

Lancashire County Council Scrutiny Committee

11/01/22

Introduction

Electricity North West is the region's distribution network operator, connecting 2.4m properties in the region to the electricity grid through 13,000km of overhead lines and 44,000km of underground cables from Cumbria to Derbyshire, covering all of Lancashire. Electricity North West has a higher percentage of underground cables than any other network in the UK outside London. The company invests almost £1m a day in the region's network, systems and people which is ultimately funded via electricity bills. Ofgem found us to be the most efficient network operator in the current price control period (2015-2023) and our network is a top quartile performer for Ofgem's customer interruptions and customer minutes lost measures.

Exec summary

Storm Arwen caused significant damage across the UK with railways, roads, buildings and overhead electricity supply lines all damaged by thousands of falling trees, high winds and ice accumulation.

Please note the figures in this report relate to the whole region. A breakdown of specific figures for Lancashire have not yet been fully audited but we can provide these in future if required. The principles of our response and lessons learned remain the same.

The worst-hit area of Lancashire was the Ribble Valley and when final restorations were made here, engineering teams were released to assist other areas in south Cumbria that still had customers off supply.

- Across our region, 750,000 properties served by overhead lines were in the path of Storm Arwen.
- Of the, 93,000 that lost power around a third (c30,000) were in Lancashire with the majority in Cumbria and others in Derbyshire and other areas.
- 18,000 of the total affected were restored within three minutes using automation and 75,000 required manual intervention,
- Of the 75,000, 49,000 were restored within 24 hours and a further 17,500 were restored within 48 hours leaving 8,500 off supply for over 48 hours. The last customer was restored nine days after Storm Arwen hit the region.
- In a 24-hour period, our network sustained over 300 HV faults and over 500 LV faults, equivalent to just under two months typical fault activity; 37km of overhead line were rebuilt, 120 poles and 28 transformers replaced, 280 generator fits completed and over 3,000 trees were cut and removed.
- Over 50,000 customer calls were received during the first 48 hours, equivalent to just under two months of typical activity, 14,000 hot meals were served through four static and eight mobile facilities. 142 overnight stays in hotels were provided with additional unused accommodation available each night.
- Overall the ENWL strategy of **prevent, automate and repair or restore** was effectively deployed
- Nevertheless, many customers who were off supply for extended periods are disappointed at the time taken to restore power.
- The network has been built and maintained to meet or exceed agreed industry standards established with policy makers (BEIS) and funded and monitored through the regulator Ofgem.
- The event raises some fundamental questions about the existing resilience standards given the disruption caused, the increasing future reliance on electricity and the potential for more regular severe weather. Other areas to consider are; rights to cut trees; access to customer data and the availability and purpose of other pools of resources.

Responding to Storm Arwen

Storm management strategy and preparation

Electricity North West's storm strategy has three elements; **prevent** supply interruptions through network investment and maintenance, **automate** supply restoration within three minutes for those who suffer an interruption and **repair or restore** by generation those still off ASAP by continuous working.

Customers protected from Storm Arwen through our **prevent** strategy:

- There were 750,000 of our customers supplied by overhead lines in the path of Storm Arwen.
- 445,000 were protected by a variety of resilience and maintenance measures.
- 110,000 customers were protected as a direct result of improved tree cutting standards (ETR 132) established post the storms of 1997 and 1998 (250,000 lost supply) which are focussed on high voltage circuits.
- 103,000 customers were protected by discretionary shareholder-funded investments to apply automation and increase interconnection and by undergrounding a limited number of circuits.
- That left the 93,000 who lost supplies during the storm, 18,000 of which were restored by **automation**.

Our approach is informed and funded by an agreed set of standards set by Government and overseen by the regulator Ofgem. For storm management we also liaise and follow the guidance from BEIS and E3C (Energy Emergencies Executive Committee).

Storm Arwen was forecast to impact only Cumbria and was downgraded from an amber to a yellow level storm, the actual impact was a red level storm across the entire length of the region. We prepared on the basis of the amber warning from Thursday 25 November, increasing staff on standby, sending 42,000 text messages to our most vulnerable customers in the path of the storm and issuing the first of 24 news updates.

