FY 2010

Reports on Research Activities Settlement of Accounts

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Reports on Research Activities
FY 2010

On the Publication of the Research Activities Reports for Fiscal 2010

In fiscal 2010, we pursued research in projects with a focus on Nuclear Technology, Stable Power Supply Technology, and Environment and Energy Utilization Technology. This research is intended to support the foundations of the electric power industry into the future and contribute to the realization of a sustainable low-carbon society. This research yielded solid results in the areas of Plant Life Management of Light Water Reactors to ensure their reliability and Nuclear Fuel Cycle Backend Technology; technology for the management and maintenance of distribution facilities, such as technologies addressing snow damage to electric transmission plants, and technology for next-generation thermal power plants; and electrification and energy-saving technology, such as heat pumps, and next-generation power grid technology.

However, the Great East Japan Earthquake, which occurred on March 11, 2011, brought an extremely grave threat to Japan's society and economy and the technology that supports it. In addition to the extensive damage caused by the earthquake and tsunami, it also led to the loss of the cooling functions at the Fukushima Daiichi Nuclear Power Plant. Although intensive efforts are still underway to resolve this situation, it has had a major impact on the surrounding area. Moreover, the damage to a key power source resulted in large-scale rolling blackouts in the Kanto region. Indeed, there are still concerns that pressures on electric power would have a grave impact on society and the economy.

CRIEPI has been responding to urgent and wide-ranging requests for support since immediately after the earthquake with all its powers, utilizing the knowledge that it has built up thus far. We have already set up a framework and begun research on issues related to the nuclear power accident requiring an urgent response and time-consuming issues leading to long-term stabilization. We are making extensive revisions to our fiscal 2011 research plans, with a focus on three new areas: development of optimal response to risk, greater sophistication of technology for the administration and maintenance of facilities, and the development of advanced electric power supply bases.

The recovery and reconstruction from this unprecedented disaster will test Japan's true worth. CRIEPI aims to concentrate its research skills to build a solid foundation for a safe, secure and stable society and economy. We believe that this would be best contribution we could make to the electric power industry and society.

Overview of Fiscal 2010 Research Activities

<Research Activities>

In fiscal 2010, we worked to solve a range of short-term and medium- to long-term problems confronting the electric power industry, with a focus on research in Nuclear Technology, Stable Power Supply Technology and Environment and Energy Utilization Technology. We carried out the following research projects in fiscal 2010.

Nuclear Technology

We focused our resources on research into the plant life management of light water reactors (irradiation embrittlement, stress corrosion cracking, pipe wall thinning, etc.), and also steadily carried out the research and development to support the implementation of low-level radioactive waste disposal.

Stable Power Supply Technology

We pursued research related to the administration and maintenance of electric transmission and distribution facilities, such as measures to alleviate wind, snow and salt damage to such facilities and enhancing nondestructive testing techniques for thermal and nuclear power generation facilities. We also worked to develop an Integrated Gasification Combined Cycle (IGCC) system with CO_2 capture.

Environment and Energy Utilization Technology

We endeavored to develop electric energy-saving technology such as highly-efficient heat pumps and all-solid-state lithium secondary batteries, and also accelerated research on the evaluation of the impact of distributed power generation, such as photovoltaic power generation (PV), and performance assessments of information and communication infrastructure.

<Research Promotion>

In pursuing our research, not only did we coordinate with CRIEPI's eight laboratories*, but we also adopted a project system to integrate multiple fundamental technologies and resolve issues. In addressing issues in broad-ranging affiliations with the electric power industry, academic societies, manufacturers, domestic and overseas research institutes, and others, we exercised our collective strength at a higher level in conducting research, while deepening our mutually complementary expertise.

Moreover, when planning research subjects, we gave serious consideration to the perspective of the electric power industry and the synergistic effects with other research issues when designating research topics, and also endeavored to choose issues that would accelerate progress in related research issues under investigation.

We are always aware of the need to optimize the spillover effect (outcome) of our research results on the electric power industry and society, and thus we managed projects appropriately and ensured that we managed outcomes, such as revising plans at every stage of research and selecting the beneficiaries of technology transfers

* Socio-economic Research Center, System Engineering Research Laboratory, Nuclear Technology Research Laboratory, Civil Engineering Research Laboratory, Environmental Science Research Laboratory, Electric Power Engineering Research Laboratory, Energy Engineering Research Laboratory and Material Science Research Laboratory.

<Response to the Great East Japan Earthquake>

CRIEPI provided all the support in its power to address the situation at the Fukushima Daiichi nuclear power plant in response to requests from the electric power industry and the national government immediately after the Great East Japan Earthquake, such as providing its knowledge concerning earthquakes, tsunami, radiation, fuel, nuclear reactor cores and waste.

In addition, we began to identify issues that will need to be resolved going forward and to carefully examine our priorities in current research areas. We also prepared to strengthen our programs addressing important issues facing the earthquake response from fiscal 2011 and reviewed the focal points of our research.

<Management and Application of Intellectual Property>

We also encouraged the use of our research results by making our intellectual property more visible with the publication of the Intellectual Property Report (2010) discussing the creation of intellectual property and its utilization and the expansion of services for downloading research reports. In addition, we worked to spread technology on to the electric power industry and society by holding lectures and participating in exhibits.

<Business Management>

Our main initiatives in business management are described below.

- We acquired new land in the Yokosuka area, where one of our research bases is located, and prepared for the construction of infrastructure and land development.

- We endeavored to continue cutting costs and use assets efficiently, and also sold or otherwise disposed of real estate and put idle facilities to another use. We continued to reduce fixed management costs by curbing personnel costs with cuts to executive salary and other measures.

- After discussion by the Advisory Council, the Board of Directors decided that CRIEPI would adapt to the reforms to the public interest corporation system by preparing to become a non-profit general foundation. This decision was made in consideration of CRIEPI's character and the impact of a transfer to the status of a new corporation.

<Settlement of Accounts>

Revenue amounted to 34.22 billion yen in fiscal 2010, including the balance brought forward from the previous fiscal year, and expenditures totaled 32.53 billion yen.

The balance of net assets at fiscal year-end stood at 37.35 billion yen, up 510 million yen compared to the end of the previous fiscal year.

I. Research Activities

We developed technology with a focus on the three focal points of our research: Nuclear Technology, Stable Power Supply Technology, and Environment and Energy Utilization Technology. This was intended to ensure energy security and address environmental problems.

We selected issues that meet the needs of the electric power industry and society as our project subjects with the aim of achieving timely results. At the same time, we conducted research into fundamental technology in order to build up and enhance our fundamental technology skills for the future. The main research results we achieved as a result of these efforts are as follows.

Table 1 shows the number of reports issued and Table 2 shows the number of papers presented, which illustrates our research results in fiscal 2010. We issued a total of 562 reports and presented 1,605 papers both in Japan and overseas (of which 444 were papers with referee readings) to ensure that our research achievements are returned to the electric power industry and society.

1. Project Subjects

We set 37 project subjects and formed groups such as “Plant Life Management of Light Water Reactors” to carry out research. We have described the main research results in our project subjects below.

(1) Nuclear Technology

In the field of nuclear technology, CRIEPI proactively pursued the development of technology to addressing plant life management to ensure the reliability of operating aging light water reactors. In addition, we conducted research on Nuclear Fuel Cycle Backend Technology to contribute to the smooth implementation of the nation and the electric power industry’s operations and research on next generation reactors and advanced fuel cycle technology, with the aim of improving seismic reliability and providing innovative options in the future, respectively. Moreover, we conducted research on radiation safety to contribute to ensuring rationalized radiation safety.

Plant Life Management of Light Water Reactors: In line with the national road map for R&D on measures to address aging plants, we carried out research on irradiation embrittlement, stress corrosion cracking (SCC), pipe wall thinning, and the seismic assessment for the thinning pipe walls, to obtain a better understanding of these phenomena and to develop countermeasures. In particular, hybrid seismic response tests incorporating the numerical analysis of the entire piping system and the vibration of elbow portions of the piping system demonstrated that the piping strength barely declined when the pipe wall thinning was localized. We also conducted a simultaneous accelerated deterioration test with heat and radiation on electric power cable insulators used in power plants, and found that there could be a threshold at which the cable insulators begin to deteriorate as a result of the drop in the concentration of the antioxidant in the material.

Nuclear Fuel Cycle Backend Technology: We conducted research on concrete casks, which offer such promise as a next-generation storage method for spent fuel (recycled fuel), in the hope of developing practical applications. As a result, we determined that there is a potential for its application in saline environments and in technology that reduces the welding residual stress, which would mitigate SCC in the metal canister in the concrete casks. We also confirmed that the permeability of bentonite composite soil, used as an engineering barrier in the disposal of low level radioactive waste, declines as a result of the settlement of secondary products produced in the reaction with alkaline solutions. Moreover, we proposed new methods for measuring groundwater age to assess nuclide migration speed in the ground using krypton levels in underground water and oxygen isotope ratios.

Improvement of Earthquake Resistance Assessment: In order to develop methods to assess the coupling of active fault movement, which is important in determining the earthquake scale associated with a reference design earthquake ground motion. we studied the active faults coupled in the past and identified the characteristics of the geologic structure that could serve as an index for the coupling. Moreover, we used the results of velocity logging to examine the attenuation model for a rock site that we had developed in order to more accurately assess the seismic wave amplification characteristics.

Light Water Reactor and Advanced Fuel Cycle Technology: We completed the fabrication of Japan's first metallic fuel pins, which are expected to have strong proliferation resistance and to reduce the environmental impact of radioactive waste. These metallic fuel pins will be used in irradiation tests as a part of our efforts to develop a metallic fuel fast reactor cycle. In addition, we carried out uranium recovery tests using a system of devices such as an electrolytic refining device with a 5kg/day capacity and an injection casting device, and determined the recovery that could be realistically achieved.

Radiation Safety: With a view to optimizing radiation protection standards based on scientific data, we continued to accumulate biological response data and identify mechanisms under low dose and low dose rate radiation conditions using cell cultures and laboratory animals (mice). We disclosed this information on a global scale with the aim of reflecting the findings in international radiation protection standards. Moreover, we developed a technique for assessing radioactivity distribution in a large-scale waste container that combines the shape measurements of the waste in the container with gamma-ray measurements and Monte Carlo transport calculation of gamma-rays to contribute to developing rationalized technology for the transport of large radioactive waste generated by decommissioning.

(2) Stable Power Supply Technology

We developed technology for the rational diagnosis, operation and maintenance of aged facilities in order to ensure the long-term, stable supply of electric power. We also developed technology to diversify fuel used in thermal power plants and raise their efficiency to use resources effectively and reduce CO_2 emissions.

