Trends in Solar Power FIP/FIT Auction

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1. Bid capacity exceeded available capacity in eight out of 21 rounds of auction

With the amendment of the law[1] concerning feed-in tariffs (FIT) in April 2017, the selling price of solar power generated as prescribed under FIP/FIT schemes will be determined through auction, and a total of 21 auction rounds have been conducted so far (separate auction sessions were held for the FIT and FIP categories in the 12th to 15th rounds, meaning a total of 25 rounds held if these were added). Details such as the scale of the power generation facility subject to auction, the upper limit of bids, and the publication of the upper limit, have been reviewed several times. In the 21st round of auction held most recently, an upper limit of 9.13 JPY/kWh was set for facilities of 250 kW or more in the FIP category.

Looking at the trends in supply prices from the first auction in September 2017 to the most recent 21st round (Fig. 1), the weighted average price in the first round was 19.64 JPY/kWh, compared to 8.08 JPY/kWh in the 21st round. This represents a halving of the bid price within a period of about seven years (Fig. 1). Moreover, the supply price in the 21st auction was close to 7 JPY/kWh, the target cost for solar power generation in 2025 established by the Calculation Committee for Procurement Prices.

However, looking at the trends in the available capacity and bid capacity in each round (Fig. 2), out of the total 21 auction rounds held to date, the bid capacity exceeded the available capacity only 8 times. In particular, in the 21st round held most recently, the bid capacity was 33.67 MW, making up just 31% of the available capacity (107.00 MW). Furthermore, even when comparing the upper limit bid price with the weighted average of the bid procurement price, the results show that the procurement price remained very close to the upper limit price in many rounds (Fig. 1). Therefore, based on the trends in FIP/FIT auction so far, we can infer that the volume of bids necessary for promoting competition has not been secured, or that the upper limit price that has been set has come close to the limit for power generation companies to secure sufficient profitability.

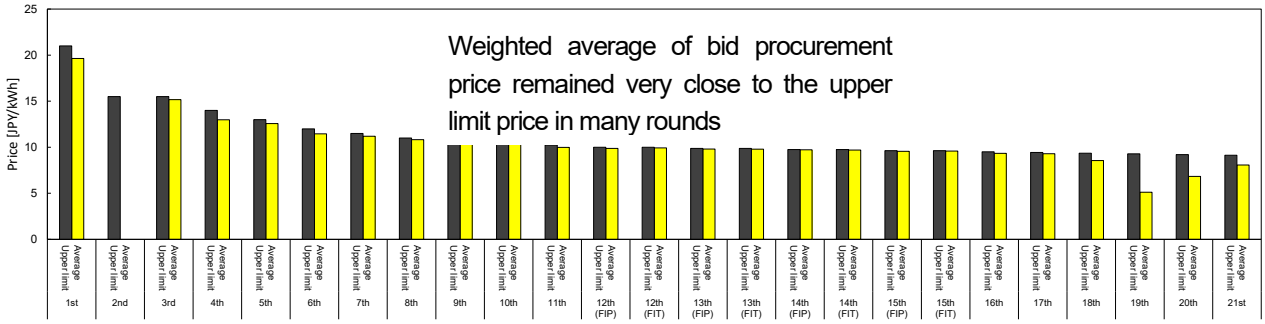

Fig. 1 Trends in supply prices for solar power FIP/FIT auction [JPY/kWh]
(Estimated based on various results of "The Auction System under the FIT Act" of the Organization for Cross-regional Coordination of Transmission Operators, Japan)

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[1] Act on the Partial Revision of the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities

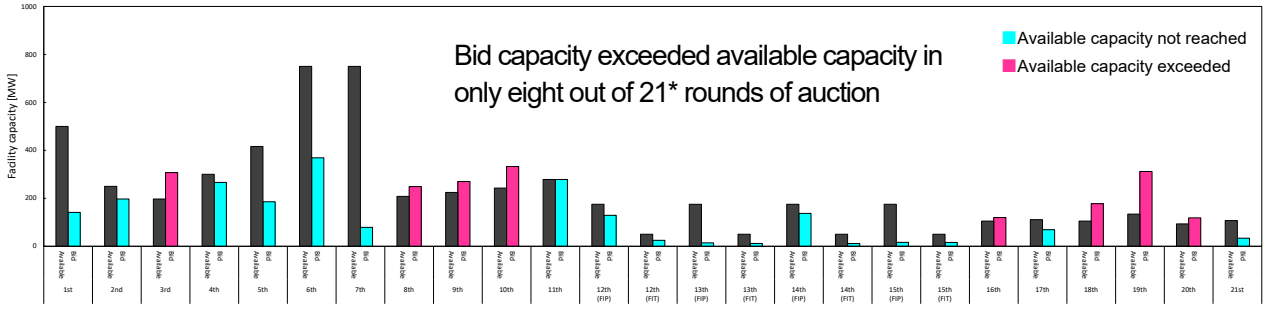

Fig. 2 Bid capacity against available capacity [MW]
(Estimated based on various results of "The Auction System under the FIT Act" of the Organization for Cross-regional Coordination of Transmission Operators, Japan)
* Separate auction sessions were held for the FIT and FIP categories in the 12th to 15th rounds, meaning a total of 25 rounds were held if these were added.

