

PERSPECTIVES ON NORTHEAST ASIAN SYSTEM INTERCONNECTION

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1. Introduction

Considering that Northeast Asian system interconnection is a multi-national business rather than a national one, there might be many barriers to the success of this project. However, it is well known that North and South America, Europe and Southeast Asia have successfully overcome such difficulties and their efforts have been compensated by a reduction in operational costs, relief of military tension and so on. In comparison with these regions, there has not been any significant action in Northeast Asia for cross-border power system interconnection except for discussions inside academic circles and between research organizations. However, in my view, we have no more time to lose. We have to ask, "why Northeast Asia is in this situation", and find out to a way to move towards cross-border system interconnection. In this context, the future and present status of the electric power industry in Korea is briefly introduced. Also, perspectives on system interconnection in Northeast Asia are conceptually discussed here.

2. Power Supply And Demand In South Korea

The power system in the Korean peninsula has been divided into two major systems, South and North Korean, since 1948. Thereafter, both systems have been operated and expanded separately without any try to interconnect them. As of 2000, the generating capacity of South Korea was about 48,000[MW] and the transmission voltage has been upgraded from 154[kV] to 345[kV] and 765[kV]. According to the recently revised 5th long term plan for power supply, it is forecasted that the power demand will increase annually by 4.3% and reach approximately 68,000[MW] in 2015. In order to supply this forecasted load demand, 106 new generating units with a total capacity is 30,500[MW] will need to be constructed and the statistics on the Korean power industry in 2015 will be as follows:

- (1) Generation mix highly reliant on nuclear and thermal plants : nuclear 33.0%, coal-fired 26.8%, LNG-fired 23.8%, oil-fired 7.6% and the others 8.8% including hydraulic.
- (2) Annual electrical energy consumption/person of about 7,400[kWh/person] a little more than the Japanese consumption of about 6,300[kWh/person] in 1997.
- (3) Portion of primary energy for generation : about 35% of the total domestic consumption.
- (4) Effects on air pollution : liable to 22.6% of CO₂ emission in Korea
- (5) The estimated construction cost of generators, transmission lines and substations for the next 15years : about 46.7 billion US\$ at 1999 constant prices including about 11.8 billion US\$ for maintaining a reserve margin of 16.2%.

Considering the shortage of natural resources, the environmental effects of generation, the increase rate of electricity consumption and the difficulties of siting in such a mountainous country, there might be many barriers confronting the Korean power industry which will have to be overcome to supply the required power demand. There could be various ways to solve the problem but one of best is likely to trade in electricity with neighboring countries through interconnection lines.

3. Factors Affecting Cross-border System Interconnection

There are many factors which should be taken into account in making decisions on cross-border system interconnection. For instance, national energy security, finance, cost benefit, environmental effects and technical issues such as reliability, security, load characteristics and operation techniques. However, in my view, more important than any other factors in Northeast

Asia are political and economic instability, military tension and the historical background. Or more accurately speaking, these three factors seem to be difficult rather than important. If it is necessary for Northeast Asian system interconnection to dismantle these three barriers, it is likely to take several tens of years or more to establish interconnection. Considering that North Korea is located between Russia and China and South Korea, these factors look more serious to Korea. In order to overcome such barriers, the author would like to suggest that a feasibility study on this project should be commenced under the following conditions.

- (1) Project team : an international consortium consisting of one or more organizations from every member country.
- (2) Project management : a central steering committee which plans a detailed schedule and evaluates the results at each stage, consisting of one or more delegates from each member country.
- (3) Finance : Each member country is liable to an equal portion of the total amount.

There are two reasons for suggesting that the feasibility study takes place first. The first is to create interest amongst decision makers and to demonstrate the benefits of this project to them not qualitatively but quantitatively. The other is to provide a forum for decision makers and engineers of the neighboring countries to come together and to give them a opportunity for enhancing mutual understanding and trust

In addition, in Korea's viewpoint, this project is extremely sensitive to the political relationship between North and South Korea and the Korean power industry seems to hesitate to participate in this project if North Korea does not. Considering this, decisions on this project will probably made politically even though the Ministry of Commerce, Industry and Energy, KEPCO and the electricity council are likely to take an extremely important role in making decisions. However, starting a feasibility sponsored by all the neighboring countries might be helpful to persuade North Korea to participate in this Northeast Asian interconnection project regional sustainability and to clear the most difficult barrier in the viewpoint of Korea.