

How can Residential Battery Applications be used to support the Integration of Variable Renewables into the Grid?

November 7, 2014

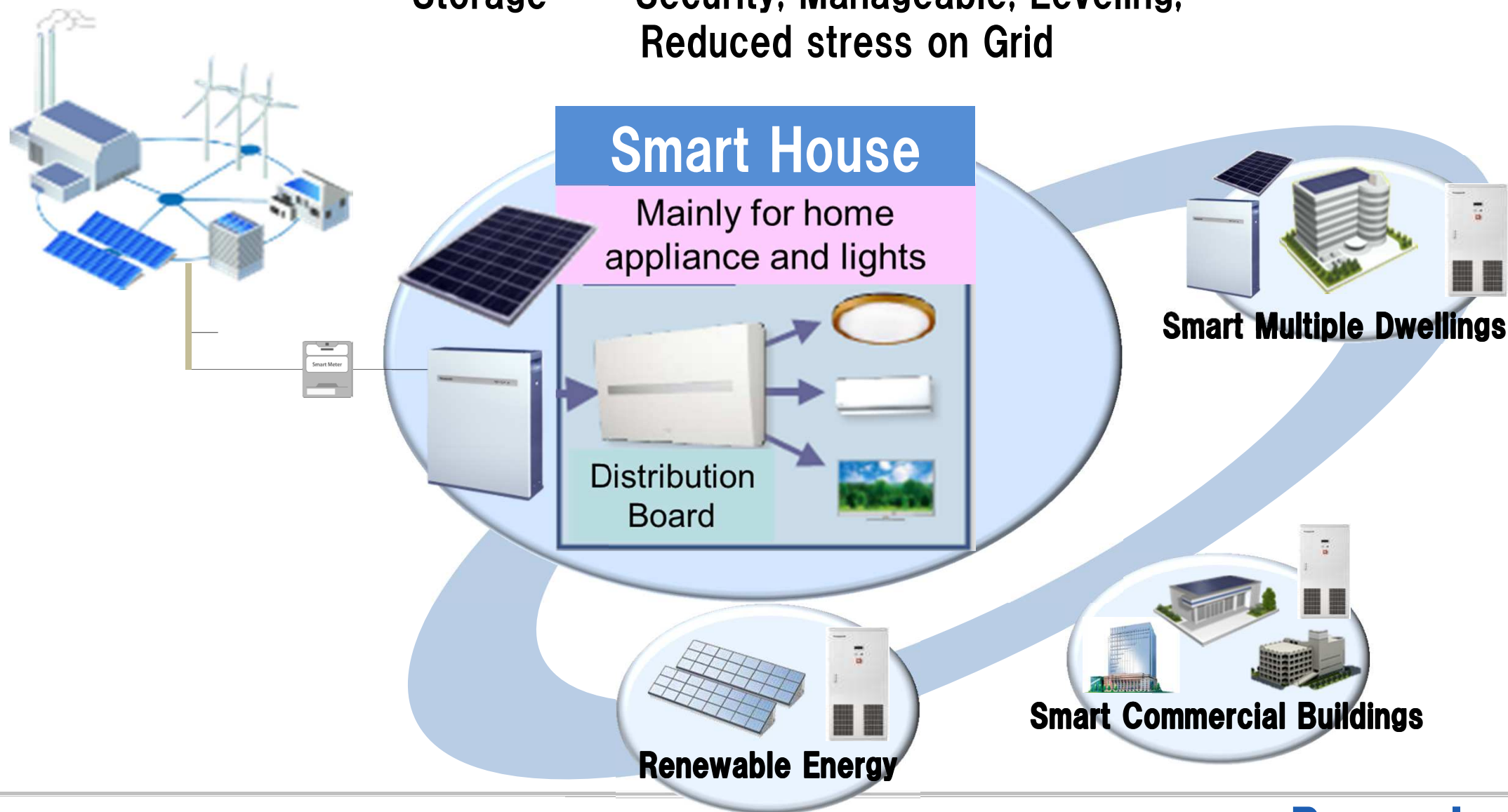
Panasonic

05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Smart House & Community at **Demand Side**

