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PROFESSIONAL SERVICES

Housing economics analysis
Impacts Framework

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For Infrastructure South Australia

Publication Date December 2022

Preferred citation

Oberklaid, S. and Alves, T. (2022) *Housing economics analysis - Impacts Framework,* report prepared for Infrastructure South Australia, Australian Housing and Urban Research Institute, Melbourne, https://www.ahuri.edu.au/research/research-papers/housing-economics-analysis.

Related reports and documents

Oberklaid, S., Gower, A., Roggenbuck, C. and Alves, T. (2022) *Housing economics analysis,* report prepared for Infrastructure South Australia, Australian Housing and Urban Research Institute, Melbourne, https://www.ahuri.edu.au/research/research-papers/housing-economics-analysis.

Infrastructure South Australia (2022) *Impact Analysis Guide: Cost-benefit analysis,* https://www.infrastructure.sa.gov.au/our-work/project-assurance/business-case-templates/Impact-Analysis-Guide.pdf.

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Acknowledgements

AHURI Limited gratefully acknowledges the significant contributions of Infrastructure South Australia to this project, particularly Sabina Schaare, Benjamin Cooper, Jeremy Conway, and Catherine Jamieson.

This project was also supported by expertise provided by Professor Chris Leishman, The University of South Australia, and Professor Emma Baker, The University of Adelaide.

Contents

1. Introduction

This framework has been developed as part of the Housing Economics Analysis prepared for Infrastructure South Australia by the Australian Housing and Urban Research Institute.

The framework captures the diversity of benefits which stem from provision of secure, affordable, and appropriate housing, as evidenced by available research, which can be utilised in cost-benefit analysis. The purpose of the framework is to enable a consistent assessment of housing interventions and guide decision-making. The framework is intended to be used in the assessment of a broad range of housing interventions, with benefits to be applied where relevant to the proposed intervention.

The framework is based on available research, and identifies opportunities for further development where there are gaps. The framework is intended to be iterative and updated based on new information that is identified or shared for inclusion.

Structure

The framework categorises benefits in the following three tables:

1. **Monetised housing benefits:** Benefits which have a corresponding dollar value attached to it and could be used in CBA and integrated analysis. All figures are in Australian Dollars and have been adjusted for inflation to 2021.
2. **Quantified housing benefits:** Benefits which have a unit of measure (numbers or statistics) but have not yet been monetised and can be used parallel to CBA in an integrated analysis.
3. **Qualitative housing benefits:** Benefits which are descriptive and do not rely on quantitative or monetised information and can be used parallel to CBA in an integrated analysis.

These are categorised in the following six benefit areas:

- **Social (Health)**
  - Health and mental health impacts associated with unaffordable and insecure housing
  - Health impacts associated with poor quality / poorly performing housing
- **Economic**
  - Productivity impacts associated labour market proximity
  - Discretionary spending impacts associated with labour participation and affordability
- **Environmental**
  - Climate impacts associated with reduced resource and energy consumption
  - Household benefits associated with improved environmental performance

2. Framework

A description of the content of the framework is provided below.

- **Impact name:** Type of impact
- **Description:** Summary of the impact including background and benefit rationale
- **Beneficiary:** Individual (***i***), government (***g***) society (***s***)
- **Direct or indirect:** Whether the impact is direct (●) or indirect (●)
- **Measurement:** How the impact can be measured
- **Parameter values:** Relevant data sources for calculation method
- **Benefit calculation method:** Formula to apply
- **Benefit:** Benefit value
- **Unit:** Unit of measurement (i.e./ per person per year)
- **Confidence level:** Confidence in suitability of values / calculation method (HIGH MED LOW)
- **Dependencies / Constraints:** Data inputs which are dependent on other factors, limitations of the research or applicability of values
- **References:** Source of measurement, parameter values, and method
- **Further development:** Potential data, opportunities to improve suitability or alternative approaches

2.1 Monetised housing benefits

Condidence level: HIGH MED LOW
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* *Using RBA, Inflation Calculator*

Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Social								
Health and mental health impacts associated with affordable and secure housing								
HIGH ● *g* **Soc1:** Decreased government health costs	Avoided costs to government due to reduction in health service use by formerly homeless people when housed in social housing. Avoided costs have been applied from study by Wood, Flatau et al. (2016) conducted in Western Australia and adjusted for inflation (2021). Comparative cost savings to government were found by Johnson, Kuehnle et al. 2014 (see: Soc2 for alternative method). The preferred benefit calculation is Wood, Flatau et al. (2016) as the original study as it focuses on the impact of homeless individuals being accommodated in public housing, and was significant in scope (3,383 homeless individuals and 277 Department of Housing tenants). This benefit measure is applied for projects targeting cohort experiencing or at risk of homelessness.	1. Cost saving to government due to reduction in health services by homeless people comparing year before and after provision of social housing	Cost savings to government per person per year due to overall decrease in frequency and duration of health service use, comparing the year before and after provision of social housing = ($174 emergency presentations + $3,114 length of stay in hospital + psychiatric care $1,558) = $4,846 (2013)[1] **Data used in the study:** 1. Emergency: IHPA, 2015, National Hospital Cost Data Collection Australian Public Hospitals Cost Report 2012–13, Round 17 Average cost per emergency presentation WA (2012–13). 2. Cost per hospital day: IHPA, 2015, National Hospital Cost Data Collection Australian Public Hospitals Cost Report 2012–13, Round 17 Average cost per admitted separation WA (2012–13) / Average length of stay WA (2012–13) = $5,285/2.6=$2,032/day. 3. Cost per psychiatric care day: Mental Health Services in Australia, 2015, Expenditure on Mental Health Services, Table EXP.7. 4. Service utilisation: Linked Western Australia Department of Housing and Department of Health data.	**Calculation** • Health cost savings (2013) = $4,846 • Adjusted for 2021 inflation* = $5,591.63	$5,591.63	Person per year (person formerly experiencing homelessness)	Utilises WA data	There is opportunity to use health cost data for South Australia where available. Wood, Flatau et al. (2016) cite that decreased emergency / hospital service use contributes to a reduction in overcrowding which negatively impacts quality of care and poorer patient outcomes (Richardson and Mountain 2009). Therefore, another flow on benefit of secure and affordable housing which could be measured is the number of hospital beds which are freed up.
HIGH ● *g* **Soc2:** Decreased government health costs	Avoided costs to government due to reduction in health service use by formerly homeless people when provided with secure housing. Similar cost savings to government were found by Wood and Flatau, 2016 (see: Soc1 for preferred method). Johnson, Kuehnle et al. (2014) surveyed 88 people comparing a control group to those in a pilot program for permanent housing. This benefit measure is included for comparative finding and method to Soc1, however can be applied as an alternative for projects targeting cohort experiencing or at risk of homelessness.	1. Cost saving to government due to reduction in health service use by homeless people provided with secure housing compared to a control group	Cost savings to government per person due to decline in health service use by formerly homeless people who are securely housed over 4 year period: $23,489 (2012 figure)[2] **Data used in the study:** 1. Average Medicare benefits paid on nonpreferred GP attendances, specialist attendances, and other health services, Victoria. Department of Health and Ageing, Medicare Statistics. 2. Nights in hospital: Total admitted patient recurrent expenditure / total admitted patient days, Victoria, AIHW, Australian Hospital Statistics. 3. Casualty or emergency: Emergency department average cost per occasion of service, by triage class, public sector, Australia, National Average. Productivity Commission, Annual Report on Government Services. 4. Outpatient: Non-admitted clinic occasions of service reported at Tier 0 clinics, public sector, National (Ibid). 5. Other health worker: Non-admitted clinic occasions of service for tier 1 clinics, sample results, public sector. 2008–09. Cost per occasion of service, National (Ibid). 6. Ambulance: Total expenses / total number of patients transported, Victoria, Ambulance Victoria Annual report. 7. Day clinic: Total expenditure / total occasion of services for non-admitted clinics, total average, national, Productivity Commission, Annual Report on Government Services. 8. Psychiatric ward: Average cost per occasion of service, National (Ibid). 9. Nights in psychiatric hospital: Average recurrent costs per inpatient bed day in psychiatric hospitals (all units), Victoria, (Ibid). 10. Community mental health services: Average cost of ambulatory care per day: cost per episode / number of average days per episode, Victoria, (Ibid). 11. Dentist: Average cost per occasion of service, National, (Ibid). 12. Needle exchange: Total spending on NSP (Needle and Syringe Exchange Programs) / Number of syringes exchanged, Victoria, Department of Health and Ageing. 2009. Return on investment 2: Evaluating the cost-effectiveness of needle and syringe programs in Australia.	**Calculation** • Health cost savings $23,489 / 4 years = $5,872.25 • Adjusted for 2021 inflation* = $6,941.78	$6,941.78	Person per year (person formerly experiencing homelessness)	Utilises national and Victorian data	There is opportunity to use South Australian health cost data where available. An alternative calculation could be developed utilising the percentage decline of emergency service use of 59 per cent found in study by Johnson, Kuehnle et al. (2014). A proposed calculation could be (average emergency cost per day in South Australia x average use by homeless individual x 0.59 reduction).
HIGH ● *s* **Soc3:** Decreased health costs to society	Avoided costs to society due to reduction in health service use by formerly homeless people when provided with secure housing. This benefit measure is applied for projects targeting cohort experiencing or at risk of homelessness.	1. Avoided costs to society due to reduction in use of health service use for homeless people provided with secure housing compared to a control group.	Cost savings to government per person due to decline in health service use by formerly homeless people who are securely housed over 4 year period: $19,714 (2012 figure)3 Data used in the study cited in Soc2.	**Calculation** • Health cost savings $19,714 / 4 years = $4,928.50 • Adjusted for 2021 inflation* = $5,826.14	$5,826.14	Per person per year (person formerly experiencing homelessness)	Utilises national and Victorian data	There is opportunity to use South Australian health cost data where available. An alternative calculation could be developed utilising the percentage decline of emergency service use of 59 per cent found in study by Johnson, Kuehnle et al. (2014). A proposed calculation could be (average emergency cost per day in South Australia x average use by homeless individual x 0.59 reduction).

