SP Energy Networks
ICP Safety Seminar
Friday 8th April 2022

Thank you for your time today

SP Energy Networks
ICP Safety Seminar
Friday 8th April 2022

Agenda

Thank you for taking the time to attend today.

We value your opinions, and we are keen to generate an open session with opportunities to hear your feedback.

This session will be recorded

11:00 – Welcome, Housekeeping and Safety Contact
11:10 – HSE General Safety Stats
11:20 - GTC Safety and Environment
11:50 – Islanding Battery Fail Safe Test Discussion
12:20 – Overhead line Safety and Innovations
12:50 - Questions
13:00 – Close

SPEN & GTC attendees today:

- David Overman – GTC UK Electricity Networks Director
- Simon Dawson – GTC Installations Manager
- Rachel Donahue – SP Distribution Head of Planning and Design
- Louise Taylor – SP Manweb Customer Account Manager
- Stuart Walker – SP Distribution Customer Account Manager
- Kenny Bowie – SP Distribution Head of Planning and Design
- Iain Boyle – Senior Standards Engineer
- Karl Watson – SP Distribution Head of Planning and Design

About GTC

We are the chosen utility partner for housebuilders and developers across the UK, delivering leading multi-utility infrastructure solutions to all types of new-build developments.

GTC delivers a combination of low-carbon and conventional technologies. We construct, own, and operate multi-utility networks for new-build housing and mixed-use developments. GTC offers an innovative, customer-focused approach, and a single-supplier solution. **Find out more about our multi-utility services.**

Services for House Builders

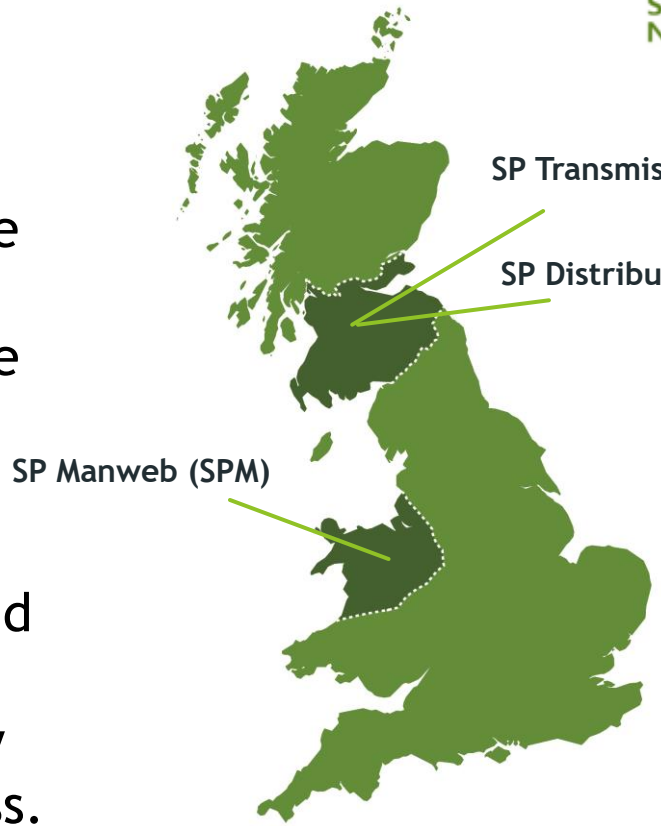
- Heat
- Electricity
- Gigabit Fibre
- Water
- Wastewater
- Gas

gtc

About SP Energy Networks

SP Energy Networks own and operate the electricity transmission and distribution network in the South of Scotland and the distribution network in Cheshire, Merseyside and North Wales.

As the network operator we maintain and repair the electrical equipment and network assets that transport electricity to around 3.5 million homes and business.



Safety Contact – Highway Code changes

Electric car owners should take provisions to not trip pedestrians with their charging cables

The Highway Code now has new instructions for electric vehicle users. And one of these is primarily focused on what to do when using a charging point:

- Drivers should park as close to the device as possible so the charging cable doesn't become a trip hazard for people walking.
- And if they are concerned someone might fall over the cable, they should put out a warning sign near their vehicle.
- The guidance also states that they should neatly return the charging cables in the device so they don't cause a hazard for pedestrians wh not in use.

