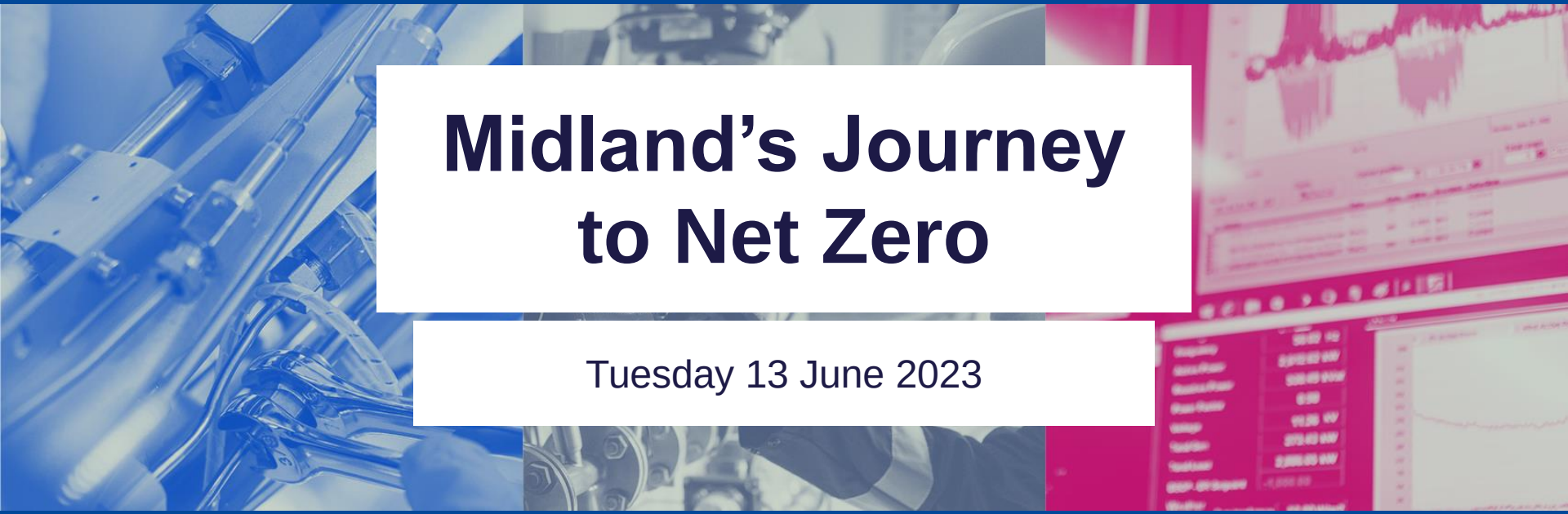
ENERGY RESEARCH ACCELERATOR

HyDEX



Midland's Journey to Net Zero

Tuesday 13 June 2023

Advanced Manufacturing Building room C11, University of Nottingham

Aston University BIRMINGHAM UK

UNIVERSITY OF BIRMINGHAM

Cranfield University

Keele UNIVERSITY

UNIVERSITY OF LEICESTER

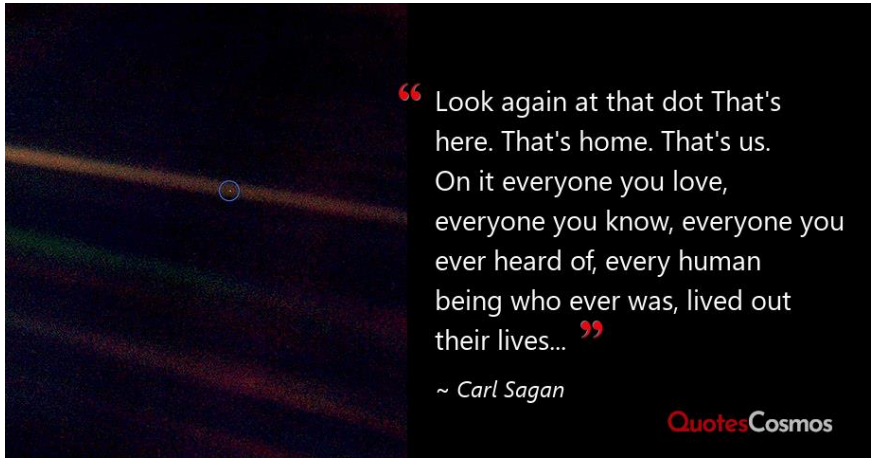
Loughborough University

University of Nottingham

WARWICK THE UNIVERSITY OF WARWICK

BGS British Geological Survey

Why are we here?



— "Carl Sagan Quotes." *QuotesCosmos.com*, Last modified July 31, 2021.

It has been said that astronomy is a humbling and character-building experience. There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world. To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known."

— Carl Sagan, Pale Blue Dot: A Vision of the Human Future in Space

What are we doing?

- 10:30 – 12:15 Plenary Session
  - Angie Lillistone (Nottingham City Council) – Net Zero by 2028.
  - Mark Gillott (University of Nottingham) – Energising communities with active buildings.
- 12:15 – 13:15 Lunch
- 13:15 – 14:15 Workshop: How different sectors can work towards Net Zero
- 14:15-15:30 HyDEX flex fuel demonstrator tour / networking session
- 15:30 – 17:00 Local net zero initiatives: short talks and panel discussion

Who?

Fern Baker – Nottingham PhD student.

First PhD student designed, organised, and led conference funded by the ERA community fund and supported by HyDEX

https://hydex.ac.uk/

https://www.era.ac.uk/

Plenary Session

Angie Lillistone
(Nottingham City Council)
– Net Zero by 2028.

Mark Gillott
(University of Nottingham)
– Energising communities with active buildings.

University of Nottingham
Energy Institute

Energising Communities with Active Buildings

Prof Mark Gillott

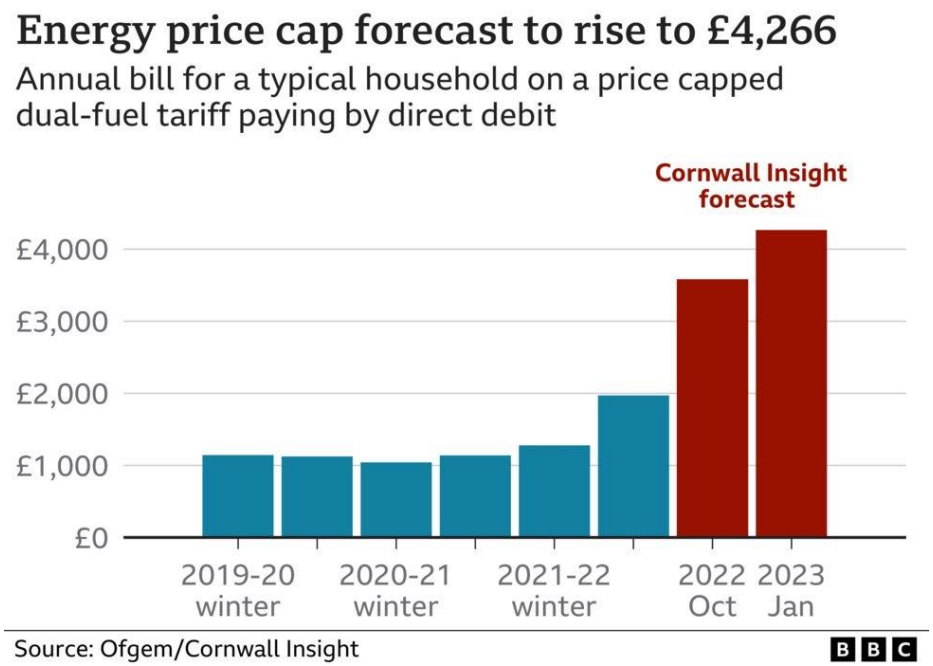
Buildings, Energy Use & CO_2 Emissions

Globally buildings and buildings construction sectors combined are responsible for 36% of global final energy consumption and nearly 40% of total direct and indirect CO_2 emissions.

Energy demand from buildings and buildings construction continues to rise, driven by improved access to energy in developing countries, greater ownership and use of energy-consuming devices, and rapid growth in global buildings floor area, at nearly 3% per year.

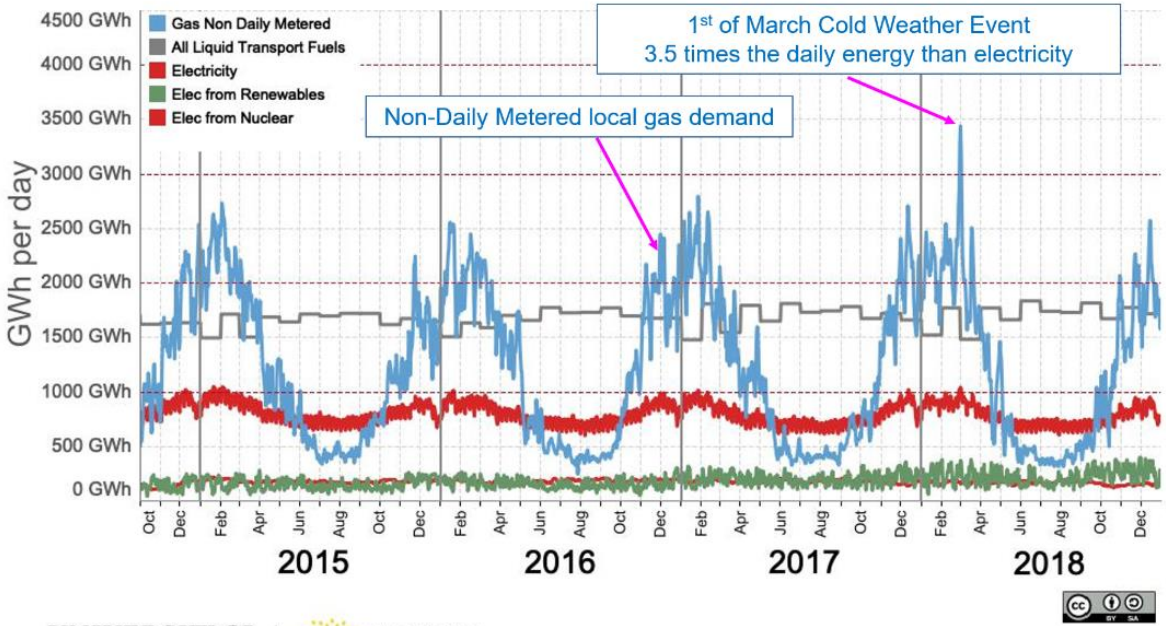
Energy & Buildings - Cost & Carbon

Trent Building, University of Nottingham



UK Energy Vectors

Great Britain's Energy Vectors – in GWh per day



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Underlying data are from National Grid, Elexon and BEIS
Figure produced by Dr Grant Wilson: i.a.g.wilson@bham.ac.uk
https://www.researchgate.net/project/multi-vector-energy-analytics

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Nottingham Trent Basin

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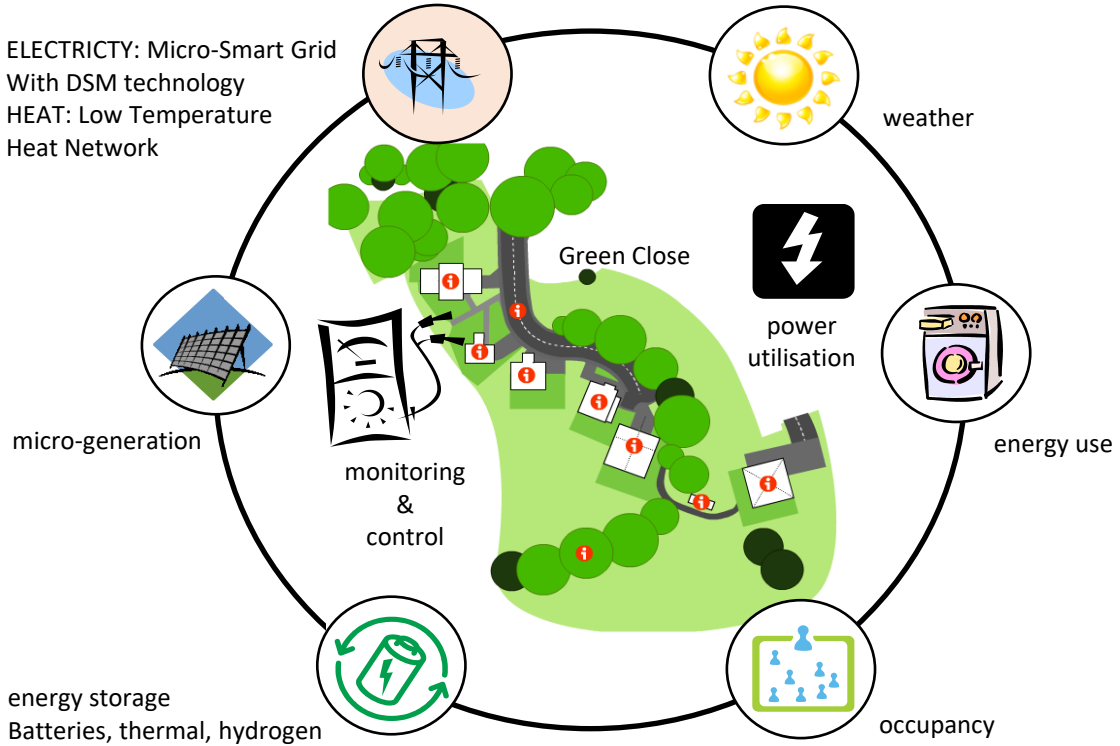
Creative Energy Homes (University of Nottingham)

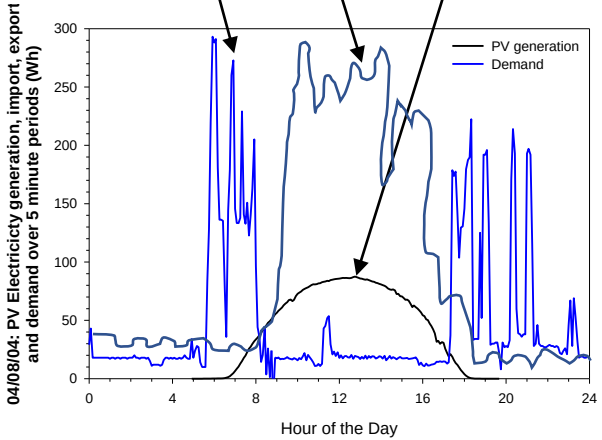


Why Community Energy?

28p/KWh (47p/kWh Oct 2022)
circa 250g CO2/KWh

Different typologies,
e.g. School

circa 2 -10 p/KWh
0gCO2/KWh



Why Community Energy?

UK NEWS:
SEPTEMBER 2019

Daily Mail
THURSDAY, DECEMBER 14, 2017 www.dailymail.co.uk NEWSPAPER OF THE YEAR 65p
FEMAIL magazine STARTS PAGE 42

Fury over the fading benefits of solar power as thousands complain to finance watchdog that glass panels DON'T provide the rewards they were promised

WARNING

- Financial Ombudsman has received 2,000 complaints from home-owners
- Barclays put aside millions to compensate those who bought mis-sold panels
- Brian Thompson, from Gateshead, took out £10,000 loan to pay for panels
- Was told by firm PV Solar UK that the panels would boost his pension
- Payments from power panels sent to National Grid not enough to pay loan coast

Why Community Energy?

- Community energy refers to the delivery of community-led renewable energy, energy demand reduction and energy supply projects, whether wholly owned and/or controlled by communities or through a partnership with commercial or public sector partners.
- The Germans often speak of *Bürgerenergie*, which translates literally as “citizen energy.”
- The term encompasses residential solar, community biogas, and wind farms (partially) funded by citizens and businesses. The more these investors are local, the closer the project becomes to *Bürgerenergie*

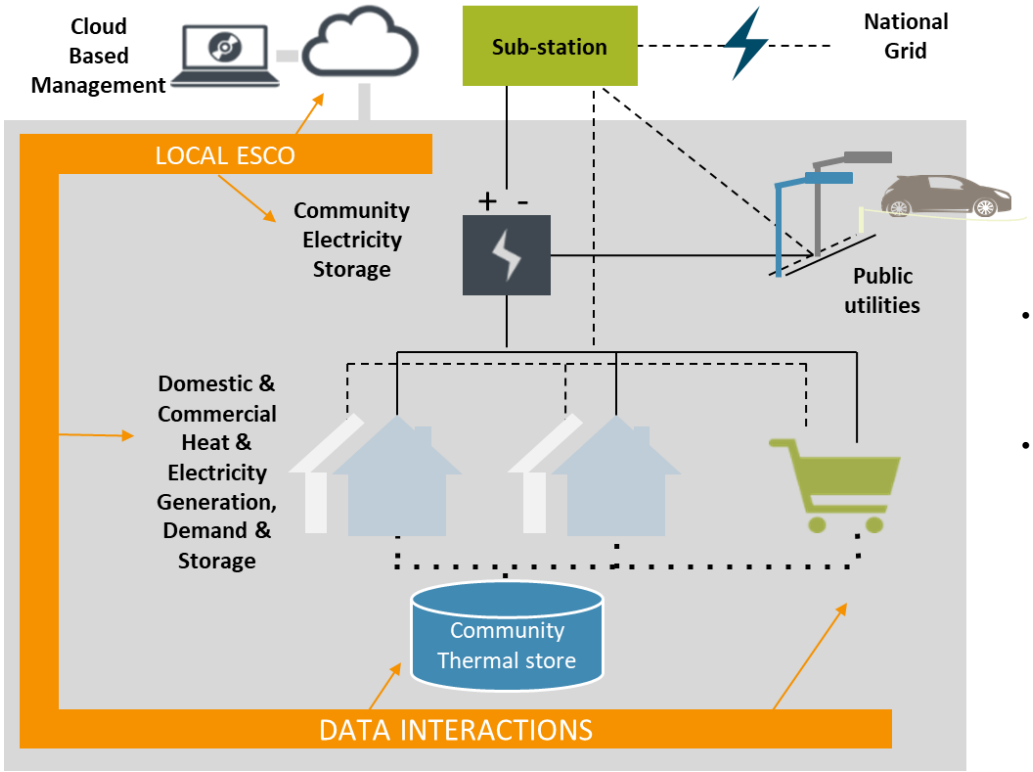
Sustainable Community Energy Networks

Nottingham Trent Basin

Project SCENe key messages

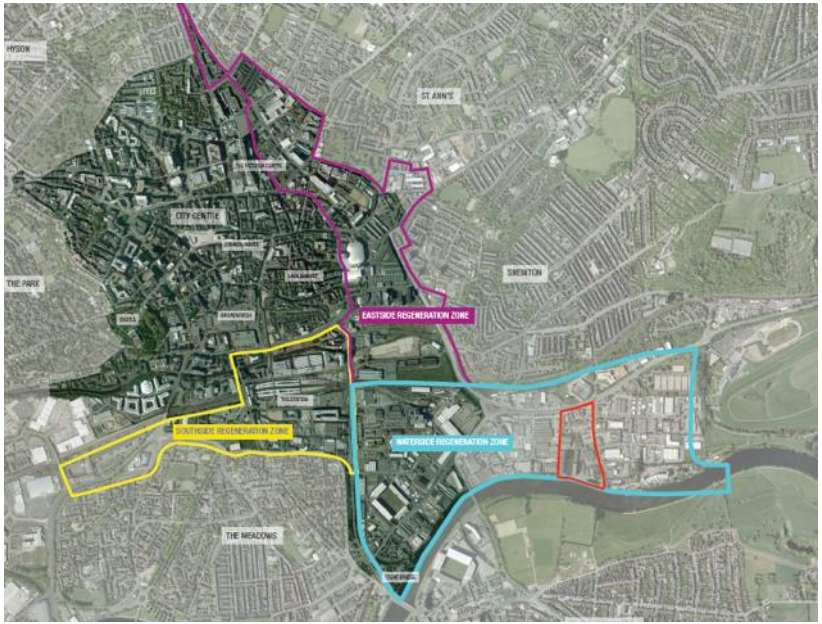
1. Currently NO business model in the UK for community energy that does not require additional subsidy
2. SCENe will **develop a 'subsidy free' commercial model** for new build residential developments
3. The demonstration integrates a new supply chain in a real commercial development, with consumer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

