

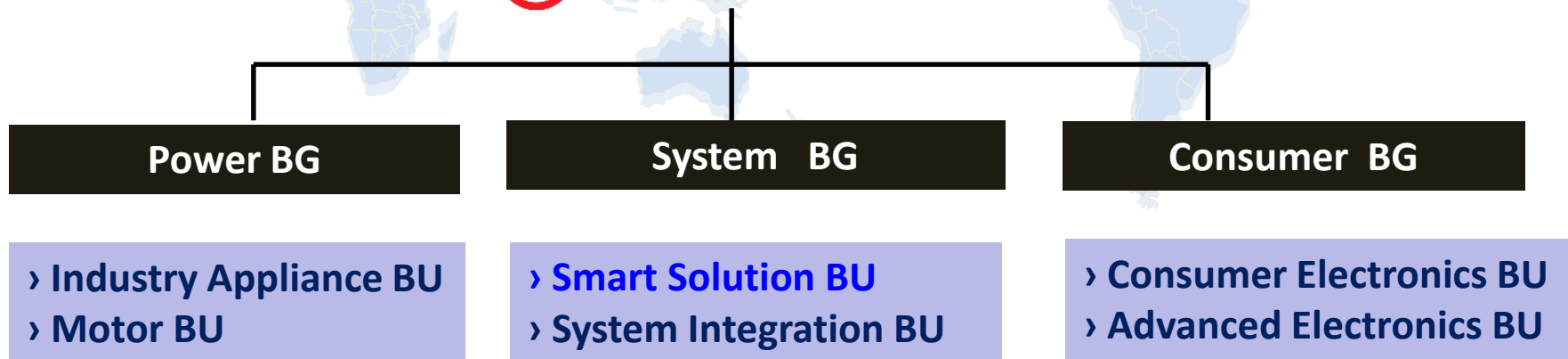
Smart Energy Management in Smart City- Taiwan Experiences



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Tatung Co.
Smart Solution BU
Marketing and Sales
Senior Manager

Company Profile

Established	1918
Capital	US\$1.5 billion
Revenue	US\$3.64 Billion in 2014
Employee	Over 30,000 worldwide
Headquarters	Taipei, Taiwan



Tatung Group Global Investment



Taiwan Tatung Co.

- Power Business Group
- Consumer Business Group
- System Business Group
- Real Estate Asset Management Division

Investments

- Chunghwa Picture Tubes, Ltd.
- Forward Electronics Co., Ltd.
- Shan Chih Semiconductor Co., Ltd. (Reinvest GET)
- Shan Chih Asset Development Co., Ltd.
- Tatung Consumer Products (Taiwan) Co., Ltd.
- Chunghwa Electronics Development Co., Ltd.
- Tatung System Technologies Inc.
- Tatung Fine Chemicals Co., Ltd.
- Toes Opto-Mechatronics Co., Ltd.
- Tatung Medical & Healthcare Technologies Co., Ltd.
- Shan Chih Investment Co., Ltd.
- Chih Sheng Investment Co., Ltd.
- Elifgroup Computer Systems Co., Ltd.
- Others

- Electronics & Information Business
- Optoelectronics
- Energy Solutions Business
- Telecommunication
- Retail Channel Business
- Industrial Appliance Business and System
- Chemical Engineering Business
- Asset Development Business
- Home Appliance Business
- Moto Business
- Others