HSE Stats – General

- Gillian Sloey
- Public Safety Consultant

Public Safety

Health & Safety

Gillian Sloey

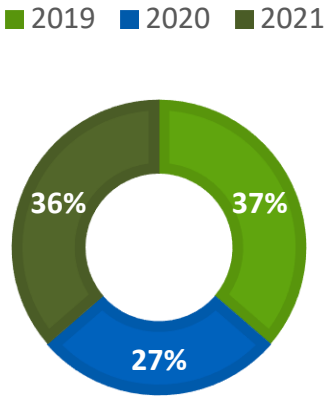
2022

Public Safety Statistics 3 Year Trend

2019-2021

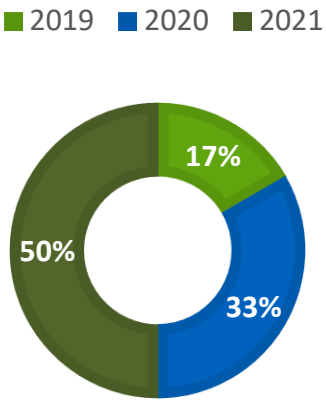
Incidents/Injuries & Fatal Incidents

INJURIES



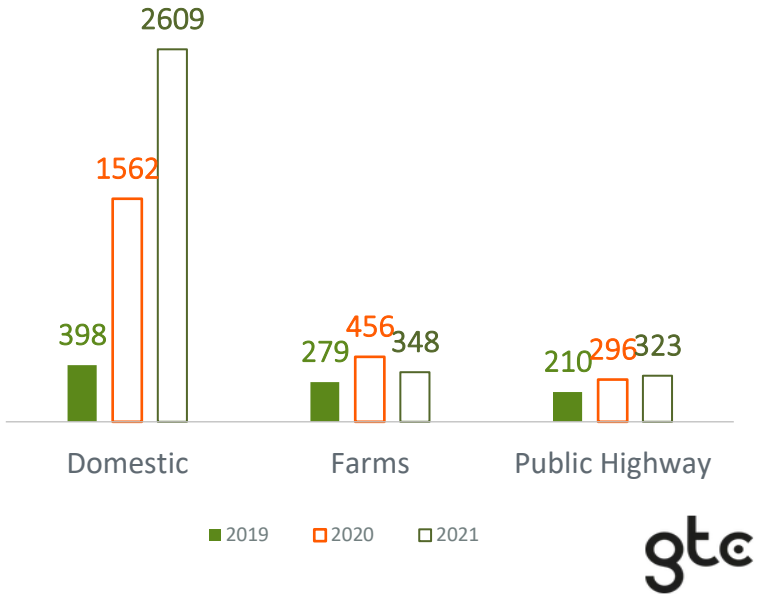
Year	Injuries
2019	16
2020	12
2021	16
Total	44

FATAL INCIDENTS



Year	Fatal Incidents
2019	1
2020	2
2021	3
Total	6

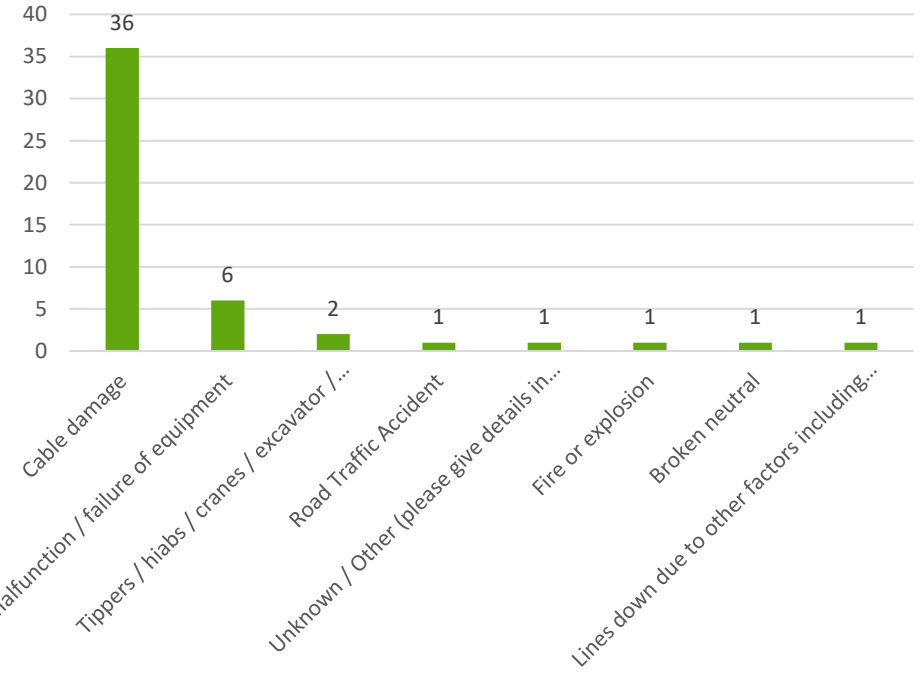
Top 3 Trends Public Safety
2019, 2020, 2021



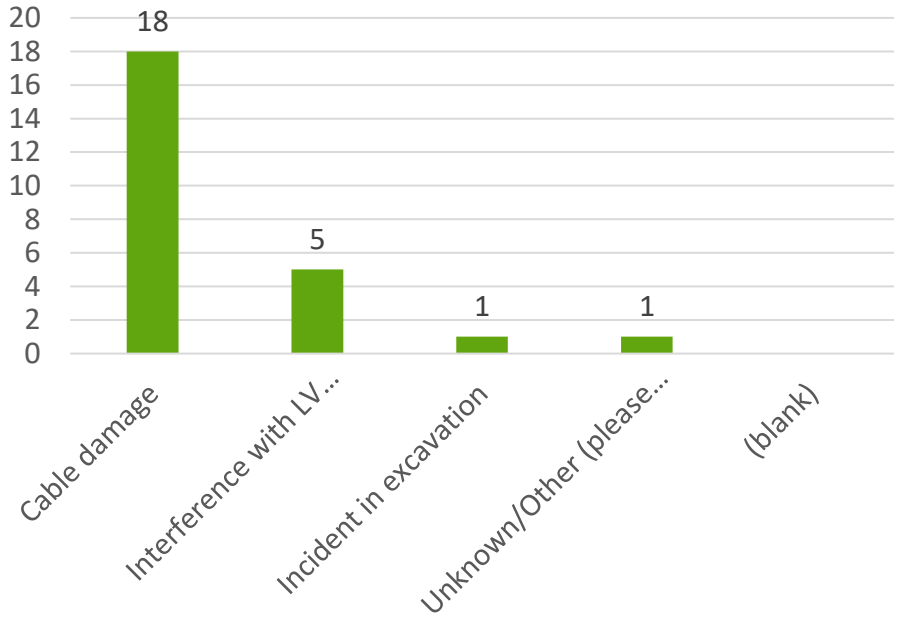
All fatal incidents occurred due to contact with overhead lines.

