

RIIO ED1 output measures

Availability and Capacity working Group

20th June

Draft for discussion

UKPN Strategic Objectives to meet the Primary Outputs

Output 1: Network reliability & availability

- Invest (opex and capex) at the lowest long-term cost to manage the health of the network to avoid detrimental impact on outputs that are important for our stakeholders.

Output 2: Conditions for connections

- Maintain profitable market share through competitive advantage in a demonstrable competitive environment.

Output 3: Social Obligations

- Respond to society's existing and evolving expectations of social obligations to deliver value to the business.

Output 4: Safety

- Change the regulatory outputs to recognise our approach to long-term improvements in safety.

Output 5a: Environmental Impact (facilitation of Low Carbon Future)

- Invest at the lowest long-term cost to deliver the anticipated needs of a future carbon conscious network through the delivery of outputs that our customers value.

Output 5b: Environmental Impact (UKPN environmental footprint)

- Make sustainable choices that lead to long term financial benefits where they are in line with outputs that our customer value.

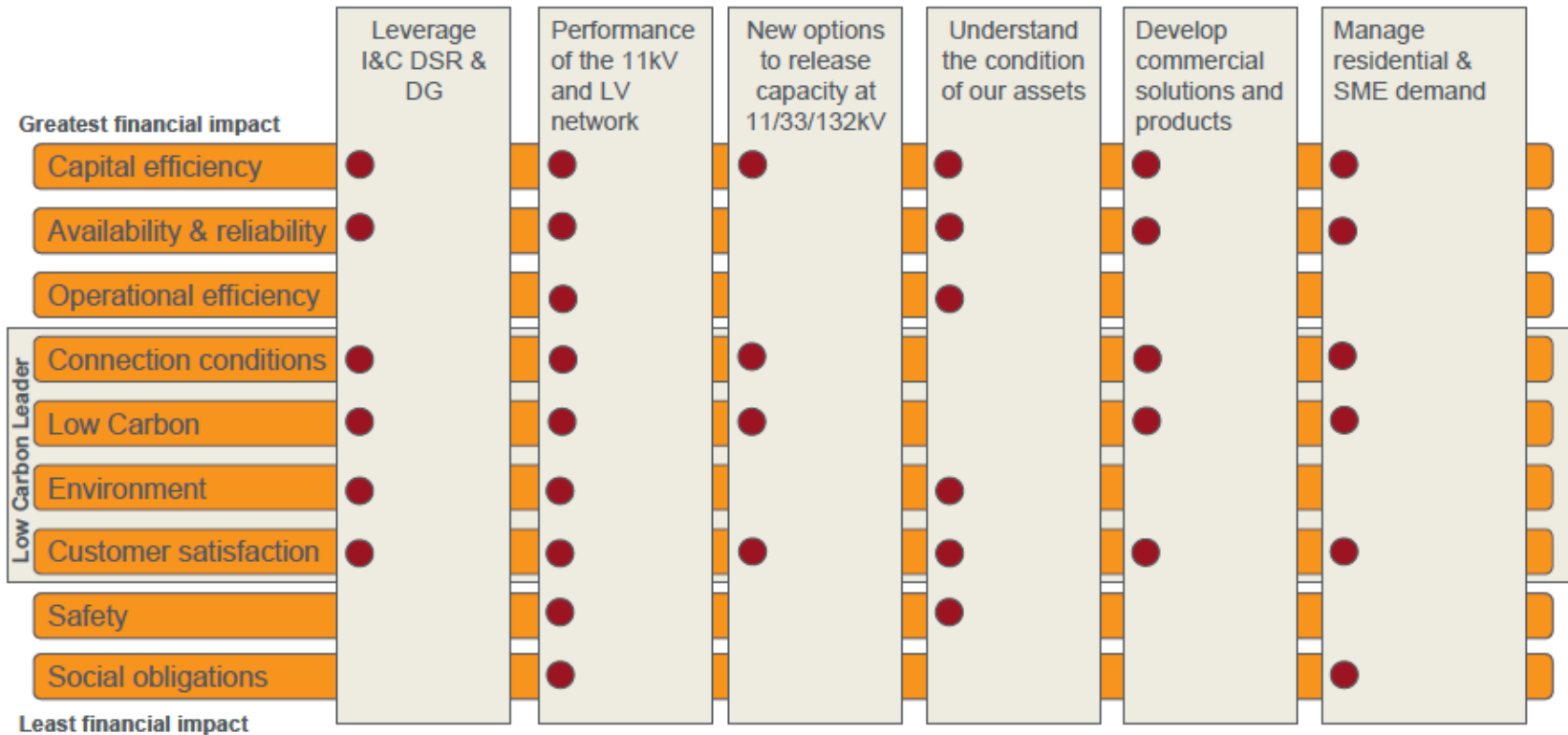
Output 6: Customer satisfaction

- Operate our customer processes to deliver sustained customer satisfaction and upper quartile performance.

Stakeholder Engagement

- Stakeholders endorse our business plans & business processes through effective engagement.

