Cisco Connected Grid:

Home Energy Management

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Cisco Smart Grid Vision – Connected Grid

Transform energy production, distribution and consumption using an end-to-end IP Platform to sustainably meet the world's future energy needs

- Architect end-to-end IP-based communications platform integrated with the power grid from generation to consumption

- Converge utility systems and processes across all key elements of the grid to increase grid intelligence and efficiency

- Deliver increased grid reliablity, resiliency, power quality and security

- Enable the Smart Grid to become a platform for energy service innovation
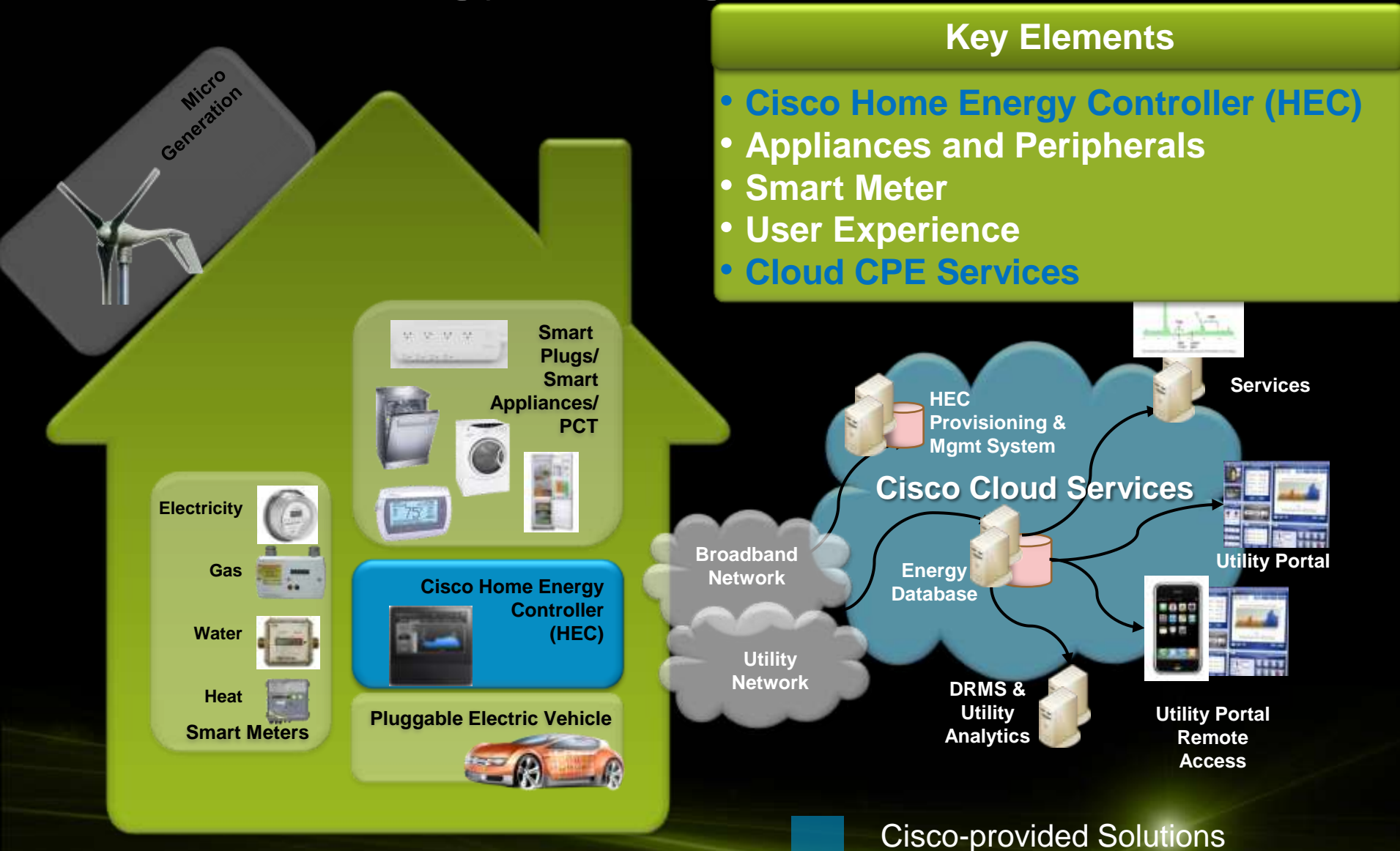
June Announcement:
Home Energy Management Solution

Home Energy Controller

- o Touch Screen Display with network interfaces
- o Energy Management Software for monitoring and control

Energy Management Services

- o Hosted software for provisioning and management, data storage and 3rd party interface

Home Energy Management

Key Elements

- **Cisco Home Energy Controller (HEC)**
- **Appliances and Peripherals**
- **Smart Meter**
- **User Experience**
- **Cloud CPE Services**

