SP Energy Networks

Energy Innovation Summit 2024

Predict4Resilience (P4R)

SP Energy Networks

Scottish & Southern Electricity Networks

SIAPARTNERS

University of Glasgow

Contents

Background

Problem Statement and Benefits

P4R Fault Forecasts

Live Trials

What's next…

Project Partners:

Background

Storm Arwen

On November 26-27, 2021, Storm Arwen brought severe weather with 98 mph winds to the UK, causing approximately 9,700 faults and leaving over 1 million customers without power.

Public Review

Due to the widespread disruption, Distribution Network Operators (DNOs) were reviewed by Ofgem and BEIS through the Energy Emergencies Executive Committee (E3C).

DNOs' Commitment

DNOs have committed to enhancing their preparedness, resilience, and customer support to respond even more effectively to severe weather events.

Predict-4-Resilience

2022: Discovery

Initial analysis and survey of existing practice and available tools. Potential benefits identified.

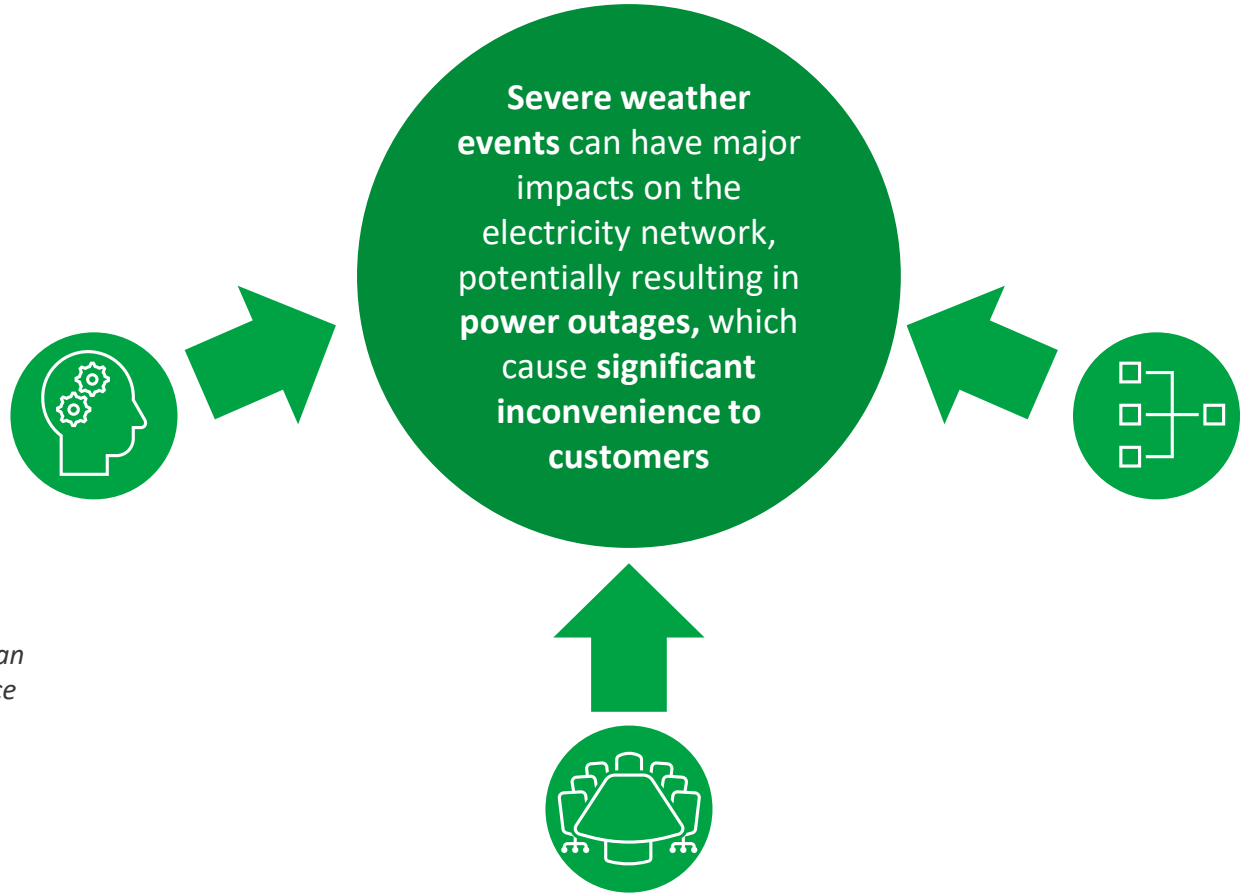
2022-23: Alpha

Proof-of-concept developed, and desk-based studies verify potential skill of fault forecasts. Business case developed.

2023-27: Beta

Fault forecasting methodology has been productionised and live trials are under way. Enhancements continue to be developed and rolled out to trial participants. Commercialisation strategy under development.

Problem statement



Reliance on Tacit Knowledge for Risk Assessment

Not backed by data, subject to human bias and limited/differing experience

Financial Impact of Limited Fault Insights

Weather forecasts alone don't quantify range of fault impacts, potentially leading to higher costs

Reactive Management of Severe Weather Risks

Limited DNO information about the potential risks of upcoming severe weather

Benefits

1. Direct Financial Benefits

Savings to SPEN through improving performance against **Customer Minutes Lost** incentive scheme and reducing compensation payments to customers for failing to meet a **Guaranteed Standard of Service.**

2. Network Avoided Costs

Savings for SPEN through avoidance of costs that it would have otherwise incurred as part of its **Storm Support**.

