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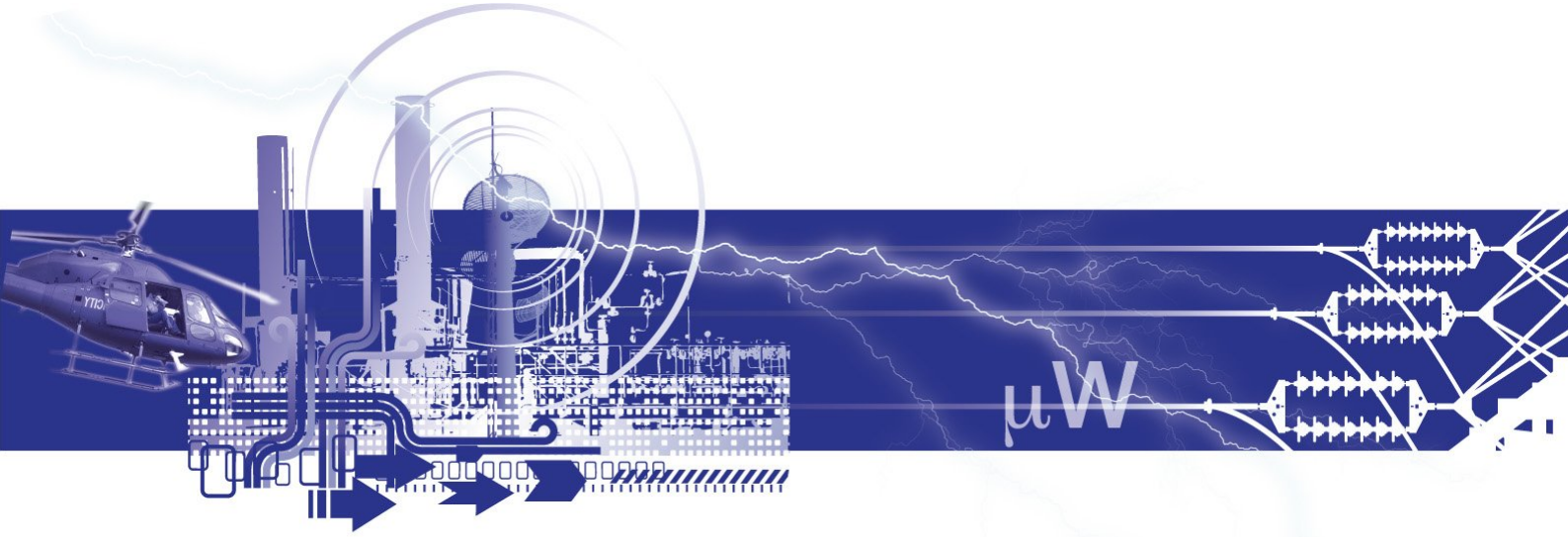

Electricity DPCR5 Policy Paper

EA Technology's Submission to Ofgem's Consultation

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February 2009

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2007

Electricity DPCR5 Policy Paper

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1 Executive Summary

EA Technology is one of the UK's leading power asset management companies, based at Capenhurst, near Chester. The business has evolved and developed over the past 40 years to its present status of an independent limited company, working on behalf of clients in the electricity, energy, infra-structural and associated sectors. EA Technology provides a wide range of specialist services to the Distribution Network Operators and network users in the UK and overseas, as well as coordinating a number of specialist technical forums for network engineers. We would therefore highlight the following considerations and recommendations in the development of the fifth Distribution Price Control Review.

i). Inclusion of Environment as a key driver
We welcome the addition of the Environment as a key driver for the DNO's performance, alongside the traditional focus on customer service and network performance. Many of the national strategies proposed and developed over recent years are likely to impact significantly on 'business as usual' for network operations. It is therefore vital that the DNOs are part of this dialogue and the incentives support and encourage the development of best practice in this area.

ii). Moving through Uncertainty
There is undoubtedly a great deal of uncertainty about what may be required of the networks of the future. We recognise the challenge of making investment decisions during the five-year period covered by DPCR5, without knowing what the future may hold. Flexibility in network operation and an increased use of non-network and commercial solutions are likely to prove essential in allowing the DNOs to delay or defer that investment until they are in a better position to 'future-proof' their decisions. The introduction of the Innovation Funding Incentive in DPCR4 has encouraged the DNOs to develop more innovative solutions and we welcome its continuation into DPCR5.

iii). Broader use of 'Totex'
In order for the DNOs to consider a wide range of measures, we see the use of 'Totex', rather than the traditional distinction between Capex and Opex, as being preferable. The Totex approach has the benefit of simplicity and provides DNOs with more freedom to develop different business strategies and for best practice to emerge.

iv). Use of Output Measures
We welcome the use of Output Measures as an objective assessment of the performance of the DNOs. We believe that these measures are better indicators of effective management of networks than CIs or CMLs, which are lagging indicators of network performance. Correctly selected output measures should establish a clear framework for DNOs to demonstrate how they operate their networks. There are a few areas, such as technical losses, where we would suggest that input measures need to be used for this price control period, in order to provide the information to set relevant output measures for subsequent periods. Given that losses comprise approximately 98% of the proposed Business Carbon Footprint measure, we would recommend that losses are distinguished from other factors to be included in any environmental output measures, in order for all the actions being taken by the DNOs to reduce their environmental impact to be recognised.

