

Overview of Smart House Demonstration

< NEDO New Mexico Smart Grid Demonstration Project >

10 Dec. 2010

Kyocera Corporation

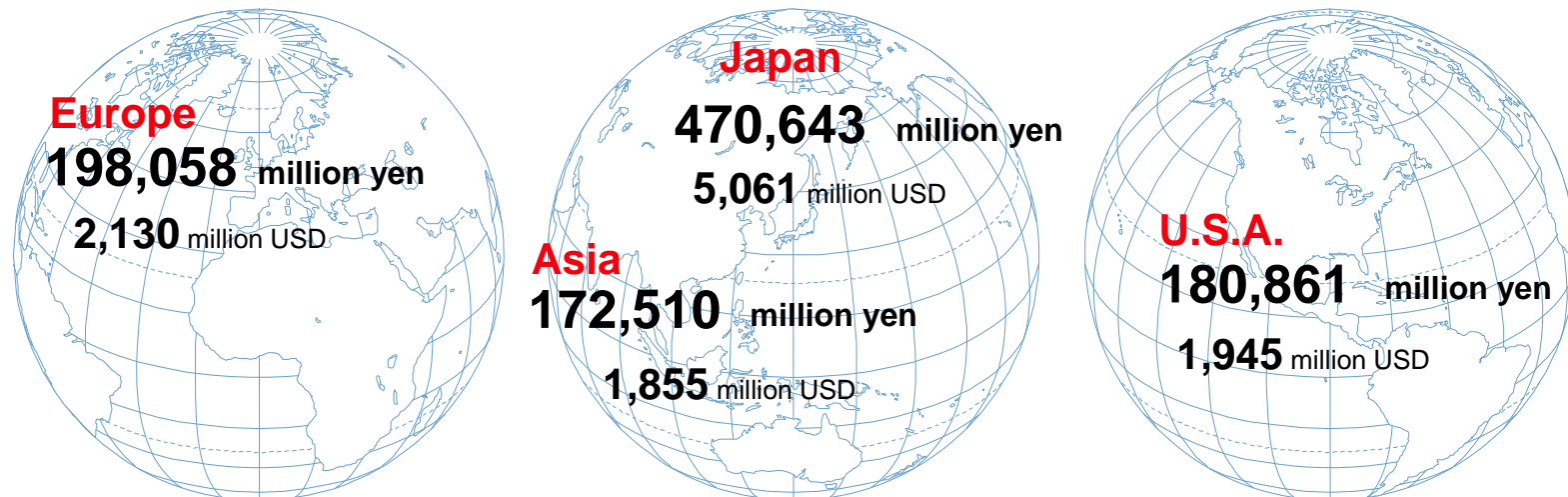
1. Introduction of Kyocera
2. Work Scheme of Demonstration
3. Objectives of the Smart House Project
4. Structure of the equipment
5. Wiring Diagram
6. The optimal energy management system (HEMS)
7. Smart House floor plan (Example)
8. Schedule

Summary

| | | | |
|---------------|---------------------|--|--|
| Company Name: | KYOCERA Corporation | Consolidated Net Sales: | 1,073,805 million yen |
| Established: | April 1, 1959 | Consolidated Income from Continuing Operations Before Income Taxes: | 60,798 million yen |
| President: | Tetsuo Kuba | Group Companies: | 213 (Including Kyocera Corp.) |
| Capital: | 115,703 million yen | Group Employees: | 63,876 (Excluding affiliates accounted for by equity method) |

