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ENA Future Worlds: Impact Assessment Consultation

Submission from the Energy Policy Group, University of Exeter

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Section 1: Overview

The Energy Policy Group (EPG) of the University of Exeter is pleased to give our comments on Baringa's Impact Assessment of the ENA's 'Future Worlds'. It is acknowledged that the ENA has undertaken a great deal of work in devising and consulting on the Future Worlds; which we applaud, and we appreciate that this has now been subject to independent assessment by Baringa.

The EPG did not provide feedback to the initial Future Worlds consultation in 2018 and as such this response may cover aspects which are more related to the ENA's work, than the scope of the actual Baringa report.

We believe that the starting point in any deliberations on future energy systems should be "What outcome are we trying to achieve?" and subsequently, "What needs to change to get there?" We consider that by developing a wide range of competing scenarios the ENA has not as yet concentrated on what outcome it aims to achieve. We understand that a range of options is necessary for consultation purposes, but we would have expected to see a clear steer towards 'this is what we want to achieve'; and 'we consider that this is the best option for achieving that end result, for these reasons'. That would have given clarity to consultees on how the ENA sees the future energy system progressing.

We are particularly disappointed to see that decarbonisation of the electricity system was not highlighted as a key governing factor. Decarbonisation has to happen within the lifetime of this plan if we are to achieve the UK's carbon reduction commitments. Therefore, we would have expected you to have set out which Future World would best deliver on these commitments and to have given that factor the appropriate weighting.

We understand that decarbonisation was one objective (amongst 30) which was scored by Baringa but that this was not seen as a key policy driver. When we asked the question on why this was not

seen as a key driver through the online webinar held in March, we received the following response from Baringa:

"Since this is an initial assessment which is not designed to 'pick a winner', we chose not to weight the different criteria. How to balance the competing objectives and trade-offs between the Future Worlds is more of a policy decision for BEIS and Ofgem. The Impact Assessment is designed to provide a body of evidence to help take these decisions."

If you require more policy direction from BEIS and Ofgem then this should be sought, and we encourage you to do so. We will address this issue later in the Overview. However, we do not accept that there has been a lack of evidence on the need to decarbonise rapidly in order to meet legally binding climate change targets. This should have been considered much earlier in the Future Worlds process and should also have been explicitly expressed through Baringa's Impact Assessment (IA).

Consideration of decarbonisation would then have provided a legitimate steer for the ENA to state 'this is what we want to achieve, and we consider that this is the best option for achieving it'. Although it is too late now to address these issues within what's already been released for consultation, we do expect to see a much greater 'narrowing' of the potential options in the next iteration of the Future Worlds – to those options which will best deliver on the principles of carbon reduction and the overarching aims of the 'Smart Systems and Flexibility Plan'¹.

It is our opinion that distributed energy resources (DER) and distributed energy technologies should be widely encouraged if GB is serious about cutting carbon emissions and delivering a smart and flexible energy system in time to meet the CCC budgets. The 2006 World Survey of Decentralized Energy² showed that at that time the UK had less than 10% of DER penetration; however, capacity has since tripled and now represents around 30% of total installed capacity, representing almost 31,000 MW as of December 2017³.

Delivering a decarbonised, smart and flexible energy system is increasingly a very interlinked process with decarbonisation, digitalisation and decentralisation most particularly coming together at the local level. Whichever route GB ultimately takes (be it one of the Future World scenarios, or an alternative scenario) there is clear evidence for the need for change and the need for coordination between actors in the future energy system, particularly at the local level.

Our overall comments are that the ENA should therefore pursue a pathway whereby coordination is undertaken at this local level – akin to the DNOs coordinating local value (World A); or via neutral market facilitation (as in World E) but with coordination occurring in the DNO area under the grid supply point (GSP); rather than via the four area facilitators currently proposed for World E through the Baringa IA.

We have written extensively on how current DNOs could evolve, and whether they should (or should not) be transformed from the current 'passive' distribution utilities into 'active' market facilitators; market balancers at the local GSP level and system coordinators/managers^{4,5,6}. Some

¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633442/upgrading-our-energy-system-july-2017.pdf

² http://localpower.org/documents/report_worldsurvey06.pdf

³https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736152/Ch5.pdf

⁴ <http://projects.exeter.ac.uk/igov/primer-dsps-and-valuing-der/>

⁵ <http://projects.exeter.ac.uk/igov/blog-1-of-name-form-and-function-of-distribution-entities/>

sort of coordinating distribution entity will be vital as electricity systems continue to become more decentralised and flexible, and as the electricity, heat and mobility sectors become more inter-related. We have called this distribution entity a DSP (a distribution service provider) as we consider the DSP model to be far more wide ranging than the current proposals for the anticipated DNO to DSO transformation⁷, and vital if we are to meet our CC budgets on time^{8,9}. We see a DSP as an area coordinator of both energy and system services. It is a local market coordinator and balancer, linking public goals and regulatory outcomes and bringing new value chains to the coordination of local flexibility markets.

