

# How Smart Grid Enables a Greener and Smarter Future City of Hong Kong

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# The City of Hong Kong



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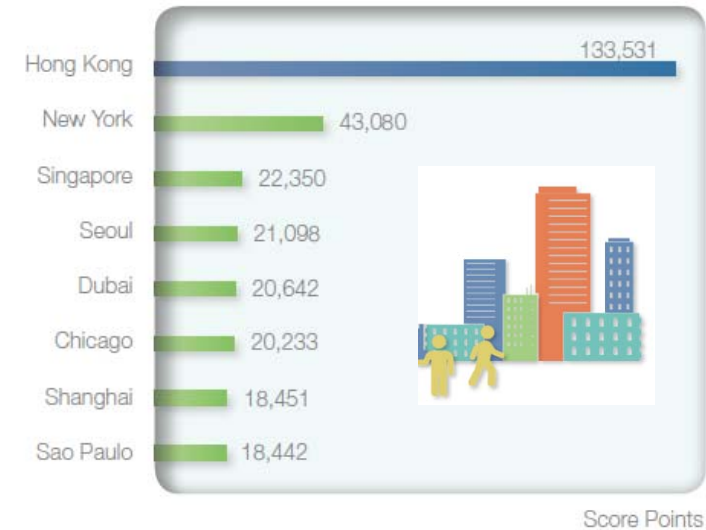
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# Key Characteristics of Hong Kong

- **Very High Density Metropolitan**
  - 50% people live or work above 15<sup>th</sup> floor
- **Well Connected**
  - Broadband coverage ~85%
- **Wide Adoption of Smart Devices**
  - 2.4 mobile phones per person
  - 50% EV growth last year
- **Ambition to be a Greener & Smarter City**
  - 2020 fuel mix targets
  - Smart city roadmap study

Emporis Skyline Rankings



Source: Emporis, June 2015

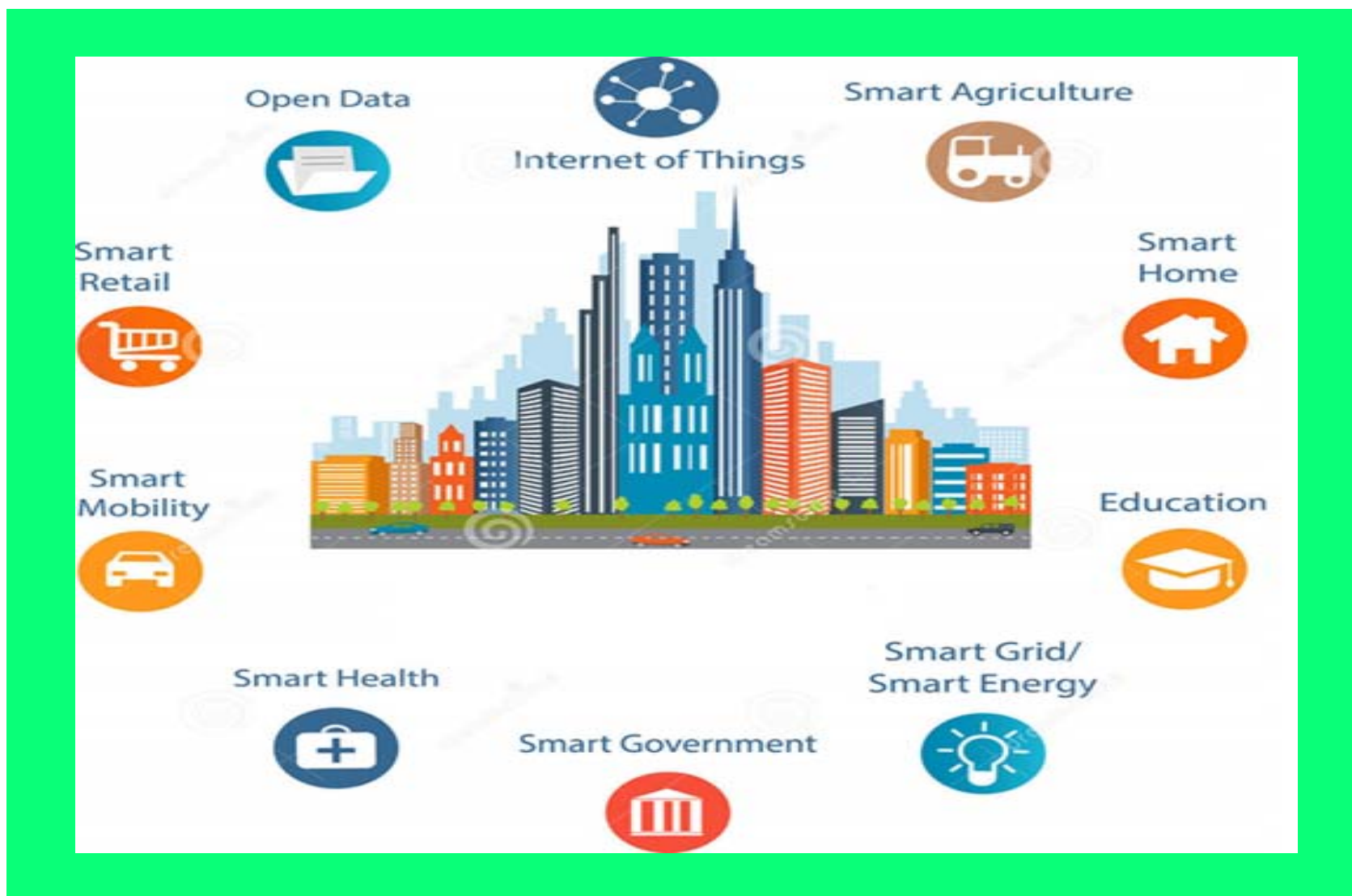


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# A Greener and Smarter Future City of Hong Kong



