# Electricity Reform Is the Best Performer for the Growth Strategy

**ITOH Motoshige, Professor at the Graduate School of Economics of University of Tokyo**
**Interviewer: ABE Junichi, Editor-in-Chief of *Chuokoron***

## The Great Earthquake and Tsunami Disaster that stopped nuclear power generation revealed the vulnerability of Japan's electricity system

**ABE Junichi (AJ)**: The Government decided in a cabinet meeting and submitted to the Diet the Bill for Partial Revision of the Electricity Act in March to achieve electricity system reform. Professor Itoh, you had, in the capacity of the chairman of the "Electricity System Reform Expert Committee," compiled a report in February 2013 proposing the full liberalization of electricity retail sales and the separation of power generation and power transmission. The report became the pillar of electricity system reform. Why should the electricity system be reformed now?

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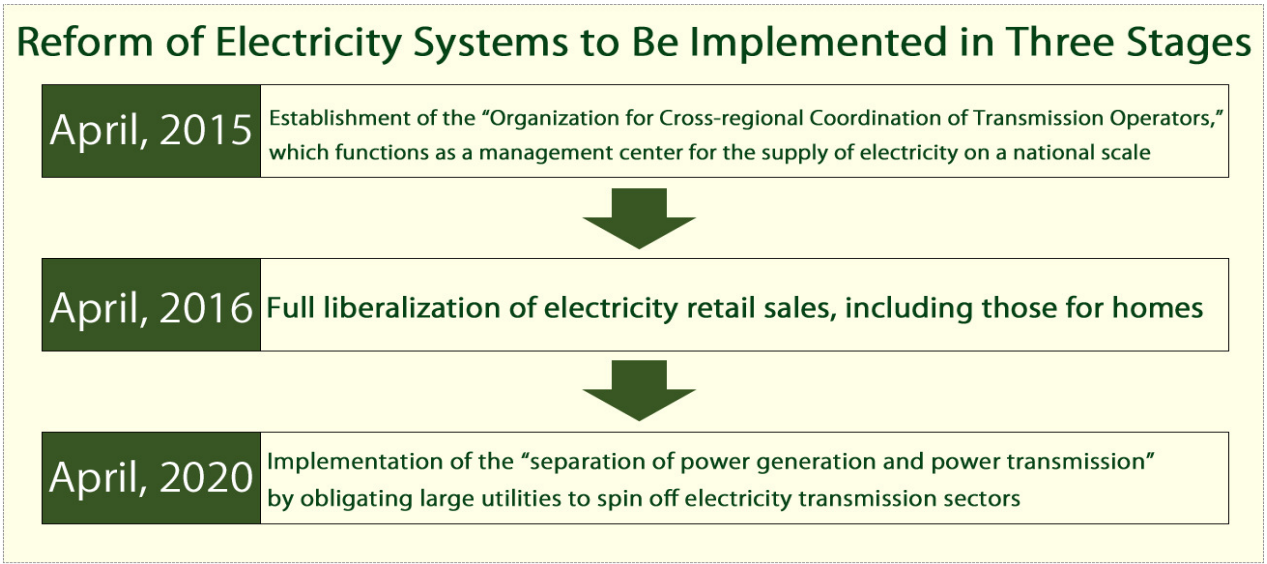
**ITOH Motoshige (IM)**: I think that there are a couple of factors. Experts, and even the Government, have been keenly aware of the need for electricity reform for more than ten years. However, there are some difficult issues, and the industry exercises very strong power in every part. I am not saying this in a bad sense. The industry strives to supply electricity under a very responsible system, and therefore exercises very strong power to resist any reforms that attempt to break up the system. Their power is strong in the technological arena, as well as politically. Reflecting this situation, we have not been very successful in pushing forward with reform. This is the reality that Japan faces today. Meanwhile, many states in the United States, as well as Europe and Australia, among other countries, aggressively moved ahead with reform, leaving Japan behind.

Then, the nuclear power plant accident occurred in Fukushima. Of course, we should not necessarily link the issues of nuclear power generation to the reform of electricity systems directly. However, it was not until after nuclear power plants stopped operation as a result of the Great

Earthquake and Tsunami Disaster that we realized that electricity in Japan was not as robust as we had thought. One symbolic aspect was the difference in frequencies used in eastern Japan and western Japan. Consequently, we could not do anything, even though we wanted to, when power went down in eastern Japan and the lights were still on in western Japan.