Sustainable Community Energy Networks

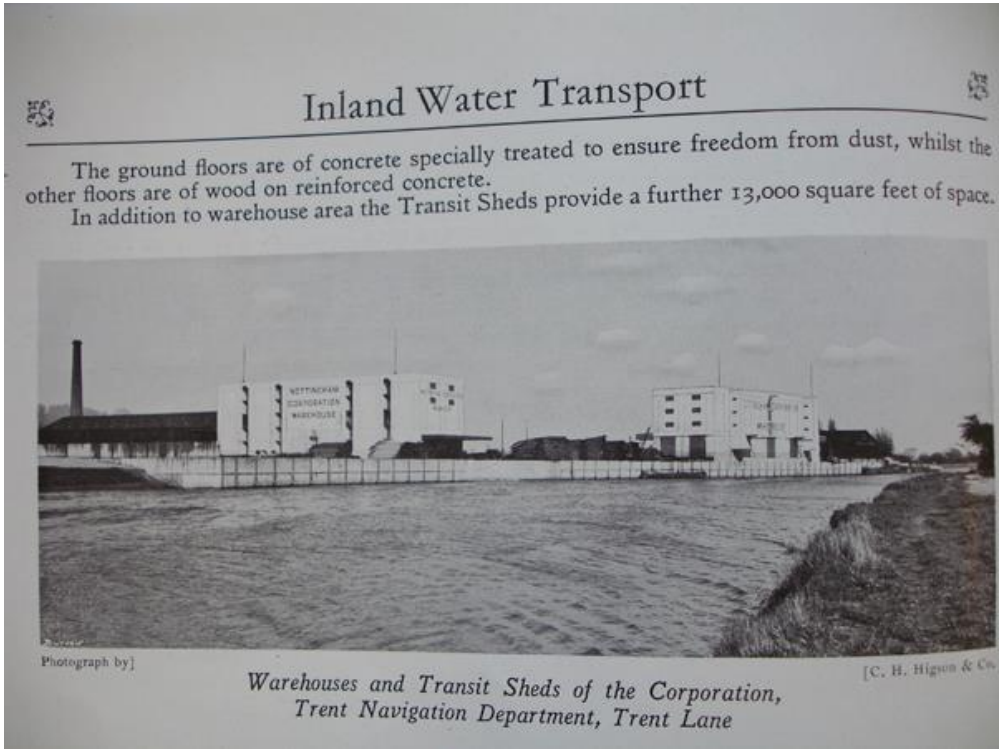


- SCENe will demonstrate scalable ESCO services
  - Trent Basin ESCO Ltd
- Potential to integrate other value streams such as assisted living, health care and security

Nottingham Trent Basin Development Site



Nottingham Trent Basin Development Site



Completed between 1928 - 1931 and billed as "Nottingham's Highway to the Sea" Trent Lane Depot significantly increased tonnage carried on the Trent to Nottingham from 28,000 in the 1920s, to over 250,000 by 1936.

Trent Basin Phases 1-5 Masterplan

Construction Phases

Trent Basin

Trent Basin

Trent Basin

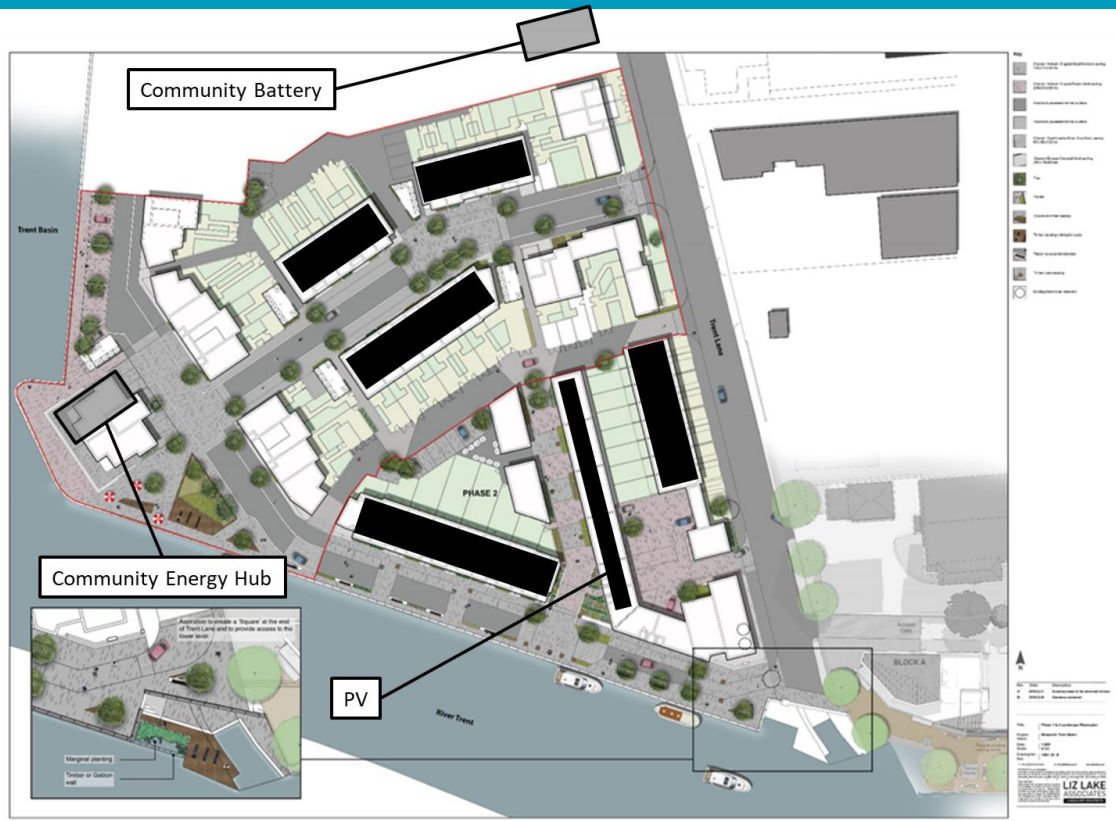
Asymmetric roofs for Solar PV

University of Nottingham
Energy Institute

Trent Basin

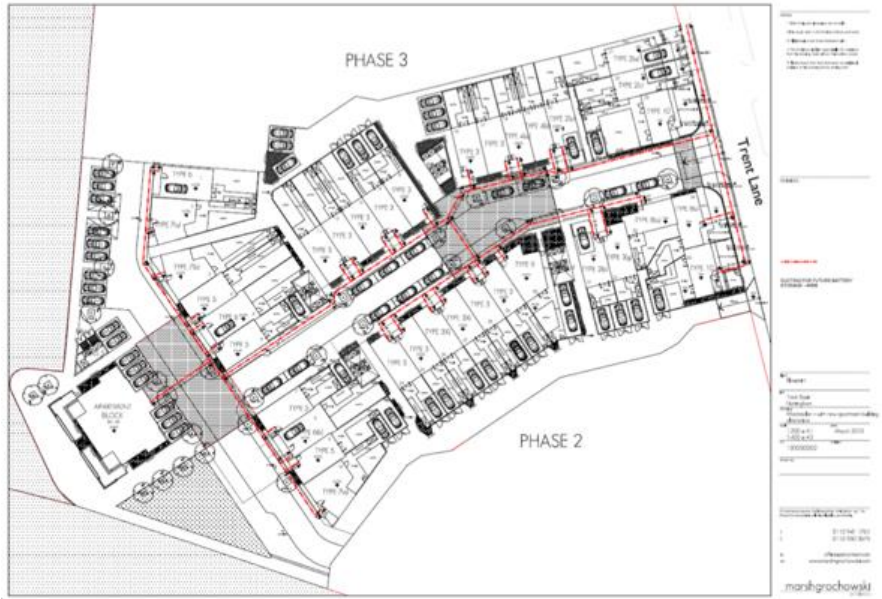
Photo taken September 2021

Community Energy Assets



ERA Funded Energy Hubs – Generation, Storage & Use (*people*)

Community Energy Assets



Electrical Infrastructure
Local Power Networks

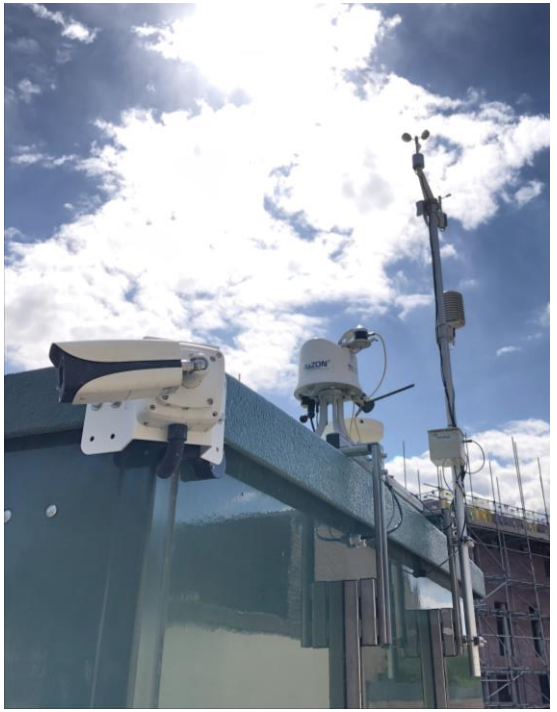
Community Battery

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

Energy Centre

Tesla 2.1MWh Battery - 500kW inverter

Low Voltage Distribution Panels

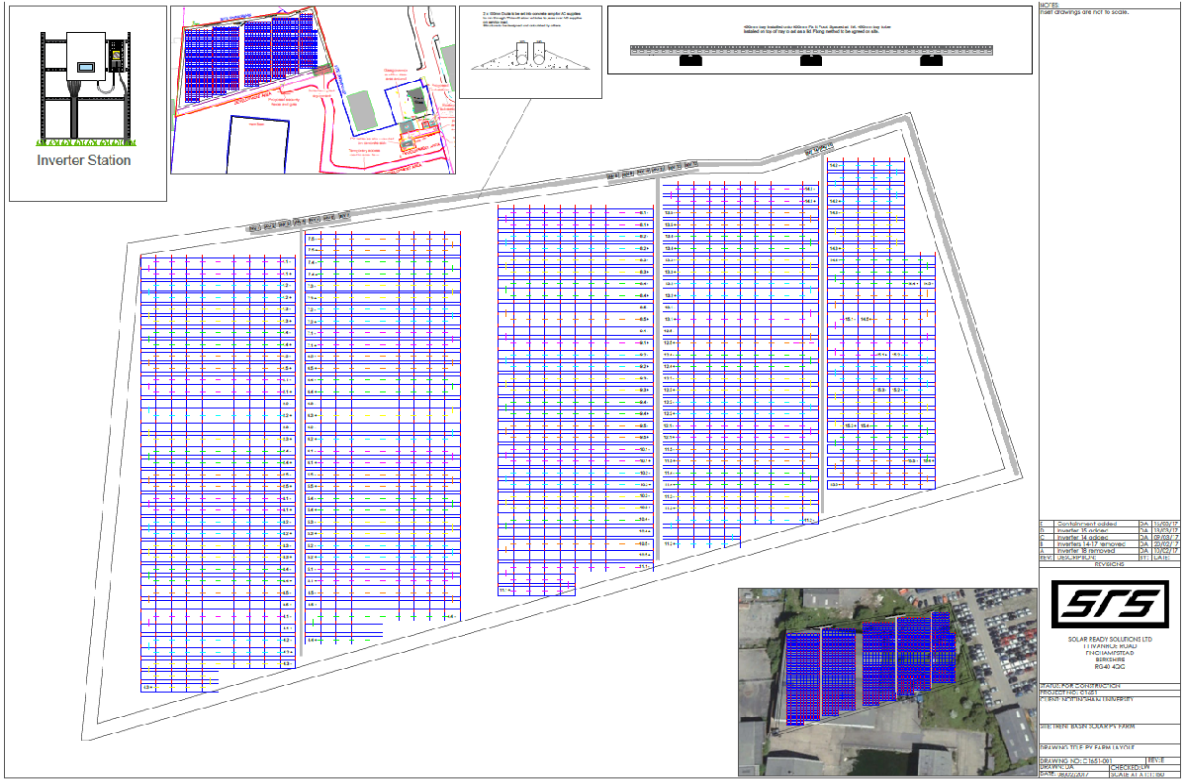


Weather Station

Enclosure - Security and Acoustic Fencing

Energy Centre Sub Station

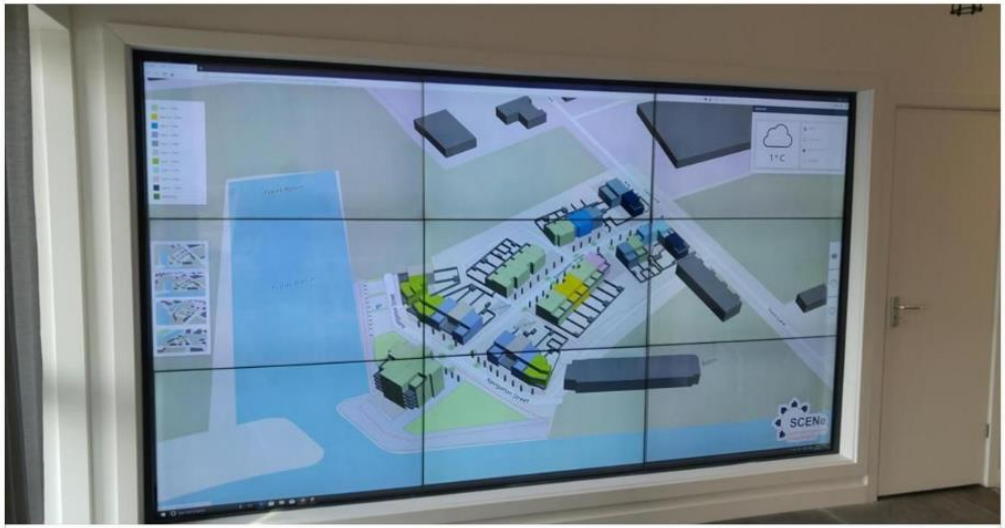
Meanwhile Use - Urban Solar Farm



Meanwhile Use - Urban Solar Farm

SCADA – Supervisory Control And Data Acquisition

Digital Twin



3D Community Interaction Model

Consumer Engagement

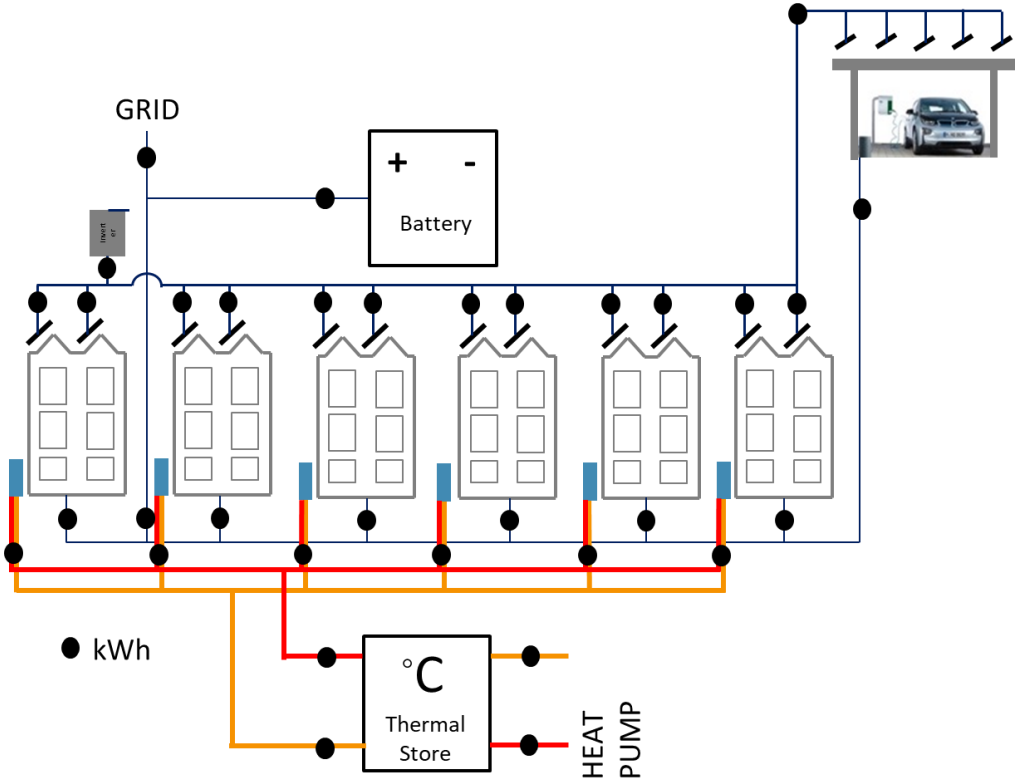
Smart Speaker

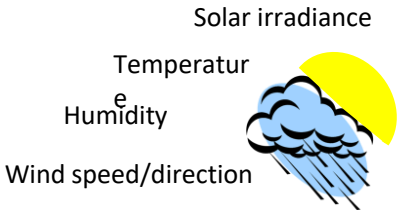
Smart Phones

I H D

Tablets

Monitoring - Community





Site Weather Station

Monitoring - Homes

Temperatures

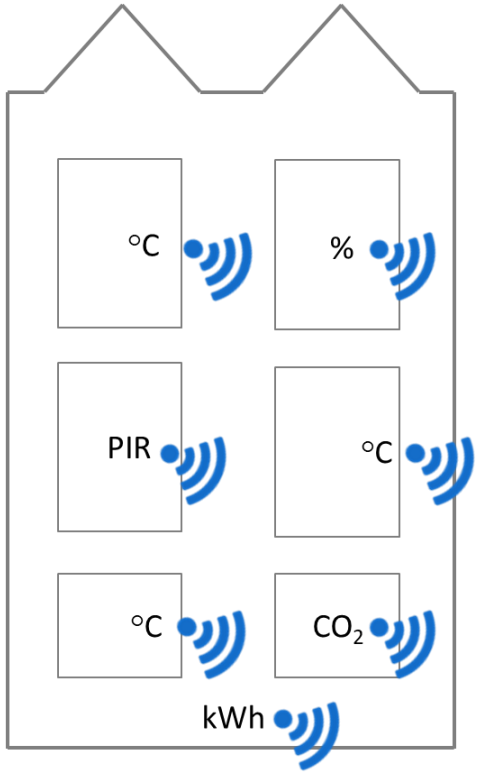
Relative Humidity

Carbon Dioxide

Occupancy

Electrical Energy
- Total Electricity
- Circuits
- Significant Appliances

Thermal Energy
- Hot Water
- Space Heating



CLOUD SERVER

Energy Centre

Monitoring - Homes

Smart Thermostat

The Honeywell Evohome system is an advanced heating system that allows control of individual rooms within the homes

