

Future Japan Power Generation Sector by Introducing Hydrogen plant with 80% CO₂ emission reduction target : A preliminary analysis

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Abstract— Large amounts of carbon emissions is produced in Japan which releases almost 4% of global carbon emissions. It is the fifth largest emissions producer in the world, after China (25.5%), the US (16.9%), India (5.6%) and Russia (5.3%). Ever since, Japan has target of 80% emission reduction of current condition by 2050. The purpose of this research is to investigate the changes of the power generation system with radical emission reduction target by applying Markal-Times Japan framework. A new hydrogen power plant technology to support 80% emission reduction is also introduced. The results show a sharp reduction of coal, oil, and natural gas utilization by 2030 and a completely phased out by 2050. In the analysis used in this paper, the nuclear is assumed no longer available in the future. Hydrogen fired and co-firing power plant has a big role in future power generation system. Therefore, the change of power generation scenario affect the emission reduction radically. The emissions decrease to 351 Mt by 2020, less than 300 by 2030, and just 82 Mt by 2050—which would be 80% of the emissions released in 2010.