Harmonizing energy supply with the environment Envisioning the J-POWER Group in 2030

On December 1, 2008, we sat down with outside experts to discuss what kind of company the J-POWER Group should strive to become in 2030, in light of the need to harmonize energy supply with the environment.

Yuko Sakita
Journalist and environmental counselor

- The situation regarding energy sources seems to have changed greatly in the past year. With the rise in oil prices leading to more expensive food, no doubt the public has a renewed awareness that Japan's food self-sufficiency is only 40 percent and our energy self-sufficiency is a mere 4 percent.
- Given the reality that Japan gets approximately 25 percent of its electricity from coal-fired generation, I hope the J-POWER Group as an active player in the industry will take the lead in clean coal technology that would reduce the environmental burden. There are also areas in which Asian nations lag considerably in technology development, so it will be important for you to contribute to global warming measures and environmental conservation strategies.
- Rather than becoming negative about environmental measures and energy problems due to the financial crisis, a company that can shape the future is one that takes on these issues squarely. Going forward, it will be vital to create a sustainable society in which the environment and economy are in a virtuous cycle.
- As for what kinds of power generation will be important in the future, the need to reduce CO_2 makes it imperative for us to determine what roles renewable energy and nuclear power should play in Japan's energy mix. Regarding nuclear power, I hope you will provide timely information as to the kinds of safety measures you are taking and maintain a relationship of trust with the local society. It will also be necessary for you to provide information about such remaining issues as deep geological disposal of high-level radioactive wastes.
- I believe furthering communication with local communities involves more than just taking part in local events. Another effective means is to actively provide basic education on energy, for example. And to prepare for the day when energy becomes important to the region, it will be necessary to think about how to carry out new community development premised on coexistence of community and corporations.
- What I see as a basic approach to the energy of the future is for each community to think about energy that makes use of its own untapped resources and to aim for self-reliance in power generation suited to that community. On that basis, Japan will achieve a kind of balance in which power companies support stable supply for the nation as a whole.

Ryuta Uozumi
CEO, KPMG AZSA Sustainability Co., Ltd.

- Looking at global trends, when peak oil comes I believe there will be a shift toward coal as an energy resource from the standpoints of both cost and its approximately 200 years of reserves. Given the strong political current regarding global warming, however, the direction will likely be affected by policies like the U.S. Green New Deal and EU thinking on such themes as the environment, innovation, and employment. In the U.S. and EU, the future looks to be shaped by government initiatives aimed at creating a low-carbon society whose primary energy does not discharge CO_2, in the process of which jobs will be created through an industrial restructuring. For example, renewable energy is set to become the global mainstream by 2030 or 2050, and the EU strategy is to take the lead in hastening that trend.
- With CO_2 reduction being such a pressing issue, the time would seem to be ripe for CCS (CO_2 capture and storage). I think there is a need to proceed cautiously here, however, because there are still many questions about the efficacy of CCS, including such matters as capture efficiency and risks to biodiversity. If CCS ends up not being used, regionally dispersed energy based on renewable sources will become necessary, which will require studying facilities for supplying renewable energy such as solar, wind, geothermal, and biomass generation.
- Right now J-POWER is proceeding with nuclear power station construction. To gain the trust of the local communities, I hope you will be thoroughgoing especially in the areas of compliance and information disclosure concerning nuclear energy.

Participants
(in order of appearance here)

Yuko Sakita, Journalist and environmental counselor
Ryuta Uozumi, CEO, KPMG AZSA Sustainability Co., Ltd.
Mizue Tsukushi, President and CEO, The Good Bankers Co., Ltd.
Izumi Washitani, Professor, Department of Ecosystem Studies, Graduate School of Agricultural and Life Sciences, The University of Tokyo
Gento Mogi, Associate Professor, Department of Technology, Management for Innovation, School of Engineering, The University of Tokyo
Masayoshi Kitamura, J-POWER President; Chair, Environmental Management Promotion Board (at the time of the session)

Mizue Tsukushi
President and CEO, The Good Bankers Co., Ltd.

