Council of European Energy Regulators

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2nd CEER Report on Tendering Procedures for RES in Europe

Renewable Energy Sources Work Stream of Electricity Working Group

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INFORMATION PAGE

Abstract

This CEER report (C20-RES-67-03) presents the current state of play on RES tendering schemes in Europe. It is an update of the 2018 CEER Report on Tendering Procedures for RES in Europe (C18-SD-63-03). It provides a comprehensive overview of the various competitive bidding procedures in place for determining the level of support for RES in CEER Member countries. Assessments of schemes in selected countries complement the report.

This report should be read in the context of the revised Renewable Energy Directive adopted in December 2018. With this revision, transparent, competitive, non-discriminatory and cost-effective principles are almost certain to become the standard criteria for RES support schemes across Europe.

Target audience

RES operators, electricity customers, RES industry, electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Renewables; Support schemes; Competitive bidding procedures; National Regulatory Authorities (NRAs).

If you have any queries relating to this paper, please contact:
CEER Secretariat
Tel. +32 (0)2 788 73 30
Email: brussels@ceer.eu

Related documents

CEER documents

- Status Review of Renewables Energy Support Schemes in Europe for 2016 and 2017, Ref: C18-SD-63-03, December 2018
- CEER Report on Tendering Procedures for RES in Europe, Ref: C17-SD-60-03, June 2018
- Status Review of Renewables Energy Support Schemes in Europe for 2014 and 2015, Ref: C16-SDE-56-03, April 2017
- Key support elements of RES in Europe: moving towards market integration, Ref: C15-SDE-49-03, 26 January 2016

External documents

- Directive 2018/2001 on the promotion of the use of energy from renewable sources, December 2018. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001
- Directive 2009/28/EC on the promotion of the use of energy from renewable sources, April 2009. http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0028
- Guidelines on State aid for environmental protection and energy 2014-2020, European Commission, June 2014, 2014/C 200/01. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014XC0628%2801%29

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EXECUTIVE SUMMARY

Background

The EU is striving towards reaching at least a 32% renewable energy sources (RES) share in its gross final consumption of energy in 2030. European energy regulators agree that decarbonisation[1] should be done at least cost, therefore this deployment of RES should be realised at the lowest possible cost to society. Market-based mechanisms, notably competitive tendering procedures, have been – in many circumstances – observed to be a successful instrument for reducing RES support cost.[2]

The 2018 revision of the Renewable Energy Directive (2018/2001) foresees competitive tendering procedures as a standard instrument for granting RES support in an "open, transparent, competitive, non-discriminatory and cost-effective manner"[3] in all the European Union Member States. This is in line with the Guidelines on State Aid for environmental protection and Energy[4] (EEAG), which first paved the way towards the implementation of competitive bidding procedures.

Objectives and contents of the document

This report offers an update to a previous CEER report on RES tendering procedures published in 2018[5], which described key tendering design elements and provided an overview of experiences with the implementation of tenders. Besides mapping the tenders implemented since the last report, this report will put an emphasis on available empirical evidence up to July 2020, notably with respect to the level of competitiveness and price development as well as the realisation rate.

The report is structured as outlined below:

- Update of existing or planned tendering procedures in CEER Member countries (MCs);
- Experiences with technology-specific tenders;
- Experiences with technology-neutral tenders; and
- Key lessons learnt.

Brief summary of the conclusions

By mid-2020, tendering as a competitive instrument to determine the level of financial support for the operation of RES installations had been implemented in a large number of European countries. This is an important change from the 2018 CEER report, where tendering was a relatively new instrument.

This second report has brought forward the following main conclusions concerning the implemented tendering procedures:

- In a large number of MCs, national tendering schemes have already been implemented. The report shows that by mid-2020, 18 out of the 29 MCs that are included in the report have introduced tendering schemes, while one MC has passed the legislation and is about to carry out its first tendering procedures.

[1] See CEER's 3D Strategy for 2019-2021.
[2] See Directive (EU) 2018/2001 recital 19.
[3] See Directive (EU) 2018/2001 Art. 4 (4).
[4] Communication from the Commission — Guidelines on State aid for environmental protection and energy 2014-2020: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014XC0628%2801%29
[5] CEER Report on Tendering Procedures for RES in Europe, Ref: C17-SD-60-03, June 2018.

- The report finds that most MCs have opted to implement both technology-neutral and technology-specific tenders. Only a small number of countries (5) do not have any technology-specific tenders at all. It can also be observed that MCs tend to first gain experience with technology-specific tenders and introduce or switch to technology-neutral tenders at a later stage.
- Across all technology-specific schemes implemented, offshore wind, onshore wind, PV (solar) and biomass have been the most selected renewable technologies.
- The technology-neutral tenders in Germany, France and Hungary[6] brought forward PV as the winning RES technology of the procedure.
- All tendering schemes implemented after 2018 have remained national in scope.
- As a price-awarding mechanism, the pay-as-bid method, where bidders are awarded a support entitlement in accordance to the level of their submitted bid, has been the favoured approach.
- Recent tenders have predominantly been set up to determine the level of the reference value for calculating a market premium, i.e. the support payment in addition to the market income. While the first tender generation had also been used to determine the reference value for the Feed-in-Tariff (FiT), all recent tenders introduced used Feed-in-Premiums (FiP) as the outcome of the tendering process.
- Where empirical evidence is available, results regarding the main criteria demonstrating the success of tenders as a market-based instrument – level of competition, price developments and realisation rates – are mixed. Indeed, prices went down, but often not in a continuous linear manner but with ups and downs, and not always as strongly as expected. Competition among bidders could not be ensured throughout all tenders. Realisation rates observed are high in solar tenders and mixed for biomass. However, for most tenders, realisation times are still running. However, as the level of information provided does not allow one to look into the details of national schemes, only tentative conclusions can be drawn.
- In theory, market-based instruments should be more efficient than administratively-set support levels. At the moment, tendering as a market-based instrument for determining the level of RES support is still in the learning stage. More and more MC are implementing new schemes and updating existing ones.
- Acceptance issues for RES deployment are being observed, especially for onshore wind, negatively impacting the participation level in onshore wind tenders.
- Competitive procedures do not obviate the need for administrative processes. Instead of detailed monitoring and anticipating price developments of supported technologies, the implementation of tenders, i.e. the preparation and the evaluation of the tenders, is at the centre of attention, which also requires administrative capacities, notably in National Regulatory Authorities (NRAs).

[6] No information provided on this aspect by the other MCs.

1 Introduction

The EU is striving towards reaching at least a 32% renewable energy sources (RES) share in its gross final consumption of energy in 2030. European energy regulators agree that decarbonisation[7] should be done at least cost, therefore also this deployment of RES should be realised at the lowest possible cost to society. Market-based mechanisms, notably competitive tendering procedures, have been – in many circumstances – observed to be a successful instrument for reducing RES support cost.[8]

The 2018 revision of the Renewable Energy Directive (2018/2001) foresees competitive tendering procedures as a standard instrument for granting RES support in an "open, transparent, competitive, non-discriminatory and cost-effective manner"[9] in all European Union Member States (MS). This is in line with the Guidelines on State Aid for environmental protection and Energy (EEAG), which first paved the way towards the implementation of competitive bidding procedures.

Purpose of this report

This report offers an update to a previous CEER report on RES tendering procedures published in 2018, which described key tendering design elements and provided a first return of experiences with the implementation of tenders. Besides mapping the tenders implemented since the last report, this report will put an emphasis on available empirical evidence up to July 2020, notably with respect to the level of competitiveness and price development as well as the realisation rate.

Structure of the report

The report follows the structure outlined below:

- Update of existing or planned tendering procedures in the CEER Member countries (MCs) ;
- Experiences with technology-specific tenders;
- Experiences with technology-neutral tenders; and
- Key lessons learnt.

[7] See CEER's 3D Strategy for 2019-2021.
[8] See Directive (EU) 2018/2001 recital 19.
[9] See Directive (EU) 2018/2001 Art. 4 (4).

2 Tendering procedures for RES in Europe: Status 2020

Since the publication of the first report in 2018, tendering procedures have been introduced in an increasing number of CEER MCs: 19 MCs carried out one or more tendering procedures and one MC stated that the respective legislation is in place while the actual tendering rounds were still outstanding. 8 MCs stated that no concrete plans for introducing tenders were available yet. Among these countries, Sweden and Norway have chosen a joint certificate scheme as an alternative market-based instrument for setting cost effective levels of RES support.

2.1 Overview of RES tenders in place

Status	CEER Member Countries 2020 (2018)
One or more tendering scheme(s) in place	**19 (13):** Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Malta, the Netherlands, Lithuania, Portugal, Poland, Slovenia, Spain, United Kingdom
Legislation in place, first concrete tendering rounds outstanding	**1 (5):** Czech Republic
No official legislation or concrete plans for introducing tenders in the short term	**9 (11)**: Austria, Belgium, Bulgaria, Cyprus, Iceland, Latvia, Norway, Romania, Sweden
Tendering scheme discontinued	**2 (2)**: Germany, Italy

Table 1: Overview of implementation status of tendering procedures
Note: The numbers in brackets are the numbers from the 2018 CEER report.

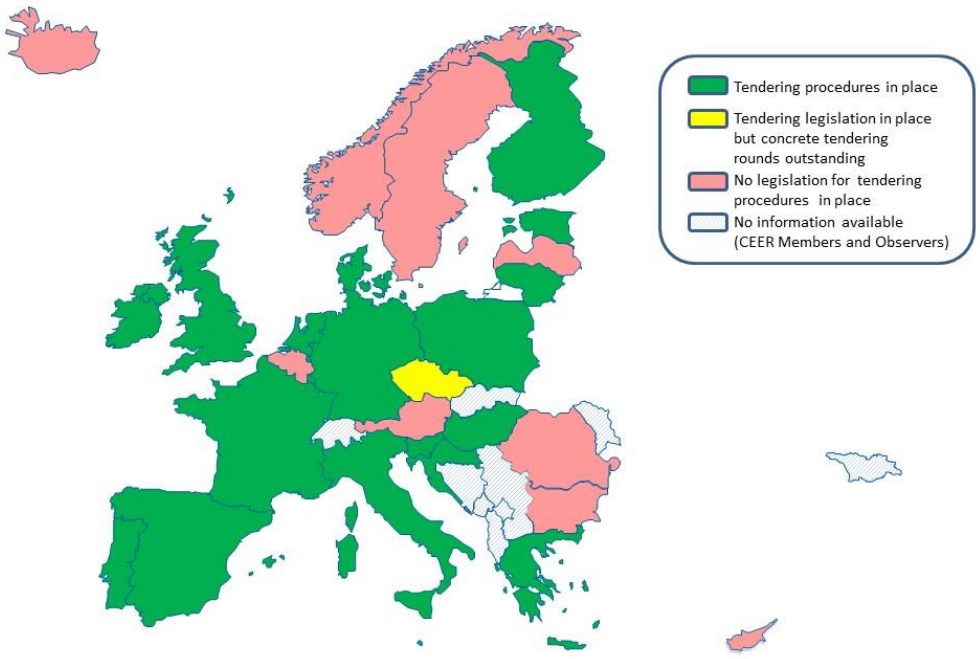

Figure 1: Tendering schemes for RES in Europe

	PV	Wind onshore	Wind offshore	Biomass/ biogas	Technology-neutral	Cross border scheme	Other
Croatia					2020		Small hydro, geothermal, CHP - 2018
Czech Republic					2022		
Denmark	2018 (>1 MW)		2009		2018 (onshore & offshore wind, solar)	2016 (PV with Germany)	
Estonia					2018		
Finland					2018		
France	2011-2012; 2013-14; 2015-16 (Rooftop & ground-mounted PV) 2016 (Rooftop >= 100 KW/ ground-mounted PV >= 500 KW) 2017 (Inovative PV >= 100KW)	2017	2011, 2013 (tenders on specific sites) 2019	2015	2018 (wind & solar)		hydroelectric (2017), CHP (2016), self-consumption (2017)
Germany	2015-2016 (ground-mounted PV >100 KW) 2017 (All solar > 750 kW)	2017	2017	2017	2018 (wind & solar) 2020 (innovative tender: any RES technology alone or in combination and with a storage)	2016 (PV with Denmark)	
Greece	2016 (PV installations with $P_{pv} \leq 1$ MW and 1 MW < $P_{pv} \leq 20$ MW	2018			2019 (wind & solar)		
Hungary					2019		
Italy	2012 - 2013. No more incentives are defined for PV	2013/2016	2013/2016	2013/2016	2019 (wind/solar); (hydro/ residual gases); (repowering onhore wind/ refurbishing hydro & residual gases)		2013 (geothermal and hydro) 2016 (geothermal and concentrated solar power (CSP))
Ireland					2020		
Lithuania		2015		2013	2019 (wind, solar, biomass & hydro)		2013 hydro
Luxembourg	2018 (PV on industrial land > 500 kW; PV on non-permeable surfaces > 500 kW)) 2019 (PV on building 200-500 kW; PV on shading structure or water bassin 200-500 kW; 2019 (PV on shading structure or water bassin 500 kW - 5 MW)						
Malta	2017				2020 (all technologies)		
Netherlands			2015		2011 (Solar PV, Solar Thermal, Wind onshore,		

	PV	Wind onshore	Wind offshore	Biomass/ biogas	Technology-neutral	Cross border scheme	Other
					Biomass, Water & Geothermal)		
Poland				2018 agricultural biogas < 1 MW 2018 agricultural biogas > 1 MW	2016-2018 (all RES technologies) 2018 (wind and PV) 2018 (biomass, biogas from wastewater treatment plants, biogas from landfill site, waste incineration plant)		
Portugal	2010 2019 (PV > 10 kW)	2005			2011		2010 small hydro
Slovenia	2016 (PV on building and ground-mounted PV < 10 MW)	2016 (< 50MW)		2016 Biogas < 10 MW	2016 (renovated plants of all techonologies < 10 MW)		2016 Hydro < 10 MW 2016 Geothermal < 10 MW
Spain		2016		2016	2017 (Wind & Solar)		
UK			2014		2014		