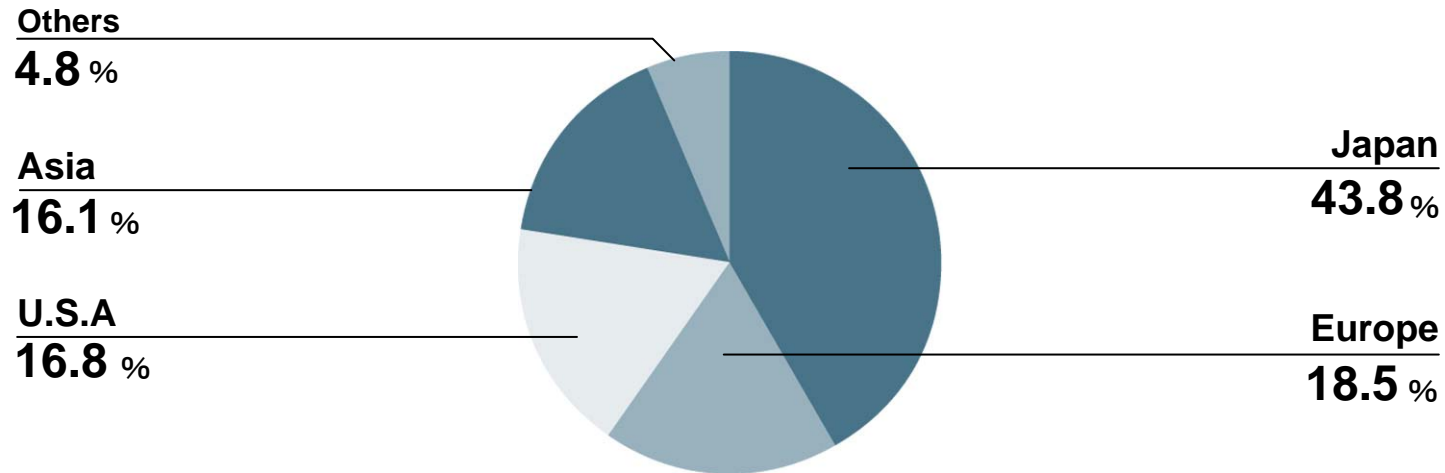
Financial and employee data from fiscal year ended March 31, 2010
Group company data current as of April 1, 2010

Consolidated Sales by Region (Year ended March 31, 2010)

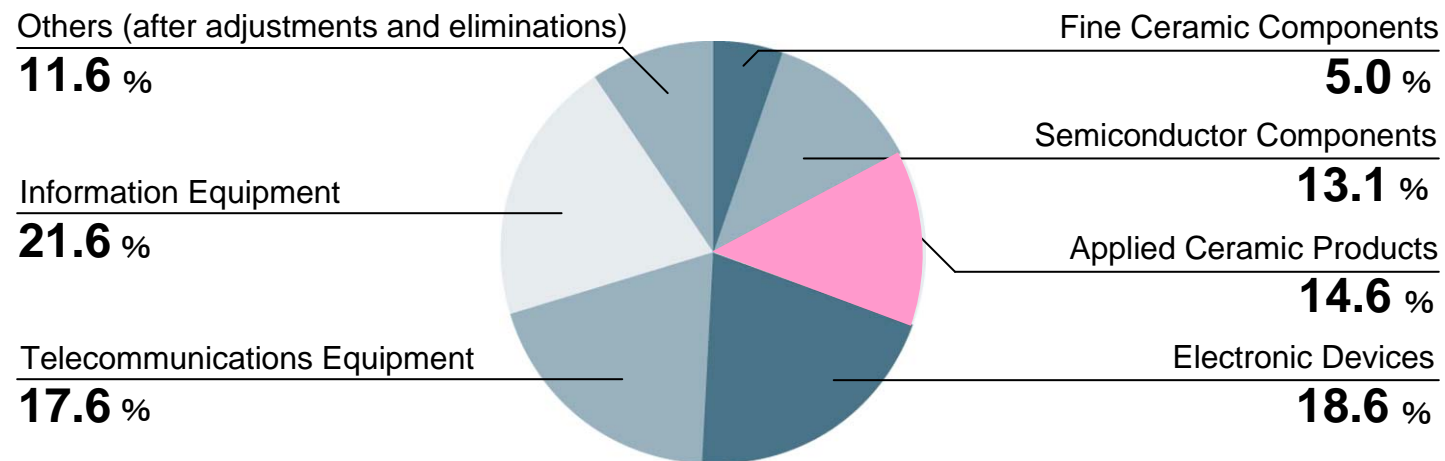


As a convenience to the audience, US dollar conversion is based on the rates of USD1=JPY93, round to the nearest unit.

