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# FARADAY GRID

Response to the Energy Networks Association Future  
Worlds Impact Assessment Consultation



## **Introduction**

Faraday Grid Ltd (FGL) welcomes the opportunity to respond to the Energy Networks Association's consultation on the Future Worlds Impact Assessment.

FGL are developing an entirely new technology, the Faraday Exchanger (FE), to address short term volatility and frequency, which when deployed across the existing electricity grid will create a Faraday Grid, enabling significantly greater integration of renewable energy; increased grid stability and resilience to cyber-attack; as well as contributing to reduced cost of energy for consumers through reductions in the costs of balancing and ancillary services.

We recognise that undertaking an impact assessment at this stage of a very complex piece of work will necessitate making assumptions and dealing with a significant number of "unknowns" – the comments below are offered in that context and intended to assist with further development and prioritisation of the project.

We would, of course, be more than happy to discuss any of the comments made in this response, and look forward to continued cooperation with the ENA on this project.

## **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.**

As the developer of an entirely new technology, we do not believe that FGL belongs in any of the identified stakeholder groups.

**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?**

The impact assessment takes quite a networks-focused approach. This is evidenced, for example, by a view that whole system outcomes are best achieved through a centralised coordination and planning function. This need not be the case in reality, and it is our view that the project would benefit from exploring the conditions under which de-centralised decision-making could result in optimal whole system outcomes.

Baringa provide a good overview of the limitations of their impact assessment in section 3.8

## **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.**

The Exec Summary is a reasonable summary of the document, and we have provided more detailed comments on specific conclusions/insights in Q4, Q5, Q8 and Q10 of this response.





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## **Transition Paths**

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

Whilst the directions of travel described by the potential transition paths seem reasonable, we have serious concerns about the timescales associated with all of the paths.

The impact assessment assumes that Worlds A and B would reach their second stage around 2028. Worlds D and E are assumed to reach their second stage around 2031 and 2036, respectively. The main reason for the timing appears to be a judgement as to the “readiness gap” to enable the technologies and market mechanisms in each World.

The industry has previously demonstrated its ability to deliver radical change in considerably shorter timescales e.g. the transition from the Pool to NETA, the transition from NETA to BETTA, and the design and implementation of Electricity Market Reform (EMR).

There are a number of potential reasons why such a lengthy timescale may have been envisaged: to correspond with RIIO-ED and RIIO-T timescales, change-resistance from incumbent parties, the need to create a set of protocols (e.g. for data sharing) with the Flexibility Provider(s) in World E.

However, it is our view that such factors should not be allowed to impede technological advances and innovation, which will occur on a timescale not driven by RIIO business plans. Technological advances may close the “readiness gap” faster than currently envisaged which could result in a need for Ofgem (and/or Government) to make a decision on future market arrangements before the scheduled start of RIIO-ED3.

It is stated in the Executive Summary that many of the trigger points for the transition paths are driven by the level of DER uptake; there is a risk that this could become a circular argument in that the level of DER uptake is driven (or impeded) by the prevailing market and regulatory arrangements.

Developments in recent years demonstrate an appetite on the part of consumers to provide flexibility and on the part of energy networks to procure flexibility. Where there is potential for delivering major consumer benefits in a timescale faster than envisaged in the impact assessment, Ofgem should be prepared to make enhanced incentives available within the RIIO framework for those network companies prepared to adopt more innovative solutions.

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

The transition paths described cover a reasonable range of possibilities but are largely based on incumbent players continuing broadly in their current roles. Ofgem’s review of the supplier hub model may result in a need to review how any changes will impact on the transition paths described.

Similarly, were Ofgem to adopt the suggestion in Dieter Helm’s review of the cost of energy that there should be a simplification of the licensing regime at supplier/distributor/generator level which could open up opportunities for new revenue streams for network companies at the same time as reducing costs to consumers, then this might result in a need to produce a variant of World E.