Operation and Maintenance of Electric Power Transmission and Distribution Facilities: With the aim of rationally operating highly aged substations and underground power transmission facilities, we developed diagnostic techniques for individual pieces of equipment such as XLPE cables. We also improved and adopted asset management programs that minimize the cost of facility replacement, and supported the establishment of replacement plans. Adding a function for estimating lighting outage rates of transmission lines to the lightning risk assessment program which we previously developed, we made it possible to assess the lightning risk of transmission lines and instantaneous voltage dip risk of a power system. We continued our field observations evaluating wind, snow storm and salt damage, and conducted indoor wind tunnel experiments to determine the occurrence conditions and oscillation properties of galloping phenomenon, which are difficult to observe in power lines, and succeeded in recreating these phenomena. In the area of support for strategic disaster restoration for distribution facilities, a power company ran tests of the earthquake damage assessment system that we had developed, and this system was also used in the initial motion response for the Great East Japan Earthquake. We also ran experiments to verify techniques for the simple removal of low-level PCBs and measuring techniques, an inexpensive way to process transformers contaminated with miniscule amounts of PCBs. Both of these techniques were officially recognized by the Ministry of the Environment.

Maintenance and Operation of Electric Power Generating Facilities: We developed a model based on satellite images and aerial photographs to identify the conditions under which landslides occur on upstream sites of a dam, which are important for upstream landslide management, and verified applicability in river basins where an increase in landslides is possible. Moreover, as part of our efforts to develop more advanced nondestructive testing techniques for the key piping in thermal and nuclear power plants, we established technology making it possible to apply ultrasonic phased array to parts with complex shapes such as welded pipes, which had previously been difficult.

Next-generation Thermal Power Technology: In our research aimed at diversified fuel used in pulverized coal boilers, we determined that the blend rate of subbituminous coal into bituminous coal could be raised to more than 50% by adjusting the distribution of air to burners. In addition, we conducted experiments with the biomass carbonized gasification test facility to determine the impact of moisture in fuel on power generation efficiency, and acquired basic data on designs for commercial plants. In addition, our experiments demonstrated the accelerative effect that CO_2 has on gasification reaction in the highly efficient IGCC (Integrated Coal Gasification Combined Cycle) systems with CO_2 capture that we have proposed.

(3) Environment and Energy Utilization Technology

We carried out environmental research with a focus on global warming forecasting and assessments of its impact. We also proactively developed technology that will help realize a low-carbon society in the future, such as electrification and energy-conserving technology that will help consumers use energy more efficiently and improve the living environment, as well as next-generation power grid to facilitate its adoption in power systems for distributed power sources.

Global Warming Prediction and Impact Assessments: We upgraded our integrated energy-environment-economy model, which is used to assess the effect of global warming countermeasures and the impact, to accurately reflect scientific knowledge on climate change. With the aim of developing localized climate change forecasts over the Japanese archipelago 20-30 years from now, we examined the effectiveness of a method we had developed with recurrence calculations using past weather data, and determined that this could be applied to future forecasting. Moreover, we developed a method of estimating changes in design wind speed and maximum rainfall during typhoons as global warming intensifies, and also analyzed examples of typhoons caused by global warming conditions.

Electrification and Energy Saving Technologies: In order to reduce CO_2 emissions by promoting electrification and conserving energy, we measured the ventilation air volume required for several different types of cooking appliances in order to develop ventilation technologies suitable for the electrical commercial kitchen. We also invented a heat-pump water heater, which can reduce performance loss with frost in winter. In the development of all-solid-state lithium polymer secondary batteries, we demonstrated that battery life can be extended by introducing technology that would inhibit side reactions in the interaction between the positive electrode and the solid polymer electrolyte. We found that a hybrid electric storage system for heat-pump water heaters could be run at low cost with the use of secondary batteries, and also developed a wireless power transfer system for electric vehicles that suggested the possibility of a bi-directional power supply.

Next Generation Power Grid Technology: We carried out demonstration tests using PV and heat-pump water systems to verify the effectiveness of the next-day operation plans and same-day correction systems for electrical end-use appliances that we have proposed to maximize use of the surplus power generation expected with the massive introduction of photovoltaics (PVs). We also developed a calculation method for regulating capacity, which incorporates the impact of PV output fluctuations resulting from wide-ranging weather changes, to keep the supply-demand balance in an electrical grid. In addition, as regards communication infrastructure for the next-generation electricity grids, we carried out experiments to assess the communication performance of multi-hop wireless LAN, which shows great promise as a transmission technology on customer-side communication. We evaluated the information-gathering time for meter reading in the case of approximately 600 smart meters per $1km^2$, the standard number adopted.

Energy Technology Strategy: We continued to exercise case studies of energy-conserving policies, such as analyzing the cost-benefit performance of energy-conserving measures in large-scale offices in the metropolitan area, in order to propose technology development and dissemination strategies to realize the vision of a future in which global warming prevention, the economy and energy safety are in accord. We also found that increasing electrification rates in the business and households sectors and promoting the low carbonization of power sources are economically effective measures in significantly reducing CO_2 on a global scale.

2. Fundamental Technology Issues

We designated 36 fundamental technology issues (we added one during this fiscal period). While capitalizing on the strengths and specialized skills of the eight laboratories with specific research fields, we pursued the research described below at each laboratory to deepen and broaden fundamental technology and resolve related issues, such as technology that maintains and sustains, technology that develops and technology needed for new research breakthroughs.

Socio-economic Research Center: The Socio-economic Research Center contributed to the management of the electric power industry and the planning of energy and environmental policies by accurately assessing the changes in the business environment affecting the electric power industry and the social structure, analyzing and evaluating issues such as electricity management, energy and environmental policies, regional problems, and human factors, and presenting options for solving the issues. For example, the center examined the pros and cons of regulatory policy through a detailed analysis of the results of a fact-finding survey on incentive regulations for the transmission and distribution tariffs in Germany, an example of a frontrunner in this area. This clarified the impact on the institutional framework and the reinforcement of the transmission and distribution for introducing renewable energy in Japan.

System Engineering Research Laboratory: The System Engineering Research Laboratory conducted research on planning, operation, control and analysis methods for electric power transmission systems, distribution systems and information and communication systems to ensure a secure supply of electricity. The laboratory also pursued research on the development, test and assessment of customer service technologies that promote the efficient use of electricity. For example, we developed an automatic diagnosis method for internal transformer failures based on huge gas-in-oil data by using machine learning techniques.

Nuclear Technology Research Laboratory: The laboratory worked to improve basic technological capacities for the assessment of fuel integrity and nuclear reactor cores, thermal hydraulics, the analysis of the dynamic characteristics of nuclear power plants, reprocessing, and the use of risk information. The laboratory also carried out research on the advanced use of light water reactors using the above basic technologies. For example, the laboratory developed a system to calculate the failure rate of equipment needed for a probabilistic risk analysis of each plant. In addition, the laboratory determined the basic physical properties such as the viscosity and electric conductivity of glass containing platinum metal, which are helpful in improving the vitrification technique in aqueous reprocessing.

Civil Engineering Research Laboratory: This laboratory worked to improve fundamental technology related to geology, earthquake engineering, structural engineering and fluid dynamics that is needed to support civil engineering technology and natural disaster mitigation measures for electric power facilities as well as nuclear fuel cycle backend projects. For example, the laboratory proposed a new survey method that identifies past tsunami inundation zones through a scientific analysis of soil. This method's application in a survey of the area affected by the 2010 tsunami in Chile was shown to be highly accurate in distinguishing inundation zones.

Environmental Science Research Laboratory: The laboratory worked to improve fundamental technology related to the atmosphere, marine, hydrosphere, biology, environmental risks and biotechnology with the aim of contributing to the resolution of various environmental problems associated with the electric power industry from the regional scale to the global scale. For example, the laboratory developed practically available guidelines for ecosystem impact assessment in the development of power plants by proposing fundamental ideas and execution procedures for the assessment, and showing case studies estimating the effect quantitatively for golden eagle as a top predator species and Japanese badger as representative species.

Electric Power Engineering Research Laboratory: The Electric Power Engineering Research Laboratory was engaged in the advancement of fundamental technologies related to electric power transmission and distribution facilities, including electrical insulation, lighting protection and high power testing technologies. The laboratory also conducted basic and fundamental research on new electric power technology, such as the development of next-generation electric power equipment, laser application and arc plasma application, and power electronics technology. For example, as an application of electromagnetic waves, the laboratory developed measurement technology using terahertz waves and showed it to be applicable to noncontact, nondestructive measurement of topcoat thickness (several hundreds μm) of thermal barrier coatings for gas turbine blades used in thermal power plants with an accuracy of ±10μm.

Energy Engineering Research Laboratory: The laboratory worked to improve fundamental technologies related to biomass utilization, the reduction of the environmental impact of thermal power generation, facility diagnostics, plant operation and maintenance, and energy conversion, storage and utilization with the aim of creating a highly efficient, clean, low-cost system for the supply and demand of electric power and energy and contributing to the creation of a recycling-oriented society. For example, related to the gas turbine technology, the laboratory determined through experiments and numerical analysis that the effectiveness of film cooling on the surface of the blade can be raised by adjusting the structure and placement of the internal cooling promotion rib. This will advance efforts to improve the cooling performance of the blade, which raises the efficiency of the gas turbine.

Material Science Research Laboratory: The laboratory conducted research on various material-related problems faced by the electric power industry. These range from identification of damage and aging mechanisms of structural materials in nuclear power and thermal power plants and improvements in life prediction and nondestructive evaluation techniques, to the development and evaluation of functional materials, such as secondary batteries, semi-conductors and superconducting devices. For example, an analysis using first-principles calculations and molecular dynamics methods showed that thermoelectric properties can be improved by adding elements such as alkali metals to silicon clathrate, which is a thermoelectric material with a low environmental impact.

3. Research Promotion

(1) Exercising comprehensive strengths

CRIEPI's eight laboratories endeavored to resolve fundamental technology issues and extend their specialized fields. We also capitalized on the strengths of the laboratories' wide-ranging expertise and integrated fundamental technologies to solve problems.

To ensure timely and high-quality outcomes, we promoted research in close cooperation with the electric power industry, and also formed affiliations for joint research with academic associations, manufacturers, and Japanese and international research institutes boasting unique knowledge and facilities. One such example was the promotion of research on snow damage measures using transmission and distribution facilities currently in operation at the urgent request of the electric power industry. We also participated in a national program "Funding Program for World-Leading Innovative R&D on Science and Technology" for SiC power electronics with Kyoto University and the National Institute of Advanced Industrial Science and Technology.

