NORTHUMBRIAN WATER living water

NORTHUMBRIAN WATER STORM ARWEN REPRESENTATION

Contents

1 Executive Summary

(1) ***Storm Arwen on 26th – 27th November 2021 was an abnormally destructive storm, which was particularly damaging to the North-East of England and the East coast of Scotland***. The strength and direction of the winds followed by unusually cold weather made this a very rare weather occurrence. The return period of the storm on wind speed alone has been assessed as 1 in 20 to greater than 1 in 50 and resulted in a red weather warning – the last time this was issued for wind speed was for Storm Gertrude in 2016.

(2) The storm caused widespread damage to power infrastructure in the North-East with Northern power Grid (NPG) being particularly badly impacted. Thousands of customers went without power for many days including NWL. The lack of power supply caused numerous lengthy interruptions in supply to our customers. Despite mobilising our entire fleet of backup generators, ***the scope of the outages was beyond anything we could have reasonably prepared for.*** The Energy Emergencies Executive Committee Storm Arwen Review, commissioned by BEIS, concluded that ***"Storm Arwen resulted in electricity disruption which went well beyond the expectations of both Government and society."***

(3) Ofgem has undertaken a review into the Distribution Network Operator (DNO) response to the storm. It concluded that that the majority of network faults were caused **by strong winds or trees and branches falling onto power lines**. Ofgem recommended a number of actions to improve network resilience and the speed of customer reconnections. Ofgem also concluded that **DNO emergency plans were not sufficient to deal with the scale of the storm** and some DNOs did not adapt their resources or strategies quickly enough. Ofgem has recommended that DNOs submit winter preparedness plans to provide assurance that all necessary steps have been taken.

(4) ***Northumbrian Water Limited (NWL) is consistently in the upper quartile of performers against water supply interruptions and has a track record of responding well to severe weather incidents***. Over AMP6 we were the best performing company in two of the five years and had one of the lowest interruption targets in the sector. During Beast of the East in 2018 we were also amongst the best performers with only 0.05% of customers experiencing an interruption longer than four hours. In its 'Out of the Cold' report, Ofwat identified us as an example of a company exhibiting industry leading practices, further indicating our resilience and robustness when it comes to managing interruptions. This strong performance has continued during AMP7. In the year ending March 2021, we had the second lowest average interruption impact in the industry in terms of the common water supply interruptions performance commitment.

(5) ***We commissioned Jacobs to prepare a report into our storm preparedness and response. Jacobs's findings concluded that our extreme event preparedness was effective and that we went above and beyond to attend to our customers in the aftermath of the storm.*** The review also stated that we went beyond our duty in organising alternative water supplies and that ensuring customers on the PSR were kept informed and were provided with bottled water was a key focus.

(6) There were numerous examples where our teams went above and beyond to support the communities they serve, for example supporting customers with private water supplies with bottled water, helping to fix private generators, and in remote areas providing a temporary kitchen to support those without power.

(7) Consistent with this we observed no material adverse impact on our Customer Satisfaction (CSAT) metrics nor on our C-Mex scores[1]. Neither was there a material adverse impact on our written complaints metrics, with Arwen only accounting for 0.3% of the 2021/22 total (also

[1] Noting we would not necessarily expect to see an impact here due to limited sample sizes.

equivalent to only 0.3% of the properties affected by the storm). ***Given the scale and severity of the event we consider this further evidence of a very robust response.***

(8) ***The overall impact of Storm Arwen meets the criteria for a civil emergency under the relevant performance commitments with several key third parties noting the severity and rarity of the storm***. This is also confirmed by independent legal analysis which notes the calling of 'major events' in two local authority regions covering our North-East operating areas. In order to protect businesses from unreasonable penalties as a result of extreme events, Ofwat allows companies to make an application to exclude interruptions caused by civil emergencies. ***The storm therefore appears to us to represent precisely the event that Ofwat must have included the exemption in the PC for***.

(9) ***The exemption appears to have been designed for precisely this type of event and would allow us to reasonably exclude the full impact of the storm***. We note that energy networks have similar exclusions in place for extreme weather events. The Environment Agency has already offered a full exemption for pollution events incurred during the same storm on very similar grounds.

(10) ***Although this would allow us to apply for an exemption for the full impacts, we consider there is room for us to improve in some specific instances and propose a partial penalty***. We are therefore proposing a penalty of £3.375m. This is in addition to the c. £1.9m of costs incurred by NWL in responding to the storm, including GSS payments.

(11) ***We consider a partial exemption is in the interest of customers and preserves incentives to manage service efficiently and effectively in extreme events:***

- ***Applying such a penalty would set poor precedent and be bad for customers over the long-term.*** It would effectively render the exemption included at PR19 null and void and would place an asymmetric risk into the regulatory process. This would both set an incentive for companies to focus on low probability event mitigation and uneconomic investment to mitigate those risks rather than other service improvements that customers would prefer. It would also drive an increase in the cost of capital to address that asymmetric risk which would result in material additional costs to customers.

- ***The partial exemption importantly retains the incentive properties to minimise supply interruptions. It means customers do not pay for service areas that could have been improved.*** The ex-post approach also retains the incentive during an event to return customers to service as fast as possible as any exemption needs to be adequately evidenced and justified.

- ***The counterfactual of not applying an exemption in contrast would push costs onto customers through higher cost of capital or uneconomic investment to mitigate the risk of an ODI penalty for events that are extreme.*** This would not be in the customer interest and have an opportunity cost to other service areas.

(12) The final penalty we are eligible to pay fits within the balance of risk determined by the PR19 price control. ***If the ability to make representations for civil emergencies was not in place, then the penalty we would be facing would be more severe than any ODI penalty for supply interruptions incurred since the beginning of PR14***. At the same time the full penalty would represent a far greater financial penalty than has been incurred by any of the Distribution Network Operators following the Ofgem and BEIS reviews of the storm. Those companies had far greater numbers of customers off energy supply and the absence of power was clearly the material cause of the supply outages for us. Such a penalty would be disproportionate to the scale of the harm.

(13) Civil emergency events are rare occurrences. As a result, ***NWL's specific exemption application does not set a broader precedent to be applied to other events due to its rarity.***

This coupled with the need that any exemption needs to be adequately evidenced and justified provides an overarching level of customer protection.

(14) While the proposed partial exemption preserves appropriate incentives from a company perspective, applying the partial penalty via the ODI framework does have the consequence of benefitting all customers as opposed to those directly affected by the event***. We would be open to a conversation regarding the possibility of instead making an equivalent transfer of value from company to customers in a different manner*** – for example by additional investment to mitigate the impact of future storms, alternative schemes/investment to benefit the communities affected and/or additional and more targeted compensation payments.

2 Our historical performance and incentives

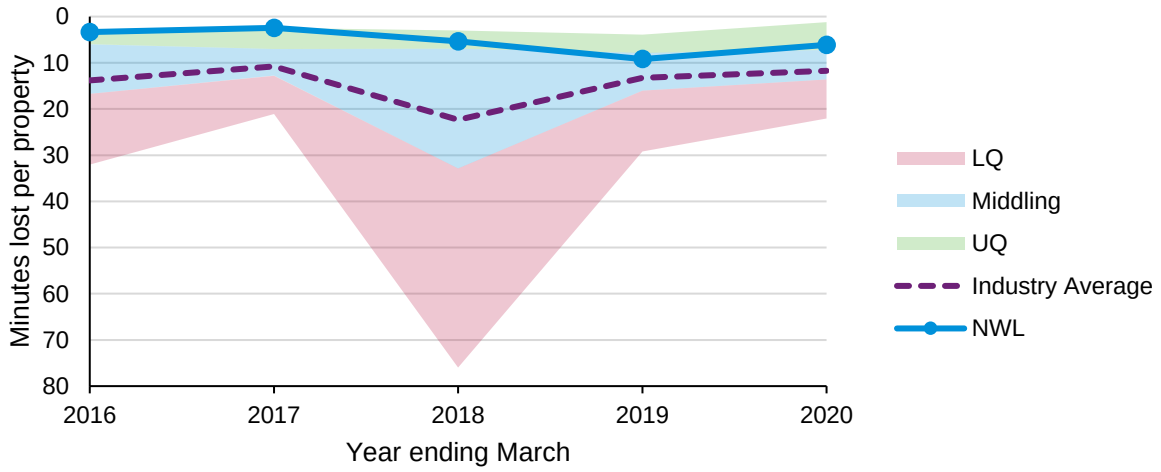
2.1 Introduction

(15) Our customers have told us consistently that they want a reliable supply of water. We have acted on our customers' priorities and have placed considerable weight on interruptions to supply as a key measure with financial incentives to drive high performance. Our focus has paid off, with upper quartile performance throughout the last five-year period and into this.

2.2 AMP6 performance

(16) We are consistently in the upper quartile of performers against water supply interruptions. Over AMP6 we were the best performing company in two of the five years and had one of the lowest interruption targets in the sector. Figure 1 below shows our performance against the industry average, upper quartile, and lower quartile.

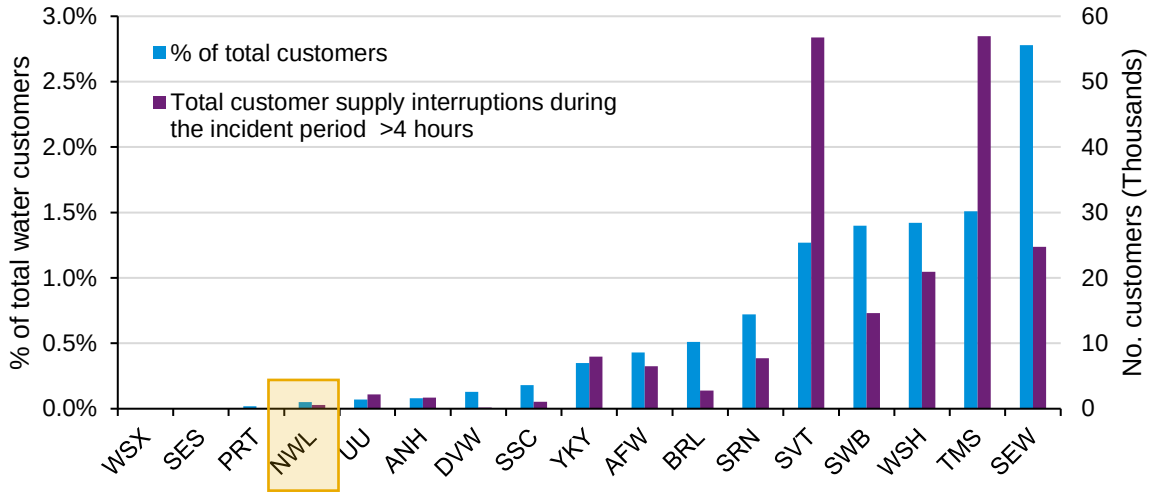
Figure 1 AMP6 water supply interruptions (NWL vs Industry)



Source: NWL Analysis

(17) This performance includes the 2018 "Beast from the East" freeze and thaw event. We were also amongst the best performers during that period with only 0.05% of customers experiencing an interruption longer than four hours.