2. Bids at 0.00 JPY/kWh

Of all the rounds of auction conducted to date, the lowest weighted average supply price was 5.11 JPY/kWh in the 19th round. In light of that, looking at the supply prices and power generation facility output of the top eight facilities with the lowest supply prices in the 19th round, it was found that the lowest bid was 0.00 JPY/kWh from Operator A. This in turn pushed down the weighted average of procurement prices in the 19th round. While it is not entirely clear why the operator in question had tendered a bid of 0.00 JPY/kWh, taking into account the views of various online media outlets[2-3] and other sources, such operators are likely to be supplying electricity directly to electricity consumers through PPA, rather than selling electricity to power transmission and distribution companies at the FIP/FIT supply price.

According to the FY2023 business report released by the Japan Electric Power eXchange (JEPX), the annual average price of the wholesale electricity market has been fluctuating significantly over the past three years, from 13.45 JPY/kWh (FY2021) to 20.38 JPY/kWh (FY2022), and then to 10.74 JPY/kWh (FY2023). In addition, the annual average price was particularly high in FY2022 due to soaring fuel costs and tight electricity supply and demand. In such cases where significant fluctuations in wholesale electricity prices are expected, electricity consumers can minimize the uncertainty of expenditure by purchasing electricity directly from solar power generation companies over the long-term. From the perspective of the solar power generation companies, with the upper limit for FIP/FIT bids being lowered to a level of around 9.0 to 9.5 JPY/kWh, there are likely to be cases in which selling electricity through PPA becomes more profitable.

Therefore, although FIP/FIT auction is intended as a system to promote cost reductions for solar power generation through the principles of competition, there are also cases in which power generation companies bid for FIT/FIP in order to acquire certification for their business plans. According to information[4,5] published by general power transmission and distribution companies, a power generator tariff is imposed on power generation companies to cover the costs required for maintaining and expanding power transmission and distribution facilities, but FIT/FIP power sources that have obtained certification by March 31, 2024, are exempted from this tariff. While it is unclear why a power generation company would place a bid of 0.00 JPY/kWh, at the time of the 19th round of auction, power generation companies would be exempted from the power generator tariff if they acquired certification for their business plans. This creates the incentive for power generators to acquire FIP certification even if they are selling electricity under PPA rather than FIP.

[2] Mega Solar Business, "Solar Power Auction Results: Weighted Average Falls to 5 JPY Range, Special Large Output Projects Down to 5," March 11, 2024
[3] Smart Japan, "Project awarded at 0 JPY at 19th round of solar power generation FIT/FIP auction," March 15, 2024
[4] Hokuriku Electric Power Transmission & Distribution Company, "Overview of power generator tariffs (grid-connected power reception service charges)" (https://www.rikuden.co.jp/nw_gkakin/)
[5] Chugoku Electric Power Transmission & Distribution Co., Inc., "Power Generator Tariffs (Grid-connected Power Reception Service Charges), (https://www.energia.co.jp/nw/service/retailer/g-charge/)

Table 1 Supply prices and power generation facility output of the top eight facilities with the lowest supply prices in the 19th round of auction

Operator	Supply price [JPY/kWh]	Power generation facility output [kW]
Operator A	0.00	19,900
Operator B	4.94	1,990
Operator C	5.00	29,910
Operator D	5.09	1,999
Operator E	5.37	12,000
Operator B	6.00	800
Operator F	6.90	23,000
Operator G	6.90	1,999

3. Challenges to subsidy-free solar power generation systems.

If a solar power generation company sells electricity through PPA, then that facility alone becomes what is known as an "independent power producer" that does not require renewable energy subsidies. However, it is important to note that this only applies to large-scale facilities at present. For example, if we were to examine the supply prices and power generation facility output for the 19th round of auction (Table 1), the facility with a supply price of 0 JPY/kWh is a large-scale facility with an output of 19.9 MW. Additionally, facilities with a supply price of 6.90 JPY/kWh or less are generally facilities with an output of 1 MW or more.

According to another analysis by the author and others,[6] with a growing trend of imposing installation restrictions through ordinances aimed at preventing uncontrolled development, there are limited locations available for the installation of ground-mounted photovoltaic generation systems, suggesting that the introduction of solar power generation on buildings with small roof areas will be an important way of expanding solar power generation in the future. On the other hand, based on the "recommendations made by the Calculation Committee for Procurement Prices on procurement prices for FY2024 onward and other details," the system cost of a 500 kW to 1,000 kW solar power generation system installed in 2023 is 147,000 JPY/kW, while that of a 10 kW to 50 kW system is 251,000 JPY/kW. This is a cost difference of about 1.7 times due to the difference in facility scale. Therefore, under the assumption of the large-scale introduction of solar power generation in the move toward carbon neutrality, it will be important to promote cost reductions for small-scale solar power generation systems in the future.

Therefore, in efforts to promote solar power generation through FIP or FIT schemes going forward, there is a need to conduct a detailed analysis of the cost structure of solar power generation based on facility scale and installation location (rooftop or ground-mounted), and to set an appropriate upper limit price in order to reduce the cost of solar power generation and promote its adoption.

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[6] Hideaki Obane, Soichi Morimoto, Yoshiaki Shibata, Takashi Otsuki, "Evaluation of the Potential for Introducing Solar Power Generation in Consideration of Local Ordinances and Building Characteristics," Advisory Committee for Natural Resources and Energy, Committee on Energy Efficiency and Renewable Energy/Electricity and Gas Industry Committee, Subcommittee on Mass Introduction of Renewable Energy and Next-Generation Electricity Networks (67th Meeting)