



# Minimum Standards for Rental Properties and Rooming Houses

Department of Energy, Environment and Climate Action and Department of Government Services, Victoria

Asthma Australia Submission, July 2024

## ABOUT ASTHMA AUSTRALIA

Asthma is a respiratory condition that affects nearly 2.8 million Australians, with children being the most impacted. Asthma is responsible for at least one Australian death every day, making it a serious health concern. More than 30,000 people are hospitalised each year due to asthma, yet at least 80% of these hospitalisations are considered potentially avoidable.

Despite the prevalence of asthma, it is often misunderstood, causing fear and anxiety for those living with the condition. Asthma Australia has been the leading charity for people with asthma and their communities for over 60 years.

The challenges of climate change, unhealthy air, and health inequity make it more important than ever for people with asthma to have a voice. We search for new and progressive approaches to challenge the status quo. Our work is grounded in evidence and centred on the experiences of people affected by asthma. We believe by listening to those living with asthma, designing solutions with them, and influencing change, people with asthma can live freely, unrestricted by their asthma.

## INTRODUCTION

Asthma Australia welcomes the opportunity to comment on the proposed Minimum Energy Efficiency and Safety Standards for Rental Properties and Rooming Houses (the Proposed Standards). For too long, Victorian renters have had to live in homes that fail to provide thermal comfort, healthy indoor air quality or energy efficiency. The housing shortage, competitive rental market and cost of living have limited the ability of renters to choose homes that provide a healthy living environment, while also requiring them to manage escalating rents and energy bills. This means many renters are not only exposed to unhealthy housing conditions, but their ability to afford health care may also be constrained. Renters also have limited agency to make changes to improve their homes as they do not own them. For people with asthma, poor rental housing conditions increase the risk of developing asthma and of triggering asthma symptoms. Asthma Australia's research into asthma and allergy triggers in homes found that 41% of people with asthma or allergies who rent from real estate report worse symptoms after spending time in their home.<sup>1</sup>

The Proposed Standards have the potential to significantly improve the conditions in which many Victorian renters live and reduce their energy costs. However, while Asthma Australia broadly supports the Proposed Standards, their health and energy efficiency benefits should not be overstated as further improvements are needed to holistically improve outcomes and avoid unintended consequences. These include, for example, the need to prioritise additional cooling and ventilation measures to ensure that the Proposed Standards on Draught Sealing do not expose renters to increased indoor heat during hot weather or worsen air quality inside rental homes. Additionally, the Minimum Standards should require the replacement of all gas appliances and wood heaters with efficient, electric alternatives.

In our submission, Asthma Australia briefly sets out the importance of a healthy home to people with asthma, key findings from our research on this issue and the importance of a holistic approach to improving housing conditions in the Minimum Standards. We then provide more detail about the changes that are needed to the Proposed Standards to ensure rental homes provide a healthy living environment, particularly for people with asthma.

### ASTHMA AND HOUSING

Housing is a key social determinant of health. More than 90% of our time is spent indoors, mostly inside homes.<sup>2</sup> Homes should provide residents with safe and secure spaces that support their health and wellbeing by providing shelter, sufficient space, healthy indoor air quality, thermal comfort and affordable, efficient and healthy energy sources.

Certain housing conditions can increase the risk of developing asthma and, in people with the condition, trigger symptoms and exacerbations. For example, hot and cold temperatures can trigger asthma, while indoor airborne hazards such as gas cooktop emissions and mould can contribute to the development of asthma and trigger symptoms. Housing conditions associated with asthma can also cause other health problems. For example, cold homes contribute to increased sickness and death from cardiovascular illnesses in winter. This means a healthy home environment is not only important for asthma prevention and management, but also supports broader health and wellbeing.

The quality of housing is also increasing in importance as climate change causes hazards that require people to shelter in their homes. Currently, conditions within homes across the nation can too often become unhealthy from bushfire smoke entering leaky homes, extreme heat or mould caused by heavy rainfall and flooding. Policies to improve housing conditions should consider the needs of those people who are highly vulnerable to climate change impacts, including people with asthma.

