Agenda

Optimise Prime

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CHARGE

1. Introductions
2. Optimise Prime – Profiled Connections / Site Planning Tool
3. Charge – Transport Model / Smart Charging / Connect More
4. Learning More & Getting Involved
5. Q & A

Accelerating fleet transition to electric

Optimise Prime

World's biggest commercial EV trial targeting 3,000 commercial vehicles

UK Power Networks
Delivering your electricity

HITACHI
Inspire the Next

Scottish & Southern Electricity Networks

Home Charging

British Gas

Depot Charging

Royal Mail

Mixed Charging

Photo: Casey Gutteridge/Uber/PA/CC BY-SA 3.0

Uber

RIIO NIC
NETWORK INNOVATION COMPETITION

Refuelling Tomorrow's Electrified Transport

CHARGE

SP ENERGY NETWORKS | PTV GROUP | smarter grid solutions | ea technology

Accelerate the connection of public EV charging infrastructure across SPM

April 2019 – March 2023

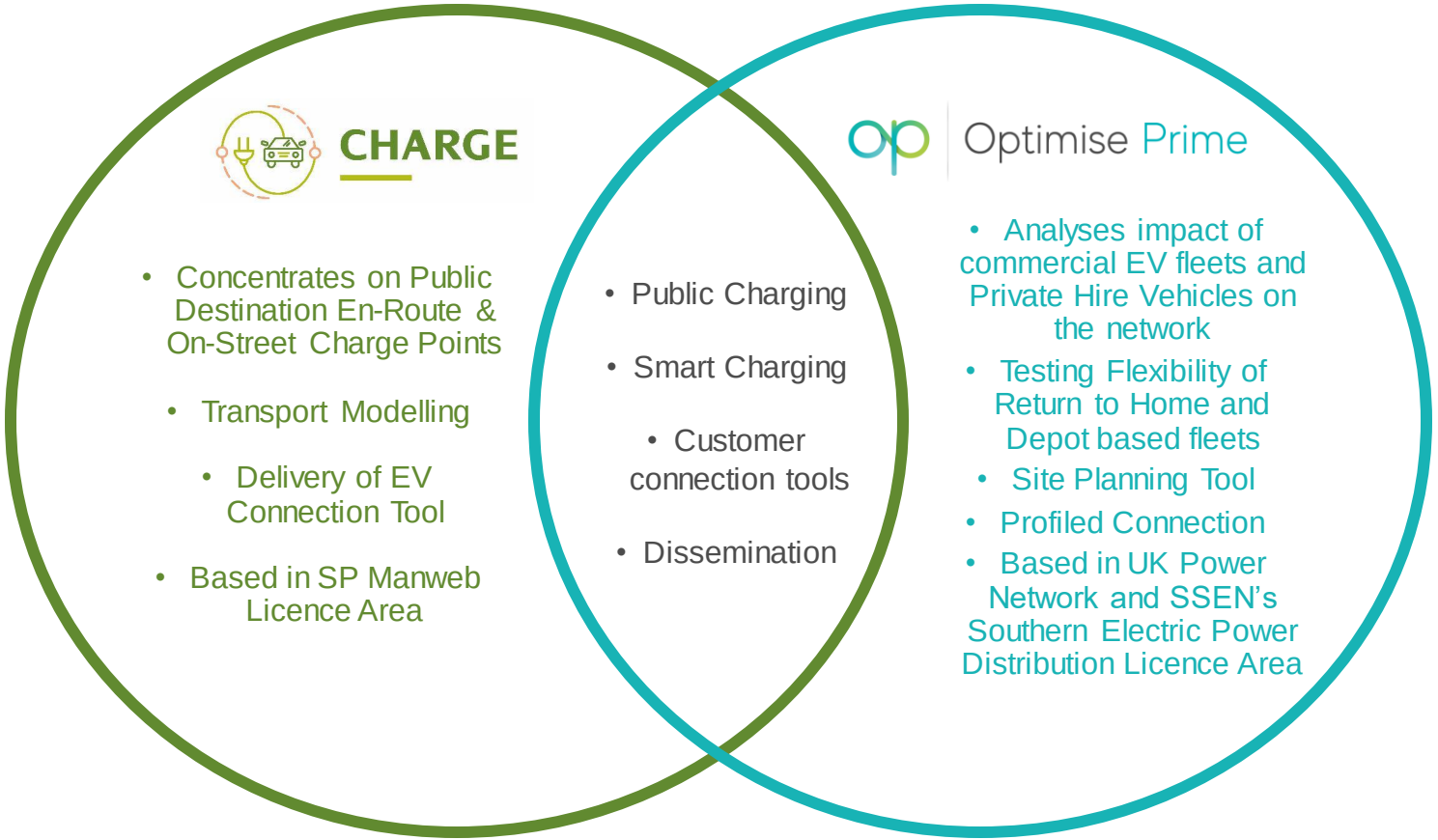
Transport model

Smart charging solutions

ConnectMore online tool

RIIO NIC NETWORK INNOVATION COMPETITION

Project Synergy



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Profiled Connections

Florentine Roy

Innovation Engineer UK Power Networks

Smart Charging

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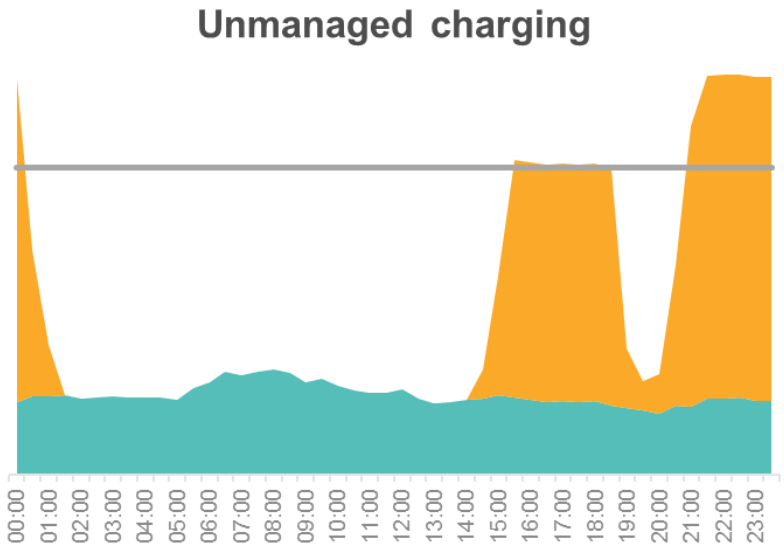