Table 2: Tendering schemes for RES in CEER member countries, by technology

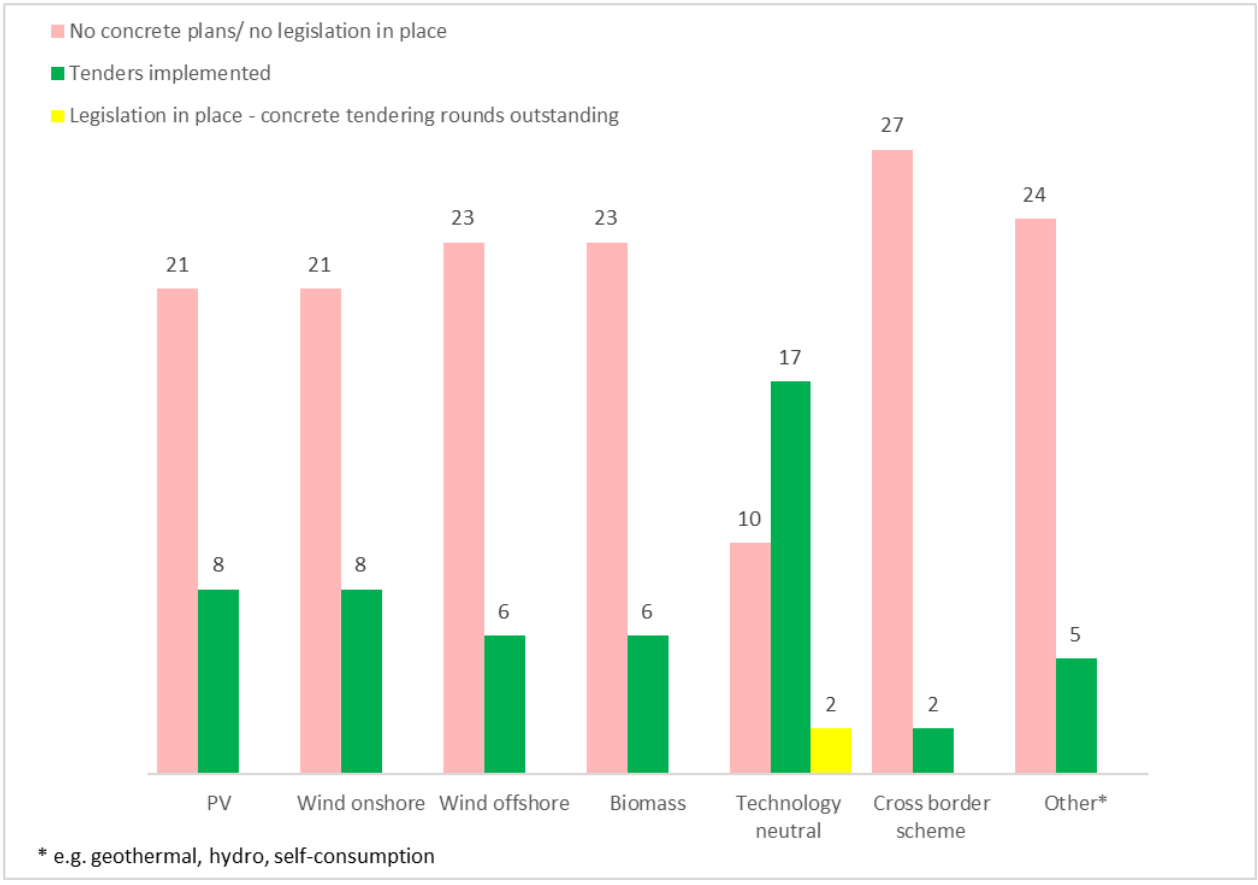

Figure 2: Tendering schemes: Status quo by RES technologies 2020 (n=29)
Note: The graph includes data from 29 MCs, showing in green the number of countries in which the respective type of tender has been implemented.

2.2 Main elements of RES tenders

The key design elements applied in RES tenders implemented up to 2018 have been extensively described in the 2018 report. NRAs have been asked to update the information about national tendering procedures in place up to mid-2020 (see Annex 2 for the list of questions). Based on the information provided, the following main elements can be observed:

	Technologies	Price awarding mechanism	Key awarding criteria	Reference value (RV) determined through tender
Technology-neutral	All or selected RES technologies, often only solar and wind.	Mainly pay-as bid. Only in Spain is uniform pricing applied.	Mainly price and in case of equality, volume matters. In Hungary, a range of additional criteria are taken into account (there is a preference for investments on "brown fields", greater capacity, the earlier application and the lot).	RV for FiP or the investment revenue
Technology-specific	Onshore wind, offshore wind, solar, biomass, hydro, biogas, geothermal	Mainly pay-as bid. In Spain, and in Germany for energy communities in the onshore wind tenders, uniform pricing rules are applied.	Mainly price and in case of price equality, volume offered matters. In France other criteria such as the environmental impact, the carbon footprint, the level of innovation and the occupancy of the area and industrial plans are used.	RV for FiP, investment revenue & for FiT.

Table 3: Main elements of tendering schemes

2.3 Administrative aspects of tendering procedures

2.3.1 Implementing body

The design of a tendering scheme for determining the level of RES support falls within the remit of the respective national ministry, while the implementation of the tendering procedures may be the task of different public or private entities.

In some MCs, such as in Germany, Greece, Finland, France, Hungary, Lithuania, Poland, Slovenia and Spain, the national regulatory authority (NRA) is in charge of carrying out the tenders (see Table 4). Alternatively, the implementation of the process may also be delegated to a public-interest company, as is the case in Italy, the Netherlands and in the United Kingdom. In Malta, responsibilities are divided: The Ministry for Energy and Water and the Agency for Energy and Water are in charge of the implementation while the Maltese NRA only provides certain resources. In other words, the NRAs do not always play a role in the implementation of tendering procedures, but are the national body most often entrusted with this task (8 out of 19 MCs).

In general, the practical implementation of a tender encompasses a range of activities, such as:

- Preparation and publication of tendering documentation (explanation of the procedure, forms to be submitted by the bidders, etc.);
- Information service for potential bidders (e.g. service hotline, email account, etc.);

- Preparation of an electronic platform for submitting the bids;
- Database for the administration of the bids and awards; and
- Evaluation of bids and publication/analysis of results.

A stable bidding environment is crucial for bidders to develop trust in the new tendering instrument and in the body implementing the procedures. As such, it is advisable to avoid changing the procedures once introduced or to change the results. As displayed in Table 4, only in one MC (France) is it possible for the Ministry to change the decision taken by the NRA with respect to the volume and bidders awarded. The French Ministry can accept informal appeals from eliminated bidders[10] and under exceptional circumstances[11], a higher volume of projects can be awarded as tendered out.

MC	NRA's role in tenders	Can the decision (tendering outcome) taken be changed?
Croatia	None	n.a.
Denmark	None - The Danish Energy Agency (ENS) is in charge.	The technology-neutral tenders (wind + solar PV in 2018-2019 and wind + solar PV + wave + hydro in 2020-2021) have been decided by a large majority in the Danish parliament. The decision to discontinue conducting tenders or to cancel an ongoing tender can be made by a majority in the Danish parliament.
Estonia	None - The Ministry of Economic Affairs & Communications is in charge.	n.a.
Finland	NRA is responsible for implementing the auction, including among others collecting the bid bonds and also for paying out support for the electricity generated (in periods of 3 months for the duration of the support scheme).	No. The NRA implements the law, which sets out the principles for how the auction is to be carried out, pay as bid, bid bond, building permit requirement etc. The NRA implements the law based on best international practice and sound economic principles, since it was the first auction in Finland.
France	NRA in charge of collecting and analysing the bids and establishing a list of winning candidates.	Yes. The Ministry can accept informal appeals from eliminated bidders; under exceptional circumstances, the Ministry may select a higher volume of projects than the tendered volume.
Germany	NRA in charges of implementing tendering procedure from A to Z; The tendering design is designed by the ministry.	No
Greece	NRA in charges of implementing tendering procedure from A to Z.	No
Hungary	NRA issues the call for tender and carries out the tendering procedure, evaluates the applications. The Ministry sets the main parameters of the tender. The Ministry oversees the full tendering process.	No
Italy	None - GSE S.p.A., a state-owned company, established by the State to pursue and achieve environmental sustainability, is in charge of carrying out the tenders.	No
Ireland	NRA has no direct involvement in the tendering process; however it does carry out a competition assessment which informs the target volume to be secured. NRA also as oversight role appointing an auditor and monitor for the tendering process.	The Minister reserves the right to reject offers and possibly re-run auction under certain circumstances.

[10] The Ministry can have a different legal interpretation of the specification of the tendering procedure but that does not apply to bidders eliminated because of a low rate/high price.
[11] This is a political decision. For example, if the participation is exceptionally high and prices low and if complementary volumes are needed to meet the renewable energy development targets.

MC	NRA's role in tenders	Can the decision (tendering outcome) taken be changed?
Lithuania	NRA, in accordance with the law, prepares and approves the rules of auction procedures, organizes the auction from A to Z, at the time set by the Government, and approves the winner of the auction.	No, except court. If the NRA's decision was appealed to a court, the judge could rule that the decision was made in violation of the law.
Luxembourg	No - No formal involvement of the NRA in the tendering procedure.	No
Malta	None - Ministry for Energy & Water and the Agency for Energy are in charge. NRA only provides certain resources.	No
NL	None - The Netherlands Enterprise Agency (RVO) is in charge.	No
Poland	NRA prepares and organizes auctions. Ministry determines the tender maximum volume and value, ceiling bid price.	No
Portugal	None – The Energy Directorate General is in charge.	No
Slovenia	NRA in charge of implementing tendering procedure from A to Z.	No
Spain	NRA in charge of implementing tendering procedure from A to Z; Supervisory role.	No
UK	None - System Operator (NG ESO) is in charge.	No - Decisions taken by NG ESO cannot be overruled by the government or NRA. After the auction is completed NG ESO provide an audit report to government which evaluates whether the processes have been followed correctly. At this point the Secretary of State can terminate the round or require it to be re-run but this would be without sight of who had won a contract and re-running would usually be on the basis of problems with the auction.

Table 4: NRAs' roles in implementation of tenders and scope for alteration of decisions

2.3.2 Fees and procedures

For participation in a tendering procedure, nine MCs have indicated they have an electronic procedure to submit bids, while a bid submission in paper is still widely used. Fees are usually charged for participation but this is not the practice in all MCs. When applied, the fee varies between technologies, project sizes and are either expressed as a fixed value or per kW. The highest fee is observed for offshore wind bids. The approach followed for announcing the submission dates and the participation features, and as such the time allocated to bidders for compiling their bids, differs from MC to MC. In most MCs, bidders have between one and six months to prepare the requisite documentation for submission. Where electronic procedures are in place, the time allocated to upload the submission varies between two hours and eight weeks (see Table 5). Once submitted, the body in charge for assessing and ranking the bids often has limited time at its disposal for publishing the results. This time span varies between 24 hours and four months. Alternatively, where no specific deadlines are defined, the body in charge is requested to publish the results as soon as possible.

MC	Electronic procedure	Administrative fees for participation	Time to compile the bidding document	Time for administration to evaluate the submitted bids
SOLAR				
France	Yes	No	The online platform is open for between 2 to 4 weeks depending on the tender	1-4 months depending on the tender
Germany	No	Yes, €586	5 to 8 weeks before the tender publication	Not defined by law/ as soon as possible
Greece	Yes	Yes, €500 – 1,000	Around 3 weeks	An electronic procedure is followed. The participants know the results of the auction the day it is held
Luxembourg	Yes (and paper version)	No	6 months	n.a.
Malta	No	Yes, €522	No requirements - in the first session 83 calendar days and in the second session 66 calendar days	The process was not administered by the NRA. Bidders were required to keep bids valid for 90 days.
Portugal	Yes	No	Electronic auction at a defined date according to previously presented rules	n.a.
Slovenia	No	No	2 months from the announcement of the tender	60 days from expiration of applications
ONSHORE WIND				
France	Yes	No	The online platform is open for 1 month for bids to be submitted	6 weeks
Germany	No	Yes	5 to 8 weeks before the publication of tender specifications. Dates are communicated in the law.	Not requirements set by law / as soon as possible
Greece	Yes	Yes, €1,000	Around 3 weeks	An electronic procedure is followed. The participants know the results of the auction the day it is held
Slovenia	No	No	2 months from the announcement of the tender	60 days from expiration of applications
Spain	Yes	€0.17 /kW	Electronic procedure is open for 2h.	24 hours
OFFSHORE WIND				
France	Yes	No	No requirements - Closing date is communicated in advance. Candidates can ask questions until 6 weeks before the closing date.	6 weeks; or 8 weeks if NRA considers that some bidders submitted offers with underestimated prices
Germany	No	Yes, €4727.29	5 to 8 weeks before the publication of tender specifications. Dates are communicated in the law.	No requirements set by law / as soon as possible
BIOMASS				
Germany	No	Yes, €522	5 to 8 weeks before the publication of tender specifications. Dates are communicated in the law.	No requirements set by law / as soon as possible
Slovenia	No	No	2 months from the announcement of the tender	60 days from expiration of applications
Spain	Yes	€0.17 /kW	Electronic procedure is open for 2h.	24 hours
TECHNOLOGY-NEUTRAL				
Denmark	Yes	No	Not determined but usually 2 months between announcement and submitting deadline	Not determined but usually about 1 week for the publication of results
France	Yes	No	Online platform is open for 3 weeks to submit bids	6 weeks
Hungary	Yes	No	Minimum of 3 months	4 months

MC	Electronic procedure	Administrative fees for participation	Time to compile the bidding document	Time for administration to evaluate the submitted bids
Italy	Yes	Yes, €1,420 for 1 MW to 5 MW €2,300 > 5 MW	30 days from the notice publication by GSE S.p.A.	GSE S.p.A. publishes tender results 90 days after the call closure
Ireland	Yes	Yes - bid bond of € 2,000/MW	Bidding open for one week	Typically 2 months for final decision, provisional results in 1 week
Lithuania	No	Yes, €200	70 days to prepare proposal and required documents 15 days to submit	10 working days with the possibility of extension for another 10 working days
Malta	No	No,€50 would apply if clarifications are necessary during evaluation	Determined by the Minister for each bidding process	no requirements
Poland	Yes	No	Auction session takes at least 8 hours.	21 days
Slovenia	No	-	2 months from the announcement of the tender	60 days from expiration of applications
Spain	Yes	€0.08 /kW	Electronic procedure is open for 2h	24 hours
United Kingdom	Yes	No	NG ESO must issue a Notice of Auction which will provide details of the window within which sealed bids must be submitted. The closing date for this window must be a working day no less than five working days after the day the Delivery Body issues the Notice of Auction (it may however be longer than 5 working days)	The delivery body must commence the allocation process as soon as practicable after the date of the relevant notice. The delivery body must obtain an independent audit as soon as practicable after the completion of the allocation process. In AR3 it took about 2 weeks

Table 5: Administrative aspects of tenders

2.3.3 Main formal challenges for bidders

In tendering procedures, a support can only be awarded if – besides placing a competitive bid – all formal criteria for participation are met. This is the first barrier to every tendering procedure. The formal requirements should be well conceived and balanced to ensure a high number and variety (professional or group(s) of citizens) of participants as possible.