## OUR RESEARCH: HOMES, HEALTH AND ASTHMA

In 2022, Asthma Australia undertook a nationally representative survey of 5,041 people to understand how healthy Australian homes are for people with asthma or allergies, and those at risk of developing asthma.<sup>2</sup> The key findings from this research include (access the full [Homes, Health and Asthma Report](#)):

- **Homes are not healthy places for all Australians**, particularly people with asthma or allergies. Among respondents with asthma and allergies, three in ten reported that their symptoms were worse after spending time in the home.
- **Many people were exposed to asthma triggers** in their home in the previous 12 months:
  - 70% of respondents had pests (e.g. cockroaches, dust mites and mice).
  - 50% of respondents had mould or dampness.
  - 48% of respondents used a gas cooktop, 13% of respondents used wood heaters and 7% of respondents used unflued gas heating.
- **Some population groups were also more likely to report greater exposure to triggers** in their homes than other respondents, including people with asthma and allergies, people with children, people living in social housing and Aboriginal and Torres Strait Islander people.
- **Many respondents reported the following barriers to reducing triggers within the home:**
  - Lack of autonomy over property. Half of respondents who rent or live in social housing said they were unable to protect themselves from cooking emissions, mould and pests because they do not own their home. They were frustrated with their landlord's lack of action and feared rent increases/eviction if they requested action.
  - Cost. One quarter of respondents said it is too expensive to purchase or use equipment, like air purifiers, to help reduce triggers while cooking or to tackle mould and pests.
  - Lack of concern or knowledge. 38% of respondents stated that they were not concerned about taking action to address a trigger/s and 18% reported that they do not know what to do to protect themselves against a trigger/s. This highlights the need for a public health approach to healthy housing, including improved regulations.

## A HOLISTIC APPROACH TO IMPROVING HOUSING CONDITIONS

Asthma Australia supports holistic approaches to improving housing conditions. As set out in our [Housing and Asthma Position Statement](#), the housing features needed to reduce asthma risk and support broader health and wellbeing include adequate and appropriate ventilation, draught sealing, insulation, internal and external window shading and cooling and heating. Collectively, these measures are likely to improve air quality and support thermal comfort. Conversely, housing modifications made in isolation can have unintended consequences that harm health. For example, the implementation of the Proposed Standard on Draught Sealing without improving ventilation concurrently may prevent the dispersal of air pollution, promote indoor airborne hazards such as mould, reduce thermal comfort during hot weather, and increase energy costs.

In addition, ensuring rental properties are equipped to keep people safe from heat should be a priority given climate change is increasing temperatures and heatwaves in Australia.<sup>3</sup> Yet the cooling measures in the Proposed Standards are inadequate, do not apply to rooming houses, and fail to include low-cost measures that can keep homes cooler during hot weather and reduce the need for air conditioning. A holistic, affordable approach to keeping homes cool should include installing ceiling fans and window shading and screens so that residents can open windows and doors.<sup>4</sup> Failure to mandate such measures in the Proposed Standards is likely to leave many renters either with unnecessarily high air conditioning costs or, if unaffordable, exposed to unhealthy heat in their own home.

Finally, a holistic approach to improving housing conditions requires the replacement of appliances that emit harmful pollutants, such as gas cooktops and gas and wood heaters, with efficient, electric alternatives to ensure healthy indoor air quality. Gas cooktops and gas and wood heaters emit harmful gases such as fine particulate matter and nitrogen dioxide into the home. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia.<sup>5</sup> However, the Proposed Standards do not require the replacement of all gas appliances and wood heaters. This must be rectified as the electrification of all appliances in rental properties is essential to support health and wellbeing.

## THE PROPOSED STANDARDS

### CEILING INSULATION

Asthma Australia supports measures to improve ceiling insulation in homes. Ceiling insulation can help to reduce heat from penetrating homes in summer,<sup>6</sup> and to retain heat within homes in winter.<sup>7</sup> This is particularly beneficial for people with asthma for whom cold or heat are triggers for their asthma,<sup>8</sup> as well for many other people with chronic conditions that can deteriorate in cold or heat, such as cardiovascular disease.<sup>9</sup> Through reducing the need to heat and cool homes, insulation also reduces greenhouse gas emissions and energy costs.