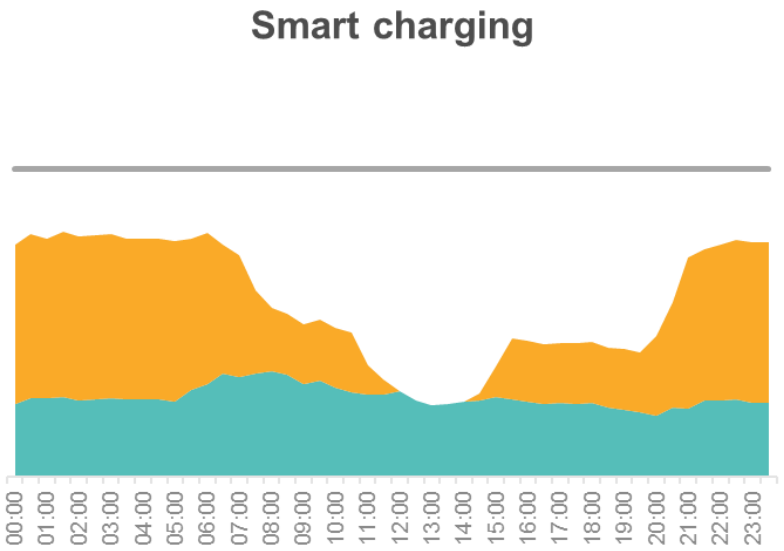

Smart charging enables **cheaper** and **faster** transition to EVs

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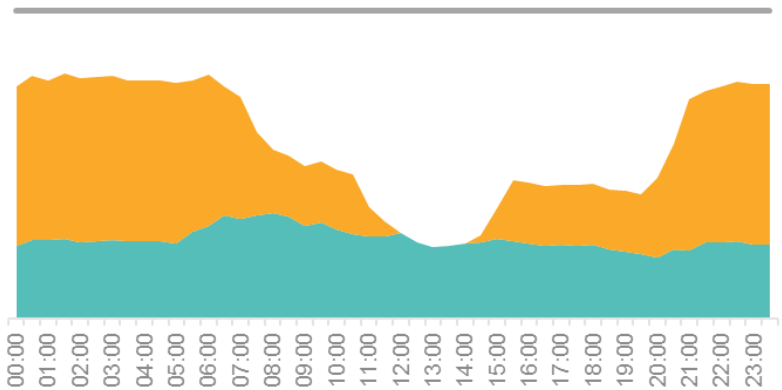
Smart Charging

Optimise Prime

Smart charging:

- Enables **cheaper and faster** transition to EVs
- Refers to the technical **concept of shifting the time** at which vans are **charged**
- In practice, requires customers to be aware and **willing to change their behaviour**



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Profiled Connection Definition

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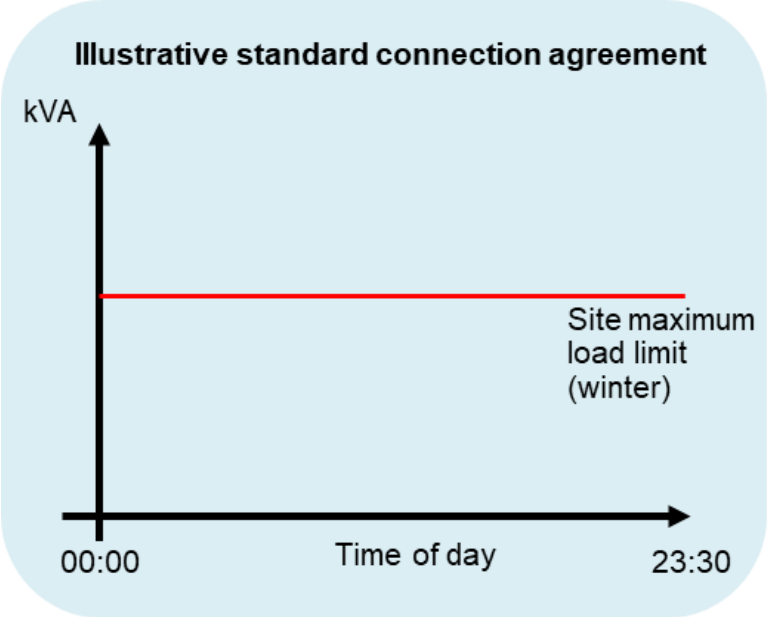
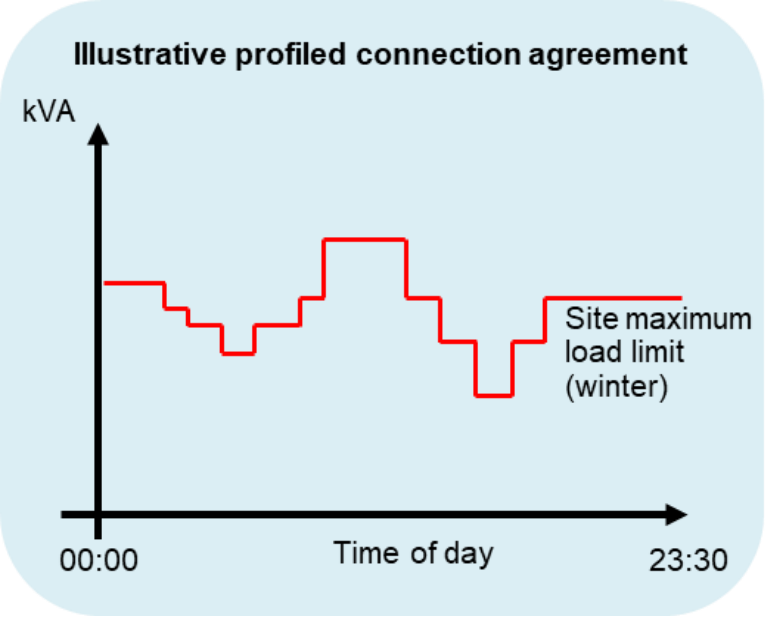