In **France,** bidders are disqualified from the procedure if one of the documents requested as material prequalification is missing or unsatisfactory. For example, if the building permit is out of date or not established in the name of the bidding company. Those documents have to cover all the installation and fit all the requirements described in the specifications of the tender. Once the documents have been submitted, it is not possible to submit missing documentation at a later stage. In order to avoid disqualification due to formal errors, Q&A sessions are arranged before each round. After several tenders and rounds and based on the specifications and the explanations provided during Q&A sessions, the French NRA – Energy Regulatory Commission (CRE) – has established a jurisprudence for the disqualification of bidders. The specifications of the tendering procedures are regularly amended and clarified between the rounds

In **Malta,** submitted bids are screened by an Evaluation Committee with respect to missing or incomplete information. For a non-refundable administrative penalty of €50, bidders have the opportunity to provide the missing information or make rectifications within five working days from the notification by the implementing body. Failure to comply with the requested changes results in the exclusion of the bid from the tendering procedure.

In **Slovenia**, disqualification of bids is often the result of the wrong documentation provided and an incorrect calculation of the offered price (which must follow a certain prescribed methodology). So far, the tendering procedure has not been adapted to reflect these issues, because the procedure is prescribed in the executive act and in its methodology (which is an integral part of the executive act).

In **Germany,** the highest rate of disqualification based on formal errors is observed in solar tenders. In order to reduce the number of formal errors, all potential bidders have the possibility to voice their doubts and questions, orally through a hotline or in writing through an email. In addition, technology-specific explanation sheets are published on the website of the implementing body, specifying the requirements and providing examples. The major challenge for solar tenders is the submission of the correct documents as proof of the material prequalification (e.g. building permit). The disqualification rate ranges from 2% to 22% and averages 11% (over 20 rounds). For biomass tenders, the average disqualification rate is 10% (over 5 rounds). In onshore wind tenders, the average disqualification rate is 5% (over 15 rounds).

In **Greece**, bidders were excluded from participation in the technology-specific tenders where the participants' legal or licensing documents did not comply with the requirements for participation. After these tenders, the requirements were made widely known to the participants and were highlighted in an attempt to reduce exclusions from tenders.

In **Hungary**, applicants have a one-time correction possibility with a 15-day deadline if any documentation is missing or incorrect. However, the bid price and specification of the plant cannot be changed. Main reasons for formal exclusions from the first tender in 2019 were problems with the financial guarantee (e.g. no bid bond), application submitted after deadline, outstanding liabilities and wrong documentation. The disqualification rate in the first tender was 29%, although a workshop was held for potential applicants and a Q&A document was also available on the NRA’s website.

In **Poland**, wrong documentation provided or wrong signature under the bid are usually the reasons for exclusion. The Polish Regulator URE provides information on these issues on its website.

3 National experiences with technology-specific tenders

A number of MCs have opted – exclusively or in addition to technology-neutral tenders – for technology-specific tenders to determine the level of support for RES installations. Technology-specific tenders have been implemented for PV (8 MCs), for onshore wind (8 MCs), for offshore wind (6 MCs), for biomass (6 MCs) and for other RES such as hydro (4 MCs), geothermal (3 MCs) and biogas (1 MC).

This chapter will provide an overview of the technology-specific tenders implemented so far in CEER MCs.

3.1 Experiences with tenders for PV

Tendering procedures for solar PV have been in place as early as 2010 in Portugal, 2011 in France or 2012 in Italy[12]. However, most tenders have been introduced after 2014, the year in which the EEAG introduced competitive procedures as a prerequisite for approving new or adapted national RES schemes.[13] By 2020, eight MCs had carried out tendering procedures to determine the level of support for solar installations.

3.1.1 Main elements of PV tenders

In PV tenders, different sizes, types and sites of PV installations are covered. As shown in Table 6, tenders are carried out for solar installations on buildings (e.g. rooftops, shading on structures, car parks) and for ground-mounted installations on industrial land, agricultural or green land, disused landfills, or quarries. In one MC (France) the innovative aspects of the participating solar installation are of relevance for the tender.

MC	Tendering categories
Denmark	Solar < 1 MW (2018)
France	Rooftops PV (since 2016)
	Ground-mounted PV (since 2016)
	Innovative PV (since 2017)
Germany	Ground-mounted PV > 100 kW (2015-2016 – not in place anymore)
	All solar installations (rooftop, ground-mounted on different sites) > 750 kW (since 2017)
Greece	PV ground-mounted $P_{pv} \leq 1$ MW (in 2016 and 2018)
	PV ground-mounted 1 MW < $P_{pv} \leq$ 20 MW (in 2016 and 2018)
	PV ground-mounted $P_{pv} \leq 20$ MW (since 2019)
Luxembourg	PV on industrial land > 500 kW (since 2018)
	PV on non-permeable surfaces (e.g. building) > 500 kW (since 2018)
	PV on building 200-500 kW (since 2019)
	PV on building 500 kW – 5 MW (since 2019)
	PV on shading structure (e.g. covering a parking) or water basin 200-500 kW (since 2019)
	PV on shading structure (e.g. covering a parking) or water basin 500 kW – 5 MW (since 2019)
Malta	PV ≥ 1 MW_p (since 2017) on official disused landfills, quarries, car parks, Industrial land and roof tops and land other Government concession

[12] These schemes have been adapted over time.
[13] Only under certain conditions, the country can abstain from introducing tendering as a competitive instrument to determine levels of RES support. For example, if sufficient competition cannot be assured or in the case of demonstration or small projects.

MC	Tendering categories
Portugal	PV ≥ 10 kW (since 2019)
Slovenia	New PV on buildings < 10 MW (since 2016)
	New PV ground-mounted < 10 MW (since 2016)

Table 6: Categories of PV tenders in place

Since the introduction of the tenders for solar installations, some minor changes have been made to most schemes, usually by:

- Adapting the ceiling and floor bid prices to reflect technological developments or price developments in the former rounds;
- Adapting the maximum participation size; or
- Introducing additional subcategories.

Some more important changes to the tendering scheme are being observed in France, where after having encountered several rounds of low participation, especially for rooftop PV, new rules have been introduced in all tenders to prevent candidates from anticipating low competition levels and systematically bidding at the ceiling price. For every round, if the tendered volume is not reached, bids with the lower rates (i.e. higher prices) are eliminated, up to 20% of the volume of the submitted bids.

The tenders are mostly used to determine the reference value for a market premium. In the tendering scheme for rooftop PV installations in France, the value determined for smaller installations between 100-500 kW is the reference value for a feed-in-tariff.[14]

The support is granted for a period of 15 years (in Luxembourg, Portugal, Slovenia) or 20 years (in France, Greece, Denmark), while in Malta, the support is provided for up to 1,600 hours per year. Where a support is granted, additional revenues are not foreseen with the exception of Slovenia, where income from Guarantees of Origin (GOs) are optional. Only France specifically supports self-consumption in one of its tendering schemes.

In all the PV tenders, the price offered by the bidders is always the main awarding criteria, although not always the unique one. In France, other criteria such as the carbon footprint, the environmental relevance or the level of innovation are considered in accordance with the different schemes implemented (rooftop PV, ground-mounted PV or innovative PV). In Portugal, specific lots are tendered and the bidders can bid on one of two schemes (discount to the average tariff or contribution to the system[15]). The offers of those two schemes are harmonised for each lot through a net present value (NPV) system and ranked according to that outcome. For all the remaining PV tenders, the price is the only criteria for selection and only in case of bid price equality, the offered volume is taken into account for the ranking. In such cases, the smallest volume offered is awarded first. In Slovenia, in case of bid price equality, the bid with a larger share of assets from the European funds obtained for the project is selected first.

The price awarding mechanism used in all PV tenders is pay-as-bid, i.e. the successful bidders are awarded the price they offered in the tender.

[14] See the CEER Status Review of Renewable Support Schemes in Europe for 2016 and 2017, C18-SD-63-03.
[15] The bidder pays an on average value to the system and gets the wholesale market revenue.

Regarding the detailed tendering elements such as the volume offered, the number of rounds carried out each year, the availability of floor and/ or ceiling prices as well as the realisation time, a very heterogeneous picture of the solar schemes can be observed in eight MCs. This is not surprising since the schemes are covering differing types of solar categories, from small-scale rooftop to large-scale ground-mounted solar installations.

With this in mind, Table 7 shows the ranges of solar tenders observed:

Design element	Range over all solar tenders
Number of implemented rounds p.a.	1 – 7 rounds
Tendered volume per round or budget	Capacity: 5 - 500 MW Budget: €10 million
Tendered volume or budget per year	5 – 1,800 MW Budget: €20 million.
Minimum participation size (volume in KW)	10 – 1,001
Maximum participation size (volume in KW)	500 – 30,000
Ceiling bid price (in c/kWh)	6.602 – 14.3 c/kWh
Floor bid price (in c/kWh)	5.0– 9.2 c/kWh (only France uses this)
Realisation time for awarded projects	12 – 36 months
Penalties for realisation > 18 months	0.3 – 0.5 c/kWh

Table 7: Summary of key elements of solar tendering procedures

Another important design element is the choice of material and financial prerequisites for participation to ensure the genuine intention of a bidder to realise a project and to minimise the risk of speculative behaviour.

In the solar tenders implemented up to now, all but one MC are requesting some kind of material prequalification to disclose the development status of the submitted projects. Portugal is not requesting a material prerequisite, which is to be explained by the very small size segment of the tender (< 10 kW). The type of documentation requested for participation varies between MCs, as shown in Table 8. A building permit or certification from a local administration disclosing the availability of the area for building a solar installation, are seen as standard prerequisites in solar tenders. Additional prequalifications such as a business plan and a carbon footprint assessment (France), a production licence (Greece) or a grid connection agreement (Greece, Malta) are also observed. For the innovative solar tenders in France, an additional report describing the innovative aspect of the installation is requested.

In terms of financial prequalifications, four MCs are requesting a total financial security between €25 and €50 per kW to be installed. The security is either split into a financial security for participating and a financial security to be paid once the bid has been awarded (Greece and Germany), or in other cases, the financial security is only due once the bid has been awarded (France, Luxembourg). Germany applies a reduced financial security for more advanced projects, i.e. participating with a building permit (€25/kW instead of €50/kW). Furthermore, three MCs have indicated they do not request any financial security, although in the case of Malta, a certification from a recognised bank regarding the financial capabilities of the bidder could be interpreted as a financial security as well.

MC	Solar tender category	Material prequalifications	Financial prequalifications
France	Rooftops PV	- Administrative identification of the bidding company/person - Certification for the carbon footprint assessment - Building permit - Business plan	€30 /kWp if awarded
	Ground-mounted PV	- Administrative identification of the bidding company/person - Certification for the carbon footprint assessment - Building permit - Business plan - Certification from the local administrative authority that the area is eligible	€30 /kWp if awarded
	Innovative PV	- Administrative identification of the bidding company/person - Descriptive report on the innovation - If agrivoltaic : descriptive report on how PV and agriculture are co-developed - Certification from the local administrative authority that the area is eligible	None
Greece	PV ground-mounted P ≤ 1,000 kW	Final/binding grid connection offer or Grid connection agreement	€10 / kW to participate + €30 /kW if awarded
	PV ground-mounted 1,000 kW < P ≤ 20,000 kW	- Production license - Grid connection agreement or final/binding grid connection offer	
	PV ground-mounted P ≤ 20,000 kW		
Malta	PV capacity greater or equal to 1,000kWp	- Recognised bank certifying that the bidder has sufficient financial resources/credit facilities. - Screening letter issued by the Planning Authority and a site plan indicating clearly the area which is being proposed to host the installation. - A copy of a recent “Grid Connection Study” and “Quotation” (issued not earlier than 90 calendar days from the publishing of invitation to bid.	None
Portugal	PV ≥ 10 kW	No material prequalifications requested to submit a bid	None
Slovenia	New PV on buildings < 10.000 kW	Building permit, given assurance on future compliance with the required sustainability conditions	None
	New PV ground-mounted < 10,000 kW		
Luxembourg	PV on industrial land > 500 kW	Certificate of usage rights for project site (Certificate that the project developer is allowed to build PV plant in the location it is applying for)	Guarantee of €50,000 / MWc if awarded
	PV on non-permeable surfaces (e.g. building) > 500 kW		
	PV on building 200-500 kW		
	PV on building 500 kW - 5 MW		
	PV on shading structure (e.g. covering a parking) or water basin 200-500 kW		
	PV on shading structure (e.g. covering a parking) or water basin 500 kW - 5 MW		

MC	Solar tender category	Material prequalifications	Financial prequalifications
Germany	Ground-mounted PV > 100 kW Solar > 750 kW	Official document from local authority showing the development stage of the project (Development Plan, disclosed development plan or building permit)	1) €5/kW to participate/ €45/kW if awarded 2) Reduced financial prequalification for advanced projects with a building permit: €5/ kW to participate/ €20/kW if awarded

Table 8: Prequalifications for PV tenders

3.1.2 Evaluation criteria: competition level, price development and realisation rate

Besides the tendering design, it is of great interest to policy makers to evaluate the outcome of the tendering procedures, i.e. to assess whether they have been successful in delivering RES deployment at least cost. Relevant criteria underlying such an assessment are the level of competition, the bid price development and eventually, the realisation rate. Robust empirical data is not yet readily available for all MCs. The following information has been provided so far:

In **France,** empirical evidence regarding the clearing price development and the level of competition is available for the three solar tendering schemes (see Figures 3-5).

The level of competition, defined as the ratio between the capacity tendered out and the capacity submitted, was high in the first three rounds of rooftop PV tenders (between 2 and 4) in 2017. In the following six rounds it was twice slightly above 1 (round 5 and 10) and four times below 1, i.e. the tenders were undersubscribed. Simultaneously, the tendered volumes increased over the rounds and the participation decreased. It seems that a lot of projects were already at a late stage of development when the tender was launched but that the tendered volumes were too high compared to the pace of development of solar projects. A complementary explanation could be the fact, that due to high competition at the start, smaller installations may have seen themselves as not competitive enough and did not participate further. This situation led to lower levels of competition and thus higher prices. The average price dropped from 10.57 c/kWh to 7.66 c/kWh after 5 rounds and went up again to 9.59 c/kWh after the seventh round. After the tenth round the clearing price was at 8.96 c/kWh (See Figure 3).

