Competition reform on Japanese electricity market

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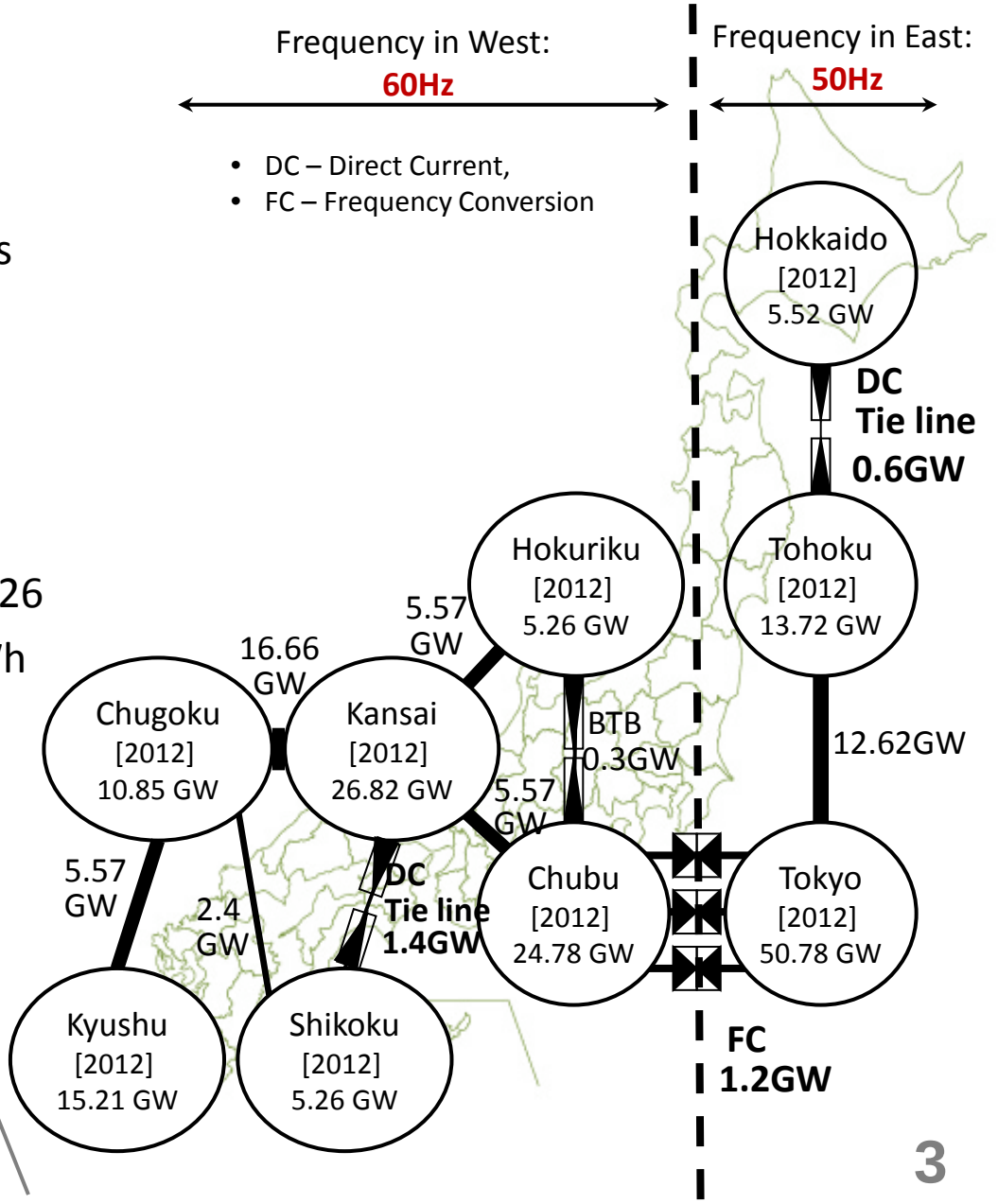
OUTLINE OF JAPAN'S ELECTRICITY MARKET REFORM PROJECT

Japan's Electricity Market Outline

- 10 Vertically Integrated Power Companies (EPCOs) and New Entrance (PPSs)
  - Market volume: 1094TWh / 287 GW (2012)
  - Retail competition for over 50kW customers (62% of the market in 2013)
    - Share of non-EPCOs: 4.2% (2013)
    - 1.3% of the total retail market sales is transacted at JEPX (2013)
  - Average household electricity price was 21.26 yen/kWh before 3.11 (2011); 24.33 yen/kWh (2013) (24.81 yen/kWh in 1994)

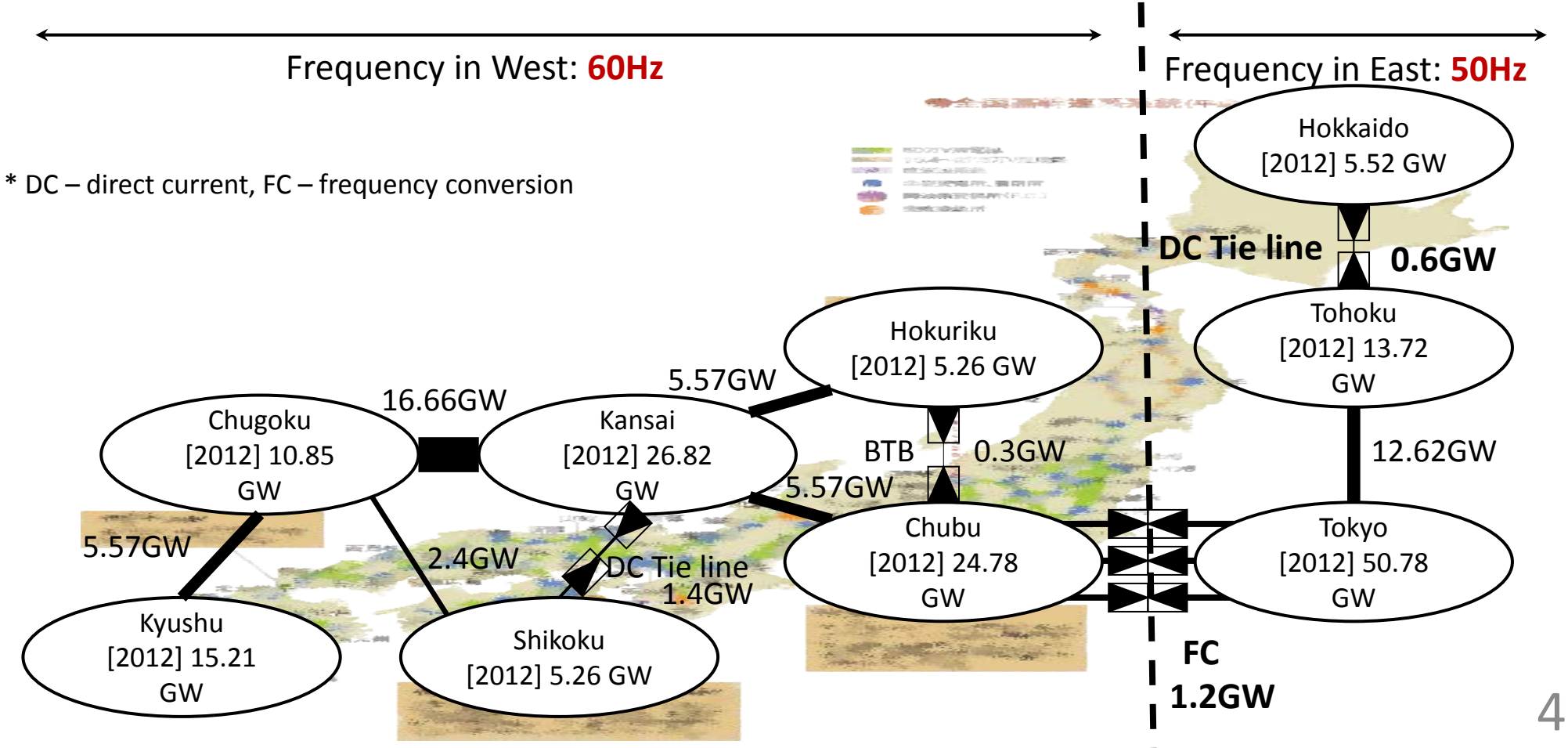
*EPCO: Electricity Power Company
*PPS: Power Producers and Suppliers
*JEPX: Japan Electric Power Exchange

- Frequency
  - West Japan: 60Hz
  - East Japan: 50Hz
    - Hokkaido (peak demand: about 5.7 GW) is connected by DC line.