Distributed Generation with Residential Storage Battery System

'Storage' = Security, Manageable, Leveling,
Reduced stress on Grid

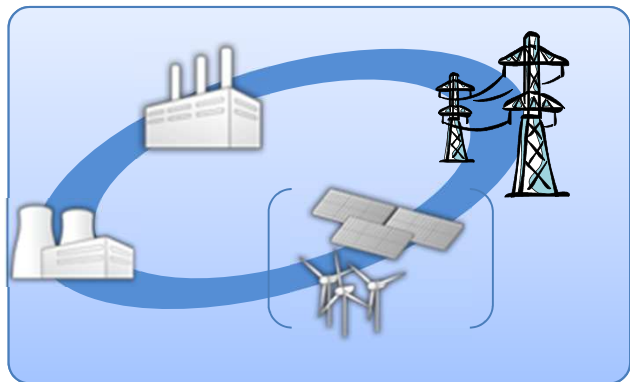


Reduction of Stress on Grid

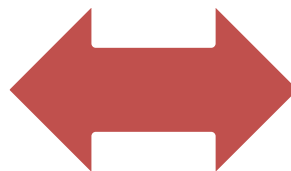
Supply side

Full responsibility to control

NOW



High Level Technology to Balance

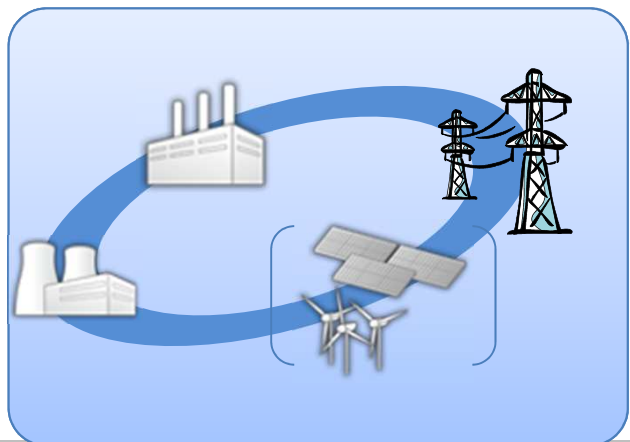


Demand side

Unpredictable and Un-controllable



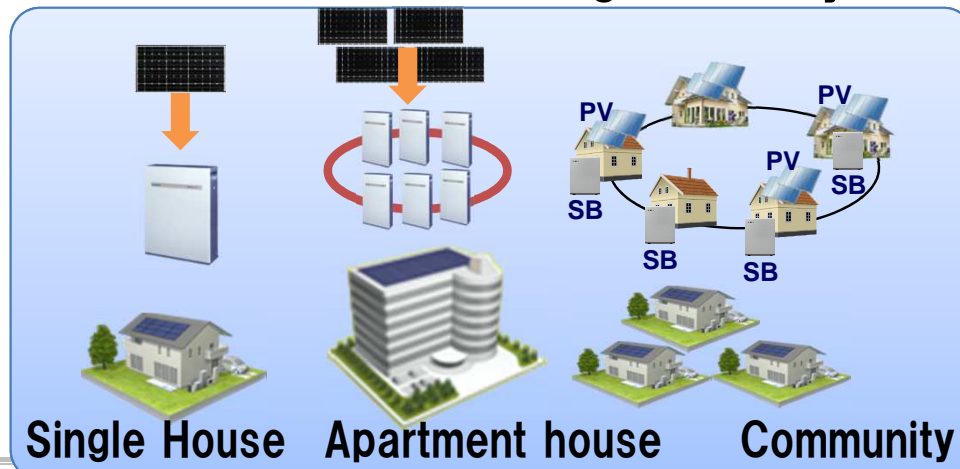
Future



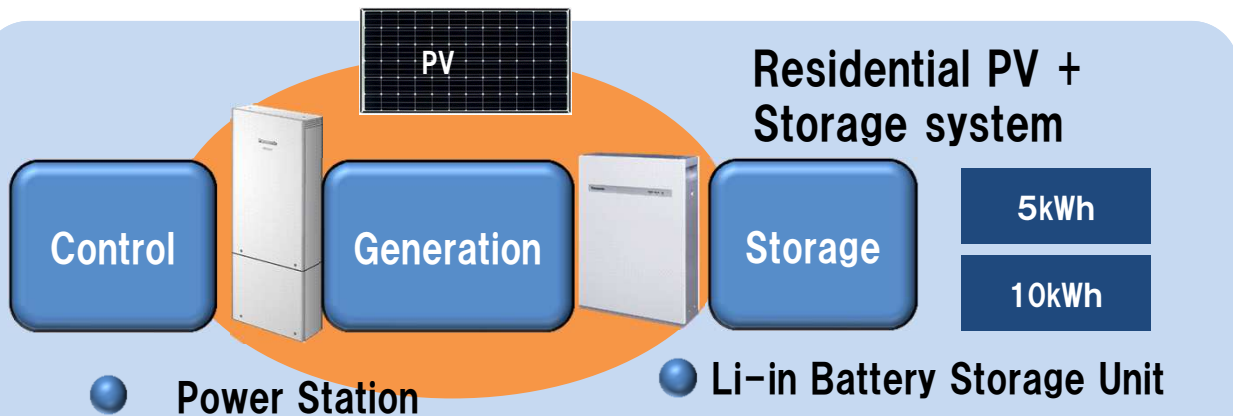
Less Dependent



Controlled with Storage Battery



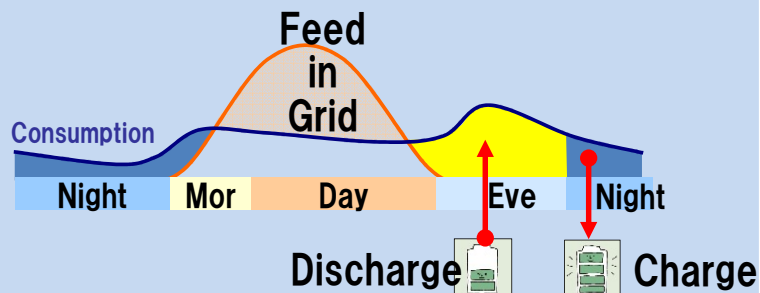
Stand Alone Systems are to be connected to HEMS



