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ENGINEERING RECOMMENDATION P2 REVIEW (PHASE 1)

Analyses of Responses to the Consultation on future development of distribution network planning security standard

Energy Networks Association

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Objective:

This document provides the analyses of the responses received to the formal consulation to gather feedback and views from industry stakeholders and interested parties related to the potential reform of the ENA Engineering Recommendation P2/6 network security standard.

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1 INTRODUCTION

This document forms part of the Phase 1 works of the fundamental review of Engineering Recommendation P2/6 commissioned by the Distribution Code Review Panel[1] (DCRP) through the Energy Networks Association[2] (ENA). A background overview to this ER P2/6 review is presented in section 2 and includes a description of the various work streams that form the Phase 1 review process.

On the 9th March 2016 the ENA held an industry event covering the options identified for reform of P2/6 and an overview of the supporting work and analysis provided by the Consortium. Following this industry event and publication of the reports produced during the review, the Distribution Code Review Panel P2 Working Group (DCRP P2 WG) sought feedback from industry stakeholders on the potential recommendations for reform of the security standard. This request was part of the Phase 1 review industry consultation process and also ensures compliance with the DCRP governance process. The consultation questionnaire document[3] was issued to industry by the ENA on the 2nd May 2016 with the closing date for responses on the 12th June 2016.

Respondents were asked to provide their views and feedback based on the evidence and analysis provided in the supporting published reports[4] to the consultation as well as their own knowledge and experience.

This report summarises the views and feedback received from parties that responded to the consultation questionnaire.

Following this introduction, section 2 provides a background overview to the P2/6 review followed by a summary of the respondents' views and feedback to each question in the consultation document, presented in Section 3. Section 4 provides the concluding remarks to this report in preparation for developing the final report which will identify and structure the recommendations from the DCRP P2 WG to the DCRP in preparation for the development of the agreed changes or updates or reform to Engineering Recommendation P2/6.

1 The Distribution Code Review Panel (DCRP) is the body responsible for overseeing the maintenance and development of the Distribution Code and its subordinate documents. Those subordinate documents include Engineering Recommendation P2/6. The ENA is the service provider to the DCRP for the physical maintenance of the Distribution Code and its subordinate documents.

2 Energy Networks Association is the industry body for UK energy transmission and distribution licence holders and is the voice and agent of the energy networks sector.

3 Consortium/ENA report "Consultation on future development of distribution network planning security standard", dated 29 April 2016.

4 All supporting documents were made available on the Distribution Code Review Panel website http://www.dcode.org.uk/dcrp-er-p2-working-group.html and included:

1. Consortium Work Stream 2.0 report "Findings of the qualitative review associated with the future development of the P2/6 distribution network planning security standard", Nov 2015;
2. Consortium Work Stream 2.7 report "Engineering Recommendation P2 Review Work Stream 2.7: Alignment of Security of Supply Standard in Distribution Networks with Other Codes and Schemes", prepared for the Distribution Code Review Panel, P2 Work Group, 20 November 2015;
3. Imperial College Work Stream 2.1 to 2.6 report "Review of Distribution Network Security Standards, Extended Summary Report", to the Energy Networks Association, March 2016;
4. Imperial College Work Stream 2.1 to 2.6 report "Review of Distribution Network Security Standards, Extended Report", to the Energy Networks Association, March 2016;
5. Imperial College Work Stream 2.1 to 2.6 report "Review of Distribution Network Security Standards, Extended Report Appendices", to the Energy Networks Association, March 2016, and
6. Consortium/ENA Work Stream 3 report "Engineering Recommendation P2 Review (Phase 1), Options for future development of distribution network planning security standard", March 2016.

2 BACKGROUND OVERVIEW

Engineering Recommendation P2[5] has been in place since the 1950s and has played a major role in the development of secure and reliable distribution networks. Whilst a number of changes have been made over the years, notably the introduction of P2/5 in 1978, the document has served the industry and consumers well for over 30 years.

Engineering Recommendation P2/6 is a subordinate document to the Distribution Code and also forms part of a Distribution Network Operator's (DNO) License conditions. Distribution Code[6], clause DPC4.2.1 Security states that "In accordance with the Condition 5 of the Distribution Licence, DNOs shall plan and develop their DNO's Distribution Systems to a standard not less than that set out in DGD Annex 1 Item 4, Engineering Recommendation P2/6 – "Security of Supply" or such other standard of planning as DNOs may, with the approval of the Authority, adopt from time to time."[7] The standard conditions of the Electricity Distribution Licence[8], condition 24.1 indicates a similar requirement.

The most fundamental issue regarding the future evolution of the P2/6 Engineering Recommendation is whether it continues to prescribe economically efficient investments, given the many changes affecting the energy markets and networks at present, including the (anticipated) prolific deployment of new and emerging technologies and the changing role of the customer including demand, generation and production by consumers (prosumers). This potentially gives rise to the need for a fundamental review of the baseline philosophy of distribution network planning to ensure that the UK Government's energy policy objectives can continue to be met in a cost effective and pragmatic way[9].

The review of ER P2 is formed of two distinct phases. The objective of Phase 1 is to identify and agree a range of options for a future UK security standard and agree the most appropriate approach that should be taken forward into Phase 2, the development and codification of the new standard.

The fundamental review of Engineering Recommendation P2/6[10] is being directed by the Distribution Code Review Panel P2 Working Group (DCRP P2 WG)[11] through the Energy Networks Association (ENA).

In January 2014 the DCRP P2 WG, through the ENA, engaged a consortium consisting of DNV GL[12], Imperial College London (ICL)[13] and NERA[14] to carry out Phase 1 of the P2 review.

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5 Engineering Recommendation P2 is intended as a guide to system planning covering security of supply that defines the required capability of electrical networks to maintain supply to a defined level of demand under defined outage conditions. P2 is neither a design standard nor an operational standard.

6 "THE DISTRIBUTION CODE OF LICENSED DISTRIBUTION NETWORK OPERATORS OF GREAT BRITAIN", Issue 27 – 01 January 2016, available on the DCODE web site, http://www.dcode.org.uk/assets/files/dcode-pdfs/DCode%20v27%20121015v2%20DPC6.2%20and%20G12-4-1%20and%20guide%20stripped%20out%20161215.pdf

7 While DNOs can opt to invest in security above the minimum requirement prescribed by P2/6 where they can justify this, to propose design solutions below the minimum level the DNO is required to seek a derogation for this from the Regulator where they cannot self-derogate (a DNO can presently self-derogate for Class of Supply A, B and C listed in Table 1 of P2/6).

8 Gas and Electricity Markets Authority, ELECTRICITY ACT 1989, "Standard conditions of the Electricity Distribution Licence", 30 October 2015, available on the Ofgem web site, https://epr.ofgem.gov.uk//Content/Documents/Electricity%20Distribution%20Consolidated%20Standard%20Licence%20Conditions%20-%20Current%20Version.pdf

9 It is assumed by the DCRP P2 WG that within these policy objectives there is a need to maintain a security of supply that meets customers' expectations.

10 The present version of the Engineering Recommendation P2/6 document is available on the DCODE website for this review and can be accessed using the following link: http://www.dcode.org.uk/assets/files/Working%20Groups/P2/ENA_ER_P2_Issue_6_(2006).pdf

11 On behalf of the Distribution Code Review Panel (DCRP).

12 DNV GL is a Global certification and advisory business working in the maritime, oil and gas, business assurance and energy sectors.

13 Imperial College London is a university of world-class education and research in science, engineering and medicine, with particular regard to their application in industry, commerce and healthcare.

14 NERA Economic Consulting is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges.

Phase 1 of the ER P2/6 review is essentially a comprehensive research, analysis and modelling engagement supported by a consultation process being carried out by the Consortium with direction and support provided by the DCRP P2 WG and the ENA.

Phase 1 of the project commenced in February 2015 with the development of a Project Initiation Paper (PIP)[15]. The PIP highlighted the key objectives of Phase 1 of the ER P2/6 review project to industry stakeholders and the process adopted to achieve these objectives.

The process to deliver the Phase 1 objectives outlined in the PIP consists of a number of work streams which can be broadly summarised as follows[16]:

- **Work Stream 1**; set out the Phase 1 objectives and process, and included an initial engagement with all key industry stakeholders.
- **Work Stream 2**; identified, researched and evaluated options for a future UK security standard.
- **Work Stream 3**; engaged with the DCRP P2 WG to examine the deliverables from WS 2 and derive and describe the range of options that informed the processes in WS 5.
- **Work Stream 5**; included an industry wide workshop that focused on introducing and discussing the deliverables from WS 3 (both quantitative and qualitative exercises).
- **Work Stream 6**; further supported WS 5, through a formal industry wide consultation to seek and gather written feedback from all industry parties on some of the more pertinent issues and concerns associated with the proposed options for reform of the security standard.
- **Work Stream 7**; develops a summarised and tabulated view of the WS 6 consultation question responses and identifies views and key discussions to be taken into the final Phase 1 recommendations report. Work Stream 7 is documented in this report.
- **Work Stream 8**; will produce the final Phase 1 recommendations report that will lay out the arguments and all the supporting evidence for the development route for any new standard while critically highlighting the benefits of such a route.
- **Work Stream 9**; will scope the work needed to implement the final recommendations from Phase 1 that will be undertaken in Phase 2 including a work programme for Phase 2 with an associated project plan.

The Consortium supported by DCRP P2 WG members has identified and assessed high level options for the reform of ER P2/6 through a range of quantitative and qualitative analysis. The high level options considered for reform included:

1. *Retaining the present deterministic[17] P2/6 standard without revision*.
2. *Retaining a deterministic planning standard, but with improvement.*
3. *Implementing a non-deterministic planning standard.*

15 DNV GL, NERA and Imperial College document "Engineering Recommendation P2 Review (Phase 1), Project Initiation Paper", report number 16011094/110, rev 001, 13/04/2015. Available on the DCODE website for this review and can be accessed using the following link: http://www.dcode.org.uk/assets/files/Working%20Groups/P2/project%20initiation%20paper%2020150413%20V%20004.pdf

16 Work Stream 4 is an optional work stream for further, more in depth modelling and analysis presently not commissioned by the ENA for the Phase 1 works and hence is excluded in the list shown. If necessary a second iteration of the techno-economic modelling could be carried out under Work Stream 4 during Phase 2 to confirm one option to proceed within Phase 2 if a single option is not fully identified at Phase 1.

17 P2/6 is commonly referred to as deterministic in nature and throughout this report is also referred to as a deterministic standard in that the network security performance outputs from the standard are pre-determined based on group demand.

4. *Implementing a high-level standard that obliges efficient investment, while retaining some deterministic elements* (represents a hybrid of options 2 and 3).

5. *Abolition of the planning standard*.

The options report[18] from work stream 3 sets out the assessment to date of the high level options for reform of ER P2/6 drawing on evidence from the various quantitative and qualitative tasks carried out together with inputs from a range of stakeholders including DCRP P2 WG members. It provides a set of potential recommendations for reform that will be further considered and amended based on the analyses of the responses to the formal industry consultation provided in this report. Once agreed as a DCRP P2 WG set of recommendations, they will be presented to the DCRP to be managed under their standard governance process. The latter part of this Phase 1 project will set out the high level plan for the Phase 2 standard development and codification works dependent on the outcome of the recommendations review by the DCRP and subsequent interactions with Ofgem[19].

