



RENEWABLE  
ENERGY  
INSTITUTE

# Corporate PPA

## Latest Trends in Japan (2024 Edition)

1. Contract Structures
  - On-site PPA
  - Physical PPA
  - Virtual PPA
2. Cost Comparisons
3. Latest Projects
4. Issues & Solutions

April 2024

A close-up photograph of a contract document. The word "CONTRACT" is printed in large, bold, black capital letters. Below it, there are several lines of text, including "red into by and between", "ent shall begin on", "e modified in any", "d any attachme", "hall be bind", "d under", "al p", "shall continue thro", "constitute the entire agreement be", "the Parties, their successors, heirs and", "the State of", "with herein, the First Party covenants and", and "nd agrees that". A black pen with silver accents is resting diagonally across the bottom of the page.

**CONTRACT**

red into by and between \_\_\_\_\_

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with herein, the First Party covenants and \_\_\_\_\_

nd agrees that \_\_\_\_\_

# ■ Key Topics on Corporate PPA

## 1. Contract Price Going Up

Almost all the corporate PPAs in Japan are made for solar power. The generation cost of solar power in FY2023 was about JPY11/kWh on average. With increasing demand, PPA contract prices went up from a year ago. As regular electricity tariffs stay on a high level, corporate PPAs are economical for corporate consumers.

## 2. Wholesale Market Price Down

The average wholesale market price in FY2022 surged beyond JPY20/kWh due to high fossil fuel import prices. It settled down to below JPY11/kWh in FY2023 as the electricity supply was improved. The market price continues to be volatile by several factors, affecting to consumer costs particularly in case of virtual PPA.

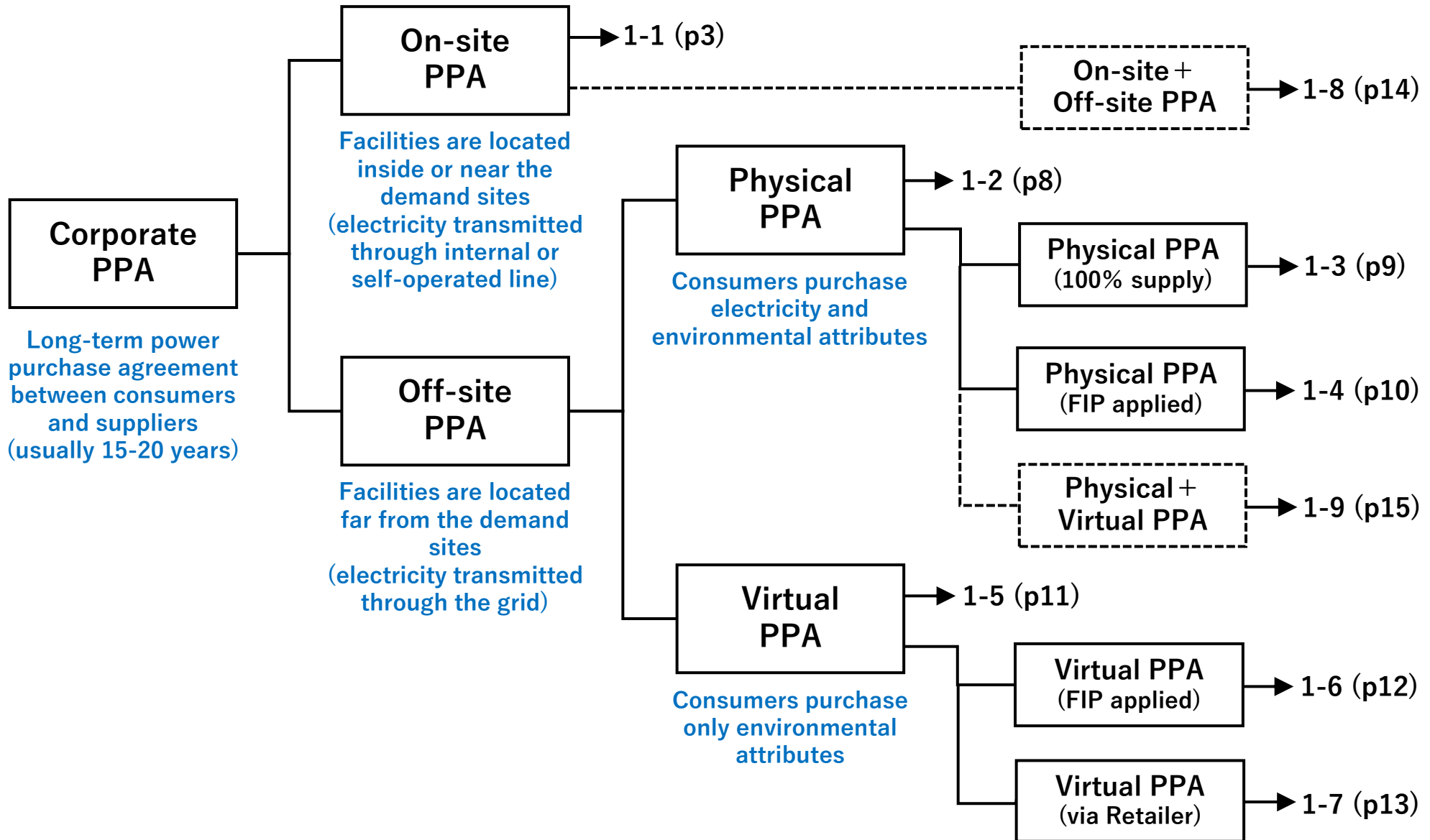
## 3. New Rules for Electricity Tariffs

Electricity systems continue to be revised in various aspects and affect electricity prices. New rules are introduced in FY 2024 to charge a part of wheeling fees for generators and capacity costs for retailers. They may increase contract prices of off-site PPAs while on-site PPAs are not affected and will be more cost-efficient.

