# UKES2019

## UK Energy Storage Conference


UKES 2019 – Welcome and Introduction

03/09/2019

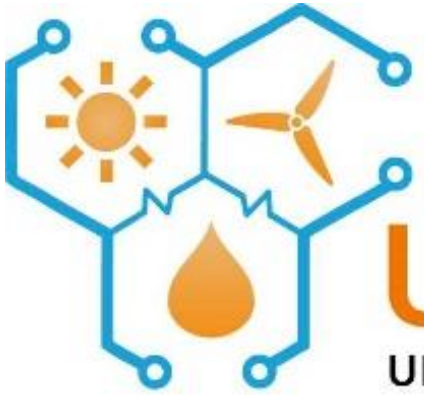
*Dr Haris Patsios, Senior Lecturer in Power Systems, Newcastle University*

Newcastle University

EPSRC Pioneering research and skills

CESI National Centre for Energy Systems Integration

# Thank you!



UKES2019
UK Energy Storage Conference

- Previous Organisers (2014,2015,2016, 2018,2019)
  - University of Warwick, Birmingham University, Imperial College …
- Sponsors and Supporters
  - Siemens, EPSRC (CESI, Supergen Energy Storage Network+, Supergen Energy Networks), Alvatek, Royce Institute, ESRN, WERIN, Biologic …
- Science Board, Plenaries and Keynotes, Session Chairs
- Lindsey Allen, Faye Harland
- All of you for coming and sharing your work and ideas

ESRN
ENERGY STORAGE RESEARCH NETWORK

ENERGY SUPERSTORE
THE UK'S ENERGY STORAGE RESEARCH HUB

STFCBatteries.org

Supergen
Energy Storage

Supergen
Energy Networks

SIEMENS
Ingenuity for life

Women's Whole Energy Systems Research and Industry Network
We're in!
www.werin.org.uk

HENRY ROYCE INSTITUTE
ENERGY STORAGE

BioLogic
Science Instruments

ALVATEK
electrochemical solutions

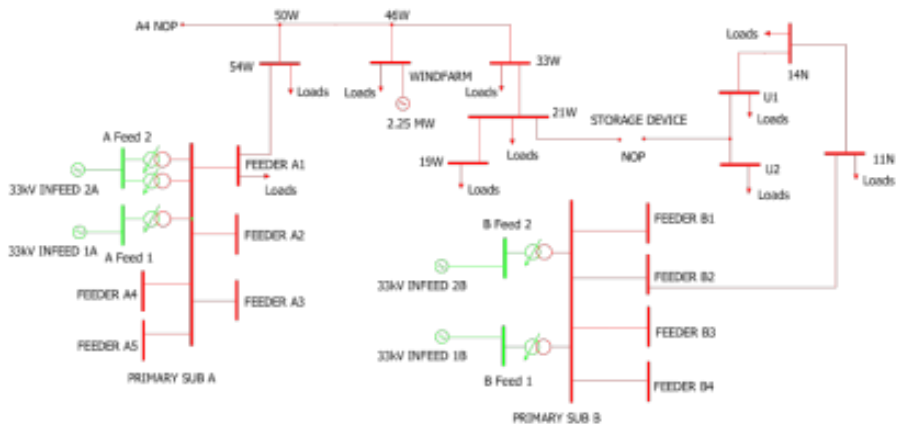
# Welcome to Newcastle


- Broad Coverage of Storage
  - **Energy Storage in the Digital World**
  - Thermal, Mechanical, Thermochemical, Electrochemical Storage
  - Future Mobility
  - Built Environment
  - Global Challenges and Energy Storage in the Human Context
  - Policy and Economics
  - Design, Planning and Life Cycle Analysis
  - Demonstration and Commercialisation
  - Energy Storage, Integration and Control in Whole Energy Systems
- 220 attendees, 45 from Industry
- Morocco, South Korea, Peru, Jordan, and across Europe

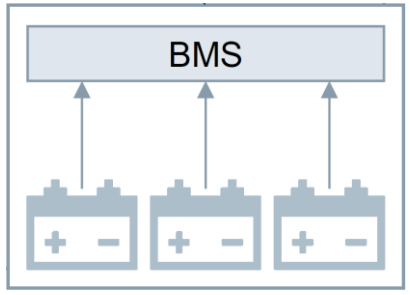
- **Speakers**
  - Siemens
  - Northern Powergrid
  - The Alan Turing Institute
  - BEIS
  - E.ON
  - The Knowledge Transfer Network
  - Faraday Institution
  - Doosan Babcock
  - Helmholtz Institute
  - Energy Systems Catapult

