

PROMOTING INNOVATION IN LIBERALISED ELECTRICITY MARKETS

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ABSTRACT

The paper discusses the barriers to innovation in a liberalised market, the challenges to be overcome and the approach that has been adopted with success in the UK to incentivise innovation and develop 'joined up thinking' across a range of agencies, universities, manufacturers and the distribution network companies.

It draws together the lessons from the first two years of Ofgem's Innovation Funding Incentive for UK Distribution Network Operators and presents practical pointers on the active involvement of all parties from concept developer to end user.

BARRIERS TO INNOVATION IN A LIBERALISED MARKET

The liberalization of the electricity market in Great Britain has delivered many successes. Focusing on the distribution network businesses we find that customer charges for using these networks are some 50% lower than pre-privatisation levels. Supply quality has not been sacrificed to achieve this. Customer minutes lost have reduced by some 20%.

While the GB approach to price control for these monopoly businesses has been very successful in promoting efficiencies in the companies' core activities, it has been observed that this approach has not been conducive to Research, Development and Demonstration (RD&D). In the period leading to the most recent distribution price control review, implemented in April 2005, Ofgem explored the impact of price regulation on R&D activity. Evidence from the Research and Development (R&D) sector revealed dramatic reductions in R&D spending since privatisation.

There are a number of reasons for this. Perhaps the most important is that the benefits of successful R&D investment are realised over long periods of time after the adoption of the innovations it delivers. When a network company knows that the benefits delivered by R&D are likely to be passed on to customers at each price control review, the benefits seen by the company will be significantly reduced making the case for R&D investment much more difficult. This is compounded by the fact that R&D investment is entirely discretionary. There is little or no short-term downside to reducing R&D activities but the revenue saved does have an immediate, positive impact on the company's

financial performance. It is therefore not surprising that R&D comes under pressure in this environment.

CHALLENGES TO BE OVERCOME

Two specific innovation challenges can be identified which are sequential elements in the innovation supply chain.

The first is the initiation and execution of innovation projects. The second, which is perhaps more challenging, is the transfer of R&D successes to commercial adoption.

Regarding R&D initiation, it could be argued that the electricity distribution equipment and service suppliers in this sector should be prepared to bring forward new products without the direct involvement of the companies. This approach clearly increases the risk of developing products and services that do not have sustainable markets, with negative impacts on the manufacturing and service supply companies. Similarly academic research institutions, working in isolation are unlikely to deliver maximum success. It is vital that the customers for these R&D projects, the distribution companies, provide a market pull both for academic research and industrial product development.

The distribution companies can also play a vital role in the second part of the challenge. This is to bridge the gap between successful research and product adoption. Introducing new products into the electricity supply system is more challenging than in many other commercial environments. Distribution companies prioritise network performance and will naturally gravitate toward tried and tested products and solutions. Creative ways need to be found that allow new equipment and techniques to be brought into operation with the minimum risk to the safety and integrity of the system. Co-operation between all involved parties is essential.

GB APPROACH

The approach developed, through consultation, by Ofgem has been well reported elsewhere¹ and so is only briefly summarized here. Two incentives have been introduced; the Innovation Funding Incentive (IFI) and Registered Power Zones (RPZ). The IFI is focused on the first of the challenges above - initiating R&D activity. It allows the GB distribution companies to spend up to 0.5% of their regulated turnover on R&D projects and pass 80% of the cost to their customers. The projects initiated are reported

in the public domain. The most recent reports are available on Ofgem's website².

The RPZ initiative relates more closely to the challenge of adoption but focuses on innovation in the connection of generation to distribution networks. It effectively allows a distribution company to earn a premium rate of return on its investment in a new connection if it can demonstrate a significant level of innovation. Four such projects have now been initiated.

Ofgem has recently carried out a consultation to gauge how well these initiatives are working. It is expected that our conclusions from this process will be published in the Spring.