2 EA Technology

EA Technology is one of the UK's leading power asset management companies, based at Capenhurst, near Chester. Its origins date back to the mid-1960s, when it was established as the UK Electricity Industry's Research and Development arm. The business has since evolved and developed to its present status of an independent limited company, working on behalf of clients in the electricity, energy, infra-structural and associated sectors.

EA Technology provides a wide range of specialist services to the Distribution Network Operators and network users in the UK and overseas, including surveying and monitoring of asset condition; consultancy services on strategic asset management for ageing networks; failure investigation and analytical services, and supply of specialised instrumentation for condition assessment and fault location for cables and switchgear. We also coordinate a number of forums which the DNOs participate in, enabling them to develop common approaches to tackling shared projects and to learn from each other's best practice.

EA Technology welcomes OFGEM's consultation on its latest Policy Paper as part of the DPCR5 process and is pleased to provide its response in the following pages.

3 Responses to the Consultation's Chapters and Specific Questions

EA Technology routinely works with a wide range of stakeholders, within the electricity industry and wider energy sector. We therefore fully appreciate the size and the complexity of the task facing OFGEM in setting this the fifth Distribution Price Control Review (DPCR). The task is further complicated by the range of drivers on OFGEM, the consequences of the current economic climate and the current uncertainty as to what the next few years may require from the distribution networks. That said, we fully support OFGEM's decision to focus on three key themes: Environment, Customers and Networks. We believe that this is both in keeping with OFGEM's longstanding commitment to champion the interests of customers and to seek continuous improvements in performance, as well as formally setting out the role that the DNOs will need to play as part of a national, and global, resolve to tackling environmental issues

EA Technology's responses to the chapters of the consultation document and to the specific questions raised by the consultation are provided in the following pages. Our response takes the form of a combination of direct responses to some of the specific questions posed by Ofgem as part of their consultation process, along with a broader discussion of some of the topics contained within the chapters, which we believe would benefit from further comment. We have targeted our response to those areas where we are qualified to contribute and have therefore not responded to those questions outside our expertise.

3.1 Chapter 1: Introduction and Overview

Throughout DPCR4 (and earlier price control reviews), EA Technology has worked with many of the UK DNOs. We would suggest that DPCR5 is a departure from some of approaches taken in previous price controls and that this should be welcomed. We see the use of output measures as beneficial in establishing a clear framework for DNOs to demonstrate how they operate their networks.

The use of output measures that are designed around the conditions facing each specific network are definitely preferable to more generic measures, as they provide an opportunity for each DNO to demonstrate how they are tackling the specific challenges they are facing. The challenges faced in the operation of the networks vary significantly across the country and as a consequence the networks are not directly comparable. Whilst there is still a role for some generic measures such as CIs and CMLs, the widespread use of generic measures could run the risk of benefitting some and penalising others, dependent on the nature of each network, and would therefore generally seem inappropriate in most areas.

We agree that there is significant uncertainty around the role of the networks as we move towards a low carbon future. The importance of DNOs working with other stakeholders to consider the impact of proposals on the electricity networks is likely to be critical and we looking forward to continuing our dialogue with the industry to support the development of the national policies for the next phase of the energy sector's evolution.

We appreciate OFGEM's efforts to engage with all stakeholders as part of the DPCR5 process. We have found the workshops to be a particularly useful forum to both put across our views and to hear the views of other stakeholders; and to discuss first hand the process and objectives with the OFGEM team.

Q1: Do you agree with our assessment of how the DPCR4 settlement has performed in practice?
We understand the concern expressed by OFGEM that the lack of output measures makes it difficult to assess performance, particularly where DNOs have under spent. DPCR4 has been effective in stimulating significant and much needed capital investment in networks. We appreciate the need for DNOs and their shareholders, along with OFGEM and other stakeholders, to be able to assess whether or not such investment is targeted effectively. Output measures have the potential to provide for an objective measure of each network operator's performance to enable all relevant parties to carry out their own assessment.

A concern has been expressed that, at times, the settlement may have inadvertently incentivised DNOs to spend in ways that were not necessarily efficient, through the treatment of capex and opex. Given the expectation included in the policy paper that DNOs will need to give greater consideration to non-network solutions in the next price control period, we would suggest that this distinction needs to be carefully considered and discuss our suggestions further in response to chapter 4, question 5.

However, in terms of innovation, during the course of DPCR4, we have seen a marked improvement in the DNOs approach to network development. The Innovation Funding Incentive (IFI) has helped to both unlock latent talent and to focus minds on delivering improved performance across a range of technical areas. DNOs are willing to collaborate when necessary or go it alone if necessary to pursue initiatives. The IFI is setting the conditions for developing networks fit for the 21st century. The long lifetime of network assets (40 years plus) means that significant changes will not happen within the course of a single price review. The real benefits of IFI could still be some 10 – 20 years away, as networks become more active and customers start to play an increasing role in the way networks are designed and operated. It is therefore important not to lose the momentum gained during the DPCR4 period, but to instead build on it in the next price control review period.