Monitoring - Homes

Heat meters

To measure hot water and space heating energy use

Electricity Circuit Sub meters

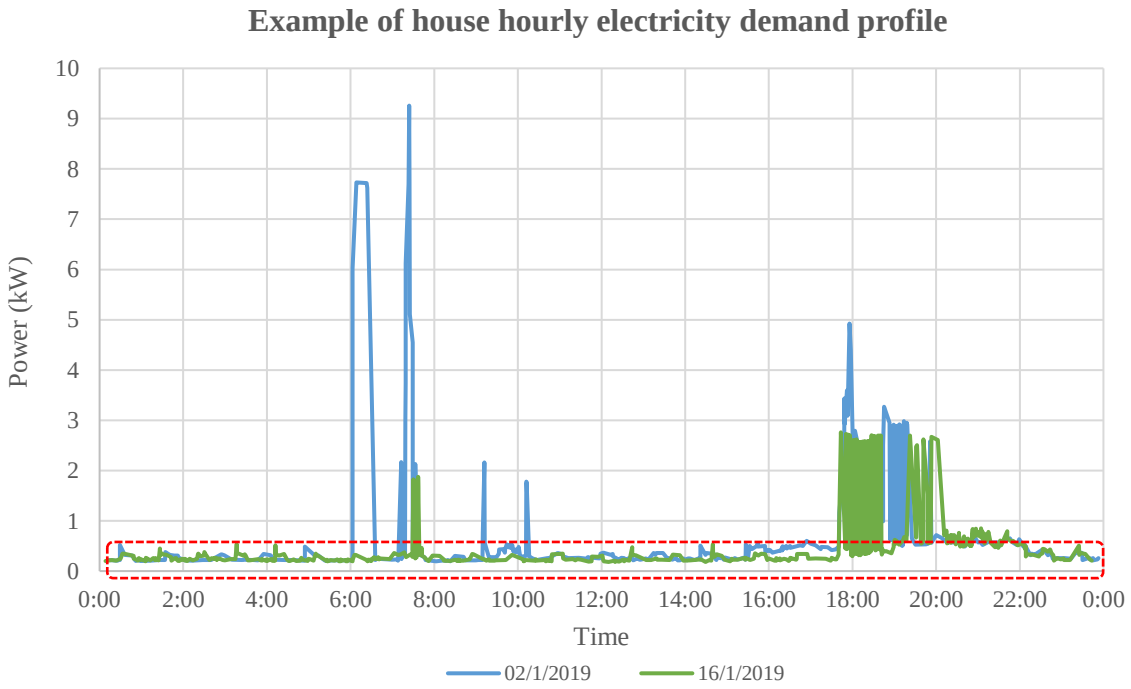
Monitoring - Homes

Gateways

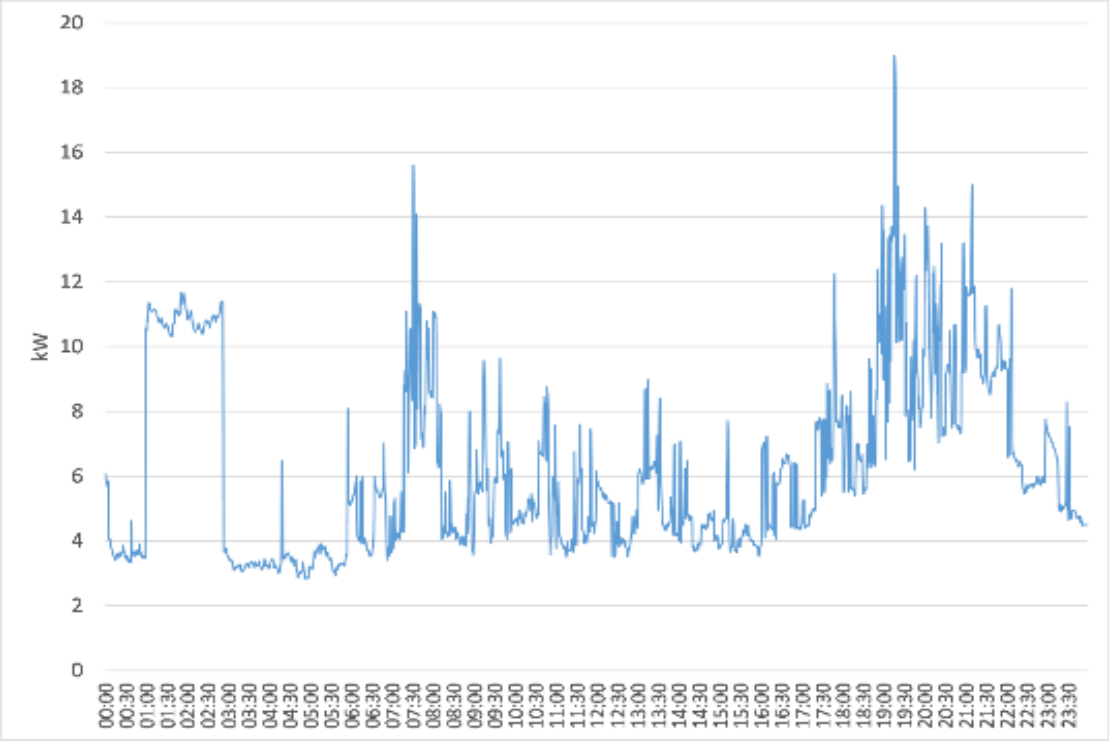
Much of the equipment installed in the homes uses low-power wireless technology to transmit the monitored data.

A gateway is required to listen for data transmissions and send them on to the project servers for further processing.

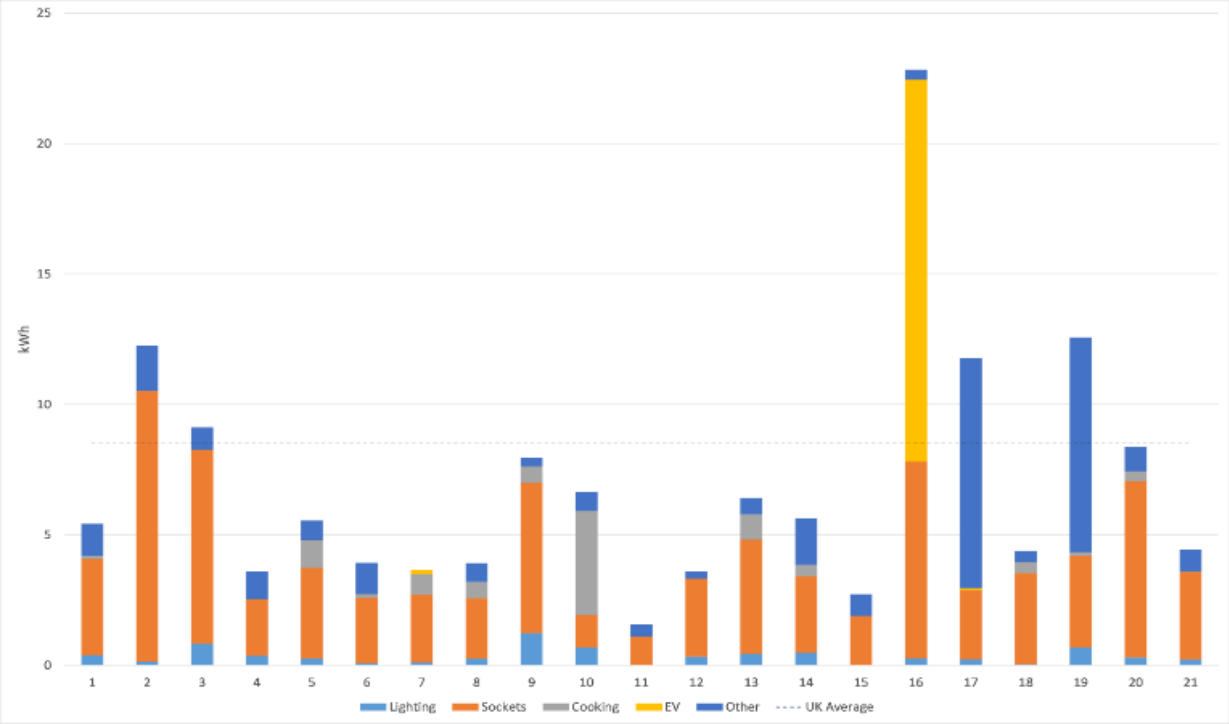
Home Monitoring – Sample Data



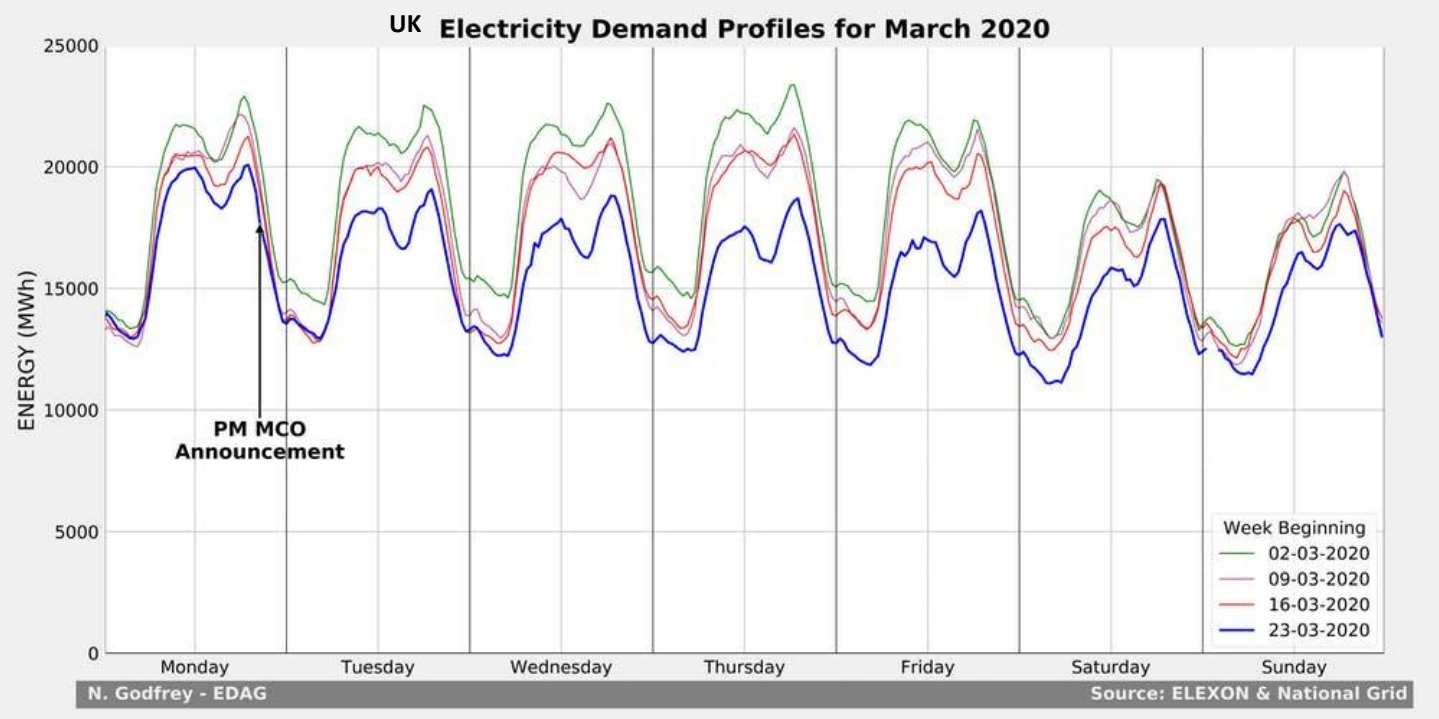
Home Monitoring – Sample Data



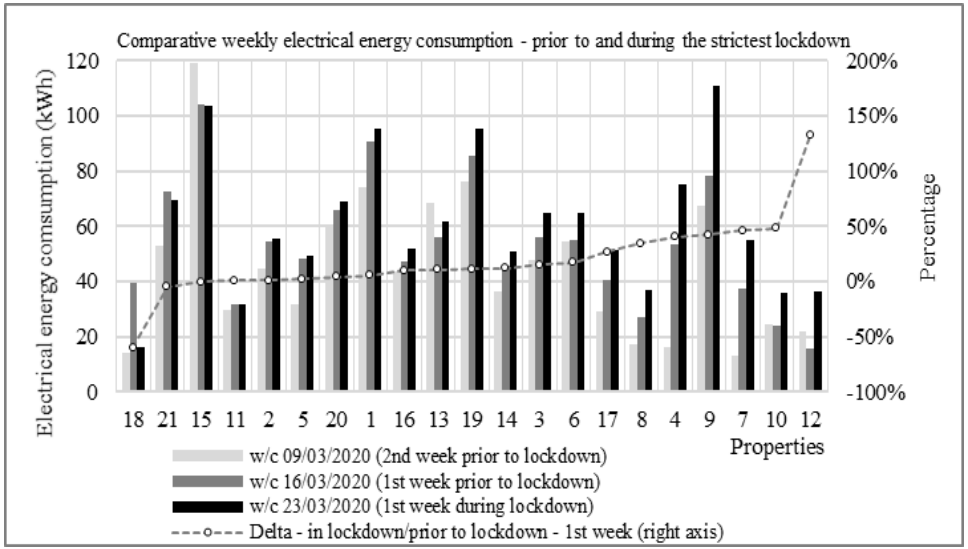
Home Monitoring – Sample Data

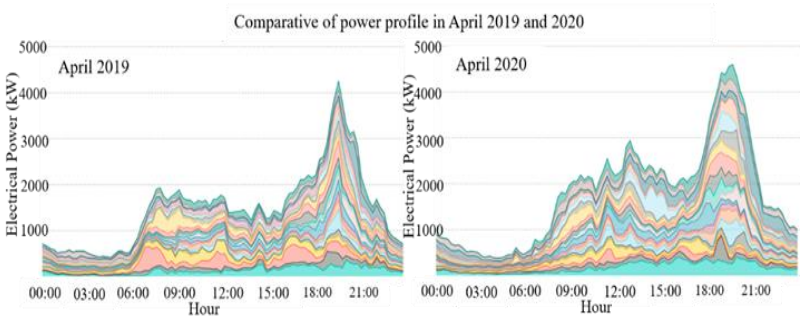


Covid-19 Lock Down Energy Behaviours



The impact of lockdown on electricity consumption





During 2020-2021 the households had an average increase in their annual average consumption of 17% when compared to 2019-2020

Tubelo, R., Naghiyev, E., Gillot, M., Rodrigues, L., & Shipman, R. (2021). Assessing the impact of lockdown due to COVID-19 on the electricity consumption of a housing development in the UK. In J. R. Littlewood, R. J. Howlett, & L. C. Jain (Eds.), Sustainability in Energy and Buildings 2021 (45-55). Springer. https://doi.org/10.1007/978-981-16-6269-0_4

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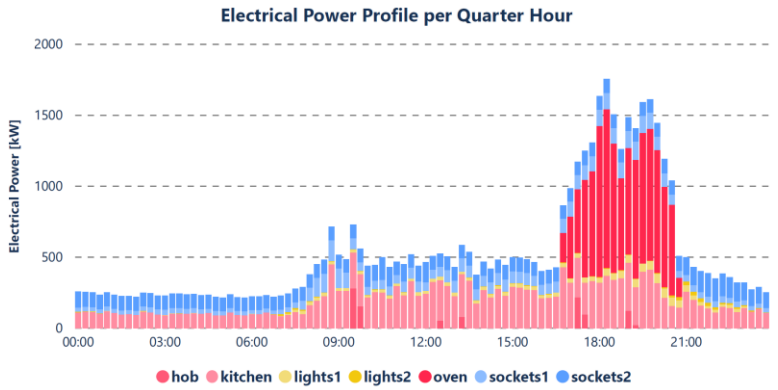
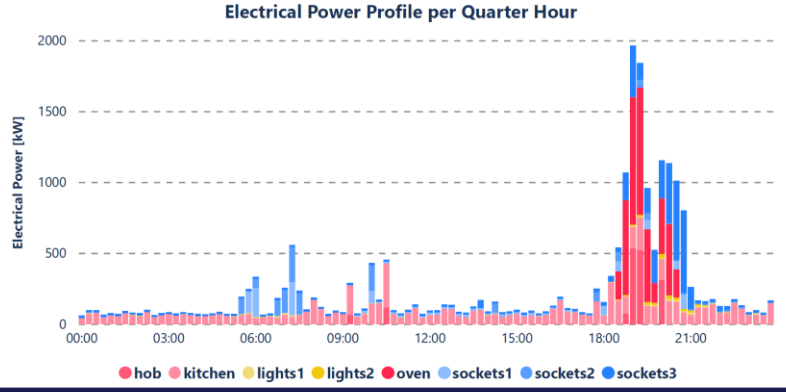
Covid-19 Lock Down Energy Behaviours