We therefore support the proposed option of requiring the highest level of ceiling insulation (R5.0), thereby aligning rental properties with the 7-star energy efficiency standard required for new homes built in Victoria. However, the proposed option would only apply to rental properties with no ceiling insulation and not require any improvement in rental properties with existing but inadequate ceiling insulation. To ensure all renters have the same health and energy efficiency benefits from ceiling insulation, all rental properties should be required to be fitted with R5.0 ceiling insulation.

**RECOMMENDATION 1: Implement option 3.B so that the Proposed Standard for Ceiling Insulation applies to rental properties with both no and low levels of ceiling insulation.**

### DRAUGHT SEALING

Asthma Australia supports measures to seal draughts in homes. Draught sealing can minimise the infiltration of outdoor airborne hazards into homes, increase thermal comfort during cold weather and reduce energy costs. This is particularly important for people with asthma whose symptoms are triggered by air hazards from outdoor sources such as bushfire and wood heater smoke, pollen and dust, as well as temperature extremes, as outlined above. Hence, we support proposed option 2 as a good starting point for improvements to rental homes.

However, in the absence of adequate ventilation, increasing home air tightness can worsen indoor air quality by preventing the dispersal of pollution from indoor sources, such as gas and wood heaters and gas cooktops, and by promoting mould growth. It can also increase indoor heat during hot weather.<sup>10</sup> These airborne hazards and heat are triggers for asthma symptoms. Therefore, Asthma Australia again supports a holistic approach that includes measures to ensure adequate and appropriate ventilation alongside draught sealing. Improvements to ventilation can include fitting windows and doors with screens so that residents can open them, installing ceiling fans,<sup>11</sup>

and installing rangehoods in kitchens and exhaust fans in bathrooms and laundries.

In addition, Asthma Australia has serious concerns about the rationale for exempting rental properties fitted with flueless gas heating and flueless gas cooking appliances<sup>1</sup> from the Proposed Standard for Draught Sealing. Unintentional draughts in rental properties do not provide adequate protection, and should not be relied upon to keep people safe, from the health risks of flueless gas appliances. The Regulatory Impact Statement (RIS) recognises that flueless gas appliances pose significant dangers to health that are exacerbated in the absence of good ventilation.<sup>12</sup> They release harmful pollutants directly into the home, including nitrogen dioxide and carbon monoxide, increasing risks to health and mortality of those exposed.<sup>13</sup> Flueless gas appliances are particularly dangerous to children and have been found to cause and exacerbate childhood asthma,<sup>14</sup> and worsen symptoms in adults with asthma.<sup>15</sup> Rather than providing an exemption to the Proposed Standard for Draught Sealing for rental properties with flueless gas heating and cooking appliances, the Minimum Standards should require the removal of all flueless gas appliances in rental homes. This would allow for the better investment of the costs associated with their proposed biennial safety checks and ensure that the RIS' concern that safety be 'the highest priority' is realised by removing flueless gas appliances from many thousands of rental homes that have them.<sup>2</sup>

**RECOMMENDATION 2: Take a holistic approach to improving rental housing conditions by:**

- a. **Implementing Option 2 in relation to the Proposed Standard for Draught Sealing; and**
- b. **Adding a Ventilation Standard to ensure adequate and appropriate ventilation that includes fitting windows and doors with screens and installing ceiling fans, kitchen rangehoods and exhaust fans in bathrooms and laundries.**

**RECOMMENDATION 3: Remove the exemption from the Proposed Standard for Draught Sealing for rental properties with existing flueless gas heating and flueless gas cooking appliances and instead require the removal of flueless gas heating and flueless gas cooking appliances from all rental properties in Victoria.**

#### **HOT WATER SYSTEMS AND SHOWER HEADS**

Asthma Australia supports measures to improve the energy efficiency of hot water systems, thereby reducing greenhouse gas emissions and energy costs for renters. We therefore welcome the proposed option 4 for hot water systems, which requires electric only, low running cost systems, as this would deliver the greatest benefits in energy costs and greenhouse gas emissions.

