

Project SCENe @ Trent Basin, Nottingham

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University of Nottingham

Community Renewable Energy Workshop
Institute of Mechanical Engineers, February 2019



University of
Nottingham
UK | CHINA | MALAYSIA

Innovate UK



ERA ENERGY
RESEARCH
ACCELERATOR

THE SITE

Trent Basin Blueprint Development Site



Trent Basin Phases 1-5 Masterplan



PHASE 1







PHASES 2 & 3







INFORMED BY...

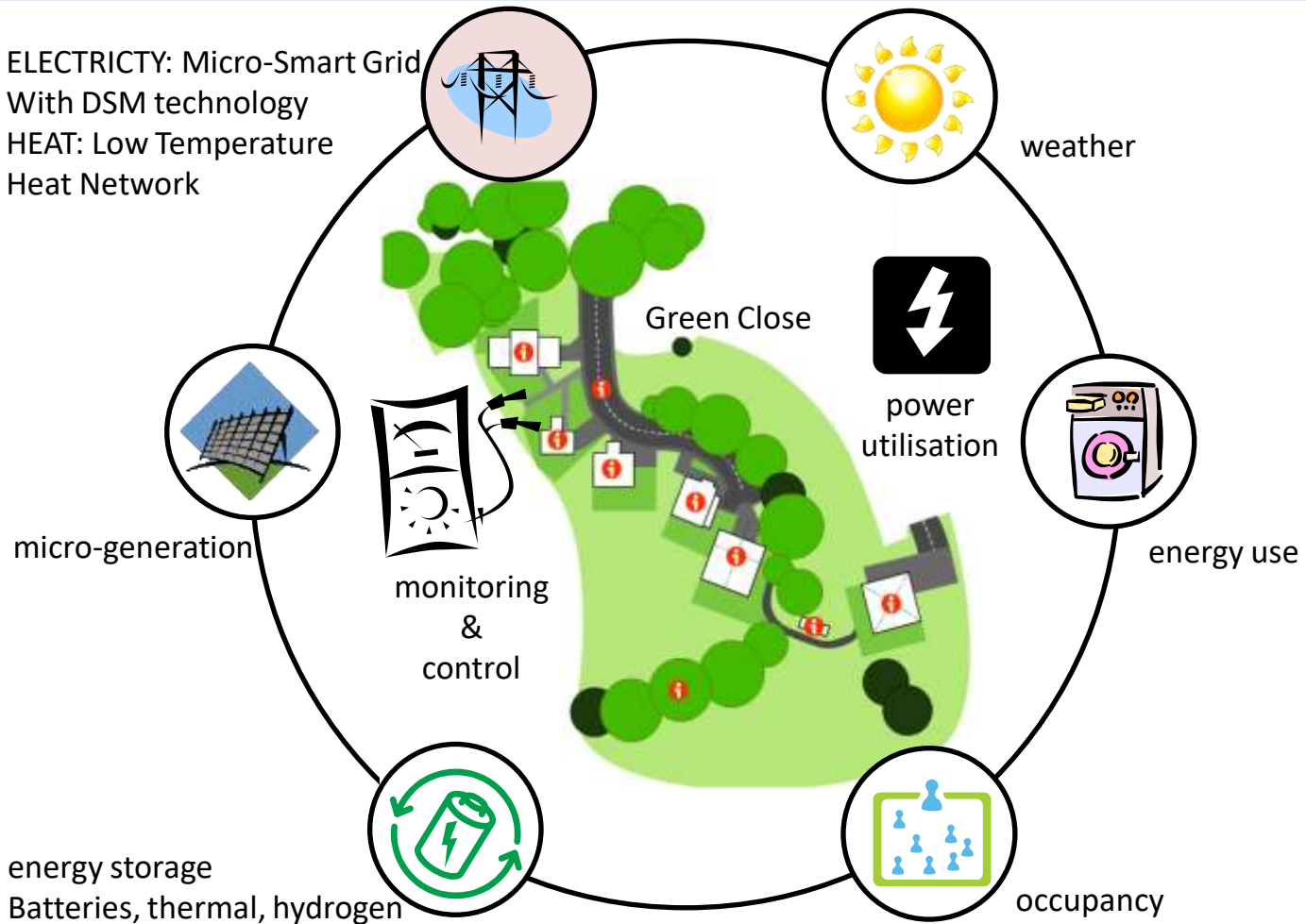
Creative Energy Homes: showcase of innovative energy efficient solutions for sustainable homes & communities



iSEC: intelligent Smart Energy Community



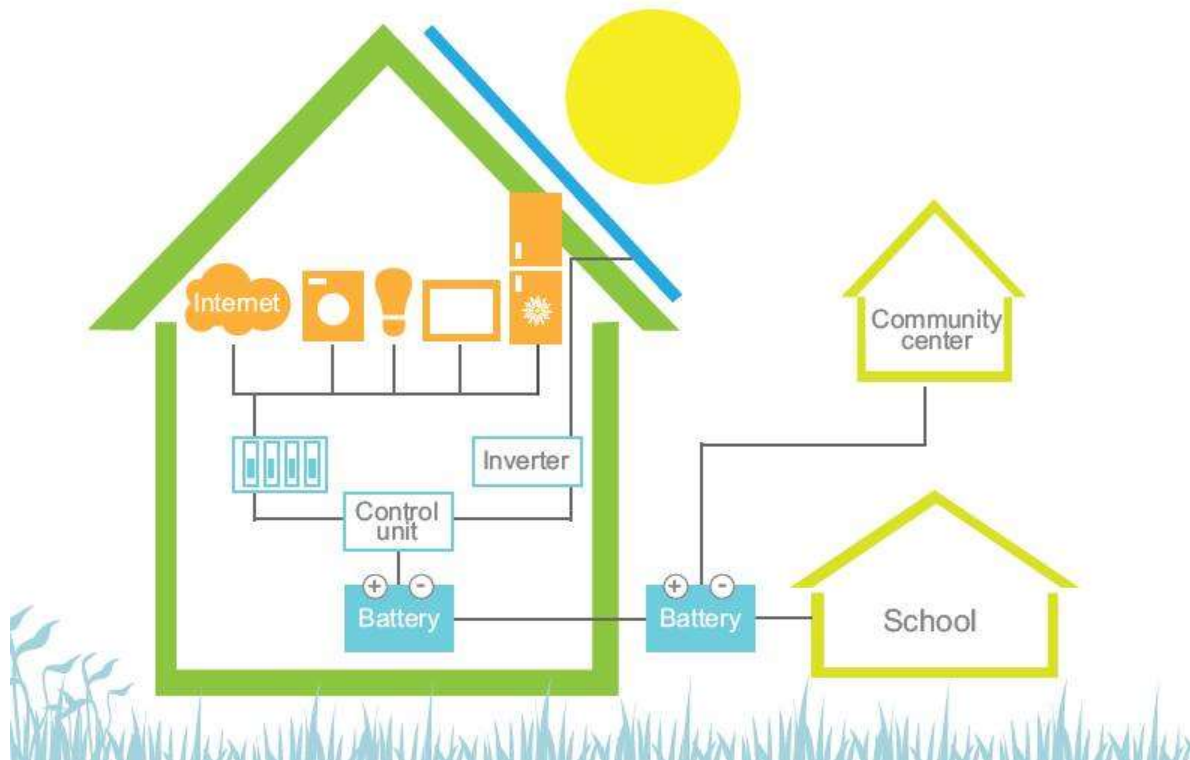
ELECTRICITY: Micro-Smart Grid
With DSM technology
HEAT: Low Temperature
Heat Network