18 Consortium/ENA report "Options for future development of distribution network planning security standard", dated 17 March 2017.

19 Reform to P2/6 recommended by the DCRP would require agreement with Ofgem and an Ofgem consultation as P2/6 is referenced in the DNO license conditions.

3 CONSULTATION QUESTION RESPONSES

The responses to the consultation questions have been analysed as part of the WS7 work and are summarised in this section of the report.

We received 18 written responses to the consultation through the DCODE email address. Responses were received from a wide range of stakeholders including distribution network owners, transmission network owners, independent distribution network owners, generation representatives, storage representatives, academics, project developers and other infrastructure regulators. Some respondents provided detailed responses to all the questions, some chose to respond only to questions relevant to their particular type of business, while some did not respond directly to the questions, providing a summary of their general views in a written response. Where possible these written responses have been summarised and included in the overall summary response to each relevant question areas set out below. The full list of all organisations that responded to the consultation is provided in Appendix A. Appendix B provides the summary list of the number of responses per question identified between DNO licence holders and non DNO license holders (this includes one independent DNO license holder).

This section provides the summarised responses to each of the questions raised in the consultation document. For clarity, each question is stated (as in the consultation document) followed by a breakdown of the responses with a summary of the position of the different parties, highlighting any key issues or matters of particular concern.

Question 1
Based on your experience and the working group reports do you believe that the current P2/6 standard should be revised or more radically reformed? Please state your views and provide any supporting evidence.

14 responses were received to this question.

11 (6 DNOs and 5 non DNOs) provided responses in support of the revision to the present security standard with 3 responses (3 non DNOs) supporting the proposal for a set of more radical reforms. There were no responses advocating that the present ER P2/6 should remain unchanged, remaining in its current format.

On radical reform

The position of a trade body was summarised as being that the current ER P2/6 standard needed significant reform and it was not clear to them whether the changes they believe are necessary could be achieved through only revision of the standard. In their view, the way the network operates physically and the issues arising from the significant change in connectees means that the network is now radically different to the type of network when ER P2/6 was updated from P2/5. This respondent stated that it is difficult to know whether the updates it believes are required could be delivered through a revision of the standard or whether more radical changes were needed, which, if this was the case, might result in an entirely new version of the standard or a new approach.

The views expressed by the academic institutes were also supportive of radical change to the security standard. They stated that they believed that the existing standard was no longer fit for purpose, and should be either abolished or radically reformed. The first shortcoming of ER P2/6, they noted, and as

presented in the Imperial college reports, was a disconnect between the security of supply prescribed by ER P2/6 and any economic assessment; they asserted that DNOs are privately run businesses, but as a result of the standard, many of their investment decisions are taken without considering whether the new infrastructure represents value for money, in addition, ER P2/6's binary view of risk should also be addressed. They indicated that when the standard was originally written, networks consisted almost entirely of fixed assets, with demand as the only source of variability. The existing standard treats variable resources as assets with a fixed equivalent circuit capacity, when it considers them at all. While this fits with the simple, deterministic rules which form ER P2/6, it does not adequately represent the variable technologies upon which many customers' security of supply could depend. They acknowledged that ER P2/6 does have a number of strengths, which should not be ignored: it is simple to apply, and through its application, the majority of customers enjoy extremely high levels of reliability. They noted that these strengths also present potential hurdles in devising its replacement: customers and DNO's are unlikely to welcome a standard which results in lower levels of reliability, and the transparency provided by its simple rules means that network investment decisions are relatively straightforward and easy to understand.

Additional supporting comments from the academic institutes indicated that radical reform was necessary. They recommended that, in the updated standard, full use was made of the much larger datasets on DG performance which are now available. In their view, one possible outcome of the ER P2/6 review is that some new characterisations or analysis methods are developed that could guide planners in identifying the need for investment and which investments would be appropriate. However, they indicated that it is also important to consider how new characterisations or methods would be used and this depends, to a very large extent, on the wording of a standard and any accompanying guidance. They suggested a lead could be taken from the National Electricity Transmission Systems Security and Quality of Supply Standard (NETS SQSS) and work led by the European Network of Transmission System Operators for Electricity (ENTSO-E) towards the harmonisation of standards across Europe and the development of new standards.

On revision to the current standard

Many responses supported the position that ER P2/6 coupled with ETR 130 and ETR 131 should be revised to develop a more flexible standard and ensure that it was able to account for new network technologies and emerging markets in the distribution and supply of electricity rather than be drastically reformed. Also, many expressed a view that there were many positive aspects of the existing standard and that these should not be disregarded (including simplicity and transparency). It was noted that the present standards do not explicitly provide any scope to include alternative methods of securing supply by utilising new technologies and network solutions now being rolled out across distribution networks, such as ANM (Active Network Management), DSR (Demand Side Response), ES (Energy Storage) etc. In addition, there is a lot of uncertainty and ambiguity around the treatment of these techniques when performing network security assessment and further consideration is needed on whether there are levels of distributed generation where a security standard is needed.

It was noted that the method detailed in ETR130 does allow for the calculation of security values from DG, however, given the rapid state of development of smart grid systems and the advent of actively managed networks with energy storage, it is appropriate to revise the security contribution tables. ETR130 is also quite complicated, especially relative to the simplicity of interpreting ER P2/6.

Responses indicated that they believed the standard of security set out in the present ER P2/6 standard should be retained, but that guidance on the means of delivering that level of security from non-network

technologies should be added, implying that the document should be revised rather than radically reformed, while maintaining its intuitive design and operation. Some responses indicated that it was also important that subjectivity is not introduced into the standard as DNOs must be able to determine compliance in a consistent manner.

Other responses indicated that it would be a significant step change to make drastic and radical transformation to the present standard, based solely on the analysis performed and underlying assumptions and at this stage it could be that this might be a step too far. A more progressive or step by step approach to change the present standards was the preferred option.

One DNO indicated that they believed that the level of demand security prescribed in the present standard helps to deliver the security of supply that customers experience and that the feedback they have from their customers was that this level of security is about right. They identified the strengths of the current ER P2 as:

- Implements probabilistic assessments deterministically.
- Increases the required resilience with demand / number of customers.
- Provides resilient networks that cater for a wide range of contingencies – particularly for large load groups.
- Is simple for all stakeholders (ranging from government to customers) to understand.
- Is clear and simple which brings advantages for all parties associated with wayleave hearings; a probabilistic standard would be more open to interpretation potentially resulting in increased costs in the wayleave process.
- Sets out a minimum standard free from short term market forces.
- Provides a backstop against which improvement can be justified in accordance with the IIS[20] framework.
- Includes the option for obtaining a derogation for lower levels of security based on probabilistic and economic assessment.

The DNOs confirmed that they were committed to delivering the prescribed level of security from non-network solutions as well as traditional network solutions and highlighted that there is much more information available now about the performance of generation than in 2006 when the security contribution from generation was last reviewed. There is limited guidance on assessing the security contribution from LCTs[21] including DSM[22] and energy storage, which they believe would be good to develop, building on the learning from various LCNF[23] and other innovation projects. They indicated that there is room for a new standard to incorporate areas of dynamic operation and that this work would better benefit from a review of the findings of previous work to inform such proposals that does not obviously appear to have occurred to this point. They also noted that there is a wealth of analysis and trials associated with understanding various areas of dynamic system behaviour, whether relating to Distributed Generation, Demand Side Services, Electric Vehicles and Heat Pumps, Active Network Management under Low Carbon Network innovation Fund and Network Innovation Allowance and

[20] Interruption Incentive Scheme
[21] Low carbon technologies
[22] Demand side management
[23] Low carbon network fund

Network Innovation Competition arrangements, as listed on the Energy Networks Association Smarter Networks Portal.

One DNO indicated that ER P2/6 reflected the traditional design approach to network security, with the Supply Class sizes generally based on standard, traditional asset sizes (i.e. 1MW, 12MW, 60MW) and timings based on historical practical considerations of operating traditional radial networks (i.e. 3 hours, 15 minutes, immediately) and the contingency levels generally set by network voltage level (i.e. n-0 at LV, n-1 at 11kV and 33kV and n-2 at 132kV). However, they indicated that the emerging Smart Grid technologies do not fit neatly into the framework Supply Class sizes so consideration should be given to developing a suitable framework for the assessment of both conventional and Smart Grids.

Some responses also addressed the future development of the security standard, suggesting that one approach to adopt should be a revision short-term (i.e. RIIO ED1) leading to a more radical reform to support the longer term (i.e. RIIO ED2 and beyond), this approach does not seem to explicitly rule out a revision for updating the standard for new technologies but would also present a defined road map for more radical reform.

Question 2
Reducing the level of security in a reformed standard could defer the need for investment in UK distribution networks during the period to 2030, with an associated reduction in customer bills. What are your general views on the trade-off between the potential increases in outage duration and/or outage frequency compared to the potential reduction in customer bills?

15 responses were received to this question.

All of the 15 responses expressed the view that the potential reduction in customer bills did not merit the potential increase in outage duration and/or outage frequency. A wide variety of views were presented to support this position across the responses.

The DNO responses indicated that the feedback and response from many stakeholder events and communications exercises over the years was that their customers showed a preference to at least maintain the current level of supply security but also to consider investment to improve the level of service to "worst served" customers. They indicted that there is an expectation by the public that their supplies are 'always on' so any reduction in the higher voltage levels standard security would need to be fully detailed and explained to them. DNOs indicated that complaints regarding interruptions would indicate to them that customers value their supplies quite highly. Reducing the level of security to below N-1 at EHV level and relying on HV interconnection as a means of security would in practice work (where there is HV interconnection) but would mean that they would be building a network based on 'borrowed' capacity and so in times of network stress they may run out of capacity.

DNOs provided their view on the feedback from customers from their DPCR5 and RIIO ED1 price control submissions indicating that their customers were generally happy with the security of supply they currently experience and that they were not prepared to pay more for a higher level of service or have a desire to pay less for a reduced service. Before any decision is made to reduce the security of supply from the present P2 level, there was support for further assessment of the potential cost savings and identification of the potential level of reduction in security (with its quantified cost to society) so that all stakeholders could fully understand the trade-off between costs and the change in network reliability and provide informed feedback.

Generally DNOs were of the view that in the future, customers will value security of supply more than at present as they begin to use electricity in different ways as part of the commitment for a low carbon economy e.g. EV[24]s and Heat Pumps. DNOs indicated that their customer feedback back showed their view was that potential increase in bills to fund additional infrastructure would be relatively low and generally acceptable if the alternative is for a reduction in the security of supply. DNOs indicated that it is important that the network security standard aims to meet customers' needs in to the future and avoids a scenario where network security is intentionally reduced in the short term but becomes unacceptable in the medium term, this could create the danger of triggering a wave of reinforcement.

In addition, they stated that customer service is a high priority to their businesses and in their view customers want increased supply reliability not a reduced one, and that the current levels of performance achieved under the IIS incentive exceed that described by P2/6 LV standards (restoration time for <1MW). Customers have expressed a willingness to pay for network renewal to enable smart grids but show little willingness to accept a poorer level of service. It is the belief of the DNOs that as customers begin to have a higher reliance on smart devices delivering a secure service, there does not appear to be substantive drivers for this to change in favour of lower standards.