Figure 2 Beast from the East customer supply interruptions (>4hrs) by company



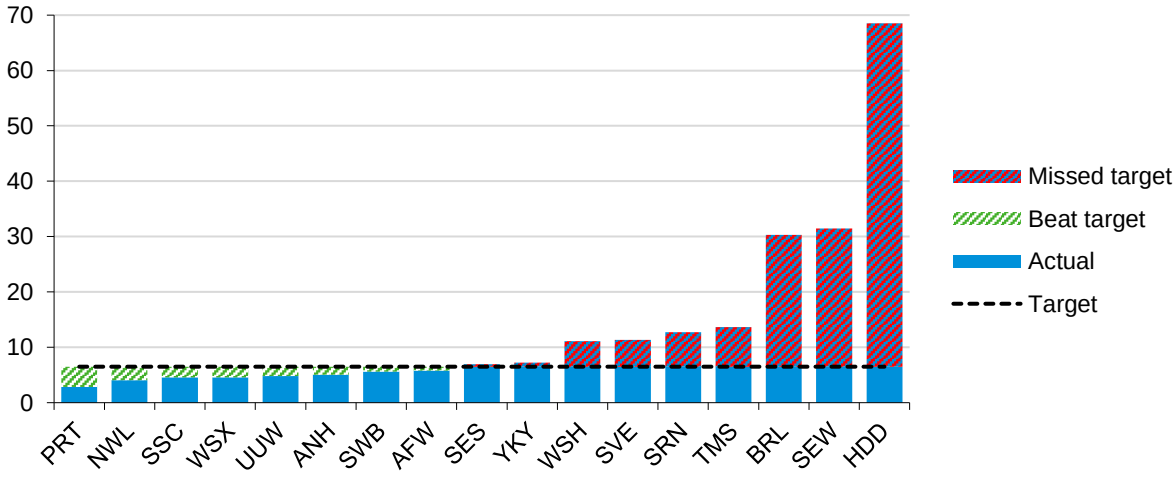
Source: NWL Analysis

(18) In its report into companies' responses to the 'Beast from the East'[2] Ofwat identified Northumbrian as an example of good practice, specifically noting our use of "*real time information and monitoring systems to identify and manage the issues*" as well as staffing "*key water treatment works 24 hours a day during the incident period to reduce to reduce the likelihood of loss of production*".

2.3 AMP7 performance

(19) We started the AMP7 regulatory period by continuing this industry leading performance in interruptions. In the year ending March 2021, we had the second lowest average interruption impact in the industry in terms of the common water supply interruptions performance commitment.

Figure 3 2020-21 Supply interruptions (minutes lost per property per year)



Source: NWL Analysis

(20) This strong track record, as noted by Ofwat, shows that we have resilient supply networks and a robust process for managing interruptions.

[2] Ofwat (2018), *'Out in the Cold: Water companies' response to the 'Beast from the East''*, [Link]

2.4 Description of current performance commitments

(21) There is a common PC for water supply interruptions which is defined as the average number of minutes lost per customer for the whole customer base for interruptions that lasted three hours or more. For the purposes of this PC, as well as the bespoke commitments described below, a supply interruption is defined as when the supply of water to a property is at a pressure of three metres or less (adjusted for any difference in ground or property level).

(22) On top of the common water supply interruptions performance commitment (PC), NWL has two bespoke PCs measuring different aspects of supply interruptions:

- Interruptions to supply greater than 12 hours - Measured as the total number of properties that experience an interruption of 12 hours (or more) in each year.

- Interruptions to supply between one and three hours – Measured as the average time the water supply is interrupted is greater than one hour and less than three hours in the reported year, as a proportion of the baseline.

(23) Specifics of the incentive rates for both the common and bespoke PCs can be found in NWL's outcomes performance commitment appendix to the PR19 final determinations.[3]

(24) Unlike the common PC, our bespoke commitments do not involve a cap or collar on the potential reward or penalty derived from their outcomes. This differs to other companies with similar bespoke PCs such as Affinity Water, which has a cap and collar[4]. Whilst this makes us eligible for significant downside risk, the risk balance associated with the ability to make a representation for civil emergencies provides sufficient protection from significant penalties for situations outside of reasonable control.

2.4.1 Exclusion allowances

(25) When setting incentives, it is important to maintain an appropriate risk balance. Part of maintaining this risk balance is the use of exclusions. By allowing companies to exclude specific extreme circumstances from the measurement of their performance commitments ensures that potentially damaging penalties are not incurred by companies for situations that are beyond reasonable levels of preparation or caused by circumstances well beyond the control of the companies. Having such exclusions help to ensure that companies are not driven to provide uneconomic levels of resilience, incurring costs that are ultimately borne by customers.

(26) It is for these reasons that Ofwat includes in its reporting guidance on supply interruptions for PR19 an allowance for companies to apply for an exemption on the basis of a civil emergency. This guidance is the basis for our reporting on all three of our supply interruptions performance commitments.

(27) The exact wording for the relevant representations allowance is quoted in the box below:

[3] Ofwat (2019), *'PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix'*, [Link]
[4] Ofwat (2019), *'PR19 final determinations: Affinity Water – Outcomes performance commitment appendix'*, Page 65 [Link]

Reporting guidance – Supply interruptions[5]

*Companies may make a representation to Ofwat for an exception to be granted on the basis of a civil emergency under the **Civil Contingencies Act 2004**, where the supply interruption is not the cause of the emergency.*

(28) The storm caused widespread power and water supply outages, disruptions in travel and communication, and most unfortunately, the loss of human life. NWL commissioned TupperSLaw to consider whether Storm Arwen would constitute a "civil emergency" under the Civil Contingencies Act 2004 (CCA) and, if so, whether that can be relied upon to seek an exception to the reporting requirements under NW's ODIs relating to supply interruptions. Their conclusions are summarised in Section 3.3.

[5] Ofwat (2018), *'Reporting guidance – supply interruptions'*, [Link]

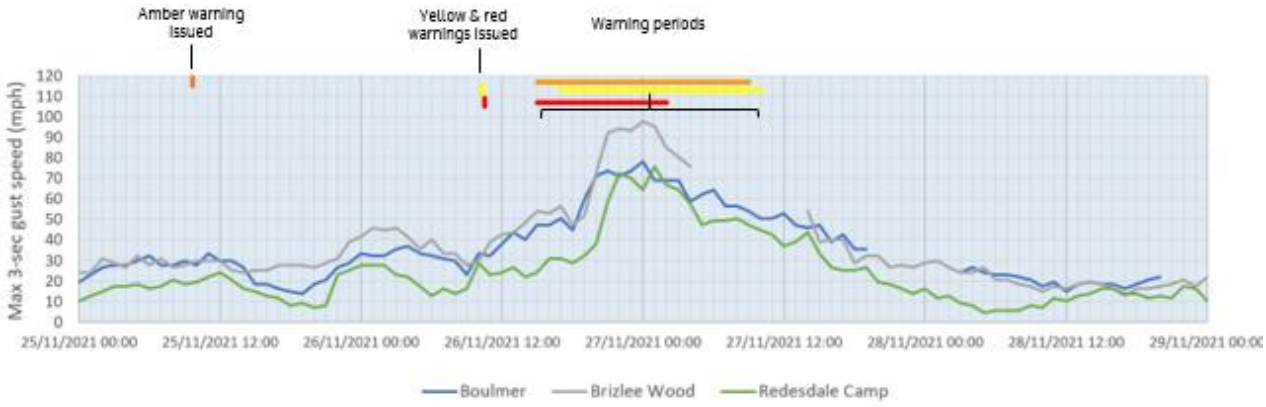
3 Storm Arwen and its impact

3.1 Storm Arwen weather overview

(29) Hitting the northeast of Britain over the 26th and 27th of November 2021, Storm Arwen was one of the most powerful and damaging winter storms of the last decade. Atypical northerly winds gusting as high as 98mph were combined with abnormally cold weather for the period causing widespread damage to infrastructure and sadly killing three people. Fallen power lines resulted in over 100,000 homes going without power for several days. The loss of power also had grave impacts on Northumbrian Water Limited's (NWL) ability to supply water to customers and maintain wastewater treatment processes.

3.1.1 Timeline of weather impacts

Figure 4 The occurrence of Storm Arwen together with the Met Office warnings



Source: Jacobs Review of Northumbrian Water's response to Storm Arwen

(30) Met Office warnings: yellow for snow, amber and red for wind. In all cases, the first marker indicates when the warning was issued. The solid line indicates the period over which the warning applied.

3.1.2 Rarity analysis

(31) Storm Arwen was notable both for its extreme wind speeds and freezing temperatures, but many sources point out that what made the storm particularly rare and destructive was the direction of the wind. As part of their independent report for us, Jacobs outlined the rarity of Storm Arwen:

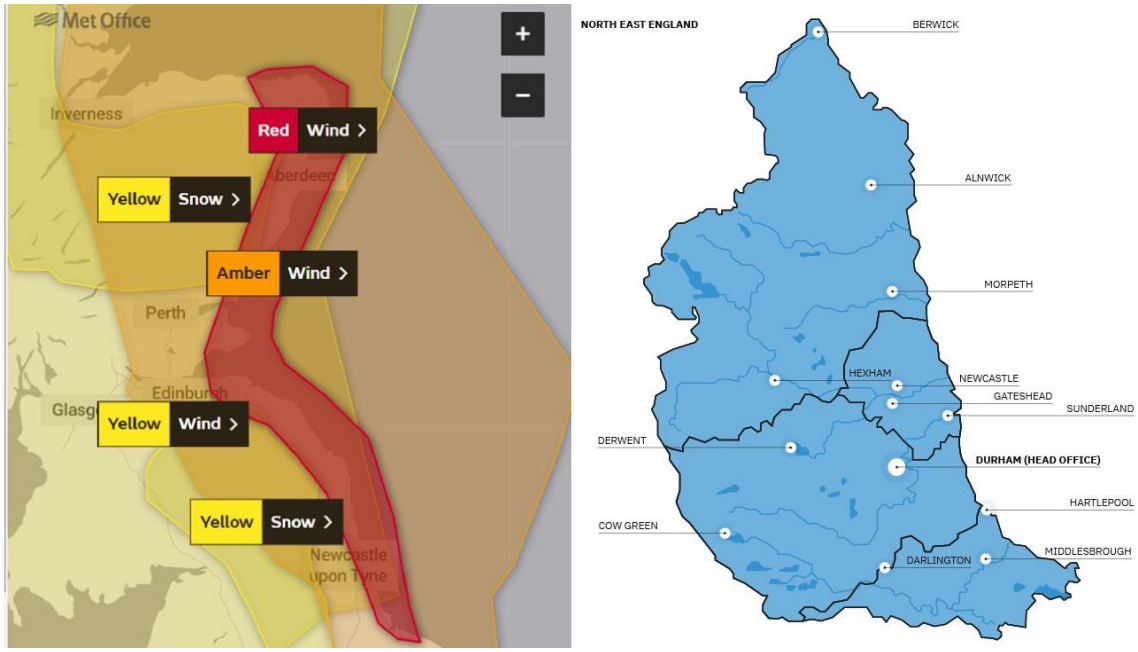
(32) *"When the direction of the wind is considered, the rarity is estimated to be significantly higher. Atypically the extreme wind speeds from Arwen came from the north. In this direction the return periods of the maximum 3-second gusts in and around Northumberland are estimated to be between 1 in 20 years to greater than 1 in 50-years. It is likely that this unusual extreme wind direction led to the storm causing more tree damage than would otherwise have been the case… The wintry conditions after Storm Arwen caused additional difficulty with freezing temperatures and snow on higher ground. Compared to the historical temperature records for other major events, this is unusual for extreme wind events."* – Jacobs report pg. 13

(33) In a report on the storm prepared by the Met Office, the Met states that "This was undoubtedly one of the most damaging windstorms of the latest decade."[6] This report indicates that the speed of the wind gusts experienced in the North-East of England were particularly exceptional with the wind gust of 85Kt (knots) at Brizlee Wood being the highest gust recorded in north-east England since 89Kt at Lynemouth (Northumberland) on the 16th of January 1984.

(34) Between the 2nd of December and 8th of December, 306 military personnel were deployed in Northumbria in England, and the Grampians in Scotland.[7]

(35) These exceptionally strong winds triggered a rare Met Office red warning for wind in the North-East of England and the East of Scotland, as shown by the graphic below. According to the Met Office, the last time a red warning was issued for wind only was storm Gertrude in January 2016. We have provided a map of our network coverage area for reference to show that these warnings covered the majority of our North-East service region.