In addition, we reinforced the research project planning functions of the head office and designated subjects with an emphasis on the electric power industry's perspective, the need to ensure research competitiveness, and synergistic effects with other research issues when planning research subjects. We promoted comprehensive initiatives, and also accelerated related SiC power research subjects.

(2) Establishing outcome management

We continued to manage projects appropriately at the stages of research planning, implementing and outcome utilization, always keeping in mind the need to optimize the academic, social and economic spillover effects (outcome) of the research results on the electric power industry and society. We endeavored to further entrench this management in this fiscal year.

In particular, we did the following in order to support overall research strategies and maximize outcomes:

- Identified the strengths of CRIEPI's technology, developments at competing research institutes, and the market potential of research results;
- Followed up on research plans in the research implementation stage in light of developments in research in Japan and overseas; and
- Carried out survey activities in the final technology transfer stage, such as selecting the most effective technology transferee.

(3) Promotion of funded research

Applying CRIEPI's fundamental research skills, we actively engaged in research meeting the needs of the electric power industry, and also received government funding for research for research on issues related to the electric power industry. We also facilitated the projects of the PD Center, which gives certification exams for experts in ultrasonic inspection in nuclear power plants, as well as the projects of the High Power Testing Laboratory, which performs short-circuit tests on electric power equipment.

Table 3 shows the main research projects receiving government funding.

(4) Systematic Introduction and Upgrades of Large-scale Research Facilities

We introduced the large-scale research facilities needed to support technology development for the electric power industry, as described below.

- We have established the "Facility for Evaluation of Crack Growth Rate under High Stress" which allows us to evaluate crack growth rate of large-scale specimens (75mm thick, three times larger than a standard specimen) with a high stress intensity factor.
- We renewed the making switch and the gas insulated bus of the short-circuit generator to facilitate research tests using high power test facilities.
- We also upgraded and augmented our Electric Grid Simulator Facility in order to assess the impact of the large-scale adoption of diversified power sources, such as solar power generation.

We had planned to adopt a Reactor Thermal Hydraulics Transient Test Facility to research statistical safety evaluation methods with an eye on the advanced use of light water reactors in the future, but we determined that we needed to revise our research plans in light of the March 2011 earthquake, and reconsidered our approach to introducing this facility.

(5) Steady Implementation of Fundamental Activities

We steadily carried out the following basic activities to promote a wide range of research activities and effectively disseminate information on research activities and results.

a. Collection of Literature, Materials and Statistics

We utilized our position as an academic research institute to collect and compile high-quality information, and also steadily secured and maintained literature, materials and statistics related to our research. We used this information in research activities, and gave it back to society at large through publications such as research reports.

b. Establishment and Use of Mainframe

We used the general-purpose mainframe installed at CRIEPI to pursue research efficiently and generate a range of results in research on issues of increasing sophistication and complexity. We actively gave licenses for the software that we have developed to the electric power companies and manufacturers to ensure its wide-ranging utilization.

c. Issuance of Publications

We effectively issued information on our research activities and results by publishing research reports and a wide range of public relations materials in line with the progress made in our research. We also disclose this information to society at large via our website.

4. Response to the Great East Japan Earthquake

We have begun to partially revise our research activities to address the urgent requests from the electric power industry and the national government that we received immediately after the Great East Japan Earthquake struck, and to quickly resolve the important issues confronting the earthquake recovery.

Specifically, we provided support after the accident at the Fukushima Daiichi Nuclear Power Plant with all our powers, utilizing our expertise and technology in a wide range of research areas, such as earthquakes, tsunami, nuclear power and radiation, to promptly address the needs of the electric power industry and the country as it confronted. We have begun to identify issues that will need to be resolved in the future and to carefully examine priorities in our current research areas, and have revised the focal points of our research accordingly.

[New Focal Points for Research (Proposal)]

1. Optimal management of risk

Impact of natural disasters and socio-economic fluctuations on the electric power industry, and issues related to the electric power industry's response to these events and the formation of a social consensus

2. Greater sophistication of facility administration and conservation technologies

Issues aimed at raising the sophistication of electric power facility administration and conservation techniques and continuing to provide a more stable supply of electricity

3. Development of advanced electric power on demand/supply basis

Issues related to the establishment of electric power output infrastructure aiming to balance greater efficiency with energy security

Table-1 Number of Reports in FY 2010

	Research reports, etc.	Funded research	Total
Socioeconomics	47	8	55
Environment	25	22	47
Customer energy services	33	2	35
Power delivery	52	41	93
Nuclear power generation	101	37	138
Fossil fuel power generation	40	9	49
New energy	9	9	18
Information & communication	33	8	41
Construction and maintenance of electric power facilities	35	18	53
Advanced basic technologies	30	3	33
Total	405	157	562

Table 2 Number of Papers Reported in FY 2010

	Papers (Peer reviewed papers included above)
Socioeconomics	156 (40)
Environment	229 (66)
Customer energy services	111 (32)
Power delivery	154 (38)
Nuclear power generation	343 (85)
Fossil fuel power generation	107 (44)
New energy	35 (5)
Information & communication	42 (13)
Construction and maintenance of electric power facilities	200 (52)
Advanced basic technologies	215 (64)
others	13 (5)
Total	1,605 (444)

Table 3 Major Funded Researches from the National Government and Others.

Research Title	Consigner	CRIEPI's name for subject
Expenditures for commission for survey of geologic disposal technology (Joint Technology Study on Geologic Disposal: Development of Advanced Boring Technology)	METI	Processing of high-level radioactive waste
Expenditures for commission for survey of geologic disposal technology (Joint Technology Study on Geologic Disposal: Development of Advanced Techniques for Assessment of Groundwater Travel Time in Bedrock)	METI	Processing of high-level radioactive waste
Study on technology for storage of recycled fuel resources (experiments on long-term soundness of intermediate storage facilities)	METI	Transport and storage of recycled fuel
Study on formation of power system-related facilities (study on dependability of supply in other countries)	METI	Operation of key systems in cooperation with power systems in demand area
Research development on engineering technical demonstration of metal fuel cycle for practical application	MEXT	Evaluation of practical utility of metal fuel cycle
Development of analysis techniques using computer simulation of morphological evolution for nuclear fuel	MEXT	Evaluation of practical utility of metal fuel cycle
Assessment of validity of and prediction errors in air quality models for $PM_{2.5}$ in Japan's urban regions	MOE	Atmospheric and marine environment
Li-ion and excellent advanced batteries development project	NEDO	Lithium Secondary Battery with Reliable Safety
Research on technology development of energy storage system to facilitate interconnection of renewable energy to power grid	NEDO	Lithium Secondary Battery with Reliable Safety
Innovative zero-emission coal gasification power generation project, fundamental research project on innovative gasification technology, development of next-generation CO_2 capture IGCC technology	NEDO	CO_2 capture thermal system
Study on downstream effects relating to sump screen clogging issues	JNES	Nuclear power materials
Microstructural characterization of PWR standard reference materials for the prediction of irradiation embrittlement at high fluences	JNES	Radiation embrittlement and integrity assessment of pressure vessels

II. Management and Application of Intellectual Property

In our role as a research institute supporting the electric power industry and society, we endeavored to secure innovative and effective intellectual property—the fruit of our research activities—and to manage it appropriately while utilizing it widely.

Table 4 shows the number of patents and software license applications we submitted and the number registered in FY 2010.

(1) Visualization of intellectual property

To promote visualization of the intellectual property of CRIEPI and its application in the society, we published the Intellectual Property Report (2010) introducing creation and application situation of the intellectual property. In a download service of research reports to the public, approximately 107,000 items were downloaded so far by the power industry, various organizations and persons for wide application.

(2) Promotion of technology succession and transfer activities

We carried out activities to pass technology on to the electric power industry and society through technical exchange courses and technology lectures with the aim of encouraging greater utilization of CRIEPI's intellectual property. We also actively introduced our intellectual property in CRIEPI forums. We were proactive in carrying out technology transfer activities by utilizing technology transfer organizations and participating in external exhibits.

Table 5 shows the number of patent licenses and software licenses that CRIEPI authorized in FY2010.

(3) Contribution to formation of codes and standards

Applying our features as an academic research organization, we contributed to formation of various codes, standards and technical guidelines related to energy and environmental fields through participation to committees by the government and academic societies.

Table 6 shows contribution to forming of major codes, standards, and technical guides.

Table 4 Number of applications and registrations of patent, and software in FY 2010

Type / Field	Patent		Software registration
	Application	Registration	
Socioeconomics	0	0	2
Environment	23	16	6
Customer energy service	13	6	10
Power delivery	20	16	35
Nuclear power generation	16	11	8
Fossil fuel power generation	17	19	3
New energy	3	3	3
Information & communication	5	11	2
Construction & maintenance of electric power facilities	9	5	16
Advanced basic technologies	27	33	0
Total	133	120	85

Note: Number of patents held as of end-FY 2010: 459

Table 5 Number of licensed patents and licensed software applications in FY 2010

	Total
Number of licensed patents	15
Number of licensed software applications	385

Table 6 Contribution to Formulation of Major Codes, Standards, and Technical Guidelines in FY 2010

Code, Standard, Technical Guideline, etc.	Organizations and Groups Concerned
Manual for Rapid Analysis for PCB in Insulating Oil (Second Edition)	Ministry of the Environment
Guidelines for IT Project Benchmark Suppliers: Use within Organization, Supply of Benchmarks for Public Release	Ministry of the Economy, Trade and Industry
IEC TC60493-1 Statistical Work with Data on Heat-resistance Assessment, Part 1: Method based on Average Value of Normal Distribution	International Electrotechnical Commission (IEC)
JEC-2501-2010 Electromagnetic Compatibility Test on Protective Relay	Japan chapter of IEC (The Institute of Electrical Engineers of Japan; IEEJ)
JEAG4612 Guidelines of Categorization of Degree of Importance for Electric and Mechanical Equipment with Safety Features	Japan Electric Association
JEAC5006-2010 Regulations for Electricity Storage Batteries	Japan Electric Association
AESJ-SC-P003：2009 Code for Wind Tunnel Experiments to Calculate the Effective Stack Height of Emitting Source for Nuclear Power Facilities Safety Analysis: 2009 (Issued in May 2010)	Atomic Energy Society of Japan
AESJ-SC-S002: 2010 Chemical Analysis Methods for Primary Coolants for PWR: Boron: 2010	Atomic Energy Society of Japan
Japan Health Physics Society Standard “Method for Determining Clearance Using Surface Contamination Measurements”	Japan Health Physics Society
JIS C 9220 Heat Pump Water Heaters for Household Use	Japanese Standards Association
Green heat certification standards	The Institute of Energy Economics Green Energy Certification Center
2010 ASME/BPVC SectionIII-DIV3 Subsection WB, WC Fiscal 2010 ASME General Specifications for Standards and Design of Boilers and Pressure Vessels	American Society of Mechanical Engineers

III. Business Management

(1) Formulation of Utilization Plans for Each Area and Facility Improvements

We have decided to move the System Engineering Research Laboratory and Nuclear Technology Research Laboratory in Komae to Yokosuka, where the Electric Power Engineering Research Laboratory, Energy Engineering Research Laboratory and Material Science Research Laboratory are located to establish a base for research on energy industry technology. Based on this, we began to improve our research bases in the Yokosuka area with construction on power infrastructure so that large-scale research facilities can be built in this area. We also prepared to develop the new site we have acquired.

