Outline of Virtual Power Plant

1. Business Overview:

Bundling end-use devices scattered across power grids through the IoT (Internet of Things), will create one "virtual" power plant, where demand and supply on the grid can be more effectively balanced by controlling demand. Enhancing the system for controlling demand will make it easier to accommodate renewable energy sources in the power grid.



1.1 Images of service to be provided by Virtual Power Plant

By remotely controlling end-use devices and adjusting for increase and decrease in electricity demand, aggregators will be able to provide, among others, the following services.

- To retailers: services that allow retailers to secure greater balance between demand and supply by decreasing the demand from consumers and/or communities
- To grid system operators: services that facilitate creating additional demand or supply by keeping a balance between supply and demand

- To renewable energy generators: services that help avoid sudden curtailment by creating demand
- To consumers and communities: services such as those that facilitate "self-consumption" by utilizing electricity from behind the meter renewable sources and those that reduce energy costs overall



1.2 System of Virtual Power Plant

The service provided varies depending on the nature of the command issued from the consolidated server in response to the rise or fall in demand and end-use device from which it originates.. Consequently, each resource server and, ultimately, the overall consolidated server are designed in light of the kind of end-use installations they need to respond to and how each resource server needs to be controlled.

The consolidated server allocates data to each resource server on the basis of the transactions that take place between retailers and grid system operators. The resource server allocates the relevant data to each resource based on commands issued from the consolidated server. In view of the expected expansion in the range of resources to be serviced, the Virtual Power Plant system must also adopt a standard communications protocol.

	EMS	Air Conditioner	Boiler	EV·PHV	Second Battery	PV	Generator
House hold	HEMS	Air conditioner	Household HP boiler	Private car	Small second battery	roof PV	Household Co-generation
	Enegate	Nature Japan	Kansai Electric Sumitomo Electric Nihon Unisys Enegate	Kansai Electric Sumitomo Electric	NTT Smile Energy ELIIY Power Mitsubishi Corporation	Mitsubishi Corporation	
industry	BEMS FEMS	Industrial air conditioner	Industrial HP boiler	Company car	Large second battery	Mega Solar Power	Co-generation
					Kansai Electric		
	Kansai Electrical Inspection Association			1	Fuji Electric Sansha Electric		
	Sumitomo Electric			Enegate	GS Yuasa		
	DAIHEN				Sumitomo Electric		
			i	i	i Obayashi	Decourses to be de	nonstrated this year

1.3 Resources Targeted for Virtual Power Plant Experimental Project

The Virtual Power Plant is designed to control the resources illustrated below. Under the experimental project, some of these resources are operated through IOT, as per the monitoring and controlling systems established by the participating companies. Expanding the scale and range of resources to be controlled by the Virtual Power Plant will also be considered as the project unfolds.



2. Project Execution Location:

The Kansai region of Japan

3. Schedule:

July 21, 2016 (date subsidies granted) to February 28, 2017