● Program setting with KEY PURPOSE

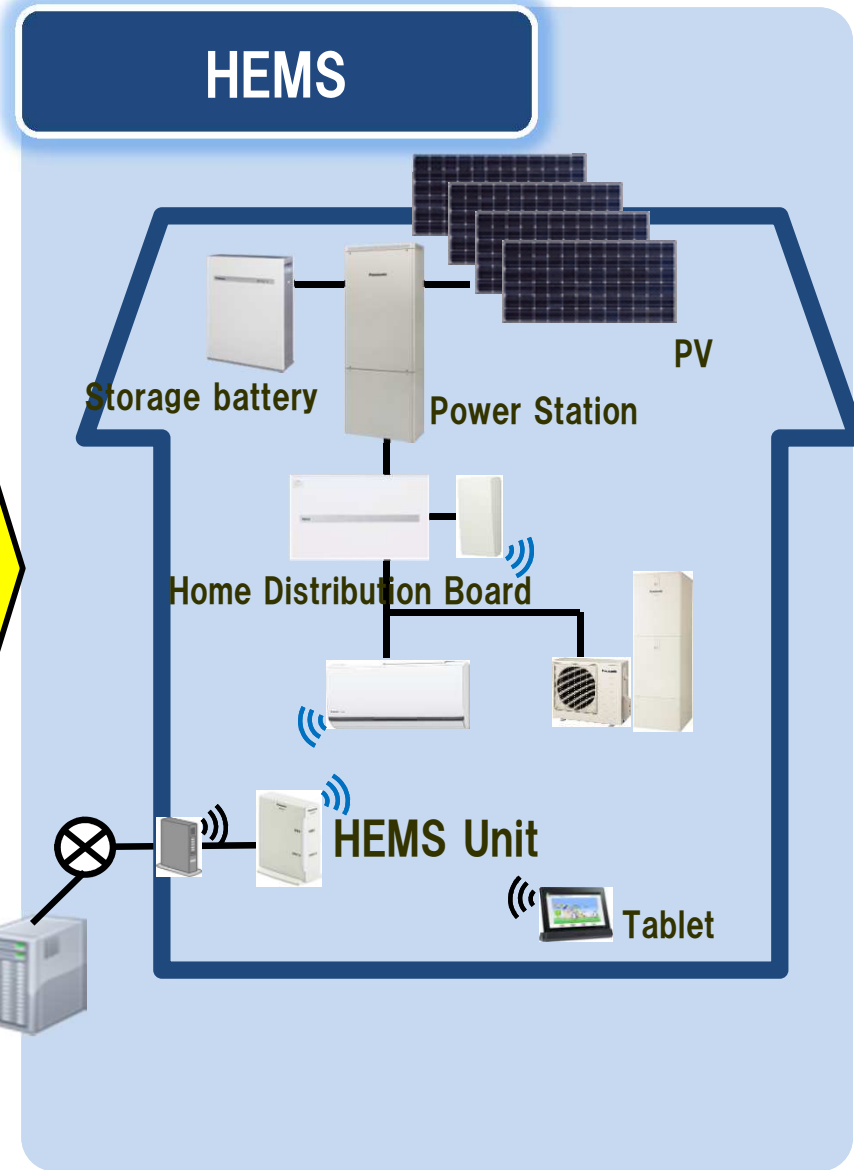
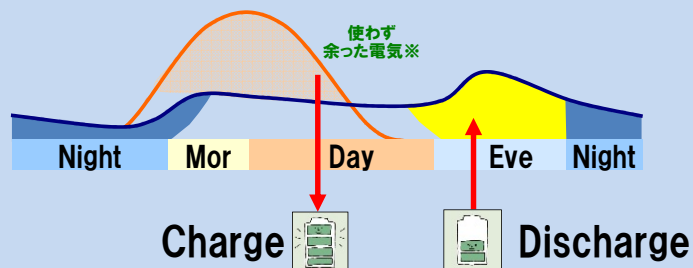
Economy

Cheap night ele. stored and used later. Peak shift & reduction of energy bill.