Response to extreme damage

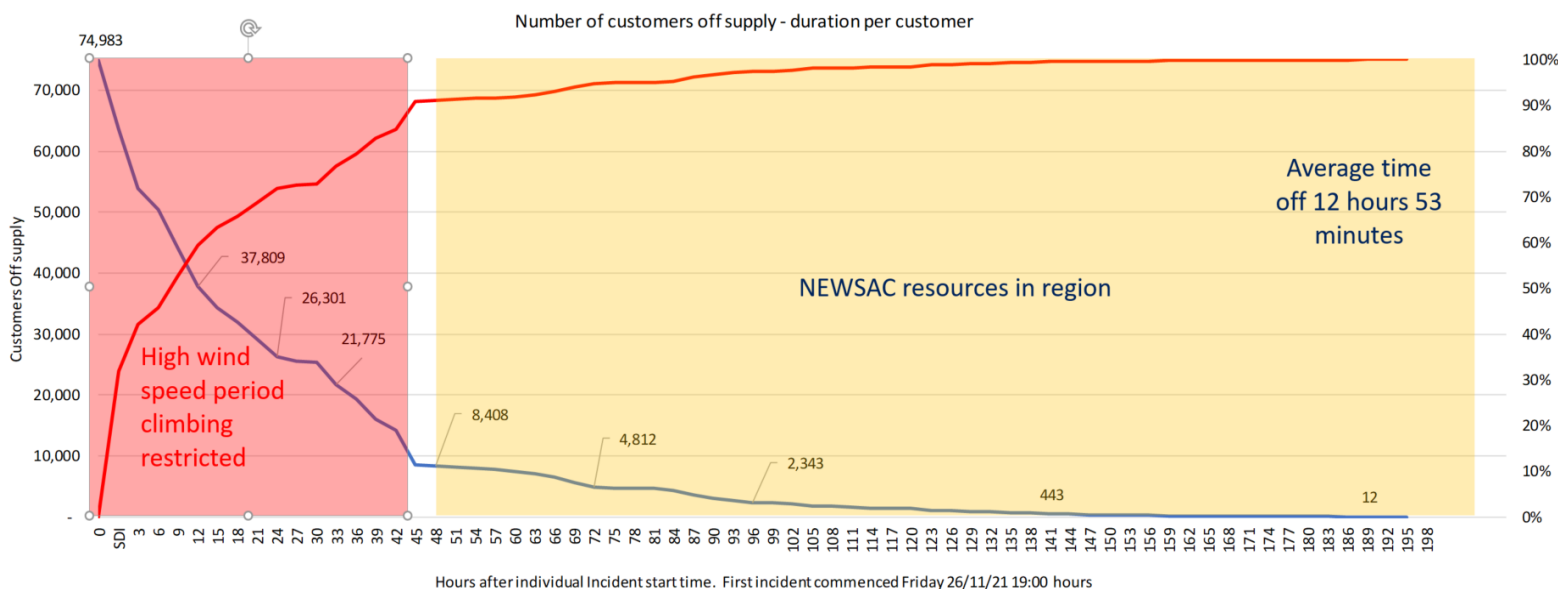
Storm Arwen caused more than 800 separate instances of damage to the network in the 24-hour period after the storm broke on Friday 26 November, equivalent to just under two months typical fault activity (a typical amber level storm may cause 50 instances of damage). The damage was primarily caused by falling trees due to high winds, saturated ground, and heavy snow and ice loading. During the first 42 hours, wind speeds were above safe levels for working at height preventing repairs, access to many damaged sites was prevented by deep snow and fallen trees.

- We deployed 618 engineers (including up to 130 additional staff from other network areas via NEWSAC).
- Arborists cut 3,010 trees from the network
- Engineers repaired, rebuilt and connected;
 - 673 spans of overhead line (37km)
 - 120 broken poles
 - 28 pole-mounted transformers
 - 280 generator fits

For the 93,000 off supply, we restored supplies as follows:

- 18,000 properties within three minutes using network automation (the remaining 75,000 required manual intervention)
- 49,000 within 24 hours
- A further 17,500 within 48 hours

This left 8,500 off supply, 9% of the initial 93,000. After 72 hours, 4,800 customers remained off supply and it took a further six days to restore these customers primarily due to access problems as a result of fallen trees and the extensive damage to both our high voltage (HV) and low voltage (LV) networks. Many of these properties had multiple faults preventing supply which made accurate restoration forecasting practically impossible.



NB. This graph covers restorations across the whole of the North West, including properties in South Cumbria which were off for the longest with properties in Lancashire restored sooner.

Our contact centre is set up efficiently to handle the average 30,000 calls in a typical month, supported with messaging systems. We had two months' worth of calls (50,000) in the first two days of Storm Arwen and increased the capacity of our contact centre by more than 150% by bringing in colleagues from across the business. Customer calls were prioritised as follows; fault sightings/emergency calls, then priority service register customers and finally all other calls.

