

Electricity Market Reform in Japan

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Ministry of Economy, Trade and Industry

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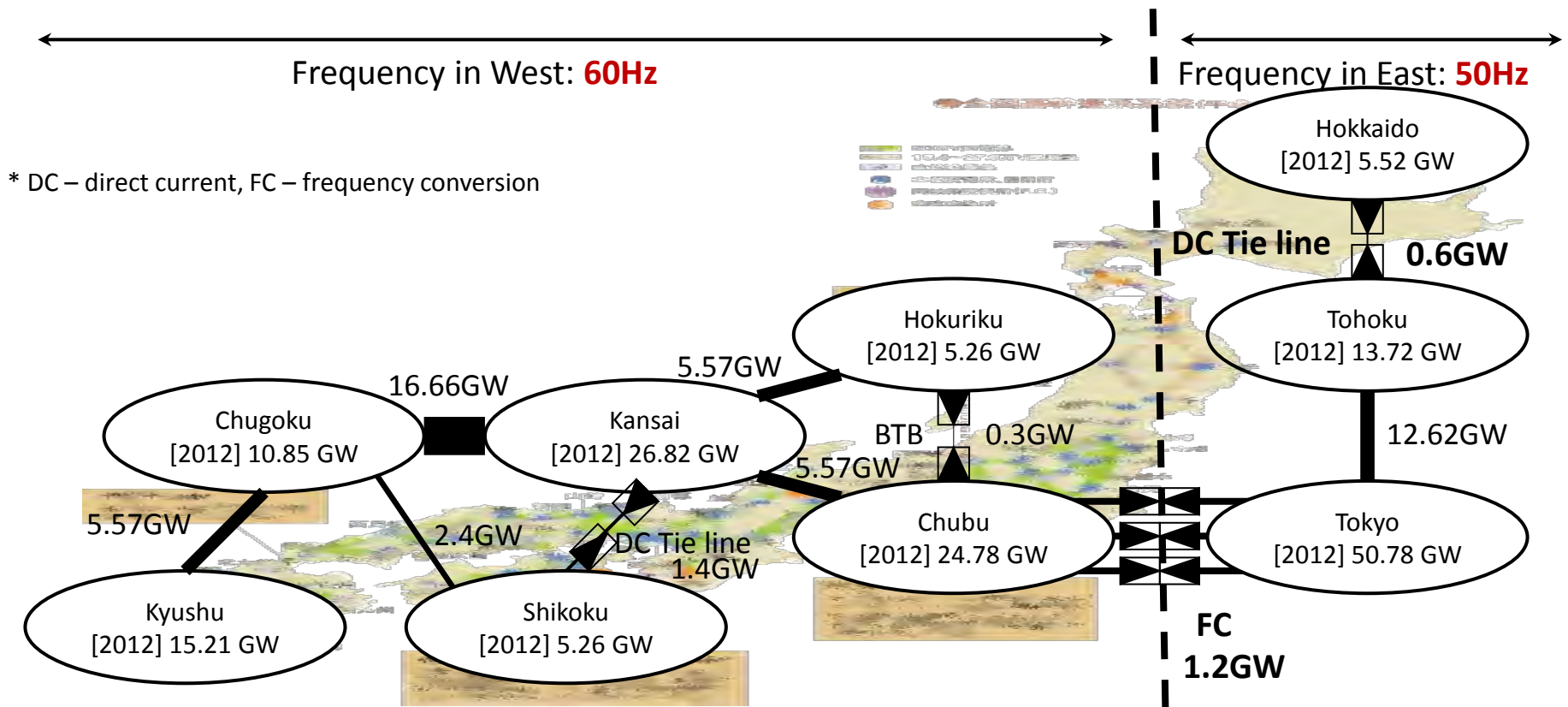
1. Current electricity system and problems revealed by 3.11
2. Planned actions on electricity market reform after 3.11
3. Market integration in Japanese market reform