Problem revealed by 3.11

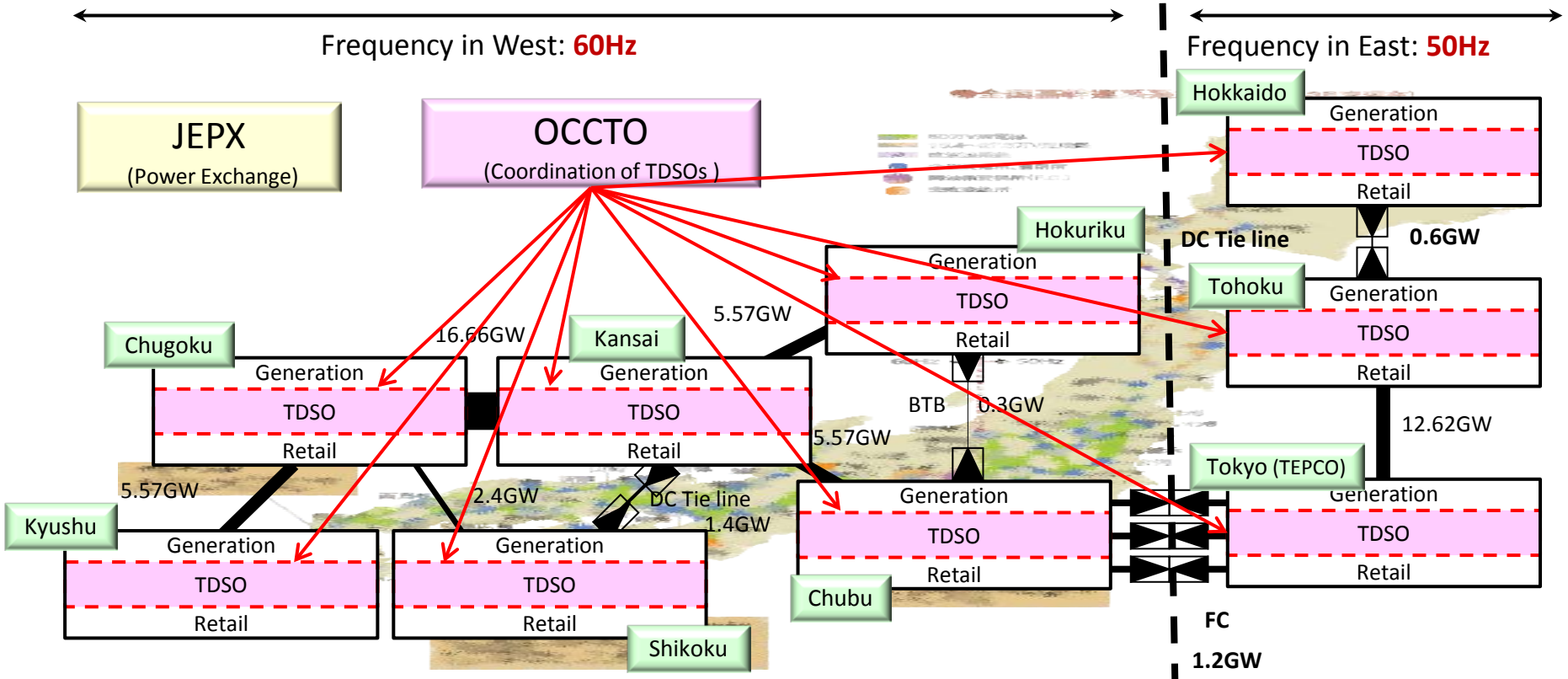
- Negative aspects of regional monopoly system with 10 big and vertically integrated EPCOs were revealed in the Great Earthquake 3years ago:
  1. Lack of system to transmit electricity beyond regions
  2. Little competition and strong price control
  3. Limit in handling the change in energy mix including the increase in renewables



1st step: Establish the OCCTO

The 1st Bill

- Establish the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) in 2015
  - ➢ Main functions of OCCTO
    1. Aggregate and analyze the EPCO's supply-demand plans and grid plans, and order to change EPCO's plans such as tie lines construction
    2. Order EPCOs to reinforce generations and power interchanges under a tight supply-demand situation



* DC – direct current, FC – frequency conversion, TDSO – Transmission and Distribution System Operator

2nd step: Full Retail Competition

The 2nd Bill

- Expand retail competition to the residential sector in 2016, opening a new market
- Maintain regulated tariffs to 10 big EPCOs at around 2018-2020

Liberalized Sector
(50kW～)

Large factory
Large building

Building
Medium factory

Small Factory

Share of total power: 63%

Regulated Sector
(～50kW)

Market Volume ; \7.5 trillion (=$ 75bn, € 54bn)
Number of contracts
Residential Customers : 76.8m
Small shops and offices: 7.4m