Figure 5 Met Office red warning map (left) and NWL service area (right)

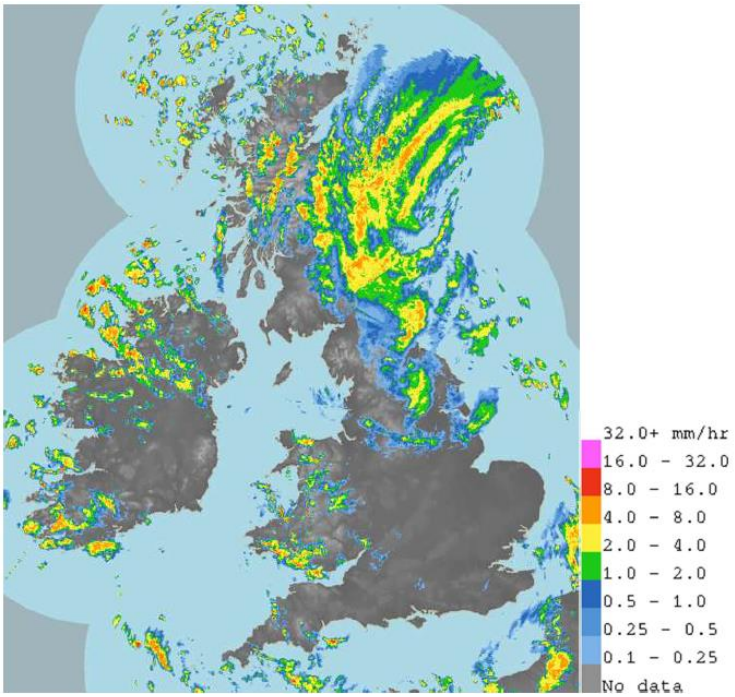


Source: Met Office

(36) The Met Office rain-radar image provided below for 18:00 hrs on the 26th of November 2021 shows rain associated with storm Arwen across north-east England and eastern Scotland, much of this falling as snow to give atrocious weather conditions in exposed locations. As can be seen from the radar, the southern points of the storm covered large portions of our service area. The snow and ice accumulation that this brought along with the extreme winds, made getting around our region particularly hazardous meaning maintenance workers were delayed in their deployment both for our network and especially that of NPG.

[6] Met Office (2021), '*Storm Arwen'*, [Link]
[7] BEIS (2022), '*Energy Emergencies Executive Committee Storm Arwen Review. Interim Report'*, p.27 [Link]

Figure 6 Met Office rain-radar image at 1800 UTC 26 November 2021



Source: Met Office

(37) BEIS's Energy Emergencies Executive Committee Storm Arwen Review Final Report[8] (the BEIS report) also notes that the damage inflicted by Storm Arwen on electricity networks was far more severe in Scotland and Northern England compared to other parts of the country, particularly along the Eastern Coast in regions such as Aberdeenshire, Northumberland, and Yorkshire.

(38) Forestry England estimate that the area of forest impacted by Storm Arwen equates to approximately two years annual harvesting programme (circa 2,000 hectares) across Cumbria, Northumberland, Lancashire, Durham, and Gateshead[9].

(39) The accumulation of all of these destructive weather forces caused widespread damage to electricity networks in the North-East. The damage caused widespread power outages lasting numerous days in many locations. As with all businesses and households, our supply is heavily dependent on a continuous supply of electricity. Therefore, the loss of power to our network had a knock-on effect of causing severe water supply interruptions to our customers.

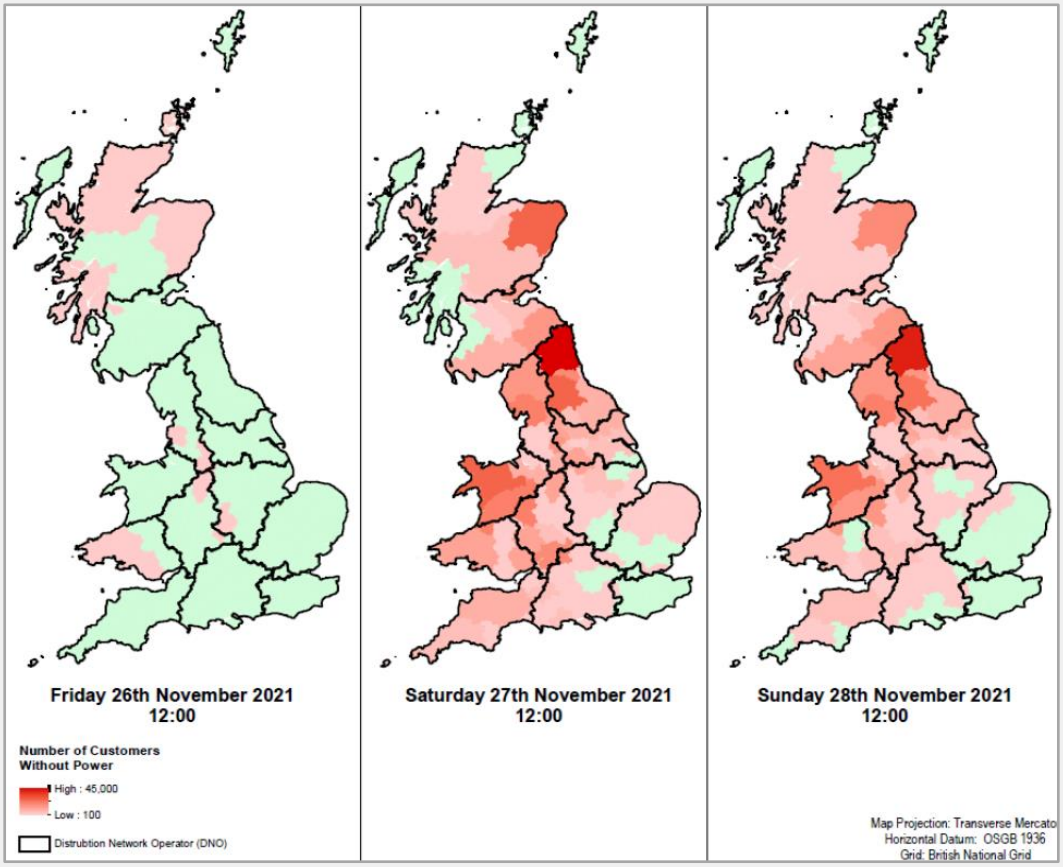
3.2 Impact on NWL

(40) As mentioned in the previous section, the leading cause of the loss of water supply on our system was the lack of power supply. Roughly 95% of customers that lost supply did so because of a loss of power to our network.

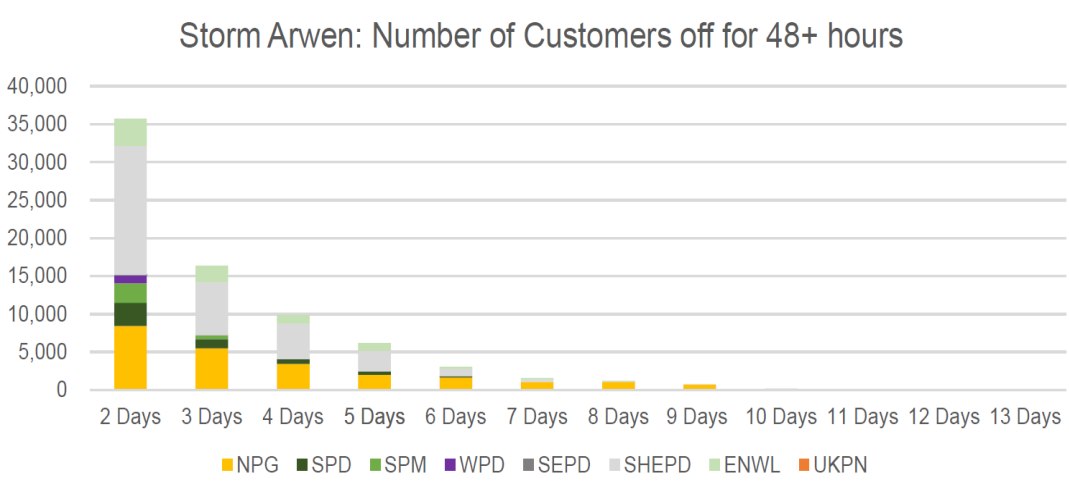
[8] BEIS (2022), '*Energy Emergencies Executive Committee Storm Arwen Review*', [Link]
[9] Letter to NWL CEO from Forestry England, Forest Management Director, North England Forest District.

Figure 7 Power sector impact

- When the DNOs' higher wind speed thresholds were triggered by the Red Warning on the morning of 26 November, there was insufficient time to mobilise an additional response beyond what was typical for the severe amber weather warnings.
- Both distribution networks that supply our region (NPG and SPEN) experienced difficulties in assessing damage and carrying out repairs in the first 48 hrs due to high winds, blocked roads, and the need to remove large numbers of fallen trees.
- Around one million homes were affected by the storm, significantly impacting all DNOs in the northeast. NPG had the largest number of affected customers (280,867). It reported 1,217 faults. SPEN had 189,133 customers off supply and 1,331 faults. The map below (from Ofgem's Final report on the review into the networks' response to Storm Arwen[1]) shows how the storm was particularly impactful in the north of NPG's operating area.



- The figure below from the BEIS report shows how NPG customers particularly suffered from extended delays in having their power supply restored. This included many of our assets.



- Some reports indicated that 3,827 people were still without power seven days after the storm,[2] whilst other reports suggest that the number so affected might be more than 9,000.[3]
- According to the interim report from BEIS[4], NPG did not share final expected restoration times with government or customers until 1 December, at which time they estimated restoration would be complete by 3 December. This date then continued to be pushed back one day at a time for many customers for several days. All NPG customers were restored by the 9 December.

[1] https://www.ofgem.gov.uk/publications/storm-arwen-report

[2] https://www.northumberland.gov.uk/News/2021/Dec/Storm-Arwen-Major-Incident-declared.aspx

[3] https://www.theguardian.com/environment/2021/dec/27/storm-arwen-trees-devastated-positives-aoe

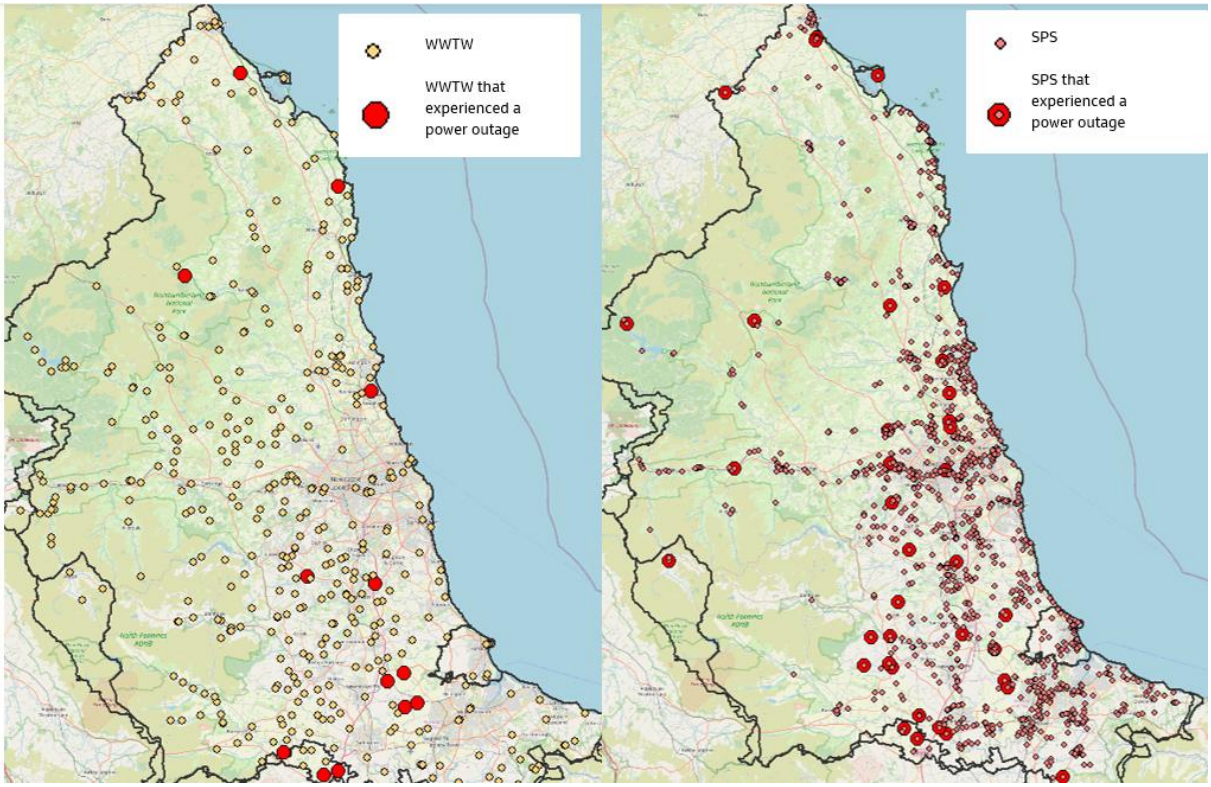
[4] https://www.gov.uk/government/publications/storm-arwen-electricity-distribution-disruption-review