Consolidated Sales by Region (Year ended March 31, 2010)



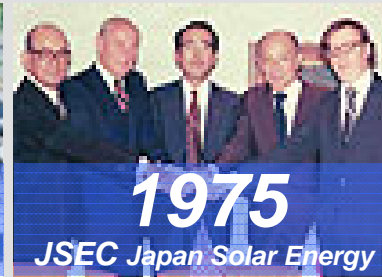
Consolidated Sales by Segment (Year ended March 31, 2010)



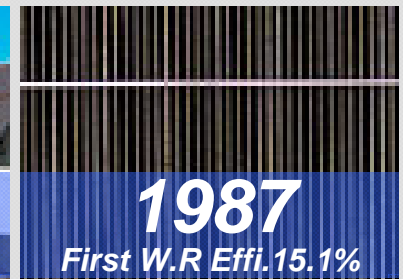
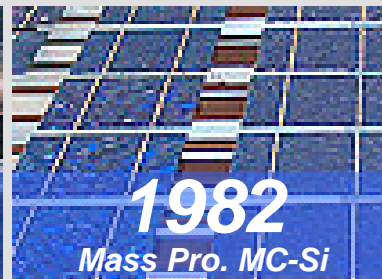
Introduction of Kyocera --- History of Solar Energy Business



1970's



1980's



1990's



2000's





Avanzalia Solar, Spain



PV roof, TOYOTA Prius

NEDO



Kyocera

- Site coordination
- Home energy management system (HEMS), PV, Inverter, Li-Ion Battery, Hot water storage, In-house communication