A trade body noted that maintaining the standard of N-1 presumably has significant costs and it would be interesting to know what those costs are versus the reduction in costs of relaxing security of supply standards. It was noted that most customers, particularly I&C[25] customers, make their own backup arrangements, but providing your own electricity backup comes at a cost and a balance needs to be struck between the costs that customers incur in securing supply themselves versus the costs they pay in helping the system achieve security of supply. Domestic customers and smaller businesses may not have a backup supply and this would be more of a concern. Work to determine what customers, at all levels, would or would not tolerate in terms of the number of outages needs to be done.

A non DNO noted that the security of electricity supplies is a critical element for the safe and efficient operation of the nation's rail network, (and other high priority national infrastructure) it is not only being increasingly used to power trains, but also supports safety critical signalling and communication systems. They stated that whilst the rail industry does take safeguards, where practical, to mitigate losses of supply, any reduction in the level of security could have significant implications on the industry in terms of safety implications with an increased likelihood of stranded trains and closed/unlit stations. They noted that some of these risks may be mitigated by increasing safeguards or changes to more internal generation strategies but it would inevitably lead to increased costs to the rail industry.

A further non DNO stated that they believed that increases in outage duration or outage frequency would not be acceptable but by employing new and innovative technologies relating to plant and protection devices (for example energy storage) there would be the opportunity to actually reduce outages at little additional cost to connected customers. Therefore, they were not of the opinion that there would be any associated reduction in customers' bills simply by relaxing the existing security standard - and thereby increasing customer outage times.

A DNO further noted that over the planning horizon to 2030, their general view was that a reduction in the level of network security, through the Security of Supply standard, would have limited impact on customer bills, due to other investment drivers. They recommended co-ordinated customer consultation and impact assessment before progressing with any action that could significantly impact customers' security of supply.

[24] Electric vehicles
[25] Industrial and commercial

Views from the academic institutes indicated that they believed that this question demonstrated one of the difficulties presented in moving away from the levels of security provided by the ER P2/6 standard. They noted that at present the cost of distribution, as dictated by ER P2/6, is passed on to the customer; however, distribution charges only make up 16% of the average electricity bill. A gradual decline in security of supply, and matching decline in distribution charge, could have a severe impact on customer satisfaction, which may not be perceived as being justified by the reduction in energy bills – especially if the other components of energy bills continue to rise. They stated that it was very doubtful whether customers would wish to save a relatively small amount of money in exchange for a possibly much reduced reliability of supply where savings would equate to a few tens of pounds per customer per year. Further, they indicated that the cost benefit analysis approach taken in the review documents further implicitly assumed that customers are indifferent as to whether they receive electricity supply, or they are cut off and paid compensation. They emphasised that customers might consider a significant reduction in reliability of supply, even with compensation for disconnections, as not worth the consequent savings on the network part of their bills. In summary, they closed with their view that the consensus regarding customer levels of satisfaction seems to be that, on average, they are satisfied with the present balance and that customers would not welcome higher costs for increased security, neither would they accept decreased security as the consequence of lower costs.

Question 3
Should the present demand security standard be modified to include guidance on the contribution to system security from non-network technologies? Such non-network technologies could include Energy Storage, Demand Side Management (DSM), Demand Side Response (DSR) and other commercial arrangements? What are your views regarding the inclusion of these categories of users/providers.

14 responses were received to this question.

All of the 14 responses fully supported the approach outlined and indicated that the present demand security standard should be modified to include guidance on the contribution to system security from non-network technologies. None of the responses provided any view or evidence to indicate that there were likely to be any circumstances where guidance should not be provided.

Some responses indicated that it may be more appropriate for the detailed treatment of these technologies to be placed in ETR130[26] and ETR 131[27], to further develop the existing methods stated and update these to take into account control and communication approaches. It was also stated that the link and references between the security standard and the Engineering Technical Reports (ETR) should not be lost in any future reform of either set of documents[28].

The responses indicated that an up to date security standard should consider and reflect the structure and make up of a modern distribution network with all proven forms of technologies which have the ability and capacity to secure supply to customers. This would apply to both normal running arrangements and abnormal running (during outages) situations.

[26] Energy Networks Association, ETR 130 Application Guide for Assessing the Capacity of Networks Containing Distributed Generation, July 2006.
[27] Energy Networks Association, ETR 131 Analysis Package for Assessing Generation Security Capability – Users' Guide, July 2006.
[28] Both ETR 130 and ETR 131 are referred to in ER P2/6.

Responses indicated that non-network technologies have a place in providing network security alongside traditional network assets and that only some limited guidance on the treatment of DSR[29] in a security assessment is provided at present. It would be helpful to provide consistency across the industry. There were some responses that indicated that their preference was that the additional guidance should take the form of simple 'look up' tables to promote transparency of any assumptions used.

One response noted that the list of non network technologies provided was not fully comprehensive and omitted a review of generation contribution. They noted that categories such as solar, tidal and various new forms of biomass & CHP plant were not areas of significant consideration in the original review which formed the basis of the current P2/6 standard.

Further support for guidance was provided in some responses indicating that it is essential that the standard is updated to recognise the broader range of future technologies, for example: non-network technologies (including, but not limited to), renewable forms of generation, such as solar, tidal and the various forms of biomass and CHP that could provide some contribution to network security. The issue for the standard is determining a consistent means of attributing security benefit recognising the variability of provision that is likely to be encountered as these services develop and facilitate the provision for new as yet unknown approaches. Any methodology needs to be suitable to adapt to a rapidly developing commercial environment, but modelling techniques must be consistent in their operation to ensure a level playing field in highly competitive markets and that new ways of managing the networks are required to meet changing conditions. They suggested that the new standard should facilitate, support and allow any techniques that help deliver security at lower cost to the end consumer.

One response agreed with the proposals to enable connection of generators and consumers, but raised the question of a review of the method of control of the Network and in particular Distributed Generators in response to an N-1 or equivalent type event.

Question 4
In a deterministic standard there should be a balance between the level of deterministic specification and the ability to depart from this using Cost Benefit Analysis (CBA) or derogation processes. Do you think this balance is correct in the current P2/6 standard? If not, how should this be addressed?

12 responses were received to this question.

In total, 8 responses expressed the view that the present ER P2/6 standard adequately balanced the level of deterministic specification and the ability to depart from this using Cost Benefit Analysis (CBA) or derogation processes (5 DNOs and 3 non DNOs). Four of the responses did not agree this was the case and provided some views in support of their position (1 DNO and 3 non DNOs).

The balance is correct

Typical views in support of the existing adequacy included the existing use of derogations from P2/6 providing a useful tool to deal with unusual circumstances and should continue to be supported. The use of CBA where an enduring rather than a short term derogation is proposed was supported as a sensible option.

One response noted that the current standard provided very little allowance and flexibility to depart from the current prescribed and deterministic approach to allow the use of CBAs to justify investment decision,

[29] Demand side response.

however their experience was that that the derogations process approach had worked well over the years. They believed that the solution to address this problem was not straight forward because consumers were the ones impacted by these decisions and their behaviour was in this matter was key. With the various ongoing development plans and emerging trend to move towards electric heating and electric vehicles, they indicated that it was not clear what the customer expectations towards future security of supply would be and that consumer behaviour and consumer choice may change and impact the VOLL in multiple ways.

One DNO indicated that there are definite advantages of deterministic standards; that the present P2 set a minimum standard and they would not expect to depart from this standard as an enduring solution unless there were exceptional circumstances. The present derogation arrangements provide a mechanism for deferring reinforcement, for example, where there was a problem implementing the reinforcement or where the non-compliance is marginal and there was some concern whether an enduring reinforcement was required. The regulatory requirement to develop an economic, efficient and coordinated network, together with the risk of having expenditure disallowed where it is deemed not to have been incurred efficiently, mitigated against providing excessive network security. Based on their experience they were of the view that the present balance of deterministic standard with provision for short term derogations and controls of excessive security provision are reasonable checks and balances associated with a deterministic standard. This was supported by a further DNO stating that in their view P2 has historically been a broadly successful balance of deterministic and discretionary requirements which has delivered as demonstrated across successive regulatory reviews since privatisation, consumer value.

A non DNO response indicated that the use of derogations, whilst a good facility should only be used as an interim measure until network reinforcement.

An academic institute supported the position stating that they believed that any departure from the standard approach should be justified economically and technically; it would be required for unusual network design, very large load groups, or scenarios with significant contributions from variable assets such as DSR, DG or ES. While a hard rule was probably not appropriate, they suggested that guidelines would be appropriate, informed by an assessment of the approximate cost of carrying out these studies to the DNO (in effect a cost benefit analysis of the cost benefit analysis). They stated that, in their view, the present ER P2/6 standard did not make allowance for the routine application of CBA, and so exceptional derogations would be required in such cases.

A trade body provided additional support to the statement stating that they understand that the current standard allows for DNO 'sponsored' derogations such that the levels of security indicated by deterministic standards can be 'modified' where the DNO can support such an approach. Therefore they concluded that the current balance was appropriate and correct.

A DNO also indicated that the complexity and topology of some networks can present circumstances that make the use of Cost Benefit Analysis (CBA) or other economic assessment more appropriate than a deterministic approach. In these circumstances they need to potentially revert to the basic principles of network security (i.e. recognising the differences in reliability between cables, overhead lines, transformers and Value of Lost Load) using economic assessment techniques to arrive at the most appropriate solution. They indicated that they would like to see a mechanism to facilitate CBA and other economic assessment techniques within the Security of Supply standard.

The balance is not correct

In total, 4 responses (1 DNO and 3 non DNOs) expressed the view that the present P2/6 standard did not adequately balance the level of deterministic specification and the ability to depart from this using Cost Benefit Analysis (CBA) or derogation processes.

A DNO response indicated that, in their opinion, P2 provided a reasonable balance for today only. For example, HV and LV networks are already specified beyond P2 as a result of IIS incentives. The current standard attempts to codify the benefits in the percentage of load that has to be restored in a given time, this is again an area where this represents a backstop to the incentives in place for IIS. They suggested that it would be worth considering retaining a set of minimal simplified requirements (e.g. when to adopt N-1/N-2) with the use of cost benefit to cover variability and uncertainty. Further, they indicated that the use of derogations should be better documented within P2, especially with regard to the use of cost benefit to justify non-intervention."

The response from an academic institute suggested that in their opinion, a 'balance' is not necessarily, what is required and that a 'deterministic' standard, (although one based on probabilistic analyses), that can set a prudent minimum requirement for which the risk of stranded assets is low. They indicated that a CBA could be used to test whether any additional provision above the minimum is required. Two advantages of a 'deterministic' minimum were stated as:

- it can be clearly and consistently interpreted by both DNO staff and consultants appointed by Ofgem to assess capital expenditure by DNOs;
- it can provide a clear needs case for any developments that require contentious planning consents.

They summarised their view by stating that the current standard does not make the above at all clear.

Question 5
What are your views on the merits of including Cost Benefit Analysis (CBA) or other economic assessment techniques in determining optimum networks versus the likely lower network planning costs associated with a prescriptive standard such as P2/6?

14 responses were received to this question.

In total, 3 responses expressed the view that there was little or no merit in the inclusion of further Cost Benefit Analysis (CBA) or other economic assessment techniques in determining optimum networks (2 DNOs and 1 non DNO) while the balance of responses indicated that there was possible merit at differing levels (4 DNOs and 7 non DNOs).