SENSIBLE

Storage-Enabled Sustainable Energy for Buildings and Communities



European
Commission

Horizon 2020
European Union funding
for Research & Innovation



We work with
Innovate UK

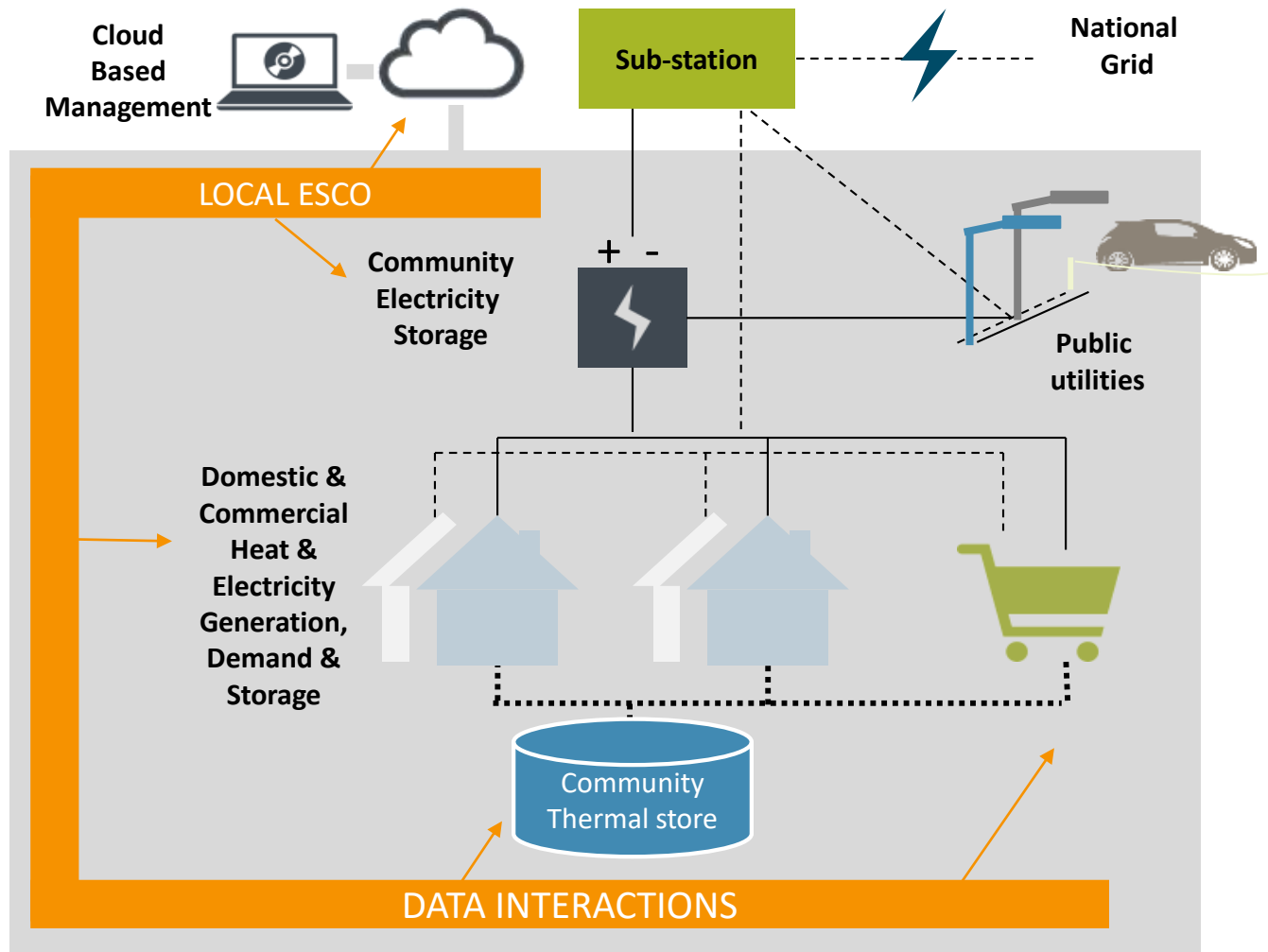
Sustainable Community Energy Networks



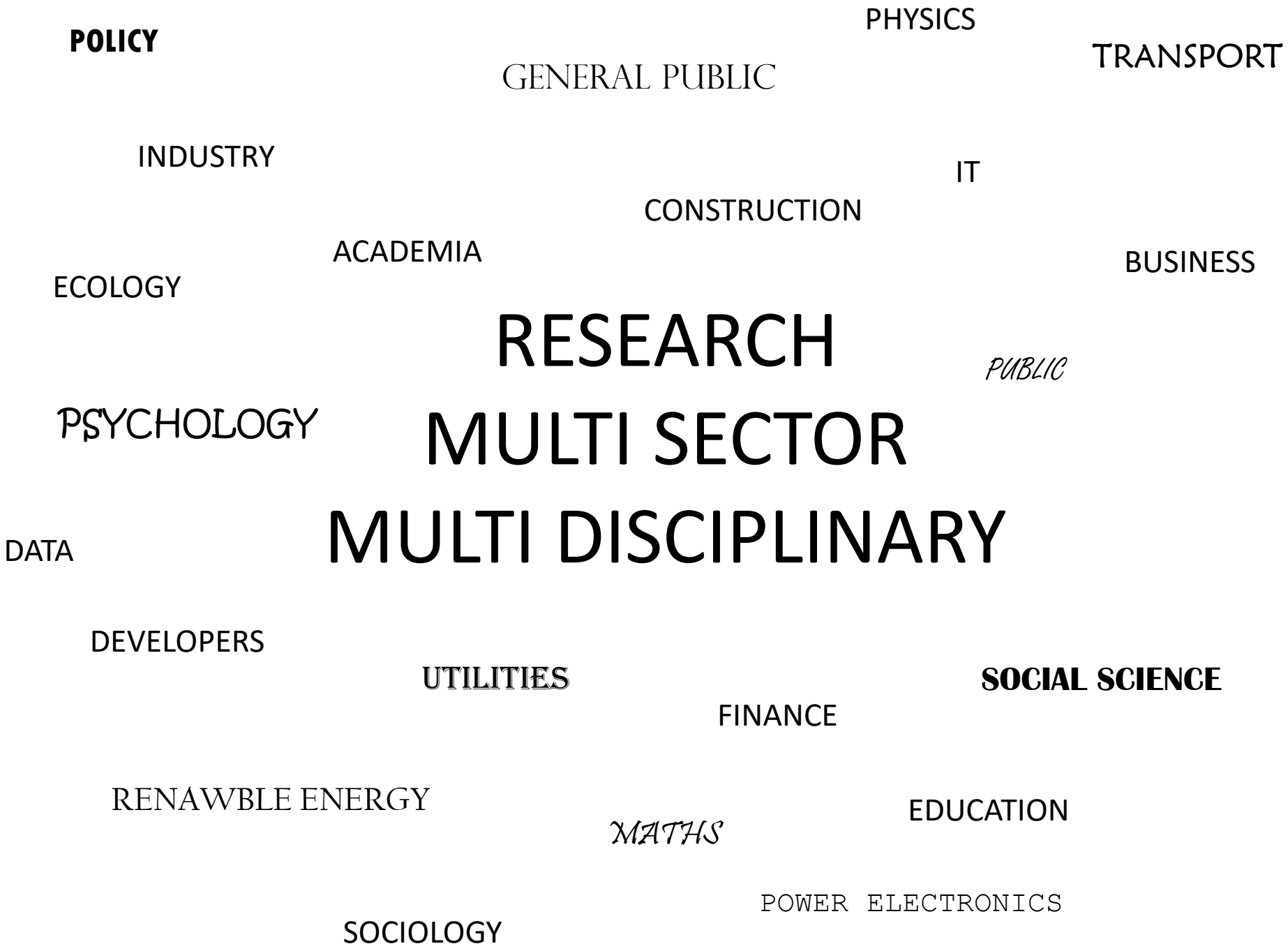
Project SCENe key messages

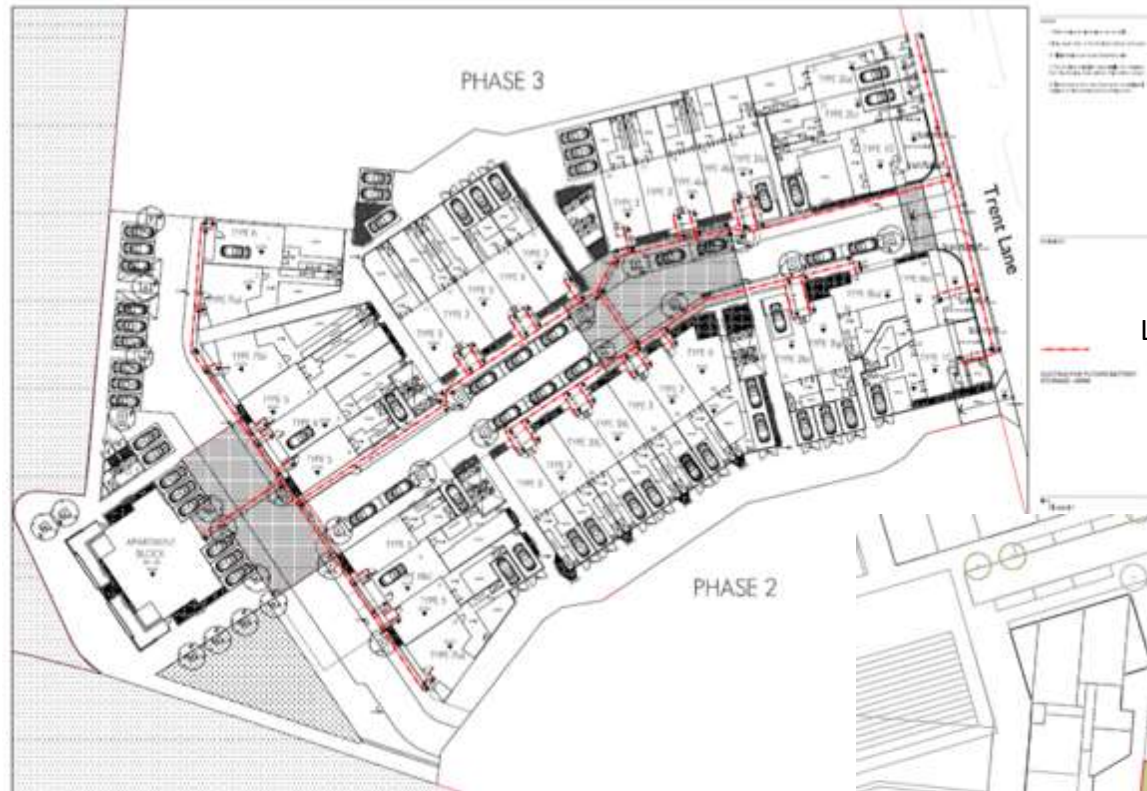
1. Currently NO business model in the UK for community energy that does not require additional subsidy
2. SCENe will **develop a 'subsidy free' commercial model** for new build residential developments
3. The demonstration integrates a new supply chain in a real commercial development, with consumer choice, at scale
4. Results will be disseminated as Business Model Templates that can be used by any developer or ESCO in the UK

