

## Evaluation of the New Electricity Industry System - Centered on a Comparison with the European and American Systems -

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### Research Objective

On February 18 of this year, a “Desirable Future Framework for the Electricity Industry System (draft)” (“Report”) covering a new framework for the electricity industry was agreed to at the 14<sup>th</sup> Electricity Industry Committee, and a report was submitted to the Minister of the Economy, Trade and Industry. Then, in March of this same year, a draft amendment to the Electricity Utility Industry Law based on this proposal was introduced to the National Assembly.

The debates on this present system reform concern the realization of a system intended to reconcile issues of public interest with the dual objectives of (1) rectification of relatively high electricity charges compared with other countries, and (2) the designing of a system that compares favorably internationally. Then, an attempt will be made to evaluate how the framework of the new system indicated in this report measures up to the above objectives, based on the current situation in the Europe and America.

### Main Conclusions

1. Though several issues still remain, this system reform should be able to assure a system that fosters wide-area competition, while maintaining stable supply, and, as a Japanese type model, can be evaluated as having realized a first step towards a framework for an electricity industry system that stands well up to comparison internationally.
2. From the perspective of promotion of wide-area competition, it has been decided to take the initiative over the United States and Europe, by “eliminating the rate pancaking problem,” the so-called addition of transmission charges to straddled supply regions (abolishment of transfer charges), which is expected to result in the realization of a “**creation of a single nationwide market.**” As a result, consumer choices will be greatly expanded and competition will evolve into a nationwide scale. Moreover, it is anticipated that the establishment of Power Exchange will lead to the utilization of wide-ranging power sources and will also promote additional competition.
3. On the other hand, from the perspective of assuring neutrality for the transmission sector, it will be important (1) not to adopt structural regulations intended to separate the generation sector and transmission sector of existing General Power Utilities (GPUs), while emphasizing the assurance of the

neutrality of the transmission sector, and (2) to establish Neutral System Organization (NSO) that draw up and monitor rules (facilities formation, system access, system operation and disclosure of information) for the transmission sector, as new organizations. The NSO is, in addition, expected to perform a variety of functions, including managing a system for making public information on Available Transmission Capacity (ATC) on interconnection lines, and providing a point for coordination related to the planning for providing interconnection lines between areas, and should play an important role in the maintaining of a stable supply on a nationwide scale.

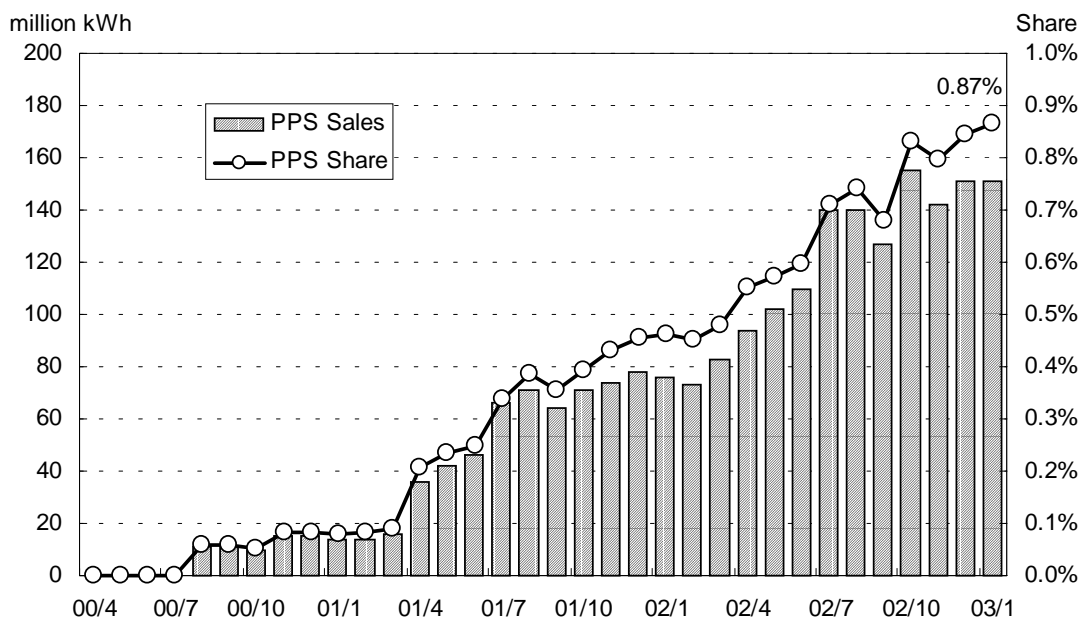
4. An important issue will be the handling of the nuclear power, the conclusions of which are to be forthcoming by the end of 2004. The outcome of those conclusions may also potentially have an impact on the present framework. Over the long term, the coordination of the creation of a single nationwide market with a network infrastructure that has been formed from a regional perspective, will also be an issue. The formulation of the plan for a wide-area network infrastructure and the bearing of the costs are to be coordinated through the forum of the NSO, “which will provide the forum for the coordination of the planning for the outfitting of the interconnection lines between regions;” however, just how it will actually be coordinated will be an issue.
5. Though serious discussions on the future detailed system design are anticipated, a number of points of contention remain to be studied. Three will be particularly important: (1) the providing of a compensating mechanism in conjunction with the elimination of the rate pancaking problem,(2) the governance of the NSO and the decision making process, and (3) participation of government offices in the Power Exchange and a supervisory system. A function for reconciling opinions among the interested parties will of course be particularly important for the NSO, and the creating of a framework for it will be an issue. At the same time it will also be essential to train neutral specialists capable of holding their own in specialized discussions.