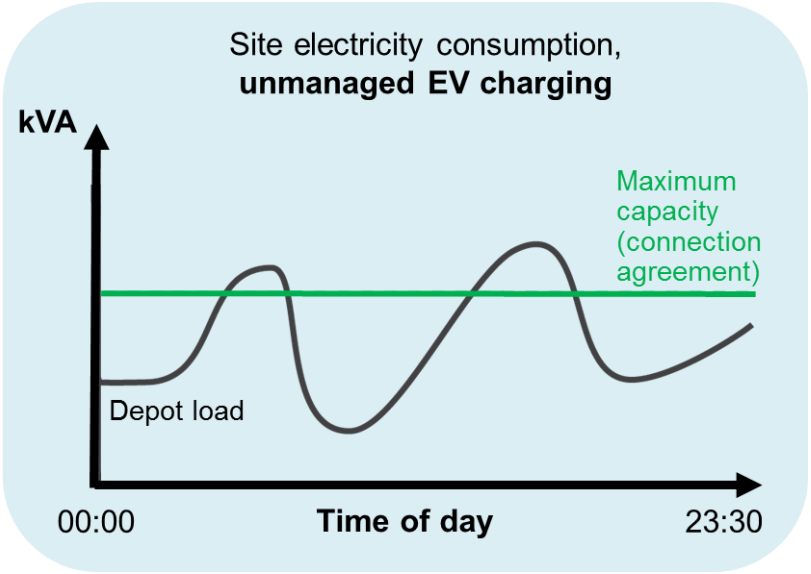


A connection agreement where the applicable **maximum power requirement** (in kVA) **varies according to the time of day** and the season, up to 48 half-hourly time slots per day, with adherence to the profile **actively managed through smart systems by the customer** and monitored by the Distribution Network Operator.

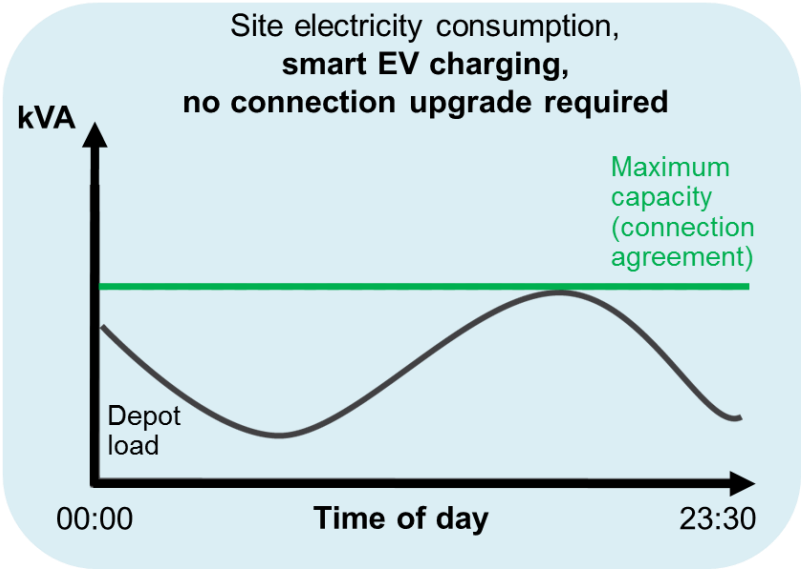
Implementation

Optimise Prime

Unmanaged charging



Smart charging



Smart charging may enable the consumption to remain within the existing maximum capacity.

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Implementation

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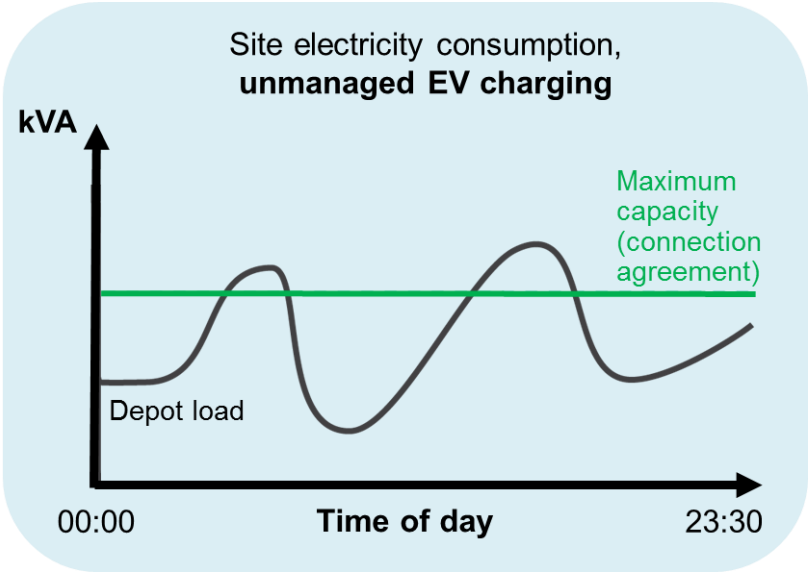
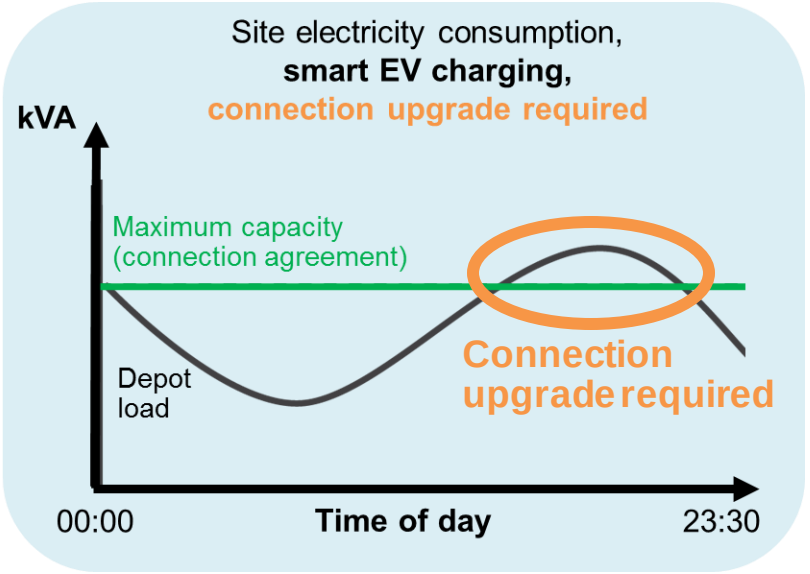
Unmanaged charging



Smart charging



In some cases, a connection upgrade will still be required.

