

Agenda

- 1. Introduction to Hitachi**
- 2. Social Innovation Business**
- 3. Global Smart Communities Activities**
- 4. UK Smart Communities Activities**



Hitachi, Ltd.

Chairman & CEO

Hiroaki Nakanishi (left)

Hitachi, Ltd.

President & COO

Toshiaki Higashihara (right)

Established

1910

Capital

2,577 million GBP
(at the end of Mar. 2014)

Number of Employees

320,725
(at the end of Mar. 2014)

Revenues

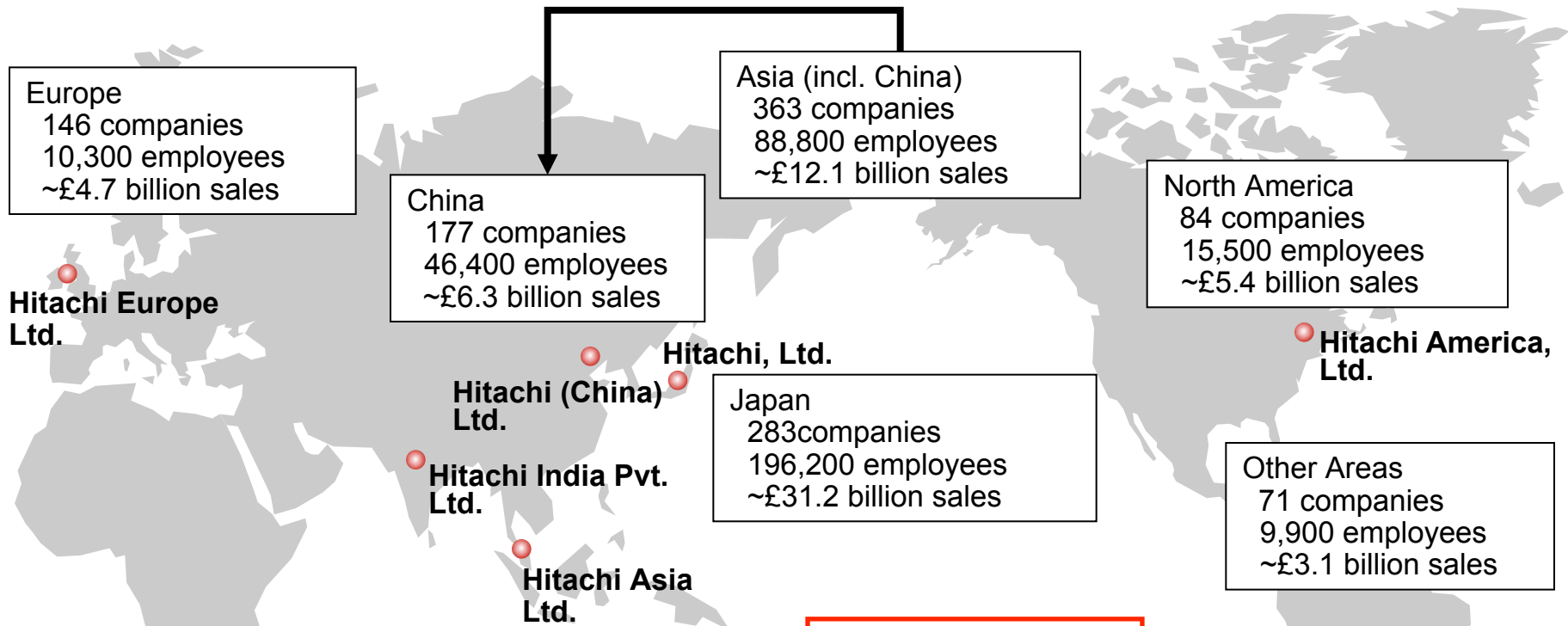
54,024 million GBP
(FY13)

Operating Income

2,993 million GBP
(FY13)

Figures are on a consolidated basis

Hitachi Group Introduction



Hitachi Europe Ltd.