- The J-POWER I envision in 2030 will be selling electricity not just in Japan but to power companies around the world. You will also be designing platforms for supply of electric power that encompass everything from power source development to power station maintenance, and will be a company that gets its earnings from provision of these platforms. With that in mind, I would like to suggest that you build up mechanisms for developing and supplying power sources suited to each of the needs of various countries.
- From our perspective as SRI investors, corporate investor relations (IR) will need to change drastically. Today probably the most advanced type of research method is one that employs a data mining system to analyze a company's basic ESG (environment, society, governance) performance, following up with visits or telephone interviews to add a human touch to the information gathering, and then makes an overall assessment of this information.
- For a company like ours asked by end investors to perform a survey, the era is coming when artificial intelligence in the system will get information from all over the world while we sleep, following a list of check items. That's why the key to IR for a global corporation will be to produce as much information as possible and to take it directly to investors throughout the world. J-POWER will need to educate its employees without delay to be able to do this.
- In the U.S., the Democratic Party has majorities in both the House and Senate for these two years. During this period, we can expect them to be aggressive in coming up with spending plans and policies that affect your business. It will be important for J-POWER to adapt to this reality. My suggestion is that you consider how to take advantage of these as business opportunities.
- This is a time when CO_2 fundamentalism has taken hold, but the environment is impacted not only by CO_2 but also by such things as disposal of wastes. The entire life cycle needs to be considered. A key for companies is the capability for bringing logic to the discussion on all kinds of environmental impact, and for explaining the importance of examining the entire lifecycle associated with power generation.

Izumi Washitani
Professor, Department of Ecosystem Studies, Graduate School of Agricultural and Life Sciences, The University of Tokyo

- Looking ahead over the next 30 years, it appears certain that in addition to climate change, we are in for big changes in the social environment as well. Japan will see its population decline, as other developed nations similarly experience rapid aging of their societies. Populations will become even more concentrated in metropolitan areas, and society will be based more on service industries, causing the locations and amounts of energy needs to change year by year. The pace of change over the next 30 years will without a doubt outstrip the last 30 years, which will be a major problem.
- Electricity, however, is sure to grow further in importance as energy both in daily life and in production arenas. How its consumption is structured will therefore be a key issue. Considering environmental and other restrictions, in some cases it may be necessary to exercise restraint in electricity use based on the degree of necessity. Fair distribution of electricity consumption may need to be worked out between individuals and between nations in order to ensure minimum needs are met.
- Up to now it has been possible to apply a uniform standard for optimally matching electricity supply to needs. In the future, however, we will need to optimize supply in accord with a diversity of criteria, and to build a system for making those determinations.
- With the large variability and the accompanying changes taking place in people's sense of values, seeing ahead 30 years is by no means easy. Rather than deciding now how things should be in the future, what is needed is to make choices today that leave the younger generation with a diversity of options.
- It is important to set flexible goals permitting diverse values and methods to be chosen.
- The two pillars for environmental conservation on a global scale are climate change and biodiversity, making it of key importance to analyze and assess these two aspects in light of the overall supply chain.

Gento Mogi

Associate Professor, Department of Technology, Management for Innovation, School of Engineering, The University of Tokyo