Given this reality, it became necessary to facilitate reform of electricity systems all at once. Interestingly, the Democratic Party of Japan held the power when we attempted to push forward with the reform of electricity systems. Edano Yukio was the Minister of Economy, Trade and Industry (the responsible ministry).




**AJ**: Are you saying that it was because the DPJ was in power that reform started?

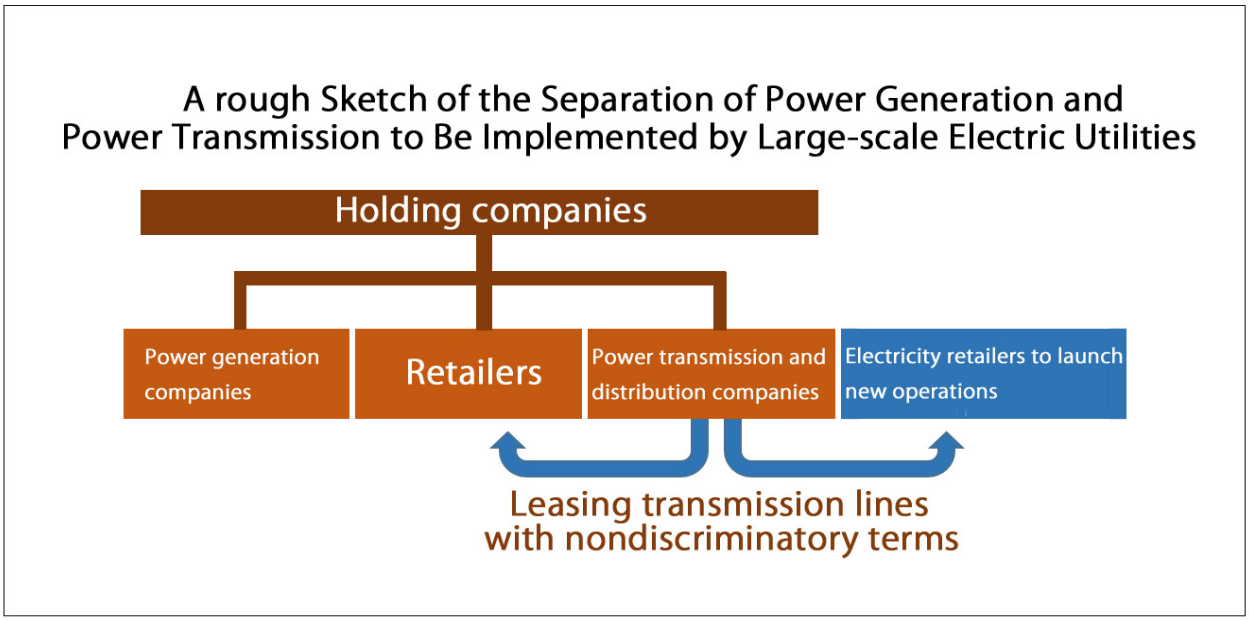
**IM**: I think that it was easier for the DPJ to take on challenges against existing industries in a sense. What was very interesting to me, however, was that a change in government occurred around the time the report had almost been completed by the Electricity System Reform Committee, the committee where I served as a chairman. So I kept watching how the coalition administration of the Liberal Democratic Party of Japan and New Komeito Party would handle the issue. At the end of the day, they accepted the report as it was. In addition, they started electricity system reform in a bid to build it into the larger framework of the Abe administration's growth strategy. I am not an expert on politics, but, even so, I would say that the electricity system reform has come this far in a very special environment.

## Cross-regional management of electricity, essential to expanding renewable energy

**AJ**: Electricity reform will be facilitated in three stages. In the first stage, the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) was established in April as a control center for the supply of

electricity across the nation. In the second stage, a full liberalization of electricity retail sales, including those for homes which are being exclusively conducted by the existing large electric power companies, will be carried out in April 2016. In the third stage, the "separation of power generation and power transmission" will take place, turning the electricity transmission sectors of large electric power companies into separate companies. I can envision what will be done through a full liberalization of electricity retail sales and the separation of power generation and power transmission. But what will be accomplished by the OCCTO?

**IM**: One of the goals of the electricity system reform is to encourage the participation of new operators by adopting the principle of competition in the electricity business. To make it happen, it is very important to manage electricity on a cross-regional basis. For example, if a company wants to start a retail electricity business, it has to procure electricity from somewhere. Needless to say, it would be best if it could get it from someplace closer to the metropolitan area. Depending on the situation, though, the company may need to procure electricity from a distant region. In such a case, it would be desirable to make electricity available on a cross-regional basis.