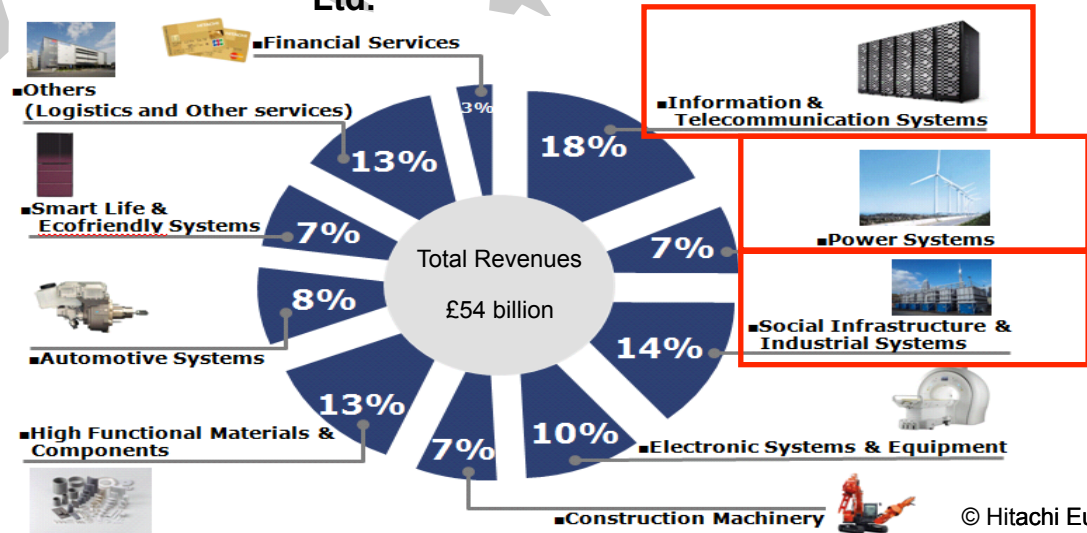
China
177 companies
46,400 employees
~£6.3 billion sales

