



Open Networks – Future Worlds Impact Assessment - BEAMA Response

April 2019

Submission Deadline: 1st May 2019

Link to Consultation Material and supporting information

Consultation - [Link](#)

Baringa - Future World Impact Assessment Report - [Link](#)

Text Key	Consultation or report quoted text	BEAMA proposed text	Consultation Questions
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Images, figures and tables are taken from the report or consultation document.

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About BEAMA

BEAMA represents manufacturers of electrical infrastructure products and systems from transmission through distribution to the environmental systems and services in the built environment, with over 200 members ranging from SMEs to large multinationals.

We work with our members to ensure their interests are well represented in the relevant political, regulatory and standardisation issues at UK, EU & international levels.

BEAMA member products provide a sustainable, safe, efficient and secure UK electrical system. We support our members in ensuring that the UK has a strong electrotechnical industry which is recognised as an essential part of modern society and brings invaluable economic, social and environmental benefits.



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Introduction and Key Themes

The ultimate purpose of the impact assessment is to build an evidence base from the Open Networks Project to help inform discussions on policy in a decentralised, decarbonised and digitalised energy landscape. The report is intended to help stimulate and guide conversations within the industry and between stakeholders on the various models, the emerging distribution system operator (DSO) role and the effective coordination of distributed energy resources (DER). Lastly, the report identifies areas for further investigation which will help define future arrangements and reduce uncertainty relating to the assessment of the Future Worlds.

Therefore, the questions in this consultation are structured to:

- encourage as many stakeholders as possible, from a wide variety of viewpoints, to read the report and the insights within it;
- seek feedback on the approach and inputs used to carry out the impact assessment, to ensure its validity and relevance; and
- help inform and shape the future work undertaken by the Open Networks Project and other organisations to further develop thinking in this area.

Supporting Material

Baringa's high-level approach for its relative assessment is designed to be simple and transparent. The spreadsheet models, which underpin the analysis, are available alongside its Future Worlds Impact Assessment Report to allow others to review and build on this initial work. This consultation document, the Future Worlds Impact Assessment Report and the supporting materials detailing the methodologies and data are available to download from [ENA's website](#). The following workbooks containing the data and methodologies used within the impact assessment have been published:

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- Master benefits_v1.0: The methodology for the benefits assessment;
- Final Master costs_v1.0: The methodology for the cost assessment;
- Final Master costs_Integrated World C_v1.0: This is the methodology for the cost assessment but where we assume that World C is integrated into all other Future Worlds;
- Final Future World results: This brings together the outputs of the costs and benefits methodologies across all assumption cases; and
- Final Future World results_Sensitivity_v1.0: This brings together the results of the costs and benefits methodologies across all assumption cases based on a later development of Worlds D and E into Stage 2.

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Our Response

A flexible and optimised energy system should be able to balance the introduction of new technologies into buildings with the challenges these new loads can place on the network. This is particularly relevant to the sharp increase in electric vehicle charging infrastructure required and electrification of heat.

The role of the DSO in facilitating an open and accessible market does not address market formation and delivery. As such, ownership and leadership are provided by the responsible authority, be that government or other responsible parties with appropriate oversight. This emerging role is essential if markets are to work for customers, market participants, new entrants and the system, and to provide certainty to all parties. Local energy zone models could provide the results required, Energy Service Providers could provide the scale and aggregation needed direct to the DSO through market platforms (when they exist), and new market entrants could disrupt the way we think about, engage with and use energy. With scenario planning and more certain market requirements, participants can start to make sense of what the system should look like and what is needed to deliver it.

Many consumers are likely to respond to the increase in access to near real-time energy consumption data by becoming more engaged with the way they buy and consume energy. However, this renewed interest will not be seen everywhere and may not last long if there are limited consumer-centric offerings. The challenge for Government and industry will be to maximise the public's engagement with their energy bills and their new options for energy management, control and services, although this should not be used as an opportunity to increase energy prices.

There is a challenge for all parties to develop ways of facilitating simple, flexible and responsive energy use without relying on continued high levels of consumer engagement. This will be achieved by developments in energy storage and intelligent automation. For example, more visibility of the load and cost of running specific appliances may encourage consumers to schedule their use according to static Time of Use (ToU) tariffs or price signals, but load shifting in response to dynamic ToU tariffs is most likely to be at least partially automated.

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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.

BEAMA is an Association for the electrical manufacturing and technology sector.