Share of total power: 37%

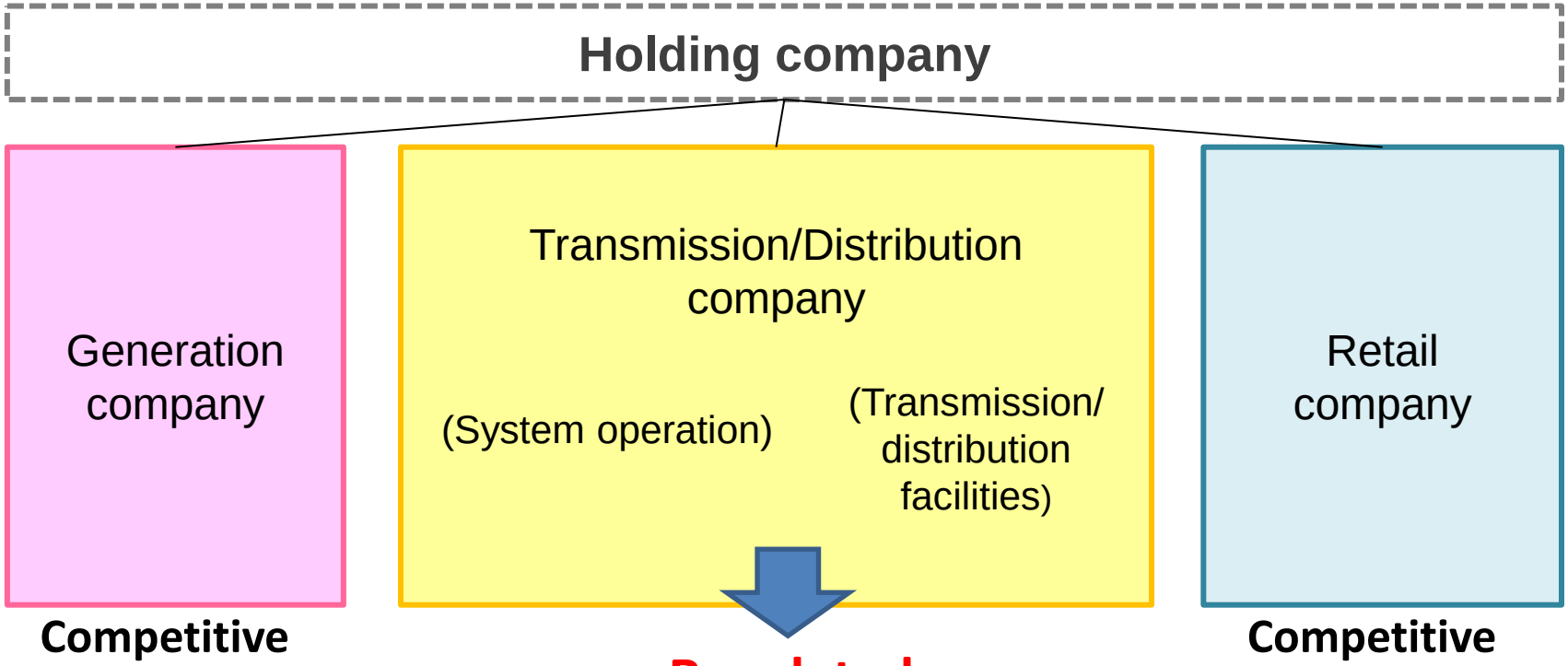
Small shop

Residential Customer

3rd step: Unbundle the T/D sector

The 3rd Bill (will submit in 2015)

- Unbundle the transmission/distribution sectors of big EPCOs by legal unbundling style at around 2018-2020



Regulated

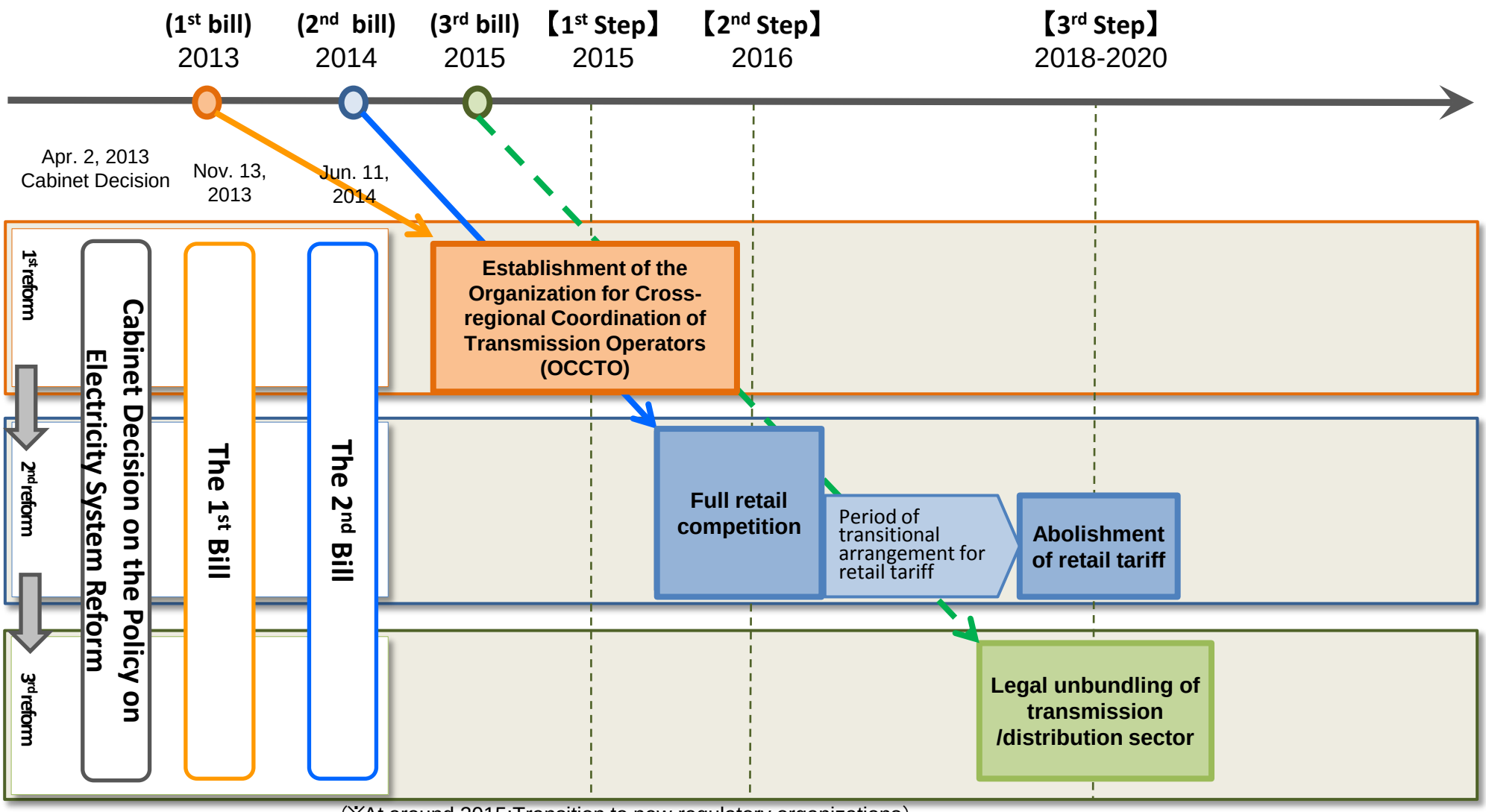
- Regional monopoly
- Network tariff
- Responsibility for maintaining frequency & providing LR service
- Code of conduct

<Note>

✓ Big EPCOs will be required to unbundle transmission and distribution companies from generation ones or retail ones, in “legal unbundling.”

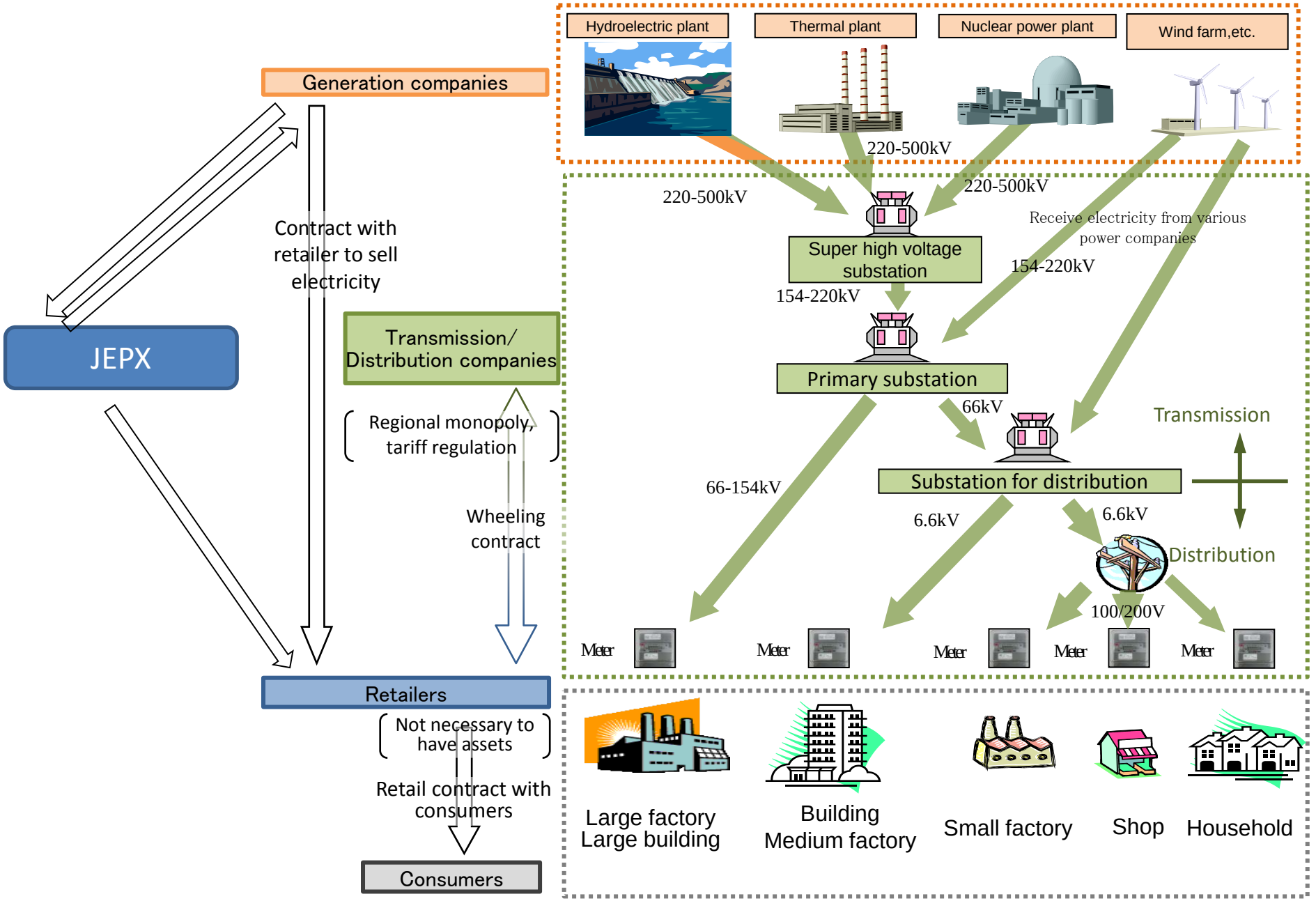
✓ Both the holding company style and the affiliated company style, in which a generation and retail company has a transmission and distribution company as a subsidiary company ,are allowed.