SCENe will demonstrate scalable ESCO services



Potential to integrate other value streams such as assisted living, health care and security





Electrical Infrastructure
Local Power Networks

Community Battery

Located on Trent Lane Adjacent to Local Sub Station
Includes: Distribution boards, ring main and
Substation + Energy Centre – SCADA server,





Urban Solar Farm



Apartment Wall PV

Community PV



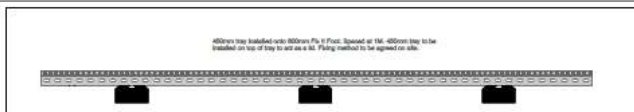
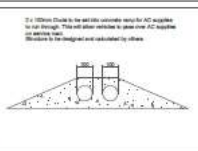
Power Network Nodes



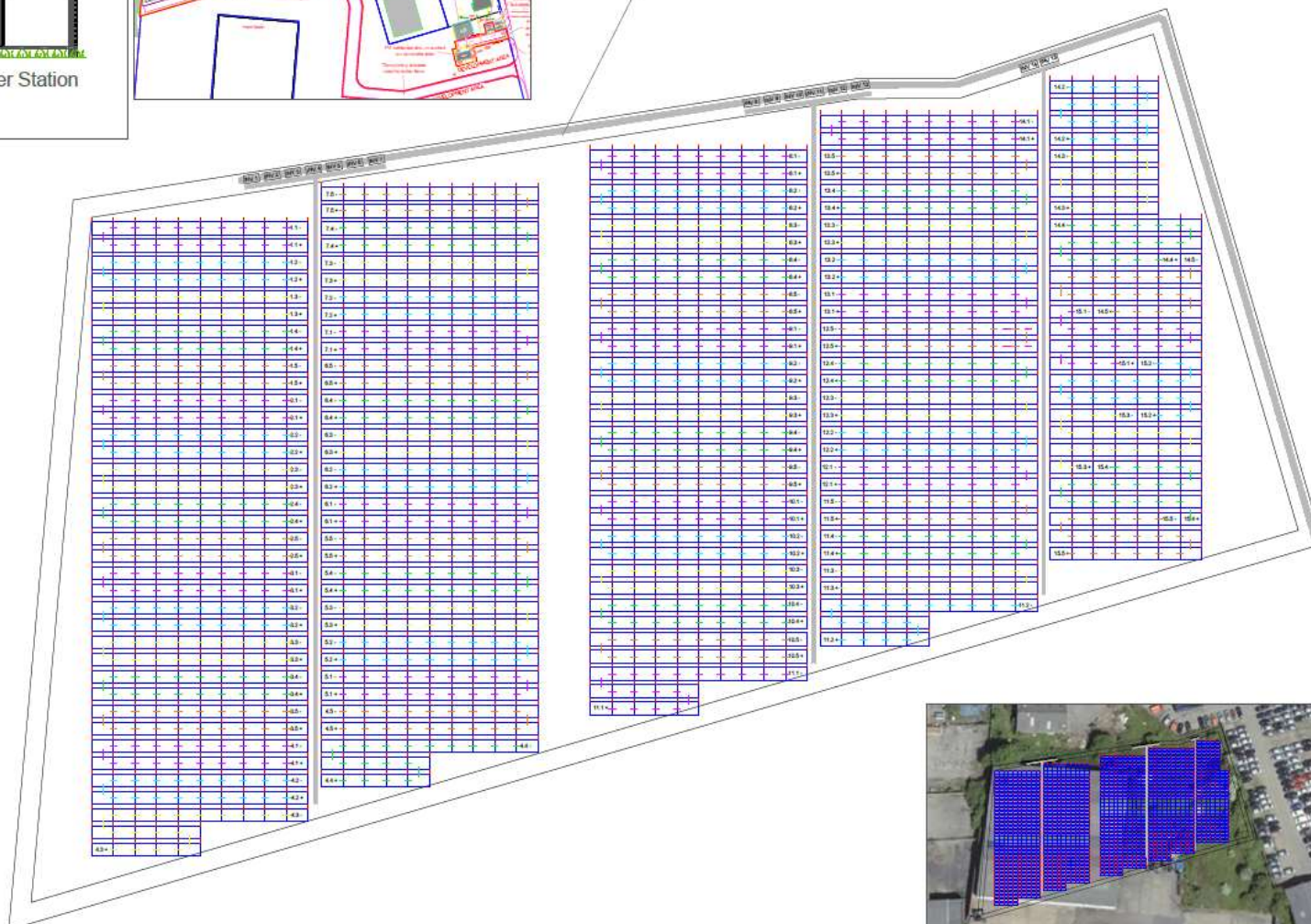
Rent a Roof



Inverter Station



NOTES:
Panel drawings are not to scale.