We continued our deliberations on our future approach, such as the sale of some land in the Komae area, to ensure effective utilization of our assets.

(2) Continuing cost cuts and effective use of assets

We cut costs further in all of our business activities and added to our reserves for the future in order to focus on the introduction of large-scale research facilities and improvements in the Yokosuka area with the aim of facilitating new research developments.

We sold land left after the suspension of welfare facility operations. We are considering the use of research facilities no longer being used. We also endeavored to streamline our assets by eliminating unnecessary assets. We continued to cut fixed management costs by curbing personnel costs, starting with cuts to salary for executive officers.

(3) Disclosure of information on research results and raising recognition

CRIEPI proactively discloses research results and proposals on energy problems to the public through publications and various media forms in order to raise the electric power industry and society's recognition of CRIEPI's R&D capacity and research results.

- We published CRIEPI TOPICS as a regular publication providing a comprehensive introduction to the front lines of research, and endeavored to promote understanding of our research activities.

- We held the CRIEPI Forum 2010 on the subject of smart grids, which have attracted a great deal of public attention, and presented our approach to the public based on our research results, including technical and social analysis.

- We welcomed visits from about 5,000 people living near our laboratories and others to encourage understanding of our research activities among a broad range of the public, and we also opened research laboratories in Komae, Abiko, Yokosuka and Akagi for public.

- We continued to carry out activities to promote understanding of energy and environment-related problems with seminars for teachers and the dispatch of lecturers to the community activity having handcraft classes for elementary and middle school students, for example.

(4) Response to Reform of Public Interest Corporation System

To prepare for our request to transfer to the status of a non-profit general foundation, we compared the impact on CRIEPI of transfers to the various corporations under the new system from a long-term, comprehensive perspective, including the tax impact. Based on this, after discussion by the board of trustees, CRIEPI's board of directors decided to move ahead with preparations to transfer to the status of a general incorporated foundation under the Establishment Law* and a non-profit corporation under the corporate tax law. We also considered the establishment of new articles of incorporation and the steps we will take to comply with the accounting system and tax system after the transfer.

Moreover, we prepared to establish more effective internal controls by closely examining our internal controls in light of the new system and considering the establishment of regulations on internal controls, such as risk management and compliance.

* Act on the Revision, etc. of Related Acts that Accompany the Enforcement of the Act on General Incorporated Association and General Incorporated Foundation and the Act on the Authorization, etc. of Public-interest Incorporated Associations and Public-interest Incorporated Foundation

IV. Workforce

We hired new researchers in line with our plan, and also added and augmented employees need both to launch new research and maintain ongoing technology by actively utilizing temporary contract employees and external staff such as Visiting Researchers.

The workforce as of March 31, 2011, was as follows.

Item	Numbers	Percentage distribution (%)
1. Research	735*	88.0
[Breakdown]		[100.0]
(1) Electricity	119	16.2
(2) Civil engineering and construction	92	12.5
(3) Mechanical	94	12.8
(4) Chemistry	75	10.2
(5) Biology	63	8.6
(6) Nuclear engineering	48	6.5
(7) Environmental science	45	6.1
(8) Information & communication	42	5.7
(9) Socioeconomics	45	6.1
(10) Research support & management	112	15.3
2. Office work	100	12.0
Total	835	100

*This includes 38 Visiting Researchers.

V. Meetings Held and Appointments of Executive Officers in Accordance with Act of Endowment

1. Board of Directors

Date held	Agenda
April 20, 2010 (No. 219)	1. Selection of member of Advisory Council
June 3, 2010 (No. 220)	1. Approval of reports on research activities in FY2009 2. Approval of reports on settlement of accounts in FY2009 3. Selection of member of Advisory Council
August 30, 2010 (No. 221)	1. Selection of member of Advisory Council
March 10, 2011 (No. 222)	1. Changes to Statement of Budget for FY2010 2. Response to public corporation system reforms 3. FY2011 Research Plans (draft) 4. FY2011 Statement of Budget (draft)

2. Advisory Council

Date held	Agenda
April 20, 2010 (No. 32)	1. Appointment of vice president
May 21, 2010 (No. 33)	1. Reports on Research Activities in FY2009 2. Reports on Settlement of Accounts in FY2009
August 30, 2010 (No. 34)	1. Appointment of vice president
December 3, 2010 (No. 35)	1. Appointment of vice president
February 18, 2011 (No. 36)	1. Changes to Statement of Budget for FY2010 2. Response to public corporation system reforms 3. FY2011 Research Plans (draft) 4. FY2011 Statement of Budget (draft)

Settlement of Accounts

Outline of Settlement of Accounts

The business scale in fiscal 2010 was 32.53 billion yen, 1.76 billion yen less than budgeted. Net property at the end of fiscal 2010 was 37.35 billion yen, 510 million yen higher than the end of the previous fiscal year.

1. Financial statements

(1) Assets condition

Total assets amounted to 49.52 billion yen, 290 million yen less compared to the end of the previous fiscal year. This increase in assets is attributable to 5.00 billion yen for newly acquired fixed assets, including 760 million yen in assets acquired with revenue from subsidies, and 2.60 billion yen in special assets accumulated to establish a new research base. At the same time, assets decreased due to 5.82 billion yen resulting from depreciation and 950 million in the liquidation of special assets. In addition, land assets increased 3.81 billion yen to 8.69 billion yen compared to the end of the previous fiscal year due to the completion of the acquisition of the Yokosuka site (approximately 45,000 m^2).

(2) Liabilities condition

Total liabilities amounted to 12.17 billion yen, down 800 million yen compared to the end of the previous fiscal year. This was because, although fixed liabilities increased 620 million yen due to an increase in retirement benefits, the acquisition of research facilities was minimal compared to the end of the previous fiscal year, which reduced the accrued liabilities for current liabilities by 1.31 billion yen.

(3) Net assets condition

The year-end balance of net assets was 37.35 billion yen, including 36.0 billion yen in general net assets and 1.34 billion yen in designated net assets.

2. New assets increase/decrease calculation sheet

(1) Changes in general net assets

- Ordinary revenue was 30.56 billion yen, up 3.81 billion yen over the previous fiscal year. Current benefits received fell 3.42 billion yen to 27.37 billion yen compared to the previous fiscal year due to lower electricity demand in fiscal 2009 resulting from the economic slump. Revenue from research projects funded by the government fell 600 million yen to 2.04 billion yen.
- Ordinary expenditure fell 680 million yen compared to the previous fiscal year to 31.34 billion yen. This decrease can be attributed to the fact that, although depreciation costs increased due to the change in the method for calculating depreciation, operating costs decreased as a result of funded research and the difference in the amortization of actuarial calculations for retirement benefits decreased after rising in the previous fiscal year.
- As a result, the change in net assets decreased 3.13 billion yen over the previous fiscal year for a net decrease of 780 million yen.

・The non-recurring change was up 760 million yen over the previous fiscal year to 690 million yen. This was because of the significant revenue from the sale of public housing sites in the Komae area and Abiko area.

As a result, the current change in general net assets fell 2.36 billion yen over the previous fiscal year for a net decrease of 80 million yen.

(2) Change in designated net assets

The change in designated assets was up 640 million yen over the previous fiscal year to 600 million yen. This increase was due to significant revenue from subsidies received by the government and others.

3. Statement of revenues and expenditures

The Statement of Revenues and Expenses was corrected with the approval of the regular board of directors meeting (held on March 10, 2011).

As a result, reserves for special assets for the construction of a research base increased to 2.60 billion yen.

(1) Balance of business activities

Revenue from business activities was 31.13 billion yen, 150 million yen higher than the budget.

Business activity expenditures amounted to 24.92 billion yen, 270 million yen lower than the budget. Project expenditures were down 290 million yen over the budget to 13.53 billion yen due to the postponement of maintenance as a result of the Great East Japan Earthquake.

(2) Investment activity balance

・Revenue from investment activity was 580 million lower than the budget at 2.17 billion yen. This decrease was due to the suspension of construction of the nuclear reactor transient testing facility due to revisions to research plans following the Great East Japan Earthquake and the carry-over of revenue from the liquidation of special assets as a result of delays in the introduction of short circuit test facilities.

・Expenditures on investment activities were 1.49 billion yen lower than the budget, at 7.60 billion yen. This decrease was primarily due to suspension of construction of the nuclear reactor transient testing facility and delays in the introduction of short circuit test facilities.

(3) Financial activities

There were no income or expenditures related to financial activities.

As outlined above, current revenue totaled 33.31 billion yen, the carry-over from the previous fiscal year was 900 million yen, and total revenue was 34.22 billion yen, down 410 million yen compared to the budget. On the other hand, current expenditures were 32.53 million yen, down 1.76 billion yen over the budget. As a result, the balance to be carried over to the next fiscal period was 1.69 billion yen.