## 4. Off-shore Wind Increasing

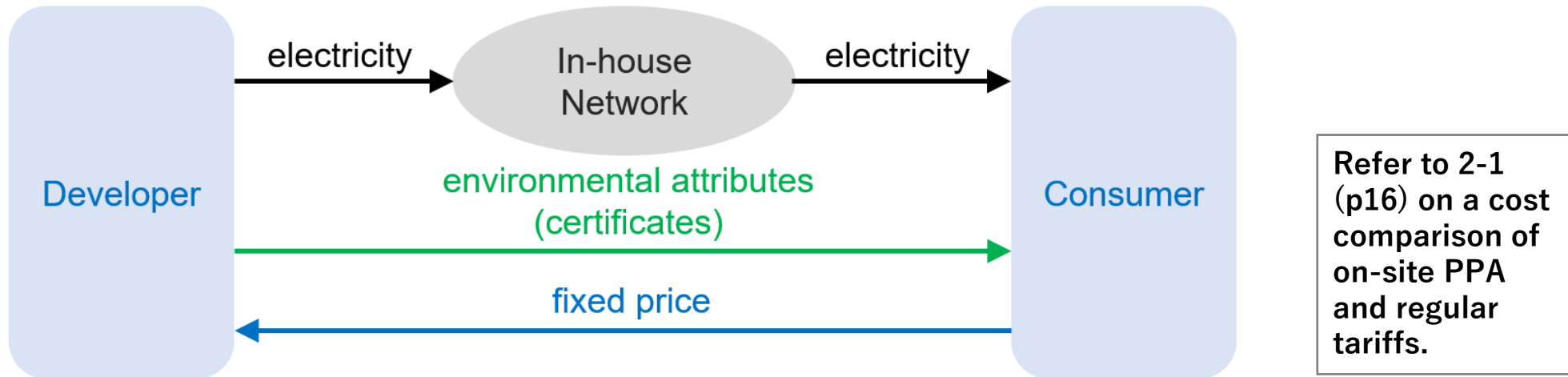
Renewable electricity is increasing by off-shore wind projects. The generation cost is higher than solar for the time being, but PPA contract prices may be reduced by applying Feed-in Premium (FIP). In virtual PPAs, the cost fluctuation for consumers due to wholesale market price can be mitigated with premiums from FIP.

# Options for Corporate PPA



# 1-1 Contract Structure of On-site PPA

On-site PPA is made between a consumer and a developer. Consumer provides spaces to install facilities and purchases generated electricity and environmental attributes at a fixed price.



Features	Benefits	Issues
<ul style="list-style-type: none"> <li>● Consumer provides developer with spaces on the roof-top of buildings or lands in the demand site (or adjacent sites connected with self-operated transmission lines)</li> <li>● The installation, operation and maintenance of generation facilities are outsourced to developer.</li> </ul>	<ul style="list-style-type: none"> <li>● Consumer is not responsible for the installation and operation of the facilities (not like self-generation).</li> <li>● Wheeling fees and renewable surcharges are not imposed.</li> <li>● Consumer can take over the facilities without extra costs when the contract is completed.</li> </ul>	<ul style="list-style-type: none"> <li>● The scale of generation facilities is usually small due to limited spaces.</li> <li>● It requires additional measures to utilize surplus electricity (necessary to install batteries or connect with the grid).</li> </ul>

## \* On-site PPA Project (Rooftop)



Source:  
City of Nogata

**Location: City of Nogata, Resource Recycling Center of Excess Sludge**  
**Capacity: 189kW**

# \* On-site PPA Project (Ground)



Source:  
Proterial

**Location: Proterial, Kumagaya Works and the Global Research and Innovative Technology Center**

**Capacity: 9.7MW**

# \* On-site PPA Project (Carport)



Source:  
University of  
Miyazaki

**Location: University of Miyazaki, Kiyotake Campus**

**Capacity: 2.3MW**

# \* On-site PPA Project (Floating)



**Location: Honda Motor, Kumamoto Factory**

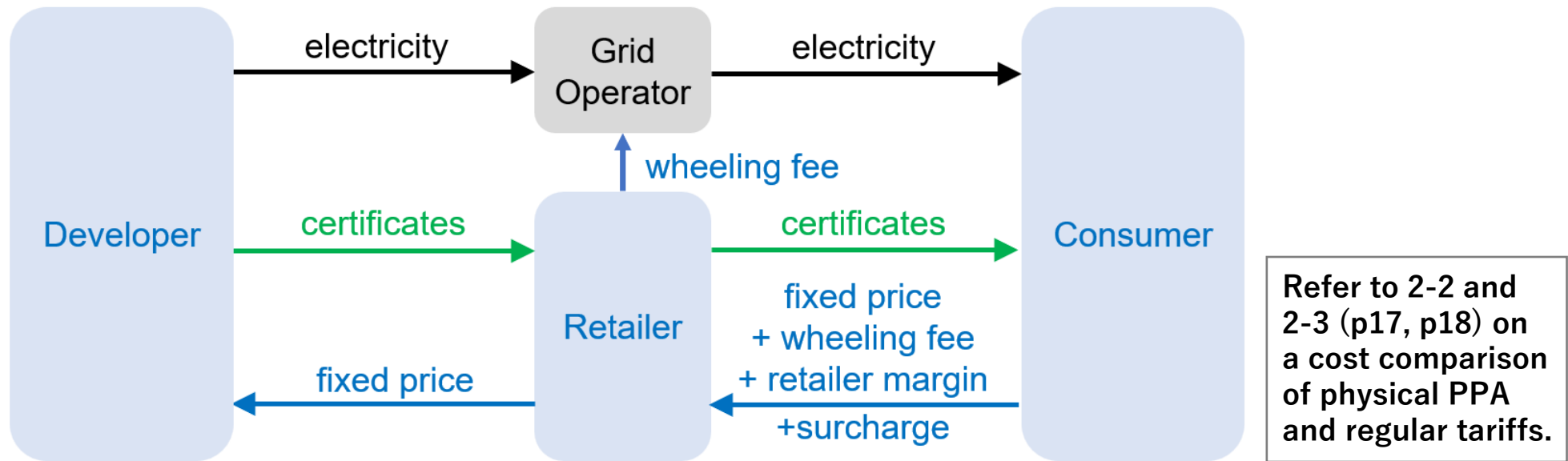
**Capacity: 784kW**

Source:  
Sumitomo Mitsui  
Construction



# 1-2 Contract Structure of Physical PPA

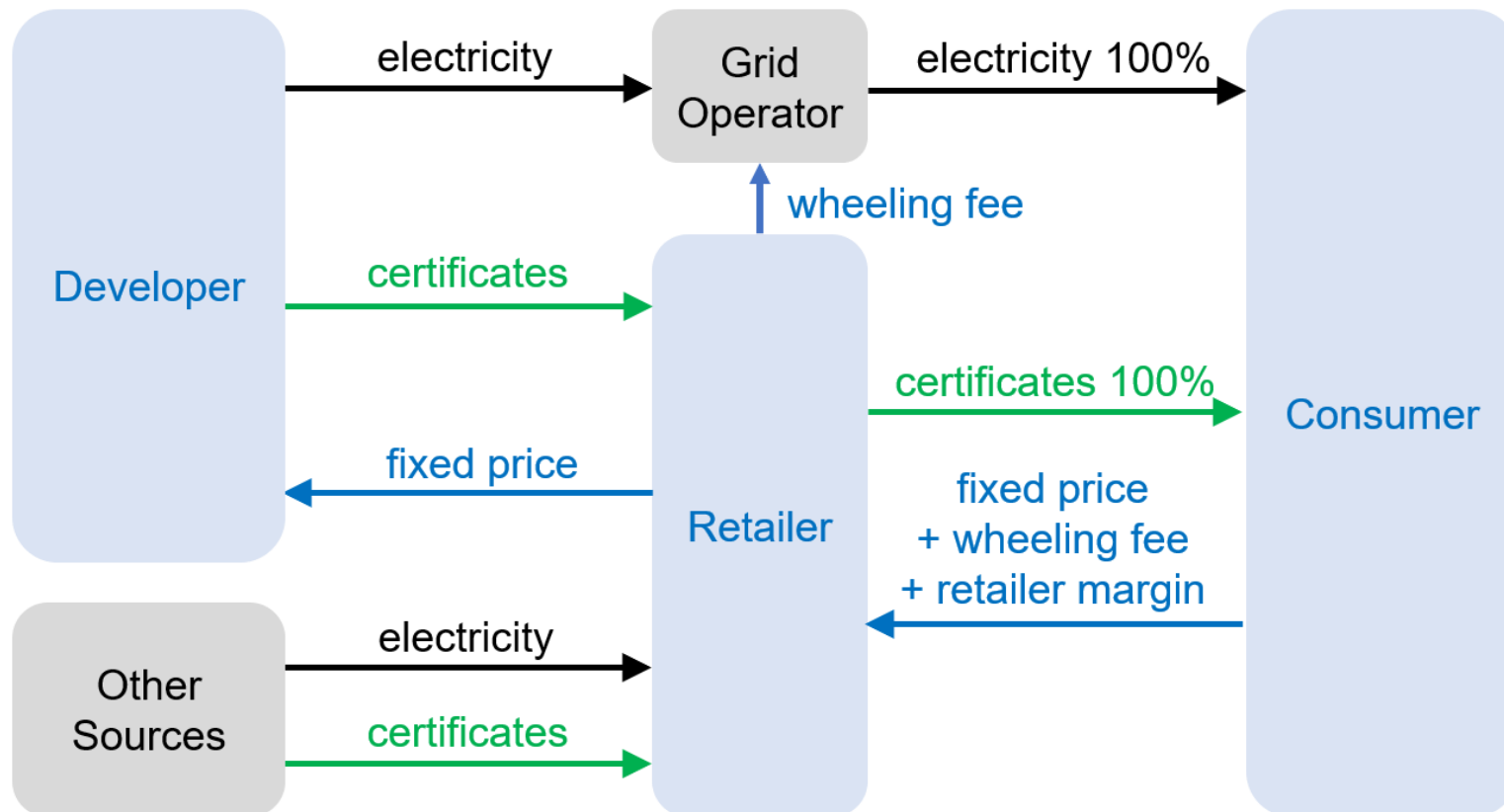
In physical PPA, generation facilities are constructed at distant places from the demand site. Consumer purchases generated electricity and certificates (environmental attributes) at a fixed price through retailer.



Features	Benefits	Issues
<ul style="list-style-type: none"> <li>● Developer constructs generation facilities for consumer to provide electricity and certificates through retailer.</li> <li>● Consumer needs to pay retailer margins, wheeling fees and renewable energy surcharges in addition to the fixed price for physical PPA.</li> </ul>	<ul style="list-style-type: none"> <li>● Consumer makes a contract for specific facilities and can confirm environmental impacts of electricity generation.</li> <li>● Consumer can fix purchasing costs of renewable electricity for the long term.</li> </ul>	<ul style="list-style-type: none"> <li>● Consumer needs to make another contract for filling the gap between the entire demand of the site and the supply by physical PPA.</li> <li>● Consumer cannot change the demand site.</li> </ul>

# ■ 1-3 Contract Structure of Physical PPA (100% supply)

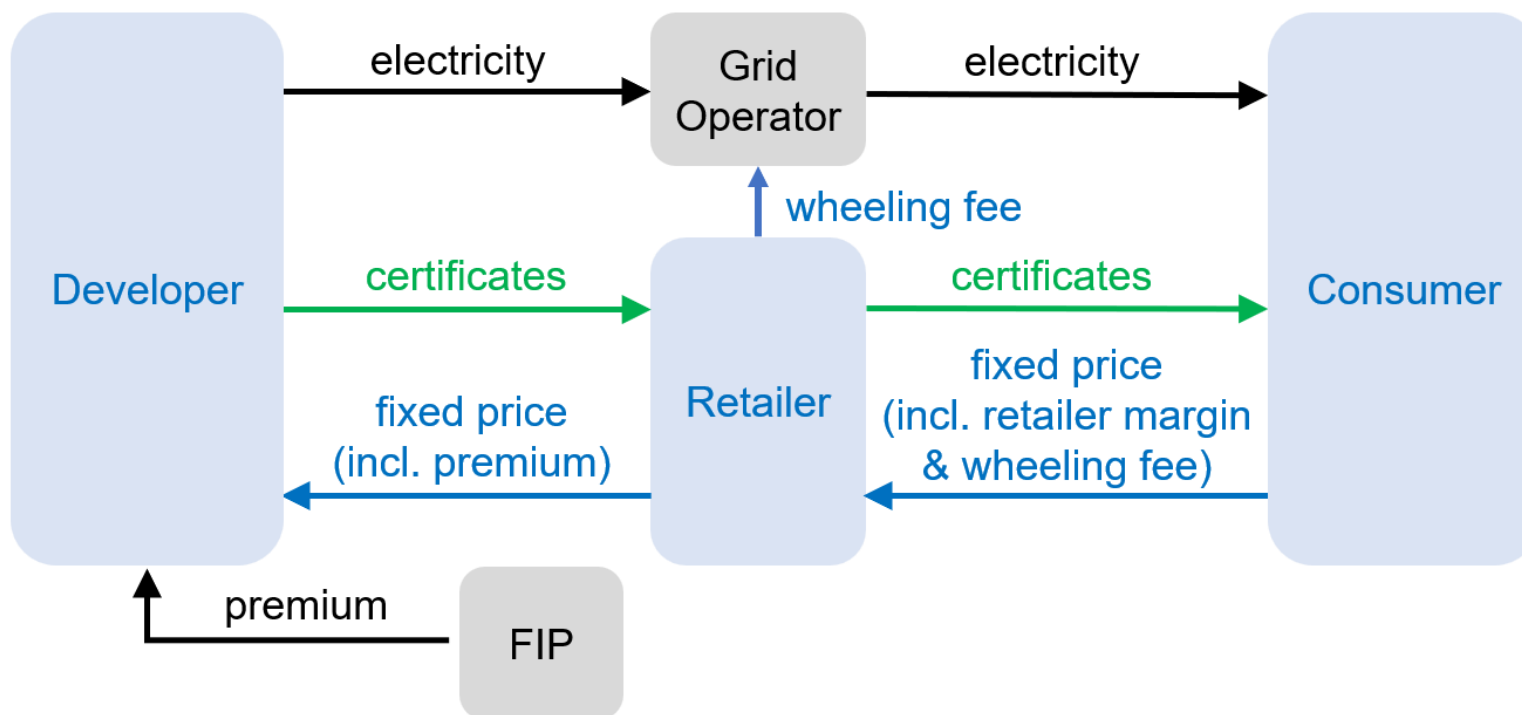
In case the entire demand of the site is not provided only by physical PPA, retailer procures electricity and certificates from other sources to provide 100% renewable electricity to consumer.