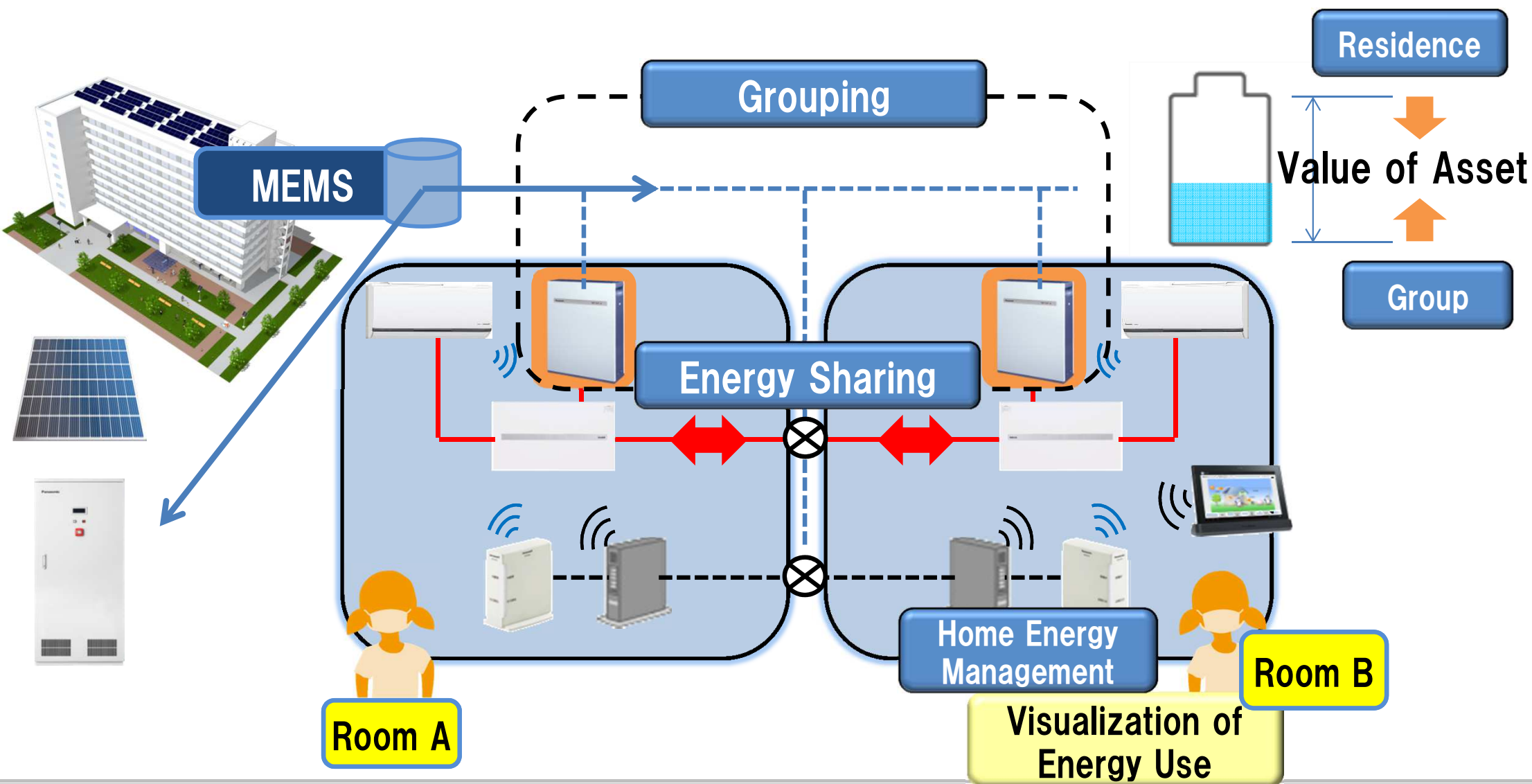


Environment

PV Generation Stored and used during the night.



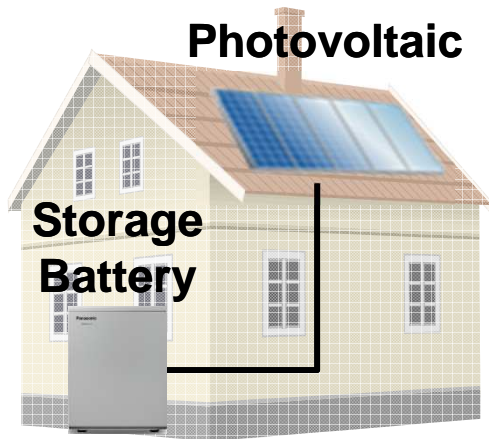
Maximize energy benefit by optimum control of storage system



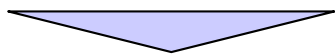
Less Dependent on Grid by Aggregating Residential Demand

