Achieving China's Intended Nationally Determined Contribution: Role of the Residential Sector

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In preparation for the Conference of the Parties 21 held in December 2015, countries have agreed to submit their own national targets and climate actions under the post-2020 framework for international climate change actions, known as the Intended Nationally Determined Contributions (INDCs).

One of the important actions by 2030 in China's INDC is to lower carbon dioxide emission per unit of GDP by 60% to 65% from 2005 levels. This study examines the efforts and roles of the residential sector for achieving the CO_2 reduction target stated in the China's INDC.

Implementation of efficient technologies and shifting to low-carbon energy are crucial for CO_2 reduction. In this study we use a cost optimization model, namely AIM/Enduse, to evaluate CO_2 reduction potential brought about by efficient technologies in China's urban and rural households.

Considering climate diversity and its impact on household energy service demands, our analysis disaggregates the whole of China into 31 provincial-level regions. The results show that in most of the regions, the residential sector has a large potential for no-regrets CO_2 reduction. However, in order to realize China's INDC, efficient technologies such as heating stove and cooling device need to be implemented more both in rural and urban households. Features of efficient technology selections vary across provinces due to climatic variation and economic disparity. For instance, introducing heating technology is effective for the cold northern areas while promoting efficient electronic technology contributes to emission reduction most in the warm southern areas. It is also important to note that there is a certain co-benefit of reducing indoor-house air pollutants such as PM2.5 (particulate matter of diameter less than 2.5 microns) and BC (black carbon) when achieving China's INDC.