

# **Research and Development Tasks Towards Carbon Neutrality of 2050**

## **—NEDO's Challenges—**

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NEDO has been challenging the research and development of innovative energy technologies for realizing carbon neutrality of 2050 by executing a plenty of NEDO large scale energy engineering projects and additional large scale Green Innovation Fund projects.

The systematic overview of energy technology has been explained at first based on the “3 essential social systems for sustainable society”, which is composed of the circular economy, the bioeconomy, the sustainable energy and the supporting digital transformation.

Furthermore, the CO<sub>2</sub> reduction targets of 2030 in Japan and the Green Innovation Fund projects for 2050 have been explained in detail from the viewpoints of research and development.

NEDO estimated the CO<sub>2</sub> reduction potential for many important energy technologies and the integrated amount would not enough for the carbon neutrality. Furthermore, the estimated total abatement cost of about \$10 trillion would be annually needed to achieve just a 40GtCO<sub>2</sub> reduction and even higher abatement cost would be needed to achieve carbon neutrality. Therefore, the large amount of CO<sub>2</sub> abatement cost reduction by research and development for the innovative technologies would be essentially necessary and important to realize the carbon neutrality.

Research and development tasks for secondary energy systems has been systematically classified for matching the supply and the demand simultaneously to maximize the utilization of variable renewable energy. The usage of demand response machines and energy storage batteries and also the systematic simulation of the total energy system would be very important for promoting the utilization of variable renewable energy.

As for the application fields of mobility, the systematic overview has been explained with the viewpoints of the output and the stored energy for various kinds of mobility, such as automobiles, airplane, ship, construction machines and agricultural machines.