REV.	DESCRIPTION	BY	DATE
E	Contingency added	DA	16/08/17
D	Inverter 15 added	DA	13/08/17
C	Inverter 14 added	DA	09/08/17
B	Inverters 14-17 removed	DA	20/07/17
A	Inverter 18 removed	DA	10/07/17



SOLAR READY SOLUTIONS LTD
11 WAINHOSE ROAD
FINCHAMPTON
BERKSHIRE
RG40 4QG

STATUS FOR CONSTRUCTION
PROJECT NO: C1181
CLIENT: NOTTINGHAM UNIVERSITY

SITE: TRENT BASIN SOLAR PV FARM

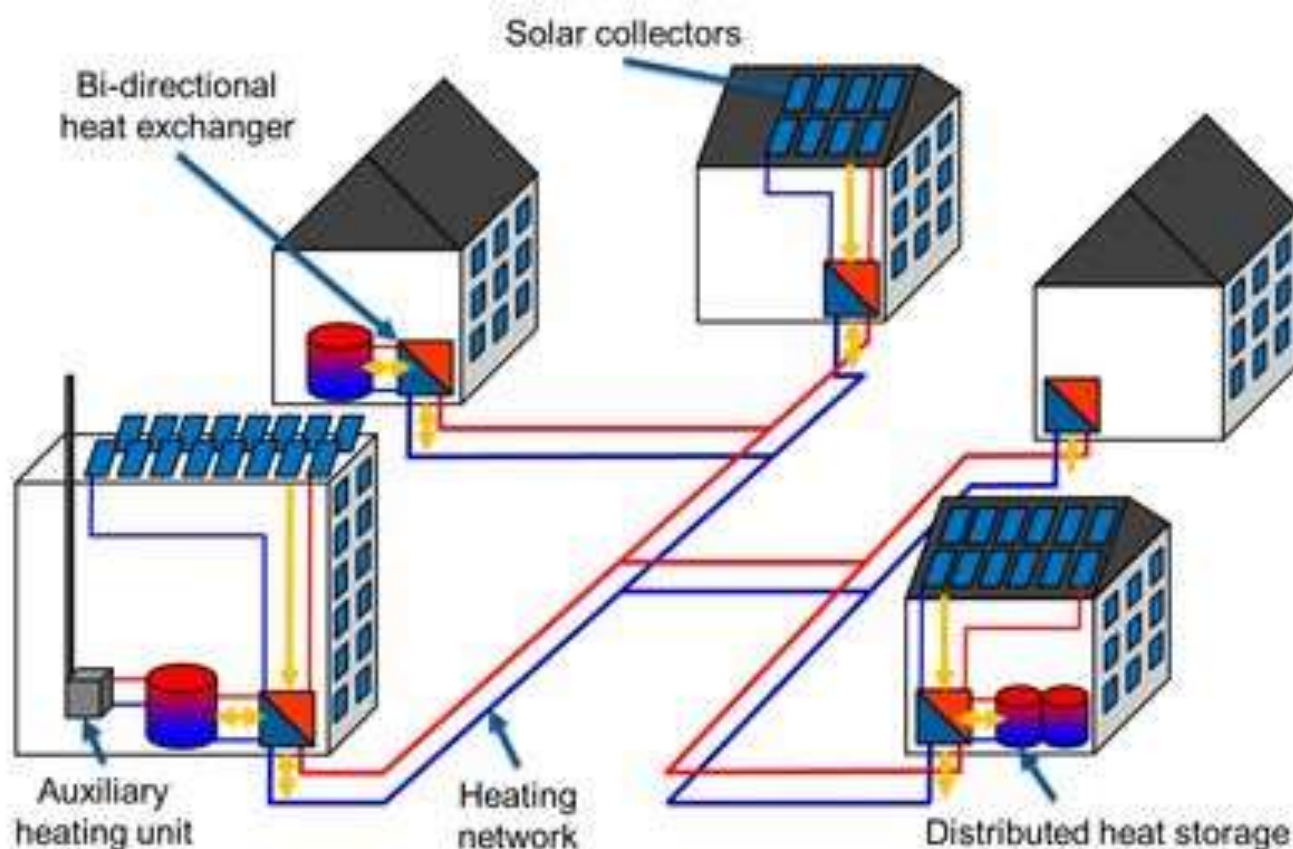
DRAWING TITLE: PV FARM LAYOUT
DRAWING NO: C1181.001
DATE: 08/02/2017
CHECKED: LW
SCALE: AT A1: 1:100



European Union

European Structural
and Investment Funds

HEAT NETWORK





Community Energy Battery – 2.1MWh (largest in Europe)
Installation - January 2018
Energising - March 2018
Grid connection – April 2018



Tesla 2.1MWh Battery - 500kW inverter



Low Voltage Distribution Panels



Enclosure - Security and Acoustic Fencing



Energy Centre Sub Station

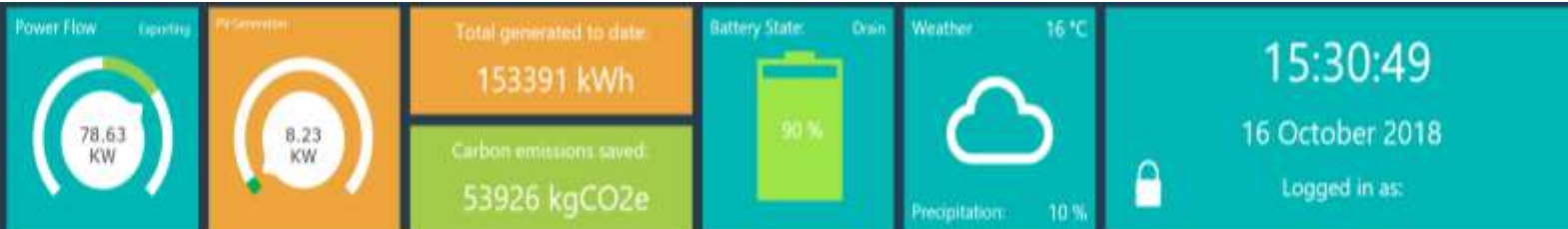
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200 KWp URBAN SOLAR FARM



