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Prepared for: Energy Security and Net Zero Committee

Purpose: Submission to the inquiry into Preparing for the winter

Contact: Thomas Longden, Senior Researcher – Urban Transformations Research Centre

Overview Temperature-related energy insecurity in England and Wales

Extreme temperatures increase energy use, which can lead to energy insecurity. Temperature-related energy insecurity can increase the risk of adverse impacts on the health of vulnerable people (Longden, 2022). Stable energy supply is crucial for protecting against extreme cold. How to keep warm during a cold winter with higher energy costs is an issue facing many vulnerable UK residents.

My research has used endogenous threshold regressions to statistically determine the temperature thresholds that trigger significant increases in energy insecurity events for prepayment customers. These energy insecurity events are the use of emergency credit and self-disconnections when credit runs out. Self-disconnection is the term used when a consumer with a prepayment meter runs out of credit and the meter cuts out; this often occurs due to affordability reasons and not having enough money to top-up (House of Commons, 2023; Citizens Advice, 2018).

Temperature-related energy insecurity for natural gas occurs on days with minimum temperatures below -3˚C. The threshold differs by region. Endogenously determined thresholds are -5˚C for North England and Yorkshire, -4˚C for East England, -3˚C for London, and -3˚C for West England and Wales (shown in Figures 1 to 4). The trend towards significantly higher energy insecurity starts at -3˚C across all regions (shown in Figure 5).

The design of hardship policies, government support, and education programs should incorporate temperature thresholds for individual cold nights. While the Cold Weather Payment is used in parts of the UK, it is triggered by 7-day events and not individual cold nights or even a 3-day coldwave. The Cold Weather Payment is not triggered often enough. Additional support is needed on individual cold nights with minimum temperatures below -3˚C.

The study, which will be released in coming weeks, uses data provided by **Utilita Energy**, the largest prepayment energy utility in the United Kingdom. These data capture most prepayment customers in England and Wales. The study period is between January 2018 and February 2023.

Response What more could have been done to prevent price shocks being passed to consumer bills?

Temperature-related energy insecurity for natural gas occurs on days with minimum temperatures below -3˚C.
Financial assistance is needed to prevent self-disconnections and protect vulnerable groups as temperature-related energy insecurity places people at risk of ill health. This has implications for the policies implemented ahead of the 2023/24 winter.

Figures 1-4 provide a snapshot of the analysis that will be released in the coming weeks. These graphs show the relationship between minimum temperatures and energy insecurity events. This part of the analysis used fixed effects panel threshold regressions to identify the temperature thresholds that coincide with significant increases in the use of emergency credit and self-disconnections.

The threshold differs by region and type of energy insecurity event. The statistically determined thresholds are -5˚C for North England and Yorkshire, -4˚C for East England, -3˚C for London, and -3˚C West England and Wales (Figures 1 to 4).

Other regressions show that energy insecurity is statistically significant at temperatures below -3˚C (for all regions) and gets worse as temperatures get colder. Figure 5 provides an example where the estimates are separated by age group. There is some evidence that those aged over 65 years have greater temperature-related energy insecurity than other age groups.

The Cold Weather Payment does not sufficiently capture all types of cold events and it is triggered during too few cold events.
While the Cold Weather Payment is used in parts of the UK, i.e., a payment of £25 for a 7-day period of very cold weather between 1 November and 31 March, these results indicate that additional support is needed on individual days with minimum temperatures below -3˚C.

The Cold Weather Payment isn't even triggered for all 7-day events. The payment is triggered "if the recorded or forecasted 7-day average temperature is 0°C or below and there are no overlapping periods for which a Cold Weather Payment has already been made".

The Cold Weather Payment includes an overlap penalty that decreases the number of times a payment is made by a factor of 2 to 5.
The Cold Weather Payment is triggered less often than needed. As described above, this is partly due to the trigger being a 7-day event. Also, there is an overlap penalty that severely impacts those in North England and Yorkshire. The Cold Weather Payment should be triggered at least 5 times more often in North England and Yorkshire. This is justified either due to: - individual events being brought into the scheme, or - based on this overlap penalty that ignores cold events that cluster together. The 'no overlapping periods' directive severely impacts those in colder regions.

