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RIIO-ED3 Framework Consultation: S&C Electric Response

We welcome the opportunity to respond to Ofgem's 'ED3 Framework Consultation.' We set out our answers below to several of the specific questions posed and attach an annex with some further detail, focusing primarily on the arrangements for short interruptions.

None of the material outlined in this response is confidential and therefore we are happy for Ofgem to publish it in full.

Q38. In the context of greater electrification, is our current approach towards regulating reliability appropriate for ED3?

In the consultation Ofgem makes the following statement *"It is crucial that both domestic and industrial consumers receive an uninterrupted supply of electricity from DNOs, especially as reliance on electricity grows in order to meet net zero and for certain growth industries, such as data centres."* We agree entirely with this position. The changing energy landscape means that rapidly growing volumes of distributed generation are being connected to the distribution networks, and there is emerging electrification of transport and space heating. These changes all mean that the reliability of distribution networks is growing in importance. Increasingly we all rely on an uninterrupted supply of electricity as critical to all aspects of our economic and social wellbeing.

In this context, we consider that three aspects will be critical to ensuring the effective regulation of reliability to meet the challenges for customers during RIIO-ED3:

- (1) Retaining and updating strong incentives for reliability under the Interruption Incentive Scheme (IIS), including opportunities for rewards for outperformance relative to the targets, which have had an immensely positive impact on the experience of British electricity customers.
- (2) Introducing arrangements to ensure the same focus on the growing importance of short interruptions; and
- (3) Addressing potentially perverse incentives related to the severe weather exceptional event mechanism within the IIS.

We address each of these points below.

Retaining the IIS

Since its introduction, the IIS has unquestionably had a positive impact on the experience of British energy customers. DNOs have achieved significant improvements in reliability. Since 2001-02 there has been a 54% improvement in average British customer interruptions (CI) and a 68% improvement in average British customer minutes lost (CML). This has resulted in a level of service that is world



leading. Consequently, many regulators in other countries including Australia, New Zealand, and Italy have replicated and adopted aspects of the IIS framework.

Ofgem makes the point that the pace of improvement has slowed in recent years. This is true but should not be interpreted as a sign that the mechanism has served its purpose and is therefore no longer required. Ofgem significantly reduced the incentive rates for CI and CML in RIIO-ED2, due to the way in which it calculated them. This included the multiplication of the Value of Lost Load (VoLL) in £/kWh by the average load per customer, which was falling at that time, and the multiplication of the VoLL for a minute without electricity by the latest average British CML, which was also reducing. This has meant that the CI incentive and CML incentive rates have fallen significantly despite the underlying VoLL increasing.¹ We consider the application of the falling CML to calculate the CI incentive rate to be an anomaly in the methodology rather than accurately reflecting what customers value. It is also important to consider that the average consumption per customer is likely to be increasing over RIIO-ED3 and beyond due to increased levels of electrification as part of the energy transition.

Despite what DNOs have already achieved, there is still scope for further improvement, and this requires the regulatory framework to send the right signals. Innovation means that new technologies to improve reliability and resilience on various parts of the electricity distribution networks are continually being developed and the increasing role of electricity in the broader economy means that the VoLL is increasing, which means that reliability improvements deliver additional benefits.

The update of targets to reflect past historical performance is fair as network companies should only be rewarded for strong performance in driving improvements. However, the risk of over-tightening targets or reducing the scope for rewards is that investments to improve reliability become uneconomic for companies even though the value of the improvements to customers are greater than the costs of the investments. That is another interpretation of what we have seen in recent years with improvements in CI and CML reducing as RIIO-ED2 incentive rates have fallen.

Reiterating the point that reliability will be increasingly important to customers, then regulation must recognise this in the way incentives are employed. This means retaining the IIS and updating the value of incentives. In this context, we welcome Ofgem's statement of plans to review the VoLL. It will be important that the review considers current and future developments in terms of electrification. Ofgem should also review the methodology for how it translates the VoLL into incentive rates. Incentive rates should be driven by the value provided to customers and the VoLL provides a means to determine that value.