Sharp

- HEMS, Smart appliances

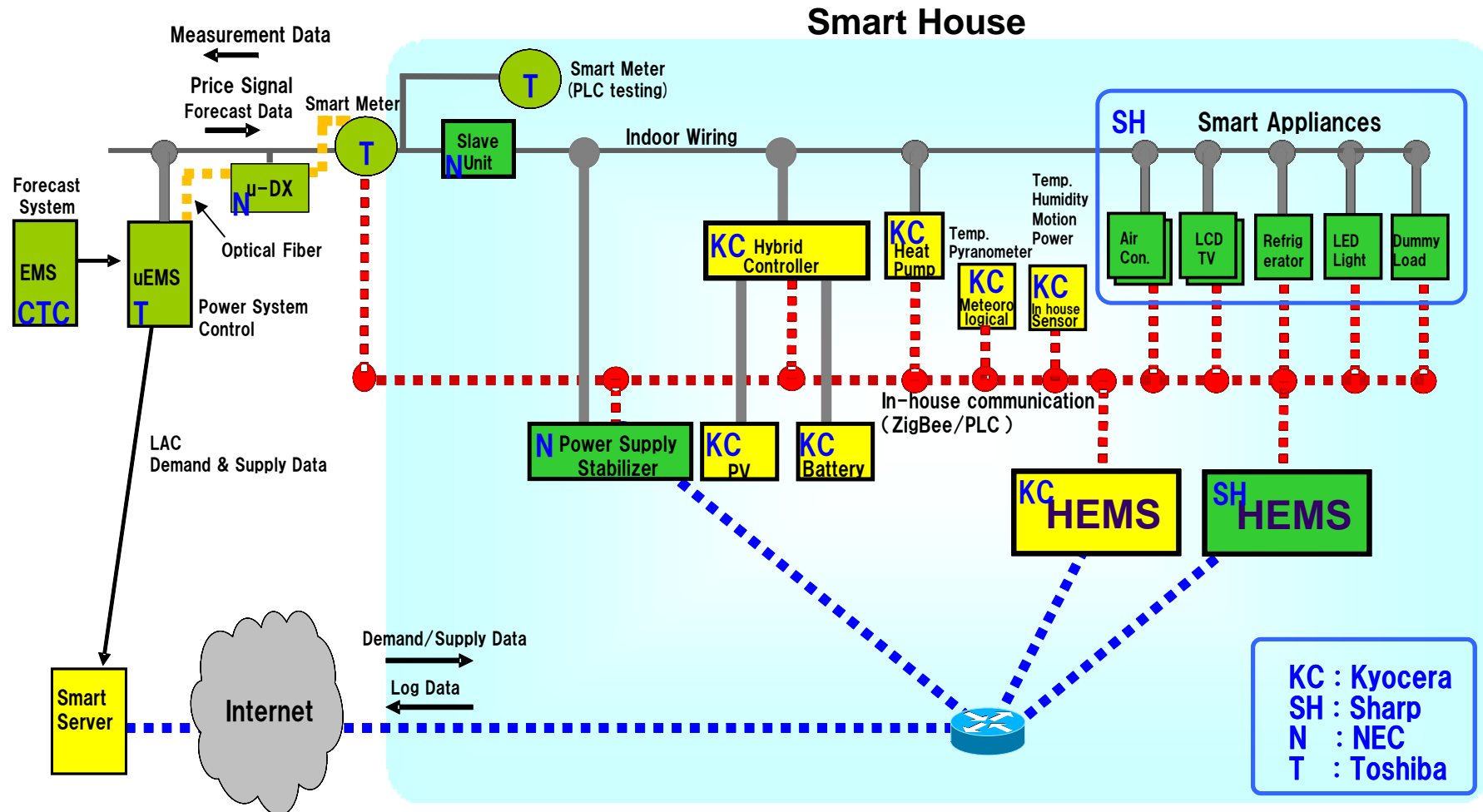
NEC

- Equipment to stabilize supply and demand

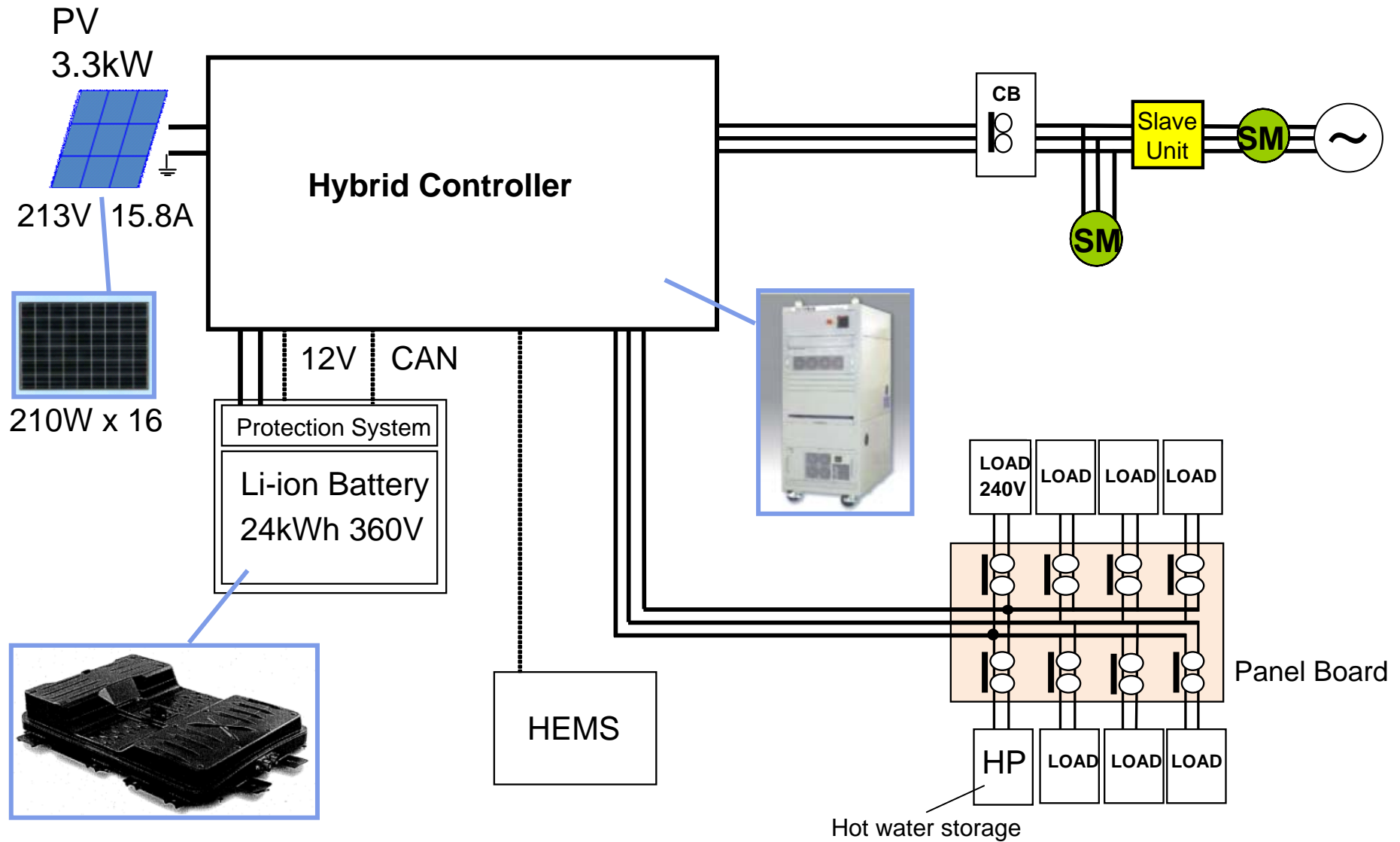
Installation of renewable energy and energy storage technologies to the house and highly intelligent HEMS that can control each technology will be demonstrated to minimize the load / impact for the grid