I. Financial Statements

Balance Sheet

As of March 31, 2011

(Unit: yen)

Account	Current fiscal year	Previous fiscal year	Increase/ decrease
I. Assets section			
1. Current assets			
Cash and deposit	3,624,861,993	4,643,218,904	Δ 1,018,356,911
Securities	4,123,405	4,120,128	3,277
Account receivable	1,066,894,406	687,314,155	379,580,251
Suspense payable	26,318,513	37,557,108	Δ 11,238,595
Advance payment	9,058,530	5,718,761	3,339,769
Total current assets	4,731,256,847	5,377,929,056	Δ 646,672,209
2. Fixed assets			
(1) Fundamental property			
Cash and deposit	7,000,000	7,000,000	0
Total fundamental property	7,000,000	7,000,000	0
(2) Special assets			
Buildings	298,740,222	319,093,783	Δ 20,353,561
Ancillary buildings	5,254,937	6,568,646	Δ1,313,709
Structures	4,132,523	1,254,781	2,877,742
Machine and equipment	1,525,809,040	418,351,215	1,107,457,825
Tools and furniture	39,741,215	25,874,582	13,866,633
Lump-sum depreciable assets	560,701	623,046	Δ62,345
Intangible fixed asset	578,776	6,084,382	Δ5,505,606
Special assets for retirement lump sum grants benefits package allowance	3,435,900,000	3,435,900,000	0
Special assets for research facility acquiring allowance	5,300,000,000	3,650,000,000	1,650,000,000
Total special assets	10,610,717,414	7,863,750,435	2,746,966,979
(3) Other fixed assets			
Land	8,698,562,302	4,881,494,620	3,817,067,682
Building	9,724,652,268	10,146,765,012	Δ 422,112,744
Ancillary buildings	2,750,947,449	3,127,248,113	Δ376,300,664
Structure	912,705,600	1,020,156,297	Δ 107,450,697
Machine and equipment	8,888,142,326	10,758,793,345	Δ 1,870,651,019
Tools and furniture	1,830,267,644	1,908,633,240	Δ 78,365,596
Rolling stock and vehicles	22,696,244	15,435,585	7,260,659
Lump-sum depreciable assets	34,130,833	40,202,207	Δ 6,071,374
Intangible fixed asset	845,534,411	987,211,341	Δ141,676,930
Construction in process account	314,295,500	3,302,072, 859	Δ2,987,777,359
Long-term prepaid expenses	157,382,419	385,539,013	Δ 228,156,594
Total other fixed assets	34,179,316,996	36,573,551,632	Δ 2,394,234,636
Total fixed assets	44,797,034,410	44,444,302,067	352,732,343
Total assets	49,528,291,257	49,822,231,123	Δ293,939,866
II. Liability section			
1. Current liability			
Accrued liability	2,937,704,713	4,256,493,218	Δ1,318,788,505
Money entrusted	98,267,226	92,367,059	5,900,167
Advance receipt	3,430,466	123,496,676	Δ120,066,210
Accrued bonus	396,000,000	392,000,000	4,000,000
Total current liability	3,435,402,405	4,864,356,953	Δ 1,428,954,548
2. Fixed liabilities			
Allowance for retirement benefits for directors	309,000,000	221,000,000	88,000,000
Accrued retirement benefits for employees	8,433,000,000	7,900,000,000	533,000,000
Total fixed liabilities	8,742,000,000	8,121,000,000	621,000,000
Total liabilities	12,177,402,405	12,985,356,953	Δ 807,954,548
III. Net assets section			
1. Designated net assets			
Special benefits	554,354,915	619,315,958	Δ 64,961,043
Cash subsidy	712,393,988	54,447,455	657,946,533
Cash contribution	75,178,399	64,296,154	10,882,245
Total designated net assets	1,341,927,302	738,059,567	603,867,735
(Including appropriation to fundamental property)	(7,000,000)	(7,000,000)	(0)
(Including appropriation to special assets)	(1,334,927,302)	(731,059,567)	(603,867,735)
2. General net assets	36,008,961,550	36,098,814,603	Δ89,853,053
(Including appropriation to fundamental property)	(0)	(0)	(0)
(Including appropriation to special assets)	(5,839,890,112)	(3,696,790,868)	(2,143,099,244)
Total net assets	37,350,888,852	36,836,874,170	514,014,682
Total of liability and net assets	49,528,291,257	49,822,231,123	Δ293,939,866

Net Assets Increase/Decrease Calculation Sheet

From Aril 1 2010 to March 31 2011

(Unit: yen)

Account	Current fiscal year	Previous fiscal year	Increase/decrease
I. General net assets increase/decrease section			
1. Current increase/decrease section			
(1) Current revenue			
[1] Benefit received			
Current benefit received	27,377,598,000	30,804,474,000	Δ3,426,876,000
[2] Operating revenue	(2,656,575,986)	(3,299,468,972)	(Δ642,892,986)
Funded research operating revenue	2,048,775,266	2,649,135,933	Δ600,360,667
Other operating revenue	607,800,720	650,333,039	Δ42,532,319
[3] Other revenue	(233,416,168)	(151,652,567)	(81,763,601)
Interest received	13,055,313	27,845,025	Δ 14,789,712
Facility usage fee received	93,962,393	92,131,353	1,831,040
Miscellaneous revenue	126,398,462	31,676,189	94,722,273
[4] Transfer from designated net assets	293,414,978	117,939,265	175,475,713
Total current revenue	30,561,005,132	34,373,534,804	Δ3,812,529,672
(2) Current expenditure			
[1] Project cost			
Personnel expenditure	(10,186,585,439)	(10,463,682,673)	(Δ277,097,234)
Salary and benefit	7,778,192,907	7,716,885,559	61,307,348
Retirement benefit expenditure	1,361,052,460	1,802,637,947	Δ441,585,487
Welfare expenditure	1,047,340,072	944,159,167	103,180,905
Expenditure	(19,264,442,805)	(19,656,633,186)	(Δ392,190,381)
Supplies expenses	1,820,446,373	2,285,001,109	Δ464,554,736
Printed material expenses	444,415,073	511,667,766	Δ 67,252,693
Fuel, light, and water expenses	651,287,539	627,115,727	24,171,812
Expenses for commission	6,070,417,727	6,490,778,745	Δ420,361,018
Collaboration research contribution	723,845,270	665,617,670	58,227,600
Repair expenses	1,317,834,906	1,261,991,351	55,843,555
Rental rate	189,414,624	211,046,411	Δ21,631,787
Tax and public charge	103,036,518	119,408,627	Δ16,372,109
Travel and transport expenses	764,566,108	731,921,086	32,645,022
Communication and transportation expenses	128,875,073	121,402,728	7,472,345
Other expenditure	1,287,220,541	1,267,211,255	20,009,286
Depreciation allowance	5,763,083,053	5,363,470,711	399,612,342
Subtotal of project cost	29,451,028,244	30,120,315,859	Δ669,287,615
(2) Administrative expenses			
Personnel expenditure	(1,043,947,585)	(1,086,342,137)	(Δ42,394,552)
Board members' salary	151,110,000	167,450,000	Δ16,340,000
Salary and benefit	638,203,041	614,418,866	23,784,175
Retirement benefit expenditure	97,739,020	119,150,903	Δ21,411,883
Welfare expenditure	68,895,524	62,632,368	6,263,156
Allowance for retirement benefits for directors transfer	88,000,000	122,690,000	Δ34,690,000
Expenditure	(850,828,480)	(820,725,940)	(30,102,540)
Supplies expenses	10,723,157	13,251,175	Δ 2,528,018
Printed material expenses	57,816,376	59,263,613	Δ1,447,237
Fuel, light, and water expenses	29,645,780	28,617,852	1,027,928
Expenses for commission	140,419,753	132,418,514	8,001,239
Repair expenses	8,016,470	6,449,165	1,567,305
Rental rate	364,797,337	370,307,249	Δ5,509,912
Tax and public charge	7,497,388	6,744,957	752,431
Travel and transport expenses	46,862,168	46,354,733	507,435
Communication and transportation expenses	9,309,477	8,863,433	446,044
Other expenditure	114,228,878	95,313,340	18,915,538
Depreciation allowance	61,511,696	53,141,909	8,369,787
Subtotal of administrative expenses	1,894,776,065	1,907,068,077	Δ 12,292,012
Total current expenditure	31,345,804,309	32,027,383,936	Δ681,579,627
Current ordinary increase/decrease	Δ784,799,177	2,346,150,868	Δ3,130,950,045

2. Nonrecurring increase/decrease section			
(1) Nonrecurring profit			
[1] Gain from sale of fixed assets			
Gain from sale of land and building	821,932,611	85,323,106	736,609,505
[2] Fixed asset donated profit			
Facility donated profit	31,820,000	13,870,000	17,950,000
[3] Amount transferred from designated net property	0	33,054	Δ 33,054
Total nonrecurring profit	853,752,611	99,226,160	754,526,451
(2) Nonrecurring expenses			
[1] Loss on sale of fixed assets			
Loss on sale of tools and furniture	0	3,850,933	Δ3,850,933
[2] Loss on retirement of fixed assets			
Loss on retirement of facilities	158,806,487	167,974,093	Δ 9,167,606
Total nonrecurring expenses	158,806,487	171,825,026	Δ13,018,539
Current nonrecurring increase/decrease	694,946,124	Δ72,598,866	767,544,990
Current ordinary net asset increase/decrease	Δ89,853,053	2,273,552,002	Δ2,363,405,055
Ordinary net asset beginning balance	36,098,814,603	33,825,262,601	2,273,552,002
Ordinary net asset final balance	36,008,961,550	36,098,814,603	Δ89,853,053
II. Designated net asset increase/decrease section			
[1] Cash subsidy received			
Subsidy received	868,968,943	51,763,412	817,205,531
[2] Fixed asset donated profit			
Facility donated profit	28,313,770	20,843,733	7,470,037
[3] Transfer to ordinary net assets	293,414,978	117,972,319	175,442,659
Current designated net assets increase/decrease	603,867,735	Δ 45,365,174	649,232,909
Designated net assets beginning balance	738,059,567	783,424,741	Δ 45,365,174
Designated net assets final balance	1,341,927,302	738,059,567	603,867,735
III. Net assets final balance	37,350,888,852	36,836,874,170	514,014,682

Notes for Financial Statements

1. Important accounting policy

Public-Service Corporation Accounting Standard (October 14, 2004, understood thing at the concerned government ministries meeting related to teaching and direction of public-service corporations) was employed.

(1) Assessment standard and assessment method of valuable stock certificates

For other valuable stock certificates without market price, the cost method by the moving-average method has been applied.

(2) Depreciation method of fixed assets

- For tangible fixed assets, building (excluding building attached structures) has been managed by the equal installment method, small fixtures have been by the three-year uniform extinguishment, and other tangible fixed assets including machine and equipment have been by the constant percentage method.
- Intangible fixed asset has been managed by the equal installment method.
- Lease assets from finance lease trade other than ownership transfer was calculated for the lease period of expiration year and based on the equal installment method with zero residue prices.

(3) Allowance allocating standard

Allowance for doubtful debts:

To prepare for doubtful debts including account receivable and loan receivable, uncollectible amount is individually estimated to account for allowance.

Bonus payment reserve:

To prepare for doubtful debts including account receivable and loan receivable, uncollectible amount is individually estimated to account for allowance.

Allowance for retirement benefits for vice presidents:

To prepare payment of vice presidents special service bonus, estimation at the end of period is account for allowance based on the private regulation to pay allowance for retirement benefits for vice presidents.