Single House

PV + Battery System



Self Consumption of PV Generation

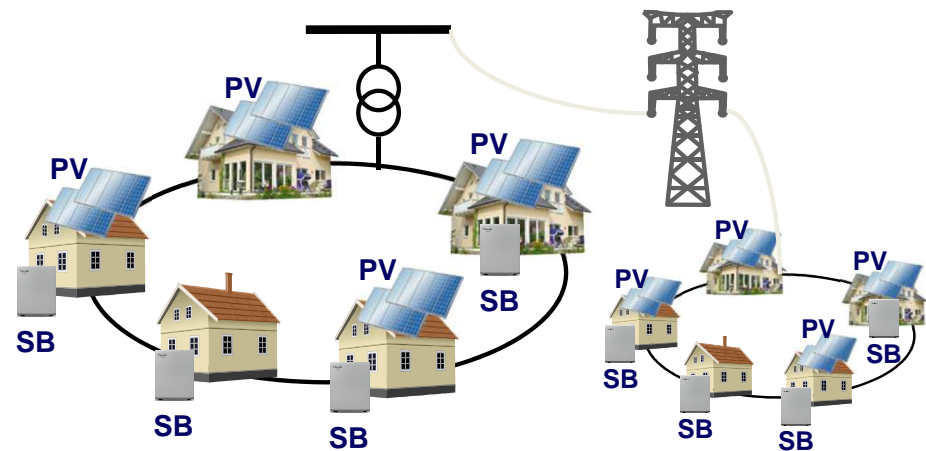


For Consumer:
Reduced energy bill

Aggregation of Distributed Generation

Solution to reduce Stress on Grid

Aggregation of distributed systems



Potential benefits from providing flexible capacity reacting to utility's needs.