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# Smart City Initiatives in Other Regions



## ■ New York

- Screen City24/7: consolidated service information through mobile networks & outdated payphone booths turned into smart screens
- Larger no. of sensors to track traffic, energy consumption and air quality

## ■ Barcelona

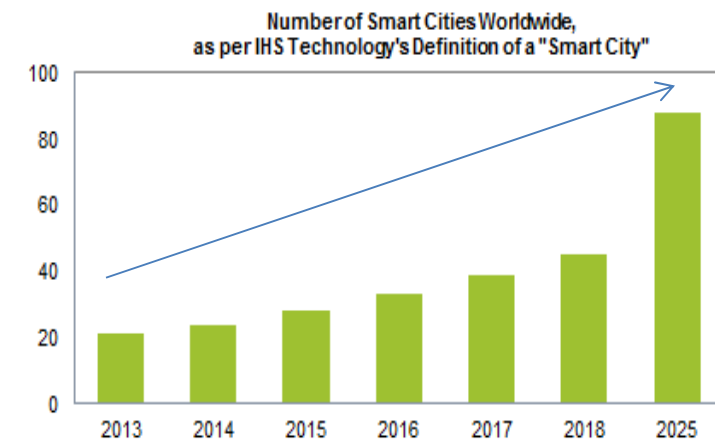
- Integrated top-down smart city planning and design
- Remote control of street lighting and tele-management of irrigation system
- Sensors for parking spaces, rubbish bin trash level, junction location alert and bicycle rental
- Solar power bus stop information system

## ■ Singapore

- Build well-connected society through national fiber network and wireless broadband
- Extensive IoT on key industries - financial services, manufacturing, logistics, tourism, retail, health, etc.

## ■ Shenzhen

- Strong drive for high tech / IoT industry
- Electronic public services – health records, online payment, remote consultation
- Smart district in Qianhai