We consider that the valuing of a DER resource within an area – for example under the GSP points – is a central building block for an energy efficient and affordable energy system¹⁰. Such an assessment is best undertaken via an area based co-ordinated approach. We therefore think DSPs are the best institution to value DERs and to coordinate local areas.

We acknowledge that this analysis goes much further than the proposals that are currently being considered through the ENAs Future Worlds; and indeed, the scope of Baringa's IA. However, by stating that we see DSPs as the essential enablers of a DER energy system, we hope that this gives you clarity on our comments on the IA.

Overall, therefore we consider that the current ENA proposals are not far ranging enough. Whilst we would prefer to see a move in line with World A or World E, we would prefer to see these Worlds as whole system balancers and coordinators, not just flexibility procurers and coordinators. We draw on our own insights to propose an alternative World; which we discuss further in Q5.

We also consider that the given timeframes are much too long. We acknowledge that Baringa's brief was to assess in stages out to 2030; 2040 and 2050. However, in our view planning needs to accommodate DER in line with the requirements of meeting the CCC budgets. As stated, we have already seen DER capacity triple in the last few years and given an enabling policy steer from BEIS this growth could continue to rise steeply. We would direct you to the situation which has already occurred in the UK with solar and RII0¹¹; and that which is currently occurring in Australia, where the rapid uptake of solar PV and battery storage has caused significant disruption to the networks^{12, 13, 14}. This has created a situation where incremental, conventional governance has not managed to keep abreast of technology change.

Therefore, whilst we acknowledge the work undertaken to date by the ENA on the development of the Future Worlds, we consider that it is ultimately for BEIS to initiate a Government agreed institutional framework and timeline for taking GBs energy policy forward and not the ENA. The ENA is the body representing network interests – and whilst it is useful that the ENA does do that, the ENA should not be involved any more than any other stakeholder. The future of networks, and how they are regulated, has major distributional impacts on GB plc, and on the ability of GB to

⁶ <http://projects.exeter.ac.uk/igov/new-thinking-reset-the-reset-1-we-need-institutional-governance-reform-and-we-need-it-now/>

⁷ <http://projects.exeter.ac.uk/igov/wp-content/uploads/2018/05/Mitchell-DNO-to-DSO-Delivering-the-Power-System-of-the-Future-1.pdf>

⁸ <http://projects.exeter.ac.uk/igov/submission-ofgem-riio2-methodology/>

⁹ <http://projects.exeter.ac.uk/igov/new-thinking-more-ambition-needed-for-riio2-outputs/>

¹⁰ <http://projects.exeter.ac.uk/igov/new-thinking-reset-the-reset-3-der-walking-the-walk/>

¹¹ <http://projects.exeter.ac.uk/igov/new-thinking-solar-surprise-revisited/>

¹² <http://projects.exeter.ac.uk/igov/new-thinking-tales-of-the-unexpected/>

¹³ <http://projects.exeter.ac.uk/igov/wp-content/uploads/2018/09/Devolution-and-Defection-in-Energy-Networks-1.pdf>

¹⁴ <http://projects.exeter.ac.uk/igov/primer-energy-system-change-in-eastern-australia/>

reduce its GHG. This vital work should be led either by BEIS or by an Energy Transformation Commission¹⁵ – but certainly not by those who have most to win or lose in the outcome.

We discuss the different Worlds in the next Section. Our view is that networks should be incentivised to be complementary to CCC budget requirements – in other words, networks should be complementary to a decarbonised electricity system by 2030; a decarbonised heat system by 2040 (meaning no fossil gas for heat); and decarbonised mobility by 2050. This means therefore that distribution entities – however they may have evolved – should be capable of local area balancing and coordination and market facilitation, and therefore DSP-like rather than the much less active DSO¹⁶. We therefore consider that the proposed Future Worlds have insufficient ambition and stringency. We do not intend to repeat this each time this comes up – but please take this to be our view.

Section 2: Specific Questions (please note we have only responded to Qs 1-8)

1. *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.*

Academics

2. *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*

World A:

We welcome discussions surrounding the DSO operating and dispatching flexibility as we believe that in an ever-decentralised world there needs to be increased governance at a more distributed level. We consider World A, particularly in Stage 2, to offer much better coordination of DER on the system than is currently in place.