Q2: Do you agree with the main lessons we have drawn from this assessment?
EA Technology would suggest that the lessons to be learnt from DPCR 4 are that DPCR5 should promote effective investment and efficient spend, taking into account the uncertainties facing the networks and the economic climate. We would therefore support the use of a Totex approach to expenditure, rather than a separation of Capex and Opex, and discuss this in more detail in relation to chapter 4, question 5. The use of Totex could promote more effective asset management, as well as facilitating the use of DSM and other non network solutions.

Such non network or commercial solutions are likely to become increasingly more important as DNOs attempt to manage the uncertainty with regard to the role of the networks in the future and may allow DNOs to delay or defer infrastructure investment until they can better assess the needs their networks may face. We would suggest that the DNOs and wider stakeholders would benefit from some clearer guidance as to what commercial and non-network solutions OFGEM believes it is appropriate for the DNOs to be considering. This is particularly important if OFGEM anticipates greater interactions between the DNOs and demand customers, as these have tended to be the domain of the supply companies, or if a change in the licence conditions will be required to facilitate certain solutions.

The IFI has been very successful in encouraging the DNOs to begin to face some of the challenges that the next few years are likely to bring and we would definitely recommend that this focus on innovation be carried forward.

Q3: Have we identified appropriate measures to address our concerns and deliver a settlement that provides better rewards/penalties for highly performing/poorly performing companies?
We recognise the difficulties that OFGEM has had in assessing which have been the best performing companies with the most efficient and well targeted investment. Network assets have long lifetimes, many times greater than a regulatory review period. Many of the measures used, such as CIs and CMLs, can only provide a lagging indicator of a network's health.

We therefore support OFGEM's intention to define and measure output measures which are closely coupled to the actual long-term performance of a network operator. We suggest that each of the output measures should be explicitly linked to the published objectives and statutory obligations of OFGEM and the Authority, perhaps by means of a diagram, to demonstrate how these measures help Ofgem and the Authority achieve their objectives.

It may also be useful to discuss with the DNOs whether it would be helpful for DNOs to explicitly link the output measures to their published business objectives. This could assist in achieving alignment of interest and result in DNOs gaining value from using these output measures.

3.2 Chapter 2: Environment

DPCR5's focus on the environmental impact of network operations reflects the broader national impetus in this area that saw the establishment of the Department of Energy and Climate Change last year, for example. There are a large number of national policies and strategies that have either been consulted on or are still out for consultation in this area. Many of these will impact on 'business as usual' for the distribution networks and we believe there are many opportunities for the DNOs to engage with these policies, although these will then have consequences for the way in which the networks are managed and operated. OFGEM highlighting this area as of similar importance to customer service and network performance emphasises how the environment has moved up the agenda since the last price control review. We strongly believe that the DNOs can, and should, be active participants in national measures to minimise the environmental impact of our energy usage.

Q1: Do you agree with our view of future uncertainties and the need for DNOs to change their way of working and thinking to encompass innovation and flexibility?
EA Technology fully agrees with OFGEM's assessment of uncertainty, as stated in 2.10. We would suggest that many of the national consultations to date have failed to consider how the distribution networks will need to evolve in order for national targets to be achieved and understand the concern about investment into assets that could become stranded as part of the move to a low carbon future. Recognising the uncertainties is the first step towards understanding the risks that DNOs might face when designing networks to be capable of becoming more active over time.

We fully believe that there is an appetite within the DNOs to design and build networks that can accommodate environmental requirements. We therefore welcome OFGEM's suggestion that the DNOs be able to use a wider range of commercial arrangements and non network solutions, such as DSM and energy storage. To move the process forward, we would suggest that it is vital that OFGEM devise suitable incentives that will encourage DNOs to take bold steps to develop and trial new equipment, network configurations and commercial arrangements. Whilst on the face of it, these may appear overly complex for current network requirements, they could be justified in 10, or more years time. The move

from existing, largely passive arrangements for managing the distribution networks to a more active approach is likely to require some radical approaches. The DNOs are appropriately risk averse, focusing on ensuring the security of their networks so, without appropriate incentives, the risk is likely to be too high for them to take such bold steps.

Whilst the DNOs can play a part in tackling climate change associated with the operation of their networks and facilitating low carbon technologies, they are not the only contributor. EA Technology would therefore propose that to maximise the prospect of spending money effectively, it will be necessary for there to be a high level of stakeholder coordination and cooperation. For a number of years now, we have supported the DNOs and other stakeholders during their participation in working groups and other initiatives aimed at easing the process of connecting more distributed generation, improving network performance and reducing losses. During this time, it has become clear that there is no simple answer to defining what the networks will need to look like by 2050 (or any other long term horizon). The LENS work has been helpful in this regard, however it is a high level approach and cannot be considered a replacement for scenario planning by individual DNOs as to the particular challenges that they anticipate their networks facing in a similar timeframe.

We do not believe that there will be a single answer 'one size fits all' solution. Some networks might need to change very little, whereas others might need to undergo much more radical change. The drivers for change will be as much the requirements of local customers as other stakeholders. We would therefore emphasise the need for routine engagement between all the key players, if they are to develop a common vision on what is to be achieved and how.