Trent Basin SCADA System Dashboard



Overview

Solar

Battery

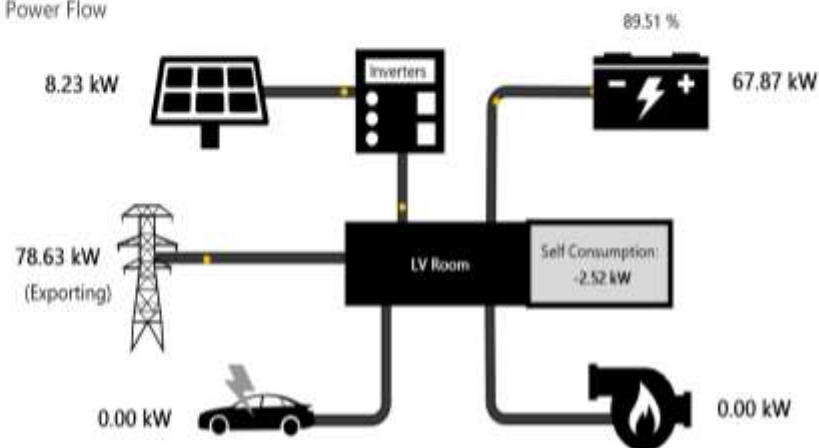
Inverters

ESCO

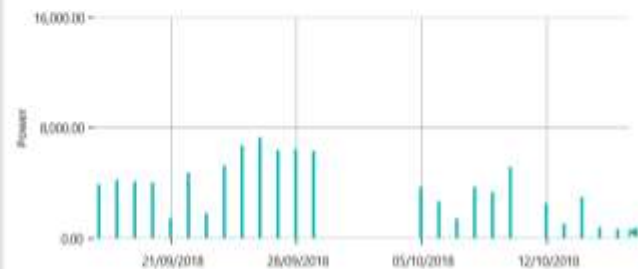
Trends

Alarms

Power Flow



Daily Power Trend

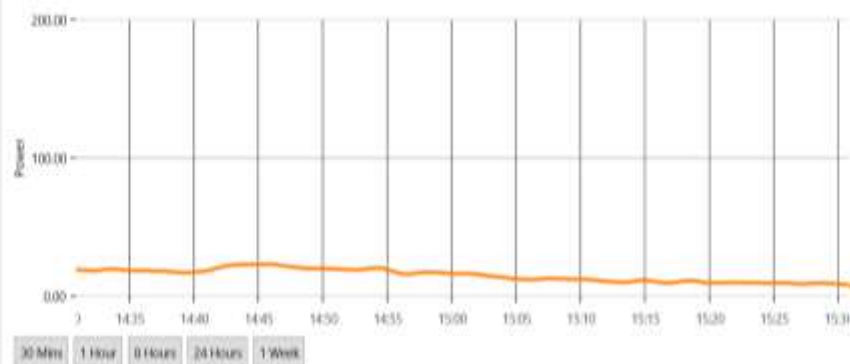


Weather Station

Rain Gauge: 0.00
Outdoor Temperature: 15.65 °C
Outdoor Humidity: 100.17 %
Solar Irradiance: 56.00 W/m²



Instantaneous PV Power Generation (kW)



5-day Weather Forecast

	16/10	17/10	18/10	19/10	20/10
Temperature	12 °C	15 °C	12 °C	12 °C	14 °C
Precipitation	10 %	5 %	4 %	5 %	7 %
Humidity	94 %	72 %	66 %	70 %	79 %

