



Applicable to home energy management

Home Energy Grid (HEG) Hardware and Software Technology

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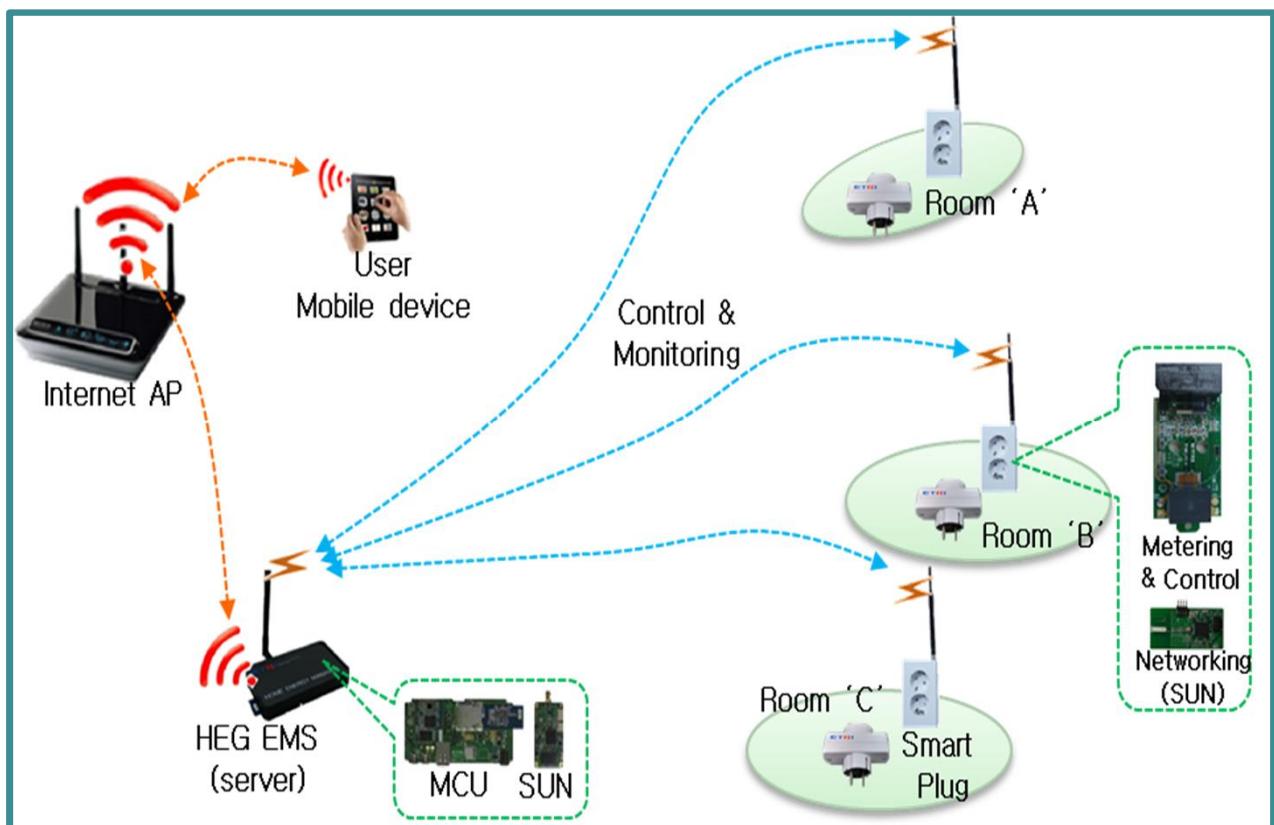
TECHNOLOGY BRIEF

Home Energy Grid (HEG) Hardware and Software Technology

Technology Overview

This smart grid technology, convergence of electric power technology and ICT technology, is designed to efficiently use electrical energy in Home Energy Grid (HEG) environment

- Smart Plug module to get electric power usage information and to control electric power per devices.
- Home Energy Grid energy management server system and mobile application software technology are included.



Keywords

Smart grid, Home Energy Grid (HEG), energy management system, smart plug

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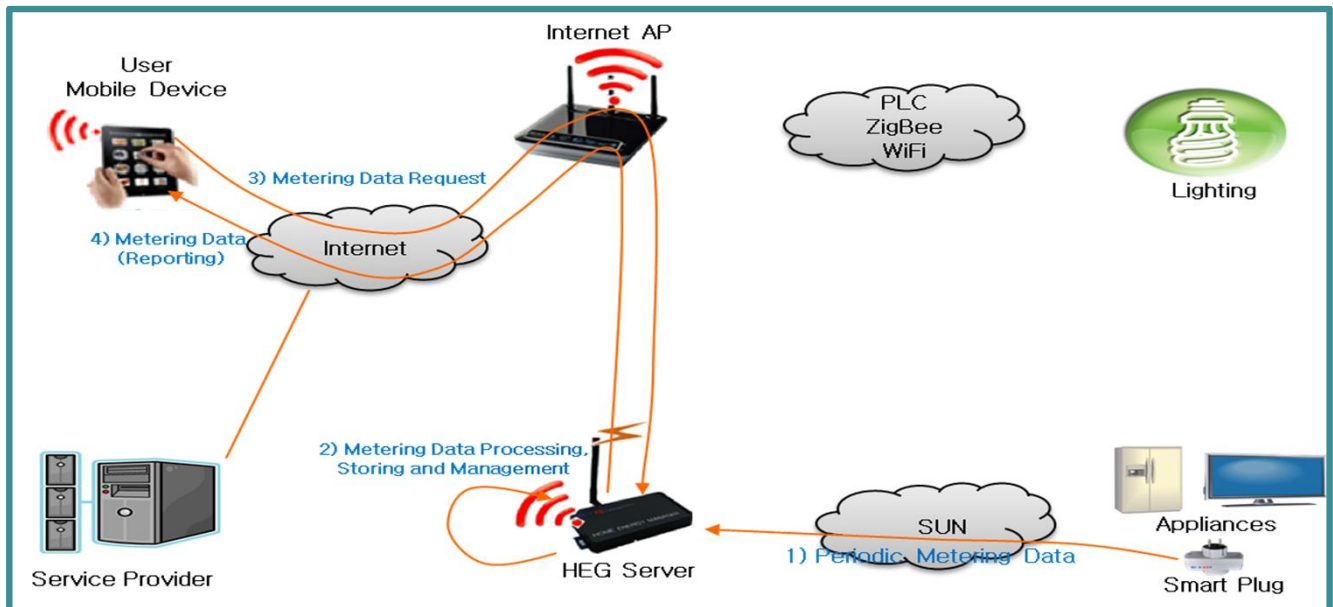
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Technical Classification Code		
Sector	Sub Sector	Industry
Creative Convergence	Energy ICT	Energy Consumption