## **Explanation**

### **1. Current State of Progress in Deregulation**

The deregulation of electric power in Japan has shown steady progress. The 1995 amendment to the Electricity Utility Industry Law introduced the IPP (independent power producer), while the 1999 amendment to the Electricity Utility Industry Law brought about retail market opening for special high voltage customers as of March 2000. Though the market share for new entrants (PPS; Power Producer and Supplier) in January 2003 was a mere 0.87%, a lively competition has been realized primarily for business in the major metropolitan areas. PPS power sources are expected to grow steadily over the medium and long term. The efficiency of the General Power Utilities (GPUs) should also progress and the benefits of deregulation will be passed on in the form of lower charges in regulated customers as well. Nevertheless, situations such as the existence of transfer charges that were charged when GPUs supplied across straddled supply regions left the impression that competition was restricted to within regions.

**Figure 1 PPS market share trends**



Source: Prepared from the “Total Electrical Energy Demand Bulletin” of the Resource Energy Agency

## 2. “Report” Outline

The outline of this “report”(“Desirable Future Framework for the Electricity Industry System (draft)” ) may be summarized in the following five points.

### (1) Elimination of the rate pancaking problem (= abolishment of transfer charges)

It has been decided to abolish the transfer charges that are charged whenever supply areas are straddled, which have tended to obstruct competition between GPUs, the use of wide area supply capability and the expansion of customers choices. In response to this, transmission charges will be integrated into the connection charges and a so-called postage stamp system for each demand region will ensue. In conjunction with the abolishment of the transfer charges, measures for settlement between GPUs are to be introduced and the reliable collection of costs is to be guaranteed.

### (2) Establishment of NSO and Power Exchange

Neutral System Organization (NSO) play an important role. In relation to the utilization of the network, that serves as a common infrastructure, they establish the rules for (a) the formation of facilities (rules for the formulation of network facilities plans), (b) system access, (generator side access rules and customer side access rules), (c) system operation and (rules for assuring sufficient capacities during system operation, rules for formulating operating plans for network facilities, rules for load-dispatch instructions, and rules for interconnection line operation), and (d) the disclosure of information, and they provide supervisory and dispute handling (mediation and arbitration) services. In addition, they make public information on Available Transmission Capacity (ATC) on interconnection lines, provide a point for coordinating central electricity supply communication functions and the planning for providing of interconnection lines between areas, evaluate supply reliability, produce and publicize various statistics and undertake investigation and research relating to bulk power

systems.

