Overview of Smart Grid Activities in Korea

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Korean Agency for Technology & Standards
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I. Introduction of KATS

1. About KATS

- Rooted in the National Constitution of the Republic of Korea
- National Member Body for ISO & IEC APLAC/ILAC MRA Signatory WTO/TBT Enquiry Point
- 127-Year History (since 1883)

2. Mission

**National Standards & Conformity System**
- Develop & Disseminate KS
- Operate Accreditation Bodies
- Establish Legal Metrology System

**Product Safety Control**
- Safety for Industrial Products, and Electrical Appliances

**International Cooperation**
- Coordinate and Participate in International Standardization Activities

**Support for Technology Innovation**
- Certification of New Excellent Product
- New Excellent Technology, Good Recycled Product, Excellent Service Quality Enterprise
I. Introduction of KATS

3. Organization

Ministry of Knowledge Economy

KATS

4 Bureaus (20 Divisions) : 221 Staffs

Bureau of Technology & Standards Policy
Bureau of Product Safety Policy
Bureau of Knowledge Industry Standards
Bureau of Conformity Policy

Energy & Environment Standards Division
New Convergence Technology Standards Division
Culture & Service Standards Division

Smart Grid Team
- Development of Standardization Policy
- Coordination of Standardization Activities
II. Smart Grid Roadmap

1. Concept of Korea Smart Grid Roadmap

- **(U.S.)** Based on **Components of Existing Power Grid**
  - 7 Domains (Generation - Transmission - Distribution - Customer – Market - Operation - Service)

- **(KOREA)** Based on **Business Areas**
  - 5 Domains (Power Grid - Consumer - Transport – Renewable - Service)
II. Smart Grid Roadmap

2. New Business Opportunities from Korea Smart Grid Platform

- Energy Control Equipment
- Energy Use Service / Consulting
- Intelligent Home Appliances / Digital Appliances
- Building Energy Efficiency Interior

- Renewable Energy Generation / Marketing
- Power Storage Equipment
- Micro Grid System Development

- Power System Vehicles Control Equipment
- Transmission / Transformation Intellectualization Equipment
- Smart Distribution Equipment
- DC Distribution / Application Equipment

- Battery Rent / Replacement
- Used Battery Marketing
- Electric Vehicles Remodeling
- Complex Personal Service Linked to Communication
- Electric Vehicles charging

Smart Grid Platform

- Smart Consumer
- Smart Renewable
- Smart Transport

Smart Electric Service

Smart Power Grid

Convergence of existing technologies

Electric Power Heavy Electric Machinery Information Technology Home Appliance
Vehicles Construction Energy Communication

- Power Wholesale / Retail / Resale
- Reserve Power Marketing
- Energy Financial Product Development & Investment
- Total Power Information Service
II. Smart Grid Roadmap

3. Vision & Goals by Phase

**Vision**

Low Carbon Green Growth through Smart Grid Development

**Goals by Phase**

- **World Class SG**
  - Pilot City
  - 2012

- **Consumer-centric**
  - Metropolitan Area SG
  - 2020

- **World’s First**
  - Nationwide SG
  - 2030

**5 Sectors**

- **Smart Power Grid**
  - Smart Power Grid based Technology Development

- **Smart Consumer**
  - AMI based Technology Development

- **Smart Transport**
  - Pilot City Charging Infra Development

- **Smart Renewable**
  - Smart Renewable Generation Platform Development & Demonstration

- **Smart Electric Service**
  - RTP & Real-Time Demand Responsive Operating System Development

- **World Class SG**
  - Urban Smart Power Grid Development

- **Consumer-centric**
  - AMI based System Establishment

- **World’s First**
  - V2G and VPP Technology Acquisition

- **Smart Renewable**
  - Smart Renewable Generation Linking Technology Acquisition

- **Smart Electric Service**
  - Smart Power Trading System Development

- **World Class SG**
  - Nationwide Smart Power Grid Operation

- **Consumer-centric**
  - AMI based Automatic Power Trading

- **World’s First**
  - EV and Charging Service Generalization

- **Smart Renewable**
  - Large Scale Smart Renewable Generation Supply Infra Development

- **Smart Electric Service**
  - Integrated Power Trading and Service Development
III. "Jeju" Island Test-Bed

1. Plan

- Initiated Test-Bed

- Selected Participating Consortia for Demonstration Project

- Initiate Integrated Operation (Connect TOC with each Consortia)

