimes, to attract the awarded projects to their territories by offering fiscal or other advantages.

Table 7: Winning bidders in the wind auction (names and allocated volume)

Nombre adjudicatario	Código de Identificación de la instalación tipo de referencia	Potencia adjudicada (kW)
Consorcio Aragonés de Recursos Eólicos, S. L.	ITR-0102	300.000
Crossfield Engineering, S. L.	ITR-0102	40
Desarrollos Renovables del Ebro, S. L.	ITR-0102	29
EDP Renovables España, S. L. U.	ITR-0102	93.200
Eólica Montes de Cierzo, S. L.	ITR-0102	1.670
Ingeniería y Planificación Sostenible, S. L.	ITR-0102	61
Jorge Energy, S. L.	ITR-0102	102.000
Planta Enersos III, S.L.	ITR-0102	3.000
Total.		500.000

Source: DGPEM (2016). Available at: <http://www.subastasreibe.omie.es/subastas-de-energia-renovable/resultados>.

Note: The first column includes the names of the winners in the auction, the second column refers to the identification code of the SRP. The last column indicates the amount of capacity being allocated to each winner.

Regarding the biomass auction, the Association of Small Renewable Energy Producers (APPA) claims that it has excluded the small and medium-size plants as well as biomass cogeneration in industries (APPA 2016b).

Table 8: Winning bidders in the biomass auction (names and allocated volume)

Nombre adjudicatario	Código de Identificación de la instalación tipo de referencia	Potencia adjudicada (kW)
Auténtica Generación Distribuida de Castilla y León, S. L.	ITR-0101	587
Ence Energía y Celulosa, S. A.	ITR-0101	40.000
Forestalia Renovables Generación I, S. L.	ITR-0101	108.500
Municipal de Servicios Villahermosana, S. L. U.	ITR-0101	1.000
Renova Generación de Energías Renovables, S. L.	ITR-0101	49.913
Total.		200.000

Source: DGPEM (2016). Available at: <http://www.subastasreibe.omie.es/subastas-de-energia-renovable/resultados>.

Note: The first column includes the names of the winners in the auction, the second column refers to the identification code of the SRP. The last column indicates the amount of capacity being allocated to each winner.

Regarding the social acceptability of the results, the low support costs which it implies could be considered a positive aspect by the population (electricity consumers). This is important at a time when the retail electricity prices for consumers are comparatively high in Spain with respect to other EU countries (see Section 1) and have increased in the recent past. In the past, renewables (together with other factors) have contributed to the so-called tariff deficit. However, the low capacity being auctioned, after years of moratorium, may not be attractive for a Spanish population which is widely in favour of RES. It should be taken into account that there

is comparatively quite a large RES penetration in the country already, in a context of large electricity generation capacities.

Compatibility with market principles and integration

The auction scheme seems to help to develop the Spanish energy sector towards the principles of the EU internal market (liberal, competitive, integrated). It was open for foreign investors and led to a very low support price. The greatest investors are outsiders from the energy sector (see above), but they will have balancing responsibilities since their electricity will have to be sold in the wholesale market. In Spain there are no negative prices. There are no local content rules in this price-only auction and problems with state aid approval or other EU rules cannot be expected. However, one interviewee points to the possibility that the investment support provided by the auction procedure is rejected by DG COMP since, he/she argues, this type of support is not allowed by the EU State Guidelines for Energy and Environmental Protection 2014-2020. It remains to be seen how the auction will help Spain to comply with its 2020 RES target.

Distributional effects & minimisation of support costs

The specific, context conditions under which the auction for wind electricity has been carried out has led to many bids. This competition has led to very low support prices, i.e., to zero remuneration for the investment (see also under “effectiveness criterion”). The results have been very positive for the government, as mentioned in the press note released by the Ministry after the auction (see Section 4 above). Electricity consumers could also be deemed favoured since they will have to pay less in their electricity bills than if the support had not been zero. And conventional electricity generators could also be happy since the impact of the RES auctions on their market quota is very small. However, the losers are clearly RES investors and RES generators (more so in the case of wind than biomass).

6 Conclusions

Several preliminary conclusions on the design and outcome of the Spanish auction, a complex regulation without world precedents, can be inferred. The auction is strongly motivated by the willingness to keep support costs at very low levels. However, although Spain is above the interim Directive targets, compliance with the 2020 RES target may be difficult under the new scheme, since the signal to investors is a very weak one.

Regarding the design of the wind and biomass auctions in Spain, this is conditioned by and in turn complements the existing regulation (what has been called as “umbrella regulation” throughout this report). This umbrella regulation envisages investment-based support and revisions every 3 and 6 years. As a

consequence, the design of the auction shows a main particularity with respect to other auction schemes around the world, i.e., the provision of investment-based support. Lax prequalification and qualification requirements are also a relevant design element influencing the outcome of the auction. The absence of a schedule for regular auctions, in addition to the 3 and 6 year revisions of support is likely to send a weak signal to RES investors which, as mentioned above, may put compliance with the RES target at risk.

The results are dependent on the design elements chosen, but also on the particular context conditions of RES in Spain and, more specifically, the large pipeline of projects due to the long period since the moratoria in 2012. The results have shown that all the volume auctioned in both the wind and biomass auctions has been allocated at extremely low prices (zero remuneration for investment) to rather small actors and outsiders from the sector. The very low support has cast doubts about the potential effectiveness of the scheme, i.e., about whether support levels may be too low to make construction of the projects profitable. Different explanations for such result have been provided. However, it should be taken into account that any conclusion on effectiveness should be taken with care, since this obviously depends on the projects being built, which is too early to tell.

The results also leave clear that design choices may lead to interactions between criteria (synergies, complementarities and conflicts), as proposed in the assessment criteria report for the AURES project (del Rio et al 2015). In particular, this price-only auction, in which priority was given to the minimisation of support costs, may have led to relatively high social acceptability, but also to lower scores regarding the effectiveness and dynamic efficiency criteria. However, contrary to what it could be expected, the price-only auction has not led to the exclusion of small actors and outsiders to the sector. Quite the opposite is true, which is probably due to a combination of the specific context conditions under which the auction procedure has taken place as well as the design elements chosen (i.e., the lax prequalification and qualification requirements).

Finally, a few words on transparency and the regulatory process of the auction procedure are worth mentioning. According to the wind energy and the renewable energy sector, there was too much opacity by the Ministry. There is a formal consultation procedure, through the Consejo Consultivo de la Electricidad, but the sector association feels that many of the allegations which were presented there have not been taken into account (see APPA's and AEE's, the wind energy association, press notes APPA 2015, AEE 2015).

Regarding the regulatory process, the time between the successive regulations relevant for the auction (coming in October-November) and the actual auction procedure might have been too short for some investors and for having an impact on the supply chain. The rules of the auction are absolutely compatible (indeed, they complement) the previous regulation (what it has been called in this paper "umbrella regulation"). It is somehow striking that the RD 947/2015 does not include the full details of the auction, and these details have come in a serialized regulation (in the IET on October 23rd and the Resolution November 30th). Some stakeholders argue that the legal form (a Resolution of the State Secretary for Energy) used to provide those details is not appropriate and should have been a higher-level one (maybe its contents should have been included in the RD947/2015, as used to be the case with RES-E regulation before (in the late 90s and 2000s). Finally, it is not very clear for some stakeholders under which conditions the auction can be postponed.

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