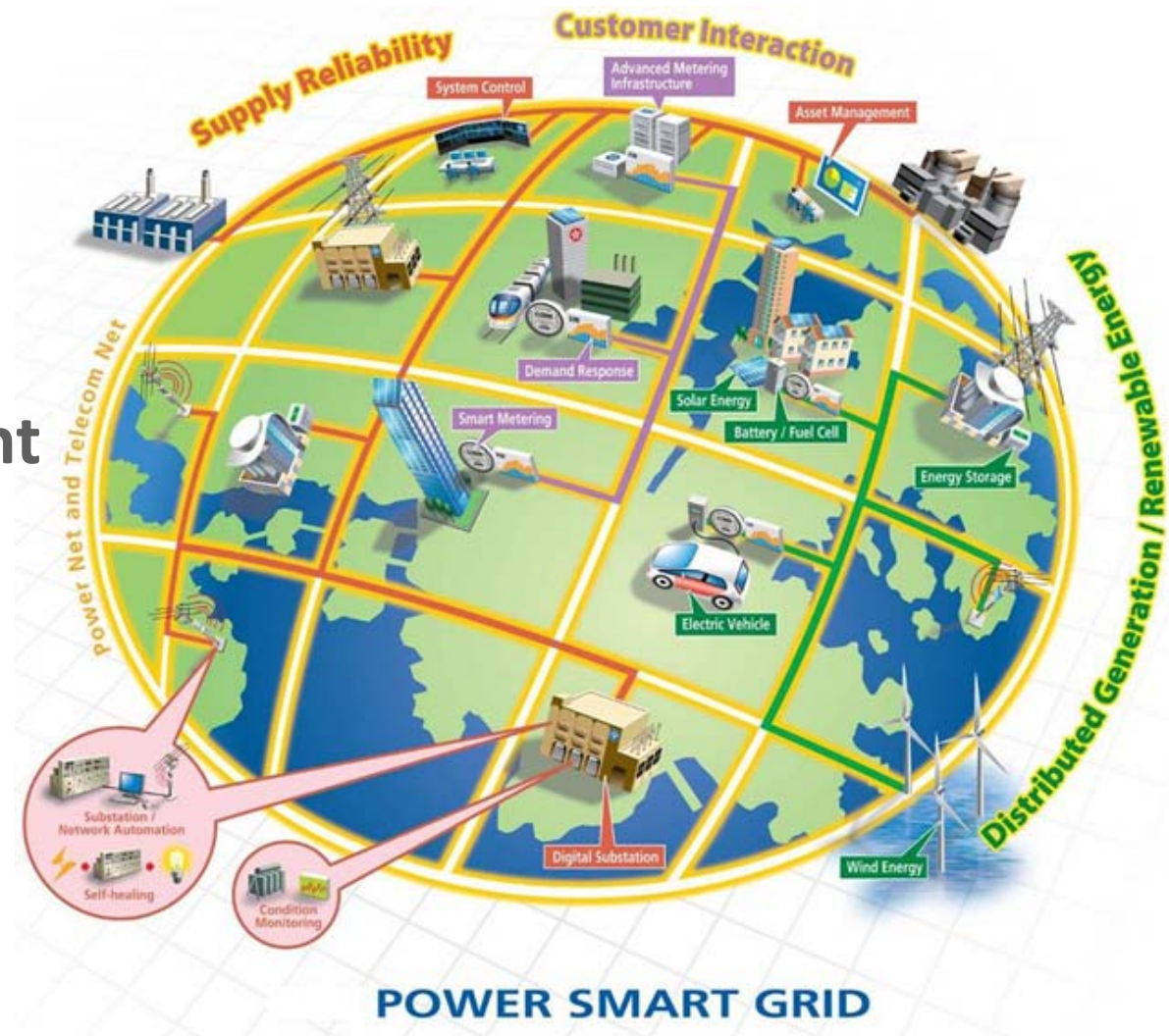
Source: IHS Technology, July 2014

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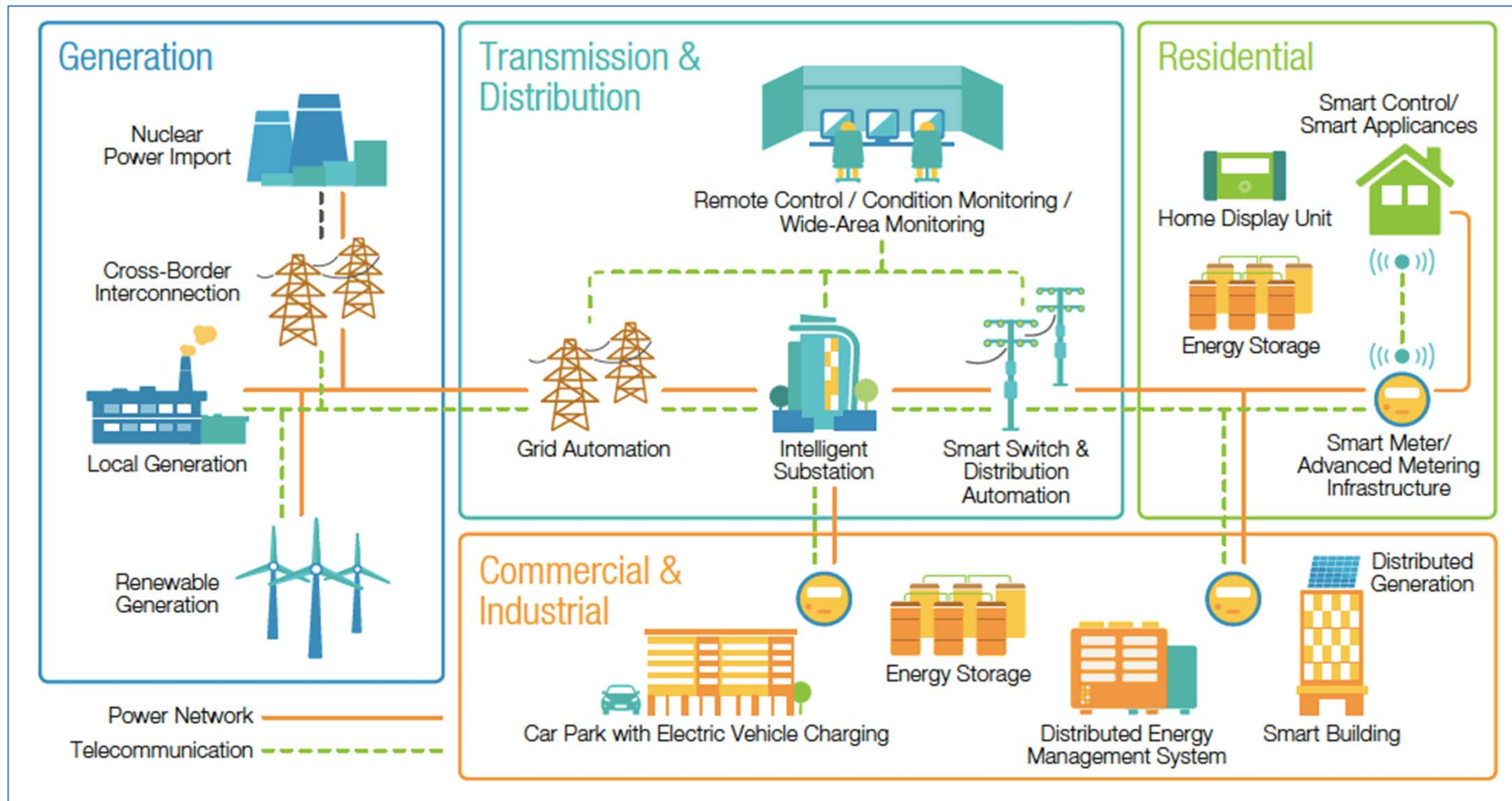
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# Smart Grid is a Key Enabler for Green & Smart City

- Renewable & Clean Fuel
- Reliable & Intelligent Network
- Efficient & Smart Energy Usage