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	Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Social	HIGH ● *g* **Soc4:** Decreased government health costs	Decreased health costs to government due to reduced rates of domestic violence attributed to fewer women returning to violent partners because they have nowhere to live and cannot afford housing. Equity Economics (2021) estimates health annual cost savings to government from avoiding further domestic violence due to provision of housing to be $1,471 per survivor in Australia. This finding is based on recent national data for hospitalisations due to DFV and is relevant to the SA context. This benefit measure is applied for projects targeting victims or survivors of domestic family violence.	1. Avoided health costs due to reduction in number of hospitalisations caused by domestic family violence based on average cost per hospitalisation in Australia.	Estimate of avoided health cost related to hospitalisations = $1,471.[4] **Data used in the study:** 1. 10 per cent of DFV victims return to a violent partner as they have nowhere else to go. 2. Hospitalisations: Total cost of females hospitalised / number of females hospitalised in Australia to produce a cost per hospitalisation. Number of women hospitalised due to domestic and family violence x average cost per hospitalisation to produce total healthcare costs x rate of DFV prevalence to establish a hospitalisation cost per victim.	**Calculation** • $1,471 avoided health cost estimated by Equity Economics (2021)	$1,471.00	Per person per year (domestic family violence survivor)	Utilises national data.	Potential data sources for tailored metrics for SA include Australian Health and Welfare data on rate of DFV which is 17 per cent nationally, hospitalisations and average costs due to DFV.
	HIGH ● **s** **Soc5:** Health gain to society	Health gain to society due to reduced rates of domestic violence attributed to fewer women returning to violent partners because they have nowhere to live and cannot afford housing. Equity Economics (2021) estimates health annual gains to society (avoided costs) from avoiding further domestic violence due to provision of housing to be $13,151 per survivor in Australia. This finding is based on recent national data for reduced pain, suffering and premature mortality for DFV survivors which is relevant to the SA context. This benefit measure is applied for projects targeting victims or survivors of domestic family violence.	1. Value of reduced burden of disease to society due to decreased prevalence of domestic family violence.	Estimate of avoided health cost related to reduced pain, suffering and premature mortality = $13,151.[5] **Data used in the study:** 1. 10 per cent of DFV victims return to a violent partner as they have nowhere else to go. 2. Pain, suffering and premature mortality: A burden of disease analysis using partner violence data and disability adjusted life years. The total cost of the burden of disease is divided by domestic violence prevalence to produce a unit cost in pain and suffering for each woman.	**Calculation** • $13,151 health gain to society estimated by Equity Economics (2021)	$13,151.00	Per person per year (domestic family violence survivor)	Utilises national data.	As described in Soc4.
	HIGH ● *g* **Soc6:** Decreased justice costs to government	Avoided justice costs due to decreased risk of ex-prisoners reoffending after the first 12 months following provision of secure and affordable housing. This benefit measure is applied for projects targeting ex-prisoners in their first year after provision of secure and affordable housing. From 2018–2022, an average of 1,449 people were released from prison in South Australia (ABS, 2022).	1. Avoided justice cost savings to government per individual exiting the prison system housed in secure and affordable housing after the first year	First year avoided justice cost to government per individual exiting prison system = $2039.99 + $4,996 = $7,035.83[6] **Data used in the study:** Comparative interrupted time series analysis was conducted to estimate the impact of receiving public housing after prison on criminal justice outcomes. 1. Police incidents: Number of police incidents before and after public housing relative to comparison group from the Mental Health Disorders and Cognitive Disabilities Databank (MHDCD) (2008–2018). 2. Court appearances: finalised court appearances data from the MHDCD Databank (1994–2017). 3. Time in custody: Custody data from MHDCD Databank (1988–2018). 4. Time on supervised community orders: Data from MHDCD Databank (1994–2018). 5. Justice costs: Cost of police incidents relating to crime / number of recorded criminal incidents; average costs per case from the Report on Government Services (RoGS, 2020) for each type of court; custody costs per day per prisoner were calculated by the sum of the net operating expenditure and capital costs per prisoner and payroll tax per prisoner (RoGS, 2020); costs of supervised community order per day was calculated by the sum of recurrent expenditure per offender per day plus payroll tax (RoGS, 2020); social costs of crime was calculated by an average for each proven offence.	**Calculation** • Initial year avoided justice cost = $7,035.83 (2021 figure)	$7,035.83	Per person per first year only (ex-prisoner)	Use in conjunction with Soc7 for subsequent years. Utilises national data.	There is potential to develop a measure of reduced risk of criminal activity per capita due to access to housing and apply per household. There is potential to develop a benefit measure calculating avoided prison costs to government due to reduced recidivism attributed to ex-prisoners being provided with secure and affordable housing. In 2021, SA's recidivism rate was 42.3% (DCS). The cost per prisoner per day is $228.68 or $83,000 per year (DCS, 2019). Norway's Housing First approach has a 20% recidivism rate. A large-scale study of ex-prisoners in Queensland by Thomas, Spittal et al. (2015) found that an ex-prisoner's risk of reincarceration was 8% higher when they had a history of unstable housing. An 8% reduction would reduce SA's recidivism rate to 38.92%. Simplistically, an 8 per cent reduction in prison costs would be potentially significant, however further information is needed to monetise this due to issues with respect to operational fixed costs. In NZ, Morrison and Bowman (2017) found that just under half (47%) of a cohort of dischargees did not have stable accommodation on release. At 4–6 months post-release, 39% of individuals released into unstable accommodation were back in prison.

