

Intellectual Property Report 2007 Edition Summary

Sep. 2008

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Central Research Institute of Electric Power Industry

Summary

1. Introduction

The Central Research Institute of Electric Power Industry (CRIEPI) is a non-profit research organization that has been conducting diverse research activities relating to the electric power industry since its establishment in 1951. The results of our research have been directly applied to solve various problems on the electric power infrastructure, such as environmental assessment of thermal power plants, construction of nuclear power plants and the stabilization of electric power systems. In addition, we have been extending our field of research to the development of end-user products, such as EcoCute, a highly efficient CO₂ heat pump water heater.

CRIEPI is now putting great deal of effort into the management and application of intellectual properties. Especially, the creation of “outcome” is the most important concept among our strategies on intellectual properties. “Outcome” is defined as the social, economic, and academic impact of our research activities on the electric power industry, Japanese society and the global society. We believe that our contributions to society can be maximized by pursuing outcomes in both the planning and the evaluation of research.

In August 2006, we published our first “Intellectual Property Report” (2005 edition) in order to visualize the current status of CRIEPI from the perspective of intellectual properties and outcomes, for the easier and deeper understanding by the stakeholders who support us or benefit by our activities. Publishing an intellectual property report was a challenge for us since it may well be the first such report issued by a non-profit research institute in Japan. The report’s effectiveness in fulfilling our accountability to the stakeholders has prompted us to publish one annually.

This report, entitled “Intellectual Property Report 2007 Edition”, summarizes the current status of intellectual properties at CRIEPI focusing on activities conducted in FY2007. The report was edited by CRIEPI’s center for intellectual property and technology licensing. We hope this report will be instrumental in improving the stakeholders’ understanding and utilization of CRIEPI.

2. Topics in 2007

- Contributions to the electric power industry and society
 - CRIEPI promoted the establishment of a policy for the prevention of global warming through various means including publishing a book and a DVD, publishing information on our internet website, and hosting a forum.
 - CRIEPI accelerated the research on the earthquake resistance of nuclear power plants prompted by the Niigataken Chuetsu-oki Earthquake and hosted “The International Symposium on Seismic Safety of Nuclear Power Plants”.
 - CRIEPI licensed EgWin, a heat mass balance analysis software of various power generation systems, for electric power companies, and contributed to the advancement of the operation, maintenance, and management of power plants.
 - CRIEPI licensed HINT-HFC, a human performance incidents analysis tool, for electric power companies to assist their human error cause analysis.
 - ESAS-R, an energy saving activity support tool for residential buildings, was developed and made available to the public on CRIEPI’s web page. It proposes energy-saving activities suitable for individual homes.
 - A location selection tool for biomass power plants was developed. It assesses the siting potential and profitability of biomass power plants from information on quantity and distribution of biomass resources.
 - Source efficiency regarding radioactive surface contamination for various materials was experimentally evaluated. The acquired data are expected to contribute to the rationalization of radiation control in nuclear power plants.