For ground-mounted PV tenders in France, the level of competition was high during the first three rounds in 2017 and subsequently was around one. In fact, participation stayed rather constant over the rounds as tendered volumes increased simultaneously. At the end of the third round, the maximum participation size was increased to allow more sites to participate. In terms of average prices, a decrease from 7.06 c/kWh to 6.21 c/kWh has been observed, with a decrease up to 5.81 c/kWh after the fourth round. Average prices went up again after this round as the level of participation decreased (see Figure 4).

For the innovative PV tenders only two rounds (2017 and 2019) have been implemented so far. The average price dropped from 9.45 to 8.25 c/kWh although the level of competition decreased from almost 4 to 2.

With respect to realisation rates for PV tenders launched between 2011 and 2014[16], realisation rates of around 70% can be observed. For the current tenders, only a small number of installations that won the tender have already been commissioned. However, higher realisation rates are expected as a consequence of introducing additional prequalifications, notably the addition of a financial guarantee and the necessity to provide a building permit.

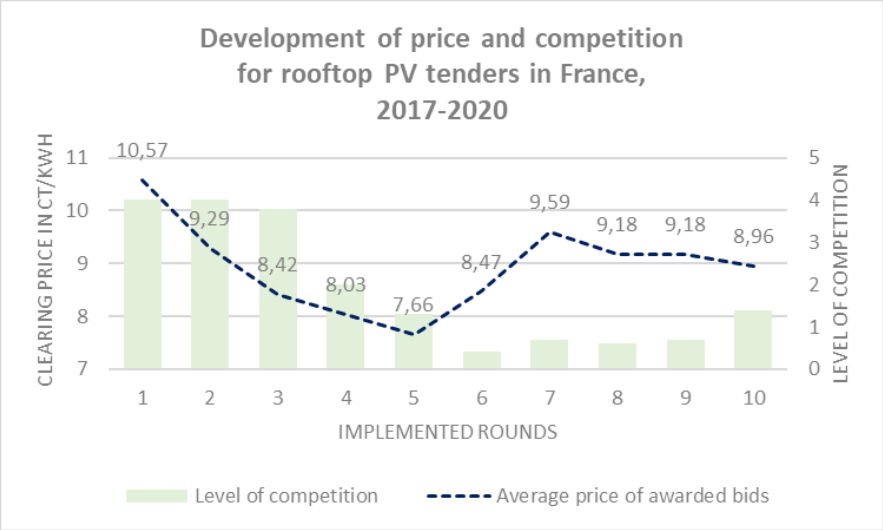

Figure 3: Development in price and competition in rooftop PV tenders in France

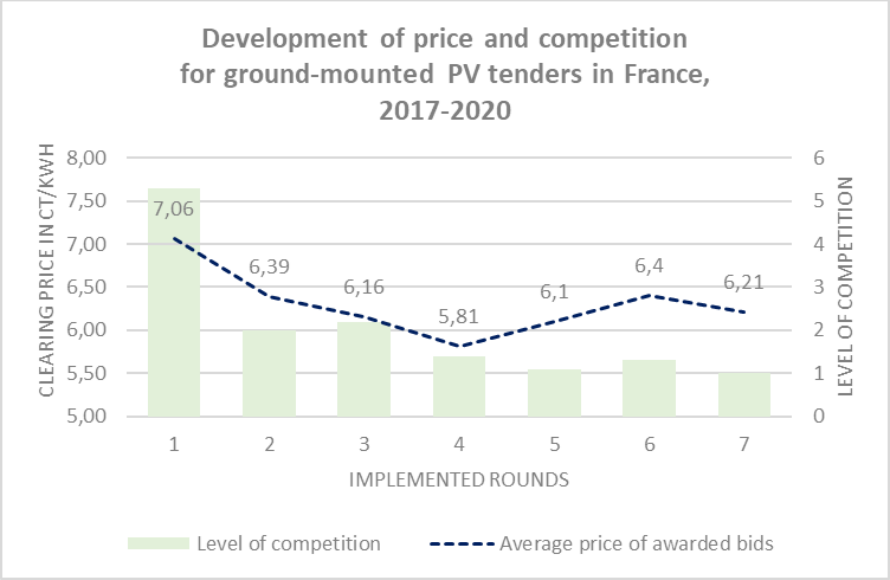

Figure 4: Development in price and competition in ground-mounted PV tenders in France

[16] No information about the realisation rates is available for 2017 tenders.

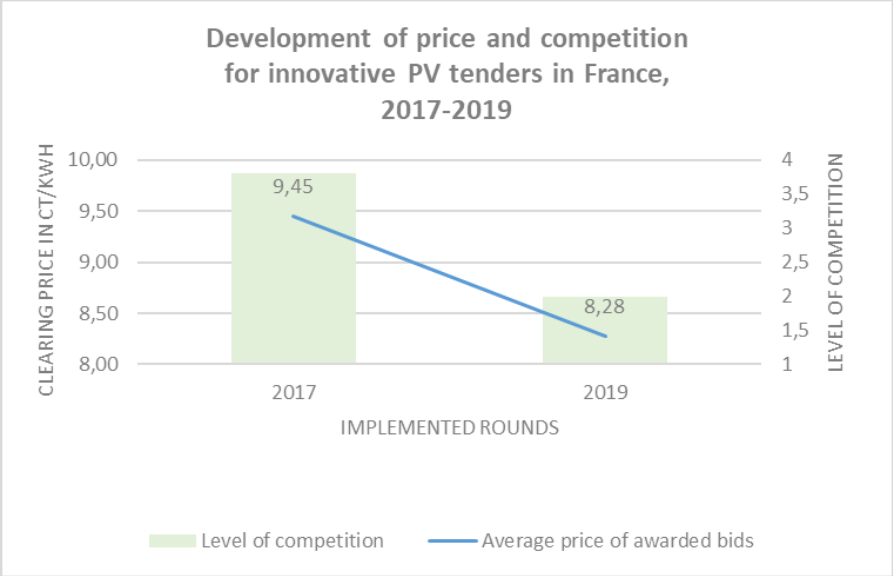

Figure 5: Development in price and competition in innovative PV tenders in France

Empirical evidence for **Greece** is available for three types of PV tenders implemented since 2016 (see Table 9). For each tender segment, only one to two rounds have been carried out. Where two rounds had already taken place, the clearing price decreased, while the level of competition remained stable at a medium level (1.4 to 1.75). All projects awarded up to 2018 have been realised.

Round	Price (c/kWh)	Realisation rate	Level of competition
PV ground-mounted P ≤ 1,000 kW			
01.07.2018	7.842	100%	1.75
01.12.2018	6.660	100%	1.75
PV ground-mounted 1,000 kW < P ≤ 20,000 kW			
01.07.2018	6.381	100%	1.75
PV ground-mounted P ≤ 20,000 kW			
01.07.2019	6.277	n.a.	1.40
01.12.2019	5.998	n.a.	1.40

Table 9: Development in price and competition in PV tenders in Greece

In **Malta**, empirical evidence is available for the two solar tenders issued in 2017 and 2018. The observed level of competition was high (2), although only 13 (of which three awarded) and seven (of which three awarded) offers were submitted in respective tenders. The drop in offers is mainly attributed to the lack of availability of sites with sufficient space to accommodate PV installations with a minimum size of 1 MW. As bidders were required to bid according to specific site categories (official disused landfills, quarries, car parks, industrial land and roof tops and land other government concession) limited offers were expected. The price determined through the tendering procedures was very close to the ceiling price; in the first tender in 2017 being slightly below, and in 2018 exactly matching the ceiling price. In terms of realisation, two out of three projects awarded in 2018 have been realised, while one is still under construction. The projects awarded in 2019 are still in the permitting stage (see Table 10). With realisation time up to 24 months, the projects under construction and in the permitting stage are still on time.

Tender	Awarded bids	Price (c/kWh)	Ceiling price (c/kWh)	Completion stage
Tender issued in 2017/ bids awarded in 2018				
Official disused landfills	1	13.0	14.0	100%
Quarries	1	12.8	14.3	Under construction
Quarries	1	13.3	14.3	100%
Tender issued in 2018/ bids awarded in 2019				
Official disused landfills	1	14.0	14.0	Permitting stage
Official disused landfills	1	14.0	14.0	Permitting stage
Official disused landfills	1	14.0	14.0	Permitting stage

Table 10: Development in price and competition in solar tenders in Malta

For **Slovenia**, data on solar tendering rounds is available for 2016 to 2019. In terms of the level of competition in a general sense, a decrease is observed between the rounds.[17] This is due to the fact that in the first tenders, the conditions for participation were less strict, while the conditions in the last three tenders became stricter and the number of applications decreased (especially for some technologies). The realisation time is 36 months, which means that all awarded projects in the rounds from 2017 to 2019 are still on time to be realised. The deadline for the implementation of projects approved in the tender on 15 December 2016 has expired – nearly half of all the projects (by number, not by MW) have already been implemented. Some projects have not been implemented for business reasons, and for some there is a problem in obtaining permits for their implementation, mainly in relation to spatial planning.

Tender	Ceiling price (€/MWh)	Realisation rate	Level of competition
15.12.2016	85.53	Approximately 50%	n.a.
05.09.2017	80.70	23%	n.a.
23.02.2018	73.42	0%	n.a.
12.12.2018	70.30	4.4%	n.a.
28.06.2019	69.54	0%	n.a.
18.12.2019	69.54	0%	n.a.

Table 11: Development in price and competition in PV tenders on buildings in Slovenia

In **Portugal**, the first solar tender was carried out in 2019 and the level of competition was very high, with the volume of bids submitted seven times higher than the tendered volume. The tendering procedure covered 24 lots[18] with a total of 1,400 MW. For each lot a separate bidding procedure has been carried out.

[17] Competitiveness in accordance with the criteria used in this report cannot be monitored in these tenders as they are not based on the volume of electricity offered in MW, but in the sum of available funds for support for all technologies). Hence, Table 11 does not give specific figures.

[18] A lot is a given injection capacity that has a specific tender.

The outcome of the two Portuguese tendering schemes was that 22 of 24 lots have been assigned (1,150 of 1,400 MW), where 75% of the volume has been allocated to bids based on the offered discount to the average tariff and 25% to bids based on their contribution to the system. All bids (discounted to the average tariff or contribution to the system) for each lot are harmonised through a NPV system to determine the winning bid. For the lots, where the winners bid in the scheme on the discount to the average tariff, the discount was 54.93%. That means they will be receiving (on average) a FiT of €20.33/MWh. For the other lots, where the winners bid on a contribution to the system, the winners will pay on average 2.135 c/kWh[19] to the system.

In **Luxembourg**, a first round of bidding has been implemented for PV on industrial land and on rooftops. The level of competition was not as high as expected and the tender has been undersubscribed. The weighted average price for PV installations on industrial land is 8.89 c/kWh while it was 12.06 c/kWh for PV rooftop installations. All ground-mounted projects on industrial land (7.26 MW in total) have been completed within the 18-month realisation period. Six out of the eight selected rooftop projects with a total capacity of 4.16 MW have also been completed before the deadline of 18 March 2020. One project (2.43 MW) has been delayed beyond this date and will be built in a different location, which will lead to a reduction of the FiP by two times €3 /MWh. One 1.3 MW project will not be built. Meanwhile, a second round of bidding has been completed, and the third round will be in autumn 2020.

	Average price	Level of competition	Completion rate (capacity)
Tender 1 (2018)			
PV on industrial land > 500 kW	8.89 c/kWh	0.73	100%
PV on non-permeable surfaces > 500 kW (e.g. buildings)	12.06 c/kWh	0.79	53% (as of August 2020)
Tender 2 (2019-20)			
PV on industrial land > 500 kW	8.9 c/kWh	0.74	To be completed within 18 months of 23 June 2020 (or up to 24 months with a penalty)
PV on buildings (200 - 500 kW)	11.45 c/kWh	0.9	
PV on buildings (500 kW - 5 MW)	11.42 c/kWh		
PV on shading structure or water basin (200 - 500 kW)	14.45 c/kWh	0.54	
PV on shading structure or water basin (500 kW - 5 MW)	13.99 c/kWh		

Table 12: Development in price and competition in solar tenders in Luxembourg

Germany has been implementing solar tenders since 2015, at first only for ground-mounted installations larger than 100 kW and since 2017 for all types of solar installations (ground-mounted and on buildings) larger than 750 kW. Competition has been intense throughout the 20 rounds, ranging from 1.74 to 4.93. On average, the tendered volume was oversubscribed 3.17 times. In order to achieve the German midterm RES objective, two additional tendering rounds (five instead of three) for a total volume of 1,000 MW (original schedule was 650 MW) have been introduced in 2019 and for 2020. Four additional rounds with a total capacity of 1,400 MW (original schedule was 400 MW) will be implemented. In addition, since 2019, technology-neutral tenders covering onshore wind and solar, with a yearly volume of 400 MW to be auctioned, have been introduced as well. Despite the additional capacity tendered out for solar installations, the level of competition remained high, which shows that the solar sector has well assimilated tenders as a competitive instrument to determine levels of support and that there are still enough solar projects to be realised.

[19] Those producers earn whatever they will yield from the wholesale market.