Roadmap for Electricity Market Reform in Japan



(※At around 2015:Transition to new regulatory organizations)

Future Design of Japan's Electricity Market



<2>

PLANNED MEASURES FOR FACILITATING COMPETITION

Planned measures for facilitating competition

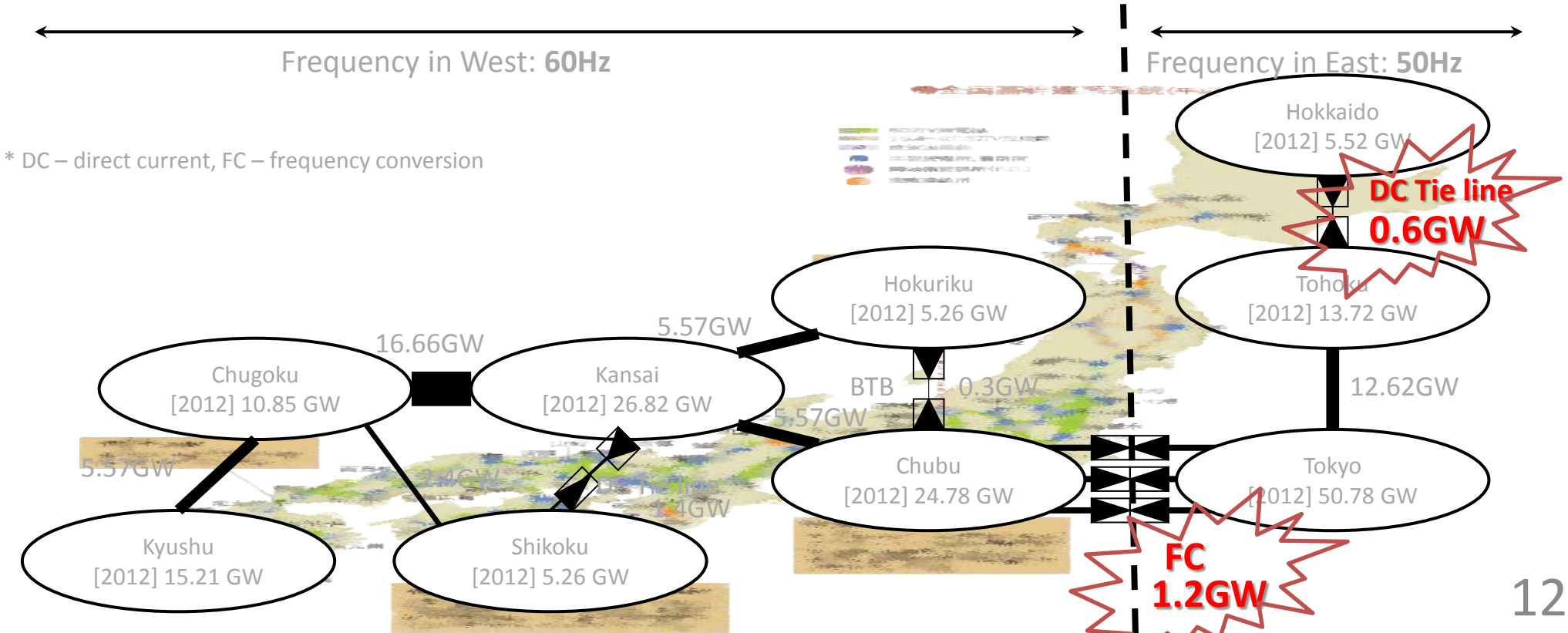
1. Promote cross-regional competition
2. Improve liquidity in the wholesale market
3. Revise imbalance mechanism
4. Facilitate the switching of retailers

Promote cross-regional competition

- Avoid market separation and congestion of tie lines through OCCTO's function for reinforcing their capacities.

  Eg. Frequency conversion b/w Tokyo and Chubu : 1.2GW → 2.1GW → ? ?
  DC tie line b/w Hokkaido and Tohoku: 0.6GW → 0.9GW → ? ?

- Maintain the "postage stamp" cost allocation scheme for network fee, even after introducing full retail competition.

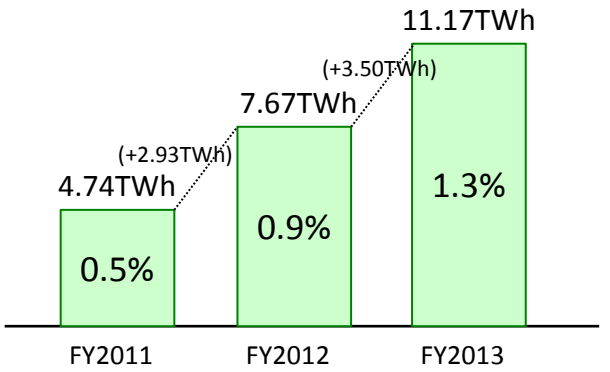


Improve liquidity in the wholesale market

- Current rule (from March 2013):
  - Self commitment by 10 big EPCOs to provide all capacity except for adequate reserve margin into JEPX
  - Market monitoring by the regulator

