

Rating Methodology by Sector

Electric Power

1. Business base

JCR in this report primarily describes outline of rating methodology for Japan's electricity utilities (power companies), which are engaged in power generation, transmission/distribution, and retail, and adds factors that should be noted for large power generation company (former wholesale electricity utilities, etc.)

As a supplier of energy that is fundamental to Japan's production and consumption activities with a high degree of public use, Japan's electricity business has been regulated by the government in many ways to protect the users. Stepwise deregulation has been made 4 times since 1995. The electricity system reform as a result of the Great East Japan Earthquake was a large-scale revision to the system for the first time in 60 years. This reform is intended for utmost control of electricity rates and expansion of users' options and business operators' opportunities based on assumption of stable supply of electricity. It was carried out for 5 years from April 2015 to April 2020 in 3 stages: the 1st stage for establishment of the Organization for Cross-regional Coordination of Transmission Operators in April 2015; the 2nd stage for the full liberalization of the retail market and abolishment of wholesale regulation in April 2016; and the 3rd stage for unbundling of the transmission/distribution sector from the generation/retail sector in April 2020.

From the 2nd stage beginning in April 2016, business types of "general electricity utility," "specified-scale electricity utilities" and "wholesale electricity utility" have been abolished and 3 types including "power generation company," "power transmission/distribution company" and "power retail company" have been established. JCR assesses individual power companies, placing a relatively large value on the stability of Japan's electricity business system as foundation, while also paying attention to individual companies' characteristics and considering comprehensive capabilities for power generation, transmission/distribution and retail, and will continue to reflect the impact of regulatory changes on their business bases as appropriate.

(1) Characteristics of the industry

(i) Market overview

While affected by short-term business fluctuations and weather changes, demand for electricity has been steadily growing along with Japan's economic growth. However, demand may gradually decline over the long term, due to the shrinking domestic population, changes in the industrial structure, progress in measures to reduce CO₂ emissions and prevent global warming, well-established consumer mind for saving electricity after suspension of operation of nuclear power stations stemming from the accident at Fukushima Daiichi of Tokyo Electric Power Company, and widespread use of energy-saving

equipment.

(ii) Competitive situation

Economies of scale strongly work on electricity business, which is a social infrastructure. Electricity cannot be saved in high volume and its quality is always the same, despite differences in frequencies. In cases where principle of market mechanism is introduced into this kind of market or product, it will fall into price competition at last, and the existing customer base, capacity to procure fuel, financial strength, and so on determine the competitive strength. As a supplier of electricity, power companies, which are engaged in power generation, transmission and distribution for the users, account for majority of the market at the moment. These power companies, however, will face a risk that their business base will be impaired by new entrants' entry into the monopolistic market in effect. On the other hand, the principle of market mechanism will allow them to take strategic management approaches including increasing their opportunities to enter areas outside their own service areas and flexible setting of electricity rates. Checking the speed and degree of changes of competition advancement as a result of the electricity system reform, JCR will assess how changes in the power companies' competitiveness, as shown by acquisition or loss of demand, can have an impact on their earnings power and financial structure.

(iii) Cost structure

Excluding retail business, electricity is a typical large process industry that requires a large amount of fixed cost in an inflexible cost structure. The cost of fuel, a major variable cost of power generation business, can fluctuate relatively significantly, depending on fuel price trends. A matter to note concerning cost structures for power generation business is that an increase in greenhouse gas emissions is inevitable due to its nature. A possible scenario is that government environmental regulations will be strengthened, causing a burden to the electricity industry, depending on design of such regulations, and will result in an adverse effect on the industry's profit and financial structure. This may not only add downward pressure on the power companies' credit risk, but also slow down their growth by spending their management resources on technological development and capital expenditure for low-carbon emissions. For power generation and retail businesses, application of the full cost plus pricing method is to be discontinued in the future after a period of transitional measures. Accordingly, JCR will assess the certainty of investment recovery by checking the stability of their customer base.