TECHNOLOGY BRIEF

Home Energy Grid (HEG) Hardware and Software Technology

■ Technology Description



► Home Energy Grid (HEG) energy management system hardware technology

- Hardware technology for smart plug for HEG energy management system
- Control software for smart plug hardware in HEG energy management system
- Hardware technology for HEG energy management system server
- Control software for hardware on HEG energy management system server

► Home Energy Grid (HEG) energy management system software technology

- Application software technology for smart plug in HEG energy management system
- Application software technology for HEG energy management system server
- Mobile application software technology for HEG energy management services

■ Application Fields

► Energy management system

- Home energy management system
- Home energy management system for residential areas including apartments
- Development of building energy management system
- Smart plug for power metering and power control per device
- Smart grid for electric energy management

■ Outstanding Features

Low-power wireless network based energy management technology in Home Energy Grid environment with real-time monitoring and local/remote control

▶ Technology Characteristics

- Electric power energy consumption metering, collection and statistics per device
- Electric power supply/cut-off by control and management technology
- Include wireless personal area network hardware and device control technology
- Home energy management system and mobile application for user interface to provide smart energy service

▶ Competing/Replacement Technology

- Real-time electric power metering per device based on low-power wireless network
- Home energy management software technology for improved hardware and user-oriented control

■ IPR Status

2 Korea patent applied

■ Technology Trend

□ Korea

- Provide built-in home network service to new apartment areas by large construction companies
- Home gateway products are leading world market, whereas home server products involving various services are weak
- Development of smart grid energy management system 'Energle' by using Open XML (Extended Markup Language) platform (Byucksan Power)

□ Global

- As market for smart meter-related peripheral devices, such as IHD and Wallpad, is growing, related companies are participating in the market
- Researching and developing "Smart Watts" program for energy-optimization for home appliances (Siemens)
- Focusing on interoperability with smart devices and smart appliances via smart TV (Google, Apple)
- Announced "Android at Home", smart framework that extends android platform to smart home and smart appliances (Google)

■ Market Trend

- **Home energy management technology is a high growing industry in the world market, expecting to have high impact on various industries such as home network, smart grid, renewable energy and electric vehicle industry, etc.**
- **Home energy management system is expected to grow to more than \$40.5 billion by 2018.**

Company	Key Trends
Freescall Semiconductor	Provides MPC8308, home energy manager reference platform, which is used for energy gateway production including ZigBee, wired and wireless LAN communications, etc.
Digi International	Provides ethernet and ZigBee, SEP1.0&1.1 and introduced smart energy gateway, ConnectPort®X2, which support connection with various companies' PCT (Programmable Communication Thermostat) and IHD
Belkin	Introduced 'Conserve Gateway', home energy gateway, in 2010, which has capability of connecting to smart meter via wireless and transmit energy usage information to specific website
Panasonic	SEG(Smart Energy Gateway): Provide home energy management and conservation by connecting to smart meters, gas meters, water meters, appliances, including renewable energy such as solar energy and fuel cell
Google	Power Meter solutions show electric usage every 15 minutes, which induce voluntary energy savings. Intel also introduced home dashboard concept. Microsoft also developed energy savings service, where user can compare average energy usage by simply entering zip code/ house size/ house built year
Netherlands companies such as Nuon, IBM, CISCO, etc	Performing energy management system with sample test of 500 houses, where user can control air-conditioning/heater through internet and mobile devices. It reduced 9% electricity and 14% gas.
Panasonic	With Denmark energy company, SEAS-NVE, it developed Lifinity Home Energy Management System and is currently expanding its area to smart grid industry

□ Market Leaders

▶ Global

- Google
- Siemens
- Apple
- Miele

▶ Korea

- Byuksan
- NURI Telecom
- Kocom

□ Technology Demand

Application	Home network/energy management business, end users
Industry	Home energy management system, home energy management server, smart plug, energy management mobile app

▣ Scope of Technology Transfer

▪ Technology Transfer Overview

- Home Energy Grid (HEG) energy management system smart plug hardware module and control technology
- Home Energy Grid (HEG) energy management system server hardware module and control technology

▪ Technology Transfer Scope

- Home Energy Grid (HEG) energy management system smart plug software technology
- Home Energy Grid (HEG) energy management system server software technology
- Home Energy Grid (HEG) energy management system mobile user interface app technology

▣ Applications and Effects

▶ Home energy management system

▶ Smart plug for home energy management system