TATUNG Smart City Solutions

Smart Energy Solutions

AMI

PV system

PV Energy station

Micro-Grid

Smart Community Solutions

Smart Building

Smart Home

Office Management System

Smart Parking System

Smart Healthcare Solutions

Healthcare Service System

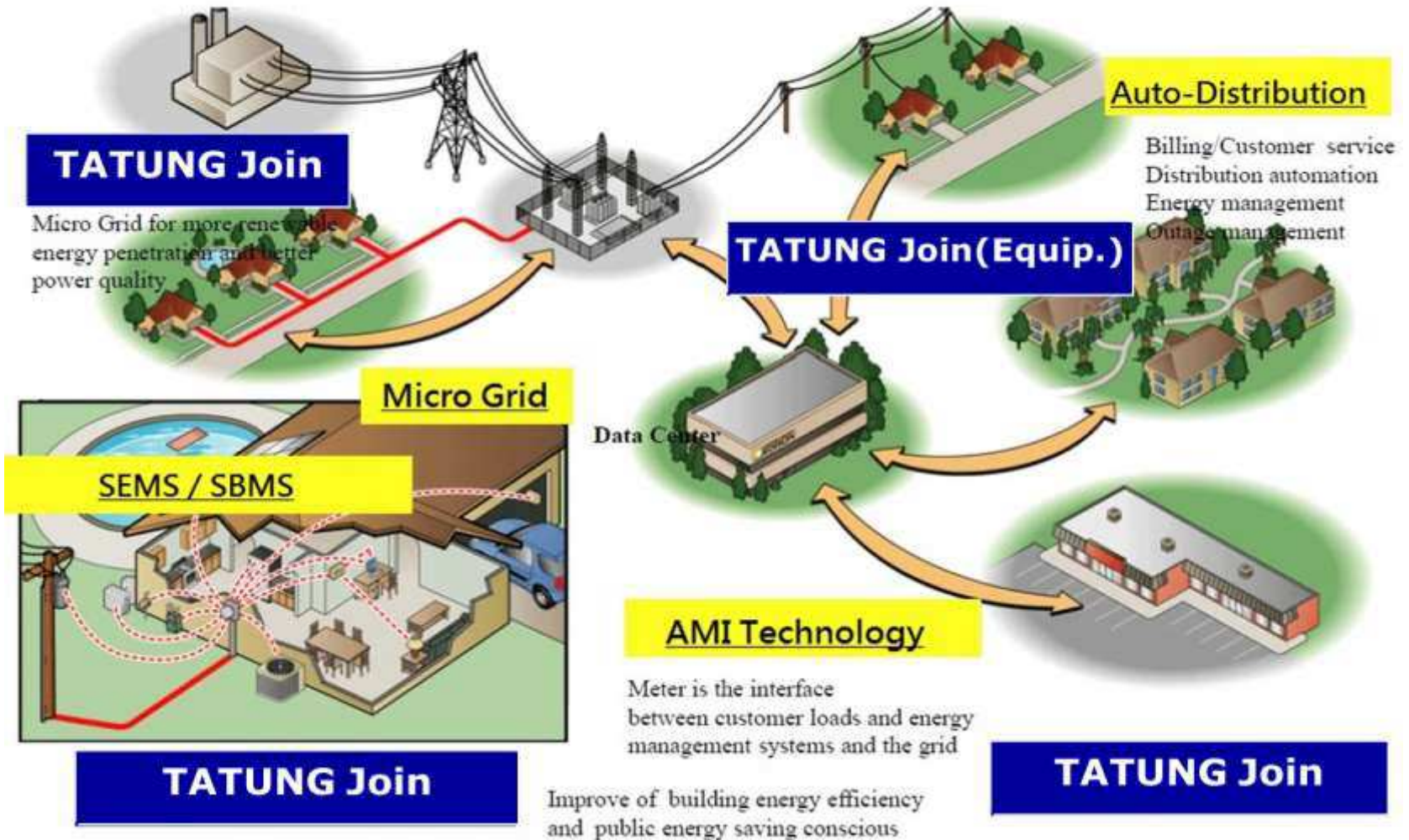
Healthcare Cloud Platform

Smart Surveillance Solutions

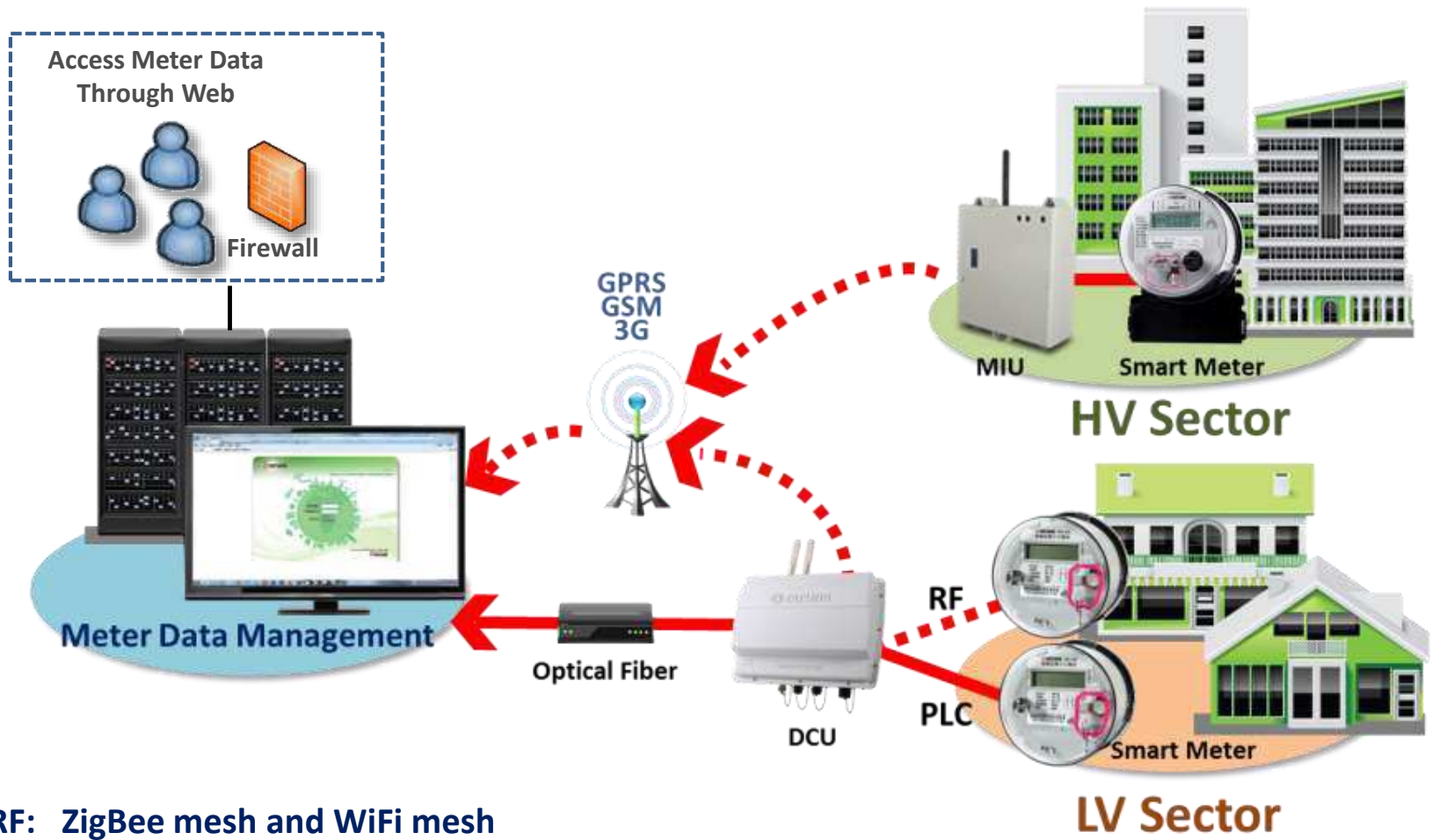
Intelligent Video System Application

Development of Smart Grid in Taiwan

Smart Grid in Taiwan



AMI System Architecture in Taiwan



RF: ZigBee mesh and WiFi mesh

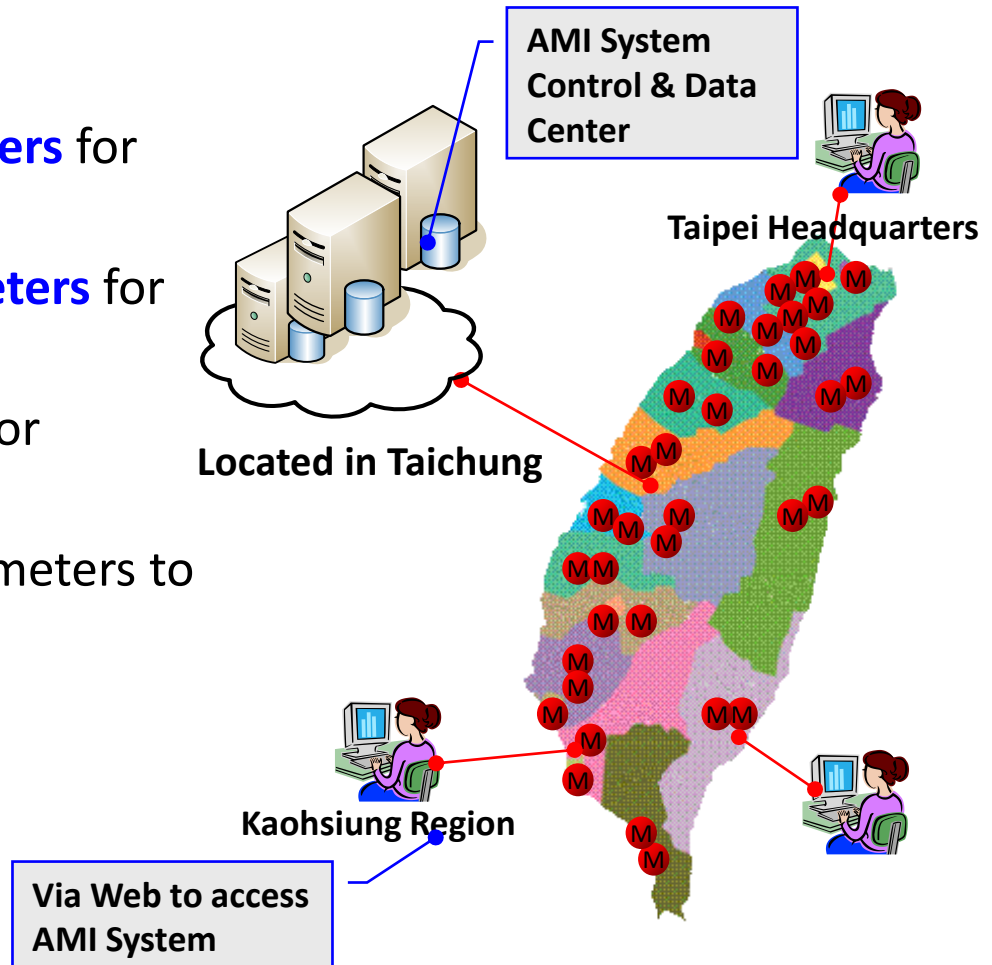
PLC: BPL and G3-PLC