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CURRENT ELECTRICITY SYSTEM AND PROBLEMS REVEALED BY 3.11

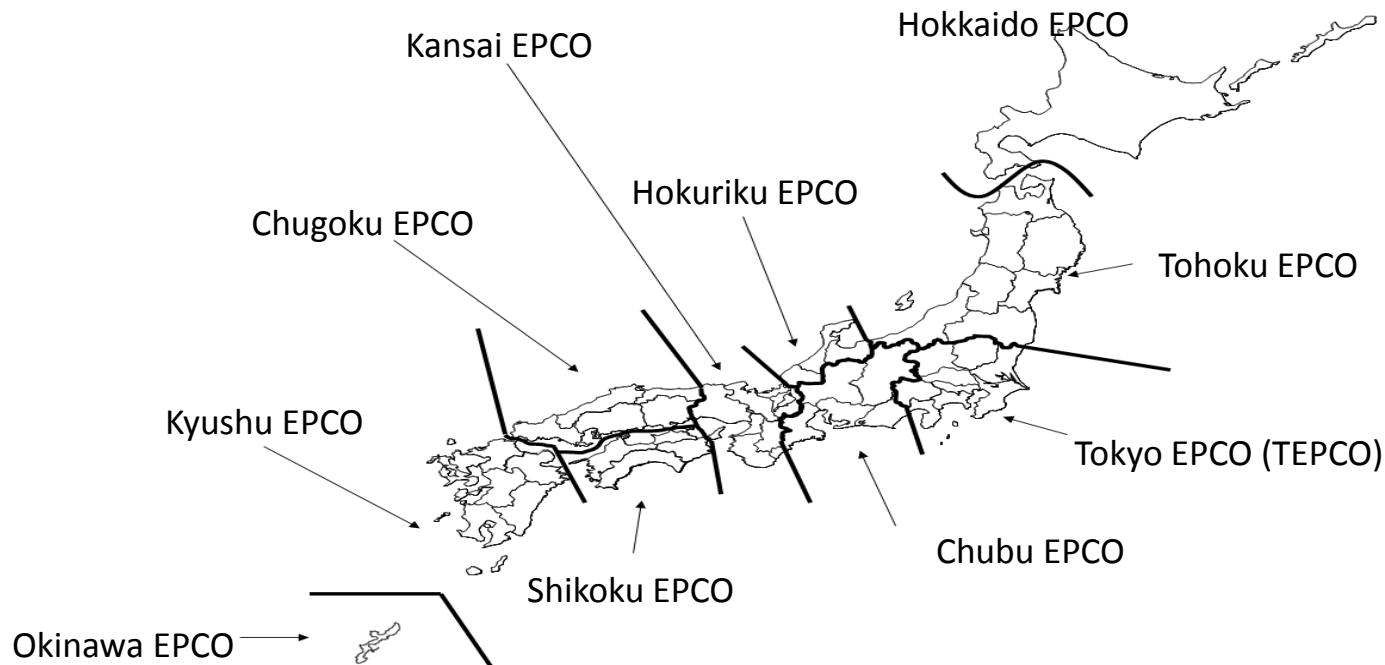
Current electricity system

- Partial liberalization: retail competition for over 50kW customers
 - Retail Players: 10 big EPCOs (vertically integrated, regional monopoly), PPS, etc.
 - Reality is...
 - Share of non-EPCO power producer and supplier : 3.6%
 - 0.6% of the total retail market sales is transacted at JEPX
- <Cf.>
- Market volume: 1000TWh/ 280GW
 - Electricity price (2011): 16.8 yen (average), 21.3yen (household), 14.6yen (industry)



Problems Revealed by 3.11

- Negative aspects of regional monopoly system were revealed:
 1. Lack of system to transmit electricity beyond regions
 2. Little competition and strong price control
 3. Limit in digesting the change in energy mix including the increase in renewables



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PLANNED ACTIONS ON ELECTRICITY MARKET REFORM AFTER 3.11

Expert Committee on Electricity System Reform

- Agency for Natural Resources and Energy organized the Expert Committee on Electricity System Reform in February 2012. The Committee compiled an interim report, “The Basic Policy on Electricity System Reform,” at the meeting on July 13.
- In November, the Committee started discussion on detailed design of reform. Based on the discussions over 12 meetings, the Committee compiled a final report on February 8, 2013.

The Members of the Expert Committee of Electricity System Reform

<Chairman>

Motoshige Ito Professor at Graduate school of Economics, The University of Tokyo

<Deputy Chairman>

Junji Annen Professor at Law School Academy, Chuo University

<Members>

Toshinori Ito Representative Director and analyst at Ito Research and Advisory Co., Ltd.

Hiroko Ohta Professor, National Graduate Institute for Policy Studies

Junichi Ogasawara Chief Research fellow and Manager at The Institute of Energy Economics, Japan, Electric Power Group

Takao Kashiwagi Specially appointed professor at Tokyo Institute of Technology

Hiroshi Takahashi Chief researcher at Fujitsu Research Institute of Economics Co., Ltd.

Kikuko Tatsumi Regular adviser, Public Corporation, Nippon Association of Consumer Specialists

Tatsuo Hatta Special visiting professor, Gakushuin University

Toshihiro Matsumura Professor at The Institute of Social Science, The University of Tokyo

Akihiko Yokoyama Professor at Graduate School of Frontier Sciences, The University of Tokyo

Cabinet Decision on Electricity System Reform

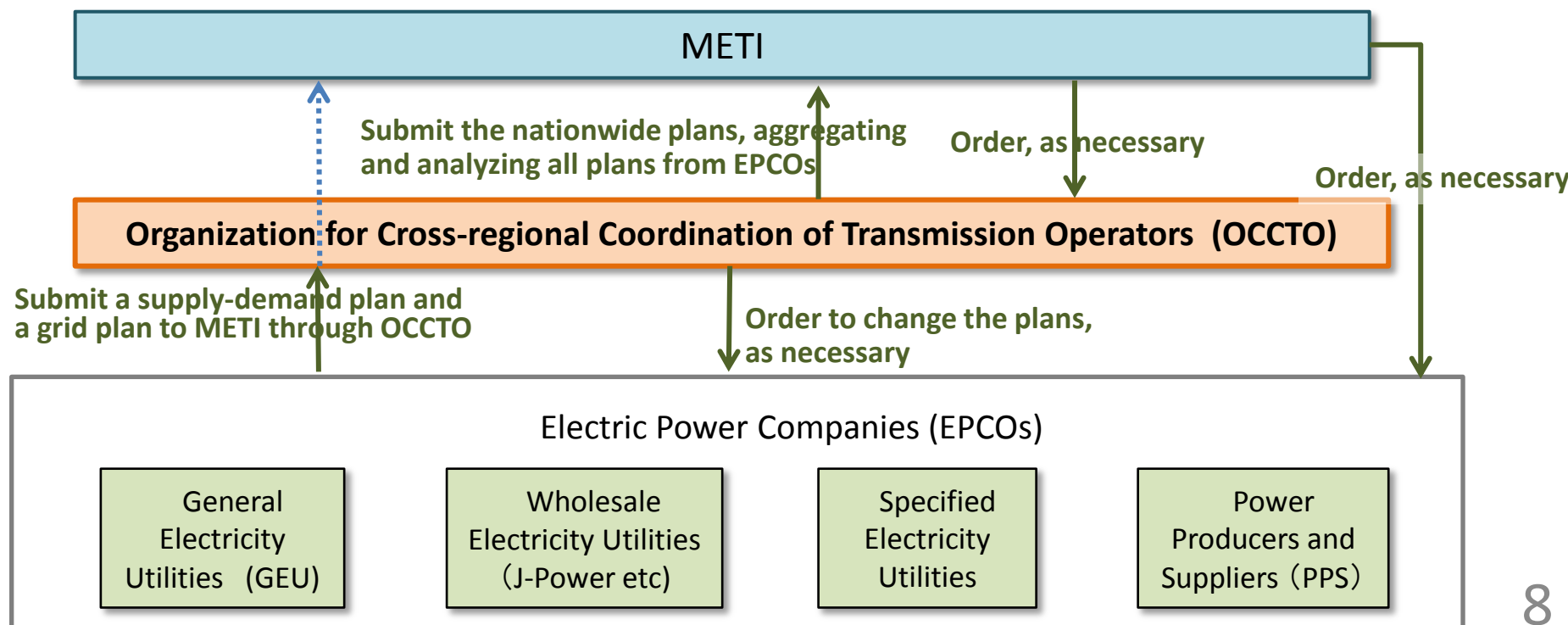
- Based on the report by Expert Committee, the Cabinet decided to approve the Policy on Electricity System Reform on April 2, 2013.

