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Session 2: Energy Efficiency Technologies Applicable to South Africa

Hitachi's Energy Efficiency Technologies in Smart Cities

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1. Social “Innovation” Businesses
2. Hitachi’s Concept of “Smart City”
3. Energy Efficiency Technologies Applied in Smart Cities
4. Examples of Current Projects

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Social “Innovation” Businesses

1.1 Corporate Foundation

1.2 Infrastructure Systems Business

1.3 Social Infrastructure Desired

1.1 Corporate Foundation

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- Hitachi was founded in 1910 as a machine repair shop at Kuhara Cupper Mining Company in Hitachi City, Ibaraki Prefecture, Japan
- Mine development requires building of houses for employees, schools, hospitals and infrastructure to support the life of the residents.
- Hitachi has been deeply involved into urban development since its very foundation, and has contributed the development of infrastructure of Japan throughout its history of 101 years.

Corporate credo: Contribute to society through the development of superior, original technologies and products

Hitachi founding spirit: Harmony, Sincerity and Pioneering Spirit

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Business Concept

Hitachi drives the business in social infrastructure systems characterized by the integration with highly efficient and highly reliable ICT, which Hitachi calls "Social Innovation Business"

Social Innovation Business

Solutions and services
- Optimize operation and management of social infrastructure

Engineering
- Integrate information and control systems and plant facilities

Core components
- Lead in energy saving, resource saving and materials innovation

1.3 Social Infrastructure Desired

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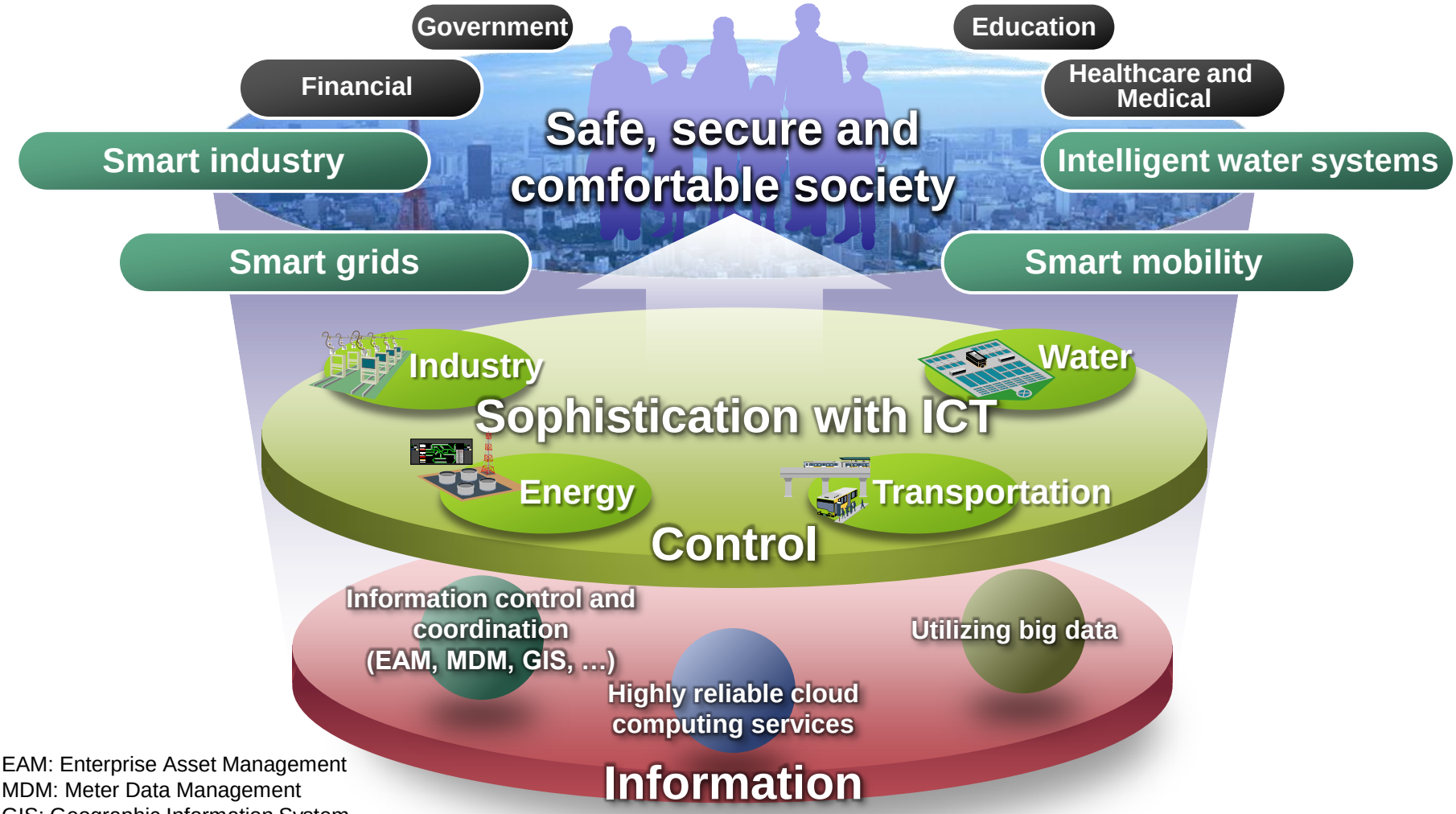
Ecologically friendly, safe, secure and comfortable

- By the fusion of knowledge and experience in information, control and infrastructure business -



EAM: Enterprise Asset Management
MDM: Meter Data Management
GIS: Geographic Information System

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Hitachi's Concept of "Smart City"

2.1 Infrastructures to Support Smart Cities
2.2 Basic Model of City Management System
2.3 Layer Structure of Energy Management
2.4 Layer Structure of Intelligent Water
2.5 Layer Structure of Smart Mobility
2.6 City Management Infrastructure

2.1 Infrastructures to Support Smart Cities

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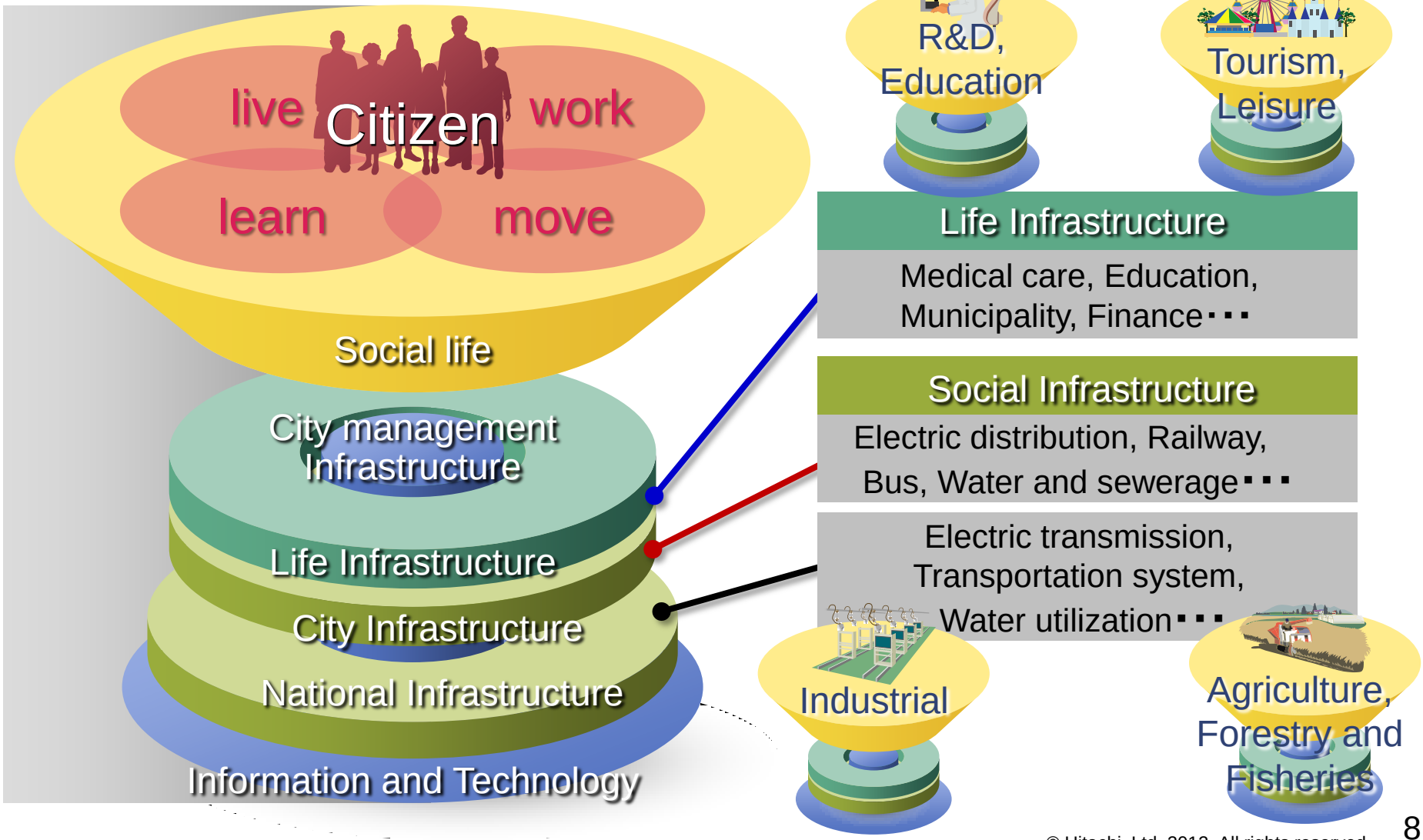
- Infrastructures harmoniously support social life from the wide area to the neighborhood.