Prior to COVID-19 crisis, April 2019

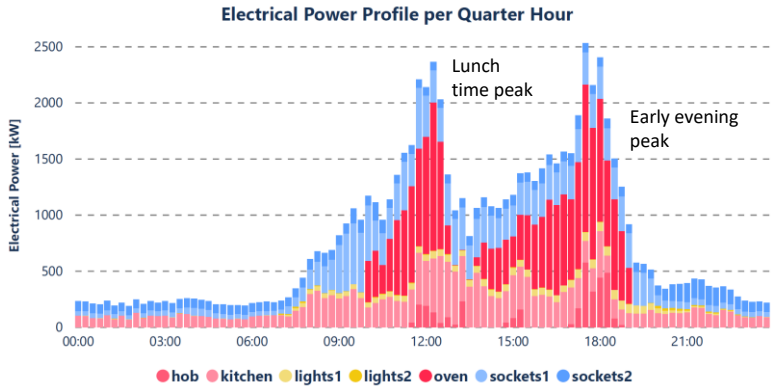
House x

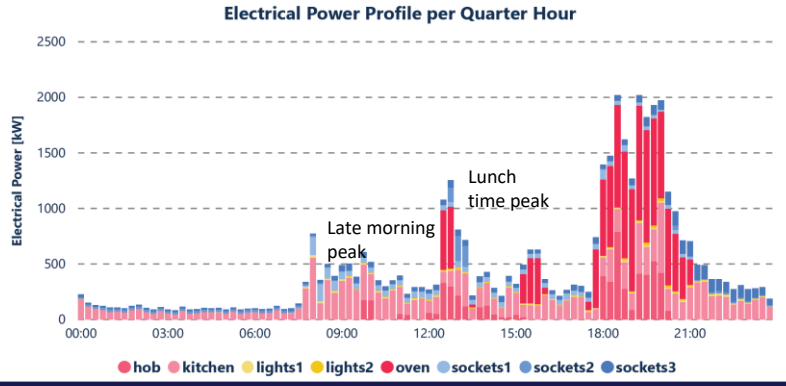


House y

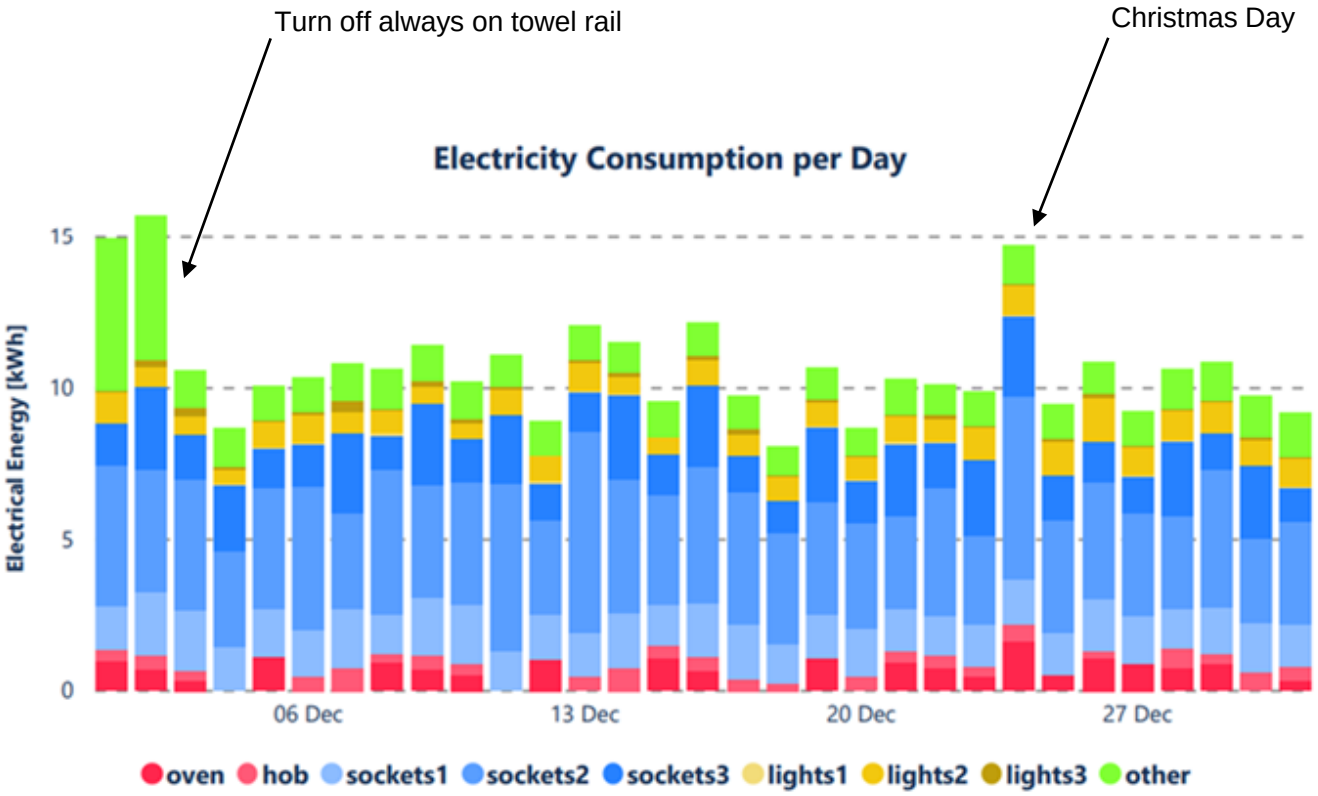


During COVID-19 crisis, in lockdown, April 2020

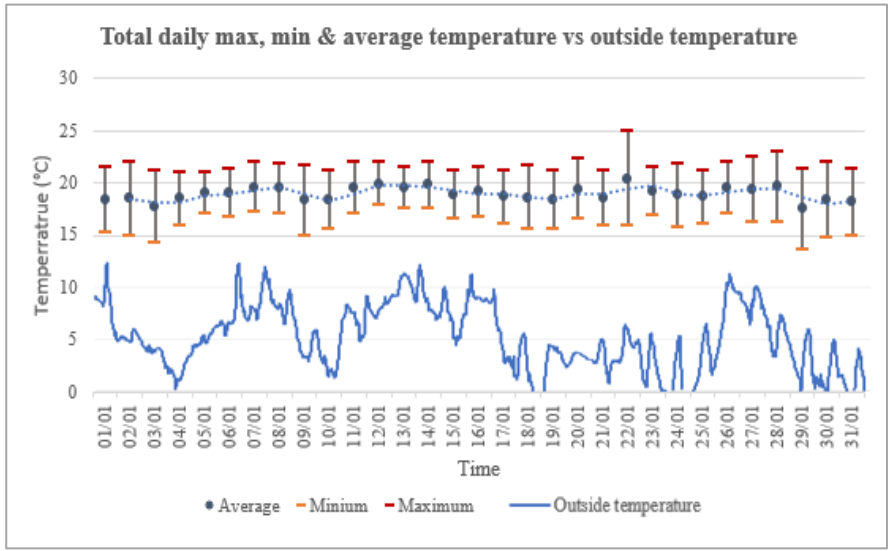


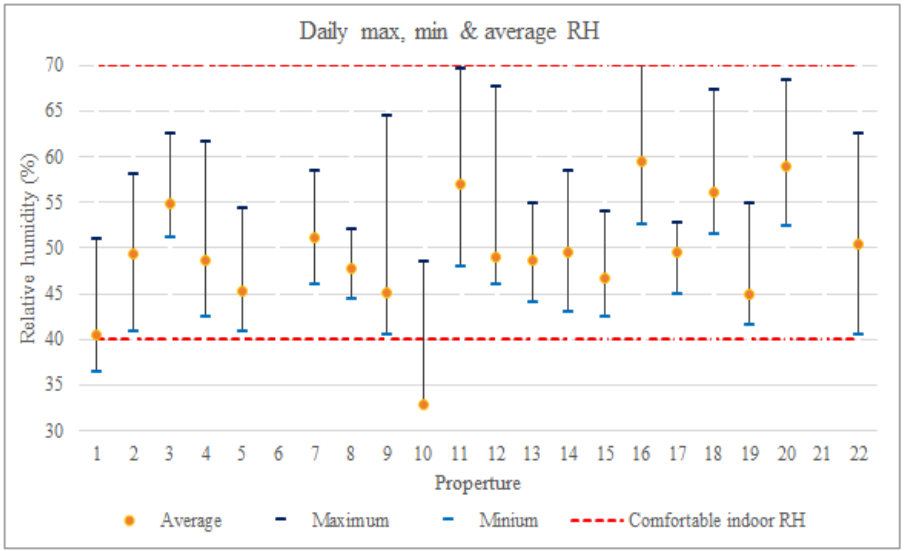


Energy Behaviours

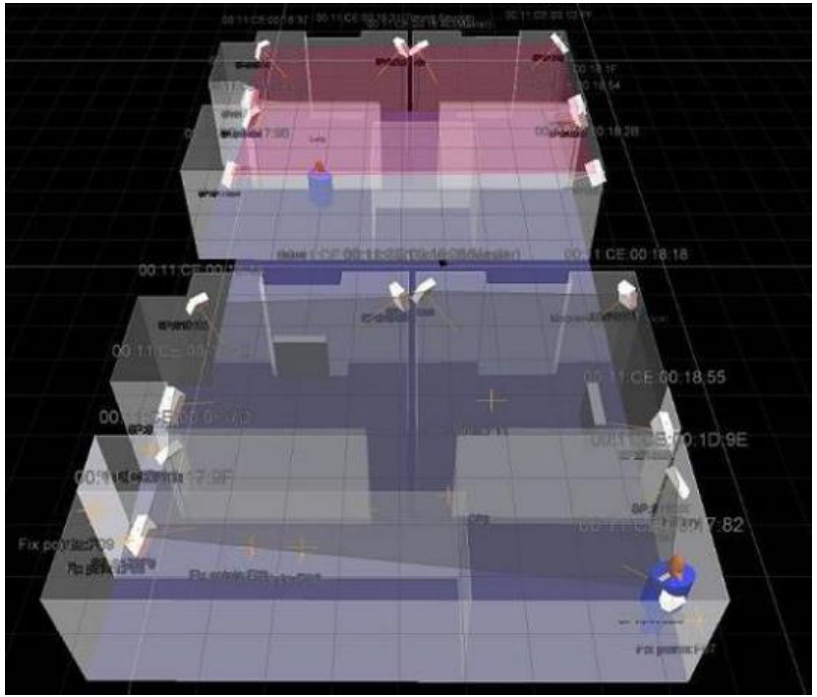


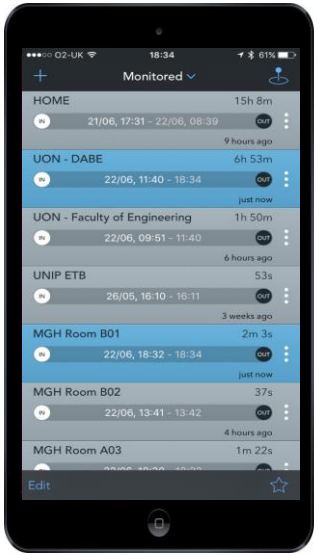
Indoor Environmental Monitoring





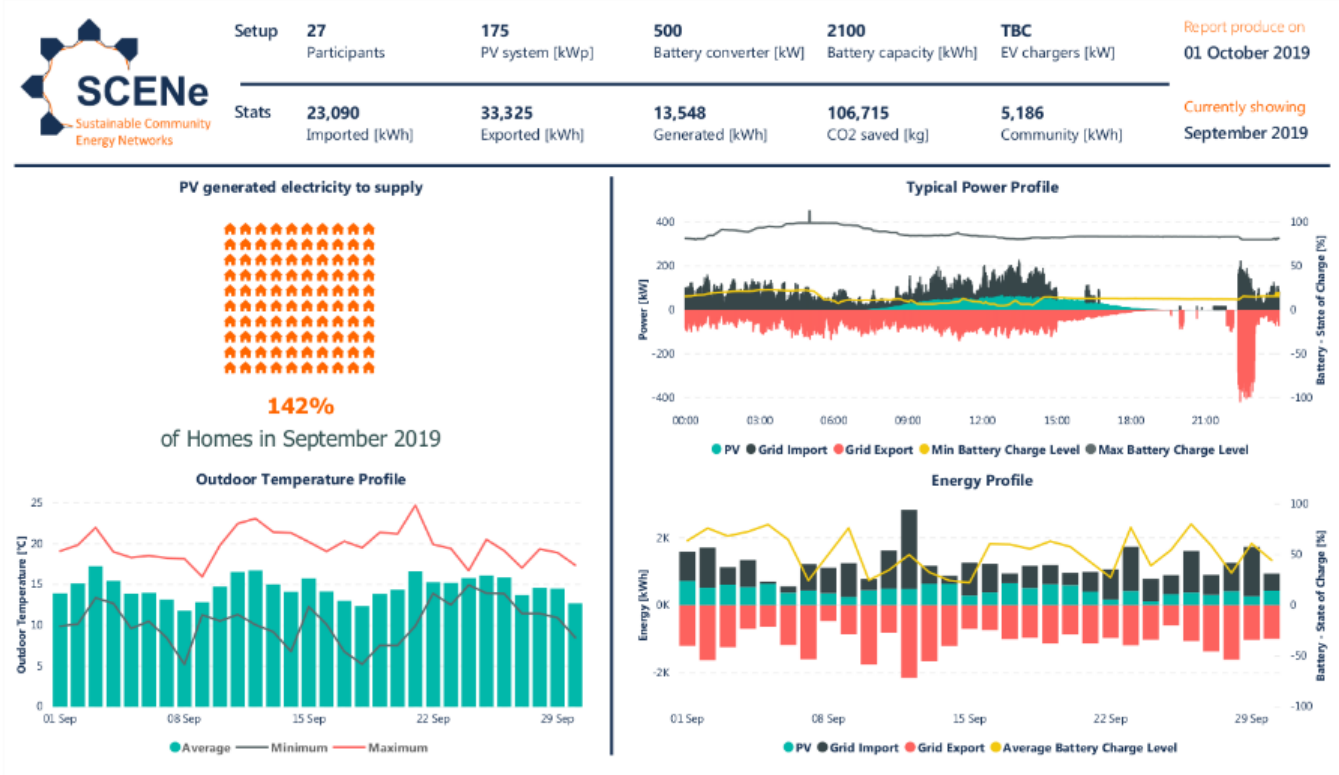
Real Time Energy & Location Tracking (RETLS)





iBeacon Room Level Occupancy Monitoring

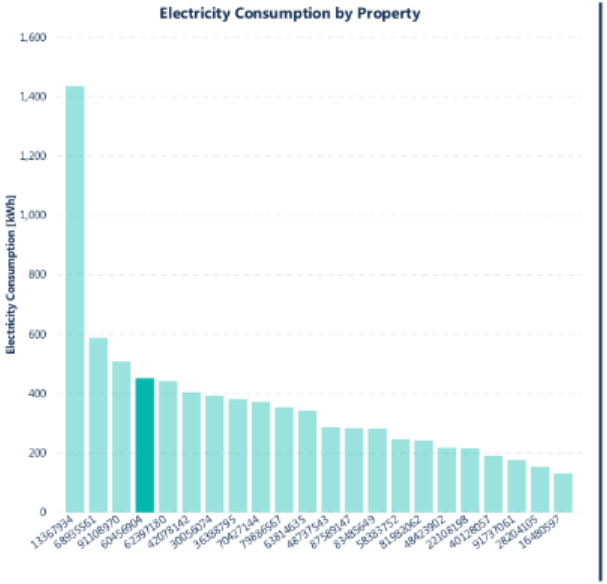
Reports for Home Occupiers

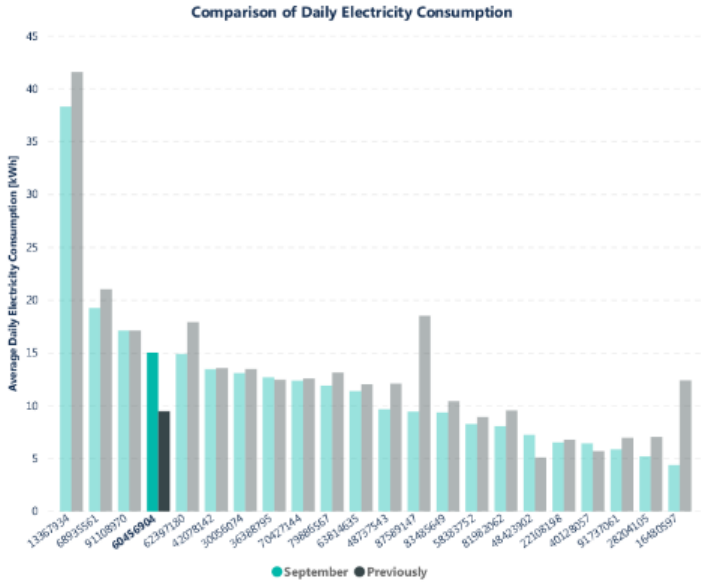


Reports for Home Occupiers

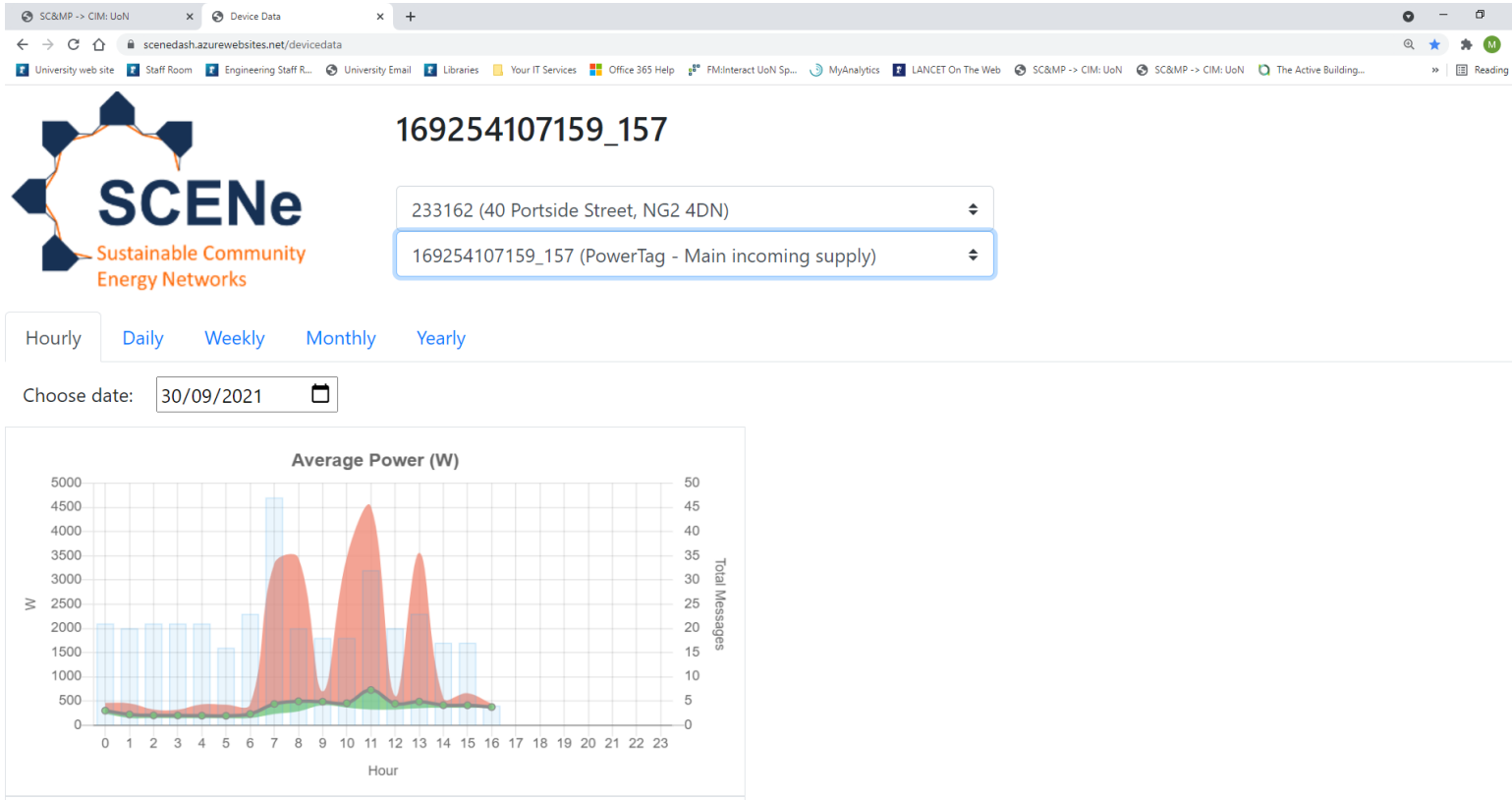
SCENe
Sustainable Community Energy Networks

Setup	27 Participants	175 PV system [kWp]	500 Battery converter [kW]	2100 Battery capacity [kWh]	TBC EV chargers [kW]	Report produce on 01 October 2019
Stats	23,090 Imported [kWh]	33,325 Exported [kWh]	13,548 Generated [kWh]	106,715 CO2 saved [kg]	231 Community [kWh]	Currently showing September 2019





