Data in Smart Distribution Grids

Presented by **Michael Clark – UK Power Networks**

Low Carbon London Programme Director

UK Power Networks
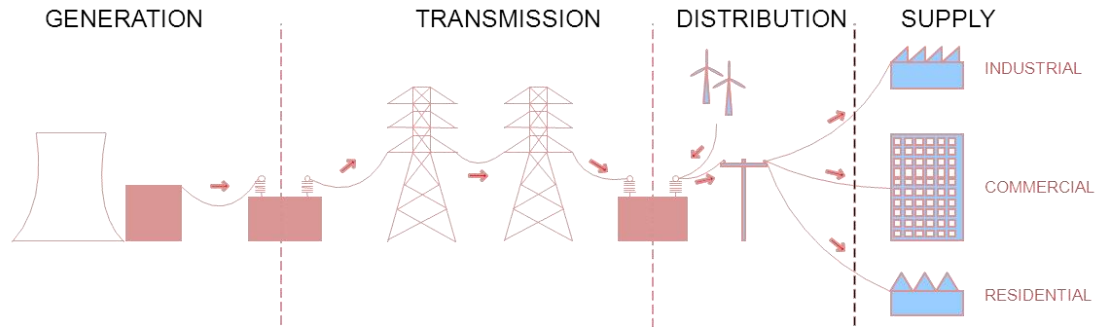
UK Power Networks
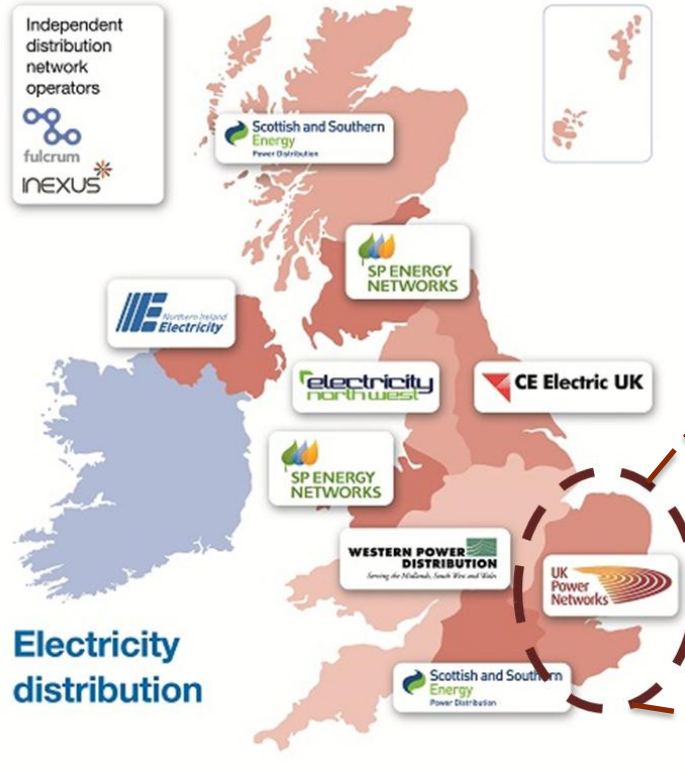
	Total	% of Industry
End Customers Millions	8.0	28%
Service Area km²	29,165	12%
Underground Network km	134,767	29%
Overhead Network km	47,391	15%
Energy Distributed TWh	89.4	28%
Peak Demand MW	16,229	N/A
New Connections	130,768	35%

The Context

- Radical shift in UK energy policy;
    - 35% electricity from renewables by 2020.
    - Electricity generation decarbonised by 2030.
    - 80% reduction in carbon emissions by 2050.
- Potential impact on our network (if we do nothing);
    - Higher peak demands.
    - Thermal and voltage constraints.
    - Higher fault levels.
    - Less predictable load cycles.
    - Higher losses.
    - Potential of a doubling of demand by 2050 without 'smart' intervention.
    - Costly and disruptive capital investment.