**RECOMMENDATION 4: Implement Option 4 for the Proposed Standard for Hot Water Systems.**

---

<sup>1</sup> Defined in the Regulatory Impact Statement as not having a rangehood.

<sup>2</sup> The RIS estimates there to be around 84,000 open flued gas heaters in 2020.

## HEATING AND COOLING

Asthma Australia supports measures to improve thermal comfort in rental homes. Both cold and hot temperatures can trigger symptoms in people with asthma.<sup>16</sup> Reducing heat in homes will become more important as climate change is increasing temperatures and heatwaves in Australia.<sup>17</sup> Research by Better Renting has found people living in rental properties and people on low incomes are particularly exposed to the harmful health effects of heat and face barriers to improving the thermal comfort of their homes.<sup>18</sup> Other research has found that renters in Australia are exposed to temperatures below the level considered healthy by the World Health Organisation in winter, and above the healthy limit in summer.<sup>19</sup> Having a comfortable indoor environment at home is particularly important during extended periods of poor air quality, such as bushfire smoke events, as extreme heat can amplify the adverse effects of air pollution on health.<sup>20</sup> Yet, as we set out in more detail below, this Proposed Standard has few measures to reduce heat in the home.

Furthermore, energy efficiency and affordability must be key considerations for the type of heating and cooling appliances required in rental homes to ensure that renters can afford to use them. Hence, while we welcome the proposal to implement Option 4, which will require installation of electric split-system air-conditioners in the main living room of a rental property, we note the heating standard in Option 4 is not as high as that in Option 3. Option 4 has been selected following an assessment that the current market would not be able to meet the needs of Option 3, that is a 3 Star heating and cooling electric split system air conditioning in the main living room. To overcome any market supply issues, we recommend a staged approach to rolling out this Minimum Standard so that 3 Star heaters and coolers can be installed in all rental properties, including bedrooms of rooming houses, which are currently required to be fitted with less efficient room heaters and no room coolers.

In addition, Option 4 in its current form is likely to perpetuate adverse health outcomes for renters for the reasons set out below.

### **1. Inadequate requirements for efficient heating and cooling**

The Proposed Standards for rental properties require efficient heating and cooling in the main living room alone, likely leaving many rooms in homes exposed to temperature extremes, including bedrooms. In addition to the previously mentioned health risks of indoor heat, heat adversely affects sleep, which in turn detrimentally affects a range of health and wellbeing outcomes.<sup>21</sup> The inadequate requirements for efficient heating and cooling appliances in rental properties is particularly concerning for large families or people in shared houses who have limited space to escape the heat or cold.

Additionally, the Proposed Standard requires fitting bedrooms of rooming houses just with an electric room heater. This not only allows the installation of a less efficient heater than that required for rental properties but also fails to require the installation of an electric room cooler. With more heatwaves and generally higher temperatures expected as climate change continues to progress, this is a significant oversight that would inequitably expose some of Victoria's most vulnerable people to the adverse health impacts associated with heat.

### **2. Cost of running appliances**

The RIS assumes renters will be able to afford to run air conditioning. However, research by Sweltering Cities found 72% of renters reported concerns about costs stop them from turning on

their air conditioner.<sup>22</sup> The development of the Proposed Standards should consider the incomes of people who rent, and efforts should also be made to equip homes with affordable, high-impact measures to help keep homes cool and to reduce the need to use air conditioning. Further, the Proposed Standards in their current form are likely to have greater impacts for health outcomes associated with exposure to indoor cold than heat or air quality (e.g. owing to ceiling insulation, draught sealing and heaters combined). Affordable, high-impact thermal comfort improvements should include:

- **Ceiling fans**, which can reduce indoor heat and increase air movement, thereby reducing the need for air conditioning.<sup>23</sup>
- Appropriate **internal and external window shading**, which support thermal comfort and reduce energy costs.<sup>24</sup> These could include window shutters, treatments and shades. External shutters are particularly effective at reducing heat,<sup>25</sup> with a modelling study from the United Kingdom estimating that external shutters reduce heat-related mortality risk by 30-60%.<sup>26</sup>
- **Flyscreens on windows and doors**, which enable renters to ventilate their homes and reduce indoor heat by reducing solar penetration.<sup>27</sup>

Finally, the Proposed Standard provides that where a fixed efficient heater and/or cooler is unable to be installed in the main living area, a fixed inefficient heater and/or cooler should be installed instead. Given cost is already a barrier to using efficient air conditioning for many renters,<sup>28</sup> it is critical that the Minimum Standards require affordable, high-impact measures to improve thermal comfort in homes where efficient appliances cannot be installed.