Little or no merit in including further Cost Benefit Analysis

In general, responses suggested that there was little merit for the inclusion of further cost benefit analysis than currently used in conjunction with P2/6 where there were different investment options to meet the security level required and that the existing process could be used to support decisions to seek a derogation. In their opinion, they indicated that the use of economic analysis against just a single value of VOLL can result in very poor service availability for a small number of customers. They suggested that CBA or other economic assessment techniques could be considered in determining the

most efficient solution but that such processes would have to be flexible and account for all aspects and the business environment each DNO has to consider when planning networks. They were concerned that there are both common and uncommon factors that will need to be considered which may make such a process highly complicated.

One response noted that it would be necessary to have a common methodology statement that ensured a consistent approach is followed by each DNO and the interests of the customer are not undermined. This consistent approach of delivering a minimum solution is a requirement of the existing standard.

One response indicated that they would not be able to support any revision that totally removed the current deterministic approach, but did not explicitly indicate that there was additional merit in including options to include additional economic analysis in a reformed standard.

Some merit in including further Cost Benefit Analysis

In total, 11 responders (4 DNOs and 7 non DNOs) expressed the view that there is some merit in the inclusion of further Cost Benefit Analysis (CBA) or other economic assessment techniques in determining optimum networks.

The responses indicated that deterministic network planning rules are simple, cheap to apply and transparent, although some confirmed that they did not always result in cost efficient network design. They stated that CBA based planning rules would be inherently complex, less transparent, (as the assessment itself would be more complex and based on a wider range of assumptions which themselves may be subjective) and more expensive to implement. Although potentially they would result in more cost efficient networks, the practicalities of implementing CBA based rules would need to be considered, including: the volume of HV and LV network studies implying that there will be groups of studies that if subject to a CBA analysis, would inevitably deliver similar results and this would tend to result in the development of generic CBAs /planning rules. From a regulatory perspective, whist an eight year RIIO ED2 plan may have outline CBAs for 132kV and EHV schemes, an ED2 plan would not be able to include a CBA assessment for all HV and LV schemes and the development of generic CBAs would still be required. One DNO concluded that the use of CBAs would be more reasonable at 132kV and EHV as HV and LV network designs are carried out by engineers with a lower skill level.

One DNO noted that if CBAs were used in certain scenarios, they believed that in order to provide some degree of consistency across DNOs guidance should be provided on the factors that should be included in a security of supply CBA including:

- Whether a CBA assessment should be applied to test compliance (i.e. be applied for all 132kV & EHV networks) or just when remedial work is being considered (as this would have a material impact on the required resource).
- Should VOLL be used in the assessment, if so what value and is this valid for future customers.
- Should historic generic or predicted future fault rates be used?
- Should construction outage, common mode failures or HILP risks be considered?
- Over what period the CBA should be based.
- Should demand and non-network security contribution be forecast?
- Should the economic cost of losses be considered?

There would also need to be guidance on how often a CBA assessment should be carried out to test compliance.

Another DNO noted that in their view, CBA and other economic techniques were essentially, techniques to be applied as appropriate to engineering challenges surrounding security of supply. They indicated that the key was that a standard provided an appropriate framework for the correct use of these tools to these challenges such that the end objective frames the consideration of factors to be further assessed in order to respond to it using such economic techniques as required. They suggested that what is of greater importance than the use of economic techniques is the framework of the standard in articulating the engineering challenges to be addressed and the factors that would need to be explored across any economic and or other techniques then applied.

It was also noted by a DNO, that in their opinion, economic assessment techniques to some extent are already part of the planning process, particularly when justifying enhanced security, although not strictly recognised within the current P2 model. Therefore they supported the move to a more cost benefit type model, stating that although the deterministic rules may be easier to apply, the transition to a more flexible cost benefit driven standard future should be manageable provided it is gradually introduced so that as networks become flexible and dynamic, cost benefit techniques would become more useful than deterministic standards.

One response suggested that in their opinion, in many circumstances, the benefits of performing the CBA would outweigh the cost of doing so. They suggested that a hybrid standard, with suitable criteria for selecting when to do a CBA (or alternatively leaving that choice to DNO discretion) was likely to achieve a good balance. They also recognised that other benefits could be unlocked via a CBA, including economic benefits, such as lower electrical losses, and reliability benefits, such as increased asset lifetime or greater resilience against HILP events.

One DNO noted that CBA and other economic assessment techniques are already undertaken as part of the planning process for the assessment of larger projects. A progressively staged approach could be considered using a deterministic specification in the majority of cases, with the use of CBA or other economic assessment techniques where: benefits are less clear; scenarios are closer to the margins; or where projects are of sufficient value. They indicated that the use of CBA or other economic assessment techniques should be proportionate to the level of investment.

One industry party indicated that they appreciated the challenge the electricity supply industry is facing and would support a move to a less deterministic approach if it ensured that any proposals included consultation with customers and included an evaluation of the safety risks and 3rd party costs as part of any CBA approach.

Question 6
What are the advantages or disadvantages in adopting any of the potential reform options outlined in the options report to provide alignment with the NETS SQSS or other industry standards, codes or licence obligations?

10 responses (6 DNOs and 4 non DNOs) were received to this question.

In total, 8 responses (5 DNOs and 3 non DNOs) identified advantages in providing alignment with the NETS SQSS[30] or other industry standards, codes or licence obligations.

Requirement to align with NETS SQSS

Responses indicated that the main requirement was to ensure alignment between ER P2 and NETS SQSS for consistency between the security assessment approach and the availability of consistent data sets. Whichever reform option was selected there would be an associated data exchange required so that NGET and the DNOs would have access to the required data on a consistent basis, enabling them to assess the security contribution from non-network technologies on a consistent basis. Alignment of the planning security standard at the boundary between DNO and TO was essential to ensure that investments made were effective and usable.

One response indicated that the alignment with other standards and obligations was beneficial, as the more integrated the transmission and distribution system becomes, the more important it is that the planning standards and incentive frameworks should align, but they noted that this may require changes on both sides to ensure the most efficient outcome overall. The interactions between transmission and distribution have always been important but are becoming increasingly so as the level of penetration of distributed generation and reliance on them increases. Fitness for purpose and consistency between standards and codes is essential to ensure that the power system as a whole meets the requirements placed on it by society at large.

It was noted by one DNO that the greater the changes to P2/6, the greater the need to ensure alignment is maintained with NETS SQSS and that alignment of codes and standards should reduce complexity and improve transparency.

One response indicated that in their opinion there was limited consideration or recognition in the options papers regarding alignment with NETS SQSS and concluded that further work would be required to fully quantify the impact of further developed options. However, they did conclude (in absence of such detailed consideration) that options retaining a degree of determinism which have a relate-ability between the reformed P2 and the SQSS provide a better basis for maintaining whole system security than those which do not.

No requirement to align with NETs SQSS

2 responses (1 DNO and 1 non DNO) identified disadvantages in providing alignment with the NETS SQSS or other industry standards, codes or licence obligations.

Their views included the issue relating to the fact that the NETS SQSS is a little broader than ER P2/6 and covers both operational as well as planning standards. At present they stated that the operational aspects for a DNO are covered by IIS. The IIS gives good levels of reporting and strong financial incentives which are appropriate and should remain in force. However, they believed that there was no need for further consistency between the two industry documents (other than interfaces across GSPs[31]) as the standards were attempting to achieve two different things: NETS SQSS – system stability at a national level, P2/6 security of supply at a regional level.

A further response concluded that maintaining alignment with the NETS SQSS would severely limit the scope for revising or replacing ER P2/6. Given that NETS SQSS predates P2/5, and that the transmission network is better suited to a CBA based security standard than the distribution network, (because it features a small number of high capacity lines and transformers) they did not recommend limiting the

[30] National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS)
[31] Grid Supply Points

scope of the review to maintain alignment with the existing NETS SQSS. It was argued that a revised standard should maintain sufficient compatibility with the NETS SQSS to minimize planning complexities while the existing NETS SQSS is in effect. On a wider point, it was noted that it would be more prudent to ensure that ER P2/6 was compliant with the EU network codes, given that there is an obligation to ensure that the network codes of member states would not affect cross border trade. Additionally, if a revised P2 aligned with the EU codes, it could provide the path for a revised NETS SQSS to also be compliant.

Question 7
Should P2/6 which currently applies primarily to securing demand be extended to include securing generation? Please provide supporting evidence for your response.

13 responses were received to this question, 6 from DNOs and 7 from non DNOs.

The standard should not be extended to secure generation

In total, 10 responses (5 DNOs and 5 non DNOs) supported the view that the standard should not be extended to secure generation. It was suggested that prescribing a security standard and network capacity for demand and extending this standard to include distributed generation may have a negative impact on generation development, as it has the potential to take away the flexibility and ability for generators to request a non-firm supply. It was felt that generators are presently free to decide on the level of security required for their connection and introducing additional security requirements could introduce additional hurdles and potentially may require higher levels of investments for new connections.

It was noted that the evidence from the analysis was that it is generally uneconomic for generators to have a more secure supply and although generators could choose their level of supply security there was concern amongst the generator community with the issue of extended network outages. Where generation was embedded with network load, it was the load security requirement that would dominate in the consideration of network security requirements, making it unnecessary to explicitly consider the security of the generation. It was felt that the security for generators would generally be determined according to the requirements of the connecting customer, not by a Security of Supply Standard. Further, it was recognised that when connecting a generator, the customer usually wanted the lowest cost connection arrangement with the associated level of supply security but it was noted that this may change in the future as the security of a generator's connection could influence participation in the balancing mechanism or other commercial mechanisms. One response stated that it may be appropriate to allow consideration of generation security in due course, but the work published to-date implies that it is not necessary to mandate this at present.

A DNO suggested that initial generation security should be covered by commercial arrangements between the DNO and generator. However as generation becomes more important to secure local system operation the TSO/DSO may require the ability to ensure networks enable secure generation output and this may require guidelines in the form of a standard, even if it is cost benefit driven.

A generator indicated that if they were supplying balancing services then the cost of interruption is much higher than pure generation, similar to demand side industrial sites. However, they indicated that the margins are also higher, so provided that they were not exposed to punitive damages by National Grid

then this could be factored into the project costs. If they were also part of the network solution, then the additional benefit of providing resiliency services far outweighed the costs of disconnection events.

Academic institutes indicated that they did not believe that there should be a rule in any future security standard stating that generation (or energy storage) required the same level of connection security as demand. The purpose of any planning or design standard was to give guidance leading to the operation of the system, which should be done in accordance with relevant operating standards. These, in turn, should be defined to provide an appropriate balance between cost of infrastructure, cost of operating the system and the impact of unreliability. However, they noted that it did not mean that all generators' access to the market or energy users' ability to make use of it should always be constraint-free. Again, there should be a balance between the cost of network infrastructure and the cost of curtailment and replacement of generation that is constrained by lack of network capacity.

They noted, however, there could be some instances in which a more secure connection was particularly valuable to the DNO, the TSO or the generation/storage operator and in such cases; a CBA could be performed by one of the relevant parties. In some cases, the DG/ES[32] may have contractual obligations to the DNO or the TSO, and a less secure connection would increase the risk of failing to fulfil these obligations. They identified the question of who is responsible for a failure to deliver contracted services in the event of a disconnection due to network outages. At present, there is no clear and consistent guidance to DNO planners on how to identify the most economic solutions when facilitating generator access. They stated that the largely ad hoc arrangements that seem to have been put in place to date in respect of 'actively managed' connections placed almost all risk on the generator.

The standard should be extended to secure generation

3 responses (1 DNO and 2 non DNOs) expressed the view that there was a case to extend the standard in include generation.