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Social	HIGH ● *g* **Soc7:** Decreased justice costs to government	Ongoing annual avoided justice costs related to re-entry into prison due to decreased risk of ex-prisoners reoffending after the second year following provision of secure and affordable housing. This benefit measure is applied annually for projects targeting ex-prisoners following the second year of provision of secure and affordable housing.	1. Avoided justice cost savings to government per individual exiting the prison system housed in secure and affordable housing per year following the second year	Avoided justice cost to government per individual exiting prison system per year = $2,039.99[7] Data used in study referred to in Soc6.	**Calculation** • Annual avoided justice cost from second year onwards (2021 figure) = $2,039.99	$2,039.99	Per person per year from second year onwards (person exiting prison / ex-prisoner)	Use in conjunction with Soc6 for first year. Utilises national data.	Cost per prisoner per day in South Australia ($228.68) (DCS 2019) could be applied to the reduced recidivism rate arising from access to secure housing to calculate avoided corrections costs to government by properly housing ex-prisoners. E.g. In AHURI's 2003 report Ex-prisoners and accommodation, the recidivism rate for interview participants housed in public and assisted rental housing was 34% compared to 53% for other non-family housing - a 35% decrease. A large-scale study of Queensland ex-prisoners by Thomas, Spittal et al. (2015) found that an ex-prisoner's risk of reincarceration was 8% higher when they had a history of unstable housing. An 8% reduction would take SA down to 42%. In NZ, Morrison and Bowman (2017) found that just under half (47%) of a cohort of dischargees did not have stable accommodation on release. At 4–6 months post-release, 39% of individuals released into unstable accommodation were back in prison.
	HIGH ● *g* **Soc8:** Decreased justice costs to government	Avoided costs to government due to reduction in justice service use related to police contact by formerly homeless people when housed. Zaretzky and Flatau (2013) measured justice service changes for homeless individual in year before and year after being housed. This included analysis of programs in SA, NSW, VIC, and WA. Another smaller study has shown similar cost savings to government for reduced court appearances, interactions with police and corrective services (Parsell, Petersen et al. 2015). The findings from Zaretsky and Flatau (2013) have been utilised as it is more significant in scope (204 participants), compared to Parsell, Petersen et al. (2015) (41 participants). This benefit measure is applied for projects targeting cohort experiencing or at risk of homelessness and should be used in conjunction with Soc9 and Soc10.	1. Avoided police contact justice cost savings to government per homeless individual per year following provision of affordable and secure housing	Avoided police contact as victim of assault / robbery (justice cost) to government as per homeless individual per year = $2,153.00[8] **Data used in study does not include specific sources but incorporates numbers and average costs of:** 1. Police contact: Victim of assault / robbery, stopped in street, stopped in a vehicle, apprehended, visited by a justice officer and held overnight.	**Calculation** • Annual avoided justice cost $2,153.00 • Adjusted for 2021 inflation* = $2,484.27	$2,484.27	Per person per year (person formerly experiencing homelessness)	Utilises national data.	Specific justice service costs for South Australia could be applied to the decrease in incidence of contact with police resulting from homeless individuals being the victim of assault or robbery (0.98 times per year)
	HIGH ● *g* **Soc9:** Decreased justice costs to government	Avoided costs to government due to reduction in justice service use related to nights in prison by formerly homeless people when housed. Further detail about study by Zaretzky and Flatau (2013) is outlined in Soc8. This benefit measure is applied for projects targeting cohort experiencing or at risk of homelessness and should be used in conjunction with Soc8 and Soc10.	1. Avoided night in prison justice cost savings to government per homeless individual per year following provision of affordable and secure housing	Avoided nights in prison (justice cost) to government as per homeless individual per year = $1,443.00[9] **Data used in study does not include specific sources but incorporates numbers and average costs of:** 1. Number of nights in prison.	**Calculation** • Annual avoided justice cost $1,443.00 • Adjusted for 2021 inflation* = $1,665.03	$1,665.03	Per person per year (person formerly experiencing homelessness)	Utilises national data.	Specific justice service costs for South Australia could be applied to the decrease in average number of nights spent in prison (4.96 days) cited by Zaretzky and Flatau (2013).
	HIGH ● *g* **Soc10:** Decreased justice costs to government	Avoided costs to government due to reduction in justice service use related to night in remand or detention by formerly homeless people when housed. Further detail about study by Zaretzky and Flatau (2013) is outlined in Soc8. This benefit measure is applied for projects targeting cohort experiencing or at risk of homelessness and should be used in conjunction with Soc8 and Soc9.	1. Avoided night in remand or detention justice cost savings to government per homeless individual per year following provision of affordable and secure housing	Avoided nights in remand or detention (justice cost) to government as per homeless individual per year = $230.00[10] **Data used in study does not include specific sources but incorporates numbers and average costs of:** 1. Number of nights in remand or detention.	**Calculation** • Annual avoided justice cost $230.00 • Adjusted for 2021 inflation* = $265.39	$265.39	Per person per year (person formerly experiencing homelessness)	Utilises national data.	Specific justice service costs for South Australia could be applied to the decrease in average number of nights spent in remand or detention (0.85 days) cited by Zaretzky and Flatau (2013).