Source: BEIS, Ofgem, Northumberland County Council, The Guardian

(41) The repercussion of the damage to our electricity distribution companies was as follows:

- **Loss of power** causing failure of fixed telecommunications – NWL's SCADA system was impacted with data feeds from sites to the RCC being disrupted.
- **Loss of power** causing failure of mobile telecommunications. Mobile signal was disrupted in several areas, making it difficult for operations staff to report back to team leaders and the RCC.
- **Loss of power** causing sites and assets without on-site generation to fail (water treatment, water pump stations, water reservoirs, wastewater treatment sites and wastewater pump stations).
    - For water assets this caused source water production to cease and water in service reservoirs to continue to supply customers until these reserves were exhausted. At this point, interruptions to customer water supplies occurred.
    - For wastewater assets this caused pumps to cease operation, leading to chambers filling and then, potentially, overflowing to watercourses.
    - Wastewater Treatment Works and Sewage Pumping Stations which experienced power outages during Storm Arwen are shown below:

Figure 8 NWL wastewater sites that experienced power outages during Storm Arwen



Source: Jacobs Review of Northumbrian Water's response to Storm Arwen

(42) The effect of Storm Arwen on the distribution network operators (DNOs) was great. Ahead of winter the DNOs carried out several activities in line with their established pre-winter checks including tree cutting programmes, inspections on substation and overhead circuits and more. Despite these efforts the magnitude of Arwen caused significant damage especially for Northern Powergrid (NPG) which serves 3.9 million homes and businesses in the Northeast, Yorkshire, and northern Lincolnshire.

(43) The vast majority of faults were on lower voltage lines, the main causes were identified in the BEIS report as being:

- Trees falling directly onto the overhead lines/wooden poles
- Flying debris bringing down/getting entangled in the overhead lines or onto equipment with the substations
- Strong winds snapping overhead lines or the wooden poles that support them
- Ice forming around the overhead lines causing them to break under the weight and additional resistance in the sustained high winds

(44) There was a high number of fallen and broken trees due to the northerly wind direction. The BEIS report states that "*trees grow to withstand winds coming for the prevailing direction, which in most cases is the south-west. As a consequence, Storm Arwen uprooted/snapped more trees causing more faults on the electricity networks than similar wind speed for the south-west would have done*"[10]. This had a significant impact on overhead lines in the North of England and also caused disruption on roads hindering the restoration process.

[10] BEIS (2022), '*Energy Emergencies Executive Committee Storm Arwen Review. Interim Report'*, p.10 [Link]

(45) The UK saw another two red weather warnings this winter for Storm Eunice during February 2022. Table 1 summarises the key facts from the two storms.

Table 1 – Comparison of Storms Arwen and Eunice

	Storm Arwen[11]	Storm Eunice[12]
Strongest Gust	98mph (note that a data outage occurred at this site on the 27th of November)	122mph
Red warning	One red weather warning for the North-east of England	Two red weather warnings for the Southeast and Southwest of England and parts of Wales
Loss of Life	3	4
People without power	Over a million	Over a million
Cold Weather Alert (NHS England)	Level 3[13]	Level 2[14]
Wind Direction	Northerly	South-westerly (prevailing)

Source: Met Office, NHS England

(46) There are many similarities between the storms such as high wind speeds, with speeds in the region of 100mph likely to cause significant damage, and the loss of power. However, there are two notable differences: **the wind direction and the cold weather**. Arwen brought rarer northerly icy winds which triggered a level 3 cold weather alert, whereas Eunice had south-westerly winds which also brought cold weather but not to the same extent.

(47) The importance of these differences is the effect on overhead power lines. In the Ofgem report on the networks response to Storm Arwen it was noted that the effect of wind on the wood pole in isolation had little effect, but the resistance comes from the equipment attached to the pole and most significantly the conductors. This resistance is exacerbated when those conductors become covered in a layer of ice. The resistance to wind is also dependent on the direction of the wind, where a cross wind would impose the greatest force.

(48) In its 'final report on the review into the networks' response to Storm Arwen'[15] Ofgem found numerous issues with NPG's response to the storm, particularly noting the lack of resources deployed in the early stages of the response, notably longer restoration times compared to other networks, and a lack of communication to customers.

(49) NPG has the highest proportion of poles which have a "high probability of failure" according to the asset health measure used by Ofgem, with SPEN also having a high proportion of poles in poor condition, as shown in Figure 10. This shows that the area served by NPG is particularly vulnerable to suffering power losses from windstorms.

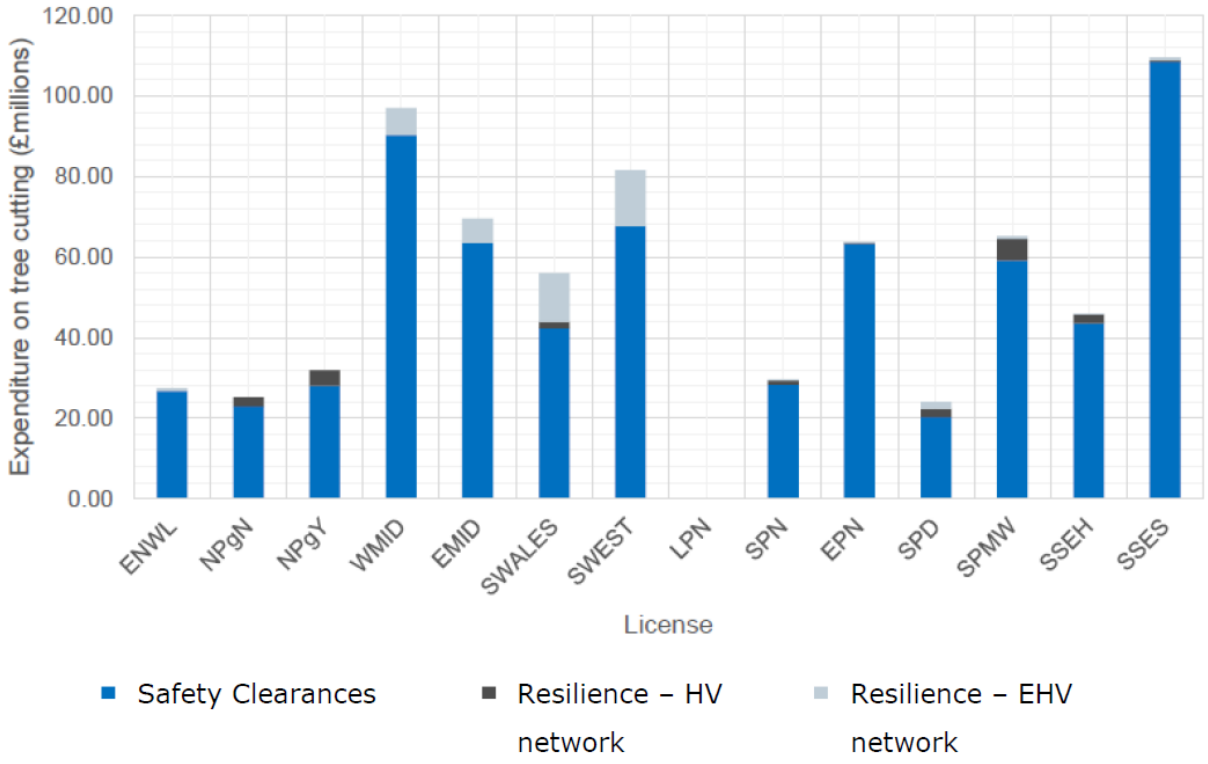
(50) The final BEIS report provides a number of comparisons between Storm Arwen and Storm Eunice. According to BEIS *"Although more people were affected by Storm Eunice the overall restoration was faster compared to Storm Arwen, with the final households restored after 9 days compared to 13. For each HV and EHV fault repaired by engineering teams during Storm Eunice, over twice the number of customers had their supplies restored compared to similar repair work during Storm*

[11] Met Office (2021), '*Storm Arwen'*, [Link]
[12] Met Office (2022), *'Storms Dudley, Eunice and Franklin'*, [Link]
[13] NHS (2021), *'Cold weather alert: Level 3 – cold weather action'*, [Link]
[14] NHS (2022), *'Cold weather alert: Level 2 – alert and readiness'*, [Link]
[15] Ofgem (2022), *'Final report on the review into networks' response to Storm Arwen'* [Link]

Arwen." The BEIS report also shows that falling trees had a larger impact during Storm Arwen than Eunice (32% of electricity faults vs 23% respectively).

(51) Arwen created the perfect storm of conditions to bring down overhead lines with icy weather and the northerly wind uprooting trees. The final Storm Arwen report from Ofgem explored tree cutting expenditure by each DNO. Figure 9 below shows that NPG had comparatively lower expenditure in this regard compared to other networks.

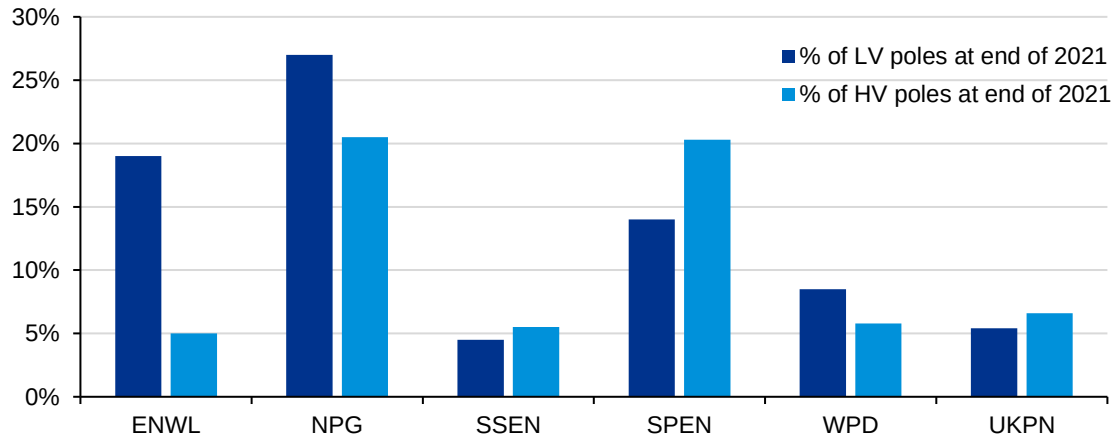
Figure 9 Comparison of tree cutting expenditure for safety clearances and for resilience purposes



Source: Ofgem

(52) This coupled with NPG's high dependence on overhead power lines and the poor condition of over 25% of their low voltage poles meant they were particularly vulnerable. This impact on NPG and SPEN had a knock-on effect to NWL which caused significant disruption in water supply.

Figure 10 Proportion of poles with a high probability of failure[16]



Source: Ofgem

(53) Data analysed after the Storm Arwen event indicates that water supply interruptions peaked at approximately 8,000 properties at around 14:00 hrs on 28 November 2021 (see figure below). More than half of these interruptions were restored by 2200 hrs on 28 November 2021. By 09:00 hrs on 30 November 2021, interruptions were still being experienced by roughly 1,200 properties. Beyond 30 Nov properties were being progressively restored or were experiencing intermittent supply due to airlocks.