Moreover, it has been decided to organize Power Exchange on a national scale made up of day-ahead market and forward market, so as to promote the utilization of generation facilities over a wide area. Assuring a certain transaction volume in the initial stages of the founding of the exchange is an issue of concern. Nonetheless, though the GPUs will not be compulsorily required to provide their generation production, they will initially contribute voluntarily to make public policies on power supplies.

(3) Non-adoption of structural regulations, such as the separation of transmission sector and generation sector (unbundling)

With the objective of maintaining supply reliability, considering the geographic and facilities requirements peculiar to Japan, it was decided at this time not to impose structural regulations, such as the separation of transmission sector and generation sector (unbundling) on GPUs. Instead, three behaviors will be reliably guaranteed: (a) the information firewall, (b) the prohibition of cross subsidizing, and (c) the prohibition of discriminatory treatment. This is to be done by guarantees provided under the laws and by setting up an *ex post facto* government checking function.

(4) Phased retail market opening (schedule clarification)

A schedule has been made known indicating retail market opening for 500 kW and above (about 40%) in 2004, for 50 kW and above (about 63%) in 2005 and the start of discussions for full retail market opening from 2007. Rather than a sudden deregulation, as has been seen in some foreign countries, it has been decided to adopt a phased approach while laying groundwork, such as the establishment of NSO and Power Exchange.

(5) (Positioning of nuclear power and coordination with the market)

It has been decided to proceed in the following manner. "A system will be set up to analyze and evaluate factors, such as the cost structure encompassing the back-end operations in general and the profitability of nuclear power generation as a whole. Based on the results, arrangements will be made, for example as to the appropriate apportionment of roles between the government and private sectors, and coordination with the existing system. A study will then be made, including necessity as well, as to the orientation for specific systems and measures, such as economic measures, with a target of the year 2004." This report is to be 'finished,' at the stage where this study is completed.

