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Report Summary

Current status and Evaluation of Electricity market liberalization in Japan, USA and Europe

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<Research Purpose>

The Electricity Utility Industry Law was revised in fact after all of 31 years in 1995, and electric industry reform was started in Japan following Europe and USA. After that, the law was revised secondly in 1999 and thirdly in 2003, then a great change has been introduced in electricity industry system, like partial liberalization of retail associated with an entry of PPS (Power Producer and Supplier), and establishment of Power Exchange and Neutral System Organization.

On the other hand, an investigation on further system reform is planned to be started from 2007, including full retail liberalization, after 10 years from the start of electricity industry reform in Japan. It is considered a good opportunity to review the current status of electricity industry system reform in Japan. Therefore, this study is aiming to get a future prospect through reviewing on four criteria of (1) liberalization scheme, (2) efficiency, (3) progress degree of competition, and (4) stable supply.

* This study is based on the 2004 contract research, "Current status and Evaluation of Electricity and Gas Market Liberalization (Comparisons between Japan, USA and Europe)" from the Committee for Energy Policy Promotion.

<Main Conclusions>

(1) Japan selects step-by-step electric industry reform, then (1) in comparison with liberalization scheme, the requirement is not fully fulfilled from European and American view point, (2) from the view point of efficiency, through step by step revision of electricity price, over 20% price down is realized since start of liberalization (TEPCO), electricity price is stably falling down and approaching to major European and American utilities' price level, and it can be judged that **at the present stage, Japan's system reform is stably attaining a good result of efficiency**. On the other hand, (3) the change rate of supplier is remaining at low level, in spite of uneven distribution in locality and a sort of consumers, and (4) it

is evaluated that stable power supply is of no problem for the present, the future issue is what kind of framework should be established in a case that a further system reform is carried out in the electricity industrial juristic circumstances different from Europe and America.

(2) The followings are the points in the discussion of system reform including full retail liberalization planned in 2007, (1) the new framework after 2003's revised Electric Utility Industry Law, **especially, could the Neutral System Organization and Power Exchange accomplish an expected function?** (2) **What kind of disputes can occur under the new framework?** (3) taking account of the difference of framework between Japan and USA or Europe, and being compatible with the other political problems like promotion of efficiency and nuclear or renewable power source which are the objectives of electricity system reform, **how can we establish the framework of long term stable power supply, under the completely new framework of the reform associated with maintaining present scope of liberalization, or full range of liberalization**.

<Explanation>

(1) Taking account of comparison with the liberalization scheme, the degree of achievement was demonstrated, in comparison with system reforms carried out in Europe and America concerning liberalization. In Europe and America, the concept of "standard market design" is getting to be popular, however **in Japan, the difference is prominent especially in unbundling of network sector (transmission and distribution), as a result, it was found that only few requirements of standard market design were fulfilled**. But in case of Japan, relative to Europe and America, the compatibility between public beneficial issue such as energy security, and electric industry reform is more severely considered, then step by step system reform is adopted, therefore it is necessary to evaluate the final scheme of the system.

(2) From the view point of efficiency, one of the objectives of electricity industry system reform was to realize a reasonable electricity price at the international standard. We carried out present status evaluation. **It is found that Japan's electricity price level is approaching to the representative utilities of France, Germany, United Kingdom and the USA, diminishing differentials, and getting to equal or lower in comparison with New York area of the USA**. Concerning the changing trend of electricity price after the start of electricity industry reform, an up-down fluctuation can be seen in European and American market,

in case of Japanese market, after 5 times of price revisions, TEPCO realizing more than 20 % of price down, the trend is consistently falling, then **the stable and efficient development has been achieved**.

(3) From the view point of degree of competition, the comparison of customer choice switch rates. At first in the USA, it is found that the switching rate is greatly different between the state where a competition is promoted, and the state where restoration of profit from liberalization to consumer is encouraged. In Europe, it is found that the changing rate is high in the country, like UK, which initiated liberalization in advance, and because Europe is aiming the single market, the market concentration measure and the foreign capital market share are adopted as comparative items. In Japan, because the un-symmetric regulation as in the USA is not introduced, **the share of PPS is low-lying 2.30% for consumers of liberalization objective (at the time of February 2005), however the changing rate of business consumer in metropolitan area is high, therefore uneven distribution locally exists**.

