

Energy V2X Solutions

sEMSATM (Sumitomo Energy Management System Architecture)

Systems & Electronics Division

Sumitomo Electric Industries, Ltd.
Date: September, 2022

Background (EV-VPP)

EV/PHV

- Increasing
- Driving time is limited
- Added value is desired

Renewable Energy

- Increasing
- Very volatile
- Grid needs more flexibility



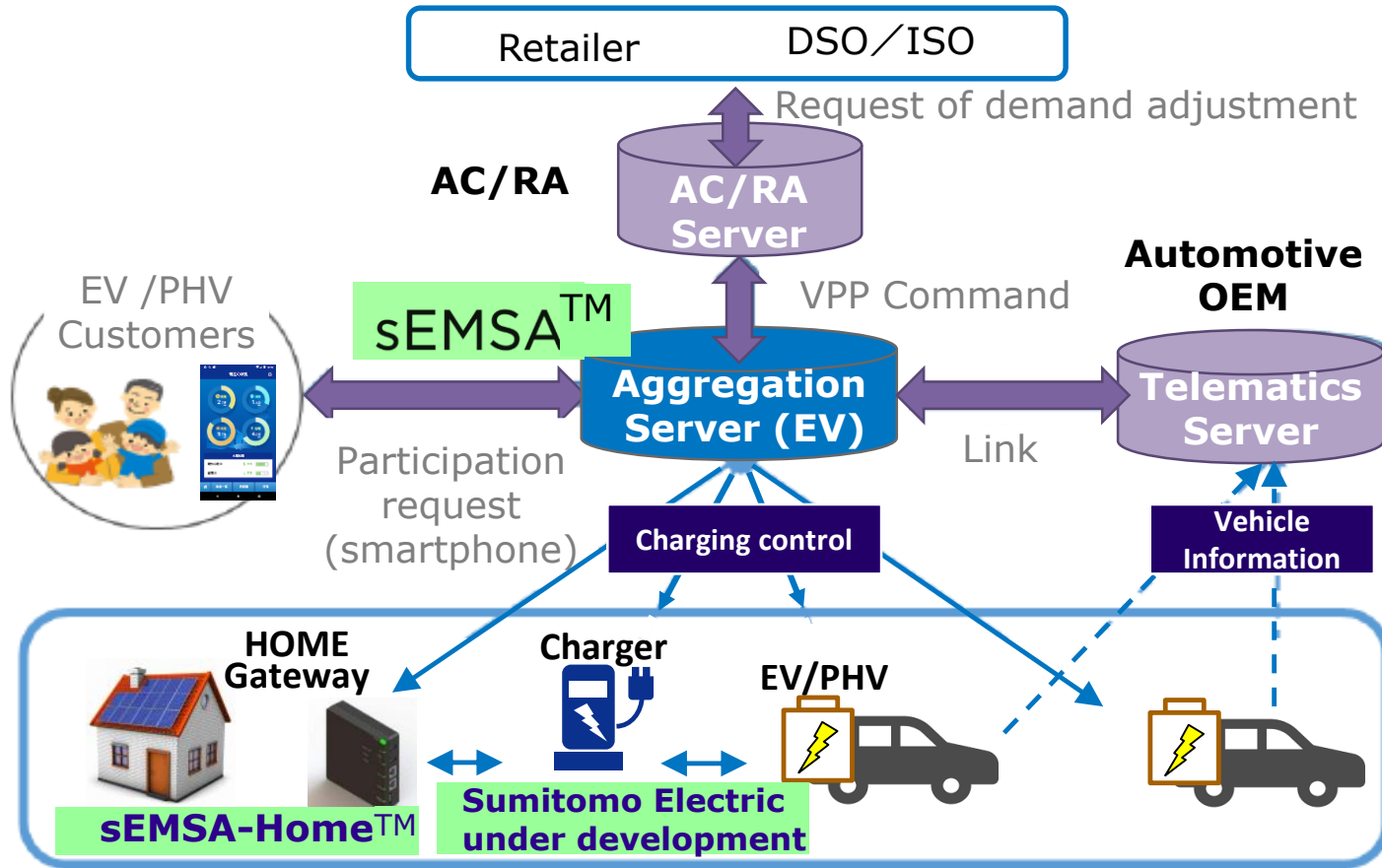

**Sumitomo's
Virtual Power Plant System**



- ✓ The batteries in parked EV/PHVs can work as electric storage equipment.
- ✓ Aggregation of them is used for balancing electric demand and supply.