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Social	HIGH ● *g* **Soc11 :**Reduced government health costs due to decreased Medicare costs	Reduced demand for Medicare benefits paid by government to people with a disability when they are provided with secure and affordable housing. Phibbs and Young (2005) found that heavy service use households experience a 30 per cent decline in the average monthly Medicare benefits paid to heavy service use households after moving into public housing. Heavy service users are defined as averaging over 3 services per month over 12 months. This measure has been used in an SROI for community housing (Ravi and Reinhardt, 2011) and CBA for affordable housing (SGS, 2019). This benefit measure is applied for projects targeting individuals with a disability or who have heavy Medicare service use as defined above.	1. 30 per cent reduction in average yearly spend on Medicare services in South Australia for person with a disability.	All Medicare benefit contribution to service processed in 2021–2022 in South Australia per 100,000 population = $105,753,714 = $1,057.75 per person[11] Reduction in Medicare benefit expenditure to government per person multiplier = 30 per cent[12]	**Calculation** • Medicare benefit paid per person = $1057.75 x 0.30 (demand reduction) = $317.33 per person per year $317.33 x no. of people with disability and/or heavy service use (individual who averages over 3 service per month over 12 months)	$317.33	Per person per year (person with a disability or heavy service use of Medicare)	To avoid potential double counting, remove people with a disability / heavy Medicare service use from benefit measure Soc11 if applying as well.	It is likely that the average Medicare benefit contribution paid to people with a disability / heavy service users would be higher than the average Medicare benefit paid in SA. There is need to source the average Medicare benefit paid for people with a disability in South Australia which would replace the first data input. There is potential to develop a method for calculating this benefit across all households given that the prevalence of disability in South Australia is 19.4 per cent (Health Performance Council South Australia, 2021).
	MED ● *i* **Soc12:** Value of improved health	As a proxy to estimate the value people place on improved health attributed to living in affordable and social housing, average household spend on health and medical costs has been used in multiple valuations (Ravi and Reinhardt, 2011; SGS 2019). This is estimated using average annual spend on health and medical costs per household in the 2nd quintile of income. It is applicable to all affordable and secure housing projects. It is recognised that the value of health extends beyond household spend on health services. It is therefore a conservative estimate of the value of improved health and further development of more suitable measures are required.	1. Average weekly spend on health services and medical costs for households in 2nd quintile of income in South Australia.	Average household medical spend per week for 2nd quintile in SA = $46.71 Annual household medical spend = $46.71 x 52 = $2,428.92[13]	**Calculation** • Annual household medical spend $2,428.92 • Adjusted for 2021 inflation* = $2,609.16 per household per year	$2,609.16	Per household per year	Measurement is a proxy for the value of improved health.	A more comprehensive and refined measure of health value to households is needed to be developed and tested. This could draw upon the quantified wellbeing and mental health impacts (Soc20 and Soc21 in 2. Quantified Benefits) and monetise these. Measures could include the impact of affordable and secure housing on quality of life, life expectancy, Disability-adjusted life years (DALYs), or Quality-adjusted life years (QALYs). Data from MADIP, the Australian general Social Survey, or HILDA could be utilised to further develop this.

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Improved health impacts associated with good quality and well performing housing								
Social HIGH ● *i* **Soc13:** Value of improved satisfaction	Value of improved life satisfaction due to avoiding exposure to damp and mould attributed to poor quality housing. Recent research has quantified the percentage decrease in life satisfaction associated with exposure to indoor environmental hazards including damp and mould compared to no exposure (Phillips, Janta et al. 2022). A wellbeing valuation analysis estimated the relationship between wellbeing, life satisfaction and indoor climate. A econometric regression analysis was used to estimate how much individuals are willing to trade off income for not being exposed to the particular hazard. This is monetised by measuring the compensating income variation (CIV) which is a measure of the income a working-age individual would need to be compensated for exposure to the indoor environmental hazard to have the equivalent wellbeing as an individual who is not exposed. The CIV is calculated by comparing an increase in salary to an improvement in life satisfaction (for example, "if exposure to damp reduces a person's life satisfaction by 2 per cent, and a 1 per cent increase of household income improves a person's life satisfaction by 2 per cent, then 1 per cent of a person's household income would be required to compensate the person for the loss in life satisfaction from being exposed to damp"). This benefit measure applies the CIV of the study, and establishes this for the Australian minimum wage. This is applicable to redeveloping existing and building new housing where relevant design / building standards are met / exceeded.	1. Value of improved life satisfaction of 1.61 per cent due lack of exposure to damp and mould equated to 5 per cent of average individual compensating variation.	National minimum wage x 38 hour week = $812.60 Annual minimum wage = $812.60 x 52 = $42,255.20[14] Average household compensating income variation (CIV) required for exposure to damp and mould = 5 per cent[15] **Data used in the study:** 1. Frequency of poor indoor climate of dwelling, household factors (including income) and life satisfaction: EU-SILC database. 2. Wellbeing valuation analysis: Measured using econometric analysis of EU-SILC data.	**Calculation** • Annual minimum wage $42,255.20 x CIV 0.05 = $2,112.76	$2,112.76	Per person per year	Research on decreased life satisfaction associated with poor quality housing is based on survey conducted of 27 countries in Europe. Potential for slightly different findings if conducted in Australian context.	Tailored parameter values for South Australia could be developed through survey conducted of residents of impact of housing quality. Similar research has been conducted in New Zealand (Smith and Davies, 2018), which estimates the monetary impact of mould in housing for the general population and public housing residents. This research offers potential to be transposed for Australian values, or further development of a similar method for calculation in South Australia. There is potential for developing a benefit measure based on willingness to pay an increased weekly rent for a home after it is upgraded.
HIGH ● *i* **Soc14:** Value of improved satisfaction	Value of improved life satisfaction due to avoiding exposure to dark attributed to poor quality housing. Recent research has quantified the percentage decrease in life satisfaction associated with exposure to indoor environmental hazards including dark compared to no exposure (Phillips, Janta et al. 2022). Further detail regarding the approach is provided in Soc13. This is applicable to redeveloping existing and building new housing where relevant design / building standards are met / exceeded.	1. Value of improved life satisfaction of 1.10 per cent due lack of exposure to dark equated to 3.5 per cent of average individual compensating variation.	National minimum wage x 38 hour week = $812.60 Annual minimum wage = $812.60 x 52 = $42,255.20[16] Average household compensating income variation (CIV) required for exposure to damp and mould = 3.5 per cent[17] Data used in study referred to in Soc13.	**Calculation** • Annual minimum wage $42,255.20 x CIV 0.035 = $1478.93	$1,478.93	Per person per year	As outlined for Soc13.	As outlined for Soc13.
HIGH ● *i* **Soc15:** Value of improved satisfaction	Value of improved life satisfaction due to avoiding exposure to noise attributed to poor quality housing. Recent research has quantified the percentage decrease in life satisfaction associated with exposure to indoor environmental hazards including noise compared to no exposure (Phillips, Janta et al. 2022). Further detail regarding the approach is provided in Soc13. This is applicable to redeveloping existing and building new housing where relevant design / building standards are met / exceeded.	1. Value of improved life satisfaction of 0.55 per cent due lack of exposure to noise equated to 2.4 per cent of average individual compensating variation.	National minimum wage x 38 hour week = $812.60 Annual minimum wage = $812.60 x 52 = $42,255.20[18] Average household compensating income variation (CIV) required for exposure to damp and mould = 2.4 per cent[19] Data used in study referred to in Soc13.	**Calculation** • Annual minimum wage $42,255.20 x CIV 0.024 = $1,014.12	$1,014.12	Per person per year	As outlined for Soc13.	As outlined for Soc13.