Consumer Engagement



Smart Speaker



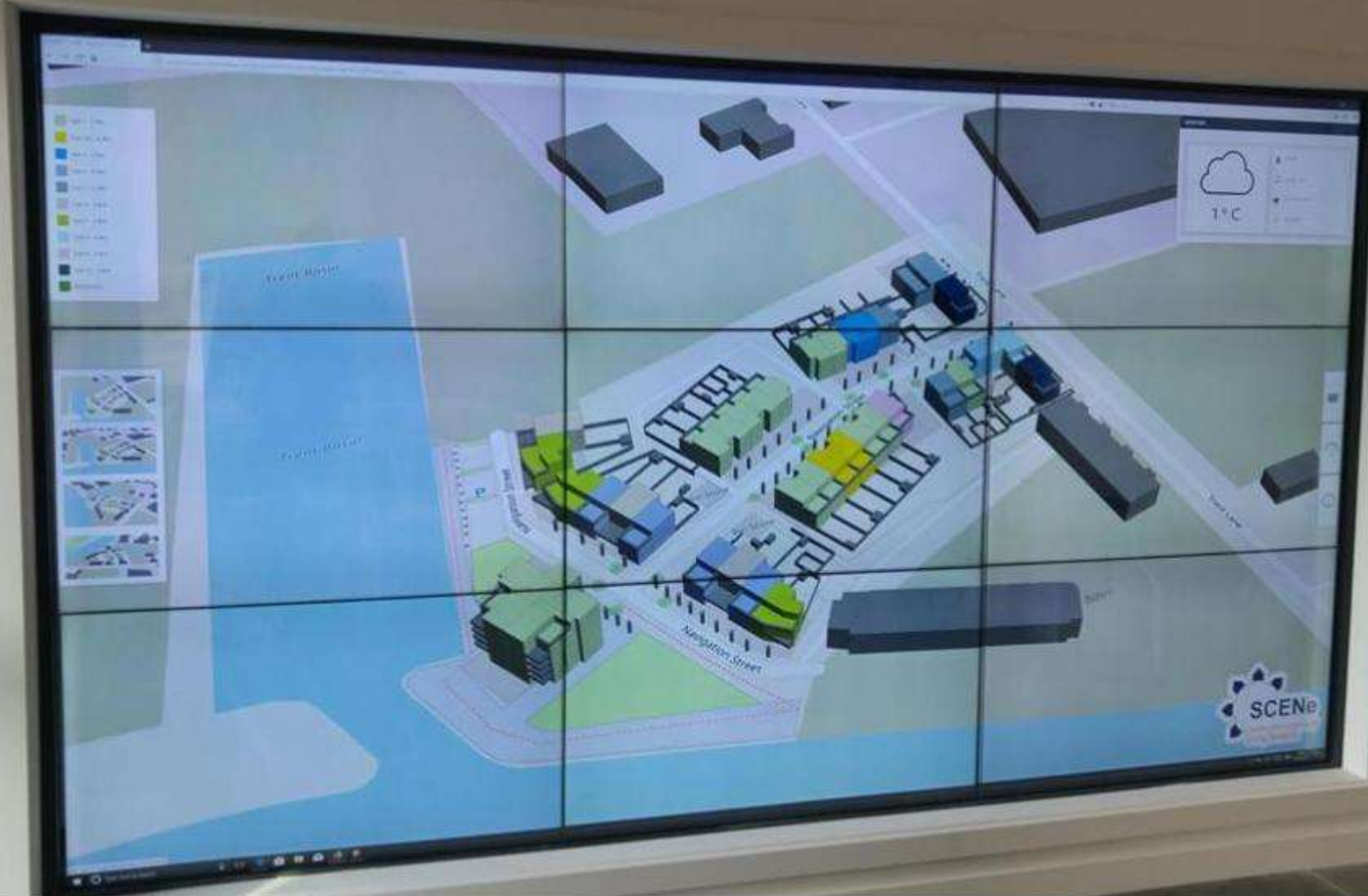
Smart Phones



I H D



Tablets



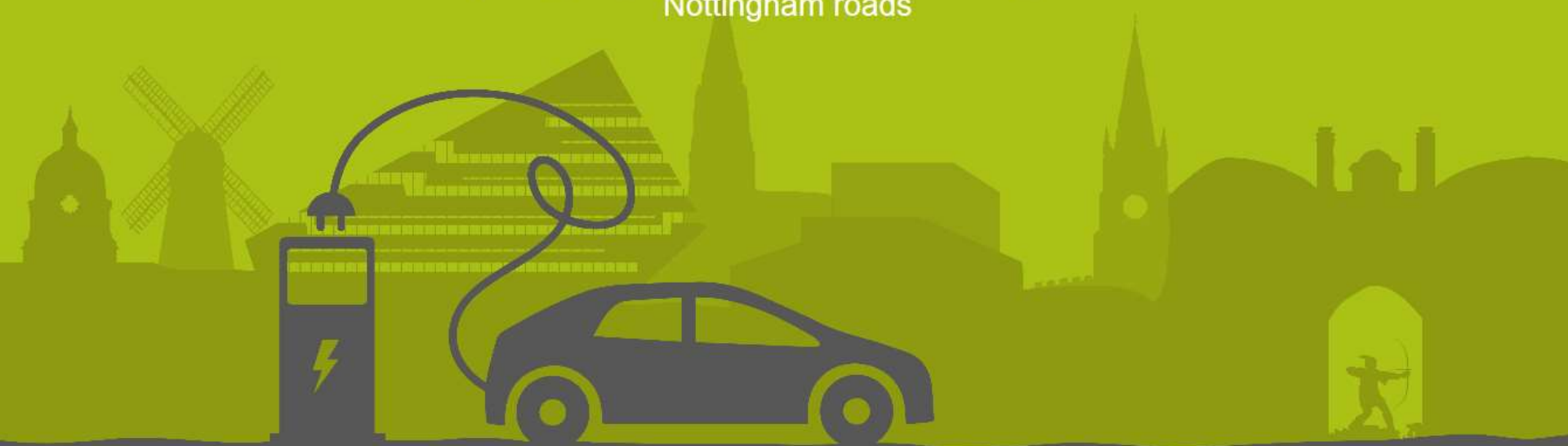
3D Community Interaction Model

NOTTINGHAM HOURLY CAR & VAN HIRE

Self-Service Vehicle Rental Made Easy

GO ULTRA LOW NOTTINGHAM

Innovative steps to get 8,000 additional electric and hybrid vehicles on to Nottingham roads





Our ecosystem of partners is looking to develop a new set of offerings using innovative V2G solutions such as dedicated and intelligent parking, loyalty programmes through new data patterns and inside airport individually targeted information. The project will demonstrate the value of this offering via six case studies with a view of scaling deployment across the country and Internationally.

Funded by:



Innovate UK





Not for profit

Proud to be different from other energy companies.

As a not for profit company, we like to do energy differently.

Launched by Nottingham City Council, our mission is to provide low cost energy to all households. No private shareholders. No director bonuses. Just low and competitive energy tariffs. Because we know that no-one wants to overpay for their gas and electricity we work hard to keep our prices low and competitive to help our customers save money on their energy bills.

As the UK's first local authority owned energy supply company, we set ourselves apart from the 'Big Six' and many other private sector energy companies.

We make it easy to switch to Robin Hood Energy, we keep customers on a low price when they renew with us and don't apply exit fees if they decide to leave their account early. Our entire switching process is designed to help residential and commercial customers nationwide save on their energy bills.