Together with our recce activity, customer input helped identify fault locations and these were prioritised by the numbers of customers involved. Given the widespread damage, forecasting 'estimated time of restoration' (ETR) for the final 4,800 customers was extremely difficult. On Monday 29th November, all customers still off supply had their ETRs updated in the range Tuesday 30th to Friday 3rd December. Each day following the 29th, individual calls were made to customers informing them if their ETR had advanced or been put back. Due to the difficulties in communicating with some customers, working with the Local Resilience Forums, a systematic 'door knocking' operation was started on 28th November. Due to its success, this was progressively increased during the week.

During the event, we served 14,000 hot meals to customers without power and made available 400 hotel rooms, empowering our Local Resilience Forum partners to arrange take-up direct with customers where necessary.

Under nationally-agreed 'guaranteed standards' arrangements we estimate that between 8,500 and 9,000 customers may be due compensation of £2.6m (off supply for greater than 48 hours). To date (05/01) we have paid £1.8m to 6,200 customers. In addition, repair and response costs are expected to exceed £10m.

Considerations for future resilience and lessons learned

The event raises some fundamental questions about the existing resilience standards given the disruption caused, the increasing future reliance on electricity and the potential for more regular severe weather.

We're contributing to the BEIS and Ofgem reviews, as well as running our own review involving independently facilitated customer feedback research and engagement with Local Resilience Forums and key stakeholders. Below are four key areas for consideration as part of these reviews:

1. Tree cutting near lines

Now would be a good time to review industry standard ETR 132 ('Improving Network Performance Under Abnormal Weather Conditions by the Use of A Risk Based Approach To Vegetation Management Near Electric Overhead Lines') which sets out the requirements for network resilience through vegetation management.

It focuses on circuits feeding large numbers of customers using cost benefit analysis (towns or large villages typically >4,000 inhabitants) and has proved effective in improving resilience. Since 2010 we have completed 60% of the 20-year programme, clear-cutting along 900 km of lines to ensure that if trees do fall, they do not reach our lines. However, there is no doubt that the existing approach leaves smaller, rural communities fed by circuits feeding 100s or dozens of customers, exposed to longer duration outages in events such as Arwen.

We do maintain clearances between wires and trees on these circuits, but this can vary from 1.1 to 5m which only provides protection against falling or swaying branches. Network operators have no 'legal right' to clear trees from near its lines. If a landowner resists we can go to court, but this is so time consuming as to be impracticable when we are dealing with many 1000s of trees. Understandably many landowners are very protective of their trees, as can be the public.

2. Determining best value network resilience

Networks can make the infrastructure even more resilient, but this will come with additional costs especially in remote rural areas (eg, moving overhead lines underground or building in redundancy). Ofgem already has a 'worst served customer' scheme in place which helps address customers who suffer frequent supply interruptions, perhaps this could be extended to protect small and rural communities from extended duration supply disruptions?

A review to explore the most cost-effective means of providing resilience to rural locations would be helpful. How much resilience should the networks provide and how much should be provided at an individual level or through small groups of householders / businesses by say the provision of local generators and connection points, and how should this be funded?

3. Customer data

Consideration should be given to developing a national database for all customers, both vulnerable and others. CAT1 (government) and CAT2 (utilities) responders under the Civil Contingencies Act, should be able to confidentially share both vulnerable customer and customer contact information, this would have provided a comprehensive list of customers and enabled us to contact them more rapidly.

Customers supply their contact details to their electricity suppliers (the retailers), not to their networks. We have collated data on vulnerable customers on a voluntary basis only (900,000 vulnerable customers out of a population of 5.5 million). From discussions with local resilience forums, our data appears the most complete, but it is not comprehensive. During Arwen we relied on MPs offices and direct customer contacts to enhance our data to prioritise responses.

4. Use of additional support

We already have effective industry arrangements for mutual aid through [NEWSAC](#) (North East South West Area Consortium) via industry body, Energy Networks Association. This allows for the transfer of field resources and

supplies between network operators in the United Kingdom, Ireland and the Isle of Man (including National Grid). Network operators used this agreement successfully during Storm Arwen.

It would be useful to explore whether NEWSAC arrangements could be extended to customer support services.

Review

We are conducting our own review into Arwen speaking to key stakeholders including councils, Local Resilience Forum partners and customers directly. We welcome views and we will publish our lessons learned from the review. Thank you for taking the time to give us your feedback.

We look forward to hearing from you and encourage you to share your views with us as part of the review either at the meeting, or via stakeholderengagement@enwl.co.uk.

Images from Electricity North West during Storm Arwen:



