

Key takeaways from Portugal's second solar auction

Portugal's recent solar PV auction drew a lot of attention, principally due to the record-breaking €11.4/MWh bid. However, this is not the key takeaway of the auction. inspiratia sheds light on the innovative auction design and highlights the memorable points of the process

Earlier in September [2020], the Portuguese government announced the final results of the country's second solar PV auction, which took place in late August.

The auction aimed to award 700MW of solar PV and offered three different bidding options: CfDs for standalone solar PV, merchant solar PV, and the flexibility option covering solar-plus-storage.

The auction was approximately 10-times oversubscribed. For the 12 available slots, the auction attracted 35 bids and ended up allocating 15-year contracts to 670MW across six bidders, half of which are new entrants to the Portuguese renewables market.

Portugal's second solar PV auction results

Bidding option	MW	Slots
CfDs	10 (1.5%)	1
Merchant solar PV	177 (26.4%)	4
Solar-plus-storage	483 (72%)	8
Total	670	12

Source: Portuguese Government

Solar PV manufacturing company Hanwha Q-cells was the big winner of the auction, as the company was awarded a total of 315MW across six slots of both merchant solar PV, and solar-plus-storage.

Endesa Generación Portugal – a subsidiary of Enel-owned Spanish developer Endesa, was awarded a 99MW solar-plus-storage slot.

Iberdrola was awarded 83MW plus 14MW of battery storage. French developer TagEnergy was also awarded two lots of 10MW each under the merchant solar PV bidding option.

Details of the winning bids

Lot	Bidder	MW	Net added value to the system (€/MW)	Variable premium for difference (€/MWh) (option 1)	Fixed contribution to the National Electricity System (option 2)		Flexibility option (option 3)	
					Annual contribution to SEN (€ per MW)	€/MWh	Discount rate	Guaranteed revenue (€/MWh)
1	Green Show Lda	99	903.6k		72.9k	-37.2		
2	Hanwha Q Cells	109	795.3k				207.3%	-18.3

3	Endesa Generacion Portugal	99	721k				187.9%	-15
4	Green Show	54	978.4k		79k	-40.3		
4	Green Show	4	939.4k		75.8k	-38.7		
4	Hanwha Q Cells	50	978.4k				255%	-26.5
5	Iberdrola Portugal	69	568.7k				148.1%	-8.25
6	Hanwha Cells	99	939.4k				244.8%	-24.8
7	Solarengoradar-Unipessoal	10	685.4k	11.14				
8	TagEnergy	10	795.3k		64.2k	-32.8		
9	TagEnergy	10	795.3		64.2k	-32.8		
10	Hanwha Q Cells	19	721k				187.9%	-15
11	Hanwha Q Cells	19	903k				235.5%	-23.2
12	Hanwha Q Cells	19	1.06m				276.3%	-30.2

Source: Portuguese Government

In order to make sense of the results, one should have a clearer idea of the auction design, which was principally about awarding connection points to willing developers and introduced the concept of system contributions, which is illustrated under the net added value to the system in the table above.

Auction design

Bidding option (referred to in many different ways)	Details
Fixed contribution to the National Electricity System/ system compensation mode/ merchant solar PV	<ul style="list-style-type: none"> Bidders offer fixed compensation in €/MW/year to the system Bidders receive the right to connect Bidders choose how to sell their electricity, either on a merchant basis or through private PPAs
Fixed premium per difference/ fixed-price PPA/ CfDs for standalone solar PV	<ul style="list-style-type: none"> Bidders sign a two-way CfD with the system operator Bids on a discount basis against the strike price which was set at around €45/MWh The fixed tariff is then compared against monthly forecasted captured price Bidders receive the right to connect

<p>Fixed flexibility premium/ storage mode/ flexibility option/ solar-plus-storage</p>	<ul style="list-style-type: none"> · Bidders receive a fixed flexibility premium and the right to connect · The premium was set at €33,500 per MW/year, and bidders were bidding against this on a discount basis · On top of the flexibility premium, bidders signed a one-way CfD with the system operator with predetermined strike prices that get updated every quarter. If spot prices exceed the predefined prices, bidders need to compensate the system · The option is capping strike prices for the assigned volume, and protects the system against spot price spikes · Bidders can sell their electricity and generate revenues from storage as they wish (merchant, private PPAs, ancillary services for storage)
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All three options have heavy merchant elements, including the CfD one, as the low strike price acts merely as a very low floor rather than a bankable revenue stream.

Key takeaways

The record-breaking €11.4/MWh bid for the CfD option is not the key point of the auction

As analysed above, the majority of the bidders opted for the solar-plus-storage option of the auction. Only one slot was awarded under the CfD option, which represents 10MW out of the 670MW of the awarded capacity – that is, roughly 1.5% of the awarded capacity.

Since the auction was known for its solar-plus-storage element, a common misunderstanding was that the €11.4/MWh bid from Solarengoradar-Unipessoal was awarded under the solar-plus-storage option, jumping to quick celebrations about the competitiveness of the two technologies coming together.

The record-low bid could be certainly celebrated by the standalone solar industry, but with caution – as the solar industry already knows very well. Such prices are excellent PR for governments, tackling the myth that renewables are expensive. However, they also create unrealistic expectations and pressure on developers.

It is interesting that such a low strike price was awarded to a relatively small project of 10MW, as usually such bids emerge from the economies of scale of massive projects. However, due to the size of the project, there are good chances that the project could be financed off balanced-sheet, without the need for project finance.

On the other hand, since the industry has seen project financing for purely merchant projects in Spain – a country whose electricity system shares identical characteristics with Portugal's – it could be the case that merchant financing for a small solar PV plant could be possible.

Discounts for solar-plus-storage were impressive, indicating increased merchant appetite

As explained in the auction design table above, bidders interested in the solar-plus-storage option initially were given the opportunity to tap a capacity payment of maximum €33,500 per MW/year. Bidders bid against this reference price on a discount basis, with discounts reaching up to 276.3%.

In essence, this means that bidders will be paying the system operator to tap future opportunities with storage and ancillary services.

"This was the biggest surprise of the auction for me because what started off as a receivable ended up a payable" says Florian Mayr, a partner at Apricum, a clean energy advisory firm.

However, looking at the state of the ancillary services market in Portugal, the pathway for an energy storage business case is cloudy at the moment.

Time-shift and arbitrage are de facto excluded as an option, as the operator will be using energy storage as an insurance against price spikes.

"There might be a good opportunity for the secondary reserve control market in Portugal, but the rules on how storage could participate and how much revenue it could generate are not clear yet," says Mayr.

The winning bidders have chosen to be quiet about commentary on their business strategy, but it certainly appears that they took a generous leap of faith. The projects have a lead time to connect by 2024, so there is still plenty of time for pivotal regulatory updates and storage cost reduction.

"Now that the government has had some good experience with the technology, this may push the regulators to improve the market framework for energy storage," adds Mayr.

Auction innovation paid off

Portugal's grid bottlenecks are no secret, and they represent the main barrier for further renewables deployment in the country.

According to July 2020 statistics, the country has 5.4GW of onshore wind installed capacity, but merely 0.97GW of solar PV installed capacity. The country has set ambitious targets for renewables to represent 80% of Portugal's electricity generation capacity – up from approximately 50% in 2018, including hydro.

The country has been operating a lottery scheme to award the scarce connection points, especially to areas with weak grid capacity, and it appears that grid connection applications – and the targeted new capacity – far exceed the country's grid capacity.

In short, the scarcity of connection points in the country was key to the auction outcome.

The Portuguese government played its cards right and monetised on this scarcity, by making the bidders pay handsomely for the points through the system compensation element.

With regards to the solar-plus-storage case, Apricum's Mayr estimates that the financial models for the projects could be significantly changing after the 15-year tenor of the contracts.

"It could be that the first 15-years are viewed as the investment period, with the payoff for the storage starting after," Mayr says.

"A grid connection is a valuable asset way beyond the 15-year tenor of the contracts," he adds.

These very grid bottlenecks, nonetheless, are also making the country a very interesting case for flexibility options. Policymakers have already embarked on the bold journey of innovation, and auction design for the country's second solar auction is a testament to this.

At this stage, all signs show that the country led the way to how the next renewables auctions need to be, by making renewables part of the solution, and no longer a burden to the grid.

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