2.2 Basic Model of City Management System

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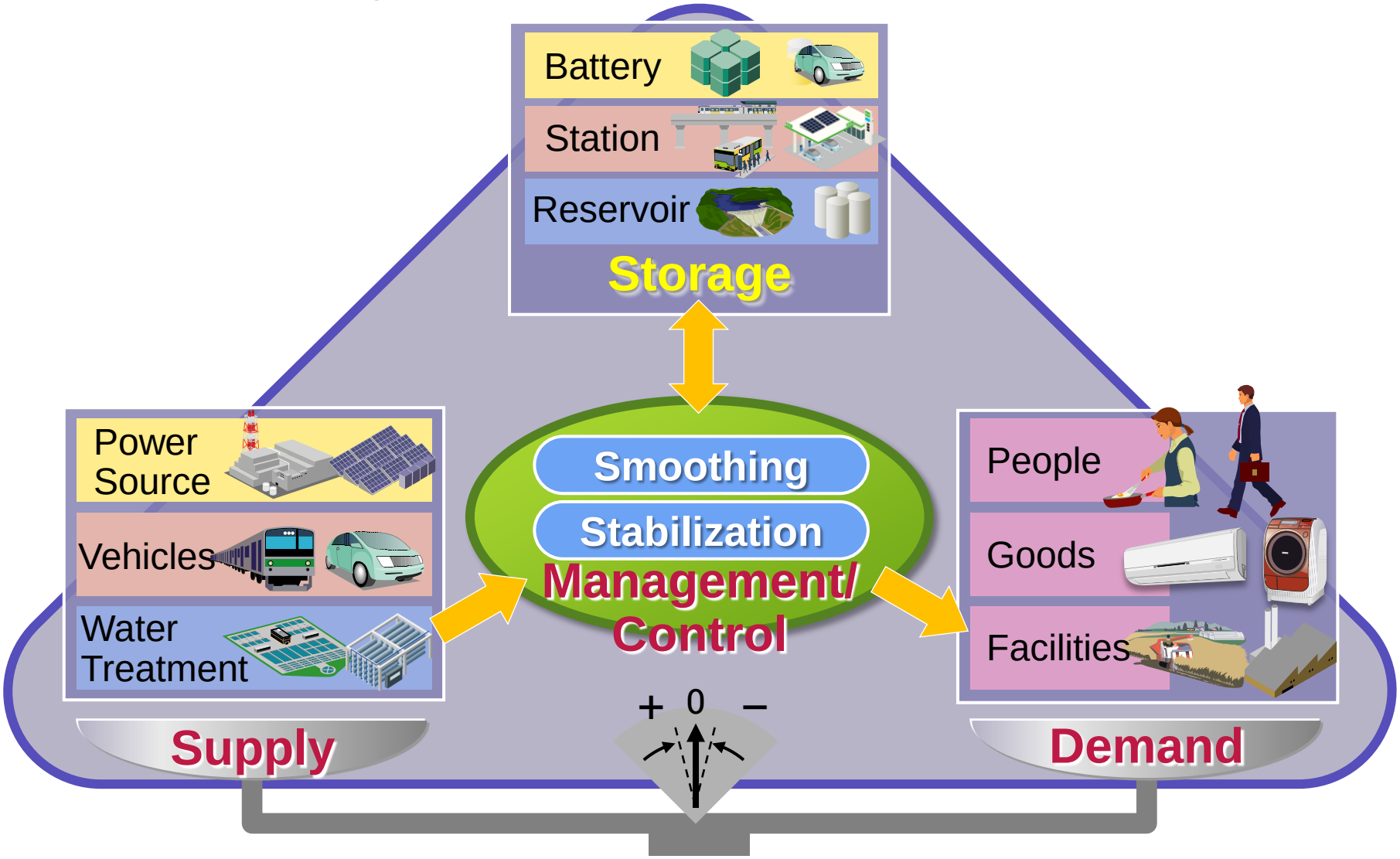
- Every urban infrastructure is composed of the **supply side** and the **demand side**, and the **storage** function to balance supply/demand in between.



2.3 Layer Structure of Energy Management

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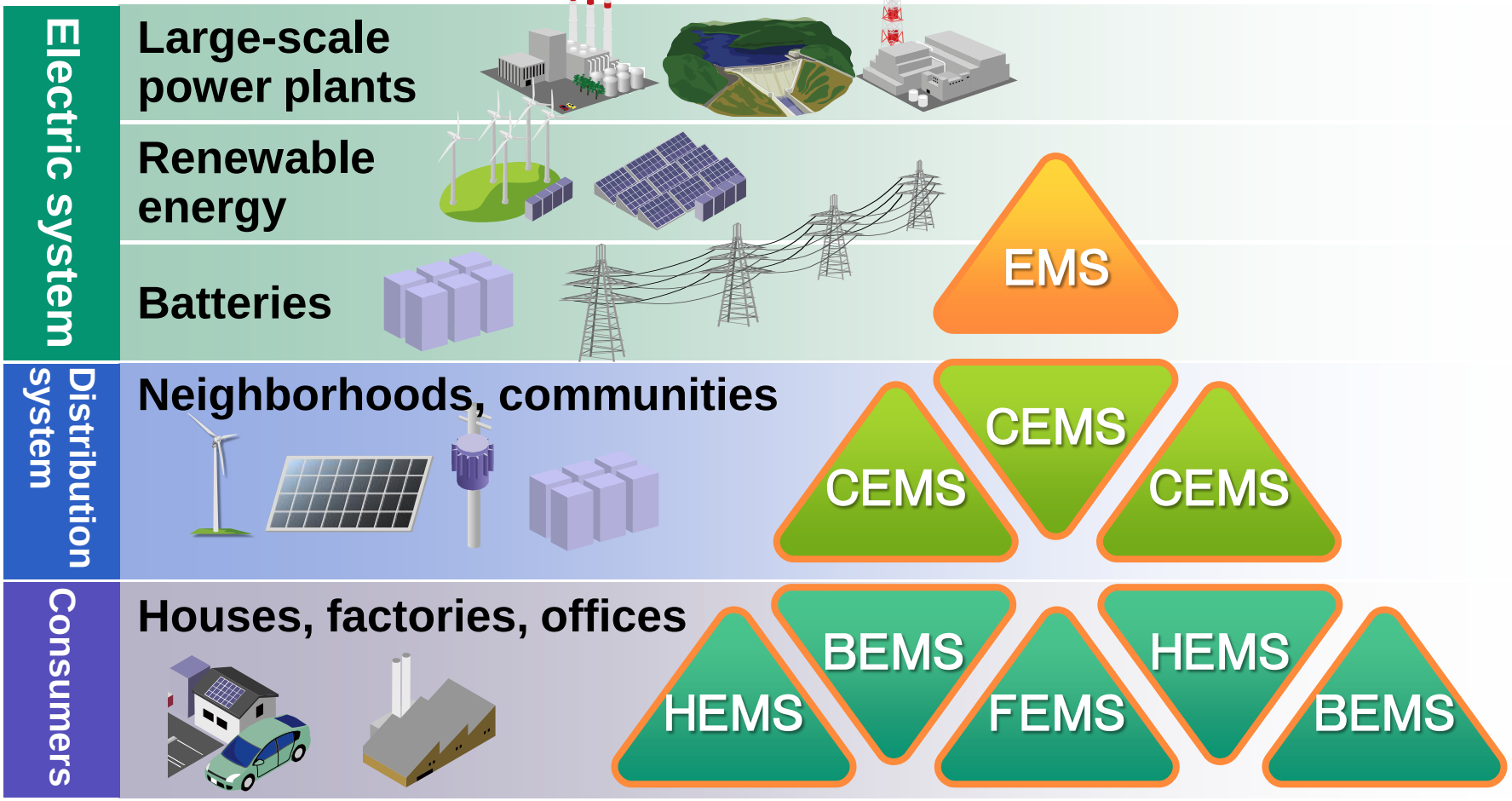
- Smart communities and smart grids are composed by combination of unit systems, shown in the previous page.



