Pilot Cases for SMART ENERGY PROJECT

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SMART

SMART INDUSTRIES

S M A R T

FARM

FACTORY

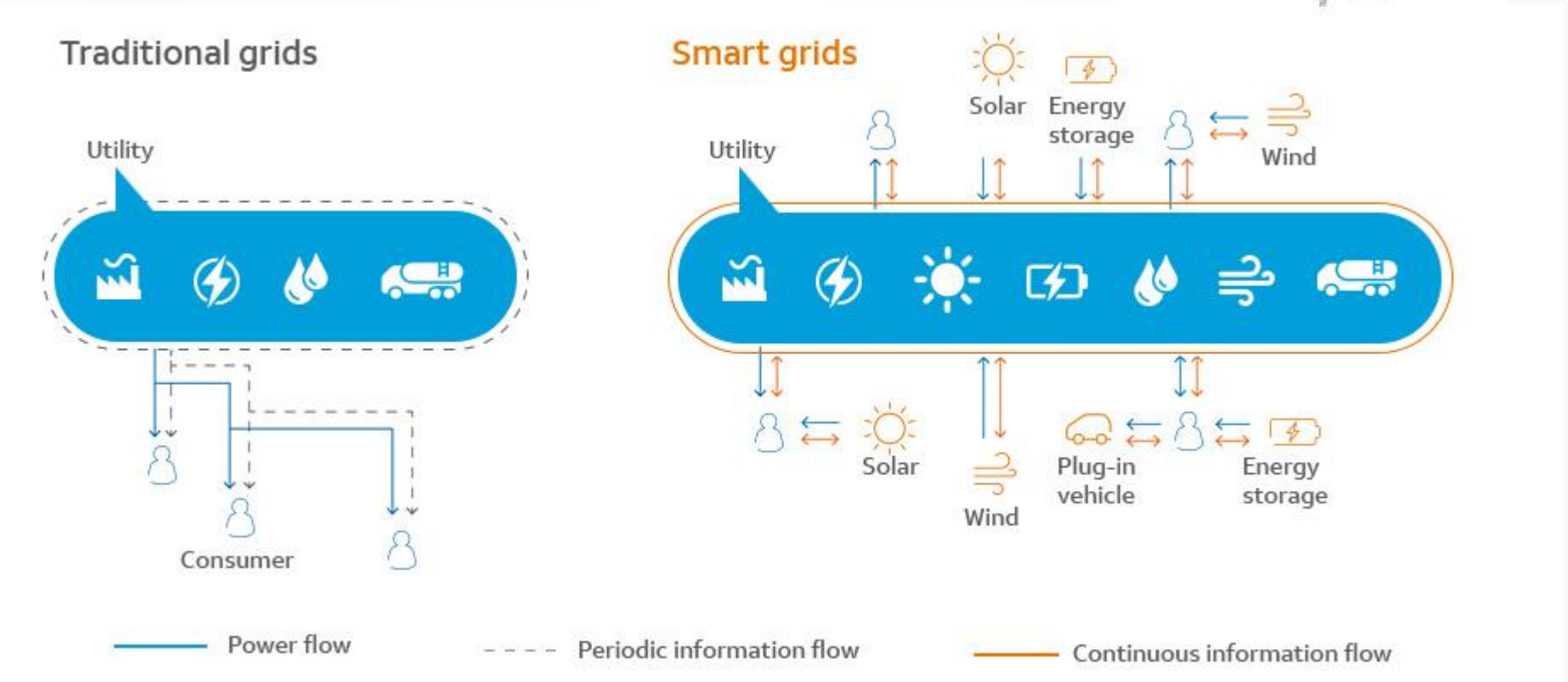
GRID

CITY

. . .

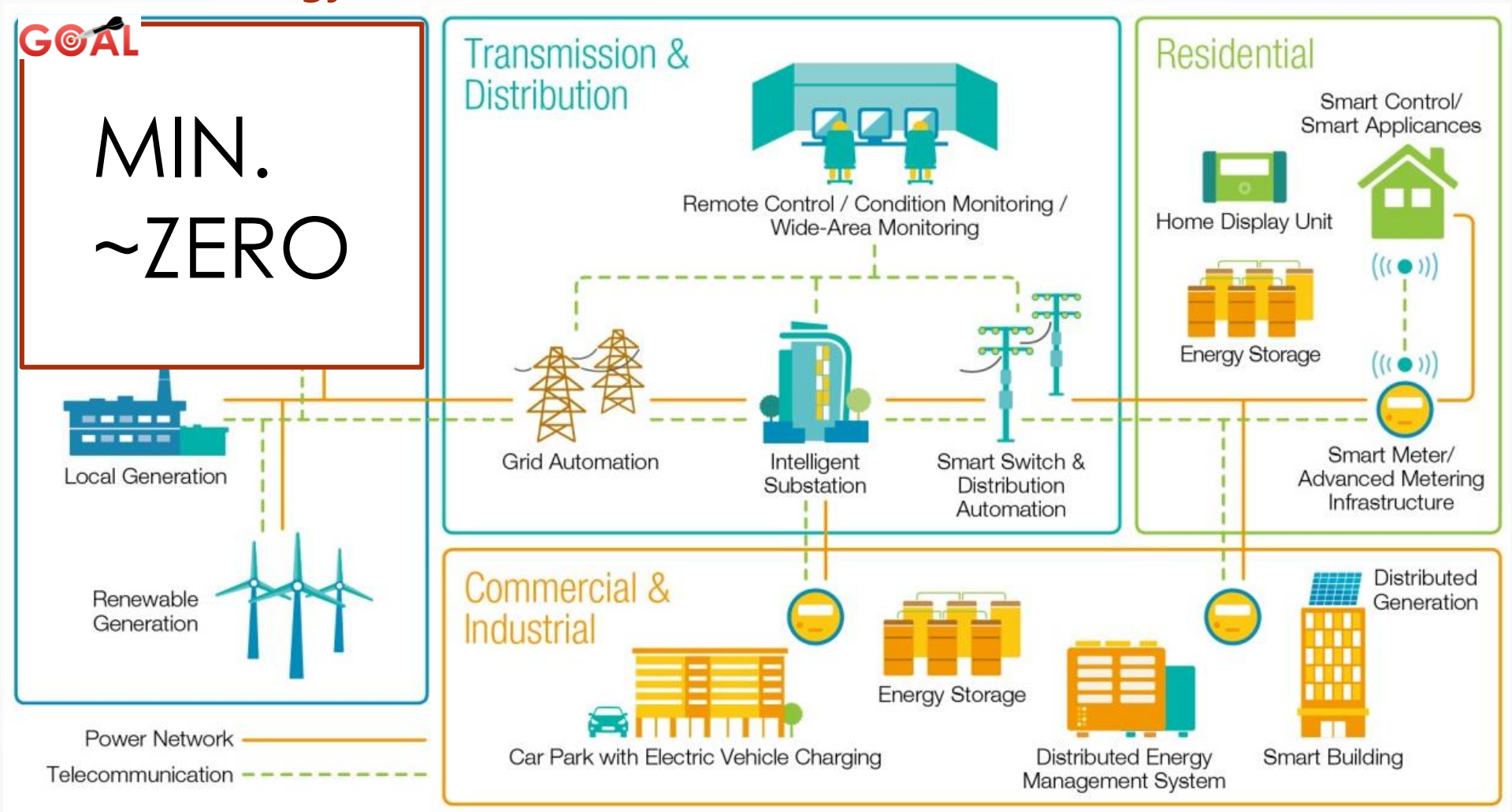
Smart Grid(Energy)

