Working Paper

Sustainability first

Greening electricity distribution networks: How green are the RIIO-ED2 Business Plans?

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All the DNOs have now published drafts of their RIIO-ED2 business plans, with the exception of UKPN which has published a twenty-page exec summary. These are weighty documents and from the perspective of a stakeholder like Sustainability First it is not practical to go through all the Annexes and supporting documents that some of the companies have published. In comparing the plans we have therefore relied very largely on what is readily accessible in the core business plan documents.

In reflecting on how green the plans are this note considers first the role that the companies say they will play in facilitating the wider net zero transition and then looks at the steps they propose in relation to their own operations as set out in their Environmental Action Plans. Finally, the note touches briefly on the issues around a just transition – the implications of net zero for consumers in vulnerable situations and for inter-generational equity. It does not look more broadly at what the companies are proposing in their vulnerability strategies or questions of affordability. We welcome the Citizens Advice commentary which explores these consumer issues in more depth.

In its Business Plan (BP) Guidance Ofgem included minimum requirements that companies need to cover, along with an expectation that they would position the individual actions in a broader strategy or framework. From the core business plans it is not always clear how Ofgem's minimum requirements have been met – but this may well be set out in the various appendices that we have not looked at.

In particular, (BP Guidance 3.29) the companies are supposed to make use of a comprehensive environmental assessment methodology – to inform their strategies, targets, outputs and metrics including looking at counterfactuals – i.e. including do nothing (and we would argue ideally also "do more"). On decarbonisation 'at lowest cost to consumers', the BP Guidance (3.30) also requires the companies (where decarbonisation is the main investment rationale) to reflect this in the Engineering Justification, the cost assessment process and the DSO strategy.

Support for the energy transition

How well do companies understand the shifts required?

Ofgem's Business Plan Guidance requires network-level forecasts with a robust sensitivity analysis, including on peak-related assumptions and evidence of extensive stakeholder testing. It is clear that all the companies have a good sense of what is involved in electrification of transport and indeed their hands on experience and involvement in significant innovation projects through ED1 should mean that they have a good sense of the practical issues and challenges.

In contrast, on heat they are typically at an earlier stage in the journey, reflecting the level of policy thinking across the UK as a whole. In developing their distribution scenarios (DFESs) they have built in projections around heat pump installations and some (like SSEN and UKPN) are starting to explore what the varying levels of energy efficiency of buildings might imply for electricity demand. While the DFESs look at trends at a granular geographic level based on demographic and other data, including testing the assumptions through local authority engagement, there doesn't seem to be any real insight or understanding in the business plans themselves about their different geographies or baselines. For example, in SSEN's Scotland region there are already significantly more heat pumps than EVs – presumably reflecting the geography and that it is largely off the gas grid – but this is not commented on and there is no discussion of what this means for ED2.

These shifts in demand and in sources of generation all come together in the DNOs evolution to distribution system operators and, in particular, in their thinking around the contribution that customer flexibility services could offer in terms of avoided or deferred network investment. All networks are moving forward in this space although quantified metrics are hard to come by.

How do they plan to handle the uncertainty in future load growth?

As has been clear throughout the development of Ofgem's methodology for ED2, one of the big challenges is how to deal with the uncertainty around future load growth. Ofgem has asked the companies to ensure that their plans can flex to accommodate the range of FES scenarios and those produced by the CCC for the 6th carbon budget. Ofgem is clear that infrastructure should not be a barrier to net zero delivery but equally that consumers should not be paying for investment that is not required. They have therefore proposed that there will be some form of uncertainty mechanism – almost certainly an automatic volume driver – to deal with load related investment. Some larger strategic investment projects could be treated as price control deliverables.

What Ofgem has not done is set out which scenario should be used for baseline planning and hence each company has taken a slightly different approach. For the most part they have sought to present the baseline as being the minimum investment required, with additional funding coming through an uncertainty mechanism, although some have used a "best view" as their base case. As well as creating problems in comparing across companies this does also create a risk that (in the former case) both the companies and Ofgem will be understating the full bill impact for the ED2 period. Companies vary in how explicitly they set this out with UKPN in particular presenting clearly the bill impacts of different scenarios.

