



Northern Powergrid's response to the ENA's consultation on Future Worlds' Impact Assessment

Key Points

- The Impact Assessment makes an important contribution to the DSO debate, albeit within the limits of applicability of its results, as explained comprehensively by Baringa. The various responses to this consultation will form an interesting open debate, and support the creation of an objective evidence base to inform policy making.
- A decision by the policy maker and regulator for a DSO transition path is required to inform ED2 business planning.
- Generally, we think the methodology deployed in the Impact Assessment is a useful piece of work to inform policy making:
 - We welcome the fact that the benefit of synergies between network and system operation as maximised by "World A" has rightly been identified – we support this with tangible examples in this response - as has the importance of clarity of accountability for performance between parties.
 - There are a few places where we contest the scores, and expect other respondents will do the same. This scrutiny will enhance the quality of the product.
- The validity of the Impact Assessment is limited in at least two places:
 - The benefits assessment very likely overstates the value for avoided distribution network reinforcement because it omits to consider smart network flexibility solutions as a third, lower cost, option to sit alongside customer flexibility or network reinforcement.
 - Acknowledging that there are four use cases for a network-led customer flexibility market and reflecting that throughout the assessment would have led to a more nuanced and stronger qualitative and quantitative assessment.
- We understand the value of summarising the results in a trade-off table, but think that all criteria are not equal, and are very uncomfortable that technical performance (i.e. reliability of the system) has been omitted. It is a material strength or weakness by which to compare the worlds by because it is the output that our customers prioritise consistently the most. It is also important to note that society as a whole puts more weight on the overall value of system reliability than a purely economic analysis.
- We suggest that further work would be beneficial if it studied the interaction between network-led customer flexibility markets and the competitive energy markets led by retailers or other parties.

Responses to the questions

General questions

Q1. Please confirm which stakeholder group you believe that you belong to; this will enable the Open Networks Project to understand the spectrum of respondents to this consultation.

1. Northern Powergrid runs the electricity distribution network that provides power to customers in the Northeast, Yorkshire and northern Lincolnshire. We are responsible for the safe, secure and cost-effective delivery of electricity to around eight million people in 3.9 million homes and businesses.
2. In practice we operate as one company, but we are regulated by the energy regulator, Ofgem, as two licensed businesses: Northern Powergrid (Northeast) Ltd and Northern Powergrid (Yorkshire) plc.

Q2. Please provide your views on Baringa's interpretation of the Future Worlds, detailed in Section 2, for the purpose of this impact assessment and the overall approach, highlighting any key strengths or weaknesses, or areas which should be explored in more detail?

3. We think that the interpretations made by Baringa are reasonable, and recognise that the Future World's current definition is too high-level to serve as a basis to develop fully fledged commercial models or, as mentioned in the Baringa report, to identify where ultimate accountability lies. **The issue of clear accountability is not a minor issue, and we welcome the fact that it is picked up in the qualitative assessment** ('Clear dischargeable accountability for technical performance').
4. However Baringa seems to have made another assumption without making it explicit. Network-led customer flexibility opportunities are of four types, as defined by Open Network's Product 2 of Workstream 1, 2018¹: Scheduled Constraint Management, Pre-fault Constraint Management, Post-fault Constraint Management, and Restoration Support. The qualitative and quantitative assessments seem to mainly focus on the Scheduled Constraint Management type. This is evident in two places. First the methodology opposes customer flexibility with network reinforcement (typically a solution to address known constraint). Second it fails to discuss the much more dynamic scenarios of pre-fault and post-fault in which the time it takes for the system operator to decide on the optimal system solution has an impact on the service level delivered to the customer (i.e. interruption time); and this should be captured somewhere in the qualitative assessment. We have discussed how this affects the results later in our response (see paragraph 29 vii).
5. On the coordination mechanisms in place in World B: 'assumption the DSO needs should be prioritised, with residual flexibility offered by distributed energy resources (DER) being available to the ESO. Where the distribution networks are not constrained, the full flexibility from DER

¹ Available from: www.energynetworks.org/assets/files/ON-WS1-P2%20DSO%20Service%20Requirements%20-%20Definitions%20-%20PUBLISHED.pdf

could be offered to the ESO': Baringa seems to have gone beyond the thinking taking place elsewhere in the Open Networks programme. This will need further consideration in Product 5 from Workstream 1a and Product 3 from Workstream1b.