Consumer may make a contract with retailer at a fixed price for the entire demand. The fixed price for 100% supply may be higher than physical PPA.

# ■ 1-4 Contract Structure of Physical PPA (FIP applied)

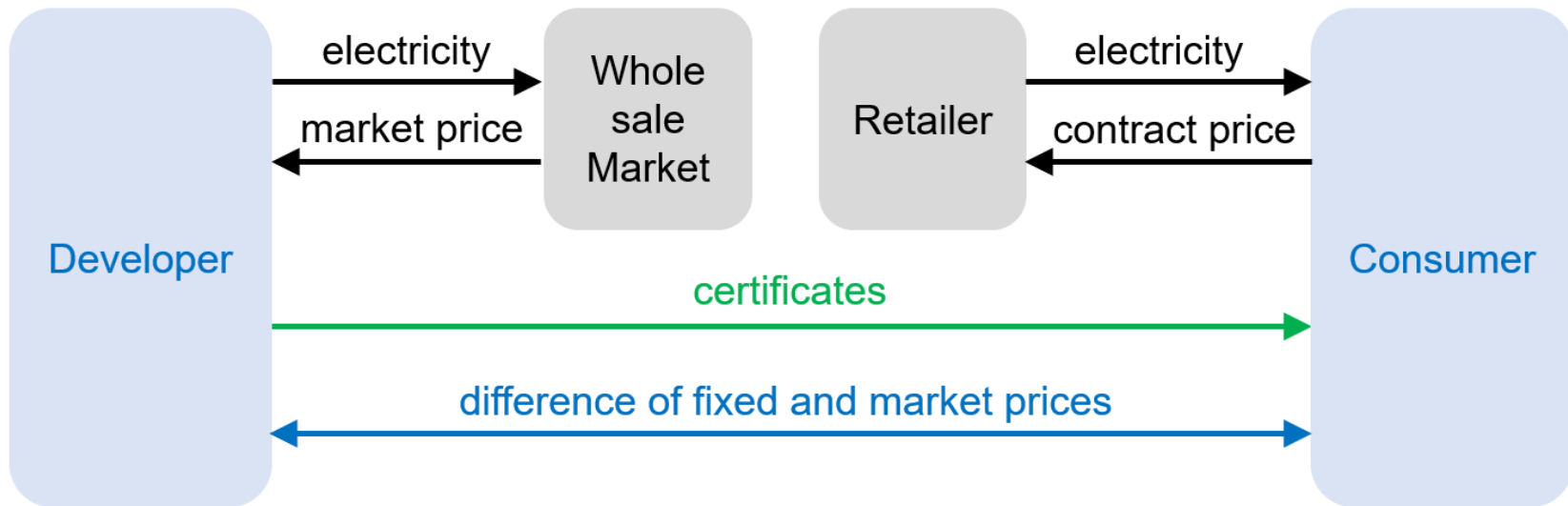
With applying the Feed-in Premium (FIP) program, developer can receive premiums based on the difference between FIP-certified fixed price and the average wholesale market price. Physical PPA with generation facilities other than solar can be made at the same level of market price.



In the FIP program, a fixed price is certified for each generation facility. Premiums are paid to developer based on the difference between the fixed price and the average wholesale market price. Developer can get market-based premiums in addition to the fixed revenue from Physical PPA.