Executive Summary

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?

We agree with the interpretations set out and the assumptions made but would add a consideration for how worlds combine to realise hybrid worlds that are better suited in highlighting how some world aspects intersect and compliment one another. As highlighted with our response to the previous stage of this consultation; So far, a hybrid of world C and E aligns well with our thinking and previous work undertaken in Electrification by Design etc. Opening up participation to new entrants, innovators, technologies and market development, enablement and delivery is key. There is a need to consider the design of the settlement process as well as the dispatch process. We would suggest the consideration of shifting roles from the traditional as considered, to wider models such as 'Energy Service Providers' or roles transitioning to provide the new entrant services such as Flexibility Coordinator. We could consider here that an energy supplier possesses many of the required expertise and know how to more readily develop these roles and or transition to them. In this case an energy supplier has a known and reinforced relationship directly with the customer that new entrants would struggle to build in a short amount of time, this is the same for some of the other market participants who could be considered for transitional roles. Relationships and customer access and experience are key here in what is generally unknown territory.

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	Stage 1	Stage 2
World A	<ul style="list-style-type: none"> DSO co-ordinates the majority of flexible DER down to LV but there remains an option for the ESO to procure services directly The ESO provides the DSO with its residual requirements for flexibility services from DER 	<ul style="list-style-type: none"> The DSO becomes responsible for the co-ordination of all DER The DSO is responsible for managing flows across the GSP to meet ESO needs (both constraints and national balancing) as part of aggregating DER into national ESO markets
World B	<ul style="list-style-type: none"> Co-ordinated management of DER flexibility between ESO and DSO DSO constraints are generally prioritised as being met first where the DSO has no alternative resources 	<ul style="list-style-type: none"> As per stage 1 but with more detailed rules to co-ordinate dispatch of DER and manage a greater volume of DER on the system.
World C	<ul style="list-style-type: none"> Increased choice in network access products and increased time of use and locational price signals down to HV with some static time of use at LV and simple access products 	<ul style="list-style-type: none"> Granular, dynamic price signals flow down to and including LV substation level
World D	<ul style="list-style-type: none"> The ESO co-ordinates all flexible DER down to HV Below HV the DSO relies mainly on asset solutions to manage the network (other than ToU charging signals) 	<ul style="list-style-type: none"> The ESO co-ordinates all flexible resources down to and including LV
World E	<ul style="list-style-type: none"> There are regional Flexibility Co-ordinators which undertake all procurement of flexibility and undertakes the assessment of the costs of flexibility compared to the asset costs provided by DSOs and ESO The Flexibility Co-ordinators do not undertake dispatch of resources at this stage 	<ul style="list-style-type: none"> Regional Flexibility Co-ordinators now assume the role of dispatching DER resources to meet ESO and DSO needs In order to optimise dispatch decisions, the Flexibility Co-ordinators take on more operational responsibility

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.

BEAMA welcomes independence in developing these approaches and in further refining proposals and criteria for the future worlds, including the additional elaboration provided and the introduction of the stage two approach, At this stage factoring in uncertainty is key as whilst a number of different options are perceived as near definitive solutions, these are not currently tested at scale and real world experiences will differ in some cases.

Customer choice and level playing field for market participants is key and BEAMA are supportive of this. Innovation and new market entrants should be encouraged and enabled, we should not seek to deliver markets or market frameworks that are overly complex and unwilling or unable to adapt as innovation occurs and new opportunities arise. Affordability is key but so is accessibility, convenience and simplicity be that via the customer themselves, a third party, technology or services packages.

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Transition Paths

In Section 5, Baringa describes their observations on the performance of the Future Worlds and proposes four potential Future Worlds transition pathways which are illustrated in Figure 21, and reproduced as Figure 1 below for ease of reference. Each world has been subdivided into Stage 1 (initial development phase with limited coverage) and Stage 2 (mature development, full scope coverage) and it is assumed that World B, Stage 1 best represents where we are now and so is chosen as the starting point. In summary, Baringa believes that all Future Worlds are viable and the transition paths from World B Stage 1 could be:

- transition path 1: continued joint procurement and co-ordination between DSOs and electricity system operator (ESO) (World B Stage 2);
- transition path 2: move to DSO led co-ordination (World A Stage 2);
- transition path 3: move to ESO led co-ordination (World D Stage 1); and
- transition path 4: move to independent flexibility co-ordinators (World E).