Asia (incl. China)
363 companies
88,800 employees
~£12.1 billion sales

North America
84 companies
15,500 employees
~£5.4 billion sales

Japan
283 companies
196,200 employees
~£31.2 billion sales

Other Areas
71 companies
9,900 employees
~£3.1 billion sales



*As of March 31, 2013

SOCIAL INNOVATION
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FUTURE**



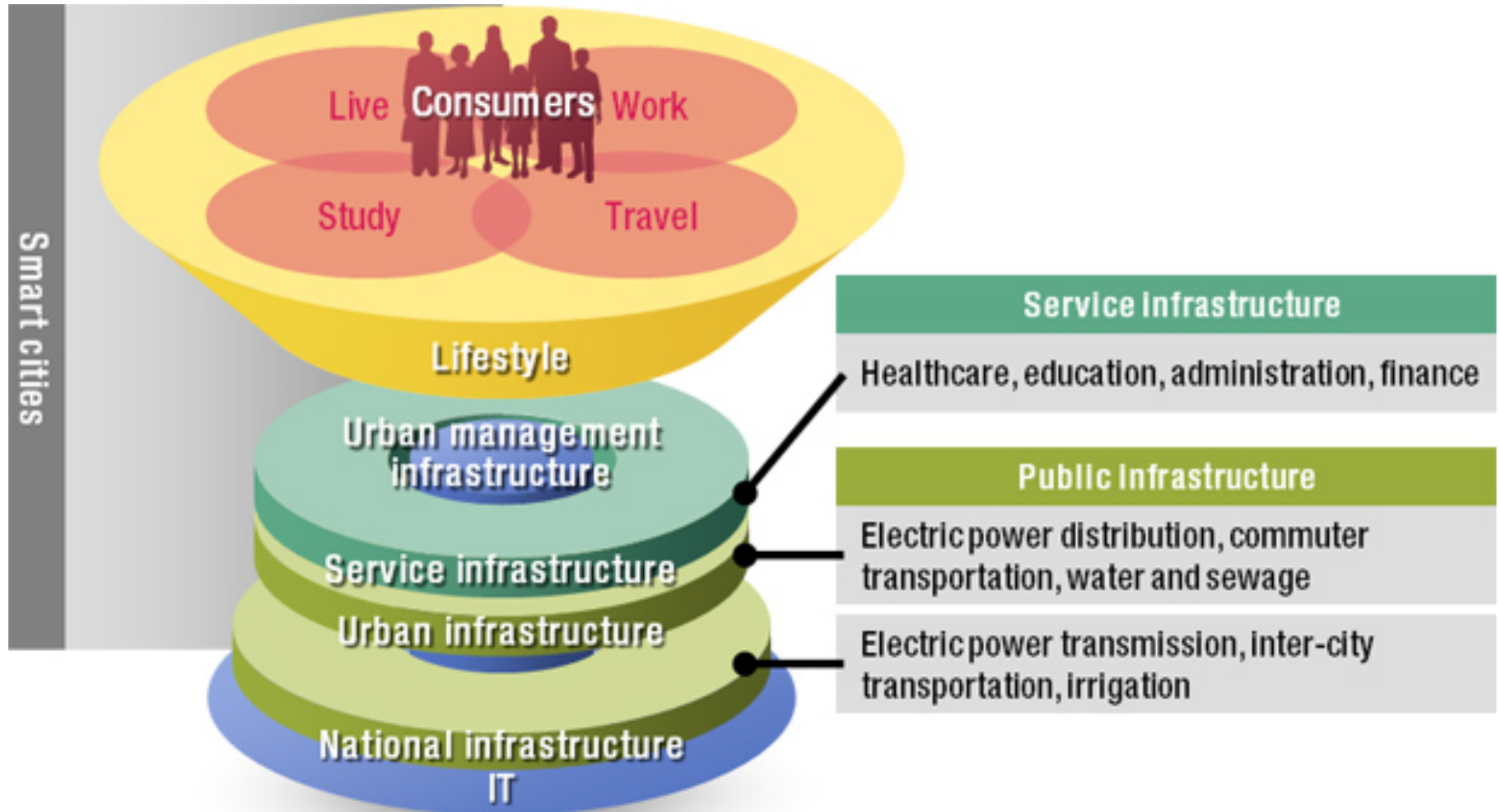
<http://social-innovation.hitachi.com/>

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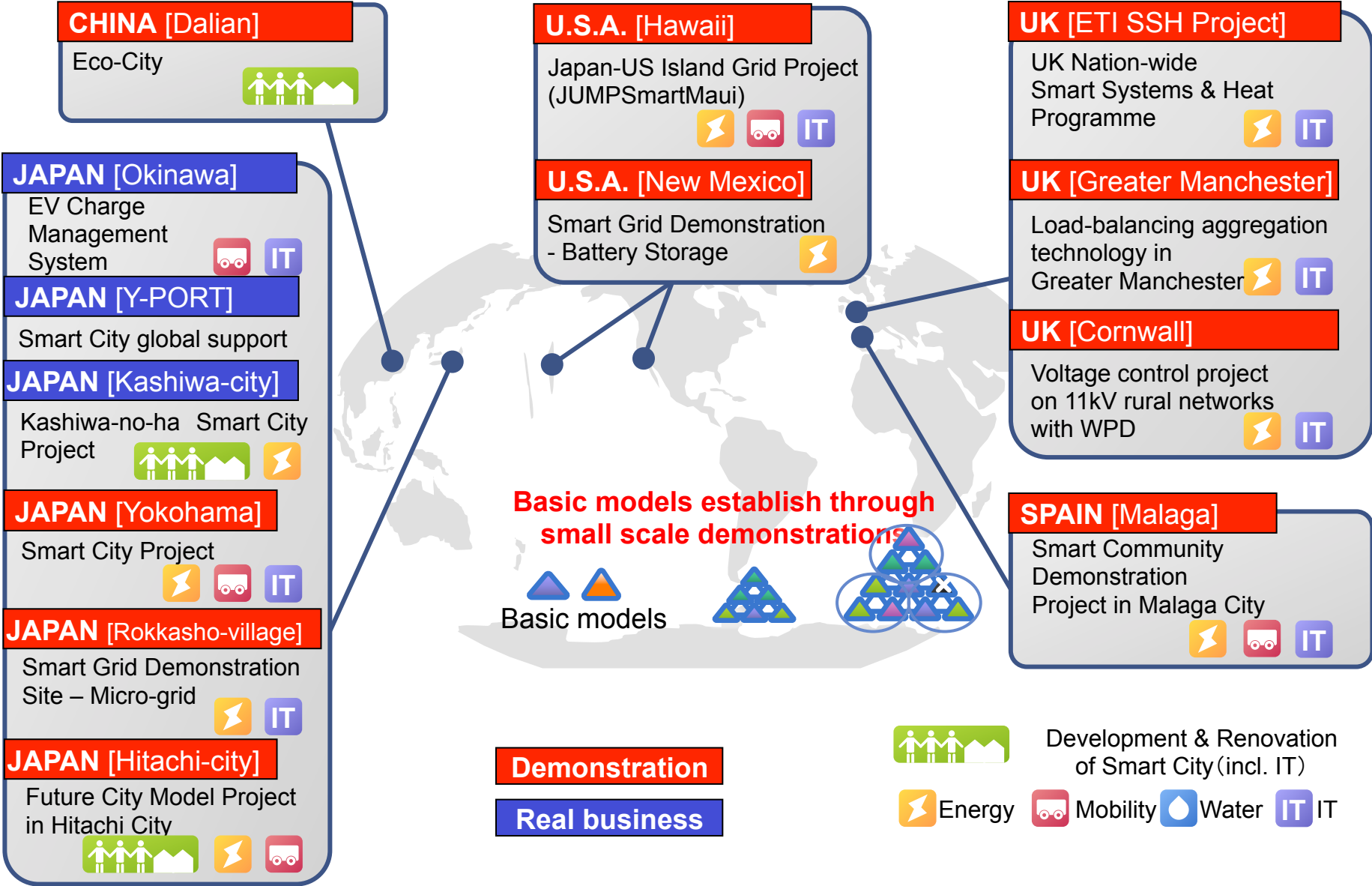
[Social Infrastructure] x [IT]



- Smart Communities vary in size and character, but are based on common concept of different layers of city management and services enabled by an IT infrastructure



Global Smart Community Activities

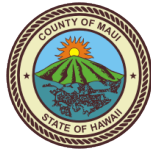




JUMPSmartmaui

SMART ENERGY. SMART CARS. SMART GRID.