Q2: What are your views on our proposals for DNOs to provide more information to help low carbon initiatives and have we adequately identified and defined the information requirements?

EA Technology would suggest that there is already a lot of information available in the public domain. We do believe that not all of this is being used or accessed, which would suggest that there could be benefit in a duty on the holders of this information to make its availability more well known or to improve accessibility. We would also suggest that different customers require different types of information. Small scale generators, for example, are likely to be satisfied by the generic approach set out in ER G83/1, whilst developers of larger schemes will require more bespoke information and bilateral discussions with the DNOs.

Our recommendation would therefore be that the DNOs should be incentivised to actively engage with low carbon initiatives, rather than to provide information per se. This would encourage them to consider the likely information needs of different customer types and to respond accordingly.

Q3: Do you agree with our proposal that all distributed generation should pay use of system charges, and if not, can you provide evidence to substantiate your specific concerns?

We support the proposal for new DG connections to pay use of system charges. With an increase in the proportion of electricity coming from DG, we believe that it is right that it should not be unfairly subsidised by avoidance of GDUoS charging. However, we believe that the use of GDUoS should be proportionate and fair and that OFGEM must take care not to burden historic DG with GDUoS charges that they had not budgeted for at the time of connection. Therefore, OFGEM might have to accept that DG connected before 1 Apr 05 are given grandfather rights so they do not pay GDUoS.

Similarly, we would also suggest that GDUoS be linked to the impact on the system so DG that is consumed locally or provides support to the network is perhaps charged at a lower rate. Whilst we recognise the work that OFGEM has done recently in looking at creating a

common charging methodology, we would suggest that one alternative commercial arrangements that some DNOs may wish to consider is the use of Time Of Use related charging. This could be applied to both generation and load customers and could offer an alternative approach to managing overloaded or constrained areas of the network.

Q 4(a): Do you agree that the distributed generation (DG) incentive should be retained?
The DG incentive, introduced as part of DPCR4, has been beneficial in covering the costs incurred by DNOs in processing an increasing number of connection requests for DG and establishing the necessarily connections for DG. We therefore believe it should be retained, as these costs are likely to increase over the DPCR5 period. We would suggest, however, that this is not a true incentive and that, if OFGEM wishes it to be used as such, it needs to be developed further in order to achieve that purpose.

Q5: What are your views on our proposals on innovation and flexibility? How would you rate their feasibility and which option is most likely to drive the more innovative and flexible behaviour that we are seeking?
We support OFGEM's view that there is a need to encourage DNOs to adopt innovative technical and commercial solutions which encourage the development of flexible networks. However, these solutions are likely to require a larger initial investment, which may not be justified by changes during the price control period in which the investment occurred. The creation of a "generator friendly" network, for example, with an overall lower cost of connection for a number of generators, may only have one or a few actual connections during the period. The value of the additional cost of that asset over and above conventional practice would therefore not be realised during the price control period and, without special treatment, would be regarded as inefficient spend. We recognise that the RPZ concept in DPCR4 was designed to address this but to date, unfortunately, there have been few RPZs registered.

The IFI, however, has been successful in stimulating DNOs to develop more innovative technical solutions. However, due to the long lifetime of assets, significant changes cannot be expected during a single price review. We welcome OFGEMs recognition of this and its commitment to continue the IFI through DPCR5.

A number of projects are evaluating technology on the network and adoption of these technologies will hopefully follow. We are not however aware of any projects demonstrating high cost network equipment that could deliver benefits over conventional assets. We therefore support OFGEM's intention to develop an incentive framework which will stimulate demonstration and deployment of more radical solutions. As discussed above, the long-run value of such a solution may not be realised over one price control period and it therefore may be difficult to judge the success or otherwise of such a solution at the end of one price control period.

It should also be recognised that, quite appropriately, DNOs are by nature risk averse. Each DNO has a duty to maintain a high level of network security and network performance. It is in no-one's interest for DNOs to gamble with strategies that have a high risk of significant deterioration in network security and performance, even if these could possibly lead to long term benefit. However, it is this very driver that has resulted in the low numbers of RPZs, and this is recognised in the Policy Document.

In our opinion, it is important to recognise that the risk associated with demonstrating an innovative solution is greater than the risk associated with adopting the solution. Successful demonstrations will significantly reduce uncertainties (or at least bound them) and therefore reduce the risk associated with the solution before adoption is considered. It should also be noted, that in order for a new technology to be considered ready for adoption, it is likely to

have needed to be demonstrated in a range of circumstances and that a single demonstration project for any one technology is unlikely to result in complete confidence in the technology.

We believe that the risk of demonstrating an innovation solution should be bounded (in terms of network segment), as is the case for RPZs. We believe that it should be possible for the DNO to justify an increased cost of an innovative solution over a conventional solution, where the cost increase is necessary to mitigate the risks introduced by the innovative solution.

We assume that the proposed options for incentivising DNOs to adopt innovative solutions would be applied after the technology has been demonstrated.

Our opinions on the proposed options are as follows:
Option 1: Ex-Ante project funding is most likely to result in DNOs adopting, because it has lowest risk for the DNO. However, practically it will be difficult for DNOs to submit well considered proposals by August, covering all innovative activities during the DPCR5 period. Any such proposals are likely to require review and reconsideration during the price control period and hence in reality option 1 is likely to migrate to become option 2.

