



Energy security performance in Japan: past and future



Dr. Ken'ichi MATSUMOTO¹

Assistant Professor

¹ *Contact details of corresponding author*

Tel: +81-(0)749-28-8278

Fax: +81-(0)749-28-8348

e-mail: kenichimatsu@gmail.com

Address: 2500 Hassaka, Hikone, Shiga 5228533, Japan

Abstract

Japan is poor in energy resources and the large amount of its oil import is from the Middle East. Therefore, Japan has serious energy security issues. This study aims to understand the historical transition of energy security performance in Japan and observe the future energy security based on energy scenarios.

Energy security performance is evaluated using three indicators based on the Shannon-Wiener diversity index: S1: evaluating diversity of primary energy sources; S2: applying energy imports in S1; S3: applying country risks of energy exporters in S2. These indicators focus on energy supply, the most frequently considered aspect in energy security studies. Using these indicators, we first evaluate Japan's past energy security performance based on the statistical data. We then evaluate the prospective energy security performance based on four energy scenarios. These scenarios consider climate mitigation in the future.

During the period of rapid economic growth, the indicators declined, because the dependence on oil increased. However, after the oil shocks, the indicators improved, because the share of oil has decreased and those of natural gas and nuclear power have increased. Observing S2 and S3, they generally continued to be flat from mid-1980s until the early-2010s because of the dependence on imports of natural gas and coal. After 2010, all the indicators declined tremendously due to the shutdown of nuclear power plants. The results of the scenario analysis suggest that using no nuclear power is unreasonable from the energy security perspective. The best scenario among the four is that balancing energy technologies.

References

Ang B.W., Choong W.L., Ng T.S., 2015. "Energy security: definitions, dimensions and indexes". Renewable and Sustainable Energy Review. Vol 42, pp.1077–1093

Institute of Energy Economics, Japan, 2015. "Toward choosing energy mix". available at: <http://eneken.ieej.or.jp/en/press/press150116c.pdf> and <http://eneken.ieej.or.jp/en/press/press150116d.pdf>

Lehl U., 2009. "More baskets?: renewable energy and energy security". GWS Discussion Paper. No. 2009-8

Matsumoto K., Andriosopoulos K., 2016. "Energy security in East Asia under climate mitigation scenarios in the 21st century". Omega. Vol. 59, pp.60–71.

Takase K., Suzuki T., 2011. "The Japanese energy sector: current situation, and future paths". Energy Journal. Vol. 39, pp.6731–6744.

Session : ie A2 and B1