However, the operations of the major electric power companies are divided vertically in Japan. A robust monopolistic structure is in place as the ten electric utilities conduct every operation from power generation to power transmission to retail sales vertically on an exclusive basis. Such a system has prevented them from competing beyond their operating boundaries.

Looking ahead, however, I think that "cross-regional" will be a very important key concept. Take a look at Kyushu, for example. There, the solar power generation capacity is increasing significantly now. It is not easy to

use it all solely with demand in Kyushu. We may be able to succeed in using the electricity if we work on it on a cross-regional basis, extending the supply to Chugoku, Shikoku, and further to Kinki and Chubu, as well as even Kanto. As far as a product like electricity is concerned, what is important is creating a scheme in which it is exchanged across regions as broadly as possible.

Looking ahead, the current infrastructure network is probably not good enough, if we are going to further increase the use of renewable energy, such as solar power and wind power. So far, the infrastructure network has been built based on a style where the Chubu Electric Power Company designs for Chubu and Kansai Electric Power Company for Kansai. However, to distribute electricity across Japan, we need to manage electricity through a cross-regional organization that covers areas beyond those covered by one operator. So an organization like the Organization for Cross-regional Coordination of Transmission Operators is required.
The OCCTO is chiefly comprised of private operators. That said, its operation is centered on governance. Therefore, a variety of players are expected to participate in the organization, in addition to the existing electric power companies. It is anticipated that a comprehensive system design will be implemented, factoring in the opinions of investors, power generation companies and retailers. I think that it is an important organization from the perspective of the kind of electricity system we should create, going forward.

**AJ**: Why is the present network not workable for the introduction of such renewable energy sources as solar power and wind power?

**IM**: One of the characteristics of electricity is that frequencies decline when demand exceeds supply and increases in opposite cases, such that supply and demand must be adjusted locally as well as totally. Power generation using solar or wind power requires more adjustments as it is subject to significant volatility due to climate conditions.

Wind turbines in Mie Prefecture

We must also work on how to facilitate the transmission of electricity when, for example, a thermal power generation plant in Kyushu is temporarily shut down. The larger the area an electricity source covers, the more adjustments are necessary.

In addition, if you increase the number of distributed generators, you will need to make even more adjustments. Japan has adopted centralized generators for its power supply system, in which a great amount of electricity, which is generated in large-scale thermal power plants and nuclear power plants, as well as large-scale hydroelectric power plants, is transmitted to the places where it is consumed. On the other hand, various types of distributed generators are used overseas, particularly in Europe. The intention is to generate more power in places closer to where it is used, by means of such a system as co-generation (co-generation systems

produce and supply electricity and heat simultaneously), although the system necessitates the coordination of the entire network to an even greater degree.

So far, considering the level of demand at respective end points, the ten electric utilities have successfully adjusted the amount of electricity that they can generate in their own plants. Going forward, there will be many competing power plants and various types of operators. We need to deal with them comprehensively. The OCCTO is tasked with this challenge.

Actually, electric power transmission and distribution companies will continue to be tasked with fundamental adjustments to supply and demand, even after power generation and power transmission are separated in the third stage. Even so, it will be increasingly necessary to make adjustments to cross-regional bases, including those of renewable energy. From this perspective, there will be a greater need for coordination between such places as Kanto and Tohoku. The organization will play the role of a control center for such operations, as well as long-term investments.

**AJ**: As we discussed earlier, the electricity system is vertically divided in Japan. The frequency is different between eastern and western regions. Additionally, there are "check points," or power interconnection lines that control the amount of electrical current that passes through. Am I correct in assuming that the OCCTO will have difficulty coordinating supply and demand unless we attempt to loosen the control on check points?

**IM**: Loosening the control on checkpoints means two things. One is just increasing the number and capacity of interconnecting points. But that's not enough. The important thing is to establish rules that specify how electricity that passes through checkpoints every day should be distributed and who has the rights to conduct such operation. I suspect that the existing electric utilities will want to do that. The OCCTO is expected to make the operation more transparent. Discussions are ongoing in conjunction with the issue of 50 Hz and 60 Hz, and how it should be addressed. It is not clear yet whether the government will take the initiative and issue an order, the OCCTO will deal with it internally, or each operator will deal with it autonomously. Whatever the case, we are moving in the direction in which capacity will be boosted by spending a reasonable amount of capital.

## New entrants and industry reorganization driven by the full liberalization of electricity retail sales

**AJ:** The upcoming full liberalization of electricity retail sales, the second stage, is scheduled for April next year. I think this is an important program for the reform of the electricity system. What will be accomplished and how will the reform be implemented?

