

Social and Business Risk Management

– Contributing to More Comfortable and Safer Communities –

Brief Overview

To ensure safety and security in the power facility, we integrally promoted researches on countermeasures for natural disaster risks due to earthquake, harsh weather, and thunderstorm, as well as human risks caused by human errors. Among them, for wind disaster resistant assessment for the power facilities, we added accumulated rainfall prediction function to the typhoon disaster prediction system of the power distribution installation developed by CRIEPI for improving prediction accuracy to raise practicality as a disaster recovery tool. In addition, we proposed a design method considering thunderstorm, strong wind, and wind disturbance for the purpose of establishing guidelines for wind power generation facilities in Japan.

In addition, relating to global warming prevention policy, we concluded future direction including Japan's energy scenario, global warming measures and framework in the 21st century and delivered to the society based on case example analyses such as environment tax, emissions trading, and technical development policies.

Achievements by Research Theme

Risk management of electric power infrastructure (natural disaster risk)

- Earthquake scale assessment by active fault survey
 - Targeting seismic source region during the 1984 Nagano-ken Seibu earthquake difficult to determine seismic source, we constructed analysis flow to estimate seismic fault property from long-term accumulation displacement due to earthquake fault.
- Wind and snow disaster prevention assessment of electric power facilities
 - We applied accumulated rainfall prediction function to the typhoon disaster prediction system of the power distribution facilities to increase prediction accuracy.
 - We established a guideline of Japan type wind power generation systems in which lightning, strong wind and wind disturbance are considered. (Fig.1)
- Ground collapse effect assessment at earthquake occurrence
 - We studied earthquake collapse behavior by centrifugal loading test at the slope modifying cracks in the ground to verify adaptability of slope collapse effect analysis code.
- Lightning risk management
 - We have developed a nationwide lightning hazard map for power transmission lines and substations that covers all over the country based on the lightning flash density and lightning peak current values.
- Disaster recovering support of electric distribution facilities
 - We added the short term planning support function to the disaster restoration simulator already developed to expand simulating system for emergency response process at the individual zone level.

Risk management of electric power infrastructure (human risk)

- Cyber security risk management framework
 - We developed an analysis framework for the cost-effective security measures along with the progress of security technology, and also developed the fundamental part of a highly accurate abnormal event detection method as a basis of intrusion detecting technology.
- Human error measures and safety culture cultivation
 - We prepared a pocket-sized Caution Report effective for reminder at the working field to prevent human error at the nuclear power plant business. (Fig.2)

Energy policy

- Analysis and recommendation of global warming prevention policy
 - Throughout the case-based analysis of environmental tax, emissions trading, technical development policy, technical development treaty, we concluded Japan's energy scenario, global warming measures, and future framework in the 21st century to deliver to the society. (Fig.3)
- Japan type deregulation system measures
 - For proper understanding trading trend at Japan Electric Power Exchange, JEPX, we developed an estimation method of trade bidding price reflecting time-shift at the electric power spot market and demand price elasticity of demand.
- Scenario analysis for energy technical policy
 - We finalized scenarios for large-scale reduction of greenhouse effect gas viewing to 2050, China scenario for energy saving, and introduction of biomass scenario in Japan.
 - We concluded the case-based analysis on technical development policy, energy saving regulation, low pollution vehicle diffusion, and solar water heater diffusion.
- Biological effect assessment of intermediate frequency magnetic fields
 - We confirmed that intermediate frequency magnetic fields did not affect rat organogenesis in vivo and gene mutation in vitro.

Risk management of electric power infrastructure (natural disaster risk)



Fig.1 Large-scale thunderbolt test to a wing of wind power generator

Risk management of electric power infrastructure (human risk)



Fig.2 Caution report pocket version for preventing human errors

Energy policy

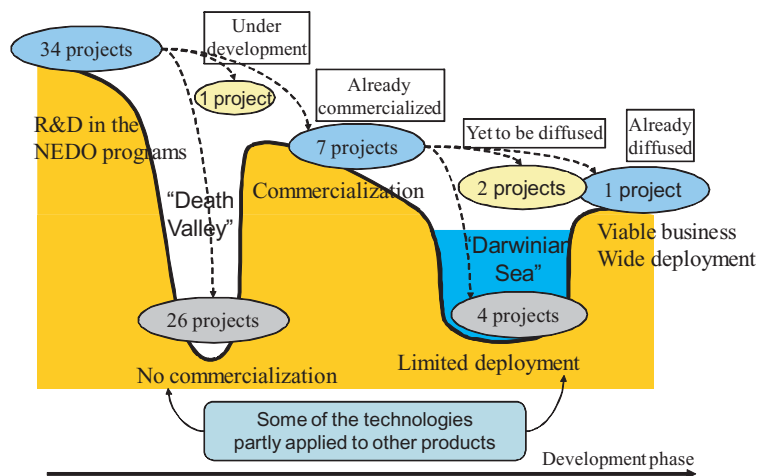


Fig.3 Commercialization process of governmental R&D projects: Case of NEDO projects. Governmental R&D is risky but sometimes succeeds in developing new technologies.