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	Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Social	HIGH ● *i* **Soc16:** Value of improved satisfaction	Value of improved life satisfaction due to avoiding exposure to excess cool (inability to adequately warm the dwelling) attributed to poor quality housing. Recent research has quantified the percentage decrease in life satisfaction associated with exposure to indoor environmental hazards including excess cool compared to no exposure (Phillips, Janta et al. 2022). Further detail regarding the approach is provided in Soc13. This is applicable to redeveloping existing and building new housing where relevant design / building standards are met / exceeded.	1. Value of improved life satisfaction of 3.85 per cent due lack of exposure to excess cool equated to 10.7 per cent of average individual compensating variation.	National minimum wage x 38 hour week = $812.60 Annual minimum wage = $812.60 x 52 = $42,255.20[20] Average household compensating income variation (CIV) required for exposure to damp and mould = 10.7 per cent[21] Data used in study referred to in Soc13.	**Calculation** • Annual minimum wage $42,255.20 x CIV 0.107 = $4,521.3064	$4,521.31	Per person per year	As outlined for Soc13.	As outlined for Soc13. Similar research has been conducted in New Zealand (Smith and Davies, 2018), which estimates the monetary impact of cold housing for the general population and public housing residents. This research offers potential to be transposed for Australian values, or further development of a similar method for calculation in South Australia.
	HIGH ● *g* **Soc17:** Reduced government health cost	Reduced hospitalisations due to respiratory illness attributed to improved thermal comfort. A study in New Zealand measured the rate of hospitalisations prior to and after installing insulation (Chapman, Howden-Chapman et al. 2009). There was a reduction in the number of hospital admissions for asthma, attributed to a cost saving. This measure directly applies NZ research converted to AUD and adjusted for inflation (2021).	1. Avoided health cost to government due to reduced hospitalisation people for asthma associated with exposure to poor thermal comfort.	Reduced cost of hospital admissions for asthma per household per year = $74.37 (2002 figures)[22] **Data used in the study:** 1. The reduction in the number of hospitalisations is estimated using the reduction in the number of hospitalisations for respiratory complaints, categorised as overnight (inpatient) and day (outpatient) admissions, with an estimate of the cost of a hospital admission. 2. Estimates for the costs of asthma admissions are for children NZ$597 for an outpatient and $1195 for an inpatient, and for adults (18–64) NZ$740 for an outpatient and NZ$1480 for an inpatient, and for older people (65 or over), $1347 for an outpatient and NZ$2694 for an inpatient.	**Calculation** • Converted into AUD (conversion rate from 2002 AUD 0.82) = $60.98 • Adjusted for 2021 inflation* = $94.76	$94.76	Per household per year	Utilises NZ data.	This measure does not generate a high value, however offers a promising way of exploring avoided costs to government for a variety of health conditions that are linked with housing. Measures could be developed for links between housing and hospitalisation costs for other conditions (i.e./ housing stress and mental health; walkability and obesity / diabetes). A potential calculation to utilise the findings from Chapman, Howden-Chapman et al. (2009) using SA data could be proportion of people over 65 hospitalised in SA for asthma x reduction in admissions (0.10) x cost, averaged for households. **Potential data:** Average hospitalisation decrease for asthma (over 65s) = 10 per cent[23] Average asthma hospitalisation (over 15s) in Australia = 0.00098[24] Number / percentage of people in SA over 65 = 306587 (18.2 per cent)[25] Average hospital admission cost for asthma = $2,591[26]
	HIGH ● *s* **Soc18:** Reduced mortality	Improved health due to avoiding exposure to poor quality housing. Recent research conducted a ex-post valuation of the health impacts associated with improving insulation in 45,000 homes in New Zealand (Chapman, Preval 2017). This explored the impact of insulation retrofits on morbidity. They found that mortality risk was reduced for people aged 65 and older who been hospitalised with pre-existing circulatory conditions in the previous year compared to the control group. The ratio of the rate of death for the intervention group compared to the control was 0.67:1. The researchers valued mortality, by predicting individuals who avoided mortality may be anticipated to live approximately half the typical additional life years for people their age, reflecting an average gain of five years of life. This was monetised through the value of a statistical life. This is benefit measure is applicable to retrofitting and building new housing where relevant design / building standards are met / exceeded with respect to thermal comfort.	1. Reduced mortality risk for people over 65 (who had previously been hospitalised due to circulatory condition) due to improved insulation and thermal comfort 2. Value of a statistical life year	Estimated benefit of reduced mortality for people over 65 (previously hospitalised with circulatory condition) due to improved insulation and thermal comfort = NZ$750 (2017) **Data used in the study:** 1. Reduced mortality for people over 65 (previously hospitalised with circulatory condition) due to improved insulation and thermal comfort = 32.7 per cent 2. Estimated additional life expectancy for people over 65 (previously hospitalised with circulatory condition) due to improved insulation and thermal comfort = 5 years 3. Value of a statistical life calculated using willingness to pay method.	**Calculation** • Converted into AUD (conversion rate from 2017 AUD 0.96) = $720.00 • Adjusted for 2021 inflation* = $773.43	$773.43	Per household per year	Utilises NZ data.	This measure offers a promising way to calculate the value of reduced mortality risk attributed to improved quality housing for a variety of health impacts. There is potential to source SA data relating to health and housing quality.