### **3. Heating exemptions: Wood heaters**

Rental properties with wood heaters will be exempt from meeting the Proposed Standard. The RIS does not provide a rationale for this or explain why a wood heater can be replaced with another wood heater at their end of life. Wood heaters are an inefficient and, for most users, expensive form of heating.<sup>29</sup> Wood heater smoke contains harmful pollutants including fine particulate matter and known carcinogens, with smoke polluting indoor air and the local neighbourhood.<sup>30</sup> Wood heater smoke can trigger asthma symptoms and flare-ups<sup>31</sup> and is also a risk factor for other respiratory illnesses, certain cancers, cardiovascular disease, premature birth and premature death.<sup>32</sup> In Victoria, the total health costs of wood heater smoke have been estimated at more than \$8 billion over 10 years.<sup>33</sup> Each wood heater is estimated to cause more than \$4,000 in annual health costs.<sup>82</sup>

The Minimum Standards should require the removal of all wood heaters from all rental properties in Victoria to improve health outcomes and energy efficiency.

### **4. Gas powered cooking and heating appliances**

Cooking with gas is a significant source of household air pollution. Gas cooktops produce a variety of air pollutants, including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde. Similarly, gas heaters produce a variety of harmful air pollutants, and flueless gas heaters are particularly dangerous because these pollutants remain inside the home rather than being vented outside. Exposure to the pollutants produced by gas cooktops and heaters can trigger asthma flare-ups and contribute to the development of asthma. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia.<sup>34</sup>



Despite the well-evidenced health concerns with using gas appliances in the home, as set out in the RIS, the Proposed Standards for heating and cooling exempts rental properties with LPG or flueless heaters from meeting the Standard. In addition, the Standards do not require the removal of gas cooktops from rental properties. As a result, renters will continue to be exposed to the health risks associated with these gas appliances and will not benefit from the cost savings from removing their home connection to gas. Research by Sweltering Cities has found that combining thermal upgrades with electrifying hot water and cooking appliances can save households up to \$2,200 a year off their energy bills.<sup>35</sup> The Proposed Standards should require removal of gas appliances and wood heaters and their replacement with efficient, electric alternatives.

**RECOMMENDATION 5: Implement Option 3 of the Proposed Standards for Heating and Cooling for rental properties using a staged approach.**

**RECOMMENDATION 6: Improve the Proposed Standards for Heating and Cooling in rental properties in the following ways by requiring:**

- a. **The installation of efficient, electric heating and cooling appliances in other rooms.**
- b. **The installation of ceiling fans, window coverings (external shutters where possible) and flyscreens.**
- c. **The removal of all wood heaters and their future installation prohibited.**
- d. **The removal of all gas appliances, including flueless gas appliances, and their future installation prohibited.**

## **IMPLEMENTATION**

Compliance is key to the successful implementation of the Minimum Standards. To this end, we recommend the establishment of an independent audit and registration process to ensure rental properties comply with the Minimum Standards before they are leased, with spot checks throughout the life of the lease to ensure ongoing compliance to them. This would remove the need for renters to have to identify any compliance issues themselves, and so too renters' concerns that doing so could affect future lease renewal or rent costs. In addition, the audit and registration process should be supported by appropriate penalties for rental providers who do not comply with the Minimum Standards and for property managers who mislead tenants about the condition of a property.

Effective implementation also requires funding for community and not-for-profit housing providers to retrofit housing stock to meet the Minimum Standards.