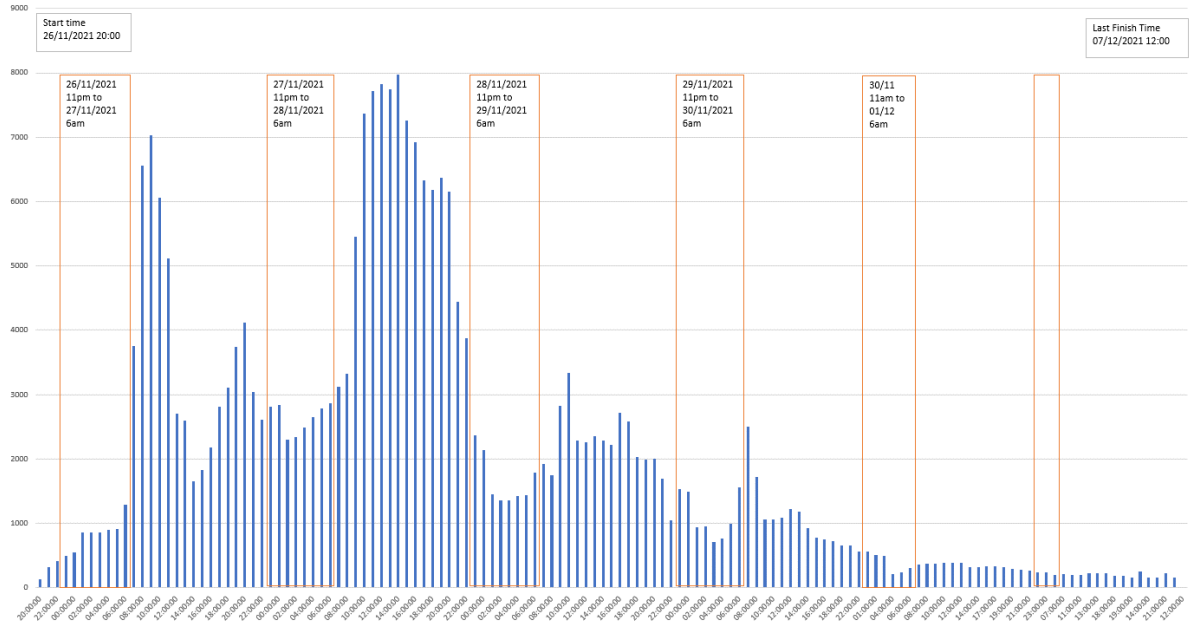
(54) All interruptions were restored by 12:00 hrs on 7 December 2021.

(55) Figure 8 below shows the distribution of customers affected over time. The longer duration outages were primarily due to areas of our supply system which became airlocked following sustained power outages, which in turn took some time to clear. Customers will typically have received intermittent supplies during this period however we have calculated interruptions (and likewise calculated GSS payments) on a precautionary basis – i.e. up to the point at which we were certain that normal supply had been fully restored. In relation to these (and other) customers Jacobs confirmed that "we went beyond our duty in organising alternative water supplies for members of the public" and that "ensuring customers on the PSR were kept up to date about supply outages (text messages and calls for example) and were provided with bottled water was a key focus."

(56) To show the exceptional nature of these numbers, Table 2 below shows the impact of the storm in terms of our performance commitments next to the *annual* figures from the year before. As you can see, our target for the year ending March 2022 was to have fewer than 475 properties experience water supply interruptions of over 12 hours. Storm Arwen alone caused almost 12 times that number in the space of two weeks. It is clear when comparing these figures, just how exceptional of an event this was for our network.

[16] Ofgem (2022), *'Final report on the review into networks' response to Storm Arwen'* [Link]

Figure 11 NWL analysis of properties impacted by supply interruptions



Source: Jacobs Review of Northumbrian Water's response to Storm Arwen

(57) The impact of these interruptions is even more evident when you compare the figures to the outcomes from 2020-21 as a whole:

Table 2 Storm Arwen impact on ODI measures

	2020-21	Storm Arwen
Interruptions to supply between one and three hours (mm:ss)	N/A	00:24
Water supply interruptions greater than three hours (mm:ss)	Actual: 04:04 Target: 06:30	Actual: 06:58
Interruptions to supply greater than 12 hours (properties)	Actual: 143 Target: 500	Actual: 5,536

3.3 Civil emergency categorisation

(58) The Civil Contingencies Act (2004) states that an emergency is an event or situation which threatens serious damage to human welfare in the United Kingdom or in a Part or region. The CCA and the CCA Regulations are also supported by statutory and non-statutory guidance, in particular the Cabinet Office's 'Emergency Preparedness Guidance' (CO Guidance).

(59) NWL commissioned TupperSLaw to consider whether Storm Arwen would constitute a "civil emergency" under the Civil Contingencies Act 2004 (CCA) and, if so, whether that can be relied upon to seek an exception to the reporting requirements under NW's ODIs relating to supply interruptions.

(60) The report examined factual data on whether Storm Arwen met the criteria for a Civil Emergency including both the impact of the storm and the classification response.

(61) The report examines a range of data sources and concluded:

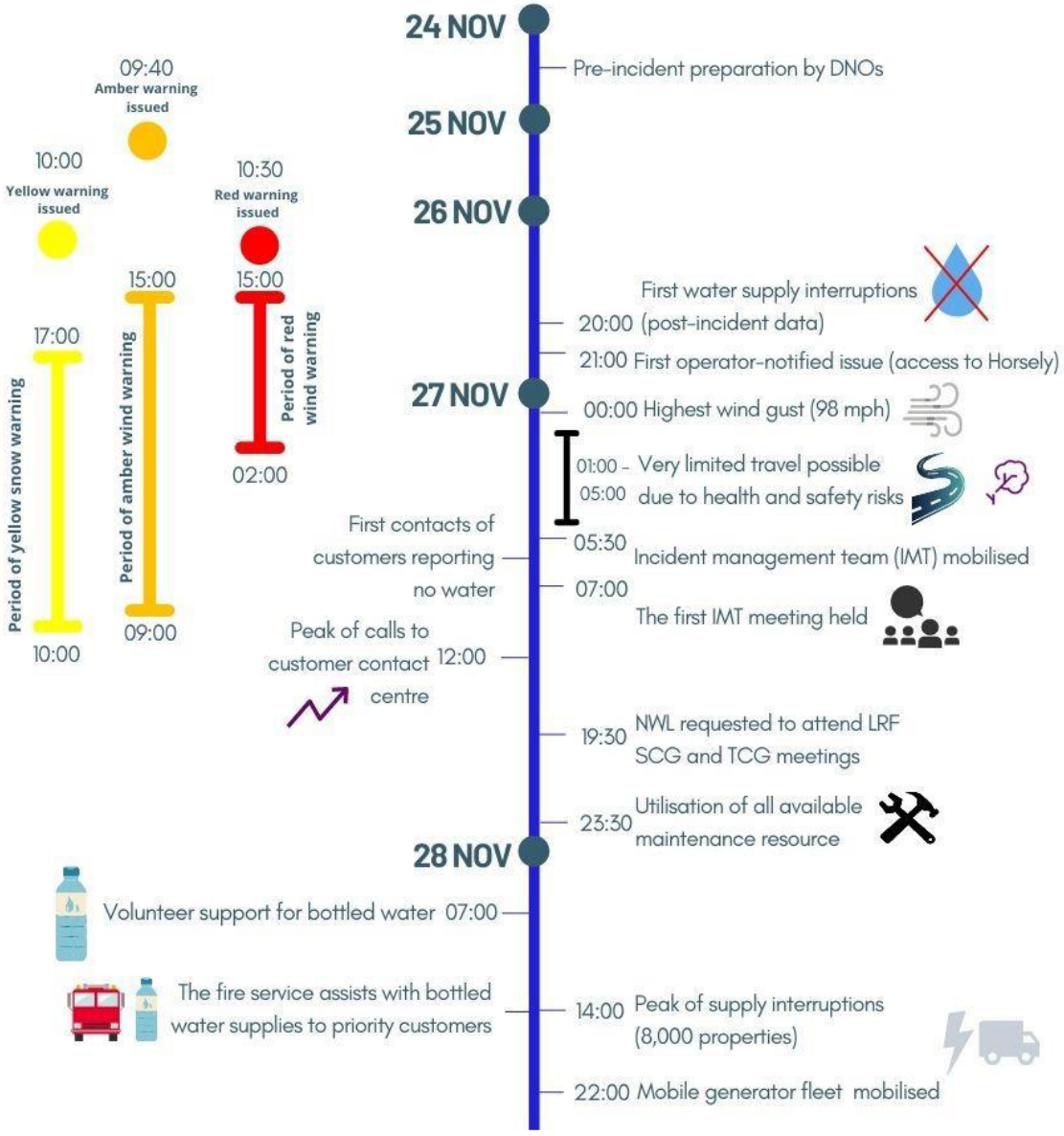
(62) *"Based on the circumstances surrounding Storm Arwen, its impact and the response it required from the Category 1 responders, it satisfies all applicable limbs of the legal test for being categorised as a civil emergency under the CCA. "*

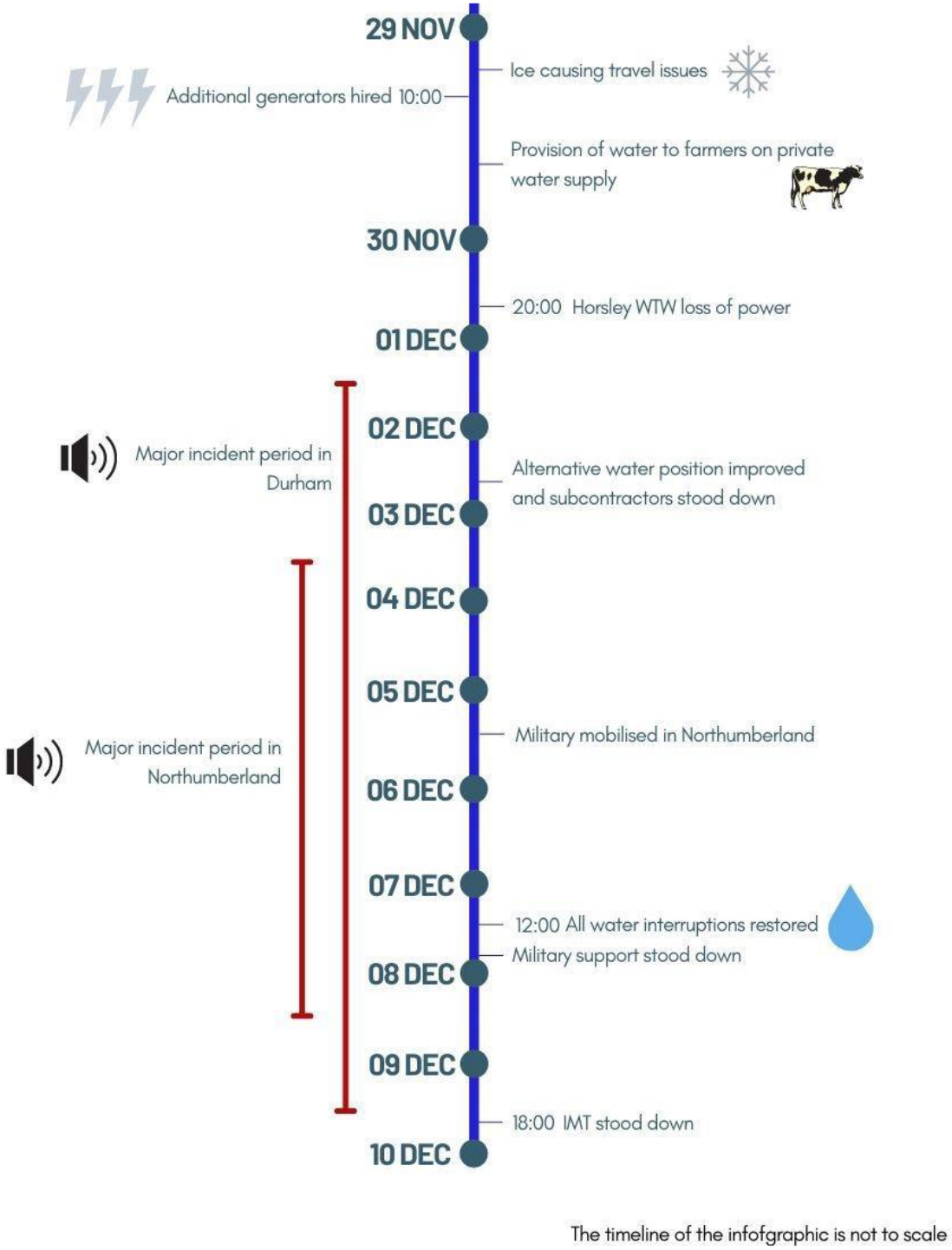
4 NWL preparations and response

(63) We have commissioned a full independent report into the extent and appropriateness of response to Storm Arwen as well as our preparedness for such events. The main points of that report are summarised in this chapter.