(4) From the view point of stable supply, the comparison between the framework of supply reliability maintaining and the reliability assessment which is carried out in local reliability councils. As an overall framework, the company is certificated for each function necessary for reliability maintenance in the USA, on the contrary the reliability organization is positioned as an adjustment place in Europe and Japan. **The framework of stable supply is legally of great difference, between Europe, America and Japan, therefore the applicable scheme for Japan could be limited**. As for middle and long term prospect of power supply, ensuring a long term supply is getting to rely on the market principle, depending on the preeminence of the market of power-generating sector in the USA. Therefore, the review of evaluation method was done in the USA, and it was confirmed that an expectation for the interconnection line as a available supply power was enhanced in Europe. In Japan, the reliability assessment report has been published by the Electric Power System Council of Japan (ESCJ), then it is evaluated that an enough supply power exists.

<Data>

Table1 Comparison of liberalization model between Japan, USA and Europe

	EU	USA	Japan
The year of liberalization start	Electricity regulation reform of EU-wide started in 1996, according to EU Electricity directive. The enforcement time of regulatory reform was various depending on the country. (liberalization of UK started in 1990)	Reform of generation and transmission sectors started following order 888 in 1996. The other sectors were carried out separately by the state. (partial liberalization was started at Rhode island in 1997.)	Overall reform of electricity industry was started according to revision of Electric Utility Industry Law in 1995. Retail liberalization was started March 2000, according to 1999's revision of Electric Utility Industry Law.
Main purpose of system reform	Realization of single market following EU economic integration	Correction of electricity price gap among the states	Correction of gap between domestic and foreign price
Framework of wholesale market	No regulation in all EU. But, most of countries have power exchange.	RTO founded mandatory energy market within its area. (so to speak "pool market")	Japan electric power exchange (JEPX), a non-mandatory type exchange, started operation from April 2005.
Unbundling of transmission sector	Functional and accounting unbundling were obliged by 1996 EU directive. The legal and functional unbundling were obliged by 2003 EU directive.	Functional and accounting unbundling were requested by 1996 order, however a wide area transmission organization RTO was proposed by 1999 order 2000. The northeastern PJM ISO, Midwest ISO are approved as RTO.	The accounting unbundling and information isolation were obliged by the 1999 amendment of the Electricity Utility Industry Law. The enforcement of regulation on action was carried out by the 2003 amendment.
Scope of retail liberalization	Full liberalization is obliged to start by 2007. Especially, UK and Germany has already started full liberalization.	There is no unified movement at Federal level. Full liberalization was carried out in the most states of the northeastern area. The southeastern area is not liberalized.	Liberalization was carried out for high or more voltage consumers April 2005. The discussion on the review of system including appropriateness of full liberalization is scheduled to start in 2007.

Table 2 Evaluation of Japan's regulation reform from the European and USA's viewpoints

		Europe	USA	Japan
Generation market	Founding of Power Exchange(energy market)	necessary	necessary	○
	Adoption of LMP method	unnecessary	necessary	×
	Obligation of ensuring resources to supply for retail company	unnecessary	necessary	×
	Establishing of balancing market	necessary	necessary	×
	Establishing of ancillary service market	necessary	necessary	×
Transmission Sector	Unbundling of accounting	necessary	necessary	○
	Unbundling of decision making	necessary	necessary	×
	Legal unbundling	necessary	unnecessary	×
	Ownership unbundling	unnecessary	unnecessary	×
	Establishing energy market	unnecessary	necessary	×
	Establishing of a wide area independent operator (RTO)	unnecessary	necessary	×
	Solution of pancake problem (*1)	necessary	necessary	○
	Reliability regulation	necessary	necessary	○
Retail sector	Full liberalization	necessary	-	×
	Establishing of last resort service supplier	necessary	-	-
Regulation	Establishment of independent regulatory authority	necessary(*2)	necessary	×
Number of circles from each assessment axis		4/11	4/12	

*1 "Pancake problem" means a special charge which is assigned to wide area trade, for example in Japan, the transfer charge crossover multiple general utilities supply areas is that. (It was decided with 2003's amendment of Electricity Utility Industry Law to be abolished by April 2005.)

*2 The independent regulatory authority mentioned here is the one which is obliged to establish for each country government. It doses not mean that the authority is independent from decision making of competitive policy in EU's overall energy policy.

