Views on enhancing the consumption capacity of renewable energy resources

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Abstract

Clean and low-carbon, safe and efficient and sustainable development of energy consumption has become a consensus, but there are many different viewpoints on the way to promote renewable energy consumption. As the main way of renewable energy consumption, the large-scale wind power and photovoltaic power integration brings a great challenge to the secure and economic operation of current power grid. Although from the view of power system, the solutions on sources, network and loads have already been proposed, it is still facing some technical economic difficulties. With the development of energy conversion technology, multiple-energy cooperation extends the ways of renewable energy consumption, and the ideas of multiple-energy carrier systems and Energy Interconnection have become hot topics recently.

This paper focuses on the problems of new energy integration, and discusses the ways to improve the ability of renewable energy consumption from the point of the energy conversion and storage. The key to coordinate multiple energy forms is the design of coupling part of multiple energy forms. Taking enhancing the capacity of wind power consumption by coordinating power network and gas pipe network as an example, on the one hand, it is put forward to overcome the storage and transmission of intermittent renewable energy through power-to-gas, making renewable energy converted into continuous energy forms which can be stored, transmitted, scheduled. The converted energy can go directly into energy consumption links in the society. On the other hand, by coal-fired Boiler Being Converted to Burn Gas, improve effectively the capacity of the grid to accept and transmit renewable energy by fast generators frequency and peak load modulation on the basis of maintaining short circuit capacity and inertia. Ideally, the energy conversion and multiple-energy cooperation can promote conventional power system mostly relied on fossil energy transit to the power system mostly relied on renewable energy, even the system of 100% renewable energy generation, transmission and consumption.

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