# 1-5 Contract Structure of Virtual PPA

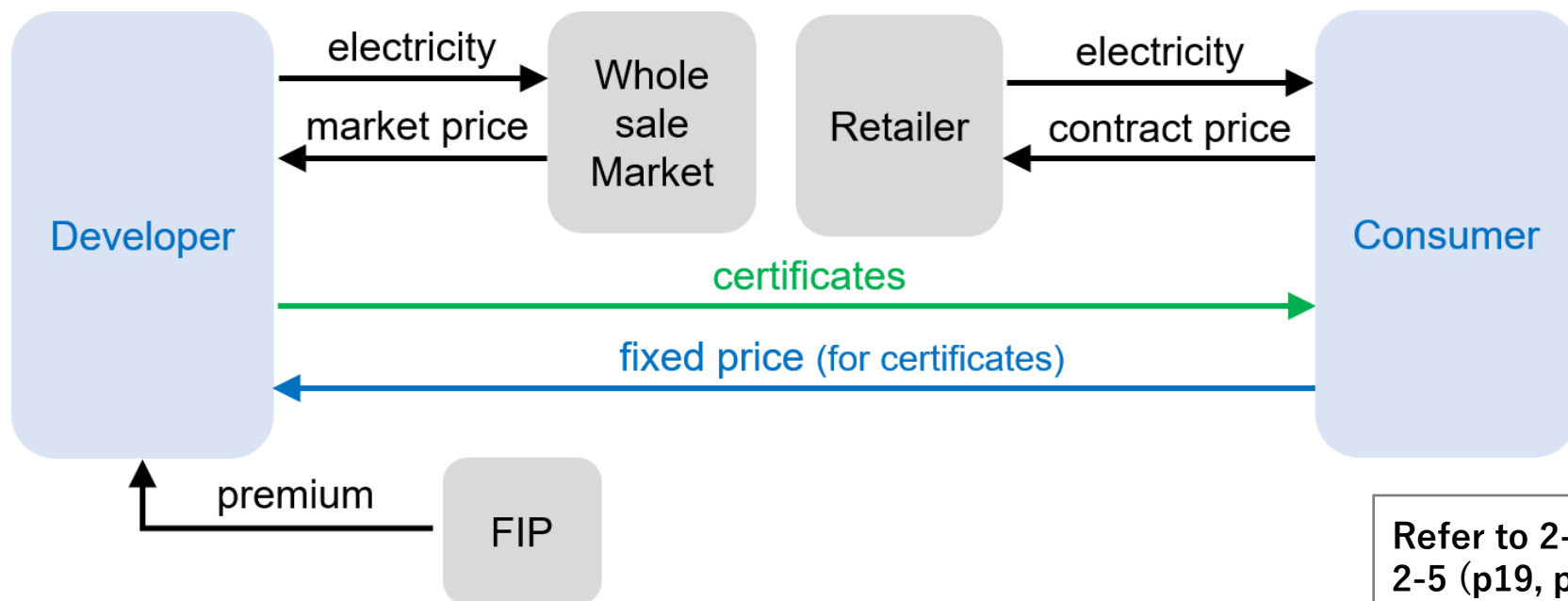
In virtual PPA, consumer purchases certificates from developer, and electricity from retailer through another contract. Developer sells generated electricity to the wholesale market and receives or pays the difference of the fixed price and the market price with consumer.



Features	Benefits	Issues
<ul style="list-style-type: none"> <li>● Developer constructs new generation facilities and provides only certificates to consumer while selling electricity to the wholesale market.</li> <li>● Contract price including electricity and certificates is fixed and the difference from the wholesale market price is paid between developer and consumer.</li> </ul>	<ul style="list-style-type: none"> <li>● Consumer can continue the existing electricity contract.</li> <li>● Certificates can be applied to any demand sites.</li> <li>● Regardless of the demand every hour, certificates can be applied for electricity consumed during the month or the year.</li> </ul>	<ul style="list-style-type: none"> <li>● Consumer needs to manage with variable costs by the difference between the fixed price and the market price.</li> <li>● Mark-to-market accounting may be required.</li> </ul>

# ■ 1-6 Contract Structure of Virtual PPA (FIP applied)

Developer can receive premiums based on the difference between FIP-certified fixed price and the average wholesale market price. Long-term cost fluctuation by virtual PPA becomes smaller. With the premiums, developer may make virtual PPA with consumer at a fixed price.

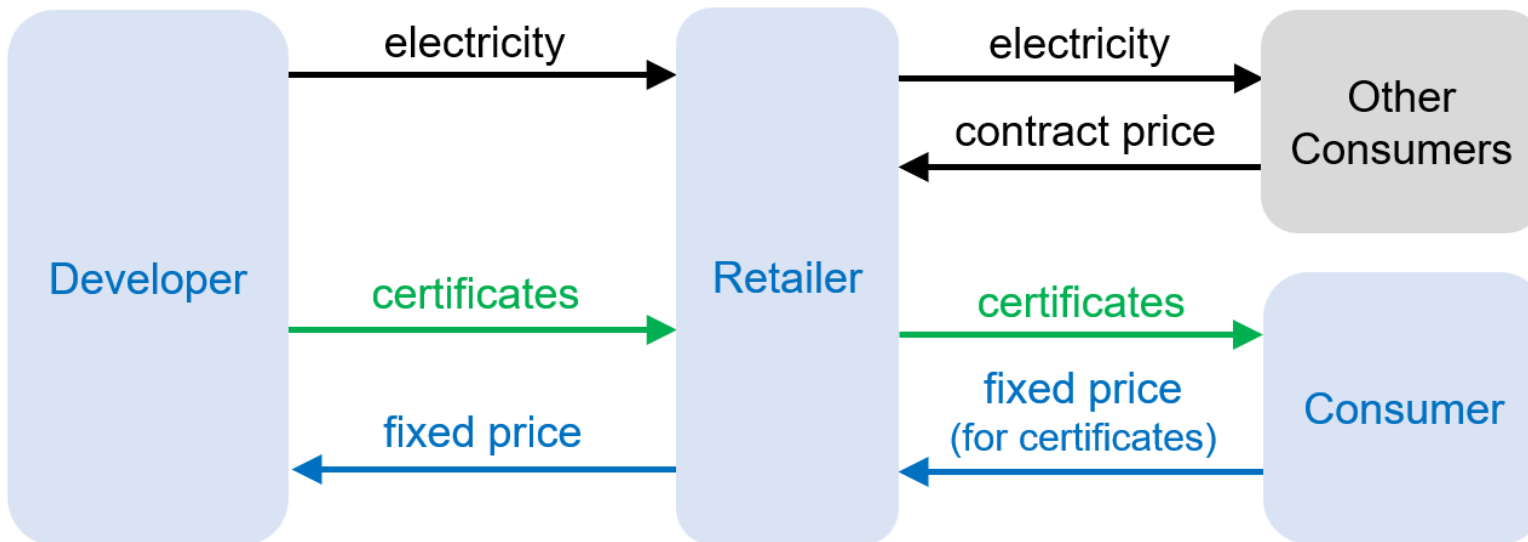


Refer to 2-4 and 2-5 (p19, p20) on a cost comparison of virtual PPA and regular tariffs.

Virtual PPA between developer and consumer is allowed in case generation facilities start the operation in April 2022 or beyond. Facilities completing the Feed-in Tariff program or repowered after April 2022 are also eligible. In other cases, retailer must be involved due to the Japanese electricity regulations.