The Challenge

"Historically, Distribution Network Operators do not deal with large volumes of asset data. Pioneering programmes such as Low Carbon London are breaking new ground in collecting high resolution data sourced from very low levels within the installed asset base. This provides new insights into the operation of the system and will lead in Smart design and operation of the electricity distribution system in a low carbon world"

Michael Clark
UK Power Networks

Low Carbon London - A learning journey

Learning how to create a smart low carbon city

A pioneering demonstration project, trialling new low carbon technologies, commercial innovation and design, operation and network management strategies...

- Smart Meters
- Wind Twinning
- Demand Side Management, Industrial & Commercial (I&C)
- Residential ToU - Smart Appliances, Demand Flexibility
- Distributed Generation
- Electric Vehicles
- Heat Pumps
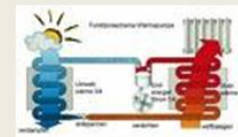- New Tools, Operational and Investment Practices

UK Power Networks

We will learn and demonstrate how to…

...maximise opportunities for low carbon, distributed and micro-generated electricity

...respond to new demands on the electricity network from a low carbon economy
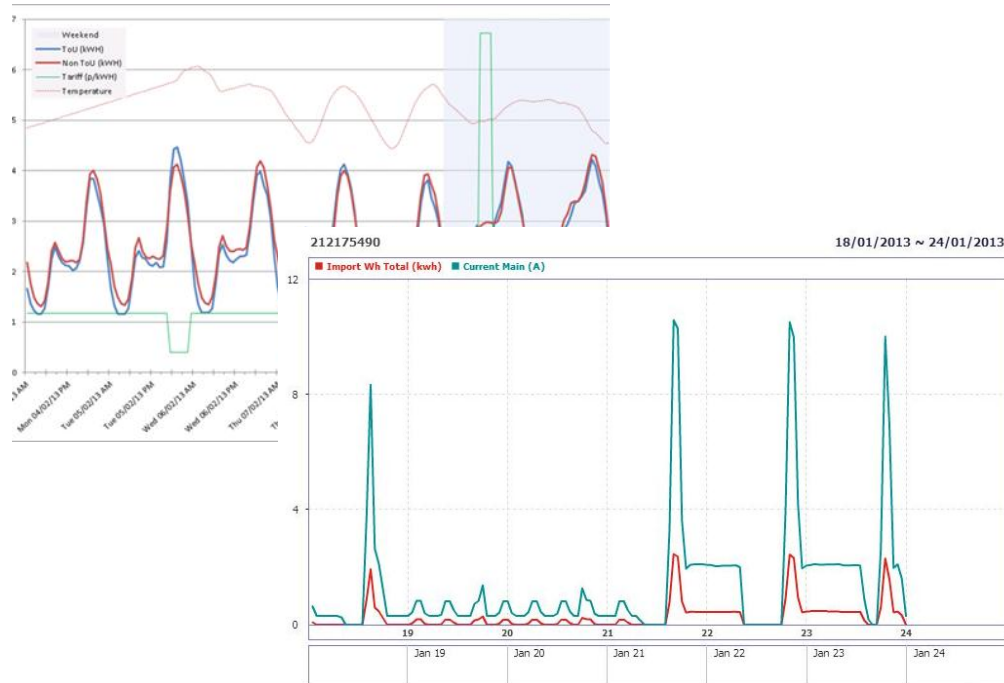
...work with communities and businesses to help them manage demand

