Report D4.1-FR, March 2016

Small-scale PV Auctions in France: Instruments and lessons learnt

Short about the project

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

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

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

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

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

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Small-scale PV Auctions in France: Instruments and lessons learnt

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Project deliverable:

WP4 – Empirical aspects of auctions for RES-E: learning from real experiences

D4.1 – Characteristics of Auctions

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1. Characteristics of auctions in France

Table 1. Characterisation of auctions in the selected countries

Characteristics	Description
Country characteristics	France has committed to a 40% share of renewable electricity in supply by 2030 and 27% by 2020. In detail, the targets for 2020 are: 8 GW photovoltaics[1], 19 GW onshore wind, 6 GW offshore wind, 2.3 GW biomass. Additionally, France's nuclear share in electricity production will decrease from 75% in 2014 to 50% by 2025. Electricity from renewable sources is promoted through feed-in tariffs (FIT) and tax benefits. Additionally, France has a tender system for offshore wind, biomass and solar PV. In the transport sector, a quota system is used to promote renewable energy sources, while various tax regulation mechanisms and subsidies, as well as a zero interest loan support renewable heat generation.
Market characteristics	The French electricity generation market is still dominated by the historical incumbent, EDF, which owns all of the country's nuclear power plants, the nuclear fleet alone accounts for 73% of total generation. In 2013, total installed capacity was 128 GW and total electricity generation was 550 TWh. Electricity generation was 1.7% higher in 2013 than in 2012. The energy transition bill still under discussion provides for a cap on nuclear capacity at its present level. In 2013, spot prices were €43.2/MWh on average over the year, down by € 3.70 compared to 2012. In 2013, the French regulator (CRE – Energy Regulation Commission) forecasted significant price increases by 2017 in regulated tariffs for all types of customers. Transmission and distribution are unbundled from generation. However, the transmission operator, RTE, and the largest distribution operator, ERdF, are 100% owned by EDF. Auctions have the aim of assisting in achieving the renewable energy targets and keep costs low. They are Pay-As-You-Go (PAYG) financed; The *Contribution au Service Public de l'Electricité* (CSPE) has to be paid by all consumers per consumed kWh quarterly via their electricity bill. The differential costs for bridging the "Price Delta" are determined annually on the basis of calculations of the current regulatory authority of the Ministry of the Environment, with the exception of auto production in

[1] The target was raised in 2015. Before it was 5.4 GW by 2020.

Characteristics	Description
	the industry sector (consumption to 240 million kWh).
Name of auction scheme	The legal basis for the auctions is set with the Decree n°2002-1434 of 4 December 2002 on the procedures of calls for offers for electricity producing installations (*Décret n°2002-1434 du 4 décembre 2002 relatif à la procédure d'appel d'offres pour les installations de production d'électricité*) and the Decree n°2004-90 on compensation for the additional costs arising from public electricity services. Two different auction schemes for solar PV exist: one for solar PV with installation capacity between 100 and 250 kW and one for solar PV with capacity >250 kW. **This analysis focuses on tenders for solar PV 100-250 kW.**
Objectives	Long-term investment planning (*Programmation Pluriannuelle des Investissements*) as well as achieving the 2020 targets (if FITs are not sufficient) are the two main policy objectives of the auction scheme in France. Additionally, France hopes to achieve the following policy goals with the auctions: *1.* Cost reduction *2.* Reduced project risks *3.* Local value added *4.* Innovation *5.* Reduced environmental impact[2]
Contracting authority	Executive body: The Energy Regulation Commission (CRE) is responsible for the execution and evaluation of the auctions. Government: The Ministry for Ecology, Sustainable Development and Energy (*Ministère de l'Ecologie, du Développement durable et de l'Energie*, MEDDE) has the final decision over selected projects.
Main features	France conducts standardised pay-as-bid online-auctions. No prequalification stage exist (however the bidder has to meet certain criteria - see pricing rules). Bids can be submitted during the 3-month auctioning phase. In France, 20% of the tariff is indexed annually with income levels in the energy industry and an industry-specific price index. Tariffs are guaranteed for 20 years.[3]

[2] Cruciani. (2015).
[3] Held, A., Ragwitz, M., Gephart, M., de Visser, E., Klessmann, C. (2014).