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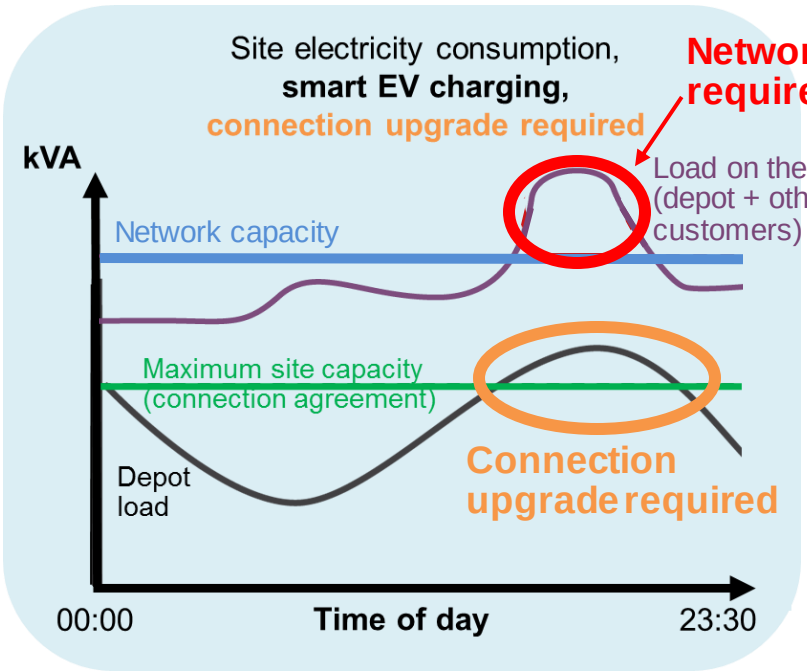
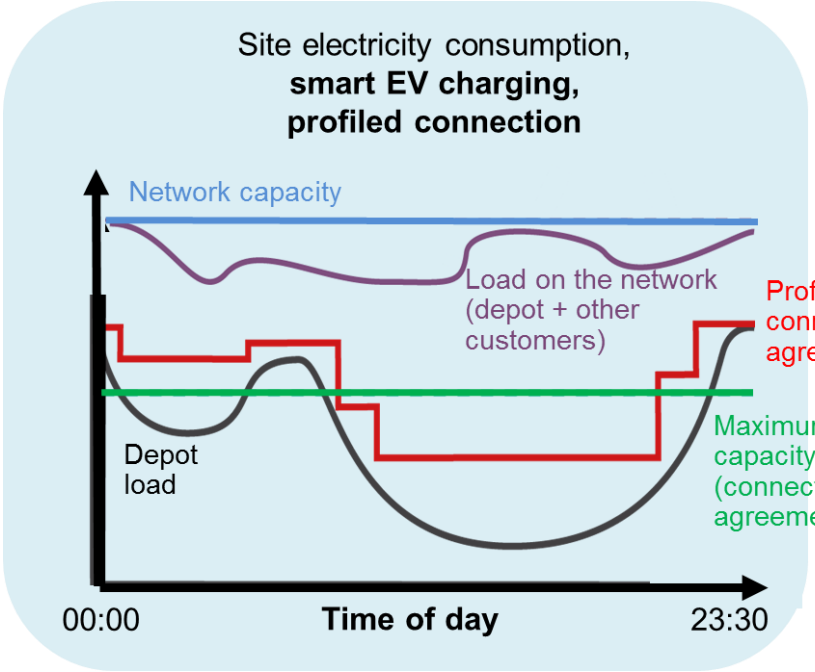
Implementation



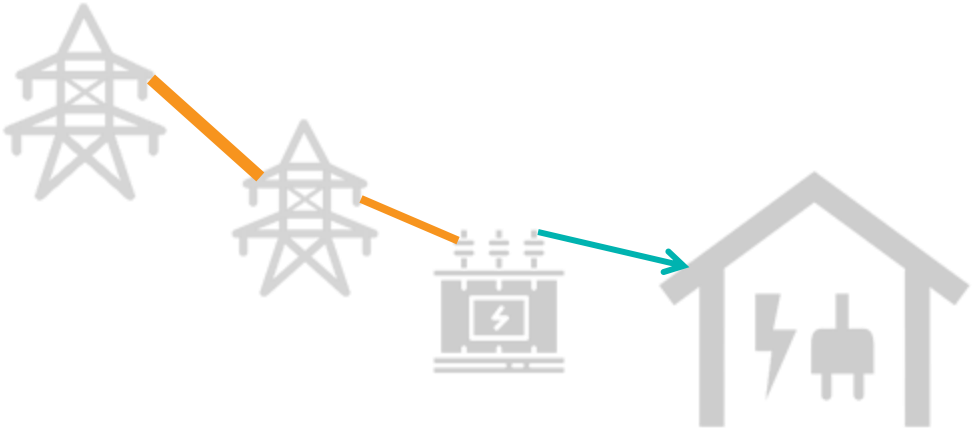


A profiled connection allows the customer to **consume more electricity than the existing maximum capacity at some times of the day**, while consuming **less** at times **when the network is constrained** by the consumption of other customers.

It relies on the **diversified load profiles** of customers.

Illustrative Cost Savings

- A profiled connection aims to reduce, defer or avoid network reinforcements and associated cost
- Any **reinforcement required to exclusively to the depot** would have to be paid by the customer
- This cost **cannot be avoided with a profiled connection** (no diversification potential)
- **Wider network reinforcements can be reduced** thanks to profiled connection



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UK Power Networks
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Site Planning Tool

Hugo Seymour

Senior Manager at Hitachi

Site planning tool overview

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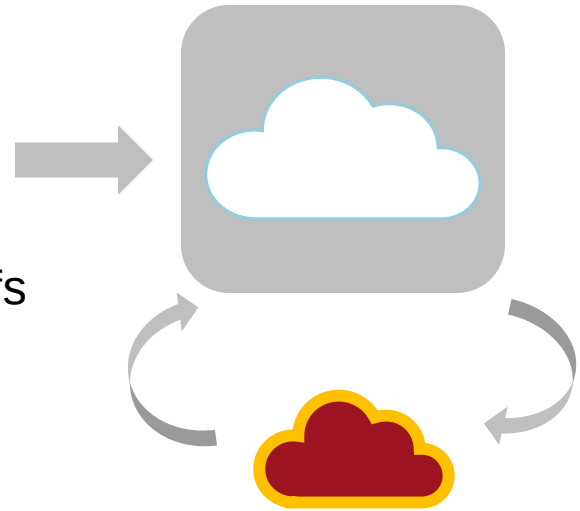
A freely accessible, web-based site planning tool will be developed as part of the Optimise Prime project. The tool is intended to support depot-based fleet operators to plan the electrification of their fleet.

Inputs

- Fleet size
- Vehicle schedules
- Mileage
- Site energy profiles
- Location
- Existing energy tariffs

Site planning tool



Outputs

Estimated EV charging schedules and costs

Behind the meter infrastructure requirements

Load profiles of the site

Interface with UKPN profiled connections tool

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Objectives and benefits

Optimise Prime

The tool will enable the impact of different scenarios to be explored – for example varying the number of electric vehicles, the charging approach, or the use of other low carbon technologies. The implications for the depot's grid connection will be highlighted.