Focusing on short interruptions

If Ofgem accepts the importance of an *"uninterrupted supply of electricity"* then this means a recognition that all interruptions impact the customer experience. Short interruptions are becoming an increasingly important part of the overall impact on customer experience and as highlighted by

¹ See Figure 16 in Appendix 6 of the RIIO-ED2 Sector Specific Methodology Consultation – Annex : Delivering Value for Money Services for Customers - https://www.ofgem.gov.uk/sites/default/files/docs/2020/07/ed2_ssmc_annex_1_delivering_value_for_money_services_for_customers.pdf



DNOs in the RIIO-ED2 Safety, Reliability and Resilience Working Group (SRRWG), now form a significant part of customer complaints. Separately, messaging from companies' Customer Engagement Groups (CEGs) for RIIO-ED2, Ofgem's own Customer Challenge Group report, and the response by Citizens Advice to the RIIO-ED2 business plans, all indicated that more could and should be done in this area.

UKPN has already responded to this messaging. It introduced its own short interruptions target and standard in RIIO-ED2. We also note that Ofgem acted by increasing reporting in this area but stopped short of introducing an incentive/ guaranteed standard at that stage.

We point to a wealth of international evidence of measures being introduced by regulators to tackle short interruptions and significant improvements in performance being delivered. Financial incentives on short interruptions have already been successfully implemented in several countries including Italy, Sweden, and the state of Victoria in Australia. Further details are set out in our Appendix on short interruptions.

Overall, we consider that there is strong merit in introducing a short interruptions incentive in RIIO-ED3. This can drive significant improvements in performance as we have seen across a range of other jurisdictions. The incentive should reflect the value that customers place on short interruptions. For this reason, it is important that the further work on VoLL Ofgem has proposed, considers how customer value reducing short as well as longer duration interruptions. We recognise concerns that such an incentive must be based on robust data, but Ofgem has been collecting this data from DNOs for a number of years and UKPN has already demonstrated the value that a short interruption standard and target can provide.

While a certain level of short interruptions is needed as part of rapid restoration following faults, the overall number of short interruptions experienced by customers can be addressed by reducing the scope of customers impacted. For example, reclosing on spurs can avoid transient faults impacting all customers on a feeder. Appropriate target setting using historical data, can reflect historical evidence on actual levels of CI, CML, and short interruptions, while providing balanced incentives to improve performance against each of these.

We consider the tools are in place to enable a short interruptions incentive and/or Guaranteed Standard to be implemented from the start of RIIO-ED3.

Climate resilience and the treatment of severe weather exceptional events

There is a potential perverse incentive in the current severe weather exceptional events mechanism in the IIS, which is now becoming more significant given the increased importance of climate resilience. If a DNO improves its resilience, and therefore has less CIs and CMLs during major events, this will tighten its severe weather threshold which in turn means it will potentially be exposed to more risk under the CI and CML incentives.

Q55. Do you agree that we should retain the Network Asset Risk Metric (NARM)? How should it further evolve in ED3?

We consider that the NARM mechanism has made a very positive contribution to the network companies' evidence-based approach to assessing the need for non-load related investment and the focus on resilience.



In terms of evolution, we recognise that Ofgem has increasingly favoured ensuring a consistent approach is adopted across all networks. While we recognise that consistency is important, we also note that network sectors are not all the same. The Electricity Distribution Common Network Asset Indices Methodology (CNAIM) is the most developed of these methodologies. Both now and going forward, network companies will face different risks and should be able to adapt to respond to those risks. Therefore, we would suggest that an approach is adopted that does not drive for consistency for consistency's sake but only where it provides benefits to customers.

The other aspect of evolution should be a focus on increasing the coverage of assets to cover a more complete range of categories such as a greater range of underground cables at different voltages. This will enable a broad and targeted assessment of risk which is likely to lead to be a better understanding of the challenges faced, and better outcomes for all customers.

Q56. Do you agree that we should consider a more integrated approach to managing asset health, together with load-driven expenditure, given the need to future proof for resilience (climate, cyber and physical security) and future demand? What might the risks and benefits of this approach be?

We agree that the clear interaction between asset health and load investment should be recognised by the regulatory framework. The challenges facing the energy networks are real. Climate threats have risen materially in recent years and resulted in significant costs to networks companies to both prepare for and manage those threats. At the same time, the risks posed by cyber and physical security threats continue to evolve and become more sophisticated.

This means that such challenges have to be addressed in a progressive way. Network companies need to invest to get ahead of those challenges and in doing so optimise across all the drivers of risk and capacity requirements. Failure to do so will mean higher costs in the long-term.