AMI System Deployment in Taiwan

Tatung is the only AMI System supplier which has actual performance in Taiwan. Completed High-voltage and Low-voltage AMI System for Taiwan Power Company.

Smart Meter Deployment Plan

- 2009-2010 Deploy **1,000 smart meters** for industrial sectors.
- 2011-2012 Deploy **27,000 smart meters** for industrial sectors.
- 2013 Deploy **10,000 smart meters** for residential sectors.
- After 2016 Gradually deploy smart meters to **12 million residential sector**.



Benefits of AMI

- Utility company to have smart power distribution to **reduce buffer power capacity** and lower operational costs.
- When electricity users have their own smart energy saving systems, they have **on demand practice** with utility company and save energy bills.
- With smart meters to have **accurate and timely readings**, utility company can **balance peak and trough** of electricity, improve capacity utilization and **cut down** unnecessary power plant **CAPEX**.
- AMI can allow for **power balance** monitoring.

Integrated Supply Chain of Solar System

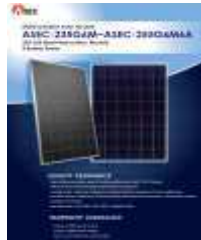
Integrated supply chain



Ingot/ slicing: Green Energy Tech, Inc.



PV Module:



Solar System Design:



TOP
DOWN



EPC:



PV Energy Station

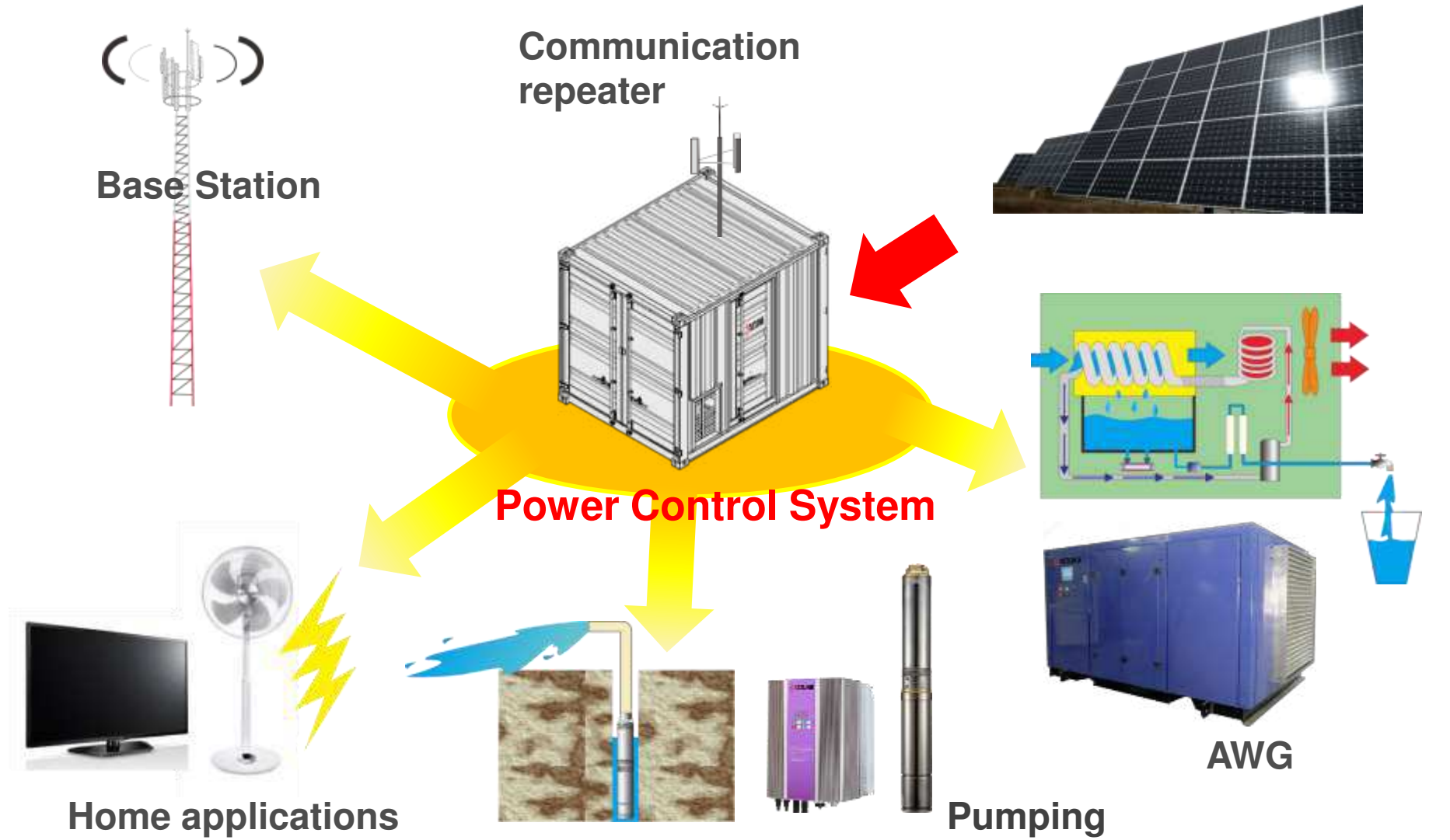
The solar panels can be extended when charging, folding when moving.



Features

- Easy moving, especially for emergency.
- It can storage around 19.2kWh/ day. (for 3.7 peak sun hours in Taiwan)
- It can be charged by solar PV system or by city electricity.
- It also can be charged by diesel generator.
- It can be customized.
- Storage capacity: 240kW~960kW。

PV Cabinet Integration Solutions



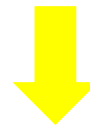
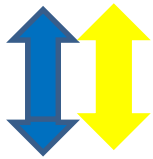
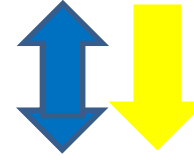
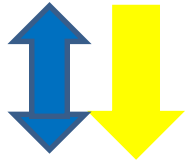
Micro Grid



Conventional Power Plant



Renewable Energy



Storage



Energy Management System
LOAD



Micro Grid Practices in Taiwan



**House & School
based level**



**Village-based
level**



**Island-based
level**

Advantage and Feature :

- Energy Independence
- Reliable and affordable energy supply
- Provide the locally sufficient energy usage
- Support plug and play to easily extend



Smart Micro-grid Demonstration Park in Lin bian

Assisting Ping-tung County Government to build up smart micro grid system in Linbian, which won **Smart Energy Saving Award** in 2015 Smart City Innovation Application competition organized by the Board of Science and Technology, the Executive Yuan. At the same year, this project won the silver award of **ESCI (Energy Smart Community Initiative) Best Practices Awards**.



Feature

Renewable Energy

- 78kW PV
- 10kW Wind

Smart Inverter

- Generation control
- Power factor control

Energy Storage

- High capacity of 159kWh Lithium battery
- High efficiency and 660V high voltage

Energy Management

- Accommodate generation , load and storage
- Provide APP information

Bio-diesel Generator(backup)

- 60kW generator
- B20(20% biodiesel) to reduce diesel usage

Islanding and paralleling operation

- Provide electricity without the utility's grid
- Smoothly change between islanding and paralleling

Micro Grid Estimated Benefit in Linbian Practice

Energy Saving Estimated Benefit



Environmental Goal

100% Energy Independence



- ⑩ Islanding operation without utility

Zero Emissions Power Generation



- ⑩ Renewable energy generation: 115,675.8 kWh/Y
- ⑩ Reduce carbon emission 60 tons