4.1 Timeline of events and responses

Figure 12 Timeline of warnings and responses





Source: Jacobs Review of Northumbrian Water's response to Storm Arwen

4.1.1 Assessment of the response: 26 November 2021 to 27 November 2021

(64) We received no notification of electricity disruption from NPG or SPEN.

(65) We check strategic network storage levels on a daily basis and maximise storage to minimise risk of any supply demand issue. The review on the day of Storm Arwen showed a clean bill of health in all the supply areas where the storm had a substantive impact – with a "green" assessment made against both absolute and rate of change of storage levels – including when compared to

expected distribution input and demand. This equated to > 24 hours storage being available and/or reservoirs being at or greater than 90% full.

(66) Phone calls from our site operators and interruptions to data displayed on our SCADA system were the primary means by which we became aware of electricity disruption at its sites.

(67) During the night of 26-27th of November, many roads were blocked because of fallen trees and this restricted access to our sites. These access and health and safety constraints meant that incident response was necessarily on hold until conditions improved. Our Water Production North lost around a day of time. Access and health and safety constraints mirrors that experienced by the DNOs. The availability of vehicles that could tow required loads was also a constraining factor on the response.

4.1.2 Assessment of the response: 28 November 2021 to 1 December 2021

(68) During 28 and 29 November 2021, the widespread and severe nature of the storm impacts were being recognised. Local Resilience Forums (LRFs) and Partnerships stood up their response mechanisms for Storm Arwen and major incidents were declared in Northeast Scotland on 29 November and Durham and Darlington on 1 December. A Major Incident is defined by JESIP as 'beyond the scope of business-as-usual operations, and is likely to involve serious harm, damage, disruption or risk to human life or welfare, essential services, the environment or national security'.

(69) Access across the region was a challenge and posed health and safety risks during and in the first days after Storm Arwen, particularly at night. This impacted our ability to get on top of emerging issues, a situation compounded by the widespread communication challenges that meant our visibility of the status of its remote assets was incomplete. Both these factors contributed to the spike in water supply interruptions seen on the 28th of November.

(70) The RCC became inundated with alarms and responded by asking the Wastewater team to manage alarms directly. This worked well: the Wastewater team used their laptops to log-in to SCADA remotely allowing the RCC to focus on the response to water asset alarms.

(71) We have Outage Plans for all our water sites, but these could not be implemented in all cases due to the widespread nature of the storm (the normal outage response would be to rezone or tanker). A few of the actions in the outage plans also rely on the availability of power.

(72) On 29 November, as NPG was trying to restore power to its networks, it cut power to Horsley water treatment works. The response to this issue became a priority focus for us. Mechanisms and procedures to ensure greater collaboration and communication between NPG and NWL, and the broader LRF, would have helped to prevent the issues at Horsley.

4.1.3 Assessment of the response: 2 December 2021 to 9 December 2021

(73) Supply interruptions to properties because of Storm Arwen had ceased by 7 December – in advance of IMT being stood down on 9 December 2021, however some customer contacts for discolouration were still being received around this time. Documenting of future incidents should include a clear justification for the stand down of the IMT along with any remaining remedial activities.

4.2 Conclusions from the independent review

(74) Jacobs reviewed the manuals relevant to our preparedness and response to Storm Arwen confirming they are, overall, comprehensive in our content and intended use. Our plans were

confirmed to be typical of emergency plans currently in use in other water companies in England and Wales. No significant deficiencies were identified.

(75) Minor gaps were identified in our Generic Plan for Prolonged or Region Wide Disruption of Electricity Supplies and the Generic Plan for Severe Weather Conditions. Jacobs stated the winter readiness plan appeared to be an informal arrangement which should be developed into an official procedure, with the requirements reviewed annually.

(76) Jacobs also considered that our response during and in the aftermath of Storm Arwen was appropriate, noting particularly that we quickly mobilised the IMT and effectively organised what resources we had to manage the incident to the best of our ability.

(77) As stated in the BEIS report, we were hampered by a lack of information about power restoration from NPG and engaged well with the LRFs and our contractors and other organisations to provide alternative water and reinstate supplies.

(78) We used all of our standby generators in bringing power back online, however, the level of power outage was far beyond what could have been reasonably expected. There is no record of the entire fleet of mobile generators needing to be deployed simultaneously, as was the case with Storm Arwen.

(79) The review states that we went beyond our duty in organising alternative water supplies for members of the public and farmers on private borehole supplies who were impacted by the power outages.

(80) Ensuring customers on the PSR were kept up to date about supply outages (text messages and calls for example) and were provided with bottled water was a key focus.

(81) Section 9 of the Jacobs report sets out all the recommendations identified in its review. In the majority of cases Jacobs has identified that the recommendations, had they been in place at the time of the event, had “low” potential to have a positive effect on the level of customer outages experienced – i.e., these recommendations would simply ease the burden placed on NWL stuff whilst responding to the event.

(82) No recommendations were identified that could have had a ‘high’ impact on outages.

(83) In relation to the small number of recommendations which Jacobs assessed as having the potential for low/medium or ‘medium’ impact on outages – we have assessed these areas further and reached the following conclusions:

(84) In relation to weather warnings and the extent to which an improved weather warning service might have enabled greater preventative action:

- We investigated the weather forecasting service that DNO’s receive and understand that DNO’s do typically receive a more granular energy sector forecast from MeteoGroup/DTN. However, this is consistent with the fact that energy supply operations are much more sensitive to fluctuations in weather than is the case for water supply - especially where generation from renewables has to be accounted for and balanced with demand on a 15-minute basis, and where there is any potential weather impact on overhead power lines.

- The fact that NPG commenced preparations 2 days earlier, on the basis of the yellow weather warning in place at the time, is simply consistent with this. NWL received daily weather updates in the days preceding Storm Arwen and can see no evidence that a more granular weather forecast would have facilitated any earlier preparations: a ‘yellow’ weather event would not typically warrant the same degree of intervention to protect water supplies (via underground

pipes), as evidenced by the fact that we effectively maintained supplies during numerous other recent yellow and amber weather events. Moreover, as the report evidences, we took effective preparations for the storm.

- Our preventative action did nonetheless include checking robust network storage levels against target.

- Given the severity of the event he ESDWG (electricity supply disruption working group) was superseded by the Incident Management Team which Jacobs acknowledges was quickly mobilised and effectively organised resources.

- The primary issues at play were a. the late escalation to a 'red' weather warning and b. very limited information available from NPG regarding predicted outages and forecast restoration times. We can accept that more effective notifications in this regard could have helped us to manage the event more effectively, but this should not be viewed as a shortcoming on NWL's part.

(85) In relation to generator maintenance:

- We can accept that in a small number of instances, more robust generator maintenance could have lessened the impact of the storm on customers and are proposing to accept a portion of the ODI impact in relation to the extent to which poor generator reliability extended customer outages.

- Jacobs explore this further in table 6-3 in its report. We are proposing to accept some ODI impact in relation to all the areas where Jacobs identified generator issues as having a "major" impact, and some of the areas where the impact was assessed as "minor" – depending on whether our own root cause analysis concluded that this impact was material.

5 Our proposed ODI penalty

(86) Although we believe the full impacts of the storm could be excluded via the allowances provided for in the PR19 reporting guidance, we are proposing an ODI penalty which reflects those aspects of our response which could have been more robust. Notwithstanding the fact that in practice it is near impossible to achieve a perfect response to such challenging events. Therefore, we are proposing an ODI penalty relating to Storm Arwen of £3.375m. This amount has been arrived at through the following procedure:

(87) **Identifying the interruptions caused as a result of Storm Arwen.**

- 830 individual incidents starting from 8:00pm on 26th November through to 12:25pm on 7th December have been identified as caused as a result of Storm Arwen. This includes almost 25,000 properties (over 5,500 without supply for more than 12 hours).

- These incidents should be exempt as per the civil emergencies exclusion rules.

(88) **Accepting 100% of the ODI impact in one area where prevention of generator failure could have eliminated all outages.**

- At Fowberry WTW our backup generator failed as it had never been tested under load. Had this been tested prior to the event and the resulting issues addressed, we believe we could have avoided all customer outages in this area. (This is covered in the “Fowberry” evidence proforma and relates to the areas described as “High Fair” and Ford Common/Watchlaw” in Jacobs table 6-3).

(89) **Accepting a portion of the ODI impact where two more minor generator issues prolonged customer outages.**

- In the Cockershields area, failure of a backup generator trigged a shorter, secondary interruption. We are proposing to accept the impact associated with this secondary interruption. (This is covered in the “TY170 Parkgates Lower” proforma, described as “Parkgates Lower Meter District” in Jacobs table 6-3).

- In the Hillend/Cambo area, a backup generator was missed from a refuelling schedule and subsequently ran out of fuel. We are proposing to accept the portion of the ODI penalty associated with this refuelling issue. (This is covered in the “ET040 Hillend Cambo” evidence proforma, described as “Hillend / Cambo (Rothley)” in Jacobs’ table 6-3).

(90) **Accepting a portion of ODI impact in 1 area where improved operability of monitoring equipment would have enabled more rapid restoration of supply.**

- The primary cause of outages in this area was again loss of power, which in turn resulted in airlocks in the supply system which took some time to clear. However there had been a long-standing issue in the area with operability of some DMA monitoring equipment for flows and pressures. Had this equipment been operable we would have been able to identify and resolve the airlocks more rapidly. We have estimated how much more quickly we might have been able to restore supplies if this had been the case and are proposing to accept this portion of the ODI penalty. (This is covered in the “ET022 Cambo” evidence proforma. This issue was discovered by our own root cause analysis as opposed to by Jacobs’ review).

(91) In relation to points 3 and 4 – the portion of the ODI we are proposing to accept is based on the **difference** between the total ODI impact calculated based on all Arwen related interruptions being

included in their entirety, and what the total Arwen related impact would have been if our response had been more robust. i.e., we are proposing to accept the ODI impact relating to the extent to which shortfalls in our response extended customer outages.

(92) Table 3 below details the ODI impact of each of these aspects of our interruptions and shows the resulting ODI penalty we are proposing:

Table 3 Proposed ODI Penalty

No. props > 12 hrs	ODI Impact (£m)	HH:MM:SS 1 – 3 hrs	ODI Impact (£m)	HH:MM:SS > 3 hrs	ODI Impact (£m)	Total ODI Impact (£m)
Excluding Storm Arwen						
235	**0.794**	**00:07:15**	**0.626**	**00:04:47**	**1.388**	**2.808**
100% of ODI impact in 1 area where prevention of generator failure could have eliminated all outages:						
609	-2.016	0.54 sec	-0.010	36.69 sec	-0.629	**-2.655**
Portion of ODI impact where 2 minor generator issues prolonged customer outages:						
73	-0.240	0.61 sec	-0.011	3.55 sec	-0.061	**-0.312**
Portion of ODI impact in 1 area where improved operability of monitoring equipment would have enabled us to resolve airlocks and restore supply more rapidly once power was restored:						
-	-	-	-	24.21 sec	-0.415	**-0.415**
Total proposed ODI penalty due to Storm Arwen:						
682	**-2.256**	**1 sec**	**-0.019**	**64 sec**	**-1.10**	**-3.375**
Resulting net ODI position for 2021/22						
	-1.462		**0.607**		**0.288**	**-0.567**
Total including Storm Arwen Impact for Information						
5,771	**-17.53**	**00:07:39**	**0.321**	**00:11:45**	**-5.774**	**-22.982**

Source: NWL Analysis

(93) Therefore, the final ODI penalty we are proposing in relation to Storm Arwen is £3.375m across our three interruptions ODIs.

5.1 Impact on annual performance commitment

(94) The net ODI position for 2021/22 overall which results from this proposal is also shown above and is a total net penalty of £0.567m.