<http://www.youtube.com/watch?v=Zx37Z1Q6cF0>



**Hawaiian
Electric**



**Maui
Electric**

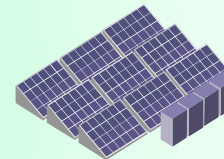
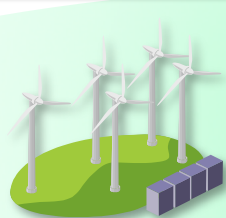


HITACHI
Inspire the Next

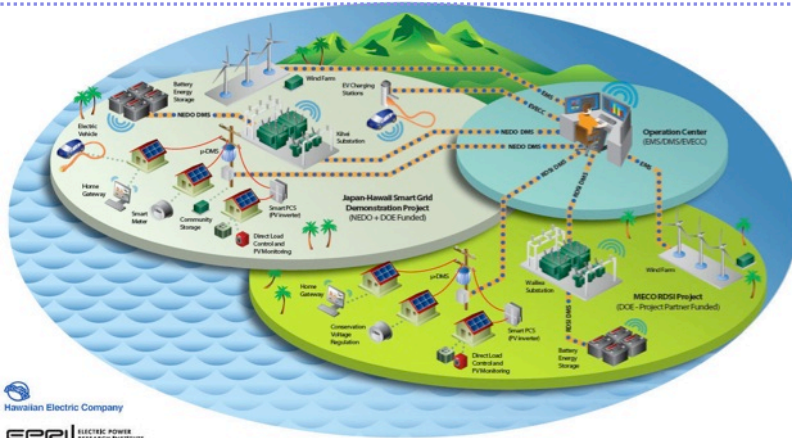
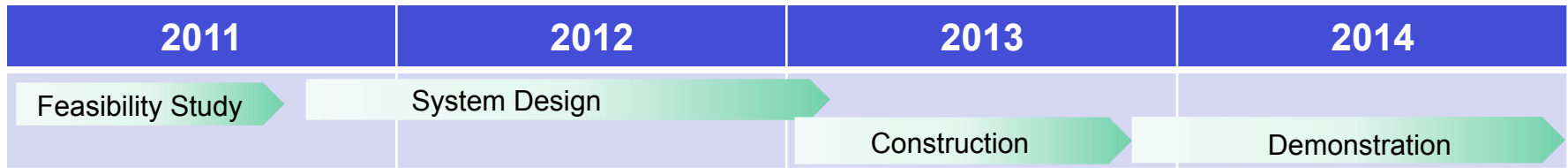
Achieving 40% renewable energy in Hawaii by 2030

In the US, Hawaii has by far the highest dependence on oil among the 50 states, with a ratio of oil-fired power generation greater than 70%. This is about six times that of Alaska, the second highest state.

Fossil fuels accounts for 90% of Hawaii's energy consumption, including fuel used by cars and airplanes. Electricity prices in Hawaii three times higher than the average prices found in the US due to soaring crude oil prices. Hawaii has set a goal to produce 40% of its electricity demand through renewable energy (RE) by 2030, from around 10% at 2010.



- RE ratio is significantly increasing in the state of Hawaii.
- In particular, Maui county of the state already accounts 30% RE of the total electricity demand with 72MW of wind turbine and 40MW of photovoltaic as of the end of 2013.



In Maui, large scale renewable energy resources have been introduced. In addition, PV and EV high penetrations are expected.

Issues

- Excess Energy
- Influence on frequency
- Influence on distribution line voltage



