



Registered Power Zone Annual Report

Scottish Hydro-Electric Power Distribution

Southern Electric Power Distribution

for period 1 April 2005 to 31 March 2006

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1. Executive Summary

One RPZ scheme has been registered in the Scottish Hydro-Electric Power Distribution (SHEPD) area in 2005/06 with further potential schemes under active consideration for 2006/07 and beyond.

2. Introduction

As part of the recent Distribution Price Control Review (DPCR) effective from 1 April 2005, Ofgem (the regulatory body for the energy industry) introduced two new incentives: the Innovation Funding Incentive (IFI) and Registered Power Zones (RPZ). The primary aim of these two incentives is to encourage the distribution network operators (DNOs) to apply innovation in the way they pursue the technical development of their networks. A Good Practice Guide (Engineering Recommendation G85) has been produced by the DNOs that is available free of charge via the Energy Networks Association's website: www.energynetworks.org.

RPZs are focused specifically on the connection of generation to distribution systems. The estimates made by DNOs as part of the DPCR process indicated that some 10GW of generation could be connected in the next five years. This generation could connect at all distribution voltage levels bringing new system design and operating challenges.

RPZs are therefore intended to encourage DNOs to develop and demonstrate new, more cost effective ways of connecting and operating generation that will deliver specific benefits to new distributed generators (DG) and broader benefits to consumers generally. The RPZ incentive applies from April 2005 and, at present, this excludes DG applications processed prior to this date.

This report covers activities in the period from 1 April 2005 to 31 March 2006. It will be published on SSE's website www.scottish-southern.co.uk in the Energy System's area along with SSEPD's IFI report. The reports will also be available on Ofgem's website www.ofgem.gov.uk within the "IFI and RPZ" area of work.

3. Scope

This document covers the two electricity distribution licensees within SSE Power Distribution (SSEPD):

Scottish Hydro-Electric Power Distribution Ltd (SHEPD) and Southern Electric Power Distribution plc (SEPD).

The SHEPD area is seeing a higher level of DG activity and is consequently more active in developing innovative solutions in this field. As there is no completed or current RPZ development activity in the SEPD licence area, there is no report for the SEPD area in this reporting period.

4. Overview of RPZ Activity

We have an established R&D link with Strathclyde University who are an acknowledged UK leader in the field of electrical and electronic engineering. They have made valuable contributions to other areas of our work and are helping us to develop active management systems for our networks. Earlier work has been developed during 2005/2006 and this has resulted in Ofgem registering our application for the Orkney network as SSE's first Registered Power Zone. This work will continue in 2006/07.

The renewable energy resource on the Orkney Isles is considerable and has attracted significant levels of wind farm and marine development such that further renewable energy generation output is constrained by the capacity of the distribution network. SHEPD, working with Strathclyde University, has devised an active network management scheme which will make better use of the existing infrastructure thereby providing a lower cost alternative to network upgrading and reinforcement works. The active management scheme is expected to realise a total of 62MW or more of generator connected capacity onto the Orkney network. Currently 47MW is already contracted and a further 15MW of viable renewable generation output could be allowed onto the network by the active management scheme.

This concept is being developed as an IFI project and the first trials are expected to be run on the Orkney distribution network during 2006. Once the information gained from the trial scheme has been analysed, it is expected that significant further work will be necessary to develop the full active management scheme such that it is sufficiently robust and reliable to accept the new non-firm renewable capacity. If the scheme proves to be successful, there will be scope to repeat this innovation and also to develop variations of the concept for application to other network situations.

In the SHEPD area, considerable amounts of renewable generation are in the process of being connected to our network. However, network constraints have become apparent in many geographic areas which currently limit the amount of generation we can connect until extensive transmission reinforcements are completed. We believe active management systems and other methodologies can be developed to allow more generation to be connected. SSEPD are progressing solutions to reduce the impact of these constraints.

5. Potential Registered Power Zones

SSEPD is giving consideration to the evolution of innovative solutions to facilitate the connection of new renewable generation on two distribution networks which are experiencing considerable interest from renewable energy developers, including a number of community schemes.

The two potential RPZs currently under consideration are:

1. The Shetland Isles electricity network is an island power system with no existing connection to the National Grid. Generation is located in three places and, as an island network, all variations in system demand must be met by these three generating stations. Although there is some interest from developers to connect further renewable generation within the Shetland Isles, technical studies have shown that there is no further scope for the firm connection of renewable generation. This is due to system stability issues rather than network capacity. However, it may be feasible to allow the connection of an amount of non-firm DG, for example at times of higher demand.

A detailed technical study is being carried out in 2006/07 with the aim of determining the level of new non-firm generation, if any, which could be connected. Should the outcome of these studies be favourable, it is likely that a proposal will be developed and submitted within the RPZ framework.

2. The Western Isles distribution network consisting of Lewis/Harris and the Uists is connected to the transmission system via two separate 33kV subsea cables. This interconnection, commissioned in 1990, was designed to meet customer demand and reduce the dependency on diesel generation rather than to cater for the present challenge of exporting large amounts of generation to the mainland. Connection of generation to this network requires consideration to be given to four significant aspects: thermal rating of the circuits; voltage rise; voltage step changes; and effects of machine starting currents. Due to the length of the circuit connecting the Western Isles to the transmission system, relatively small changes in demand or generation levels can cause noticeable changes to voltage levels. Currently, two significant transmission schemes are under consideration which will affect the Western Isles distribution network; a large DC link to the Western Isles and a second 132kV circuit to Skye from the mainland.

Both these transmission reinforcements will provide scope for connecting further renewable generation but due to the scale of these projects they will take a significant amount of time to construct and local distribution network constraints may also restrict the commercial viability of DG connections. As this situation is similar to the Orkney Isles, it is intended that once the Orkney RPZ active management system, which is currently under construction, has been installed and proven as being reliable and acceptable then SSEPD will give consideration to developing its application to the Western Isles network, again through the RPZ framework.

Section 6

Scottish Hydro-Electric Power Distribution

RPZ Report

for period

1st April 2005 – 31st March 2006

Scottish Hydro-Electric RPZ Report April 2005 – March 2006

Name of RPZ	Orkney Active Distribution Network Management
DG Capacity	Expected to be about 15 MW (0 MW connected in 2005/06)
Starting Year	2005/06
Description of project and technical details.	New generators accepted under the RPZ scheme will be instructed to limit their output to match the available export capacity to the mainland grid. Available capacity will be derived from real time network measurements and will depend upon the level of Orkney demand and output of existing generation
Expenditure for financial year	£10,500
Type(s) of innovation involved	Radical
Status (planned, under construction, operational) and operational starting year	Under construction – expected to be operational in 2006/07
Connection cost	Of the order of £200,000 is expected
Expected benefit to customers when project was registered	Ability to connect an additional 15 MW of new renewable generation to the Orkney Distribution network