5.2 Historical precedent for supply interruptions penalties

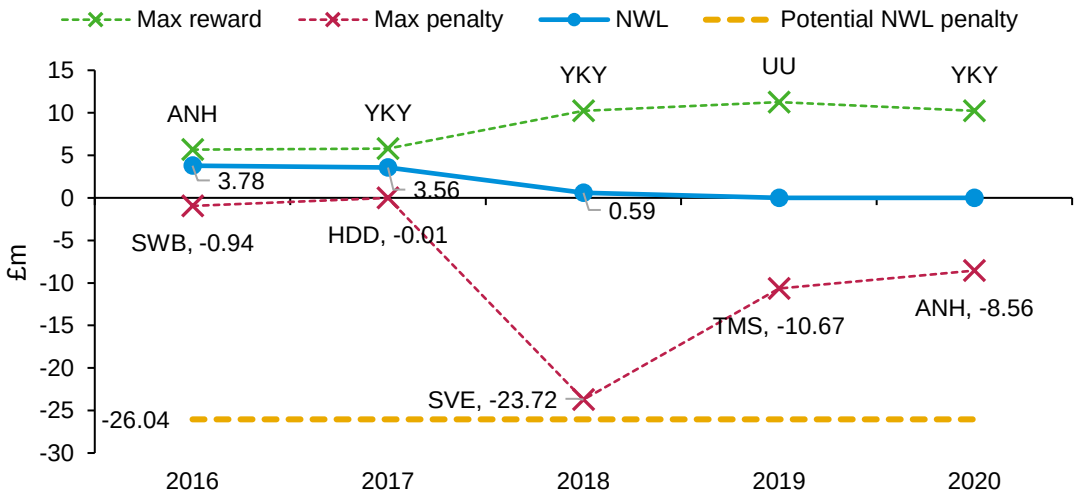
(95) The final penalty we are eligible to pay fits within the balance of risk determined by the PR19 price control. If the ability to make representations for civil emergencies was not in place, then the penalty we would be a clear outlier when compared to industry wide ODI penalties for supply interruptions incurred since the beginning of PR14.

(96) To show this, we provide the charts below to display our interruptions based ODI rewards compared to the maximum rewards and penalties in each year of the AMP6 regulatory period. Figures are shown both in £million and as a percentage of notional regulatory equity. What is clear is that we have held ourselves to a high standard throughout AMP6, having one of the best performances and the most stretching targets, with little reward for such high performance. Had the AMP7 approach of setting a common industry target based on upper quartile performance been established earlier, NWL would have been in significant reward each year of AMP6.

(97) What is also clear is that the potential penalty NWL faces as a result of Storm Arwen will be bigger than any penalty for interruptions given over this period[17].

(98) As well as not being in line with the ODI definition (which explicitly allows for exclusions relating to civil emergencies), this would be drastically disproportionate. Especially considering our strong performance both throughout the rest of the year, and during the storm event.

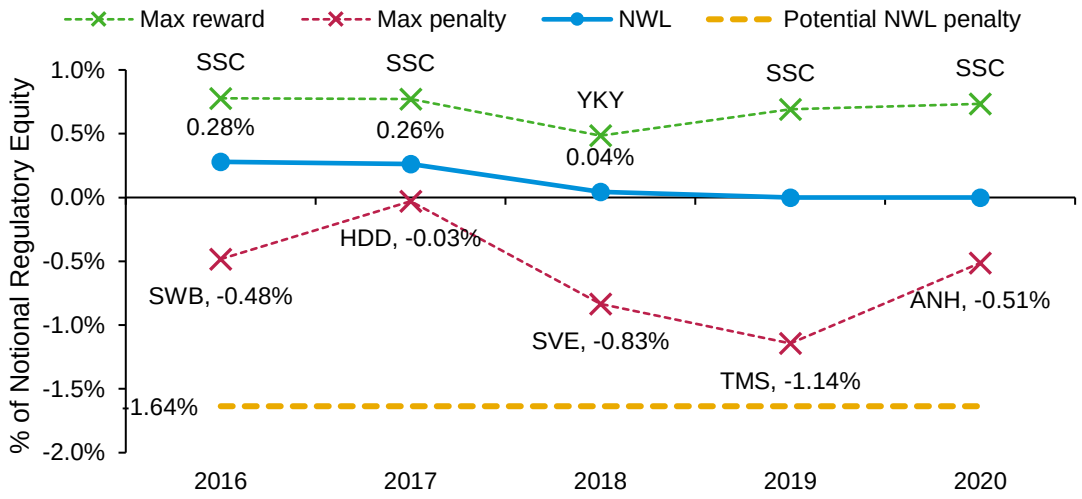
Figure 13 AMP6 maximum supply interruptions rewards and penalties by year (£ millions)



Source: NWL Analysis

[17] We note that in 2020/21 HDD incurred an interruptions penalty which while low in absolute terms was high in RoRE terms.

Figure 14 AMP6 maximum supply interruptions rewards and penalties by year (% of Notional Regulatory Equity)



Source: NWL Analysis

6 Maintaining the right incentives to protect customers

(99) Most UK regulators refer to allocating risks to "the parties best able to control or manage that risk", as cited in Ofwat's past paper on risk allocation[18].

(100) Customers may benefit from a risk being allocated for a water company to manage – particularly where the company can materially and efficiently manage that risk. However, there is a cost to customers brought on by the regulated company managing the risk on their behalf.

(101) If costs outweigh the benefits, then it is inefficient for the risk to be managed by the regulated company.

(102) Events such as Storm Arwen are high consequence, low probability events. However, as shown in this case the risk exposure faced by the company is not fully within its control. This leads to the central questions of what is the appropriate risk sharing mechanism and does the decision on Storm Arwen set a precedent for not managing risk appropriately?

6.1.1 Impact of no exemption for civil emergency events

(103) If no exemption exists for civil emergency events, this leaves a regulated company open to an unbounded financial exposure from penalties.

(104) This would lead to either:

- A regulated company proposing caps at future price controls to limit risk; or
- Over investment planning for an unbounded impact.

(105) In both cases this leads to costs being borne by the customer.

(106) In the first instance, there would be limited incentive to resolve customer issues once any threshold has been breached. This is because there would be no financial penalty from further delays in response.

(107) In addition, a cap would protect companies from all penalties beyond a certain threshold regardless of whether these were caused by the company or by events outside of its control. The use of an exemption for civil emergencies provides targeted protection for major events that are outside of the company's control.[19]

(108) In the second, it would lead to inefficient investment. Where customers support additional resilience investment, companies make cases for these as part of the price review process. The costs that would be involved in making NWL resilient to these types of exceptional events are disproportionate relative to the customer benefits.

(109) We note that for DNOs, the equivalent Interruptions Incentive Scheme (IIS) excludes severe weather exceptional events.[20]

[18] https://www.ofwat.gov.uk/wp-content/uploads/2015/11/prs_inf_1010fplrisk.pdf
https://www.ofwat.gov.uk/wp-content/uploads/2021/06/CEPA-report-Allocation-of-risk.pdf
[19] In some instances, the use of overall penalty caps may be appropriate. However, they are always implemented with the implication of dulling companies' incentives in certain situations.
[20] See Table 15 of: RIIO-ED2 Methodology Decision: Annex 1 - Delivering value for money services for consumers (ofgem.gov.uk)

6.1.2 Impact of exemption for civil emergency events

(110) High consequence/low probability events occur in other water company service areas. For example, water companies do not plan to meet all drought events or all flooding events. Instead, a 'design standard' or cut off is used. In the case of water resources this is currently 1 in 200 for severe restrictions. The exemption clause for civil emergencies is analogous to this 'cut off' at which it is no longer economic to provide further system resilience. The retention of a civil emergency exemption is therefore consistent with managing other 'tail end' risks to avoid uneconomic investment.

(111) An exemption of this type also retains the correct performance incentives. Any decision on applying an exemption would require the water company to demonstrate it was efficient and effective in its response to an event. At the time of the event, as the overall impact is not known, nor the evidence on the efficiency of response is available, the incentive remains on the company to deliver service as fast as possible. Failure to do so would be revealed in the post event analysis and means the penalty will borne by the company.

6.1.3 Implications of principles and best practice for risk allocation

(112) Risk should be allocated to the party that is best able to manage it or the party best able to control or minimise the impact of the risk.

(113) This has been emphasised in a number of recent government reports as well as regulatory decisions. For example, the Government Commercial Function published the following guidance in May 2021 in relation to contracting with third parties [bold highlights added for emphasis]:

- *Allocation and management of risk is central to all commercial contracts and is one of the core commercial principles informing the approach to contracting with third parties.*

- *Effectiveness and value for money of contracted services will only be achieved where risk allocation is equitable and* ***where the party managing the risk is the one most reasonably able to do so****. Departments and their advisers should be aware that the* ***objective of risk allocation is not to transfer as much risk as possible to suppliers, but to distribute risk appropriately across the parties.***

- *In the past,* ***government has made poor decisions about how it allocates and manages risk in contracts, and this has contributed towards many high-profile public sector contract failures****, particularly where a party has been responsible for something out with its control.*

- *Suppliers can often price and manage certain risks better (and more cost effectively) than government.* ***There are some types of risks that suppliers are well placed to manage such as day-to-day operational delivery risk.*** *There have, however, been examples of* ***less successful risk transfer, especially where risks that are beyond the supplier's control are transferred from government***

- ***When it is clear that a risk transferred to the supplier will result in a higher cost (because of risk premiums) than the expected potential loss if that risk were to be retained and managed directly by government, then the department should consider retaining that risk***[21]

21 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/987140/Risk_allocation_and_pricing_approaches_guidance_note_May_2021.pdf

(114) Ofwat has also recognised that risk should be allocated to the party best able to manage the risk. Some events such as Storm Arwen are so extreme that they are reasonably beyond management and company control. This risk should therefore not sit with or be allocated NWL, as in this event, and similar circumstances, NWL is unable to control the underlying risk.

(115) As a result, it is not appropriate in line with best principles of risk allocation and management for risks associated with an extreme event outside of management and company control to be allocated to NWL, and it would be appropriate to apply an exemption on this basis in line with regulatory policy.

6.1.4 Implications for pricing

(116) The removal (or failure to grant) of the exemption for civil emergency events alters the downside risk faced by companies in the event of a severe weather event. This section considers how this increased risk exposure could impact the cost of capital and costs to customers over time.

(117) Under certain circumstances, a business might be exposed to downside risk that does not have a commensurate upside i.e., there is asymmetric risk. If the assumed cashflows are not appropriately adjusted for such downside events, the un-adjusted cost of equity will not be adequate and will have to be appropriately uplifted to reflect expected losses on a mean probability-weighted expected basis. For example, where regulatory mechanisms incorporate ex-post review regulatory discretion as in this case, these truncate return distributions because, at best a company will not be exposed to risks from civil emergency, but Ofwat has significant discretion to apply a penalty when these risks occur.

(118) Asymmetry is an important consideration for investors in a regulatory context, because regulated companies cannot raise prices to balance downside risks on a mean expected basis. This means that, if a regulated company faces material asymmetric risks over which the company has no control (such as e.g., risks imposed on the company by the regulatory framework design and calibration of regulatory mechanisms), then the regulatory settlement needs to set allowances to balance such risks to ensure 'a fair bet'.

(119) There is strong regulatory precedent for the fair bet principle as it was applied by Ofcom to BT Openreach and by the CMA to System Operator for Northern Ireland ("SONI").[22] [23]

(120) For example, in SONI's appeal against the Northern Ireland Utility Regulator (UR), the CMA stated:

(121) "*the UR failed to have regard to asymmetric risk and that, as indicated by SONI's own analysis, this would result in expected returns being lower than the assumed WACC*".[24]

(122) Where companies are exposed to asymmetric downside risk they cannot mitigate, they will achieve a lower return than the required return on a mean expected basis.

(123) Consistent with theory and regulatory practice, a company would need to be compensated for this exposure to asymmetric risk.