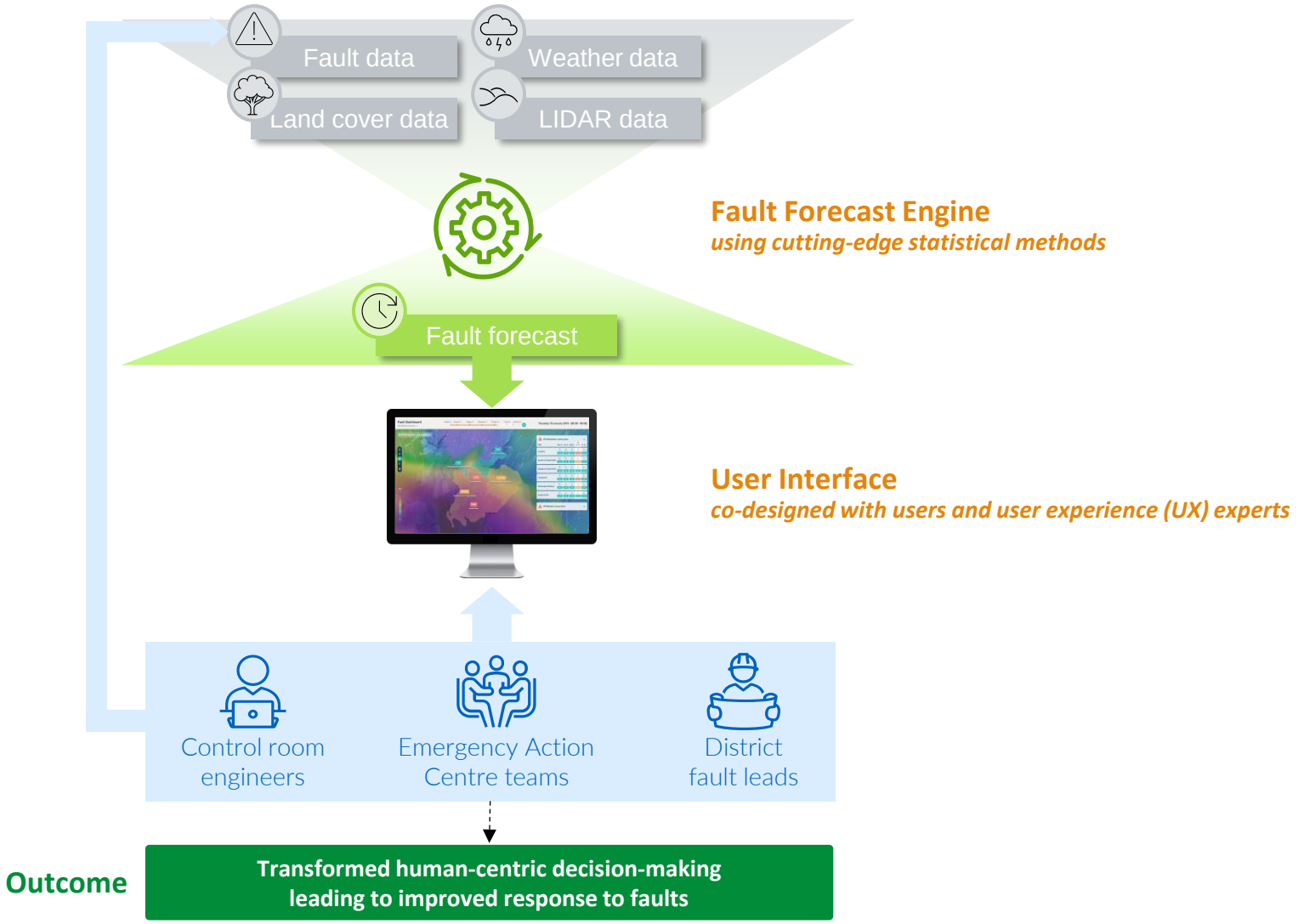
3. Environmental Benefits

A reduction in **CO2 emissions** and an improvement in air quality. A Social Return on Investment (SROI) model helps capture and quantify these benefits.

4. Social Benefits

A reduction in **stress** for vulnerable customers and minimising the **inconvenience** of a disruption in power supply to all customers, assessed using the SROI model.