Executive summary

Q3. Do you agree with the conclusions and insights within the Executive summary? If not, please explain your rationale. Please provide reference to more detailed comments against individual sections if this is appropriate.

6. We generally agree with the conclusions and insight drawn within the limitations of the methodology.

Transition paths

Q4. Do you agree with the options set out as potential transition paths?

7. Yes, but suggest introducing the acknowledgement that the trigger point 'DER uptake' will occur at different times in different parts of GB which has implication for the transition paths, the timing of stage 1 and 2 and the value that can be generated from the deployment of customer flexibility.
8. As an example, the level of network constraint on the Northern Powergrid network was much lower compared to other licence areas in 2016²; and statistics of vehicle licencing issued by the Department for Transport already show a variance between regions of England, with the North East being well behind all others.
9. We also understand that the onus is on the network operator to demonstrate that the likelihood for the conflict of interest risk to realise itself is low, thanks to mitigation solutions that are effective and that stakeholders are satisfied with.
10. Options as set out in the Impact Assessment now need to be considered by Ofgem and BEIS such that preferences for a future world or a transition path may be provided ahead of business planning for RIIO-ED2.

Q5. Do you believe there are any other viable transition paths? If so, please explain why.

11. We consider that the conclusions drawn about viable transition paths are sensible. We have no alternatives to offer at this time. Q6. Do you agree with the assumption that all transition paths start in Stage 1 of World B?
12. Yes. It is in effect the world we have been in since most network operators have started to run their own customer flexibility offers.

Further work

² www.ofgem.gov.uk/ofgem-publications/111164

Q7. Do you agree with the areas identified for further work in the 2019 workplan and the further work ideas in the impact assessment or do you feel there are other areas of work that should be prioritised to progress in this area?

Q8. What future work do you believe would enhance the debate and body of evidence around transitioning to the potential Future Worlds?

13. Yes, and we also suggest another area of further work looking at the interaction between different local energy markets.
14. We suggest a fifth area of possible further work. The Future Worlds structure focusses on the interaction between transmission and distribution network-led customer flexibility markets. This omits the interaction between network-led customer flexibility markets and competitive energy markets led by retailers or other parties (i.e. Time-of-Use tariffs deployed to serve either a balancing need or a wholesale procurement strategy at the energy supplier level).
 - i. In parallel to the distribution network operators (DNOs) transitioning to DSO, the energy market (wholesale and retail) is evolving too, and finding ways to tap into the value of DER. It is deploying a vision for a retailer-led customer flexibility market, enabled by smart meters and half-hourly settlement.
 - ii. At present, the work done by the industry on DSO is looking at the Transmission and Distribution interface, the Distribution and Customer interface, but not much is done on the Distribution and Retailer interface. The issues of synchronisation between the retailer-led customer flexibility market and the network-led customer flexibility market remains out of scope of the Future Worlds when the benefits of including them could be strong. Coordinating actions of networks and retailers could serve to optimise the whole system outcomes for the customer (from a financial and also decarbonisation perspective).
 - iii. Northern Powergrid's innovation project Customer-led Distribution System (CLDS)³ has recently explored the need to establish rules that will coordinate network-driven flexibility markets with energy retail-driven flexibility markets:
 - In a world where networks operate a flexibility market on top of a local energy retail market, it is important to identify the pieces of the energy supply chain from where we are seeking to maximise value (i.e. what asset and for whom?).
 - This then allows market configuration principles that are necessary to coordinate different network-driven markets with energy retail markets, particularly if there are competing objectives (for instance between network and balancing needs) – because price signals alone do not reflect the preferred prioritisation and thus fail to organise the customer flexibility procurement according to a hierarchy that maximises the outcome(s) for the energy system.

Benefits assessment

³ Reports to be published in May 2019 on: www.northernpowergrid.com/innovation/projects/customer-led-distribution-system-nia-npg-19

Q9. Do you agree or disagree with the four categories of system operation benefits identified? Are there areas that should be excluded from the list and/or other areas that should be included?