(124) The CMA in its final determination for SONI noted that - "i*f asymmetric risks result from a framework under which SONI faces considerable risk of not recovering its efficiently incurred costs without it being compensated for these risks, in our view this would not be consistent with*

[22] Ofcom (2011), Proposals for WBA charge control: Consultation document and draft notification of decisions on charge control in WBA Market 1, para A8.27
[23] CMA (2017), SONI Final Determination, para 12.109
[24] CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation Final Determination', 10 November para. 7.371

UR's duty to ensure SONI's financeability".[25] As a result the CMA applied a risk premium of 3% to costs subject to asymmetric risk. Moreover, a business operating in a competitive market and exposed to significant one-side risks would have to create a financial buffer through prices such that it could withstand reasonable shocks and earn the required probability-adjusted returns on average.

(125) The risk associated with civil emergency events is downside only, i.e., there is no scope for NWL to outperform under these conditions – when they occur there is only downside exposure. The removal of the exemption for civil emergency events would result in an expectation that NWL would be exposed to losses (associated with ODI penalties) associated with these types of events in the future, with no corresponding upside. This would result in an expected loss implied by the regulatory framework which would need to be priced to ensure that each regulatory determination represents a fair bet for investors.

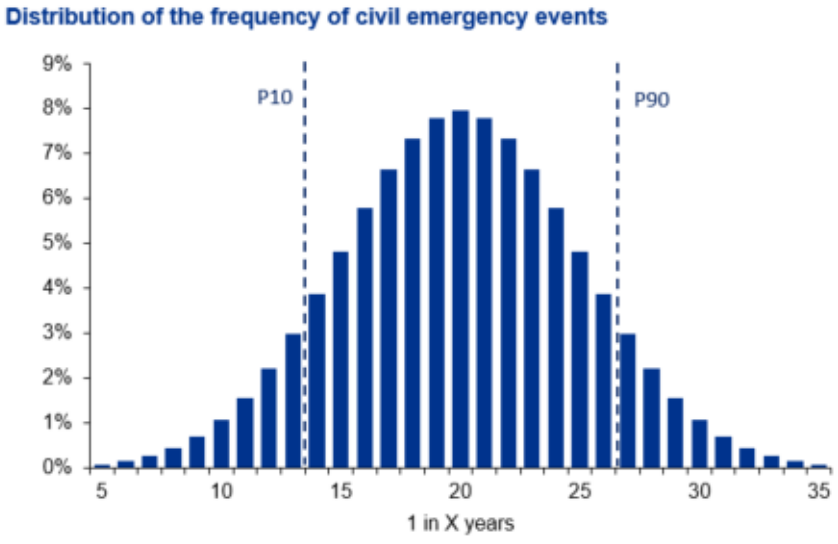
(126) The introduction of asymmetric risk arising from non-application of the exemption in this case would result in an expected loss which would need to be priced to ensure that the price control represents, all else equal, which would result in a requirement for a higher cost of equity.

(127) The analysis below sets out an initial quantification of the impact of a weather event like Storm Arwen for NWL based on different assumptions around the frequency and severity of the event.

(128) Storm Arwen was a severe storm with a financial impact of £27.9m, £26.0m of ODI penalties incurred and £1.9m of additional costs (including GSS payments). If we consider, for illustrative purposes, that Storm Arwen was a 1 in 20-year event, on a mean expected basis – and on the expectation that NWL would be exposed to these losses on an expected basis – we would estimate an annual penalty of c. £1.4m per year or £5.6m per AMP.

(129) However, there is material uncertainty regarding the future frequency of this type of event. If we assume the frequency for this type of event follows a normal distribution with a mean of 1 in 20 years and a standard deviation of 1 in 5 years. It is particularly important to consider the distribution of potential outcomes and uncertainty of e.g., frequency of future weather events as for most weather patterns, the intensity of the events is expected to increase, in particular for large scale storms.

Figure 15 Distribution of the frequency of civil emergency events



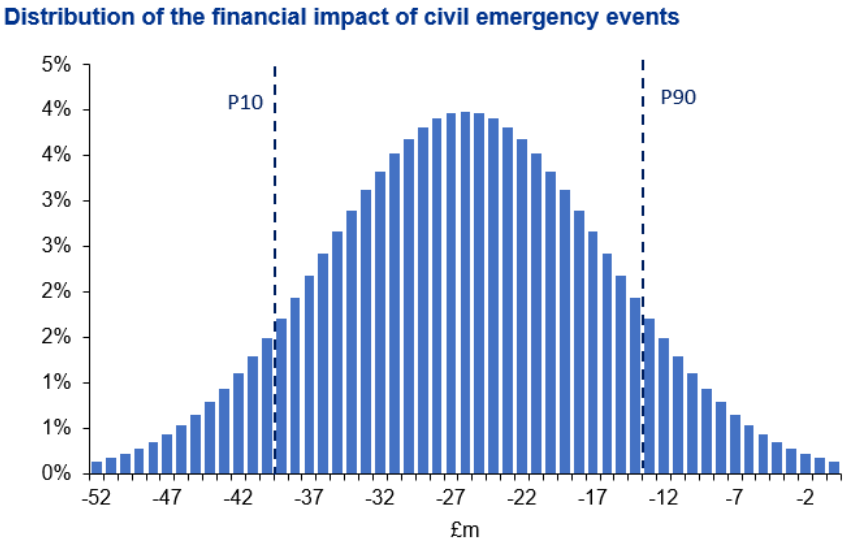
[25] Ibid, Para 6.220

Source: NWL analysis

(130) Figure 15 above shows the distribution of the frequency of these weather events with a P10 of c. 1 in 14 years. Under this P10 scenario for frequency – as a proxy for the increased frequency of events such as Storm Arwen – holding the financial impact of each event constant, the mean expected annual impact of this type of event would be £2.0m, or £10.1m per AMP.

(131) However, it must also be considered that the severity of these events, and therefore the corresponding financial impact, might increase in future. Figure 16 illustrates the range of financial impacts of a civil emergency event, with a P10 penalty assumed to be £38.8m.

Figure 16 Distribution of the financial impact of civil emergency events



Source: NWL analysis

(132) A combination of the P10 frequency (1 in 14 years) and P10 financial impact (£38.8m) would translate into a £3.0m penalty per year, or £14.8m per AMP, on a mean expected basis. This would need to be funded by customers through a premium for asymmetric risk at each price control.

(133) Ofwat recognises the importance of aligning risk and return as a core regulatory principle underpinning its regulatory framework. For example, in its final methodology for PR19, it noted:

(134) *We will promote long-term resilience by ensuring efficient companies can continue to finance their functions and invest in the services they provide, by earning a reasonable return that reflects the risks they face*.[26]

(135) The range of potential financial impacts represent material and expected downside risk to NWL on an expected basis which would need to be priced as an additional premium to the cost of equity to reflect asymmetric risk should Ofwat remove the exemption for civil emergency events. If the exemption is allowed, then this mitigates the asymmetric risk and negates the requirement for pricing of the risk.

(136) Additionally, it is important to consider that the removal of the exemption could reduce the predictability and stability of the regulatory framework and how this is perceived by investors and lenders in the sector. Both debt and equity investors in the water sector take a long-term investment horizon and depend on the predictability and stability of the regulatory regime. The

[26] Ofwat PR19 Methodology

removal of the exemption for civil emergency events could undermine perceived stability of the regulation and increase the cost of capital required in the sector and hence also increase costs to customers – over and above the premium for asymmetric risk set out above.

(137) In summary, the removal of the exemption for civil emergency events would result in increased risk for NWL and other companies in the sector. This increased risk would be primarily asymmetric in nature and would need to be priced in future controls. This change in the risk profile for the company and investors would ultimately lead to an increase in costs to customers.

6.1.5 Does applying the exemption set a precedent?

(138) The above paragraphs explore the strengths and weaknesses of an exemption. This particular performance commitment was defined upfront as having this exemption. If Ofwat were to intervene and disallow the exemption, that could undermine the regulatory process, setting a precedent for ex-post changes. This would place an asymmetric risk into the regulatory process and set an incentive for companies to focus on low probability event mitigation and not other service improvements.

(139) Civil emergency events are rare occurrences. Therefore, NWL's specific exemption application does not set a broader precedent to be applied to other events due to its rarity. It should also be noted that any exemption needs to be adequately evidenced and justified.

7 Conclusions

(140) Northumbrian Water Limited (NWL) is consistently in the upper quartile of performers against water supply interruptions and has a track record of responding well to severe weather incidents. Over AMP6 we were the best performing company in two of the five years and had one of the lowest interruption targets in the sector. During Beast of the East, we were also amongst the best performers during that period with only 0.05% of customers experiencing an interruption longer than four hours. In its 'Out of the Cold' report, Ofwat identified us as an example of a company exhibiting industry leading practices, further indicating our resilience and robustness when it comes to managing interruptions. This strong performance has continued during AMP7. In the year ending March 2021, we had the second lowest average interruption impact in the industry in terms of the common water supply interruptions performance commitment. This strong operational background provides solid experience for dealing with interruption events.

(141) Storm Arwen was an abnormally destructive storm, which was particularly damaging to the North-East of England and the East coast of Scotland. The strength and direction of the winds followed by unusually cold weather made this a very rare weather occurrence. The storm caused widespread damage to power infrastructure in the North-East with NPG being particularly badly impacted. Thousands of customers went without power for many days including NWL.

(142) The lack of power supply caused numerous lengthy interruptions in supply to our customers. Despite mobilising our entire fleet of backup generators, the scope of the outages was beyond anything we could have reasonably prepared for.

(143) We commissioned Jacobs to prepare a report into our storm preparedness and response. Jacobs's findings concluded that our extreme event preparedness was effective and that we went above and beyond to attend to our customers in the aftermath of the storm.

(144) The overall impact of Storm Arwen meets the criteria for a civil emergency under the relevant performance commitments according to independent legal analysis with several key third parties noting the severity and rarity of the storm. This is also confirmed by independent legal analysis which notes the calling of major events in two local authority areas covering our North-East operating areas.

(145) In order to protect businesses from unreasonable penalties as a result of extreme events, Ofwat allows companies to make an application to exclude interruptions caused by civil emergencies. The storm therefore represents precisely the event that Ofwat must have included the exemption in the PC for.

(146) Although this would allow us to apply for an exemption for the full impacts of the storm, we consider there is room for us to improve in some specific instances and propose a partial penalty.

(147) We are therefore proposing a penalty of £3.375m. This is in addition to the c£1.9m of costs incurred by NWL in responding to the storm, including GSS payments.

(148) The Environment Agency has already offered an exemption for pollutions events incurred during the same storm on very similar grounds.

(149) The final penalty we are eligible to pay fits within the balance of risk determined by the PR19 price control. If the ability to make representations for civil emergencies was not in place, then the penalty we would be facing would be more severe than any ODI penalty for supply interruptions incurred since the beginning of PR14. At the same time the full penalty would represent a far greater financial penalty than has been incurred by any of the Distribution Network Operators follow the Ofgem and BEIS reviews. Those companies had far greater

numbers of customers off energy supply and the absence of power was clearly the material cause of the supply outages for us. Such a penalty would be completely disproportionate to the scale of the harm.

(150) Applying such a penalty would also set poor precedent and be bad for customers over the long-term. It would effectively render the exemption included at PR19 null and void and would place an asymmetric risk into the regulatory process. This would both set an incentive for companies to focus on low probability event mitigation and uneconomic investment to mitigate those risks rather than other service improvements that customers would prefer absent these extreme weather events. It would also drive an increase in the cost of capital to address that asymmetric risk which could be material to customer bills.

(151) Civil emergency events are rare occurrences. Therefore, NWL's specific exemption application does not set a broader precedent to be applied to other events due to its rarity. It should also be noted that any exemption needs to be adequately evidenced and justified.

(152) While the proposed partial exemption preserves appropriate incentives from a company perspective, applying the partial penalty via the ODI framework does have the consequence of benefitting all customers as opposed to those directly affected by the event. We would be open to a conversation regarding the possibility of instead making an equivalent transfer of value from company to customers in a different manner – for example by additional investment to mitigate the impact of future storms, alternative schemes/investment to benefit the communities affected and/or additional and more targeted compensation payments.