http://www.meti.go.jp/english/press/2013/pdf/0402_01a.pdf

- 3 objectives:
 - (1) Securing the stable supply of electricity
 - (2) Suppressing electricity rates to the maximum extent possible
 - (3) Expanding choices for consumers and business opportunities
- To achieve these objectives, a bold reform will be steadily carried out according to a realistic schedule step by step, focusing on the following the 3 agendas:

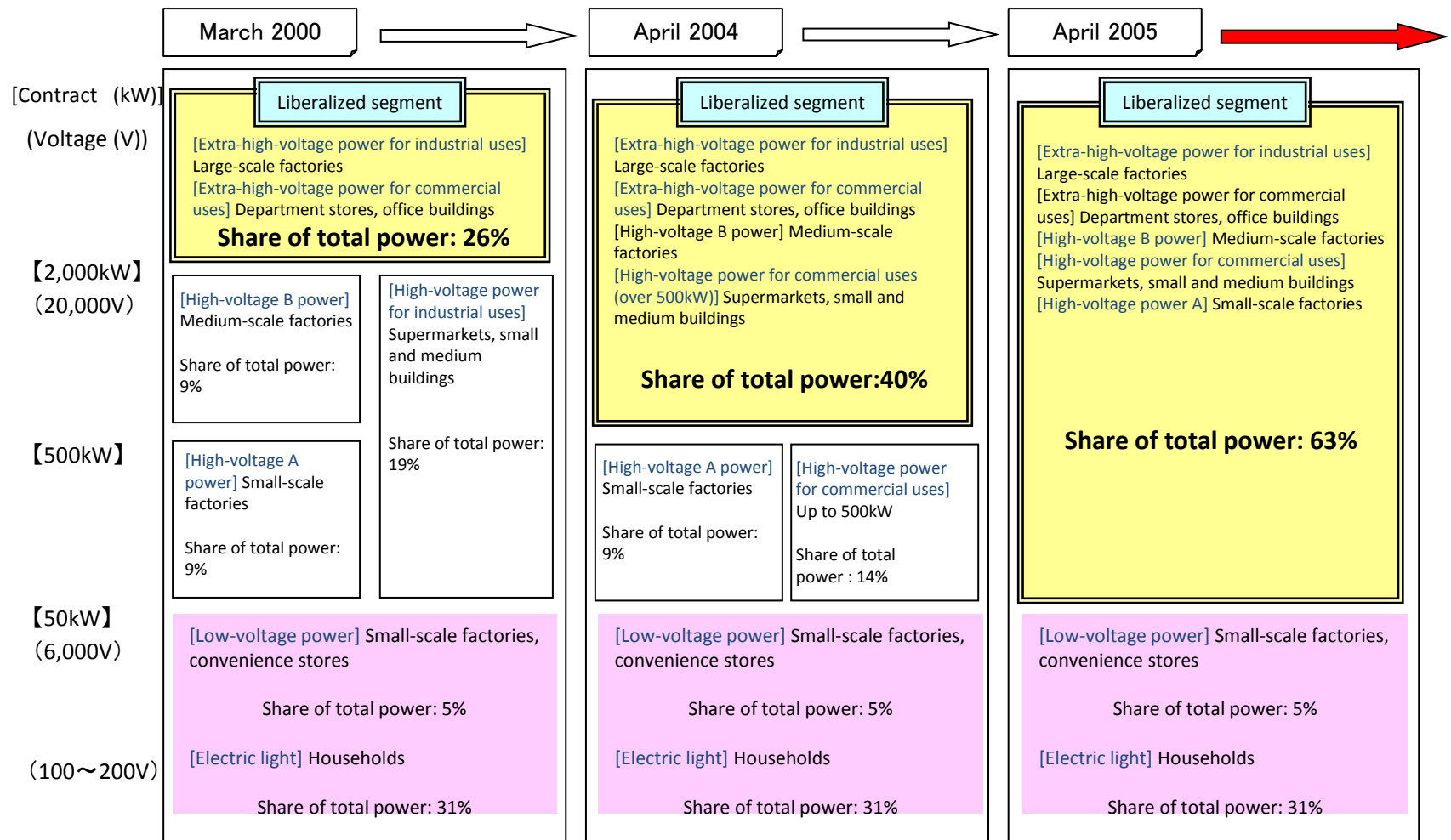
Agenda 1: Cross-regional Coordination of Transmission Operators

- Establish the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) by about 2015
- Main functions of OCCTO: Detailed designing is ongoing
 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. Coordinate the supply-demand balancing and the frequency adjustment by T/D sectors (T/D sectors are responsible to balance the supply-demand in each area)
 3. Order EPCOs to reinforce generations and power interchanges under a tight supply-demand situation