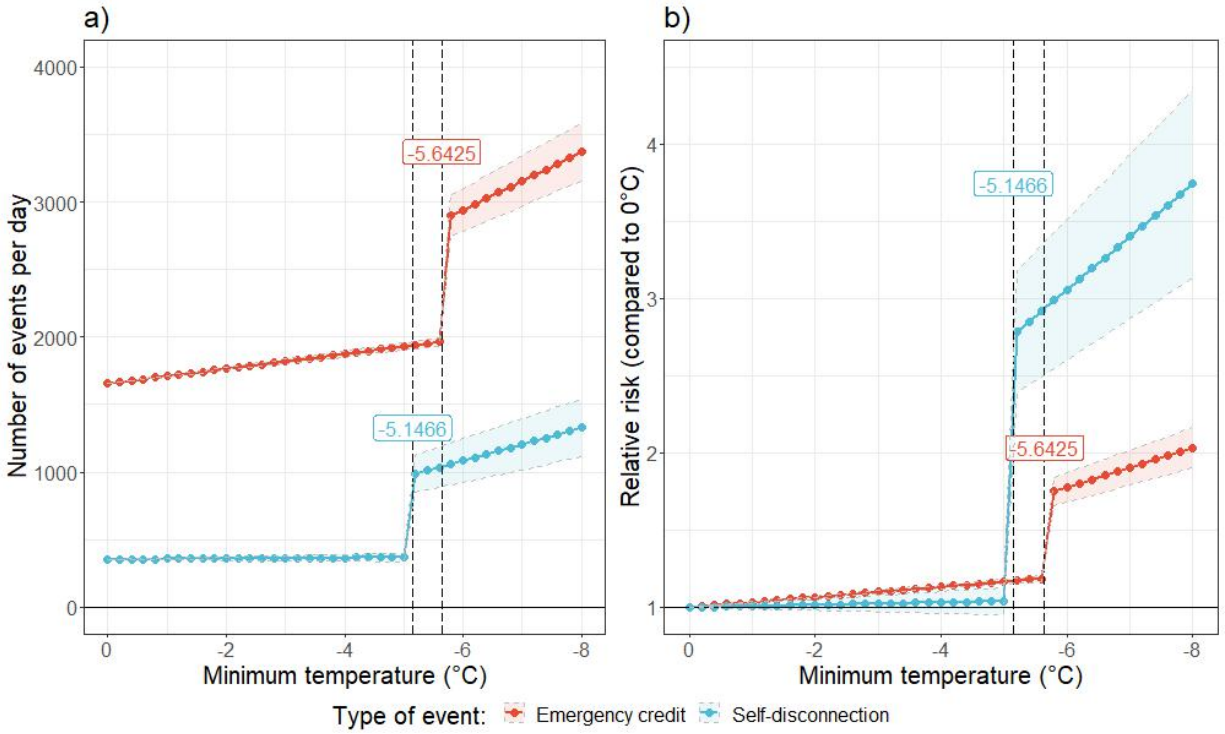
Figure 6 shows the number of self-disconnections that occur during extreme cold events. It also denotes the relative difference to the status-quo where the Cold Weather Payment is triggered using a 7-day average temperature with no overlapping periods.

It isn't clear when the Cold Weather Payment will be triggered and without clear communication UK residents will not anticipate the payment, which could lead to self-rationing.
The current measure is also not communicated to households. It is unlikely that UK residents calculate the 7-day average temperature to understand whether it has been 0°C or below during the last week. This is an important issue, as people do not anticipate the payment and will not change their behaviour. Many vulnerable households will turn down the heat on cold nights due to concerns about cost. Self-rationing occurs when "customers limit either energy use to save money" (Citizens Advice, 2018).

Communicating when the Cold Weather Payment will be triggered would be much easier if it is based on the minimum temperature, which is readily available (via news media and meteorology services) and often discussed. The payment should also be made in advance of cold events. Utilities could add the Cold Weather Payment directly to the meter of customers with smart meters. This would be an effective way of reducing self-disconnections and self-rationing during cold nights.

