

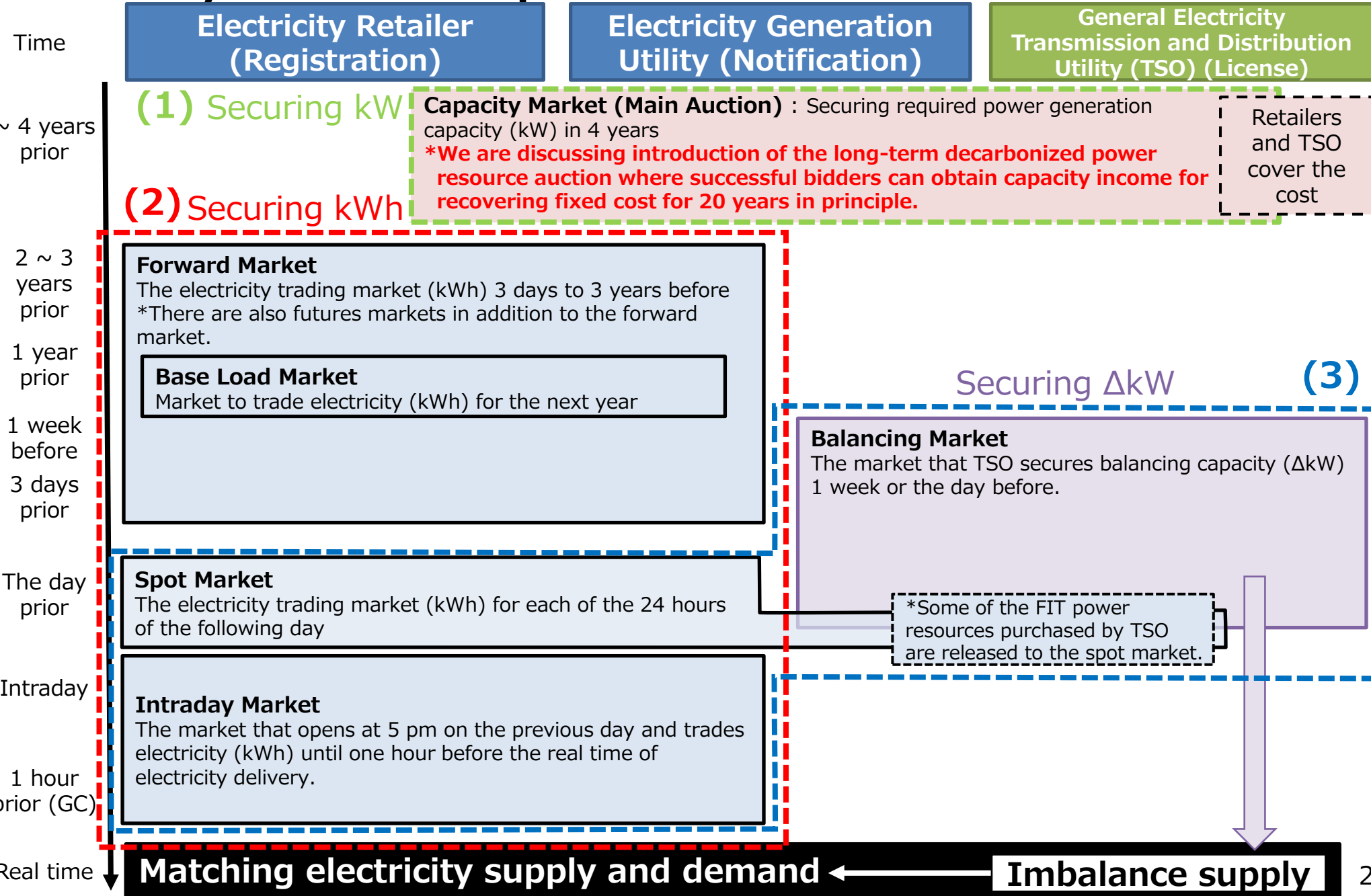
The Latest Developments in Electricity Market Reform in Japan