Online Data Platform for Home Occupiers and Research Community



ofgem

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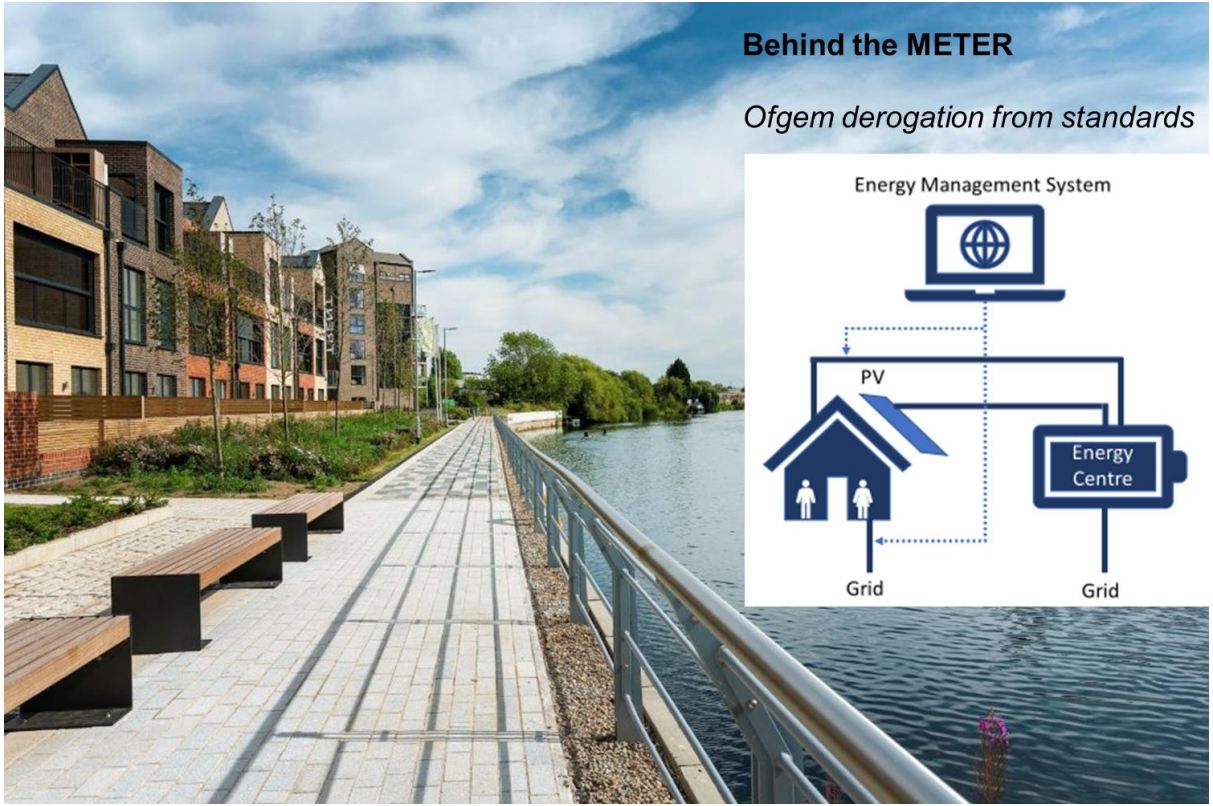
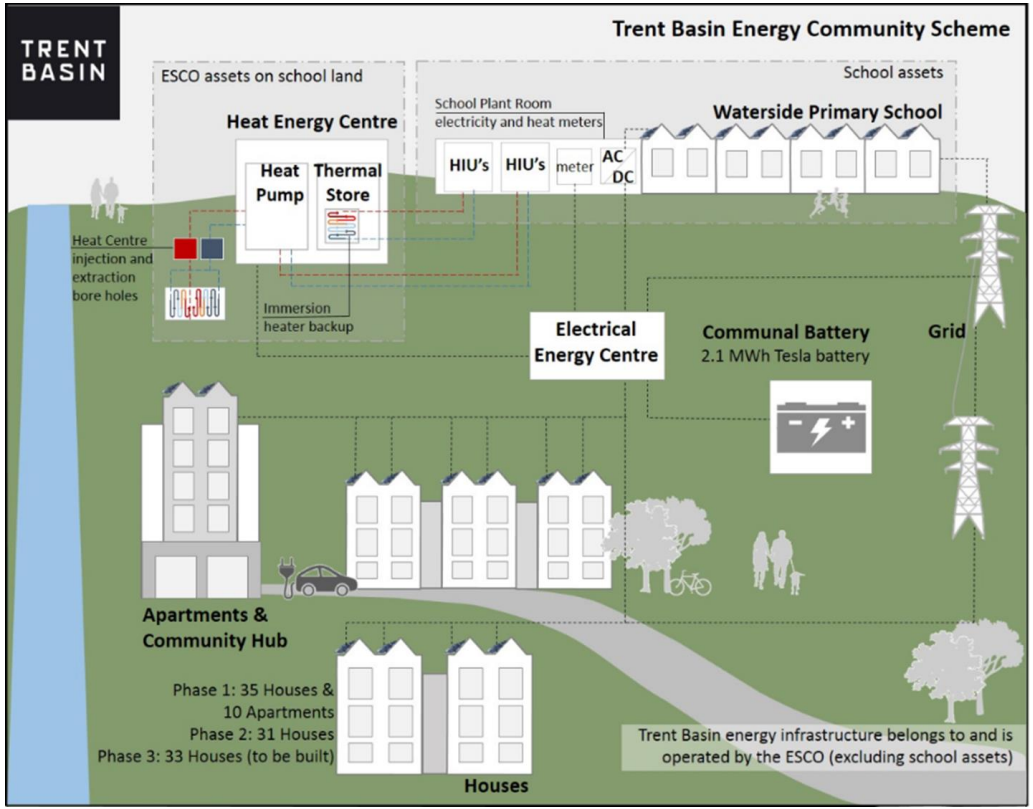
UK | CHINA | MALAYSIA

SMARTKLUB
Empowering Communities

Active Building Centre



What next?


TRENT BASIN
Trent Basin Energy Community Scheme
ESCO assets on school land
School assets
Heat Energy Centre
School Plant Room
electricity and heat meters
Waterside Primary School
Heat Pump
Thermal Store
HIU's
HIU's
meter
AC
DC
Heat Centre injection and extraction bore holes
Immersion heater backup
Electrical Energy Centre
Communal Battery
2.1 MWh Tesla battery
Grid
Apartments & Community Hub
Phase 1: 35 Houses & 10 Apartments
Phase 2: 31 Houses
Phase 3: 33 Houses (to be built)
Houses
Trent Basin energy infrastructure belongs to and is operated by the ESCO (excluding school assets)

EV-elocity project

EV-elocity is a research and development project looking at increasing the uptake of electric vehicles through helping consumers to monetise their investment using vehicle-to-grid (V2G) innovation.

Funded by:

Department for Business, Energy & Industrial Strategy

Office for Low Emission Vehicles

Innovate UK

Partners:

cenex

CrowdCharge

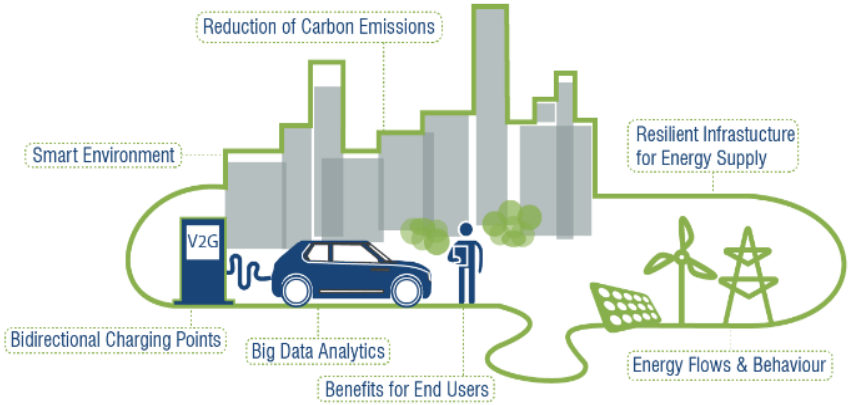
Leeds City Council

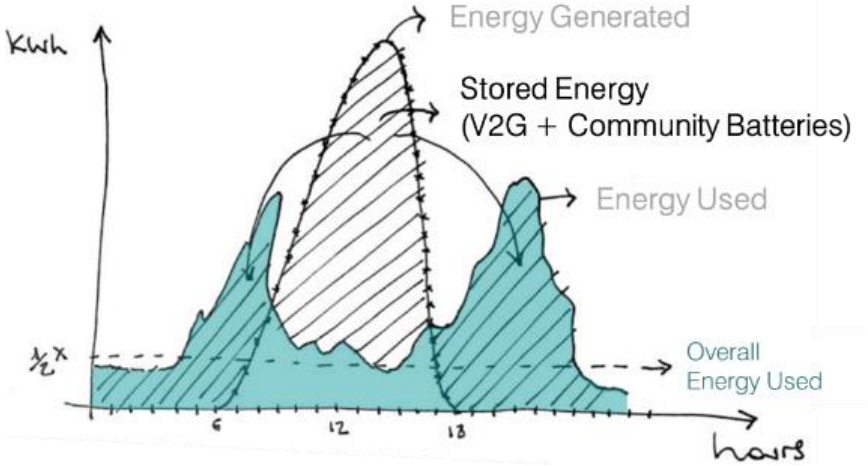
Nottingham City Council

University of Nottingham UK | CHINA | MALAYSIA

WMG THE UNIVERSITY OF WARWICK

Vehicle-to-Grid (V2G)





SHIPMAN, R.; WALDRON, J.; NAYLOR, S.; PINCHIN, J.; RODRIGUES, L.; GILLOTT, M., 2020. Where Will You Park? Predicting Vehicle Locations for Vehicle-to-Grid. *Energies* 2020, *13*, 1933.

WALDRON, J., RODRIGUES, L., GILLOTT, M., NAYLOR, S., SHIPMAN, R., 2020. "Decarbonising Our Transport System: Vehicle Use Behaviour Analysis to Assess the Potential of Transitioning to Electric Mobility". *In*: 35th Passive and Low Energy Architecture Conference (PLEA): Planning post Carbon Cities, 1-3 September 2020, Coruna, Spain.

SALAZAR, J., WALDRON, J., RODRIGUES, L., 2019. Regulatory and policy framework for the uptake of renewable energy in the United Kingdom. In 18th International Conference on Sustainable Energy Technologies - SET2019, 20th – 22nd August 2019, Kuala Lumpur, Malaysia.

WALDRON, J., RODRIGUES, L., GILLOTT, M., NAYLOR, S., SHIPMAN, R., 2019. Towards an electric revolution: a review on vehicle-to-grid, smart charging and user behaviour. In 18th International Conference on Sustainable Energy Technologies - SET2019, 20th – 22nd August 2019, Kuala Lumpur, Malaysia.

University of Nottingham
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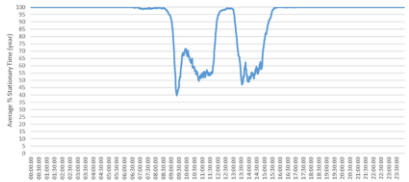
EV-elocity: our campuses are demonstrators

Stationary Time of Vehicles - Fleet 'X'

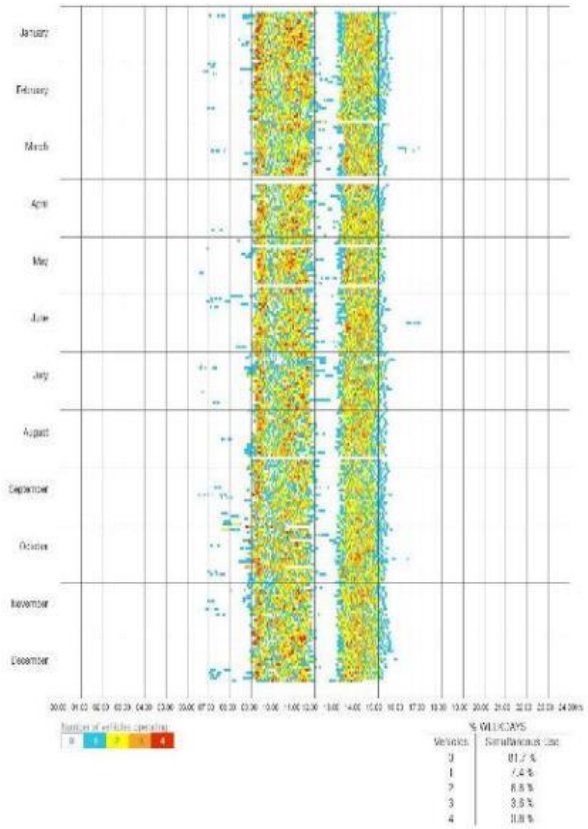


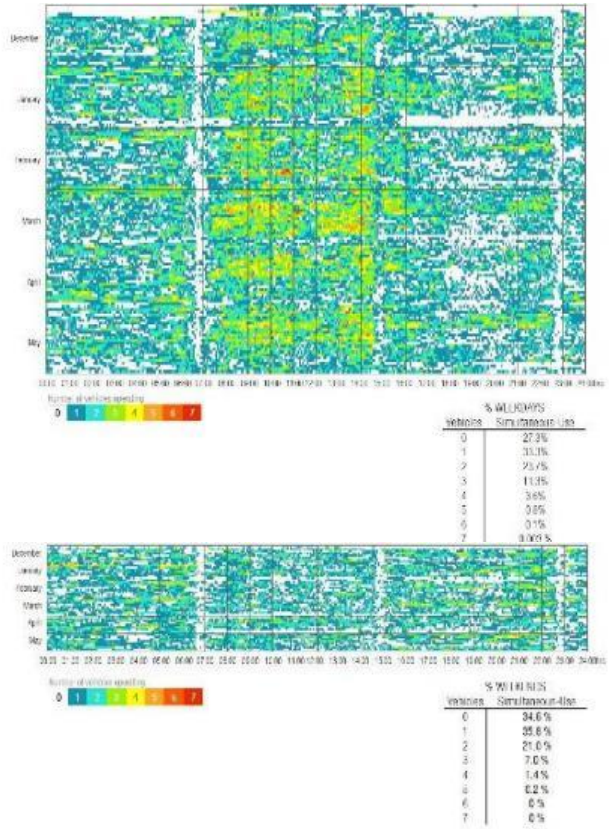
Stationary Time of the vehicles during 24 hours. 100% means that all the vehicles are stationary, as the percentage is lower; the probability of the vehicles to be in use at that time is higher.

Vehicle batteries are flexible energy storage as they can move energy around the city and release energy to the grid on demand.

Stationary Time of Vehicles - Fleet 'Y'

It is required to understand the patterns of behaviour of different type of users to build a resilient infrastructure.





@UoNEnergy

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Energy Institute

EV-elocity Case Studies

Leeds City Council

University of Nottingham

West Midlands Police
Worcestershire County Council

University of Warwick

University of Nottingham V2G demonstrators

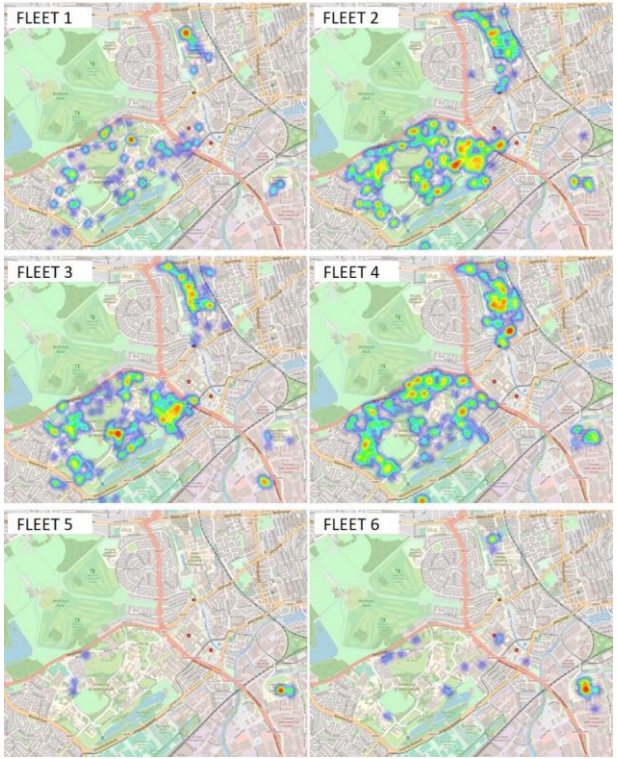
Location: Hallward Library
Use: University fleet

Location: Creative Energy Homes
Use: Integrating V2G & renewable energy generation

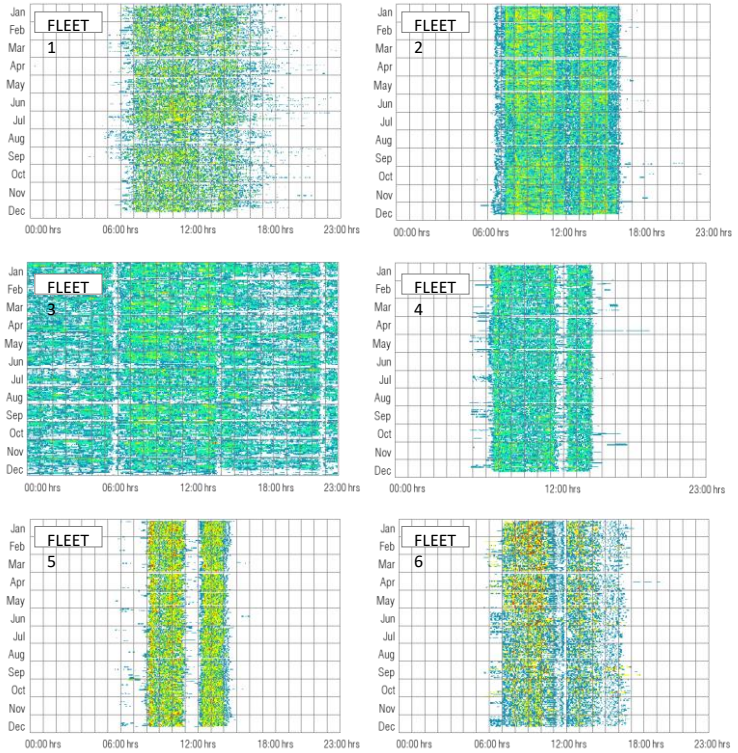
University of Nottingham
Energy Institute

Behaviour data analysis

Long dwell location analysis
(stops over 1 hr)

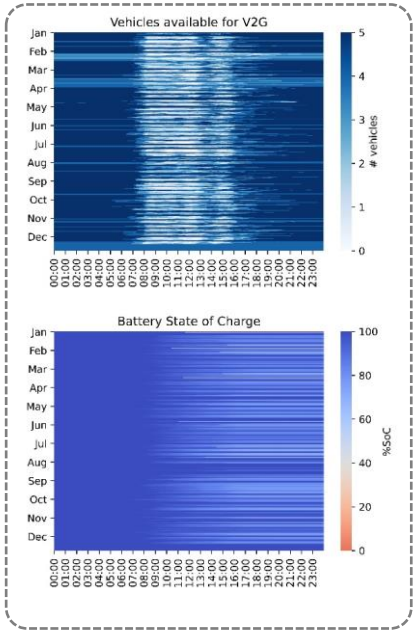


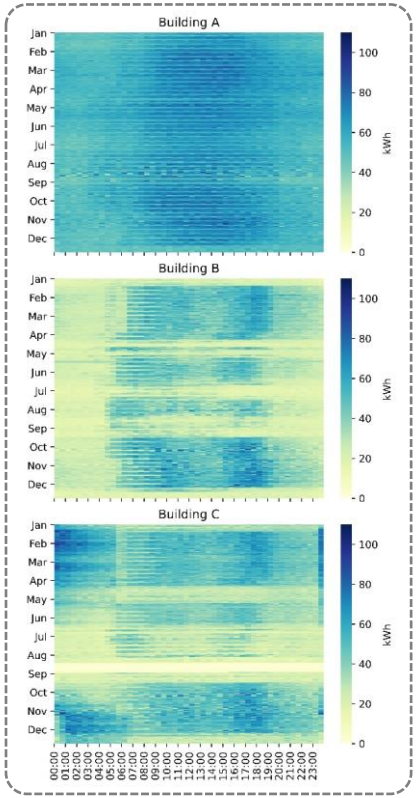
Fleet use patterns
(simultaneous use of vehicles)