Public Safety Construction Statistics 2021

SPD Construction Data
2021



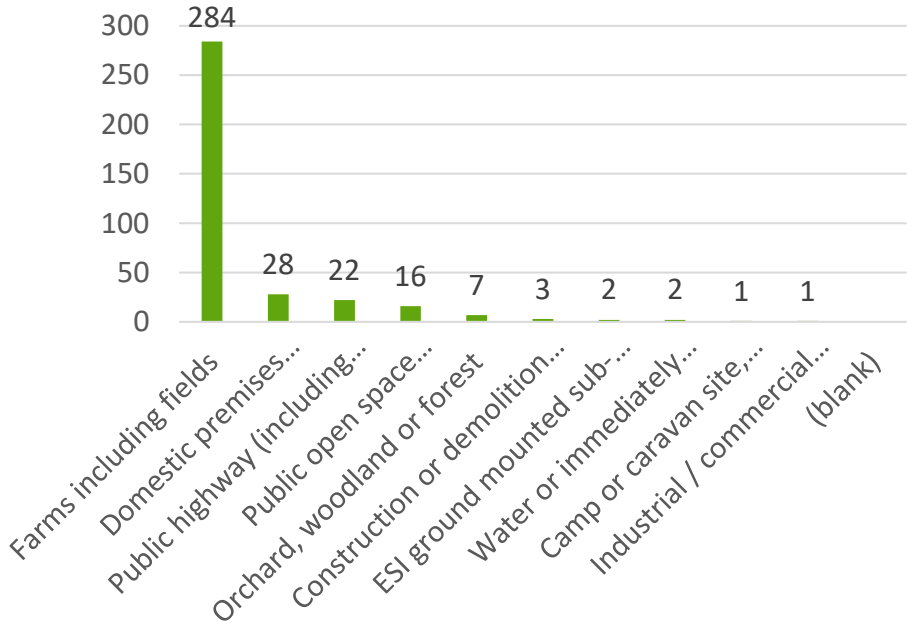
SPM Construction Data
2021



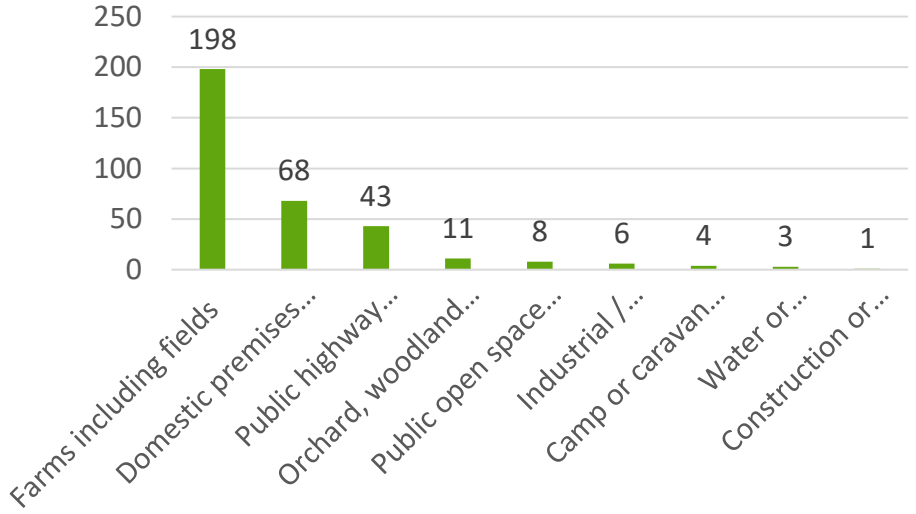
Incidents Total	
SPD	SPM
49	25

Public Safety Overhead Conductor Statistics 2021

SPD Overhead Conductor Data
2021



SPM Overhead Conductor Data
2021



Incidents Total	
SPD	SPM
366	342

Questions


WHAT?
WHY?
WHERE?
WHEN?
WHO?
HOW?
WHICH?
WHOSE?
WHAT? HOW? WHY?
WHO? WHERE? WHAT? HOW?
WHY? HOW? WHERE?
WHO? WHOSE?
WHERE? WHAT? HOW?
WHEN? WHERE?
WHERE? WHICH? WHOSE? WHEN? WHY?

SPEN and GTC Safety and Environment discussion

- Dave Overman
- Electricity Networks Director GTC

GTC Safety and Environment discussion

What goes on (hopefully) behind closed doors.

- Things that make you stop and wonder if you really know what is going on…….

GTC Safety and Environment discussion

Things that make you stop and think.

- Grenfell started as an electrical fire
- March 7th 2022 – Aldgate East. GTC network.
- Fire on 17th floor where a MSDB is installed.
- 240 appts @ circa £1m each
- Heart in mouth time.
- Is it our fault?