Option 2: Project by project funding during DPCR5 has the benefit of a longer timescale for development and assessment of proposals and would give DNOs confidence at the point of committing to a project, because the risks and potential rewards are defined. Decision making would fit more readily into the normal business processes of DNOs. A disadvantage is that OFGEM will have to "approve" the projects, in a similar process to that used for RPZs.

Option 3: This option places the largest level of risk on the DNO of all of the options. The incentive in the event of success will need to be very attractive to induce DNOs to change their normal treatment of unknown risks. There are a number of possible adverse outcomes with this incentive:

1) The risks are considered too great by the DNO for the rewards offered, so the incentive fails
2) Successful adoptions and the large rewards associated with these successful adoptions are publicised, whilst the projects that failed are not noticed by the media. Ofgem could then be subject to publically criticism for overly rewarding the DNOs.
3) The innovative solution cannot demonstrate sufficient value over the price control period, although subsequently it does deliver significant value.
4) There is too much uncertainty at the end of the price control period to judge whether or not an innovative solution has increased network flexibility and delivered value.

Therefore, for option 3 to work OFGEM would need to propose and agree with the DNOs a fair and representative metric for increased network flexibility. It is unlikely that this will be agreed before the start of the next price review period. Therefore we favour option 2 although discussions related to option 3 should continue throughout DPCR5 period, informed by the outcome of projects during DPCR5.

Q 7: What are your views on our losses proposals, and do you have any additional comments on the option to install smart meters on low voltage substations?
We are supportive of the *DNO Proposal* (for reducing losses) presented in the policy paper, since we believe that this is the most cost effective way of incentivising DNOs to take immediate action to employ equipment that is guaranteed to reduce network losses. We understand, but do not share, OFGEM's concerns over the potential risks associated with introducing an input based incentive. We believe that it should be possible for OFGEM to devise an incentive scheme that is similar to IFI, i.e. a scheme that is financially capped at a certain percentage of a DNOs revenue and is made available on a 'use it or lose it' basis;

and where OFGEM impose a qualitative criteria for what is (or is not) an acceptable loss reducing solution. If such an incentive were to be introduced we feel confident that the DNOs would actively pursue the most cost effective solutions for reducing network losses. Such a scheme, operated on an input measures basis for DPCR5, could allow both OFGEM and the DNOs the opportunity to better understand how an output measure could be used in future price control reviews.

We would also recommend that further work be carried out over the DPCR5 period to evaluate the impact of the settlement system on the losses reported by the DNOs. We would suggest that the problems highlighted by OFGEM are symptomatic of some more fundamental problems with the existing settlement arrangements. Given the changes that are currently happening in the industry as a whole, such as the anticipated roll-out of smart meters to all customers, we would suggest that it might be an appropriate time to review the settlement systems and to consider whether any changes could be made to the existing arrangements that would allow it to evolve to meet the changing needs of the industry.

With regard to the proposal to install smart meters on low voltage substations, we understand some of the concerns expressed by some of the DNOs and would welcome further studies to explore the feasibility of this option.

Q8: What are your views on the various aspects of the business carbon footprint proposals?

The business carbon footprint (BCF) proposals appear to be sensible and we welcome the proposals to recognise the actions being taken by the DNOs to minimise their environmental impact. We do, however, have a few reservations as to approach proposed. Monitoring and reporting schemes, for example, do not deliver direct value. The value of such schemes is the changes in behaviour which are stimulated as a consequence of the exercise, which lead to improvements in the area which is monitored.

Without doubt, the biggest opportunity for DNOs to contribute towards a reduction in carbon emissions is by reducing network losses. Since losses comprise 98% of the BCF, initiatives to reduce losses will have a proportionally greater effect on the BCF than any other initiatives and we would therefore question whether the value of detailed reporting in the other areas (in terms of reduction of BCF) warrants the additional costs incurred.

In order for DNOs to comply with OFGEM's requirement to apply "proportionate effort and focus", it seems appropriate that any efforts by DNOs to reduce their carbon footprint must focus primarily on initiatives aimed at reducing network losses. Similarly, a focus exclusively on annual carbon footprint reporting may artificially incentivise short-term measures to reduce CO_2 (e.g. reducing the use of vehicles) over more sustainable long-term solutions (such as increased use of automation or a policy to specify low-loss transformers) whose benefits will accumulate over many decades.

EA Technology would suggest that the greatest value from the proposed detailed reporting is in demonstrating to Government and the public the commitment that DNOs and OFGEM have towards reduction of carbon footprint. Green initiatives, such as "improving the energy efficiency of buildings and vehicles" are valuable and have the potential to promote a holistic approach towards tackling climate change and we support recognition of the efforts being taken by the DNOs to reduce the environmental impact of their activities. We would therefore propose that these initiatives are treated and incentivised separately from losses (and improvements in losses), with a slightly different reporting regime for losses to better captures the long-term benefits of measures taken to reduce these. The proxies for carbon emissions which have been selected for reporting should be readily available and not result in too great an additional overhead. Since emissions by contractors working on behalf of DNOs is a fraction of the 2% of the BCF, we would propose that it is not appropriate to

require reporting of this contribution to BCF as the costs of collecting and validating the data are likely to significant outweigh the value of the additional information.

