



**ENERGY POVERTY AND
OLDER AUSTRALIANS**
The Extent, Causes and Impacts

Caroline Porto Valente

Energy poverty and older Australians: The extent, causes and impacts

by Caroline Porto Valente

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the degree of

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under the supervision of
Professor Sara Wilkinson and Professor Alan Morris

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Faculty of Design, Architecture and Building

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Certificate of Original Authorship

I, Caroline Porto Valente, declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Built Environment (Faculty of Design, Architecture and Building) at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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Caroline Porto Valente

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Abstract

Faced with predictions of resource scarcity and climate change impacts in the near future, governments and the global energy sector need to address three big challenges—increased demand for energy security and infrastructure reliability in uncertain scenarios, the urgent need for a clean energy transition towards low-carbon energy sources and energy efficiency, and ensuring the accessibility and affordability of energy supply across the population. Referring to the latter, energy poverty, as it is manifest in more advanced economies, affects millions of people and is the product of three main factors: the cost of energy for essential needs relative to income, the energy efficiency of the home and household income. The issue is largely overlooked in Australia, and the precarious situation in which energy poor households live is under-researched. Unless there are major interventions, rising energy costs and climate change are likely to increase household energy expenditure in future decades, widening and accentuating the problem. Living in poor indoor environmental conditions due to energy poverty is a health risk especially for older people (those aged 65 years and over), who constitute a growing proportion of the population, especially in advanced economies. Low-income older households are among the most vulnerable to energy poverty.

This study examines energy poverty among older Australians on low incomes, to understand the extent of the issue amongst this group, the contributing factors and its impacts. The research design uses a mixed methods approach. A quantitative analysis of the Australian Housing Conditions Dataset, published in 2019, enabled a generic understanding of the extent of energy poverty among older households and the housing conditions that might contribute to it. To complement it, a qualitative analysis of 23 in-depth semi-structured interviews presents the voices of those who suffer energy poverty. Their perspectives on the factors that shape their experience of energy poverty added original insights into the study. Pierre Bourdieu's concepts of field, capital, symbolic violence, and habitus were used to analyse the interviews. A key focus, drawing on Amartya Sen's concept of capabilities, is how energy poverty affects Age Pensioners' capacity to lead a decent life. With contributions that extend the body of knowledge about the extent, causes and impacts of energy poverty in Australia and broader theory advancement, this research provides a basis for better policy frameworks and potential solutions to alleviate energy poverty among vulnerable households.

Doctor of Philosophy supervised by

Professor Sara Wilkinson
Faculty of Design Architecture and Building – University of Technology Sydney

Professor Alan Morris
Institute for Public Policy and Governance – University of Technology Sydney

*To my dear love and partner of all adversities,
dreams, and adventures, Kenzo.
Life is easier beside you.*

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*Science is not only compatible with spirituality;
it is a profound source of spirituality.
(Carl Sagan)*

List of Publications and Related Works

Journal Articles

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- Wilkinson, S., Morris, A., & Porto Valente, C. (2019). [A circular economy approach to sustainable housing adaptation in Sydney](#). *Australia and New Zealand (ANZ) Property Journal*, May edition, 12-17.
- Porto Valente, C., Wilkinson S., & Morris, A. (2021). [Building adaptations to address energy poverty](#). *Australian Institute of Quantity Surveyors (AIQS) Built Environment Economist - Australia and New Zealand*, March edition, 17-21.
- Porto Valente, C., Morris, A. & Wilkinson, S. (2021). [Energy poverty, housing and health: the lived experience of older low-income Australians](#). *Building Research & Information*, DOI: 10.1080/09613218.2021.1968293.

Conference Papers and Presentations

- Porto Valente, C., & Wilkinson, S. (2019). '[Applying a Circular Economy Approach to Sustainable Housing Adaptation in Sydney](#)'. In: *Proc. 25th Annual Conference of the Pacific Rim Real Estate Society (PRRES)*. Melbourne, Australia, 14-16 January 2019.
- Porto Valente, C. (2019). '[Causes and Impacts of Energy Poverty among Older Australians](#)' [Conference paper]. *UTS DAB (Design, Architecture and Building) Faculty HDR Paper and Presentation Conference*. Sydney, Australia, 22 February 2019.
- Porto Valente, C., Wilkinson, S., & Morris, A. (2020). '[Age Pensioners' Homes: Current State and Adaptation for Climate Change](#)'. In: *Proc. 26th Annual Conference of the Pacific Rim Real Estate Society (PRRES)*. Canberra, Australia, 19-22 January 2020.
- Porto Valente, C., & Wilkinson, S. (2021). '[Alleviating Energy Poverty Through Post-Covid Stimulus](#)' [Conference presentation]. In: *Proc. 27th Annual Conference of the Pacific Rim Real Estate Society (PRRES)*. Virtual conference, 4 February 2021.
- Porto Valente, C. (2021). '[Energy poverty among older, low-income Australians](#)' [Conference presentation]. In: *Making Decarbonisation Fair – Fuel Poverty Research Network (FPRN) International Conference*. Virtual conference, 1-4 March 2021.
- Marchand, R. (Chair), Cortes, A. (Panellist), Bajomi, A. (Panellist), Sanchez-Guevara, C. (Panellist), Porto Valente, C. (Panellist), Castano-Rosa, R. (Panellist), Jiglua, G. (Panellist), Cuervo, T. (Panellist). (2021). '[Energy poverty across the world](#)' [Panel discussion participation]. In: *Making Decarbonisation Fair – Fuel Poverty Research Network (FPRN) International Conference*. Virtual conference, 1-4 March 2021.