Yet, there are concerns that the current proposal only seeks to utilise flexibility in order to avoid network reinforcement costs. Considering the increased role which variable renewable generation can play, we consider that flexibility (and all of its providers such as DSR, storage, interconnectors etc) should be seen as an essential part of the future energy system and therefore undertaking a much wider role.

To that end, we believe that the DSO should evolve to reflect characteristics of a DSP as introduced earlier in the Overview. This thought is explored further in Q5.

World B:

Although we acknowledge that World B is the current starting point (see Q4) we are not in agreement with World B as a viable solution for whole energy system change. In our opinion, it certainly will not deliver on the ambitions set out in the Overview.

¹⁵ <http://projects.exeter.ac.uk/igov/enabling-the-transformation-of-the-energy-system/>

¹⁶ <http://projects.exeter.ac.uk/igov/blog-1-of-name-form-and-function-of-distribution-entities/>

We do however agree that stacking of revenue streams should be put in place as this will aid in the rationale for investing in more distributed energy resources; and we agree that more coordination between SOs is needed to resolve potential conflicts.

The next step for us would be a more in-depth explanation of how such a scenario would play out and be resolved i.e. when an energy imbalance is caused through the activation of an asset at the Dx level, how would this imbalance in energy (and any costs associated with this) be paid for? As World B is the proposed starting point for the ENA's transition pathways, we believe that this is a question which should be explored immediately. To that end, the ENA and Baringa may find the methodology proposed by Guillaume *et al.* insightful¹⁷.

World C:

We do not agree that World C should have been presented as a separate World option in the original Future Worlds consultation. World C does not address any coordination issues between the ESO and the DSOs; instead relying solely on Ofgem's Charging Futures work to enable access and address pricing. The Charging Futures principles will either happen, or they won't happen; but either way are outside the scope of the Future Worlds consultation as they will be implemented by Ofgem. In addition, the EPG do not agree with Ofgem's methodology for the Residual or the Forward-Looking Charges Reviews as detailed in our respective consultation responses delivered to Ofgem^{18, 19}.

In our consultation responses to Ofgem we argued that they were effectively putting 'the cart before the horse' by developing short-term economic options for the future energy system without a clear sustainable framework for setting the future direction and goals of that system. Therefore, by repeating Ofgem's proposals here, badged as World C, we do not believe that a positive long-term coordination strategy will occur. We therefore urge that World C be removed from any further consideration by the ENA.

World D:

We are not in agreement with World D and effectively see it as a failure of the system if DER cannot be accommodated at scale on the distribution networks. For World D to be a viable option we would need policy and regulatory guidance from BEIS that GB will seek to maintain a highly centralised energy system. However, this is not what we are seeing happening in practice (either in GB or elsewhere globally); nor would we recommend it.

As previously stated, DER capacity has tripled in recent years and now represents around 30% of total GB installed capacity. Much of this capacity (around 86%) comes from renewable and low-carbon resources such as solar PV, wind and bioenergy; and as such should be seen as a positive contribution towards meeting CCC targets; rather than as a negative disruptor for network operators.

Further, analysis undertaken by Poyry and Imperial College²⁰ suggests that reduced system operation costs of between 25% and 40% could be achieved through the deployment of new,

¹⁷ http://smartnet-project.eu/wp-content/uploads/2019/02/2019215113154_D2.2_20190215_V1.0.pdf

¹⁸ <http://projects.exeter.ac.uk/igov/wp-content/uploads/2019/02/Exeter-EPG-response-to-Ofgem-Targeted-Charging-Review-Feb-2019.pdf>

¹⁹ <http://projects.exeter.ac.uk/igov/submission-ofgem-electricity-network-access-and-charging/>

²⁰ <https://www.theccc.org.uk/wp-content/uploads/2017/06/Roadmap-for-flexibility-services-to-2030-Poyry-and-Imperial-College-London.pdf>

cheaper, flexibility sources connected at the distribution level rather than from conventional generation on the transmission network.

World D therefore does not reflect the best use of renewables, flexibility and local coordination and will end up costing consumers more in the long run. Although in your cost assessment this option appears to be the cheapest World to deliver, we do not accept that this will be the whole energy system case overall, given all the necessary capacity additions and network upgrades which will be needed in the next 30 years to accommodate a highly centralised system, with ever increasing peaks. Instead, local flexibility will need to become the norm over this timeframe to reduce these peaks and increase efficiency of assets, given the greater expected electrification of both heat and transport.