Each of these transition pathways are described in more detail with potential triggers identified that could initiate a change to another transition path. A single transition path is presented for each of the Worlds B, A and D, with three alternative transition routes to World E:

- an early transition from World B (Stage 1) to World E (Stage 1, then stage 2), or
- a later transition part way through World B (Stage 2) to World E (Stage 2); or
- a later transition part way through World A (Stage 2) to World E (Stage 2).

Note, there is no path indicated for a transition from World D to World E since it is assumed that the legal separation of the ESO does not require a separate fully independent Flexibility Coordinator or Coordinators. In addition, the impact assessment indicates that World C is not a stand-alone world but forms an additional layer within all the other worlds. World C, in the form of reformed access and forward-looking charges arrangements, is shown as being implemented from 2023 (coinciding with the next distribution price control period).

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

Yes

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

No comment

Q6. Do you agree with the assumption that all transition paths start in Stage 1 of World B?

Yes - BEAMA generally agree with the plans on a pragmatic level, as with the 'least regret' approach, however, as the worlds are largely similar, and B already exists, there is the strong likelihood that we will move continually towards that world, with technical/market innovation occurring in isolation, driving the agenda. Our concerns are that a 'least regret' approach will result in reactionary market set up and conservative/protectionist regulation/policy.

Following the clear view from government about what future we would like as a nation, each assessment of the worlds should be evaluating primarily on how we deliver that vision as completely and rapidly as possible. Living with status quo or marginal and ineffective modifications in practice will be a disappointing outcome to an ambitious Open Networks project.

Further work

The approach to the impact assessment was intended to be broad with only relative outputs, this hopefully allows the reader to draw general conclusions about possible transitions to Future Worlds. Baringa has listed further work ideas in Section 5.5 that could follow their Impact Assessment Report and the Open Networks Project workplan for 2019, with the timeline and potential activities for Workstream 3 is reproduced below in Figure 2. We are

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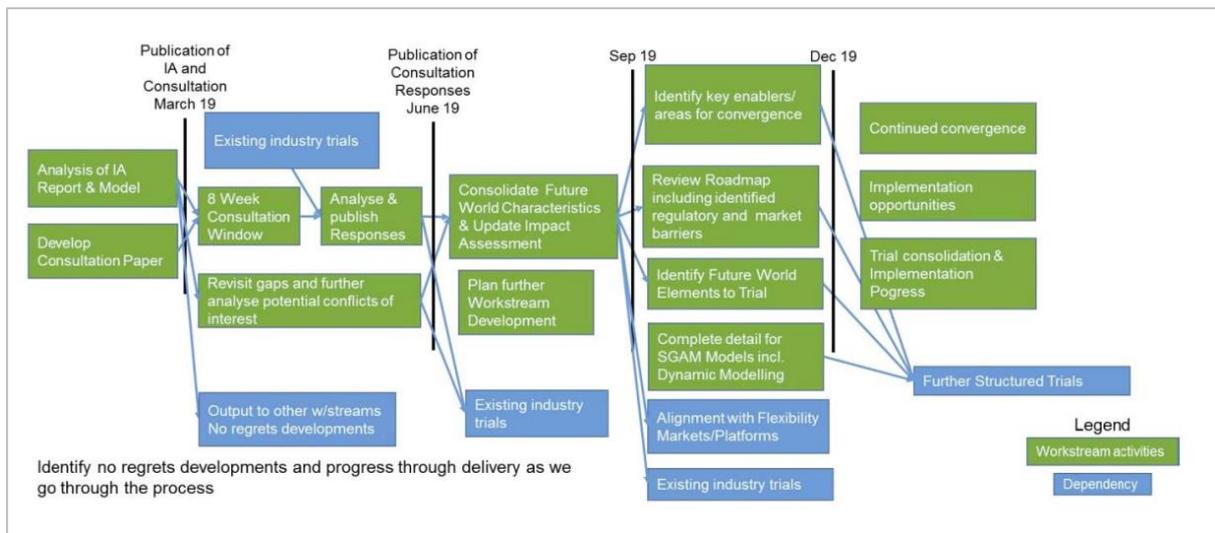
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looking for stakeholder views on what activities would add the most value to either the impact assessment or which areas ENA could focus on during 2019.

Figure 2: Workstream 3 elements of Open Networks project 2019 Workplan



Q7. Do you agree with the areas identified for further work in the 2019 workplan (figure 2 above) 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?