Agenda 2: Full Retail Competition

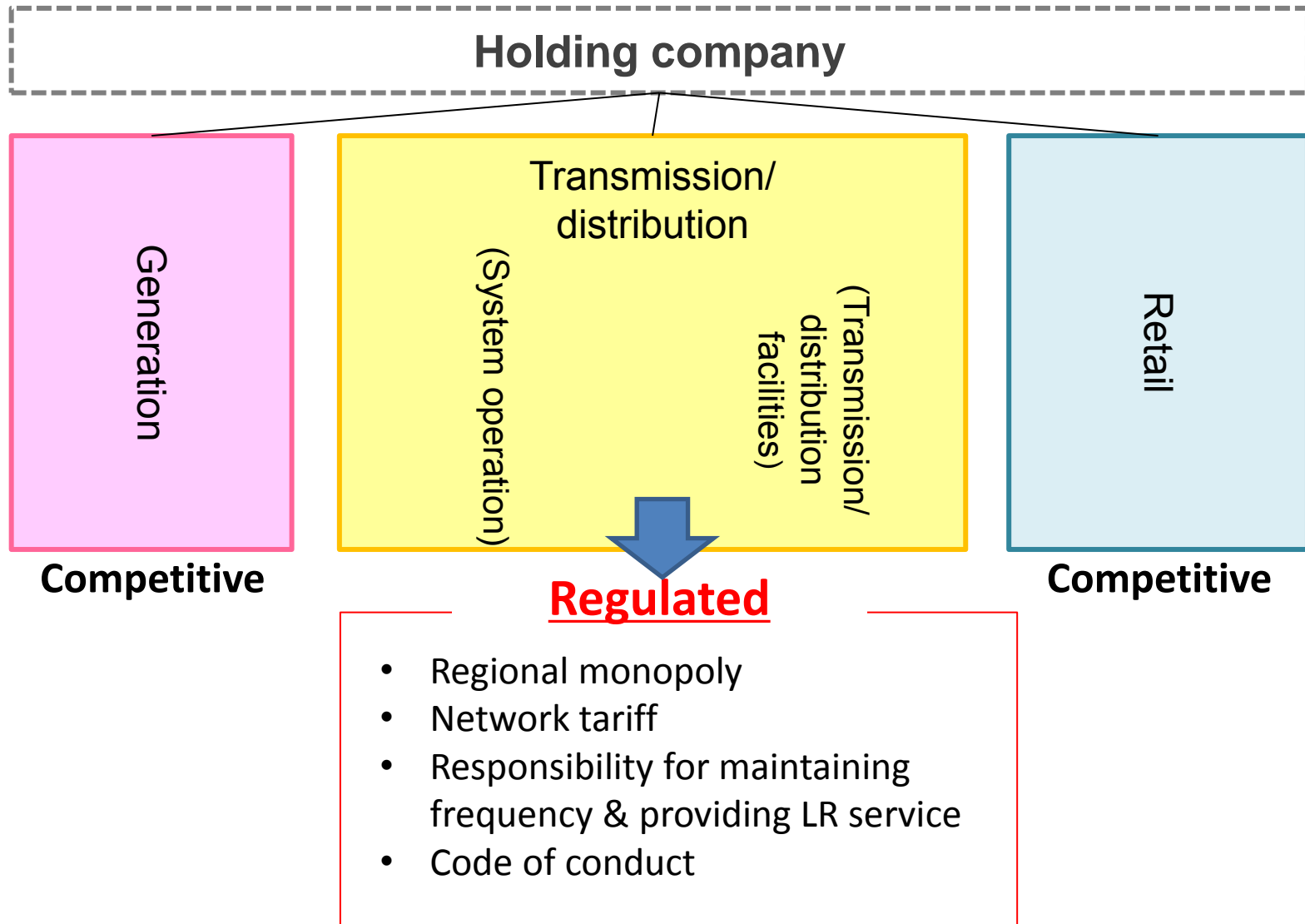
- Expand the retail competition to the residential sector at around 2016
- Remain the regulated tariff to 10 big EPCOs until around 2018-2020



(Note) The scope of liberalization of Okinawa Electric Power Company was expanded in April 2004, from users of power over 20,000kW, 60,000V, to extra-high-voltage power users (over 2,000kW, in principle).

Agenda 3: Unbundle the transmission/distribution sector

- Unbundle the transmission/distribution sectors by ITO-style (legal unbundling) at around 2018-2020



Roadmap for Electricity Market Reform in Japan

Bills

1st Reform: Ordinary Diet in 2013 →extended

- 1) Establishment of the Organization for Cross-regional Coordination of Transmission Operators (OCCTO)

- 2) Action programs for 2nd and 3rd reforms etc.

2nd Reform: Ordinary Diet in 2014

- 1) Full liberalization of entry to electricity retail business
- 2) Revision of applicable and regulations associated with the abolishment of GEU system

3rd Reform: Ordinary Diet in 2015 (Plan)

- 1) Legal unbundling of transmission/distribution sector
- 2) Code of Conduct

Reforms

Apr. 2, 2013

[1st Stage]

Around 2015

[2nd Stage]

Around 2016

[3rd Stage]

Around 2018 through 2020

Cabinet Decision on the Policy on Electricity System Reform

Establishment of the Organization for Cross-regional Coordination of Transmission Operators (OCCTO)