The benefits of a more joined up approach are clear, networks that are more resilient to the threats faced and which ensure customers retain the uninterrupted supplies that they increasingly rely on. Such an approach will also enable networks that support Britain's critical infrastructure as well as its growth and Net Zero ambitions.

The risk lies in the development of "stranded assets" that are not required or over-engineered in relation to the threat faced. However, these are the same challenges associated with any anticipatory investment and, as Ofgem has demonstrated elsewhere, regulatory mechanisms can be employed to minimise these risks – volume drivers, uncertainty mechanisms etc. Further, we reiterate Ofgem's own message which is extremely well articulated in the consultation document i.e., *"that the risk and downside for consumers of network underinvestment in network reinforcement would be greater than the downside of overinvestment."*

Q58. How should we monitor progress on the delivery of climate change resilience? Do you have any specific learnings which can help shape this?

We consider that there should be several elements to this including the monitoring of companies' delivery of work and outputs identified in their RIIO-ED3 Climate Resilience Strategies and the development of more outcome-based metrics for resilience, discussed further below.



Q59. Do you have any comments on the suitability of current incentives to ensure that consumers continue to receive a reliable service in the face of climate hazards?

As highlighted in response to Q38, we consider that the IIS incentives form a strong basis to support the provision of a reliable service but that these should be supplemented with additional attention on reliability performance including exceptional events and a separate focus on short interruptions in recognition of the increased importance of an uninterrupted supply.

As noted in our response to Q38, the exceptional event mechanism within the IIS can potentially cause perverse incentives in term of resilience. If a DNOs improves its resilience, and therefore has less CI and CMLs during major events, this will tighten its severe weather threshold which in turn means it will potentially be exposed to more risk under the CI and CML incentives.

However, recognising the increasing challenges posed by climate threats, we note that Ofgem has previously indicated the intention to consider a specific “resilience incentive.” We consider there is merit in developing such a mechanism but also recognise that doing so presents challenges, in particular ensuring that incentives are only set with respect to outcomes that network companies can influence through their actions.

Various regulatory regimes have identified a desire to deliver a form of incentive on resilience. For example, in Australia in a 2022 Position Paper the Australian Energy Regulator (AER) highlighted that existing reliability incentives did not cover the impact of major events and that there may be merit in introducing an incentive for such events. This may be one option that Ofgem could consider e.g., with respect to the treatment of exceptional events.

We would be happy to discuss any of the points raised in this letter further with Ofgem.

Yours sincerely,

Chris Watts

Director - Regulatory Affairs



Appendix: Short interruption proposals and the energy system transition

In developing its consultation on the Sector Specific Methodology for RIIO-ED3, Ofgem has rightly recognised the key role that electricity distribution networks will have in enabling the transition to a smart, flexible, low cost and low-carbon energy sector. If full advantage is to be taken of the opportunities available, then reliable and flexible networks will be required to serve the evolving needs of distributed generation and other DERs as well as demand customers.

It is on this basis that we consider the reliability incentive arrangements for RIIO-ED3 should be enhanced to take account of these ongoing changes. A key part of this should be acting on short interruptions which stakeholders are already telling network companies are having significant impacts on customers.

Impact of rapid change on electricity distribution networks

The IIS was first introduced by Ofgem in April 2002 against a background of large, centralised generation feeding through the transmission and distribution networks to inflexible demand at the base of the system. The design of the IIS did not anticipate some of the dramatic changes that are well underway in the energy sector, and which will continue to evolve quickly. The principal areas are summarised below.

Increasing proliferation of electronics and power electronic devices

There are a wide range of devices now used by domestic and commercial customers that are sensitive to short interruptions. This impacts a wide range of stakeholders:

- Domestic customers are increasingly irritated at the loss of internet access and video streaming when their routers take several minutes to reset following a short interruption.
- Retail businesses are upset at the cost and lost sales while their equipment reboots.
- Factories make increasing use of digital interfaces, smart sensors and alarms which would all be affected by short interruptions and lead to lost production and waste.

Research carried out in the U.S. suggests that the average cost to a medium and large commercial and industrial customer for a single short interruption is over \$12,000 (£10,000).²

Increase in distributed generation

Over the past decade the share of electricity generation from renewable sources has increased dramatically as the costs of new technology (including storage, solar and wind power) have fallen at rapid rates. Over 50% of total renewable electricity generation capacity (and 31% of total capacity) is now connected to the local distribution networks. Most of this is likely to be connected to the overhead network, which will typically experience higher fault rates than the underground network.