# Digital Applications – Battery intelligence

**Application**



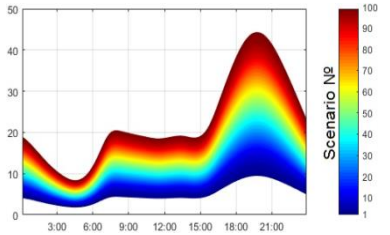




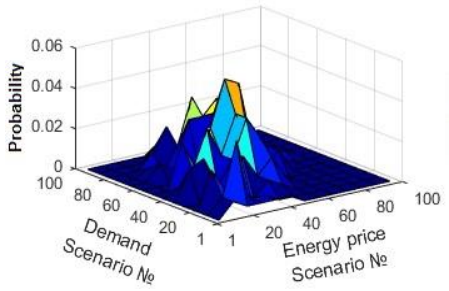

**Asset**

Translate **historical** and **real-time data** into **health metrics.** Mapping onto **customer** use **cases**

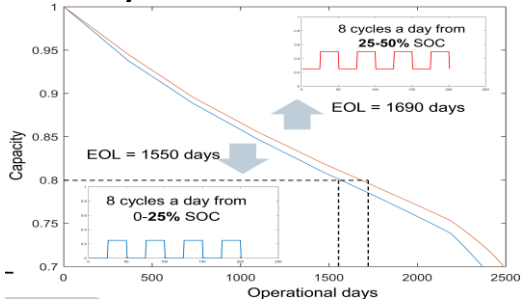
**Toolchain** enabled by Cloud Analytics and Domain Expertise




Enable **optimised fleet operation** combining **prognostics** and **optimal control**




**Extrapolate information** from raw battery data to system level




**Encapsulate intelligence** of battery diagnostics into **software applications**.

- **Optimise** new **designs**, improve existing
- **Optimise** System **Operation**
- **Expand Application** field
- **Increase Value**

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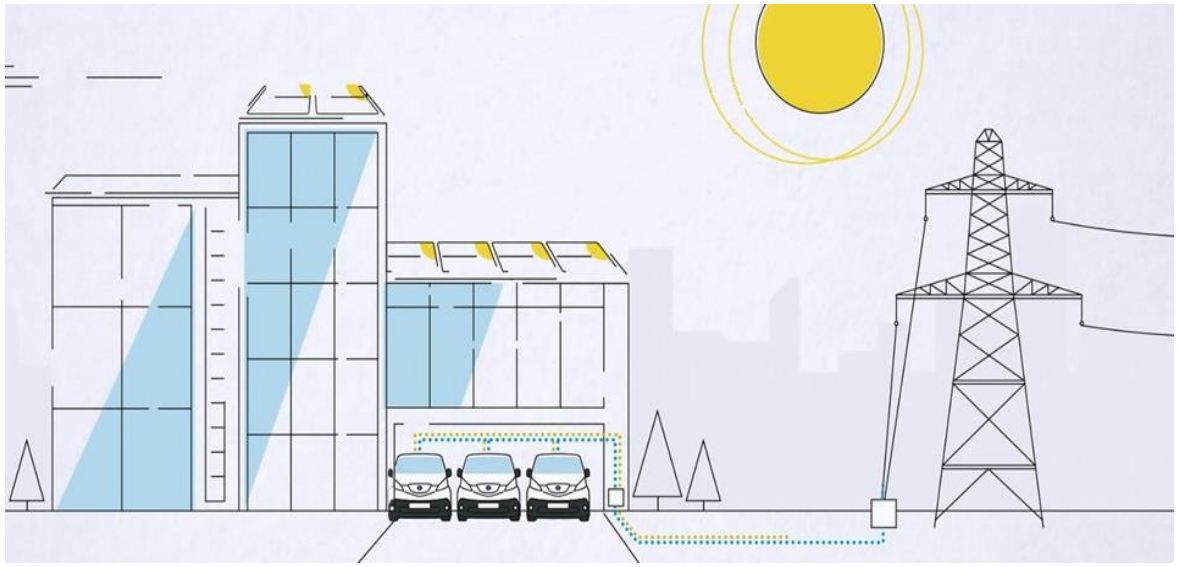
Ingenuity for life

Newcastle University

The University Of Sheffield.