- ❖ Power Generation by Data
- ❖ One way => Two ways
  - ➢ Power Line vs. Communication Line



Smart Energy

❖ **Energy As A service**

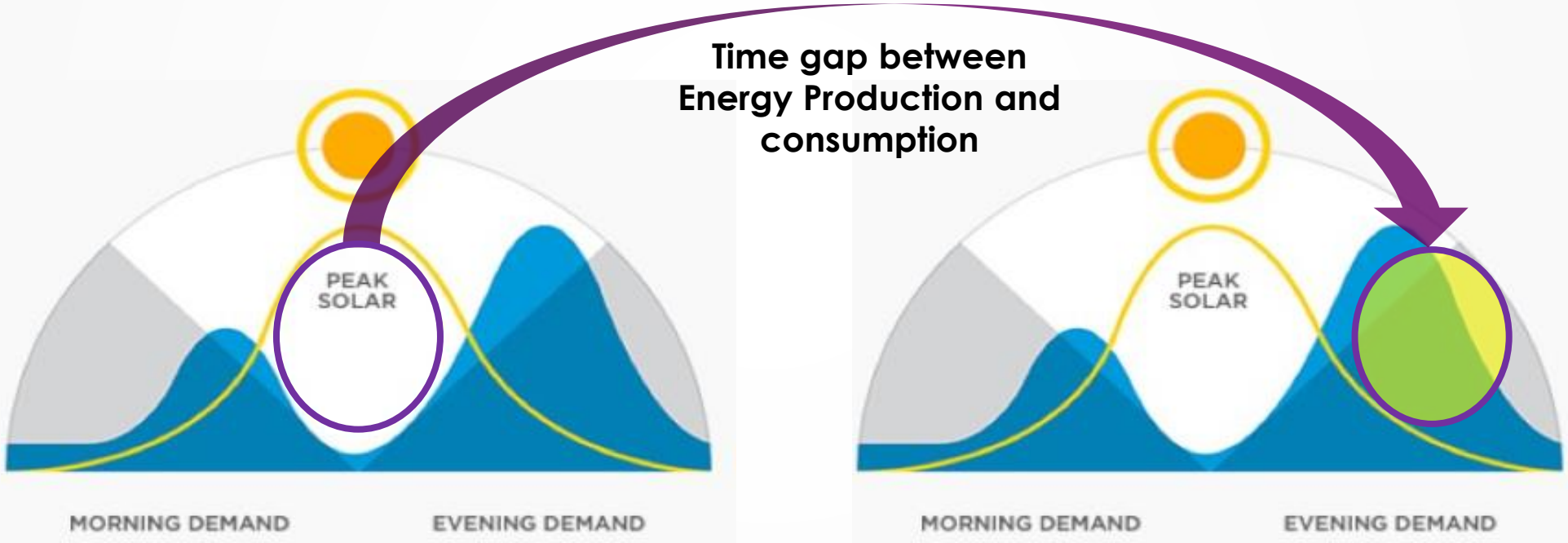


Google Image, 2017

Smart Energy

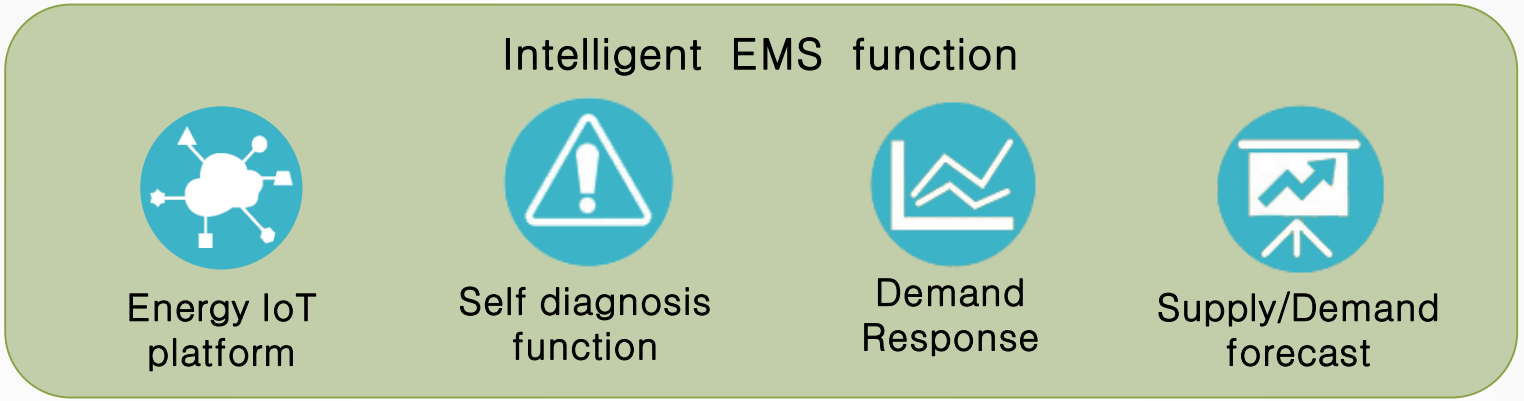
❖ PV(Photovoltaic) and ESS(Energy Storage System)

- ➢ The wasted energy to be used efficiently by energy storage system due to the time difference between production and consumption



Smart Energy Master Plan

Distributed Energy Resource Management



- ❖ **Fine-grained Energy Management**
  - ➢ Smart Plug with Low power/high reliability sub-GHz wireless Network Energy consumption monitoring of individuals or each device
- ❖ **Convenient, Intelligent Energy Saving**
  - ➢ Energy saving without intervention
- ❖ **Automated Reward Management**
  - ➢ Estimating user's effort to save energy, turning off PC and monitor, taking stairs

Strategic Approach

- **Large Scale Project**
  - Roadmap for the financing and technology
- **High Risk Project**
  - Step Approach to reduce the risk