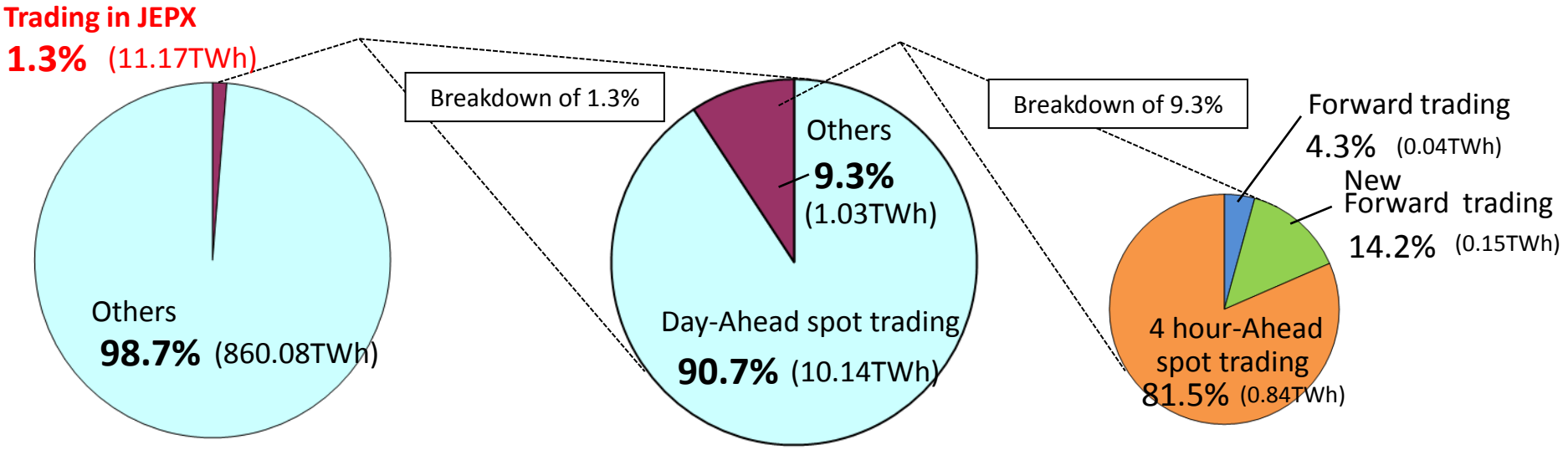
- Further discussion including introduction of VPP scheme will be needed depending on the result of market monitoring

Trend of share of trading in JEPX to retail market sales



Share of trading in JEPX to retail market sales (FY2013)

Breakdown of trading in JEPX (FY2013)



Source: JEPX

Revise imbalance mechanism

Current Imbalance Mechanism

- 1 portfolio
- Fixed imbalance price (cost-based)
- Two prices (system buy / system sell)
- x3 Penalty for system buy price in exceeding 3% threshold
- Applied to new entrants. (Imbalance for vertically integrated utilities are not measured)

Revised Imbalance Mechanism (after 2016)

[already decided]

- 2 portfolios
- Fluctuate imbalance price
- Applied to all utilities
- No threshold

[under discussion]

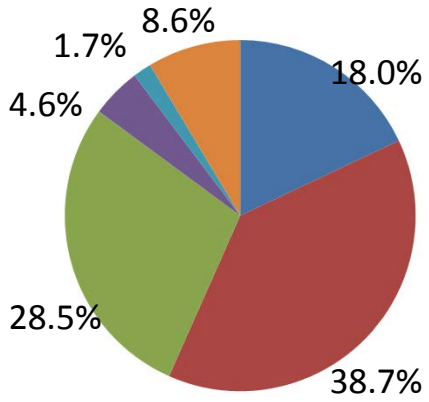
- Spot market based *or* Generation Cost based
- Two prices *or* One price
- Unit-based settlement *or* Balancing Group-based settlement

Facilitate the switching of retailers (1): Opinion research

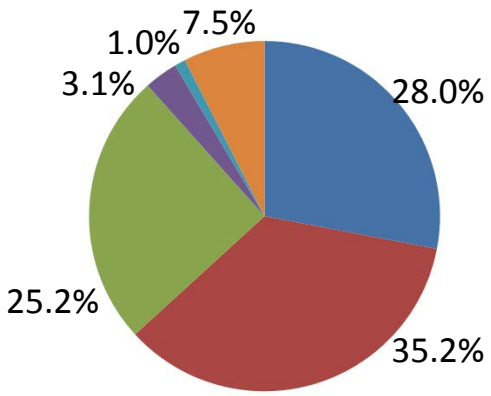
Opinion research to residential customers on full retail competition in Japan (April 2014)

- Ca. 60% recognized social importance of the full retail competition. Also, ca.70% is positive for introduction of full retail competition.
- People who understand the contents of the full retail competition more and more recognize the importance of the full retail competition more strongly and are more positive for promoting the full retail competition. That is to say, it shows that publication of the information concerning full retail competition to the customers is important for implementing full retail competition with understanding and supporting of the customers.

Importance of full retail competition



Introduction of full retail competition

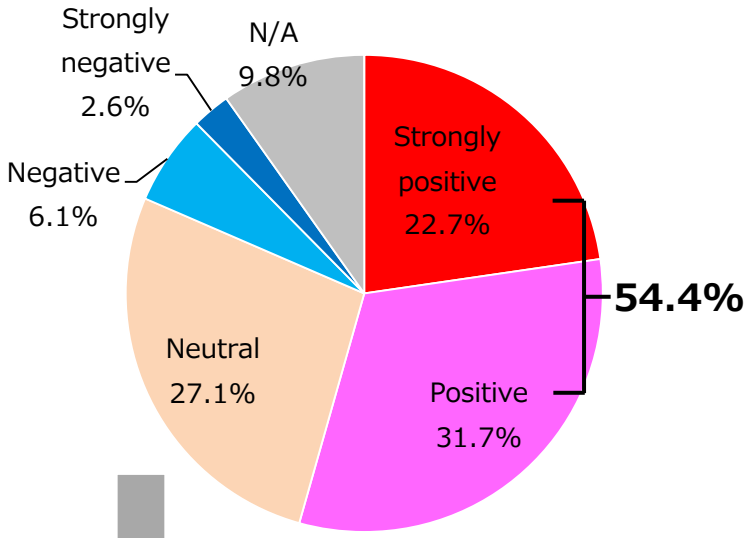


Strongly positive Positive Neutral Negative Strongly negative N/A

Facilitate the switching of retailers (1): Opinion research (cont.)

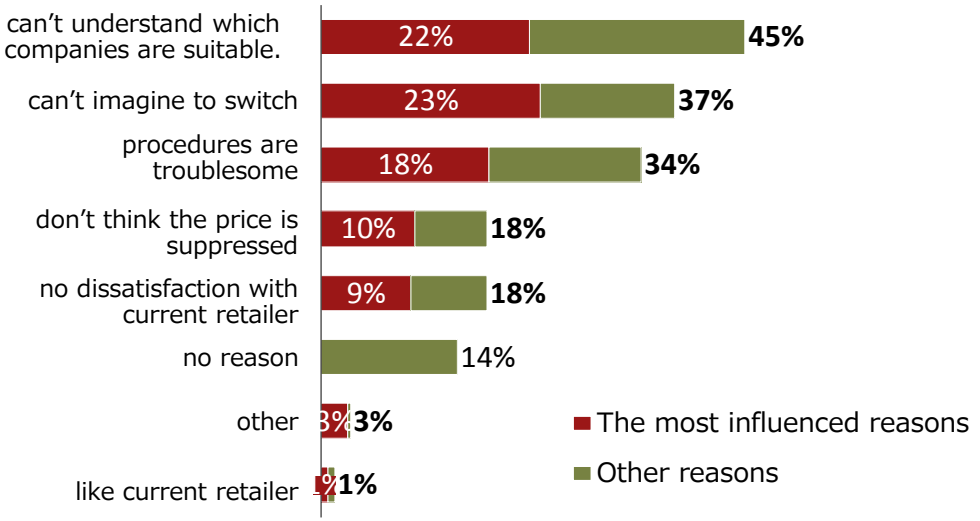
- Over 50% people (54%) shows their interesting of switching their own retailers after introducing full retail competition.
- The reasons why the customers are not positive for switching are shortage of concrete image, concerns for troublesome procedures and so on. For that, the retail competition will be expected to be activated by telling the future concrete image, simplifying the procedures.

Do you want to switch your retailer?



