

Socio-economic Research Center

Brief Overview

The Socio-economic Research Center, through proper understanding of the changes of the business environment and of the society surrounding the electric power industry, endeavors to present solutions to various utility management issues in the socio-

economic circumstances and energy and environmental issues, and thereby to contribute to the electric utilities' business planning as well as to the energy and environment policy developments.

Achievements by Research Theme

Utility Management and Policy

Via quantitative and multi-dimensional analyses of possible impacts of changes in the business environment and social structure on the electric utility industry, we strive to propose desirable institutional designs, as well as directions for electric utility industry management.

- By analyzing the cost structures of nine electric utility companies in Japan, we found that: (1) the economies of scale have shrunk in the power generation sector since 2004, while they still prevail in the transmission and distribution sector, though they have almost reached to their optimal levels, and (2) the economies of vertical integration, expressed as virtual cost savings from the imaginary case where generation and transmission are disintegrated, are evaluated as 19-29% of the current cost basis in average across the nine utility companies (Fig. 1) (Y11009).
- We established a methodology to estimate the LNG consumption savings gained by connecting two LNG terminals operated by an electric power company. Based on past records, the savings could be as much as 3.4% (Y11007).

- We developed an optimization model to determine thermal generators' operation patterns under multi-area cooperation, taking fluctuation of wind power outputs, operational constraints of fossil-fired power generation and mechanisms to secure operating reserves into account. The model proves itself effective to evaluate the "value of operating reserves" in terms of the fossil fuel cost additions needed for securing reserve capacity (Y11025).
- Through a series of psychological experiments to analyze hindrances for accurate transfer of risk-related information, we identified a cyclical process where a false report by the information provider evokes the receiver's self-protective (risk-averse) attitude and distrust to the provider, which then leads to further false reporting (Y11011).

Economic and Social Systems

We aim to clarify the impacts of various policy instruments for reconstruction after the 2011 Great East Japan Earthquake on the macro and regional economy in Japan. We also investigate interests among stakeholders in the policymaking process for disaster prevention in wider-range administration bodies and draw meaningful implications toward policy decisions.

- A questionnaire survey was given to companies in Miyagi and Iwate prefectures after the 2011 Great East Japan Earthquake. The surveys found that, in the regions that were not affected by the tsunami, the production capacities of the manufacturing sector had recovered to 90-100% of the pre-quake level within six months after the earthquake. It also found that the majority of the companies have intentions of continuing their business without changing locations, and relocations outside the Tohoku region are limited (Y11022).
- We examined the effects of population density and market access on industrial productive efficiency in the Japanese regional economy. As a result, we clarified that "agglomeration economies" had a positive effect on the productive efficiency of some

individual manufacturing sectors and that this result was robust (Y11004).

- Interviews to the stakeholders in the administrative sector and industrial sector in the Kansai and Tohoku regions point to the fact that one of the key drivers to promote wide-range cooperation in the Tohoku region during the reconstruction period will be the leadership of the industrial sector to coordinate interests among sectors (Y11035).
- We analyzed the stochastic process of both the national and regional business cycles of Japan. From our empirical results, it was found that the amplitude of the regional business cycles was enlarged after the Great East Japan Earthquake in all regions, excluding Hokkaido, Kansai, and Kyushu (Y11026).

Energy Technology Policy

Toward realization of a low-carbon society and for ensuring energy security, we aim to develop various methods for analyzing energy supply and utilizing technologies, and investigate various energy policies including nuclear utilization.

- We developed a new integrated assessment model, called the BET (Basic Energy Systems, Economy, Environment, and End-use Technology) model, which includes not only global energy systems, economic growth, and climate science but also end-use technologies. A series of model runs revealed that the end-use technologies including electrification are an important mitigation measure for climate change (Y11005).
- Through a detailed analysis of the legal problems and other factors that the Fukushima Daiichi nuclear

disaster raised, we proposed rational directionality and two concrete options regarding the Japanese nuclear third party liability system in order to alleviate the problems (Y11024).

- As one of the design and evaluation methods for physical protection systems to protect nuclear facilities, we surveyed the features of the performance-based method studied by the Sandia National Laboratories of the United States and clarified the problems regarding if a similar method was introduced to Japan (Y11030).

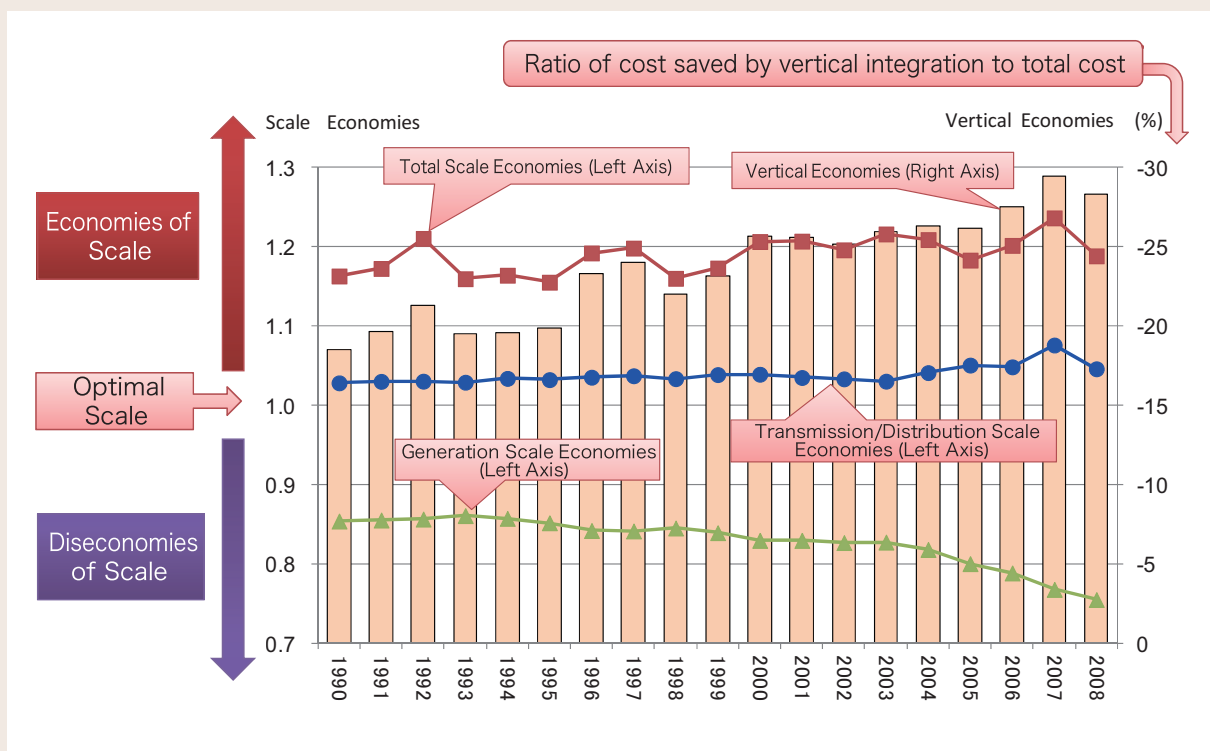


Fig. 1: Vertical economies and scale economies of electric power companies

The bar graph indicates the cost-saving effects obtained from vertical integration in an average of nine general electric utilities. The cost-saving effects represent an upward trend in recent years. Such a trend implies that cooperative operation and investment planning between the generation and transmission/distribution sectors are gaining importance for utility management.