# ■ 1-7 Contract Structure of Virtual PPA (via Retailer)

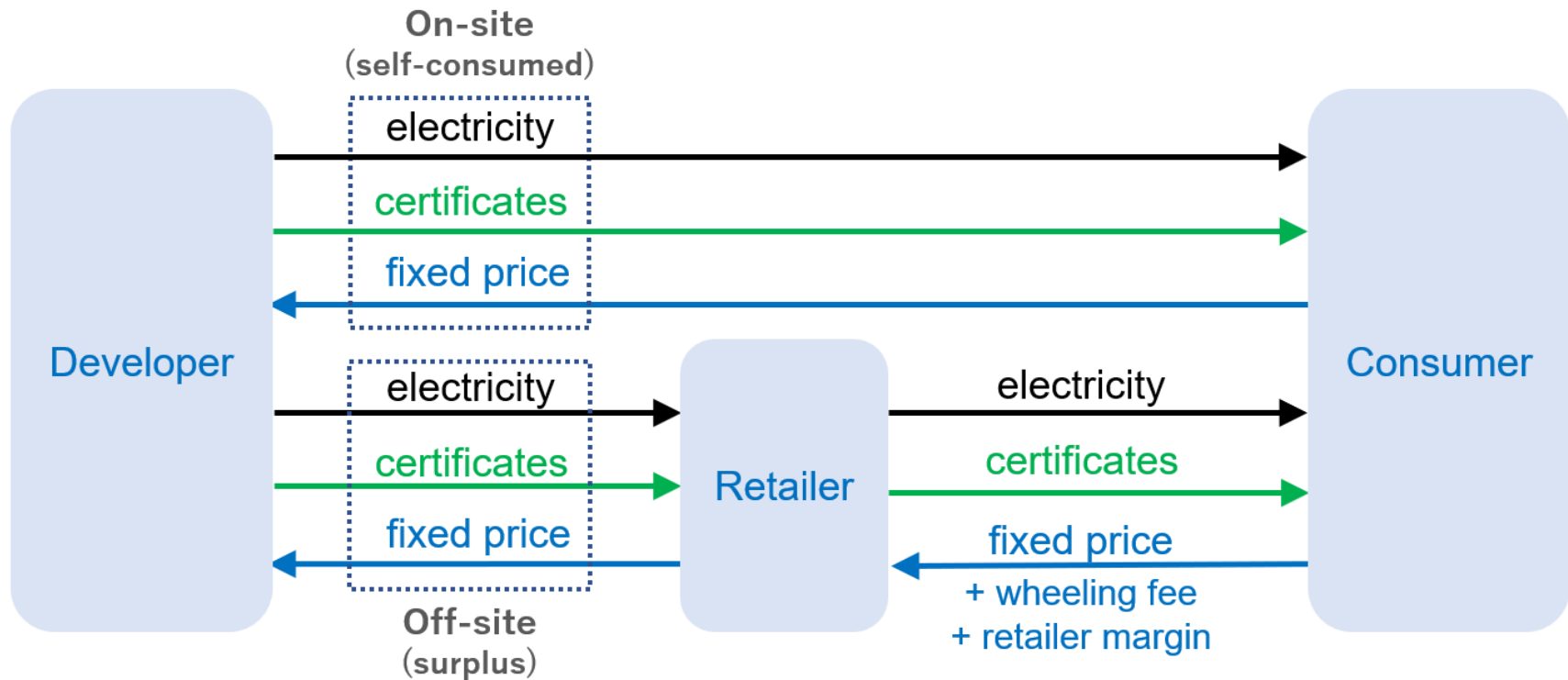
Virtual PPA can be made by involving retailer between developer and consumer. Consumer may pay a fixed price to retailer for certificates, and retailer pays a fixed price to developer for electricity and certificates. Consumer continues the existing electricity contract while retailer sells the electricity from developer to other consumers without certificates.



In the RE100 technical criteria, this structure is not categorized into virtual PPA but “project-specific contracts for unbundled EACs (Energy Attribute Certificates)”.

# ■ 1-8 On-site + Off-site Hybrid PPA

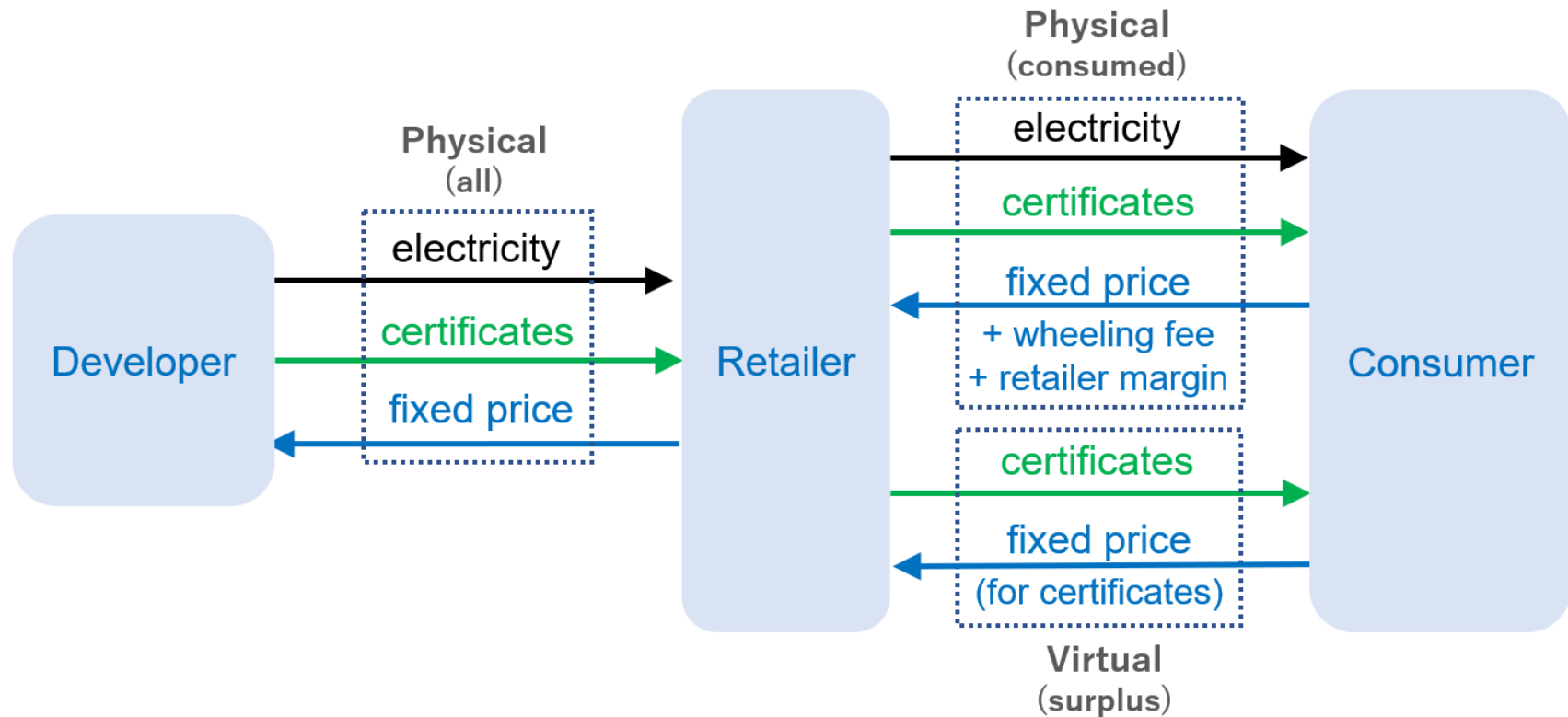
Surplus electricity and certificates from on-site PPA can be provided to other demand sites of consumer through off-site PPA.