Six cutting-edge initiatives as solutions

1. Energy Efficiency

Maximum Utilisation of Renewable Energy

2. Stabilization/Balancing

DLC and **Advanced Load Shift** as Demand Response function

3. EV infrastructure & QC stations

EV charger control and Batteries

4. Cyber Security

Ensure adequate security

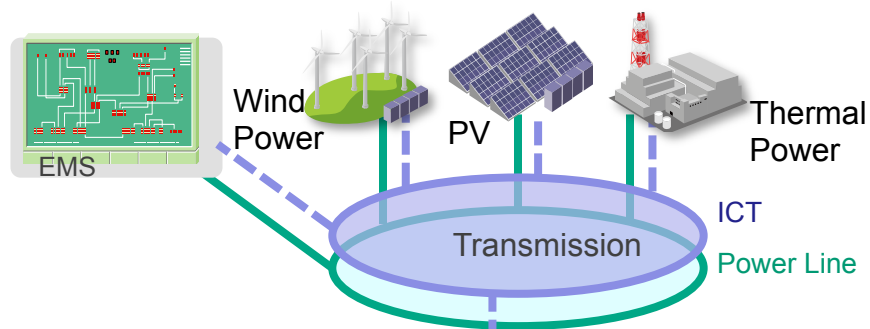
5. Autonomous System

Energy control via Autonomous Decentralised System

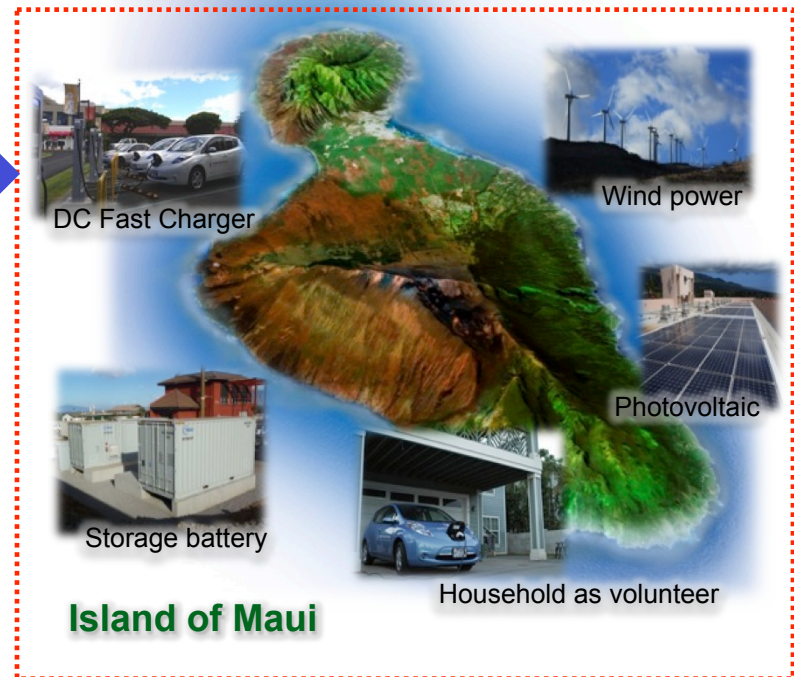
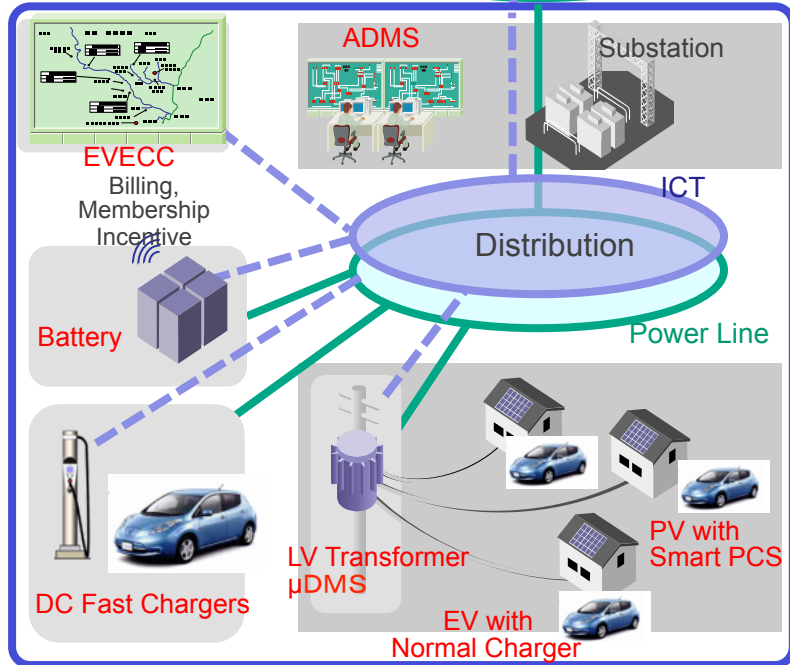
6. ICT Technology