In theory, it shouldn't really matter what the baseline is if the uncertainty mechanism works effectively (and the company has a good line of sight of its likely future workload). But the headline bill impacts will depend on the baseline that is assumed. Moreover, both the companies and Ofgem have an interest in playing down the likely bill impacts of a move to net zero. In our view it is vital that there is transparency around the bill impacts of different scenarios which in most cases is not there at present. Clear presentation of the bill impacts of the "best view" is essential.

	Summary of Proposals	Comment
ENWL	Use a Central Outlook which reflects the average of assumptions across the FES scenarios Have also costed other scenarios to get range for UMs	Really not a central theme of their plan at all No figures in main plan for EV or HP projections
NPG	830k EVs and 250k heat pumps. Planning Scenario has been developed looking across all scenarios – "at the higher end of the range". EV projections take account of govt policy on ending ICE sales (not in FES) and use CCC's Balanced Pathway for heat pumps.	Nice summary of the uncertainty beyond simply FES scenarios – how electric? How local? How flexible? How fast? Bill impacts not clear
SPEN	1.5m EVs, 0.9m HPs 3 scenarios – low, baseline and high (with baseline very much at low end)	Clear scenarios but bill impacts not obvious
SSEN	1.3m EVs and 0.8m HPs Baseline of 2 years of Consumer Transformation (CT) then System Transformation (ST) (FES scenarios). But CT remains "best view"	Good model in terms of identifying minimum needed to keep pathways open Range of scenarios not clear Bill impacts not clear
UKPN	Base: 2.6m EVs and 0.3m HPs High (top CCC): 2.7m EVs and 0.7m HPs Includes flexibility (H/M/L) as part of scenarios	Very clear on bill impacts up front (10% saving in base case; 4% saving in high case) EV and HP figures given for each scenario Includes flexibility take-up as part of scenarios (so ST is higher cost than CT; base is not very different to Steady Progression which has much lower EVs but also lower flex)
WPD	2.1m EVs 890k HPs Provides a "Best View" across full range of LCTs (including generation and battery storage) – but costs then split between ex ante and UM. Ex ante = "Certain View" (required in all 3 FES net zero scenarios)	Clear on bill impacts: fall by 95p in base case and increase by £1.21 in Best View

Environmental Action Plans

Business Carbon Footprint and Science Based Targets

Ofgem's Business Plan Guidance sets out baseline expectations for company Environmental Action Plans, including for their Business Carbon Footprint. DNOs must report on their emissions: scope 1 -directly controllable (i.e SF6, buildings, fleet, own-generation), scope 2 (emissions associated with main-business activity i.e. losses) and scope 3 (indirect – e.g. embodied carbon in new construction projects, embodied carbon in supply chain). Companies must also commit to BCF targets, actions and metrics for scope 1 and scope 2 emissions. These targets should align with the Science-Based Targets they each adopt. It would also seem to make sense for the ED2 targets to relate clearly to the 2035 milestone of a 78% carbon reduction required by the 6th carbon budget.

We would expect companies to position their ED2 BCF targets against their current BCF as reflected in ED1 reports to Ofgem. Demonstrating ambition for losses and for SF6 leakage in ED2 is particularly important given they account for the overwhelming majority of current DNO green-house gas emissions.

Ofgem has required the companies to have Science Based Targets for their company scope 1 and 2 emissions. While Ofgem chose not to specify whether this should be a target aligned to 1.5 degrees or just below 2 degrees, the SBTi has recently stated (June 2021) that going forward all accredited targets must align to 1.5 degrees which raises the bar for all companies. The benefit of SBTi accreditation is that it ensures the detail of the calculations should be on a comparable basis although it remains open to companies to set their own baseline year and (interim) target date which means that DNO comparisons will remain difficult.

According to the SBTi website (at the start of August):

- SSEN was the first to commit to developing a target (but the ambition level is not specified);
- UKPN was the only one to have a plan accepted but that is based on "well below 2 degrees". The specific target cited is to reduce scope 1 and 2 emissions by 25% by 2029 from a baseline of 2019;
- WPD and ENWL have committed to develop targets aligned to 1.5 degrees.

Alongside their SBTi targets, a number of the companies have also included in their plans ambitious sounding headline dates for becoming net zero in their "controllable" business carbon footprint activities. However, what is clear from the detail is that these headline figures exclude losses and involve offsetting.

Losses are counted as scope 2 in the SBTi methodology and account for over 90% of the companies' carbon footprint. The companies largely assume that losses are not 'directly -controllable', but this should not imply that losses can simply be ignored. We comment further on losses below.

The use of offsetting to reach net zero is a complex and potentially controversial element. Ofgem's Business Plan Guidance is clear that DNOs should adopt a SBT for the company to reduce its scope 1 and 2 BCF 'without relying on international GHG offsetting'. The SBTi are clear that negative emissions should only be counted towards a net zero goal where it is impossible to otherwise prevent emissions (or in the transition towards their formal target). It is far from clear that there are any elements of the network emissions that fall into this "impossible" category and offsetting should not be used as a way to avoid tackling the more difficult areas. These headline claims of early "net zero" dates would not meet the standards for a science based target and risk detracting from the SBTi target.

That said the SBTi do acknowledge that negative emissions can be beneficial alongside meeting interim targets en route to net zero as set out in their paper on net zero targets in the corporate sector[1]. The approach to negative emissions is understood to be an area that SBTi are continuing to explore and will be publishing a consultation on later this year.

Where offsetting is proposed this then raises issues around the assurance provided on carbon offsetting or negative emissions schemes – whether they are genuinely additional, how tree planting – which a number of the companies propose - is actually managed (and what ultimately will happen to the trees). Accreditation is still a developing area but we would expect companies to work with the best accredited schemes (or to have alternative ways to provide that assurance) and for their actions in this area to be guided by a clear set of principles. While we welcome efforts by the companies to find robust ways to offset their residual emissions this should be clearly seen as second best to actually eliminating those emissions and as an interim step.

On Business Carbon Footprint, looking at the company plans for electrification of their own fleet gives some sense of what they propose doing to reduce operational emissions (albeit these account for a small part of the overall BCF). There will be questions over how cost-effective early electrification is as a way of reducing carbon – but there is also an important leadership role for the companies to take here.

Another small element of some company plans in this area is the use of renewable electricity for their own consumption (i.e. in their own buildings). Again, green tariffs are a controversial area (as reflected in the latest BEIS consultation[2]). PPA backed tariffs are generally seen as the gold standard.

[1] https://sciencebasedtargets.org/resources/legacy/2020/09/foundations-for-net-zero-full-paper.pdf

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011032/carbon-content-energy-products-cfe.pdf

	Summary of Plan – **BCF / SBT**	Comment
ENWL	Aim to be a carbon neutral business by 2038	Definition not clear
NPG	20% reduction in BCF over ED2 SBT target to reduce scope 1 and 2 by 63% by 2035 On path to net carbon neutral operations by 2040	Recognise that total GHG is area under the curve! Show pathways for scope 1 and 2 with range of pathways dependent on losses
SPEN	38% reduction in BCF by 2028 Net zero by 2040 (scope 1,2 and 3) Will have 1.5 degree SBTi target by December Planning CVP for scope 3 emissions Neutrality in controllable BCF by 2030 Using PPA backed green tariff for energy they consumer	Not clear how different targets fit together (but cover the ground) 2030 target excludes losses and includes offsetting (using Oxford Carbon Offsetting principles). Recognise need to reduce use even if on green tariff
SSEN	35% reduction by 2028 55% reduction by 2033 Aim for Net Zero by 2045 Will set scope 3 target though not required	Includes losses and added challenge of diesel on the islands
UKPN	25% reduction by 2029 (cf 2019) SBTi accredited (2 degrees) Net Zero in controllable BCF by 2030 Using 100% renewable electricity [Press release in May said: Well-below 2 degrees for its entire carbon footprint, requiring a 25% decrease by 2028; a 42% reduction for directly-controllable emissions by 2028, in line with a 1.5 SBT; Offset any remaining directly-controllable emissions to become Net Zero from 2028 onwards]	2030 target excludes losses and includes offsetting Not clear if renewable electricity is PPA backed
WPD	Net zero in internal BCF exc losses by 2028 Commit to 1.5 degree SBT	

