

## BABA LAB.

## Demand Side Electric Power System Utilizing IoT



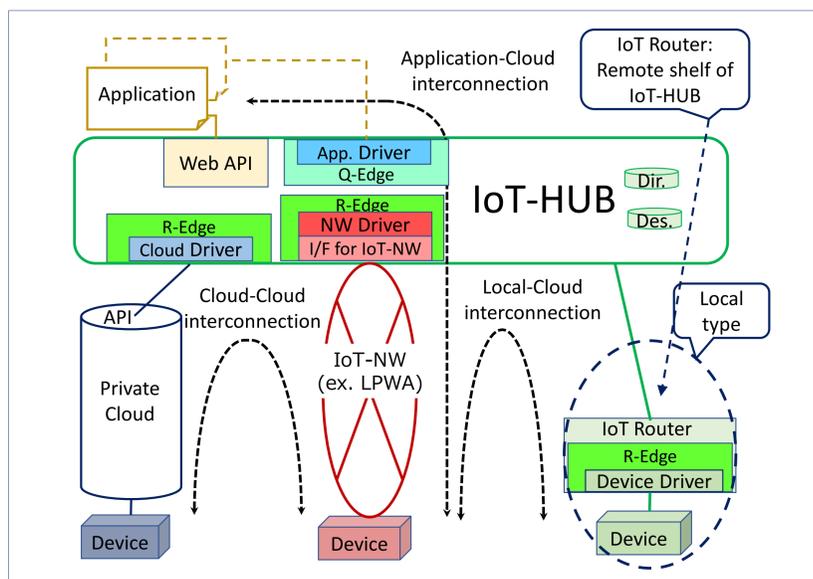
Department of Human and Social Systems

Engineering of Distributed Energy Resources Utilizing

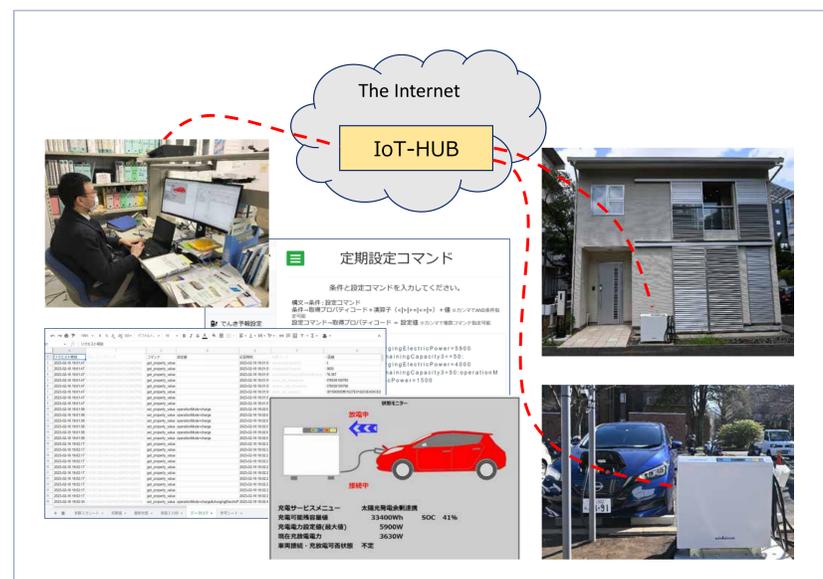
<https://www.babahiroyukilab.iis.u-tokyo.ac.jp/>

Currently, climate change has become a big issue globally, and the concrete plan of building a so-called decarbonized society is gathering interest. Of course, solar power and wind power will play an important role of it. There are various types of renewable energies, however, especially, solar and wind power generation does not obey human order as it is called "Variable Renewable Energy (VRE)". It is just up to the weather or wind and fundamentally different power sources from the conventional thermal power generation.

At present, VRE output fluctuations are compensated mainly by changing the output of thermal power generation in the reverse pattern and the frequency is maintained. But it is approaching the limit. In fact, in the Kyushu area and so on, the output of solar power is frequently curtailed because the output is greater than the demand at that moment. Unfortunately in some season, power generation can barely provide the electric power to the demand. Consequently, Japanese government can't avoid issuing a power crunch alert. In fact, stability of electric power supply is swaying now. In the future, in order to increase VRE more, socio-economic activities seem that we need to change mind now and act for the convenience of energy within reason. Of course, it is also necessary to introduce a low-cost system so that socio-economic activities are not affected. A paradigm shift is required for us right now. For example, it would be appropriate that charging for a battery electric vehicle (BEV) is conducted according to the electric power supply status. Fortunately, a technology called IoT (Internet of Things) has been developed, and it seems that we can create a power system that can introduce more VRE using IoT. Building up an EV charging testbed utilizing IoT in the campus, my laboratory will proceed with research and development of elemental technologies and social implementation method based on IoT-HUB which comes from our industry-academia collaboration.



Design of a Protocol-free Infrastructure Mechanism for Interconnecting and Controlling all Demand Equipment



Building up a BEV charging testbed utilizing IoT



Social Implementation of Infrastructure for Interconnection among any IoT Systems  
(Press Conference in May 29, 2019)  
[https://www.u-tokyo.ac.jp/focus/ja/articles/z0205\\_00056.html](https://www.u-tokyo.ac.jp/focus/ja/articles/z0205_00056.html)



BEV charging spot for research purpose  
(at Parking Lot of Komaba Research Campus)