EIP021

Can nature-based solutions mitigate flood risks?

Problem Statement Details

A desktop assessment of primary substation sites across SEPD and SHEPD licence areas was carried out as part of RIIO-ED2 business planning, identifying 65 of them as at risk of flooding. The assessment scored the sites based on flood risk and proposed flood defence measures, resulting in a total of 51 sites being identified in SEPD and 14 in SHEPD.

Currently, only traditional hard-engineering solutions have been proposed, and these can be costly, carbon intensive and may not deliver wider social and environmental benefits.

SSEN are looking to identify nature-based solutions which would deliver the desired flood mitigation in a more sustainable way – with additional biodiversity benefits, while also providing flood protection for the surrounding landscape (not just our substations). As the sites are varied in type, location and environment, a number of different options may need to be considered.

It is believed that a nature-based solution, if chosen over a typical permanent hard-engineering solution, would bring additional benefits around:

- delivery of flooding resilience at lower cost
- lower embodied carbon
- wider ecosystem benefits – carbon sequestration, water quality, air regulation…
- biodiversity enhancements
- community/societal benefits – reduced flooding of property, leisure opportunities in nature…
- DNO-wide benefits in new approach, establishment of new best practice.

DNOs have an obligation to address the risk management of floods at grid and primary substations due to coastal, river and surface water flooding. The aim of the ETR138 is to provide guidance on how to improve the resilience of substations to flooding to a state that is acceptable to customers, Ofgem and Government.

Key Stakeholders

SSEN: Portfolio Management, Asset Policy and Sustainability teams.

Consumers: those located in catchments where nature-based solutions are delivered would benefit from improved local environments. If the approach demonstrates a cost saving in flood mitigation delivery, this saving is passed onto the customer in the form of reduced network charges.

Regulators, the Scottish Environmental Protection Agency (SEPA), the Environment Agency (EA).

Target Market

SSEN: Up to 65 primary substation sites across SEPD and SHEPD; with the option to include other assets once further modelling is carried out. Additional modelling and analysis of SEPD and SHEPD would be beneficial to identify other assets at risk of flooding.

Other: other DNOs, water companies, housing developers, rail and road industries;

Enablers and Constraints

Enablers:

To date, there has been no other work on nature-based solutions for flood mitigation carried out in SSEN. Initial research shows that potential solutions may include:

- re-wetting upland peat bogs as natural storage reservoirs
- beavers as ecosystem engineers
- restoring river channels and meanders
- plant trees and hedges to increase water absorption, catch rainfall and slow down surface water run-off[1]
- improve soil cover with plants to reduce water pollution and run- off[1]
- divert high water flows and create areas to store water[1] (i.e., Swales and SUDS)
- create leaky barriers to slow water flow in streams and ditches[1]
- restore salt marshes, mudflats and peat bogs[1]

([1]Taken from https://www.gov.uk/guidance/use-nature-based-solutions-to-reduce-flooding-in-your-area)

There are also other avenues which could be utilised as source of experience in this area:

- Partnership working to leverage other funding sources/pool resources for innovative solutions e.g., within the water industry
- Partnership working for expertise e.g., The Rivers Trust, Catchment-Based Approach (CaBA).

Constraints:

- Catchment scale work is likely to require permits/consents from environmental regulators e.g., re-profiling or adding woody debris and leaky dams to water courses would require permissions from SEPA or the EA.
- Ideally, the trial site would be within our SEPD area as a lot more data is available, and flooding is a much bigger issue there than in the SHEPD area.

Scalability and Target Implementation Date

No 'hard' implementation date, however, would ideally be implemented as early into ED2 as possible to maximise the benefits. In the absence of alternative solutions, traditional engineering methods will be utilised in the meantime.

Innovation Strategy Target Areas

Innovation Theme	Target Area	Primary or Secondary
Data and Digitalisation	The shift to data-driven, digitally-enabled networks is critical as we move towards Net Zero. We need your help to drive standardisation, interoperability, security and digital skills whilst accelerating our transformation to data-driven networks by the mid 2030s.	Not applicable
Flexibility and Market Evolution	Energy networks must quickly and efficiently respond to the rapidly evolving needs of the energy system transition. We need your support to eliminate barriers to new market entrants, deploy novel commercial and network management solutions whilst ensuring fair participation and eliminating regulatory barriers within the RIIO-2 price control periods.	Not applicable
Net zero and the energy system transition	In order to meet the UK net zero targets of 2050 we must start converting our networks to deliver low carbon fuels today. We want to work with you to develop the role of our gas networks into the future by investigating, trialling, implementing and delivering safe, low carbon alternatives to natural gas such as Hydrogen.	Secondary
	Net Zero requires connection of more low and zero carbon sources of energy generation, storage and demand to both the transmission and distribution networks. We need your innovative methods for effective network management and accessing flexibility to improve visibility, forecasting and modelling of low carbon technologies.	
Optimised assets and practices	Innovation has a key role to play in ensuring our networks continue to remain reliable, safe, secure and resilient to our changing climate. We are constantly looking to improve and welcome support to identify methods to prevent interruptions, ensure resilience, reduce climate impact and future-proof our networks.	Primary
Supporting Consumers in Vulnerable Situations	Equality and fairness are the foundations of a just transition to Net Zero. We hope you can provide insight into the transient and situational nature of vulnerability and how we can overcome the impact the energy system has on consumers, building strong relationships for the future.	Not applicable
Whole Energy System Transition	The energy system must consider the full range of opportunities, risks and interdependencies that exist across the energy networks to integrate and optimise them in a way that best serves the consumer. We are looking for ways to improve visibility of the networks and transitional options, co-ordinate approaches and collaborate across the UK.	Not applicable