**RECOMMENDATION 7: Establish an independent audit and registration process to ensure that rental properties comply with the Minimum Standards before they are leased and throughout the life of the lease. This process should be supported by appropriate penalties for non-compliance.**

**RECOMMENDATION 8: Fund community and not-for-profit housing providers to retrofit their housing stock to meet the Minimum Standards for rental properties.**



## REFERENCES

- <sup>1</sup> Asthma Australia (2022). Homes, Health and Asthma in Australia. n=5,041. [https://asthma.org.au/wp-content/uploads/2022/11/AA2022\\_Housing-Survey-Report\\_full\\_v4.pdf](https://asthma.org.au/wp-content/uploads/2022/11/AA2022_Housing-Survey-Report_full_v4.pdf)
- <sup>2</sup> Institute of Medicine (2011). Climate Change, the Indoor Environment, and Health. <https://nap.nationalacademies.org/catalog/13115/climate-change-the-indoor-environment-and-health>
- <sup>3</sup> Intergovernmental Panel on Climate Change (2022). Sixth Assessment Report Working Group II – Impacts, Adaptation and Vulnerability; Fact sheet – Australasia: Climate Change Impacts and Risks <https://www.ipcc.ch/report/ar6/wg2/about/factsheets/>
- <sup>4</sup> See e.g. Alidoust S., Huang W. (2021). A decade of research on housing and health: A systematic literature review. *Rev Environ Health*. 38(1):45–64; Loughnan M., Carroll M., Tapper NJ. (2015). The relationship between housing and heat wave resilience in older people. *Int J Biometeorol*.59(9):1291–8; Taylor J. et al. (2018). Comparison of built environment adaptations to heat exposure and mortality during hot weather, West Midlands region, UK. *Env Int*. 111:287–94; Kownacki K. et al. (2019). Heat stress in indoor environments of Scandinavian urban areas: A literature review. *Int J Env Res Public Health*. 16(4); Vardoulakis S. et al. (2015). Impact of climate change on the domestic indoor environment and associated health risks in the UK. *Env Int*. Dec;85:299–313; Fisk W.J. (2015). Review of some effects of climate change on indoor environmental quality and health and associated no-regrets mitigation measures. *Build Environ*. Apr;86:70–80.
- <sup>5</sup> Knibbs, W., Marks, C. (2018). Damp housing, gas stoves and the burden of childhood asthma in Australia. *MJA*.208(7):299–302.
- <sup>6</sup> Ahrentzen S., Erickson J., Fonseca E. (2016). Thermal and health outcomes of energy efficiency retrofits of homes of older adults. *Indoor Air*. 2016 Aug;26(4):582–93.
- <sup>7</sup> Gronlund C.J., Sullivan K.P., Kefelegn Y., Cameron L., O’Neill M.S. (2018). Climate change and temperature extremes: a review of heat- and cold-related morbidity and mortality concerns of municipalities. *Maturitas*. 2018;114:54–9.
- <sup>8</sup> Han A., Deng S., Yu J., Zhang Y., Jalaludin B., Huang C. (2023). Asthma triggered by extreme temperatures: From epidemiological evidence to biological plausibility. *Environ Res*. 2023 Jan 1;216(Pt 2):114489. doi: 10.1016/j.envres.2022.114489. Epub 2022 Oct 5.
- <sup>9</sup> Seldenrich N. (2015). Between Extremes: Health Effects of Heat and Cold. *Environ Health Perspect*. 2015 Nov;123(11):A275-80. doi: 10.1289/ehp.123-A275; World Health Organization (2024) Heat and Health. [Internet]. Available from: <https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health>; WHO Housing and Health Guidelines (2018). Geneva: World Health Organization; 2018. 4, Low indoor temperatures and insulation. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK535294/>.
- <sup>10</sup> Gronlund C.J., Sullivan K.P., Kefelegn Y., Cameron L., O’Neill M.S. (2018).
- <sup>11</sup> Sy I., Cissé B., Ndao B., Touré M., Diouf A.A., Sarr M.A., et al. (2019). Heat waves and health risks in the northern part of Senegal: analysing the distribution of temperature-related diseases and associated risk factors. *Env Sci Pollut Res Int*. 2022;29(55):83365–77; Swain S., Bhattacharya S., Dutta A., Pati S., Nanda L. (2019) Vulnerability and adaptation to extreme heat in Odisha, India: a community based comparative study. *Int J Env Res Public Health*. 2019 Dec 12;16(24).
- <sup>12</sup> Deloitte (2024). Minimum energy efficiency and safety standards for rental homes – Regulatory Impact Statement. Department of Energy, Environment and Climate Action. Available from: <https://engage.vic.gov.au/new-minimum-standards-for-rental-properties-and-rooming-houses>
- <sup>13</sup> New South Wales Health (2022) Unflued gas heaters. [Internet] Available from: <https://www.health.nsw.gov.au/environment/factsheets/Pages/unflued-gas-heaters.aspx>
- <sup>14</sup> Commonwealth of Australia (2007) The health effects of unflued gas heater use in Australia. Available from: [1291947 \(sirsidynix.net.au\)](https://www.health.gov.au/health-research/1291947)
- <sup>15</sup> Franklin P.J., Loveday J., Cook A. (2012). Unflued gas heaters and respiratory symptoms in older people with asthma. *Thorax*. 2012 Apr;67(4):315–20. doi: 10.1136/thoraxjnl-2011-200236. Epub 2012 Jan 16; Knibbs, W., Marks, C. (2018).
- <sup>16</sup> Han A., Deng S., Yu J., Zhang Y., Jalaludin B., Huang C. (2022).
- <sup>17</sup> Intergovernmental Panel on Climate Change (2022). Sixth Assessment Report Working Group II – Impacts, Adaptation and Vulnerability; Fact sheet – Australasia: Climate Change Impacts and Risks. Available from: <https://www.ipcc.ch/report/ar6/wg2/about/factsheets/>

