

News Release

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NUCLEAR POWER HELPS PROTECT JAPAN FROM HIGH OIL PRICES

Rice University study analyzes economics of Japan's energy options

HOUSTON — (Sept. 21, 2004) — Nuclear power contributes to Japan's energy security by reducing the economic impact of an oil price shock, a new study released by Rice University concludes.

The study, published by Rice's Baker Institute for Public Policy, estimates that in the absence of nuclear power, the cumulative impact of a single oil price shock (25-percent change in oil prices) could result in a loss of up to 2 trillion yen (U.S. \$18.2 billion) in gross domestic product. On a per-megawatt basis, this places the value of nuclear power at roughly 42 million yen (U.S. \$382,000) per megawatt of installed nuclear capacity. That's about 15.7 percent of the capital cost of a nuclear plant in Japan.

The study also demonstrates that greater volatility in oil prices increases the importance of nuclear power to energy security. For example, Japan's nuclear power capacity saves as much as 154.4 million yen (U.S. \$1.4 million) per MW of installed capacity or the equivalent of 57.8 percent of the capital cost of construction of a Japanese nuclear power plant under a scenario of extreme oil price volatility. The authors cautioned, however, that these figures do not account for some of the more controversial operational issues regarding nuclear power, such as the problem of waste disposal and/or potential costs of nuclear accidents.

While the study calculates a clear value to energy security of nuclear power in Japan, it also demonstrates that fuel diversity is important to keeping electricity prices low and maintaining system stability. In particular, the study shows that if all electricity in Japan were to be shifted to nuclear power, electricity prices would increase above their current levels, due to the costs of managing peak loads in the absence of peaking facilities, which are typically fired by natural gas and/or fuel oil. Moreover, absent alternative fuel choices for generating electricity, the costs of the recent staged shutdown of nuclear reactors in Japan would have been exceedingly high. Consequently, while playing a key role in protecting Japan's economy from the potential cost of volatile oil prices, too heavy a reliance on nuclear power would actually raise the country's electricity costs to the point of diminishing returns.

"The study clearly demonstrates that although nuclear power can reduce a nation's exposure to international oil market fluctuations, diversity of fuel choice in the electricity sector is important to a nation's energy security," said the study's principal author, Kenneth Medlock III, senior research fellow in energy studies at the Baker Institute and a visiting professor in Rice's Department of Economics.

Peter Hartley, professor and chair of the Department of Economics, co-authored the study, which is available online at www.rice.edu/energy.

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