January 25th, 2023

Agency for Natural Resources and Energy

Electricity Market in Japan

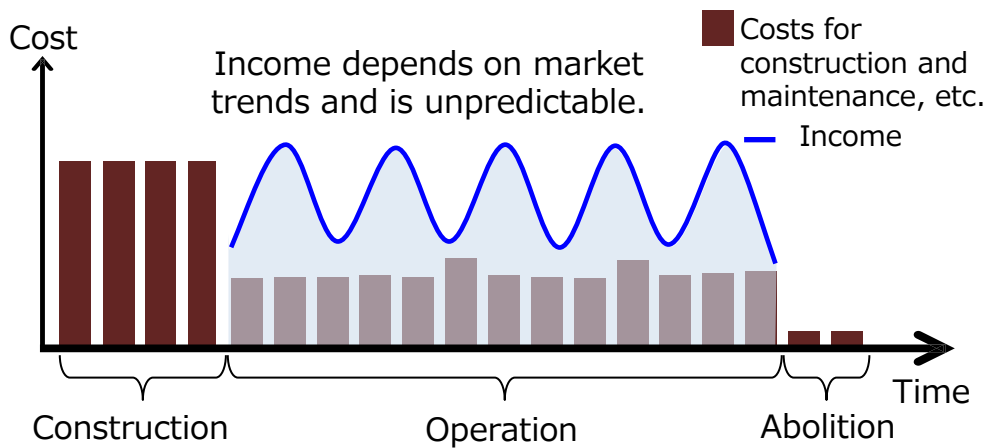
*In addition to market transactions, kWh transactions include bilateral transactions and transactions via brokers



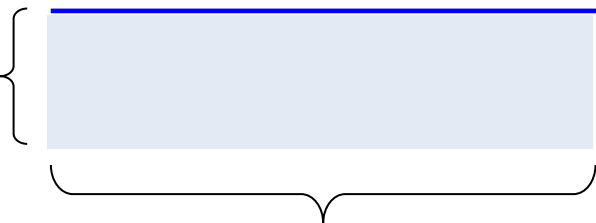
(1) Securing kW: The Long-term Decarbonized Power Resource Auction

- In order to promote investment in decarbonized power resources, we are discussing a new bidding system ("The Long-term Decarbonized Power Resource Auction") with a target introduction date of FY2023.
- OCCTO will be an open **auction for decarbonized power resources** identical to the capacity market. Successful bidders can obtain capacity income to recover fixed costs for 20 years in principle in order to **obtain predictability of long-term income to recover the massive initial investment**.

<Problem of power resource investment>



① Income level is fixed.



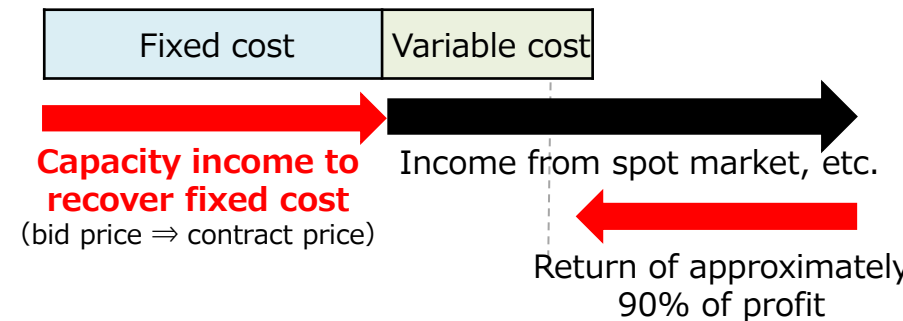
② Long-term income is obtained

<Image of the new system>

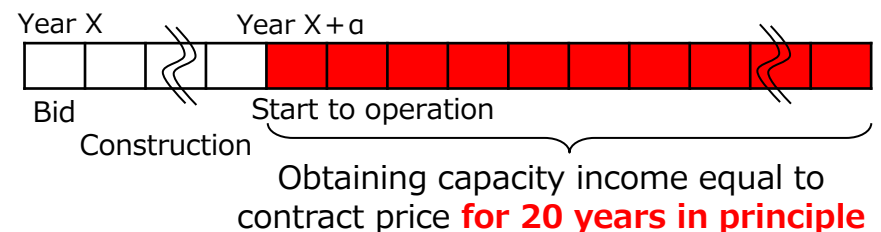
OCCTO

OCCTO will be an open auction for decarbonized power resources and decide successful bidder and contract price (identical to capacity market)

① Income level



② Term



(1) Securing kW: The Long-term Decarbonized Power Resource Auction (Cont.)

- In order to systematically secure electricity supply and promote decarbonization, we will support investment in decarbonized power resources through “The Long-term Decarbonized Power Resource Auction” and provide emergency support for power resource investment to alleviate tight electricity supply and demand as soon as possible within FY2023.