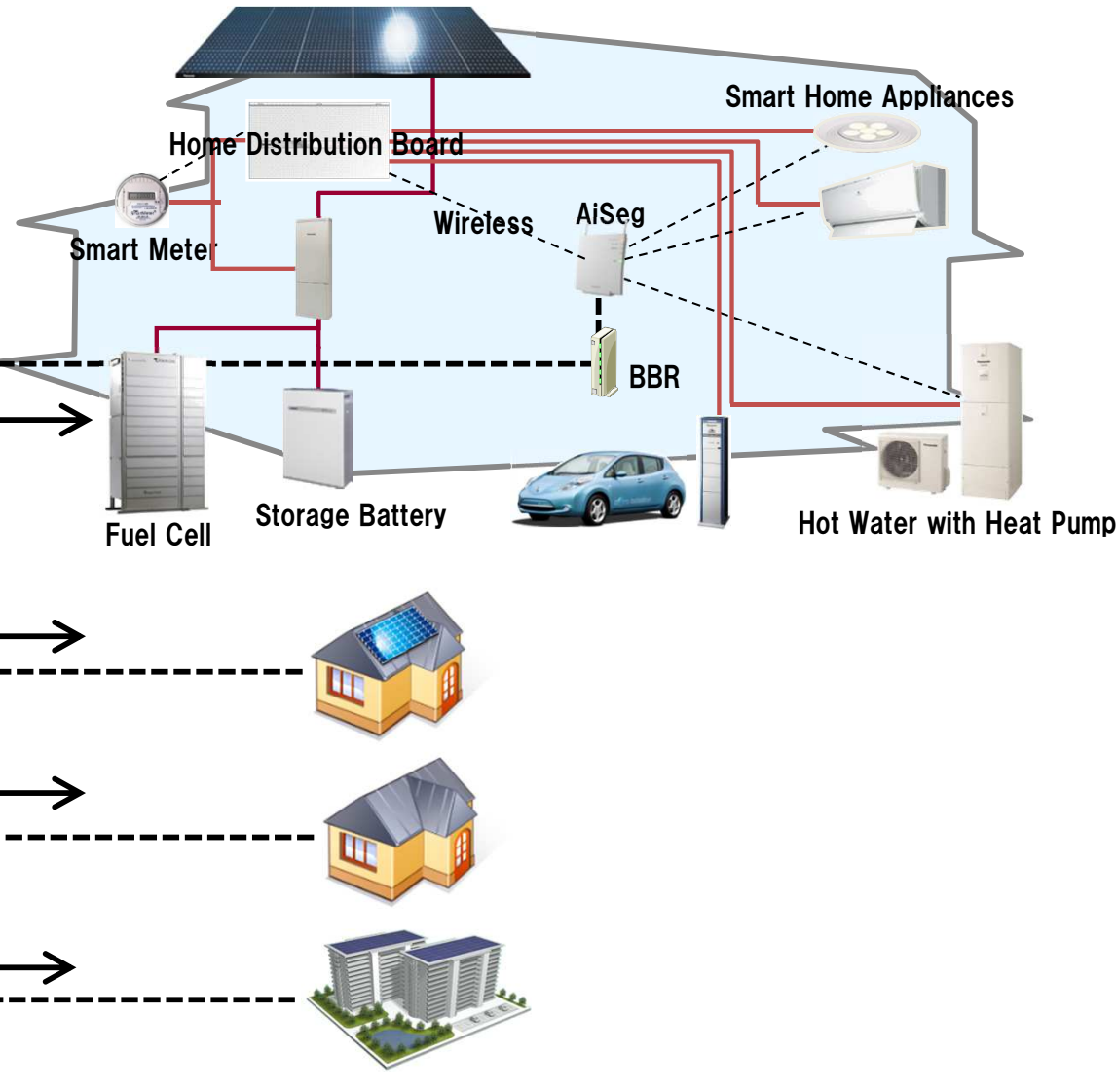
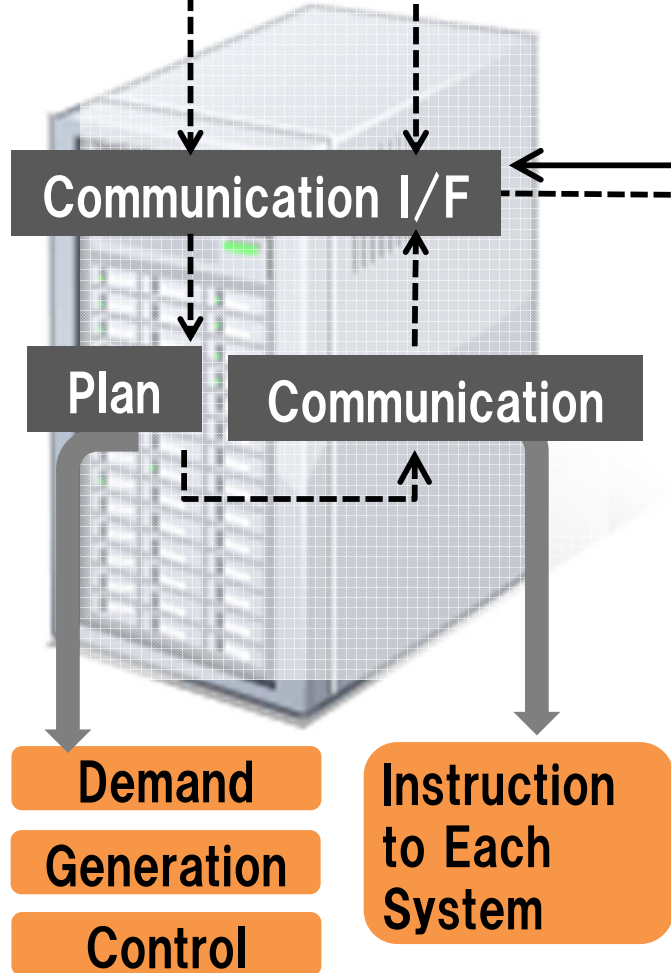
For retail: Increase demand side flexibility
→ Optimise procurement & balancing processes.
For grid: Support grid stability and manage load
→ Avoid grid infrastructure investments.