Dr David Greenwood
Dr Thomas John
Dr Haris Patsios

# E4future



Innovate UK

NISSAN e·on Imperial College London

Newcastle University NORTHERN POWERGRID nationalgridESO

UK Power Networks

Through large-scale deployment of 1000 V2G chargers providing in-depth insight into:

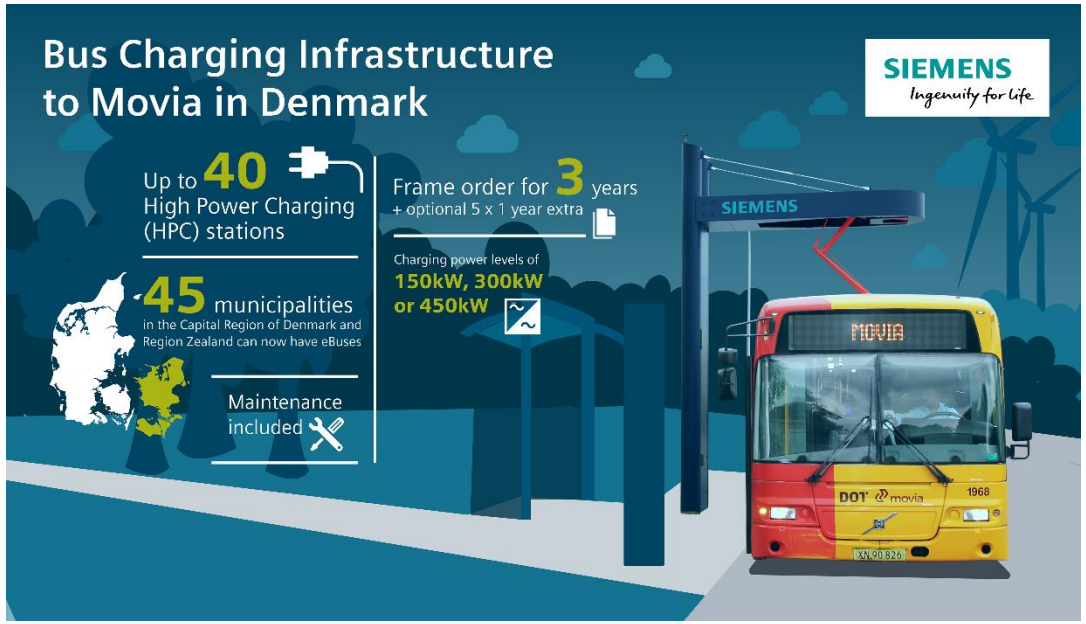
- Optimal use cases for using V2G fleets to offer power **system services**;
- The technical factors involved in **aggregating large numbers of electric vehicles** and charging from/discharging to the grid;
- The opportunities for and experience of participants choosing to take advantage of V2G technology;
- Ensuring the **privacy and security** of V2G users and infrastructure;
- Key barriers to V2G deployment.
- **Data analysis and Modelling**
- Network Modelling and Simulation

Dr Myriam Neaimeh – Turing Fellow

# E-Bus Charging Infrastructure

## Siemens E-Bus Charging Infrastructure

- Offering:
  - E-bus charging infrastructure
  - Monitoring and Smart Load Management Cloud-based Solution for E-fleet Management




SIEMENS
Ingenuity for life

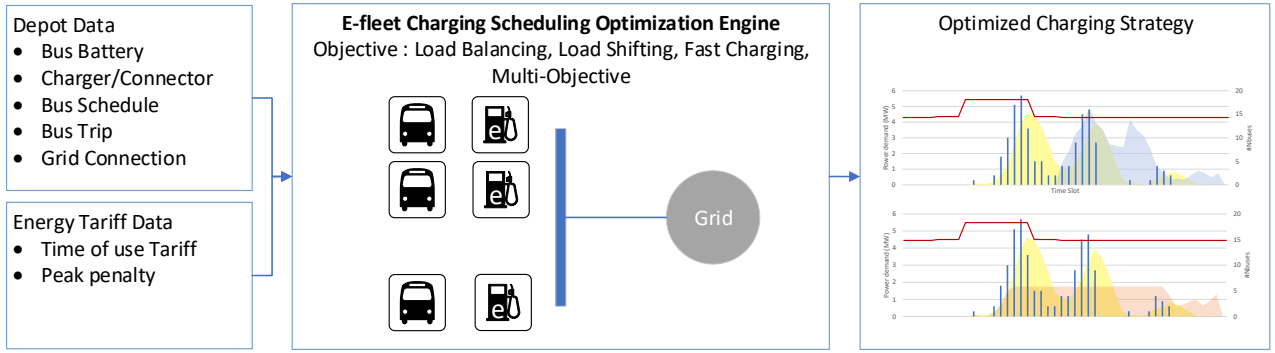
## Newcastle University/ Siemens Knowledge Transfer Partnership

