

**NEXT GENERATION
NETWORKS**

EDGE-FCLi NIA Project

**Call for the Expression of
Interest- Project Trial Host**



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1 Introduction

Growing generation capacity in distribution networks, particularly due to adoption of distributed generation sources, drives increased fault levels in these networks. More specifically, multiple connections of embedded generation make it increasingly difficult to manage fault levels without cost-effective and easy to use fault current limiting devices.

This 27-month OFGEM Network Innovation Allowance (NIA) project aims to upscale a newly developed solid-state Fault Current Limiting Interrupter (FCLi), targeted for cost-effective connection of distributed generation, from prototype level to a commercial scale device.

Details on the OFGEM NIA mechanism can be found here;

<https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/electricity-network-innovation-allowance>

This device is designed for use at the point of connection of a generator and it will be therefore installed and trialed in one of Western Power Distribution (WPD) generation customers' sites. Notably, the ownership and operation of the device will remain with WPD. Upon completion of the trial project the equipment will be decommissioned and removed from site unless agreed otherwise with the generation customer.

Further information on the WPD project, titled EDGE-FCLi (Embedded Distributed Generation Electronic Fault Current Limiting Interrupter) can be found on the ENA website:

http://www.smarternetworks.org/project/nia_wpd_033

WPD would like to invite WPD stakeholders to express their interest in holding the trial at their premises.

2 Device and Prospective Benefits

The FCLi is a series-connected solid-state device which conducts the network current and is nearly transparent during normal operation. It limits and then interrupts the fault current upon detection of short circuit conditions. The FCLi limits fault currents in the network before they can rise to high levels and before the first current peak.

Overall, the solution will allow the faster connection of distributed generation to the grid without the long delays associated with network reinforcement, while it is expected that the business as usual cost of an 11kV, 5MVA FCLi will be £275k. Based on the income of a Combined Heat and Power plant of these specifications, it is anticipated that the capital costs of an FCLi unit can be recovered within one year.

3 Hosting the Project Trial

This call is open to all our stakeholders, however recognising the academic and technical interest that such a project will have, it is envisaged that it will particularly appeal to academic institutions or research centres. Hosting this trial project entails on one hand the use of premises by WPD for the installation of the necessary equipment and the provision of generator for the trial, while on the other hand this live trial could provide opportunities for academic research in the area of fault level mitigation.

Should an academic institution site be selected we will engage with academic researchers of that particular university to explore opportunities on how this trial can enable furthering their research in the area of smart grids. Moreover, as part of the trial new academic projects can emerge relating to field data analysis and network studies which can be undertaken by MSc students or final year undergraduate students.

Overall, upon successful completion of the tests and field demonstration the solution is expected to be rolled out as a commercially available alternative to network reinforcement, thus the selected trial host, having had a first-hand appreciation of its implementation, can benefit from that by exploring the option of an FCLi method for future generation connection applications where fault level restrictions would otherwise lead to a rejection.

Notably, the OFGEM NIA funding mechanism wouldn't allow for research funding to the party hosting the trial as part of this project. In addition, special care needs to be taken with regards to the background Intellectual Property that comes with the specific technology as it is protected, so it is envisaged that research work will focus on the trial outputs and the field data.

Site installation works are expected to take place between September 2019 and January 2020 (to be finalised with interested parties based on site availability), while the live trial period is between February 2020 and October 2020.

Academic institutions or any other interested parties across the four WPD distribution licence areas are kindly invited to contact WPD for further information and to discuss site and generator availability and associated timescales. Please use the search tool on <https://www.westernpower.co.uk/distribution-area-search> to check if we distribute electricity to your area.

4 Site and Technical Prerequisites

The selected site needs to meet a number of requirements that will allow the installation, integration and operation of the FCLi and all peripheral equipment.

4.1 Equipment to be installed:

- a) 1x Containerised substation comprising
 - 7-panel 11kV switchboard
 - Battery chargers and batteries
 - Communications cabinets
- b) 1x FCLi device housed in a Glass Reinforced Plastic (GRP) enclosure
- c) 1x Distribution transformer for local supplies

4.2 Connection characteristics:

- a) 11kV or 6.6kV WPD Point of Connection
- b) FCLi integration could be made to a generator that is metered and currently exports directly to the distribution network or
- c) to one which is currently part of the Customer's wider installation and is used to support the Customer's electricity demand

Please note that the site selection process is subject to further refinement, therefore it is possible that unmetered generators which are embedded in a wider private network may be discarded due to additional commercial and metering complexities.

4.3 Generator characteristics:

(Please note that the following requirements apply either to a single generator or to a group of generators that are paralleled together)

- a) Synchronous machine
- b) Rated capacity of ≤ 5 MW

4.4 Land requirements:

- a) Available land area of at least 15m x 15m
- b) Ease of access for lorries, cranes and other machinery as part of the civil and electrical works
- c) Site to be available from 1st February 2019 for geotechnical and civil surveys

- d) Site installation works expected to start on 1st September 2019 and finish on 31st January 2020. If the first phase of installation works (September- November) is likely to cause inconvenience then WPD could examine accommodating these works during the summer months.
- e) Project finishes on 30th November 2020 followed by the necessary decommissioning works to restore the site back to its original state.

5 Contact Details

All interested parties are invited to contact WPD for further information.

Future Networks Team
Western Power Distribution
Pegasus Business Park
Castle Donington
Derbyshire
DE74 2TU

Team contact number: [01332 827446](tel:01332827446)

Email: wpdinnovation@westernpower.co.uk

Glossary

Abbreviation	Term
EDGE	Embedded Distributed Generation Electronic
ENA	Energy Networks Association
FCLi	Fault Current Limiting Interrupter
GRP	Glass Reinforced Plastic
NIA	Network Innovation Allowance
OFGEM	Office of Gas and Electricity Markets
WPD	Western Power Distribution

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