Minimization of social cost depending on regional features.

EMS: Energy Management System CEMS: Community Energy Management System HEMS: Home Energy Management System
BEMS: Building Energy Management System FEMS: Factory Energy Management System

2.4 Layer Structure of Intelligent Water

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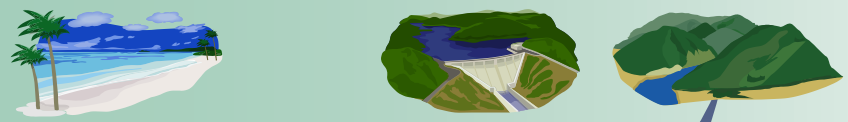
Inter-city

River water, sea water, groundwater



Water basin management

River and water utilization management

Intra-region

Municipalities, regional water operators

Desalination

Water supply control

Water purification

Water recycling

Sewage treatment

Users

Homes, factories, offices

Water supply & sewage management

Water supply & sewage management

Water supply & sewage management

Water saving management

Water saving management

Supply of water of different levels of quality, based on the needs and circumstances

2.5 Layer Structure of Smart Mobility

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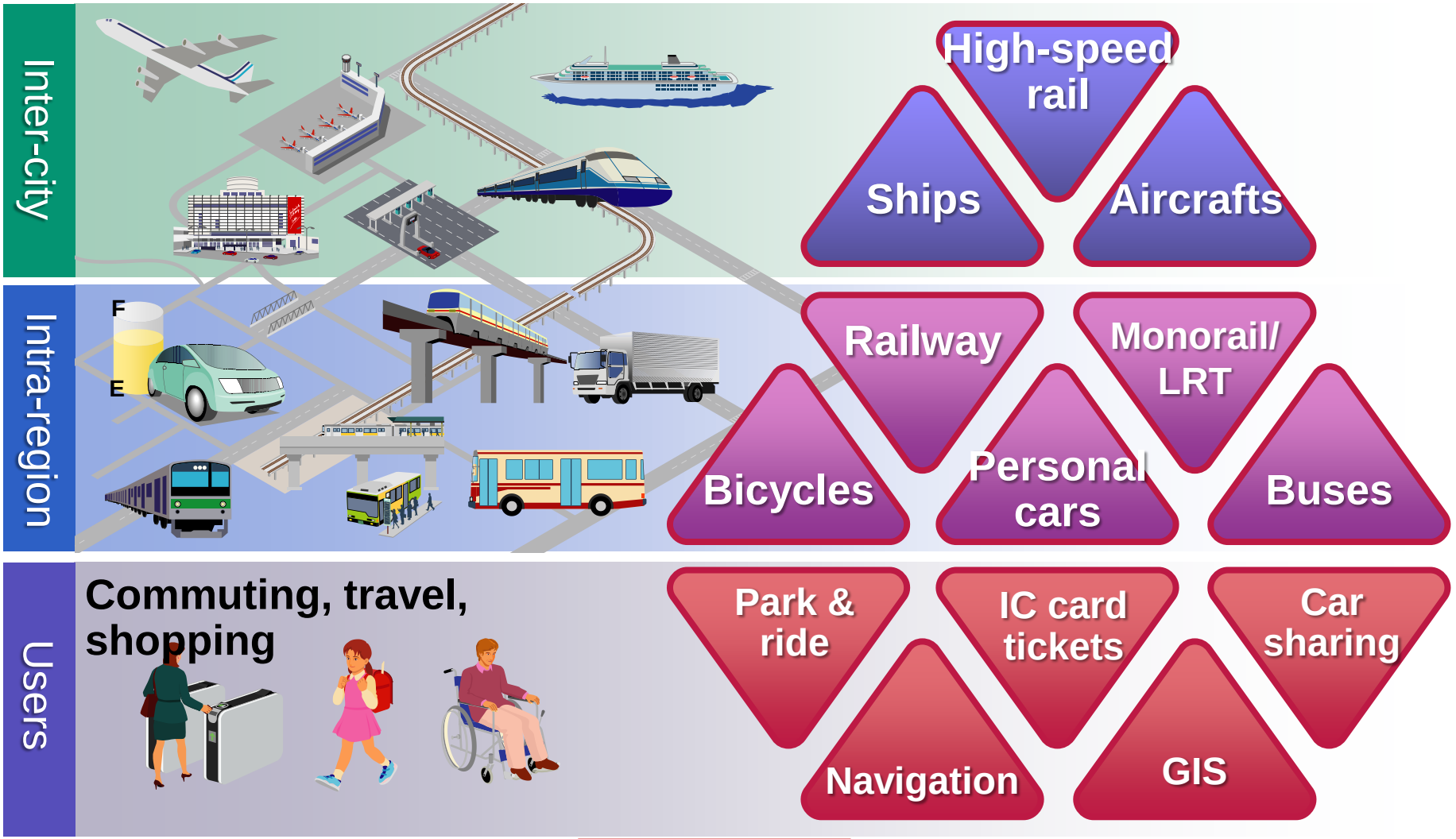
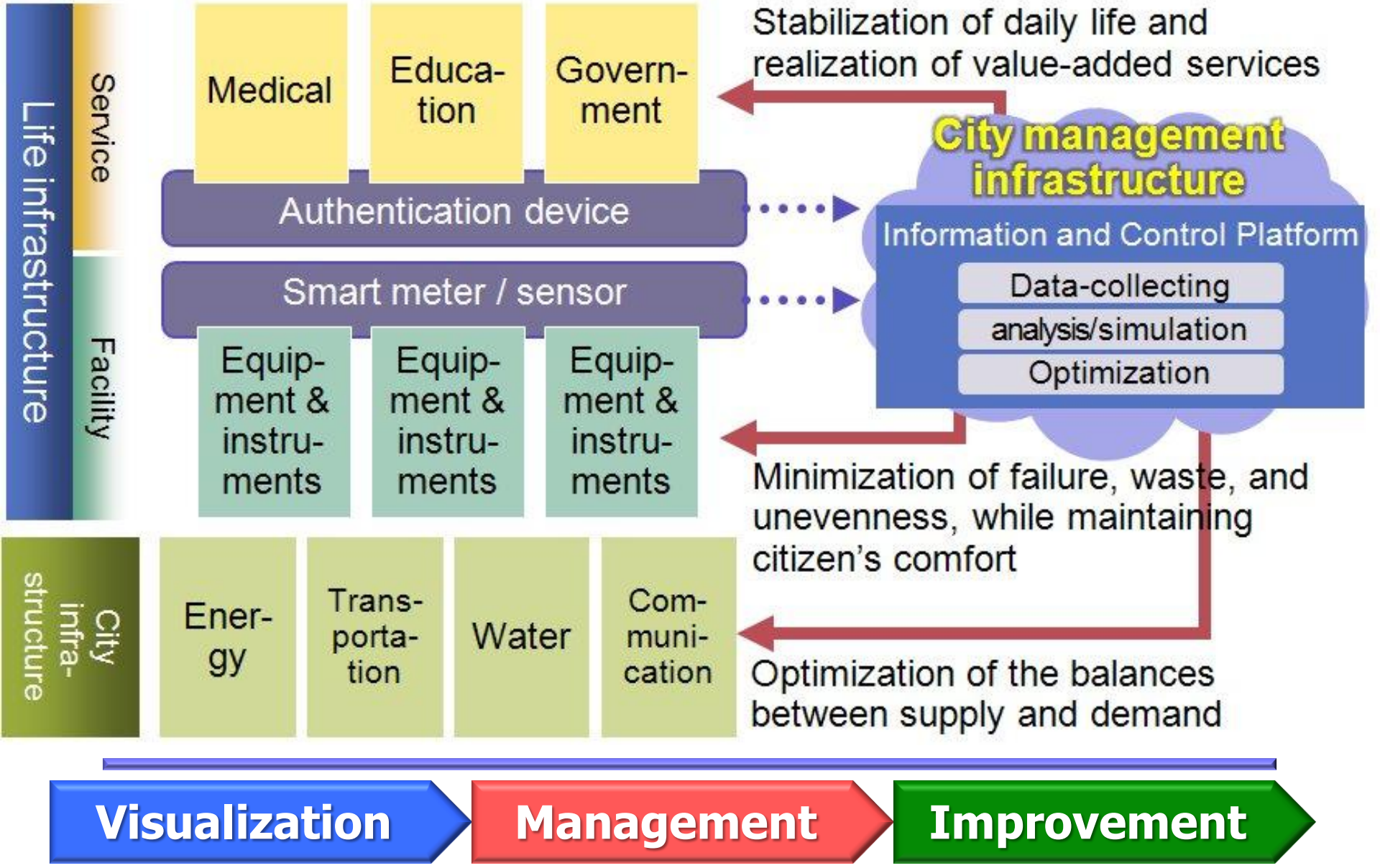