	Summary of Plan – EVs	Comment
ENWL	29% of fleet electrified by 2028	
NPG	40% of fleet to ULEVs/ZEVs	
SPEN	100% cars/vans to EV by 2030	CEG challenge cf Scotgov target to replace all small and medium vehicles in public sector by 2025
SSEN	80% of fleet <3.5 tonnes by 2028 100% by 2030	
UKPN	-	
WPD	89% of small vehicle fleet low carbon by 2028	

Scope 3 emissions

The inclusion of scope 3 emissions (outside the companies' control) is voluntary under SBTi. Ofgem requires the companies to start measuring these emissions in ED2. This includes reporting on embodied carbon in new construction projects and also embodied carbon in the supply chain. Both are important areas for future emissions reduction associated with DNO activity and a few of the companies (like UKPN) have already proposed targets for their scope 3 emissions.

While this is welcome, until there is adequate baselining (to ensure all scope 3 emissions are captured) any future targets or metrics for reduction risk being hard to baseline or compare across DNOs and may not actually be comprehensive. Together with the companies, Ofgem continues to consider the detail of a common reporting methodology for environmental action plans, including work on a number of metrics. Common approaches to reporting on scope 3 emissions will be important to enable baselining and company comparisons.

Losses

Although all companies have strategies for loss management in line with Ofgem's minimum requirement, these strategies are relatively limited and their outputs are not financially incentivised in ED2. Given that losses account for over 90% of emissions associated with DNO activity today, with higher losses and emissions expected in the medium term (due to heavier loading of network assets), Sustainability First has consistently argued that this is an area that needs more focus. Addressing losses is extremely important, even once the grid is decarbonised, as a long-run DNO

energy efficiency measure and therefore an important step in helping ensure that we have sufficient capacity in the system longer-term to achieve net zero, while keeping a downward pressure on costs for consumers.

Companies typically propose to use low loss equipment where this is justified by a CBA, or propose minimum cable sizes when replacing assets. Companies are also exploring voltage regulation schemes which can also reduce losses. Each approach can show a clear consumer case on a 'spend-to-save' basis (but without the companies themselves directly benefitting). We would therefore like to see the use of low loss equipment included as a PCD (or CVP as suggested by SPEN) to ensure the companies are sufficiently held to account for delivery. It should also be made clearer where the use of low-loss equipment simply reflects the new (mandatory) EU eco-design standards and where it goes further.

SSEN highlight the importance of losses but then have a small-scale proposal with costs of £5m and benefits of £34m – and others have similar examples (eg using voltage regulation). This highlights the potential benefits that can come from loss reduction but reinforces questions about whether enough is being done in this space.

	Summary of Plan – **Losses**	Comment
ENWL	Aim to reduce losses by 8 GWh pa	Unique in having a clear target (even if lower than ED1) No link to strategy
NPG	"Optimise whole system losses while facilitating net zero"	Include a section but no specific proposals
SPEN	CVP – network losses (£10m low voltage transformers; commit to minimum cable size)	
SSEN	Will set minimum cable size and loss reduction equipment as 1st choice CVP – substation energy efficiency and transformer switch-off (TASS)	Quoting huge benefits (£34m) from small (£5m) spend on losses Clear statements about the importance of losses but little concrete action
UKPN	-	No mention
WPD	Continuing to invest in low loss equipment and larger cables / transformers	

SF6

SF6 leakage is also an important element of the companies' emissions. The Business Plan Guidance requires DNOs to adopt an SF6 strategy for the first time. This will form a part of the EAP. While distribution SF6 leakage is less significant in absolute terms than it is for transmission there are still some larger DNO switchgear units with leakage potential

(particularly at 132kV level[3]). These must be prioritised by DNOs for repair or for replacement with non-SF6 alternatives where available given the potent and enduring nature of SF6 as a green-house gas.