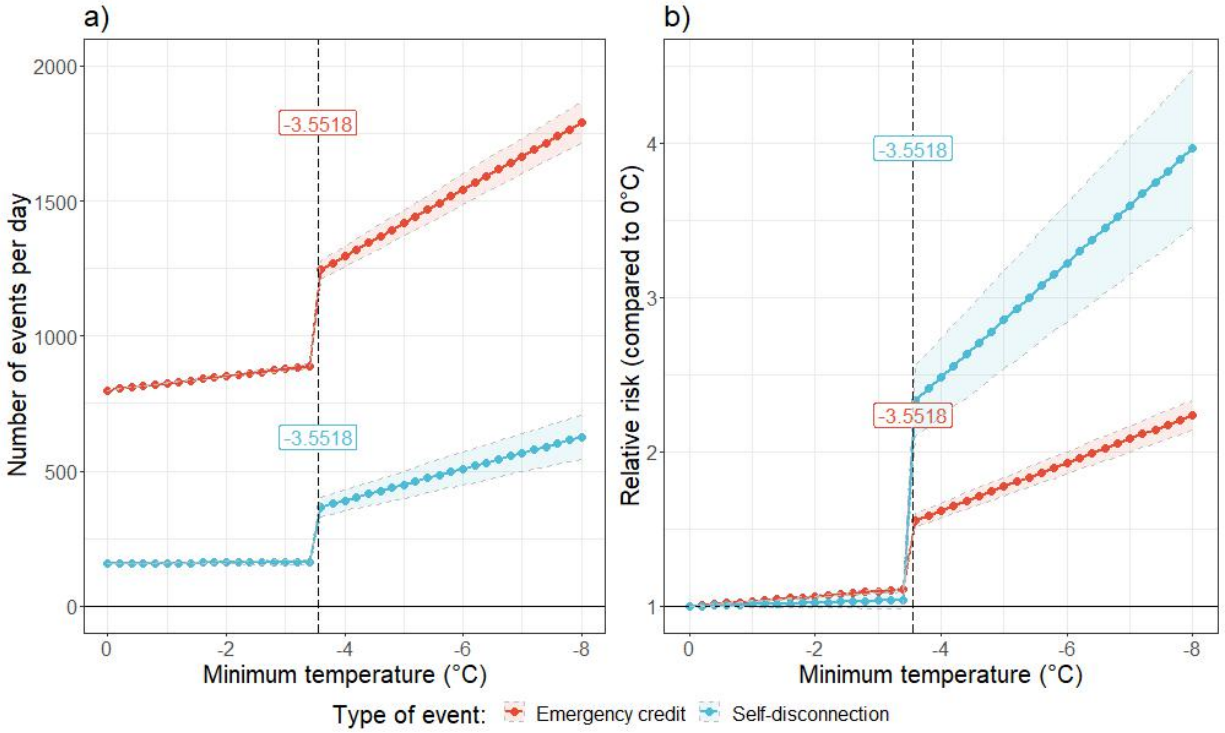
The Cold Weather Payment should be simplified, and it should be triggered when the minimum temperature is forecast to be -3°C or below. It shouldn't only be triggered by 7-day events. No overlap penalty should apply. This better reflects patterns of energy insecurity. The minimum temperature of the forthcoming night is also much more easily understood by UK households. It is an indicator that can be easily accessed via news media and meteorology services, which means that people will anticipate the payment and can change their behaviour to keep warm.