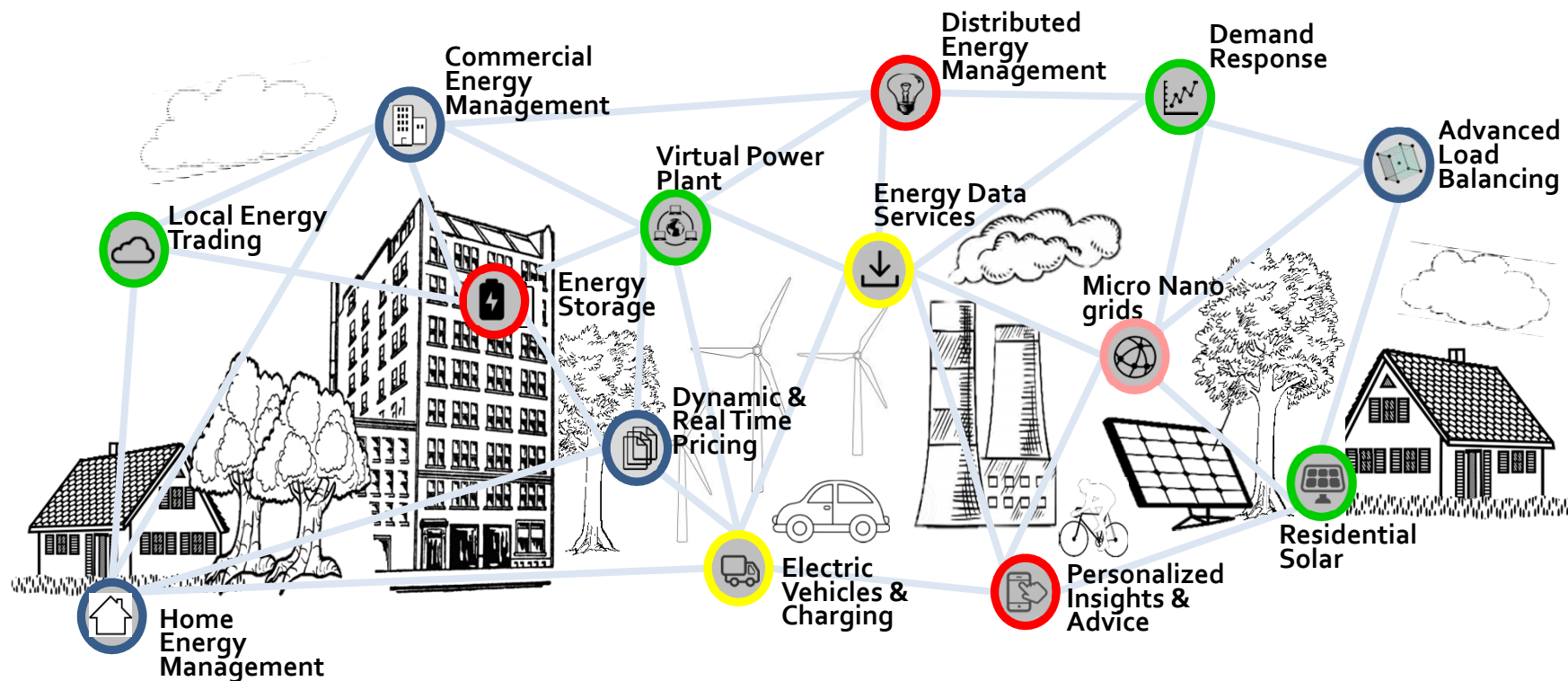
# Smart Grid Infrastructure



**A highly automated and integrated end-to-end intelligent supply network leveraging advanced communication and information processing technologies**



# Smart Grid Supports New Energy Marketplace



Smart Grid supports a greener, more distributed and interconnected new energy marketplace



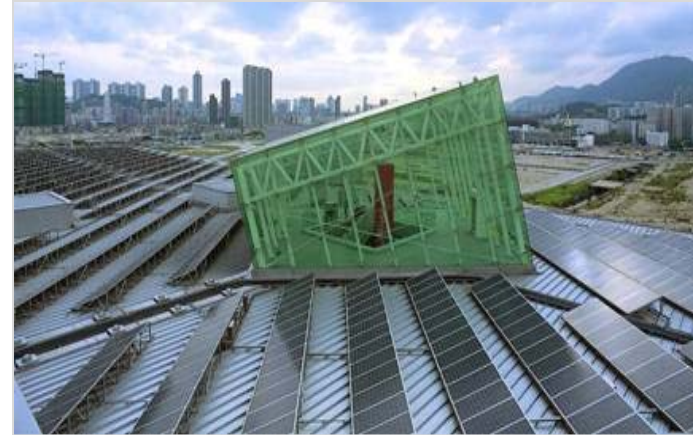
# More and Better Renewable Connection

RE is small sized, large quantify and intermittent in nature

Smart grid enables better RE connection

- Intelligent control
- Fail safe protection
- Power quality enhancement
- Battery storage support

