

# Policy toward Sustainable Structures and Regulations for Electric Utilities

### Background and Objective

Based on discussions by the expert committee on the reform of the electric power system, the restructuring of electric utilities businesses and rate systems is looking likely. However, it is not clear whether the reforms proposed by the expert committee will bring benefits to the customers such as maintaining security of supply and optimizing the system to balance

supply and demand.

In this project, we aim to identify the issues in Japan's electric power system reforms and to present socially desirable institutional framework and regulatory policy, based on case studies and quantitative analyses of the electricity restructuring in the U.S. and Europe.

### Main results

#### 1 Identifying Issues for the Security of Supply and Competition after Unbundling of the U.S. Electricity Industry

We investigated the issues in security of supply and promoting competition after unbundling in the U.S. Some regions introduced capacity market to trade the capability of supply (kW) to ensure generation adequacy. However market operation is diverse and, in general, tends to be complex (Y12020). We also investigated into a

virtual divestiture as a tool for mitigating the market power of a dominant electric utility. We found the virtual divestiture has certain advantages over ownership unbundling, given that the utility is refrained from intentionally limiting the power supply from virtually divested power plants (Y12003).

#### 2 Impact Evaluation of Liberalizations on Residential Retail Electricity Prices in the U.S. and Europe

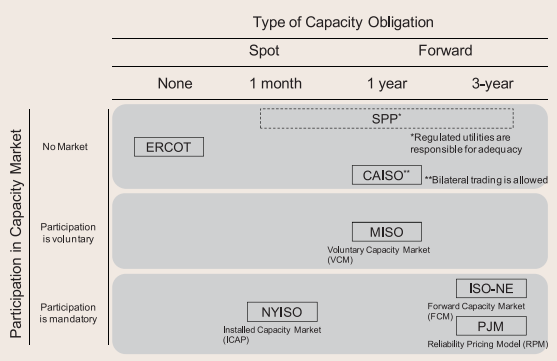
We examined the status of retail competition after the liberalizations in the U.S. and Europe, and evaluated its impact on retail electricity prices. In the U.S., while some restructured states have experienced an increase in share of competitive suppliers and a fall in retail prices since 2008 (Fig. 2), these states faced large increases in retail electricity prices up until 2008 and only a few states lowered retail electricity

prices after liberalization (Y12004). In Europe, many countries still keep regulated retail tariffs, which are too low to facilitate competition, but are difficult to abolish for political reasons (Table 1). Since residential customers do not have much interest in liberalization and do not necessarily choose the lowest price menu in the markets, it is hard to expect an immediate drop in electricity prices after liberalization (Y12017).

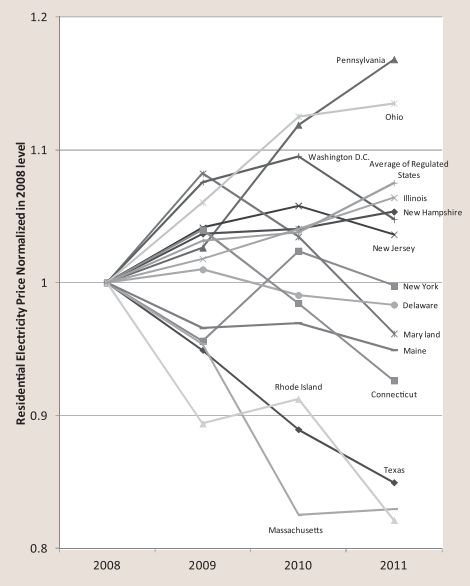
#### 3 The Impacts of Renewable Energy Deployment on Electricity Markets

We surveyed the issues in promoting competition in electricity markets as well as the deployment of renewable energy sources (RES) in Europe and the U.S. We showed that, in Germany, the wholesale market clearing price could be extremely low due to the rapid penetration of RES supported by feed-in tariffs (FITs). We also found that the penetration of renewable energy causes problems such as network constraints and cost increase from frequent re-dispatching orders that reduce the output of RES (Y12009). As for the U.S., we found that in the recent legal

discussions over consistency between renewable purchase obligations and the transmission independence policy, i.e., open access, it has been recognized that conflict exists between the open access policy that treats all types of generating technologies equally and the purchase obligations that only favor RES generators. In addition, we found that the establishment of transmission open access necessitates a partial abolishment of renewable purchase obligations (Y12027).