Autonomous configuration of optimum routes by linking different modals of mobility depending on demands and traffic situations

LRT: Light Rail Transit

2.6 City management infrastructure



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Energy Efficiency Technologies Applied in Smart Cities

3.1 Smart Grid
3.2 Home Energy Management Systems
3.3 Community Energy Management Systems
3.4 Smart Mobility (1) – EV Utilities
3.5 Smart Mobility (2) – Traffic Hub Solutions

3.1 Smart Grid

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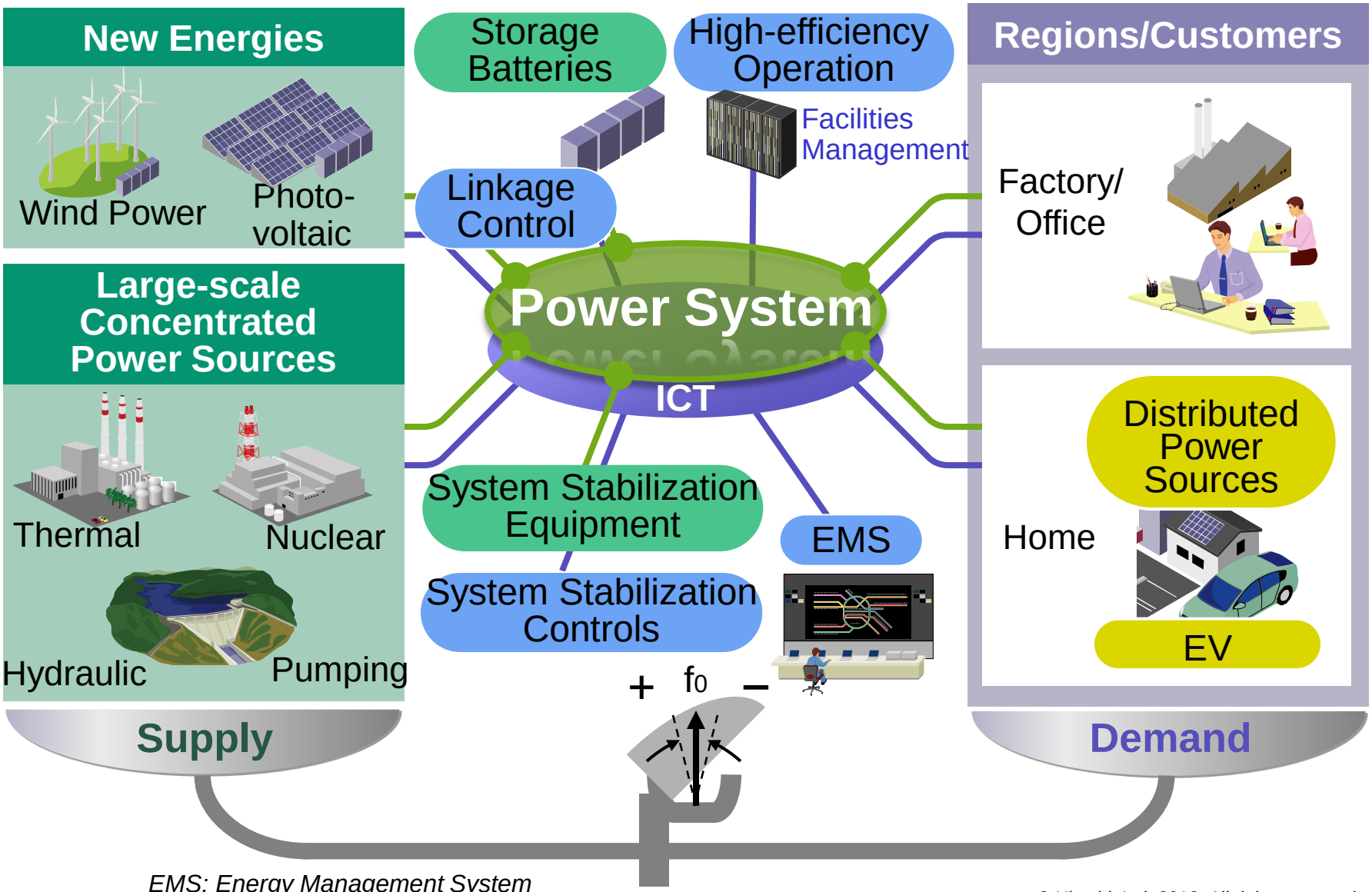
- Providing low-carbon, high-quality, economical power



