An Examination of Future Energy Mix in the Three Northeast Asian Countries and Its Implication

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Abstract:

With the increasing threat of climate change, nuclear power, as an emission-free energy source has been paid high attention by Northeast Asian countries especially by Korea, Japan and China. It is worth noting that the current total operable nuclear capacity of the three countries accounts for 20% of the world total, and the additional reactors under construction and planned will account for almost 32%. After Fukushima accident, nuclear safety has emerged as a hot issue again with discussions of replacing nuclear power with coal or LNG to address the safety issues. But, considering energy security and the CO_2 emission problems in which China is the biggest CO_2 emitter while Japan and Korea are also listed within the world top ten, nuclear power seems to be inevitable choice.

Referring to a long-term energy forecast, following two cases for the three countries are evaluated to see the potential role of nuclear power in terms of the future CO_2 emission reduction and energy security: The first case is to replace nuclear power with coal or LNG based on total power generation and its share. The second case is to evaluate that based on planned capacity.

The energy mix of these three countries and their future nuclear plan is to be examined in detail. Meanwhile, the potential problems of some inland nuclear power plants which are located around earthquake zone in China are being discussed. The choice of nuclear power for Chinese in terms of her long-term energy security is being discussed while nuclear safety problems of her own and neighboring countries are also noted by identifying the earthquake zone with a couple of inland nuclear development plan and regional wind direction. Further discussions on the institutionalizing the most advanced framework on nuclear energy among the three countries follows. It would be necessary to set a 'Northeast Asian Nuclear Council' which may be similar to that of 'EURATOM' in Europe to enhance the cooperation for the safety of nuclear power development.

References:

1. Coruche, L., Kilburn, M., 2010, Nuclear Energy in China and Hong Kong, Civic Exchange.
2. IEA, 2010, World Energy Outlook.
3. IEEJ, 2011, Outlook for BAU Scenario.
4. Jin, W., The current Situation and Issues of China Atomic Energy Law Legislation.
5. National Development and Reform Commission, 2007, Medium- and Long-Term Nuclear Power Development Plan (2005-2020), [in Chinese].
6. National Nuclear Safety Administration，1991, Nuclear Power Plant Site Selection Safety Regulation (HAF101), [in Chinese].
7. Nuclear Threat Initiative website: www.nti.org.
8. State Council of the People's Republic of China，1993.8.4, Nuclear Power Site Selection Safety Regulation (HAF002), [in Chinese].
9. Wang, Z.C., 2007, Nuclear Challenges and China's Choices.
10. World Nuclear Association home page: www.world-nuclear.org.
11. Xu, Y.C., 2007, Nuclear energy in China: Contested regimes, Energy 33(2008):1197-1205.
12. Yan, Q., Wang, A., 2010, Nuclear power development in China and uranium demand forecast: Based on analysis of Global current situation, Progress in Nuclear Energy (2010):1-6.
13. Zhou, S., Zhang, X.L., 2010, Nuclear energy development in China: A study of opportunities

and challenges, Energy 35(2010):4282-4288.
14. Zhou, Y., Rengico. C., 2010, Is China ready for its nuclear expansion?, Energy Policy 39(2011):777-781.
15. http://www.heneng.net
16. http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions
17. http://news.suzhou.eeju.com/2008-05-17/55267.html