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

We agree that Stage 1 of World B most closely aligns with today’s arrangements.

### Further Work

**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?**

See Q8

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

As covered elsewhere in this response:

- it is our view that the project would benefit from exploring the conditions under which de-centralised decision-making could result in optimal whole system outcomes; and
- there is a need to relax the assumption that all of the Worlds can achieve the same benefits when fully mature. This requires exploring more fundamentally how each World would drive market participants' behaviour (and how the development and deployment of new technology will shape the markets which the networks need to serve);
- we would like to see further investigation into whether simplification of the licensing regime at supplier/distributor/generator level, and greater incentivisation for network operators to adopt innovative technology and business models could open up opportunities to deliver flexibility services at reduced cost to consumers

### Benefits Assessment

**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?**

Agree.

**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?**

Whilst this may be the most pragmatic assumption to make in order to be able to perform this initial impact assessment, we do not believe it is a suitable premise upon which to base further analysis and, potentially, decision-making as regards the relative merits of the various Worlds.

The significant downside of this approach is that true insight into the ability of the different Worlds to transform the energy sector is lost, leading to a default view that it doesn't matter which World is the ultimate outcome, and so the status quo would prevail. This would not be desirable in an environment where it is acknowledged that major change is necessary to deliver maximum consumer benefits.

In reality, it is likely that one World would emerge as the most beneficial for consumers. In order to be able to decide which World should be favoured there is a need to relax the assumption that all of the Worlds can achieve the same benefits when fully mature. This requires exploring more fundamentally how each World would drive market participants' behaviour (and how the development and deployment of new technology, such as artificial intelligence, the internet-of-things, and increasingly sophisticated use of data for decentralised decision-making, will shape the markets which the networks need to serve).

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

For the purposes of this, high-level impact assessment the approach seems reasonable. A more sophisticated methodology will, of course, be required as the work programme develops.

**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?**

Given the high-level nature of this impact assessment, the apportioning of benefits delivered by each Future World will always contain some degree of subjectivity and there would be little to gain in quibbling over percentages; with that caveat, the assessment seems reasonable.

**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.**

As per Q12, this is a high level impact assessment which will contain an intrinsic and significant amount of uncertainty and subjectivity at this stage. The further work identified, along with drawing in some of the more detailed, whole-system analysis carried out in other studies (as referred to in Baringa's Impact Assessment) should enable the range of uncertainty to be reduced.

**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.**

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.**

For the purposes of this, high-level impact assessment the approach seems reasonable. A more sophisticated methodology will, of course, be required as the work programme develops and more accurate information becomes available.

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

As per Q13, this is a high level impact assessment which will contain an intrinsic and significant amount of uncertainty and subjectivity at this stage. The further work identified, along with drawing in some of the more detailed, whole-system analysis carried out in other studies should enable the range of uncertainty to be reduced.

**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?**

The trade-offs identified seem reasonable. However, it is not clear to us how the "most important" objectives were derived (in particular why "minimise structural change from today" is an objective, given that it is widely agreed that change is needed). We would have expected to see "reduced cost for consumers" as a most important objective.

**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.**

This seems a reasonable approach.

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

Whilst the approach is adequate for this high-level impact assessment, at a stage when it is acknowledged there is need for greater investigation into various issues, this assessment should be subject to continual review, including weighting of certain outcomes. Those outcomes which seem supportive of retention of the status quo (e.g. “difficulty to implement for system operators”, or compatibility with the RIIO funding model) should be a lower priority.

The conclusions could be considered as prone to subjectivity – for example, “complexity of system operation” could be considerably reduced by the application of artificial intelligence in a more decentralised Future World – this could be a different approach, rather than a more complex one.

**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?**

For the purposes of this, high-level impact assessment, the list is a reasonable summary at this stage. It would make sense to keep these issues under review as understanding of the various Future Worlds improves.

For further information, please contact:

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