

The Impact of Switching Off Nuclear Power Plants on Emissions Produced In Japan Using Times-Japan Framework

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Abstract

Before the Fukushima disaster, nuclear energy provided around 28.6% of Japan's total electricity production. After the disaster, however, faith in nuclear energy declined, and all nuclear plants were shut down—removing their 49 GW of generating capacity from the energy mix. To fulfill existing energy demand, Japan began importing larger amounts of coal, oil, and gas. Emissions from the power generation sector increased sharply for the first time in several years, threatenng government targets to decrease emissions.

This paper examines the impact of nuclear power phase-out and continued use on future emissions rates, as projected in three scenarios using the Times-Japan framework. In the baseline scenario, restarting current nuclear power plants and pursuing CCS and renewable energy could prevent emissions from rising much beyond 1990 levels in 2050. Actually expanding nuclear power would lead to a reduction of 17.24% from 1990 levels by 2050. In the nuclear phaseout scenario, hydrogen power offers a renewable replacement, but not sufficient to prevent a growth in emissions caused by the use of inexpensive coal-fired power plants.

Keyword: Japan; Nuclear; Power generation; TIMES