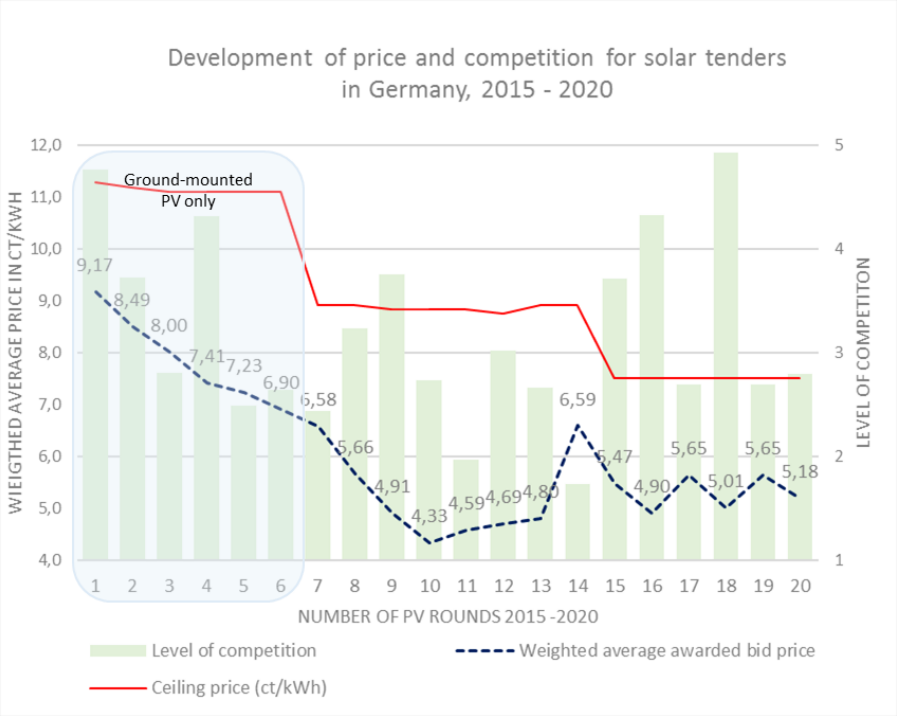

Figure 6: Development of price and competition for solar tenders in Germany, 2015-2020

Since the first round in April 2015, the weighted average price decreased from 9.17 c/kWh to 5.18 c/kWh in the 20th round in March 2020. After the tenth round, the clearing price has been as low as 4.80 c/kWh.

With a realisation time of up to 24 months (18 months without reduction of awarded support reference value), information about realisation rates is available for the first eleven rounds. The rates range between 35% up to 99.9% with an average realisation rate of 85%. The two rounds (nine and ten) with the lowest realisation rates (35% and 44%) are explained by the fact, that one major bidder did not realise its installations (awarded capacity) in time, which affects the overall realisation rate.

3.1.3 Challenges and lessons learnt since 2018

The results of solar tenders, for which empirical data is available, show trend of decrease of the clearing price over the rounds. Although support costs went down, the decreases observed are not always continuous. Ups and downs are being observed. The picture for the competition level has so far been mixed, with very high levels but also undersubscription. Empirical evidence for the level of realisation are still sparse. For France and Germany, with the largest number of implemented PV tendering rounds so far, realisation rates are on average between 70% and 85%. Achieving high realisation rates is key for achieving RES deployment objectives. As such, it is important to have tendering designs ensuring high realisation rates (e.g. with adequate penalties for non-realisation). This is an important challenge for tenders in general.

However, the main challenges of solar tendering procedures seem to be linked to the formal requirements, i.e. the submission of the right documentation. In terms of acceptance, it seems that solar installations are generally well received by the public. However, France indicated that some issue arose for larger solar installations, notably in relation to land-use (PV on agricultural land is not eligible for support schemes). In Germany, although agricultural and green land are in principle not eligible sites for support, federal states may deviate from that rule. So far five (out of 16) German federal states are using this option, which distorts the overall competition for other solar projects on restricted sites in the other states. In Portugal, the unstable market conditions due to the Covid-19 pandemic seem to be the major problem currently.

3.2 Experiences with tenders for onshore wind

Technology-specific tenders for onshore wind have been implemented in eight MCs by 2020. Information is available for five MCs: Germany, Greece, Spain, Lithuania and Portugal. These tenders were carried out between 2016 and 2018.

3.2.1 Main elements of onshore wind tenders

Based on the provided information, onshore wind tenders do vary widely in terms of the volume tendered, which is due to the different wind deployment path in each country. The preferred price mechanism is a pay-as-bid approach, except in Spain, which applied uniform pricing. Germany applies both price mechanisms, uniform pricing for energy communities and pay-as-bid for the other bidders. The reference value determined through the tendering procedure is in most cases a FiP, although Spain determined the investment revenue through its wind tender in 2016 (only 1 round). When set, minimum and maximum participation sizes do vary as well. Minimum threshold ranges between 1 kW (Spain) and 3 MW (or a minimum of seven wind turbines in France), while maximum participation is unlimited in some places but 50 MW in Spain and Greece. Germany has only a maximum participation size for energy communities, set at 18 MW. Realisation rates vary between 24 (Greece) and 48 months (France).

Design element	Range over all onshore wind tenders
Price mechanism	Pay-as-bid & uniform pricing
Reference value determined through tender	FiP or investment revenue
Number of implemented rounds p.a.	1 - 7
Tendered volume per round or budget	150 - 900 MW 8 million EUR
Tendered volume or budget per year	300 – 3,860 MW
Minimum participation size	None to > 3 MW (or min. of 7 wind turbines)
Maximum participation size	50 MW to unlimited
Ceiling bid price (in c/kWh)	None or 6.2 (min) to 9 c/kWh (max. in 2018)
Floor bid price (in c/kWh)	None or 0 c/kWh
Realisation time for awarded projects	24 - 48 months

Table 13: Main elements of onshore wind tenders

In all onshore wind tenders, bidders have to prove their technical ability and their intention to realise their wind projects by meeting the requirements for the defined financial and material prequalifications.

In Germany and Slovenia, participation is only possible with a valid building permit. In France, the bidder needs an administrative identification of his company, an environmental authorisation and optionally a commitment that the project is partly financed by individuals or territorial authorities. In Greece, bidders need to have a production licence and a grid connection agreement (or binding connection offer). In Spain, a confidentiality and non-collusion agreement need to be submitted.

In terms of financial prequalifications, bidders in France and in Germany need to pay €30/kW while in Slovenia it is only €20/kW. In Greece, bidders first pay €12.5/kW when participating and once awarded an additional €37.5/kW. In Slovenia, there are no financial prequalifications for bidders. The financial guarantee provided would then be lost if the installation is not completed within the realisation time.

3.2.2 Evaluation criteria: competition level, price development and realisation rate

Experiences with onshore wind tendering reach back as a far as 2016. Spain carried out a single round in 2016 with an average award price of 0 c/kWh. The award price is only related to the support scheme. In this round there was high pressure from the offering part, which resulted in many bids for a support level of zero, to be able to build the installation.

The other MCs for which data is available have implemented four (Greece), five (France), six (Slovenia) or even 16 (Germany) tendering rounds since they first introduced this new instrument (see Table 14).

MC	Year of first tender	Total number of rounds*
France	2018	5
Greece	2018	4
Germany	2017	16
Slovenia	2016	6
Spain	2016	1
* until June 2020		

Table 14: Year of first onshore wind tender and number of rounds carried out

In the following Figures 7 to 10, the development of prices (average awarded bid price and ceiling price per tendering round) and the level of competition in France, Germany, Greece and Slovenia are pictured. In three countries, the average awarded price is lower in the last round carried out compared to in the first round. Only in Germany (Figure 10), is the average awarded price of the last round in June 2020 higher than the results of the first auction in 2017. This remains the case even if the first three tenders of 2017 are not taken into consideration, as the results have been skewed by special rules favouring energy communities.[20]

[20] The onshore wind tendering scheme in Germany introduced specific rules for citizens' energy companies, which had an impact on the level of competition, i.e. the level of participation as well as on the price development. Community energy companies, as defined in the underlying German RES legislation, were allowed to participate in the tender without holding a building permit but only with a wind location analysis, showing the wind quality in the location where the project was planned. In addition, citizens' energy companies, when successful in the tender, have an additional 24 months (in total 54 months) to realise their projects compared to the other participants. With these specific conditions, the participation rate of citizens' energy companies was very high with far lower price bids than the other bidders. As a result, over 95% of the successful bidders in the three tendering rounds in 2017 were citizens' energy companies. They were able to bid at lower prices since they could count on a further cost decrease for wind turbines in the coming two years while the other bidders had to stick to the costs of currently available wind turbines on the market for which they were already holding a building permit. This specificity explains the important price fall between the first and the last round in 2017. The first tendering procedure for onshore wind in 2018, where

The latest onshore wind specific tenders bring forward average awarded bid priced between €5.77 c/kWh in Greece and €7.73 ct/kW/h in Slovenia, with €6.22 c/kWh in France and €6.14 c/kWh in Germany.

While the level of competition in France and Slovenia is throughout the rounds above 1, it dropped dramatically in Germany. Since round seven in 2019, all rounds but one (round thirteen) have been undersubscribed, with the level of competition well below 1. This is a consequence of the difficulties encountered by wind project companies to obtain a building permit, notably due to strong environmental and/or species protection legislation but also due to complaints filed by citizens' associations against wind projects in their regions (i.e. NIMBYism).

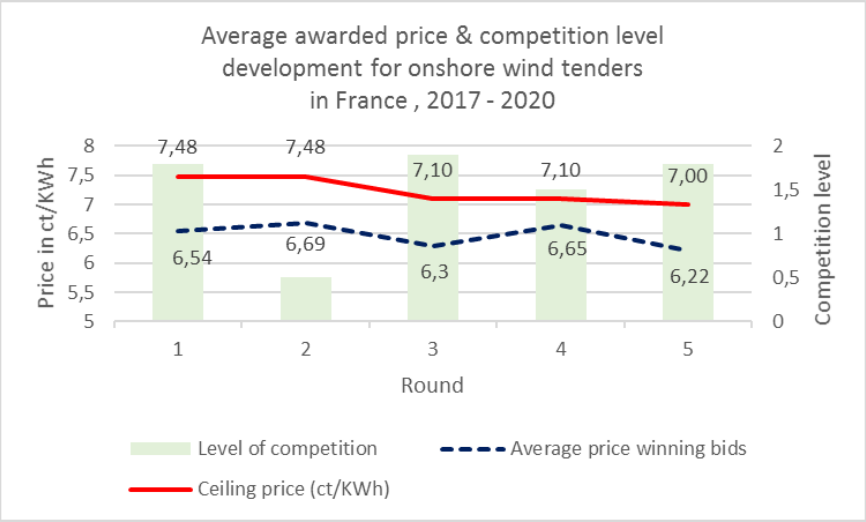

Figure 7: Average awarded price & competition level for onshore wind tenders in France

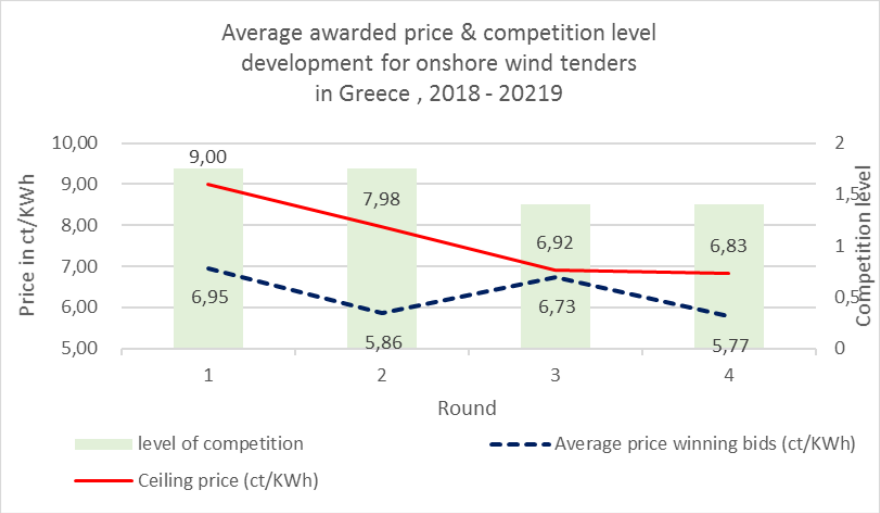

Figure 8: Average awarded price & competition level for onshore wind tenders in Greece

all bidders were only allowed to bid with a valid building permit led to an increase in the average awarded price level (4.73 c/kWh) and a dramatic reduction in the participation of citizens' energy projects (20%).

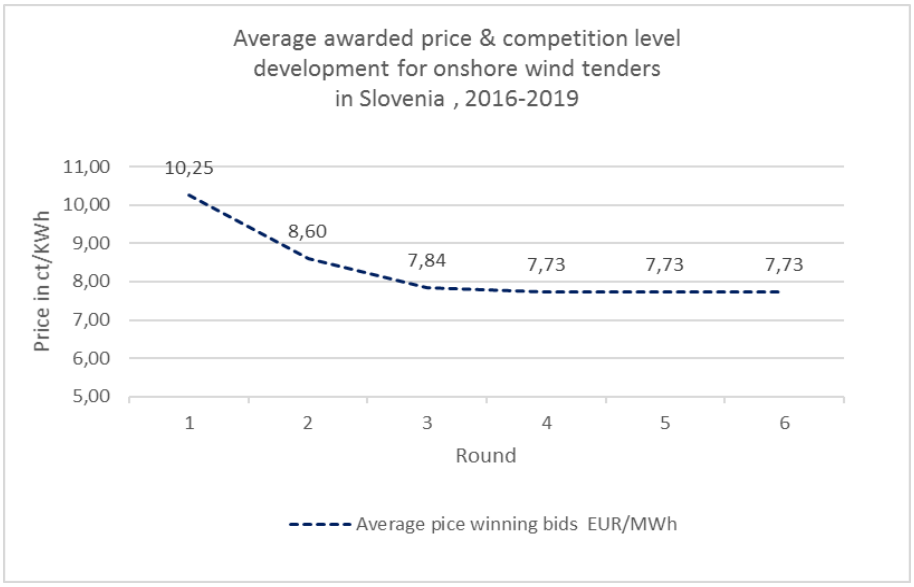

Figure 9: Average awarded price & competition level for onshore wind tenders in Slovenia

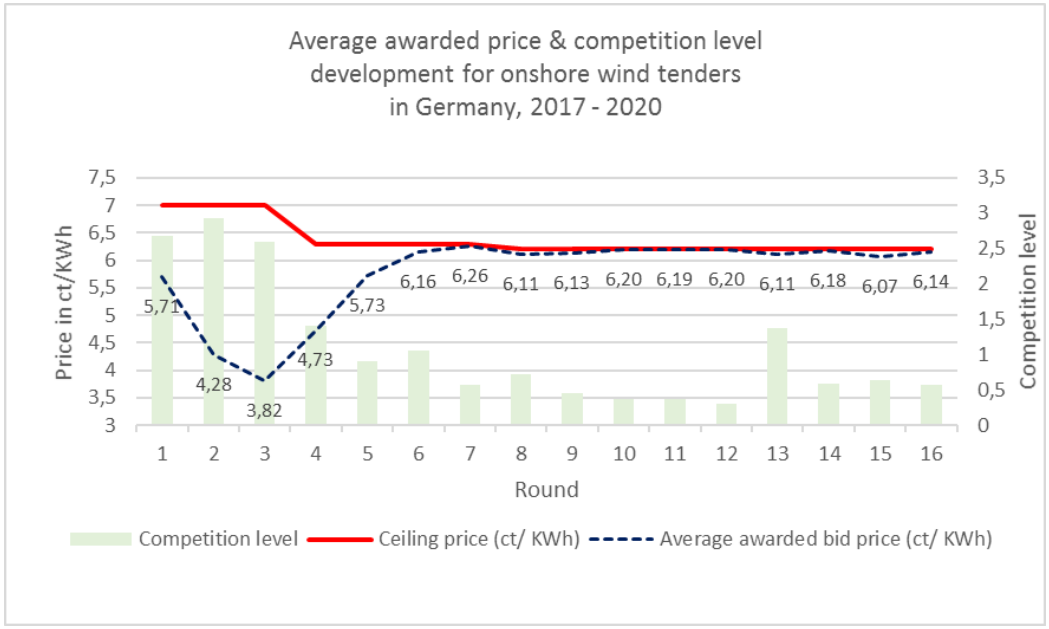

Figure 10: Average awarded price & competition level for onshore wind tenders in Germany

With realisation times of up to 48 months for most of the countries mentioned here, no information is yet available for the realisation rates. In Germany, as mainly citizens' companies have been awarded a support entitlement in the first three rounds of 2017, and as they have up to 54 months to realise their installation, the realisation rates are for the time still very low. It is expected that also after 54 months, the rates will remain low. For the first two rounds (four & five) in 2018, where the realisation time without penalisation of 24 months,[21] has expired, 61% and 63% of realisation has been achieved. However, these rates are not final yet, as the Covid-19 pandemic caused realisation difficulties, and realisation rates have been prolonged by six months through legislation. The realisation rate for Spain's 2016 round, which included biomass besides wind, is 97%.