Suggest that the 2019 workplan is sufficiently comprehensive and welcome proposals to trial and implement towards the end of 2019, it will be interested to see what real world implementation occurs during late 2019 and early 2020.

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

The technology supply chain includes upstream network transmission and distribution system equipment and downstream building based or linked equipment, encompassing manufacturers, distributors, designers and installers.

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The distinction between upstream and downstream technology is less important than the need to acknowledge that the markets for each are becoming inextricably linked. In a disaggregated and poorly co-ordinated market we would continue to have an increasing amount of load impacting technology in and around the building but completely blind to the requirements to reinforce the network; similarly, we would have the TSOs and DSOs proposing business plans for reinforcement with no real understanding of what is being connected.

Both the 'ReShaping Regulation' and the 'Cost of Energy Review' point towards a different future for network technology providers as they respond to well-planned and timely specifications of system optimisation and reinforcement solutions within the business collaboration model discussed earlier. The better coordinated and leadership-driven value chain will utilise macro data analysis and locally-driven energy service provision to invest more appropriately in the resilience, reinforcement and smart control technology required to balance the network and drive down infrastructure development and maintenance costs. This will smooth technology investment cycles and empower the supply chain to manage manufacturing output better and develop more appropriate design and installation skills.

Benefits assessment

The impact assessment describes the benefits of each Future World in Section 3.2 based on the two 2018 National Grid System Operator Future Energy Scenarios which deliver Government carbon targets but with a different mix of centralised versus decentralised energy resources, namely 'two degrees' and 'community renewables'. These benefits are assessed in two ways:

Considering the benefits available through better system operation under the subcategories of:

- a. avoided transmission investment (reinforcement costs less costs of managing constraints);

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- b. avoided distribution investment (reinforcement costs less costs of managing constraints);
 - c. reduced balancing service costs (balancing services excluding constraints); and
 - d. avoided generation investment (due to peak demand reduction).
2. Mapping the proportion of benefit to each Future World, driven by the three key factors for system operation of:
- a. primary control (for dispatch of DER);
 - b. certainty of response; and
 - c. maximising participation in markets (reducing cost through greater competition).

The full details of the benefits assessment are given in Appendix B of the Impact Assessment Report.

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?

We agree with the four categories provided.

Q10. Do you agree, disagree on the key benefits assumptions contained within Appendix B (e.g. 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?

We are slightly surprised by the relative values of LV/HV/EHV reinforcement. We had assumed that LV would be most expensive due to scale, inconvenience, outages and

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density, unless it is anticipated that a smaller percentage of LV reinforcement will be required
- Should there be a factor for inconvenience and customer disruption in any case?

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

By and large yes, although whether this approach is still robust after the Forward Charging review is uncertain.

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?

We have no option but to take this on trust, there is a very long chain of assumptions and these could probably be challenged but with little chance of offering better figures. One concern is that average values seem to have been used but there is an argument that flexibility values should be targeted where there is most need and value to be offered to providers.

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.

We cannot challenge this and have to take it on trust.

Cost assessment

In Section 4.3 of the impact assessment, Baringa utilises a bottom-up approach in order to assess the costs associated with the Future Worlds. They use a list of the DSO functions developed by the ENA and the SGAM modelling and identify where they sit with different actors in each Future World. Technology, resource, interface and business change costs are

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then overlaid on this base. Baringa sets out the detailed cost assessment undertaken for their relative impact assessment in Appendix C.

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.

Agree

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

Agree

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

Agree

Qualitative assessment

The qualitative assessment in Section 4.4 is based on the criteria set out by the ENA in its Future Worlds consultation. It is structured around HM Treasury's five case model which is highlighted as best practice for public sector impact assessments and addresses the strategic case, the economic case, the financial case, the commercial case and the management case. The qualitative assessment extends the context of the Future Worlds to those stakeholders outside of networks and assesses the Future Worlds' wider socio-economic impact. The qualitative assessment approach, illustrated in Figure 19, ranks the strengths and weaknesses of both stages for each World against the criteria. The full details of the Qualitative Assessment are given in Appendix A of the Impact Assessment Report.

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This qualitative assessment was used to summarise the trade-offs between each of the Future Worlds which is presented in Table 1 in the Executive summary.

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?