Energy Saving Goal

100% Penetration of Renewable Energy



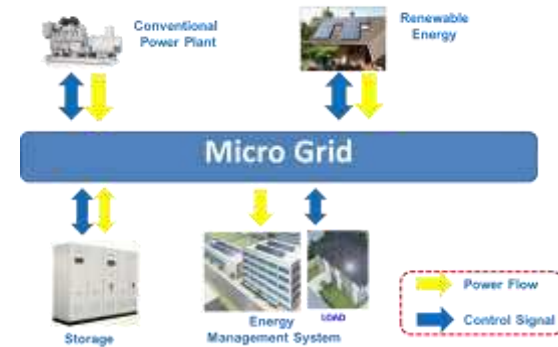
- ⑩ Power generation of solar power: 89,395.8 kWh/Y
- ⑩ Power generation of wind power: 26,280 kWh/Y

Energy Creation Experience in Czech Republic

College and Secondary School of Electrical Engineering Trebic



Micro Grid



Tatung Smart Home & Building Solutions

TATUNG Cloud

- Data Collection
- Data Analysis & Storage
- Data Access & Computing



Tatung Smart Building Management System

- Demand Management
- Scheduling Management
- Electricity Sharing
- Predictable Maintenance
- Power Analysis



Smart Commercial Building



Smart Office

Smart Conference Room

Smart Parking

Smart Renewable Energy

Tatung Intelligent Gateway

Smart Residential Building



Smart Energy Saving

Smart Healthcare

Smart Security

Smart Living

ECS Smart Commercial Building (@ Neihu district of Taipei City)

The ECS building located in Neihu is an existing building that has in all its infrastructure intelligence systems with different functionalities such as Smart Office, Smart Conference Room, Smart Parking and Smart Renewable Energy.



Features

Smart Office

- employee clock-ins and clock-outs directly affects office area lighting and air conditioning.
- Air quality control automatically.

Smart Conference Room

- Upon visitor arrival all equipment adapt to suit various conference schemes according to the designated settings.
- On-site adjustments can also be made by handheld devices.

Smart Parking

- VIP parking space reservation and indication
- Real time parking space management and license plate recognition(LPR)