There is a risk that highlighting the BCF may promote its importance against other environmental and wider sustainability issues and might result in decisions by DNOs which act against these wider issues. One of the projects of the Electricity Network Strategy Group has developed a toolkit, which is intended to assist network operators identify social, environmental and economic value in network design and operation. The toolkit was developed with the help of a wide range of stakeholders in the electricity distribution industry and was funded by BERR. We would therefore recommend that the use of this toolkit is promoted, in addition to the BCF, as it considers a wider range of environmental and sustainability issues.

Q10: Do you agree with our proposed approach for the treatment of fluid filled cables?
EA Technology agrees with the concerns expressed by OFGEM as to potential for environmental damage from the leakage of the oil presently used in fluid filled cables and understand the drive to address this risk. We would also direct OFGEM to the ENA Engineering Technical Report 135 (ETR 135), developed by the DNOs through the ENA, this document describes the management of fluid filled cables.

We are concerned that the requirement to report leak incidents may inadvertently create a disincentive to proactively locating and identifying leaks. In terms of reporting, it may be more beneficial for the DNOs to report on the overall oil lost on their fluid filled cable networks (i.e. Total Oil Leakage = Total Oil Added To Network – Total Oil Accounted For Or Removed). This would enable the actual leak rate to be monitored and provide an added incentive to locate and rectify leaks.

3.3 Chapter 3: Customers

EA Technology would suggest that improving services to customers depends on both measures to improve interactions with customers and ensuring optimal network performance. Of these two factors, we are best qualified to comment on the latter. We have therefore directed our attention to the chapter considering the operation of the Networks.

Q7: Do you agree with the proposed focus on worst served customers and which of the options do you prefer?
We agree that incentives to improve the experience of worst served customers should be aimed at delivering improvements in network performance through investment in the network. However, we believe that it is not appropriate to ignore aggregated customer duration. EA Technology is working with DNOs to produce innovative automatic restoration systems, for both LV and HV circuits, which have the potential to significantly reduce restoration times for reasonable cost. If the projects are technically successful then the technologies would be available for deployment during the DPCR5 period.

3.4 Chapter 4: Networks

Q1: Have we identified the right behaviours for DNOs? Are there others which should be included?
We broadly agree with the behaviours that OFGEM wishes to stimulate by the price control. We are encouraged that the importance of whole life costing is recognised, and discuss this further in our response to question 5. We hope that the incentives will be strong enough to change the current typical procurement behaviour of DNOs, to purchase at the lowest possible price, which has been strongly driven by previous price controls. We have reason to believe that driving the lowest possible price from suppliers has resulted in some newly installed networks assets having a higher failure rate than older assets of a similar type, even though both groups of assets nominally meet the same specifications.

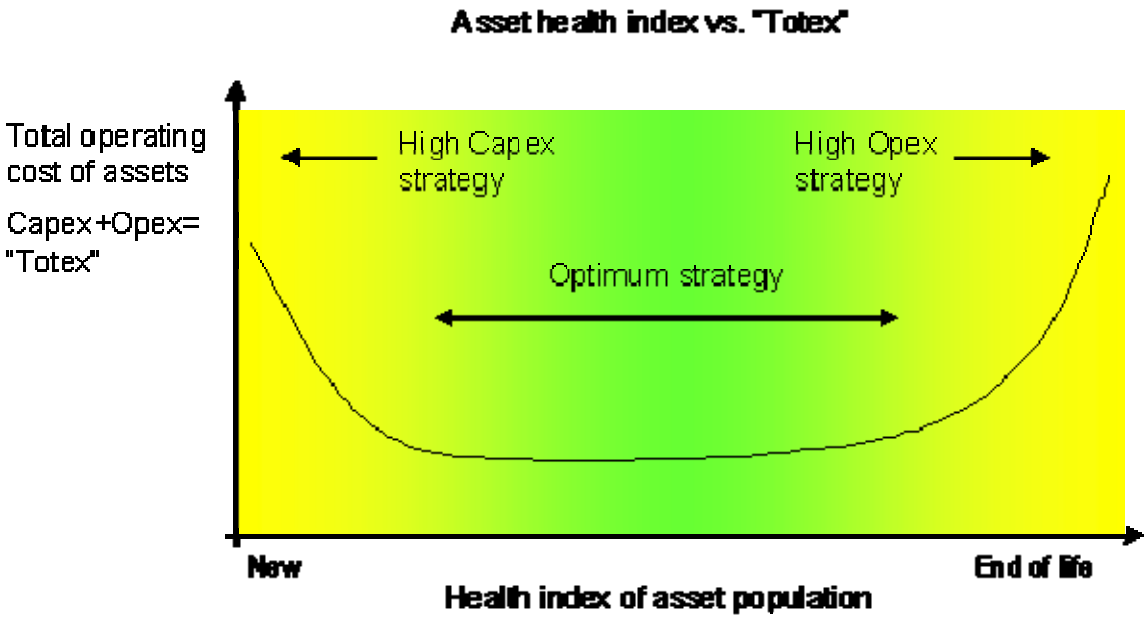
One behaviour which is not explicitly recognised, although it is discussed elsewhere in the document, is the need to create sufficient flexibility in the network to be able to accommodate future changes in requirements for the networks, rather than having to replace network assets before the end of their economic life, because of inflexibility in network design. We would suggest that this should be included and supported, especially given the uncertainties highlighted in previous chapters.