- I am concerned about the danger of concentrating too much on environmental issues alone. There seems to be too much readiness to conclude that, since we are running short of oil we need to replace it with coal, but since coal produces CO_2, the answer to CO_2 is CCS. It is true that CCS will reduce CO_2, but in the process it will also use up considerable energy.
- As I see it, the pressing issue for humanity right now is not the environment but energy. What is the sense of sacrificing energy in order to reduce CO_2? This aspect of the discussion seems to have been ignored somewhat. There cannot possibly be only one solution, so the worst thing would be for the discussion to simply end here.
- I believe that if we can solve the energy problem, the environmental issues will be solved automatically. Solving the energy problem must be approached from the two standpoints of how to meet demand and what to do about demand. Japan leads the world regarding the latter of these, and this is not likely to change.
- A key to the problem of what to do about demand will be progress in battery technology. Batteries can be looked to for their backup role in adjusting for natural energy fluctuations, and for their role in global circulation of energy. If in the future the energy density of batteries can be raised by a single digit and their cost lowered by a single digit, global transporting of electricity by batteries should become feasible. This will make it possible to produce the world's energy where suitable and consume it where needed.
- If demand continues to rise at the present rate, by around 2030 oil production will begin declining due to resource constraints, making it gradually necessary to switch to other forms of energy. The question we face is whether at that time the switch will be to coal or to natural energy, but if left to chance, the choice will end up being coal. Another issue is what will happen if electric cars come into widespread use. If that happens, demand for oil will fall, easing the oil supply-and-demand pinch even as batteries become dispersed throughout society. This will enable electrical demand to be leveled. The electric power industry requires a very long lead time, so preparations will be needed far in advance; but it will be necessary to think about integrating supply with the demand diversion.
- Stable supply will continue to be a key point for energy. People tend to understand stable supply in terms of a constant flow, but in the final analysis it comes down to price. The reason why this point does not get conveyed sufficiently is that resource constraints manifest themselves not as a drying up but as a restricted flow, and it is not well understood that this brings about a rise in the equilibrium price. The decline in production due to resource constraints is not limited to oil. The same argument can be made regarding coal, and even coal is not a resource whose supply can be increased indefinitely as a substitute for oil.

Response to the discussions

We of the J-POWER Group are carrying out a variety of innovations looking to the next generation. I believe it will take 20 to 30 years for us to verify the new technologies, put them into operation, and change our business to one that can contribute to the world's sustainable development.

Today's discussions were carried out around the theme of what kind of company the J-POWER Group should become in 2030, the midway point to our 2050 target for reducing greenhouse gases. Many valuable ideas were presented here today.

We intend to make the most of your ideas and advice as we proceed with our pursuit of innovation over the coming years.

Masayoshi Kitamura

J-POWER President; Chair, Environmental Management Promotion Board (at the time of the session)

External Evaluation and Outside Opinions

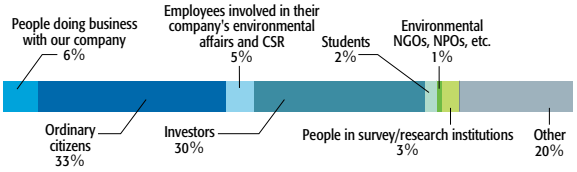
The J-POWER Group strives to incorporate various forms of third-party evaluations and recommendations into its activities, including reviews, Sustainability Report questionnaires, and expert opinions. By means of these evaluations and opinions, we determine the kind of business development and environmental activities that others expect of the J-POWER Group and work to improve our sustainable management. We also enhance our transparency and reliability by making such comments public.

Readers' Opinions

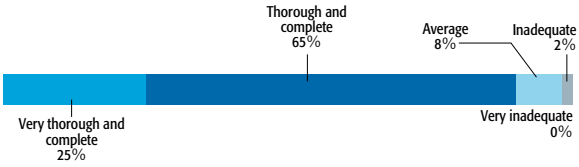
We received many comments from readers in response to the *J-POWER Group Sustainability Report 2008* (published July 2008). We consider these valuable comments to be important guidelines for compiling subsequent reports and conducting sustainable management in the future, and intend to put their lessons to use in our corporate activities.

Aggregate Questionnaire Results (as of the end of March 2009; 106 respondents)

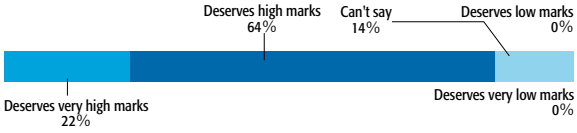
■ **Readership**



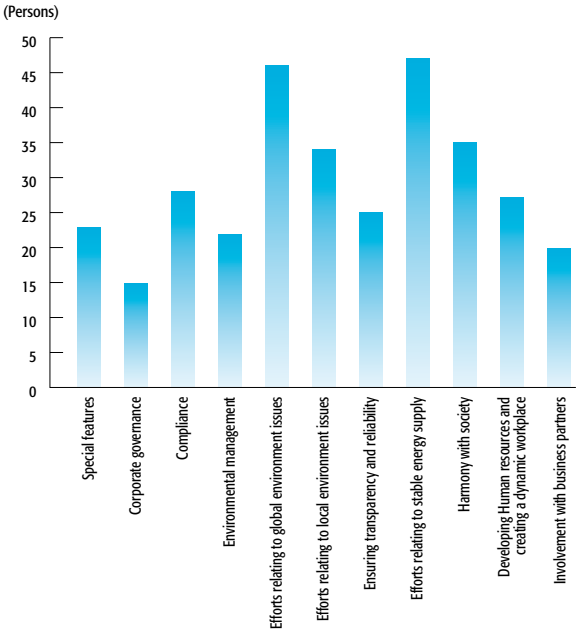
■ **Quantity and Quality of Information in the Report**



■ **Environmental Management**



■ **Areas That the J-POWER Group Should Tackle More Aggressively (up to four responses per person)**



■ **Expectations for the J-POWER Group**

Report readers	Typical comments	Our response
Investor	I came away impressed with how seriously you are working to contribute toward the world's sustainable growth. The report has more photographs than those of other companies and is easy to read. I also got a sense of familiarity from seeing actual working employees.	The 2009 edition again has been designed to be visually readable, making extensive use of pictures and figures along with a variety of font sizes. We have also tried hard to make it easy to understand and reader-friendly, in the organization and contents of each section, and by having employees introduce their work.
Ordinary citizen	The terminology in some places is difficult to understand. It would be nice if the report used plainer language.	Besides the glossary of terms at the end, we have added explanations of key terms or reference URLs at the bottom of each page. We also introduce other communication tools and hope you will make use of them as well.
Ordinary citizen	To raise awareness of safety, I hope you will provide human development and training in accident prevention measures, and create a dynamic workplace.	The J-POWER Group aims to provide safe and healthy places for carrying out rewarding work. By creating and operating a labor safety and sanitation management system and by promoting comprehensive safety management in which each Group company performs its role and duties, we strive to prevent workplace accidents and to maintain and enhance health.
Ordinary citizen	Making coal use compatible with the global warming fight seems to require a long-term undertaking. I believe coal will continue to be an important energy resource, so I am looking to you for improvements in power generation technologies. At the same time I look to nuclear energy for a stable supply of electrical power.	The 2009 edition, like last year's, has a special feature on balancing coal use with efforts to fight global warming. This year we describe how the J-POWER Group is mapping out a future in which energy and the environment can coexist, which we hope you will read. The Ohma Nuclear Power Station project is also the subject of a special feature, showing that pursuit of the nuclear fuel cycle is essential for ensuring energy stability.

Note: Other comments and our responses can be viewed on our website. WEB http://www.jpower.co.jp (Japanese only)

The Accuracy of This Report

To ensure the accuracy and comprehensiveness of important environmental and societal data as well as performance indicators (hereinafter "sustainability information") contained in the *J-POWER Group Sustainability Report 2009*, the sustainability information herein has been independently reviewed and certified by Ernst & Young ShinNihon Sustainability Institute Co., Ltd. in accord with the sustainability report review and registration system of the Japanese Association of Assurance Organizations for Sustainability Information (J-SUS). As a result of this review, an "Independent Assurance Report" has been received.

The J-SUS mark on the back cover indicates that the sustainability information contained in this report fulfills the reliability criteria established by the Association for its sustainability report review and registration system.