Table 3 Comparison of Power Rate (Japan's level normalized to each company) (in 2004)

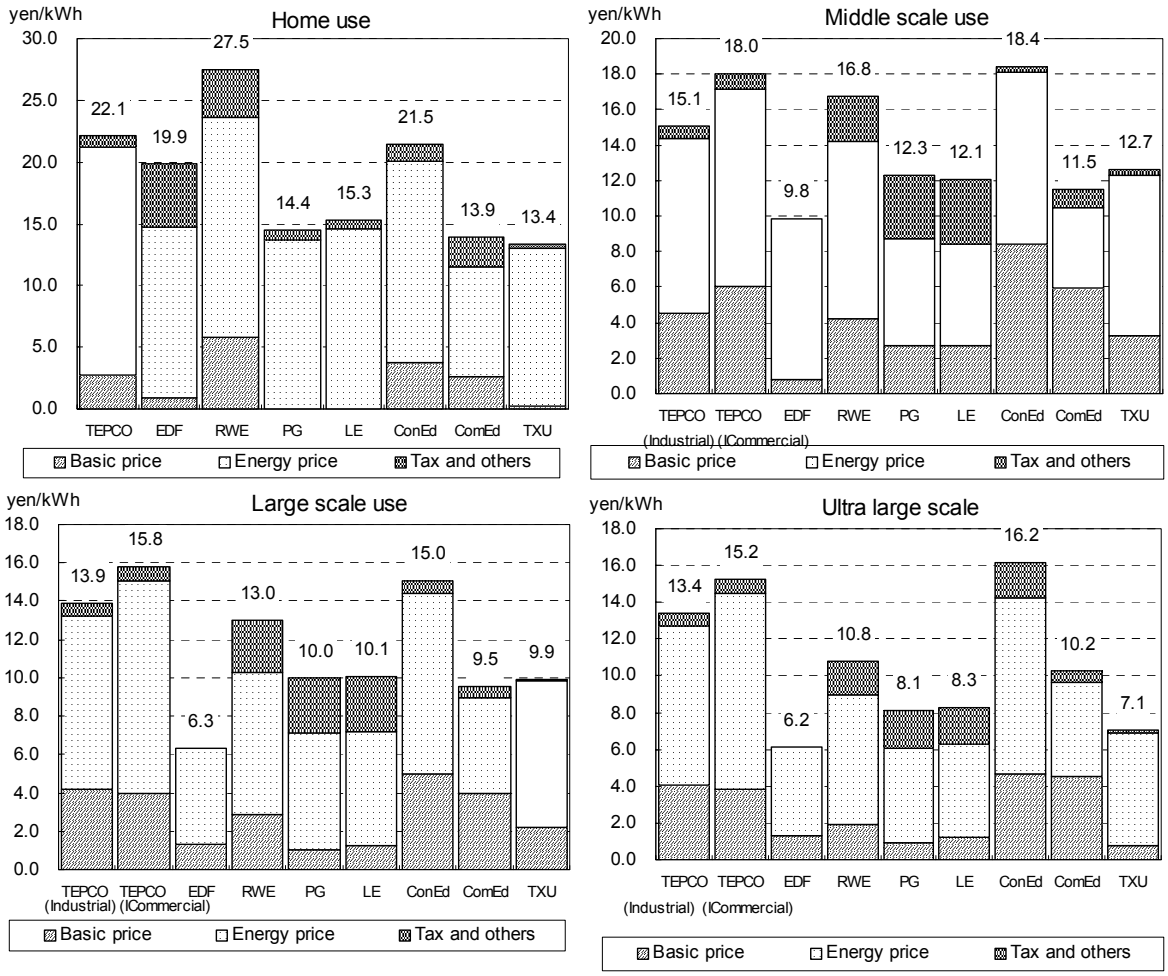
		EDF (France)	RWE (Germany)	PG (UK)	LE (UK)	ConEd (NY,USA)	ComEd (IL,USA)	TXU (TX,USA)
Home		1.11	**0.81**	1.53	1.45	1.03	1.59	1.66
Middle scale	business	1.83(*2)	1.07	1.46	1.49	**0.98**	1.56	1.42
	Industry	1.53(*2)	**0.90**	1.22	1.24	**0.82**	1.31	1.19
Large scale	business	2.52(*2)	1.22	1.58	1.57	1.05	1.66	1.60
	Industry	2.21(*2)	1.07	1.39	1.37	**0.92**	1.46	1.40
Ultra-large scale	business	2.47(*2)	1.41	1.88	1.84	**0.94**	1.49	2.16
	Industry	2.17(*2)	1.24	1.65	1.61	**0.83**	1.31	1.90