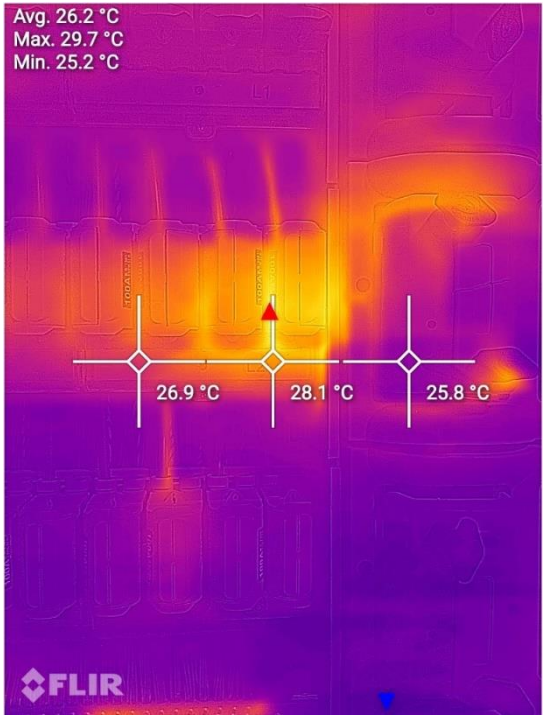
GTC Safety and Environment discussion

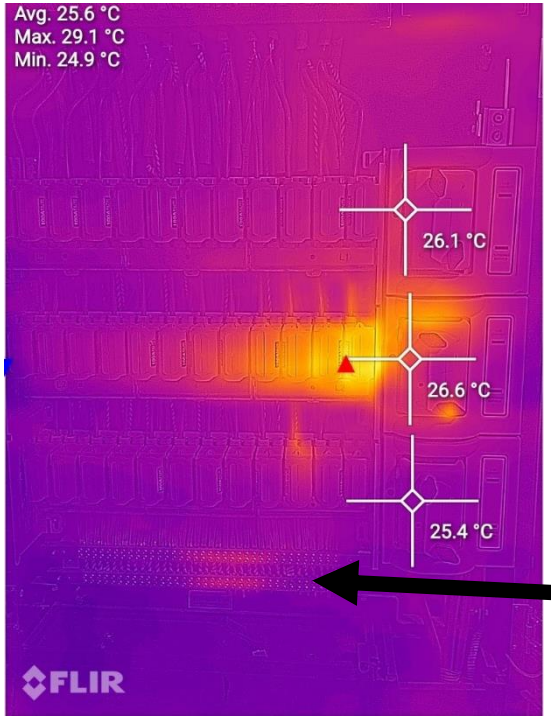
Issue that caused doubt and concern.

- Incident discovered in high rise apartment block.
- Smoke alarm operated and fire brigade attended.
- Loose connection caused plastic to melt.
- Investigation revealed bus bars had been removed by the jointer and not tightened correctly.
- Earth and neutral at the bottom and designer did not know this was changeable.
- Investigation showed this had been undertaken multiple times.

GTC Safety and Environment discussion

Tests that can and should be done





- Thermal imaging software available for use on mobile phones.
- Inspection of all installation by jointing team involved.
- A few hot spots detected and rectified.
- Earth bar at the bottom so jointer had removed the bars.

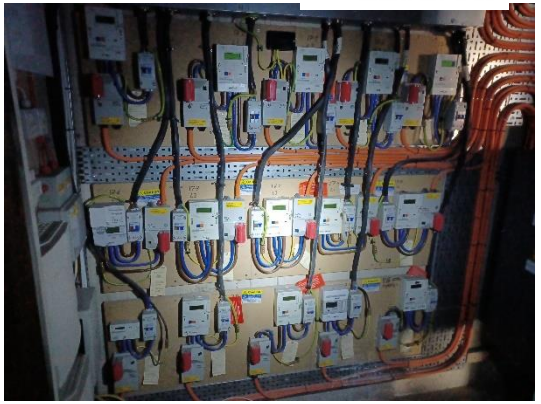
GTC Safety and Environment discussion

What else can go wrong?

- Risk of cupboard being used for storage
- Important to ensure that all of the correct stickers are applied especially when assets are not in an extremal cabinet.
- The below sticker should be applied in all internal situations.

GTC Safety and Environment discussion

Fire protection at its best



- Aldgate East was an issue in one of the apartments.
- MSDB and services all secure behind fire retardant doors.
- Earth bar at the top so bars not removed.
- Good design and installation.
- Can sleep at night again.

Questions


WHAT?
WHY?
WHERE?
WHEN?
WHO?
HOW?
WHICH?
WHOSE?
WHAT? HOW? WHY?
WHO? WHERE? WHAT? HOW?
WHY? HOW? WHERE?
WHO? WHOSE?
WHERE? WHAT? HOW?
WHEN? WHERE?
WHERE? WHICH? WHOSE? WHEN? WHY?

GTC Safety and Environment discussion

Environmental Issues

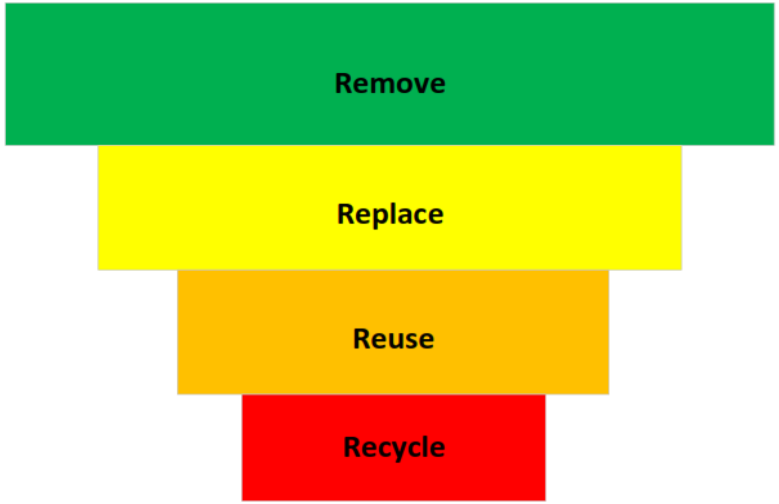
- Single Use Plastic

GTC Safety and Environment discussion

Message from our own staff – we want to remove SUP

GTC Safety and Environment discussion

Our SUP policy



Remove SUP at source and prevent it flowing into BUUK. We will measure and report upon Reduction but classify this as an interim measure only

Replace SUP with non-plastic materials which are better for the environment and can be recycled easily. Where this is genuinely not possible, we will ensure that all plastic into BUUK is reusable, recyclable, or compostable

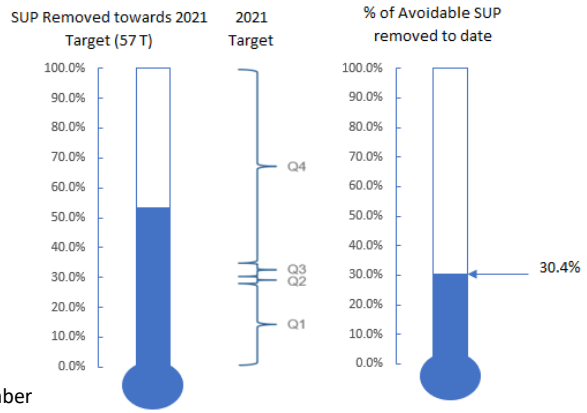
We will **Reuse** plastic materials to prevent them from being single use, where possible.