Pilot Project(Test Bed)
for the feasibility, PoC, PoP

Strategic Approach

❖ Korea Heritages

Carbon Free Island
- Jeju

ETRI Test-bed
for Smart Energy Project

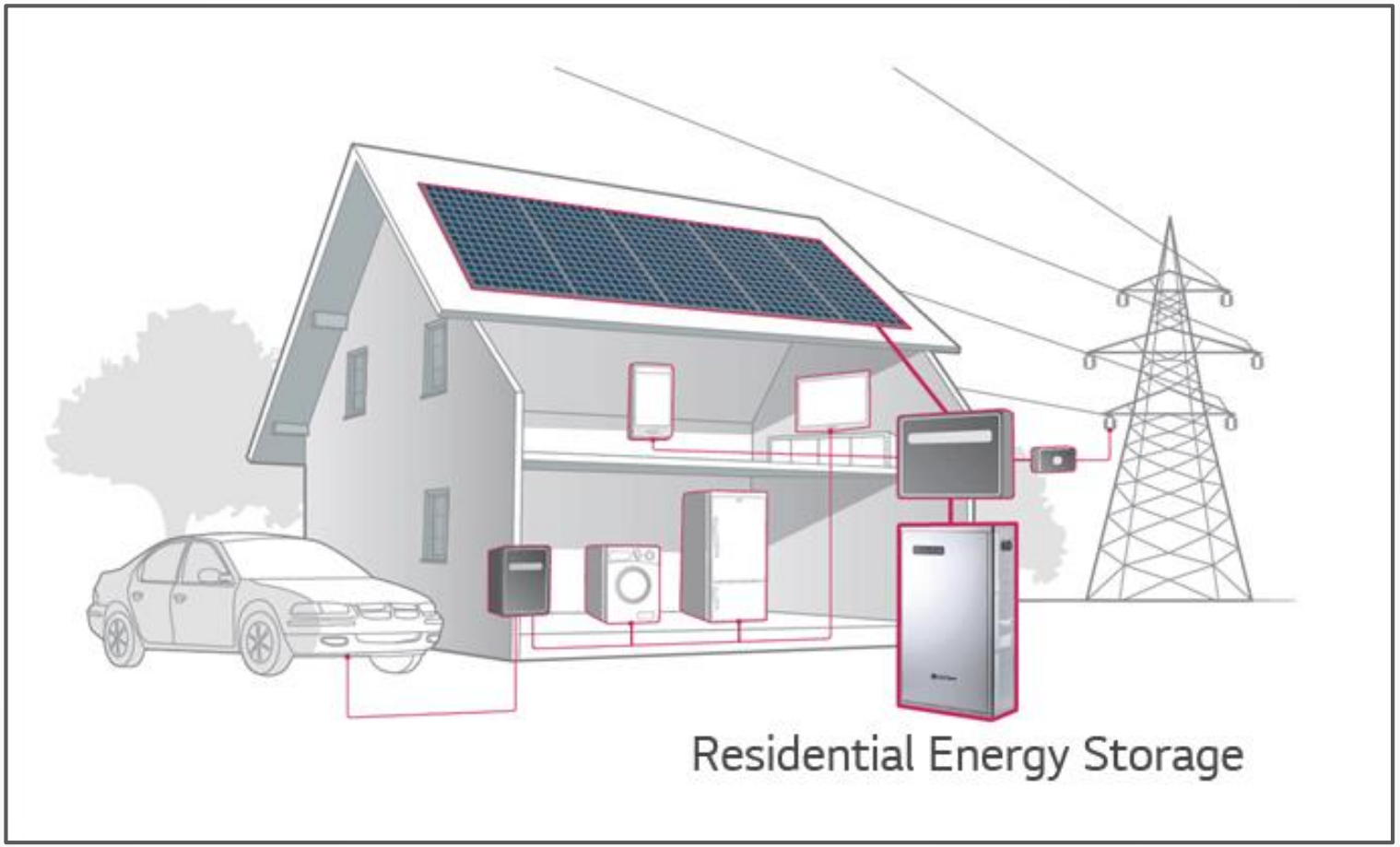
Pilot Cases

Residential Area
City Hall
Stadium
University Campus

Case 1 - Residential Area

❖ Home

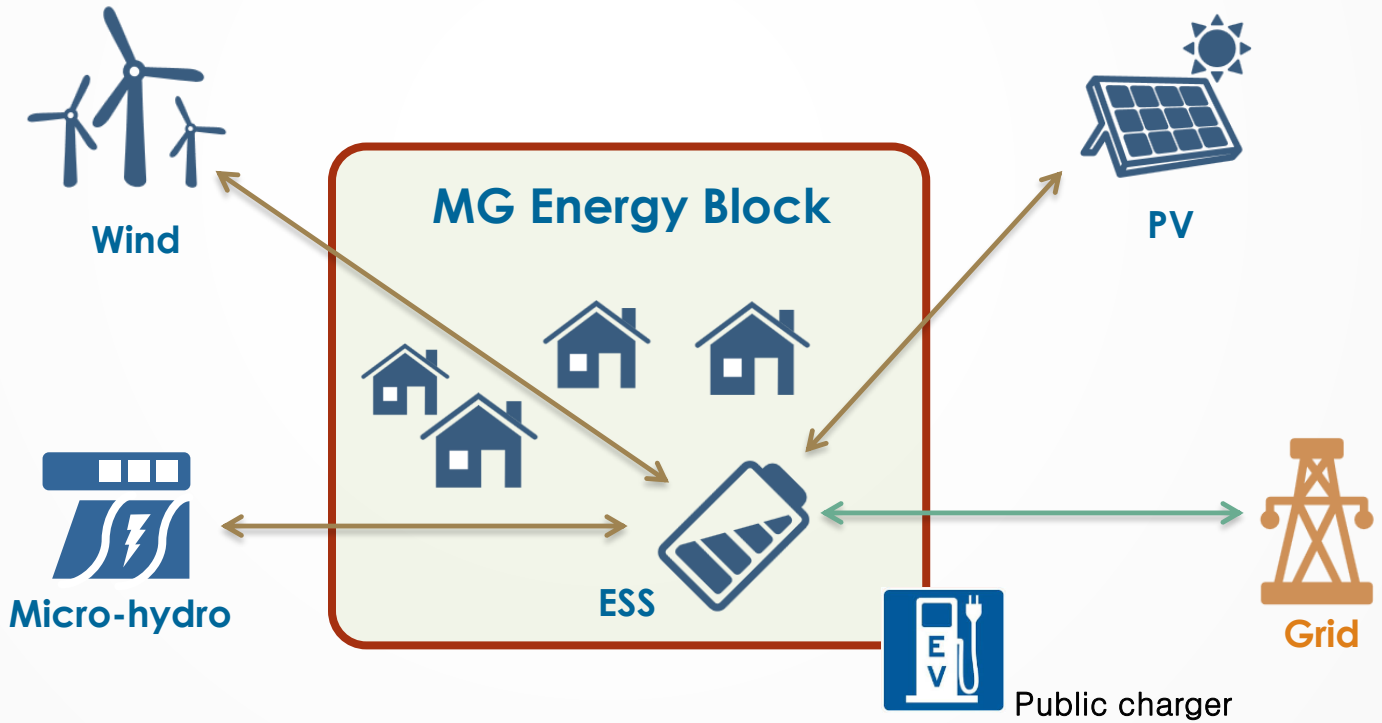
- ➢ Renewable Generation, Energy Storage System Infrastructure
- ➢ Home Energy Management System



Case 1 - Residential Area

❖ Renewable Power Generation Infrastructure

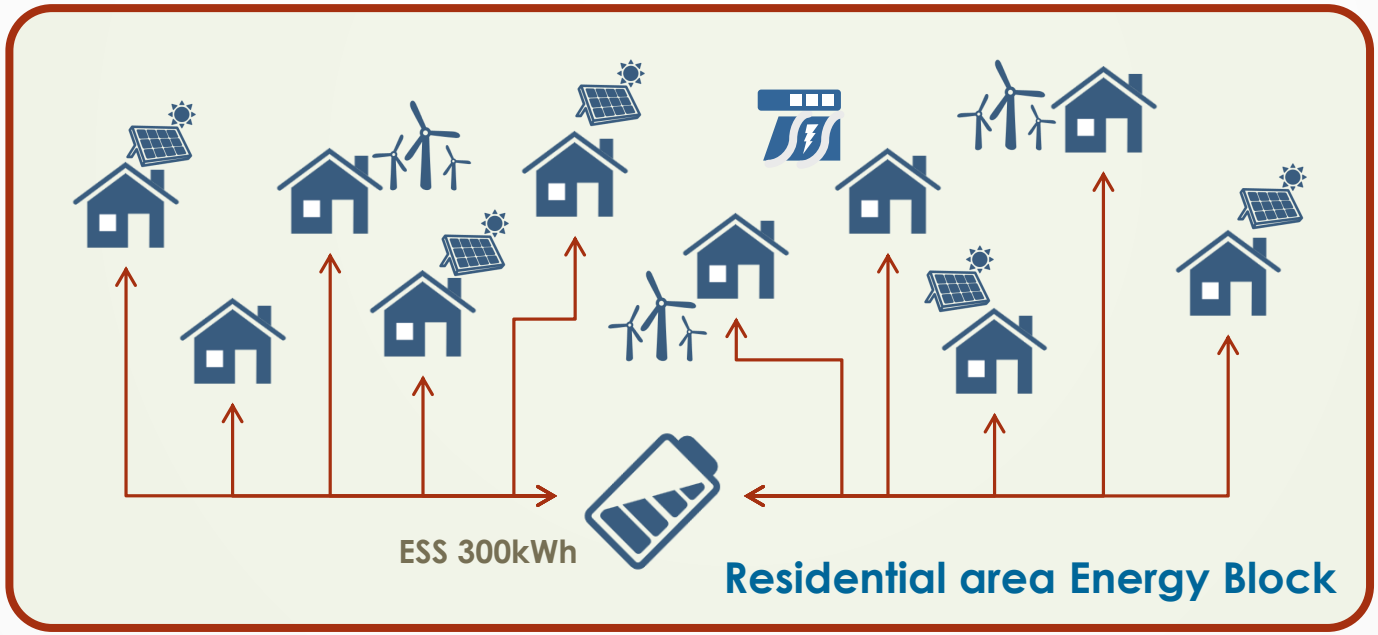
➢ Micro-Grid Energy Block (Stand-alone)