Full retail competition

Period of transitional arrangement for retail tariff

Abolishment of retail tariff

Legal unbundling of transmission /distribution sector

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

Status of the amending bill on Electricity Business Act

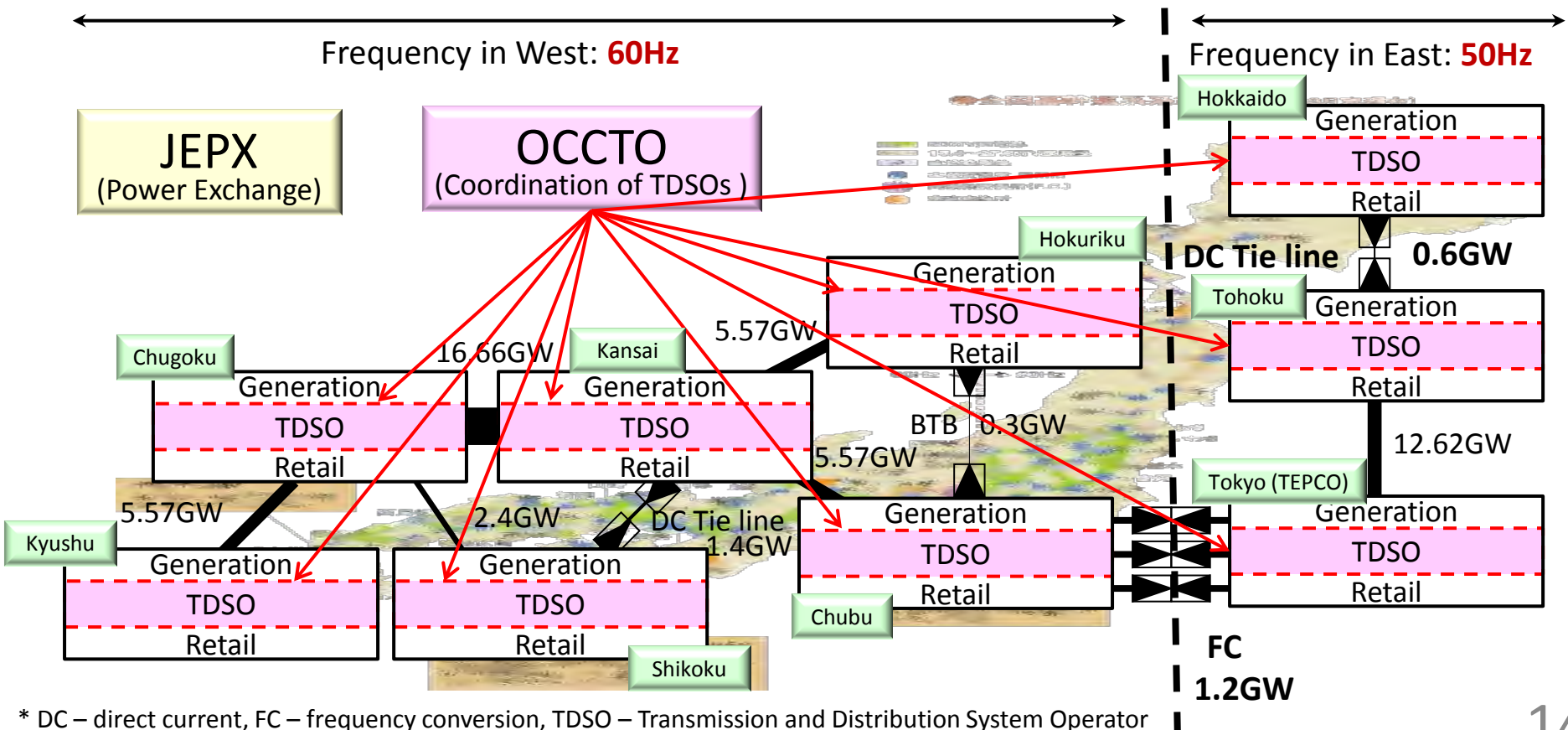
April 2, 2013	Cabinet Decision
April 12, 2013	The Bill based on the Cabinet Decision was submitted to the Diet
May 28, 2013	Discussion on the Diet started
June 13, 2013	Passed the lower house
June 26, 2013	The regular Diet session ended → The current bill was abolished → Press conference of Minister Motegi “ We will submit the bill again to the next extraordinary Diet session, and surely will try to pass it.”
August 2, 2013	The Working Group for the detailed design started to discuss
October 15, 2013	The Bill which had passed the lower house on the former Diet was re-submitted to the extraordinary Diet

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MARKET INTEGRATION IN JAPANESE MARKET REFORM

Objectives of market integration in Japan

1. Cross-regional merit-order system and competition
2. Transmit electricity beyond regions under a tight supply-demand situation
3. RES Integration



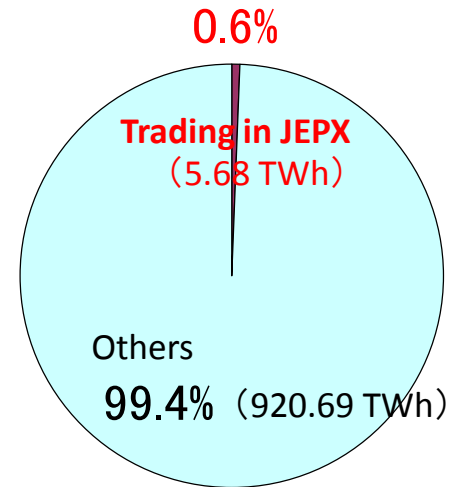
* DC – direct current, FC – frequency conversion, TDSO – Transmission and Distribution System Operator

Planned schemes for market integration

1. Activate JEPX transaction

- Encourage voluntary wholesale trading in JEPX through monitoring by the government
- Expand JEPX's functions by introducing new market products such as futures