Meanwhile, power transmission/distribution businesses remain under the group's umbrella as wholly-owned subsidiaries of power companies even after the business divestiture in April 2020. Revenue cap regulation was introduced in April 2023. This system is designed to promote management efficiency and ensure that business operators are able to make necessary investments. Under the system, the certainty of investment recovery is expected to be maintained, and even compared to the previous full cost plus pricing method, the stability of business operators' income and cash flow can be maintain.

(2) Key factors in market position and competitiveness

(i) Market position

JCR will examine how the relative positions of the electricity industry in the overall industries, or of power companies among themselves can change in accordance with changes to the framework of the electricity business system and impact of these changes on the individual power companies' cash flow levels, flexibility of distribution of their cash flows, improvement of financial conditions, etc.

There are following 3 major electricity generation companies, which provide power companies, etc. with electricity: Electric Power Development Co., Ltd., The Japan Atomic Power Company and JERA Co., Inc. As all the 3 companies with cost-competitive power sources hold important positions in Japan's power supply portfolio, JCR will analyze and assess them in line with the power companies' credit assessment, while focusing on individual business risk and changes in the contractual relationships with power recipients.

(ii) Business structure

Power companies engage themselves mostly in the electricity business, while involved in information and communications businesses by using the network infrastructure of their electricity business, as well as life services business based on their public use and closeness to local communities, among others. As domestic electricity business is expected to grow only moderately in the future, some power companies would develop derivative businesses, including enhancement of gas business, regional expansion such as investment in or management of overseas power generation business, investment in interests for stable procurement of fuel resources, or strengthening of sale of fuel to other companies. Achieving these matters, however, requires long-term strategies as a comprehensive energy business operator and a strong financial base to ensure the viability of the strategies. For this reason, JCR will check the direction of the strategies, as well as financing and investment policies, achievements in these policies, and establishment of a risk management structure.

(iii) Power source composition

Power companies attempt to achieve the "best mix of power sources" by using individual characteristics of hydropower, thermal power, nuclear power, and others, in a balanced manner. Under greenhouse gas emission controls and in line with targets for the best mix of power sources in the government's energy basic plan, companies are assumed to make more efforts to improve efficiency of thermal power generation, achieve high stabilization of capacity utilization in nuclear power generation or decommission of their facilities, and develop renewable energies.

Note should be taken on nuclear power generation, a base power source with high power generation efficiency. The higher the ratio of nuclear power in the power source composition, the larger the effect of capacity utilization fluctuations on profit and loss. Consequently, JCR needs to pay attention to

effects of operation period, capacity utilization rates, applicable period of regular inspection cycle, and status of holding of alternative power sources in case of unexpected low-level operation (or shutdown, including reactor decommissioning) on income. If a nuclear accident happens, risks from it including liability for damages should be huge. Power companies can receive financial support from Nuclear Damage Compensation and Decommissioning Facilitation Corporation. However, JCR needs to watch carefully the method of sharing of the liability burden. Furthermore, it is necessary to watch trends in improvement of environment for private business operators for its stable assumption of nuclear power business including decommissioning in the fully liberalized market. As described above, risks in relation to nuclear power generation business are diverse and many of them put downward pressure on credit ratings for a long period of time and structurally, and impact on the credit ratings is large.

(iv) Investment in power sources and transmission/distribution network

Development of power sources in anticipation of non-application of the full cost plus pricing method in the future is assessed based on factors such as scale of development, investment amount, price competitiveness, and future demand-supply balance. In practice, the operation is based on assessment of trends in demand and competition and changes in the effects of these factors on the profit. Concerning demand and supply, the adjustment capacity is large due to postponement of a power source development plan and suspension and cancellation of long-term plans for obsolete power sources. Meanwhile, JCR considers that there is still some room for additional implementation of rationalization that was promoted in the entire industry as a result of liberalization. In addition to quantitative analysis, therefore, qualitative analysis and comparison to see how each company makes a decision in response to changes in external environment is also important.