EMS: Energy Management System

3.2 Home Energy Management System

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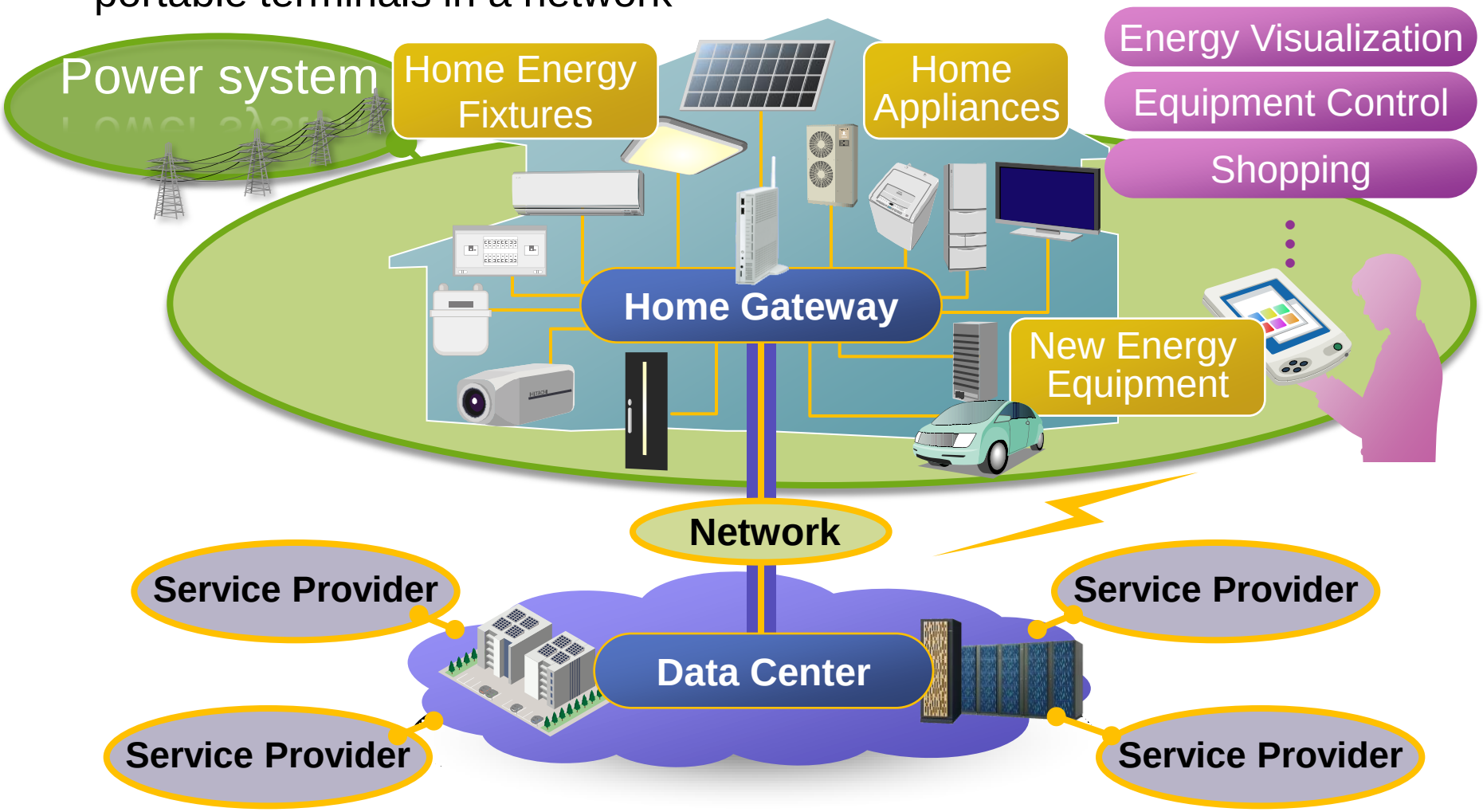
- Achieve a comfortable, ecological lifestyle by using data and linking electrical appliances, home energy fixtures, new energy equipment and portable terminals in a network



3.3 Community Energy Management System

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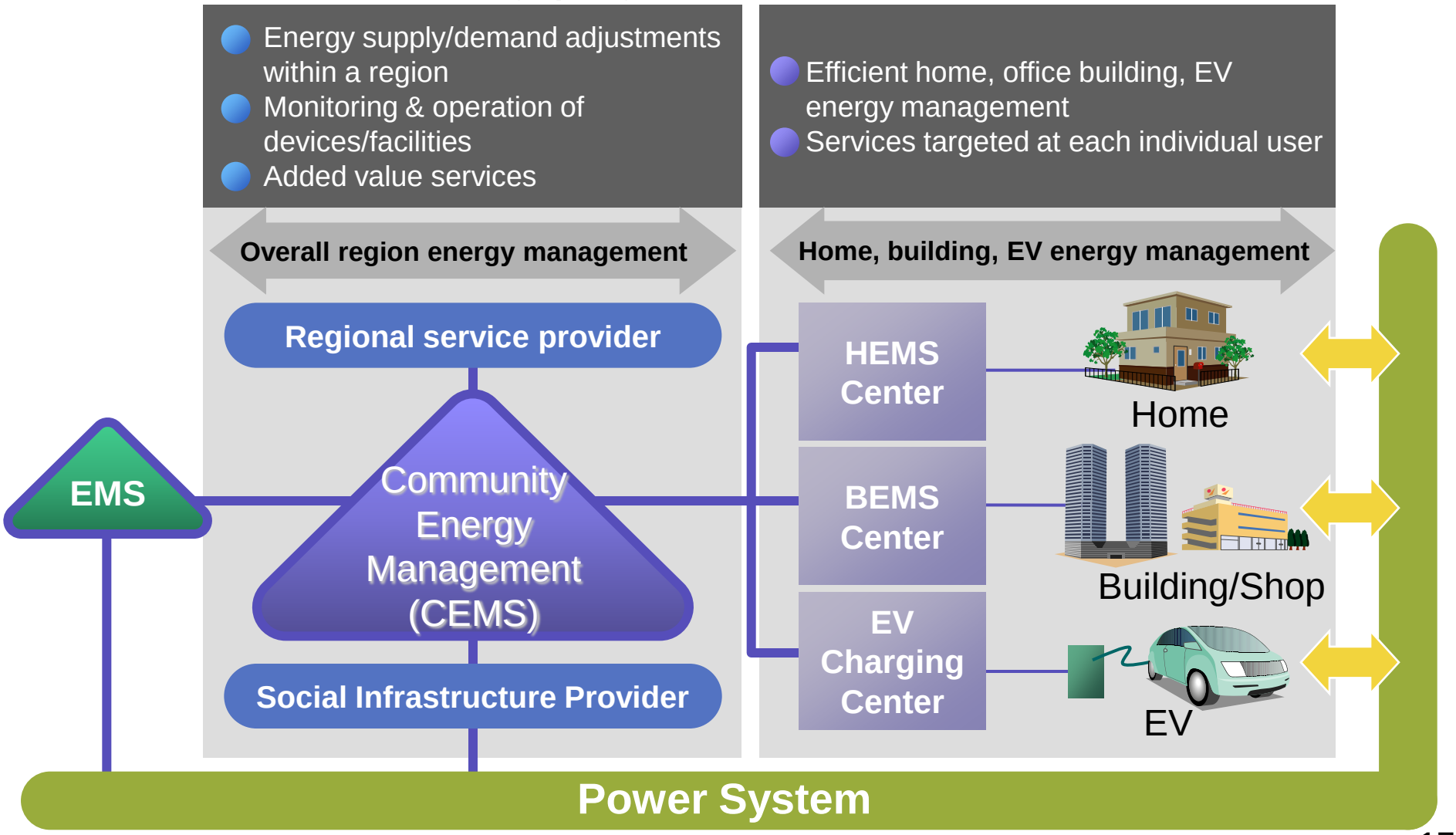
- Contributes to the building of a Smart Grid via undertakings such as the Eco-City project