Case 1 - Residential Area

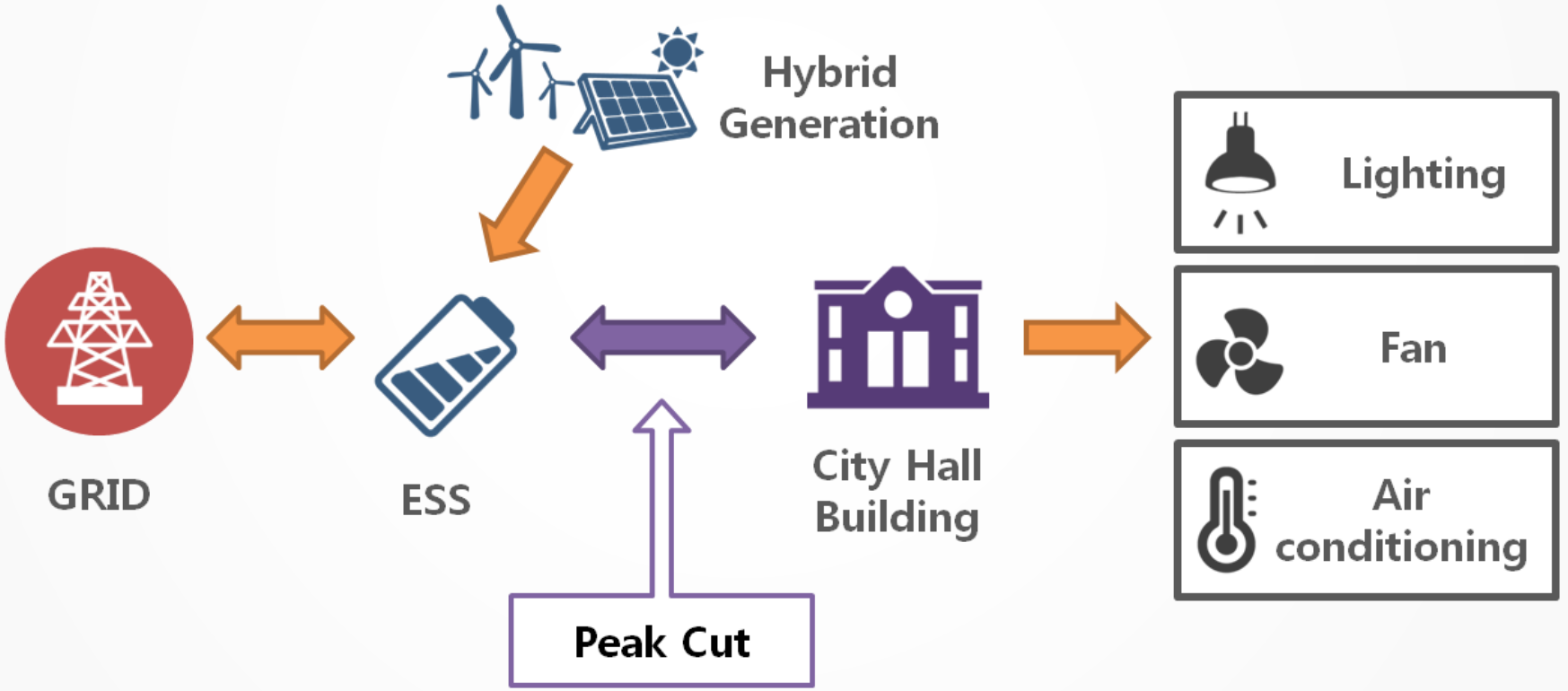
Energy Storage System Infrastructure

❖ Residential area Energy Block : 10 houses Case



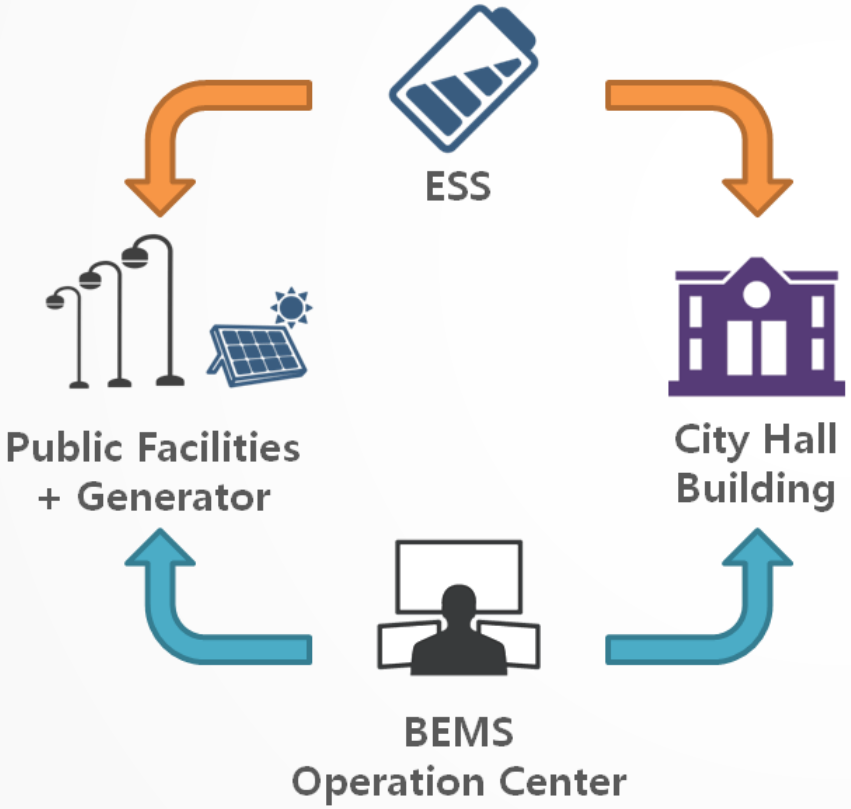
Case 2 – City Hall

Micro-Grid Energy Block (Peak-Cut Model)