Expected benefits include:

Depot operator

- Determine the technology required to support an electric fleet
- Assess the grid connection capacity required
- Understand the possible upfront and ongoing costs
- Explore how costs and timescales could be mitigated through smart charging and profiled connection agreements

DNO

- Support the electrification of road transport
- Raise awareness of new contractual options for grid connection (e.g. profiled connection agreements)
- Reduce administrative burden to develop and agree profiled connections
- Encourage more efficient use of network assets

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Illustrative outputs

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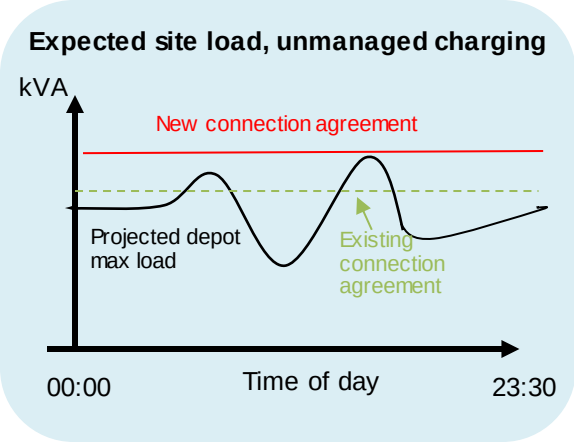
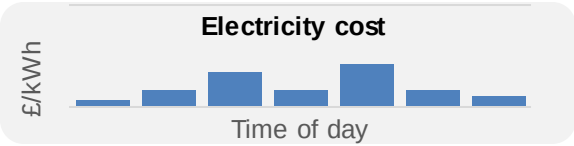
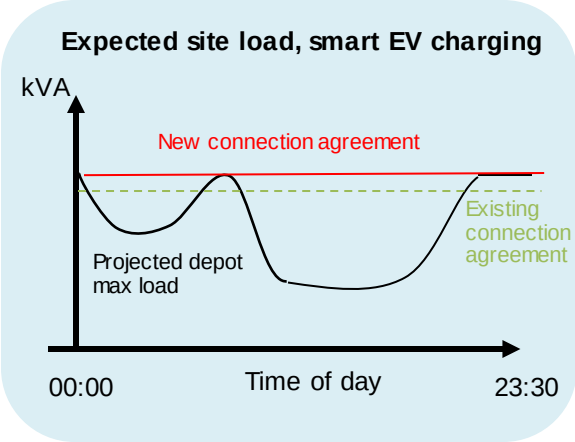
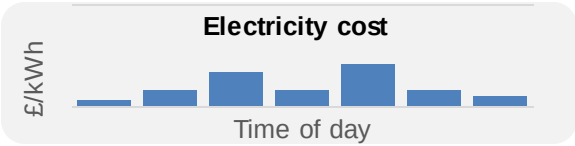
Scenario 1: unmanaged charging



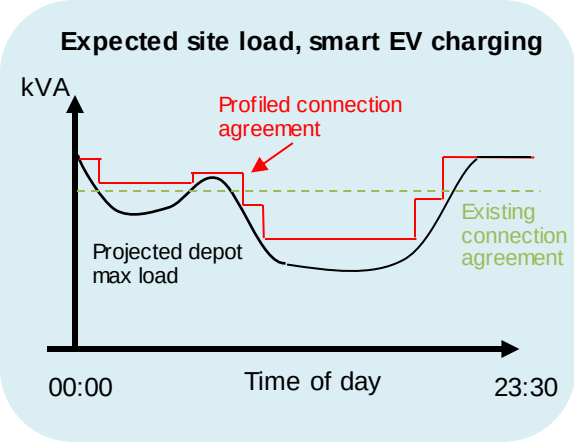


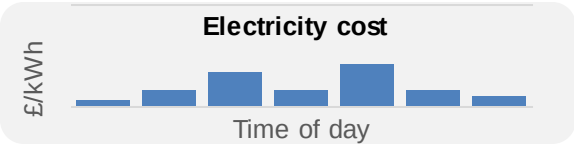
Scenario 2: smart charging





Scenario 3: profiled connection agreement





RIIO NIC NETWORK INNOVATION COMPETITION

Agenda

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2. Optimise Prime – Profiled Connections / Site Planning Tool
3. **Charge – Transport Model / Smart Charging / Connect More**
4. Learning More & Getting Involved
5. Q & A

CHARGE

Refuelling Tomorrow's Electrified Transport

SP ENERGY NETWORKS

Method 1	Method 2	Method 3
Transport Model	**Smarter Grid Solutions**	**ConnectMore Online Tool**
PTV GROUP	smarter grid solutions	ea technology