Japanese Government has proceeded with “VPP demonstration project” since 2016. Sumitomo Electric has joined the project as one of the member companies.

EV Charging Control System(EV-VPP)



Features

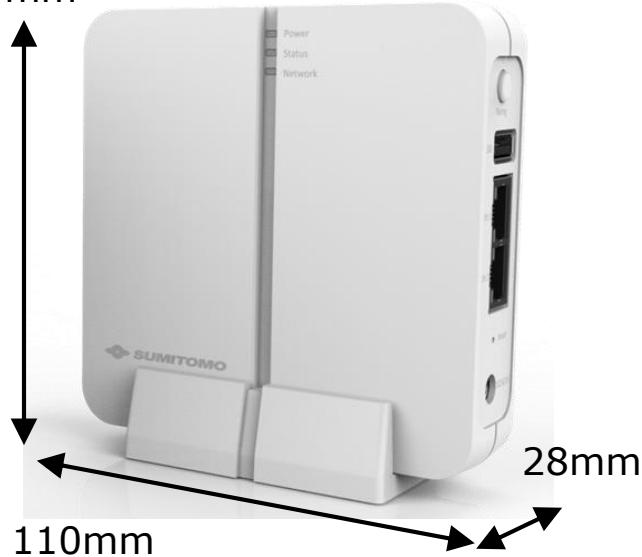
- ✓ One Stop Solution From Server to Unit
- ✓ Precise VPP Control optimized for EV/PHVs (Refer to the next slide)
- ✓ Collaboration with OEMs

Sumitomo Electric modify the following document
https://www.kepco.co.jp/corporate/pr/2018/pdf/0111_2j_01.pdf

Gateway Unit

sEMSA-Home™

110mm



Features

- ✓ Applicable to Home Energy Management
- ✓ Link to consumer electronics
- ✓ Link to EV charger
- ✓ Link to Smart Meter

Specs.

WAN/LAN, Wi-Fi, BT 4.2, Wi-SUN/ZigBee,
USB Connection

Line-Up

sEMSA-Factory™



Link to a) Generator, b) PV,
c) Large Scale Battery, etc.

sEMSA-Lite™ for building/Small Office usage

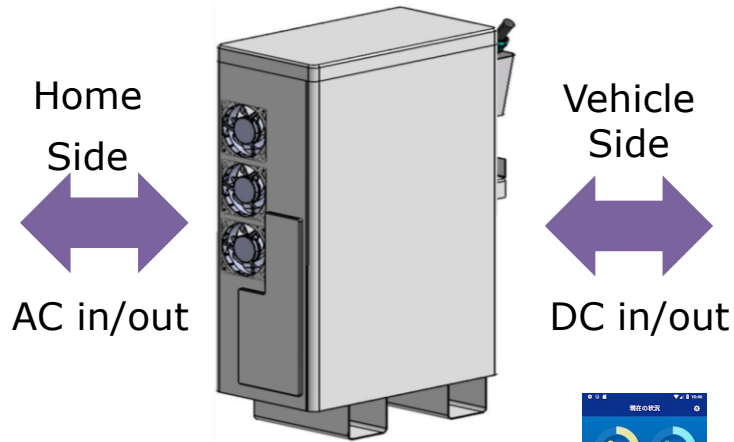


Link to a) air conditioner, b) EV
charger, etc.

Bi-directional EV charger(Under Development)

Features

- ✓ EV charger suitable for Energy V2X usage
- ✓ High Efficient Power Conversion, Compact and Light Weight design by Automotive ECU design know-how.



Control by
Smart Phone apps.



Specs.