Solar PV



Wind Turbine



Landfill Gas Road Lighting



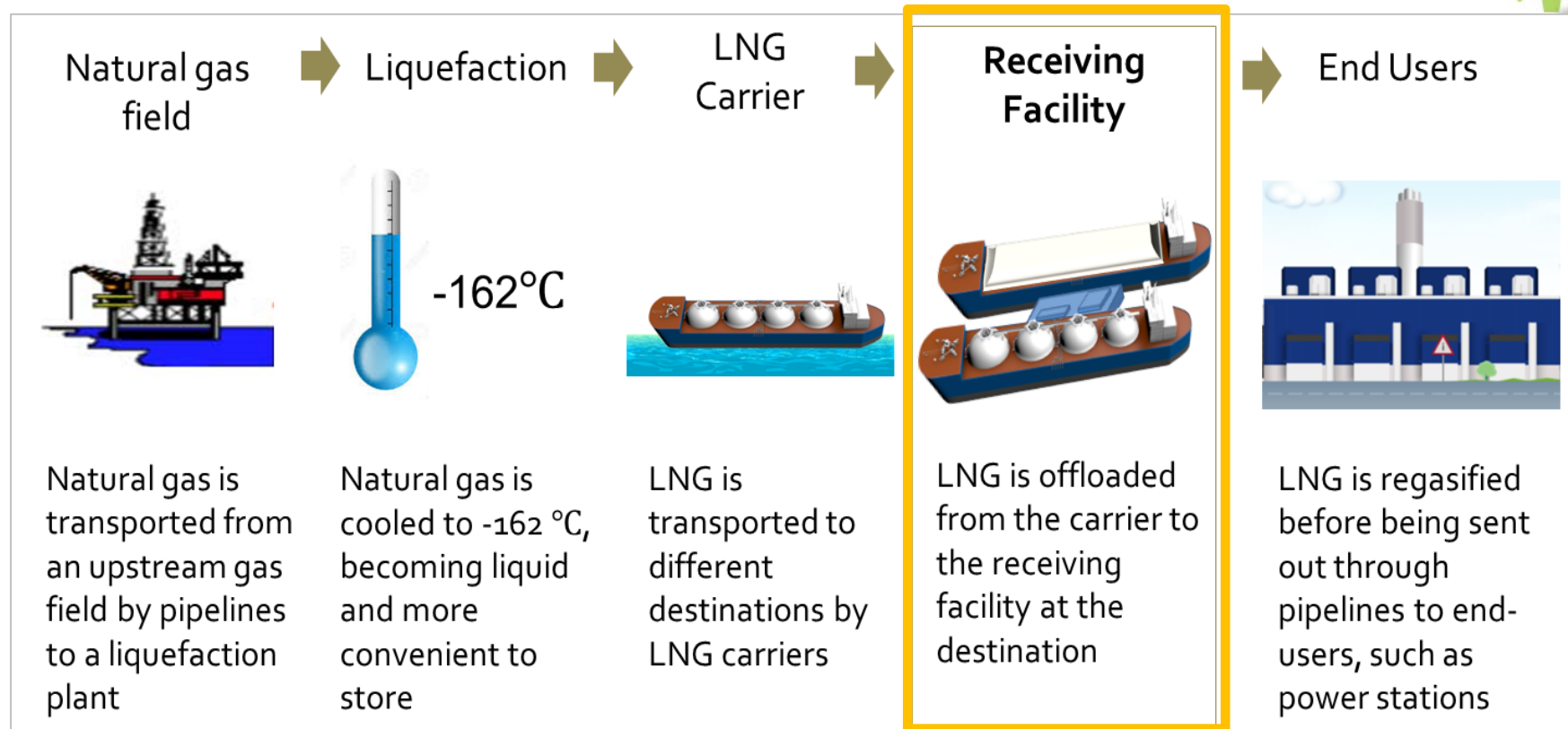
Renewable Energy Generation System at Town Island



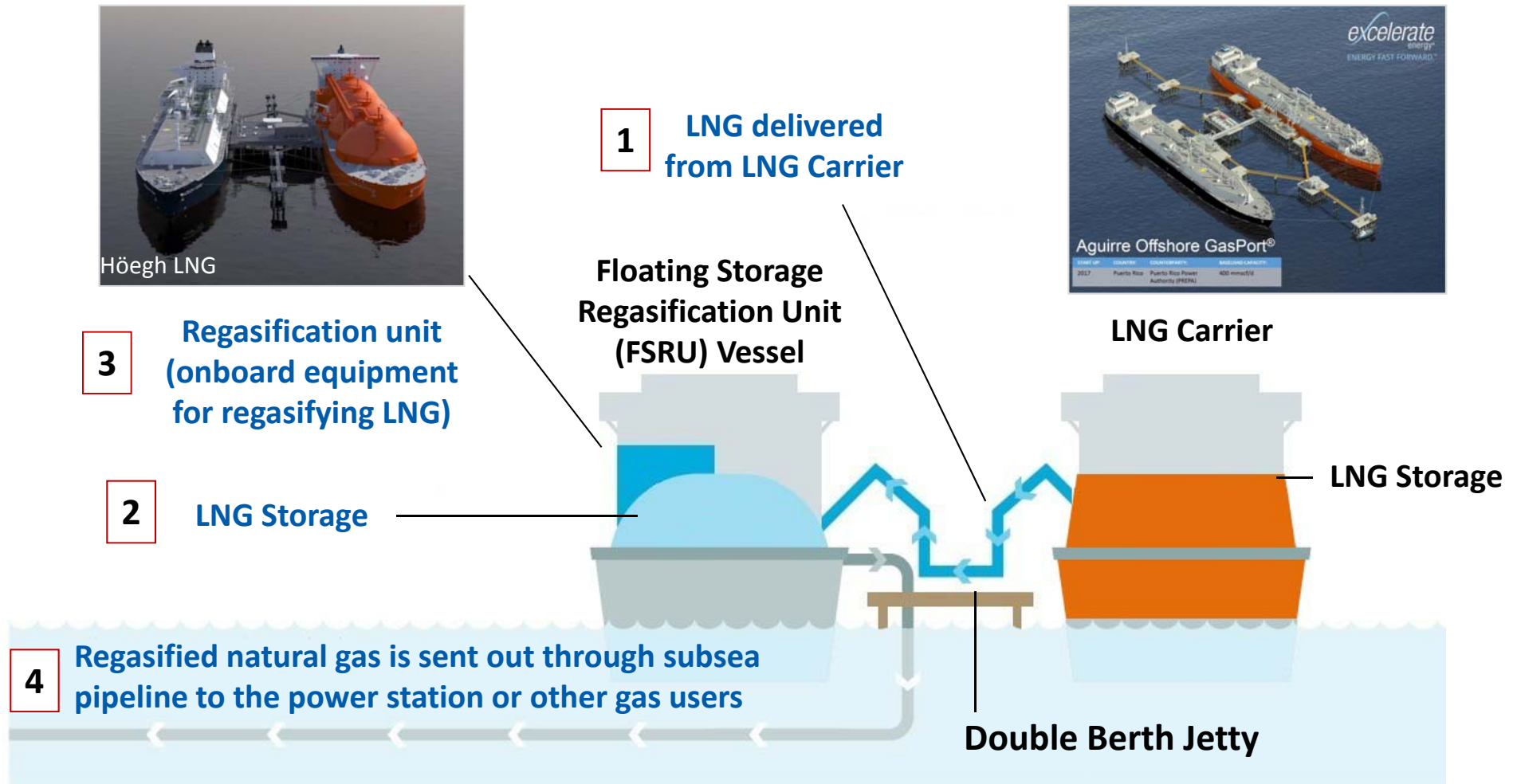
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# More Secure and Flexible Clean Fuel Supply Through Storage



