

Summary: Assessment of Japan's INDC using AIM/Enduse [Japan]

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Introduction

The Government of Japan submitted its INDC to the UNFCCC on July 17th, which is to reduce GHG emissions in 2030 by 26.0% with respect to the 2013 level [1]. This study assesses the emissions pathways using AIM/Enduse [Japan], especially focusing on the following three key aspects; 1) Feasibility and necessary effort to meet the INDC target, 2) Robustness of INDC in terms of the uncertainty of nuclear power, and 3) Consistency between INDC and 2050 target to reduce GHG emission by 2050.

Methodology

In this study, Multi-region AIM/Enduse [Japan] is used to analyze mid- to long-term transformation of energy systems and emission pathways in Japan [2]. In order to assess the above mentioned key aspects, the following different scenarios are prepared.

- INDC Scenario: Implicit carbon prices are implemented to meet the INDC target by 2030, and are strengthened thereafter toward the 80% reduction target by 2050.
- Enhanced Action Scenario: Compared to INDC Scenario, higher carbon prices are implemented by 2030 to the level of around a half of 2050.
- Low-Nuclear Scenario: All nuclear power plants operate no more than 40 years, by contrast to other scenarios considering the extension to 60 years for the several plants.

Results and Discussions

- 1) Feasibility and necessary effort to meet the INDC target
Japan's INDC target appeared feasible as long as ambitious energy efficiency improvement and promotion of renewable energies are achieved. The implicit carbon price is estimated to rise to around 187 USD/t-CO₂ in 2030 to meet the INDC target.
- 2) Robustness of INDC in terms of the uncertainty of nuclear power
Given reduced dependency on nuclear power, the INDC target is still feasible with the alternative low-carbon options such as renewable energies and gasification. These additional efforts result the rise in carbon price to around 236 USD/t-CO₂ in 2030. In addition, this scenario entails the challenge associated with energy security issue.
- 3) Consistency between INDC and 2050 target to reduce GHG emission by 2050
INDC-80% pathway by 2050 appears technically feasible with energy efficiency and low-carbon energies including CCS. The enhanced actions in early stages, mainly derived from strengthening renewables and gasification, could reduce the effort required in the period of 2030-2050.

This study suggests that energy efficiency improvement and promotion of renewable energies are vital to meet INDC and long-term targets. In addition, transforming energy systems in early stage on track to the long-term decarbonization is required as well as meeting the INDC target in 2030.

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References

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