Case 2 – City Hall

Micro-Grid Energy Block



Application Technology

1. Energy Diet Service
2. Smart Plug
3. Smart Building EMS
4. ESS management
5. Street Light

Case 2 – City Hall

Building Energy Management System

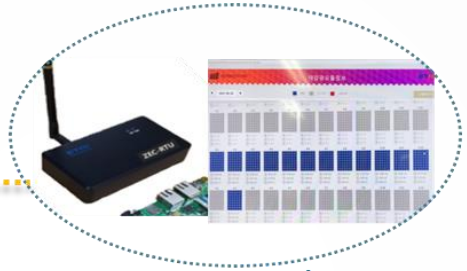
❖ Energy Diet Service with Smart Plug

Case 2 – City Hall

Building Energy Management System

❖ Smart BEMS

Monitoring



Sub-GHz WPAN-based DER/PV Monitoring

Improvement of Efficiency

Energy Diet Service with Smart Plug

Diagnosis / Analysis

Building Energy Consumption Diagnosis

Case 2 – City Hall

Smart Grid Case – City Hall

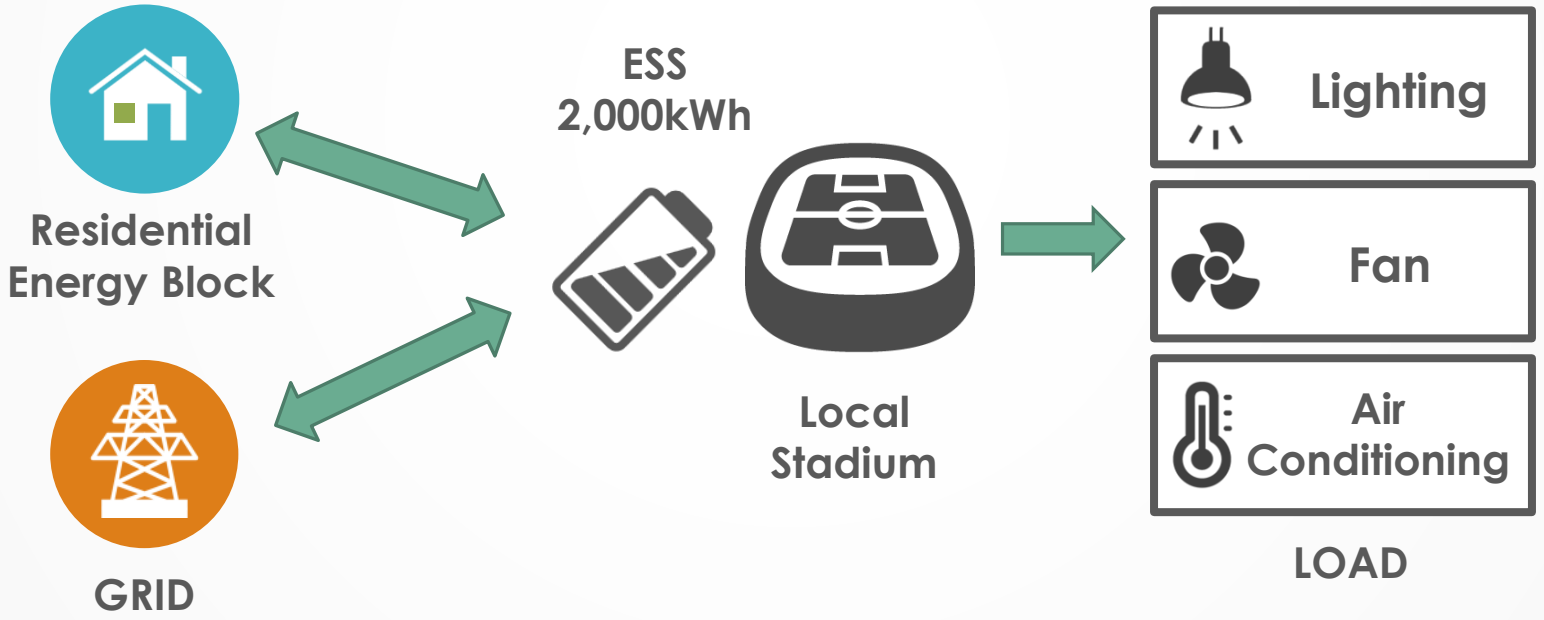
❖ Benefits

1. Providing Energy Information Collection Infrastructure
2. Low-cost, user-friendly energy saving service
3. Positive motivating the behavior of energy saving
4. Reduction of power demand at peak hours with high unit electricity rates

Case 3 – Stadium

Smart Grid Case – Stadium

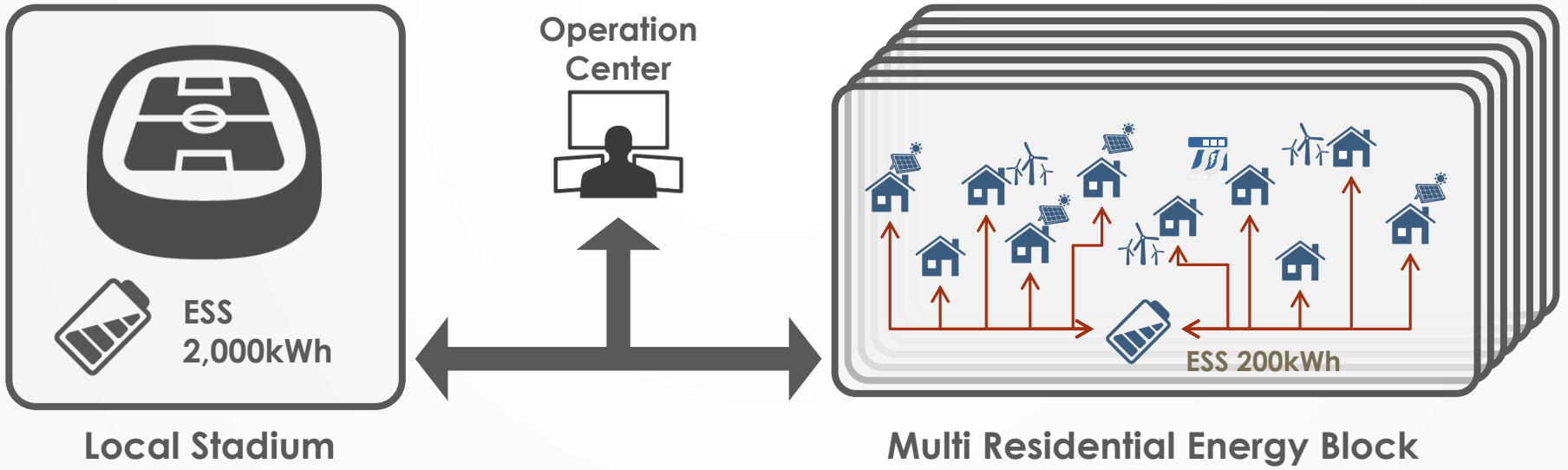
Micro-Grid Energy Block (Peak-time shift Model)