1. Demonstration to maximize demand response using HEMS
2. Installation of typical residential PV and high capacity Li-Ion battery, heat pump hot water storage equipment and smart appliances
3. EMS combining smart meter technology and real time pricing (RTP)
4. Communication systems used inside and outside houses

Structure of the equipment



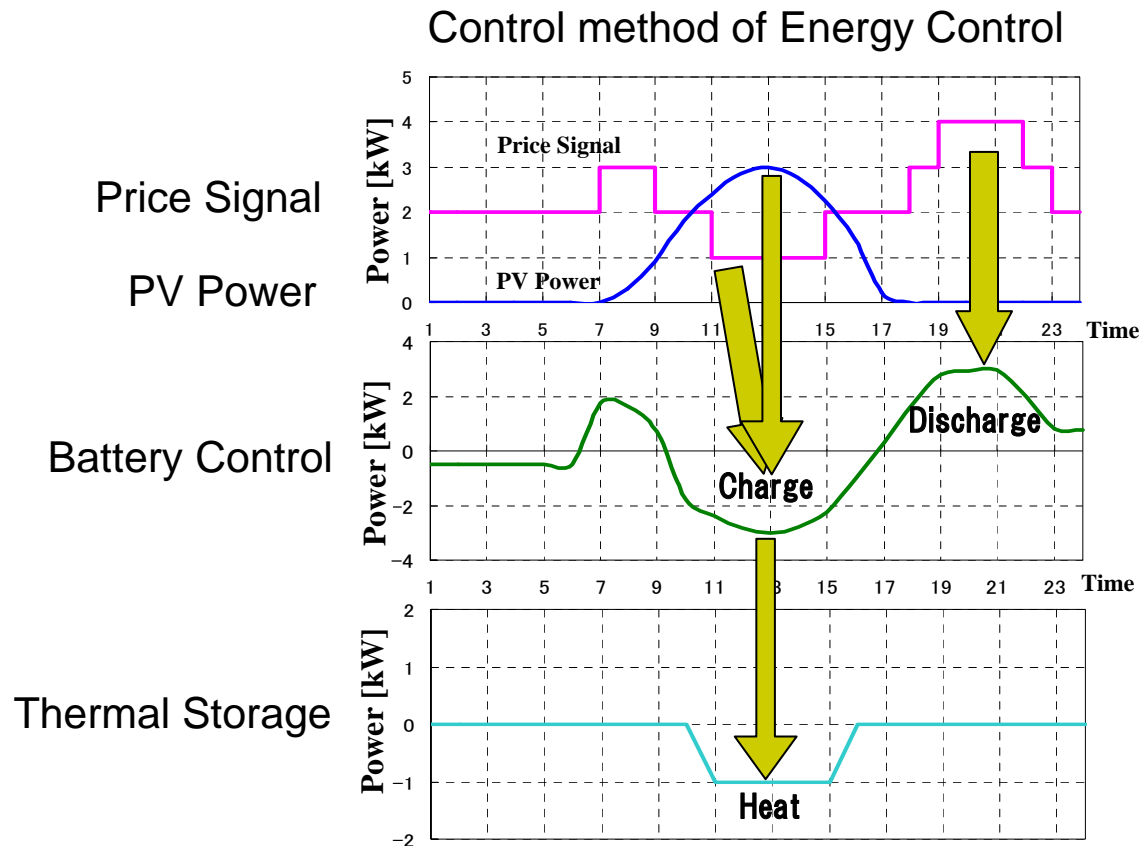
Wiring Diagram



The optimal energy management system (HEMS)

PV, battery, thermal storage and smart appliances are controlled optimally based on the information as follows,

- The price signals to distinguish between shortage and surplus of the grid
- The forecast of weather and PV power generation to schedule the operation



The optimal energy management system (HEMS)



Quantitative demonstration can be achieved to measure the amount of reduced load for the grid by comparing the smart house with the typical house in LAC.