- Independent Power Grid

- Abundant Renewable Sources

- Island with World Natural Heritages

- Final Completion of the Project

2. Why Jeju?

- Seoul

- Gujwa-eup in Jeju
  (Area: 2,001 ft², Households: 6,000)

- 227 miles

- '08.12
- '09.12
- '11.6

- '09.12
- '08.12
- 2013 May
III. “Jeju” Island Test-Bed

3. Consortia Participating in Jeju Test-Bed

- Total: 207 Companies
- Investment: USD 231.8 M

- Smart Consumer
  - (96 Companies, USD 96.9 M)
  - Companies: SK telecom, KT, LG, KEPCO

- Smart Transport
  - (42 Companies, USD 48 M)
  - Companies: KEPCO, SK energy, GS

- Smart Renewable
  - (28 Companies, USD 40.7 M)
  - Companies: KEPCO, Hyundai, POSCO

- Smart Power Grid
  - (13 Companies, USD 29.8 M)
  - Companies: KEPCO

- Smart Electric Service
  - (28 Companies, USD 16.4 M)
  - Companies: KPX
IV. Smart Grid Standardization Activities

1. Legal Base: Smart Grid Stimulation Act(‘10.12)

**Background**

- Institute a foundation to ensure stability of Smart Grid commercialization
- Transcend current ordinance and institutional constraints
  - Current regulation on “Electricity Enterprise Act” restricts business convergence between electricity and IT
- Advocate converged business and infrastructure between electricity and IT

**Major items to be included in Act**

- R&D support (Article 10)
- Incentive to participating companies for Smart Grid (Article 14)
- Selection of Smart Grid city (Article 18)
- Technology verification and standardization (Article 15, 17)
- Accumulation of personal information for Smart Grid (Article 22)
- Ensuring information security for Smart Grid (Article 26)
IV. Smart Grid Standardization Activities

2. Standard Development Process

- KSGI Interoperability Verification Center
- Smart Grid Standardization Forum
- Specified Standard Research Institutes
- Collective Standards
- Infra Standards

Flowchart:
1. KATS Standardization Committee
2. Interoperability Study Group Coordinator
3. Jeju Test-Bed Consortium
4. KSGI
5. Smart Grid Standardization Forum

Numbers indicate the flow of activities and interactions between the entities.
IV. Smart Grid Standardization Activities

3. Smart Grid Standardization Forum (‘10.6)

- **Total**: 170 Committee members
  - Academia: 15 (9%), Industry: 107 (63%)
  - Institute: 36 (21%), Other: 12 (7%)

**Committee**
- Policy
- Smart Consumer
- Smart Transport
- Smart Renewable
- Smart Power Grid
- Smart Electric Service

**Working Group**
- Roadmap
- Smart Meter
- DR
- Renewable
- Transport
- Interoperability
- Charging
- ICT
- Test & certification
- Generation Source
- Transformation
- SRMS
- Storage Device
- Interoperability
- Connection

**Management Board**

**Secretariat**
(Korea Smart Grid Association)
4. International Cooperation with Leading Partners

- Ensuring Global Interoperability of Smart Grid Technologies and Standards
  - Participate in SGIP & IEC/IEEE/JTC 1 WGs
  - Operate ‘Joint Forum’ with NIST
  - Host ‘Joint Workshop’ with IEEE
  - Host Biennial ‘Joint Workshop’ with UTE
  - Host ‘Joint Workshop’ with DKE
  - Cooperate in CJK-SITE (China, Japan, Korea)

The More, The Better
2030 Nationwide Smart Grid Future

Electricity Market
- power exchange using various renewable energy sources and storage system
- CO2 emission trading scheme
- Hub of the Northeast Asia in power transmission

Micro Grid
- Operation of Micro Grid based on renewable energy sources and storage system
- Expansion of Consumer’s options to use energy

Smart Home/Building
- Intelligent control of Energy consumption in buildings through AMI
- Bi-directional energy trading
- Zero Energy house

Electric Vehicle
- Commercial vehicles and coastal ship operated by electricity
- Easy access to EV charging services
- New business on battery disposal and recharging

Total Operation Center
- Integrated Operation of total power grid
- Analysis and prediction of power demands
- Interconnection between consumption and supply sources

Main Grid
- Large Scale Energy Generation cluster
- Renewable energy sources such as wind, solar, etc

Electric Ship
- Self recovery system for stable supply

Satellite
- Hub of the Northeast Asia in power transmission

Load Switch
- Gas/Water Meter
- Smart Thermostat
- Smart Appliance
- Micro Generator
- Home Server
- Energy Display
Thank You

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