...match local energy demand with national low carbon energy demand
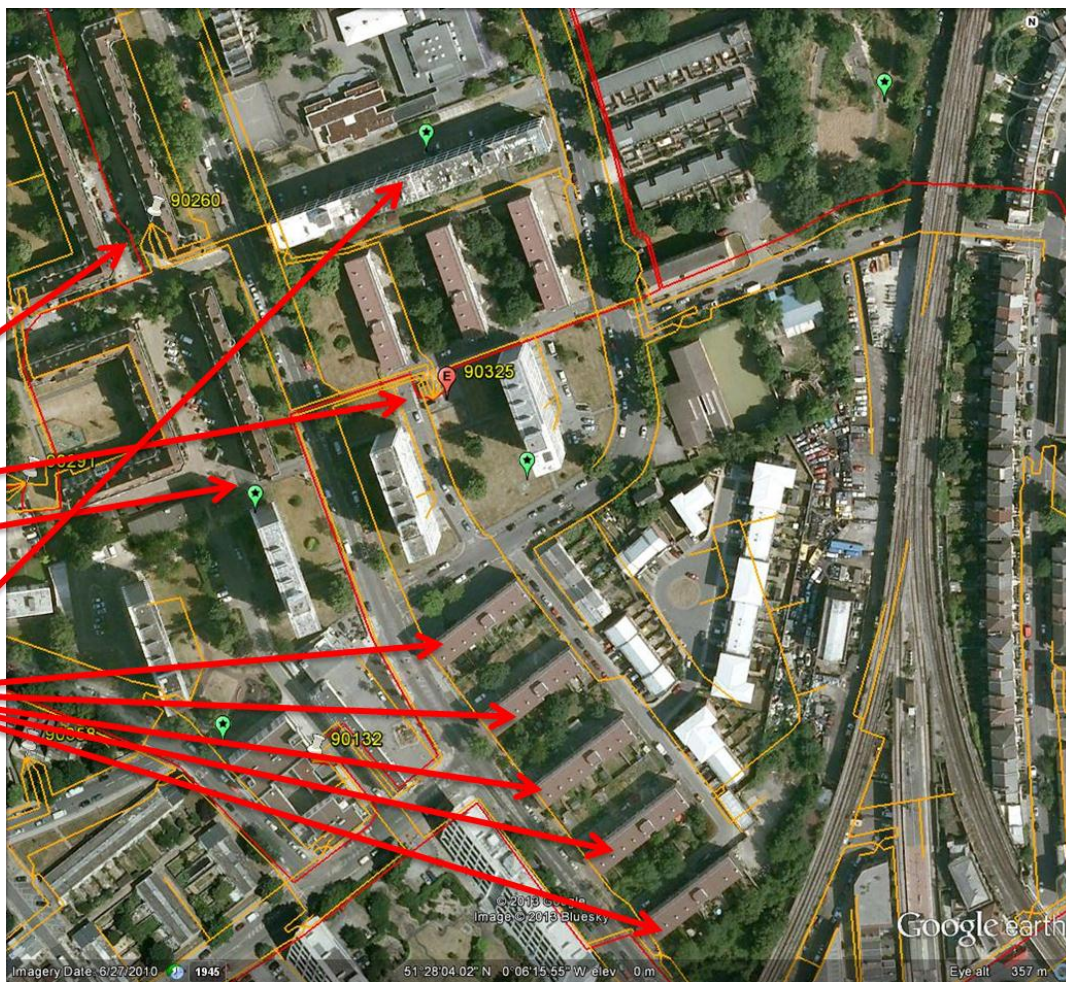
What have we achieved?

5814 Smart meters installed in the homes of EDF Energy customers and across London.

1119 EDF Energy smart meter customers have agreed to take part in a unique Low Carbon London **Dynamic Time of Use** trial. The demographic profiles of this group are closely aligned to those of London as a whole.

8/22 Eight organisations have agreed to have **Active Network Management** technology installed in 22 of their premises.

25+ Small-scale embedded generation (SSEG) trial participants and still recruiting.

900 Low Carbon London is now capturing **charging data** from more than 900 publicly-accessible electric vehicle charging posts.