As part of their long-term SF6 strategies, DNOs must also start to consider future plans for the very many small sealed units containing SF6 (~250,000 equipment items) across all of the DNO networks – to plan for continued containment, eventual secure disposal and approaches to alternatives. Alternatives should be sought for new equipment being installed. Sustainability First would like to see close working across the industry (including with transmission) on a strategy for replacing equipment containing SF6 longer term.

DEFRA is currently reviewing the status of the current F-Gas regulations and any mandates on the future phase-out of SF6 switch-gear would trigger an SF6 reopener - but currently many of the alternatives contain at least some green-house gases.

	Summary of Plan – **SF6**	Comment
ENWL	Reduce leakage rate to below 0.3% (cf 0.32% in ED1)	
NPG	Reduce SF6 losses by 15%	
SPEN	SF6 leakage down 10%	CEG support for offsetting given practicalities of reducing in short term – but unclear if they really are doing all they can
SSEN	35% reduction in leakage	Clear plan of action Targeting the assets with highest leakage
UKPN	-	
WPD	20% reduction in SF6 leakage Drive partners to develop alternatives	

Biodiversity

Ofgem's requirement is for companies to develop methodologies to baseline in this area, and specifically to:

- Adopt an appropriate tool to assess net changes in natural capital from different options for new connections and network projects.
- Adopt an appropriate tool to monitor the provision of ecosystem services from network sites and report annually.

[3] which is transmission level in Scotland

In addition, the Environment Bill will require that all major projects subject to planning (in England) deliver a biodiversity "net gain" of 10% using a standard Defra methodology.

There is generally stakeholder encouragement for companies to do more in this space but the companies are all just starting on the journey.

As a result most of the networks do not make a clear link with the existing frameworks and "net gain requirements" but focus instead on simple metrics that will resonate with stakeholders such as the number of trees planted or sites improved.

One link that some make is around tree planting to make up for their tree cutting activity. However, none of them have really addressed the environmental impacts of tree cutting programmes per se. ENWL noted that stakeholders had asked how many trees they cut down and they had to admit they didn't know as industry standard metrics are about the pole spans cleared. They are now addressing this but others will be in a similar position.

In our view tree-cutting and tree-planting should be part of a holistic and carefully managed programme of activity, considered from multiple standpoints: efficiency, care, carbon-management, forestry approaches and biodiversity, amenity, community etc. Any thinking on offsetting / tree-planting programmes – should be integrated into the company's wider environmental management programme and linked to a comprehensive environmental assessment methodology.

	Summary of Plan – **Biodiversity**	Comment
ENWL	Plant 10k trees pa Improve 100 substations (low maintenance wildflowers)	Replacing trees lost through tree cutting
NPG	200 sites improved	
SPEN	"more ambition"	44 references to biodiversity but nothing concrete
SSEN	CVP on seagrass (linked to marine cables) Afforestation proposal – addressing biodiversity (because of the types of vegetation planted) and carbon abatement	More work needed to justify these (very high cost) - but interesting Unclear re commitment to "net gain" Afforestation also linked to tree cutting (and notes time lag before sequestration starts)
UKPN	Go twice as far as legislation requires Net gain 10-20% for major substation +30% on 100 existing sites Using Defra biodiversity tool	Clear metrics linked to established methodology
WPD	Work with Wildlife Trust to develop tool	

Climate adaptation

While all companies have clear plans for flood protection, reflecting existing industry standards, only a few, like SSEN and NPG, really seem to be thinking more widely about the climate impacts (which might include wildfires, more storms or extreme heat). NPG references the impacts on vegetation management and the need for collaboration across sectors. Ofgem is requiring DNOs to have a dedicated climate resilience strategy and plan, including adaptation pathways (BP Guidance 3.25). Ofgem also expects the companies through the ENA to work up a cross-company coordinated approach to climate resilience. This is crucial given that in its latest Adaptation report the CCC highlighted the electricity grid as an area that needed to do much more, noting the wider cascade issues that could result from a grid failure. Ofgem, the ENA and DNOs will need to give priority to this climate resilience work programme.

Just transition

While most of the companies make at least a reference to the need for a just transition, SPEN is alone in presenting a Just Transition strategy (motivated by responding to Scottish stakeholders aware of the Just Transition Commission in Scotland) and a set of principles which include a strong community focus.