Characteristics	Description
Year of introduction	Since 2011, France has conducted standardised pay-as-bid online-auctions for rooftop PV installations between 100-250 kW. Five auctions were scheduled for 2011-2013 for a total of 300 MW. However, the last two rounds were cancelled in order to improve the auction design, including a revision of the qualification requirements (see below). In 2013-2014 three auctions took place for a total of 120 MW.
Technology focus and differentiation	France conducts technology specific (solar), pay-as-bid auctions. Network connection charges are covered by the project developer and have to be considered in the bid.
Lead time before auction	The lead time before the auction is around 6 months. The tenders are announced in the official gazette of the European Union as well as on the homepage of the French Energy Regulation Commission. The auction phase usually lasts for 3 months. Afterwards, an 18 month-deadline is given for construction and commission (after the announcement of the winner of the auction).[4]
Min. / max. size of project	Only 100-250 kW systems are eligible.
What is auctioned?	France conducts capacity auctions. The French Energy Regulation Commission chose the thresholds of 100 kW and 250 kW for PV tenders because: (i) the 250 kW threshold is the limit between low voltage and medium voltage, and corresponds to the connection threshold managed by ERDF (*Électricité Réseau Distribution France*), which is the operator of the low and medium voltage distribution system (ii) the feed-in tariffs described in the orders of January and August 2010 distinguished the threshold of 250 kW (iii) the facilities between 100 and 250 kW correspond to non-residential roofs, i.e. the category that exploded during the 2010 bubble. The new mechanism was designed to control its development.
Budgetary expenditures	In 2008, the Environmental Council (*Grenelle de'environment*) set

[4] Regulatory Commission of Energy (2015). .

Characteristics	Description
	targets for the deployment of renewable energies, allocating a total budget (for all renewables) of € 440 billion.
Frequency of auctions	The Ministry for Ecology, Sustainable Development and Energy (MEDDE) schedules tenders at irregular intervals to make sure that the target production specified in the multi-annual investment plan (*Programmation Pluriannuelle des Investissements*, PPI) is reached.[5]
Volume of the tender	Tender volumes vary. Several auctions are taking place per year with an average volume of 40 MW.[6]
Auction design elements	See Table 2

1.2 Design elements for the assessment of auction schemes for RES-E

Table 2. Design elements for the assessment of auction schemes for RES-E

Design elements	
Single- or multiple-item auctions	Multiple-item auction – bids are selected up to the capped volume.
Auction procedure	The auction process itself is organised as static auction (so called "sealed bid"). In this option, bidders have no information on other bids and thus cannot react to those.

Pricing rules	Pay-as bid-auction
	• All bids are made through the internet
	• Pricing rules changed in 2013. Previously they were based 100% on price ('price-only').
	• Selection in 2013 was based on two criteria, with a total mark of 30 points:
	  ○ Required purchase price, from 20 points (=80 €/MWh) to 0 (>180 €/MWh, bids with a mark 0 were discarded)
	  ○ Carbon footprint of panels kg_{eq} CO_2/kW_p= from 10 points (=295) to 0 (>2118)[7]

[5] Franco-German Renewable Energy Office (2014). .
[6] Fraunhofer ISI, Consentec GmbH, TU Wien (2014).
[7] Winkler et al. (2014).

Design elements	
Ceiling price	No ceiling price exists in France.
Qualification criteria	• Bidder has to be the owner of the building and maintain the installation • Evidence of capital of at least 0,6 €/Watt installed capacity or loan offer of bank • Obligation to cooperate with certified sub-contractors • Several bids can be submitted by the same party but separately • A detailed project description including, among others: a construction and business plan, evidence of formal qualifications, a description of the legal structure of the party operating the project, and a life cycle CO2 assessment of the PV installation • Building permit • ISO 9001 and ISO 14001 certifications (or equivalent) of the module and the inverter manufacturers • System must be checked for functioning before operation • A declaration of consent for the proper disposal modules out of use at own expense.[8]
Penalties	The installation has to be up and connected 18 months after publication of the auction results (extendable by 2 months, if the delay is caused by the DSO).In case of delays, the duration of support can be reduced by the delay, multiplied by two[9]. So far penalties have not been used.
Monitoring of realisation progress	The Energy Regulatory Commission together with the Ministry for the Environment, Sustainable Development and Energy (MEDDE) monitors project realisation.
Exceptions from requirements for small plants/developers?	The tender is only open for small-scale PV installations.
Support auctioned	Though project developers bid a certain price per kWh, support is provided per unit of capacities installed (MW). Projects are selected based on the offered

[8] Franco-German Renewable Energy Office (2014).
[9] Held et al. (2014).