98 SO FAR The charging patterns of 46 privately-owned and 52 commercially-owned **electric vehicles** now being monitored. These numbers will rise as recruitment to the innovative Low Carbon London electric vehicle leasing scheme takes place during the first quarter of 2013.
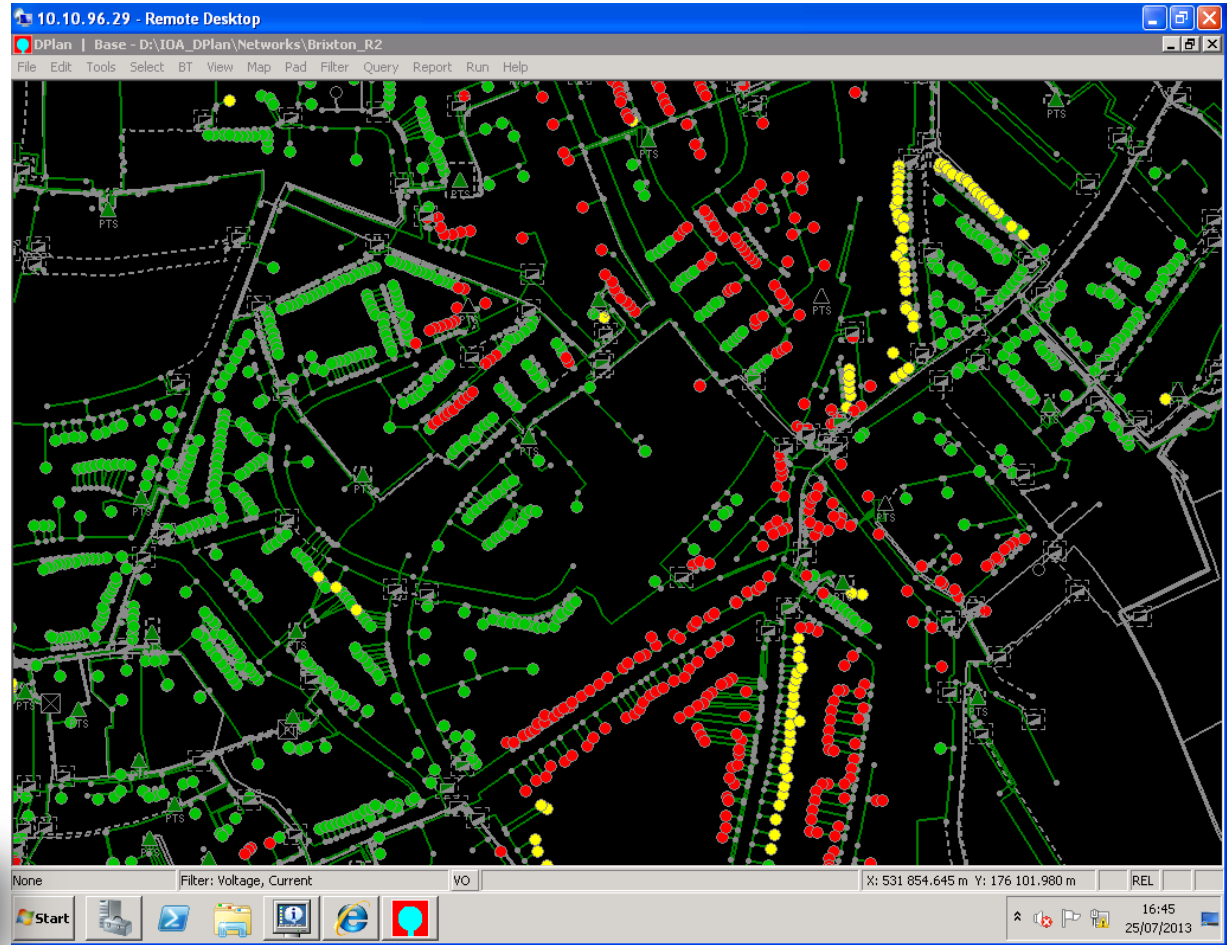
UK Power Networks

What have we achieved?