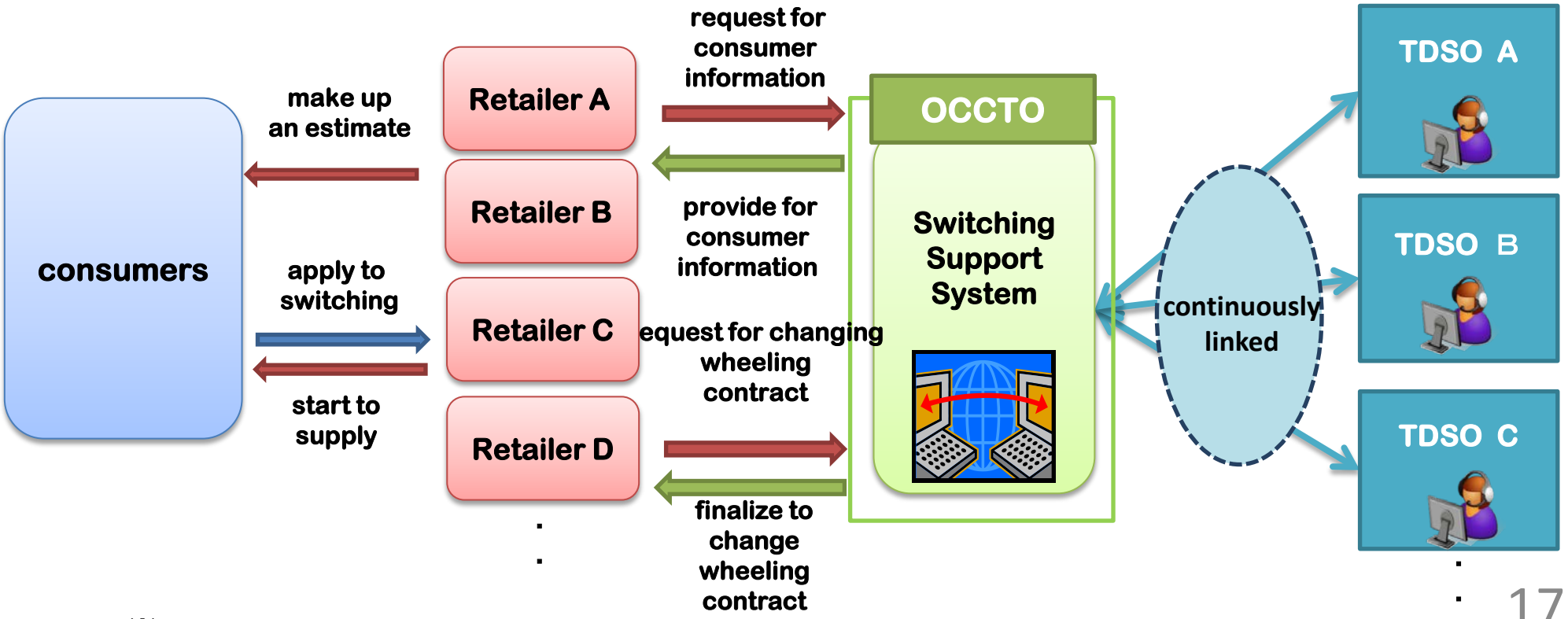
Ask to people (36%) who answered as follows
- Neutral
- Negative
- Strongly negative

Reasons why you are negative or neutral to switch you retailer?



Facilitate the switching of retailers (2): Switching support system

- Establish an one-stop system for switching support until 2016.
  - New retailer X can obtain necessary customers' information for the switching, which are standardized, from TDSOs through the system.
  - New retailer X can complete a switching process including changing a wheeling contract b/w retailer X and TDSOs through the system.
  - Time line: "automatically and instantly"



※ Information interchanged through this system will be standardized and provided for retailer instantly.

<3>

MEASURES FOR ENSURING ELECTRICITY SUPPLY IN COMPETITIVE MARKET

Ensuring electricity security in Japan's EMR project

- While expecting sufficient capacity in 2016 when full retail competition starts, the Government decided to include measures to secure long-term electricity supply:

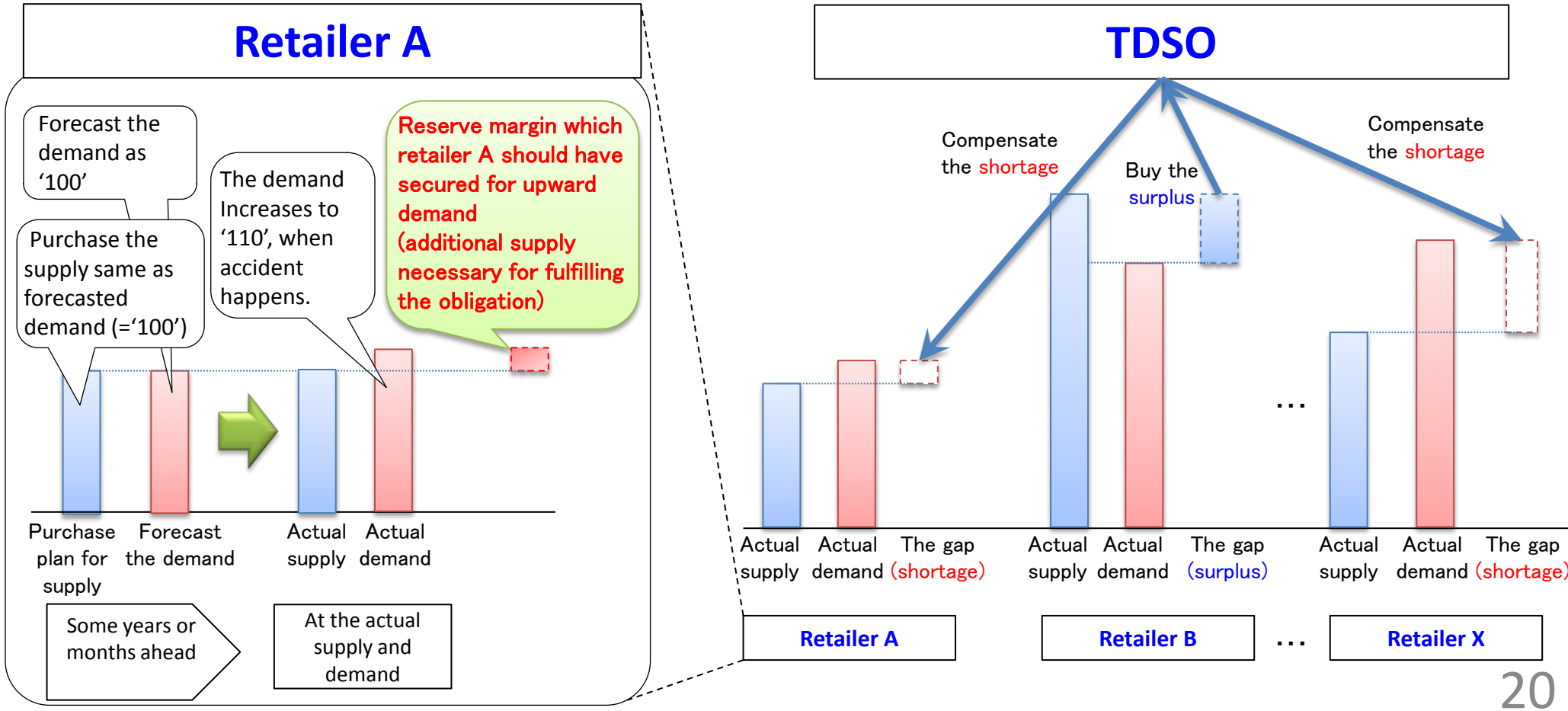
1. Obligation for all retailers to secure adequate capacity <2016>
   - Ensure procurement of enough quantity in the electricity market

2. Auction for the long-run generation capacity by OCCTO <2016>
   - Prepare for the possible shortage of long-run capacity as a safety net for the electricity market