# Floating Storage Regasification Unit (FSRU)



- Fuel supply reliability
- No use of land space / less environmental impact
- Shorter construction period



# Faster, More Accurate & Cost Effective Grid Control & Automation

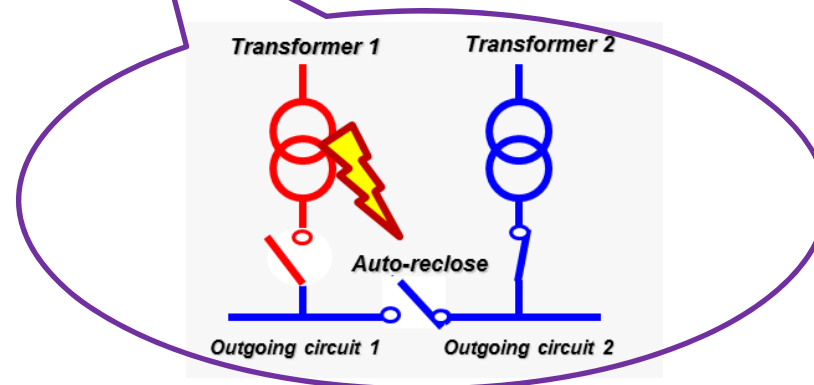
## Substation Automation



- Remote control & operation to reduce outage time and operating cost

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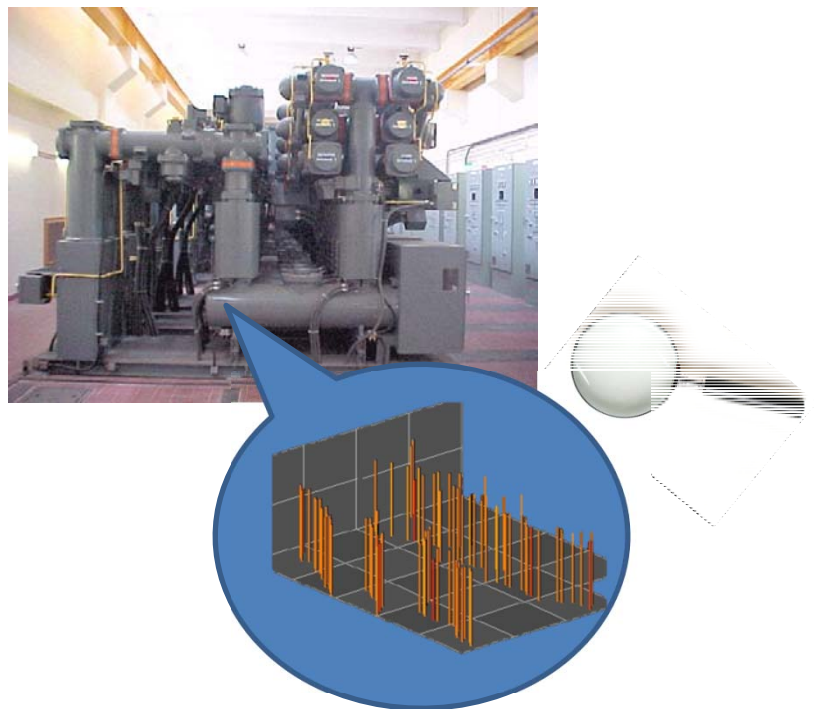
## Self-Healing



