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## Ensuring Electricity Security in Japan's Electricity Market Reform Project

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# PLANNED ACTIONS ON JAPAN'S ELECTRICITY MARKET REFORM

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## 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



#### **Roadmap for Electricity Market Reform in Japan**

- 2 April 2013, Cabinet decided the "Policy on Electricity System Reform" to realize three objectives in Japan's market with a three-step approach.
- 3 objectives:
  - (1) Securing a stable supply of electricity
  - (2) Suppressing electricity rates to the maximum extent possible
  - (3) Expanding choices for consumers and business opportunities



## 1<sup>st</sup> step: Establish the OCCTO

• Establish the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) by about 2015



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

## 2<sup>nd</sup> step: Full Retail Competition

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



## 3<sup>rd</sup> step: Unbundle the T/D sector

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



# ENSURING ELECTRICITY SECURITY IN JAPAN'S EMR PROJECT

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### Japan's supply and demand balance

- Supply and demand balance has been very tight especially in summer since Fukushima accident.
- Estimated capacity in 2016 when full retail competition starts:
  - Even without counting nuclear restarts and additional renewables, almost 10% of reserve margin will be expected
  - 18 nuclear plants (18GW) have already applied to the safety inspection



(Note) All numbers are rounded off.

Supply

\*: in comparison of demand in 2014 summer

#### **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.



#### **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. Promote cross-regional electricity supply by OCCTO <2015>
  - 2. Ensure adequate capacity investment
    - a. Obligation for all retailers to secure adequate capacity <2016>

- Ensure procurement of enough quantity in the electricity market

b. 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

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

#### Promote cross-regional electricity supply by OCCTO <2015>

- Main functions of OCCTO to be established in 2015:
  - 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
    - Eg. Frequency conversion b/w Tokyo and Chubu :  $1.2GW \rightarrow 2.1GW \rightarrow ?$ ? DC tie line b/w Hokkaido and Tohoku:  $0.6GW \rightarrow 0.9GW \rightarrow ?$ ?
  - 2. Order EPCOs to reinforce generations and power interchanges under a tight supply-demand situation



### **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 ٠ 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.



## Thank you!



## REFERENCE

## **Energy mix in Japan**

LNG mainly compensates for the decline of nuclear power.

#### **Electricity Generation by Fuel**



## **Nuclear Power Plants Suspended**

- All of 50 units of nuclear power plants are in stoppage as of September 17, 2013.
- 18 units (in blue square) are under review for restart by Nuclear Regulation Authority in accordance with new safety regulation.



## **History of Market 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> <li>Open the IPP (Independent Power Producer) market</li> <li>Allow specified-scaled and vertically integrated power generators</li> </ul>
2	2000	<ul> <li>Introduce partial retail competition</li> <li>Accounting separation of transmission/distribution sector</li> </ul>
3	2005	<ul> <li>Expand retail competition</li> <li>Establish the wholesale power exchange (JEPX) and its supporting body for transmission in wider areas</li> </ul>
4	2008	Modify the rule of wheeling rates

#### **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