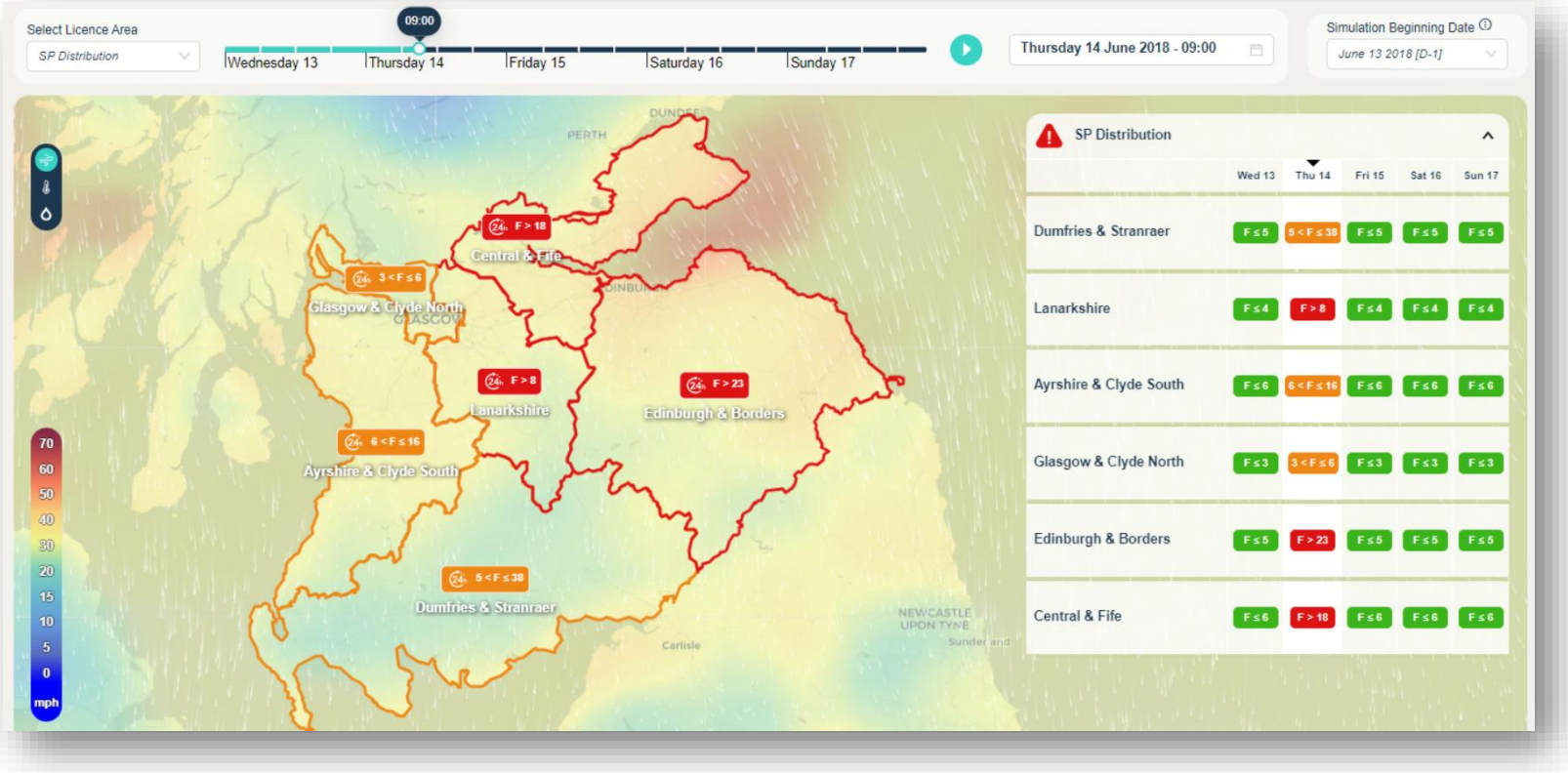
P4R Fault Forecasts



P4R Fault Forecasts

Interactive user interface with features designed for ease-of-use and options to deep-dive into forecast information:

- Map view displaying five-day weather and fault forecast for all districts in a licence area (right)
- District dashboard displaying detailed forecast at 24h and 6h resolution
- Event library and matching to compare and “replay” historic events
- Resource calculator to support allocation of staff and equipment



Visit us for a demo at the SP Energy Networks stand (M8)

Live Trials - Overview

What Are They?

- Testing of solution in a “live environment”
- 20+ operational staff trained how to use P4R
- Software now available to “P4R champions” in SPD and SPM control rooms and districts
- P4R being used alongside existing tools and in a range of situations (both storms and BAU).

Expected Timeline

- Winter 2024 (Q3 2024) through to end of summer 2026 (Q3 2026).
- That is 2 Winter Storm seasons and 2 Summer seasons.

Objectives

- Solution performance provides confidence to users.
- Users understand what they are being shown and can interpret the forecasts appropriately.
- Staff continue to use P4R and do not return to previous tools over time.
- Feedback and suggestions for new features

Next Steps

ENHANCE FAULT FORECASTING MODEL

- Integration of additional variables to account for different types of faults
- Experiments using downscaled and multi-model weather data
- Develop forecasts for License Area and "sub-districts"
- Inclusion of extreme/worst case scenario analyses

IMPROVE USER INTERFACE

- Implementation of feedback from trials.
- Development of new features and interfaces (e.g. resources and materials dispatching).

DEVELOP MODEL FOR SSEN AND START TRIALS

- Review of model fit with new datasets and potential adaptation of the models.
- Implementation of infrastructure and development of software.
- Training and onboarding.

FINALISE COMMERCIAL STRATEGY

- Organisation of the legal structure and contractual arrangements between project partners.
- Preparation of the marketing and template materials.
- Preparation of roll out.

University of Glasgow

SP Energy Networks

Scottish & Southern Electricity Networks

SIAPARTNERS