[21] After 24 months, a gradual penalty scheme is applied until 30 months, after which the support entitlement is lost if the installation has not been completed.

3.2.3 Challenges and lessons learnt since 2018

Besides Germany, MCs for which information is available do not seem to be confronted with a lack of competition for onshore wind projects. However, levels of competition are far less intense than in the solar tenders. No robust statement can be made with respect to realisation rates so far. Support levels have decreased, though not significantly, in France and Germany compared to the system using administratively set support levels. In France, the implementation of the tendering procedure represents important savings in terms of public spending compared to the level of the FiT in place before.[22]. In Slovenia and in Greece, tenders have been more successful in bringing down the prices from round to round.

Permitting issues for the building of wind turbines linked to strict environmental rules and acceptance emerge as a serious challenge in Germany. With the lack of building permits for new wind projects, the deployment objective for onshore wind, as one pillar for the energy transition, is seriously jeopardised. A revision of the RES legislation will try to address some of the issues, e.g. by increasing the capacity for onshore wind projects to be tendered out and by proposing simplification and streamlining in the permitting process.

A similar situation is also being observed in France to some extent, where numerous rules restrict the potential sites. Most wind farms are installed in the north and east of France (due to better wind conditions and less environmental constraints), leading to a "local saturation" and a decreasing public acceptance in some of those area. The challenge will be to better distribute the locations of new wind installations.

In Italy, the magnitude of the objectives for renewables, together with the fact that increases in electricity production are expected from wind, entail the need for significant surfaces to be used for these plants. From this follows the need for a strong involvement of the regional governments, taking advantage, for example, of public debate, which has been already introduced for large investments, including energy. This development, together with the participation of renewable energy communities, will allow a greater awareness in the local communities involved. This awareness is to be achieved by well-informed citizens who are involved in the process along with local authorities well in advance of the definitive choices of location. In addition to information, crowdfunding mechanisms, as well as environmental compensation measures, can contribute to acceptance. In any case, the support mechanisms will have to guide the choices of location, favouring installations with reduced environmental impact such as those on buildings and areas not suitable for other uses. Furthermore, it is considered necessary to ensure uniformity and certainty of the timing of the authorisation process, together with a necessary simplification of the same. It is also important to promote greater national-regional coordination, also through the adoption of a standardised format for the issue of authorisations at national level, comparing the times, methods and procedures. In particular, for large wind power plants, operators will be encouraged to carry out careful preliminary assessments with local communities and economies, also giving adequate priority to upgrade and repower obsolete plants.[23]

Spain switched from onshore technology-specific tenders to technology-neutral ones, covering onshore wind. This was a decision taken by the Ministry with the goal to open up the tender further to competition and try to achieve a system with equality and non-discriminatory mechanism for different technologies.

[22] The prices resulting from the tender have to be compared to the tariff of €74.8 to €76.8/MWh of the administrative procedure. Therefore, the implementation of the tendering procedure represents important savings in terms of public spending.

[23] For photovoltaics as well. Source: National Energy and Climate Plan 2030.

3.3 Experiences with tenders for other RES technologies

Tendering procedures for other RES technologies such as biomass (biogas) or hydro, are far less widespread. Only Poland, Germany, Spain and Slovenia have implemented tenders for biomass (biogas) while tendering for hydro plants have only been carried out in France and Slovenia.

3.3.1 Main elements of biomass/biogas and hydro tenders

The design elements of biomass, biogas or hydro tenders are similar to those of the other RES technologies (see Tables 15 and 16). All MC have determined material prequalifications – generally at least a building permit[24] – as a prerequisite for participation in tenders for biomass and hydro installations. However, financial prequalifications have not been requested for hydro tenders, with France and Slovenia not including financial requirements (see Table 16). For biomass, only Slovenia waived financial prequalifications

While the tender for agricultural biogas in Poland and for biogas and hydro in Slovenia determine a level of support for 15 years, all other MCs grant support for 20 years. Pay-as-bid dominates the awarding mechanisms, while Spain applies a uniform pricing approach in its biomass tender. Price is generally the only awarding criteria. Only France takes into account additional environmental aspects.[25] Volume, realisation times and number of rounds per year are adapted to the national needs. It can be observed that the tendered volumes are much smaller for biomass/biogas/ hydro compared to other RES technologies such as onshore wind or PV. Only Slovenia offers a limited budget instead of a volume. Noteworthy is the fact that Spain did not implement any ceiling price for their biomass auction. However, as the tender was about a discount in the capital expenditure, there was an implicit ceiling price in the mechanism of the tender. Realisation times vary between 24 (Germany) and 48 months (Spain, Poland).

Design element	Range over all biomass/biogas tenders
Number of implemented rounds p.a.	1 - 2 rounds
Tendered volume or budget per year	122.5 - 225 MW; 1,170 GWh -3,510 GWh (announced) Budget: €20 million
Minimum participation size (volume in kW)	1 -1,000
Maximum participation size (volume in kW)	1,000 - no limit
Ceiling bid price (in c/kWh)	yes - adapting from round to round No ceiling price in Spain
Floor bid price (in c/kWh)	None
Realisation time for awarded projects	24 - 48 months
Financial prequalifications	€13.5 - 60/kW[26]

Table 15: Elements of biomass/ biogas tenders

[24] In addition to building permits, grid connection agreement, a construction schedule and an installation diagram are requested in Poland. In Slovenia, a guarantee is requested regarding the future compliance with required sustainability criteria. In Spain, a confidentiality and non-collusion agreement are requested.

[25] In case of price equality, usually the capacity offered becomes relevant. In Poland, the time of selling the bid is taken into account in such cases.

[26] For Poland it is 60 Zt/kW which is around €13.5.

Design element	France	Slovenia
Price awarding mechanism	Pay-as-bid	Pay-as-bid
Key awarding criteria (e.g. price, volume, local content rules, special rules for local community projects)?	Price (70%) and environmental impacts (30%)	Price
Support duration	20	15
Number of implemented rounds p.a.	1	2
Tendered volume or budget per year	35 MW	€20 million (budget for 2 tenders)
Minimum participation size (volume in KW)	1,000	-
Maximum participation size (volume in KW)	4,500	10,000
Ceiling bid price (in c/kWh)	Depending of types of installations (new sites / exisiting weir) : from 12 to 13 c/kWh for round 1, lowered to 10 to 12 c/kWh for rounds 2 and 3	Adapting ceiling price from round to round.
Floor bid price (in c/kWh)	No	No
Realisation time for awarded projects	4.5 years	36 months (very technologically demanding projects on special request 60 months)
Financal prequalifications	No	No
Material prequalifications	- Administrative identification of the bidding company - Descriptive report of the project and demonstration of the readiness of the project - Proof of land-use right - Note of analysis of the energy performance - Technical report on environmental impacts of the project (to be assessed by the regional environmental authority)	Building permit; given assurance on future compliance with the required sustainability conditions

Table 16: Key elements of hydro tenders

3.3.2 Evaluation criteria: competition level, price development and realisation rate

Germany has carried out biomass tenders since 2017, initially once per year and since 2019, twice per year. So far, five tendering rounds have been carried out. All rounds have been widely undersubscribed. The tender with the greatest level of competition achieved 58% of the volume tendered out. What is probably different to other MCs is that existing biomass plants are allowed to participate in the tendering process in order to prolong their support period beyond 20 years for an additional ten years. The largest share of bidders were operators of already-existing biomass installations, who were seeking a prolonged support time as the operation of their plants after 20 years would not be financially viable without any support. The low level of participation of bids for new biomass installations is to be explained by the determined low level of the ceiling prices (14.44 to 14.88 c/kWh), see Figure 12. This makes new investments in biomass projects not appealing. As a result of the low participation level, the awarded prices stayed very close to the respective ceiling prices for new and existing biomass installations.

Realisation time has expired for biomass installations awarded in the first round in 2017 and amounted to 88% realisation of auctioned volume. For all other rounds, realisation time is still running, so that the numbers in Figure 11 from 2018 onwards are preliminary.

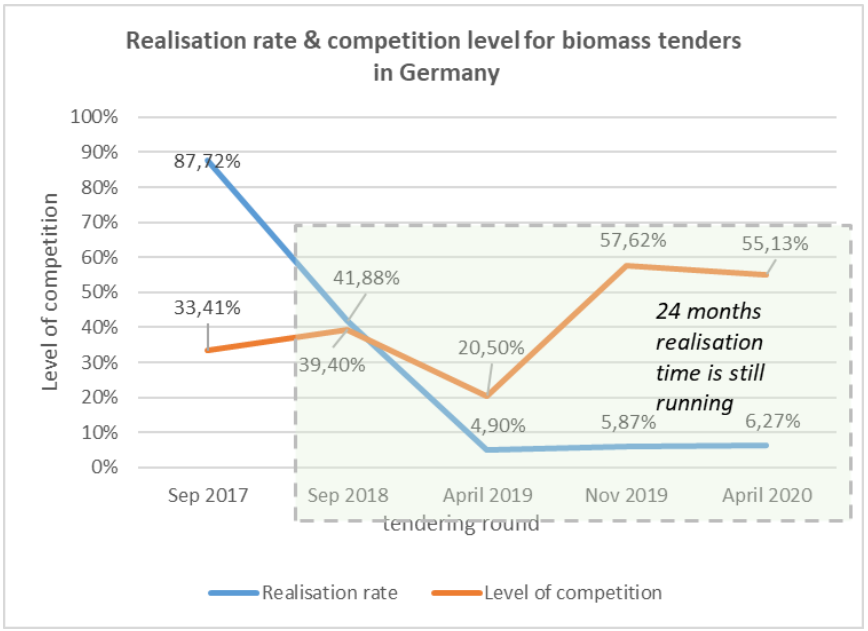

Figure 11: Realisation rates & competition level for biomass tenders in Germany

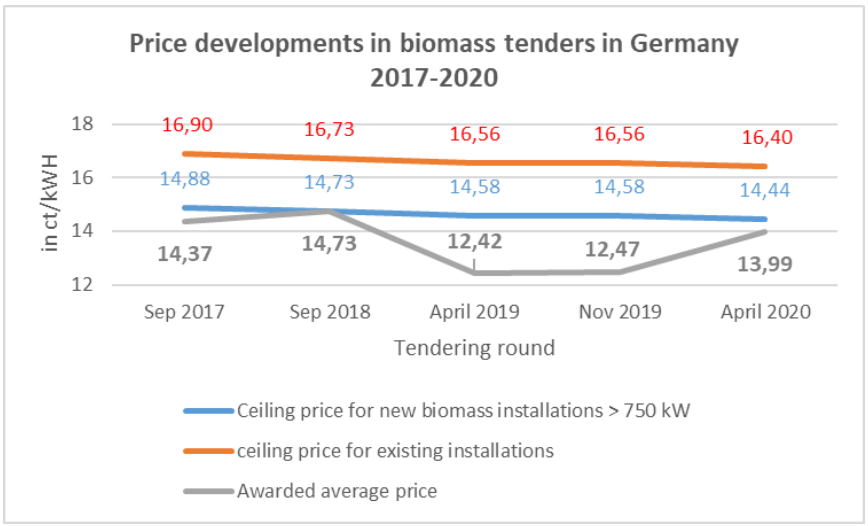

Figure 12: Price developments in biomass tenders in Germany

Slovenia is the only MC which holds tenders for biomass and hydro. Over six rounds, the level of competition was low as well as the realisation rate so far. However, similar to the German results, the realisation rate reflects only a final picture for the first round. With a realisation time of 36 months all other rounds cannot be evaluated.

Tender	Ceiling price €/MWh	Realisation rate	Ceiling price €/MWh	Realisation rate
	Biomass		Hydro	
15.12.2016	180.73	13.0%	89.13	40.0%
05.09.2017	173.67	0.0%	87.79	9.0%
23.02.2018	157.19	0.0%	86.81	50.0%
12.12.2018	155.62	50.0%	85.13	33.0%
28.06.2019	155.62	0.0%	85.04	n.a.
18.12.2019	155.62	0.0%	85.04	n.a.

Table 17: Price and realisation rates for biomass and hydro tenders in Slovenia

France called for offers in hydro tenders in 2018 and 2019. Both times, the level of competitions was high enough to ensure real competition. The price levels reached are higher than for ground-mounted PV and onshore wind, reflecting a gap between the costs of those technologies. With a realisation time of 4.5 years, the plants are still the realisation phase.