(*1) EDF is France, RWE is Germany, PG (PowerGen (E.on))· LE (London Electricity (LE Group)) are United Kingdom, ConEd (Consolidated Edison: the state of New York)· ComEd (Commonwealth Edison (Exelon): Illinois state)· TXU (the state of Texas) are US utilities. Japan is TEPCO.

(*2) EDF electricity price does not include tax and others, excluding home use.

(*3) Numeric numbers indicate the ratio of Japan's electricity price assumed the price of each company to be unity.

Figure 1International comparison o electricity price (in 2004)



Note: As for consuming magnitude, it is assumed that home use is 30A, middle scale is 150kW, large scale use is 1,000kW, end ultra large scale use is 4,000kW.

Table 4 The start year of electricity liberalization and change of price

		Initial year of liberalization(*1)	Price in initial year	Price in 2003	Changing rate
USA	Pennsylvania	1997	7.99 cent/kWh	7.98 cent/kWh	**▲0.1%**
	California	1998	8.93 cent/kWh	11.62 cent/kWh	**+30.2%**
	Massachusetts	1998	9.59 cent/kWh	10.63 cent/kWh	**+10.9%**
	New York	1998	10.63 cent/kWh	12.44 cent/kWh	**+17.0%**
	Texas	2001	7.39 cent/kWh	7.50 cent/kWh	**+1.5%**
Europe	UK	1990	7.42 pence/kWh	7.76 pence/kWh	**+4.5%**
	Norway	1991	38.9 ole/kWh	54.8 ole/kWh	**+40.9%**
	Sweden(*2)	1992	67.5 euro/MWh	83.8 euro/MWh	**+24.1%**
	Spain	1994	105.9 euro/MWh	87.2 euro/MWh	**▲17.7%**
	Germany	1998	125.6 euro/MWh	126.7 euro/MWh	**+0.9%**
	Italy	1999	157.0 euro/MWh	144.9 euro/MWh	**▲7.7%**
	France	2000	92.8 euro/MWh	89.0 euro/MWh	**▲4.1%**
Japan		1995	22.38 yen/kWh	19.05 yen/kWh	**▲14.9%**

(*1) The initial year means the year when structural reform regulations were put into effect, such as not only beginning of retail liberalization and implementation of pilot program.

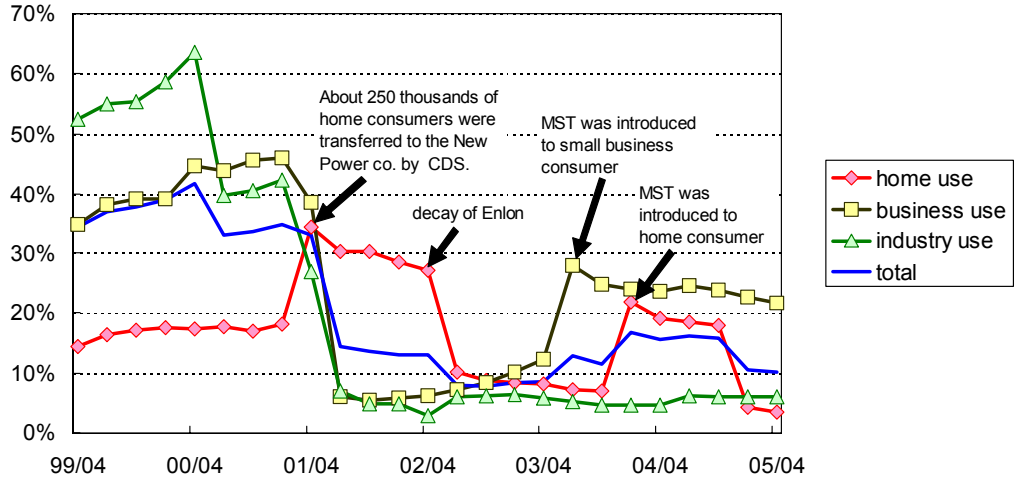
(*2) Only for Sweden, price in 1997 is used as price in initial year because of data limitations.