3.4 Smart Mobility (1) - EV Utilities

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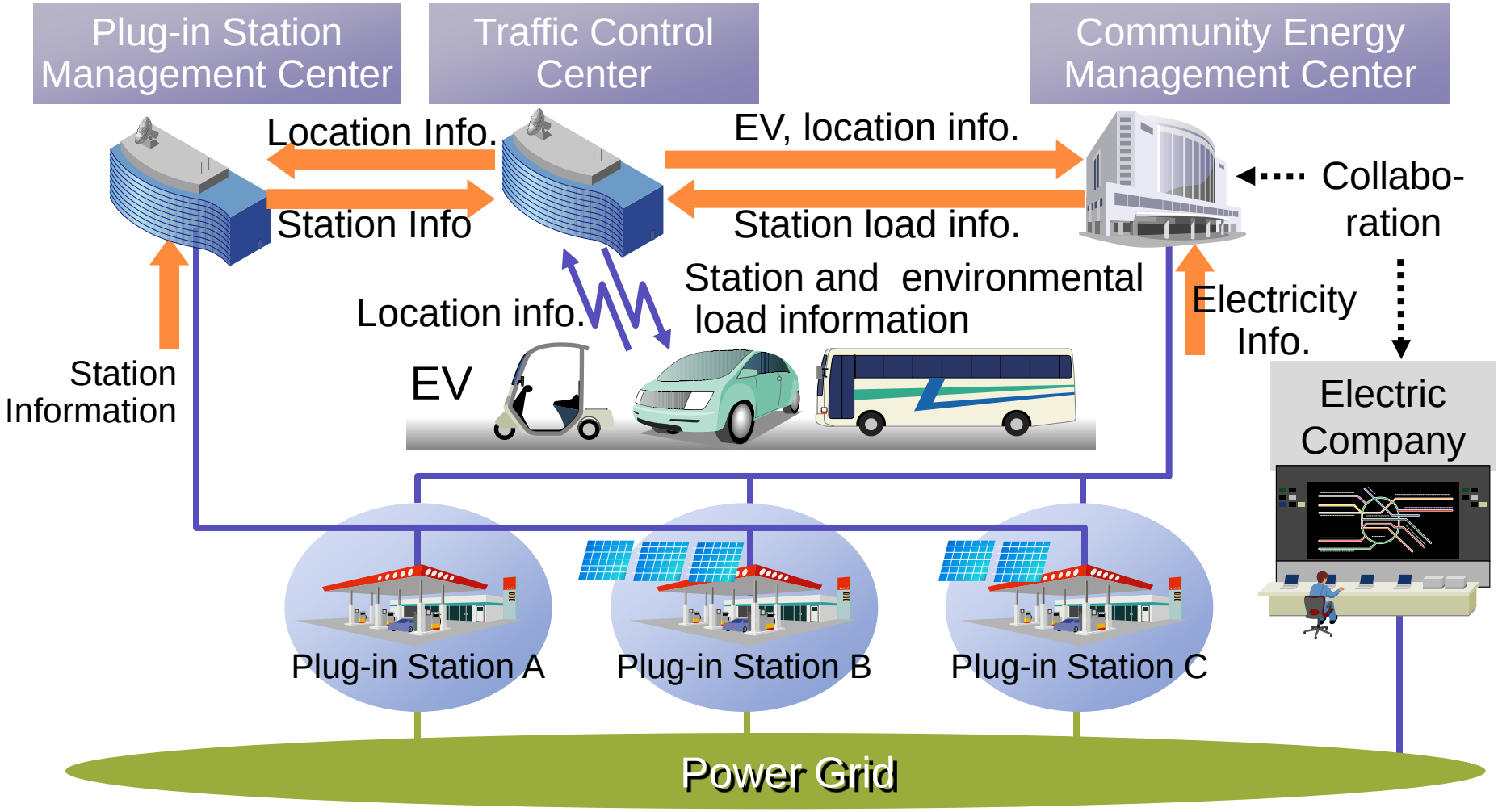
- Manage EV's operation and battery charge by car location information and local demand for electricity to reduce environmental load.



EV : Electric Vehicle

3.5 Smart Mobility (2) - Traffic Hub Solutions

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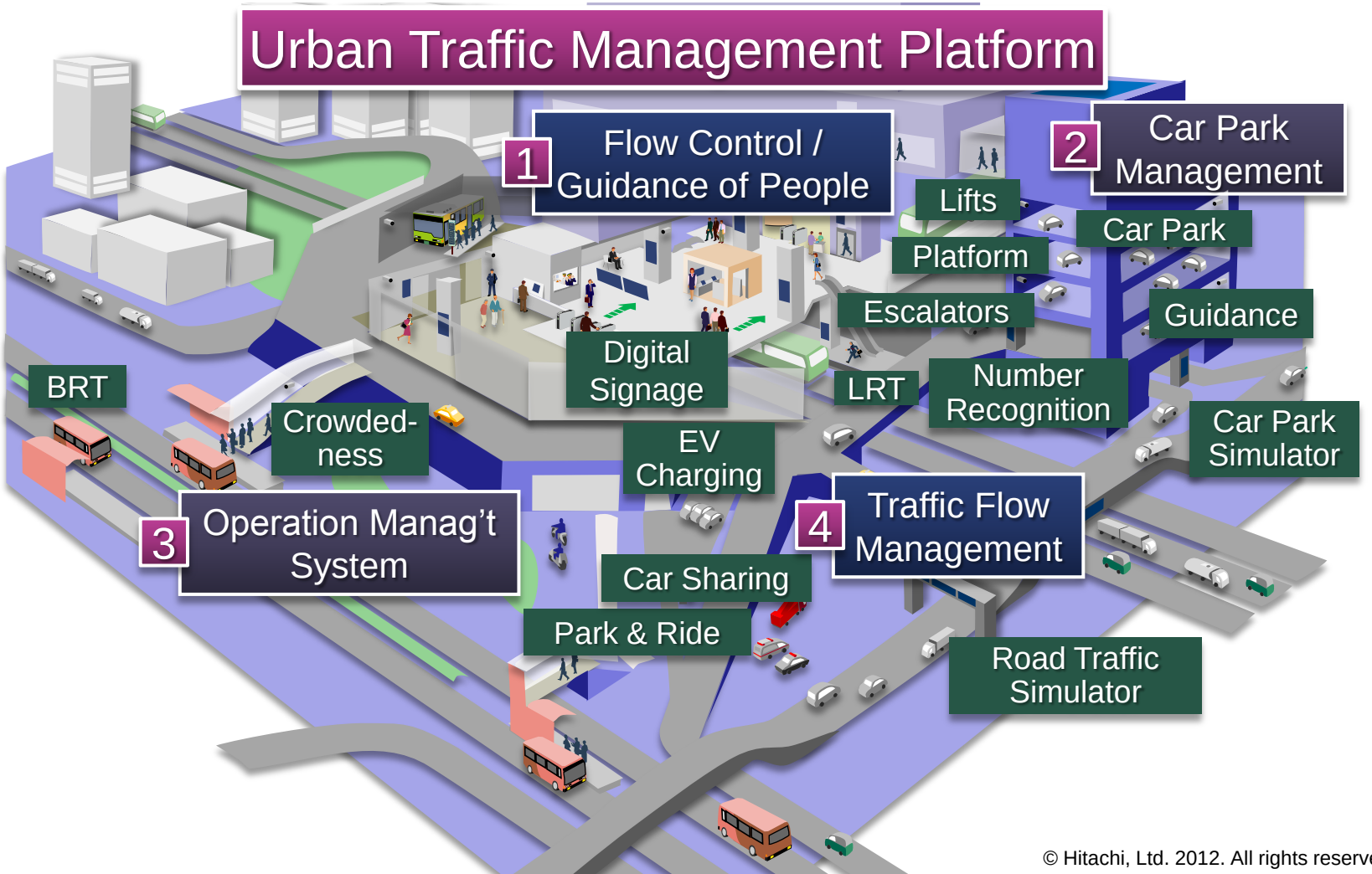
- Four solutions (1 - 4 in diagram below) in and around the station and car park, and an urban traffic management platform to combine them
- Urban traffic management on the balance of public transport and individual cars ensures sustainable development of the city and the comfort of the people.



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Examples of Current Projects

4.1 Global Deployment

4.2 Kashiwa-No-Ha Campus City, Japan

4.3 Tianjin Eco-city

4.4 Zero Emission Mobility City in Spain

4.1 Global Deployment

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Establishment of low-carbon environment-friendly infra-structure in Dahej, Gujarat, India

Conducting a feasibility study on the smart community business model and development plan.