3.3.3 Challenges and lessons learnt since 2018

Based on the limited data provided, biomass and hydro tenders seem to play a minor role in national tendering strategies. Especially compared to the tendered volume for solar and onshore wind, their status for national RES strategies becomes obvious. Although both technologies can offer base load energy, the main challenges seem to lie in the field of cost reduction.

3.3.4 Main elements of offshore wind tenders

Information about two examples for offshore wind tenders has been provided. Both were set-up as pay-as-bid tenders awarding a market premium. In contrast to other RES technologies, offshore wind tenders are implemented for specific (sometimes predeveloped) offshore sites.

France and Germany reported technology-specific tenders for offshore wind. The UK includes offshore wind in its technology-neutral[27] tender.

The French Dunkerque tender from 2019

In this pay-as-bid tender a specific site with 400 to 600 MW was tendered. There was no minimum participation size but a maximum participation size, where the tendered volume had to be met by less than 80 wind turbines. The reference value was in €/MWh for a feed-in-premium contract and the winning project (one-shot tender; only one winning candidate) will be supported for 20 years starting with the start of operation. The awarded project is not entitled to any additional revenues beyond market revenues.

There were three key award criteria that were weighted differently– price (80%), occupancy of the area (11%) and environmental impacts (9%).

The realisation time was set for seven years but depending on grid connection and environmental authorisations a longer realisation time can be granted.

[27] The UK has split its technologies into two groups, broadly along lines of established and less-established technologies. Different groups have separate auctions, though all the technologies in a given group compete against each other.

There was both a ceiling bid price – 9 c/kWh – and a floor bid price of 0 c/kWh.

The financial guarantee was set at €50m for the winning candidate but there were no administrative fees for participation.

German offshore wind tender

Germany implemented its first tendering procedures for offshore wind installations in 2017 and 2018. These tenders were only directed to existing offshore wind projects, e.g. projects which already had a building permit issued before 2016 and for which realisation is expected between 2021 and 2026. From 2021 onwards, an annual volume of 700 MW to 900 MW will be tendered out for offshore wind capacities with planned realisation after 2026.[28]

In this pay-as-bid tender, a volume of 1,550 MW was tendered in 2017 and 2018 each. There was a minimum participation size of 751 kW but no maximum participation size. The reference value was in c/kWh as the basis for a sliding premium (calculated monthly). The sliding premium is granted for 20 years and winning projects are not entitled to any additional revenues beyond the market revenue and are not allowed to self-consume any produced electricity.

	2017	2018
Tendered volume	1,550 MW	1,550 MW
Awarded volume	1,490 MW	1,610 MW
Price range of awarded bids	0.00 – 6.00 c/kWh	0.00 – 9.83 c/kWh
Average awarded bid	0.44 c/kWh	4.66 c/kWh
Awarding mechanism	Pay-as-bid	Pay-as-bid
Ceiling price	12 c/kWh	10 c/kWh
Financial prequalification	€100 /kW	€100 /kW

Table 18: Key criteria for offshore wind tenders in Germany 2017 and 2018

The key award criteria are price and volume, whereas the realisation time depends on the grid connection.

The ceiling price for the first round was 12 c/kWh and for the second round 10 c/kWh. Negative bids were inadmissible.

The financial prequalification was set at €100/kW and the administrative fee for participation was €4,727.29.

[28] The framework will be different from the 2017/18 auctions and is called “central model”.

4 National experiences with technology-neutral tenders

Technology-neutral tenders for PV and onshore wind are more and more common although technology-specific tenders for those two technologies might be in place at the same time. For this report the term technology-neutral tendering schemes is used if two or more technologies are tendered together.

The 2018 CEER report highlighted that five MCs had technology-neutral tendering schemes in place (Poland, Portugal, Spain, the Netherlands, and the United Kingdom), that Hungary had passed the relevant legislation and Germany was planning to implement technology-neutral tenders (PV and onshore wind) in 2018.

For the Netherlands, Poland, Spain and the UK detailed information has been provided. In principal, technology-neutral tenders in those countries were not restricted to a certain limited combination of RES technologies. However, the last recorded round (at that point of time) from Spain in 2017 was restricted to PV and onshore wind and the UK differentiated between "established technologies" (onshore wind, solar, hydro, biomass conversion, energy from waste with Combined Heat and Power (CHP), landfill gas, and sewage gas) and "less established technologies" (advanced conversion technologies, anaerobic digestion, dedicated biomass with CHP, geothermal, offshore wind, tidal stream, remote island wind, and wave).

In all five MC, the tendering rounds were based on installed capacity and ay-as-bid was generally used as the price awarding mechanism, only the UK had uniform pricing (pay-as-clear).

Back in 2018, when the first CEER report on tendering procedures had been published, only a handful of MCs had implemented technology-neutral tenders. Six countries that provided data for the last report and had auctions in place also had technology-neutral auctions at some point in time. Since then, more and more MCs introduced technology-neutral tenders. Looking at the data provided, a joint tender for onshore wind and solar seems to be easier to implement than other types of technology-neutral tenders. This is linked to the comparable cost structure between those two technologies.

Out of 21 MCs that provided information on their tendering schemes, five (the Czech Republic, Estonia, Hungary, Ireland and Poland) stand out for having implemented only technology-neutral ones. Fourteen MCs have technology-specific auctions as well as technology-neutral auctions in place.

4.1 Main elements of technology-neutral tendering schemes

For this year's report 13 MCs reported technology-neutral tendering schemes being in place. Of these countries, six reported technology-neutral tenders that are a combination of wind and solar together and ten countries reported technology-neutral tenders for a combination of different technologies, whilst Spain, France, Italy and Poland reported to have both (wind/solar and multiple technologies[29]) possibilities in place.

[29] In France, only for self-consumed electricity.

Awarded support

All 13 MCs but Spain (investment revenue[30]) award a reference value used for calculating some sort of market premium. Seven MCs opted for a sliding market premium while Finland, Ireland and the UK also adjust their premium for market values that are higher than certain thresholds (contract for differences). Generally, participants bid on a reference value, which is used to determine the level of support. In Lithuania, participants bid only for the premium itself and in Italy, participants bid their reduction on a percentage basis compared to a reference value set by legislation.

Support duration

The support duration varies from 10[31] to 25 years. Eight of the listed tendering schemes grant support for 20 years or more. Besides a support duration of 20 years, Malta also has a yearly production cap.

Key award criteria

For all technology-neutral tendering schemes the key award criteria is the price. In the case of Italy, the price is determined through the offered reduction from the decreed reference value. For five tendering schemes, the volume was listed as second award criteria, whereas Italy's secondary ranking criteria are (in this order) legality rating, location and submission date. In case of equal prices, the following selection criteria are applied in Hungary (in the order of mention): investments on "brownfield" sites, greater capacity, earlier application, lot.

Price awarding mechanism

Only Spain and the UK use a uniform pricing (pay-as-clear) approach for their three listed technology-neutral tendering schemes. The vast majority of 13 technology-neutral tendering schemes are based on a pay-as-bid price awarding mechanism.

Number of rounds per year

Compared to technology-specific auctions, technology-neutral tenders are carried out less often. For seven out of 19 schemes, only one auction per year is held or in the case of the UK, one every two years. Lithuania (not included in the seven) usually has one per year but this is not fixed. Italy (not included in the seven) had only one in 2019 for each of its three schemes and is planning to have three for each scheme in 2020 and 2021. Hungary is planning to hold five new tenders until August 2022, called every six months by the NRA (the supported amount would be 300-500 GWh in each tender). In the German and the French technology-neutral schemes two and three rounds per year respectively are carried out.

Realisation time

Realisation times vary widely amongst implemented schemes, from 16 months for refurbished/repowered wind onshore in Italy to up to 60 months in the UK. Greece has different realisation times depending on the type of grid connection. In general, it is 36 months but six extra months for grid connection via a new substation and plus 12 additional months for grid connection via a new extra high voltage substation. In Germany, realisation time are set in accordance with the technology, onshore wind or solar, and is identical with the realisation times defined in the respective technology-specific tenders.

[30] In Spain the idea of "Awarded support" is all the support above the income from the wholesale market of electricity.
[31] The 10 years tender is the self-consumption one and its mechanism is different from the others.

Participation sizes (min/max)

All nineteen schemes but two (Lithuania and Slovenia) have minimum participation sizes or in the case of Finland a minimum production of 800 MWh per year. Besides Spain (all schemes – 1 kW), Germany (wind/solar scheme – 751 kW) and France (all technologies except ground mounted PV scheme – 100 kW) the minimum sizes are in the couple of 100s kW range with the highest minimum size being 50 MW for wind in Greece.

Besides the tendered volume itself, seven tendering schemes do not have any maximum participation size. Germany has a maximum participation size for solar projects up to 20 MW in its wind/solar tendering scheme. Other maximum participation sizes range from 1 MW in France (all technologies except ground-mounted PV scheme) and Malta, 125 MW in Ireland to 200 MW in Spain (wind, solar and other RES scheme). The UK also tenders offshore wind together with other technologies and the maximum size for phased[32] offshore wind in this case is 1,500 MW.

Bid prices (ceiling/floor)

The majority of technology-neutral tendering schemes do not have a floor price (thirteen schemes) or have zero (three) as the floor price. Only Italy has a floor price that is higher than zero which is set by taking the general reference value or the technology-specific reference value minus 70%.

All technology-neutral tendering schemes have a ceiling bid price and eleven have an adapting/decreasing one.

Prequalifications (material/financial) and administrative fees

All 13 MCs have some kind of material prequalification such as a building permit and/or a grid connection agreement in place for their technology-neutral tendering schemes.

For all technology-neutral tendering schemes except France (all technologies except ground-mounted PV scheme), Lithuania, Malta and the UK a financial prequalification is a necessity. Most of those are set as €/kW values or in the case of Finland as €/MWh per year. In Hungary, it is a percentage of the benchmark investment cost.

4.2 Outcome of technology-neutral tenders

The following tables highlight the outcome and properties of technology-neutral tenders. The outcome of realisation rates in the upcoming years will be interesting, since up to now only limited data is available.

Looking at the outcome of the technology-neutral tendering rounds that have taken place between 2016 and 2019 (see Table 19), except for the case of Germany, the prices declined or even were zero. Whereas the level of competition in the four German tendering rounds was in the range of others, Germany was the only country that held two tendering rounds each in 2018 and 2019. With the information from limited rounds of technology-neutral tenders it might be beneficial for countries to have fewer rounds.

[32] I.e. projects that deliver in up to three phases of deployment.

Where data was provided the level of competition was medium to high. Only the SDE+ scheme in the Netherlands (see Table 23) had competition levels below 1 which could be related to also having two rounds each in 2018 and 2019. Looking at the four German rounds, a higher level of competition did not coincide with a lower price. On the contrary, the round with the highest level of competition had the highest price whereas one would expect that a higher level of competition should bring forward more efficient installation. Though, comparing tendering rounds at this point of time might lead to wrong conclusions. More data, especially for realisation rates, is needed for robust conclusions.

Germany	**Technology-neutral > 750 KW 2018-2019**				
	Round	**Price (c/kWh)**	**Realisation rate (solar only)**	**Level of competition**	**Realisation time**
	01/04/2018	4.67	0.787 (PV only)	1.98	24 months
	01/11/2018	5.27	n.a.	1.60	24 months
	01/04/2019	5.66	n.a.	3.60	24 months
	01/11/2019	5.4	n.a.	2.57	24 months
Greece	**Neutral: Wind and Solar**				
	Round	**Price (c/kWh)**	**Realisation rate**	**Level of competition**	**Realisation time**
	01/04/2019	5.70	n.a.	1.4	36 - 48 months
	01/04/2020	5.16	n.a.	1.4	36 - 48 months
Spain	**Technology-neutral**				
	Round	**Price (c/kWh)**	**Realisation rate**	**Level of competition**	**Realisation time**
	14/01/2016	0	n.a.		48 months
	17/05/2017	0	n.a.		31/12/2019
	26/07/2017	0	n.a.		31/12/2019
Finland	**Technology-neutral**				
	Round	**Price (c/kWh)**	**Realisation rate**	**Level of competition**	**Realisation time**
	31/12/2018	2.52	n.a.	3.12	24 months
France	**PV + Wind (2018)**				
	Round	**Price of the winning bids (c/kWh)**		**Level of competition**	**Realisation time**
	01/09/2018	5.49		1.8	24 months
Hungary	**Nov-Dec 2019**				
	Round	**Price of the winning bids (c/kWh)**	**Realisation rate**	**Level of competition**	**Realisation time**
	Category 0.3-1 MW	7.63	n.a.	1.75	48 months*
	Category 1-20 MW	6.67	n.a.	3	48 months*
Lithuania	**Technology-neutral**				
	Round	**Price premium €/MWh**	**Realisation rate**	**Level of competition**	**Realisation time**
	02.09.2019 - 16.01.2020	0		4.07	36 months
Poland	**PV < 1 MW**				
		Price [zł/MWh]	**Realisation rate**	**Level of competition**	**Realisation time**
	2016	381.15	0.8703		
	2017	376.14	0.9564		
	2018	353.35	0.228		18 months

UK	Contracts for Difference				
	Round	**Price (£/MWh, 2012 prices)**	**Realisation rate**	**Level of competition**	**Realisation time**
	03/04/2017	40,00 (for 2022/23 delivery: advanced conversion technologies);	0.636		about 3 - 5 years
		57,50 (for 2022/23 delivery: offshore wind);			
		74,75 (for 2021/22 delivery: advanced conversion technologies, dedicated biomass with CHP, offshore wind).			
	29/05/2019	39,650 (for 2023/24 delivery: advanced conversion technologies, remote island wind, offshore wind);	1		about 3 - 5 years
		41.611 (for 2024/25 delivery: advanced conversion technologies, remote island wind, offshore wind).			
*after 36 months, completion bond is lost					