Agree

Most important objective	Likely World(s)	Subsequent trade-offs
Decarbonisation of heat and transport (particularly if this accelerates in 2020s)	World A or B	<ul style="list-style-type: none"> Potentially more complex to operate (World B) May require mitigations to be put in place for any perceived conflicts of interests
Ease of market engagement for existing flexibility providers	World D or E	<ul style="list-style-type: none"> Potentially less conducive to local (low voltage) energy markets in the short term It takes time to implement which may impact the speed of decarbonisation in the near term
Lowest cost to implement and operate ⁵	World D	<ul style="list-style-type: none"> Potentially less conducive to local energy markets in the short term It takes time to implement which may impact the speed of decarbonisation in the near term
Minimise structural change from today	World B	<ul style="list-style-type: none"> Likely to lead to higher longer term costs compared to other Future Worlds Greater complexity in system operation and dispersion of accountabilities across different actors Potential frictional issues while co-ordination processes 'bed down'
Transparent, fair, neutral markets	World E	<ul style="list-style-type: none"> It takes time to implement which may impact the speed of decarbonisation in the near term Likely to lose efficiency in decision making as information needs to be exchanged back and forth to the Flexibility Co-ordinators

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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. (Green denotes the highest ranking and red the Lowest ranking - Figure 19 Summary results of qualitative assessment on page 25)

Case	Stage 1					Stage 2				
	A	B	C	D	E	A	B	C	D	E
Strategic Case										
Enhanced Customer Experience										
Choice	2	2	1	5	2	2	2	1	2	2
Fairness	2	2	1	2	2	2	2	1	2	2
Affordability (delivers greatest net benefits)	1	1	5	3	4	1	1	5	1	4
Confidence and trust	4	4	1	2	2	5	4	2	3	1
Consumer benefit from markets	1	1	4	5	3	1	1	1	1	1
Greater environmental sustainability										
Facilitates greater energy efficiency	2	2	1	2	2	2	2	1	2	2
Facilitates decarbonisation of generation	1	1	5	1	1	1	1	5	1	1
Facilitates decarbonisation of heat and transport	1	1	4	5	3	1	1	5	1	1
More electricity consumed closer to the point of generation	1	1	4	5	3	1	1	5	1	1
Economic case										
Financial benefits										
Cost of implementation vs benefits	1	1	5	3	4	1	1	5	1	4
Expected benefits	1	1	5	3	4	1	1	5	1	4
Whole system optimisation										
Support whole system optimisation	3	4	5	2	1	3	4	5	1	1
Optimises locally	1	1	4	5	3	1	1	1	1	1
Brings more flexibility into the system	1	1	3	5	4	1	1	5	1	1
Manages conflicts	2	4	1	2	5	2	5	1	2	2
Avoids duplication	3	4	1	2	5	3	4	1	2	5
Exploits synergies	2	2	n/a	1	5	2	3	n/a	1	5
Commercial case										
Market viability (ease of establishing new markets)	3	3	1	2	3	5	3	1	2	3
Appropriate regulation (are regulatory frameworks in place)	4	1	2	4	3	3	1	2	3	5
Financial case										
Compatibility with Regulatory funding	2	2	1	2	5	2	2	1	2	5
Funding available to support market participation	2	2	1	2	2	2	2	1	2	5
Management case										
Industry structure and organisation										
Level of rules and regulations required	2	4	1	2	5	3	4	1	2	5
Delivers neutral fair, flexible and transparent markets	4	4	1	2	2	5	4	1	2	2
Complexity of system operation	3	3	1	2	5	3	4	1	2	5
Complexity of market participation	2	2	5	1	2	2	2	5	1	2
Difficulty to implement for system operators	2	2	1	4	4	3	1	1	4	5
Difficulty to implement for market participants	4	4	1	2	2	4	5	1	2	2
Future Proof	2	2	1	2	2	2	2	1	2	2
Technical performance										
Degree of safety risk	1	1	1	1	1	1	1	1	1	1
Service availability and reliability	1	1	5	3	3	1	1	5	3	3
Physical and cyber security	3	3	1	1	3	3	3	1	1	3
Resilience and recovery	1	1	n/a	4	3	1	1	n/a	3	3
Clear dischargeable accountability	1	2	n/a	3	3	1	2	n/a	3	3

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We agree with the approach to ranking the worlds on the basis of perceived strengths and weaknesses of each world.

Q19. Do you agree or disagree with the rankings and whether they are suitably justified? If not, please comment on which ones and why? (Pages 61 – 76)

Agree

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? (Pages 49 – 51)

Agree