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Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Economic								
Productivity impacts associated labour market proximity								
HIGH ● **s** **Eco1:** Increased productivity	Reduced work absenteeism and increased ability to re-join workforce for DFV victims when provided with secure and affordable housing. Research by Access Economics (2004), cited by Equity Economics (2021) found that every victim of DFV loses up to 3 days of paid work. This benefit measure is applied for projects targeting victims or survivors of domestic family violence.	1. Average number of days of reduced absenteeism from work per year for avoiding domestic family violence 2. Average daily income	Average number of days absent from work due to DFV = 3[27] Average daily income for women in South Australia = $1,542.40 / 5 = $308.48 $902 (2021 figure)	**Calculation** • 3 days absent x Average daily income $308.48 = $925.44	$925.44	Per person per year (domestic family violence survivor)		Further research could monetise the value of workforce re-entry / reduced risk of leaving workforce due to health and disruption effects of DFV and insecure and affordable housing. DHHS (2018) estimated the value of workforce re-entry of a DFV survivor to be $4,000 however no data of how this is calculated is provided. There is potential to understand the data that contributed to this finding and develop similar estimates using SA data.
LOW ● **s** **Eco2:** Increased productivity	Increased productivity due to reduced work absenteeism caused by respiratory illness due to poor thermal comfort of homes. A cost benefit analysis conducted in New Zealand assessed the number of days off work for households whose homes were retrofitted with insulation compared to a control group (Chapman, Howden Chapman et al. 2009). The study conservatively estimated the value of a day off work to be 80 per cent of the average daily wage as this assumes that some productivity lost can be made up upon return to work. This is benefit measure is applicable to retrofitting and building new housing where relevant design / building standards are met / exceeded with respect to thermal comfort.	1. Reduction in work absenteeism due to avoidance of respiratory illness 2. Value of day off work	Average reduction in number of days absent from work due to better thermal comfort of housing = 0.1[28] **Data used in the study:** 1. Days off work comparing control group and intervention group who received insulation upgrade. Value of day of work based on the average daily minimum wage = 80 per cent[29] Average daily minimum wage = $21.38 x 7.6 = $162.49[30] South Australian full time employment rates multiplier = 53.9[31]	**Calculation** • Average daily minimum wage x 0.8 value of work multiplier = $129.99 • 0.1 average days absent x 129.99 = $10.40 • 10.40 x 0.539 FT rate = $5.20	$5.20	Per household per year	This is a conservative measure as the study only looked at absences due to respiratory illness.	This measure does not generate a high value, however offers a promising way of exploring avoided costs to society for a variety of health conditions that are linked with housing. There is potential for further research into broader impacts of housing on work absenteeism, particularly relating to housing stress (for example, forced moves and decreased mental health). In addition, research could look at impact of walkable neighbourhoods on reduction in diabetes and obesity related absenteeism.
LOW ● ***i*** **s** **Eco3:** Reduced commute to work	Value of reduced travel-to-work time to individuals due to proximity of housing to jobs. MacLennan, Randolph et al. (2019) conducted modelling and estimation of productivity effects by comparing a "Better housing outcomes scenario" (BHO) with business as usual (BAU) in Sydney. In the BAU scenario, it was assumed current levels and patterns of housing continue, with most housing developed at market prices, at low - medium densities in less accessible locations, such as the fringe. This means an undersupply of affordable housing within a 30-minute commute to jobs and services. In the BHO scenario, it was assumed 1250,000 affordable dwellings be delivered in well-serviced, accessible locations. The aim was to provide more affordable housing within a 30-minute commute of jobs and services, however a scan of potential locations, meant some were over this aim, but still shorter travel times compared to the BAU scenario.	1. Reduced average travel to work time for employees in BHO compared to BAU scenario. 2. Value of travel time.	Value of total reduced travel-to-work time for each employee in the BHO compared to the BAU scenario per year = around $2,554 (2018). It is assumed that $1,277 (50 per cent) of this will be productively used per person per year (value of travel time savings which will be used for work). **Data used in the study:** Average reduction in travel-to-work time for employees in the BHO compared to the BAU scenario per year = approximately 160 hours[32] Value of time to each person travelling by car or bus = $16.89 per hour[33] Assumed average travel time savings would be used for productive purposes = 50 per cent[34]	**Calculation** • Adjusted for 2021 inflation* = $2,692.07	$2,692.07	Per worker per year	Utilises NSW data.	This research is theoretical, and therefore requires further development. Research highlights housing location plays an important role in improved access to employment. This has a multitude of benefits to the individual, government and society. There is greater opportunity to quantify and monetise these impacts. There is potential to develop a measure utilising SA data and alternative assumptions regarding appropriate travel-to-work times for metro and regional areas. Additional areas for enquiry could be value of key worker retention due to proximity to work. Additionally, in SA, employment rates increased for individuals while they were on the waiting list and following a move into public housing, suggesting that housing security also contributes to improved employment outcomes (Productivity Commission, 2015). This highlights potential for investigating relationship between employment outcomes, and well-located secure housing.