	Support for decarbonized power resource investment	Emergency support for power resource investment
Objectives	Securing electricity supply and decarbonization through premeditated support for decarbonized power resource investment	Securing electricity supply through emergency support for power resource investment
Target resources	(1) <u>New investment and replacement of decarbonized power resources</u> (2) <u>Investment to renovate existing thermal power plants to decarbonized power resources</u>	<u>New investment and replacement of LNG thermal power plants</u>
Requirement *Main requirement	<ul style="list-style-type: none"> Hydrogen co-firing and ammonia co-firing require decarbonization by 2050 Set deadline for operation start according to situation for each power resource type 	<ul style="list-style-type: none"> Require decarbonization by 2050 Must start operation within 6 years after successful auction
Target introduction date	From FY2023	From FY2023 to 2025
Volume	FY2023: <u>4GW/year</u>	<u>6GW for 3 years</u>


(2) Securing kWh: Measures Taken to Date and the Current Situation

- It is important that electricity retailers can access power resources in order to provide consumers with competitive, stable and diverse retail electricity menus. To that end, it is important for both generation utilities and retailers that power resource investment and fuel procurement are sustainable in the long term and stable, and that the transaction environment is improved efficiently.
- From the perspective of wholesale from major generation utilities to PPS, there have been some efforts, such as “内外無差別 (Naigai-Musabetsu)” (*), development of the base load market, and bidding for all surplus electricity by marginal cost on the spot market. In relation to “内外無差別 (Naigai-Musabetsu)”, major utilities are working to clarify negotiation schedules and create and publish standard wholesale templates. Some of the measures seem to be highly transparent, such as auctions and trading through power trading platforms operated by brokers.

(*) An effort by major generation utilities to equalize the conditions of wholesale to their retail division within their group companies and other PPS. It is monitored by the Electricity and Gas Market Surveillance Commission (EGC) .
- In addition, it is important not only to secure necessary capacity (kW) through the capacity market, etc., but also to secure sufficient kWh. Because Japan depends on imports for fuel from overseas by ship, electricity generation utilities need to decide import volume of fuel 2 months before the actual electricity delivery (fuel gate closure). Failure to procure fuel leads to tight supply and demand balance for electricity, high spot market prices and imbalances, and hindrance to the stable supply of electricity. Under these circumstances, hedging transactions (bilateral transactions, forward transactions, and futures transactions) between generation utilities and retailers must maintain sufficient activity for generation utilities to fix electricity selling price and procure the necessary fuel. In addition, it is important to improve the trade environment so that generation utilities can make long-term contracts for a certain amount of fuel and build an appropriate procurement portfolio including long-term fuel contracts.

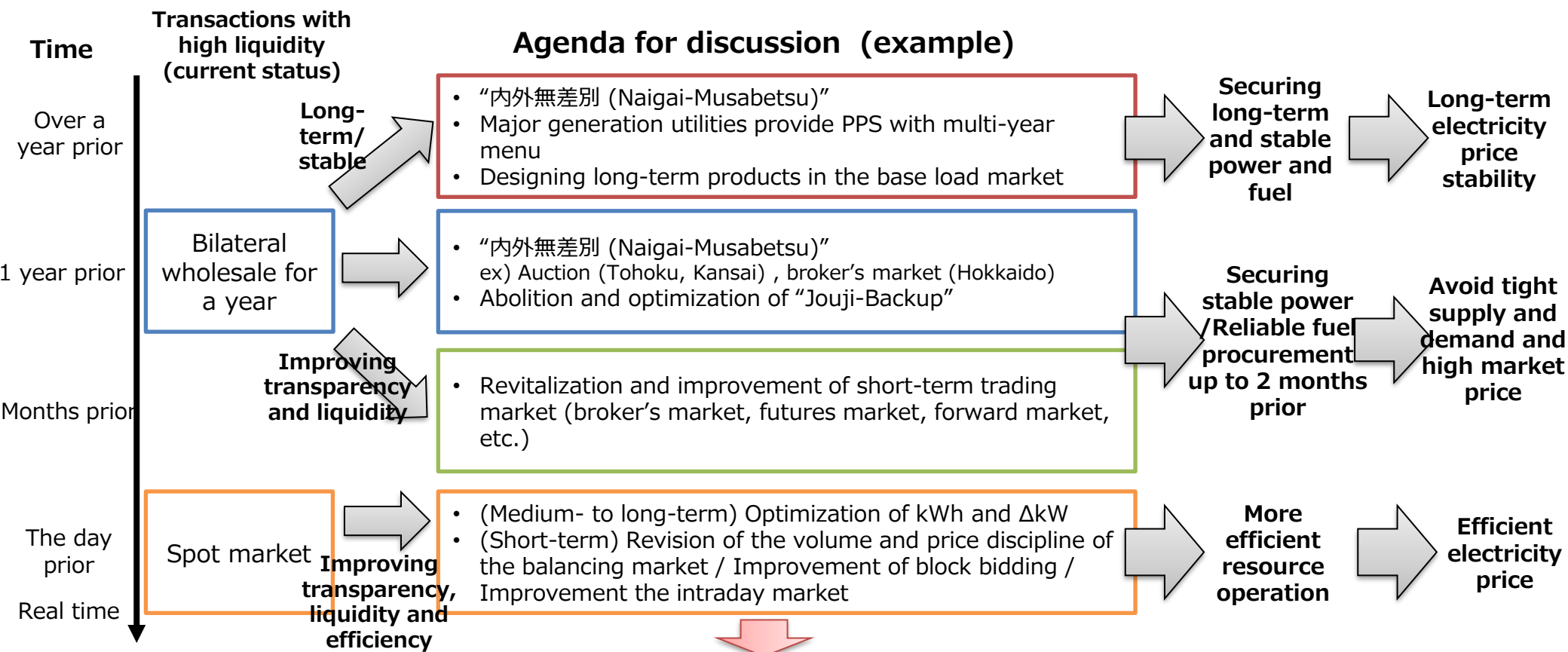
(2) Securing kWh: Measures Taken to Date and the Current Situation (Cont.)