**Fig. 1: Categorization of Capacity Markets in the U.S.**  
 Capacity market designs differ in several aspects: some markets require forward capacity obligation; in one area, participation is voluntary (Midwest, MISO); and in another area, only bilateral trading is allowed (California). ERCOT's region (Texas) has no capacity obligation and rely solely on high wholesale power prices to induce generation investment, but reserve margin will be tight in the near future and creation of capacity market is debated. There are many parameters to be predetermined in order to run a capacity market, such as required reserve margin, and consequently the market design tends to be complex. The mistakes in market design could make the cost of capacity higher than necessary.



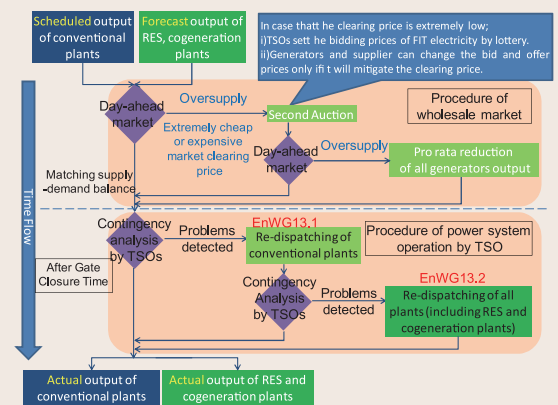
**Fig. 2: Development of retail electricity prices after 2008 in liberalized states in the U.S.**

In the U.S. electricity retail market for residential customers, the switch from regulated supply to competitive supplier has increased due to the lower wholesale market price, but retail prices have not necessarily lowered. Since 2008, electricity prices in Maryland and Connecticut have fallen, but the prices in these states had increased drastically up until 2008, and liberalization has not yet brought about lower prices.

**Table 1: Issues concerning the regulated retail prices after liberalization in France, Germany, and the U.K.**

By examining the UK, France, and Germany, we showed the issues concerning the regulated retail tariffs for residential customers after liberalizations. Many European countries such as France still maintain regulated tariffs, and in some countries, low prices of regulated tariffs prevent customers from shifting to market tariffs, and deter competitions. The European Commission requests these countries to abolish regulated tariffs, and, recently, show their firm opinion against such tariffs with a view to initiate infringement cases in the European Court of Justice.

Issue	Country	Current Status and Evaluation
Price levels of transitional regulated tariff and last resort service	France	Low-priced regulated tariffs prevent residential customers from switching to market tariffs, and adversely affect the competition.
	Germany	Default (last resort) tariffs are set slightly higher than the market tariffs, which urges residential customers to switch to market offers.
Reversibility of residential customers to regulated tariff	France	Residential customers cannot move back to the regulated tariff once they switch to market tariffs, which makes switching customers face price risks.
Deadline of the Abolishment of Regulated Retail Tariffs	France and others	The politicians and regulatory authorities cannot decide the abolishment of regulated retail tariffs because of potential opposition from customers.
Customer Protection Measures after the Abolishment of Regulated Retail Tariffs	The United Kingdom	While customer protection measures such as discounted tariffs for low-income customers were introduced, theoretical and practical problems are revealed.



**Fig. 3: The schematic procedure of spot market clearing and re-dispatching consideration of RES in Germany**

When the market clearing price becomes under minus 150 [EUR/MWh], the "second auction" of day-ahead market is opened. In the "second auction", the bid and offer prices of transmission system operators (TSOs) are set randomly. In case that network constraints occur after the gate closure time, TSOs administer a two-step re-dispatching order based on articles 13.1 and 13.2 of the Energy Industry Act (EnWG: Gesetz über die Elektrizitäts- und Gasversorgung). The first-step re-dispatching order based on EnWG 13.1 could be issued for conventional generators. Only when the first-step order could not solve network constraints, the second-step re-dispatching orders based on EnWG 13.2 could be issued for all types of generators including RES and co-generators.