**IM**: Liberalization is an important key for successful reform. I want to discuss why we are carrying out liberalization. The most frequently discussed argument is that liberalization neither decreases electricity charges as expected nor facilitates the participation of new entrants easily. Many of these arguments are shortsighted. For example, think about the airline deregulation that occurred in the United States. People said that air ticket prices would not decline in the end. Indeed, there were not any significant changes in the prices at first. An airline that joined the game ahead of others soon went bankrupt. However, after ten or twenty years, the hub and spoke system (a scheme that allows passengers to transit from a central airport to other international or domestic lines) was established. U.S. airlines repeatedly underwent reorganizations on very large scales and some of them fell into bankruptcy. Nevertheless, it created a system that generates gigantic demand. It also contributed to the participation of low cost carriers, a very different type of operator, which achieved the provision of services at very low prices. The airline industry turned into a multi-layered industry, which would not have been possible without liberalization.

The same applies to the electric power industry here. It may be important to see what will happen in two or three years, if liberalization is undertaken now. However, what really matters is what changes will occur in twenty or thirty years.

Japan has already liberalized the electricity business for large-scale users. As a result, electricity charges have been declining. It is difficult to precisely determine to what extent they will decrease for small-scale users due to liberalization, though what will happen is basically the same as U.S. airlines. Instead, the important thing are such phenomena as the realignment of the industry and changes in business models. Mergers of electric power companies may be facilitated in the near future, as competition occurs on a cross-regional scale and companies such as mobile phone operators enter the market.

In fact, it appears that TEPCO [Tokyo Electric Power Co., Ltd.] is taking steps for electricity reform ahead of competitors. The company was the first to announce the development of electricity retail sales nationwide and also collaborated with Chubu Electric Power Co., Inc. in power generation. A company, if cornered, has to make decisions that it previously couldn't tackle. The most pressing challenge for TEPCO is a management issue caused by the suspension of Kashiwazakikariwa Nuclear Power Station operations. Even so, it must dare to promote liberalization to survive in the future. In this sense, TEPCO is a driving force to facilitate the ongoing reform.

**AJ**: I see. But it's hard to imagine that TEPCO has extra electricity to sell.

**IM**: Electricity retail sales don't only mean that TEPCO is generating and selling electricity for itself. It also means selling the electricity it procures from various sources. Concretely speaking, there are local governments that engage in power generation and power generation companies like J-POWER (Electric Power Development Co., Ltd.). To date, they have operated business based on contracts concluded vertically with the retail business units of electric utilities.

If retailing is fully deregulated, a company like J-POWER, for example, will be selling electricity at its own discretion to a variety of customers. For the existing large-scale electric power companies, the critical thing will then be whether or not they have a competitive retail business unit, which is important in terms of utilizing existing resources as well. Furthermore, steel and chemical product manufacturers equipped with in-house power generation facilities may possibly expand their power generation business. If large-scale electric utilities consider it important to survive as an electricity retailer as well, they will have no choice but to follow what TEPCO is doing.

Looking to the future, suppose some hotels, condominiums, residential houses and offices are co-located in a certain region. They will consider purchasing electricity all together, instead of purchasing it separately, as they have traditionally done. Then, assume that the electricity is used in the offices only during the daytime, while a fairly large amount of electricity is used in the condominiums and residential houses at night. It would be possible to standardize the overall use of electricity, which may result in a decrease in electricity charges. In light of such possibilities, electricity retailers will attempt to design a total system structure, instead of just selling electricity.

What is easiest to understand for consumers is the issue of electricity charges. But it won't be an issue that we should deal with individually. Take a condominium for example. With many consumers residing there, it is a matter that depends on the decisions of the condominium association. Imagine the detached residential houses that a housing company constructs during large-scale land development. Sales of houses may differ according to a tariff program developed on electricity. Systems may change if there is movement in various businesses that have a bearing on consumers.

**AJ**: The separation of electricity generation and transmission, the third stage, is slated for April 2020. Large-scale electric utilities are obligated to spin off their power generating and power transmission units. Why is it necessary to separate power generation and transmission?

**IM**: There are a number of points that we should pay attention to in electricity reform. First of all, there is the reorganization of the existing electricity industry. This needs to be implemented to move toward the creation of a new scheme. Second, reorganization must drive competition. Third, many companies are expected to join the game in such a manner that promotes competition. Fourth, versatility must be included to respond to future demand or technologies, although many of them are uncertain.