Share of trading in JEPX to retail market sales

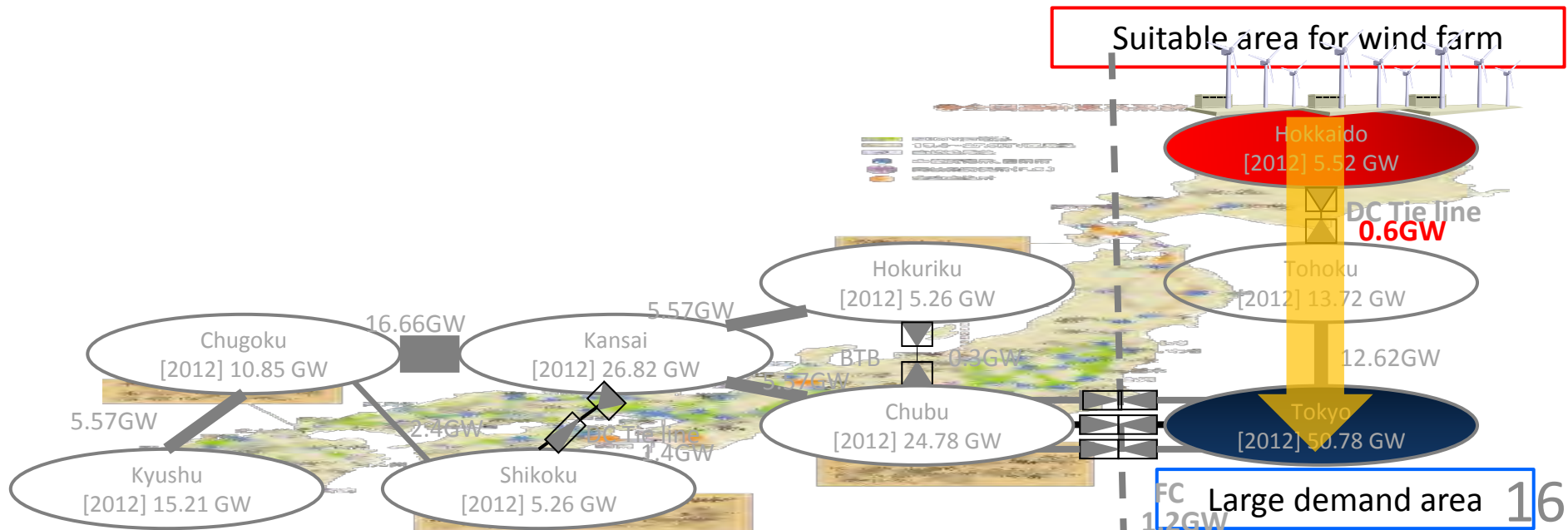


2. Establish OCCTO

- OCCTO playing a role for cross-regional transaction
 - Order to change EPCO's plans such as tie lines construction
 - Coordinate the supply-demand balancing and the frequency adjustment by T/D sectors (T/D sectors are responsible to balance the supply-demand in each area)
 - Order EPCOs to reinforce generations and power interchanges under a tight supply-demand situation

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 TSO cannot afford to control it, to large demand area



Summary

- Market integration is a key factor in the Japanese market reform
 - Even in one nation, having 9 control areas connected each other
 - 60-year long regional monopolized and vertically integrated market
- Challenges in market integration
 - Cost recovery of grid investment such as tie lines
 - Cf. FC's expansion from 1.2G to 2.1G: \ 130 b (= \$1.3b, € 1 b)
 - Expansion of trading in JEPX
- Positive movement of cross-regional competitions, even before passing the bill
 - New entrants for retail market (PPS): over 100 companies
 - JEPX trading through the market monitoring by the regulator: 5 times from 2012 to 2013 (in selling volume: average from March to August)
 - Chubu EPCO and Kansai EPCO announced to prepare for the retail in Tokyo EPCO's area

Thank you!