### 3. Situation in Europe and America

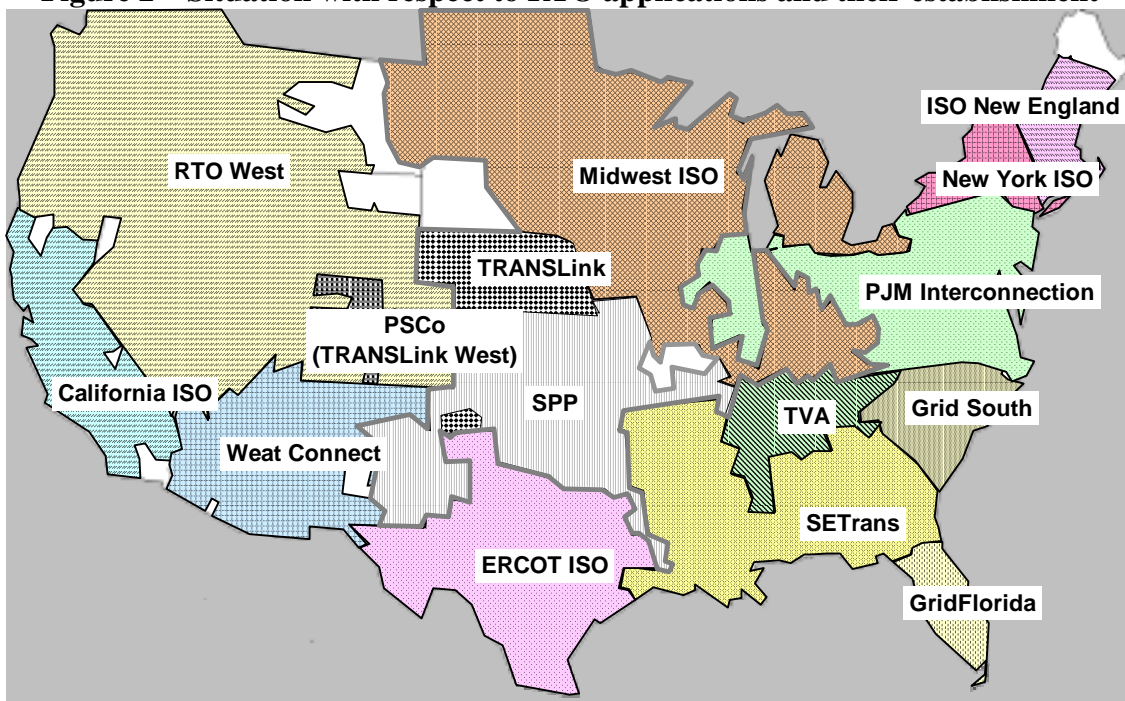
#### (1) Situation in the United States

In July of 2002, the Federal Energy Regulatory Commission (FERC) of the United States made known the draft regulation for the Standard Market Design (SMD) and called for wide-reaching discussions. The SMD came about due to the fact that no progress was being made on the establishment of an RTO (Regional Transmission Organization) that had been sought in rule (Order 2000) for the establishment of an RTO set forth by the FERC in 1999. In the background of the California Energy crisis and the Enron problem, however, a call arose for a wholesale power market design that

would include a highly reliably transmission sector which led to the setting out of the SMD. The Standard Market Design is similar in nature to the PJM ISO<sup>1</sup> system of the Northeastern region. Its major characteristics are that it requires the establishment of a day-ahead energy market and a real-time market, and that it adopts a ‘locational marginal pricing (LMP)’ system as its price determination system. In the Western region, however, hydroelectric power has a relative high weighting, and given the lack of familiarity with the LMP system, its implementation will likely be delayed.

On the other hand, a completely different deregulation system has been adopted in Texas where the jurisdiction of the FERC does not reach, which has drawn attention due to the uniform results it has shown. Its prime characteristic is that unlike the SMD and PJM systems, it adopts a quite decentralized system operation method, which, for example, does not impose an obligation on market participants to assure scheduling and ancillary services.

**Figure 2 Situation with respect to RTO applications and their establishment**



Source: Prepared from the FERC, "Regional Transmission Organization Activities" home page.

(2) Situation in Europe

In Europe, the movement aiming at a unified ‘internal electricity market’ is gaining momentum, as the next step following the 1996 EU Order. Interested parties have been gathering periodically at the scene of the Florence Regulatory Forum to study matters related to international power trade within the EU region. Uniform progress has been achieved in the aspects of unification of the transmission charges relating to international power trade, reduction of the level of charges and congestion management for interconnection lines.

<sup>1</sup> This is an organization that independently operates a system from market participants straddling the states of Pennsylvania, Maryland and Virginia through Power Exchange of day-ahead market and real-time market.

Meanwhile, important matters concerning domestic system were decided at the stage of political agreements of the related Cabinet Council in November 2002. More specifically, within the scope of retail market opening it was decided to open the non-residential sectors by July 2004, with full opening to be implemented by July 2007. In addition, management unbundling or legal unbundling was to be required for the transmission sector and distribution sector. (Other conditions are also pending with regard to the distribution sector.)

#### 4. "Report" Evaluation

##### (1) Evaluation and issues concerning the elimination of the rate pancaking problem

The abolishment of transfer charges and the establishment of a wholesale Power Exchange have made evident the new orientation from regional markets towards the creation of a single nationwide market. Though the U.S. and Europe have made a particular effort to "eliminate the rate pancaking problem," Japan has merited attention as a vanguard example for achieving its elimination.

However, as a pending condition, "They will seek to use the abolishment of transfer charges to resolve the questions of recovery of costs, settlements between regions, and location in remote areas and will watch how the situation progresses following the abolishment, and if major problems arise, they will immediately reassess the abolishment." Nonetheless, the orientation towards the creation of a single nationwide market that has been expressed lately is unlikely to change.

Since linked equipment between companies is weak in terms of physical infrastructure, and a long-term build-up will be required, the structuring of a mechanism "to provide compensation commensurate with the abolished transfer charges" will be indispensable. It is assumed that measures for settlements between companies are now being introduced and the secure recovery of costs will be guaranteed; however, a debate is now being called for in the United States and Europe on how the compensation money will be calculated, and adequate study will be required.