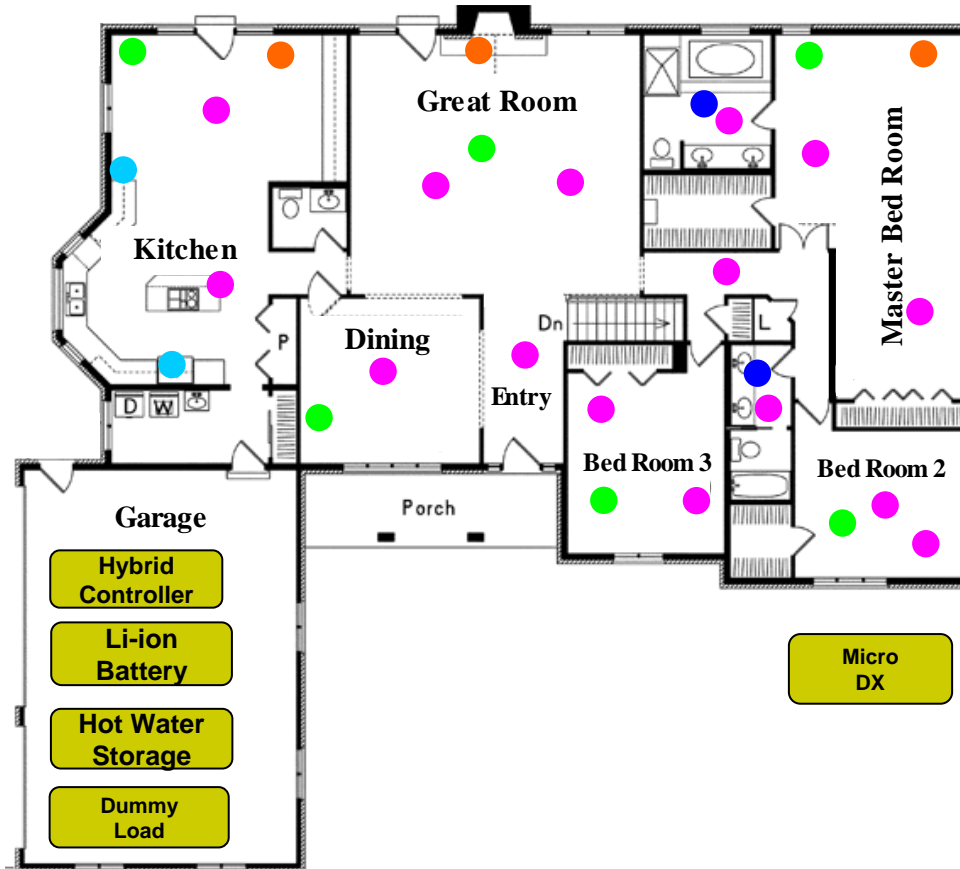
Expected comparison result with typical house (example)

| System | Equipment | Smart House | Typical House |
|----------|-------------------|--|--|
| On-Peak | System Power | Not Used | Used according to time & the weather |
| | PV Power | Reverse power flow | Reverse power flow only when power is enough |
| | Battery | Discharging for Reverse power flow | — |
| | Hot Water Storage | Not Used (Change Schedule) | Scheduled operation |
| | Appliances | Automatic energy saving | Manual energy saving |
| Off-Peak | System Power | Surplus reduction by charging battery and Heating water to storage | Used only when PV generation power is low |
| | PV Power | To battery and thermal storage | reverse power flow |
| | Battery | Charging for Surplus reduction | — |
| | Hot Water Storage | Heating water | Scheduled operation |
| | Appliances | Automatic energy saving | Manual energy saving |

Smart House floor plan (Example)

Smart house will be the same structure as typical house in LAC

Assumption : One-story house, 2,900 Sq. feet (269m²)
3 bed rooms + Garage (3 Bays)



- LCD TV : 3
- Refrigerator : 2
- Hot Water Storage
- Air conditioner : 6
- LED Light : 15

Schedule



Tentative Schedule for the Smart House demonstration