Other media and related works

- Thompson, C. (2020, 15 July). [Climate change is here. Are pensioners' homes ready?](#). *UTS Faculty of Design, Architecture and Building News*. <https://www.uts.edu.au/about/faculty-design-architecture-and-building/news>
- Taylor, A. (2020, 19 July). '[Billing anxiety](#)': How COVID-19 is driving up the cost of staying warm this winter. *The Sydney Morning Herald*. <https://www.smh.com.au/>
- Porto Valente, C. (2020). '[Empathy and science against energy poverty among older Australians](#)' [Video submission]. UTS Finals 3 Minute Thesis Competition. Sydney, Australia, 25 August 2020.
- Wilkinson, S., Porto Valente, C., & Morris, A. (2020). [Energy Poverty, Climate Change and the Residential Property Market](#) [Webinar]. *Australian Property Institute (API) & Australian Property Research and Education Fund Ltd (APREF) Research Series: Episode 3 – Energy Poverty in Australia*. Virtual event, 9 September 2020.
- Wilkinson, S., Porto Valente, C., & Morris, A. (2020, 17 September). [Here's our chance to relieve energy poverty through post COVID stimulus](#). *The Fifth Estate*. <https://thefifthestate.com.au/>
- Wilkinson, S., Porto Valente, C., & Morris, A. (2021, 25 January). '[I can't save money for potential emergencies': COVID lockdowns drove older Australians into energy poverty](#)'. *The Conversation*. <https://theconversation.com/au>
- Porto Valente, C., & Medic, L. (2021) [Don't be kept in the dark about how to keep the lights on](#) [Video]. *Energy literacy webinar for the Combined Pensioners & Superannuants Association (CPSA)*. Virtual event, 29 April 2021.
- Even, M. (Host), Brooke, R. (Guest), Porto Valente, C. (Guest), Uteuova, A. (Guest), Tran, B. (Guest). (2021, 2 September). *Think: Sustainability - Episode 145; Tackling Energy Poverty* [Audio podcast]. 2ser 107.3. <https://2ser.com/tackling-energy-poverty/>

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List of Abbreviations

ABS – Australian Bureau of Statistics	IPCC – Intergovernmental Panel on Climate Change
ACOSS – Australian Council of Social Services	LGA – Local Government Area
ADA – Australian Data Archive	LIEEP – Low Income Energy Efficiency Program
AEMC – Australian Energy Market Commission	LIHC - Low-Income/High-Cost
AEMO – Australian Energy Market Operator	MRI – Magnetic Resonance Imaging
AEPO – Australian Energy Poverty Observatory	NatHERS – Nationwide House Energy Rating Scheme
AER – Australian Energy Regulator	NCOSS – NSW Council of Social Service
AHCD – Australian Housing Conditions Dataset	NEM – National Electricity Market
AIHW – Australian Institute of Health and Welfare	NSW – New South Wales
CAHA – Climate and Health Alliance	OECD – Organisation for Economic Co-operation and Development
CALD – Culturally and linguistically diverse	PCA – Property Council of Australia
COPD – Chronic Obstructive Pulmonary Disease	PIAC – Public Interest Advocacy Centre
COTA – Council on the Ageing	PV – Photovoltaic
CPSA – Combined Pensioners and Superannuation Association	QCOSS – Queensland Council of Social Service
EAPA – Energy Accounts Payment Assistance	SA – South Australia
EEC – Energy Efficiency Council	SIH – Survey of Income and Housing
ENCRC – Energy National Cabinet Reform Committee	SUPER – Superannuation
EPOV – Energy Poverty Observatory	TOU – Time of Use (Tariff)
EU-SILC – European Union Statistics on Income and Living Conditions	NILS – No Interest Loans Scheme
EWD – Excess Winter Death	UK – United Kingdom
EWON – Energy & Water Ombudsman	UNFCCC – United Nations Framework Convention on Climate Change
GHG – Greenhouse Gas	US – United States
HAAG – Housing for the Aged Action Group	VCOSS – Victorian Council of Social Service
HECS – Household Energy Consumption Survey	VIC - Victoria
HES – Household Expenditure Survey	WEC – World Energy Council
HILDA – Household, Income and Labour Dynamics in Australia	WGEA – Workplace Gender Equality Agency
	WHO – World Health Organisation