Output Power:6kW

Volume: (not disclosed)

Weight: (not disclosed)

IP55

V2H Function applicable

Wi-Fi/LAN Access

to Vehicle Communication: CCS or CHAdeMO

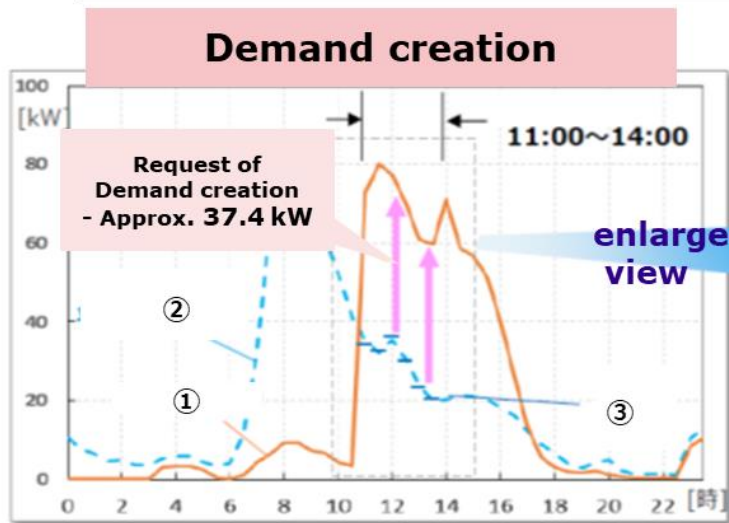
to Home Communication: OCPP or ECHONET Lite

Target Mass Production: Middle of 2020s

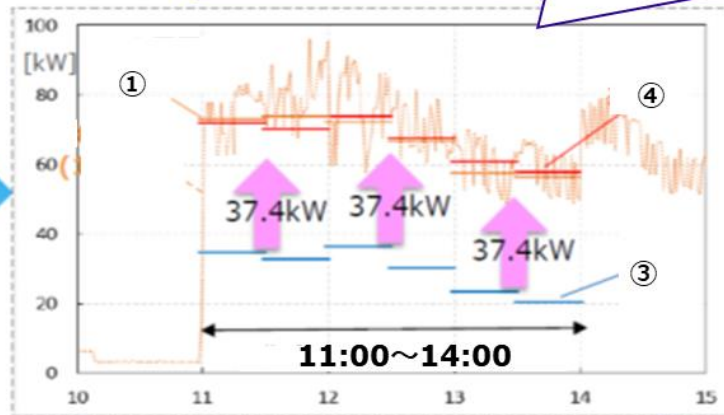
EV Charging Control Performance(EV-VPP)

Control Example

Total: 102 EV/PHVs, VPP Duration:3 hours



EV server can create demand accurately, with a software to identify available charging capacity and control EV/PHVs' charging in order.