Construction of Guangzhou Knowledge City

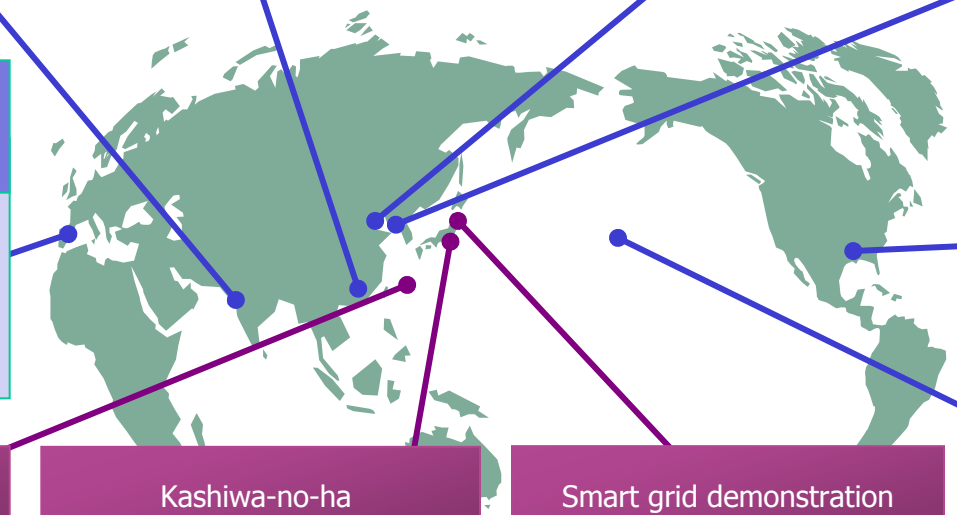
Joint project by China's Guangzhou gov and Singapore Hitachi is the first company except for China & Singapore to participate.

Tianjin Eco-City construction of model environmentally conscious city

Aiming for realization of information control platform and construction of open platform of global standard.

Dalian resources recycling and low carbon economy

Supported by National Develop-ment and Reform Commission (NDRC).
Discussion ongoing on smart grid, water treatment, and electric appliance recycling



Smart Community System Demonstration Project in Malaga-city, Andalucía, in southern Spain

Started development of control-ICT platform which enables combination of creating EV infrastructure and electric power system as one of the large scale feasibility study of NEDO.

Smart grid demonstration in New Mexico

Aiming at realization of smart platform of power equipment in NEDO's smart grid demonstration in Los Alamos.

Provision of infrastructure for EV use in Okinawa operation of EV charging management systems

AEC adopted Hitachi's EV charging management system implemented in Okinawa and went live in Feb. 2011.

Kashiwa-no-ha Smart City Project

Aiming for establishment of five "Social Systems" such as a distributed power system and Area Energy Management System to create the Next-Generation Environmentally City.

Smart grid demonstration site in Rokkasho Village

Conducting feasibility study of residency type smart grid only using wind and photovoltaic energies. Also conducting feasibility study of basic technologies aiming at effective utilization.

World-leading remote island smart grid demonstration project in Maui, Hawaii

Developed most-advanced and remote-island type smart grid system as one of the large scale feasibility study of NEDO.(A part of technical cooperation of clean energy of Japan and the United States)

EV: Electric Vehicle

4.2-1 Kashiwa-No-Ha Campus City, Japan

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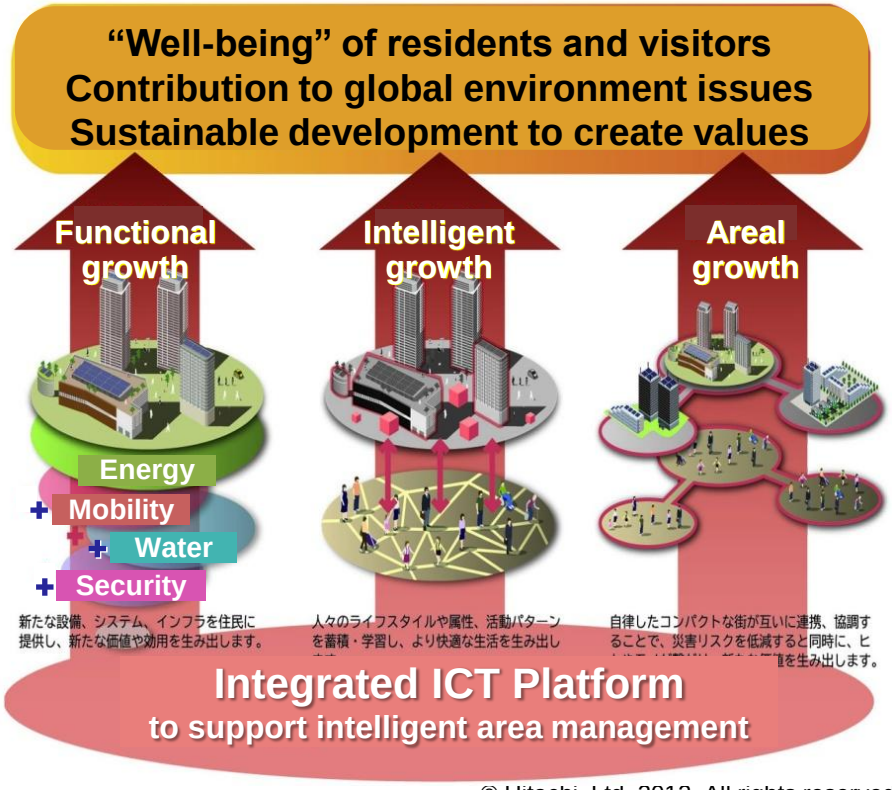
- A model of city management infrastructure, which grows along with the growth of the city and residents.

Natural symbiosis × **Technology** × **Community**

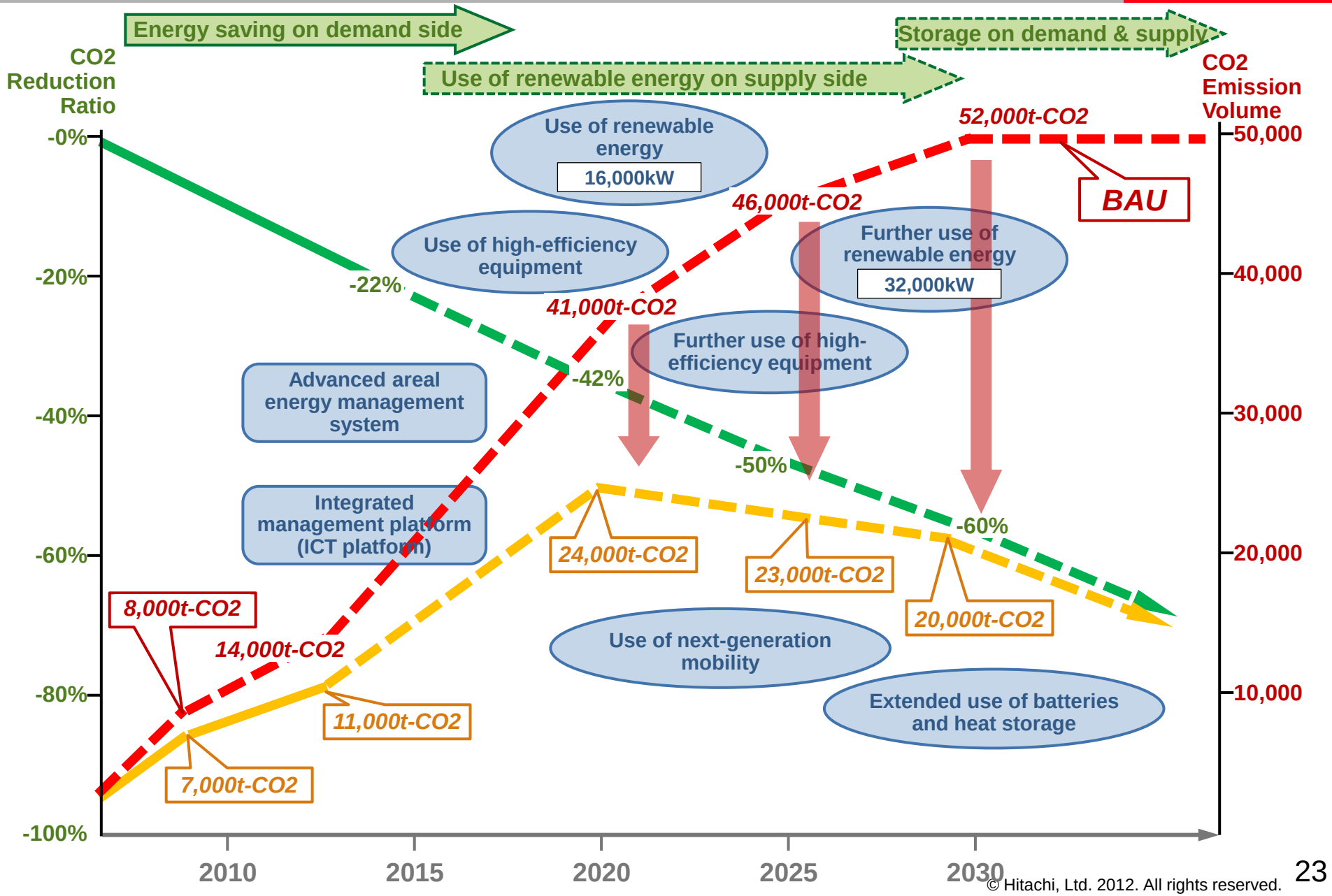
City planning to live in coexistence with nature
rooftop gardening, biotope etc.