Legal unbundling of the transmission/distribution sector was implemented in April 2020 to ensure neutrality of this sector. Despite rules governing behavior of the transmission/distribution sector in order to ensure neutrality, supply of capital in the group is not separated. Therefore, rating credit assessment for power companies based on group's unity is possible even after the legal unbundling. If the policy-planning authorities strengthen its rules of conduct on the transmission/distribution sector, restricting liquidity of funds seriously, JCR may review the rating methodology.

2. Financial base

(1) Profitability

For the power generation business, trends in fuel prices, particularly import prices of thermal power fuels (petroleum, LNG, and coal), have effects on profit in the short run. Fuel cost adjustment functions that reflect short-term fluctuations in the fuel price are often incorporated into electricity rates, enabling companies to reduce impact on profits in the medium run. JCR considers, however, price competition in

the retail market, changes to the government's environmental regulations and so on will have a significant negative impact on electricity utilities. JCR will therefore monitor medium- and long-term profit margin. Construction of a large-scale power station requires a large amount of initial investment. As it is a business model that requires a long time to recover the investment, while the payback period differs depending on the power source composition, JCR will examine investment efficiency, watching carefully capacity utilization of power source facilities, demand size and stability of demand inside and outside the service areas.

Key financial indicators:

- Ratio of ordinary income to sales
- Capacity utilization of power source facilities

(2) Cash flow generation capacity

Power companies are at a phase of facing a heavy burden of investments due to constant maintenance/renewal, response to aging power transmission/distribution facilities, installation/replacement of power generation facilities for higher efficiency, response to safety measures for nuclear power plants, among others. Power companies that are suspending nuclear power operation for a long period of time continue bearing a burden of cost for thermal power as a substitute for nuclear power. In the midst of a full-scale price competition in the retail market, a raise in electricity rates is difficult. JCR therefore will pay attention to whether companies are taking measures to improve their cash flow generation capacity by cost reduction through management efficiency enhancement and expansion of new business categories including overseas business.

Key financial indicators:

- EBITDA
- Free cash flow
- Ratio of interest-bearing debt to EBITDA

(3) Safety

As power generation and transmission/distribution businesses require a large amount of capital investment, many companies carry a large amount of interest-bearing debt. Their financial structure is relatively unstable, with a higher ratio of fixed assets to total assets and a weaker balance between debt and capital as compared with other industries. Capital needs different in quality from conventional ones, such as those for investment in overseas power generation business and measures against global warming, may increase. Moreover, in the case that the financial base is significantly damaged because of profit worsen by long-term suspension of operation of nuclear power plants, the financial base should be recovered. Efforts for improving the financial structure is highly important in order to respond to changes in business risks arising from competition progressed through liberalization, entry to businesses other than domestic electricity business, among others.

Key financial indicators:

- Equity ratio
- Debt equity ratio

Because of the possibility of human or mechanical error as well as other factors in the information herein, JCR makes no representation or warranty, express or implied, as to accuracy, results, adequacy, timeliness, completeness or merchantability, or fitness for any particular purpose, with respect to any such information, and is not responsible for any errors or omissions, or for results obtained from the use of such information. Under no circumstances will JCR be liable for any special, indirect, incidental or consequential damages of any kind caused by the use of any such information, including but not limited to, lost opportunity or lost money, whether in contract, tort, strict liability or otherwise, and whether such damages are foreseeable or unforeseeable. Information herein is statements of opinion, and not statements of fact as to credit risk decisions or recommendations regarding decisions to purchase, sell or hold any securities such as individual bonds or commercial paper. JCR retains all rights pertaining to this document. Any reproduction, adaptation, alteration, etc. of this document, is prohibited, whether or not wholly or partly, without prior consent of JCR.

Japan Credit Rating Agency, Ltd.

Jiji Press Building, 5-15-8 Ginza,
Chuo-ku, Tokyo 104-0061, Japan
Tel. +81 3 3544 7013, Fax. +81 3 3544 7026