Figure 1 – Temperature thresholds by type of event – North England and Yorkshire



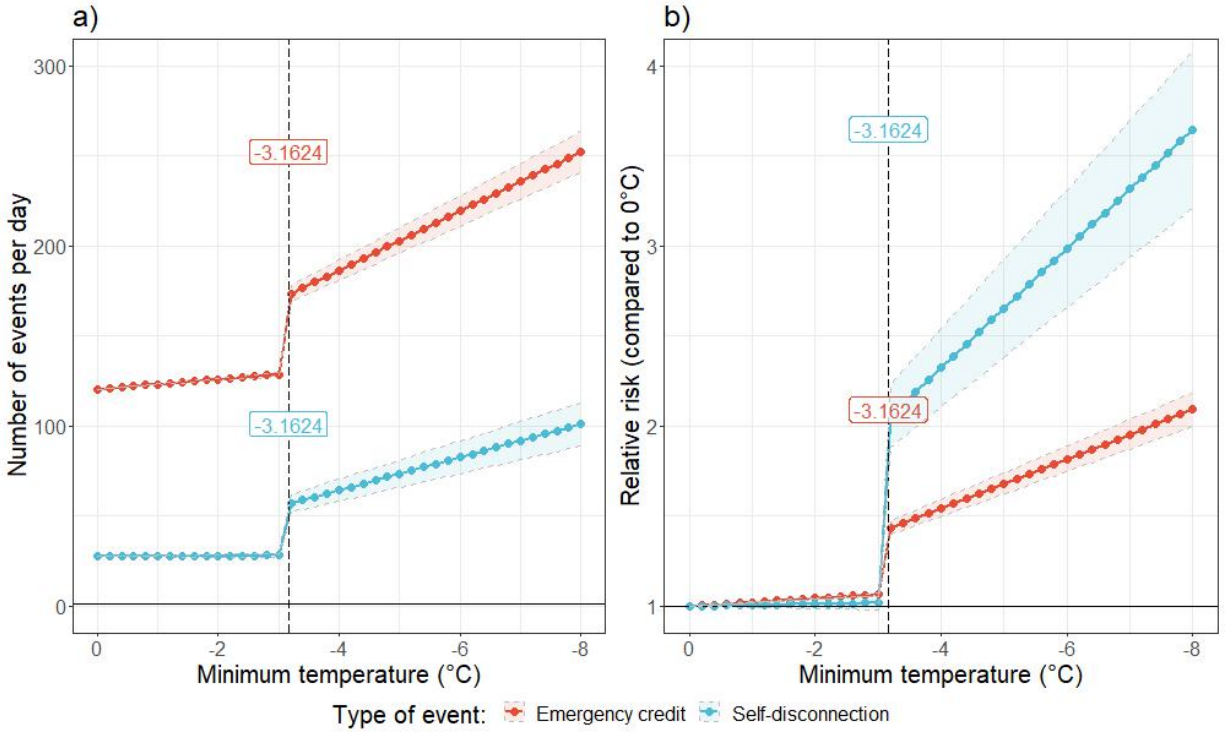
Interpretation: the use of emergency credit occurs more frequently ***[panel a]***, but when extremely cold temperatures occur (minimum temperature **below -5°C**) **self-disconnections increase by atleast 2.8 times** the rate that occurs when temperatures are more moderate (minimum temperature at 0°C) ***[panel b]***.