Transport Model

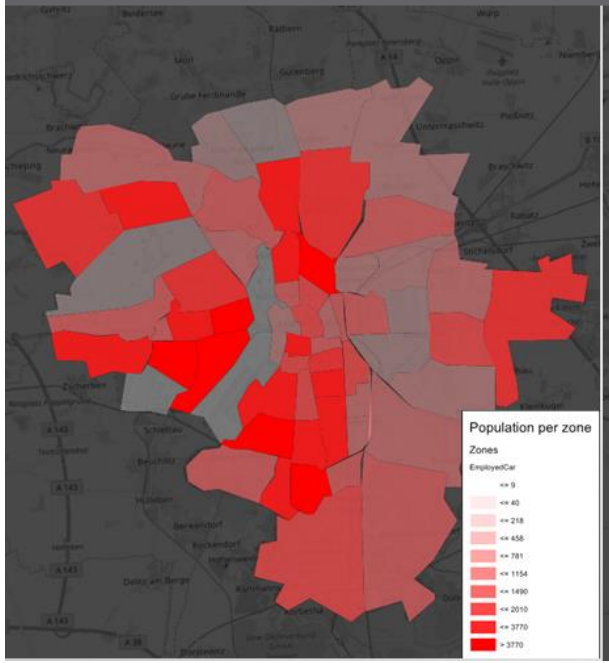
Laurence Chittock, Project Lead, PTV

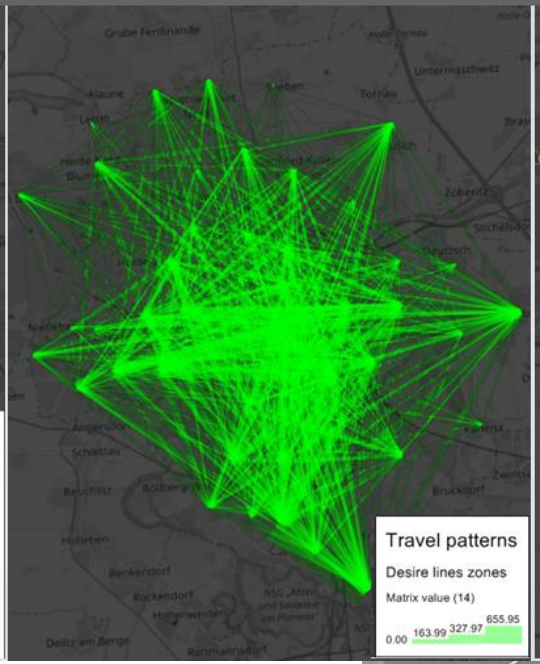
Transport Modelling Intro

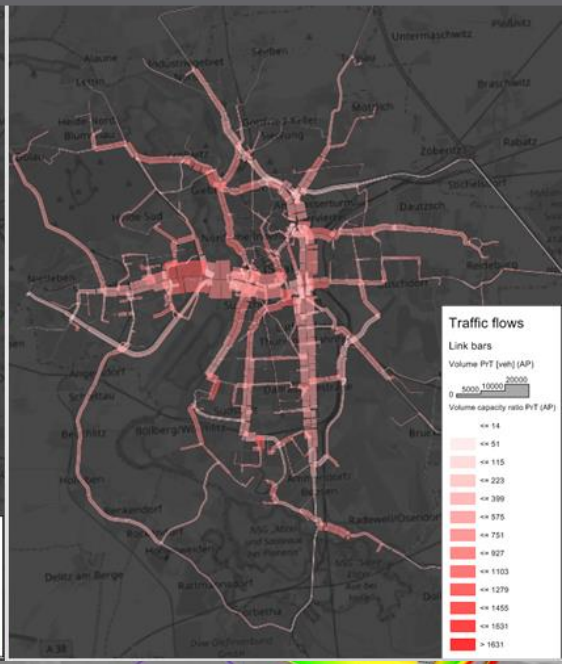
STRATEGIC TRANSPORT MODEL

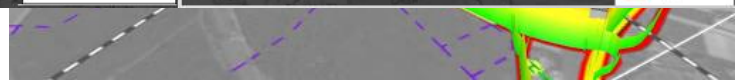
A DIGITAL REPLICA TO DIAGNOSE PROBLEMS…

…AND DEVELOP OPTIMAL SOLUTIONS



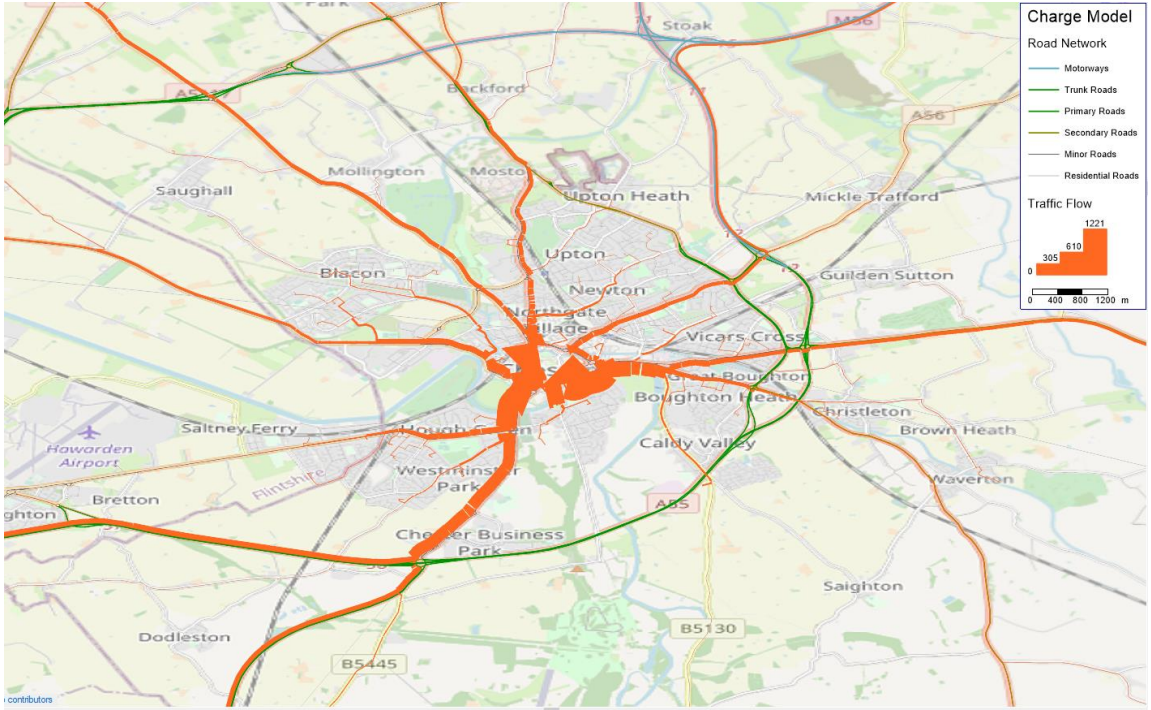






The Charge Transport Model

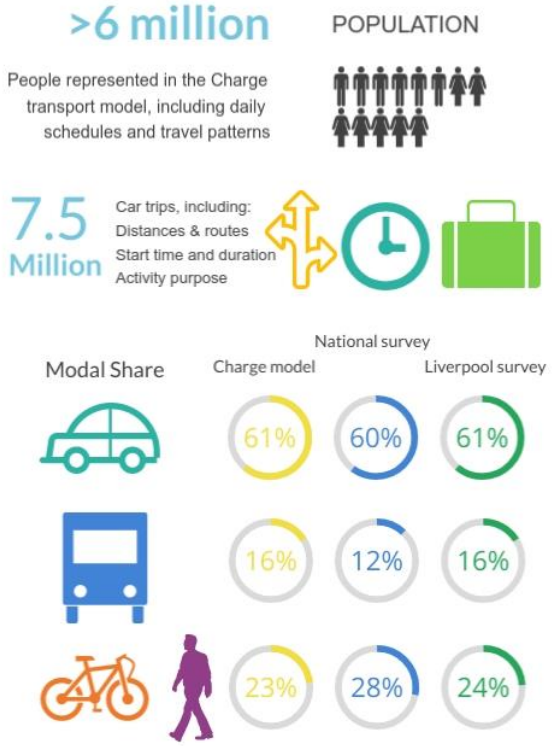
PTV Visum Transport Model for SP Manweb



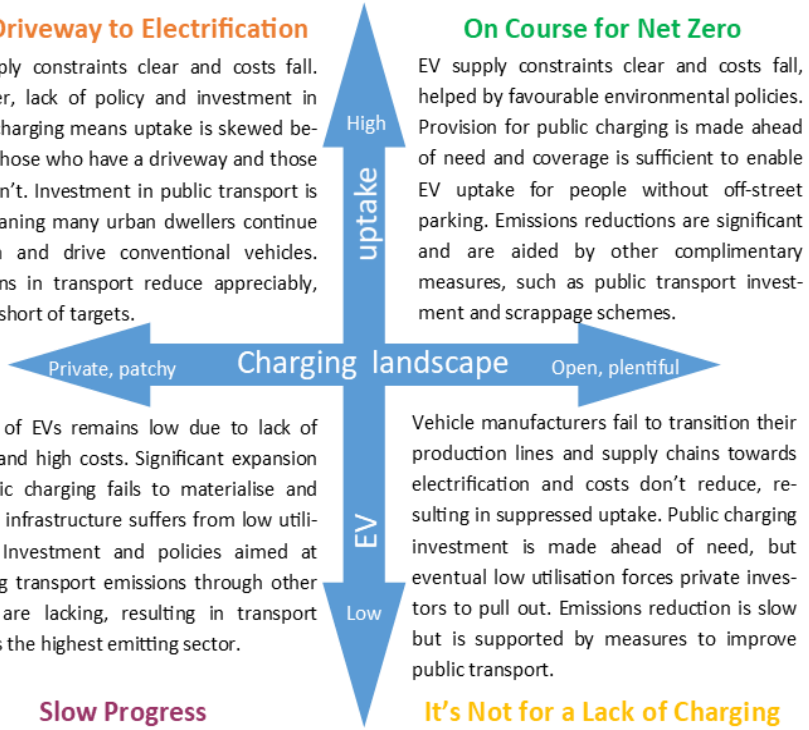
- Sophisticated transport model built to represent the SP Manweb area
- Travel patterns, car trip distances, and time of day use represented
- By knowing where and how far people travel, we can calculate energy demand for EVs
- Results can be overlaid with electricity network capacity map

Model Summary

- Validated representation of trips across licence area
- Ability to dig into model data and proportionally represent individual schedules
- Tool to analyse geographic and temporal spread of future EV demand
- Can help highlight where additional support for public charging is required



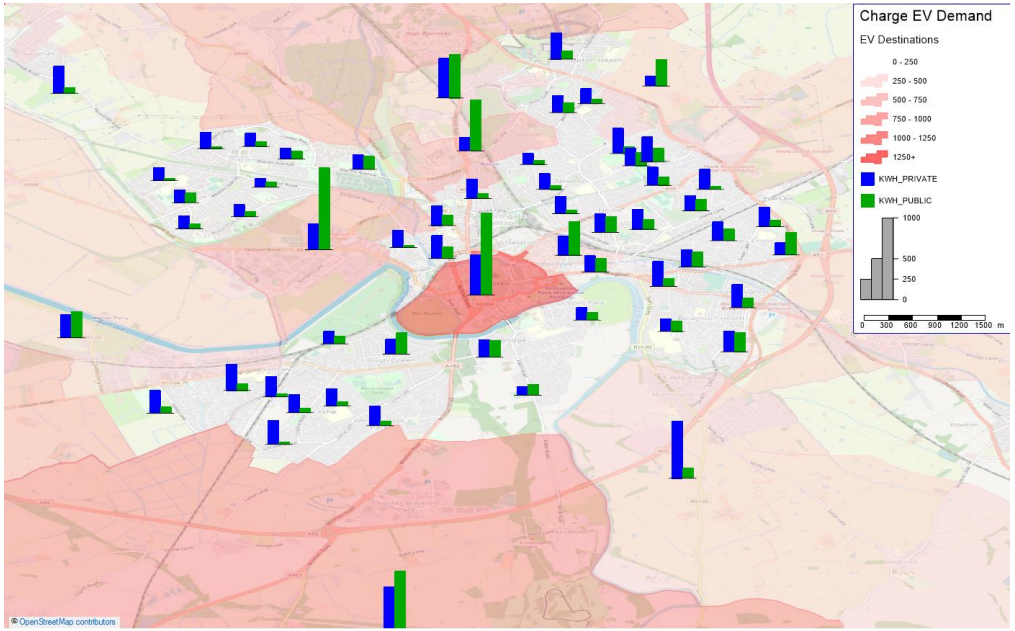
EV Uptake Scenarios



- 4 core scenarios defined for differing EV futures
- Uptake rates to be distributed based on demographics, location, and trip patterns
- Various vehicle and charging technologies to be simulated
- Outputs to show potential energy demand across SP Manweb

Next Steps

- Core scenarios to be modelled over coming months
- Projections to be compared to other forecasts and research
- Results to be made available through ConnectMore tool



Smart Charging Solutions Trials

Tom Rafferty - Smarter Grid Solutions

Smart Charging Solution Trials

- Two trials of Smart Charging Solutions in 2020 and 2021
- Ranging in complexity and application, be it residential on-street, destination or en-route chargers
- Enable flexible connections for Public EV Charging Infrastructure
- Provide customers with an understanding of the CBA of Flexible Connections vs Reinforcement

Key Update: 2020 Trial

- 3 sites encompassing 76 Public Chargers (>0.5MW) formally signed onto the trials
- Further sites still being sought for 2020 and 2021

Smart Charging Solution Trials

Next Steps for 2020 Trials

- Deployment to site at first trial site (SGS Labs Ellesmere Port)
- Site Integration Plans for Warrington Station and Warrington Times Square
- Trial Design for each of the locations
- Conduct Trials