To achieve our carbon commitment targets, both heat and mobility will need to face much higher levels of electrification during the next few years. This will place a much higher burden on the distribution networks which needs to be considered now, rather than waiting for 2030 to arrive. To this effect all consumers will need to be able to respond with behind-the-meter (BTM) flexibility by 2030 and new business models are already beginning to enable this (e.g. Piclo and Centrica's Cornwall Local Energy Market).

Therefore, the ENA cannot plan for the future now based on current experiences and expectations. The networks will need to be ready to respond and the best way to achieve this is to give the distribution entities more capabilities and incentives now, rather than less; or if they are unwilling to respond then this needs to be handled by an independent coordinator who will respond.

World E:

We are pleased that the ENA have proposed a World which could be operated by independent parties and we see this as a viable alternative to World A. However, there are certain aspects of this World where we consider that more work should be carried out.

We are not in agreement that there should be four regional flexibility coordinators. We would prefer to see distribution balancers and coordinators operating under the current DNO network areas GSP in order to enable the highest granularity of data and system resource, but also to allow 'netting off'. Different GSP areas can work with each other as they wish, but under the GSP as the discrete unit is essential.

We would also urge you to consider alternative potential advantages of World E, rather than just neutrality between system operators. We consider that there are wider benefits to independent coordination, including less overall cost to consumers if the coordinators were operated on a not for profit basis; as well as increased consumer confidence and more efficient decision making. It also fits with wider governance changes needed²¹.

General Comments on the 5 Future Worlds:

Overall, we consider that the timescales are too long, and the stringency and ambition too limited. Planning needs to begin now to be able to accommodate an increase in DER much earlier than 2030. We have already seen DER capacity triple in the last few years and given an enabling policy steer from BEIS this growth could continue to rise steeply. Furthermore, this is completely out of step with the current CCC budgets and will be even more so if we move to 1.5-degree ambition.

²¹ <http://projects.exeter.ac.uk/igov/enabling-the-transformation-of-the-energy-system/>

We would direct you to the situation that is occurring in Australia where regulation has not kept pace with rapid system change, leaving network operators, Regulator and Government caught out by the rapid uptake of solar PV. The lesson here is that we cannot predict the speed of disruption because disruption occurs as a result of unexpected occurrences²². It is essential that governance in GB is flexible enough to allow for an efficient transformation to a decarbonised, decentralised, democratised and digitalised energy system, accessible and affordable to all^{23, 24}.

We also consider that the role of these Future Worlds is too limited. Further potential could be achieved if the ENA were to propose more radical changes, especially regarding the future role of the DNOs. We explore this further in Q5.

3. *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 importance of energy network companies:

We agree that energy network companies will play a crucial role in the future of the energy system due to a variety of reasons spanning from a legacy of knowledge and expertise to their position at the Dx level where there are currently many changes occurring. As such, we view them as an integral entity in the transformation to a low carbon, high renewable and secure energy system. We therefore welcome consideration on the evolution of the DNOs. However, as has been highlighted in the Overview we would expect to see more progressive change than is currently being considered²⁵.

The importance of flexibility:

We agree that the role of flexibility is key for the future energy system if we are to see reductions in peak demand whilst also accommodating high proportions of variable power and high increases in overall demand due to the electrification of heat and transport.

However, it is our understanding that these Future World scenarios are only determining the procurement and coordination of flexibility in order to avoid network reinforcement costs. This is a narrow viewpoint, based largely on creating savings for network operators, rather than considering the overall benefit of flexibility in transforming the energy system to one which is decarbonised, decentralised and cost efficient for all end users. Again, this may be due to lack of a strategic policy lead by BEIS, combined with poor regulation through RIIO; but this consultation is an opportunity to make these claims to BEIS and Ofgem and think wider than what's best for individual network operators.

Open Networks identification of five 'Future Worlds':

The EPG acknowledges that the ENA has taken the initiative in considering the future roles of the ESO and the DNOs within a transformed energy system; along with the coordination problems which will need to be overcome to enable this. As noted above, we are only in (partial) agreement with Worlds A & E at this stage; and as also stated we do not think that these Worlds go far enough, soon enough, to enable whole system transformation which meets carbon reduction commitments.

²² <http://projects.exeter.ac.uk/igov/new-thinking-tales-of-the-unexpected/>

²³ <http://projects.exeter.ac.uk/igov/primer-energy-system-change-in-eastern-australia/>

²⁴ <http://projects.exeter.ac.uk/igov/postcard-from-australia-a-national-electricity-market-overview/>

²⁵ <http://projects.exeter.ac.uk/igov/blog-1-of-name-form-and-function-of-distribution-entities/>

Therefore, greater emphasis should be given to which scenario(s) may better enable this. Whilst the ENA have provided a useful starting point, the role of the DNOs could be greatly enhanced to aid achieving carbon commitments through incentivising greater penetration of renewable generation and flexibility, whilst offering new routes to markets and providing the much-needed co-ordination of the system. We continue this approach in Q5.