Figure 2 – Temperature thresholds by type of event – East England



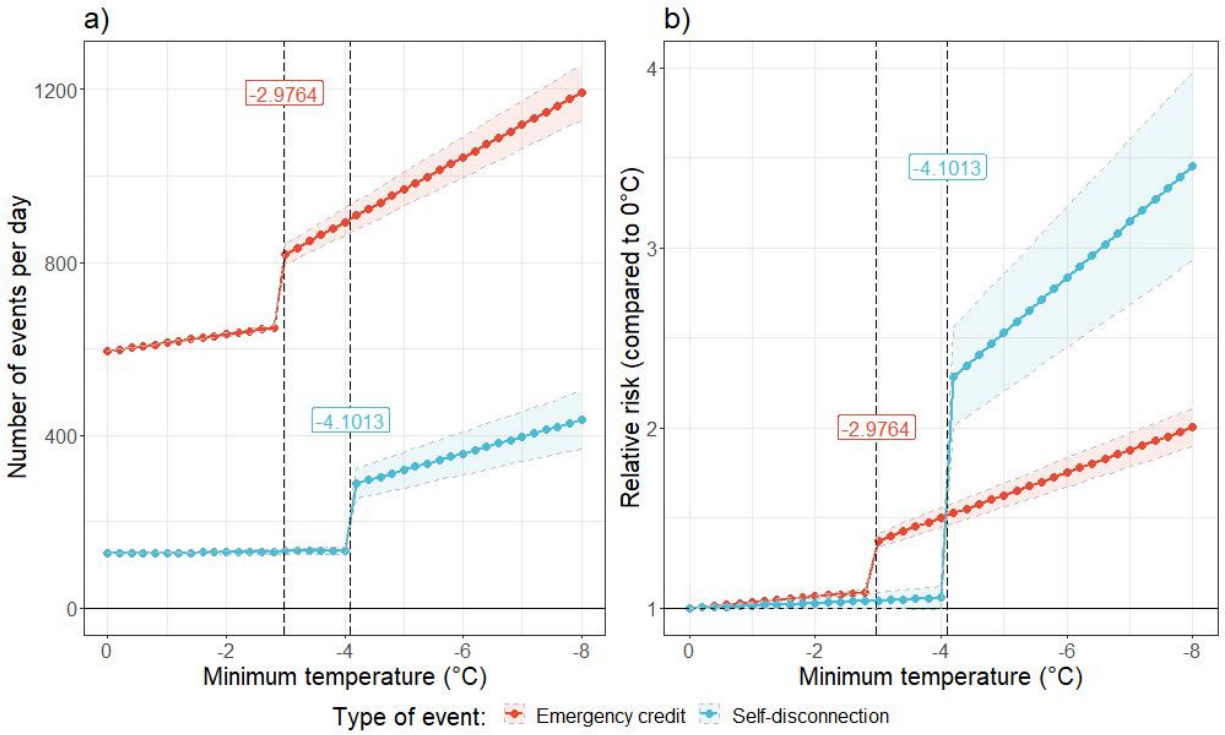
Interpretation: the use of emergency credit occurs more frequently ***[panel a]***, but when extremely cold temperatures occur (minimum temperature **below -4°C**) **self-disconnections increase by atleast 2.3 times** the rate that occurs when temperatures are more moderate (minimum temperature at 0°C) ***[panel b]***.

Figure 3 – Temperature thresholds by type of event – London



Interpretation: the use of emergency credit occurs more frequently ***[panel a]***, but when extremely cold temperatures occur (minimum temperature **below -3°C**) **self-disconnections increase by atleast 2.1 times** the rate that occurs when temperatures are more moderate (minimum temperature at 0°C) ***[panel b]***.

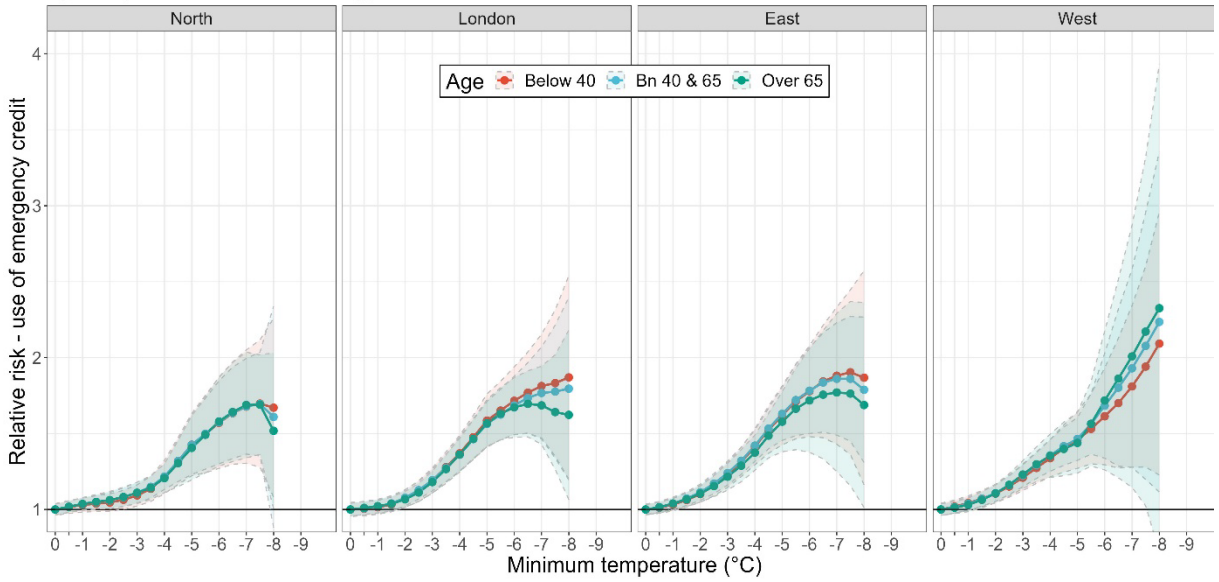
Figure 4 – Temperature thresholds by type of event – West England and Wales