Micro Generation

Smart Plugs/ Smart Appliances/ PCT

Electricity

Gas

Water

Heat

Smart Meters

Cisco Home Energy Controller (HEC)

Pluggable Electric Vehicle

Broadband Network

Utility Network

HEC Provisioning & Mgmt System

Cisco Cloud Services

Energy Database

Services

Utility Portal

DRMS & Utility Analytics

Utility Portal Remote Access

Cisco-provided Solutions

Cisco Home Energy Controller
Home Energy Management Solution

LCD Display
Capacitive-touch
Active matrix LCD panel
Glass surface
800×480 24-bit WVGA resolution
Full color with backlighting

Memory
1-2 GB Flash memory
512 MB DRAM

CPU
1.1 GHz Hyperthreaded Atom

Peripheral Connectors
USB 2.0 host port

Design Elements
Thin chassis
Thin bezel
High-quality construction

Network Connections
10/100/1000 Mbps ethernet
Wifi, Zigbee, ERT radio interface
802.11b/g/n Wi-Fi with WMM Quality of
Service support

Cisco Energy Management Services
Home Energy Management Solution

Management and Provisioning

- **Registration of consumer device**
- **Custom Builds for Groups of devices**
- **Firmware/Software push to devices**
- **Ongoing Heartbeat messaging with devices**

3rd party interface

- **Open API's for integration with utility back end and 3rd party software (ex DR analytics, Utility Portals, etc)**

Home Energy Management
Consumer Energy Monitoring Functions

Energy Consumption and Cost Monitoring

- **Real Time Energy Consumption**
- **Historical Energy Consumption**
- **Individual Appliance Energy Consumption**

Appliance Monitoring and Control

- **Control HVAC System via PCT**
- **Control Smart Appliances & Smart Plugs**
- **Scheduling mode (Day/night/away)**
- **Scene mode (home/away/vacation/etc)**

Consumer Portal

- **Predicted Energy Costs**
- **Peer Group Energy Comparisons**
- **Energy Savings Tips**
- **Remote Access User interface and Device information**

Home Energy Management
Utility Monitoring Functions

Cloud-Based Management Environment

- **Device Configuration**
- **Remote Management of Device (software upgrades)**
- **Analytics Engine**
- **Point of Integration with Utility Back End Systems**

Demand Response and Demand Side Management

- **Receive and React to Utility DR requests**
- **DR Mode Profile**
- **DR Over-ride**

Price based Demand Side Management

- **Receive Utility Price Signals**
- **React to a Utility Pricing Event**

3rd Party B2B Feeds (Retail Energy Providers, Google, Microsoft)

HEC Provisioning & Mgmt System

Cisco Cloud Services

Energy Database

Utility Portal

DRMS & Utility Analytics

Consumer Portal & Analytics

Ecosystem Strategy

Peripherals

- o 3rd party device qualification
- o Thermostat, Load Control Module, Smart Plugs, Range Extenders, etc

Cloud Services

- o Open API's for 3rd party interface
- o DRMS, Billing, etc

Utility Trials

100 home pilot in NC and OH

Variety of Pricing and Incentives

Smart peripheral integration

Summer 2010

Cisco Connected Grid Solutions

High Reliability and Security

Operations Center

- Grid sensing and observability
- Data analytics and correlation across grid
- Increased transparency, controllability of the grid
- Wider participation in market operations

Data Center

- Data storage
- Regulatory compliance
- Data management
- Data analytics

Utility and Regional network

- Inter-utility network
- Intra-utility network
- Wide area measurement and control
- Integrated security
- Common management platform

Transmission and Substation Network

- Remote asset management and monitoring
- Conditions-based predictive maintenance and planning
- Optimize asset utilization
- Cyber/physical security
- High reliability

Field Area Network

- Scalability for smart meter deployments
- Flexible access for mesh, PLC, broadband, Wi-Fi
- Interoperability and control

Premise Area (HAN/BAN)

- Visibility—optimize energy usage
- Demand—Response
- Reduce cost
- Micro—generation (solar, wind) management
- Policy-based management

Cisco Connected Grid
Home Energy Management Solutions

A Simple, Multifunction Tool that Optimizes Energy Use

- **Lowers Energy Bills**
  - Supports Demand-Response
  - Supports Time-Based Pricing
  - Scheduling Mode Day/Night/Away
  - Scene Mode Home/Away/Vacation

- **Easy to Use**
  - Intuitive Interface
  - Touch Screen Controls

- **Multifunctional**
  - Control HVAC System
  - Control Smart Plugs & Appliances
  - Supports Many Apps

- **Provides Visibility**
  - Real Time Energy Use
  - Historical Energy Use
  - Individual Appliance Energy Consumption