Case 3 – Stadium

Smart Grid Case – Stadium

❖Regional Energy Peak-shift between Residential Energy Block and Local Stadium

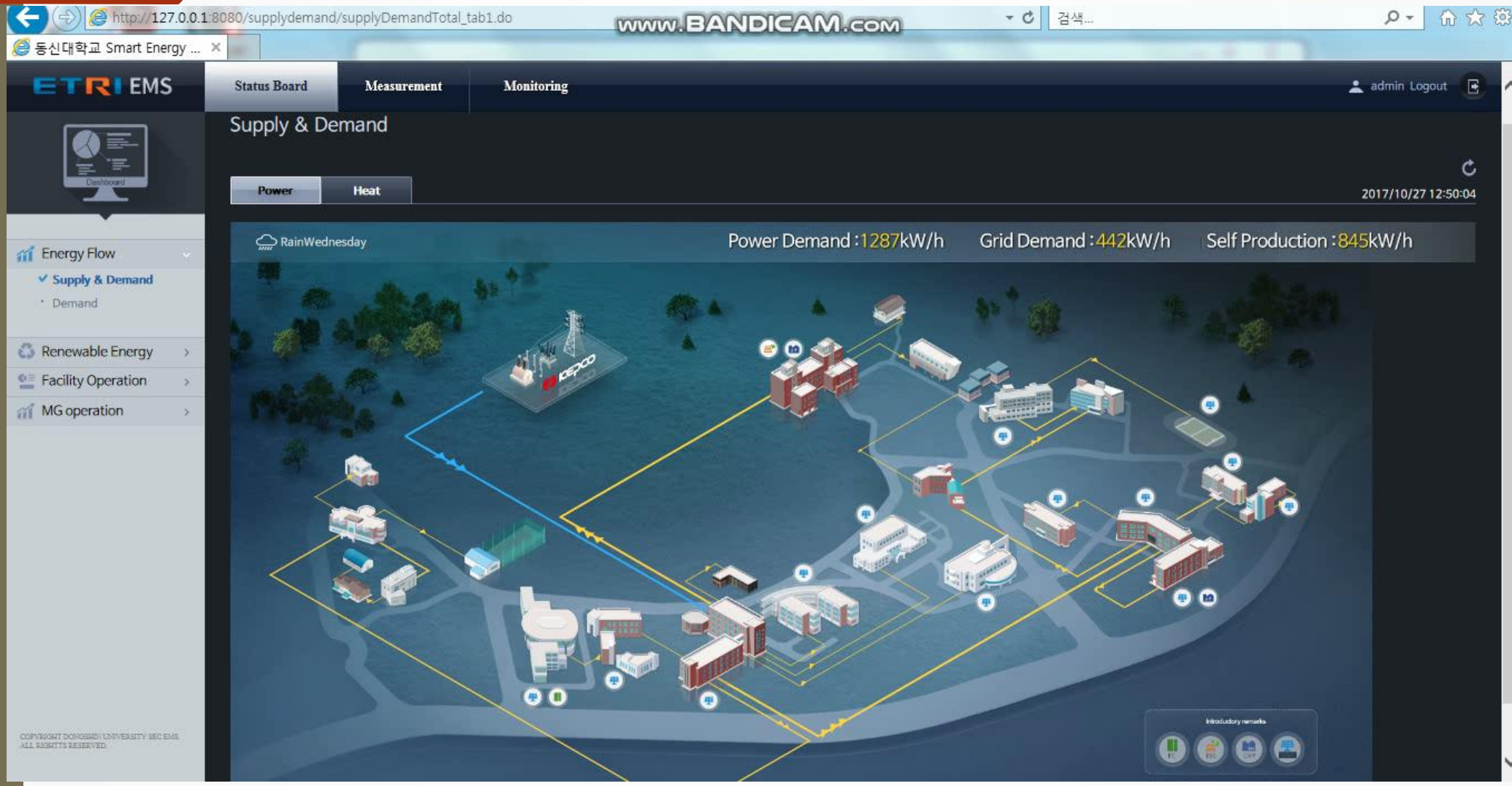


Case 3 – Stadium

❖ Benefits

- Maximize energy utilization efficiency by introducing distributed resources and effective control
- Reduction of customers' power consumption expenditure through optimal operation of distributed resources
- Reduction of power demand at peak hours with high unit electricity rates
- Enhancing Maintenance of DERs and Creating Added-Value

Case 4 – University Campus



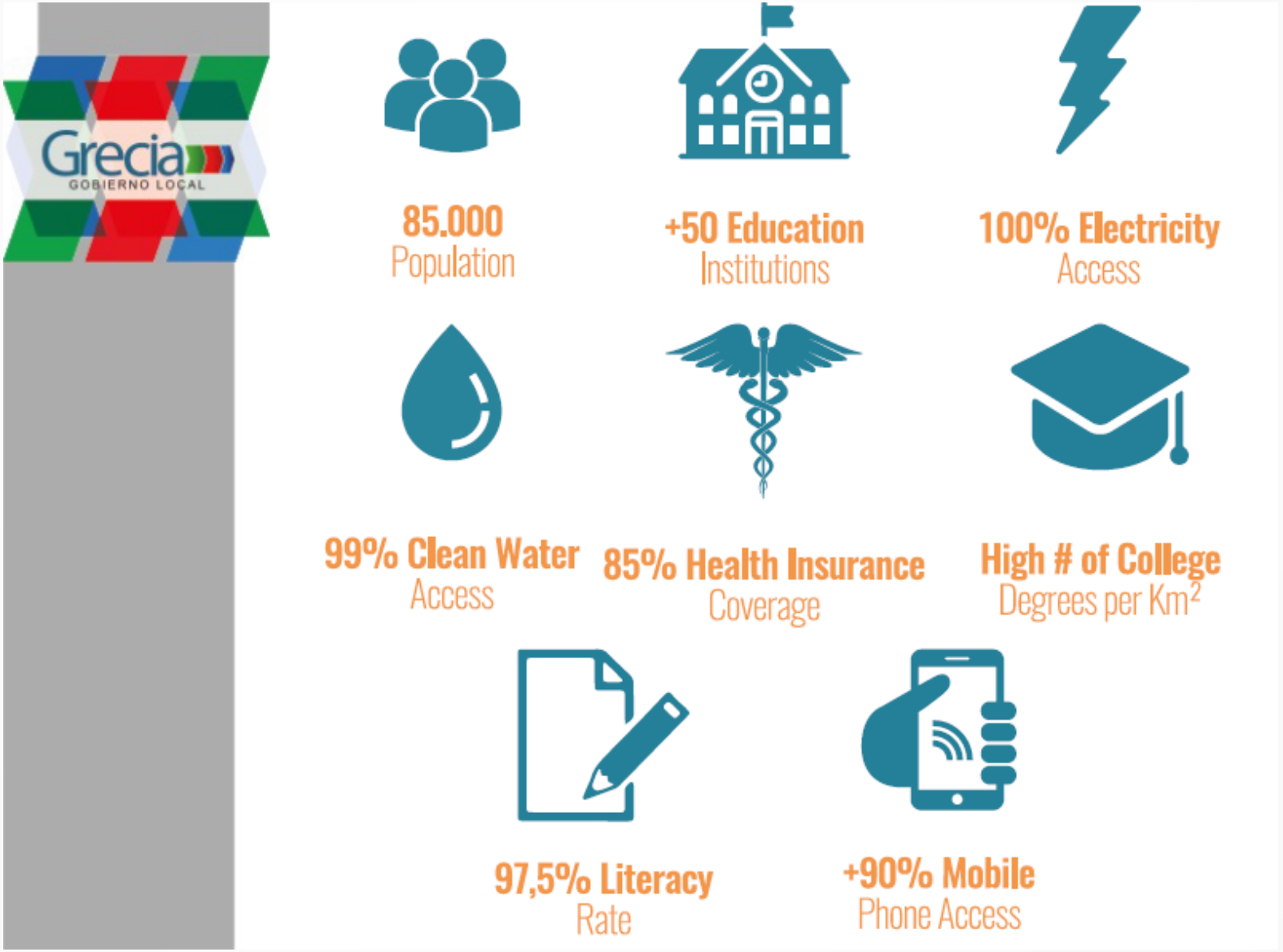
Grecia, Costa Rica

Pilot Project Plan

Grecia, Costa Rica

Grecia, Costa Rica

Grecia, Costa Rica



Grecia, Costa Rica

+ 190

1971

10 556 Kw
$2 161 x mes

Municipal Building (City Hall)