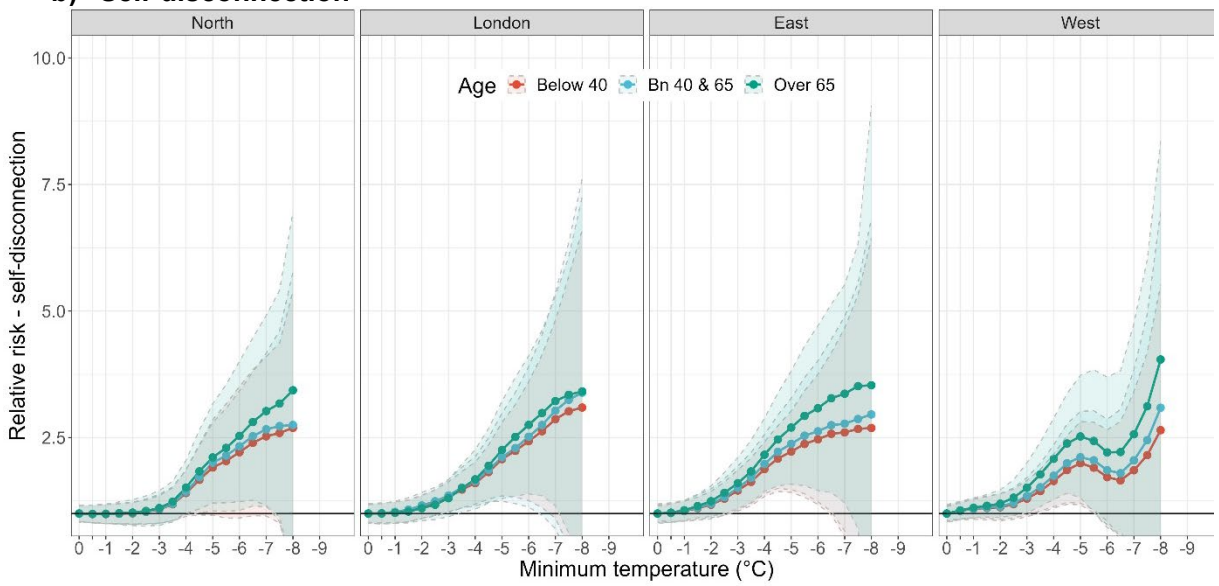
Interpretation: the use of emergency credit occurs more frequently ***[panel a]***, but when extremely cold temperatures occur (minimum temperature **below -3°C**) **self-disconnections increase by atleast 2.3 times** the rate that occurs when temperatures are more moderate (minimum temperature at 0°C) ***[panel b]***.