Approach to Delivering Primary Outputs



Translating into Possible RIIO Output Measures

ED1 Smart Grid Deliverable	ED1 Primary Output Category	Possible ED1 Output Measure
Enhanced System Integrity	Reliability and availability	Unplanned outages
Increased Supply Resilience	Reliability and availability	SAIFI (CIs) and CAIDI (avg. interruption duration)*
System Voltage Optimisation	Environmental Impact	Hybrid – load and loss load factor (higher) and ADMD (lower)
Facilitating higher levels of DG Penetration	Conditions for Connection	Speed and cost of connecting DG
Enhanced System Security through procured ancillary services	Reliability and availability	Cost of maintaining ER P2/6 security
Provision of upstream System Balancing ancillary services	Social Obligations	Cost of national system balancing
Increased Plant and Line Utilisation	Social Obligations	Avg. peak utilisation factor (i.e. higher LI through active management)
Smart Management of Distributed Energy Resources	Conditions for Connection	Speed and cost of connecting micro-and mini-generation
Smart Management of Electric Vehicles and Heat Pumps	Conditions for Connection	Speed and cost of connecting EVs and heat pumps
Improved Network Visualisation	Conditions for Connection	Capacity headroom
Enhanced Network Flexibility and Interoperability	Social Obligations	DG and DER accommodation levels
Advanced Power Outage Management	Customer Satisfaction	SAIFI (CIs)
Advanced Voltage Quality Management	Customer Satisfaction	Customer voltage and power quality complaints
Improved Load Factor	Conditions for Connection	Capacity headroom (i.e. increased due to peak shifting)
Losses Optimisation	Environmental Impact	Technical losses
Enhanced Control Systems Resilience	Social Obligations	Cyber security resilience (performance against attacks)

Output 5a - Environment Impact

Facilitation of low carbon future

Current Primary Outputs	Possible ED1 Primary outputs	Issues to be considered
<ul style="list-style-type: none"> • None 	<ol style="list-style-type: none"> 1. No of EV charging points 2. No of DG installations 3. Capacity headroom created for further low carbon technology penetration 4. Reinforcement cost offset due to non network solutions (DSM benefit) 5. Network utilisation factors – Higher factor would indicate that we had accommodated more low carbon Distributed Energy Resources (DERs) 6. MWh of DG output constrained 	<ul style="list-style-type: none"> • First two measures are not directly within our control • Measure 3 could be seen as investment in advance of need by Ofgem • Measure 5 could conflict with load index metric

Comments

- Key difficulty is that the uptake of low carbon technology will be dependent on customer choice supported by Government incentives – the ability to influence is constrained
- In transmission a financial incentive relating to change in low carbon energy flows is being evaluated – Based on Renewables UK proposal
- A consideration is whether a “connect and manage” approach is adopted for DG – This will be linked to the Time to connect metric under Conditions for Connection and if adopted would conflict with a MWh of DG output constrained

Environmental Impact - Low Carbon (1)

Proposed Outputs	
Technology selection can impact carbon emissions from the network and the ability of customers to connect low-carbon technologies	CO2 benefit of selected investment choices, measured in tonnes of CO2 (equivalent)
Our investment choices can enable more network users or customers to connect new low-carbon devices and sources of generation	Number of electric vehicle charging points installed across our networks, targeting areas where demand is likely to be greatest And/or Number of installations of distributed generation and associated capacities measured in Megawatts
Maximising capacity headroom within networks so that low carbon generation can be connected as cost-effectively as possible (Note: where there is insufficient capacity in the network to enable a new generator to connect, the generator may be asked to contribute to the cost of reinforcing the local network)	A number of alternative measures could be proposed: Reinforcement cost avoided by developers of low-carbon generation and/or Amount of generation connected to network which would have been uneconomic if reinforcement had been required. and/or Number of distributed generation enquiries received and/or Number of distributed generation enquiries subsequently provided by UK Power Networks

Environmental Impact - Low Carbon (2)

Proposed Outputs	
Provide a range of 'non-network' solutions which minimise the requirement to reinforce the network	Reinforcement cost avoided as a result of such approaches and/or Number of 'non-firm' DG connections offered/accepted (Note: a non-firm generation connection is one where we can not guarantee that the power being generated can be accepted by the network at all times. Ensuring a firm connection can require reinforcement of the network, and a generator may decide it would rather take the risk of not being able to distribute all power generated than pay that additional cost.)
Increase network utilisation such that more low-carbon generation can be accommodated	Network Utilisation Factors
Reduce the constraints that have to be placed on distributed generation, which in some cases may result in such schemes not being economic.	MWh (or %) of DG output constrained.

Stakeholder Feedback (1)

Output measure	Proposal: Existing (E), UKPN (U), Stakeholder (S)?	Stakeholders comments
Technology selection;	U	There was strong support for DNO measures that enable the expansion of CHP, in addition to other energy services
Investment choices to aid low-carbon devices and sources of generation; e.g. electric vehicles and heat pumps;	U	Stakeholders agreed that reduction of CO2 emitted through investment choices is a good output measure. There was concern over how this would be measured.
Maximising capacity headroom e.g. electric vehicles and heat pumps;	U	There was a wide-ranging discussion about the implications of connecting low-carbon technologies. The potential measure which gained the greatest support was 'the number of distribution generation enquiries subsequently provided by UKPN', as it reflects the implementation of enquires
Non-network solutions	U	Whilst stakeholders were supportive of the principle, there were no strong views re suitable measures.
Network utilisation e.g. electric vehicles and heat pumps	U	Stakeholders agree with this output but would like to know what this would mean to a layperson
Reduce constraints on distributed generation	U	Whilst stakeholders were supportive of the principle, there were no strong views re suitable measures.
Increase network utilisation to accommodate low-carbon generation	U	There was support for this output however the concern was that this measure was perhaps too broad, and would be better assessed at a lower level of granularity.