- HV cables
- LV cables
- Substations
- LV Monitoring
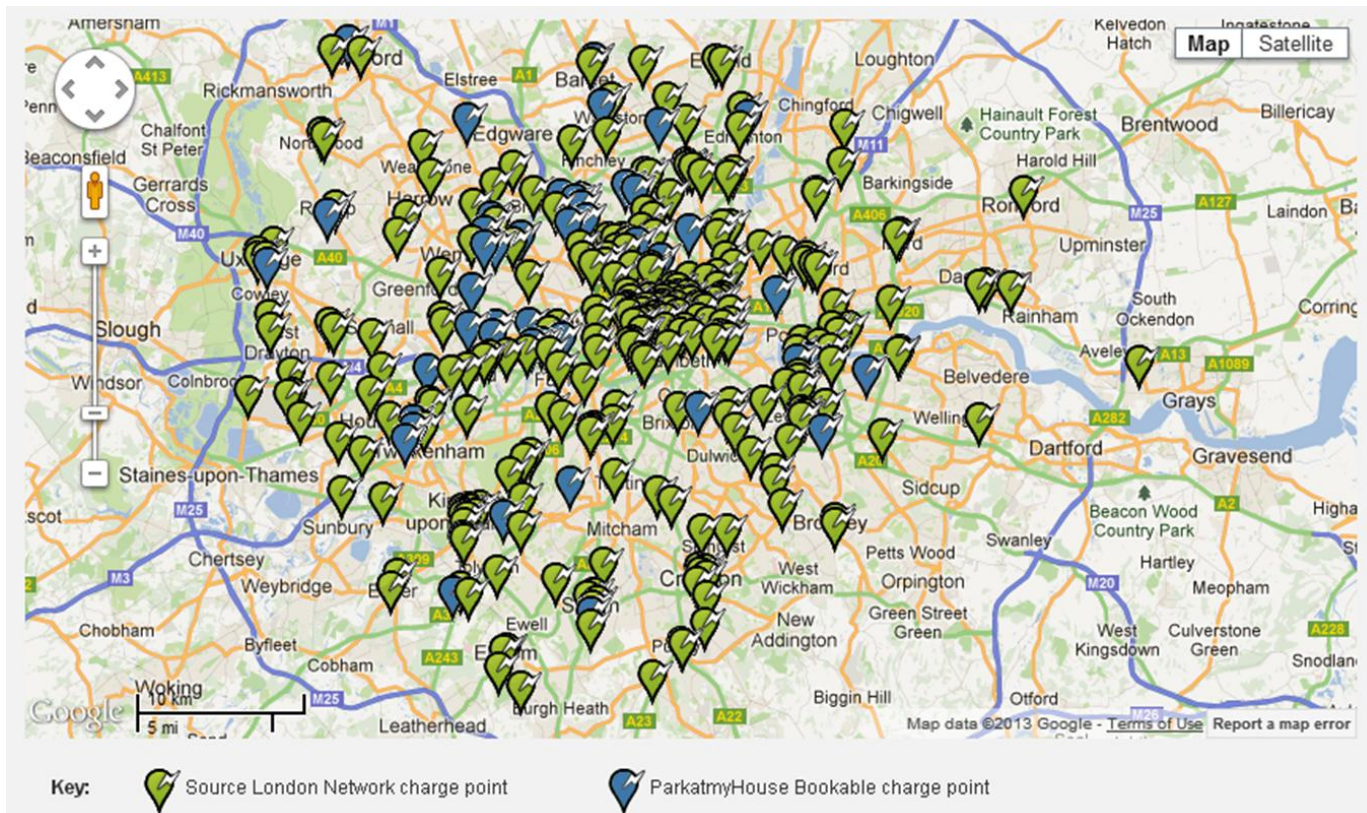- SM Trial participants
- PV installations (not on our records)
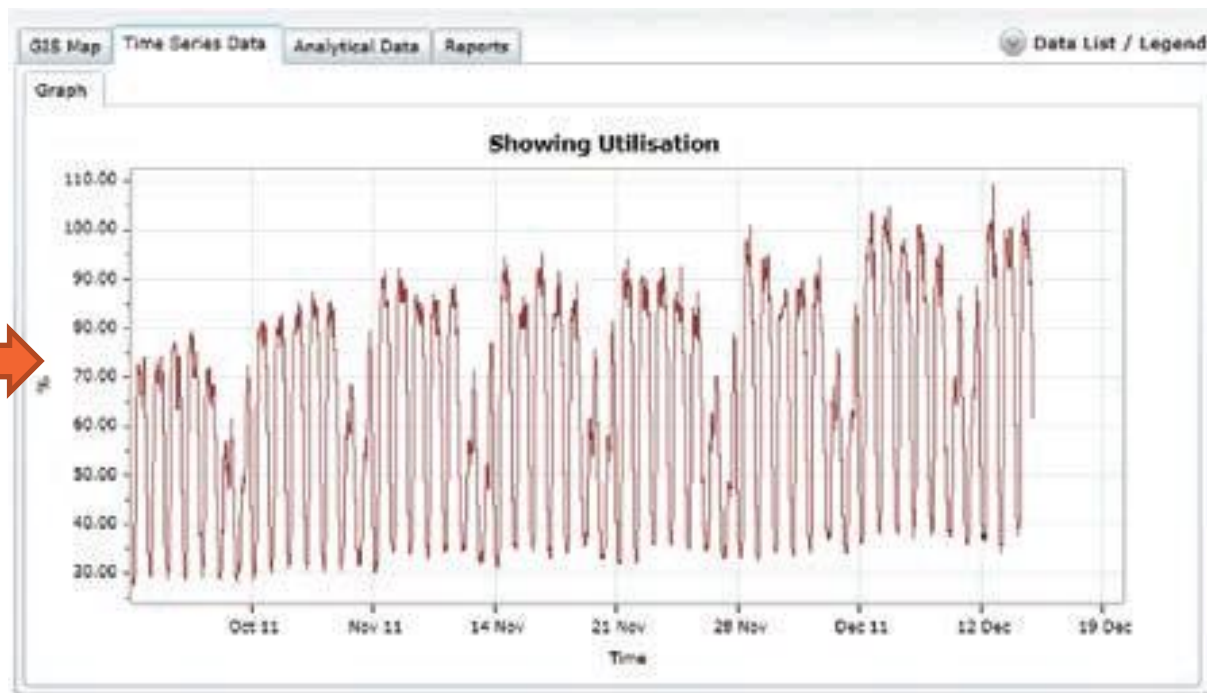
Later instances will display all MPANS
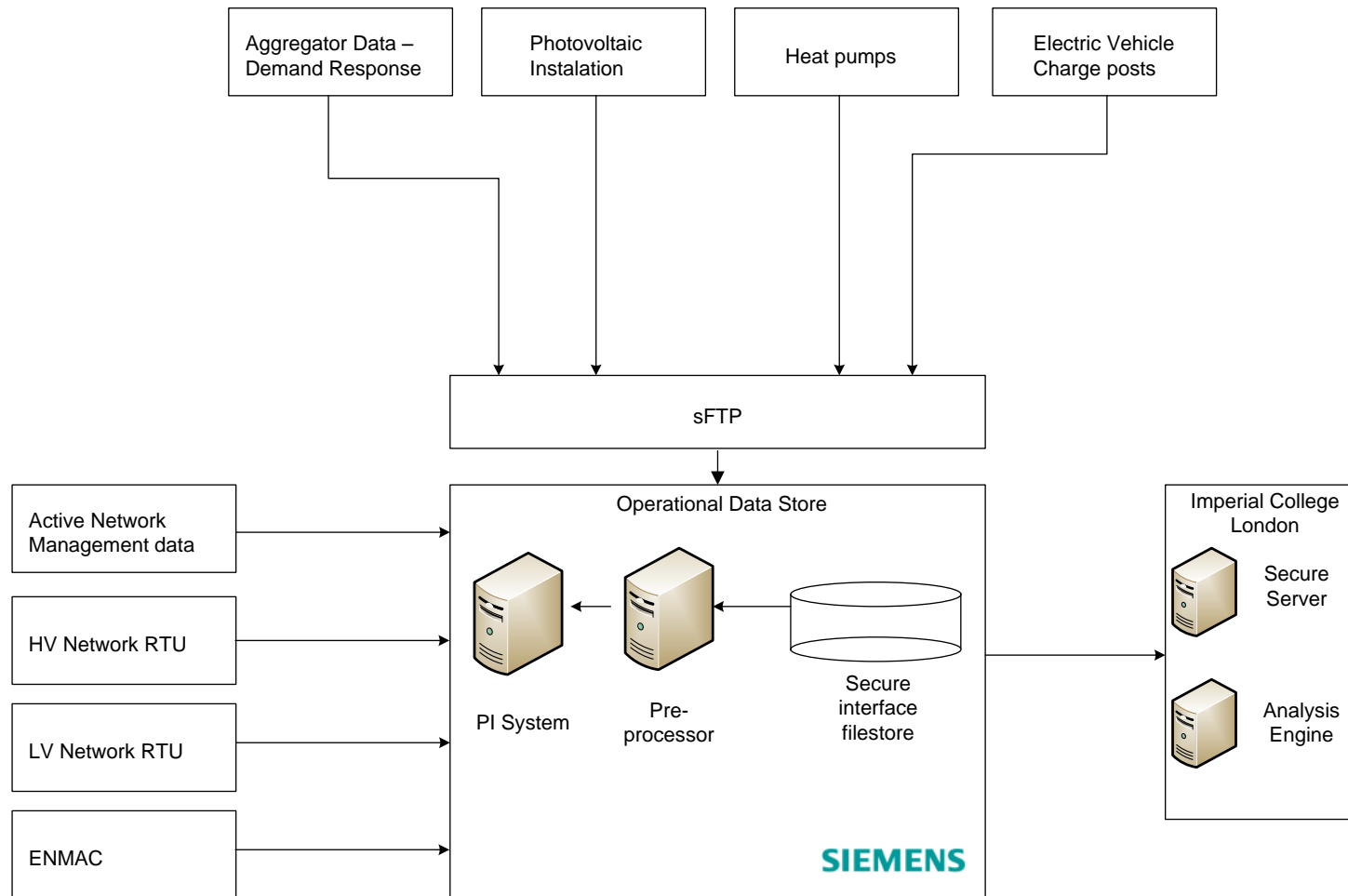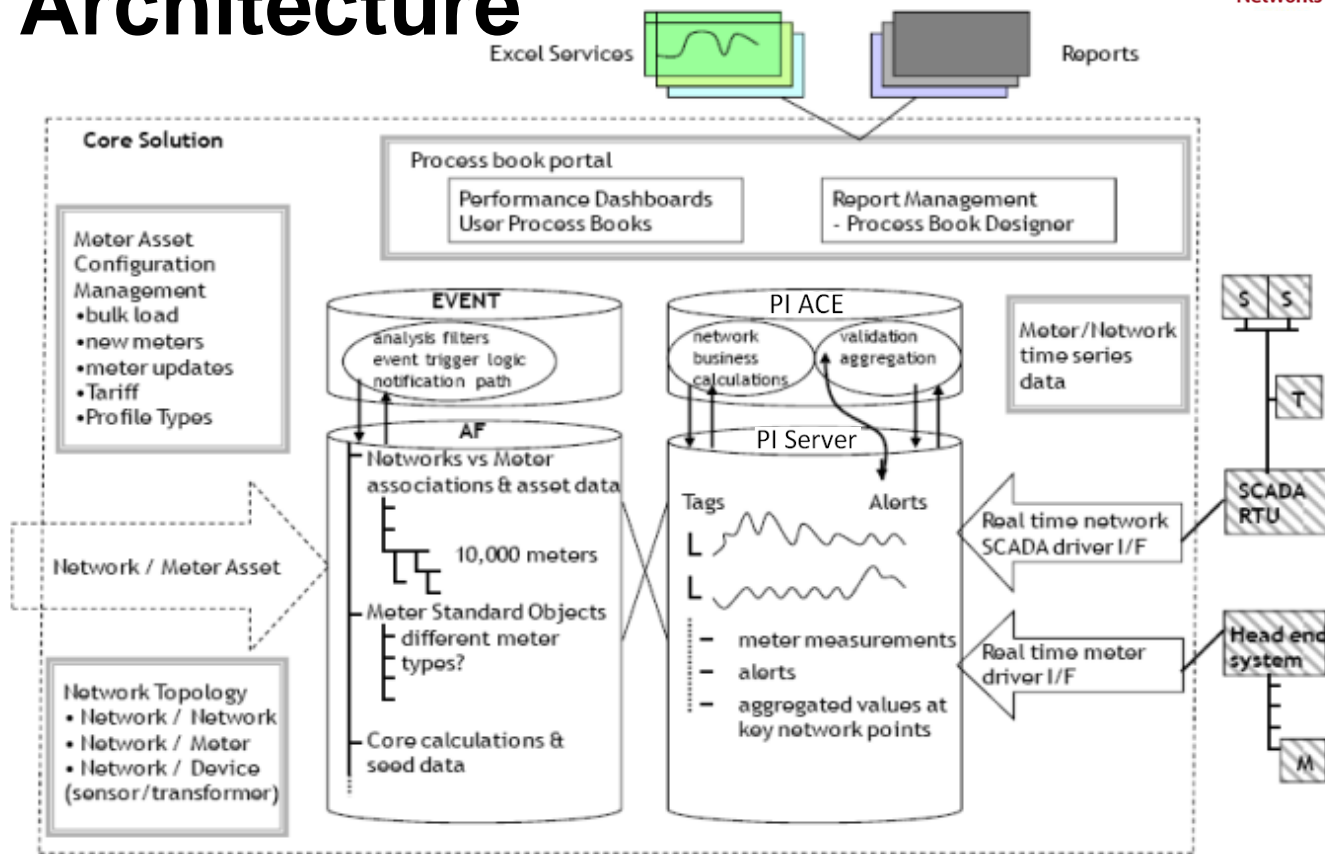
What have we achieved?

What have we achieved?

Key: Source London Network charge point   ParkatmyHouse Bookable charge point

What have we achieved?

Our solution?

Aggregator Data – Demand Response

Photovoltaic Instalation

Heat pumps

Electric Vehicle Charge posts

UK Power Networks

sFTP

Operational Data Store

Active Network Management data

HV Network RTU

LV Network RTU

ENMAC

PI System

Pre-processor

Secure interface filestore

SIEMENS

Imperial College London

Secure Server

Analysis Engine

PI System Architecture

System delivered by programme partner

SIEMENS

Why use the OSIsoft PI System?

- Approx. 4.5 million data points per day
- Across 150,000 PI Server tags
- Integration with network topology engine
- Integration to existing UK Power Networks real time system
- Scalability into Business as Usual
- Upgrade pathway

Create a 2020 scenario today to investigate and address the challenges and opportunities that DNOs will face in powering cities in a low carbon future.

Michael Clark

Michael.clark@ukpowernetworks.co.uk

Programme Director

Low Carbon London

UK Power Networks

THANK
YOU

Brought to you by

OSIsoft.