Figure 5 – Incidence of energy insecurity by age group

a) Use of emergency credit

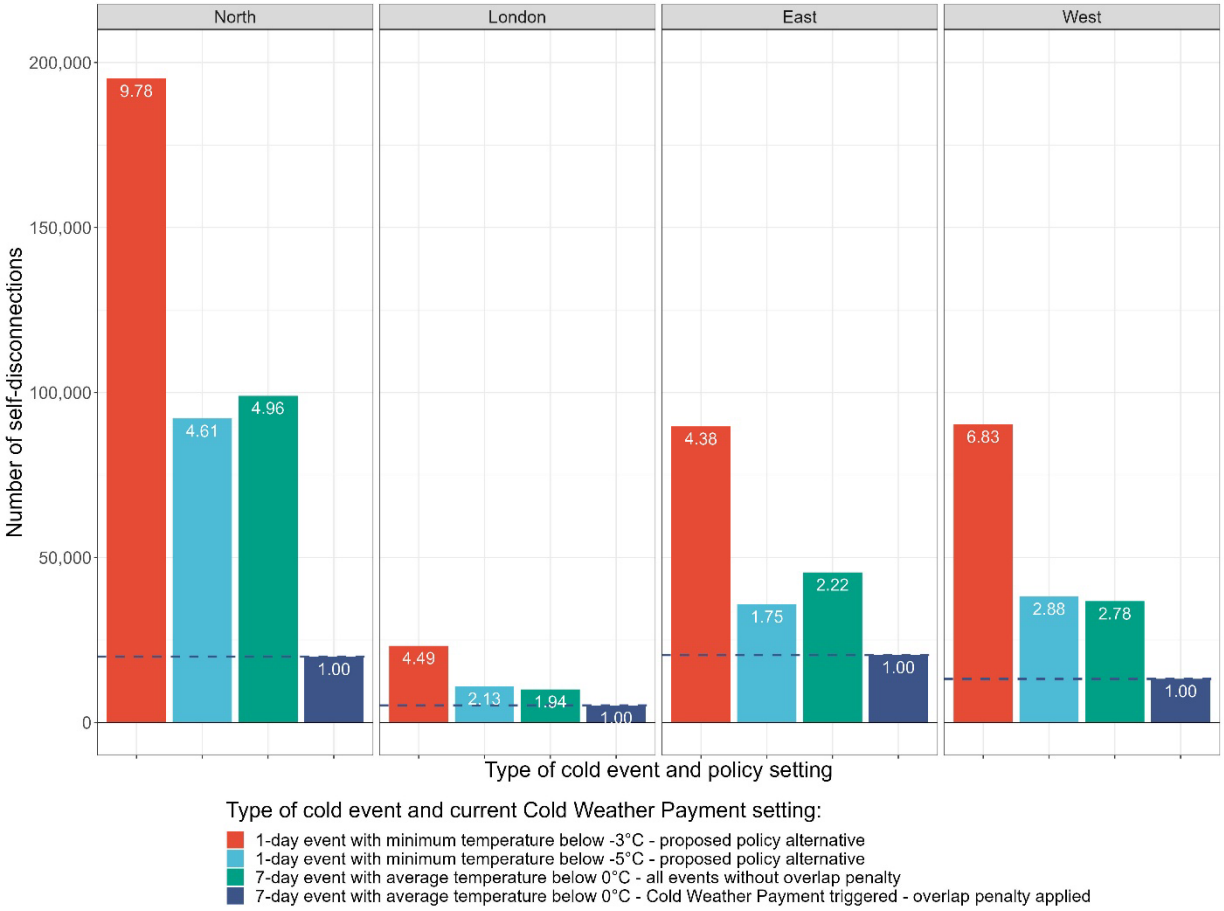


b) Self-disconnection



Interpretation: the use of emergency credit significantly increases at temperatures **below -3°C *[panel a]***; for self-disconnections, the confidence intervals are wider but a similar increase is seen with some evidence that over 65s disconnect more often at colder temperatures ***[panel b]***.

Figure 6 – Number of self-disconnections during different extreme cold temperature events



Interpretation: the Cold Weather Payment is triggered too infrequently. Many more self-disconnections occur **below -3°C *[red bar] and they are* 5 to 10 times more frequent** than the number of self-disconnections when the Cold Weather Payment is triggered *[purple bar]*. Using colder temperatures **below -5°C *[light blue bar]* shows that the Cold Weather Payment is triggered too infrequently by a factor of 2 to 5**. In addition, using a 7-day event below 0°C shows that an **overlap penalty *[green bar]* decreases the number of times a payment is made by a factor of 2 to 5**. This overlap penalty is highest for North England and Yorkshire (by a factor of of 5) but it also impacts the other regions (by a factor of 2 to 3).

Note: emergency credit and self-disconnection events are used as they are indicators of energy insecurity. Using the incidence of cold temperatures (alone) would skew the analysis based on the number of weather stations, which is notably different across the regions reviewed.

References:

Longden, T., Quilty, S., Riley, B. et al. Energy insecurity during temperature extremes in remote Australia. Nature Energy 7, 43–54 (2022). https://doi.org/10.1038/s41560-021-00942-2 https://rdcu.be/dj9yK

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