15. We agree with the four categories of system operation benefits identified.
16. In order to give a sense of scale to the 'size of the prize' put forward in the Impact Assessment, we think it important to remember that our most significant driver for network investment is not capacity but the condition, performance and safety of our assets: asset replacement for such reasons represents 48% of our network investment costs – and 16% of our total planned RIIO-ED1 investment, compared to 11% and 4% respectively for reinforcement⁴. This means that asset replacement work can sometimes be the most efficient way to resolve a load-related constraint if the forecast timing of the constraint and the scheduled replacement are reasonably coincident. It is a good example of the customer benefit resulting from the shared responsibility of network operation and system operation.
17. We limit the rest of our responses about benefits assessments to the 'Avoided Distribution investment' category.

Q10. Do you agree, disagree on the key benefits assumptions contained within Appendix B (eg all Worlds, apart from World C, achieve the same benefits by 2050 etc) and used in the impact assessment? If you disagree, please explain your reasoning. Do you have any other comments?

18. We answer for the 'Avoided Distribution investment' category where we consider the Impact Assessment would be more accurate if it included network flexibility solutions.
19. The units used in the calculations are national averages and as such do not reflect the fact that the cost of deploying a network solution varies a lot on a site by site basis.
20. More importantly, throughout the Impact Assessment report, the choice between customer flexibility and network reinforcement is perhaps incorrectly presented as a binary one. In reality, assets are placed for a number of reasons and a replacement for a different driver could have a synergistic benefit of also increasing network capacity if the timing is right. Also, solutions could involve smart network flexibility solutions such as enhanced bespoke ratings, real time thermal rating devices, enhanced voltage control, etc. which can increase headroom at a lower cost than network reinforcement and the Impact Assessment fails to acknowledge this. In parallel to introducing customer flexibility in their toolkit, network operators have been investing in replacing out-of-date, communication and control infrastructure which is laying the foundation for smart grid technology, that will give them the ability to address network issues generated by the uptake of low carbon technologies, or DERs, using *both* smarter network solutions as well as customer flexibility solutions.
21. This point is of significant importance for the benefit category under consideration because it reduces, in principle, the contribution that customer flexibility can make to avoiding reinforcement, since flexible network solution are an alternative, that will come to no incremental costs in this methodology. In practice, we are unsure how best to reflect this in the assumptions made in Table B5.

⁴ 'Our business plan 2015-23, Expenditure', Northern Powergrid, March 2014

Q11. Do you agree or disagree on the approach used to assess the overall potential benefits of improved system operation?

22. The assumption that all worlds are able to produce the same benefits is a big one to make, and almost certainly not one that applies on the real world. It limits the quantitative assessment to be a comparative analysis for the transition *rather than* for the end state.

Q12. Do you agree with the assessment of the proportion of benefits which each Future World is capable of delivering in Stage 1 and Stage 2?

Q13. Do you agree or disagree on the approach taken to deal with the uncertainty/range of benefits? If you disagree please explain your reasoning

23. We have nothing to add on these points.

Cost assessment

Q14. Do you agree or disagree with the areas identified for quantification of the implementation costs that will be faced by DSOs and ESO in Appendix C? If you disagree please explain your reasoning.

Q15. Do you agree or disagree with the approach used to assess the costs of each world? If you disagree, please explain your reasoning.

Q16. Do you agree or disagree with the approach to dealing with the uncertainty/range of costs? If you disagree please explain your reasoning.

24. Assessing the implementation costs is not a straightforward undertaking. We agree broadly with the costs presented for the DSO transition and with the approaches used in this cost assessment. However it may be worthwhile adding research and innovation costs spent by network companies, especially as the DNOs have engaged in preparing for the transition and are already committed above £30 million⁵.

Qualitative assessment

Q17. Do you agree with the trade-offs of each of the Future Worlds identified against each of the high-level criteria in Table 1 of the Executive summary?

25. In this table, we question the statement that World D supports the objective of 'ease of market engagement' because a national flexibility provider needs to interact with a minimum of four flexibility co-ordinators.
26. We also regret that it does not make mention of reliability of the network, which remains our main duty and our customers' main priority. The different future worlds all introduce new operational risks and any impact assessment should keep an eye on this matter, as a core customer outcome.

⁵ This is the rounding of the costs of the headline innovation projects: Transition, EFTS, Fusion and Customer-led Distribution System. Source: <http://www.smarternetworks.org>.

- i. This is identified by the Technical performance criterion of the qualitative assessment, but unfortunately not brought up in this summary table.
- ii. We believe that World A could be the best performer on this topic (as supported by the scores on pages 86 to 89), but that this has not been reflected in the shadings used in Table 5 of page 33.

