Check for updates

policy brief

ENERGY SECURITY

Temperature extremes exacerbate energy insecurity for Indigenous communities in remote Australia

For remote Indigenous communities prepaying for electricity in Australia's Northern Territory, temperature extremes increase reliance on the services that energy provides and the risk of disconnection of those services. Policy should focus on reducing the frequency, duration and negative impacts of disconnection, within the context of a warming climate.

Thomas Longden[1,2], Simon Quilty[3], Brad Riley[2,4], Lee V. White[2,5], Michael Klerck[4,6] ✉, Vanessa Napaltjarri Davis[6] and Norman Frank Jupurrurla[7]

BASED ON: T. Longden et al. *Nature Energy* https://doi.org/10.1038/s41560-021-00942-2 (2021).

The policy problem

In Australia's Northern Territory, most remote Indigenous households are provided with or elect to use prepayment electricity meters. This payment method is associated with high disconnection rates and is uncommon in other Australian urban and rural communities. These remote communities also experience some of the most extreme temperatures in Australia (Fig. 1a). Electricity use to sustain safe indoor temperatures can rapidly deplete available means, resulting in disconnection with little warning. As such, safe temperatures cannot be maintained, and households lose access to other essential services that electricity provides, such as food storage, washing and cooking. This raises the need to understand both the extent of current disconnections and the degree to which they are triggered by temperature. Without this understanding, the existence and severity of problems cannot be identified, and policy cannot be designed to mitigate current harms or prevent future ones.

The findings

Among 28 remote communities in the Northern Territory, we found that 91% of households experienced a disconnection event at least once during the 2018/19 financial year; 74% of households were disconnected over 10 times, and 29% of all disconnections occurred during extreme temperatures. In mild temperatures (20–25 °C), households had a 1 in 17 chance of disconnection on a given day (Fig. 1b). This increased to a 1 in 11 chance during hot days (34–40 °C) and a 1 in 6 chance during cold days (0–10 °C). Households with high electricity use in the central Australian climate zones had a 1 in 3 chance of a same-day disconnection during temperature extremes. Energy insecurity is worsened when energy use is heightened owing to heating or cooling needs (Fig. 1c). Our analysis does not explore all of the complexities underlying energy insecurity in these communities, but we expect that these findings will inform discussions of energy insecurity in regions with extreme temperatures.

Messages for policy

- Electricity disconnections among households with prepayment meters are more frequent during temperature extremes, curtailing access to essential services.
- Households with high electricity use experience more disconnection events, so policy responses should account for household structure and occupancy, as well as the opportunity to use rooftop solar.
- Greater visibility and understanding of data on disconnections in these communities is needed to determine the extent of their energy insecurity.
- Policy should seek to reduce the frequency and duration of involuntary self-disconnections in remote communities, particularly during extreme temperatures.
- To account for the multifaceted nature of energy insecurity, policy responses need to be informed by residents, local councils, healthcare professionals and other relevant organizations.

The study

This analysis used daily smart-meter data from 3,300 households across 28 remote communities in Australia's Northern Territory to identify the incidence of disconnection events. These smart-meter data were matched with daily temperature observations from the closest weather station using data from the Australian Bureau of Meteorology. We estimated the probability of disconnection

[1]Crawford School of Public Policy, Australian National University (ANU), Canberra, Australian Capital Territory, Australia. [2]Zero Carbon Energy for the Asia Pacific Grand Challenge, ANU, Canberra, Australian Capital Territory, Australia. [3]Research School of Population Health, ANU, Canberra, Australian Capital Territory, Australia. [4]Centre for Aboriginal Economic Policy Research (CAEPR), ANU, Canberra, Australian Capital Territory, Australia. [5]School of Regulation and Global Governance (RegNet), ANU, Canberra, Australian Capital Territory, Australia. [6]Tangentyere Council Aboriginal Corporation, Alice Springs, Northern Territory, Australia. [7]Julalikari Council Aboriginal Corporation, Tennant Creek, Northern Territory, Australia. ✉e-mail: michael.klerck@tangentyere.org.au