- Auto reclose of circuit breaker to reduce outage time

# Preventative Maintenance and Power Quality Enhancement

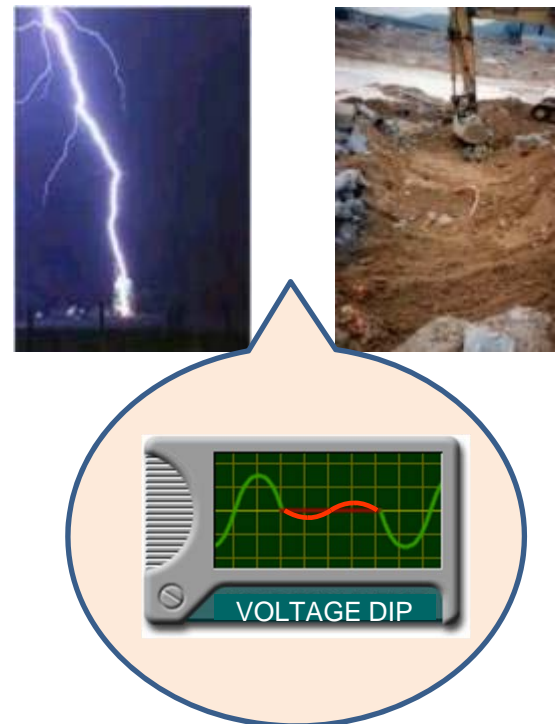
## Online Condition Monitoring



- Real-time monitoring and diagnostic of equipment condition to early detect faults

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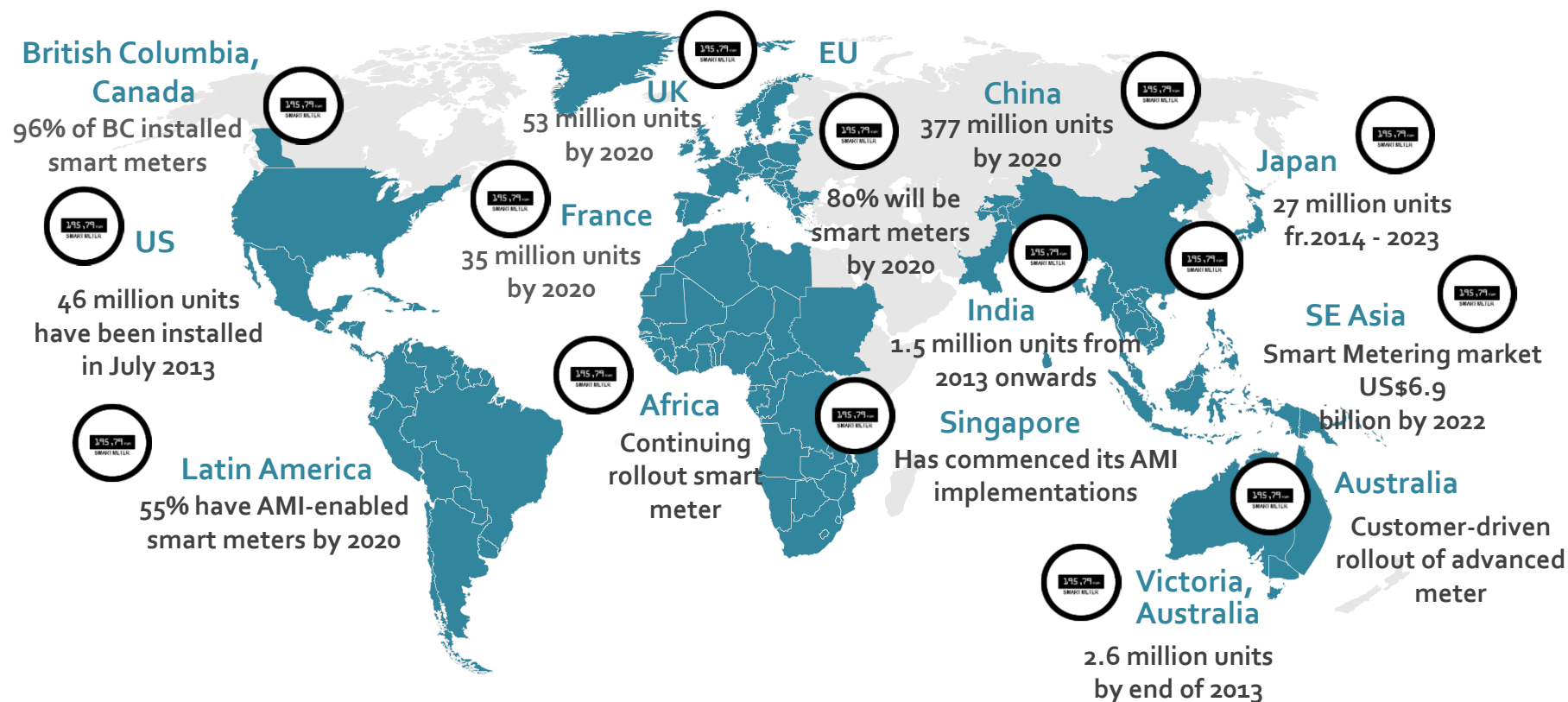
## Power Quality