Both physical and virtual PPAs can be applied for surplus electricity and/or certificates.

# ■ 1-9 Physical + Virtual Hybrid PPA

Surplus certificates from physical PPA can be provided to consumer through virtual PPA.



Surplus electricity is sold to other consumers by retailer without certificates.



## ■ 2-1 Cost of On-site PPA

Consumer does not have to pay wheeling fees and renewable surcharges for on-site PPA and can use renewable electricity with less costs.

JPY/kWh	On-site PPA (Solar, Roof-top)	Regular Tariffs (High voltage)	Regular Tariffs (Special high voltage)
Generation	15~18	20.5 (incl. fuel surcharges)	18 (incl. fuel surcharges)
Retail	—		
Wheeling	—	4	2
Total Consumer Cost	15~18	24.5 + renewable energy surcharges	20円 + renewable energy surcharges

\* All the costs are the national average estimated by Renewable Energy Institute.  
 High voltage provides electricity lower than 2MW and Super high voltage for 2MW+ .  
 Generation costs of on-site PPA vary by scale, location and other factors.  
 Tax is not included.

## ■ 2-2 Cost of Physical PPA (High Voltage)

Total consumer cost for physical PPA went up in FY2023 due to the demand increase. It was still lower than regular tariffs.

JPY/kWh	Physical PPA (Solar, High voltage)	Regular Tariffs (High voltage)
Generation	13~16	20.5 (incl. fuel surcharges)
Retail	3	
Wheeling	4	4
Total Consumer Cost	20~23 + renewable energy surcharges	24.5 + renewable energy surcharges

\* All the costs are the national average estimated by Renewable Energy Institute. High voltage provides electricity lower than 2MW. Generation cost of physical PPA varies by scale, location and other factors. Tax is not included.

## ■ 2-3 Cost of Physical PPA (Special High Voltage)

Compared with regular tariffs for super high voltage (contract for 2MW+), total consumer cost of physical PPA was lower in usual cases.

JPY/kWh	Physical PPA (Solar, Super high voltage)	Regular Tariffs (Super high voltage)
Generation	13~16	18 (incl. fuel surcharges)
Retail	1.5	
Wheeling	2	2
Total Consumer Cost	16.5~19.5 + renewable energy surcharges	20 + renewable energy surcharges

\* All the costs are the national average estimated by Renewable Energy Institute. Super high voltage provides electricity equal to or higher than 2MW. Generation cost of physical PPA varies by scale, location and other factors. Tax is not included.

## ■ 2-4 Cost of Virtual PPA

Generation cost of virtual PPA is the same level as physical PPA. Total consumer cost varies by the wholesale market price and regular tariffs.

JPY/kWh	Virtual PPA (Solar, High voltage)	Regular Tariffs (High voltage)
Generation	13~16 – market price (for certificates)	20.5 (incl. fuel surcharges)
Retail	24.5 (for electricity)	
Wheeling		4
Total Consumer Cost	37.5~40.5 – market price + renewable energy surcharges	24.5 + renewable energy surcharges

\* All the costs are the national average estimated by Renewable Energy Institute. High voltage provides electricity lower than 2MW. Generation cost of virtual PPA varies by scale, location and other factors. Tax is not included.

## ■ 2-5 Cost of Virtual PPA (FIP applied)

Consumer may make virtual PPA at a fixed price for certificates with generation facilities applying the FIP program.

JPY/kWh	Virtual PPA + FIP (Solar, High voltage)	Regular Tariffs (High voltage)
Generation	1~4 (for certificates)	20.5 (incl. fuel surcharges)
Retail	24.5	
Wheeling	(for electricity)	4
Total Consumer Cost	25.5~28.5 + renewable energy surcharges	24.5 + renewable energy surcharges

\* All the costs are the national average estimated by Renewable Energy Institute.  
 High voltage provides electricity lower than 2MW.  
 Generation cost of virtual PPA is estimated by assuming market price at JPY12/kWh.  
 Tax is not included.

# \* Cost Comparison with Carbon Price (Physical PPA)

Physical PPA is more cost competitive by adding carbon price to regular tariffs.

JPY/kWh	Physical PPA (Solar, High voltage)	Regular Tariffs (High voltage)
Electricity Cost	20~23 + renewable energy surcharges	24.5 + renewable energy surcharges
Carbon Cost	—	2.5

\* Carbon cost is estimated with the following assumptions.

- carbon price: JPY10,000/ton
- electricity carbon intensity: 0.25kg/kWh (Japan's national target for FY2030)

International Energy Agency recommends carbon price at USD130/ton in 2030 for developed countries.

# \* Cost Comparison with Carbon Price (Virtual PPA + FIP)

Virtual PPA with FIP is cost competitive by adding carbon price to regular tariffs.

JPY/kWh	Virtual PPA + FIP (Solar, High voltage)	Regular Tariffs (High voltage)
Electricity Cost	25.5~28.5 + renewable energy surcharges	24.5 + renewable energy surcharges
Carbon Cost	—	2.5

\* Carbon cost is estimated with the following assumptions.

- carbon price: JPY10,000/ton
- electricity carbon intensity: 0.25kg/kWh (Japan's national target for FY2030)

International Energy Agency recommends carbon price at USD130/ton in 2030 for developed countries.