ICT technologies to improve Quality of Life

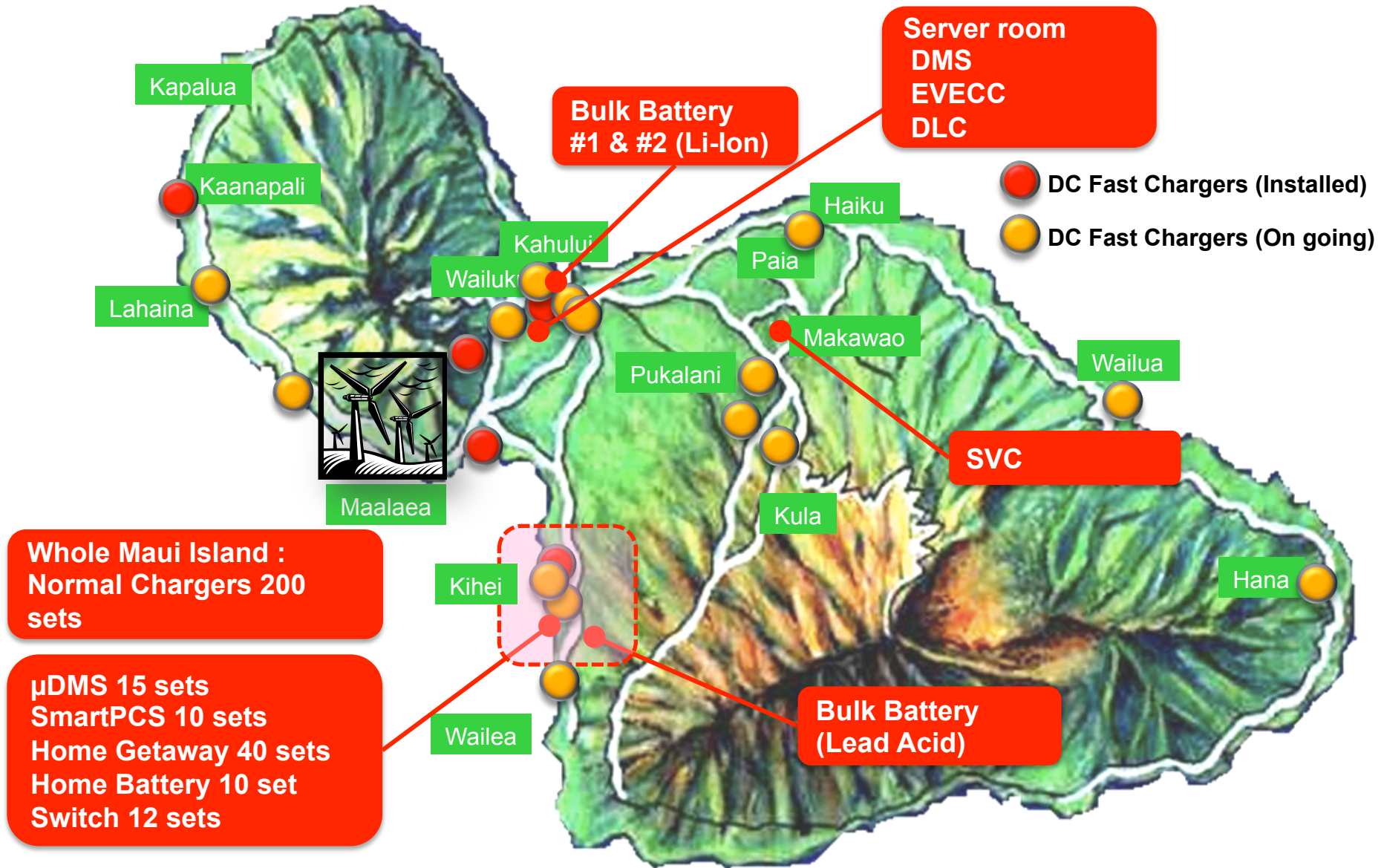
- EV batteries are utilised as stationed batteries for storing excess energy and controlling frequency fluctuation.



Demonstration will be implemented by 200 EVs and 40 Residences in all of Maui.
(Final target is to establish EV-Virtual Power Plant)