(data origin) USA: electric utilities average unit income price by EIA, UK: average credit buying price of standard family(annual consumption of 3,300 kWh) by DTI (tax included). Norway: home and agricultural average unit price (added value tax excluded) by statistics authority, other European countries: Eurostat data, Japan: general electric company light power comprehensive unit prices.

Table 5 Status of supply company change in main states of the USA

state	status
Illinois	Entry into home sector is not high transfer cost. New entry is centered to ComEd's area.
Main	Standard offer service (SOS) is provided to all consumers. A high change rate occurs in big consumers.
Merry land	SOS is provided to a consumer who does not select a new entry. A high change rate occurs in big consumers.
Massachusetts	SOS is provided as a temporary measure. Default service (DS) is provided as the final guaranteed service. Change rate varies greatly depending on the status of wholesale electricity price.
New Jersey	Because of depressed price of the basic electric power service (BGS) provided from regional distributor, change gate is low lying.
New York	Because of retail incentive policy like Backout Credit and rebate, change rate is high.
Ohio	SOS is provided to a consumer who does not select a new entry. Obligation of price depression for home use sector. High change rate is because of an active aggregation (load concentration) service in local government level.
Pennsylvania	Based on the lowest market share plan (Market Share Threshold:MST), the competition promotion policy like DS is transferred to a new company is carried out.
Texas	Already existing electric company provides power at standard price (price-to-beat) , regulated price, till the share of new entry exceed 40%.

Figure 2 Changing rate trend of power delivery at PECO company in Pennsylvania USA



(Note) MST (Market Share Threshold Program): 20% of consumers who did not change supplier were randomly selected, then Default Service supplier was decided by bid. PECO Energy's business reform plan of 1998 said that if the supplier change rate of home and small business consumers did not reach 50% by January 1 2003, the supplier for the consumers should be changed by bid. This open bid was carried out based on the provision.

(data origin) Pennsylvania Office of Consumer Advocate, "Pennsylvania Electric Shopping Statistics"

Table 6 Comparison of reliability rules

	USA	Europe	Japan
Establishing Organization	NERC	UCTE	Power System Utilization Association
Name of Regulation	Reliability Standards	Operation Handbook	Association rule
Member	Local Reliability Association	Power Transfer Company	General Utility, Wholesale Generator, PPS, Neutral
System Operation Rule	○	○	○
Ordinary system operation rule	○	○	○
Emergency system operation rule	○	○	○
Transfer System Equipment Planning	○		
Demand prospecting method	○		
Criteria for equipment ensuring	○		
Wide-area adjustment of equipments formation	○		○
Wide-area Trading Method	○	○	○
Calculation Method for Deliverable Capacity	○	○	○
Information Communication	○	○	
Training of System Operator	○	○	
Tree Management	○		
Publication of Information	○	○	○
reference> Legal Framework of Stable Power Supply	Not clear, the function of transfer sector became various and complicated	Responsibility of electricity transfer company by Utility Law	Responsibility of general electricity company by Utility Law

(data origin) The above is quoted from the web site of NERC, UCTE and ESCJ.

Table 7 Expected framework assumed overall leberalization

	Duty of stable supply	Final guarantee	Remarks
Legal separation	Transmission company	Assigned retail supply company or power transmission company	Framework is established separating stable supply and final guarantee. It is difficult to put duty on stable supply to other sector. (ex. Most of European countries)
License regulation	Transmission Licence holder and other License holder	Assigned Retail License holder	Legal separation is unnecessary because license is provided on the outer-shape criteria. It is possible to put duty on stable supply to the other sector than Transmission License holder. (ex. UK)
General supply duty regulation	Existing electric power utility	Existing electric power utility	Similar to the present system, general electric power utility widely has the duty and final guarantee on stable supply. (form of maintaining present legal framework, overall liberalization is carried out.)
Energy Industry Regulation (also transmission sector is liberalized)	(assured by industry's voluntary rule)	Assigned existing electric power utility	With no regulation on transmission price, management is done by industry voluntary rule. Only the framework of energy company remains. (ex. Germany)

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