LESSONS LEARNT FROM IFI

The objectives of the IFI scheme are to be a mechanism to encourage distribution network operators (DNOs) to invest in appropriate technical research and development so as to deliver benefits to consumers. In these circumstances it is pleasing to note that the scheme has already had a significant impact of the level of innovation activity amongst the DNOs with over a hundred separate projects and a more than doubling of the level of R&D intensity.

However this degree of activity masks a wide range in the level of IFI engagement across the DNO companies both in

the spread of research intensity and the degree to which companies have undertaken innovation on their own or with partners other than DNOs.

The DNOs' annual reports also indicate that there is a wide range of benefits estimated for the projects initiated so far. Overall this amounts to a net present value in excess of £40m being forecast for less than £7m invested.

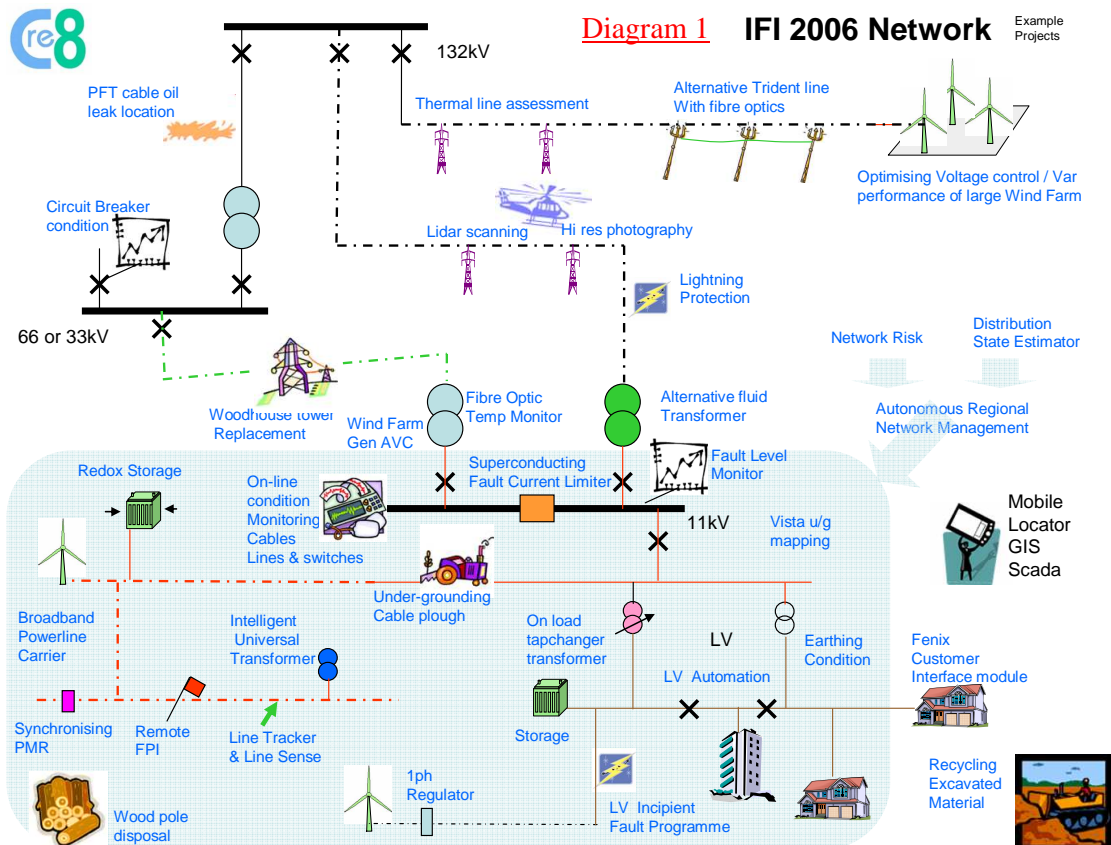
Diagram 1 attempts to summarise the broad range of over 100 individual separate projects that have been reported if they were all to be deployed on a typical UK network

Whilst some are truly adventurous and ground breaking, many are, as intended, focused on demonstrating the suitability and benefits of existing advances which have been proven elsewhere.