Accrued retirement benefits for employees:

To prepare for payment of retirement allowance and annual pension, amount deducting the pension asset amount assessed from the present value method based on future estimated retirement benefit is account for allowance. And retirement benefits for counselors are accounted for the estimation at the end of period based on the related private regulation and expressed in the combined form.

(4) Processing method of the finance lease trade other than ownership transfer before beginning of initial fiscal year applying the lease account standard.

The finance lease trade other than ownership transfer concluding contract by March 31, 2008 should be account processed continuously according to the ordinary lease contract.

(5) Account processing of consumption tax, etc.

Account processing of consumption tax, etc. is controlled by the before tax method.

2. Change in important account policy

(1) Change in method for calculating depreciation

On April 1, 2010, accounting rules and accounting treatment rules were revised and accounting methods for the depreciation of fixed assets used in the course of business was changed from April 1, 2010 in order to adopt the approach in the Corporation Tax Law (revised in fiscal 2007), whereby fixed assets are depreciated early and the allowable limit for depreciation is increased. The method for calculating the depreciation of tangible fixed assets used in the course of business was left unchanged until March 31, 2010, but the residual value of tangible fixed assets that have reached the allowable limit for depreciation are depreciated in an equal amount over five years from the next fiscal year.

As a result, depreciation increased 571,067,850 yen in the current period compared to the previous accounting method.

(2) Change in presentation of fixed assets

As a result of revisions to accounting rules, in the fixed asset category buildings were categorized as structures and ancillary buildings, while tools and furniture were classified as tools, rolling stock and vehicles, and lump-sum depreciable assets.

(3) Change in presentation of designated net assets

In order to more clearly manage the classification of designated net assets, the presentation of designated assets was revised in part and cash contributions were reclassified as “cash contributions, etc.”, while some of the money presented as cash subsidies was reclassified as “cash contributions, etc.”

As a result, compared to the previous classification, cash subsidies at the end of the fiscal year decreased 33,767,377 yen and cash contributions, etc. increased by the same amount. Prior to the classification change at the end of the fiscal year, cash subsidies amounted to 73,300,205 yen and cash contributions to 45,443,404 yen.

3. Increase, decrease and its balance of fundamental asset and special asset

Increase, decrease and its balance of fundamental asset and special asset are as follows.

(Unit: yen)

Subject	Balance at the end of previous period	Current increased amount	Current decreased amount	Balance at the end of current period
Fundamental asset				
Cash and deposit	7,000,000	0	0	7,000,000
Subtotal	7,000,000	0	0	7,000,000
Special asset				
Building	319,093,783	0	20,353,561	298,740,222
Ancillary buildings	6,568,646	0	1,313,709	5,254,937
Structures	1,254,781	3,172,850	295,108	4,132,523
Machine and equipment	418,351,215	1,297,470,082	190,012,257	1,525,809,040
Tools and furniture	25,874,582	38,023,100	24,156,467	39,741,215
Lump-sum depreciable assets	623,046	606,210	668,555	560,701
Intangible fixed assets	6,084,382	311,460	5,817,066	578,776
Special assets for reserves for lump-sum retirement benefits	3,435,900,000	0	0	3,435,900,000
Special assets for acquisition of research facilities	3,650,000,000	2,600,000,000	950,000,000	5,300,000,000
Subtotal	7,863,750,435	3,939,583,702	1,192,616,723	10,610,717,414
Total	7,870,750,435	3,939,583,702	1,192,616,723	10,617,717,414

4. Breakdown of financial resources for fundamental assets and special assets

Breakdown of financial resources for fundamental assets and special assets is as follows.

(Unit: yen)

Subject	Balance at the end of current period	(Including appropriation from designated net asset)	(Including appropriation from general net asset)	Including liability relating item)
Fundamental asset				
Cash and deposit	7,000,000	(7,000,000)	-	-
Subtotal	7,000,000	(7,000,000)	-	-
Special asset				
Building	298,740,222	(298,740,222)	-	-
Ancillary buildings	5,254,937	(5,254,937)	-	-
Structures	4,132,523	(2,641,712)	(1,490,811)	-
Machine and equipment	1,525,809,040	(987,409,739)	(538,399,301)	-
Tools and furniture	39,741,215	(39,741,215)	-	-
Lump-sum depreciable assets	560,701	(560,701)	-	-
Intangible fixed assets	578,776	(578,776)	-	-
Special assets for reserves for lump-sum retirement benefits	3,435,900,000	-	-	(3,435,900,000)
Special assets for acquisition of research facilities	5,300,000,000	-	(5,300,000,000)	-
Subtotal	10,610,717,414	(1,334,927,302)	(5,839,890,112)	(3,435,900,000)
Total	10,617,717,414	(1,341,927,302)	(5,839,890,112)	(3,435,900,000)

5. Assets offered as collateral

No asset offered as collateral is recorded.

6. Acquisition value, accumulated depreciation and balance at the end of current period for fixed assets

Acquisition value, accumulated depreciation and balance at the end of current period for fixed assets are as follows.

(Unit：yen)

Subject	Acquisition value	Accumulated depreciation	Balance at the end of current period
Special asset	(5,556,035,990)	(3,681,218,576)	(1,874,817,414)
Building	621,962,762	323,222,540	298,740,222
Ancillary buildings	131,372,924	126,117,987	5,254,937
Structures	28,268,470	24,135,947	4,132,523
Machine and equipment	4,714,073,324	3,188,264,284	1,525,809,040
Tools and furniture	57,570,740	17,829,525	39,741,215
Lump-sum depreciable assets	2,003,810	1,443,109	560,701
Intangible fixed asset	783,960	205,184	578,776
Other fixed assets	(100,053,073,586)	(75,043,996,811)	(25,009,076,775)
Building	18,402,213,563	8,677,561,295	9,724,652,268
Ancillary buildings	12,063,199,127	9,312,251,678	2,750,947,449
Structures	5,356,363,729	4,443,658,129	912,705,600
Machine and equipment	50,305,284,629	41,417,142,303	8,888,142,326
Tools and furniture	9,668,783,982	7,838,516,338	1,830,267,644
Rolling stock and vehicles	75,760,319	53,064,075	22,696,244
Lump-sum depreciable assets	108,832,315	74,701,482	34,130,833
Intangible fixed asset	4,072,635,922	3,227,101,511	845,534,411
Total	(105,609,109,576)	(78,725,215,387)	(26,883,894,189)

7. Claimable assets, balance of allowance for doubtful debts at the end of period, and balance of claimable assets at the end of period

Claimable assets, balance of allowance for doubtful debts at the end of period, and balance of claimable assets at the end of period are as follows.

(Unit：yen)

Subject	Claimable assets	Balance of allowance for doubtful debts at the end of period	Balance of claimable assets at the end of period
Account receivable	1,066,894,406	0	1,066,894,406
Housing loans and welfare loans among special assets of accrued retirement benefits	36,225,056	0	36,225,056
Total	1,103,119,462	0	1,103,119,462

8. Contingent liabilities such as guarantee liabilities

A guarantee liability to employees housing loans is 2,428,730,507 yen.

9. Breakdown of held-to maturity bond certificates and book values, actual values, and appraisal profit or loss

No held-to-maturity bond certificates are recorded.

10. Breakdown of subsidies, etc. and delivers, current increase/decrease, and balance.
Breakdown of subsidies, etc. and delivers, current increase/decrease, and balance are as follows.

(Unit : yen)

Name of subsidies	Deliverer	Balance at the end of period	Current increase	Current decrease	Balance at the end of period	Describing division in balance sheet
Subsidies						
・Subsidy of operating costs for infrastructure development for impact assessment on power systems of mass adoption of decentralized power sources	Ministry of Economy, Trade and Industry	13,203,500	558,132,276	62,164,248	509,171,528	Designated net assets
・Subsidy of costs of optimization control technical demonstration on next-generation power transmission and distribution systems	Ministry of Economy, Trade and Industry	0	4,392,370	4,392,370	0	—
・Subsidy of costs for development of cutting-edge technology for energy use rationalization	Ministry of Economy, Trade and Industry	0	1,540,000	1,540,000	0	—
・Subsidy for costs of project to develop measures such as solidification of carbon dioxide and efficient use technology	Ministry of Economy, Trade and Industry	2,151,092	0	2,151,092	0	—
・Subsidy for development costs for lithium battery technology for use in fuel-cell-powered cars	Ministry of Economy, Trade and Industry	1,470,330	0	1,470,330	0	—
・Subsidy for costs of project to generate innovation in affiliations between industry, academia and government	Ministry of Education, Culture, Sports, Science and Technology	10,741,452	0	10,741,452	0	—
・Project to promote the introduction of solar power generation system at CRIEPI's laboratories in the Yokosuka area in fiscal 2008	New Energy and Industrial Technology Development Organization	16,789,780	0	2,132,302	14,657,478	Designated net assets
・Project to promote introduction regional new energy in fiscal 2009	New Energy Promotion Council	4,000,000	0	588,000	3,412,000	Designated net assets
Grant						
・R&D for SiC innovative power electronics to create a low-carbon society (super-thick membrane and multi-layer SiC epitaxial wafer technology)	Japan Society for the Promotion of Science	0	289,186,134	106,548,954	182,637,180	Designated net assets
・Research on impact of forest's watershed characteristics on hydroelectric power generation volumes	National Land Afforestation Promotion Organization	6,091,301	1,706,106	7,797,407	0	—
・Research on the function of forest vegetation supply, which supports river ecosystems	National Land Afforestation Promotion Organization	0	12,001,057	11,123,140	877,917	Designated net assets
・Analysis of cell response mechanism attributable to energy imparted to cytoplasm	Radiation Effects Association	0	350,000	350,000	0	—
・Fiscal 2010 grant for project to subsidize costs of development of dual analog/digital equipment to alleviate poor reception	Association for Promotion of Digital Broadcasting	0	1,661,000	23,115	1,637,885	Designated net assets
Total		54,447,455	868,968,943	211,022,410	712,393,988	

11. Breakdown of transfer from designated net assets to general net assets

Breakdown of transfer from designated net assets to general net assets is as follows.

(Unit: yen)

Content	Amount of money
Transfer to balance of current account	
Depreciation allowance related to designated net assets	164,558,770
Transfer by exception from specification as designated net asset	19,898,806
Transfer by implementing of project for which subsidy was received	108,957,402
Total	293,414,978

12. Trading content to related parties

No trading to related parties is recorded.

13. Important subsequent event

No important subsequent event is recorded.

14. Trading finance lease related before beginning of initial fiscal year applying the lease account standards

(1) Equivalent transaction prices, equivalent accumulated depreciation, and equivalent balance at the end of period for lease objects.