As a last resort we shall **Recycle** effectively to ensure that plastic is reused to stop it being single use and going go to landfill, incineration, or waste to energy.

GTC Safety and Environment discussion

Project Timeline to remove SUP where possible.

Item	Description	Quantity Removed
Resin buckets (return of)	Plastic Packaging	9T (per annum equivalent)
Gas products	Plastic bags	4.5T



Q3 2021

1st October

1st November

1st December

31st Dec 2022

2023

2024/2025

Task 5
Agree SUP alternative with Manufacturer re. Resin buckets

Task 15
Manufacturer has implemented a change to packaging to avoid SUP

Task 16
Return of resin buckets with ongoing monitoring of volumes by WUK

Target - Achieve 20% Reduction in avoidable SUP

Task 11
Implement changes to electric kits following feedback.

Task 17
Implement scheme for jointers bucket return to improve volume returned.

Task 14
Confirm Timings for packaging change with Manufacturer

Achieve 57% Reduction in avoidable SUP

All unnecessary SUP plastic has been eliminated from the supply chain

Other Significant Updates

GTC Safety and Environment discussion

- Jointing manufacturer (electric joint kits c. 4.9T total, 4.2T remaining).
  - Previous paper on plastic now to be replaced with plastic printed labels.
  - GTC have instructed manufacturer to approve the change. Likely to be early 2022, following sign off by all their customers.
- Electricity kits (c. 180,000 bags per annum).
  - Trial of cardboard box kits underway in October, if successful alternative packaging can be implemented.
- Gas products (4.5T – Removed).
  - Changes to packaging have been implemented to change recycled, recyclable plastic packaging (not single use).
  - This is compliant with GIS standards and further changes to the packing will require a change to GIS. This is something manufacturer is willing to work at solutions to and propose standard amendments.
  - Alternative providers are looking to use as best practice for implementing a solution within standards

GTC Safety and Environment discussion

Next steps

- Not enough traction with manufacturers.
- Found the same plan was being worked on by SPEN.
- Now working together to raise awareness of this issue within the industry
- Lobbying all manufacturers to gain their support and commitment
- Finding other areas of significant SUP use and looking to remove the need where possible.
- Is this something you want to get involved in?

Questions


WHAT?
WHY?
WHERE?
WHEN?
WHO?
HOW?
WHICH?
WHOSE?
WHAT? HOW? WHY?
WHO? WHERE? WHAT? HOW?
WHY? HOW? WHERE?
WHO? WHOSE?
WHERE? WHAT? HOW?
WHEN? WHERE?
WHERE? WHICH? WHOSE? WHEN? WHY?

Island Mode Failsafe talking slides only

- Kenny Bowie
- Head of Planning and Design
  - Current position
  - Spen & Installer's Viewpoint
  - Options
  - Recommendation

Island Mode Failsafe

Failsafe tests	
Spen	ae solar
G99 recommendations Reasons for witnessing such installations may include: a. (a) A new Installer with no track record in the DNO area. b. (b) A check on the quality of an installation either on a random basis or as a result of problems that have come to light at previous installations. ERECg99	Limit new installer's G99 witness tests (WTs) to 3 *"Increase the number from 3 to 10"*
10, 5 & 2 = 17 reduced to 6, 3 & 1 = 10	Unified approach with other DNO's
Safety provision for customer's installation	No particular consideration re NCD *"neutral current diversion issue that has been quoted as the cause of the witness test fiasco"*
WT Fee EN3 ½ day	Unfair levy on individual customers
	barrier to deployment
	WTs a Coordination burden on installers
	Paradox barriers incentivise rule avoidance

Island Mode Failsafe - options

SPEN to witness test all installations

Reasons for Acceptance	Reasons for Rejection
• even-handed commercial policy • G99 compliant	• Unrealistic SPEN commitment • SPEN competence to test customer's installation? • Administration • Over and above G99 recommendations

Island Mode Failsafe - options

Installer's self test

Reasons for Acceptance	Reasons for Rejection
• Equitable commercial policy • Realistic spen work commitment • Spen competence to test customer's installation • Administration	• customer's good faith? & Quality concerns • Rogue installers • G99 compliance (discretionary testing for new installers)

Island Mode Failsafe - options

Installer's self test & spen spot checks

Reasons for Acceptance	Reasons for Rejection
• even-handed commercial policy • Realistic spen work commitment • Spen competence to test customer's installation • Administration • G99 compliance (discretionary testing for new installers)	• customer's good faith? • Rogue installers • **Administration**

Island Mode Failsafe - options

Pre connection spen spot checks

Reasons for Acceptance	Reasons for Rejection
• even-handed commercial policy • Realistic spen work commitment • G99 compliance (discretionary testing for new installers)	1. Testing regime perceived to be arbitrary 2. Administration/supervision for installer 3. Administration/supervision for SPEN

