DISTRIBUTED GENERATION – REGULATING FOR CHANGE

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INTRODUCTION

Distributed Generation (DG) is continuing to expand in Great Britain (GB), primarily due to the growth of renewable generation. DG is forecast to increase by 10 GW between 2005 and 2010. It is vital that this new capacity is connected in a cost efficient way that maintains or improves the quality of supply to consumers. Ofgem (the GB energy regulator) recognises the opportunities to employ innovative solutions to achieve this goal and in particular the evolution of distribution networks from passive to active systems.

This paper summarises the approaches that Ofgem is taking to help manage the challenges this growth brings to the companies it regulates. It sets out the direct actions it is implementing through price control mechanisms and the indirect actions it is supporting through industry-wide initiatives.

BACKGROUND

In Great Britain there are 14 Distribution Network Operators (DNOs). As DNOs are regional network monopolies, it is necessary for Ofgem to regulate their prices. The amount of revenue that each DNO can earn on its regulated business is restricted by an RPI-X price control. It controls prices, not profits, and so encourages companies to look for efficiency gains. Electricity distribution price controls are reviewed by Ofgem every five years. The current distribution price control is the third 5 year price control since privatisation and covers the period between April 2000 and March 2005.

In November 2004 Ofgem published final proposals [1] for the next 5 year price control starting from 1 April 2005. Ofgem is addressing the connection of DG in a number of ways. A specific incentive for the connection of DG is being introduced as well as an Innovation Funding Incentive (IFI) and Registered Power Zones (RPZ). The DG incentive, IFI and RPZs will come into effect from 1 April 2005.

DG INCENTIVE

The objectives of the DG incentive are to encourage DNOs to undertake the investment required to facilitate DG connections, to encourage DNOs to invest efficiently and economically and to generally be proactive in responding to connection requests.

The volume and location of DG connections in the period 2005-10 is uncertain. It is therefore not practical to set price controls based on estimates of the cost of reinforcement. However, to allow cost pass-through, for example through charging of all costs directly to the generator, would not give the DNOs incentives to develop efficient solutions. New thinking was required.

Ofgem therefore proposed the introduction of a ‘hybrid’ incentive scheme for DNOs in relation to the connection of distributed generation, the broad characteristics of which are:

1. Reinforcement costs incurred by the DNO to provide network access to distributed generation are given a partial pass-through treatment; and

2. DNOs are given a further supplementary £/kW revenue driver (or incentive rate) to incentivise the connection of distributed generation to the network.

Pass-through and incentive rate

The hybrid scheme combines incentives for efficiency (via the incentive rate) with protection against cost uncertainty (via the cost pass through). The pass-through element of the scheme allows DNOs to pass-through a percentage of the total reinforcement cost of a DG connection. The incentive payment is made to DNOs on a £/kW/yr basis independent of the cost of reinforcement. This is designed to incentivise DNOs to invest efficiently and economically.

Ofgem has set the pass through rate at 80% and the incentive rate at £1.50/kW/yr. In combination, these provide the DNOs an additional rate of return of 1% over the allowed pre-tax cost of capital (which is set at 6.9% for the next price control period). The cost of the DG incentive (both the pass-through element and incentive rate) will be recovered from all generators connecting to the distribution system from 1 April 2005 through use of system charges.

Revenue certainty

To provide the DNOs with a reasonable level of certainty about the incentive rate it will be “locked in” for 15 years (which is the asset life assumed by Ofgem for the infrastructure assets for accommodating DG). The pass-through component of the incentive will also be recovered on an annuity basis, starting the year after the expenditure is incurred.

The returns for the DNOs in relation to the overall portfolio of DG connected during the price control period are limited by a “cap” and a “floor”. This is to protect both DNOs and generators against cost uncertainty. Adjustments may be made to the future incentive rate for DG connected in the next price
control if the expected pre tax return earned by a DNO on its overall portfolio of DG is below (above) the floor (cap).

In addition, to cover operation and maintenance costs the DNOs are allowed an opex allowance of £1/kW/year. This is based on a percentage (approximately 1%) of the DNOs own estimates of the required capital expenditure.

Network access

In order to provide DNOs with an incentive to provide ongoing network access (availability), DNOs are required to make a rebate payment to generators for unavailability of network access. This is not based on the value of consequential losses caused by the interruption for the generator but is derived from the incentive rate received by the DNO for the connection.

To avoid disproportionate administrative burden the payment only applies to DG connected at HV or above (>1 kV). DG connected at LV (<1 kV) will be protected by the same standard payments as apply to demand customers (demand customers are currently eligible for a ‘Guaranteed Standard’ payment for an interruption lasting longer than 18 hours during normal conditions).

