

## Development of Electricity Technology Roadmap for Nuclear Power Technology

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### 1. Introduction

KEPRI has finished the development of technology roadmap for the electric power technology (eTRM) in April, 2004. eTRM is the national strategic R&D program for the electric power industry based on the forecasting of the future technology trend and the needs of electric power market until 2015. eTRM consists of 4 major technology relates to the electric power industry – those are electric power transmission and distribution, fossil fuel power, alternative energy and nuclear power.

This paper states the result of eTRM development for nuclear power technology. The long and mid term strategy of technology development was identified in detail for the selected 6 technical parts (Table 1).

Table 1. 6 Technical Parts

Part □	Site and Environment
Part □	System, Equipment and Structure
Part □	Radiation Safety
Part □	Safety Evaluation
Part □	Operation and Management
Part □	Advanced Nuclear Power Plant

### 2. Development and Results

#### 2.1 Background

The restructuring of the electricity industry is a primary motivator for the development of eTRM. The method of R&D planning is being changed because the life cycle of technology is getting shorter and the limitation of R&D resources makes impossible to develop all the technologies. So we should select and support the favorable technologies to meet the future market needs. The effective and coherent approach has been required for the proper allocation of the limited R&D resources under the restructuring of the electricity industry. eTRM is one of the systematic approaches, which makes it possible to accomplish the vision and the target of the electric power industry technology.

#### 2.2 Concept of eTRM

The past R&D planning method is based on the "technology push" strategy and "bottom up" approach.

This approach is useful for non-competitive market and short term planning, however, not easy to apply the developed technology to the market. The R&D market is getting more competitive, and the development of the R&D plan based on market driven approach is strongly required. The development of eTRM starts from a three key concept. Those are the satisfaction of market needs, the selection and the concentration and the forecast of what is possible or likely to happen in the future.

#### 2.3 Process of eTRM development

We followed the general process of roadmapping ; First, we established the vision and the target of eTRM which reflect the future market of the nuclear technology. Then two steering committees, consists of industry, university, and research institute, were organized and operated. The one committee consists of 12 opinion leaders, and the major role of committee is the direction making of eTRM development. The other committee consists of 120 experts of nuclear power technology and does the practical work for the development of eTRM. Second, the development of eTRM was carried through the two committee, and several workshop were held for the understanding eTRM and the discussion of eTRM development. eTRM includes the vision, the target, the background, the necessity, the market environment, the prediction of future market, the core technology, the strategy plan, and the budget plan. Third, the core technology or product and the definition, the target and the development strategy for each technical part were specified. To enhance the validity of eTRM and make the consensus of nuclear power industry, the public hearing was held.

#### 2.4 Development Activity

As stated before, opinion leader committee made a major decision and gave the recommendation to expert committee members. Opinion leader committee accepted six technical parts of eTRM prepared by expert committee, then expert committee produced detail contents of eTRM. To proceed the eTRM work intensively, working group for each technical part was made and the working group defined the vision and the quantitative target of each part. They specified the core technology or product of each part and analyzed the market situation, the technology status and the strategy value through the experts workshop. The activities of working groups are focused on the market needs which were analyzed based on the forecast of future electricity industry environment. The technology

of eTRM is classified into 4 levels. Six technical parts ( table 1 )is the highest technology level. The total number of technology in eTRM is shown in table 2.

Table 2. The Number of Technology in eTRM

1 <sup>st</sup> level techonlogy	2 <sup>nd</sup> level technology	3 <sup>rd</sup> level technology	4 <sup>th</sup> level technology
Part □	3	7	19
Part □	5	26	113
Part □	4	17	60
Part □	6	21	72
Part □	3	8	25
Part □	2	8	27
total	23	87	316

### 3. Conclusion

eTRM was developed for the effective R&D planning in eletric power industry. It includes the quantitative target and the strategy of technology development for the six major technology areas. The selected technologies will be considered as the candidates for the mid and long term R&D program and will be supported concentrically by the Electricity Industry Infrastructure Fund.

It is important to pay attention to the role of the nuclear power industry, because the vision and the goal of industry will be changeable according to the industry trend. To deal with the market and industry trend effectively, eTRM should be reviewed and updated continuously.

### REFERENCES

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Figure 1. Roadmap Sample(System, Equipment and Structure Part)