The DNO noted that there had been insufficient analysis presented to fully address this question. They suggested that whilst the VOLL for generation was more easily verified and appears to be substantially lower than that of demand that the increasing volume of DG and the services that it will need to provide to the wider network indicated that a standard was needed at some level of aggregation of generation. They noted that services to help support system frequency and reactive power absorption are already in development and that consideration is needed of the availability of these resources if there is no security standard for generation at any scale of aggregation below 1320MW (or 1800MW).

Other responses suggested that securing generation would enable the Network Designer to fully understand the benefits of low Carbon Technology including Storage. They suggested that as DNO networks support a great deal of generation as well as demand, in the future they could support a great deal of electricity storage, which provides both import and export capability. In order to support the network and the system in general, it could be critical to maintain access to network resources such as generation and storage, so that services, such as frequency response could be reliably provided.

One response stated that they considered the securing of generation capacity and other non-network options (for example storage) in a manner consistent with whole system security to be a logical prerequisite to the increased use of dynamic arrangements to support demand security within the distribution network.

[32] Distributed Generator/Energy Supplier

Question 8
Regarding the options outlined in the options report, do you consider that the advantages and disadvantages for customers have been fully identified? If not, please identify, including additional benefit tests.

12 responses were received to this question, 6 from DNOs and 6 from non DNOs.

In total, 6 responses (2 DNOs and 4 non DNOs) expressed the view that the advantages and disadvantages for customers had been fully identified in the options report. Responses indicated that in general at this stage of the review process that the assessment seemed reasonable but consideration must be given to the future demands on the standard as networks evolve and become more flexible. One response suggested that such issues should be addressed now to establish a resilient planning framework for ED2 and beyond.

Customer advantages and disadvantages have been fully identified

It was indicated by one response that given the representation on the working group, the requirements of the customer as well as the Network Operators has been adequately considered at this stage of the review but acknowledged that the granularity of cost assumptions is necessarily coarse and further refinement work would be needed in later stages of the reform process. This was further supported by another response that indicated that they were unable to identify any additional advantages or disadvantages for customers that had not already been identified in the options report for this level and stage of the review. One response indicated that they were confident that the P2/6 review had been thorough, but noted that they did not necessarily agree with a number of the scenarios and assumptions made within the report.

A generator response confirmed that from their perspective as a network customer the options report covered the issues well.

Customer advantages and disadvantages had not been fully identified

6 responses (4 DNOs and 2 non DNOs) expressed the view that the advantages and disadvantages for customers had not been fully identified in the options report.

The DNO responses focused on the potential change in the level of service provided to customers particularly those in the 'worst served' category. They indicated that the way in which customers value their supply is not fully appreciated, this behaviour is subject to change if supply starts going off on a regular basis and that further information on the distribution of change in the level of service resulting for customers is needed.

DNOs responded that as a general statement customers severely dislike going off supply and care very little for the reason and as customers become more reliant on electricity as their primary energy source then they will become even less tolerant to faults that take them off supply for any length of time and the VOLL could potentially increase significantly once the events start unfolding. It was noted that particular customer needs above and beyond the requirements of generic VOLL assessment should be considered and the flexibility of any reformed P2 standard to accommodate the range of customers impacted would be a key test of that standard.

Before any decision is made to reduce the security of supply from the present P2 level, there was general support for further assessment of the potential cost saving and security reduction in order that all stakeholders could understand the trade off and provide informed feedback. This financial

assessment should take into account the increased network losses arising from the increased level of network utilization and analyse the effect on:

- increased customer interruptions associated with construction and maintenance outages;
- increased risk from events outside those catered for in the planning standard, and
- environmental and practical issues associated with increased use of mobile (diesel) generation.

One licence holder argued that at this early stage the options presented were not yet developed to a point where a customer could properly understand the impact of these proposals and that it was fundamentally not clear to what extent customer choices, charges and design inputs would influence such factors in a future standard. Further work would be required ahead of any consultation upon a specific change as to the nature of the customer change, influence and impact associated with a reformed P2 standard.

One academic response noted that the value of security and the cost of interruption was not uniform across all customers and customer interruptions are not shared fairly across all customers; so the impact of any change in the standard could have a large number of effects which are almost impossible to assess at this stage. They noted that this problem is further exacerbated by the fact that degradation in security of supply could take place several years after the change in the standard and by a lack of knowledge of how different customers would participate in demand response or demand management schemes aimed at enhancing security of supply. They suggested that there is no straightforward answer to the question, and while the reports quantify the financial impact of different levels of reliability, some sort of trial may be required to assess other impacts on customers. It was noted that a reduction in system losses represents a potential benefit to customers and shown to be of significant value, but did not feature in the consultation process.

Question 9
Is it feasible to implement any reform to the security standard during the period of RIIO-ED1? If, not what would be the most appropriate timescale?

11 responses were received to this question, 6 from DNOs and 5 from non DNOs.

In total, 8 responses (3 DNOs and 5 non DNOs) expressed the view that some form of reform to the security standard was feasible during the RIIO-ED1 period. 3 responses (3 DNOs and none of the non DNOs) expressed the view that it was not feasible during the RIIO-ED1 period, but some did confirm that they believed some very minor reform may be possible during the period of RIIO-ED1 depending on the level of complexity and significance.

Not feasible to implement reform during RIIO-ED1

The main issues identified by the DNOs regarding any reform during the RIIO ED1 period included the potential conflict with the price control agreement, the impact on stakeholders and the time taken to prepare for any substantial reform.

One DNO clearly indicated that it would not be feasible to implement significant changes to the security standard during the RIIO ED1 period, as it was likely that they would conflict with the assumptions that underpin the price control settlement. They noted that the implications of any security standard changes

on DNO expenditure (capital and operational) and interaction with the IIS framework and Load Index arrangements would need to be assessed for materiality before they were implemented.

DNOs noted that stakeholder engagement was a significant element of the RIIO ED1 price control and therefore the impact of changes on stakeholders, especially where it conflicted with their express expectations for RIIO ED1, needed to be properly consulted upon. They indicated that it would be more appropriate for any material changes be deferred to RIIO ED2 but they would need to be agreed in sufficient time for DNOs to use any new standard to prepare their RIIO ED2 plans and that stakeholder expectations for RIIO ED2 should feature in the decision on implementation. One DNO believed that detailed development, consultation, regulatory agreement and implementation of any substantial change to P2 was unlikely to be ready to implement significantly before RIIO ED2

This position was supported by the other 2 DNOs indicating that they believed that the most appropriate timescale for implementation was in good time for the RIIO-ED2 price review. Implementing reforms within RIIO-ED1 could be inefficient given the scheme timelines and lifecycles. They were concerned over the degree of investment change needed and whether this would be encompassed within any reopener criteria.

Feasible to implement reform during RIIO-ED1

8 responders expressed the view that some level (even minor) of reform to the security standard was feasible during the RIIO-ED1 period. One response expressed the view that the reform should be completed before the end of the RIIO ED1 period, while others noted that some degree of change was practical and desirable during RIIO ED1, but the main concern was to prepare the reform during RIIO ED1 in preparation for implementation at the start of the RIIO ED2 period.

DNOs suggested that it was feasible to implement some degree of changes in this price control period, especially the integration of some of the non-network reinforcement solutions that requires little in the way of consultations and codifications. They suggested that complete reform would require more time and further analysis to assess the impact of the reform on other stakeholders that use ER P2/6, suggesting that RIIO ED2 could be a reasonable target. One licence holder suggested that it was critical in order to take the P2 work forward, that the workgroup produced a prioritised programme of measures to evolve the existing standard in areas in which it was currently silent or unclear relating to the new challenges of operation and planning within distribution systems and across whole system issues. They indicated that such measures may be practical during RIIO-ED1, such that this work would ultimately inform RIIO-ED2 discussions. They indicated that, on the basis of the material provided they considered at this time the case for more widespread reform of the P2 standard was not fully formed and the arguments for these changes were not suitably robust to justify an extended period of significant change in a fundamental standard subject to more immediate considerations.

One DNO suggested that the reforms could be prepared and tested within the RIIO-ED1 period, but not implemented until the following period; alternatively it could involve a phased introduction. In addition, they recommended a trial period in carefully selected areas, to assess any potential impacts, though this would be have to be carefully designed and managed due to the timescales involved.

A trade body clearly stated that reform is required before the end of RIIO-ED1 in 2023. They indicated that the networks are already significantly different to those originally covered by P2/6 and for the remaining period of RIIO ED1 (6 years) the networks would change radically and the new standard needs to be ready for this new environment.

Another trade body supported this view and suggested that reforms to the standard should be implemented as soon as practicable (regardless of RIIO-ED1 or any other timescales) since any required/desired modification to P2 should not have to wait for any 're-financing period'. They maintained that the standards are only subject to the RIIO-ED1 timeline by virtue of any DNO/Ofgem collaboration and interface issues. Another non DNO stated that implementation of the reforms should be considered ahead of 2023, and that the reforms should be seriously considered for implementation as soon as possible and ahead of the end of RIIO-ED1 in 2023.

Question 10
What are your views on the use of deterministic rules ("look-up" tables) in a revised or reformed standard?
How could such tables be developed to include non-network technologies and/or relaxing of the present rules on network security?

13 responses were received to this question, 6 from DNOs and 7 from non DNOs.

In total, 12 responses (6 DNOs and 6 non DNOs) expressed the view that some form of deterministic rules ("look-up" tables) should form part of any reformed standard while only 1 non DNO respondent did not agree with this view.

Some form of deterministic rules should form part of any reformed standard

Some responses fully supported the use of the deterministic approach due to its simplicity and its aid to promoting transparency, while others suggested that the approach had some (but limited) appeal, depending on its implementation due to the wide variety of technologies that would need to be included in the potential set of "look-up" tables.

The DNOs in favour of the use of "look-up" tables stated that this approach would continue to give transparency to the regulatory process, provide good, clear explanations to customers and provide clear justification where planning or other consent issues are involved. Further statements indicated that as long as they are based on thorough analysis, they had a place in any future security standard. However, it was also noted that such an approach can be over-simplistic, particularly if they fail to take account of surrounding network topology and other specific factors.

Retaining the deterministic approach and employing lookup tables may potentially simplify the structure and interpretation of the security of supply requirements. These "lookup tables" if adopted should have supporting documents with more detailed information and analysis. It was suggested by many that the format and structure of ETR130 was a good representation of what is required to develop these tables.

Responses went on to argue that deterministic network planning rules were simple, cheap to apply and transparent, but recognised that they may not always result in the most cost efficient networks through the complete lifecycle of a network; however they believed that it should be possible to develop deterministic tables that result in a network that is not so far from the 'economic' network to warrant moving to a CBA approach. They stated that CBA based planning rules will be inherently complex, less transparent (as the assessment itself will be more complex, more expensive to implement and based on a wider range of assumptions which themselves may be subjective).

Further supporting the use of this deterministic approach, responses indicated that in addition to retaining deterministic rules to establish the degree of security required, they were also of the view that

it should be possible to develop a set of look up tables for assessing the security contribution of non-network technologies. Again they recognised that this approach might not result in the most economic network through the lifecycle of the network, but believed that this would result in designs that would not be so far from the 'economic' network to warrant moving to a bespoke analysis approach.

It was noted that the "look up" tables would need to be based on a probabilistic assessment across a range of scenarios for each non network technology and that there is an increasing body of knowledge developed through innovation projects (including LCNF and NIA/NIC projects) that could be used to assist in the production of such tables, in addition to monitoring data from the generation connected since P2/6 was first published.