INNOVATION

Ofgem has a statutory duty to promote efficient investment by companies and is of the view that the network developments necessary to accommodate the growing capacity of DG are most likely to be achieved efficiently if innovative solutions and technologies are employed.

Ofgem therefore considered that it is in customers’ interests for the DNOs to invest appropriate resources in technology development activities and to manage such activities to best practice standards. Ofgem recognises that Research and Development (R&D) funding in DNO opex budgets comes under great internal pressure as companies respond to RPI-X incentives to out-perform the price control.

The Department of Trade and Industry’s (DTI) R&D Scoreboard [2] provides an indication of research and development spending (usually opex) in a range of business sectors. Data available to Ofgem suggested strongly that on average, DNOs are investing significantly less in innovation than broadly comparable companies on the scoreboard.

ADDITIONAL DG INCENTIVES

In order to promote innovation, special regulatory treatment may be appropriate where a DNO is pursuing innovative technologies and connection solutions and is likely to be operating in an environment exposed to higher risks than in its core business. Ofgem has addressed this through the introduction of two additional DG incentives:

Innovation Funding Incentive (IFI) - a mechanism to encourage DNOs to invest in appropriate network R&D activities.

Registered Power Zones (RPZ) - a mechanism to encourage DNOs to develop and demonstrate new and more cost effective technologies for connecting and operating generation on their systems.

Pass-through

In order to encourage efficient expenditure the DNOs are exposed to some of the financial risk in undertaking IFI projects. This is achieved though a percentage pass through; the percentage is reduced going forward to provide a greater incentive for first movers as shown in Table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>05/06</th>
<th>06/07</th>
<th>07/08</th>
<th>08/09</th>
<th>09/10</th>
</tr>
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<tbody>
<tr>
<td>Id</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass-though rate</td>
<td>90%</td>
<td>85%</td>
<td>80%</td>
<td>75%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Unlike the DG incentive the cost of IFI will be recovered from all users of the distribution system (i.e. both demand and generation customers)

Internal costs and carry forward

In order for a DNO to pursue an IFI project successfully the DNO may need to invest a certain level of their internal resources. DNOs will therefore be able to fund internal company expenditure up to a cap of 15% of total IFI funding in each year.

DNO’s will also be able to carry forward up to 50% of the maximum allowable IFI funding for a given year although this will not be cumulative i.e. the carry forward will be for 1 year only.
Progress to date

Ofgem has allowed spending on IFI projects to commence early from October 2004 to maintain momentum. DNOs have indicated to Ofgem an estimate of the number and value of projects likely to be undertaken in this period.

To date (January 2004) all DNOs have indicated a desire to undertake at least 1 IFI project in this period prior to April 2005. In total DNOs have indicated more than 30 potential projects with a total value in excess of £3.5m.

REGISTERED POWER ZONES (RPZs)

RPZ is a mechanism to encourage DNOs to develop and demonstrate new and more cost effective ways of connecting and operating generation on their distribution systems.

Where a DNO can demonstrate that an innovative technical solution could offer material advantages to DG customers compared with conventional solutions the DNO can apply to register the project with Ofgem as an RPZ and an additional financial incentive will be provided.

An RPZ is defined as a network of contiguously connected distribution system assets used to connect DG in an innovative way with potential benefits to DG customers.

Registration

Ofgem will register, though not approve, RPZ projects. An independent panel will be established to confirm, where appropriate, the innovation content and potential benefits of an RPZ proposal. Registration will both establish visibility via websites and ensure DNOs sign on to ‘ground rules’ that provide protection to customers.

Incentive rate

Where a DG connection meets the requirements and is registered as a RPZ with Ofgem the DNO will receive an additional incentive of £3/kW/year (over and above the main DG incentive) for a five year period commencing on the date of commissioning of the project.

The total additional revenue which can be claimed for RPZ projects will be capped at £0.5 million per DNO per year. This corresponds to 167 MW of DG per DNO. DNO’s will also initially be limited to registering only 2 RPZs per year. This is intended to encourage a small number of good quality projects.

As with the DG incentive the cost of RPZs will be recovered from all generators connecting to the distribution system from 1 April 2005 through use of system charges.

Impact on the Generator

The DNO will be required to inform the new generator of the RPZ application, the innovation involved and the risks associated. The DNO will be required to take full responsibility for the management of the risks of the scheme.

IFI AND RPZ REGULATORY IMPACT ASSESSMENT

As part of the policy development for RPZs and IFI Ofgem undertook a Regulatory Impact Assessment (RIA) on the likely costs and benefits of RPZs and IFI [3].