ConnectMore Online Tool

Elaine Meskhi - EA Technology

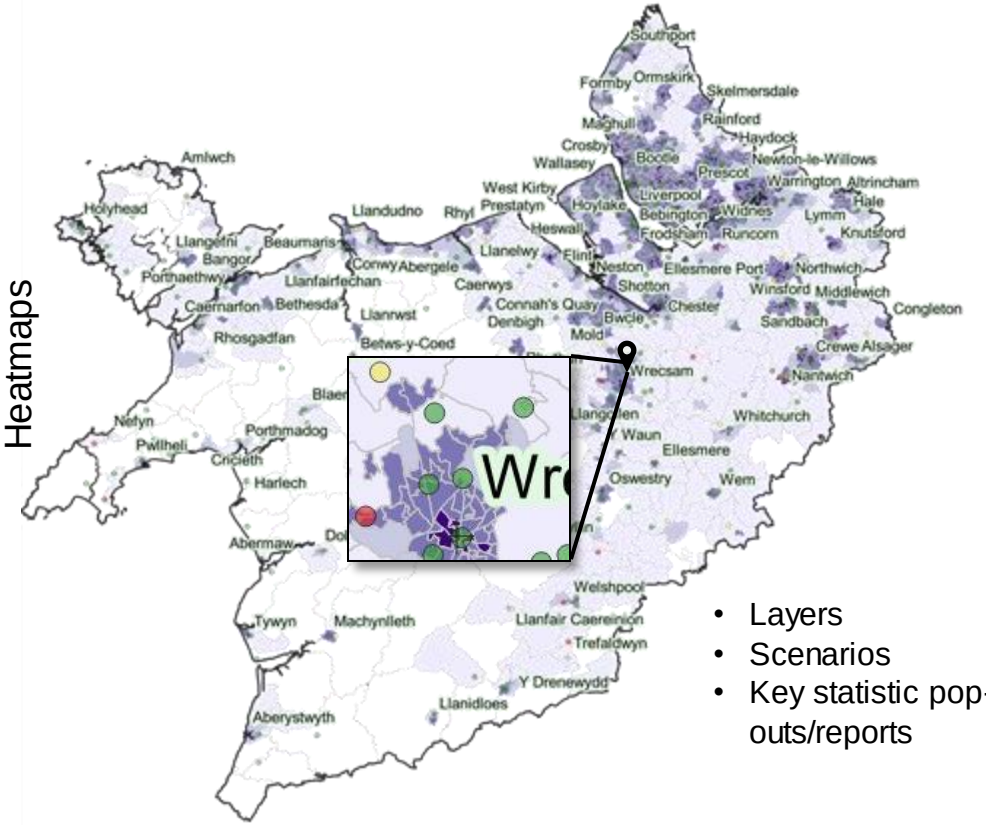
ConnectMore Online Tool

What will it show/do?

Connection tool

- Builds on existing load-flow software
- Extended to enable fault level and interconnected networks to be assessed

Heatmaps



- Layers
- Scenarios
- Key statistic pop-outs/reports

ConnectMore Online Tool

For public charge point installations/planning

Who will use it?

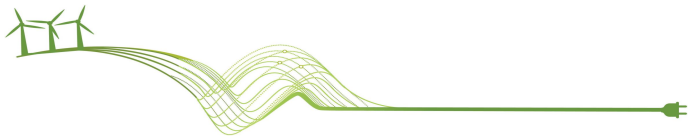
- Car park owner
- Local Authority representative
- Development surveyor
- Community group
- Electrician & installer
- Charging Network Operator
- Parish/Town Councillor
- Leisure destination manager

Why will they use it?

- ✓ Free to use
- ✓ Easy to use: Step-by-step

How will they benefit?

- ✓ Understand charging demand in the area
- ✓ Identify best locations for charge points (high demand, good capacity)
- ✓ Instantly generate connection cost estimates
- ✓ Presented with flexible connection options



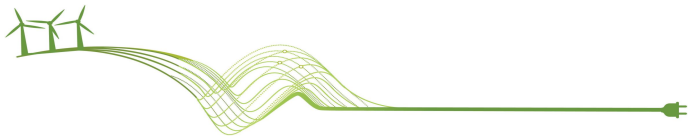
Next Steps

Geoff Murphy – SP Energy Networks

Charge 2020 Deliverables

Key project deliverables for this year include:

- Smart Charging Solutions **trial design**
- **Heatmaps** showing overlay of network capacity and private vehicle energy demand
- ConnectMore tool user requirements and specifications
- ConnectMore tool data transfer and processing plan
- **Forecasts** private EV demand by location for four scenarios



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Further Events

(Subject to COVID19 Restrictions)

- LCV CENEX – Millbrook, September 2020
- LCNI Conference – Liverpool, November 2020
- Webinars TBC

Optimise Prime

2021 Trials – Additional Trial Participants Wanted

- Return to home fleets operating in London, South & South East England
- Return to depot fleets operating in London, South & South East England
- Please get in touch to explore opportunities to participate in Optimise Prime trials

For more information please visit the Optimise Prime website:
https://innovation.ukpowernetworks.co.uk/projects/optimise-prime/

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Hugo Seymour – Hitachi EU
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Getting Involved / In Touch

2021 Trials – Sites / Partners Wanted!

- Public Charging Sites in the SP Manweb Licence Area in situ Summer 2021
- Partners willing to adopt a flexible 'Smart Charging Solution' based connection
- Sufficient demand to challenge the networks capacity
- Multiple Charge Points to facilitate flexibility

Please get in touch or visit our website for more information:
spenergynetworks.co.uk/pages/charge.aspx

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Elaine Meskhi – EA Technology
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Q&A

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What do you think the impact will be on EV take up generally given the current crisis?

Is smart charging part of your current suite of EV solutions?

What are the best ways to mitigate the cost of upgrading electricity infrastructure?

Q&A

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CHARGE

How will UKPN use LV monitoring as part of their strategy to support the growth in EV charging?

How can the electrical supply to new developments be designed and maximised to achieve optimum electrical connections to accommodate fast change EV charging for all new dwellings?

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Q&A

CHARGE

What is planned for load monitoring and demand control, or otherwise what increased network capacity is anticipated and how will this be achieved?

How well can DNOs identify network areas and how they are going to be impacted by increasing demand for EV infrastructure? What proportion of the work is planned and proactive how much is instead reactive / driven by customer requests?

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Q&A

CHARGE

What role do you think hydrogen will play in zero emission mobility?

Do you envisage commercial EVs being used for international (cross-channel) routes?

Q&A

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What are the actionable insights from each innovation project we can introduce and roll out as business as usual? What data use cases and data analytic methods have been applied and can be repeated to wider company initiatives? Out of each of the project, has customer segment data/insights presented anything contrary to our initial company working assumptions, if so what was this and how has that been factored in to future strategic forecasting?

Thank You

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CHARGE

Partners

SP ENERGY NETWORKS · ea technology · PTV GROUP the mind of movement · smarter grid solutions

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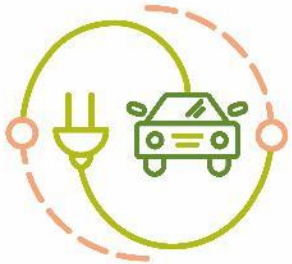

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