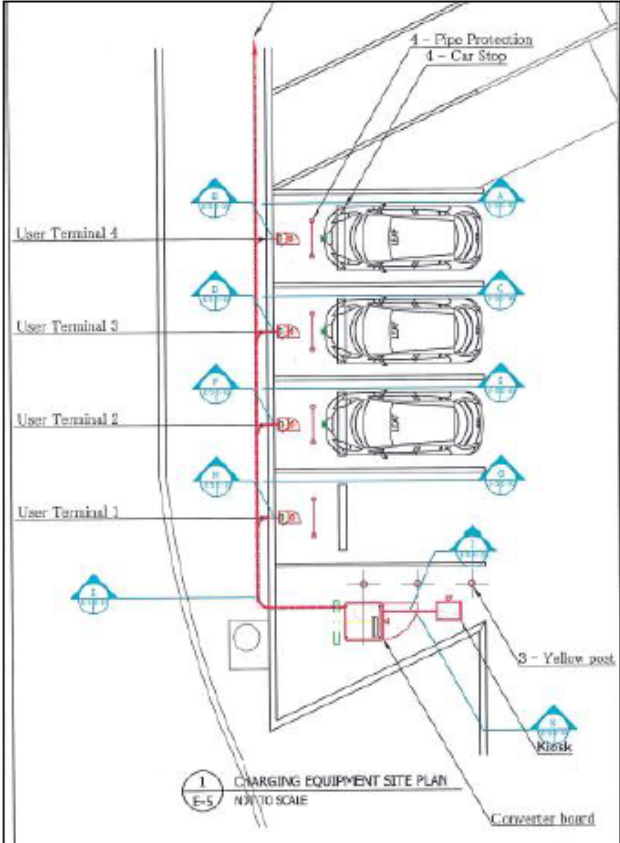
JUMPSmartMaui: Equipment Locations



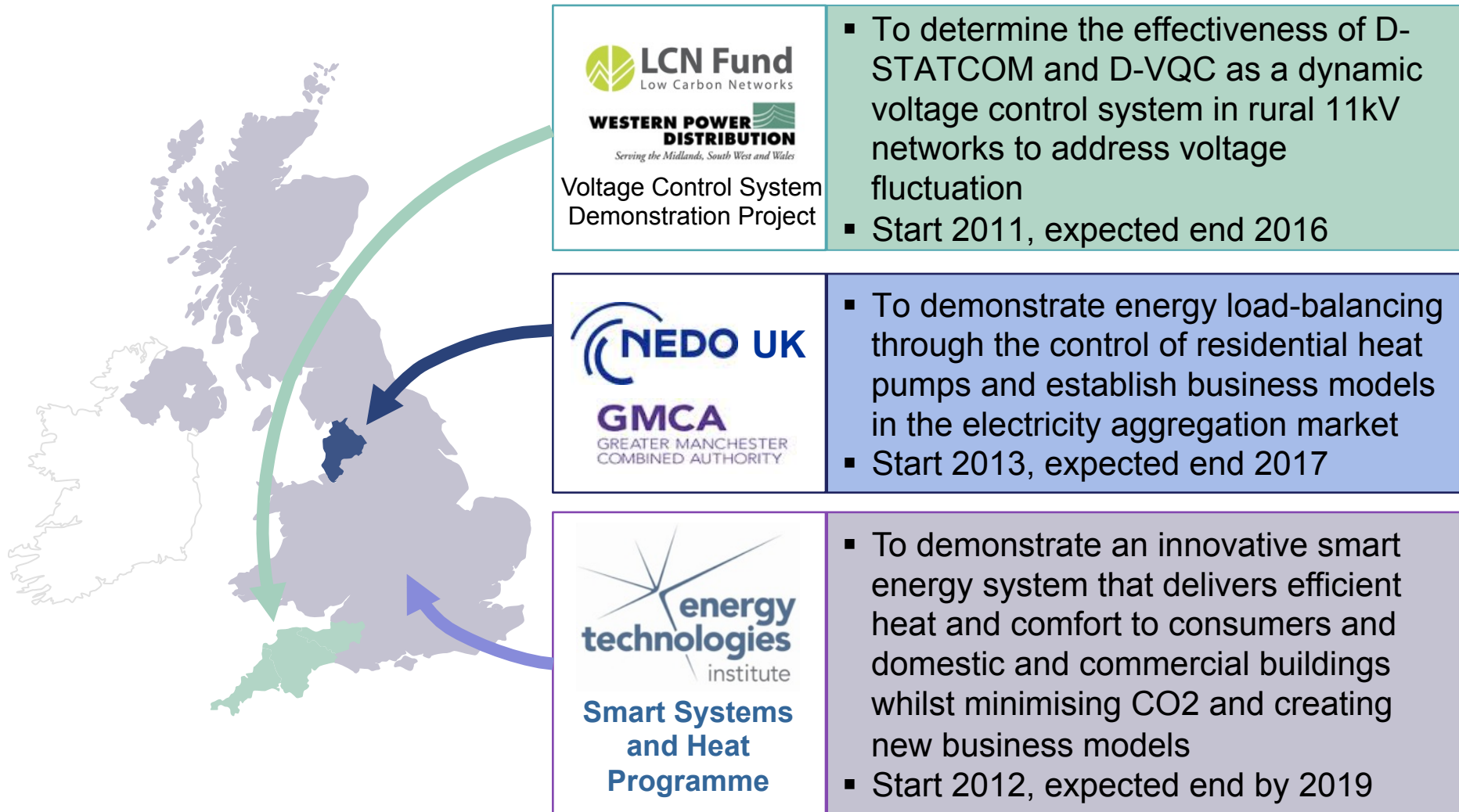
Queen Ka'ahumanu Shopping Center



Volunteer recruit kick-off Ceremony
@ Queen Kaahunumanu Center
June 15th 4:30 p.m. ~ 6:00 p.m.