SIEMENS Ingenuity for life

Newcastle University

Innovate UK Knowledge Transfer Network

- Developing an E-depot Smart Charging Scheduling and Load Management Solution
  - Data-driven integrated optimization platform
  - Considering Economical and Technical aspects of operating an e-fleet
  - Scalable solution for large e-fleets




Mrs Parisa Akaber

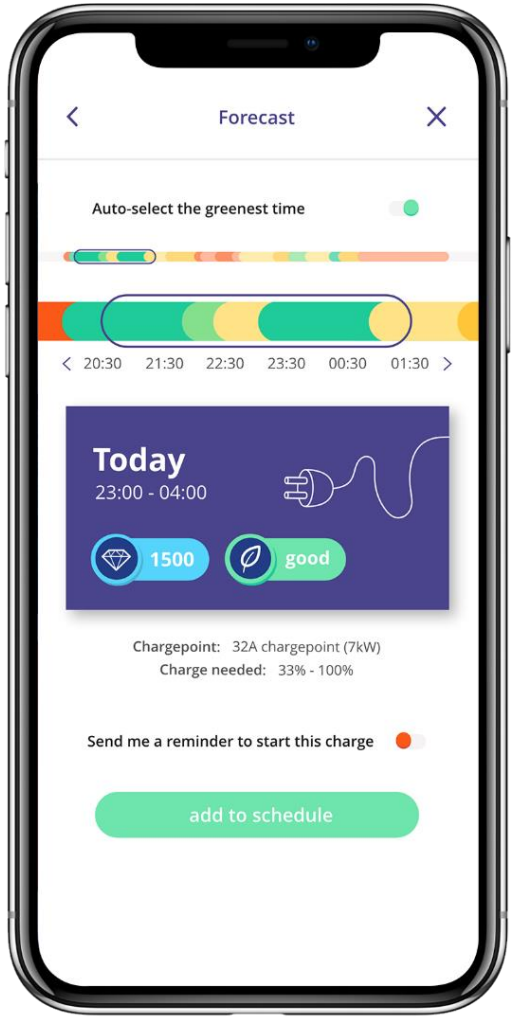
# ‘Nudge Nudge Switch Switch’ project

## Digitalisation of domestic flexibility through the use of mobile applications

## Flexibility from:

- **Behind-the-meter storage**
- **Electric Vehicles**
- **Coordination with on-site generation**

| | |
|---|---|
| **Planning** | Usage scheduling in combination with grid carbon levels |
| **Automation** | DSR rules |
| **Performance** | Usage insights |
| **Enjoyment** | Leagues & rewards |





Dr Peter Davison

GenGame ecotricity Teesside University GridDuck EnAppSys ENERGY INSIGHT Newcastle University

# UKES2019 what is different


- More diversity
- ECR Class (Thursday 11:15am, Fellowship Schemes, Supergen ECR programmes, ECR speakers, EPSRC)
- Special Issue on IET Smart Grid
- Battery Safety Class (Thursday 14:00, safety aspects, risks and risk management, safety testing, damage control)
- Demonstration and Commercialization – Barriers and Opportunities, expert panel including BEIS, Northern Powergrid, Siemens, Doosan Babcock, Innovatium, The Knowledge Transfer Network). Session supported by OMBEA (Wednesday 9:45am)
- Pub Quiz! (Tuesday 18:00)