Increasing volumes of distributed generation, means short interruptions are becoming less tolerable. Even a short interruption of 5 seconds will knock generation offline. Different types of generation have different recovery times. Some types of generation recover quickly, within a few minutes, and others may be subject to manual intervention of complex startup sequences, meaning they are offline for a

² Updated Value of Service Reliability Estimates for Electric Utility Customers in the United States, Ernest Orlando Lawrence Berkeley National Laboratory, January 2015.



longer period, even though the service is restored to the feeder and the load is fully present. Taken in scale (such as during a large storm with many scattered outages) this is unwelcome news for the DNO/DSO as a growing portion of the generation is not available when it is most needed. This can aggregate from a small, local problem to a larger distribution network problem as generation availability is shifting on and off.

In summary, short interruptions on the distribution system cause these additional DG/DER related problems:

- Renewable generation is unable to export and will have a direct monetary loss.
- Demand previously met by distributed generation now must be met through additional reserve from conventional generators.
- Distribution-network loading under the planning standard, must be managed in a way that does not take distributed generation into account.
- DERs such as energy storage and generation will be unable to provide services to the distribution network or other users when the network is unavailable.

Development in flexibility services and the transition to DSO

Over the past 5 years we have seen DNOs procure increasing volumes of flexibility services such as peak demand shaving from DERs through flexibility tenders to defer the need for distribution reinforcement. All the DNOs have now market-tested significant reinforcement schemes against such alternative solutions. Ofgem and BEIS' Smart System and Flexibility Plan highlighted the benefits of a smarter, flexible energy system to be £17-40bn out to 2050.

Most flexibility resources will be connected to distribution feeders and therefore will depend on distribution system reliability to provide services when they are needed. Therefore, all outages including shorter duration interruptions matter. DERs cannot provide flexibility services to TSOs or DSOs or peer-to-peer services to other customers if the network is not available or generation sources have been knocked offline, even temporarily. Interruptions mean that such services are less reliable, and the full benefits of flexibility cannot be realised.

Implications of focus on CI and CML for the operation of the networks

Approximately 70 to 80% of faults affecting overhead lines are transient. A key part of the way in which such faults have been tackled has been to replace fuses on tee or spur lines with auto-sectionalisers. This improves reliability in terms of longer duration interruptions because you no longer have transient faults blowing fuses which requires the line crews to go to the field searching for a problem that is no longer there.

However, when you take fuses out and use auto-sectionalisers together with up-line breakers or reclosers, short interruptions increase significantly, because the auto-sectionalisers do not contain the fault to the tee or spur they occur on. As a result, all customers on the main feeder are affected, meaning 100s or 1,000s of customers experience a disruption instead of just 10s of customers on the affected spur.

The implications of this are significant on the modern distribution networks with large proportions of generation and other DERs connected to distribution feeders. Such interruptions trip off distributed generation for several minutes or longer. As noted above, when taken at scale during a large event such as a storm, this can mean that a growing proportion of generation is not available when most