Island Mode Failsafe - options

Post connection spot checks

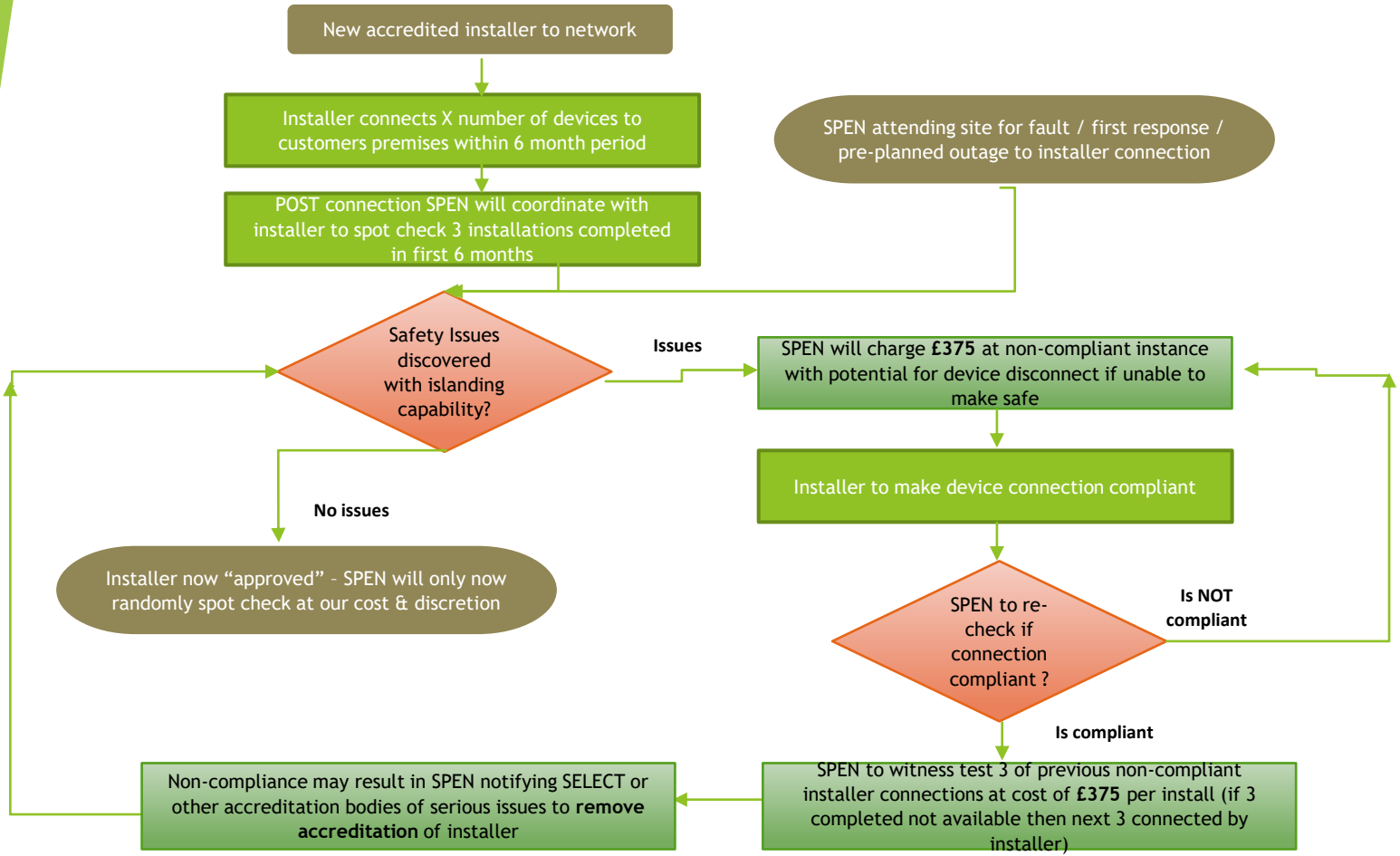
Reasons for Acceptance	Reasons for Rejection
• even-handed commercial policy - No charge?? • Easier Administration/supervision for installer & SPEN • G99 compliance (discretionary testing for new installers)	1. Disconnection risk 2. Risk with installers.

Island Mode Failsafe – recommended example onl

Recommended - Post connection spot checks

Reasons for Acceptance	Reasons for Rejection
• even-handed commercial policy - No charge?? • 3 (spot check)-Rejection £375 • Easier Administration/supervision for installer & SPEN - liscenced programmes • G99 compliance (discretionary testing for new installers)	1. Disconnection risk 2. Risk with installers.

Island Mode Failsafe – Flow Chart



Questions


WHAT?
WHY?
WHERE?
WHEN?
WHO?
HOW?
WHICH?
WHOSE?
WHAT? HOW? WHY?
WHO? WHERE? WHAT? HOW?
WHY? HOW? WHERE?
WHO? WHOSE?
WHERE? WHAT? HOW?
WHEN? WHERE?
WHERE? WHICH? WHOSE? WHEN? WHY?

Overhead Line Innovation - COLLISION AVOIDANCE PROJECT

- Greg Shirley
- Senior Engineer

EIC - Energy Innovation Centre Limited

NPG - Northern Powergrid

SSEN – Scottish and Southern Electricity Networks

SPEN - SP Energy Networks

Problem Statement

The OHL network is comprised of powerlines, supports, pole mounted circuit breakers, transformers, fuses and switches, which carry voltages ranging between 230V and 132kV. In most cases the OLHL conductors are not insulated, therefore if an object/person either comes into contact or in close proximity to an OHL conductor, the flow of electricity can cause serious injury or death. These injuries can have both physical and mental impacts on the affected person's quality of life. In addition, disruption to power caused by these incidents and the impact it can have on customers is a concern for the DNOs. Based on the Health and Safety (HSE) guidance note **GS6**, awareness on electrical safety is usually raised in collaboration with National Farmers Union (NFU), through engagement with agricultural colleges and attendance at regional agricultural shows. Despite the safety awareness training, overhead line strikes still occur.

The DNOs are keen to explore/develop innovative solutions that could assist in preventing OHL strikes. There is a desire to have a user friendly, retrofitted device/app that will alert vehicle operatives when they are either in close proximity or in direct contact with the overhead line network.

To the best of DNO's knowledge, vehicles such as tractors, diggers and plant models do not have specific built-in safety features that provide proximity alerts to the overhead line network. However, some variants may have GPS systems which allow users to configure warnings for physical objects such as pole supports and stay wires. This does not include detection of live electricity nearby on powerlines.

Solutions - Open Grid Systems

Open Grid Systems has worked on multiple projects to support customers and utility field personnel using mobile applications. These applications use standardised system analytical models that integrate electrical connectivity, asset, and geographical data to support customer outage/damage reporting, and to assist field crews with access to utility data.

The proposed solution is to build on these systems and leverage the advancement in the standardisation of network data, under the open data initiative. A smart-phone App, which can utilise the integrated sensors to alert users when a user is close to sensitive pieces of equipment, will be deployed. This will include (but not be limited to) overhead lines, underground cables, and substation perimeters.