DNOs noted that deterministic rules and tables are easy for planning staff to use but they were likely to become excessively complicated in the future and therefore difficult to maintain. However, some suggested that as the industry moves away from deterministic rules to a more probabilistic approach, specific rules and tables will have less of a part to play in the overall process. Cost benefit based approaches may be more aligned with the requirements of the RIIO price control framework.

One response provided a note of caution and stated that the "look-up" tables illustrate an endemic problem within the existing planning standard; the existence of these simple, easy-to-apply rules may appear beneficial to DNOs and customers, but in fact they can allow planning decisions to be taken without adequately considering or understanding network risk.

It was agreed by many respondents that "look-up" tables used for non-network assets are an attempt to fit inherently variable resources into this deterministic system. Their existence allowed network design to take place without considering many of the specifics of a given non-network asset, and without considering the levels of risk and uncertainty that would result from depending on such an asset. Many responses agreed that if "look-up" tables were to be included, they should undergo a thorough re-analysis, and explicitly state the confidence levels of any contribution from the non-network asset. In the case of intermittent assets, some recommended a case-by-case CBA, to consider the specific site details and commercial arrangements, before allowing it to contribute to network security.

One academic acknowledged the benefits of such deterministic rules for incorporating distributed resources within the security standard, in terms of ease/speed/cost of decision making, and in terms of the range of engineers who will be able to apply the standard as written. However, they reiterated that such an approach should have a systematic basis either in the resources' contribution in a risk calculation which is relevant to the real system under study, or as a natural extension of how the standard would look without the presence of distributed resources. They confirmed the need for any approach to incorporate distributed resources should recognise the diversity of performance of different units of the same technology and be based on a sufficiently large set of observations of generator performance. They argued that using a single generic set of parameters for all units of a given technology might in some areas result in significantly degraded security of supply

A developer stated that the sole use of deterministic rules is not practicable and that alternative methods, which may use a blend of tables and economic analysis tools such as CBA, must be further researched and analysed before implementation. A second response indicated that there are advantages in encouraging a market response to the need for security. Compared to a CBA, which might be undertaken differently in different regions and by different engineers, they stated that "look-up" tables would set a level playing field amongst technologies and techniques able to provide security benefits. This should allow the market to estimate potential applications across the country and to orient its solutions accordingly.

Some form of deterministic rules should not form part of any reformed standard

Only 1 response expressed the view that the "look-up" table approach should not be adopted in any future reform as in their view, the approach did not provide the optimal outcome for network planning and hence did not provide the necessary level of benefits to network users.

Question 11
Recognising that there will be a trade-off between economic efficiency of any new deterministic rules, the variables that can be considered, the ease of use of developed rules, and the network planning scenarios that can be covered, there may be a need for flexibility to permit network planning outside of the deterministic rules where necessary. It would therefore also be appropriate to supplement such a revised standard with obligations on DNOs to conduct other economic analysis where new deterministic rules are not appropriate. Do you agree that network operators existing licence obligations adequately meet this requirement. Please explain your reasons.

12 responses were received to this question, 6 from DNOs and 6 from non DNOs.

In total, 11 responses (6 DNOs and 5 non DNOs) agreed that network operators existing licence obligations adequately meet this requirement.

Agree that existing licence obligations meet the requirements

DNOs supported the statement that existing licence obligations adequately meet this requirement obliging efficient and economic developments of networks supplemented by the ability to use derogations. The existing licence obligation provides guidance and details the expectations on the approach DNOs should consider when developing and designing their networks. The terms and conditions of the licence have to become more detailed and explicit if there is a requirement to conduct detailed economic analysis in cases where the existing deterministic specifications are inappropriate, one of the licence conditions refers to ER P2/6 as the security standard the DNO has to adhere with.

A DNO indicated that they are required to justify expenditure proposals at price controls and the review of DPCR5 output delivery and expenditure re-openers required DNOs to demonstrate that expenditure had been efficiently incurred. It would seem that a cost benefit driven standard is consistent with such an approach and that consideration should be given as to whether any deterministic elements become redundant with increasing need for cost benefit appraisal.

One DNO suggested that it was not altogether clear to what extent existing licence obligations meet this requirement. A revised security standard should therefore make clear the obligation for a DNO to identify those parts of the network where, typically due to local factors, the deterministic standard could be inadequate. The deterministic rules in ER P2 are effectively heuristics, but because of the terms of the DNO license, they are treated as facts. They stated that the key to employing any heuristics is knowing when to diverge from it, and that ER P2 did not make clear provision for this.

A trade body indicated that, in their opinion, the current arrangements whereby DNOs are allowed a level of discretion under the rules applicable to derogations provided sufficient scope to vary the given standards without any requirements for further 'flexibility'. Also, as new connections planning tasks are further outsourced to competitive tendering (via ICPs[33]) they would suggest that this could bring a level

[33] Independent Connection Providers

of confusion as to exactly what is or is not acceptable to support network extensions and re-configurations.

Did not agree that existing licence obligations meet the requirements

Only 1 response from a non DNO did not agree that network operators existing licence obligations were able to adequately meet the requirement to permit network planning outside of the deterministic rules. The reason expressed by one trade body highlighted the issue relating to the lack of flexibility enabling the network planner in delivering the solution. They indicated that deterministic rules are rigid and may not provide the required flexibility or deliver the optimal cost solution, particularly in an environment that will need to cater for future unknown technology solutions or novel approaches. They suggested that an economic analysis approach, such as CBA, would allow proper analysis of the most appropriate way to deliver a lowest cost network. It would also allow for flexibility in incorporating new approaches and technologies (with valid current costs at the time of analysis) as they emerged. Also, they stated that connections are likely to be policy driven and DNOs need to be well placed to respond with a flexible approach.

Question 12
In order to provide consistency and transparency, in the planning process, would there be merit in providing guidance for DNOs on how to undertake economic assessments as outlined in any of the proposed reform options. Please explain your views and reasoning in your response.

13 responses were received to this question, 6 from DNOs and 7 from non DNOs.

All 13 responses expressed the view that there would be merit in providing guidance for DNOs on how to undertake economic assessments. The responses and statements made by licence holders and industry parties supporting this view are summarised below.

Responses noted that it is important that customers across all regions with identical issues are treated consistently and that clarity is also needed to ensure that DNOs understand what needs to be done to meet regulatory compliance and that DNOs follow the same process when undertaking economic assessments. This would lead to consistency of interpretation; clearly identifying the skills required and enable stakeholders to have confidence in the terms of regulatory settlements.

The majority of responses suggested that it was important that common, agreed, consistent and transparent processes are used by all designers within the network operators, providing uniformity and reducing the possibility of mistakes or misinterpretation which can lead to disputes. Where possible the approach should build upon economic assessment techniques already commonly accepted across the industry. However, it was also noted that guidance for the planning process should not be the prerogative of only the DNOs. Where necessary, customers, their agents, developers, and ICPs will require visibility of the economic assessments employed in any revised connection and planning process.

One response indicated that any standards should allow DNOs to use outputs such as VOLL both as absolute and relative cost metrics in assessing and justifying schemes.

One DNO indicated that whilst they would recognise and support the point that in use of P2 as with other standards economic analysis techniques form an important and often critical element of the assessment, they suggested that this matter was a separate question to what a future P2 standard may contain.

They would welcome further guidance and advice in the use of economic assessment techniques, but indicated that there was equally risk in such guidance becoming inflexible and overly prescriptive against the context of an evolving, more flexibly managed distribution network.

One DNO suggested that during economic assessments, guidance could usefully be provided, preferably in the form of case studies that have been allowed or that would be allowed, and that could serve as a template or example for similar future analyses.

An industry party raised the issue that if the planning standard were to be abolished, DNOs would be free to carry out CBAs in any manner they saw fit and as each DNO is responsible for running a cost-effective network, they could be adequately incentivised to consider losses even if this were not included in any planning standards.

Question 13
Do you believe the existing RIIO incentives are sufficient to support an entirely non-deterministic standard or removal of the security standard altogether? Please provide the reasons for your response.

8 responses were received to this question, 6 from DNOs and 2 from non DNOs.

None of the responses expressed the view that the existing RIIO incentives were sufficient to support an entirely non-deterministic standard or facilitate the removal of the security standard altogether.

In total, 8 responses expressed the view that the existing RIIO incentives would not be sufficient to support an entirely non-deterministic standard or removal of the security standard altogether.

DNO responses suggested that a security standard provides an important baseline to maintain network security and integrity. Regulatory incentives such as the Interruptions Incentive Scheme (IIS) can be a driver for network security but the need to maintain a Security of Supply Standard remains. The new RIIO structure for price controls has a significant focus on outputs, but they indicated that compliance with the security standard can have a significant lag before the results are evident in those outputs and hence some assessment of the inputs to this process are needed. They stated that RIIO-ED1 was not a replacement for ER P2/6, and incentives alone are not sufficient to ensure security of supply.

One DNO identified that without ER P2/6, determination of system reinforcement schemes would be a completely different process. Currently, the size of group demand prescribed the minimum level of security requirements; perhaps this could change to include Customer Interruptions (CI) and customer Minutes Lost (CML) benefits which are currently treated as OPEX. Hence, they stated that the existing RIIO incentives would be insufficient to support a non-deterministic standard or abolition of the security standard.

A DNO added that in their view it was ER P2/6 which underpins the inherent security of supply in GB and that the IIS framework provides additional incentive to provide an enhanced service. A key difference identified between ER P2/6 and the IIS is that that ER P2/6 is focused on demand whilst the IIS is focused on numbers of customers; hence the IIS encourages DNOs to think more carefully about the implications for customers.

It was noted that the RIIO ED1 settlement includes an obligation to deliver particular outputs, including the forecast level of network risk as measured by Load Indices. The definitions and measurement of

Load Indices are linked to the ER P2/6 security standard. Removal of the standard would therefore bring into question how the Load Index should be assessed and how risk could be assessed in a common manner across all DNOs.

An academic institute noted that the RIIO incentives could encourage under-investment in the networks, taking the chance that most customers will escape interruptions in any given year, and that the CI and CML costs for the remaining customers can be borne as an inescapable business cost. While this could indeed lead to lower costs in the shorter term, they suggested that the increasing risk of larger interruptions, up to and including HILP events, would probably be unacceptable to customers and to the national interest. Therefore, they argued that given the existing RIIO incentives, a planning standard such as P2 (whether deterministic, probabilistic or hybrid), provided a more effective means of regulation. However, if the planning standard were to be abolished, they believed that the RIIO incentives would need to be fundamentally reviewed to ensure that they led to sufficient security of supply.

Question 14
Should the present planning standard be abolished completely? Please provide the reasons for your answer and cite any supporting evidence.

13 responses were received to this question, 6 from DNOs and 7 from non DNOs.

One non DNO response expressed the view that the present planning standard should be abolished completely. The reason expressed in support of abolishing the planning standard was that they believed that there was strong evidence it would improve economic outcomes.

In total, 12 responses (6 DNOs and 6 non DNOs) clearly expressed the view that the present planning standard should not be abolished completely. Typical statements in support of the updates included proposing that additional guidance should be included in any reformed standard and that a minimum set of planning rules should be provided to demonstrate transparency in the design of network security.