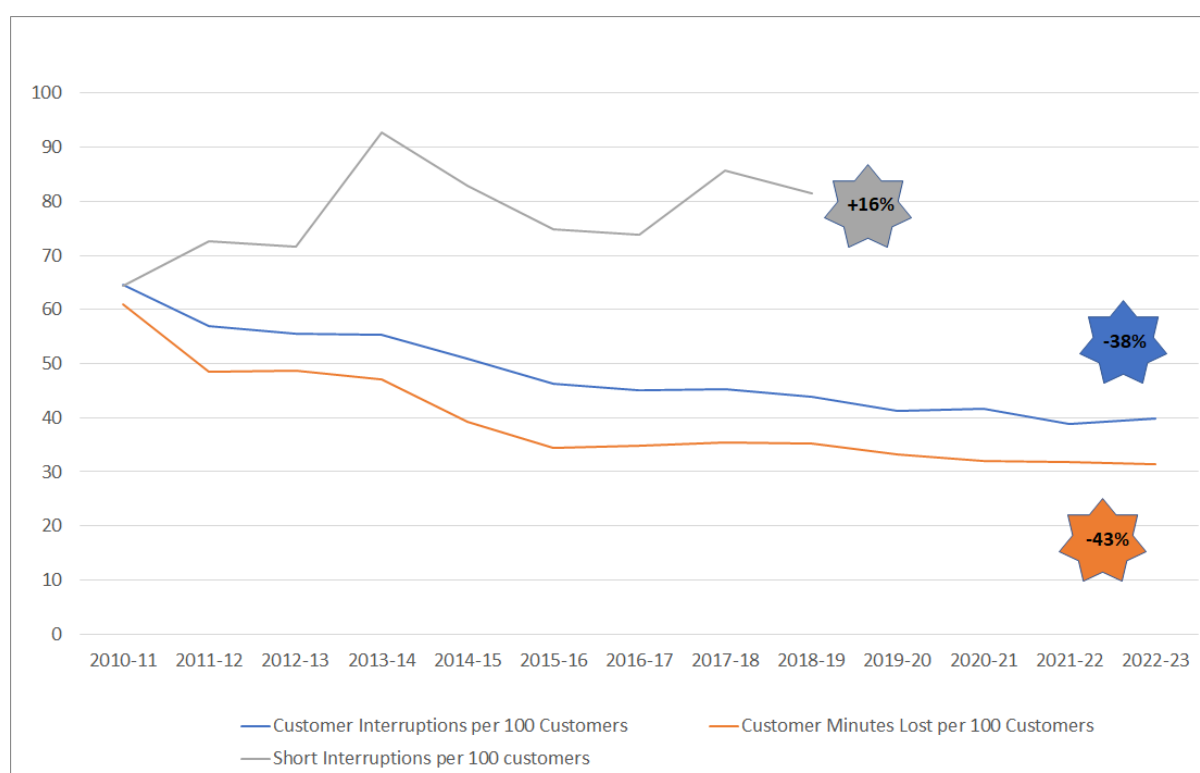


needed. This loss of generation can cause further stability issues for the network. A loss of network availability will also mean that services cannot be provided on a peer-to-peer basis or to support distribution, transmission, or overall system operation.

No longer enough just to address CI and CML

Ofgem's interruption incentives have worked well in driving major improvements in both CIs and CMLs across all the DNOs. This is emphasised in the chart below which highlights the trends in CI, CML and Short Interruptions since 2010-11.

As noted earlier, there has been a very substantial improvement in sustained outage performance - a 38% reduction in CI and a 43% reduction CML since 2010-11. By contrast, there has been a marked increase in short interruptions. By our analysis, reported short interruptions have increased by 16% over the same period between 2010-11 and 2018-19. Data for short interruptions has not yet been published beyond 2018-19.

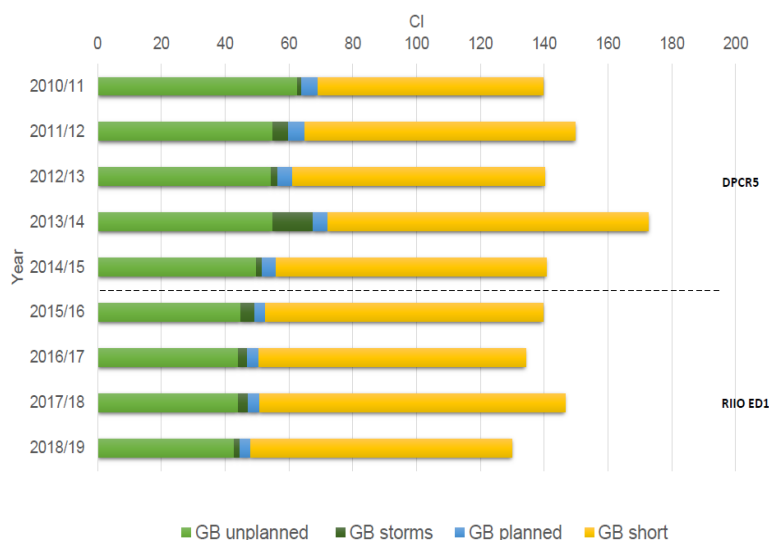


*The short interruptions element of the graph is based on Ofgem data excluding SSEN as data was not available for them the full period for short interruptions

This is reinforced by the following graph which was shared by Ofgem as part of the SRRWG at RIIO-ED2. This clearly demonstrates the extent to which short interruptions are a growing part of the overall reliability impact for customers.



Planned, unplanned, exceptional events and short Customer Interruptions – GB average



We consider that the reason for the distinction between the performance experienced for CI and CML and that of short interruptions is linked to the fact that there are currently no guaranteed standards or financial incentives associated with short interruptions, with the exception of UKPN's voluntary standard.