- Contributions to standards and criteria
 - CRIEPI research results were applied to the ASME Boiler & Pressure Vessel Code, Section III, “Use of Ductile Cast Iron Conforming to ASTM A 874/A 874M-98 or JIS G 5504-2005 for Transport and Storage Containment”. The material was approved by The American Society of Mechanical Engineers (ASME) standard committee and is now pending publication.
 - Our irradiation embrittlement correlation method for reactor pressure vessel materials was introduced into the Japan Electric Association regulation JEAC4201, “Surveillance test method of nuclear reactor structure material”.
 - CRIEPI contributed to the “Japanese guideline for windmill facilities” issued by the New Energy and Industrial Technology Development Organization (NEDO) and contributed an evaluation on air current, wind response and lightning damage to the “Japanese wind turbine design standard” issued by the Nuclear and Industrial Safety Agency.
 - CRIEPI provided the chair and vice-chair of the domestic committee for the enactment and revision of standards on harmonics problems in electric power systems for the IEC (International Electrotechnical Commission) and JIS (Japan Industrial Standard).
- Technology transfer
 - A cadmium detection kit for rice, jointly developed by CRIEPI, Kansai Electric Power Co.,Inc. and Sumika Chemical Analysis Service Co., Ltd., was introduced on the market.
 - CRIEPI developed and licensed the simulation software “VSTL (Virtual Surge Test Lab)” for Taisei Corporation and Sankosha Corporation, which was applied in the operation of a simulation system for electromagnetic environment in buildings struck by lightning.
 - OYO Corporation started an underground structure survey business using the integrated airborne survey system jointly developed by CRIEPI, Hokkaido University, Kyoto University, Kyushu University, OYO corporation and Ceres Corporation.
 - CRIEPI licensed “Fresh Green”, a titanium surface modification technology by carbon dope titanium oxide, for Shinryuhokushin Corporation and OFA Corporation.
 - CRIEPI’s dewatering technology for sewage sludge using liquefied dimethyl ether (DME) has attracted a great deal of public attention.

3. Intellectual property strategies

- Outline of research activities
 - CRIEPI research activities are currently focused on achieving three overall objectives; reducing costs and ensuring reliability, creating integrated energy services, and harmonizing energy and environmental priorities. Our research covers a variety of subjects related to the electric power industry including; generation, operation, maintenance, nuclear energy, management risks, consumer solutions, environment and natural hazards. In FY2007, priority was placed on ensuring energy security and countermeasures against global environment problems.
- Intellectual property strategies are summarized as follows
 - As a non-profit research organization, CRIEPI will utilize its research results for public benefit. We focus on interests common to the electric power industry.
 - CRIEPI will establish outcome management methodologies in the planning and the evaluation of research activities in order to maximize outcomes of our intellectual properties from the perspective of their social, economic and academic impacts.
- Typical intellectual properties created by CRIEPI include the following
 - Literature: CRIEPI reports, software and multimedia contents.
 - Industrial property rights: Patents, utility model rights, trademark rights and design rights.
 - Know-how and methods: Unique experimental techniques and assessment formulae.
- Application of intellectual properties
 - The majority of CRIEPI study results have been made publicly accessible through the publication of reports and academic papers.
 - CRIEPI is active in joint development with various enterprises and promotes the licensing of patents and software.
 - CRIEPI performs commissioned research projects and provides technical seminars for the electric power industry, the government and other stakeholders.
 - Our knowledge and findings are reflected in technical standards and design criteria through our close cooperation with the government, academic societies and industrial societies.

- We provide large capacity short-circuit test services and performance demonstration (PD) examinations.
- Our public relation activities provide knowledge and awareness on energy and environment to the general public.
- New actions in FY2007
 - Strengthening of prior art search: We performed case studies of prior art search mainly on patents and prepared “the prior art search guide” in order to support our research personnel. We prepared web-based tools for the comprehensive search of patents and academic papers.
 - Techno Forum 2007: On September 25, 2007, CRIEPI hosted a private seminar entitled “Techno Forum 2007” at Tokyo’s Toshi Center Hotel. During the forum we introduced 20 new technologies to the 220 participants from enterprises, research organizations and universities.

4. Creation and utilization of intellectual properties in 2007

- Research publications: 363 research reports and 181 commissioned reports. The total number of copies of the publications made available for open access is approximately 56,000.
- Research papers: 1,656 papers.
- Patents: 142 applications, 49 registered and 77 new licenses.
- Software: 83 registered and 232 new licenses.
- Standards and criteria: 46 contributions to standards, criteria and guidelines of the government, academic societies and industrial societies.
- Commissioned research projects and consulting activities: 534 for the electric power companies, 71 for the government and public organizations, and 40 for general enterprises.
- Seminars and training programs: 21 courses for electric power companies (562 participants) and three courses for general enterprises (330 participants).
- Public relations: Publication of the Annual Research Report 2007 and 8 CRIEPI News releases. Mass media coverage included 958 published articles.