3. Further discussion on capacity mechanism (capacity market etc.)
   - Enhance the incentive to establish and maintain generation plant

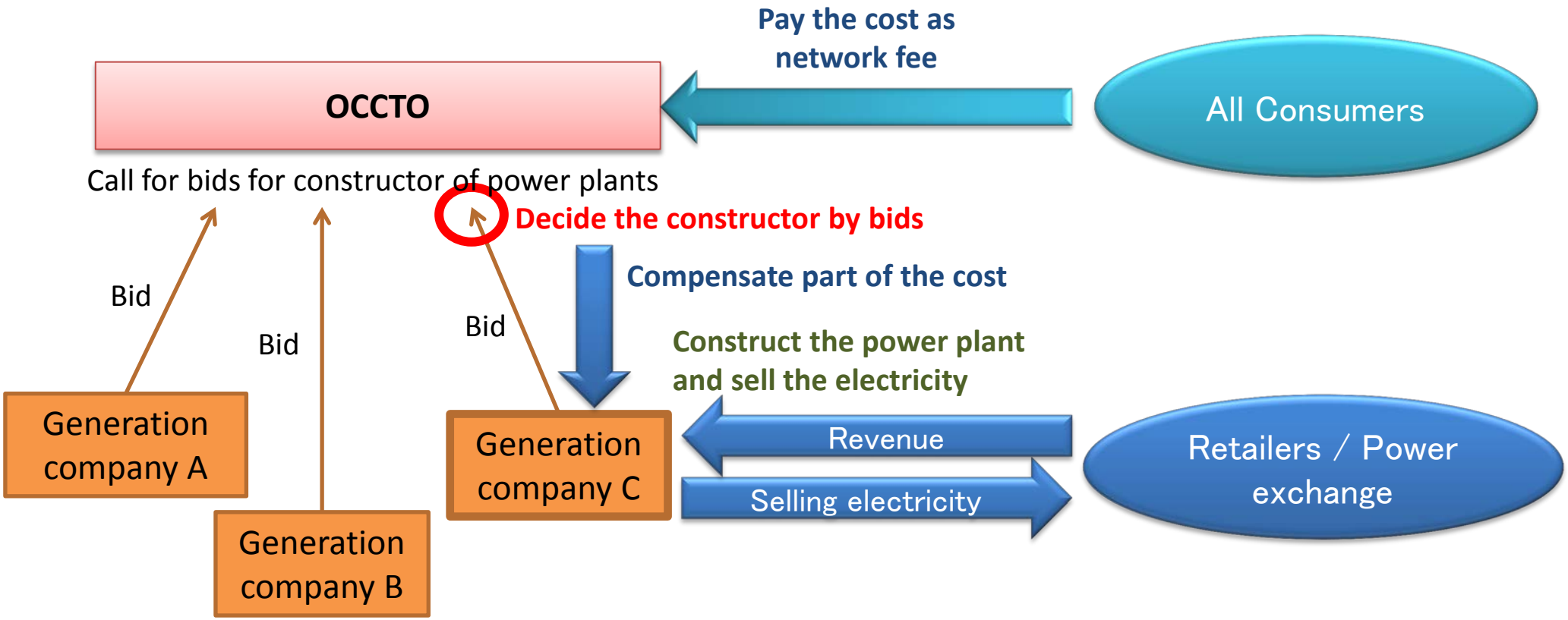
Obligation for all retailers to secure adequate capacity <2016>

- All retailers are legally obliged to ensure adequate capacity (incl. reserve margin) to match their demand.
- Government checks all retailers' plans at both points of registering to enter the market and of submitting 10-year supply and demand plan each year
- TDSO will balance the gap b/w actual supply and actual demand in the imbalance mechanism.



Auction for the long-run capacity by OCCTO <2016>

- OCCTO will call for bids when supply power shortage is likely to occur because of insufficient investment.
- OCTTO will pay for their capacity (MW), through recovering from network fee.
- The detailed design is under discussion.



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POSITIVE MOVEMENT FOR COMPETITION

Positive movement for competition

- ✓ Announcement for joining the retail market after 2016
  Eg. Gas company (Tokyo Gas, Osaka Gas): electricity+gas, Telecom company (Softbank): telecom+electricity, etc

- ✓ Big EPCOs (Tokyo EPCO, Chubu EPCO, Kansai EPCO and Chugoku EPCO) already announced to prepare for the retail in other EPCO's area.

- ✓ New investment for generation
  Eg. KOBELCO: 1.4GW (2019-2020), Saibu Gas: 1.6GW (2020), Ohgishima Power: 0.4GW (2016) etc.

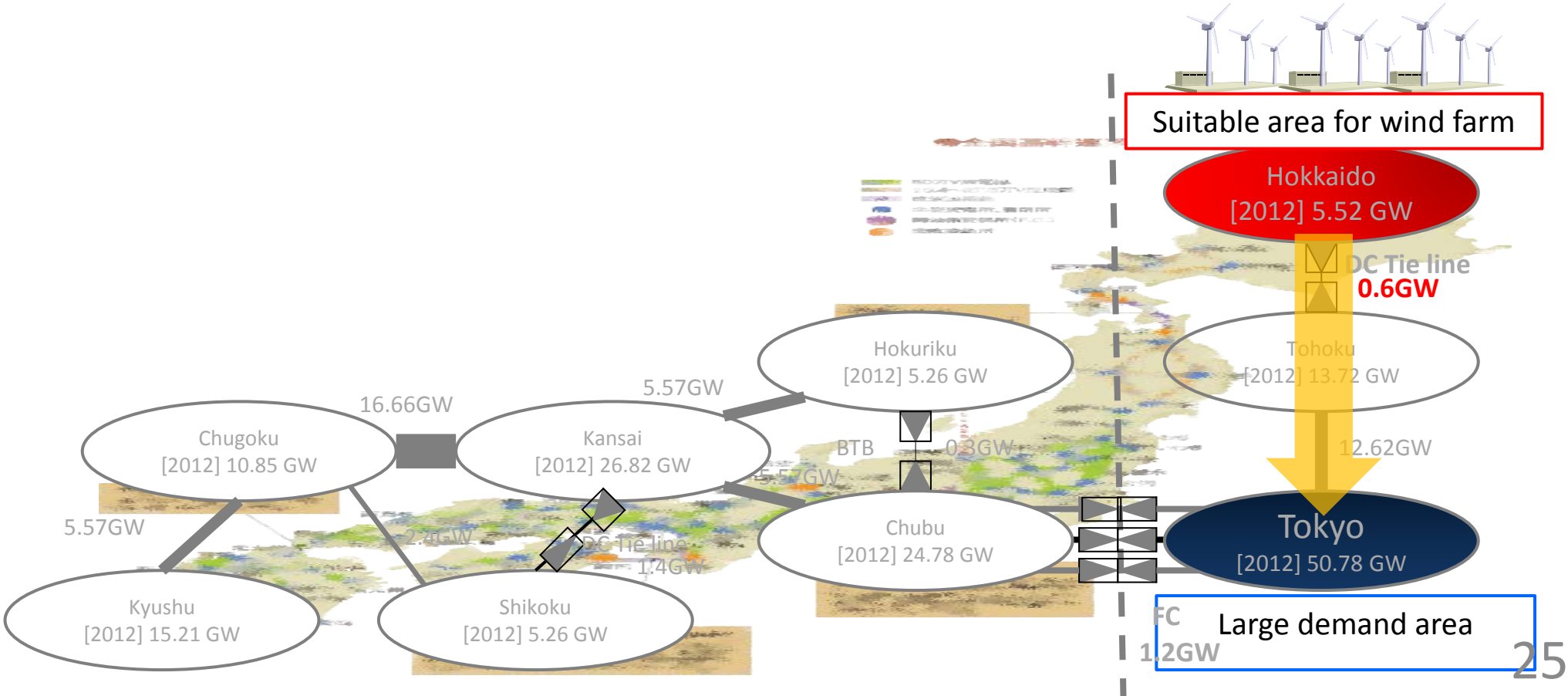
- ✓ Tokyo EPCO decided to unbundle the T/D company in 2016, even before the discussion on 3rd bill starts.