(Unit : yen)

	Machine and equipment	Tools and furniture	Total
Equivalent transaction prices	148,002,000	7,200,000	155,202,000
Equivalent accumulated depreciation	148,002,000	7,200,000	155,202,000
Equivalent balance at the end of period	0	0	0

(2) Equivalent balance at the end of period of prepaid lease revenue

(Unit : yen)

	Within one year	Over one year	Total
Equivalent balance at the end of period of prepaid lease revenue	0	0	0

(3) Current paid lease revenue, equivalent depreciation

(Unit : yen)

Paid lease revenue	0
Equivalent depreciation	7,880,100

(4) Equivalent depreciation is calculated on a straight-line basis

(5) Equivalent interest is not accounted.

15. Retirement benefit related

(1) Summary of employed retirement benefit

As a defined-benefits system, retirement pension system and termination allowance plan are employed.

(2) Retirement benefit liability and its contents

(Unit : yen)

[1] Retirement benefit liability	△22,185,301,023
[2] Retirement pension asset	13,689,118,768
[3] Non-accumulated retirement benefit ([1]+[2])	△8,496,182,255
[4] Non-depreciated mathematical calculation difference	△63,182,255
[5] Accrued retirement benefits for employees ([3]-[4])	△8,433,000,000

(3) Items for retirement benefit expense

(Unit : yen)

[1] Working expense	916,277,358
[2] Interest expense	424,665,098
[3] Expectable operation benefit	△131,037,653
[4] Mathematical calculation difference depreciation	248,886,677
[5] Retirement benefit expense ([1]+[2]+[3]+[4])	1,458,791,480

(4) Items for calculation bases of retirement benefit liability

[1] Period allocation method of retirement benefit expectation: Period fixed amount standard based on the working period

[2] Discount rate: 2.0%

[3] Expectable operation benefit: 1.0%

[4] Processing year of difference on mathematical calculation: Five-year constant percentage method is applied for depreciation after next year of occurrence.

Lists of Assets

As of March 31 2011

(Unit: yen)

Subject	Amount of money			Memo
I. Assets section				
1. Floating asset				
Cash and deposit				
General deposit	3,520,868,946			Mitsubishi Tokyo UFJ bank, 3,319,482,031 yen and others
Fixed deposit account	100,000,000			Tokyo Tomin Bank, Limited, 100,000,000 yen
Postal savings	3,993,047			Ordinary deposit
Sub-total of cash and deposits		3,624,861,993		
Securities		4,123,405		Open-end bond investment trust
Account receivable		1,066,894,406		Funded research business income and others
Suspense payment		26,318,513		Temporary payment consumption tax on construction suspense account expense and others
Advance payment		9,058,530		Advance payment of share of cost of joint research on R&D for IGCC demonstration equipment
Total floating asset			4,731,256,847	
2. Fixed asset				
(1) Fundamental property				
Case and deposit				
Fixed deposit account		7,000,000		Mizuho trust bank
Total fundamental property		7,000,000		
(2) Special asset				
Building	621,962,762			Yokosuka area, short circuit test house and others
Accumulated depreciation	Δ323,222,540			
Subtotal of building		298,740,222		
Ancillary buildings				
Ancillary buildings	131,372,924			Komae area, WANO Tokyo center, air conditioner and others.
Accumulated depreciation	Δ126,117,987			
Sub-total for ancillary buildings		5,254,937		
Structures				
Structures	28,268,470			Abiko area, Construction work for compatibility with terrestrial digital broadcasting
Accumulated depreciation	Δ24,135,947			
Subtotal of structures		4,132,523		
Machine and equipment				
Research machine and equipment	4,652,136,584			Komae area, power grid simulator, etc.
General machine and equipment	61,936,740			Yokosuka area, solar power generator equipment, etc.
Accumulated depreciation	Δ3,188,264,284			
Subtotal of machine and equipment		1,525,809,040		
Tools and furniture				
Research tools and furniture	57,570,740			Fluorescent x-ray analysis instruments, etc.
Accumulated depreciation	Δ17,829,525			
Subtotal of tools and furniture		39,741,215		
Lump-sum depreciable assets				
Lump-sum depreciable assets	2,003,810			Computers for research purposes, etc.
Accumulated depreciation	Δ1,443,109			
Subtotal of lump-sum depreciable assets		560,701		
Intangible fixed asset				Science technology calculation library etc.
Research software	783,960			
Accumulated depreciation	Δ205,184			
Intangible fixed asset sub-total		578,776		
Accrued retirement benefits for employees special asset				
Housing loan	15,283,056			Personnel loan
Welfare loan	20,942,000			Personnel loan
Long-term official credit deposit	440,539,840			Caution money and guarantee deposit and others
Special deposit	2,959,135,104			General deposit: Mitsubishi Tokyo UFJ bank, 59,135,104 yen Fixed deposit account: Mitsubishi Tokyo UFJ bank, 2,900,000,000 yen
Subtotal of accrued retirement benefits for employees special asset		3,435,900,000		
Research facility acquiring benefits special asset		5,300,000,000		General deposit: Mitsubishi Tokyo UFJ bank, 600,000,000 yen Fixed deposit account: Mitsubishi Tokyo UFJ bank, 4,700,000,000 yen
Total special asset		10,610,717,414		
(3) Other fixed asset				
Land				
Komae area	1,803,423,271			Commercial land and welfare housing land 68,812.45 ㎡
Abiko area	1,483,961,669			ditto 173,608.27 ㎡
Yokosuka area	4,319,643,545			ditto 251,774.71 ㎡
Akagi area	651,429,826			ditto 1,005,572.32 ㎡
Others	440,103,991			Shiobara experimental land and others 53,986.44 ㎡
Land subtotal		8,698,562,302		

Building				
Building	18,402,213,563			Yokosuka area, administration building and high-voltage
Accumulated depreciation	Δ8,677,561,295			insulation laboratory, etc.
Building subtotal		9,724,652,268		
Ancillary buildings				
Ancillary buildings	12,063,199,127			Komae area, exhaust facility in third wing, etc.
Accumulated depreciation	Δ9,312,251,678			
Sub-total for ancillary buildings		2,750,947,449		
Structure				
Structure	5,356,363,729			Yokosuka area, second switchgear and others
Accumulated depreciation	Δ4,443,658,129			
Subtotal of structure		912,705,600		
Machine and equipment				
Research machine and equipment	49,939,178,021			
General machine and equipment	366,106,608			Testing facilities for lifetime evaluation of existing components, short-circuit test and operations and control automation systems, etc.
Accumulated depreciation	Δ41,417,142,303			Equipment parking facility, etc.
Subtotal of machine and equipment		8,888,142,326		
Tools and furniture				
Research tools and furniture	8,362,806,063			Two-dimensional gas velocity field measuring equipment, etc.
				Abiko, Yokosuka network component and others
General tools and furniture	1,305,977,919			Telephone exchange system, etc.
Accumulated depreciation	Δ7,838,516,338			
Subtotal of tools and furniture		1,830,267,644		
Rolling stock and vehicles				
Rolling stock and vehicles	75,760,319			High-altitude work vehicle, etc.
Accumulated depreciation	Δ53,064,075			
Sub-total of rolling stock and vehicles		22,696,244		
Lump-sum depreciable assets	108,832,315			Experiment and research tools, research and work computers, etc.
Lump-sum depreciable assets	Δ74,701,482			
Accumulated depreciation		34,130,833		
Sub-total of lump-sum depreciable assets				
Intangible fixed asset				
Research software	2,913,858,840			Communications network performance assessment system, etc.
Business software	1,031,842,754			ERP system and others
Facility utilization right	126,218,328			Payment for water service application, and others
Telephone right	716,000			Each area telephone rights
Accumulated depreciation	Δ3,227,101,511			
Subtotal of intangible fixed asset		845,534,411		
Building under construction		314,295,500		Low-grade resource advanced gasification testing facilities, etc.
Long-term advanced payment		157,382,419		Equivalent facility construction expense in research contribution
Other fixed asset total		34,179,316,996		on research collaboration (coal gasification combined power demonstration plant research)
Fixed asset total			44,797,034,410	
Asset total			49,528,291,257	
II. Liability section				
1. Floating liability				
Accrued liability		2,937,704,713		Contract construction and purchased goods expense and others
Money entrusted		98,267,226		Consumption tax, inhabitant's tax and others
Advance receipt		3,430,466		Advance receipt related to next fiscal year implementation grant, and others
Accrued bonuses		396,000,000		Allowance for employee, etc. bonus
Floating liability total			3,435,402,405	
2. Fixed liability				
Allowance for retirement benefits for directors		309,000,000		Allowance for retirement benefits for vice presidents and general auditors.
Allowance for retirement pension benefits for employees				
Accrued retirement lump sum benefits for employees	7,767,000,000			
Allowance for retirement benefits	666,000,000			
		8,433,000,000		Allowance for retirement benefits for employees, etc.
Total fixed liability			8,742,000,000	
Total liability			12,177,402,405	
Net asset			37,350,888,852	

Cash flow calculation sheet

From April 1, 2010 to March 31, 2011

(Unit: yen)