Forecast of Demand and PV Generation

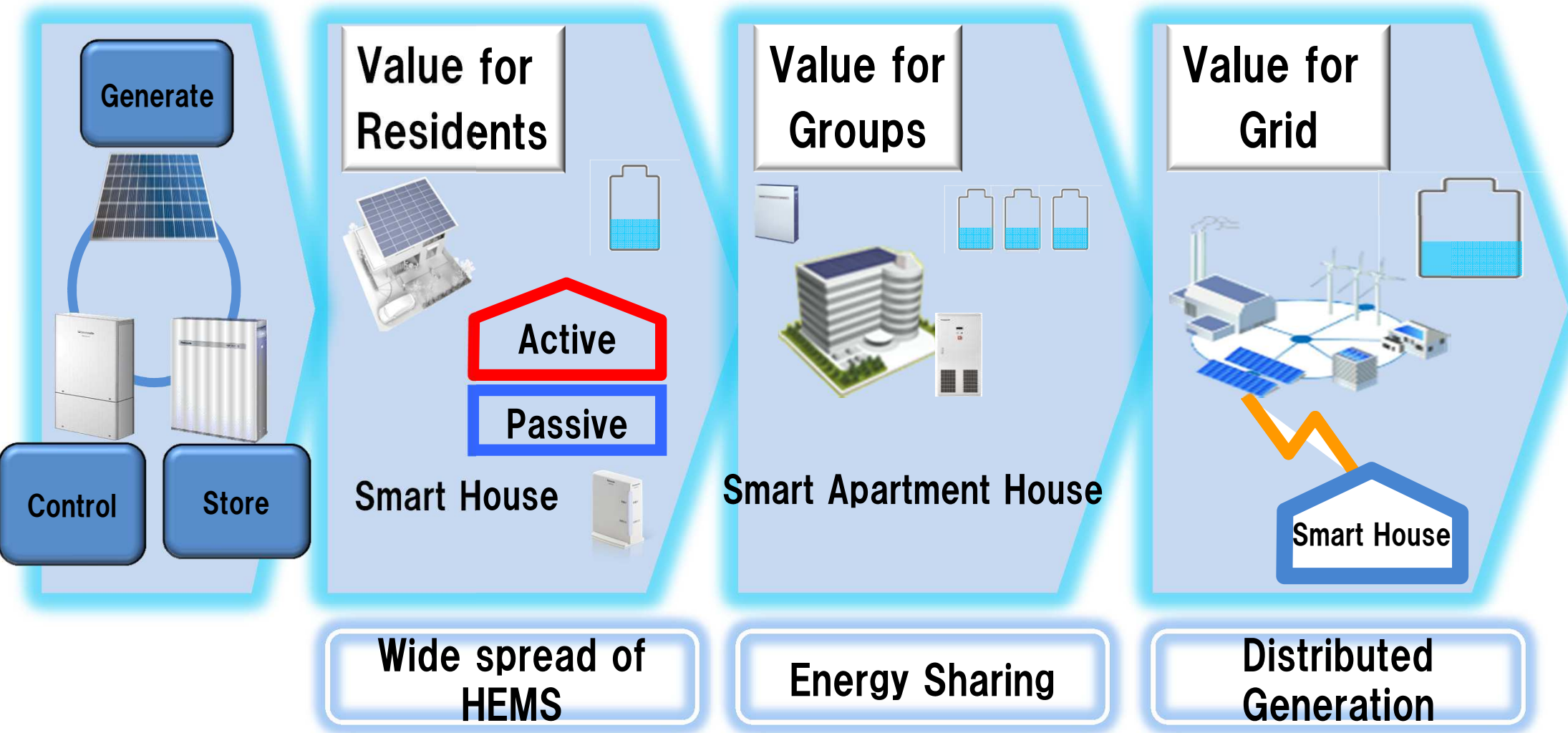
Weather Forecast Information

incl. Sunshine

Community Energy Management System



Value Created for all parties



Incentive for PV + Storage System will be effective measure like the incentive policy in Germany