The Approach:

We welcome that the starting point is now. Our issue lies with the timeframes ranging out to 2050; with a 'wait and see' approach lasting until around 2030. We do not have time to 'wait and see'; action is needed now. If you need policy and regulatory intervention to aid decision-making then that should be sought now. If policy and regulatory instruments need amending; they need amending now.

GB is fortunate that there are myriad examples of evolving distribution regulation around the world. This combined with GB's legally binding CC Act, means we know what we have to do. It is up to BEIS to give that direction, but we had hoped that the ENA was more realistic about that.

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

We can agree that World B stage 1 is the natural starting point, but we do not agree that GB should stick with this pathway until the early 2030s and then 'see what is happening' at that point (as said above and in the Overview). This is a laissez-faire approach and is indicative of organisations which either do not have the drive and determination to make real change, or which lack regulatory oversight (we are suggesting the latter in this case). We consider that an early move to Pathway 2 (World A) or Pathway 4 (World E) will be in the best interests of both consumers and the energy networks and will give DER providers more assurance on the way forward.

You state that transition towards Pathway 2 would only occur once there are clear economic benefits of operating a highly localised flexibility markets in order to avoid or defer reinforcements on the lower voltage levels of the distribution network. We would contest this viewpoint and argue that it makes sense to transition towards this pathway sooner rather than later. We hope that BEIS will eventually give you the steer needed to embrace this approach. If they will commit to enabling a decentralised pathway which incorporates high levels of flexibility markets, then this also in turn will give DER providers assurances that they will be able to partake in these markets at the local level.

We agree that World C should not be seen as a transition path in its own right but will inevitably form part of any adopted pathway. However, we consider that the proposals put forward by Ofgem could actually hinder rapid uptake of DER²⁶, which may skew initial results towards Pathway 3 (World D) and away from Pathway 2 (World A). World C in any case should be considered as outside of the scope of the ENAs work as this is an Ofgem decision.

Pathway 3 (World D) should be seen as a systematic failure by BEIS, Ofgem and the SOs to adequately cater for the uptake of DER and to enable local flexibility markets. It therefore should not be an option that is strived for. This Pathway should only occur as a Pathway of choice if BEIS make a clear decision that they want a highly centralised energy system; one which relies on nuclear, off-shore wind and interconnectors at the transmission level, with low levels of distribution connectivity. Although this could be an option, it is not what we are seeing happening elsewhere

²⁶ <http://projects.exeter.ac.uk/igov/submission-ofgem-electricity-network-access-and-charging/>

globally. Further, analysis undertaken by Poyry and Imperial College²⁷ for the CCC suggests that reduced system operation costs of between 25% and 40% could be achieved through the deployment of new, cheaper, flexibility sources connected at the distribution level rather than from conventional generation on the transmission network. Thus, were this option followed by Government, it would be one which the Government knew would cost customers the most, and therefore, one hopes, unlikely.

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

We agree with the opening remarks that “energy network companies have a crucial role to play in the transition to a low carbon economy”. However, we would argue that the ENA could propose that the DNOs play a larger role in the facilitating of a system which enables the UK to achieve the carbon targets through the integration of more flexibility, providing coordination between these new assets (Tx and Dx) and offering access to new and existing markets.

In order for this to occur, we propose a more transformative pathway, by which we mean inciting meaningful and necessary changes which may disrupt the current paradigm, but which are needed in order to achieve our emission targets, compared to the slow and steady transition proposed in the Future Worlds.

To exemplify this point, we offer a new transition pathway to an alternative World which is based upon the IGov Governance Framework²⁸ and which includes a new electricity market design currently being developed by Thomas Pownall of the EPG²⁹.

In this governance world, the DSP is a balancer and coordinator as well as a market facilitator (as introduced in the Overview), including procuring flexibility and offering new revenue streams.