The App would support both online and offline environments using localised caching of data, to assist remote field work in areas with poor cellular network coverage. The data would include network-operator defined parameters for the maximum allowed distance before an alarm would sound that can be defined at a global, per-type and per-asset level.

Solutions - Sheffield Hallam Uni

OHLs emit magnetic field which is proportional to the load current. By exploiting the variability of the magnetic field with distance, the system will determine the threshold value corresponding to the safe distance from the OHL to tractors/ haulage/ construction vehicles.

The solution will explore two measurement approaches:

1. explore the use of in-built magnetometer in smart phones (e.g. iPhone and Android) as sensors to measure the magnetic field and compare that with ground truth, for calibrations and validation.
2. alternatively, the developed on-board embedded system will double as a gaussmeter in addition to being the visual indicator.

A technology demonstrator (mobile application) will be developed to track the variabilities in the magnetic field and determine the proximity to the OHL. When the pre-defined distance thresholds are approached, the phone/ phone/on-board device will trigger a sound alert and the embedded system will provide a visual indicator. The developed system will have the functionality for sending strike alerts to a central backend platform to provide a single source of truth.

At the end of Stage 2, there is a potential for Open Grid System's solution to act as the front-end that users will have access to. If the criteria specified for integration to Open Grid System's solution is unsatisfactory, the technology demonstrator will be configured to a production-level deployable solution.

OHL Collision Avoidance

OHL Collision Avoidance aims to develop innovative solutions that could assist in preventing OHL strikes. The project will develop a user friendly, retrofitted device/app that will alert vehicle operatives when they are either in close proximity or in direct contact with the overhead line network.

DNO GIS/LiDAR data will be utilised to develop an App/Device that will alert users to proximity to OHL assets. The App would support both online and offline environments using localised caching of data, to assist remote field work in areas with poor cellular network coverage. The data would include network-operator defined parameters for the maximum allowed distance before an alarm would sound that can be defined at a global, per-type and per-asset level.

This project is being managed through the Energy Innovation Centre (EIC). Northern Powergrid will be the lead network with SP Energy Networks and SSE the other project partners.

OpenGrid Systems and Sheffield Hallam University will be the main non-DNO project partners

Better future, quicker

Project Name

For more information, please
Greg Shirley,
gshirley@spenergynetworks.co.uk

SP ENERGY NETWORKS

Project Sponsor: Gillian Sloey

Project Objective:
Develop a solution that could assist in preventing OHL strikes. This will consist of a user friendly, retrofitted device/app that will alert vehicle operatives when they are in close proximity to the overhead line network.

Project Scope:
1) Develop an App that would utilize GIS/LiDAR data as well as magnetic field proximity measurements in order to alert vehicle operatives, with visual and audio alerts.

Project Costs and Benefits Profile
Headline Budget: £260,000 over 18 Months. (SPEN Contribution)
Potential savings are XX over XXX period.
Benefit: Preventing injuries and fatalities

2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	Total
£50k	£100k	-	£85k	£25k	-	£260k