The RIA concluded that the potential value to be derived through innovation is likely to considerably exceed the cost of the IFI and RPZ incentives.

The RIA is supported by an independent assessment of the value of innovation carried out by Mott MacDonald and British Power International [4]. A summary of the key findings relating to costs and benefits are shown in Table 2.

<table>
<thead>
<tr>
<th>Present Value (£m)</th>
<th>RPZ</th>
<th>IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Savings</td>
<td>121</td>
<td>443</td>
</tr>
<tr>
<td>Cost to Customers</td>
<td>29</td>
<td>57</td>
</tr>
<tr>
<td>Net Benefit</td>
<td>92</td>
<td>386</td>
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The present value calculation is based on a discount rate of 6.5% and with a period (life of benefit) between 5 and 40 years depending on the type of asset or technology employed.

GOOD PRACTICE GUIDE

DNOs that wish to pursue IFI and RPZ funded projects will be required to produce and comply with a good practice guide for managing R&D projects. Ofgem requires that there will be open reporting of IFI and RPZ activities, including the intended benefit to consumers.

Currently the DNOs collectively, via the Energy Network Association (ENA), are developing a common good practice guide which all DNOs have indicated a willingness to adopt.

OTHER INITIATIVES

Ofgem is also supporting a number of other industry initiated working groups and projects concerned with DG. Ofgem and the DTI established and co-chair the Distributed Generation Coordinating Group (DGCG). Ofgem is also taking an active interest (and participating where appropriate) in a project initiated by the DGCG to review the technical architecture of distribution systems and consider whether their future roles require new approaches to system design, particularly in respect of communications and control philosophies.

DISTRIBUTED GENERATION COORDINATING GROUP (DGCG)

The DGCG is a group of senior industry representatives whose purpose is to identify and address technical barriers to
the connection of DG. Ofgem and the DTI co-chair the DGCG.

The DGCG provides advice to the Government and the Regulator on the development of generation connected to electricity distribution systems, with a particular view to dismantling any barriers that exist to meeting the Government’s targets regarding renewable energy.

Technical Steering Group (TSG)

The DGCG created a Technical Steering Group (TSG), which draws on a wide range of expertise from the electricity industry and associated organisations. The aim of the TSG is to develop detailed work programmes necessary to meet the objectives set by the DGCG. Its six work streams are addressing a considerable number of technical and commercial issues likely to arise from increased connection of distributed generation. The six TSG workstreams are;

1. Distributed Generation Status and Projections
2. Standardisation of Information and Solutions
3. Short-term Network Solutions
4. Micro-generation Solutions
5. Long-term Network Concepts and Options
6. Industry Skills and Resources

Progress to Date

The progress of the DGCG to date is discussed in its second annual report [5]. The report provides an introduction to the role and the background of the DGCG along with a commentary of the achievements to date of the six TSG workstreams. The third annual report is due to be published in spring 2005. A number of TSG workstream papers and status reports are also publicly available.

TECHNICAL ARCHITECTURE PROJECT

Since liberalisation of the Electricity Supply Industry in the UK many advances in efficiency and productivity have been made. A by-product of this activity has been the new commercial, regulatory and ever more important environmentally aware position of each of the stakeholders. An Institute of Electrical Engineers (IEE) seminar held in November 2003 identified that a possible barrier to large scale adoption of distributed generation could be the lack of joined-up thinking between many of the stakeholders.

As a result a Technical Architecture (TA) Project [6] was initiated by the DGCG. The IEE has been invited by the TSG to lead the project.

The initial task of the TA project is to deliver a report on the current status and the future vision(s) of distribution networks to identify tasks and barriers to get from one to the other. Their work recognises the now fully liberalised structure of the DNOs and will be non-prescriptive, while seeking to identify good practice and provide recommendations helpful to all parties.

Progress to Date

The project has forged links with many National, European and Global stakeholders to provide an environment where duplication of work is minimised and greater sharing of best practice is encouraged. The project aims to reduce wasted effort and increase the successful implementation of innovative projects to deliver safe, economic and environmentally friendly solutions to many of the significant challenges facing the UK distribution networks.

The TA project team (comprising members from across the industry including the key stakeholders) is currently progressing work on the first report to the TSG. In addition a number of open events and seminars have been held to engage industry and ensure that all points of view are captured.

SUMMARY

Ofgem is taking a proactive approach to the regulation of Distribution Networks in Great Britain with the aim of promoting the connection of DG in a cost efficient way that maintains or improves the quality of supply to consumers. The three new initiatives (DG incentive, IFI and RPZs) that have been introduced for the next price control from April 2005 are supported by the industry.

REFERENCES