- <sup>18</sup> See e.g. Better Renting (2024). Cruel Summers. N=109 Available from: [https://assets.nationbuilder.com/betterrenting/pages/469/attachments/original/1710468131/Cruel\\_Summer\\_SRR24\\_v1.2\\_embargoed\\_to\\_March\\_19.pdf?1710468131](https://assets.nationbuilder.com/betterrenting/pages/469/attachments/original/1710468131/Cruel_Summer_SRR24_v1.2_embargoed_to_March_19.pdf?1710468131); Barrett B et al (2023). Sweaty and Stressed: Renting in an Australian Summer. Available from: [https://assets.nationbuilder.com/betterrenting/pages/364/attachments/original/1677534064/Sweaty\\_and\\_Stressed\\_v1.4.2.pdf?1677534064](https://assets.nationbuilder.com/betterrenting/pages/364/attachments/original/1677534064/Sweaty_and_Stressed_v1.4.2.pdf?1677534064)
- <sup>19</sup> See e.g. Better Renting (2024). Cruel Summers; Barrett B et al. (2023). Power Struggles: Renting in Winter. Available from: [https://drive.google.com/file/d/103Mw5mO8fM8QGGV\\_GER2n8tlqYTNZDID/view](https://drive.google.com/file/d/103Mw5mO8fM8QGGV_GER2n8tlqYTNZDID/view); Barrett B et al. (2023). Sweaty and Stressed: Renting in an Australian Summer. Available from: [https://assets.nationbuilder.com/betterrenting/pages/364/attachments/original/1677534064/Sweaty\\_and\\_Stressed\\_v1.4.2.pdf?1677534064](https://assets.nationbuilder.com/betterrenting/pages/364/attachments/original/1677534064/Sweaty_and_Stressed_v1.4.2.pdf?1677534064); Barrett B. (2022). Cold and costly: Renter Researchers' Experiences of Winter 22. Available from: [https://assets.nationbuilder.com/betterrenting/pages/345/attachments/original/1661403951/Cold\\_and\\_costly\\_-\\_Winter\\_Renter\\_Researchers.pdf?1661403951](https://assets.nationbuilder.com/betterrenting/pages/345/attachments/original/1661403951/Cold_and_costly_-_Winter_Renter_Researchers.pdf?1661403951)
- <sup>20</sup> Vardoulakis S et al. (2015).
- <sup>21</sup> Minor, K., Bjerre-Nielsen, A., Jonasdottir, S.S., Lehmann, S., Obradovich, N. (2022) Rising temperatures erode human sleep globally. *One Earth*, Volume 5, Issue 5, 2022, 534-549. doi.org/10.1016/j.oneear.2022.04.008.
- <sup>22</sup> Sweltering Cities and Healthy Homes for Renters (2022). Summer Survey 2022 Report. n=2,147. Available from: <https://swelteringcities.org/wp-content/uploads/2022/04/FINAL-Summer-Survey-2022-Report.pdf>
- <sup>23</sup> See e.g. Alidoust S, Huang W. (2021). A decade of research on housing and health: A systematic literature review. *Rev Environ Health*. 38(1):45–64.
- <sup>24</sup> Australian Department of Climate Change, Energy, the Environment and Water. Hot Arid Living. [Internet] Available from: <https://www.energy.gov.au/households/household-guides/energy-saving-guide-northern-australia/hot-arid-living>
- <sup>25</sup> Kownacki KL, Gao C, Kuklane K, Wierzbicka A (2019).