Table 19: Outcome of technology-neutral tenders

MC	Germany	Greece	Spain	Finland	France	Italy	Poland < 1 MW	Poland > 1 MW
Introduced / tender	2018	2019	2017	2018	2018	2019	2018	2018
Reference value (RV) determined through tender	RV for sliding FiP	RV for sliding FiP	Investment revenue	RV for "Finnish" FiP	RV for FiP	RV set by decree downward auctions	< 500 kW - fixed price > 500 kW - FiP	RV for FiP
Duration of support (years)	20	20	25	12	20	20	15	15
Key award criteria	1. Price 2. Volume	Price	1. Price 2. Volume	Price	Price	1. Percentage reduction of RV 2. i) Legality rating ii) Location iii) Submission date	1. Price 2. Time of selling the bid	1. Price 2. Time of selling the bid
Price awarding mechanism	Pay-as-bid	Pay-as-bid	Uniform pricing	Pay-as-bid	Pay-as-bid	Pay-as-bid	-	-
Number of rounds per year	2	1	1	1	1	1 (2019) - 3 (2020 and 2021)	min. 1	min. 1
Realisation time (months)	24 for solar 30 for onshore wind	36 +6 connected via new substation + 12 connected via new extra high voltage substation	29 months (31.12.2019)	-	24, if delayed the price is reduced	24 for solar 31 for onshore wind	2018 - 30 for wind, 18 for PV 2019 - 33 for wind, 24 for PV	2018 - 30 for wind, 18 for PV 2019 - 33 for wind, 24 for PV
Minimum participation size (volume in kW)	75	> 20,000 solar > 50.000 onshore wind	1	No, but production must exceed 800 MWh per year - no support if this threshold is not reached	5,000	1,000	0	1,000
Maximum participation size (volume in kW)	20,000 (only for solar)	No	200,000	No	18,000	No	1,000	No
Ceiling bid price (in c/kWh)	Adapting	Adapting based on previous round	Yes	Yes	Yes	RV - 2 %	Yes	Yes

MC	Germany	Greece	Spain	Finland	France	Italy	Poland < 1 MW	Poland > 1 MW
Floor bid price (in c/kWh)	No	No	No	No	Yes (0)	RV - 70 %	No	No
Material prequalifications	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Financial prequalifications	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Administrative fee for participation	Yes	Yes	Yes	Yes	No	Yes	No	No

Table 20: Technology-neutral tenders for wind and PV only

MC	Spain	France	Hungary	Ireland	Italy	Italy	Lithuania	Malta	Poland	Slovenia	UK
Technologies	Wind, solar and other RES	All technologies except ground mounted PV – self-consumption only	All	All	Hydro and residual gases	Refurbishment /re-powering onshore wind , hydro and residual gases	Onshore wind, solar, biomass, hydro	All	New installations: biomass, biogas from wastewater treatment plants, biogas from landfill site, waste incineration plant	All (refurbish/re power) < 10,000 kW	All (two pots)
Introduced / tender	2017	2017	2017	2020	2019	2019	2019	2020	2018	2016	2014
Reference value (RV) determined through tender	Investment revenue	Fixed premium	RV for sliding FiP	RV for 2-way sliding FiP	RV set by decree downward auctions	RV set by decree downward auctions	Fixed premium and volume	"Sliding" premium	RV for FiP	RV for sliding FiP	RV for CfD
Duration of support (years)	25	10	15	-	20 for residual gases 30 for hydro	20 30 for hydro	12	20 production cap per year	15	15	15
Key award criteria	1. Price 2. Volume	Price	Price	Price (offer price*technology specific evaluation correction factor)	1. Percentage reduction of RV 2. i) Legality rating ii) Power plants that provide for the coverage of digestate tanks (in case of residual gases) and plants that meet some particular building permits iii) Submission date	1. Percentage reduction of RV 2. i) Legality rating ii) Location iii) Submission date	1. Price 2. Volume	Price	1. Price 2. Time of selling the bid	Price	1. Price 2. Volume

MC	Spain	France	Hungary	Ireland	Italy	Italy	Lithuania	Malta	Poland	Slovenia	UK
Price awarding mechanism	Uniform pricing	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Pay-as-bid	Uniform pricing
Number of rounds per year	1	3	Not defined	"Frequent intervals"	1 (2019) - 3 (2020 and 2021)	1 (2019) - 3 (2020 and 2021)	Usually 1 (determined by gov.)	Not defined	Min. 1	2	1 every 2 years
Realisation time (months)	31 months (31.12.2019)	24 (+18 for hydro)	48 (after 36 months completion bond is lost)	end of 2023	51	16 (onshore wind) 24 (residual gases) 36 to 48 (hydro)	24 - 36	18 (0.5 c/kWh reduction to 24 months)	2018 - 48 2019 - 42	36 (upon request up to 60 months)	36 - 60
Minimum participation size (volume in KW)	1	100	300	500	1,000	1,000	No	400	1,000	no	5,000 (only applies to onshore wind, solar PV, hydro, AD, and remote island wind)
Maximum participation size (volume in KW)	200,000	1,000	20,000	5,000 – 125,000 or equivalent to 600 GWh/year	-	-	No	1,000	-	10,000	50,000 (hydro) 1,500,000 (phased wind offshore) none otherwise
Ceiling bid price (in c/kWh)	No	Decreasing	Adapting	Yes	Technology RV - 2 %	Technology RV - 2 %	Adapting	Yes	Yes, many categories for different types of installations	Adapting	Adapting
Floor bid price (in c/kWh)	No	Yes (0)	No	No	technology RV - 70 %	technology RV - 70 %	Yes (0)	No	No	No	No
Material prequalifications	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Financial prequalifications	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No
Administrative fee for participation	Yes	No	No	-	Yes	Yes	Yes	No	No	No	No

Table 21: Technology-neutral tenders

The Netherlands introduced technology-neutral tenders in 2011. A detailed overview can be found here and the following description is based on 2019.

A feed-in-premium is determined in the SDE+ support system. The overall support volume is limited by one budget for all categories taken together and there are two rounds with three phases.

"Each phase has a maximum phase amount, rising from 9 c/kWh (6.4 c/kWh for renewable gas) in phase 1 to 13 c/kWh (9.2 c/kWh for renewable gas) in phase 3. There is a maximum base amount for each technology, above which no subsidy is granted. Subsidies for cost-effective technologies with a maximum phase amount less than or equal to 9 c/kWh may be applied for in phase 1. There is a greater chance that budget will be available for these phase 1 applications than for technologies with a higher maximum base amount."

The support duration varies between 12 (biomass) and 15 years and the supported full load hours are limited depending on the technology.

Granted amount (in € million)	2018-I	2018-II	2019-I	2019-II
Solar PV	2,031	3,294	2,545	1,734
Solar thermal	6	9	11	32
Onshore wind	149	1,874	309	1,338
Biomass	1,396	555	781	941
Water	0	1	20	-
Geothermal	216	270	241	956
Total	3,798	6,004	3,906	5,000

Table 22: SDE+ granted amount in € million
* In 2018 and 2019 there were two subsidy rounds: in spring (I) and in autumn (II)

	2018-I	2018-II	2019-I	2019-II
Available budget (€ billion)	6.0	6.0	5.0	5.0
Subsidy requested (€ billion)	5.3	7.7	4.8	9.1
Subsidy granted (€ billion)	3.8	6.0	3.9	5.0
Level of competition	Less than 1*	1.3	Less than 1*	1.8

Table 23: SDE+ level of competition
* The subsidy requested was smaller than the available budget

	Duration of support granted (years)	Realisation time
Solar PV	15	1.5 / 3 / 4 years*
Solar thermal	15	3 years
Onshore wind	15	4 years
Biomass	12	4 years
Water	15	4 years
Geothermal	15	4 years

Table 24: SDE+ realisation time

* In the 2018 rounds, installations smaller than 1 MW must start at the latest withing 1.5 years (18 months). For operations with a capacity larger than 1 MWp, the operation must start at the latest within 3 years. In the 2019 rounds, installations smaller than 1 MW must start at the latest withing 1.5 years (18 months). For operations with a capacity larger than 1 MWp, the operation must start at the latest within 3 years. For ground mounted panels this is 4 years.

Denmark has completed two rounds of technology-neutral tenders (2018 and 2019). The average fixed price premium that will be granted to the winners for the 20-year aid period was €3.1 per MWh in 2018 and €2.1 per MWh in 2019. Both onshore wind and PV projects have been awarded aid contracts. The wind projects have on average delivered the lowest bids in the tenders, but only marginally lower than PV. See more here.

In Spain the overall realisation rate for the 2017 round, where 8,137 MW was auctioned, is 77% (wind: 58 %, PV: 96 %).

4.3 Challenges and lessons learnt

Germany addressed specific challenges for its technology-neutral tender. Higher costs in combination with higher chances for higher awards within the technology-specific auctions (e.g. low level of competition in wind tenders) led to the situation that hardly any onshore wind projects took part in the technology-neutral auctions. Only solar projects have been awarded.

In the French technology-neutral tenders, only solar projects have been awarded. A few onshore wind projects did participate but nearly all of them were more expensive than solar projects. As the French objectives in terms of renewable energy production are technology-specific, it does not seem possible to switch to only technology-neutral tenders.

In Slovenia, onshore wind projects were the most successful in the technology-neutral tenders in the period to December 2018, followed by a much smaller volume of applications from solar technology, as well as hydro and wood biomass (but less then solar).

Having parallel tender schemes in place i.e. technology-neutral tender for PV and onshore wind and technology-specific tenders for PV and onshore wind can result in a less efficient support system. There is a risk that participants are cherry-picking based on the specific tendering schemes or that dividing up tendering volumes between parallel technology-neutral and technology-specific tenders can lead to insufficient participation in either case.

Compared to the first report there are no specific lessons learnt in connection with technology-neutral tenders that were highlighted by the MC. It can be observed though that some countries (e.g. Finland and Hungary) switching to tendering schemes chose to have a technology-neutral tendering scheme only.

In Hungary, almost exclusively PV plants applied and won the first tender held at the end of 2019 (except for one landfill plant). Onshore wind projects first have to gain the right to build a plant, which is done via a different auction.

In Poland, onshore wind projects have been hampered because of very strict distance rules for wind farms. However, the government is planning to review these rules.

5 Conclusions

The report brings forward the following conclusions:

- By mid-2020, the large majority of CEER MCs are implementing tenders as a means for determining the level of financial support for RES technologies in a competitive manner.
- In terms of outcome, missing behind-the-scenes information of each single national scheme limits the validity of drawing generic conclusions for this report. Nevertheless, where empirical data has been provided, prices usually went down but not tremendously, while the level of competition was very mixed. Information about realisation rates are still outstanding, as most realisation periods are still running. First results are encouraging for PV projects. Overall, the results differ from country to country and from tender to tender.
- Although awarded average bid prices did not systematically go down between the rounds, they are lower than the schemes in place before. The question that remains is how prices would have developed under those previous schemes.
- RES support systems based on tendering schemes seem to be more vulnerable to outside influences such as permit granting systems and zoning or more generally, aspects that influence the number of potential participants and the risk level. Market analysis including technology potentials (and auction volumes based on them) should therefore, also consider the time component to develop those potentials.
- Technology-specific and technology-neutral tendering procedures carried out in parallel for the same technologies impact on the level of competition and the price development. When carried out in parallel, the design of both procedures must be adapted to avoid gaming.
- Tenders as a market-based instrument for determining level of RES support are still in the learning process and experiences are continuously being gained in almost all MCs by now.
- Acceptance issues emerge, which are not per se linked to the tendering instrument. However, it has repercussions on the project risks and as such on the participation level and the price outcome.

Annex 1 – List of Abbreviations

Term	Definition
ACER	The EU Agency for the Cooperation of Energy Regulators
EEAG	Guidelines on State aid for environmental protection and energy 2014-2020, European Commission
c/kWh	Cents per kilowatt hour
CEER	Council of European Energy Regulators
CHP	Combined Heat and Power
CSP	Concentrated Solar Power
DNO	Distribution Network Operator
DSO	Distribution System Operator
EC	European Commission
EE	Energy efficiency
EEA	European Economic Area
EU	European Union
FiP	Feed-In-Premium
FiT	Feed-In Tariff
GGP	Guidelines of Good Practice
GCs	Green Certificates
GWh	Gigawatt hour is a unit of energy equal to 1,000 MWh or 1,000,000 kWh
kWp	Watts-peak and kilowatts-peak is a measure of the nominal power of photovoltaic device under laboratory conditions. Kilowatts-peak (kWp) is the most common unit in the domestic context.
kWh	The kilowatt is a unit of energy equal to 1,000 watt hours or 3.6 megajoules. The kilowatt hour is the most common billing unit for energy delivered to consumers.
MC	CEER Member Country
MW	Megawatt
MWh	Megawatt hour is a unit of energy equal to 1,000 kWh or 1,000,000 Watthours
NPV	Net present value
NRA	National Regulatory Authority (for energy)
PSO	Public Service Obligation
PV	Photovoltaic
REFiT	Renewable Energy Feed-In-Tariff
RES	Renewable Energy Sources (also used in this report to mean renewable generation)
RED / RES Directive	The Renewable Energy Directive (2009/28/EC)
RES-E	Electricity from Renewable Energy Sources
RV	Reference Value

Term	Definition
SDE+	The 'SDE+' ('*Stimuleringsregeling duurzame energieproductie*') is the Dutch support mechanism for renewable energy, introduced in 2007.
TSO	Transmission System Operator
TWh	The terawatt hour is a measure of energy large enough to express annual electricity generation for whole countries

Annex 2 – Questionnaire

NRAs were asked to provide information to the following questions:

1. Reference value determined through tender?
2. Duration of support granted through tender (in years, full load hours, please indicate)
3. Are awarded projects entitled to additional revenues beyond the market (e.g. Guarantees of Origin) or self-consume the generated electricity?
4. Key awarding criteria (e.g. price, volume, local content rules, special rules for local community projects)?
5. If different criteria are of relevance, how are they weighted or ranked?
6. Price awarding mechanism (Pay-as-Bid/ Uniform pricing/ hybrid scheme)?
7. Number of rounds per year?
8. Tendered volume per round [MW]?
9. Tendered volume per year [MW]?
10. Is the tendered volume distributed evenly throughout the year? (Yes/No)
11. If no, what are the reasons for this approach?
12. Realisation time for awarded projects
13. Minimum participation size
14. Maximum participation size
15. Ceiling bid price (in c/kWh)
16. Floor bid price (in c/kWh)
17. Material prequalifications
18. Financial prequalifications
19. Administrative fee for participation (Yes - amount/ No)
20. Is an electronic procedure available for submitting the bids? (yes/no)
21. Body in charge of carrying out the tendering procedure (NRA, Ministry, other).
22. If NRA is in charge, please describe the role played.
23. Can the decisions taken by the NRA in the context of the tendering procedures (e.g. ranking of awarded projects) be overruled by another party (e.g. ministry, politics, etc.). If yes, under which conditions?
24. Time allocated to the candidates for the constitution of the bids
25. Time allocated to the NRA for the analysis of the bids

Annex 3 – About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 39 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment friendly, harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

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More information is available at www.ceer.eu.