##### (2) Evaluation and issues concerning the establishment of NSO

###### (a) Governance

As mentioned previously, NSO have been set up to handle such problems as the formation and usage of various networks and they play an important role in the maintenance of a stable supply on a nationwide scale. Consequently, the governance and decision-making procedures at NSO have a marked affect on the operation of the electricity market. There are no examples of the same sorts of institutions having been established in Europe or America, and it is a system unique to Japan.

They are made up of "Board" and ad special committees established within the NSO as well as the representatives of the interested parties, and inevitably the 'scope of the interested parties,' the 'distribution ratio of seats,' and the 'selection' have a significant impact on the decision making process.

In Europe and America as well, the means of participation of interested parties in organizations requiring neutrality vary and it is dangerous to think that a framework, once determined, will be the ultimate outcome. Originally, in the United States as well, in many instances ISO Boards were made up of the representatives of the interested

parties; however, they have shifted to independent persons<sup>2</sup>, for example without market participant and pecuniary related interests. (In Europe it is often the case that transmission companies are made countrywide monopolies and thus similar problems are not encountered.)

It is particularly important to establish a way for interested parties to participate (Board and special committees) and at the same time, how the respective groups of interested parties will form arguments is also an important consideration. What is required is an organization for shaping an agreement among the respective the PPS, self-producers and wholesale electric utilities. Over the medium and long term, an important issue will be the training of independent specialists capable of holding their own in specialized discussions.

(b) Guaranty of legal force

The regulations providing for the presently established NSO are set up to guaranty their observation by a 'system of self-regulation' framework, in which the market participant himself observes the rules agreed upon.

In both Europe and America, there has been a diversification of the participants in the electricity industry, and the assurance of legal force for the rules relating to reliability standards is a major issue. At present, all their various countries have adopted a 'system of self-regulation.' (The enactment of a law to legally guaranty legal force is currently under deliberation in the United States.)

It is essential to the process of enactment of rules to be observed by market participants under the 'system of self-regulation' that the view of each interested party be expressed and that a thorough debate be conducted. Consequently, the governance of the NSO is also important from the perspective of the legal force for the rules to be formulated by the NSO.

(3) Evaluation and issues concerning Power Exchange

(a) The proper approach to public participation

The Power Exchange decided by this present establishment may be expected to contribute significantly to the 'creation of a single nationwide market' through the utilization of a wide-ranging generation facilities.

It has been agreed that the Power Exchange will be established as a purely 'private exchange' and that its neutrality will be secured though the organizational configuration of "an intermediate corporation". However, considering that establishment of multiple exchanges is unrealistic and the scale of the PPS market share is small, the establishment of multiple exchanges is not feasible. Consequently, this Power Exchange will need to have a fixed public character, and it may be desirable for the organizational and operating rules of the exchange to be determined through a public discussion forum to a certain degree. Up to what stage of the outline of at least the organization configuration and the operation rules would it be necessary to hold discussions in a public forum?

(b) Nature of the power provided and supervisory system

In a market it is desirable that transactions be done freely and forcing transactions for

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<sup>2</sup> This indicates persons without interests such as market participant and pecuniary type interests, and who have specialized knowledge required for ISO operation.

the concerned buying and the selling could distort the formation of the market. Moreover, there is concern that market power will be employed when transaction volume is low and thus the possibility remains that no valid price index will be formed. Hence, at present there is no compulsory obligation on the GPUs to provide power, but the GPUs were supposed to make known their thinking as to the power that would initially be provided by them voluntarily. An operation that does not distort the trading or prices in the market is necessary for this initial voluntary supply. Thus, normal operation of the market and the achievement of a supervisory structure become issues of concern where there is little participation from public institutions. Under such conditions, an emphasis should be placed on a system that executes the supervision and reporting within the exchange; however, there is room for study in the future, including finding the best approach for public participation.

(4) Problems of retail market opening and unbundling of generation sector and transmission sector

(a) Scope of retail market opening

There are various examples in the different countries and regions of Europe and America. There are, for example, those that have made full retail market opening at once, and those that are expanding the scope of retail market opening in phases, commensurate with the actual state of competition.