Document review (Tachibanawan Thermal Power Station, Tokushima Prefecture)

Site inspection (Koide Power Administration Office, Niigata Prefecture)

TRANSLATION

Independent Assurance Report

July 1, 2009

Mr. Masayoshi Kitamura
President
Electric Power Development Co.,Ltd

1. Purpose and Scope of our Assurance Engagement

We have performed certain assurance procedures, based on the engagement with Electric Power Development Co.,Ltd (the "Company"), on the "Company's Key Sustainability Performance Indicators". These comprise the "environmental accounting data" and the "material sustainability information" of the Company and its major subsidiaries for the year ended March 31, 2009, as stipulated in the "2009 Sustainability Reporting Assurance and Registration Criteria" of the Japanese Association of Assurance Organizations for Sustainability Information ("J-SUS") and that were reported in the "J-POWER Group Sustainability Report 2009" (the "Report"). The assurance procedures are with respect to whether the Key Sustainability Performance Indicators have been measured and calculated accurately and whether material information has been fully disclosed in accordance with the reporting standards for sustainability reports[*1].

The preparation of the Report is the responsibility of the Company's management. Our responsibility is to express an independent opinion on the Key Sustainability Performance Indicators.

*1 The reporting standards refer to the "2007 Environmental Reporting Guidelines" of the Ministry of the Environment, the "2006 Sustainability Reporting Guidelines" of the Global Reporting Initiative, and the "2009 Sustainability Reporting Assurance and Registration Criteria" of the J-SUS in the context of specifying the material subject matter to be disclosed.

2. Outline of the Assurance Procedures Performed

We have performed limited assurance procedures[*2] in accordance with the "2003 International Standard on Assurance Engagements (ISAE) 3000: Assurance Engagement other than Audits or Reviews of Historical Financial Information" of the International Federation of Accountants (IFAC) and the "2008 Practical Guidelines for the Assurance of Sustainability Information" of the J-SUS. Therefore, our assurance engagement provides relatively limited assurance compared to a reasonable assurance engagement.

*2 We have mainly reviewed and assessed the Company's procedures for the collection and aggregation of data, performed analytical procedures, as well as recalculated and reconciled them with the corroborating evidence on the quantitative sustainability information on a test basis. In addition, we have mainly made inquiries and reviewed the minutes on the qualitative sustainability information.

3. Conclusion

Based on the assurance procedures performed, nothing has come to our attention that causes us to believe that the Key Sustainability Performance Indicators have not been measured and calculated accurately in accordance with the reporting standards of sustainability reports, or material information has not been disclosed in accordance with the "2009 Sustainability Reporting Assurance and Registration Criteria", in all material respects.

4. Independency

We, as a subsidiary of Ernst & Young ShinNihon LLC, comply with the "Certified Public Accountants Law", and the "Ethics Regulations" of the Japanese Institute of Certified Public Accountants. Therefore, there has been no interest to be noted between the Company and us.

Akihiro Nakagome
Representative Director
Ernst & Young ShinNihon Sustainability Institute Co., Ltd.

Note: This Independent Assurance Report has been prepared as a translation of the original Japanese version.

Independent third-party certification of *J-POWER Group Sustainability Report 2009*

Acquisition of Eco-Leaf Certification

J-POWER's product, electrical power, is certified and registered as "wholesale electricity" under the Eco-Leaf environmental labeling program managed by the Japan Environmental Management Association for Industry (JEMAI). This information is available on the association's website. ISO 14025 defines three types of environmental labels: I, II, and III. Eco-Leaf is a Type III label, which means the product's environmental load has been quantitatively calculated for every stage of its lifecycle -- manufacture, use, and disposal -- using the lifecycle assessment (LCA) approach, and this fact has been independently verified.

Information on the Eco-Leaf label can be found on the Japan Environmental Management Association for Industry's website.

Product Environmental Aspects Declaration
ECO LEAF
製品環境情報
http://www.jemai.or.jp
No.BF-04-001-D

Japan Environmental Management Association for Industry

web http://www.jemai.or.jp/english/ecoleaf/index.cfm