- <sup>26</sup> Taylor J, Wilkinson P, Picetti R, Symonds P, Heavside C, Macintyre HL, et al (2018). Comparison of built environment adaptations to heat exposure and mortality during hot weather, West Midlands region, UK. *Env Int*. 2018 Feb;111:287–94.
- <sup>27</sup> See e.g. Sailor DJ, Anand J, Kalkstein L. Potential overall heat exposure reduction associated with implementation of heat mitigation strategies in Los Angeles. *Int J Biometeorol*. 2021 Mar;65(3):407–18.
- <sup>28</sup> Sweltering Cities and Healthy Homes for Renters (2022).
- <sup>29</sup> CHOICE (2023). How wood fires compare to other forms of heating. Available from: <https://www.choice.com.au/home-and-living/heating/home-heating/articles/should-you-switch-from-a-wood-fired-heater>; CHOICE (2023). What's the cheapest way to heat your home this winter? Available from: <https://www.choice.com.au/home-and-living/heating/home-heating/articles/what-is-the-cheapest-way-to-heat-your-home-this-winter>
- <sup>30</sup> Australian Department of Climate Change, Energy, the Environment and Water (2023). Wood heaters and woodsmoke. Available from: <https://www.dcceew.gov.au/environment/protection/air-quality/woodheaters-and-woodsmoke#:~:text=Woodsmoke%20contains%20a%20range%20of,particulates%20and%20formaldehyde%2C%20are%20carcinogenic.>
- <sup>31</sup> Australian Government Department of Health (2018) National Asthma Strategy 2018. Available from: <https://www.health.gov.au/resources/publications/national-asthma-strategy-2018>.
- <sup>32</sup> Australian Government Department of Agriculture, Water and the Environment (2005) Wood heaters and Woodsmoke. [Internet] Available from: <https://www.environment.gov.au/resource/woodheaters-and-woodsmoke>; Borchers-Arriagada N et al. (2020). Health Impacts of Ambient Biomass Smoke in Tasmania, Australia. *International Journal of Environmental Research and Public Health*. 17(9): 3264. Bothwell, J.E., Mcmanus, L., Crawford, V. L. S., Burns, G. Stewart, M.C., Shields, M.D. (2003) Home heating and respiratory symptoms among children in Belfast, Northern Ireland, *Archives of Environmental Health: An International Journal*, 58:9, 549- 553; Naeher, L. et al (2007) Woodsmoke Health Effects: A Review, *Inhalation Toxicology*, 19:1, 67-106.
- <sup>33</sup> Regulatory Impact Solutions Pty Ltd (2017). Policy Impact Assessment: Variation to the Waste Management Policy (Solid Fuel Heating), Environment Protection Authority Victoria. Available from: <https://www.epa.vic.gov.au/-/media/epa/files/about-epa/what-we-do/piawastemanagementpolicysolidfuelheating.pdf>.
- <sup>34</sup> Knibbs, W., Marks, C. (2018).
- <sup>35</sup> Climateworks Centre (2023). Climate-ready homes: Building the case for a renovation wave in Australia.