90

86 097 Kw

Market

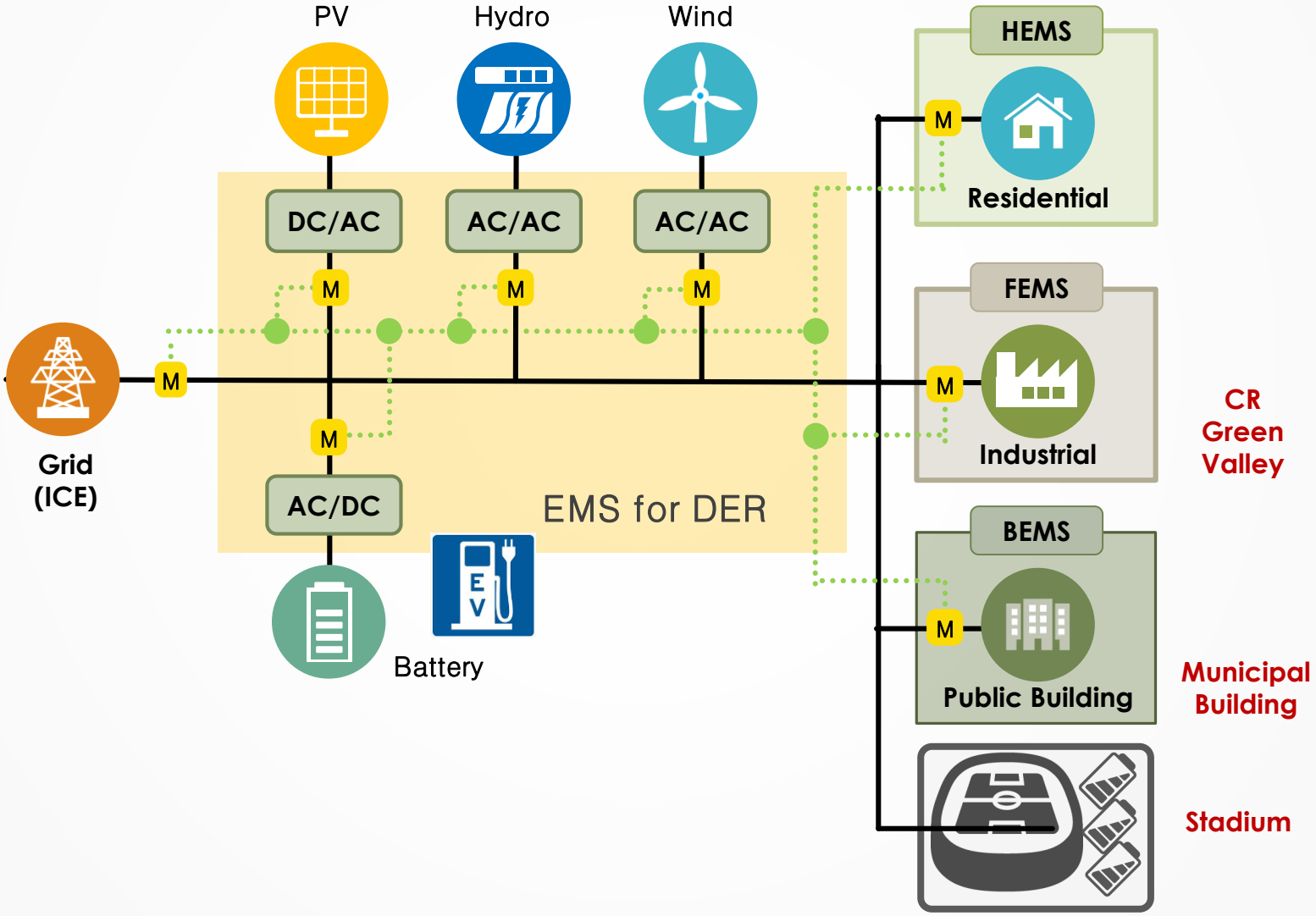
Grecia, Costa Rica

4.000

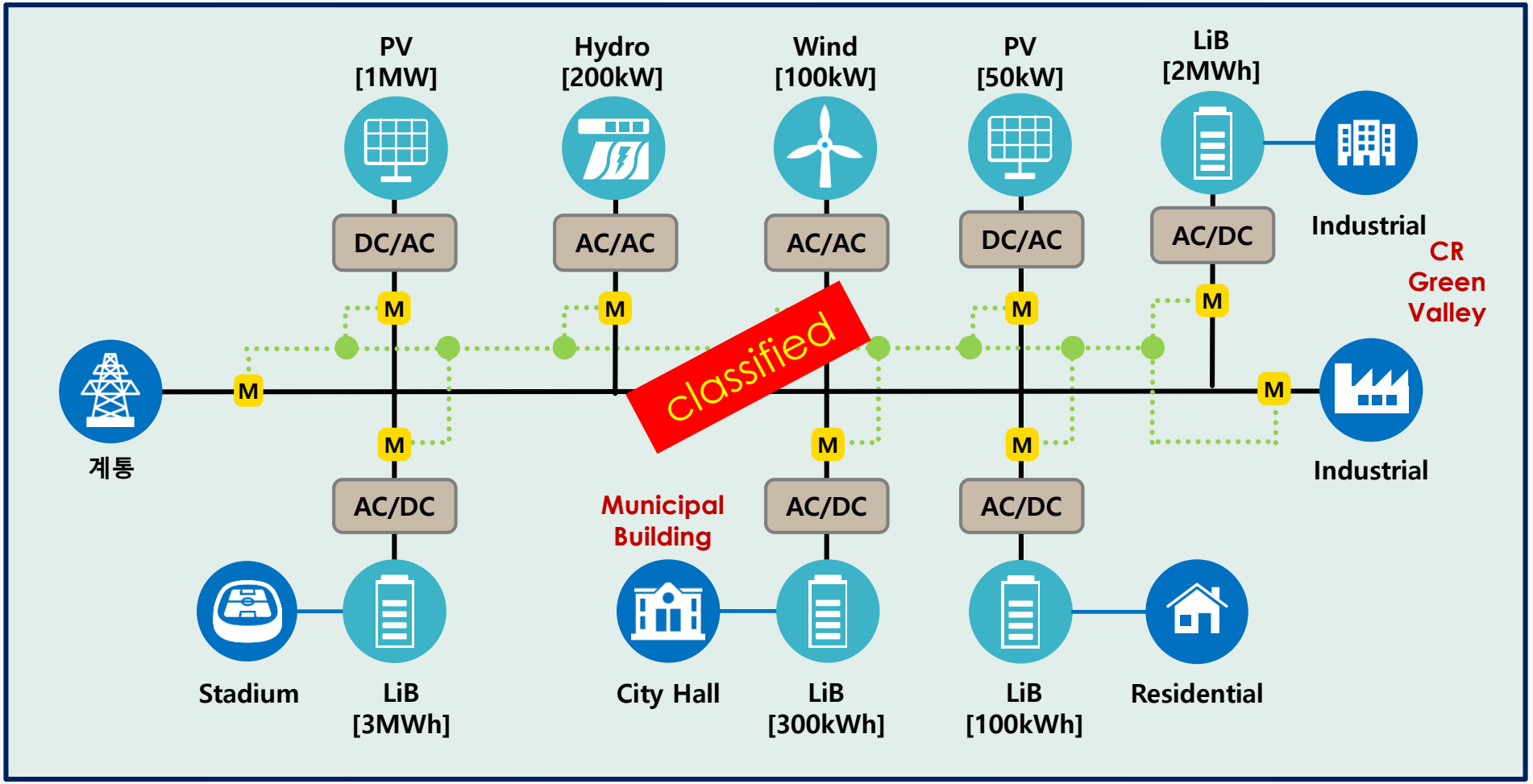
1 168 Kw

Stadium

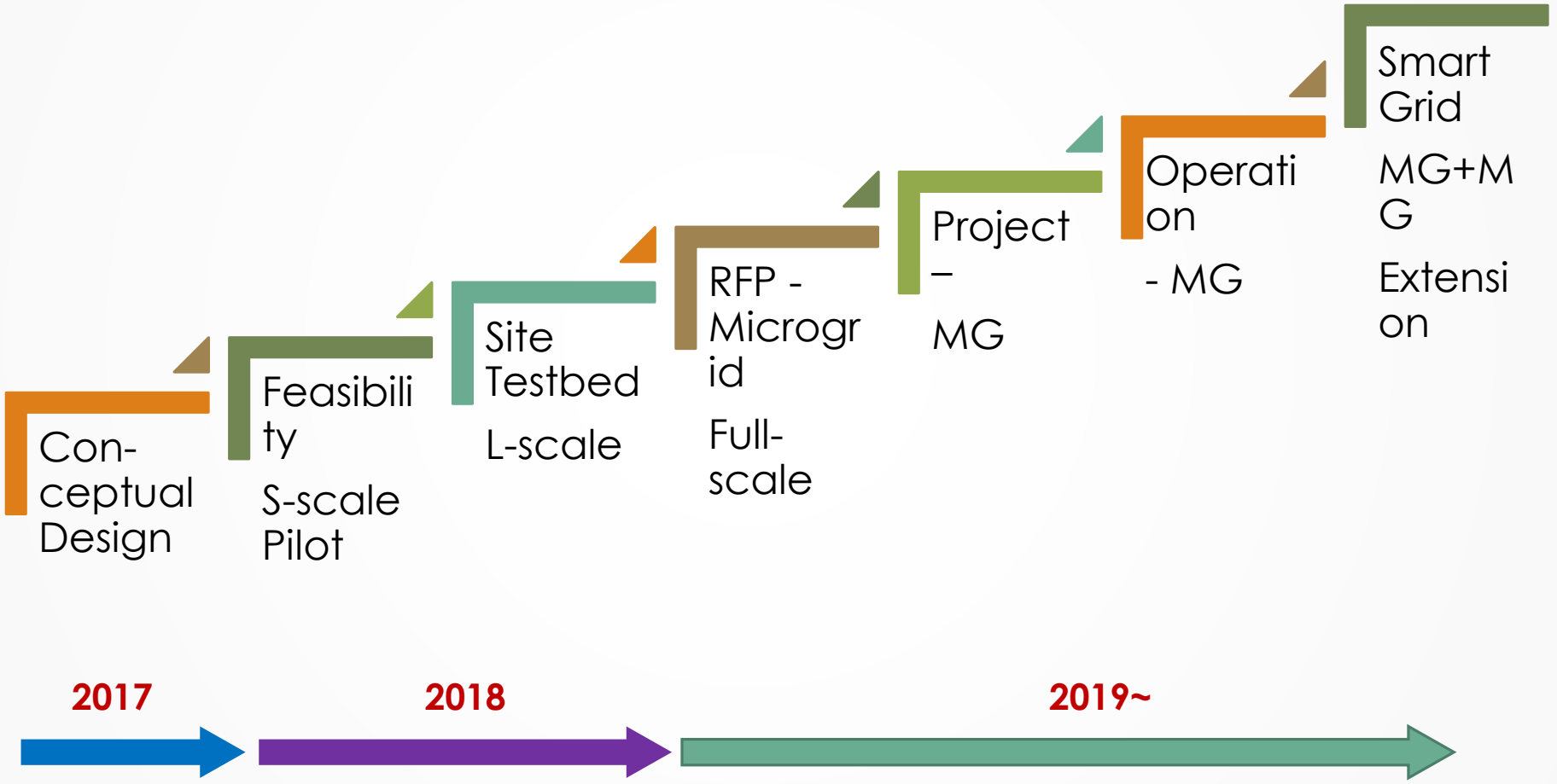
Integrated - City



Grecia EMS Design



Strategic Approach(tentative)



Alliance Suggestion for Pilot

❖ Phase I Work Sharing : Small Scale Pilot for POC (TBD)

- ➢ Korean Side (ETRI + Korean Industries)
  - ICT/ICT Devices : Demo EMS, Communication, AMI(max 5), Hybrid Street Light(1), transportation(by sea)
  - Only for the pilot
- ➢ Costa Rican Side (Grecia Municipal + ICE + Costa Rican Industries)
  - Site Preparation
  - Hardware available in Costa Rica : PV, Windmill, Hydro, Powerline/cables, installation/construction incl. labour