Regulatory approaches can address short interruptions effectively

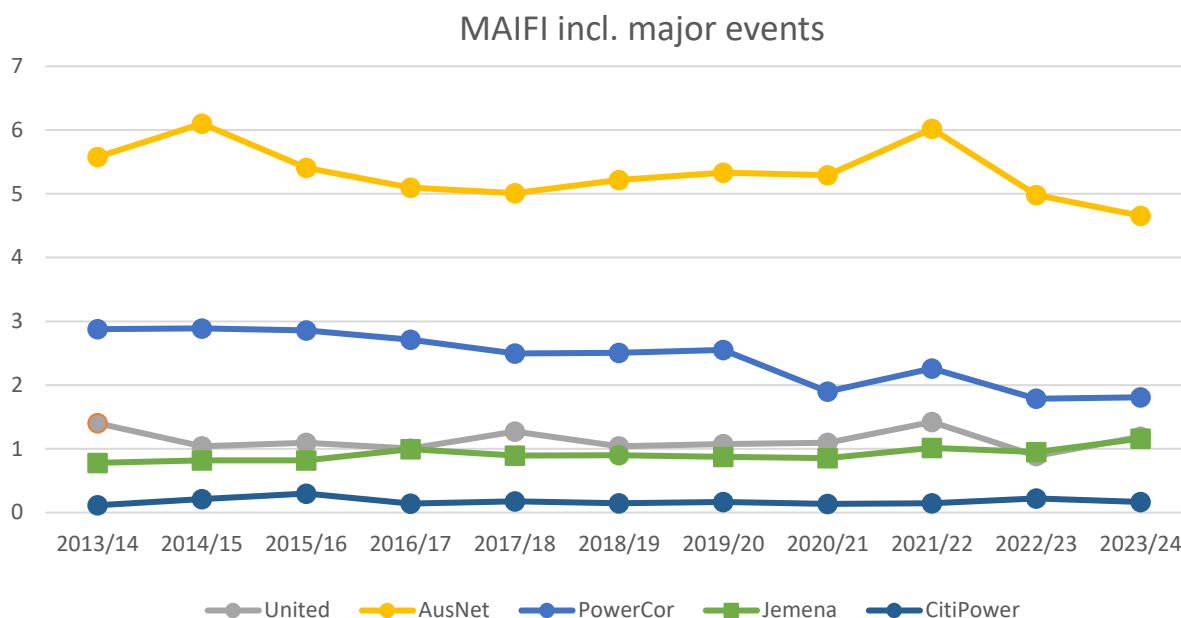
Regulators have already implemented financial incentives on short interruptions successfully in several countries. We have outlined four key examples below.

Victoria, Australia

In Australia, the regulatory arrangements set by the Australian Economic Regulator (AER) includes a specific financial incentive on service performance - the service target performance incentive scheme (STPIS). It includes incentives for the average duration a customer is without power (SAIDI) and the frequency of interruptions (SAIFI) per customer. However, since 2013, for the five distribution network service providers (DNSPs) in Victoria, it also includes financial incentives for the Momentary Annual Interruption Frequency Index (MAIFIE)³ which cover short interruptions. This specifies target levels of performance and short interruption incentive rates for each type of network – Central Business Districts, urban, short rural and long rural.

Since 2013-14 there have been improvements in MAIFIE in Victoria with a weighted average reduction from 2.62 outages per customer to 2.15 outages per customer (a 19% reduction).