- Planning ahead to protect customer sensitive equipment

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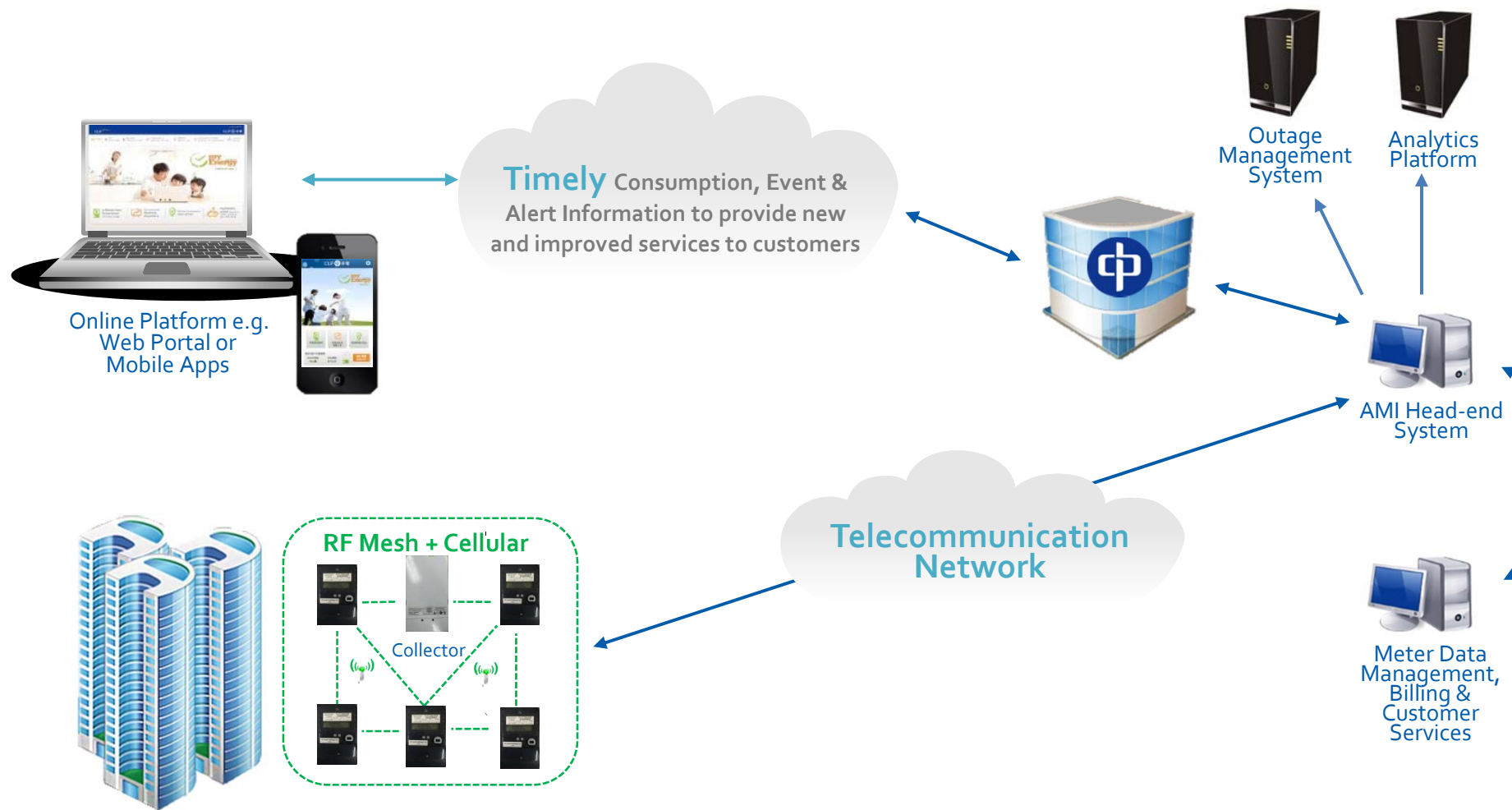
# Strong Global Trend of Smart Meter Adoption at Customer End



By 2023 Smart Meter penetration is expected to have reached 80% in the US; ~60% in Europe; and >45% in Asia with China leading the way with 380 million by 2020



# Smart Meter Infrastructure



Smart Meter enables more customer choices, more empowered customer decision on energy management and better grid peak management fault detection

# CLP “myEnergy” Smart Meter Pilot

Pilot will run for a period of

**18** months

Cross representation of  
Hong Kong with

**3000**  
residential customers

Cross representation of  
trades with

**1400**  
SME customers



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# Benefits of Smart Meters

## Offer New Services

- New products & services to match lifestyle



Lifestyle choices

Set consumption alerts

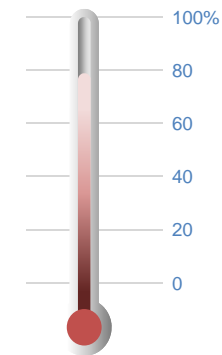
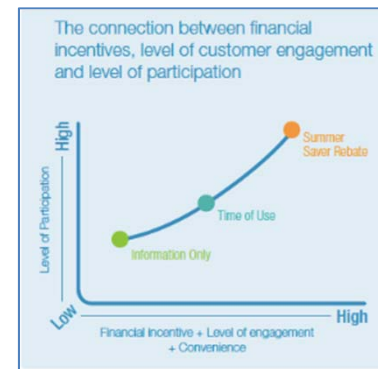


Used Mobile Application



## Change Behaviour

- Reduction in critical peak demand



## Improve Safety

- Detect meter tampering & avoiding fires



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## Improve Reliability

- Notify customer when detected outage





## A colorful illustration representing sustainable energy and urban development. On the left, there are two green wind turbines and a yellow sun with rays. In the center, there is a solar panel array and a blue electrical plug. A blue cable runs from the plug, through a green circular icon with a leaf, to a blue car on the right. In the background, there is a city skyline with several buildings in shades of orange and yellow. Three stylized human figures in yellow are positioned along the energy path: one near the wind turbines, one near the solar panel, and one near the car.



# Smart Grid Enablers a Greener & Smarter HK