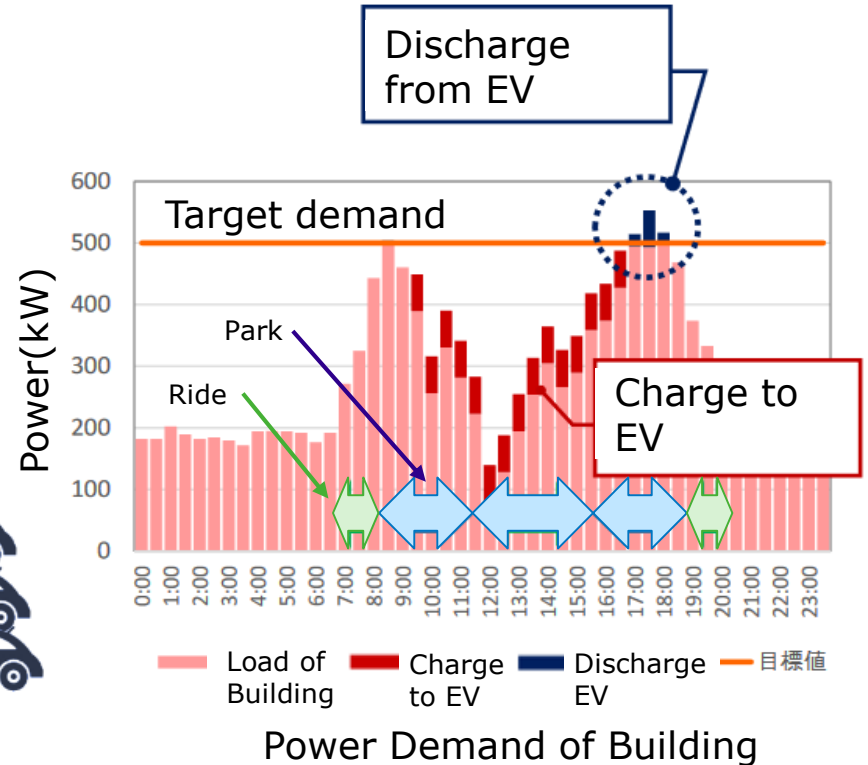
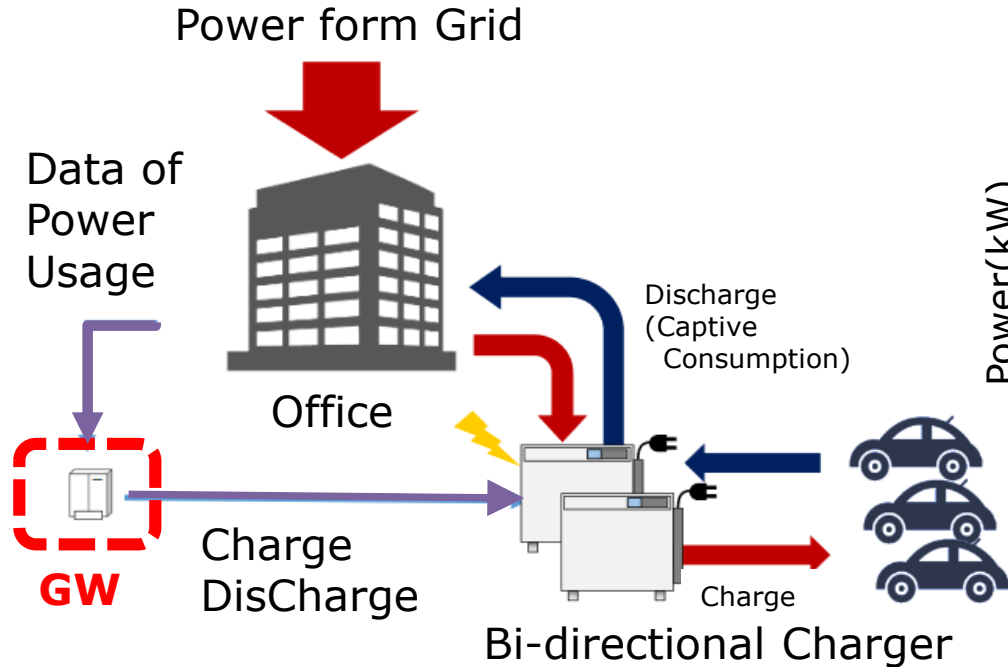
Approx. 37.3 kW Demand creation During 3 hours

- ① Charging power to EV/PHVs at the day of experiment
- ② Average charging power to EV/PHVs of five days before the day of experiment
- ③ Base-line
- ④ Target-line which is base-line plus request of demand creation