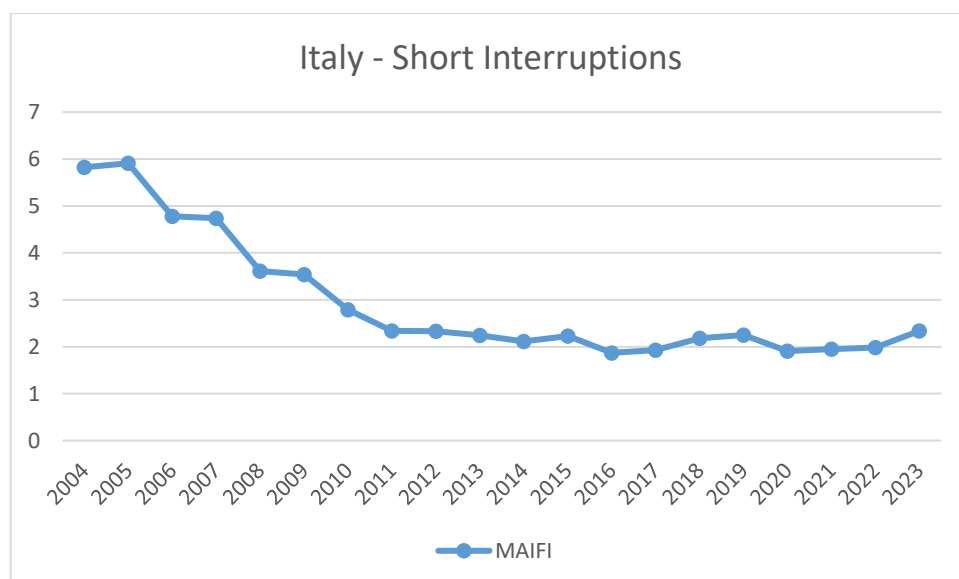
³ MAIFIE means the total number of Momentary Interruption Events divided by the Customer Base for the relevant period, provided that Momentary Interruptions that occur within the first three minutes of a sustained interruption are excluded from the calculation.



These changes highlight both an ongoing commitment to a focus on short interruptions and a recognition of the link to the energy system transition.

Italy

The Italian energy regulator extended financial incentives to short interruptions as well as sustained interruptions in 2008 and since then the number of short interruptions has fallen by 35% as illustrated in the chart below⁴.



⁴ Based on data from Relazione Annuale, Stato Dei Servizi 2023, Italian Energy Regulator, ARERA



Others

There are a range of other examples where short interruptions are measures and reported and where this has had a positive impact on network performance.

In Norway, since 1995 network companies have been obliged to report interruptions above 1kV to the Norwegian Regulator (NVE). NVE publishes an annual report where data on continuity of supply for each network company is presented. The Costs of Energy Not Supplied (CENS), the calculated VoLL for the customers, are deducted from allowed revenues. This provides a direct incentive for network operators to maintain their assets properly and to minimise even short/momentary power outages.

In Finland, the impact of two major storms in 2011 on an already aging power network directly led to the Electricity Market Act of 2013. This set much stricter outage limits and increased reporting requirements. Fingrid (Finland's TSO) is required to report all interruptions (short and sustained) to the Finnish Energy Authority (Energiavirasto). As a result, there has been a steady increase in network investments to comply with reliability requirements.

Finally, we have also seen examples in the US of utilities such as Florida Power and Light measuring multiple momentaries as indicators of worst served customer performance, which have driven significant improvements in performance.

Proposed approach for short interruptions for RIIO-ED3 and stakeholder comments on the business plans in RIIO-ED2

We consider that implementing a guaranteed standard on short interruptions is a key first step in recognising the impact that short interruptions have on end customers and DG. The importance of short interruptions was highlighted by its inclusion in UKPN's business plan for RIIO-ED2 and in commentary by the Ofgem Challenge Group, Citizens Advice, WPD and ENWL CEG reports on the business plans for RIIO-ED2.

UKPN's ongoing application of its standard on multiple short interruptions with a commitment to make payments to customers if they experience more than 25 short interruptions a year, provides a good base for implementing a standard more widely in RIIO-ED3.

The Ofgem Challenge Group Report on the Business Plan singled out UKPN as *"the only network to propose a target to reduce the number of short interruptions experienced by customers."* It noted its plan to reduce the number of short interruptions by 10% and proposes to publish more information on frequent, short power cuts and set a voluntary target for this.

The Citizens Advice response to the RIIO-ED2 business plan noted that *"UKPN, has gone much further in its business plan on the topics of SIs."* Citizens Advice explained *"we believe that the UKPN position on SIs has merit for consumers in an age of increasing reliance on electricity. We recommend that Ofgem considers using the UKPN proposals as on SIs as a universal proposition for all DNOs."*

Introducing financial incentives on short interruptions in RIIO-ED3

We consider that there is strong merit in introducing short interruption incentives. This can drive significant improvements in performance as we have seen in both Victoria (Australia) and Italy. We recognise that this must be founded on robust data but given the further work on short interruptions data in RIIO-ED2, the



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relevant information should be available for this to be part of the guaranteed standards and financial incentives from the beginning of RIIO-ED3.