

Keynote speaker

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Title

Contributions to Sustainable Future through PEiE, Power Electronics in Everything

Abstract

The world is now under difficulties due to COVID-19. The power electronics technology contributes to overcome the difficulties by supplying reliable electric power to the communication/information systems and to the industries. The speech includes examples of such contributions.

The speech reminds that the world also has long-term issues concerning the CO₂ abatement for sustainability. The CO₂ abatement policies assign great roles to the renewables and the energy efficiency, to which the power electronics can contribute very much as one of key technologies. The speech introduces recent technology trend of industrial power electronics especially on the high capacity in the range of MW. The power electronics is expected to contribute to further promotion of the renewables and the energy efficiency.

The first topic is the power electronics for the renewables and the energy storage systems, ESS. The speech introduces the key technologies for high power and high system efficiency for the industrial MW-range PV inverters. The speech also introduces the ESSs necessary for stabilizing the power grid by managing the power and energy from the renewables. Considering applications for both the renewables and the ESS, the speech introduces the latest universal inverters developed based on the modular design concept. The smart control systems are also introduced which integrates the renewables, the ESSs and the loads in the power grids.

The second topic is related to the digitalization and the factories of products essential to the daily life of these days. The demands are emerging for communication/information systems, for digital devices and for medicines due to COVID-19. The speech introduces the latest UPS, Uninterruptible Power System as one of contributions from the power electronics for fights against the virus by supplying reliable power to the data centers. The next contribution is from the MPC, Multiple Power Compensator, which feeds stable electric power for continuous production in factories of digital devices, semiconductors, medicines and so on.

The MPC also contributes to reinforce power supply systems in the factories as BCP, business continuity plan against the frequent extreme weathers increasing these years.

The third topic comes back to the issue related to CO₂ abatement, the energy efficiency in industries. The motors consume more than half of the electricity in the world. The motor drive by inverters is well recognized for better system efficiency in low voltage applications. The speech notes that, for expanding the inverter drive to higher voltage applications, the inverter technology for several kV and higher is required. Then, such technology is introduced with the high voltage motors.

In the summary, the speech remarks that the power electronics technology is now embedded almost in

everything. Then, a concept “PEiE”, Power Electronics in Everything, is proposed, in which new values will be created by linking the power electronics in things and will contribute to a sustainable future.