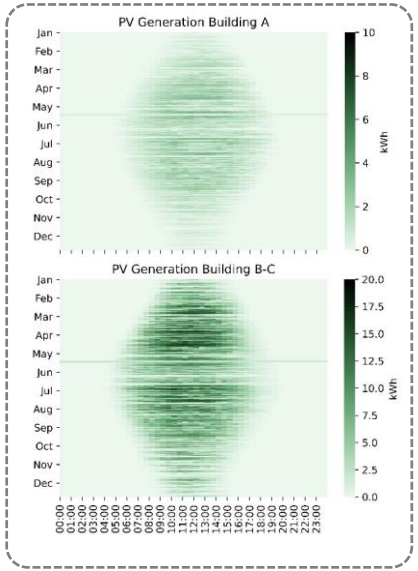


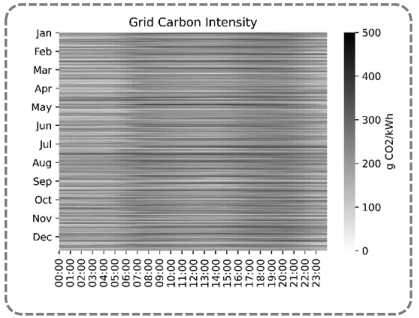
0% 100%

Vehicles Availability + Building Energy Consumption + Renewable Energy Generation + CO_2 Emissions









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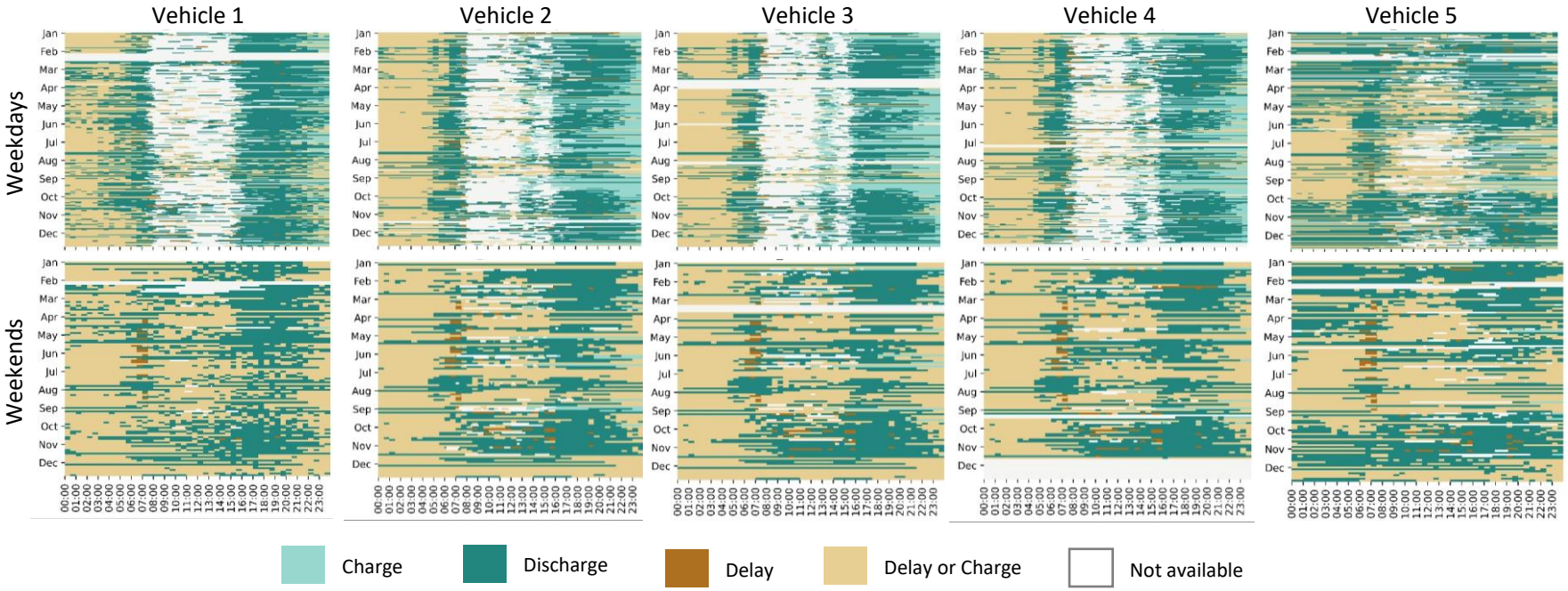
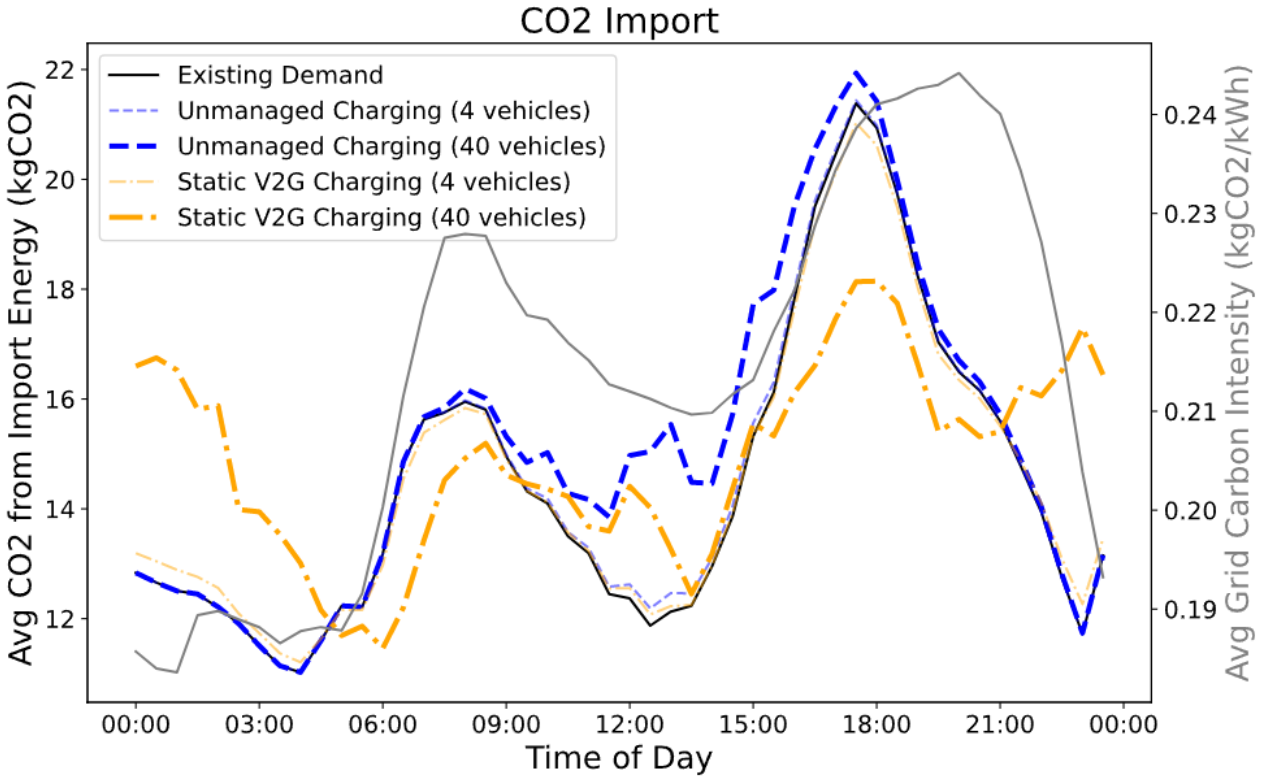
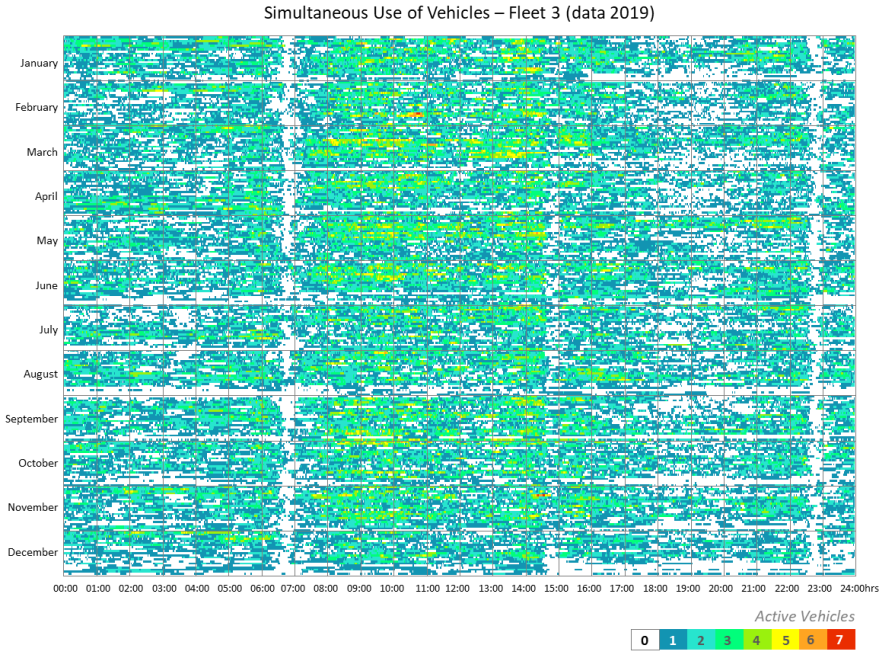
Charging/discharging to optimise environmental benefits



Carbon savings



Short dwell time fleets

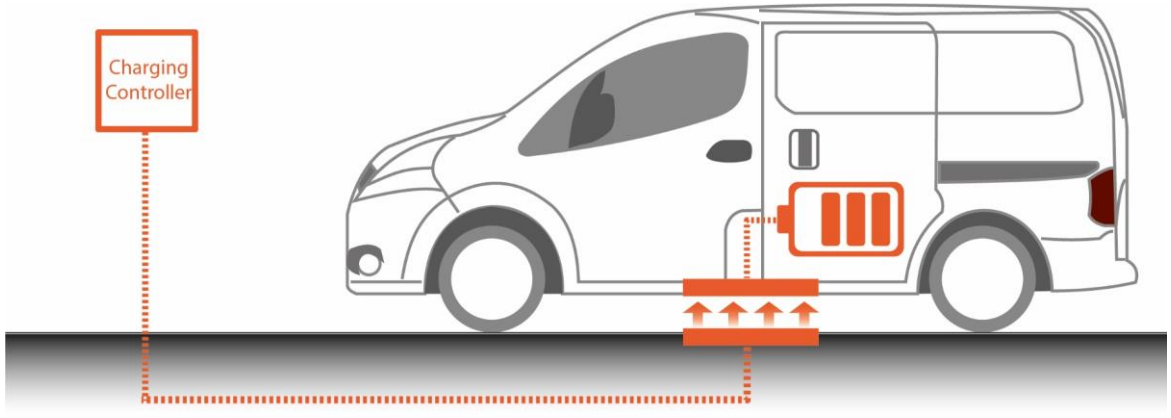


Fleet 3 - Descriptive Statistics 'Day Distance' (miles)

Vehicle ID	Max. Distance	Mean Distance	Std. Deviation	# days when distance > 100 mi/day
1	76.6	15.7	11.6	0
2	137.6	60.1	31.5	18
3	119.2	47.6	32.4	23
4	154.9	61.8	34.2	33
5	133.8	57.6	38.6	46
13	98.0	34.0	23.0	0
34	90.0	22.2	18.1	0
Fleet 3 Mean	**115.7**	**42.7**	**27.1**	**-**

Wireless Electric Vehicle Charging

Static charging – the vehicle needs to be parked first, whether it is in a car park or a garage before charging can start.
Semi-dynamic charging is a flexible pattern of charging that allows users to easily get a quick charge while on a journey, without having to come to a total stop. For example, a transit bus can be charged several times in the course of its journey during its quick stops.
Dynamic charging vehicles travelling along the highways can receive boosts in their batteries state-of-charge (SOC) from WEVC systems installed on designated charging lanes.



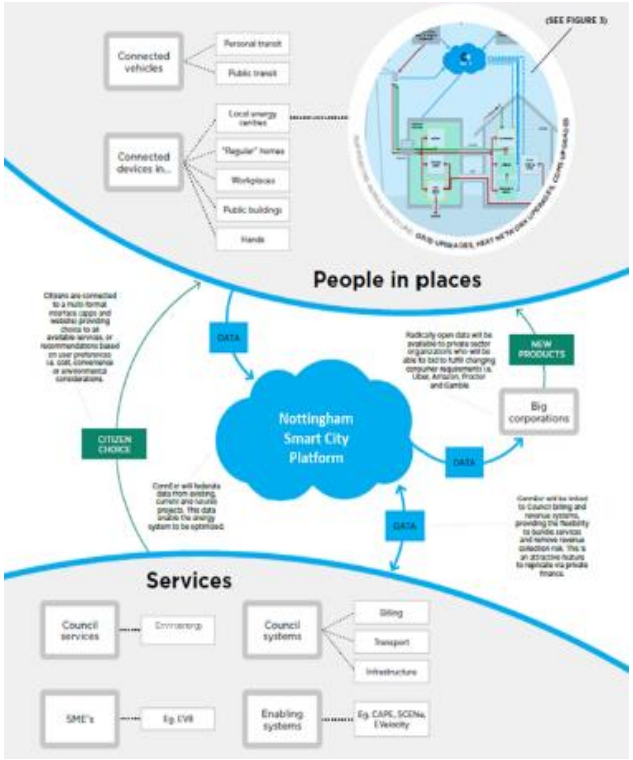
Static wireless charging

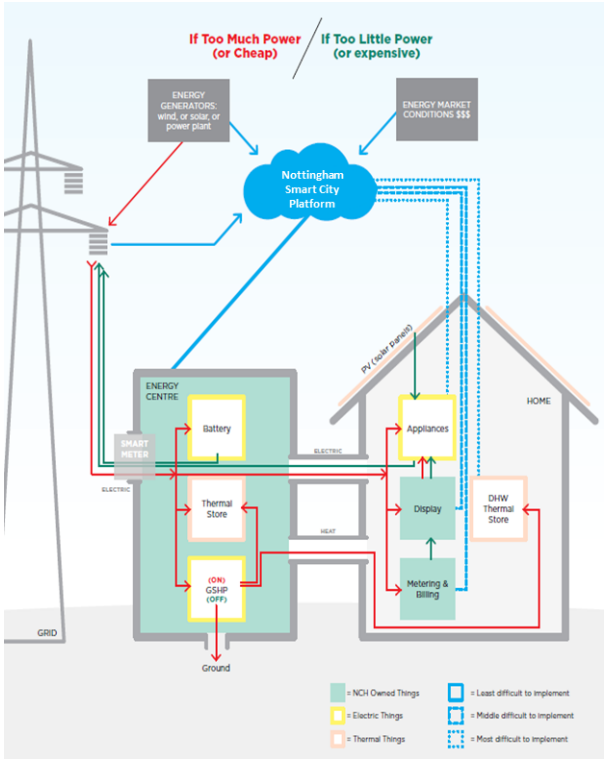
University of Nottingham
Energy Institute

Wireless charger demonstrator at UoN

University of Nottingham
Energy Institute

What next?





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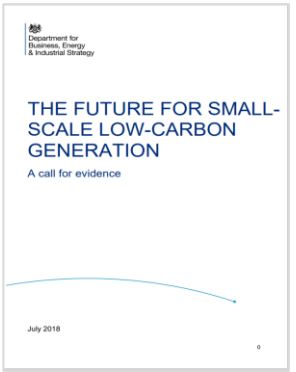
Project SCENe: Impact & Outreach

- The project appeared in 43 recorded press releases and media publications
- Received several important visits such as Sir David King, Foreign Secretary's Special Representative for Climate Change, Foreign & Commonwealth Office, and Climate Change Minister Claire Perry
- The UK100 has featured the project in its latest report "Financing the Transition: Harnessing UK Cities' Ambition for Clean Energy (2017)"
- The UK Government's Department BEIS featured the project as a case study in "The Future for Small-Scale Low-Carbon Generation – A call for evidence" (July, 2018)
- The UK Smart Cities Index (2017) recognised Project SCENe as one of the key projects contributing to Nottingham ranked 8th place between the UK 20 leading smart cities and the top smart city for energy.
- Featured in the Innovate UK Energy Heroes campaign: Clean Growth – How Nottingham Trent Basin is Generating Electricity
- Session at the Nottingham in Parliament Day: Future of Energy, the Community Energy Revolution
- Green Gown Award 2018 Highly Commended - Benefitting Society Category
- Business Link Magazine's East Midlands Bricks Awards 2018 winner - Sustainable Development of the Year
- The Decentralised Energy Awards 2018 winner - Innovation Award
- COP26, UKGov Climate Leader Exemplar Project
- dezeen, Sept 2021, named one of ten global projects that demonstrate the possibilities of low-energy architecture
- Collaborate to Innovate 2019 winner - energy and environment category
- British Renewable Energy Awards 2022 winner - community category



Active Building Centre / ERA / IUK

University of Nottingham
Energy Institute

Thank you!

mark.gillott@nottingham.ac.uk

Networking lunch

If you want to go outside and enjoy the nice weather, we will meet back at 13:15

Workshop

How different sectors can work towards Net Zero

Workshop plan

Introduce yourself

Share

Cross sector event / activity

Principles

Introduction session

- Why are you here?
- Give an example of cross-sector / cross-discipline activity you've taken part in.
- Would you like to have taken part in your table partners activity?
- What are the perceived barriers to you taking part?

Time to share

- What activities or events have you heard about that you'd like to have taken part in?
- Are there any perceived barriers for you (or your organization) to taking part?

Create a net zero focused cross-sector event or activity?

On your table brainstorm:

- What would it look like?
- Why would you do it?
- Who would you like to be involved?
- How would you reduce perceived barriers to taking part?