It remains early days for the IFI so it is perhaps not surprising that many of the more adventurous ideas from the international scene and academia have yet to find their way into the IFI reports.

EVALUATION OF BENEFITS

In order to assist the distribution companies in managing their R&D activities, Ofgem required them to develop a good practice guide. The companies decided to produce a common guide and this is available free of charge³. This guide does address the issue of the evaluation of benefits.



The guide proposes that an estimate should be made of the Net Present Value of an R&D project taking account of its costs and the benefits that it is expected to deliver. It suggests that simple methods are used to factor in the probability of success and the duration of the benefits.

Experience has shown that capturing benefits in this way has limitations and for some R&D investments it is more difficult than others. This is one of the issues explored in a recent Ofgem consultation. Several ideas have been put forward to help improve the techniques for benefit assessment. In particular, it has been proposed that a 'scorecard' approach might prove more helpful, bringing together financial and non-financial benefits such as safety and environmental improvement. A number of EU funded projects have recently reported on the evaluation of benefits and the benefits of clustering resources⁴.

One notable feature of the projects reported to date is that there are many smaller projects with comparatively limited benefits being claimed. This may, in part, be due to the uncertainty in the early phases of projects of the associated costs and benefits for potential degrees of implementation, and caution as to the degree to which benefits may be realisable for commercial and regulatory reasons.

COLLABORATIVE PROJECTS

As could be expected the analysis of IFI projects also shows that most of the declared benefits appear to be coming from a few, generally larger and more adventurous and generally collaborative projects. Further concentration of resources on selected projects with major benefits can perhaps be expected as an initial bow-wave of small but high benefit/cost ratio projects are completed.

It is equally clear that a balanced portfolio of short, medium and long term projects of a variety of sizes is necessary in order to ensure that a continuous stream of valuable innovation projects are ready for test and deployment in years to come and this requires joined up thinking and funding between long term "blue sky" research at universities and research centres with practical outworking through manufacturers and network companies.

Two of the most outstanding and longstanding conclusions of innovation research are:

1. Innovations need product champions – senior figures who will fight for resources to be devoted to the innovation, even if it is still in its early stages and a way from showing any profitable returns, and especially when an organisation is facing serious short-term challenges that focus management attention
2. Successful innovations are intimately linked to user requirements: the innovator must have some way of understanding these requirements (perhaps from being a

prime user personally by continuous involvement with user communities, or through market research).

TEN PRACTICAL POINTERS FOR SUCCESS

- 1) Innovation is not a linear activity; recognise that it is organic and requires vision; identify and cultivate (not too many) visionaries in your team.
- 2) Innovation requires your best people to be the project champions and act as the interface points to the external innovation chain. If this is going to be your limiting factor consider pre-emptive action.
- 3) Innovation does not need to be top of the senior management agenda, but it needs to feature on it.
- 4) Tightly structured investment decision processes are very effective disciplines for normal business – but not for innovation. Find ways to cut a little slack or you may stifle success at source.
- 5) Learn from other's success– they are usually keen to share them through journals, papers and conferences.
- 6) Learn from other people's problems – you won't read about these and they can only be gleaned by effective professional engagement.
- 7) Innovation is a contact sport, it can't be done at arm's length!
- 8) Attend to the Intellectual Property; who will retain it; don't own patents unless you really need to – find simpler ways of sharing in the value created. Correct IIP ownership is a powerful incentive.
- 9) If you want to convince another party, speak in their language. Ensure you have a properly costed business case for the finance director, however 'obvious' the engineering benefits. Include R&D tax benefits.
- 10) Just occasionally, it may be necessary for Government or Regulator to mandate change by means of legislation, licences or regulations.

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