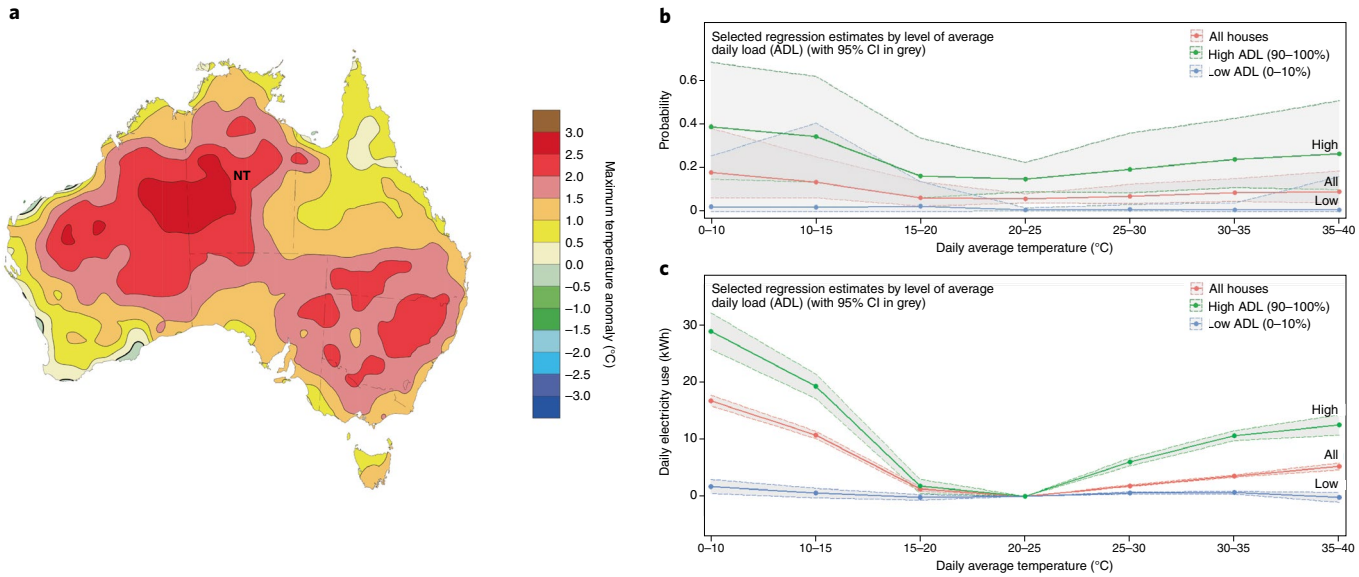

Fig. 1 | Temperature anomalies and the impact of temperature on disconnections and electricity use. a, Maximum temperature anomalies across Australia (July 2018 to June 2019 compared with 1961 to 1990), with the Northern Territory (NT) labelled. **b**, Probability of a same-day disconnection by temperature. **c**, Daily electricity use by temperature. Adapted from: **a**, http://www.bom.gov.au/jsp/awap/temp/archive.jsp under a Creative Commons license CC BY 3.0. Reproduced from: **b**, **c**, Longden, T. et al. *Nat. Energy* https://doi.org/10.1038/s41560-021-00942-2 (2021); Springer Nature Ltd.

across distinct temperature ranges using random-effects probit regressions, which allowed us to include variables for the daily average temperature, month of the year, and different levels of electricity use. Using a reference temperature range allowed us to measure how temperature influenced electricity use and the likelihood of a disconnection during both hot and cold days. This assessment of whether extreme temperatures are a factor determining disconnection events was only possible with access to smart-meter data. As the vulnerability of prepayment customers is often overlooked, we recommend that these data be better monitored and made more accessible to residents, community organizations and researchers. ❐

Published online: 24 January 2022
https://doi.org/10.1038/s41560-021-00968-6

Further Reading

Klerck, M. *Tangentyere Council, Submission to the House of Representatives Inquiry into Homelessness in Australia* (Tangentyere Council Aboriginal Corporation, 2020); https://irp-cdn.multiscreensite.com/d440a6ac/files/uploaded/House%20of%20Representatives%20Inquiry%20into%20Homelessness%20in%20Australia%202020.pdf.
This investigation of data for 570 households prepaying for electricity in Mpwartne/Alice Springs revealed that 420 homes (74%) were disconnected from electricity between April and June 2019.

O'Sullivan, K. C., Howden-Chapman, P. L. & Fougere, G. Making the connection: the relationship between fuel poverty, electricity disconnection, and prepayment metering. *Energy Policy* **39**, 733–741 (2011).
This study finds a connection between fuel poverty, electricity disconnection and the use of prepayment metering for vulnerable older people in New Zealand.

Hernandez, D. Understanding 'energy insecurity' and why it matters to health. *Soc. Sci. Med.* **167**, 1–10 (2016).
This article describes the multidimensional nature of energy insecurity, which includes economic, physical and behavioural dimensions, and identifies the types of adverse environmental, health and social consequences that can occur.

Flaherty, M., Carley, S. & Konisky, D. M. Electric utility disconnection policy and vulnerable populations. *Electr. J.* **33**, 106859 (2020).
This paper explores the differences in utility disconnection policies that have the potential to protect vulnerable populations from exposure to excessive heat or cold.

Longden, T. The impact of temperature on mortality across different climate zones. *Clim. Change* **157**, 221–242 (2019).
This study shows how exposure to extreme temperatures is associated with higher death rates in the three hottest climate zones in Australia, which correspond with the Northern Territory.

Competing interests

The authors declare no competing interests.