

## Keynote speaker

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## Title

Carbon Neutrality Accelerated by Power Electronics

## Abstract

In Glasgow last year, in COP26, countries discussed on the global issue, namely, to achieve Carbon Neutrality by 2050. Before COP26, the IPCC 6th report was issued and suggested that the global warming continues with rather high rate. IEA prepared a report to COP26 including the state of CO<sub>2</sub> emission and suggested that present policies were insufficient for Carbon Neutrality and that acceleration of renewables would be necessary. IEA especially suggested accelerating energy transition by 2030, middle milestone to 2050. In addition to those suggestions, the recent geopolitical issue forced countries to focus on energy security and to accelerate renewables.

TMEIC continues to develop power electronics technology under the concept of "PEiE", Power Electronics in Everything. This speech introduces that power electronics is a key technology essential for accelerating energy transition and for achieving Carbon Neutrality.

To accelerate achieving Carbon Neutrality, recommendation is made to increase renewables furthermore. For increasing renewables, the digital networks are required to manage the dynamic balance among generation, energy storage, and consumption. In industries, clean manufacturing technologies, including electrification for example, are necessary and now under development. In the fields of transportation, steel, and synthetic chemistry, where electrification is difficult to be applied, developments are proceeded to use Green Hydrogen as fuel or as raw material.

To the global trends, the power electronics technology contributes in various aspects. It works in power conversion of renewables and of energy storages and works in long distance power transmission from remote renewables. For producing Green Hydrogen, the power electronics supplies high DC current to electrolyzers. For digital networks for dynamic energy balancing, the power electronics feeds stable power to the server centers. For industries, the power electronics improves energy efficiency in the motor drive systems. The power electronics supports electrifications by supplying high-frequency power and DC power to induction heating and to arc furnaces, respectively. The power electronics technology also contributes to the other industrial fields as the fundamental technology.

In summary, the power electronics contribute to form the infrastructures of future clean energy networks in every sector. The power electronics is greatly expected as one of key technologies to accelerate energy transition to Carbon Neutrality.