# ■ 3 Latest Projects

(Off-site PPA, 1MW+, April 2023 - March 2024)

Consumer	Retailer	Developer	Capacity
Takashimaya	Digital Grid	Tokyu Land	4MW
Kao	<i>(Virtual PPA)</i>	Mizuho Leasing	15.6MW
Murata Manufacturing	<i>(Virtual PPA)</i>	Renova	115MW
Amazon Data Services Japan	<i>(Undisclosed)</i>	KR Energy #1	31MW
JR West	Chugoku Electric Power	Chugoku Electric Power	90MW (estimated)
JR West	Kansai Electric Power	Kansai Electric Power	5.5MW
Yasuda Real Estate	Renewable Japan	Renewable Japan	2.7MW
Tokyo Gas, Tokyo Gas Engineering Solutions	Tokyo Gas	Tokyo Gas Engineering Solutions	1.7MW
Hokkaido Coca-Cola Bottling	Hokkaido Electric Power	HARE Hare	1MW
Aeon Hokkaido	Hokkaido Electric Power	HARE Hare	12MW
Okuwa	Chubu Electric Power Miraiz	Chubu Electric Power Miraiz	2.3MW
Aeon Tohoku	Osaka Gas	Sustainable Solar Way2, S&Dx solar2	18MW
Otsuka Corporation	<i>(Virtual PPA)</i>	Renova	6MW
Nippon Steel Kowa Real Estate	Nippon Steel Engineering	Mizuho-Toshiba Leasing	3.5MW
Hokuriku Bank, Hokkaido Bank	Hokkaido Electric Power	Hokuriku Electric Power Biz Energy Solution	2.2MW

\* Information from the official announcement.



# ■ 3 Latest Projects

## (Off-site PPA, 1MW+, April 2023 - March 2024)

Consumer	Retailer	Developer	Capacity
Hulic	Hulic Property Solution	Hulic	60MW (cumulative)
JR East	Summit Energy	Summit Wind Power	20MW
Sony Group	<i>(Virtual PPA)</i>	Kamisato Construction	6MW
Microsoft	<i>(Virtual PPA)</i>	Shizen Energy	25MW
Mori Building	TEPCO Energy Partner	Mori Building	12MW
AGC Techno Glass	Chubu Electric Power Miraiz	Sun Trinity	2MW
Shizuoka Bank	Chubu Electric Power Miraiz	Chubu Electric	2MW
JPX Market Innovation & Research	<i>(Virtual PPA)</i>	Marubeni Power Retail	2MW
JTEKT	<i>(Virtual PPA)</i>	PHOTON CAPITAL	11.9MW
Pan Pacific International	TEPCO Energy Partner	ZEC	3.65MW
Sumitomo Corporation	TEPCO Energy Partner	Sun Trinity	1.6MW
Sapporo Real Estate	<i>(Virtual PPA)</i>	Prologis	4MW
Mitsubishi Estate	<i>(Virtual PPA)</i>	Mitsubishi Corporation Clean Energy	3MW
Mitsubishi Estate	<i>(Virtual PPA)</i>	Tess Engineering	1.4MW
Himi Chamber of Commerce etc.	Hokuriku Electric Power	Himi Furusato Energy	2.5MW
JR West	Kansai Electric Power	Sojitz	50MW
JR East	Tohoku Energy Service	Hitachi Power Solutions	1.2MW

\* Information from the official announcement.

# ■ 3 Latest Projects

## (Off-site PPA, 1MW+, April 2023 - March 2024)

Consumer	Retailer	Developer	Capacity
Toyo Kohan	Chugoku Electric Power	Chugoku Electric Power	64MW
Otsuka Corporation	<i>(Virtual PPA)</i>	Renova	5MW
Tokyu etc.	Tokyu Power Supply	Tokyu, Mitsubishi HC Capital Energy	20MW
Nomura Real Estate Private REIT	TEPCO Energy Partner	SymEnergy	1.5MW
Bourbon	Tohoku Energy Service	Suntech Power Japan	2MW
JTEKT	Chubu Electric Power Miraiz	Solar One	1.1MW
JR West	Hokuriku Electric Power	Hokuriku Electric Power	17MW
NTT Data Group	TEPCO Energy Partner	Pro Media	3.7MW
Sumitomo Life Insurance	TEPCO Energy Partner	Suntech Energy Development	1.7MW
Panasonic Automotive Systems	<i>(Undisclosed)</i>	<i>(Undisclosed)</i>	28MW

\* Information from the official announcement.

## ■ 4 Issues and Solutions

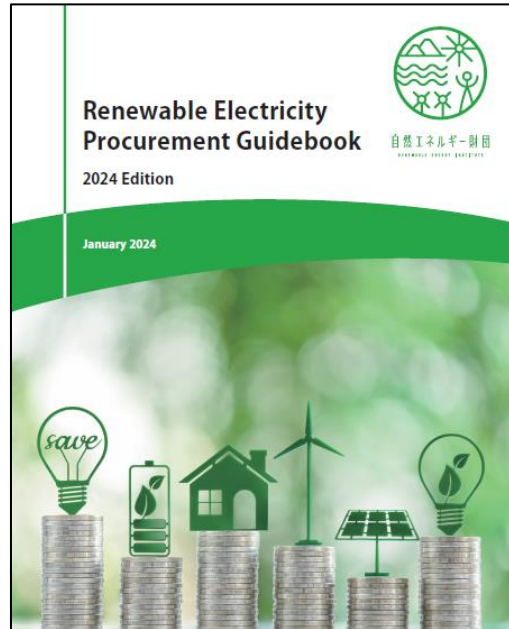
There are several issues for accelerating corporate PPAs in Japan. Policies and actions are required for ambitiously promoting renewable energy nationwide.

Issue		Key Solutions
Land Availability	● Lands for new generation facilities are limited due to strict regulations.	[Policy] Deregulations of land usage [Developer] Aggregation of small spaces [Consumer] Usage of owned spaces
Grid Connection	● Connecting new generation facilities to the grid is difficult, and the connecting costs may be very high.	[Policy] Enhancement of the grid [Grid Operator] Improvement of operation [Developer] Construction of distributed low-voltage generation facilities
Curtailment	● Temporary shutdown are required in case of grid congestion or oversupply.	[Policy] Revision of the dispatching rule [Grid Operator] Improvement of forecast [Consumer] Option of hydro and geothermal
Long-term Contract	● Risks of facility troubles and other unpredictable events may occur during the contract term.	[Developer] Purchase of damage insurance [Consumer] Addition of midterm cancellation [Financial Inst.] Insurance for corporate PPA

[Reference]

## Renewable Electricity Procurement Guidebook

January 2024



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## Corporate PPA Latest Trends in Japan

April 2024

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