

### Socio-economic Research Center

#### Brief Overview

The Socio-economic Research Center contributes to the planning of electric utilities management and energy and environmental policies by proposing and evaluating possible options and alternatives through analyzing and evaluating various issues from professional viewpoints on electric utility management, energy and environment, regional economy, energy technology development and human factors.

#### Achievements by Research Theme

##### Energy Management and Policy

###### [Objectives]

We aim to identify future issues of energy industry and examine countermeasures for the problems. To this end, we will examine impacts of changes in business environment and social structure on electric power companies, utility customers, various institutional designs and policies, trends of energy demand and economics.

###### [Principal Results]

- It was found that the increase in information and communication technology (ICT) intensity in the manufacturing industry promotes the growth of productivity through changes in the usage of factor inputs. However, in the non-manufacturing sector, it was shown that ICT does neither change the occupational composition in the labor input nor improve productivity [Y10037].
- Using data from Europe and the US, we analyzed the integrated market risks of coal-fired and gas-fired power plants that were represented as the portfolio of three commodities; electricity, fuel and CO<sub>2</sub> emission rights. We found that the integrated market risks greatly decrease compared to the solo market risk of wholesale electricity by the portfolio diversifying effect (Fig. 1) [Y10031].

##### Regional Policy

###### [Objectives]

To clarify that policy formation is related to environment, such as corresponding to global warming and low carbon society, influence on regional society and regional economic systems.

###### [Principal Results]

- Interviews and questionnaires to the officials in local governments that have introduced the reporting systems which oblige larger scale factories and offices to submit plans and reports on mitigation of GHG emissions show that most local governments do not have a prospect for introducing a reduction obligation and they are in a wait-and-see attitude [Y10028].
- To get implications for infrastructure export strategy of Japan, we clarified the characteristics of EcoCity policies in China by literature survey. The results show that the significance of local governments is observed not only in the policies such as “Tianjin EcoCity” but also in the policies which the central government leads with legal binding force of “the five years’ development plan” [Y10038].
- To investigate expert’s and lay-people’s information acquisition process in decision-making, we conducted an experiment consisting of multi-attributional decision-making about three siting problems. The results of this experiment revealed that experts tend to take longer time for decision and a greater quantity of information, and to employ alternative-wise information acquisition [Y10035].

**Energy Technology Policy**

**[Objectives]**

Toward realization of low carbon society and ensuring energy security, we aim to develop various methods for analyzing energy supply and utilizing technologies, and investigate the policies related global warming and energy security.

**[Principal Results]**

- We developed the Japanese Regional Energy Model (J-REM) which divides Japan considering regional properties and clarified the differences in technology choice of passenger cars or household hot water heaters to decrease CO<sub>2</sub> emissions considerably towards 2050 [Y10015].
- We analyzed consumer’s behavior on technology choices by using the sales data of refrigerators during fiscal year 2008-2009 and confirmed the appropriateness of the method (Fig. 2), and estimated their acceptable pay back time and discount rates [Y10022].
- We investigated the trend of international movements of nuclear security measures mainly focusing on the INFCIRC/225/Rev.5, an international guideline for physical protection of nuclear materials and nuclear facilities drawn up by IAEA and summarizing the implications for Japan [Y10018].

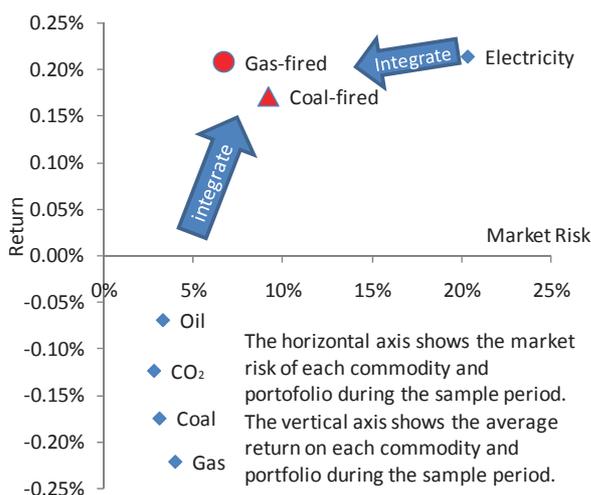
**Human Factors Research**

**[Objectives]**

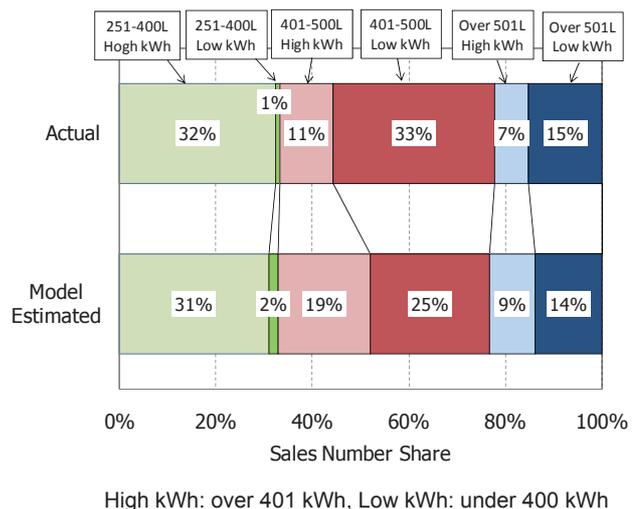
To reduce human errors and lead to safety culture of electric utility industry, we will develop measures for improving analyzing ability of human factor error phenomena, reducing errors through bringing out individual’s or team’s features, and arousing safety culture of organization.

**[Principal Results]**

- We improved and built into the practical technique that the individual hazard perception can be measured at short time [Y10012], and clarified the factors which influence hazard perception [Y10017].
- We clarified that teamwork under abnormal conditions depends on relation of the leadership and team members' technical skill proficiency which is thought much of in power plant operation teams organization [Y10006].



**Fig. 1 Risk and return analysis during the 2008-2009 oil bubble period in Europe**



**Fig. 2 Comparison between actual and estimated sales number share (fiscal year 2009, over 251L)**