**Keynote Speech**

Gao Peng

Goog morning,ladies and gentlemen.I feel privileged to share with you a few thoughts on energy internet.

Energy internet is a distributed, open and shared network based on renewable energy. Nowadays,a new round of power system reform and Energy Internet are happening in China. Many techniques such as microgrid, renewable energy, energy storage and multi-energy complementary system become mature. The concept of virtual microgrids which is positive for energy internet is firstly put forward.So my topic is Research and Prospect of Virtual Microgrids Based on Energy Internet.I will deliever my speech from three aspects,introduction, key technology of virtual microgrids, the prospect and expection of virtual microgrids.

The firt part is introduction.With the rapid development of global economics, environment and energy dilemma problem is increasingly serious. Then energy and power systems enter a transitional period, renewable energy technology like wind power and photovoltaic has got great progress since 21st century. As we know, microgrids can be solved in the problem of distributed power integration in weak distribution power system of our country, and it can enhance critical load supply reliability.

The second part is key technology of virtual microgrids .There are main three key technology of virtual microgrids.

The first technology is distributed energy storage technology which can effectively solve the energy fluctuation of distributed renewable energy and randomness of load is the important basis for virtual microgrid development . These technologies update iteration quickly while Pb-C battery and lithium ionbattery have a prominent advantage in cost and performance, that are entering the eve of the commercial application.Meanwhile, the energy storage bidirectional converter research also made great progress. The team of Professor Ci Song from Tsinghua university's Energy Internet Research Institute systematically analyzes the architecture of distributed energy storage and the network optimization management strategy.

The second technology is prediction of power generation based on big data. Big data will be important entrance of virtual microgrid. It is important to integrate and clean electricity data, new energy generation data, equipment running status data which are rough and huge. It will be helpful to achieve efficient management for big data that building a large data center or cloud platforms as an important foundation, for further provide the foundation to find users' behavior characteristics. In the advanced application stage of virtual microgrid, the data-driven innovation service will be the core value.

The third technology is energy full-link monitoring Nowadays, the cloud platforms of PV and wind have been mature and large-scale applied, that give play to a certain degree of monitoring and data mining ability, implement some goals like the comprehensive grasp, automated operations, intelligent diagnosis and auxiliary decision-making. Smart meters and AMI which have a certain accumulation and applications by many manufactures and enterprises are core technologies in demand side response and efficiency management of power user side. The cloud platform will be applied to these fields on a large scale with the increase of distributed energy storage and microgrids.

The third part is the prospect and expection of virtual microgrids.

The development of virtual microgrids is the only way for the development of distributed energy in China. Because the installed boom of large-scale wind, PV station in three-north area, the power absorption ability is limited and powersupply shortages phenomenon is serious. Distributed areas geta national key support for new energy resources. In addition, with the maturing of energy storage technology and the rapid decline of cost, it will be approaching a large-scale applicationin the distributed field. Virtual microgrid will be effective and feasible for power quality, stable operation, dispatching management and energy efficiency due to the application of distributed energy in distribution grid.

Virtual microgrids is the key link in the Energy Internet industry development,"Internet+"wisdom energy is put forward by the National development and reform commissionat 2015, then got rapid development and research from many scientific research institutes, enterprises and society. The paper argues that virtual microgrid is a blend of many innovations in Energy Internet industry as the key link in its development, which will facilitate user side application.

Virtual microgrids will promote the process of electric power system reform in our country, which participate in the power grid market and micro balance market through virtual aggregation. And it will promote the power grid company participating enthusiasm in the field of electricity selling, find the benefits and value of the parties in virtual microgrids.

So much for my speech,thank you!