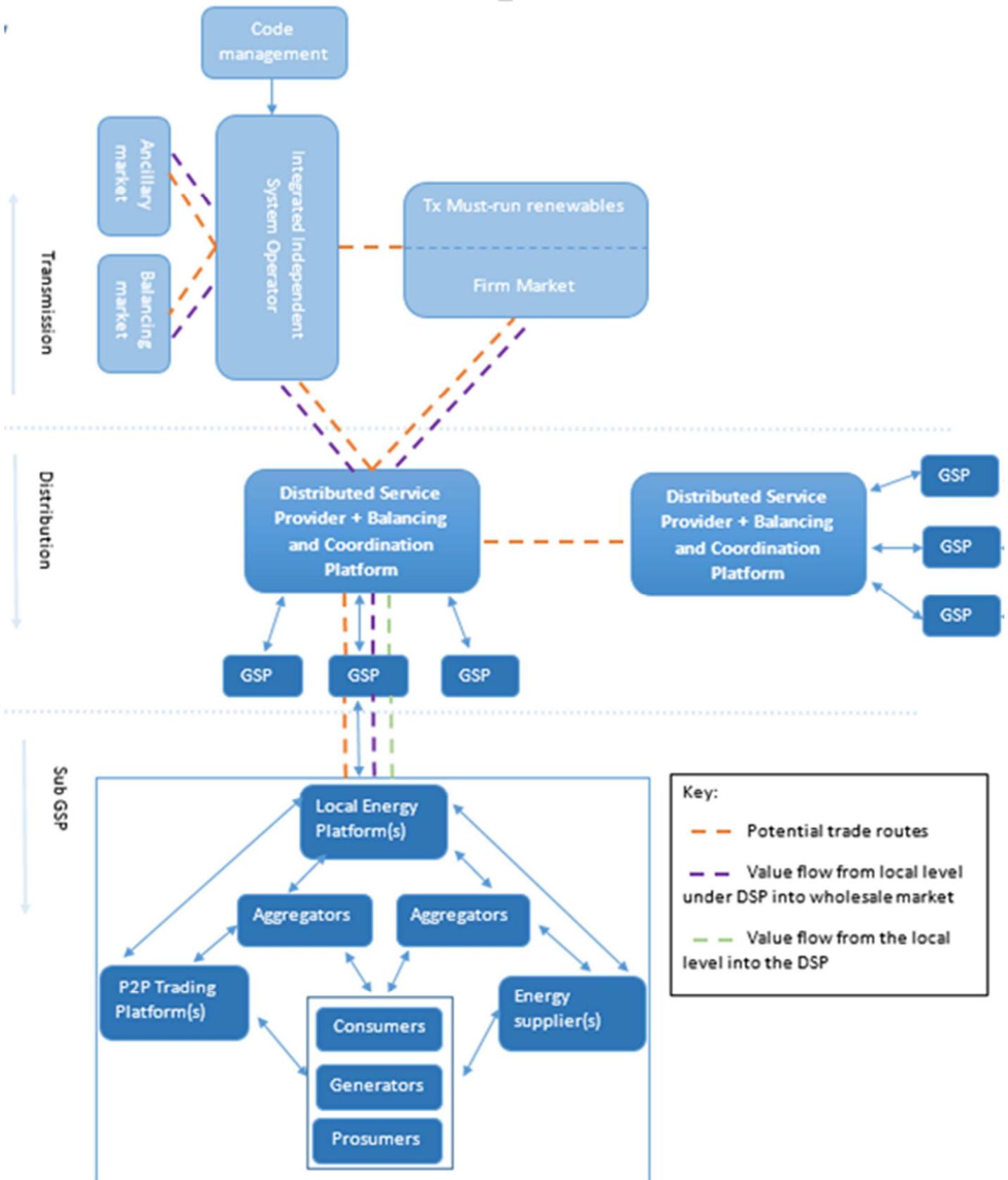
The alternative World offers insight into how the DSP could play a more integral role in the future of the electricity system, compared to what is currently proposed; whilst also enabling GB to achieve its carbon targets. Figure 1 is a schematic of the proposed electricity market design. As you can see, the DSP is at the centre of this design, taking on several new responsibilities, which highlight the potential importance that DSP’s can have. We encourage the ENA to further explore these options.

²⁷ <https://www.theccc.org.uk/wp-content/uploads/2017/06/Roadmap-for-flexibility-services-to-2030-Poyry-and-Imperial-College-London.pdf>

²⁸ <http://projects.exeter.ac.uk/igov/primer-fit-for-purpose-gb-energy-governance-framework/>

²⁹ http://geography.exeter.ac.uk/media/universityofexeter/schoolofgeography/images/researchgroups/epg/Enery_Systems_Catapult_29.01.2018.pdf

Figure 1 Alternative World



Alternative World Commentary

DSP responsible for co-ordination:

In line with the increasingly decentralised energy system within the UK we envisage multiple parties located below the Grid Supply Point (GSP) who may trade amongst each other. This may be prosumers to consumers or prosumer to aggregators for example. In order for these trades to occur it is essential that these trades are co-ordinated by an entity. We propose this to be done by the DSP as the ESO is not suitable to coordinate those assets under the Dx level. We believe this is the case as this may be too much data for one entity to compute efficiently, bodies at a regional level much have a better understanding of their assets and there is a chance that signals to incentivise the uptake of DSR may be lost if commands are centrally issued. We consider this to be an evolution of World A Stage 2.