# Energy Storage is **not** all about Energy Storage

**Decarbonisation, Decentralisation, Democratisation, Digitalisation**

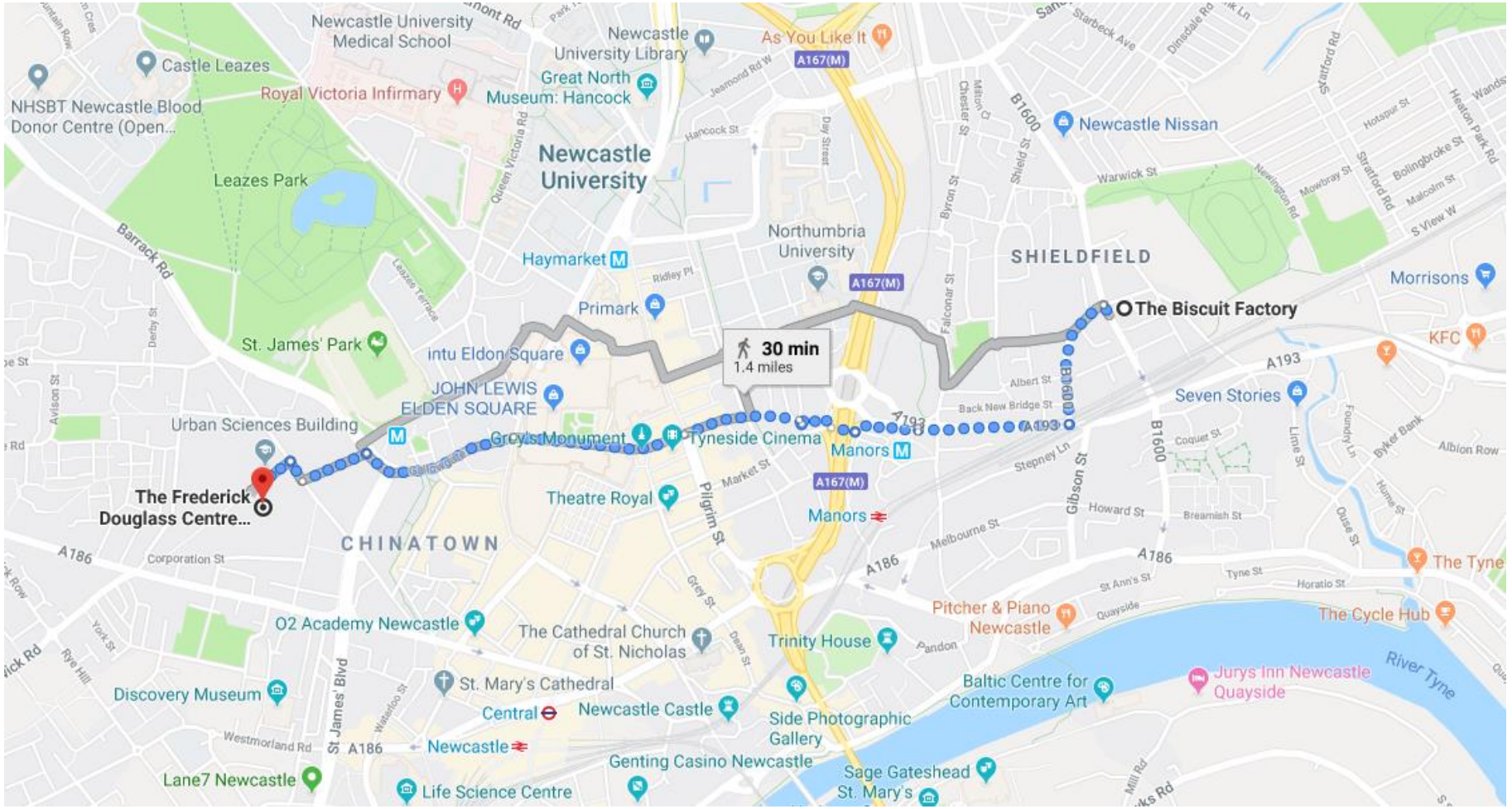
- Increased uncertainty in demand, supply
- Climate Change, geo-political factors and decisions
- Decarbonisation across vectors (incl. transport) – Complexity explodes quickly
- **Democratisation** means people and organisations actively involved in energy systems but this brings complexity in how to understand energy attitudes and practices and how they will affect the energy system
- Sensors and control systems bring increased vulnerability to **cyber** attacks

**Flexibility: Storage can still do it** (UK in leading position in terms of R&D) **but**:

- Fragmentation across many dimensions
  - Within Industry, within government/regulator, within academia, between each of these sectors, between disciplines
- Need to connect, convene and communicate more effectively **across initiatives and disciplines to properly understand, assess issues and inform the right choices**
- Need to include, secure, encourage, and sustain the best talent out there
- Need to deliver societal benefits and sustain research excellence

# Getting to the Biscuit Factory

The Biscuit Factory is a 30 minute walk from the Frederick Douglass Centre. A limited number of taxis will be leaving from outside the Frederick Douglass Centre at 17:30, if you'd like to travel by taxi please let Faye or Lindsey know.



# Enjoy the Conference !

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