5. Case studies of intellectual property valuation

Case studies of intellectual property valuation were performed targeting two CRIEPI research projects.

- SiC power semiconductor technology: Next generation power semiconductor material SiC shows great potential for the stabilization and functional advancement of electric power systems and energy savings for various products. CRIEPI has achieved results in the study of epitaxial growth and Schottky barrier diodes that can help lead the world toward greater development of these technologies.
- Policy analysis for the prevention of global warming: The establishment of an international framework and domestic policies to prevent global warming is a pressing issue for Japan and the international community. CRIEPI is promoting an effective global warming prevention policy by introducing case studies and scenario analyses applicable to domestic and foreign institutional proposals.

The valuations were performed on the input, comprised of the resources invested in the research; the output, comprised of the intellectual properties created by the research; and the outcome, comprised of the economic, social, and academic impacts of the output which benefit the electric power industries, Japanese society, and the global society.

Table 1 summarizes the results of the intellectual property valuations.

6. Conclusion

This report summarized the strategies and the accomplishments of CRIEPI in FY2007 from the perspective of intellectual properties. The case studies of intellectual property valuation were performed for two representative CRIEPI research projects.

CRIEPI will continue to play an active role in the creation and the utilization of intellectual properties in order to maximize outcomes that will benefit the electric power industry, Japanese society and the global society. We will continue our public relations efforts on intellectual properties, such as this report, for the purpose of maintaining accountability to the stakeholders.

Table 1: Results of the intellectual property valuation

		SiC power semiconductor device technology	Global warming prevention policy analysis
Input (Research and personnel expenses)		• 1.38 billion yen	• 0.73 billion yen
Major outputs (Intellectual properties)		<ul style="list-style-type: none"> • Patents and know-how on SiC power semiconductors • Reports, papers and book 	<ul style="list-style-type: none"> • Committee participation • Reports and papers • Software • Technical seminar materials • Book, website • Public-relations video / DVD • International conference, Forum
Major outcomes (Impacts on the electric power industry, Japanese society and the global society)	Electric power companies	<ul style="list-style-type: none"> • Improved functionality and economic efficiency of electric power system • Increased efficiency of grid connection for distributed power generation • Promotion of energy savings, and improved electrification ratio (All the above for future consideration) 	<ul style="list-style-type: none"> • Position formation concerning global warming • Promotion of energy savings, and improvement in electrification ratio (for future consideration) • Human resource development
	Industries	<ul style="list-style-type: none"> • Supply of SiC Epitaxial wafers by ESiCaT Japan • Formation and expansion of SiC power semiconductor market (for future consideration) 	<ul style="list-style-type: none"> • Position formation concerning global warming • New demand for energy saving products
	Academic and industrial societies	• Citation of papers: 260	<ul style="list-style-type: none"> • Information sharing and argument formation for global warming prevention policy (In cooperation with academic journal "Climate Policy") • Human resource development in universities
	Japanese government	• Participation in committees of governmental organizations: 3	• Reflection to domestic policy
	Japanese public / society	<ul style="list-style-type: none"> • Income due to primary energy consumption decrease: 3.8 trillion Yen (Net present value, Total for FY2010~2030)* • Income due to reduction of CO₂ emissions: 0.7 trillion Yen (Net present value, Total for FY2010~2030)* 	<ul style="list-style-type: none"> • Reduction of CO₂ emissions (Proposal of "the near zero-emission scenario") • Social enlightenment (Outreach)
	Overseas / International society	• Similar to outcome for Japanese society (for future consideration)	<ul style="list-style-type: none"> • Compilation of IPCC report • Establishment of appropriate rules for CDM • Research results of IHDP international joint research project • Reflection to policies (Climate technology coalitions scenario, Policy development assistance on energy efficiency improvement in Asia)

* These net present values are the total contribution of all the manufacturers and the scientific community related to SiC power semiconductor technology, and are not the sole contribution of CRIEPI.