DSP responsible for local balancing of energy (inc. local ancillary markets)

Defining by GSP sets a geographical boundary for trading areas. As entities within the GSP trade amongst each other and convey information regarding their trades to the DSP there would be, in this proposal, a requirement on the DSP to balance the DSPs region under the GSP. As such, we propose that the DSP would try to balance their local regions by operating a pool market in which entities within the sub-GSP could trade into and at time when this DSP is contracted to be short/long. Additionally, the DSP may contract with other DSPs in order to balance their regions.

There is a role for additional markets other than energy within this model. It may be that the DSP offers services such as a local ancillary market as it being trailed in the south-east of England through Power Potential³⁰. These new markets offer a route for smaller generators who may not have access into the currently centralised markets of today.

DSP provides pass-through into the wholesale market:

As a means to access into the wholesale market, assets which are located in the Sub-GSP whether they are deemed large enough by themselves or are aggregated would be able to access into the wholesale markets. In such an instance the assets would inform the DSP that they were trading into the wholesale markets at a predetermined timeframe. This would allow the DSP to ensure that network capacity was sufficient and that any activation of assets does not cause an imbalance on the system; be that financially or in terms of energy and make any adjusting measures if necessary.

Concluding remarks on our Alternative World:

We need a system set up for the future electricity system, which is looking increasingly decentralised, distributed and based on variable generation, and most importantly allows us to meet our carbon reduction targets. The proposed ENA transition pathways and Worlds, appear to be limited in their potential with minor gains over a longer than necessary timescale. An analogy commonly used within the UK's electricity system is the apparent picking of the 'low hanging fruits', however we would argue that these easy wins are running out and more substantive change is required.

In this section we offered an alternative World which highlighted how the DSP has much more

³⁰ <https://www.nationalgrideso.com/innovation/projects/power-potential>

potential than is offered within the different worlds within this consultation.

We would argue that there is a lot of opportunity for the future role of distribution entities. The role put forward for the DSO does not fully capture such opportunities. It is hoped that the ENA will consider this view and reassess the proposed roles for the DNO/DSO/DSPs.

There are other aspects to this market design which are not described here. However, if you have any questions or would like more detail on the model, we would be happy to discuss this further.

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

We can agree that this may be the starting point, but we do not agree that we should stay there until 2030 'to see what happens' with DER. We need to be much more proactive in enabling DER with plans to diverge to Transition Pathway 2 (World A) or 4 (World E) much sooner.

It is acknowledged that system operators are undertaking work now on a 'least regrets' assumption; work which will be needed whichever Pathway is eventually chosen. However, we would urge the ENA to pursue policy decision-making from BEIS in order to progress away from this 'stalemate' situation by the commencement of RIIO ED-2; not the end.

7. *Do you agree with the areas identified for further work in the 2019 work plan 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?*

We mostly agree with the further work proposed by the Open Networks 2019 Workplan and by Baringa in Section 5.5 of the IA. However, please be mindful that as stated earlier we do not believe that the Future Worlds work goes far enough in delivering a smart, flexible energy system.

Comments on Baringa's proposals include: -

- *Understanding how reformed access arrangements and forward-looking charges best support system operation functions*

In one sense, trialling of Ofgem's reformed access arrangements and forward-looking charges would be appropriate; but it should be undertaken by Ofgem rather than the ENA. We are of the opinion that it will be practically impossible to anticipate the effects of these changes once they're imposed; as our current thinking is that these measures will dampen down the uptake of DER and / or will risk network flight; thus reducing the potential availability of DER flexibility on the networks. As we said above, and in our submissions^{31, 32} we are critical of the charging consultations, believing that network charging is an out of date regulatory concept which should have been folded into the RIIO discussions.

- *What is the value of flexibility at low voltages to network operators?*

Trials are already in place via the Piclo platform and Centrica's Local Energy Market platform. However, as take-up is currently quite low, we believe that incentive regulation on distribution

³¹ <http://projects.exeter.ac.uk/igov/submission-ofgem-targeted-charging-review/>

³² <http://projects.exeter.ac.uk/igov/submission-ofgem-electricity-network-access-and-charging/>

entities should be put in place as soon as possible to help realise the potential of flexibility markets rather than dismiss them early due to current economics.