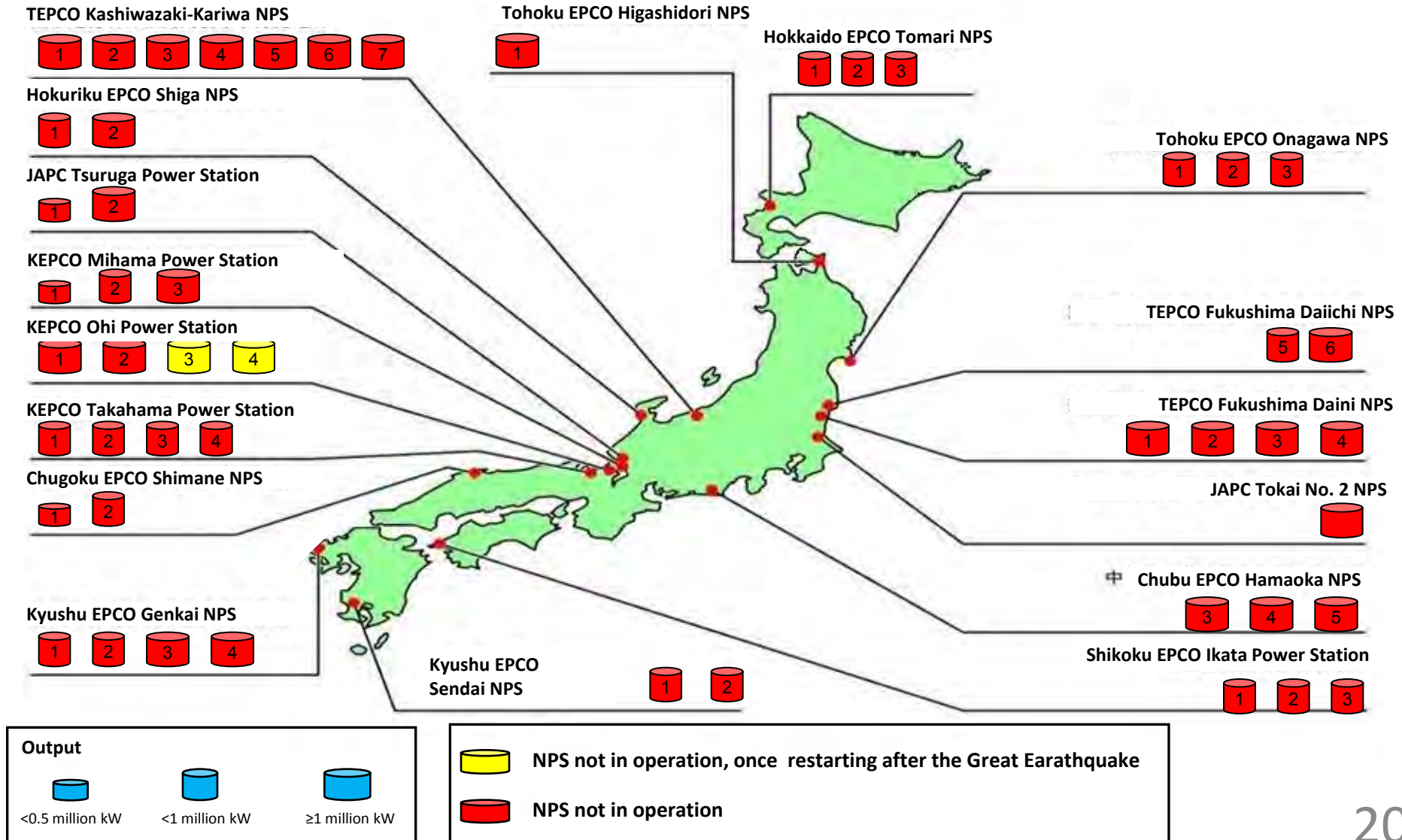


Ministry of Economy, Trade and Industry

APPENDIX

After 3.11: Nuclear Power Plants Suspended

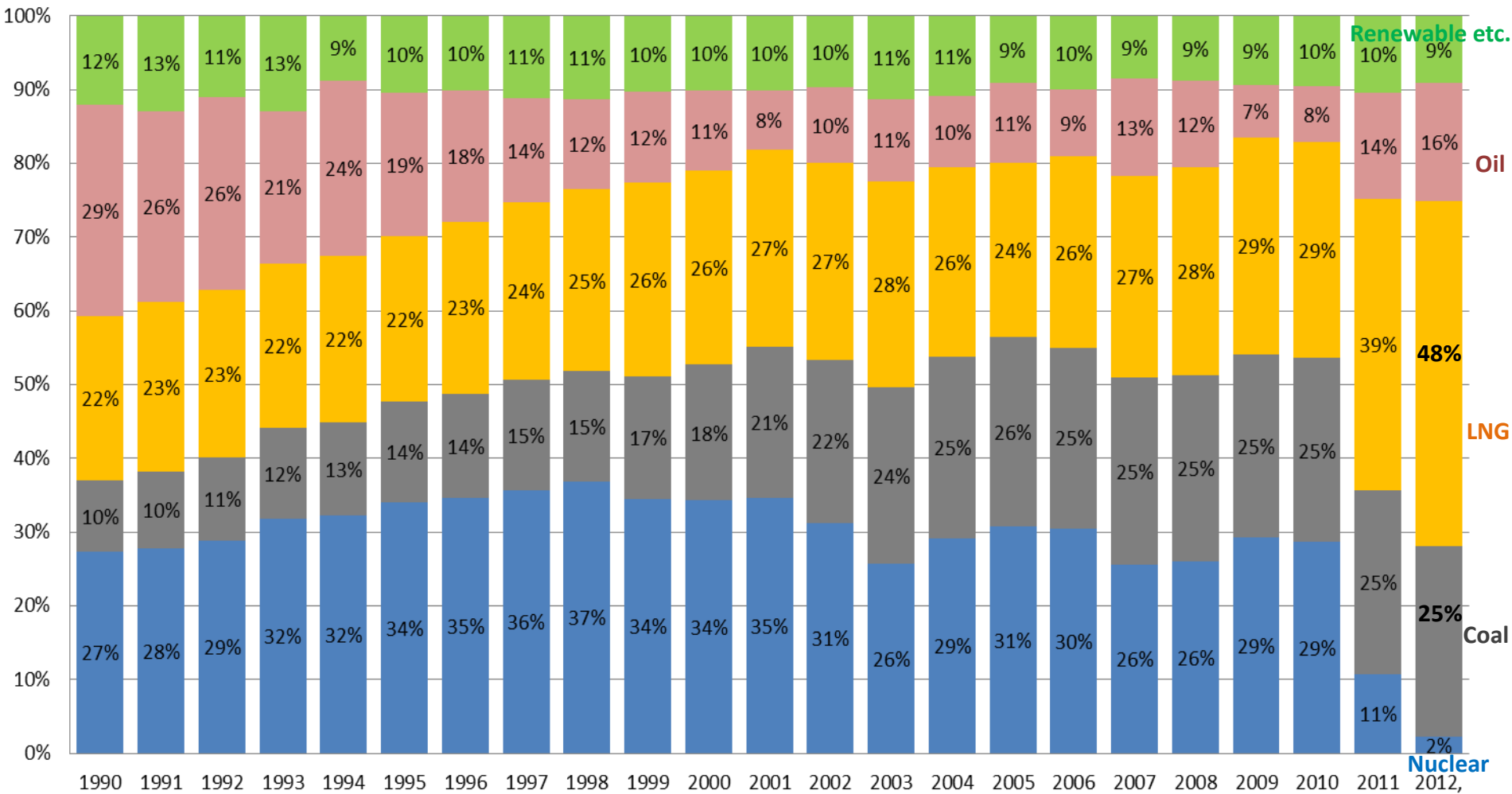
- None of 50 nuclear power plants are currently in operation
- Lost approximately 26% out of 1000TWh and 15% out of 280GW



Energy mix in Japan

LNG mainly compensates for the decline of nuclear power.

Electricity Generation by Fuel



Source: Compiled by METI based on "Outline of Electric Power Development in FY 2010" etc.

After 3.11: Increase in Renewables

- Started Feed in Tariff Scheme for Renewables in July 2012.
 - PV, Wind, Small/Medium hydro, Biomass, Geothermal
 - Eg. 42 yen/kWh for PV
- Expect rapid increase in introduction of intermittent renewables

	Amount deployed as of FY2011	Capacity of facilities that started operation between Apr. 2012 and Jan. 2013	Capacity of facilities that were approved by the end of January 2013 for the fixed price purchase system
Solar PV (residential)	Approx. 4,400MW	1,023MW	958MW
Solar PV (non-residential)	Approx. 900MW	306MW	5,749MW
Wind	Approx. 2,500MW	37MW	570MW
Mid- to small-sized hydraulic (1000kW or more)	Approx. 9,400MW	1MW	1MW
Mid- to small-sized hydraulic (Less than 1000kW)	Approx. 200MW	2MW	4MW
Biomass	Approx. 2,100MW	25MW	84MW
Geothermal	Approx. 500MW	0MW	2MW
Total	Approx. 20,000MW	1,394MW	7,368MW

History of Reforms in Japan

No competition in the electricity market before 1995:
10 vertically integrated GEUs (General Electricity Utilities) dominated and controlled the market.



METI embarked series of reforms...

No.	Year enforced	Overview
1	1995	<ul style="list-style-type: none">• Open the IPP (Independent Power Producer) market• Allow specified-scaled and vertically integrated power generators
2	2000	<ul style="list-style-type: none">• Introduce partial retail competition• Accounting separation of transmission/distribution sector
3	2005	<ul style="list-style-type: none">• Expand retail competition• Establish the wholesale power exchange (JEPX) and its supporting body for transmission in wider areas
4	2008	<ul style="list-style-type: none">• Modify the rule of wheeling rates...