Viewed from the examples of such foreign countries, there is concern that an easy expansion of the scope of retail market opening, while competitive conditions are still not right, may cause competitive harm to small users, such as the home sector. It could thus be said a sound approach would be to make the present decisions on the expansion of the scope of retail market opening in a phased manner, commensurate with the establishment of NSO and Power Exchange and the progressive development of competition.

(b) Non-adoption of structural regulations such as the separation of generation sector and transmission sector (unbundling)

A variety of methods have been adopted in Europe and America (ownership unbundling, legal unbundling, management unbundling, etc.), aimed at increasing the independence of the transmission sector from other business activities. With the exception of Japan, there are few countries that have continued with an integrated system even following deregulation.

Nevertheless, structural regulations (unbundling), such as the separation of generation sector and transmission sector at existing GPUs, were not adopted. This can be said to be an appropriate choice from the viewpoint of stable supply, as these GPUs were expected to assume almost the entire supply of electricity of regions where they continued to maintain regulated areas. The key to the handling of the structural regulations will be how the concept of 'supply obligation' deteriorates along with full deregulation.

## 5. Summary and Outlook for the Future

### (1) Medium-term issues

#### (a) Outline

A study is planned by a detailed working group, in anticipation of the National



Assembly passing the draft amendment to the Electricity Utility Industry Law. The points discussed in this report may be issues that have a significant bearing on the electricity market over the medium and long term, and thus need to be studied in depth.

The positioning of nuclear power and coordination with the market is to be studied by the end of 2004. In particular, it is anticipated that discussions to be held on the problem of nuclear power will include the appropriate direction for back-end responsibility, given that its potential affect on the present framework is undeniable.

Discussions on full retail market opening from 2007 are slated to begin over the medium term; however, as the concept of supply obligation is likely to deteriorate substantially, and there are also many aspects that cannot be ascertained on the extension line of the future framework of the electricity industry, thorough study will be required.

(b) Positioning of nuclear power and coordination with the market

It has been decided to proceed in the following manner. "A system will be set up to analyze and evaluate factors such as the cost structure encompassing the back-end operations in general and the profitability of nuclear power generation as a whole. Based on the results, arrangements will be made, for example as to the appropriate apportionment of roles between the government and private sectors, and coordination with the existing system. A study will then be made on the orientation and necessity of specific systems and measures, such as economic measures, with the year 2004 set as the target."

Amidst growing importance of energy security and global environmental problems, there is a demand for the steady promotion of nuclear power generation, which plays an important role in Japan's energy policy. Thorough discussion will be required as to how these nuclear power policies will be positioned within the deregulation system and how the of roles of the government and private sectors are to be apportioned. How they turn out could also affect the framework of the present system; hence it will be necessary to keep a careful watch on direction of these talks.

(2) Long-term issues

Though the present concept of the 'creation of a single nationwide market' will be worked out over the long-term, this will, however, leave open the issue on how to assure the formation of a network infrastructure suited to it.

In the United States the development of large scale RTOs has resulted in a shifting of the burden of the cost for wide area networks from individuals to the general market, which has in turn moved it in the direction of finding an answer the problem of the cost burden. Moreover, it is likely that an effort will be made to promote a wide-area electricity market through the formulation of RTO-wide regional transmission facilities plans.

By comparison, Europe has decided to unify the fees for power transactions within regions with equivalent charges for export and will adjust the differences with the costs for relay through a compensating mechanism. It would, however, be difficult to say that each country has been provided with an incentive for building interconnection facilities. Accordingly, it is thought that an effort will be made by the regulatory agencies of each country to assure the necessary network infrastructure by pushing for a reinforcement of interconnection facilities at the stage of plan approval for investment in 'monopolistic

transmission companies.’

It has been decided to introduce measures for settlement between companies in conjunction with the abolishment of the transfer charges, and it is likely that the collection of the costs for linked equipment will be guaranteed. Nevertheless, it is questionable whether adequate incentive has been assured for building up the interconnection facilities for the creation of a single nationwide market by the existing GPUs. In regard to this problem, it has been decided to “provide a point for coordinating the planning for the providing of interconnection lines between supply areas” at the NSO, and indeed at this juncture as well, there will be a problem of reaching a consensus at the NSO.

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