Q18. Do you agree or disagree with the Appendix A approach of ranking of worlds to help identify the strengths and weaknesses of each World against each criteria? If you disagree please explain your reasoning.

27. We understand the benefits of such a methodology.

Q19. Do you agree or disagree with the rankings and whether they are suitably justified? If not, please comment on which ones and why?

28. We agree with the majority of the analysis. There are some exceptions that we detail here.

29. We disagree with the ranking of the following:

- i. *Confidence and trust (p63):*
 - We accept that the onus is on the network operator to demonstrate that the likelihood for any conflict of interest risk involving them is low, thanks to mitigation solutions that are effective and that stakeholders are satisfied with.
 - Conflicts of interest may exist for other parties which are not recognised in the analysis. The ability of any world to mitigate these will depend on rules being in place, which is why it is important that Open Networks adds the identification of this risk in its scope.
- ii. *Facilitates decarbonisation of electricity generation (p65):* Our vision of a DSO is one made up of three plus one items: network operations, network flexibility, customer flexibility (constraint connections and demand side response), plus solution integration. The strength of World A is the ability to run very tight solution integration between network solutions and customer solution and this should arguably justify a higher score for this world in relation to the other worlds.
- iii. *Facilitates decarbonisation of transport (p66):* Accommodating more EVs and HPs onto the network will indeed require highly flexible and liquid markets, *but also* local planning, meaning thinking about the location of these new technologies, as well as, in an even more advanced scenario of urban planning, their integration in a higher-level energy plan. An evolved form of local energy planning has been described by the Energy System Catapult project⁶. The exercise can identify 'key projects and major investments through a transparent, consensus-based process involving all local stakeholders', and

⁶ "Local area energy planning [as a] process involves exploring a range of different future local energy scenarios based on a fusion of spatial planning, energy network planning and strategic review of building energy performance. It takes a whole-system view, accounting for building energy performance, heating technologies, electrification of transport, the capacity of and potential for gas, power and heat networks, local spatial constraints and opportunities. It involves area-specific energy system modelling embedded in a process of collaborative dialogue between stakeholders and local government". 'Smart Energy Services for Low Carbon Heat, Smart Systems and Heat Programme: Phase 2, Summary of key insights and emerging capabilities', Energy System Catapult, March 2019.

result in 'a clear pathway to meeting ambitious national decarbonisation objectives, based on locally specific viable and cost-effective plans'. At such planning, we think that Worlds A, D and E would rate better than the world B due to the more co-ordinated and common nature of the network operation, but World A better than D and E, thanks to the intimate knowledge of the network at the LV level that sits with the network operator.

- iv. *Supports whole system optimisation (p69)*: the criterion relates to electricity whole system, but, as described in the point above, it is worth looking at the Future World's potential for an energy whole system optimisation.
- v. *Avoids duplication (p73)*: we disagree with the interpretation of World D ('World D has little duplication since the DSO is not building out any DSO functions'), because DSO is more than procurement and activation of customer flexibility (refer back to point ii).
- vi. *Delivers neutral fair, flexible and transparent market (p80)*: we suggest that this point should have gone beyond what is already captured in the 'Confidence and trust' criterion, to study instead the *ability* of each world to deliver such markets.
- vii. *Complexity of system operation (p81)*: if we were to consider all use case for customer flexibility, as described by the Open Networks, as defined by Open Network's Product 2 of Workstream 1, 2018 ⁷ (Scheduled Constraint Management, Pre-fault Constraint Management, Post-fault Constraint Management, and Restoration Support), World D would rate higher because it would be involved in solving the multitude of pre-fault and post-fault situations that a network operator experiences as a matter of standard day to day operation. It is another example of the benefit resulting from the shared responsibility of network operation and system operation.

Q20. Do you agree or disagree with the list of potential unintended consequences identified in Section 4.5, and their prioritisation and potential mitigation as charted in Figure 20? If you disagree please explain your reasoning. Should the Open Network project progress further work on unintended consequences?

30. We agree that these themes may require further attention from the Open Networks programme.

⁷ Available from: www.energynetworks.org/assets/files/ON-WS1-P2%20DSO%20Service%20Requirements%20-%20Definitions%20-%20PUBLISHED.pdf