Generation company, Transmission/Distribution company and Retailer after the reform

A Generation company

- 1) Construct plants
- 2) Purchase fuel
- 3) Operate plants
- 4) Sell power to retailers (or retail section in the company)¹⁾

B Transmission/Distribution company

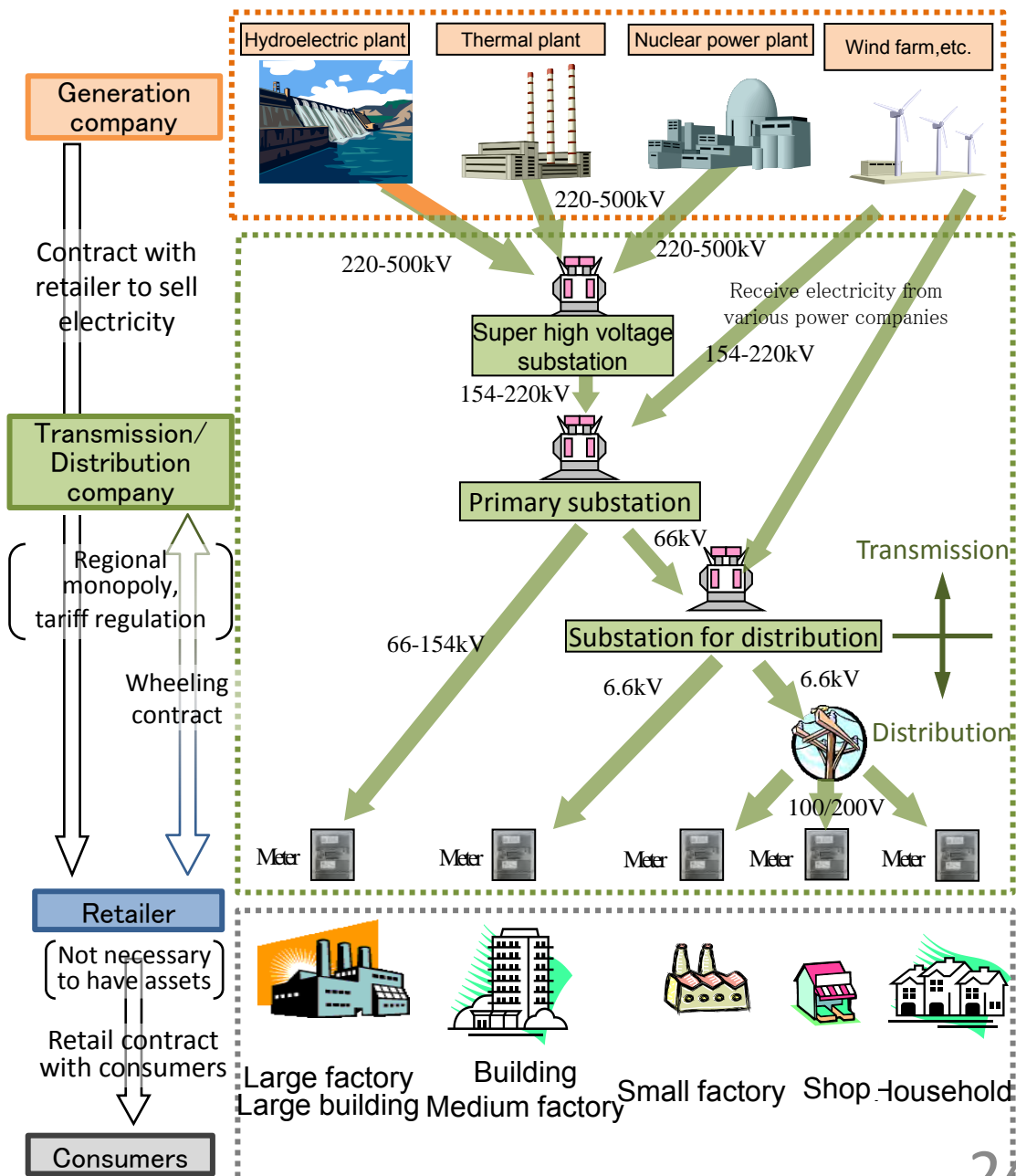
- 1) Regional monopoly, tariff regulation, 2) Guaranteed return of investment on lines through the regulated electricity rate, 3) Obligation to provide universal service, to maintain balance of demand-supply
- Code of conducts on some issues such as personnel, and accounting to secure neutrality

- 1) Construct and maintain transmission and distribution lines
- 2) Operate electric system (dispatch to each plant, stable power supply by operating the transmission/distribution lines)
- 3) Set up meters, metering
- 4) Provide "last resort service" and "universal service to isolated islands"

C Retailer

- 1) Purchase electricity to sell to consumers (purchase from power company or power sector in the company)¹⁾
- 2) Develop and provide tariff menus
- 3) Business to consumers, provide services
- 4) Collect the tariff

1) The case that a company has both retail sector and power sector.



Securing the Stable Supply of Electricity

I . Transmission/Distribution companies

- (1) Secure a high quality power supply such as stable frequency and voltage by continuously imposing the obligation to maintain a supply-demand balance of the whole electrical system.
- (2) Have obligation to construct and maintain transmission/distribution network, guaranteed through regional monopoly and tariff regulations including fully distributed cost methods.
- (3) Provide the last resort service of supply, and secure a stable supply in isolated islands at equivalent price that is comparable to that of the mainland.

II . In Emergencies

- (1) “The Organization for Cross-regional Coordination of Transmission Operators”(OCCTO) balance supply and demand by means of ordering reinforcement of thermal power sources and power interchange.
- (2) Government (METI) orders/requests power companies and other companies which have in-house power generation to supply power, as necessary.

III . Securing Capacity of Power Supply

- (1) Place an obligation on electricity retailers to secure the capacity of power supply.
- (2) Recruit constructors of power plants, which will be prepared by “the Organization for Cross-regional Coordination of Transmission Operators” (OCCTO) for future electricity shortfalls.