gtc
Better future, quicker

Solutions - Open Grid Systems

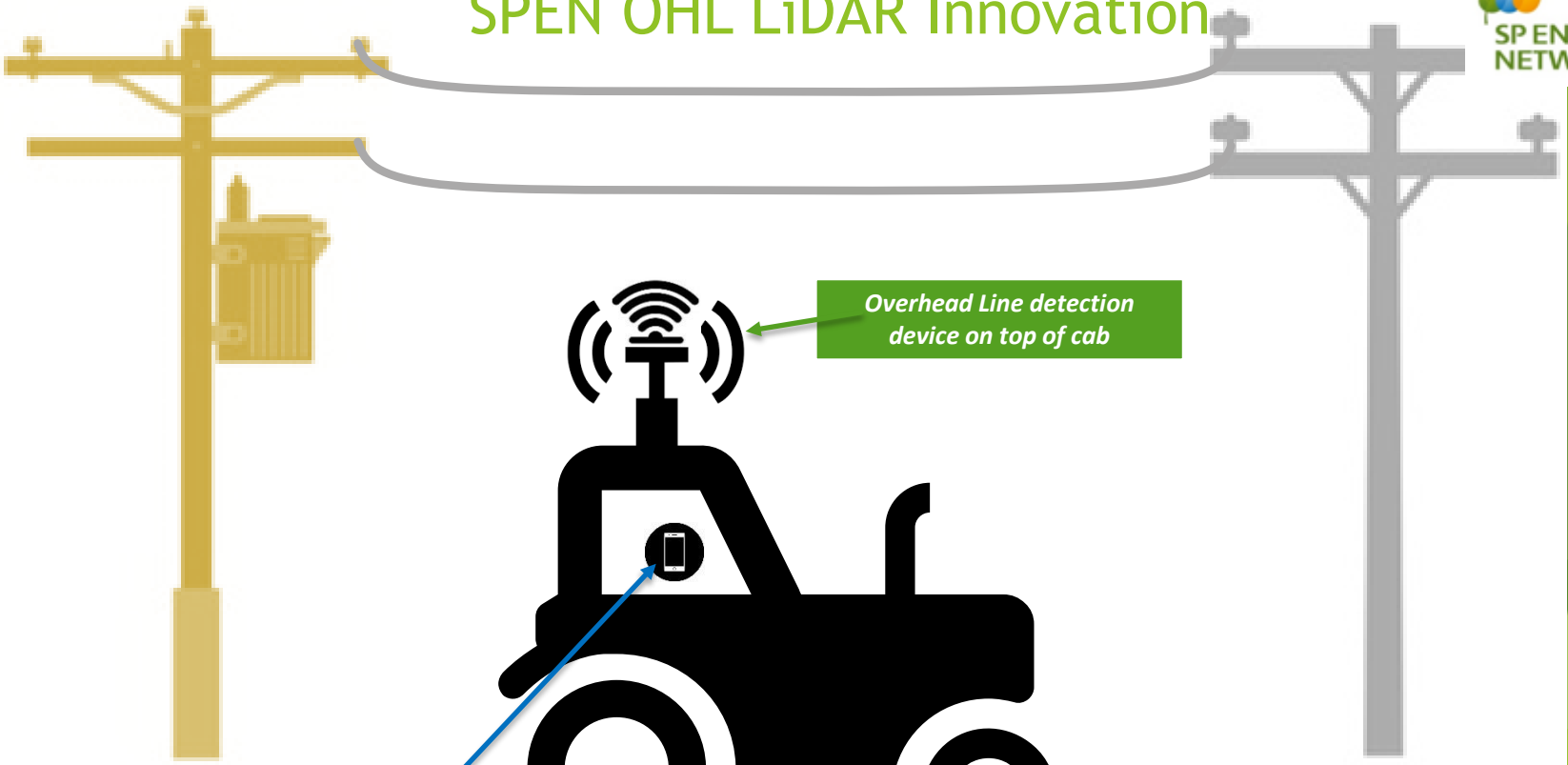
Project Name - Benefits Map

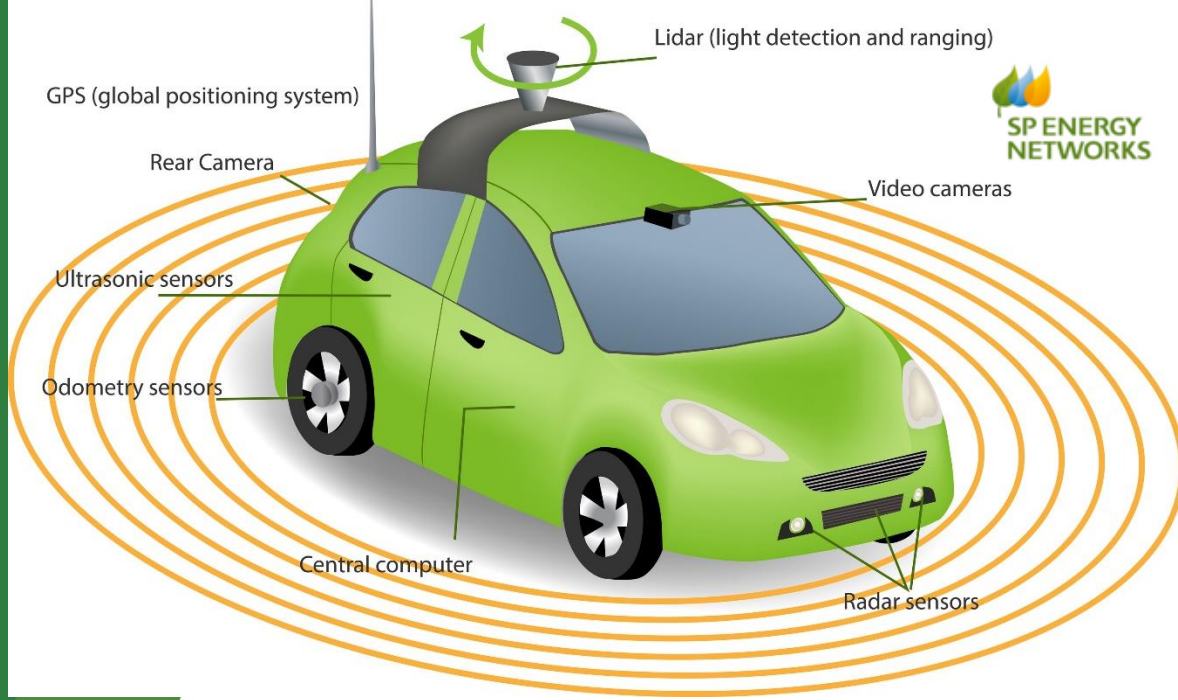
Enablers	Benefits (Blue) and Disbenefits (Red)	Objective
Development of on-board embedded system; including field measurements and validation	Prevent public injuries/deaths	A lightweight, portable on-board device for visualising alert (flashing red light)
Demonstration of PoC with mobile App on at least one mobile OS demonstrating collision avoidance in an online environment	Reduce collisions with OHL assets, reducing CIs/CMLs	App/Device integrating GIS/LiDAR data and magnetic field proximity measurements
Deployment of an App for general use and/or integration with existing utility Apps.	Reduce repair costs due to damage.	Engagement of stakeholders such as NFU to enable successful roll out of device.
	Limitations due to accuracy in Network GIS data.	

SPEN Additional OHL Innovation

- Gillian Sloey
- Greg Shirley
- Steve Field

SPEN OHL LiDAR Innovation





- **Suparule 300E (measuring device)**
- Key features include:
- - Measures up to 23m (75ft);
- - Easy to use with LCD Display, one-person button operation;
- - Long life battery capable of 50,000 measurements;
- - Auto power off after 3 mins.

- **Lidar on Cars**

Existing Technology On the Market

NFU Pilot Next Phase

Questions


WHAT?
WHY?
WHERE?
WHEN?
WHO?
HOW?
WHICH?
WHOSE?
WHAT? HOW? WHY?
WHO? WHERE? WHAT? HOW?
WHY? HOW? WHERE?
WHO? WHOSE?
WHERE? WHAT? HOW?
WHEN? WHERE?
WHERE? WHICH? WHOSE? WHEN? WHY?

SP Energy Networks
ICP Safety Seminar
Friday 8th April 2022

Thank you for your time today.

Your feedback has been useful and we will follow up and incorporate your comments when planning our next session.

Upcoming events for the calendar:

- **Preparing for Net Zero Conferences**
  - Wednesday 15th June 2022
  - Wednesday 14th September 2022
  - Wednesday 7th December 2022
  - Wednesday 8th March 2023