Q 5: Should we be looking to equalise incentives for opex and capex? If so, what approach should we adopt?
There is reasonable evidence that the current incentives cause DNOs to prefer solutions which require capex over those which require opex. In principle, this could lead to replacement of assets rather than interventions which improve the condition of the asset and lower its probability of failure. In addition, there is currently a greater motivation to reinforce circuits rather than explore more innovative operating or commercial arrangements (such as the use of DSM).

Therefore, we welcome proposals to equalize incentives. Continuing with Capex and Opex but capitalising different percentages of expenditure into the RAV would provide a powerful tool which OFGEM could use to fine tune the behaviour of the DNOs. However, it would complicate the framework and the consequence may be that OFGEM is coming close to defining the business strategy for all the DNOs and thereby reducing the opportunity for innovations by one or more companies which could lead to increases in efficiency and/or effectiveness.

The Totex approach, where costs for all activities are treated the same way and the same percentage of all costs are capitalised into the RAV, has the benefit of simplicity and provides DNOs with more freedom to develop different business strategies which will identify best practice. It is therefore necessary to define a framework which enables best practice to be identified.

The health index of an asset or collection of assets has a direct bearing on the overall “cost” of the asset. When an asset is new, this cost is associated with capital expenditure. The asset then enters a relatively low-cost phase during which it normally remains reliable. Eventually, the asset ages to the point where additional intervention (e.g. intrusive maintenance or condition monitoring) becomes essential to maintain reliability. An appropriate inspection or monitoring regime is required to identify this point. At this point, operational costs begin to rise until it becomes cost effective to replace the asset once more. This relationship is shown in the following diagram:



It is clear from the above that a regime which significantly favours capital expenditure over operational expenditure will tend to drive the curve to the left, resulting in "newer" assets overall. If the existing asset population is far to the right, then this approach will drive the asset population towards the middle of the curve and serve to lower overall costs. However, if operational expenditure is excessively penalised, it is possible for the curve to move so far to the left that overall costs begin to rise. We would therefore suggest that it is important that any regime which has incentives for Opex and Capex recognises the limitations of this approach, and seeks to incentivise behaviour which promotes "lowest overall cost". In addition, care needs to be taken in setting the percentage of capex and opex which is taken into the RAV; while such an approach may specify a sub-optimal for individual activities, if correctly applied this will drive behaviour towards best practice.

Q8: Do you agree with our proposed approach to assessing network operating costs and indirect costs?

As stated above, EA Technology recognises the difficulties that OFGEM has had in assessing which have been the best performing companies with the most efficient and well targeted investment. Network assets have long lifetimes, many times greater than a regulatory review period. Many of the measures used, such as CIs and CMLs, can only provide a lagging indicator of a network's health.

Network performance indicators today depend not only on investment and activities today, but are also strongly dependent on the past asset management activities which can have occurred over many years. Capital investment is only one aspect of these asset management activities. Similarly, network performance in the future is dependent upon asset management activities now. It is possible that investment at levels lower than the regulated allowance is efficient in the longer term, provided that greater understanding enables avoidance of unnecessary spending. It is also possible that investment at levels lower than the regulated allowance is inefficient, because it leads to a deterioration of the asset base resulting in either increased spending or reduced network performance in the future.

Without a detailed understanding of the health of the asset base, it is impossible to asses whether any given level of investment has improved, maintained, or has resulted in deterioration of the overall health of the assets.

We therefore support OFGEM's intention to define and measure output measures which are closely coupled to the actual long-term performance of a network operator. EA Technology has been working with a number of UK DNOs to define output measures and to develop techniques to robustly measure health, criticality and hence the risk associated with network assets, to enable these network operators to optimise their non-load related investment.

Non-load related investment is now much better understood, and rigorous, auditable processes are available to ensure optimum non-load related investment, including calculation of the risk which is represented by the health and criticality of the asset population. In contrast, load–related investment is not so well understood and is subject to a number of external drivers, outside of DNO control, which are more difficult to forecast. This area remains a challenge which EA Technology is working on.

EA Technology believes that DNOs and OFGEM should have an aspirational goal of reporting a representative risk metric as an output measure for each area of investment, where this risk metric is on a common scale, so that the value of investments in each area can be equitably compared. Therefore we strongly support OFGEM's proposal for a composite risk measure for load-related spend and we would like to see reporting against similar output measures in each area.