Community Energy Data

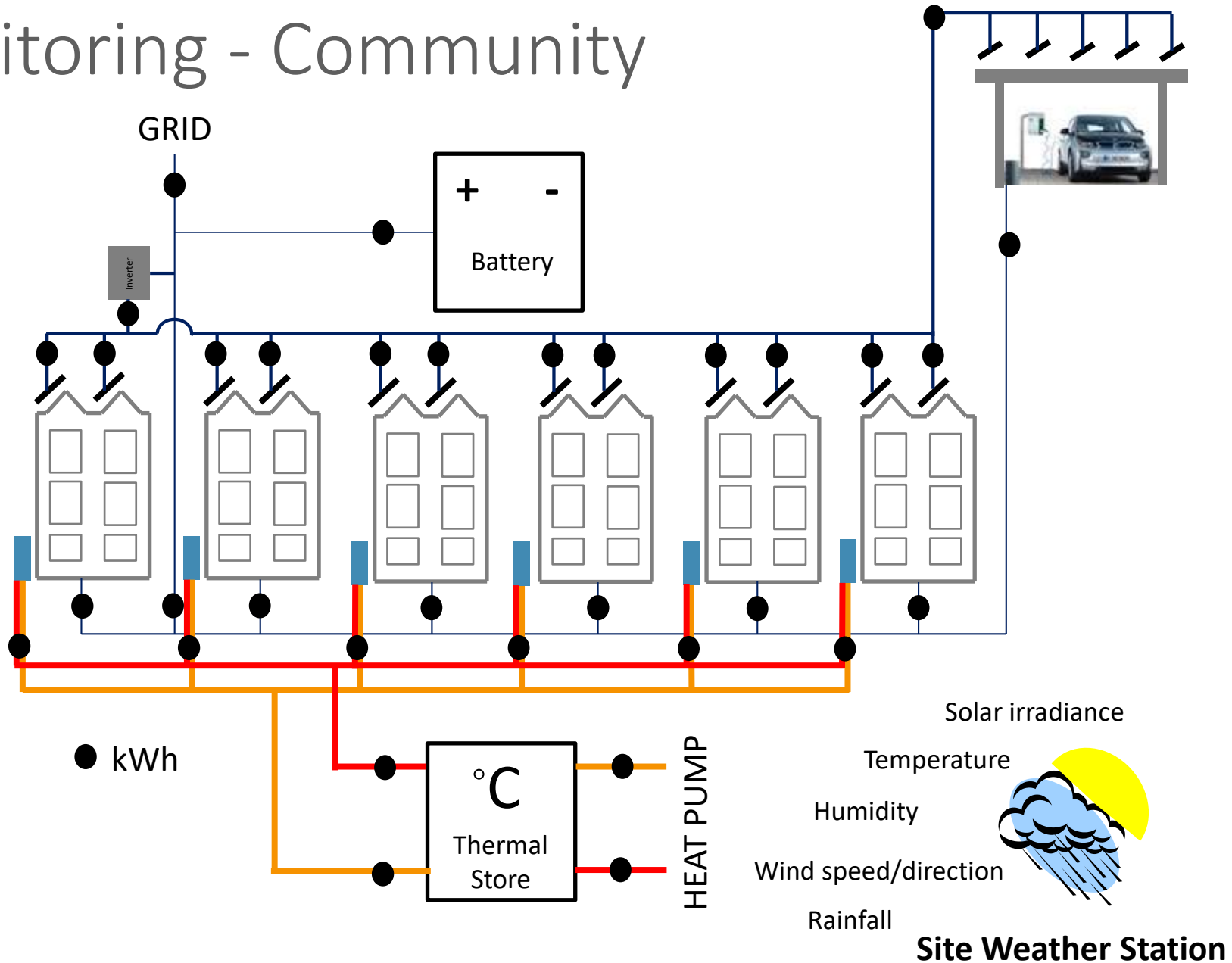
Design and installation of the cloud based data acquisition platform for real time monitoring platform for performance evaluation and informed control of home thermal/electricity energy generation, distribution, utilisation and storage across the CES at home (x120) and community scales (community batteries and thermal stores)



DATA SETS

- Design of the cloud based data acquisition platform for real time monitoring and control of home
- Data set will also include indoor environmental data (temperature, humidity and CO2) in addition to local weather data. Installation and commissioning of the monitoring system will be carried out such that each home has a local hub with data storage communicating to a network of EnOcean energy harvesting wireless sensors
- Local hubs will communicate with a dedicated community energy server located in the energy centre via fibre optic cables and then to cloud storage for the CES via broadband
- Data sets will be cleaned and presented through the web based data visualisation platform for the individual home hubs and for the community energy hub
- Real time and historical trend values for savings of energy, carbon and cost will be evaluated to optimise home and community energy utilisation

Monitoring - Community



Monitoring - Home

Temperatures

Relative Humidity

Carbon Dioxide

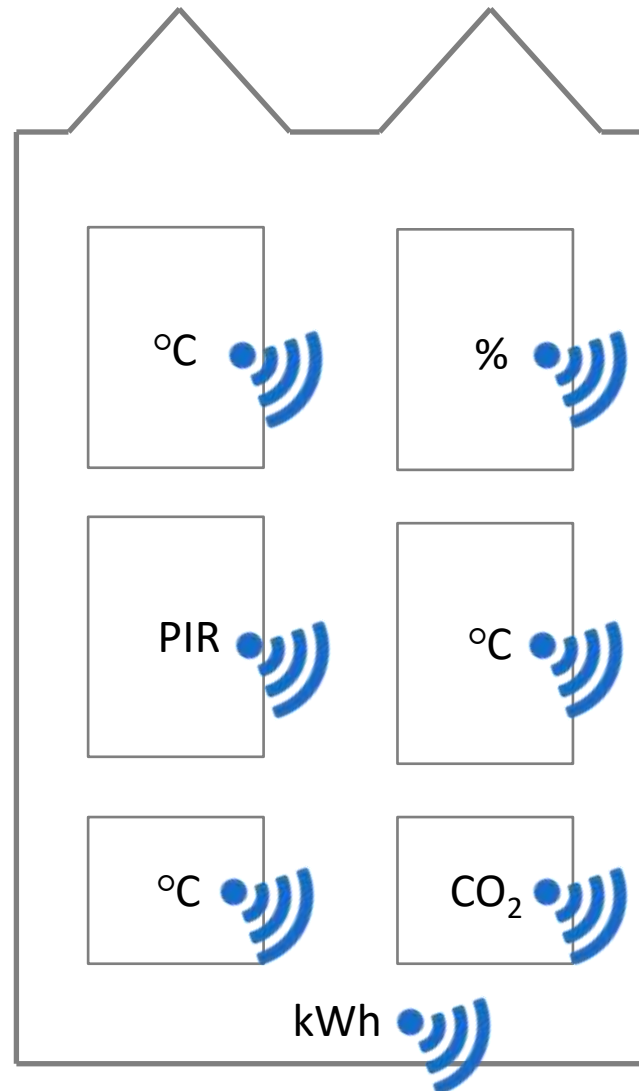
Occupancy

Electrical Energy

- Total Electricity
- Circuits
- Significant Appliances

Thermal Energy

- Hot Water
- Space Heating



CLOUD SERVER





Energy Centre

www.projectscene.uk


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welcome




🔍

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[@ProjectSCENe](#) [@innovateuk](#)

[ad.nottingham.ac.uk](#)
Internet access

CONSTRUCTION & ENERGY REVOLUTION

We need to innovate & do things differently!

Wells & Edison had the foresight over 100 years ago....

"I find it incredible that there will not be a sweeping revolution in the methods of building during the next century. A few energetic men might at any time set out to alter this."

- H G Wells, Anticipations, 1902



"You see, we should make use of the forces of nature and should obtain all our power in this way. Sunshine is a form of energy, wind and sea currents are manifestations of this energy. Do we make use of them? Oh no! We burn forests and coal, like tenants burning down our front door for heating. We live like wild settlers and not as though these resources belong to us."

- Thomas A. Edison, 1916