Gateway Use Case example

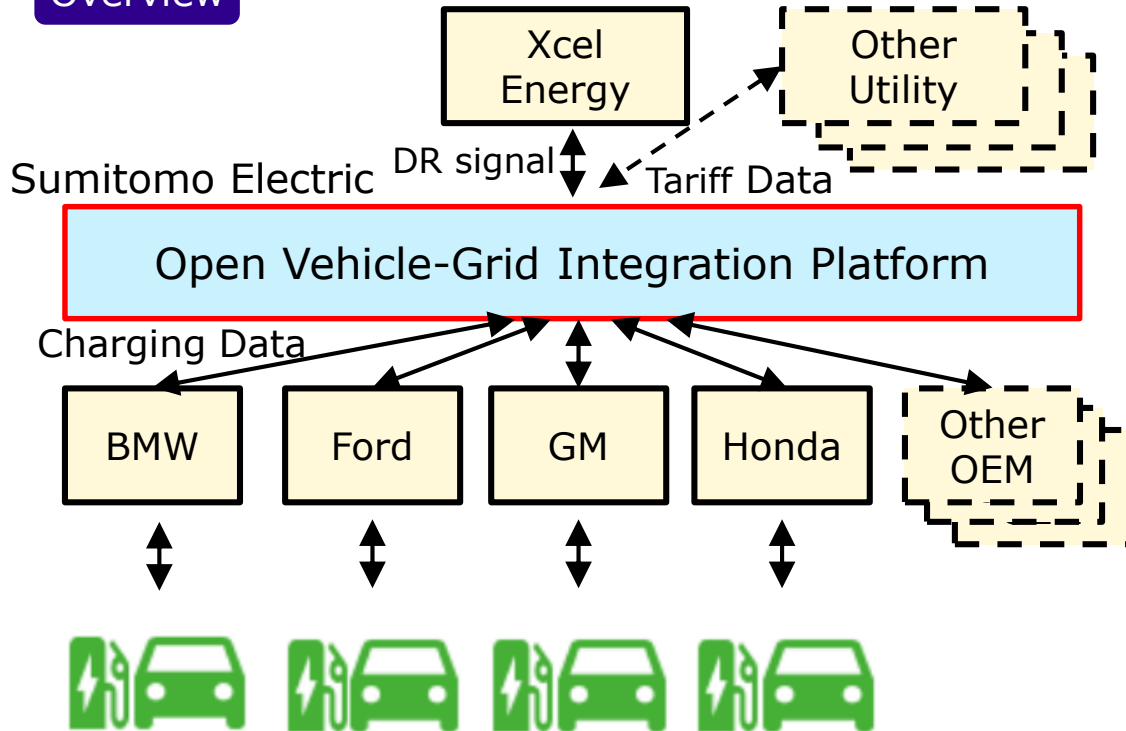
Original document https://www.kepcocorp.co.jp/corporate/pr/2020/pdf/0710_1j_01.pdf

【 Peak Shaving/BCP at Blackout by Using EV 】



OVGIP

Overview



Features

- ✓ EV Charging pilot program started from October 2022.
- ✓ To stabilize the smart grid and alleviate congestion of the power transmission in anticipation of the spread of EVs.
- ✓ The Platform integrates the information owned by an utility and automakers.
- ✓ The system encourages users to charge their vehicles in time slots when the demand for electric power is low.

Redox Flow Battery System Project in California

Overview

Sumitomo Electric Redox Flow Battery has been connected to the grid to help support reliability and maximize the use of clean energy. Sumitomo Electric collaborated with San Diego Gas & Electric to participate in CAISO market and demonstrate microgrid operation on the commercial distribution network.



Features

- ✓ Start Operation: March 2017
- ✓ Project Partners:



- ✓ Location: SDG&E, Miguel
- ✓ Capacity: 8MWh(2MWx4h, Max 3MW)
- ✓ Use cases for distribution support :
 - Peak shaving, Voltage support,
 - Energy arbitrage, Microgrid operation
- ✓ CAISO market participation:
 - Energy (day ahead, real time)
 - Ancillary Service (frequency regulation, spin, non-spin)