All DNOs should be undertaking distributed energy resource assessments³³ so that they understand what resources they have in their area. Ofgem should have made sure that they have already done this. Understanding DER value is a basic building block and should have been undertaken as part of good management of a distribution area.

Once again, a bold policy stance from BEIS is required in this respect, but if the economics aren't currently there, there is no reason to dismiss the future potential of these markets, given the correct policy stimulus

In addition, local flexibility markets should not be seen just in terms of their economic potential for negating network costs to the DNO. Local flexibility has a much wider potential for overall system operation and for delivering a low carbon energy system on time and cost effectively. Flexibility may be able to help overcome congestion and system balancing issues on the networks through more intelligent management of demand, generation and storage. Indeed, the presence of flexibility markets, operating at the distribution network level, may also enable additional renewable generators to connect to the network in locations which were previously considered to be constrained.

- *What are the potential conflicts of interest and how can they be mitigated?*

You state that moving to World E would only be an option if needed to mitigate any perceived conflict of interest. Whilst we are in agreement that more work is needed to understand the conflicts of interest between system operators; we also consider that there would be advantage in discovering what other benefits could arise from World E; and also at what scale these benefits would be maximised. As stated earlier we consider that World E should be based at the DNO level; instead of the 4 coordinators envisaged in the IA.

Another perceived conflict of interest is that each World depicts SOs owning / operating flexibility resources. This is clearly outside of the European Commission's proposals in the 'Clean Energy for All Europeans' package³⁴ and BEIS / Ofgem's 'Smart Systems and Flexibility Plan' which states that network operators should not own storage facilities as that would be uncompetitive. We agree with this.

- *How can industry arrangements facilitate a different pace of change across regions?*

Whilst we accept that the pace of change currently may be different across different networks (with different scales of uptake of flexibility) we do not accept that everything should happen at the pace of the slowest. Again, BEIS need to deliver a government steer on the change they expect to see and the timeframe for delivering that change. We have seen several DNOs which wish for transformation to happen quicker, almost competitively between them in who can deliver the best results – this is healthy competition which should be rewarded, perhaps through the RIIO framework. It is unacceptable for these forward-thinking DNOs to be held back by their peers.

³³ <http://projects.exeter.ac.uk/igov/primer-dsps-and-valuing-der/>

³⁴ <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans>

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

Of utmost importance is the need to attain a robust policy steer from BEIS. We also argue that in order to meet the CCC budgets on time, we will need institutional change, which include an Energy Transformation Commission and a changing role for Ofgem³⁵.

This would then give the ENA the focus needed to proceed with any particular World (or variation of). It is not for the ENA to make these policy decisions and we appreciate that you are in a difficult situation which you are attempting to manage.

We also consider that you should take note of what else is happening globally in this space (e.g. Australia and New York³⁶) and the work of the European SmartNet project³⁷ which is also considering similar themes.

In addition, on 26 March 2019, the European Commission approved new market design rules which are envisaged "to empower energy consumers to play an active role in driving the energy transition and to fully benefit from a less centralised, and more digitalised and sustainable energy system"³⁸.

The new rules propose several market changes/goals:

- Increased flexibility in short term markets
- Removal of the wholesale price cap in order to allow for scarcity pricing
- The cost of electricity should reflect both time and location
- Reducing bottlenecks by re-investing congestion revenues into the grid
- Higher levels of co-ordination at a regional level
- Increased demand side response
- Consumers allowed to request dynamic pricing contracts from their suppliers

In light of these proposed changes, it would be useful to know how these fit in with the ENA's Future Worlds.

It is also worth you considering the work of other academics who have been researching coordination schemes internationally (e.g. Helena Gerard ³⁹). We are also willing to provide you with any outputs from our own research as appropriate.

Please also take note of our comments made on World E where we believe that investigation should be undertaken on additional advantages of independent operation.

To end, we do thank you for the opportunity to comment on the Future Worlds proposals and Baringa's IA. We hope that our comments will be taken as constructive and that they will assist you in further dialogue with BEIS, Ofgem and stakeholders.

If you have any questions on our response, or need clarification on any of the points raised, we would be happy to discuss these with you.

³⁵ <http://projects.exeter.ac.uk/igov/enabling-the-transformation-of-the-energy-system/>

³⁶ <http://projects.exeter.ac.uk/igov/primer-new-york-state-rev/>

³⁷ <http://smartnet-project.eu/>

³⁸ http://www.europarl.europa.eu/doceo/document/TA-8-2019-0226_EN.html?redirect

³⁹ "Coordination between transmission and distribution system operators in the electricity sector: A conceptual framework" available at <https://www.sciencedirect.com/science/article/pii/S0957178717301285>