Design elements	
	price and other selection criteria. The tender is closed when the target capacity is reached. Remuneration (in the form of a FITs) is guaranteed for 20 years, limitation on the base of full load hours (1580 h/a mainland, 1800 h/a Corsica and overseas)
Transferability of support right	The transfer of support rights is not allowed: the bidder has to be the owner of the building / installation. However, a change of operator is possible, but has to be approved by the Ministry.

2. Evaluation criteria for the assessment of auction schemes for RES-E

Actor variety and social acceptability

The target audience of the auctions are private small actors. The following figure shows the proportion of individual bidders awarded slots of capacity in 2011. Most project developers bid for a small fraction of total capacity, while fewer bidders bid for the largest share of auctioned capacity. In the fourth auction of 2012, 143 bids (total number of bids) were submitted by only 35 project developers. Due to this fact, rounds scheduled for 2013 were cancelled in order to improve the auction rules. The effects remain to be seen.[10]

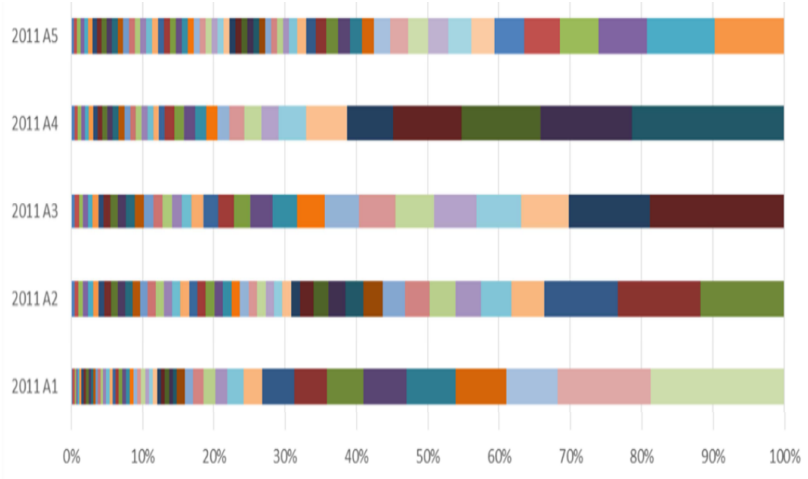


Figure 1: Proportions of individual bidders of the contracted capacity PV tender in 2011 (plants smaller than 250 kW)

[10] Franco-German Renewable Energy Office (2014).

Policy effectiveness

Tenders in France (for both small and large scale PV) take between three months and four years on average to be completed.[11] The easy-to-use online platform for auctions has attracted a high number of bids, which indicates that the auction scheme is accepted.

Except for the first round of auctions in 2012 (see Table 3), offered capacity exceeded the capacity required to meet the targets set by the French government, showing that the auction scheme has the potential to be effective. However, only 60% of submitted bids were eligible. This is likely due to unclear and / or inadequate documentation requirements (e.g. regarding the CO_2 assessment). By the end of 2012, more than half of France's 4 GW of solar installed capacity was represented by projects smaller than 250 kW. However, and due to low competition, the auction resulted in higher support prices (see below).

Yet, realisation rates for PV remain low at ca. 50%.[12] Therefore, France has shortened support periods in case of construction delays, to help improve realisation rates.[13] Results from the PV auctions for 100-250 kW were not the main reason for the failure to reach this target. Instead, an underestimation of the amount of small-scale plants commissioned under the FIT, and a higher number of winning bids than auctioned capacity for large PV plants were the key factors behind this.[14]

Static efficiency or cost effectiveness

As mentioned above, many bids were excluded for formal reasons. As a consequence, the level of competition in the auction decreased and projects that offered relatively high prices were successful. Auction results ranged from €194 / MWh to €229 / MWh in 2012, and €165 / MWh to €168 / MWh in 2014 (see Table 3). Under the previous feed-in tariff scheme prices were, on average €2-3 cent / kWh lower than those resulting from the auctions. The higher support level could be interpreted as an example of risk premiums being included into the bids.

Moreover, a low number of larger and more experienced project developers won higher shares of the auctioned capacity, since they were better able to deal with the high transaction costs associated with qualification criteria than smaller actors. By submitting several bids, these projects realised internal economies of scale, all of which reduced competition.[15].