Our comments and suggestions regarding specific output measures are as follows:

Overall Customer Performance:

- We agree that number and duration of interruptions remains a useful measure of current performance of the network, however it is a lagging indicator of the health of the network. A useful additional indicator would be the predicted future performance of the network, in terms of number and duration of interruptions. Whilst it would not be appropriate to reward or penalise companies according to this proposed additional measure, it would provide a leading indicator of future performance. If, over the next price control period, companies could agree with OFGEM a standard way to model future performance, then perhaps this measure could be included in incentive mechanisms in future price controls.
- Overall customer satisfaction is clearly a useful measure of customer performance.
- It would be useful for OFGEM, when reporting the performance of the DNOs, to plot unit cost of energy delivered at each level of the network against annual network performance in terms of CML, CI and Short Interruptions. Not only would this be useful for customers to compare the price against the performance of DNOs, but also a comparison of the change in unit cost of energy delivered at each level of the network against changes in Network Performance measures would provide a useful high-level view of the effectiveness of spend (this could be on a rolling 5 year average).

Load-related spend:

- Number of connections made is a necessary indicator of load related spend. However, it is not helpful unless there is additional information about the size and type of connection made. Perhaps this information can usefully be provided by agreeing bands and reporting numbers of connections in each band plus average cost per connection for each band.
- As stated above, EA Technology supports the creation of a composite risk measure for load-related investment. We believe that this is a better indicator of need for investment than "overall network loading" (indeed it is not clear how "overall network loading" would be calculated). Also measuring change in this indicator as a function of investment over a period (perhaps using a rolling average) would provide a useful measure of effectiveness of investment.

Asset Replacement:

- We agree with the proposal for an output metric capturing asset condition and criticality. We believe that the relevant composite metric is the product of probability of failure and criticality, because this metric represents the risk associated with the assets. It would be helpful to additionally report an overall measure of the health of the asset base.
- Providing this risk metric and the risk metric for load related spend are expressed on the same scale and are suitably normalised, then the relative merit of load related and non-load related investments can be compared.
- Although these metrics usefully report present asset health and the risk this represents, it would be informative for companies to also report modelled future asset health and risk plus predicted asset failure and fault rates based on their investment plans.
- Use of modelled percentage remaining life as an output measure is open to many different interpretations. What, for example, is the denominator used to calculate percentage remaining life? (Or, in other words, what is the assumed base life?). Would companies be able to redefine this base life? If not, then how will the base lives for different assets be set? How will older and newer assets of the same type be treated?
- Remaining life is not a good indicator if the present value cost of achieving that life is greater than the present value cost of replacement. Also, a company with many new assets and many assets close to end of life could have the same average percentage remaining life as a company with no new or close to end-of-life assets. However, the requirement for efficient capital spend would be very different. We would suggest that a frequency distribution of the population condition (health index) would be a better metric.
- A simplified distribution which would inform the level and type of investment could be to divide the population into four health categories (e.g. New / Operate / Maintain / Replace). Each category would require a different level and balance of Capex and Opex. Companies could report the percentage of their asset base in each category. This is the approach that Transco Abu Dhabi has adopted to manage their assets, for example.

Flooding:

- EA Technology would suggest that the number of substations with improved flood mitigation is not a sufficient measure. With this metric, it would be possible to spend lots of money unwisely and achieve limited benefit.
- Investment should be efficiently and effectively targeted, dependent on the criticality of substation and the probability of flooding.
- We would suggest that a more appropriate metric is the risk of flooding of substations calculated from the product of these quantities. To minimise administrative burden substations could be grouped into criticality categories e.g. High / Medium / Low.

Q9: Do you agree with our proposed approach for assessing network investment?
For asset replacement, we agree that sound asset management techniques should form the basis of any proposed expenditure plan. In our view, it is important that the right incentives are in place to ensure that DNOs continually strive to improve the effectiveness of their asset replacement programmes and we believe that output-based targets and incentives represent the best method to achieve this aim.

We believe that there is merit in moving away from simple age-based input modelling and towards output-based planning, as this can lead to more effective investment plans. Condition-based asset plans may, for example, identify significant opportunities for asset lifetime extension or cost-effective interventions that significantly increase supply reliability in

a way that like-for-like age-based plans could never identify. The current move towards health-index based planning represents an important step in this direction. However, it should be recognised that, despite these advantages, considerable effort may be necessary to develop such plans and there may therefore be a tendency to revert to models that merely reflect an age-based approach. One possible way to encourage innovation in this area might be to treat all expenditure in this area – including that for life-extension and optimisation of the investment programme – as capital investment.

OFGEM rightly recognise that the planning of load-related investment remains challenging, particularly where investments tend to be concentrated in "hot spot" areas of load change, rather than through sustained load growth. One possible method to address this issue is through the use of scenario planning, whereby a number of investment plans are presented based on different load-growth scenarios. Provided the assumptions and key criteria for each scenario are captured, this could embed some flexibility into the review period, enabling the appropriate investment plan to be adopted based on which of the assumptions turn out to be true. Such a dynamic response to changing social or economic conditions could prove more effective than the current "fixed" five-year settlement period. We would recommend further work to establish the feasibility of such an approach.

3.5 Chapter 6: Process

As mentioned in our response to Chapter 1, EA Technology appreciates the efforts that have been made by OFGEM to engage with the numerous stakeholders as part of this process. The workshops that we have participated in have been well organised and run effectively.

We have endeavoured to ensure that our response to this consultation is a useful contribution to the process and have aimed to keep it concise. We would welcome a discussion on any of the issues raised in further detail, if required.