- While improvement of the market and trading environment for expansion of access to power resources and hedging transactions are advancing steadily, the issues shown in the table below remain.

	Issues (example)	Evaluation from retailers (example)	Evaluation from generation utilities (example)
 <p>Long-term</p> <p>Short-term</p>	<ul style="list-style-type: none"> Major electricity generation utilities don't publish standard wholesale templates for more than 1 year. 	<ul style="list-style-type: none"> Long-term and stable power procurement options that contribute to improving the predictability of procurement costs is insufficient. 	<ul style="list-style-type: none"> There is a problem of maintaining long-term and stable power resources. If generation utilities cannot hedge their long-term electricity sale price when they make a long-term contract for fuel, they risk losses.
	<ul style="list-style-type: none"> "Jouji Backup" has some problems such as the extremely high proportion of some PPSs in the total contract volume, unfair resale, and inadequate evaluation of option values, etc. 	<ul style="list-style-type: none"> "Jouji Backup" has unfair and unjust competition related to power procurement between PPS. 	<ul style="list-style-type: none"> Generation utilities cannot procure fuel with predictability because they cannot predict the kWh volume with retailers' notices and the "Jouji Backup" price differs from market prices.
	<ul style="list-style-type: none"> The liquidity of forward and futures transactions is low. 	<ul style="list-style-type: none"> Electricity retailers are forced to make decisions based on the real delivery time without hedging options or ability to adjust positions 	<ul style="list-style-type: none"> Generation utilities cannot hedge for the electricity sale price when they procure fuel until fuel gate closure.
	<ul style="list-style-type: none"> The calculation logic and timing differ between the spot market and the balancing market. 	<ul style="list-style-type: none"> Because unused balancing capacity is not released to the spot market, etc., there is a possibility that market prices may rise due to market sellouts. 	<ul style="list-style-type: none"> Because power resources between kWh and ΔkW are not optimized, the difference is insufficient to guarantee a reasonable profit.

(2) Securing kWh: Direction of Discussion

- **Regarding long-term to short-term transactions**, it is important to improve the environment for access to power resources that contribute **to stable supply (power resource investment and fuel procurement), stable price and that promote competition**.
- We will marshal what kind of wholesale product design is desirable **from the viewpoint of generation utilities and retailers** and discuss a system that promotes both competition and stability.



Generation utilities can maximize and stabilize their income from electricity sales and retailers can streamline and stabilize their electricity procurement with various trading opportunities. It leads to efficient and stable power supply to consumers.

(3) Optimization of kWh and ΔkW

- Some problems with the current system of electricity markets have been highlighted.
 - Because unused balancing capacity is not released to the spot market, etc., there is a possibility that market prices may rise due to market sellouts.
 - Because there are multiple markets, power resource operation may be inefficient, for example with excessive unit commitment.
- Optimization between the spot market and balancing market is needed.** We are discussing **introduction of a Three-Part Offer (offering (1) start-up cost, (2) no-load cost and (3) incremental cost) and optimization of kWh and ΔkW .**