Energy efficiency

The companies are now required by licence to consider energy efficiency alongside flexibility as alternatives to conventional investment. Sustainability First have pressed for this as also supporting the wider heat decarbonisation agenda and helping tackle fuel poverty, with innovation and learning still required around how to value the energy efficiency system benefits and how to work with partners on cost effective funding[4]. Most DNOs do mention energy efficiency with a few picking up on it as a potential area in which they are looking to go beyond baseline expectations.

	Summary of Plan – **Energy Efficiency**	Comment
ENWL	Partnership referrals include energy efficiency advice	
NPG	CVP – voltage optimisation	
SPEN		Thoughtful summary of pros and cons of energy efficiency v flex but no specific proposals
SSEN	Possible CVP for energy efficiency demonstrator	
UKPN	Commitment to develop an energy efficiency flexibility product with 6 monthly tenders from 2023	Mention energy efficiency and flexibility together throughout
WPD	-	No mention

[4] Sustainability First. 'Energy Efficiency. What is a DNO role ?'. March 2021

No-one left behind

Most of the companies do reflect on the issues around "no one left behind" (reflecting Ofgem guidance). The challenge is how to ensure that what they are proposing is an appropriate role for the DNO to play and will deliver real benefits. It is not clear whether simply making funding pots available is really helping tackle the problem – though this may depend on the governance around such funds and the scope for stakeholders to co-create projects that deliver wider benefits.

In some cases, the proposals in this area overlap with broader vulnerability support but as mentioned above we have not done a comprehensive review of the companies' wider vulnerability strategies.

	Summary of Plan – **No one left behind**	Comment
ENWL	£1m pa community energy fund £250k fund to remove barriers to LCT take-up by struggling households £500K spend on partners with specialist skills Rollout Smart Street voltage optimisation to 250k HH in disadvantaged areas	How to demonstrate goes beyond simply 'throwing money' at a problem (alongside a further £2m to support fuel poor)? But targeted voltage optimisation is good idea (link to energy efficiency and losses).
NPG	Target to support 5k vulnerable customers through the transition – partnerships, research and innovation	
SPEN	CVP for LCT vulnerable customer support	
SSEN	CVP for community flexibility (with a focus on fuel poor communities)	
UKPN	Initiative to address market failures in on-street charging Provide information and help to 500k vulnerable customers Co-fund grants for LCTs through UKPN Foundation (funded by shareholders and employees). Upto £4m	
WPD	CVP – community energy engineers CVP - funding solar PV on schools and community buildings in deprived areas CVP – LCT advisory service	

Inter-generational equity

Questions of inter-generational equity are largely picked up in the finance chapters of the business plans. While NPG highlight the challenges created in this space by Ofgem's approach to asset lives, the others all simply rely on Ofgem having made the inter-generational equity trade-off in their methodology decision. As a first step in addressing questions of inter-generational equity there is a need for much more transparency around the longer-term bill impacts of decisions being taken now (even if elements of the future are unknowable).

SSEN do present a chart of the bill impacts out to 2060 to show the effect of different asset lives. Including this profile has allowed the CEG to raise questions about whether the resulting dip in bills followed by a large increase is actually right.

The other important element is to engage customers on what they would see as a fair outcome as ENWL have done.

SPEN also highlight the impact of the ending of agreed pension deficit funding which does not come in for SP Manweb until ED3 and, they argue, explains why these customers face a higher bill in ED2 (and also why they have included ED3 figures as well in their plan).

	Summary of Plan – **Inter-generational equity**	Comment
ENWL	Have attempted to engage on fairness questions around financing	They report that customers are calling for more costs to be recovered earlier but this does not seem to be reflected in their plans
NPG	Raise issues with Ofgem's proposed change to asset lives – calling for a reversion to existing levels "to avoid today's children and young adults having to bear an even greater proportion of the burden of transitioning to net zero"	
SPEN	Show falling bills in ED3 with flat totex	No comment on impacts beyond ED3
SSEN	Show profile of bills through to 2060	
UKPN	-	
WPD	No long-term projections	Rely on Ofgem's 2011 review of asset lives – argue that to reopen would undermine predictability