Table 3 also shows that the amount of eligible bids was less than 1 MW above the auctioned volume in the 2014 auctions. Having a volume of eligible bids so close to the auctioned volume indicates that there has been barely any competition in these auction rounds.

[11] Grau (2014).

[12] Assemblée Nationale (2014): Transition Énergétique. Amendement. http://www.assemblee-nationale.fr/14/amendements/2188/CSENER/1235.pdf

[13] IRENA (2015).

[14] CRE (2015): Commission de régulation de l'énergie (CRE). Paris, Frankreich. Online verfügbar unter http://www.cre.fr/documents/appels-d-offres. and NREAP (2015): Ministère de l`écologie, du développement durable et de l'énergie. Paris, Frankreich. Online verfügbar unter www.statistiques.developpement-durable.gouv.fr/energie-climat/r/energies-renou-velables.html?cHash=6c2aadbcba0d657fa4b7d4aa4ee6377d&tx_ttnews%5Btt_news%5D=24091.

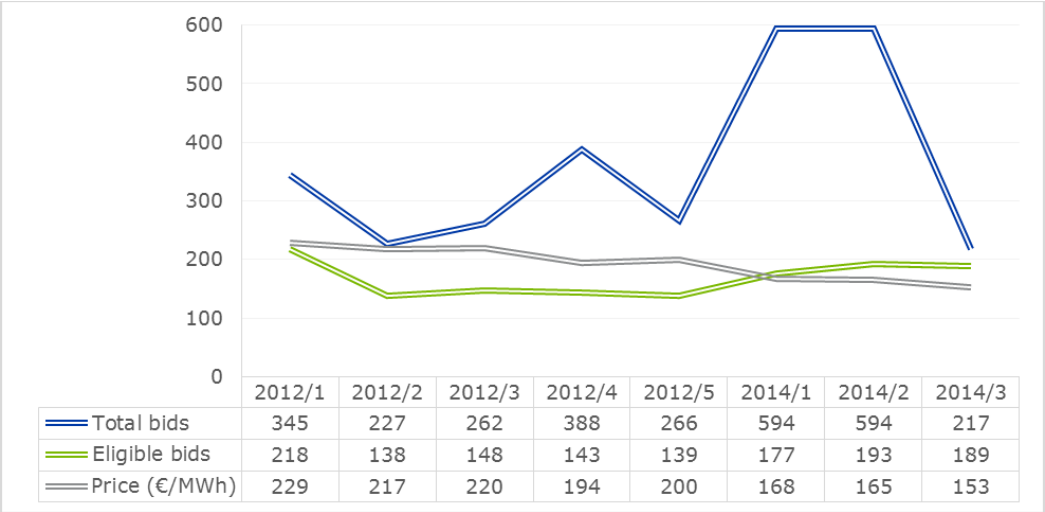
[15] IZES (2014).

Table 3. Auction results in France[16]

Round	Auctioned amount	Results
2012 / 1	120 MW	• Bids: 345 (68 MW) • Eligible/selected bids: 218 (45 MW) • Average price: €229 / MWh
2012 / 2	30 MW	• Bids: 227 (47 MW) • Eligible bids: 138 (27 MW) • Selected bids: 109 (20.9 MW) • Resulting price: €217.7 / MWh
2012 / 3	30 MW	• Bids: 262 (53 MW) • Eligible bids: 148 (30.2 MW) • Selected bids: 88 (18.5 MW) • Average price: €220.4 / MWh
2012 / 4	30 MW	• Bids: 388 (81 MW) • Eligible/selected bids: 143 (30.9 MW) • Average price: €194 / MWh
2012/5	30 MW	• Bids: 266 (53.8 MW) • Eligible bids: 139 (30.3 MW) • Selected bids: 138 (29.87 MW) • Average price: €200.3 / MWh
2014/1	40 MW	• Bids: 594 (123.9 MW) • Eligible bids: 177 (40.3 MW) • Average price: €168 / MWh
2014/2	40 MW	• Bids: 594 (123.9 MW) • Eligible bids: 193 (40.7 MW) • Average price:€165 / MWh
2014/3	40 MW	• Bids: 217 (189 MW) • Eligible bids: 189 (41 MW) • Average price: €153 / MWh

Figure 2 presents total bids, eligible bids and resulting prices, and illustrates how prices have slightly dropped over the years, as the number of total bids has risen and declined sharply.