Supplement

Company Profile

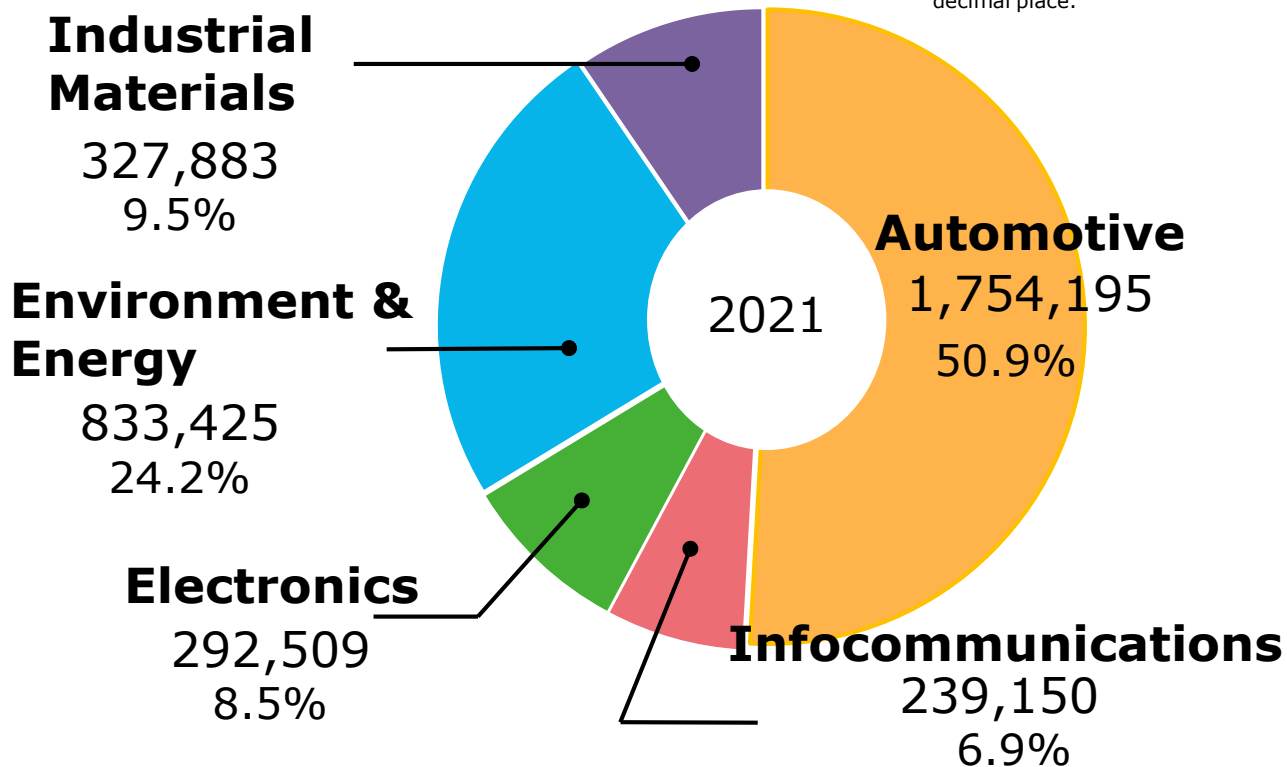
Company Name	Sumitomo Electric Industries, Ltd.
Established	April 1897
Capital Stock	¥99,737 million
President	Osamu Inoue
Employees	281,075
Subsidiaries & Affiliates	414 (Domestic [JAPAN] 106, Overseas 308)
Consolidated Business Results	Net Sales ¥3,367,863 million Operating Income ¥122,195 million

(As of March 31, 2022)