It is almost impossible to address the points raised without undertaking the separation of power generation and transmission. Suppose there is a new entry into power generation or electricity retail sales. It would be problematic if a power transmission company prevented new entrants from launching businesses (by increasing charges for new entrants using power transmission lines). Therefore the separation of power transmission and power generation is meaningful. To put it another way, we don't mind operators of different sizes participating in power generation or electricity retail sales. However, transmission line networks are properties with high

public interest. Thus, power transmission companies should be allowed to maintain a fully distributed cost method in which a certain profit is added to the incurred cost.

The separation of power transmission and power generation was carried out very carefully overseas. In the major countries of today, it is only Japan and a few southern states in the United States where power generation and transmission are not separate. Power transmission companies may not make huge profits but they remain profitable because they can generate reasonable profits thanks to the fully distributed cost method, so long as they carefully work hard to respond to the needs of society. On the other hand, competition should occur for power generation and electricity retail sales.

As a matter of fact, Japan has already had a similar experience: the horizontal separation of telecommunication. There had been an argument about who NTT's telephone line network belonged to. While there were some who believed that it belonged to NTT as it was owned by NTT, a new argument was that it belonged to the people of Japan. Then, things developed such that requests increased for the opening of NTT's telephone line networks to new operators. Consequently, broadband services that had been delayed started to spread all at once and new operators entered the market one after another. The result was a huge success. I could feel the power of the force that changed the industry.

**AJ**: In California in the United States, which was ahead of others in terms of the separation of power generation and transmission, serious blackouts occurred in 2000 and 2001 due to lack of collaboration between power generation companies and power transmission companies. What about the possibility that the stable supply of electricity will be affected?

**IM**: Whether infrastructure for power transmission and power generation will be improved enough when their separation is implemented is a system design issue. In the case of California, the great blackouts obviously occurred due to mistakes in institutional design. Even so, nobody suggested reversing the situation. I think that it is somewhat questionable to argue that serious power outages will occur if power transmission and generation are separated. In conjunction with the discussion of what a stable supply of electricity is, as I said earlier, a stable supply of electricity depends on supply and demand. So far, Japan has been focusing its efforts to increase supply to catch up with an increase in demand. However, the global trend is for demand to be adjusted if there are any constraints on supply, emphasizing the importance of the demand response. The demand response is not just making adjustments to ensure the total one-year demand equals supply. It also means that we make adjustments by shifting peak and off-peak hours of electricity, depending on the time it is used. I would say that we should aim to create a situation in which stable supply and demand is maintained, rather than only maintaining stable supply.

One more thing I would add is that a stable supply of electricity has been maintained in Japan, relying on nuclear power generation and large-scale thermal power generation. If wind power and solar power are introduced, electricity would be supplied under a very unstable design. If renewable energy is introduced, we should consider the long-term, stable supply and demand situation going forward.

**AJ**: How will the economic and industrial structures of Japan change, as we have started to move ahead with the electricity reform?

**IM**: Focusing on the electric power industry, the existing electric power companies are important players and I am watching to see what type of realignments occur with them, going forward. As I said earlier, in the power generation business, TEPCO and Chubu Electric Power entered a comprehensive collaboration in the thermal power generation business. There will be ten power transmission companies as each electric utility will create one. Integration may be facilitated. I expect different types of reorganization to take place.

From a slightly broader perspective, I think the reform will have some bearings on such factors as the social structure. If distributed power generators spread as a result of the reform, we will be living in a society where electricity is produced and consumed locally. In fact, Mitsui Fudosan Co., Ltd. will launch gas cogeneration underground in Nihonbashi to commence the supply of electricity and heat in 2019. If a company can generate power in a place close to where it is consumed and distribute it to users or retailers in the surrounding areas, a flexible electricity supply system will be created. Real estate companies can also enhance their added-value by offering electricity management. Such possibilities may expand, going forward.

As far as the government is concerned, the electricity system, which will undergo changes twenty or thirty years in the future, is no more than a growth strategy to encourage investment by the private sector. The electricity system is a large-scale property, in which the private sector, not the government, makes investments. In addition, it will make investments not to maintain existing facilities but to build the infrastructure for twenty or thirty years in the future. Such a reform is the best performer for growth strategies.

*Translated from "Hijojitai! Nihon no enerugii (2): Denryoku-kaikaku koso Seichosenryaku no Yutosei (Emerging issues! Energy in Japan [2]: Electricity Reform Is the Best Performer for the Growth Strategy)*," Chuokoron*, June 2014, pp. 112-120. (Courtesy of Chuo Koron Shinsha)* [June 2015]

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