Smart Renewable Energy

- Grid-Connected Operation with renewable energy
- Reuse rainwater

Tatung Smart Building Solution Architecture



Smart Conference Room



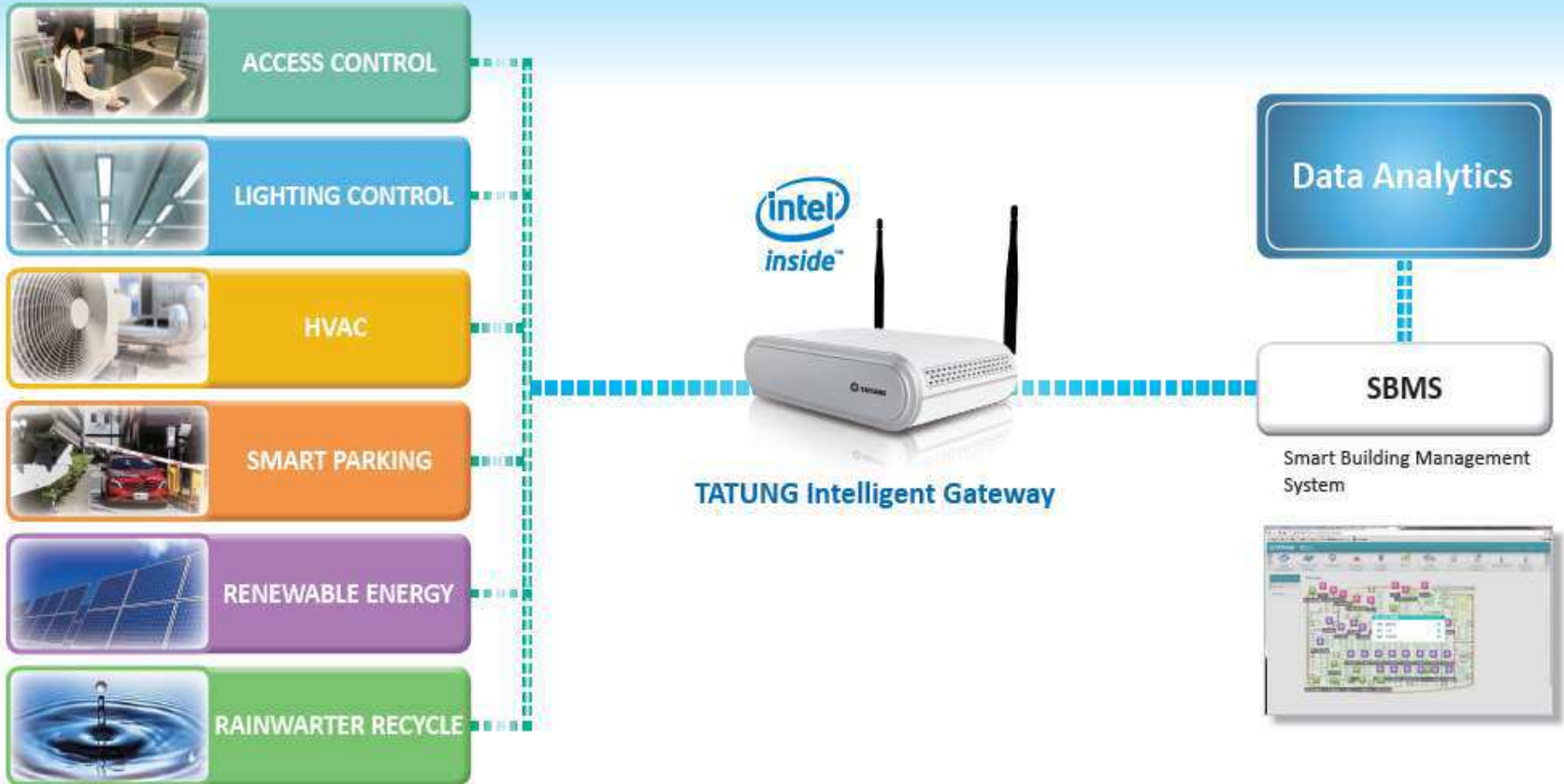
Smart Office



Smart Parking



Smart Renewable Energy



SBMS (Smart Building Management System)



Schedule manager

Light: All Control, Timetable, Timetable, Timetable, Timetable

Light Zone: All Zone

Light Zone	Light	Start Time	End Time	Is active before set	Is active
1. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
2. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
3. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
4. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
5. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
6. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
7. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
8. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
9. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No
10. 12F3in1(2)	anytime	22:00:00	22:00:00	No	No



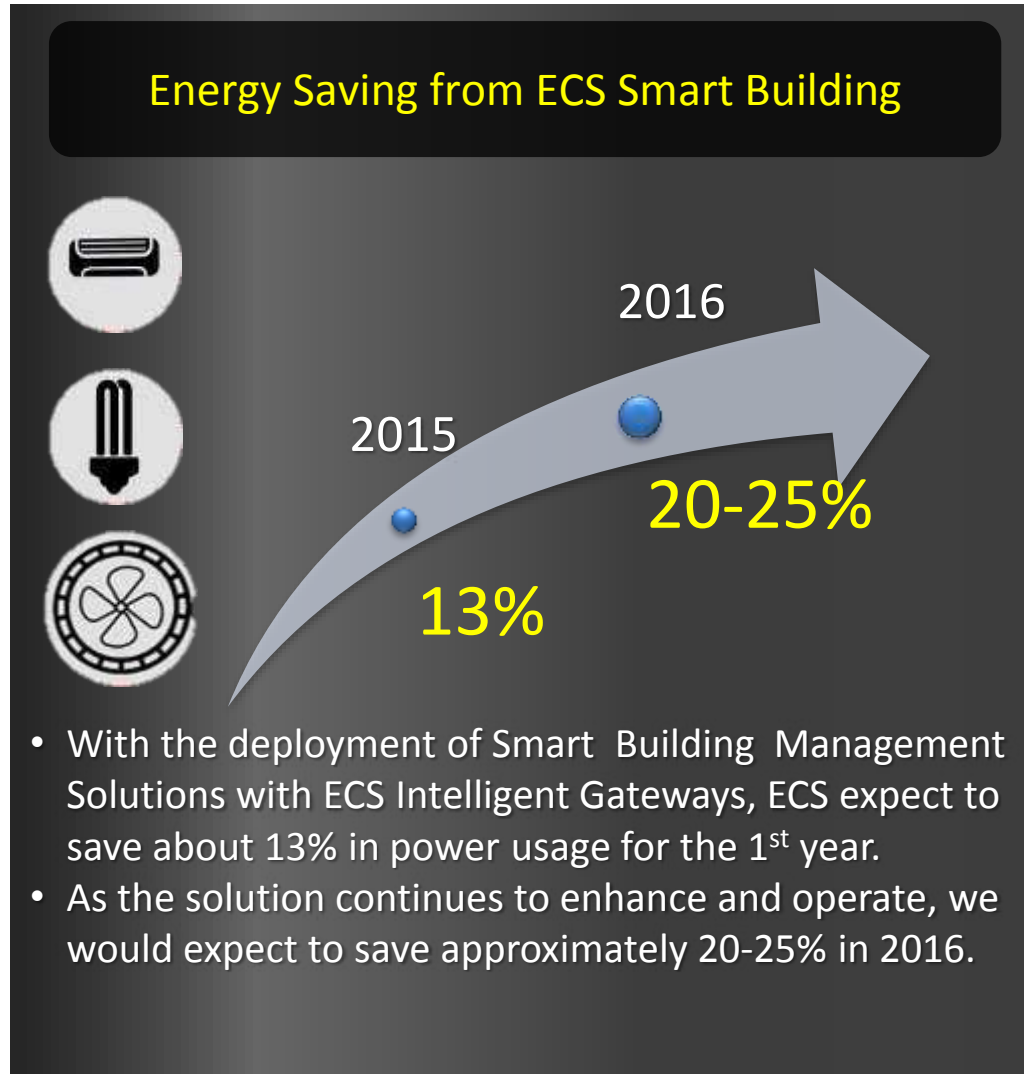
12F3in1(2)