- ✓ JEPX trading through the market monitoring by the regulator: 5 times from 2012 to 2013 (in selling volume: average from March to August)

REFERENCE

OCCTO's role for RES integration

- OCCTO has a role to resolve the imbalance between RES well-endowed area and large demand area
  1. One stop reception desk for network access
  2. Order to reinforce the main transmission lines including tie line capacity
  3. Cross-regional frequency adjustment by transferring high-frequency fluctuation from an area, in which the TDSO cannot afford to control it, to large demand area

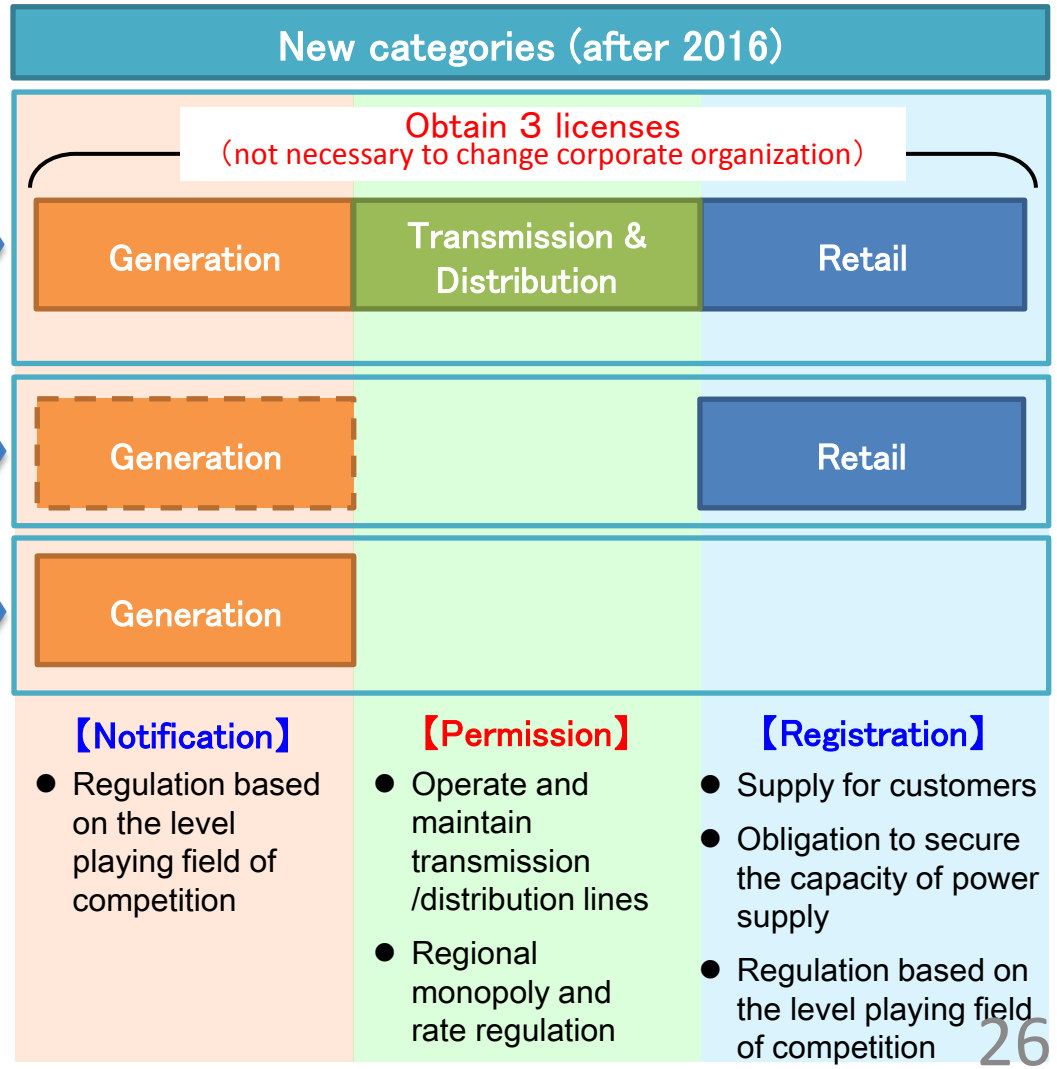


Revision of Business License Categories

The 2nd Bill

- Business License categories under the Electricity Business Act, such as “General Electricity Utilities (GEU)” and “Wholesale Electricity Utilities”, will be revised in line with the full retail choice.

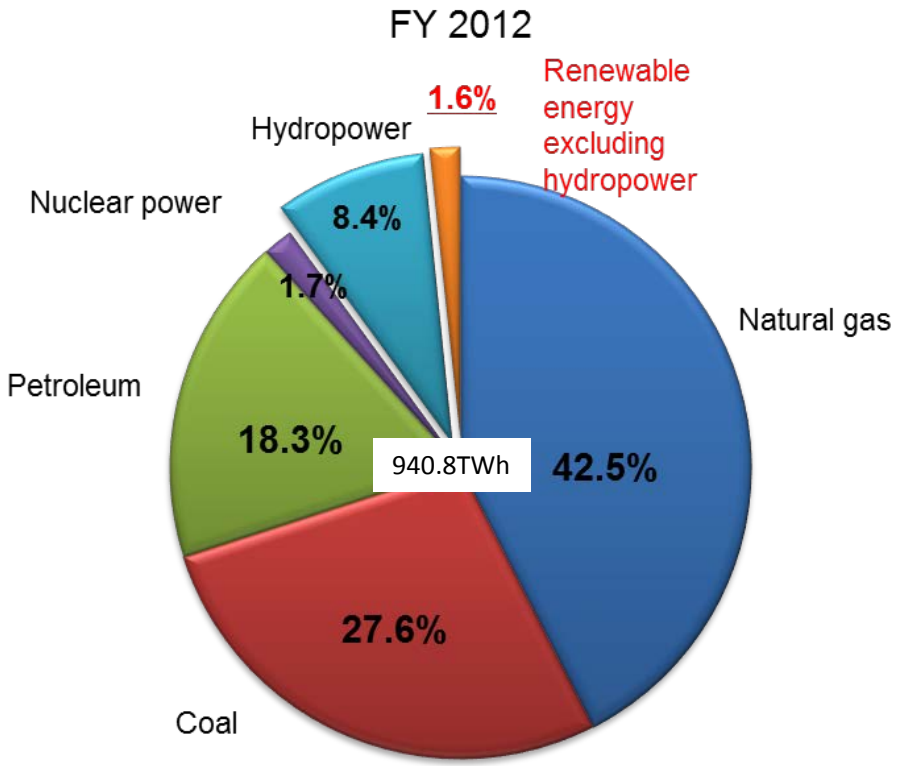
Current categories	
GEU (10EPCOs)	● Supply for customers, including those in regulated sector with obligation to supply, regional monopoly and rate regulation ● Secure stable frequency and voltage
PPS (Power Producer and Supplier)	● Supply for customers in liberalized sector (more than 50kW)
Wholesale Electricity Utilities , etc	● Supply for GEU



RES integration in Japan

- Although RES is increasing after introducing Feed-in Tariff scheme in 2012, the share of RES excluding hydro is under 2%.
- However, there already exist some challenges on grids especially for tie lines.

Composition of annual electricity generated in Japan



Source: ANRE,METI

Combined total capacity of renewable energy generating facilities