

**Published in the *Mainichi Newspaper*, January 8, 2021**

The fact that leading countries in technological and social innovation, such as Japan, the European Union (EU), the incoming U.S. administration, Canada, and South Korea, have one after another set a goal of "virtually zero emissions by 2050" has served as a "signal" for governments, businesses, universities, and research institutions around the world to start working toward the realization of this goal. So, what policies and actions are needed now and in the future?

First of all, fossil fuels, which account for 90% of our current energy supply, must be replaced by renewable and other non-CO2 emitting energy sources by the year 2050. Most of this energy transition will be achieved through a combination of supplying electricity from "zero-emission power sources" that do not emit CO2, electrifying areas that use fossil fuels for power and heat, and improving the efficiency of those who use the electricity.

Zero-emission power sources include renewable energy sources such as solar power, onshore and offshore wind power, hydroelectric power, and geothermal power, as well as hydrogen power produced using methods that do not emit CO2, and nuclear power plants. Currently, zero-emission power sources in Japan account for about 20% of the electricity generated, and the Basic Energy Plan calls for increasing this to 44% by 2030. This should be increased to 100% in 2050.

The biggest target of electrification is the car. Currently, most passenger cars, trucks, and buses use fossil fuels, but these need to be replaced by zero-emission vehicles (electric vehicles and fuel cell vehicles) powered by zero-emission power sources and hydrogen produced by these sources. In addition, the use of gas and kerosene in homes and buildings must be electrified or replaced with hydrogen. Areas related to heat, such as air-conditioning and hot water supply, are particularly expected to save energy through performance regulation of equipment and buildings.

Many of the technologies needed for this energy transition already exist in the market. Although there are economic challenges, companies, universities, and research institutes around the world invest huge amounts of money every year in R&D and mass production, and technological innovation is underway. As a result, solar power and wind power have become the cheapest power sources in many parts of the world, with prices dropping by 80% and 60% respectively in the last decade. The price of storage batteries, which are key to the introduction of renewable energy and electric vehicles, has also fallen by more than 80% in the past decade, and electric vehicles are expected to become cheaper than gasoline vehicles in the 30s. Based on the downward trend in the prices of clean technologies, more and more studies are showing that the goal of virtually zero emissions for developed countries in 2050 is economically achievable.

The U.S. state of California has mandated that public buses purchased after 2009 be limited to zero-emission vehicles, and that automobile companies increase the share of zero-emission vehicles in new passenger car sales from 22% in 2013 to 100% in 2015. It also requires electric power companies to increase the share of renewable energy sources in their electricity supply to 60% by 2030, and to increase the share of zero-emission power sources to 100% by 2045.

Fifty years is not far off in the future. It is necessary for the government to promptly draw a time-line and introduce a system that encourages local governments, businesses, and households to choose zero-emission facilities and equipment. A smooth transition would be facilitated by selecting and implementing policies such as financial subsidies, performance regulations, and sales bans, depending on the urgency and public burden.

Kenji Shiraishi, Researcher,  
Renewable and Appropriate Energy Laboratory (RAEL)  
450 Sutardja Dai Hall  
Ph.D. student, Goldman School of Public Policy (GSPP)  
University of California, Berkeley

<https://rael.berkeley.edu/people/shiraishi-kenji/>

<https://www.kenjishiraishi.com/>