溫度 | 24.6 °C

濕度 | 52 %

CO2濃度 | 840 ppm

ECS Smart Building Estimated Benefit



Tatung Smart Manor (@ Banqiao district of New Taipei City)

Tatung Smart Manor, 5S Green Community, was awarded the **Design Award (TIBA Gold)** in Aug, 2015.

Our goal is to obtain the certification in “**Diamond Intelligent Building**” and “**Golden Green Building**”.



Features

Smart Community

- Centered on green building, the community is going to be built into a microclimate regulated park featuring ecology, energy efficiency, CO₂ reduction .

Smart Energy Saving

- EMS can record the electricity usage of home appliances.
- Energy Visualization

Smart Living and HealthCare

- Scenario control and home appliances control
- Save on energy bills.
- Provide physiological data to keep track of resident's health and medical adoption records.
- Help in the prevention of diseases and accidents.

Smart Safety and Security

- Send alerts to mobile devices when accidents happen.
- Accidents prevention
- License Plate Recognition(LPR)

Smart Property Management

- The electronic butler works 24-7.
- With an APP, the vast community is at your finger tip.
- One access card

Tatung Smart Home Solution Architecture

Cloud Services



Property Mgt.



SBMS



Healthcare Center





01 Energy Visualization

Manage Electricity Bill Smartly

Tatung SHMS collects family power consumption through the Intelligent Power Monitor, and provides daily/monthly electricity status and bill information. Residents can manage their power consumption easily to avoid energy waste.

Energy saving



02 Intelligent Healthcare

Care Elders

Tatung healthcare system can collect and analyze residents' measured physiological data for their health management. In addition, the Tatung healthcare system can also operate with the nearest health center so that healthcare workers can give residents the most professional advice.

Healthcare



03 Intelligent Guard

Guard Life Safety

When an accident occurs, SHMS will provide the most real-time push notification to residents through IHD and APP, in order to relieve and assist the area. Meanwhile, security guards will also be notified. Then they will contact residents to ensure residents' life and property safety.

Security



04 ICT Appliances

Support Convenient Life

Tatung ICT appliances provide remote switching, scheduling, analysis of power consumption, and other services. By one-touch, residents can monitor and control appliances and know power consumption status. They can create a more convenient and comfortable living environment.

Life



Tatung Smart Manor Estimated Benefit

Energy Saving Estimated Benefit

Environmental goals

Water saving 30%



- ⑩ Estimated water usage of three public facilities is around 15,000 m³ /Y
- ⑩ Rainwater recycling save 5000 m³ /Y

CO₂ Reduction 40%



- ⑩ Estimated power usage of three public facilities is 1,860,000 kWh / Y (CO₂: 1153 tons)
- ⑩ Carbon reduction :466 tons

Energy Saving goals

Energy Saving 30%



- ⑩ Estimated power usage of three public facilities is around 1,860,000 kWh /Y
- ⑩ Power generation of solar power 66,000 kWh/Y
- ⑩ Energy-saving elevator save 12 million kWh/Y
- ⑩ Swimming pool heat pump save 360,000 kWh /Y



We want to be your partner!

Thank you

astleyl@tatung.com