Technology to create energy
Technology to use energy
Technology to manage and optimize energy

Proposal of living



4.2-2 Kashiwa-No-Ha Campus City, Roadmap



4.3 Tianjin Eco-City, China

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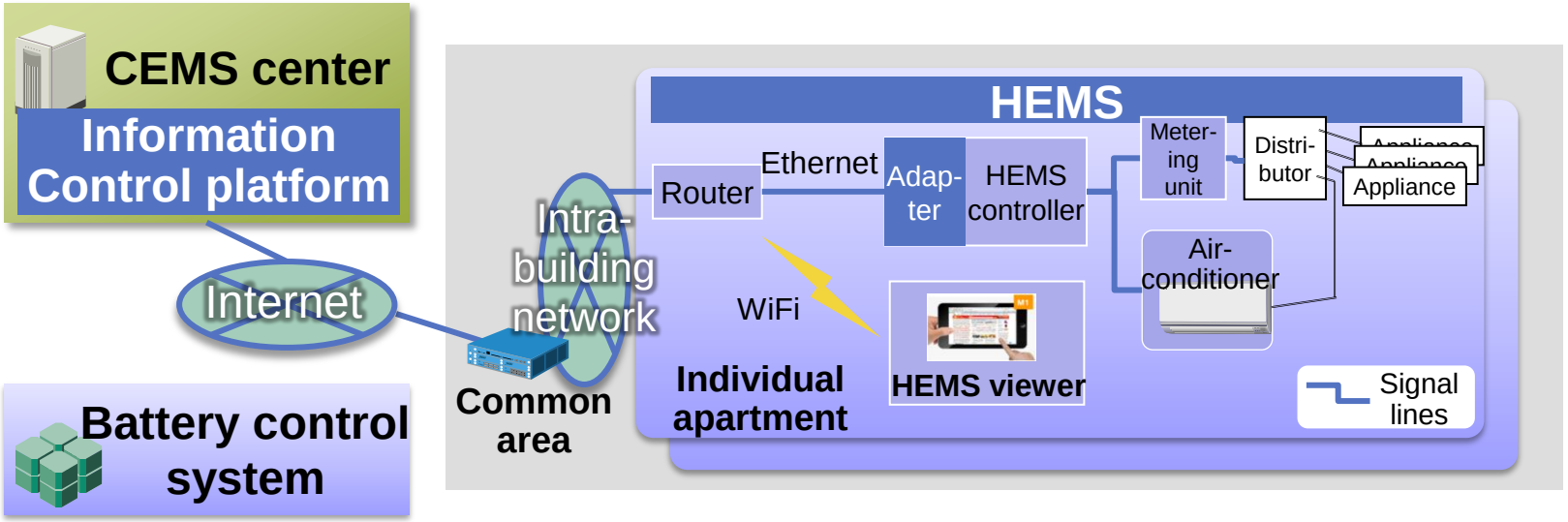
- Urban growth model that is “copiable”, “executable” and “deployable”



4.4 Zero Emission Mobility City in Spain

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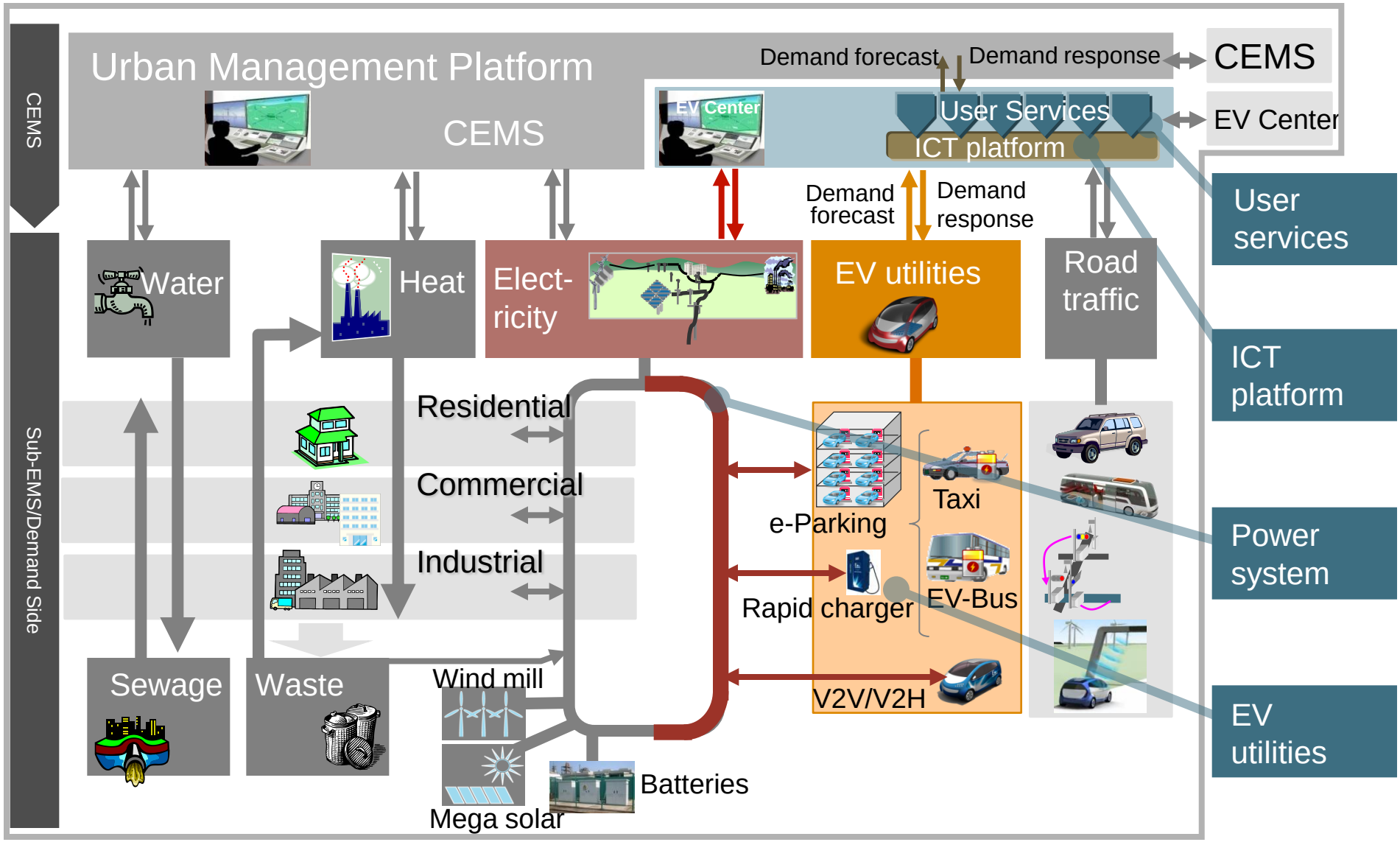


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