SCEG is currently involved in several demonstration projects in the UK which address different aspects of Smart Grids and Smart Cities



Voltage Control System Demonstration Project

- To determine the effectiveness of D-STATCOM and D-VQC as a dynamic voltage control system in rural 11kV networks to address voltage fluctuation
- Start 2011, expected end 2016



- To demonstrate energy load-balancing through the control of residential heat pumps and establish business models in the electricity aggregation market
- Start 2013, expected end 2017



Smart Systems and Heat Programme

- To demonstrate an innovative smart energy system that delivers efficient heat and comfort to consumers and domestic and commercial buildings whilst minimising CO2 and creating new business models
- Start 2012, expected end by 2019

- Contribute to the UK's transition to a low carbon society through cutting edge technologies such as heat pumps and ICT systems

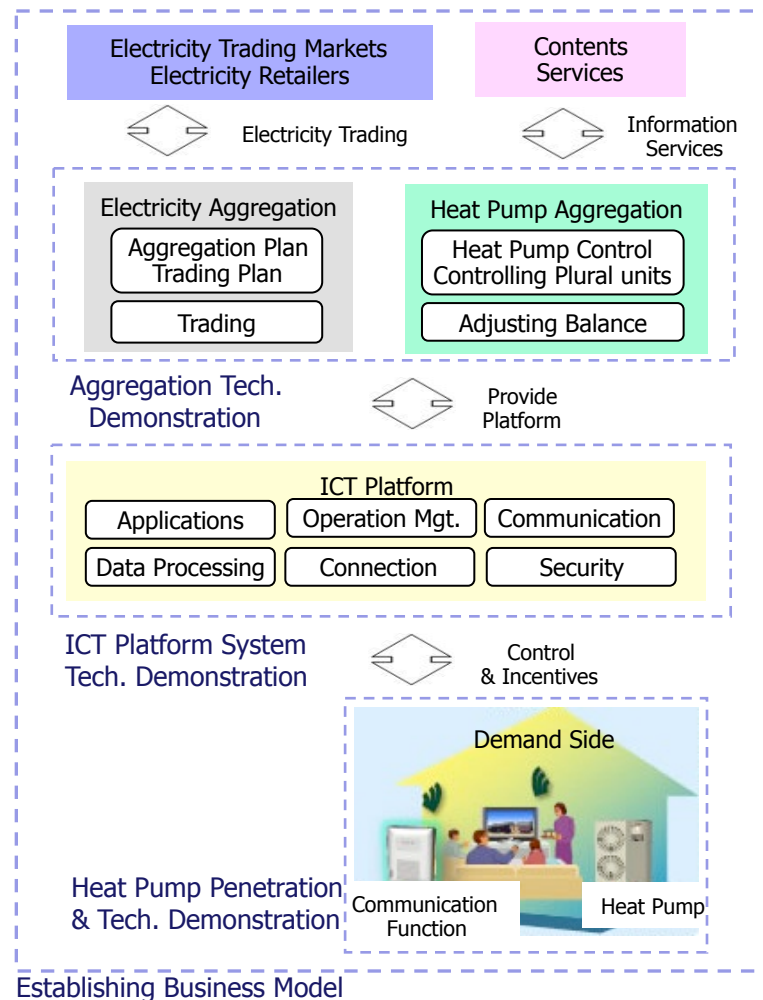


UK's target

2030: Heat Pump penetration: 30%

Theme 1. Demonstration of usability and efficiency of load-balancing aggregation technology and systems for residential power consumption (Hitachi, Daikin)

Theme 2. Establishment of Business Model (to be demonstrated by Mizuho Bank, Mizuho Information & Research Institute, Hitachi, Daikin)



Heat pump technology

- What is the optimal technical solution for a given location?
- What drives and hinders consumer adoption of heat pumps?
- What capabilities are required in the value chain?

ICT solution – electricity aggregation + telecare

- How should the ICT system be designed to fulfil the requirements of the DR market and consumers?
- What solutions are needed to ensure reliable and secure communications?
- What monitoring devices are best suited?

Business model and commercial viability

- What is the value of heat pump demand response in the UK market? What scale is needed?
- What incentives can be offered to improve take-up?
- Is regulatory change needed to enable this business model?

Corporate Partners



bp



Public Partners



Department
for Business
Innovation & Skills



Department
of Energy &
Climate Change

EPSRC

Technology Strategy
Board

Programme Associate

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- Addressing the challenges of **climate change** and **low carbon energy**,
- Creating future-proof and economic local **heating solutions** for the UK,
- Delivering enhanced **knowledge** amongst industry and public sector,
- Building better understanding of **energy challenges**,
- Providing **new technology** and **business concepts**.

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[Social Infrastructure] x [IT]



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