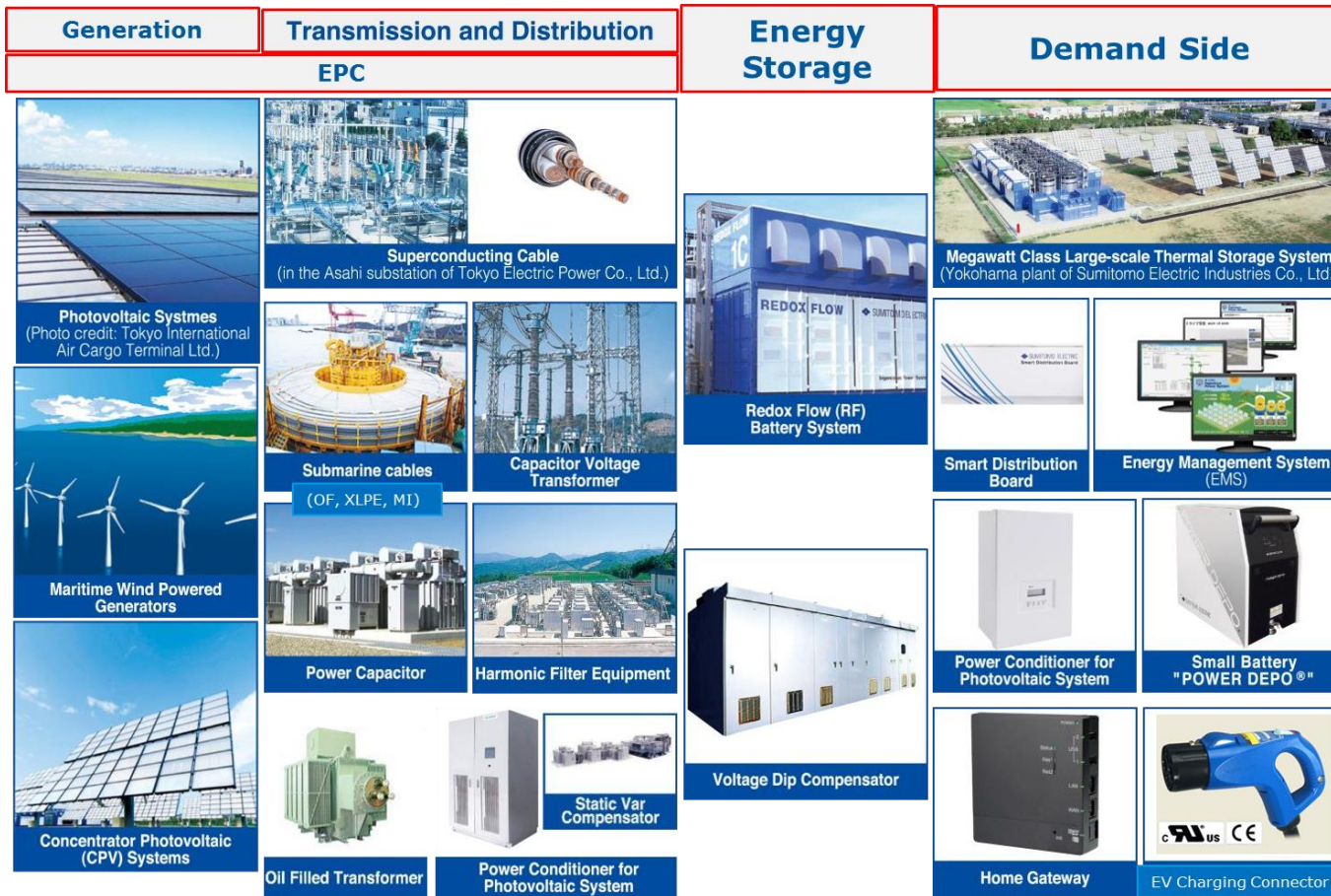
Sales by Business Segment

(Millions of Yen)

※Following data includes intersegment sales and so their total differs from net sales data. These figures are rounded off to the first decimal place.



Value Chain in Energy Solutions offered by Sumitomo Electric Group



Smart Energy Service Platform for Home (sEMSA™-Home)

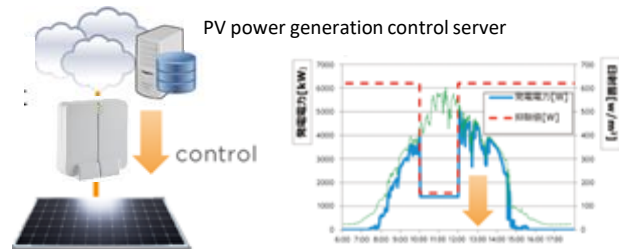
Virtual Power Plant Services

sEMSA®-Home allows the aggregator to remotely control energy resources owned by individuals, and balance electric power supply and demand.



Restriction of Solar PV Output

sEMSA®-Home provides a service to control and restrict solar PV output during the peak time from the server, and stabilizes the balance of electric power supply and demand.



Indication of Electric Power Usage / Control of Home Appliances

sEMSA®-Home offers intuitive monitoring electric power usage, and controlling of home appliances and/or energy resources such as air conditioners and water heating systems by smart phone app.