Subject	Current year	Previous year	Increase/ decrease
I Cash flow in business activity			
1. Current period ordinary net property increase/decrease	Δ 89,853,053	2,273,552,002	Δ2,363,405,055
2. Adjust amount to cash flow			
(1) Depreciation allowance	5,824,594,749	5,416,612,620	407,982,129
(2) Fixed asset loss on retirement	158,806,487	167,974,093	Δ 9,167,606
(3) Transferred long-term advance payment	228,156,594	228,211,541	Δ54,947
(4) Loss on fixed asset sale	0	3,850,933	Δ3,850,933
(5) Profit on sale of fixed assets	Δ 821,932,611	Δ 85,323,106	Δ 736,609,505
(6) Facility donating profit	Δ 31,820,000	Δ 13,870,000	Δ17,950,000
(7) Increase/decrease in allowance for retirement benefits for directors	88,000,000	Δ261,000,000	349,000,000
(8) Increase/decrease in accrued retirement benefits for employees	533,000,000	120,000,000	413,000,000
(9) Increase/decrease in accrued bonus	4,000,000	7,000,000	Δ3,000,000
(10) Increase/decrease in account receivable	Δ 379,580,251	174,791,880	Δ 554,372,131
(11) Increase/decrease in suspense payment	11,238,595	9,522,048	1,716,547
(12) Increase/decrease in advance payment	Δ3,339,769	Δ534,866	Δ2,804,903
(13) Increase/decrease in accrued liability	Δ 756,238,449	99,931,085	Δ856,169,534
(14) Increase/decrease in money entrusted	5,900,167	51,251	5,848,916
(15) Increase and decrease of advanced receipt	Δ 120,066,210	121,292,956	Δ241,359,166
(16) Transferred amount from designated net property	Δ 293,414,978	Δ 117,972,319	Δ175,442,659
(17) Others	Δ 26,800,000	0	Δ26,800,000
Subtotal	4,420,504,324	5,870,538,116	Δ1,450,033,792
3. Increase/decrease in designated net property			
(1) Subsidy income	868,968,943	51,763,412	817,205,531
Cash flow by business activity	5,199,620,214	8,195,853,530	Δ2,996,233,316
II Cash flow by investment activity			
1. Investment activity income			
(1) Transferred income from research facility acquiring special asset	950,000,000	350,000,000	600,000,000
(2) Fixed asset sale income	1,001,729,553	161,803,010	839,926,543
Total investment activity income	1,951,729,553	511,803,010	1,439,926,543
2. Investment activity expenditure			
(1) Special asset acquiring expenditure	2,600,000,000	1,800,000,000	800,000,000
(2) Fixed asset acquiring expenditure	5,569,703,401	7,425,551,821	Δ1,855,848,420
Total investment activity expenditure	8,169,703,401	9,225,551,821	Δ1,055,848,420
Cash flow by investment activity	Δ 6,217,973,848	Δ 8,713,748,811	2,495,774,963
III Cash flow by financial activity			
1. Financial activity income	0	0	0
2. Financial activity expenditure	0	0	0
Cash flow by financial activity	0	0	0
IV Difference in conversion of cash and cash equivalent	0	0	0
V Increase/decrease in cash and cash equivalent	Δ 1,018,353,634	Δ517,895,281	Δ500,458,353
VI Cash and cash equivalent balance at the beginning of a period (note 3)	4,647,339,032	5,165,234,313	Δ 517,895,281
VII Cash and cash equivalent balance at the end of a period (note 3)	3,628,985,398	4,647,339,032	Δ1,018,353,634

Notes:

1. Asset scope

   Asset scope includes cash and cash equivalent.

2. Important non-asset trade

   No important non-asset trade is reported.

3. Relation between cash and cash equivalent balance at the end of a period and amount of money described in balance sheet

Subject	Beginning of current period	End of current period
Cash deposit	4,643,218,904	3,624,861,993
Securities	4,120,128	4,123,405
Cash and cash equivalent	4,647,339,032	3,628,985,398

II. Statement of Revenue and Expenditures

Statement of revenues and expenditures

From April 1 2010 to March 31 2011

(Unit: yen)

Subject	Budget	Account settlement	Difference	Remarks
I. Business activity balance of payments section				
1. Business activity income				
(1) Benefit income				
Current benefit income	27,370,000,000,	27,377,598,000	Δ7,598,000	
(2) Business income	3,500,000,000	3,525,544,929	Δ25,544,929	
Funded research business income	(2,000,000,000)	(2,048,775,266)	(Δ48,775,266)	
Other business income	(1,500,000,000)	(1,476,769,663)	(23,230,337)	
(3) Other income	110,000,000	235,856,168	Δ125,856,168	
Total business activity income	30,980,000,000,	31,138,999,097	Δ158,999,097	
2. Business activity expenditure				
(1) Business expense expenditure	23,550,000,000	23,221,700,294	328,299,706	
Personnel expense expenditure	(9,720,000,000)	(9,691,100,542)	(28,899,458)	
Expense expenditure	(13,830,000,000)	(13,530,599,752)	(299,400,248)	(1)
(2) Management cost expenditure	1,650,000,000	1,703,749,266	Δ53,749,266	
Personnel expense expenditure	(880,000,000)	(914,432,482)	(Δ34,432,482)	
Expense expenditure	(770,000,000)	(789,316,784)	(Δ19,316,784)	
Total business activity expense	25,200,000,000	24,925,449,560	274,550,440	
Difference in business activity balance of payments	5,780,000,000	6,213,549,537	Δ433,549,537	
II. Investment activity balance of payments section				
1. Investment activity income				
(1) Special asset transferred income				
Research facility acquiring special asset transferred income	1,550,000,000	950,000,000	600,000,000	(2)
(2) Sale income of fixed assets	980,000,000	1,001,729,553	Δ21,729,553	
(3) Long-term advance payment transferred income	230,000,000	228,156,594	1,843,406	
Total investment activity income	2760,000,000	2,179,886,147	580,113,853	
2. Investment activity expenditure				
(1) Special asset acquiring expenditure				
Research facility acquiring special asset expenditure	2,600,000,000	2,600,000,000	0	
(2) Fixed asset acquiring expenditure	6,500,000,000	5,007,153,345	1,492,846,655	(3)
Total investment activity expenditure	9,100,000,000	7,607,153,345	1,492,846,655	
Difference in investment activity balance of payments	Δ6,340,000,000	Δ5,427,267,198	Δ912,732,802	
III. Financial activity balance of payments				
1. Financial activity income	0	0	0	
2. Financial activity expenditure	0	0	0	
Difference in financial activity balance of payments	0	0	0	
Difference in current balance of payments	Δ560,000,000	786,282,339	Δ1,346,282,339	
Difference in balance of payments transferred from previous period	900,000,000	905,572,103	Δ5,572,103	
Difference in balance of payments transferring to next period	340,000,000	1,691,854,442	Δ1,351,854,442	

Notes:

(1) The difference is due to delays in carrying out maintenance and repairs as a result of the Great East Japan Earthquake.

(2) The difference is due to the carry-over of a 400 million yen revenue reversal following the suspension of construction on the reactor transient test facility and the carry-over of a 200 million yen revenue reversal following the delay in the introduction of the short-circuit testing facility.

(3) The difference is due to the suspension of construction on the reactor transient test facility and the delay in the introduction of the short-circuit testing facility.

Note for income and expenditure accounts

1. Scope of revenue

   Scope of revenue includes cash and deposit, securities, account receivable, suspense payments, advanced payment and accrued liability, money entrusted, and advance receipt. Balances at the ends of previous and current periods are as shown in the following paragraph 2.

2. Breakdown of assets and liabilities included in difference in balance of payments transferred to next period.

(Unit : yen)

Subject	Balance at the end of previous period	Balance at the end of current period
Cash and deposit	4,643,218,904	3,624,861,993
Securities	4,120,128	4,123,405
Account receivable	687,314,155	1,066,894,406
Suspense payment	37,557,108	26,318,513
Advanced payment	5,718,761	9,058,530
Total	5,377,929,056	4,731,256,847
Accrued liability	4,256,493,218	2,937,704,713
Money entrusted	92,367,059	98,267,226
Advance receipt	123,496,676	3,430,466
Total	4,472,356,953	3,039,402,405
Difference in balance of payments transferred to the next period	905,572,103	1,691,854,442

3. Relation between the final accounts for the fixed asset acquiring expenditure and those indicated in the cash flow calculation sheet

(Unit : yen)

Expenditure by acquisition of fixed asst (cash flow calculation sheet)	5,569,703,401
Increase/decrease of accrued liability	△562,550,056
Final amount of fixed asset acquisition expenditure	5,007,153,345

4. The final amount of expenditures for fixed asset acquisition includes 760,011,541 yen in fixed assets acquired with revenue from subsidies.

Audit Report by Third-Party Auditor

May 2nd, 2011

Central Research Institute of Electric Power Industry

President Masahiro Kakumu

Certified public accountant, Wada Yoshihiro Office

Certified public accountant, Yoshihiro Wada

Certified public accountant, Tomikawa Masayuki Office

Certified public accountant, Masayuki Tomikawa

We audited the financial statements of the Foundation of Central Research Institute of Electric Power Industry (herein after referred to as CRIEPI) in the FY2010 business term from April 1 2010 to March 31 2011, including Balance sheet, Net assets increase/decrease calculation sheet, Cash flow calculation sheet, List of assets and Statement of revenues and expenditures (hereinafter referred to as "financial statements"). The responsibility to prepare these financial statements falls upon the executive board members, and our responsibility is to express an opinion on the financial statements from an independent standpoint.

We carried out the audit based on an auditing standard generally authorized to be public and acceptable in Japan. The audition standard requires us to give reasonable assurance that no false expression is contained in financial statements. The audit is done based on audit tests to thoroughly check expressions in financial statements, including the account policy employed by the executive board members and its application method, and an assessment of estimations made by the members. We understand that reasonable basement was obtained to express our opinion as the audit result.

(1) We accept that the financial statement is based on the public-service corporation account standard generally authorized to be arm's length in Japan, and properly indicates in all important points the assets, net assets increase/decrease, and cash flow situation for the term related to this financial statement of the Foundation of CRIEPI.

(2) We accept that the statement of revenue and expenditures is prepared correctly based on "internal management items in the public-service cooperation account" (March 23, 2005, mutual agreement related government ministries and agencies liaison conference on guidance in public-service corporations) and expresses all important points for the balance of payments in the FY 2010 business term for CRIEPI.

Additional information

As described in the notes to the financial statements "(1) Change in important account policy" under "2. Change in method for calculating depreciation," the corporation changed the method for calculating the depreciation of fixed assets.

Audit Report

Audit Report

May 10th, 2011

Central Research Institute of Electric Power Industry
President Masahiro Kakumu

Central Research Institute of Electric Power Industry
General Auditor, Masatake Kadoyu
General Auditor, Katsutoshi Chikudate
General Auditor, Koji Kaibe

We audited, on the basis of Central Research Institute of Electric Power Industry (hereinafter referred to as CRIEPI) auditor audit rule and FY 2010 auditor audit plan, CRIEPI's business and financial conditions for the applicable fiscal year from April 1, 2010 to march 31, 2011 to report the results as follow.

1. Outline of the audit method

We surveyed CRIEPI's business and financial conditions through communication with president, vice president and other employees, information collection and conditioning of audit environment, attendance to the board of director and other important meetings, browsing of important final decision documents, requiring explanation from vice presidents and other employees as needed.

In addition, we surveyed and verified that the third-party auditor properly audited financial statements and received explanation from the auditor as needed.

2. Results of audit

(1) We recognized that there was no serious fact violating laws or act of endowment of assignments for the president and the vice presidents.
(2) We recognized that the business reports properly indicated business contents of CRIEPI.
(3) We recognized that the audit by the third-party auditor was reasonable and settlement of accounts (balance sheet, net assets increase/decrease calculation sheet, cash flow calculation sheet and lists of assets, and statement of revenues and expenditures) properly indicated CRIEPI's property conditions.