[16] Franco-German Renewable Energy Office (2014).



	2012/1	2012/2	2012/3	2012/4	2012/5	2014/1	2014/2	2014/3
Total bids	345	227	262	388	266	594	594	217
Eligible bids	218	138	148	143	139	177	193	189
Price (€/MWh)	229	217	220	194	200	168	165	153

Figure 2: Overview of auction results (2012-2014)

Dynamic efficiency

Compared to the auction scheme for 100-250 kW PV plants, the auction scheme for larger plants takes a range of different criteria into account. They range from the level of R&D to the local acceptance of a specific project, and therefore explicitly provide for technology innovation. The auction schemes for PV plants between 100 and 250 kW discussed here, however, do not explicitly result in dynamic efficiency gains other than the arguably relatively low incentive to invest in more climate-friendly panels.

Compatibility with market principles and integration

It is important to note that the CO_2 assessment requirement is an implicit local content rule: a German module, for instance, will have a higher carbon footprint than a French module, given the countries' different electricity mixes. Because the CO_2 assessment influences counts for 33% of the score obtained, French modules and their lower carbon footprint would have an advantage. However, because the level of support is determined in a competitive process and PV auctions for 100 – 250 kW installations only target households, there is no substantial market distortion.

Distributional effects & minimisation of support costs

The *Contribution au Service Public de l'Electricité* (CSPE) has to be paid by all consumers per consumed kWh quarterly via their electricity bill (levied). The differential costs for bridging the "Price Delta" are determined annually on the basis of calculations of the current regulatory authority of the Ministry of the Environment, with the exception of auto-production of Industry (consumption to 240 million kWh). This ensures that system costs are evenly distributed among electricity consumers while competitiveness of the industry is maintained.[17]

[17] CRE (2015).

3. Lessons learnt: key best practices and pitfalls identified

- The French online auction scheme for PV plants between 100 and 250 kW illustrates that auctions for small-scale technologies are possible and may attract a high level of bidders.
- If the qualification criteria are unclear and/or prohibitively high, a high number of bids will be excluded. As a consequence, the level of competition and therefore the efficiency of the scheme reduces.
- The qualification criteria have to be designed adequately to ensure a high share of eligible bids. The documentation (requirements) should be kept clear, simple and straightforward.
- Auctions do not per se exclude smaller players but the scheme has to reflect the reduced capacity and capability of smaller players of bearing transaction costs. Particularly one should avoid requirements (e.g. complicated CO_2 assessments) that cannot be realised by smaller, in-experienced bidders/project developers.

References

- *CRE (2015): Evolution de las CSPE.* http://www.cre.fr/operateurs/service-public-de-l-electricite-cspe/montant#section1
- *Cruciani, M. (2015): A short analysis of the French public policy (2000-2014): Franco-German Renewable Energy Office*
- *Franco-German Renewable Energy Office:* http://enr-ee.com/de/veranstaltungen/vergangene-veranstaltungen/messen-und-fachvortraege/
- *Franco-German Renewable Energy Office (2014): Das Ausschreibungsmodell für erneuer-bare Energien. Erfahrungen aus Frankreich.*
- *Fraunhofer ISI, Consentec GmbH, TU Wien (2014): Ausschreibungen für Erneuerbare Energien.* http://www.agora-energiewende.de/themen/die-energiewende/detailansicht/article/ausschreibungen-sorgfaeltig-testen/
- *Grau (2014): Comparison of Feed-in Tariffs and Tenders to Remunerate Solar Power Generation.* http://www.diw.de/documents/publikationen/73/diw_01.c.437464.de/dp1363.pdf
- *Held, A., Ragwitz, M., Gephart, M., de Visser, E., Klessmann, C. (2014): Design features of support schemes for renewable electricity. A report compiled within the European project "Cooperation between EU MS under the Renewable Energy Directive and interaction with support schemes".* https://ec.europa.eu/energy/sites/ener/files/documents/2014_design_features_of_support_schemes.pdf
- *IRENA (2015): Renewable Energy Auctions. Design and Best Practice*
- *Regulatory Commission of Energy: http://www.cre.fr/documents/appels-d-offres*
- *Winkler et al. (2014): Sammlung der Beiträge der Zukunftswerkstatt Erneuerbare Energien.* http://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/Berichte/2014-08-07-reader-zukunftswerkstatt.pdf?__blob=publicationFile&v=7