  - Regulation/Certification(if any), custom clearance
  - Royalty for the technology transfer
- ➢ Financing and ROI Analysis
- ➢ Consulting : Joint Consortium funded by CR
  - Roadmap, Design, ROI, Work sharing, Financing

Alliance Suggestion for Pilot

❖ Global Alliance

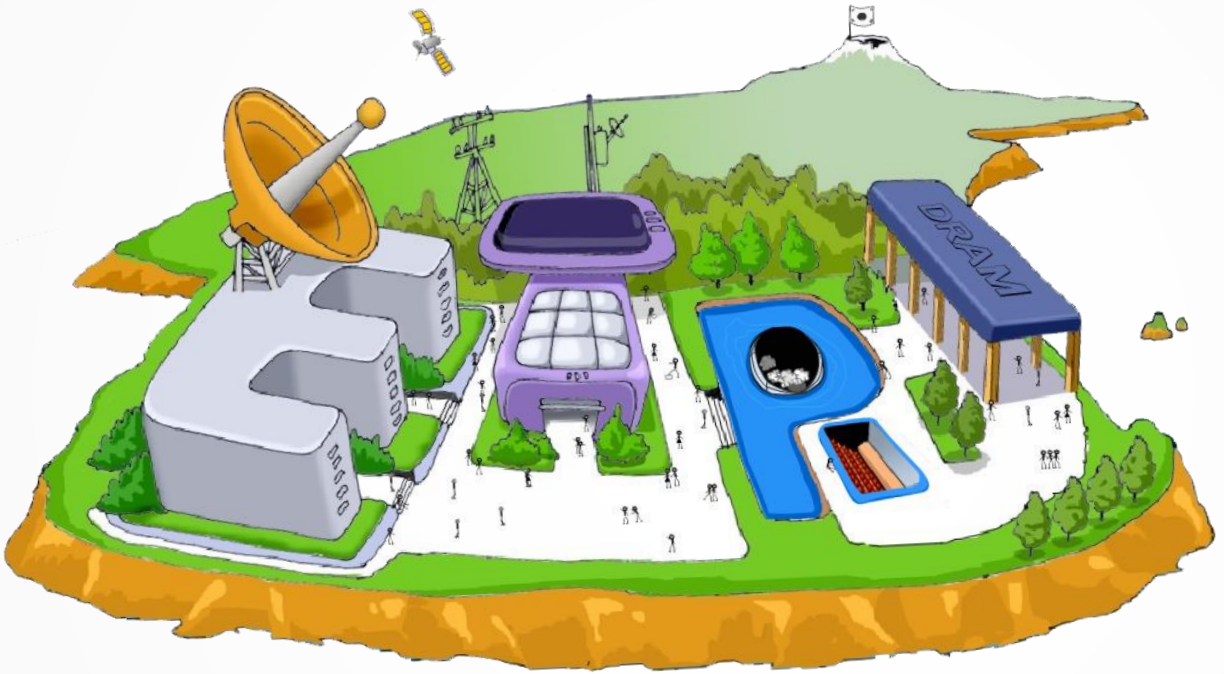
- City-to-city customization
- Reference Model

❖ Korean Side Alliance

- EMS
- Network
- AMI
- PV, Windmill, Street Light, Energy generation/converting equipment
- ESS with management and scheduling
- Energy Diet with Smart Plug
- PV Monitoring

❖ Technical Support/Consultation

Q&A



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