Not in favour of completely abolishing the planning standard

A DNO offered a series of views as to the strengths of ER P2, the level of demand security prescribed in the present standard helps to deliver the security of supply that customers experience and that the feedback from customers is that this level of security is about right. The strengths of the current P2 standard were stated as it:

- Implements probabilistic assessments deterministically.
- Increases the required resilience with demand / number of customers.
- Provides resilient networks that cater for a wide range of contingencies – particularly for large load groups.
- Is simple for all stakeholders (ranging from government to customers) to understand.
- Is clear and simple which brings advantages for all parties associated with wayleave hearings; a probabilistic standard would be more open to interpretation potentially resulting in increased costs in the wayleave process.

- Sets out a minimum standard free from short term market forces.
- Provides a backstop against which improvement can be justified in accordance with the IIS framework.
- Includes the option for obtaining a derogation for lower levels of security based on probabilistic and economic assessment.

Concern was indicated in one response that abolishing the standard completely would lead to each DNO developing its own security standards which would inevitably be different and result in customers across the country experiencing a wider variation of supply security than at present. This would cause confusion for customers seeking a connection or those designing new connections (e.g. ICPs). The use of different security standards would need to be carefully considered by Ofgem in how comparative cost assessment was applied for reinforcement & connection expenditure in the price control framework.

An industry party indicated that they believed the existing ER P2 standard had provided historically efficient investment decisions and clear planning and design outcomes enabling appropriate discretion in its application and efficiency in its combination with other complementary incentives.

They noted that ER P2 is currently a fundamental foundation across which technical standards, technical codes, customer performance requirements and customer charging decisions are based. As such a decision to remove the standard without fully responding to the areas of deficit it creates across the structure of current industry frameworks would lead to widespread incremental and cumulative impacts which would need to be adequately quantified.

A DNO indicated that a standard is required to provide a minimum set of rules to plan to and also to demonstrate transparency in the design of network security. The current standard should provide a basis to underpin the transition period to a new planning framework, there is strong evidence that this will improve economic outcomes and ensures consistency. They stated that ER P2/6 had served the industry well and that because of this it should form the foundation of any new standard, but any new standard should not be constrained by ER P2.

They went on to assert that the present planning standard is beneficial and should not be abolished completely, but there is a strong case for abolishing the planning standard altogether. It could be argued that its existence reduces the responsibility of DNOs to understand and mitigate network risk, to run cost-effective networks, and to find innovative solutions to any problems.

A further DNO did not support the abolition of ER P2/6 as they believed that it serves an important function in the overall network design process, defining a common approach to network security and should be retained, to remove it would lead to a lack of direction which would impact on both customers and the DNOs.

Question 15
From the five high level options outlined in the options report regarding the future of P2, what is your preferred option? Please provide the reasons for your response.

The high level options outlined in the Options report were (in summary):

Option 1- retaining the present deterministic P2/6 standard without revision

Option 2 - retaining a deterministic planning standard, but with improvement

Option 3 - implementing a non-deterministic planning standard

Option 4 - implementing a high-level standard that obliges efficient investment, while retaining some deterministic elements, representing a hybrid of options 2 and 3

Option 5 – full abolition of the planning standard

In total, 12 responses were received in response to Question 15. The responses provide a view as to the position and feeling of the industry on the most appropriate option to be pursued and form the potential focus of the next stages of the programme.

None of the responses were in favour of adopting Option 1 or Option 3 directly.

In total 6 responses were in favour of adopting Option 2 (4 DNOs and 2 non DNOs).

In total 5 responses were in favour of adopting Option 4 ((2 DNOs and 3 non DNOs).

One non DNO response was in favour of planning for and moving straight to Option 5.

In favour of Option 2

Option 2 was recommended by some as they believe that it keeps the strengths of the existing standard (its simplicity), but provides improvements, including the inclusion of new demand and generation technologies, and improved security that should become available due to the inclusion of new plant and protection devices. They indicated that the standard must be able to properly consider demand and export loads, enabling the Network Operator to design networks and take advantage of any export capabilities in the designs.

DNOs indicated that this favoured option retains the present approach which they believed has served customers well over the decades. Retaining the present security of supply maintains the present minimum standard experience by customers and provides a baseline from which to improve security via the IIS framework. The required improvements relate to providing additional guidance on assessing the security contribution from non-network technologies.

One response noted that whilst the review into P2 has not clearly covered all areas in full, at this stage they could envisage incremental changes to be both practical and desirable to explore in the near-medium term, and that the case to go forward beyond such incremental changes towards an Option 4 approach in the longer term may be explored within that work to inform a subsequent review and consultation beyond the horizon of the RIIO-ED1 period.

In favour of Option 4

Option 4 was recommended by some responses as they identified that there is inherent appeal in having a standard that has a minimal deterministic level but over time the deterministic element could diminish and eventually become redundant. This approach would allow the standard to remain flexible and not require continual revision.

Some saw Option 4 (effectively a combination of 2 & 3) as implementing a security standard that promoted efficient investment, while retaining the benefits of some deterministic elements, representing the hybrid of options 2 and 3. They suggested that this option would retain the benefits of the current

standard and update it with the ability to better manage emerging Smart Grid technologies or scenarios which are more appropriately assessed using CBA and other economic assessment techniques and starts down the path of improved control and communication between assets connected to the network, a practical positive move towards 'Smartgrid'.

One response identified the preferred approach to be Option 4, but did not discount the possible benefits of Option 5. They stated that the complexity of the existing network would increase and cannot be addressed adequately by a fully deterministic standard but the effort and cost of carrying out an individual CBA for each proposed project would be prohibitive and unnecessary, given that many (most) reinforcement projects are of a standard nature. They indicated that a deterministic standard guides the DNO, while a purely probabilistic; CBA driven standard would require an unnecessary volume of work from the DNOs. They identified the effectiveness of a hybrid solution (Option 4 or perhaps leading to Option 5) would depend on clear guidelines as to the criteria for deciding when deterministic rules should be employed, and when a more searching CBA would be necessary and suggested that these criteria would need to be defined within Phase 2 of the fundamental review of P2.

The academic institutes suggested that in the relatively short term they supported the present broad framework, with:

- improved framing of the standard that leads to more consistent interpretation and application;
- greater clarity on the place of cost-benefit analysis relative to a 'deterministic' minimum standard; and
- a more systematically justified approach to accommodating distributed generation (with acknowledgment that substantial resource will be required to develop this better justified approach).

In favour of Option 5

One developer supported the adoption of Option 5, as they identified that it provides the most benefit, and reduces compliance costs. They stated that DNO's should adopt sensible CBA methodologies with respect to security of supply, and a general requirement should be placed upon them to do so but that this could be incorporated elsewhere other than in ER P2. They also suggested that if this approach was not possible, then Option 3 would be suitable as this is very close in character to Option 5 and if this was the case, care could be taken to ensure the CBA requirements were not overly onerous.

Question 16
The phase 1 work to date has concluded that any reformed standard should provide guidance as to the methods for the treatment of construction outages separately from maintenance outages and unplanned outages due to their longer term nature; this would include longer term outages for new build, asset upgrade, replacement and refurbishment. Do you agree with this approach? Please state your views, indicating your reasons.

13 responses were received to this question, 5 from DNOs and 8 from non DNOs.

In total, 11 responses (4 DNOs and 7 non DNOs) agreed that any reformed standard should provide guidance as to the methods for the treatment of construction outages separately from maintenance outages and unplanned outages.

In favour of including guidance for the treatment of construction outages

DNO responses indicated that often network construction projects are moved from what is considered the 'normal' maintenance period (within clock change April to October) to meet the needs of connected customers and outage constraints. They stated that specific guidance on the treatment of construction outages would always be welcome but irrespective of the outage type it was for the DNO to manage the network and always look to minimise risk to the customers irrespective of the time.

Other DNOs were also of the opinion that it would be better to consider construction outages at the same time as a review of P2 as they are related. For example, if there was a reduction in the level of redundancy of the HV network due to a revised standard this would increase the risks associated with construction outages on the primary system. However if the underlying security of supply was to remain unchanged then they agreed that treatment of construction outages could be treated separately.

One DNO identified value in a standard providing guidance in those factors to be considered in ER P2 reform and in the mitigation of construction access and risks in line with the more general objectives of P2 for maintenance activity in order to ensure there is alignment in focus across Transmission and Distribution. However they identified that given the greater range of actions possible in response to construction work, the greater variation of impact and the limited exposure to the activity over the lifetime of the installation, that setting overly prescriptive requirements upon the management of construction work would limit flexibility of response.

Further, a DNO stated that good practice takes into account construction outage risk and a cost benefit driven approach would allow DNOs to look at each case on its merits. All these DNO construction outages are risk assessed against IIS impacts and restoration options. Such an approach, they suggested, could easily be adapted in to the revised standard. Additionally the approach is driven by the overall incentive framework. They stated that construction outages are a special case and need to be treated differently in some respects, options for retaining the same level of network security during outages could include standby generation, standby network assets, performing preventative network reconfiguration in advance, and scheduling of construction projects to minimize risk. They favoured the inclusion of a restoration plan in the event of additional unplanned outages during a construction period, as is the general practice at present and that this was probably sufficient and fit for purpose.

One DNO indicated that the difference between unplanned and planned outages was that the timing of the latter can be controlled. A reformed standard and/or accompanying guidance should address this and promote DNO engineers' understanding of the key considerations and the differences between planned and unplanned outages and the different measures that might be used to mitigate their impacts.

One of the trade body's responses confirmed that clarity at connection offer and clear advance warning of such long term outages was needed. For new connections where such constraints are clear and understood prior to investment and implementation of the generation plant this would be acceptable but for existing plants with 'non-firm' connection agreements the impact of such long term outages would be severe.

Not in favour of including guidance for the treatment of construction outages

Two DNO responders disagreed that any reformed standard should provide guidance as to the methods for the treatment of construction outages separately from maintenance outages and unplanned outages.

They stated that the Security of Supply Standard should not provide guidance as to the methods for the treatment of construction outages separately from maintenance outages and unplanned outages due to

their longer term nature. They indicated that each DNO needed to consider its own policies with respect to long term outage risks and refer to ENA ER P30: Good Practice Guide for the Risk Management of Planned Long Duration Outages. From this, each DNO should set its own outage policy. It was recognised that construction outages carry a higher degree of risk due to their longer term nature. They concluded that it was important to remember that the Security Standard is a planning standard and does not necessarily fully consider all operational aspects.

One response indicated that the treatment of long term outages was an important issue, but one for an operating standard rather than a planning standard which should restrict its scope to the adequacy of the assets needed for long term security rather than temporary arrangements that may be needed under more extreme operating conditions.

Question 17
The present P2/6 standard does not directly consider common mode failures (CMF) and high impact low probability (HILP) event mitigation in network designs. The DCRP P2 WG consensus was that the planning standard should not include extreme events; such events should be dealt with by alternative regulatory mechanisms due to their low probability and unpredictable nature. Do you agree with this conclusion? Please indicate the reasoning in your response.

In total, 12 responses were received to this question, 5 from DNOs and 7 from non DNOs.

Responses in agreement with the DCRP P2 WG

10 responses agreed that the planning standard should not include extreme events including common mode failures (CMF) and High Impact Low Probability (HILP) event mitigation, 5 responses for this question were from DNOs and 5 from non DNOs.