Principles for different sectors to work together to reach Net Zero

Together we will create some principles for cross-sector working

Parallel Session

- HyDEX flex fuel demonstrator tour
- Networking session

Local net zero initiatives

Short talks and panel discussion

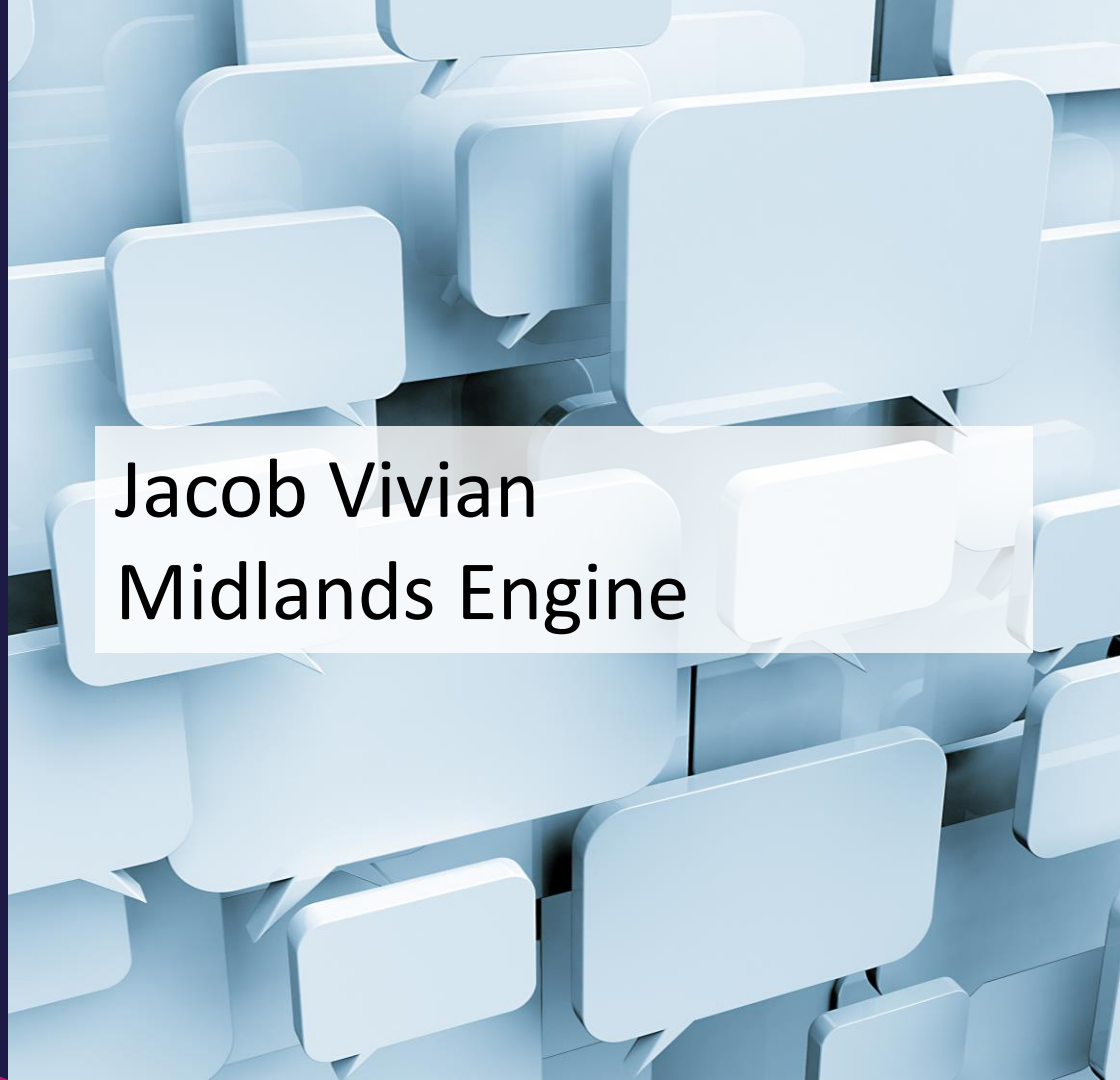
Speakers:

- Jacob Vivian - Midlands Engine
- Jonny Prest - Seed and Net Good City
- Thomas Steffen - Loughborough University Net Zero Team
- Kathryn North – C-DICE, ERA and Loughborough University

Moderator: Lennie Foster

Local net zero initiatives

Short talks and panel discussion

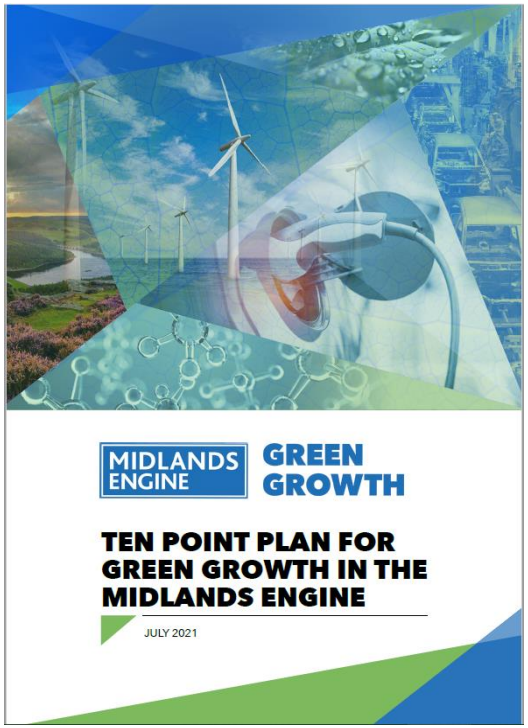


Jacob Vivian
Midlands Engine

What we do?


MIDLANDS ENGINE PARTNERSHIP
Harnessing our collective power to achieve more for our region
Advocating
Convening
Evidencing
Focusing on the strategic drivers for the Midlands Economy:
1 Increasing productivity
2 Innovating across sectors
3 Building infrastructure for growth
4 Increasing Trade & Investment
Creating strong links with our partners across key regional sectors:
Clean Growth
Advanced Manufacturing
Food & Agri-Tech
Med-Tech & Life Sciences
New Market Opportunities
MIDLANDS ENGINE

Ten Point Plan for Green Growth in the MIDLANDS ENGINE



1 GREEN BUILDINGS
Improve energy efficiency and decarbonise heat

2 NET ZERO TRANSPORT
Lead the transition to reduce emissions

3 NATURE'S RECOVERY
Protected and productive natural assets

4 BLUE-GREEN PLACES
Where people and nature flourish

5 LOW CARBON HYDROGEN
Pioneer, commercialise and deliver hydrogen solutions

6 CLEAN ENERGY
Sustainable energy generation and storage

7 SMART ENERGY
Develop digital infrastructure to decarbonise

8 GREEN INNOVATION
Green design and making for economic growth

9 ENERGY WORKFORCE
Highly skilled, inclusive and diverse

10 GREEN FINANCE
Invest and enable to unlock opportunity

What this looks like?

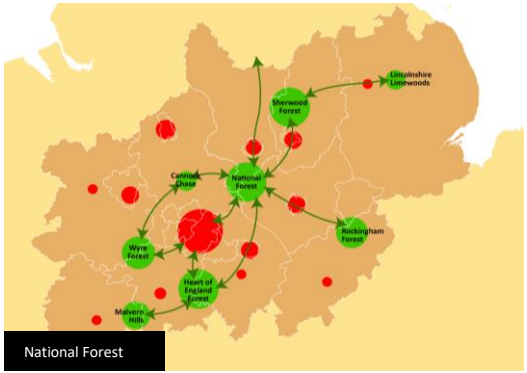
Highlighting the Levelling Up Value

Gov.UK

Showcasing the Wider, Regional Picture

National Express West Midlands

Convening to Aggregate Investment



National Forest

Demonstrating Midlands Strengths & Impact

SMART ENERGY IN THE MIDLANDS TODAY...

There are already several pioneering projects in the smart energy sector in the Midlands:

- The Smart Energy Network Demonstrator (SEND) project is the largest of its kind in Europe. The University of Keele is working in partnership with Siemens and Engie/ EQUANS to create a smart energy network of energy generation, distribution and storage across different energy sources at the university campus
- The Trent Basin project in Nottingham is a housing development focused on local smart energy systems
- The Regional Energy Systems Operator project in Coventry has examined new ways of managing energy at a local level
- Plans for the University of Birmingham and Siemens to create a smart campus with 38,000 sensors linking to a smart energy system.

...AND TOMORROW

There is a real opportunity to upscale projects and initiatives to a position where smart energy systems monitor and optimise energy use in households, commerce, industry and with electric vehicles. In our region, these systems have the potential to:

- **Make energy savings of up to £70bn** from 2022 to 2050
- **Generate up to £1.5bn in gross value added (GVA)** and £0.6bn in exports
- Sustain **7,000 jobs** per year
- **Reduce CO_2 emissions by 106,000 kt** by 2050.

7,000 jobs
sustained per year

SMART

£70bn
of energy savings

Local net zero initiatives

Short talks and panel discussion

Jonny Prest
Seed and Net Good City

Jonny Prest
Senior Strategist

jon@seedcreativity.co.uk
@seedcreativity

We’re a change agency.

Yep, I know what you’re thinking... what’s a change agency?

We use thought leadership and creative ideas to overcome obstacles in areas such as engagement, communications, culture or behaviour.

Purpose (our why)

How do we use creativity to help leaders and innovators solve the world's biggest challenges?

Elodie
Joey
Cleo

Transistion to the

Regenerative Age

Unity
Community
Collaboration

Local net zero initiatives

Short talks and panel discussion

Thomas Steffen
Loughborough University
Net Zero Team

The Midlands' Journey to Net Zero

Transport

Thomas Steffen

Reader in Control Engineering

<t.steffen@ieee.org>

About myself

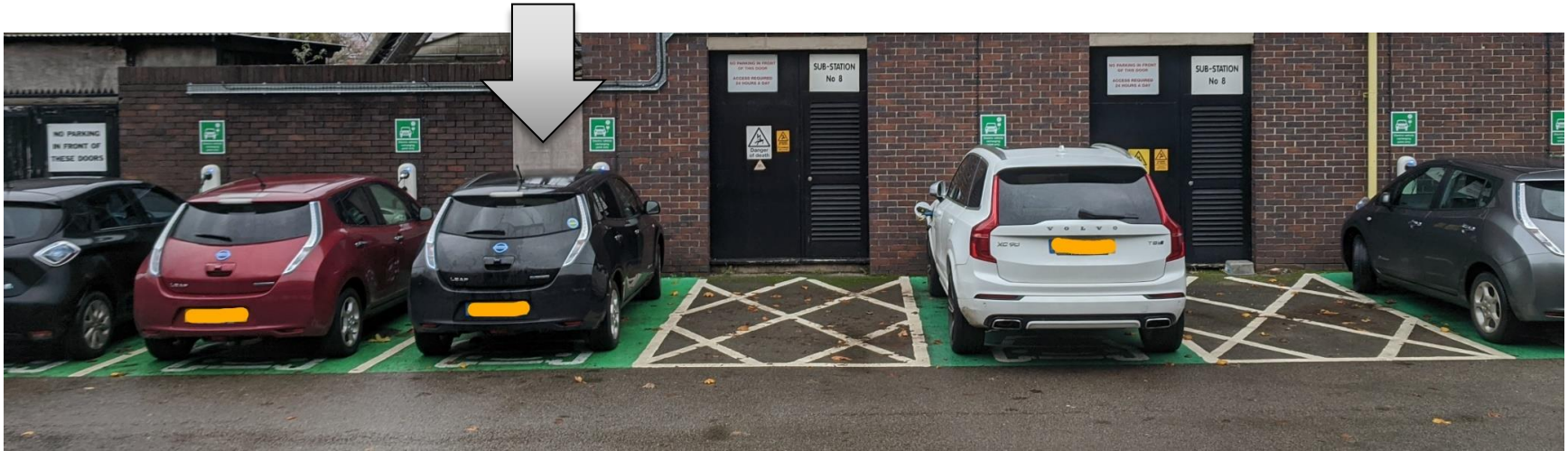
Loughborough University

Short CV

- At LU since 2007
- Reader in Control Engineering
- PhD in Fault Tolerant Control
- "MEng" in ElecEng
- MIEEE t.steffen@ieee.org
- Have a Nissan Leaf

Where am I coming from?

- Automotive Megatrends
- Electrification
- Digital Engineering
- Control
- EVs become part of our infrastructure



Trends in the Automotive Industry

https://www.pwc.com/auto

"EASCY"

- "**Electrified** – the transition to emissions-free mobility will become a global requirement. Electricity used to charge vehicles will increasingly come from renewable sources to ensure carbon dioxide-neutral mobility.
- **Autonomous**
- **Shared**
- **Connected**
- **'Yearly' updated**

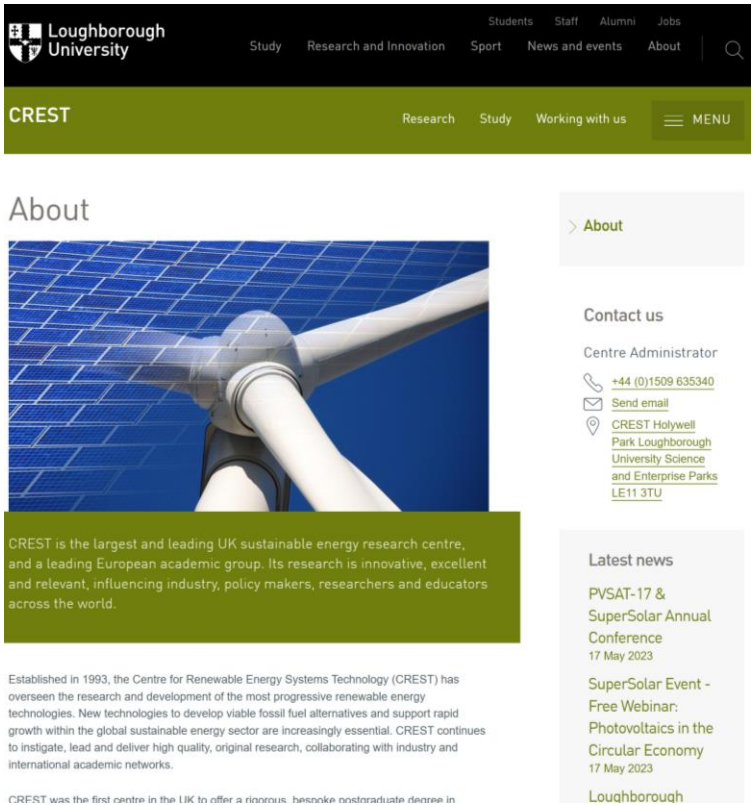
Loughborough University

This is not new!

- Svante Arrhenius mentioned global warming in 1896
- Limits to Growth 1972
- Smart Charging, 2018
- LUNZ, 2023

CREST

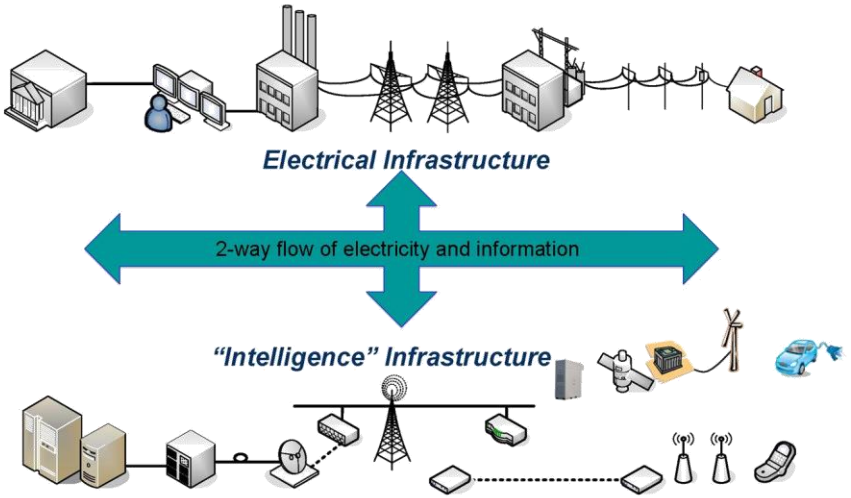
Established in 1993, the Centre for Renewable Energy Systems Technology (CREST) has overseen the research and development of the most progressive renewable energy technologies.



Smart Charging of EVs
(PhD project)

Loughborough University

- **High power and long times** needed for EV charging
- Typical charging loads: **home**, office, car parks
- **Existing grid** will have to accommodate for EV charging
- This will cause an **electricity market change**
- EVs as "smart appliance"
- Using real time pricing
- Approach: Stochastic Dynamic Programming (SDPM)

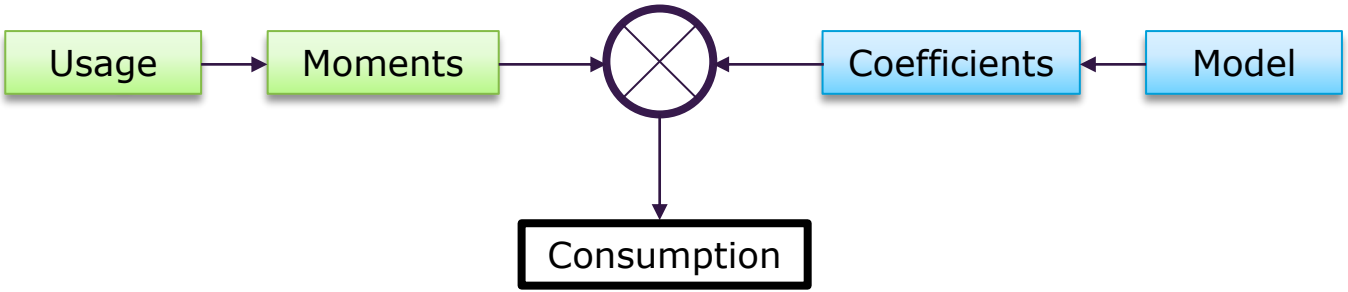


http://www.nist.gov/itl/antd/emntg/images/DS_and_CS_2.jpg

C: EV Charging

Loughborough University

Moments of Power



$$Y = T \sum_{n=0}^{\mathrm{i}} k'_n \mu'_n$$

SAE 2023-01-0541

Direct estimation of primary energy consumption under real world conditions.

No simulation required! No integration. No iteration. Just multiplication.

LU Net Zero

- Loughborough University has just updated 70 charge points
- EV Salary Sacrifice is coming
- 40 further ideas in Scope 3 (indirect emissions except energy) are under consideration

Loughborough University

OUR JOURNEY TO NET ZERO

TYPE OF EMISSIONS

SCOPE 1	SCOPE 2	SCOPE 3
Gas/Fuel	Electricity	Waste, Water, Construction, Purchase of goods & services, Staff & Student Travel (Business & Commute)

CURRENT EMISSIONS

Total Emissions 96,638 t/CO2

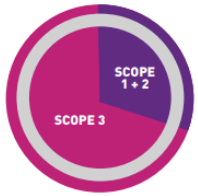
(FUEL USE, GAS, ELECTRIC, VEHICLE FUEL)

Scope 1 15,303 t/CO2 (16%)

Scope 2 2,881 t/CO2 (3%)

(WATER, WASTE, TRAVEL, SUPPLY CHAIN)

Scope 3 78,454 t/CO2 (81%)



KEY

Scope 1 + 2 Carbon Emissions (GAS, ELECTRIC, LU FLEET AND GENERATOR FUEL)

Scope 3 Carbon Emissions (WATER, WASTE, TRAVEL, SUPPLY CHAIN)

t/CO2

100,000
50,000
25,000
20,000
15,000
10,000
5,000

SCOPE 3 BASELINE

2008
- Universities First Sustainability Manager employed

2009
- It's Better OFF energy awareness launched
- Main Boiler House CHP installed
- Sports Park BREEAM Excellent

2010
- Eco campus Bronze
- Green Gown Highly Commended 'Carbon Reduction'
- BITC Award Carbon Positive Pioneer

2011
- Eco campus Silver
- Fruit Routes Launched
- Green Gown Winner Positive Behaviour Change
- (2011-2013) Operated Green impact award scheme
- Lboro Design school BREEAM Excellent
- Voltage optimisation installed

2012
- 1st Electric Car charging points on campus
- Eco campus Gold
- Emissions based Car Parking Management Strategy

2013
- Green Gown Awards Finalist - Fruit Routes
- British Heart Foundation Collaboration begins - 'The Big Clear Out!'

2014
- Eco campus Platinum
- ISO14001 accreditation achieved
- Guardian University Awards Fruit Routes wins Sustainability Project Award
- University apiary Launched with three colonies

2015
- University Strategy "Building Excellence" "we will embed sustainability and social responsibility considerations into all of our processes, operations and developments"

2016
- Sustainability Charter Launched
- Ditch the disposables Campaign launched with the introduction of the Lboro Cup.
- Fruit routes celebrate 5 years

2017
- ISO14001:2015 re-certifcation and transition London and Imago added
- Bees produced 200lbs of honey
- Green Gown Awards Finalist Ditch the Disposables

2018
- Green flag award (1st of many!)
- Ditch the disposables Removed single use boxes from catered halls.
- Alumni (Dan Dicker) designed rCUP Launched with a campus talk by Dan 23 years after graduating

2019
- Climate Emergency response
- Green Gown Awards Finalist Fruit Routes
- Signed up to the SDG accord

2020
- Single Use Supplement cup levy (Latte Levy) charges introduced.
- Waste Management Strategy 2020 – 2025 launched
- Estates Strategy 2020-2040 launched
- BSIF award Water Pollution prevention
- WARPit reuse portal reintroduced
- Covid-19 pandemic hit
- Energy strategy released

2021
- Sustainable Travel plan 2021 – 2025 launched
- Biodiversity action plan updated
- Green Gown Awards Finalist Research that Matters

2022
- Significant world events impacted utility supplies and costs
- LUNZ Committee Formed (LU Net Zero Committee) to formulate the Decarbonisation plan
- 80 Electric Vehicle charge points by the end of 2022
- 'Creating Better Futures' University Strategy

2008/09 2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20 2020/21 2025

OUR CHALLENGES

- Embedding SDG's into all our activities and operations:
- How do we work and teach in the future?
- What does the campus of 2035 look like?

The UN Sustainable Development Goals (SDGs) are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face including poverty, inequality, climate change, environmental degradation, peace and justice.

Decarbonisation of the heating network

CIRCA 15,000 t/CO2 (2020/2021)

- Hydrogen as a fuel?
- Thermal efficiency of buildings?
- Living Labs?

Zero Carbon Electricity

CIRCA 3,000 t/CO2 (2020/2021)

- Solar Farm / Renewables?
- New Technologies?
- Space Management?

Aspirational Projects

- Hydrogen/Duel Fuel Heating
- Small Holding - Grow Our Own Food
- Student Village Redevelopment Passive Hause/Net Zero
- Green Zones/Pedestrianisation of campus
- ULEV - Salary Sacrifice

SCOPE 3 BASELINE

2021

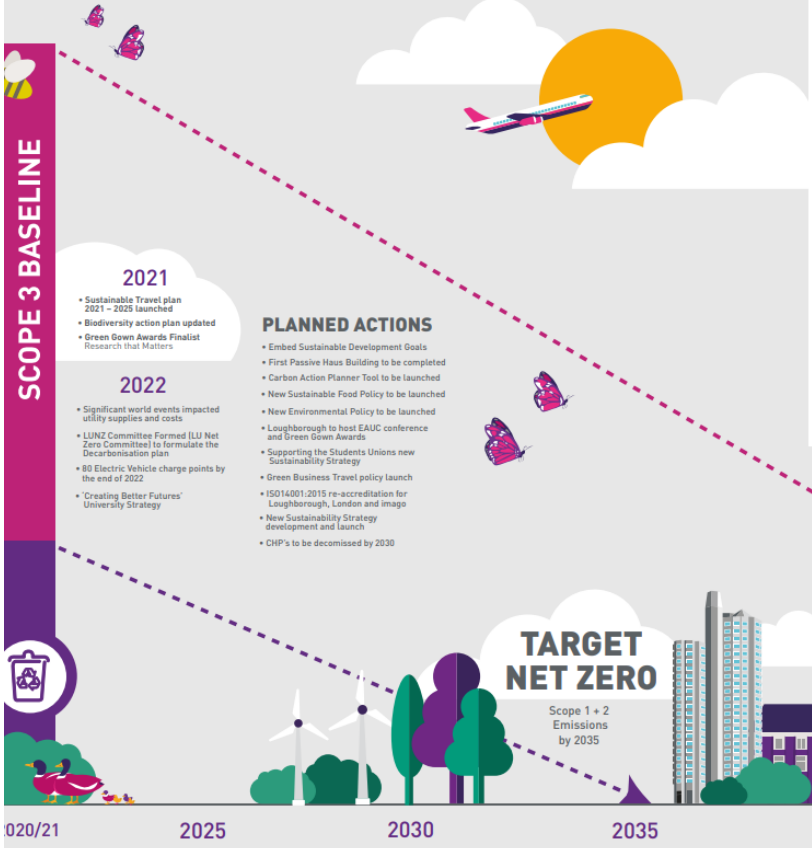
- Sustainable Travel plan 2021 – 2025 launched
- Biodiversity action plan updated
- Green Gown Awards Finalist Research that Matters

2022

- Significant world events impacted utility supplies and costs
- LUNZ Committee Formed (LU Net Zero Committee) to formulate the Decarbonisation plan
- 80 Electric Vehicle charge points by the end of 2022
- 'Creating Better Futures' University Strategy

PLANNED ACTIONS

- Embed Sustainable Development Goals
- First Passive Haus Building to be completed
- Carbon Action Planner Tool to be launched
- New Sustainable Food Policy to be launched
- New Environmental Policy to be launched
- Loughborough to host EAUC conference and Green Gown Awards
- Supporting the Students Unions new Sustainability Strategy
- Green Business Travel policy launch
- ISO14001:2015 re-accreditation for Loughborough, London and imago
- New Sustainability Strategy development and launch
- CHP's to be decomissed by 2030



TARGET NET ZERO

Some offset will be required to meet Net Zero target

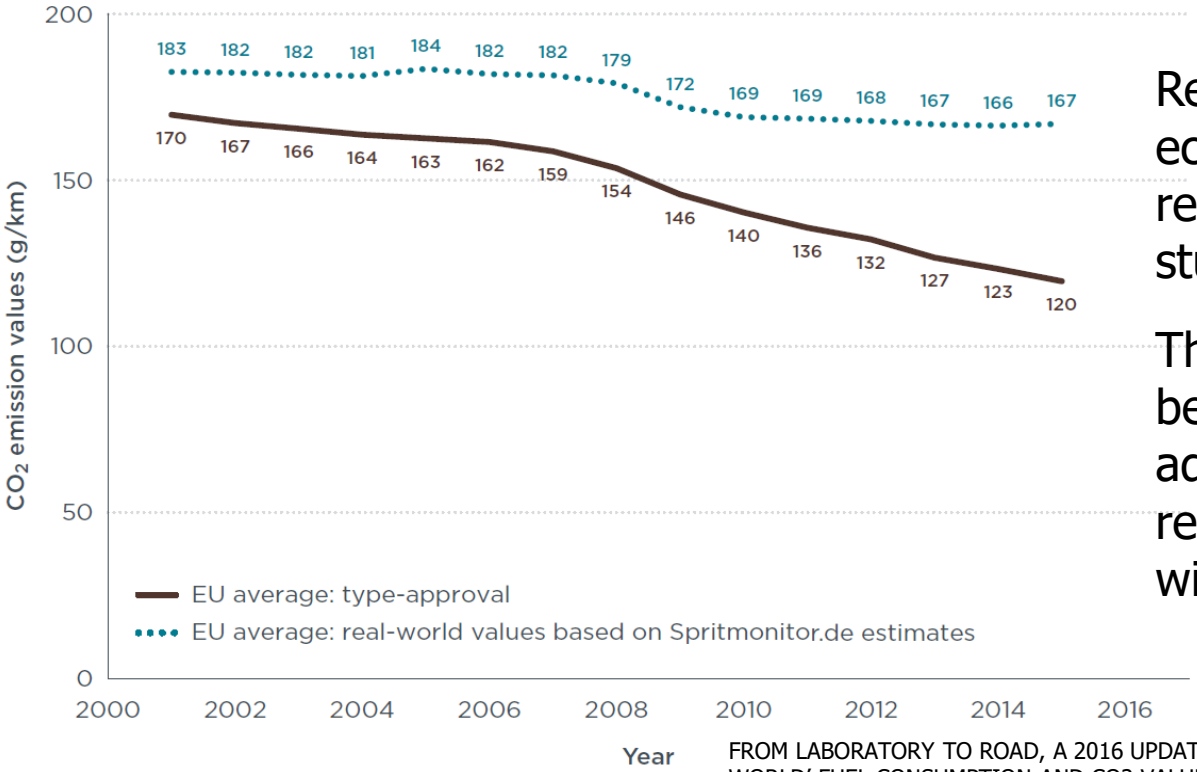
Loughborough University

So what are the obstacles?

- Local
- Global
- What to do?

Mind the Economy Gap!

Loughborough University



Real World economy remains stubbornly high

The gap between advertised and real economy widens

FROM LABORATORY TO ROAD, A 2016 UPDATE OF OFFICIAL AND 'REAL-WORLD' FUEL CONSUMPTION AND CO2 VALUES FOR PASSENGER CARS IN EUROPE, Uwe Tietge, Sonsoles Díaz, Peter Mock, John German, Anup Bandivadekar (ICCT), Norbert Ligterink (TNO), The ICCT, 2016.

Responsibilities

- Coventry has 1000 charge points
- LU has 70 charge points
- McDonalds: 2
  Tesco: 6
  Lidl: 0
- Charnwood: 2
- Leicestershire: 0
  (outside of Leicester P&R)
- National Highways: 2
  (in Charnwood)
- (And we will need tens of thousands!)

Unlike Nottingham & Derby, Leicestershire has no strategy for EV adoption.

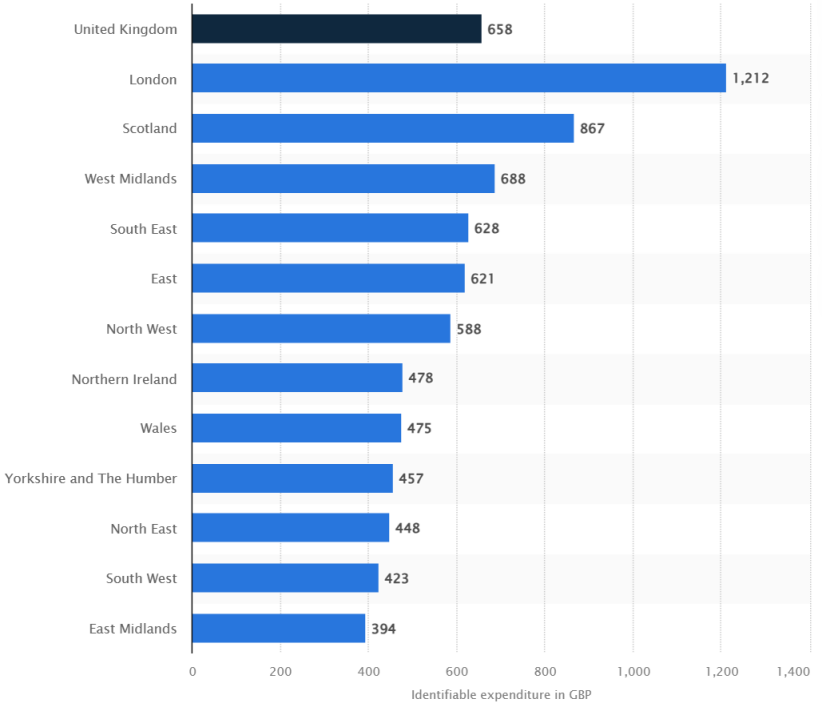
High Speed Diesel Mainline

Loughborough University

Electrification of
Midlands Main Line

- 1977 recommended
- 1983 to Bedford,
  rest scrapped
- Still running engines from the 70s and 80s
- 2009 recommended again
- 2017 scrapped again
- 2021 started again
- No end date set

→ Old, dirty, expensive, carbon intensive trains

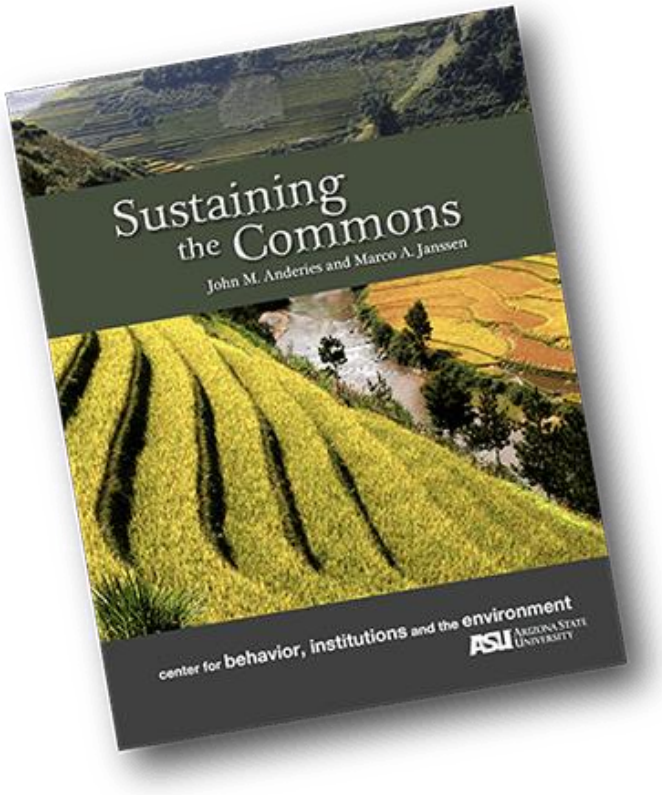


Identifiable expenditure on transport per capita in the United Kingdom in 2021/22, by region, © Statista 2023

Tragedy of the Commons

Loughborough University

- Costs are local
- Benefits are global
- There is no mechanism to align the two
- Lack of investment
- The issues are not pressing *here*

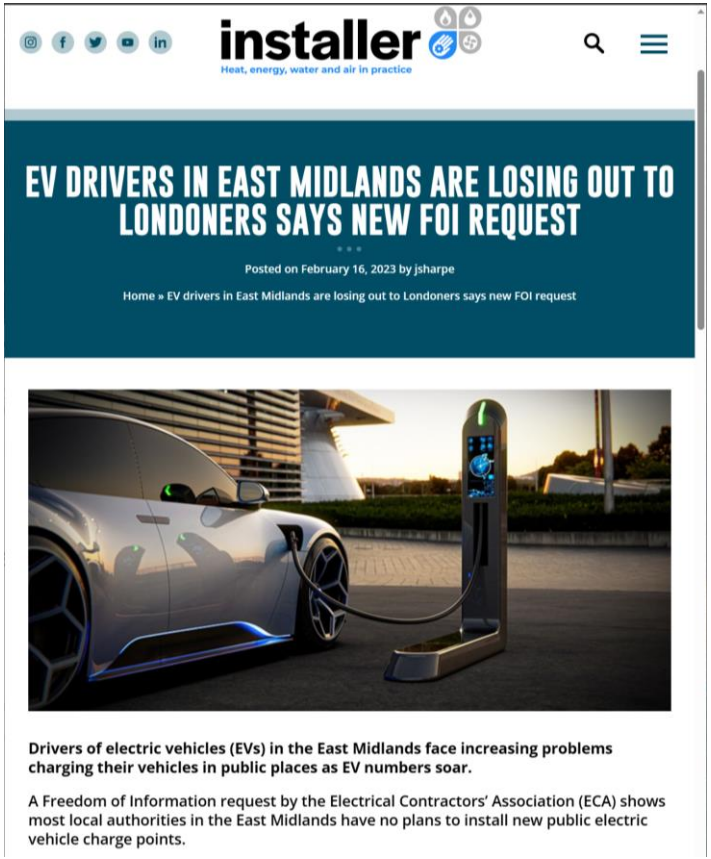


Outlook

Net zero will remain a contentious topic, with poor alignment between costs and benefits.

Regulatory measures are necessary, as is transnational financial action.

ZEV adoption seems to be generally accepted, but the infrastructure is lagging.



installer
Heat, energy, water and air in practice

EV DRIVERS IN EAST MIDLANDS ARE LOSING OUT TO LONDONERS SAYS NEW FOI REQUEST

Posted on February 16, 2023 by jsharpe

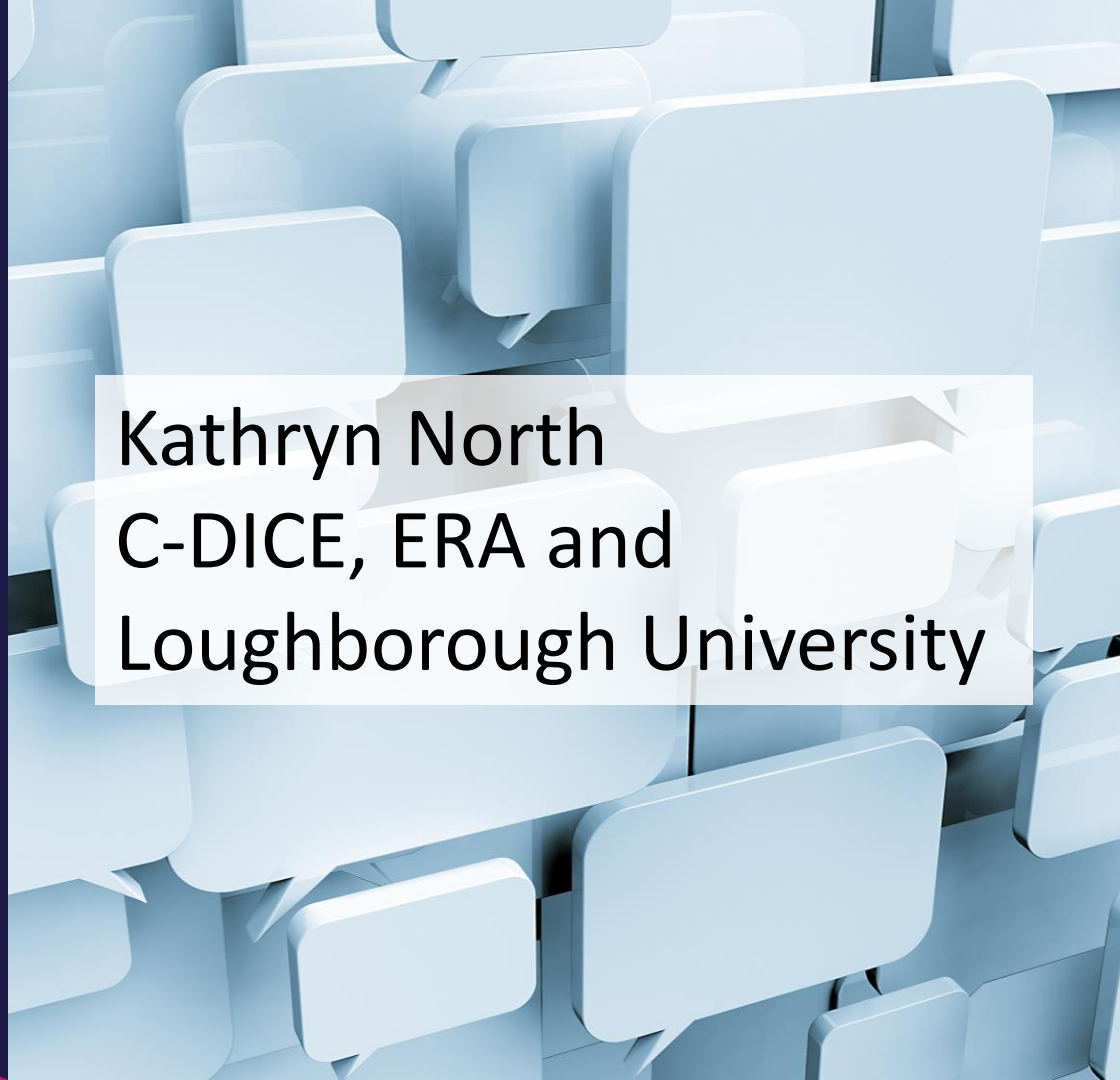
Home » EV drivers in East Midlands are losing out to Londoners says new FOI request

Drivers of electric vehicles (EVs) in the East Midlands face increasing problems charging their vehicles in public places as EV numbers soar.

A Freedom of Information request by the Electrical Contractors' Association (ECA) shows most local authorities in the East Midlands have no plans to install new public electric vehicle charge points.

Local net zero initiatives

Short talks and panel discussion



Kathryn North
C-DICE, ERA and Loughborough University

Local net zero initiatives

Short talks and panel discussion

Local net zero initiatives

Short talks and panel discussion

https://forms.office.com/e/kAQPJAiJe9

Please give us your feeback

Midlands' Journey to Net Zero feedback form

ENERGY RESEARCH ACCELERATOR

#addyourhashtag

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Loughborough University

University of Nottingham

WARWICK THE UNIVERSITY OF WARWICK

BGS British Geological Survey