DNOs were of the opinion that their networks generally performed well but when high impact events occur, they were generally only recoverable due to interconnection left by historic system design and growth. It was suggested that using customer numbers as a trigger for N-2 security enhancements maybe a good way to ensure large populations are not left exposed when things go wrong. DNOs were very aware (as demonstrated by the storms of winter 2013/14) that customers, industry and government were very critical if they could not recover supplies to their customers quickly even if they had built a compliant network.

It was suggested that as with construction outages, thinking on how best to manage HILP events should be carried out at the same time as a review of P2 as they are related. An example was provided: if there was a reduction in the level of redundancy of the HV network this would increase the risks associated with a common mode failure event or HILP event affecting the primary system. In such a scenario it would seem reasonable to develop and implement an approach to CMF and HILP events before the implementation of a reduced security standard for HV networks. However if the underlying security of supply was to remain unchanged then they agree that treatment of CMF and HILP events could be treated separately.

One response noted that this approach is compatible with application of the NETS SQSS.

A DNO stated that it was a pragmatic approach to the evolution of the existing standard however a cost benefit driven standard would allow all scenarios to be considered and if low cost solutions can address common mode risks then these can be accommodated. They noted that flooding has become a much

more significant issue as a common mode failure and further thought should be given to aligning security and resilience of supplies under a common framework.

A DNO confirmed that HILP and Exceptional Events should not be included in the security standard as such events should be treated as currently required under the current RIIO framework.

One DNO response indicated that CMF and HILP are different, and should be treated differently. They stated that CMF is not uncommon typically between 15 and 20% of all outages on EHV double circuits lead to customer loss, suggesting that CMF, consequent failure and coincidental failure added together occur on around 15 to 20 % of occasions. They believe that this is likely to increase as networks become more complex, and in particular with increased penetration of and reliance on multi-circuit control and communications technology. They questioned whether the traditional n-x analysis adequately represents this reality, and still more whether it will do so in the future.

Another DNO response concluded that HILP events by their nature are extreme. Quantitative evaluation of such events, multiplying tiny probabilities by huge consequences, tends to produce meaningless numbers that appear meaningful. The planning standard should not ignore HILP; it should incorporate it in a more qualitative way, valuing the extra flexibility provided by one solution rather than another as a justification for preferring the first over the second option.

A DNO noted that effectively these types of events are already discounted from the IIS as Ofgem recognises that the randomness for exceptional events justifies their exclusion and that this exemption is supported on the License Condition CRC 2D and the RIIO-ED1 Regulatory Instructions and Guidance Annex F. This led to the view that extreme events should not be added for inclusion within the revision of the Security of Supply Standard and that there needs to be a co-ordinated customer consultation and impact assessment before progressing with any action that could significantly impact customers' security of supply.

Responses that did not agree with the view of the DCRP P2 WG

2 responders disagreed that the planning standard should not include extreme events including common mode failures (CMF) and high impact low probability (HILP) event mitigation, both were non DNOs.

One response stated that when moving to a non-deterministic standard, and one that is backed up by increasing use of (maybe semi-autonomous) complex control systems, it becomes important to consider HILP and CMF. They indicated that this was probably the greatest risk to moving to a more actively controlled system and even if this is dealt with elsewhere, a check that incremental changes to the system have not created a potential CMF ought to be included in a CBA.

One response suggested that to the extent that additional network capacity might be 'the right answer' to a HILP event risk, it would be considered logical that they be incorporated in the ER P2 standard, as otherwise it would not be the planning standard which directly drives decisions on capacity requirements in some areas.

Question 18
The DCRP P2 WG are keen to understand if there are other security standard reform options that should be considered or important issues that have not been considered by the Consortium and DCRP P2 WG so far. Please provide details if you believe there are other high level security standard reform options or materially important issues that should be considered during this phase of the P2 review process?

There were 9 responses received to this question, providing a range of views and highlighting issues for further possible consideration and potential inclusion in further work.

It should be noted that none of the consultation responses were able to provide any additional options for potential future reform of the security standard. There was full agreement from the responses that all potential high level options had been identified during the earlier parts of the project and described in the options report.

While none of the responses to Question 18 were of a material nature and had already been considered in some form as part of the Phase 1 work, the following comments have been extracted from the responses that may be relevant for inclusion (or given greater emphasis) in Phase 2. In such cases the relevant responses have been summarised and noted below:

- Significant work has been undertaken within Europe on common planning principles across TSO and DSO control areas and is currently under discussion both in the normal planning event space and under emergency conditions, consideration of these developments should be included in the future phases of work;
- Greater analysis and understanding that if network operators contract for services to help support the network, can these new technologies always successfully deliver, and if not, can a contract and associated penalties for non-delivery ensure security of supply, and
- A move to a less deterministic approach would be acceptable if any proposals included consultation with customers and included an evaluation of the safety risks and third party costs as part of any Cost-Benefit analysis.

4 WHAT HAPPENS NEXT

This report provides a summary of the responses received from all interested parties to the stakeholder consultation, forming a key part of the Phase 1 review. This extensive industry consultation process was important to gather and understand the position and views of stakeholders at this point in the review; it also ensures compliance with the DCRP governance process.

The report summarises the responses made by the industry parties and records the number of responses provided for each question sub divided by the category of the respondent. It has not provided detailed comments or views from members of the consortium or members of the DCRP P2 WG in response to any of the points raised. There was no intent in this report to issue feedback on the validity (or otherwise) in response to the answers to the consultation questions. This report was specifically designed into the project to record and summarise the consultation feedback, preparing this feedback to be incorporated into the next phase of the analysis and help form the final set of recommendations.

The responses to the questions as summarised in this report will be used to inform the next part of the process (delivered through work stream 8) in which the consortium will work with the DCRP P2 WG to produce the final Phase 1 recommendations report. This will lay out the arguments and all the supporting evidence for the development route for any new standard while critically highlighting the benefits of such a route.

While not wishing to prejudge the outcome of the further review, at this early stage, it is clear from the quality and quantity of responses to the questions that a number of high level preferences have been identified. There is already a preference shown by all industry parties for some level of reform of ER P/6 and it is likely to include some further level of economic analysis supported by more detailed guidance (as illustrated in the support for Options 2 and 4). It is also clear that industry parties see a reformed standard including and recognising the contribution from non-network technologies to network security but that any potential reform should exclude the treatment of extreme events (in the form of Common Mode Failures or High Impact, Low Probability events).

The final set of recommendations to address these matters and the others analysed in the earlier stage of Phase 1, along with the consortium's view will be presented in the final recommendations report. Each option will be critically analysed on its own merits, including the industry views and comments provided through the feedback to this consultation. The combination of these sets of feedback will be used to help develop the arguments and approaches to be detailed for the favoured option that will in turn inform and shape the final set of recommendations for future development and further enhancements of the P2 security standard.

Appendix 1 –List of all organisations that responded to the consultation

The appendix provides the full list of all parties that provided a response to the consultation with the indication of their classification of "DNO" or "non DNO".

Organisation name	Main role or business
Western Power Distribution	Distribution Network Operator (DNO)
SSE Power Distribution	Distribution Network Operator (DNO)
Northern Powergrid	Distribution Network Operator (DNO)
Scottish Power Energy Networks	Distribution Network Operator (DNO)
UK Power Networks	Distribution Network Operator (DNO)
Electricity North West Limited	Distribution Network Operator (DNO)
Northern Ireland Electricity Networks	Distribution Network Operator (DNO)
HVMS Power Engineering	Connections business (non DNO)
GTC	Independent Distribution Network Operator (non DNO)
Electricity Storage Network	UK Trade body for electricity storage (non DNO)
Office of Rail & Road	Rail and Road Regulator (non DNO)
Noriker Power Ltd	Project Developer (non DNO)
Electric Power Systems Research Group Newcastle University	Academic (non DNO)
School of Engineering and Computing Sciences Durham University & University of Strathclyde (Joint submission)	Academic (non DNO)
Renewable Energy Association	Trade body for the renewables industry (non DNO)
National Grid	Transmission Network Operator (non DNO)
Solarcentury	Solar PV project developer and Construction (EPC) company (non DNO)
Origami Energy	Technology developer (non DNO)

Appendix 2 –Tabulated summary of number of responses to consultation questions

This appendix provides a tabulated summary view of the number of responses, identified as from DNOs or non-DNOs. Note that in the table below, the statement of the question in the left hand column has been summarised by the authors to aid understanding of the table and simplify the table structure. All responses were provided to the full statement of each question as provided in detail in Section 3 of this document.

Summarised Consultation Questions	**Totals**	**DNO**	**Non DNO**	**DNO**	**Non DNO**	**DNO**	**Non DNO**
Question 1	**Total**	**Revise**		**Radically Reform**		**No change**	
Revise or radically reform?	14	6	5	0	3	0	0
Question 2	**Total**	**Does not merit** potential outage frequency/duration increase.		**Unable to provide view**			
Tradeoff between bill reduction and potential outage frequency/duration increase.	15	6	9	0	0		
Question 3	**Total**	**Yes**		**No**			
Reformed standard to include contribution from non-network technologies?	14	6	8	0	0		

Summarised Consultation Questions	Totals	DNO	Non DNO	DNO	Non DNO	DNO	Non DNO
Question 4	**Total**	**Yes**		**No**			
Is the balance in P2/6 correct between the level of deterministic rules and non-deterministic alternative processes i.e. CBA and derogations?	12	5	3	1	3		
Question 5	**Total**	**little/no merit**		**possible merit**			
Is there Merit to include economic assessment?	14	2	1	4	7		

Summarised Consultation Questions	Totals	DNO	Non DNO	DNO	Non DNO
Question 6	**Total**	**Advantage**		**Disadvantage**	
Possible alignment with NETS SQSS?	10	5	3	1	1
Question 7	**Total**	**Should NOT BE included**		**Should BE included**	
Extend demand security to generation?	13	5	5	1	2
Question 8	**Total**	**Yes**		**No**	
Advantages/disadvantages to customers fully identified in the options assessment.	12	2	4	4	2

Summarised Consultation Questions	Totals	DNO	Non DNO	DNO	Non DNO
Question 9	**Totals**	**Yes**		**No**	
Feasible to implement reform during RIIO-ED1?	11	3	5	3	0
Question 10	**Total**	**In favour**		**Against**	
Use of deterministic rule based "look-up tables" in a revised standard.	13	6	6	0	1
Question 11	**Total**	**Yes**		**No**	
Does existing DNO License adequately cover inclusion of economic analysis where deterministic approach is not suitable?	12	6	5	0	1
Question 12	**Total**	**Yes**		**No**	
Is there merit to provide guidance for economic analysis in any revised or reformed security standard?	13	6	7	0	0

Summarised Consultation Questions	Totals	DNO	Non DNO	DNO	Non DNO	DNO	Non DNO	DNO	Non DNO	DNO	Non DNO
Question 13	**Total**	**Yes**		**No**							
Are RIIO incentives sufficient to support an entirely non-deterministic standard?	8	0	0	6	2						
Question 14	**Total**	**Yes**		**No**							
Should the present planning standard be abolished completely?	13	0	1	6	6						
Question 15	**Total**	**Option 1**		**Option 2**		**Option 3**		**Option 4**		**Option 5**	
Favoured option?	12	0	0	4	2	0	0	2	3	0	1
Question 16	**Total**	**Yes**		**No**							
Should standard provide guidance for treatment of construction outages separately from maintenance?	13	4	7	2	0						
Question 17	**Total**	**Agree**		**Disagree**							
Standard **should not** include extreme events such as CMF and HILP events.	12	6	4	0	2						

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