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Economic	LOW ● s **Eco4:** Improved job choice	Value of improved job choice effects on human capital accumulation due to proximity of housing to jobs. MacLennan, Randolph et al. (2019) conducted modelling and estimation of productivity effects by comparing a "Better housing outcomes scenario" (BHO) with business as usual (BAU) in Sydney (described in Eco3) . They established that households with greater accessibility to labour markets are able to access a greater diversity of jobs that align with skills and preferences. This is reflected in workers' increased earning, which has a flow on through increased spending per capita. Increased earnings are used as a proxy of the agglomeration benefits stemming from better housing outcomes.	1. Differences in average earnings across the lifespan for employees in BHO compared to BAU scenario.	Weighted average human capital gain per worker per year, reflecting average improvement in annual earnings = $19,865. **Data used in the study:** 1. The difference in annual earnings between BAU and BHO geographies were modelled and analysed.	**Calculation** • Adjusted for 2021 inflation* = $20,938.90	$20,938.90	Per worker per year	Utilises NSW data.	This research is theoretical, and therefore requires further development. There is potential to develop a measure utilising SA data.
	LOW ● s **Eco5:** Value of worker retention	Value of worker retention based on training and recruitment costs for employers due to reduced tenancy turnover. This benefit measures directly applies research by SGS (2019) which developed a value of worker retention by assuming tenancy turnover generates training and recruitment expenses for an employer. This measure compares the reduction in tenancy turnover due to secure housing for households experiencing rental stress, compared to the average for the general population, and an assumption for recruitment and training costs to employers. This benefit measure is applicable to affordable and secure housing projects, in particular those targeting key workers.	1. Theoretical assumption of average training and recruitment expenses to employer 2. Average benefit to household per year due to reduction in tenancy turnover for households in rental stress compared with average turnover for the general population	Assumed average training and recruitment expenses to employer as 25 per cent of $60,000 annual salary = $15,000[35] Annual key worker retention benefit per household per year factoring in increased tenancy turnover for households in housing stress = $6,323[36] **Data used in the study:** 1. Reduction in tenancy turnover assumed as difference between average number of moves for households in rental stress compared to the general population.	**Calculation** • Adjusted for 2021 inflation* = $6,559.17	$6,559.17	Per household per year	Utilises unsourced data on rental stress turnover.	Establishing the links between the impact of housing stability to employment stability requires further development. Calculating the monetised value to both households and society is also a good area for research. There is potential for this to be developed further by quantifying the impact of increased housing relocations and risk of job loses on household income utilising SA data.
	LOW ● s **Eco6:** Improved employment prospects	Value of improved employment due to secure and affordable housing. A proxy for improved employment prospects and earning potential for community housing residents has been used in an SROI by Ravi and Reinhardt (2011). This is based on assumptions of the proportion of community housing residents actively searching for work, and the percentage that are likely to be successful. It is important to note that an important factor cited in community housing surveys is greater educational and job training opportunities. This benefit measure is applicable to social housing.	1. Increased employment rates and earning potential per worker per year (average minimum part-time wage) x proportion of people in social housing actively looking for work	Part-time minimum yearly wage = $21,231.60[37] Percentage of social housing residents actively looking for work multiplier = 9 per cent[38] Percentage of community housing tenants actively looking for work who find employment (as a result of access to educational or training opportunities = 59 per cent[39]	**Calculation** • Percentage of social housing residents actively searching for work 0.09 x success rate 0.59 = 0.0531 • Part time salary 21,231.60 x 0.0531 = $1127.37	$1,127.37	Per person in social housing per year	Educational and training opportunities affiliated with provision of secure housing are a factor in the parameter values	There is need for further research to link improved employment opportunities with housing security.

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	Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Economic	**Discretionary spending impacts associated with labour participation and affordability**								
	LOW ● **s** **Eco7:** Reduced housing costs	Research highlights that a range of housing measures can contribute to reduced housing costs (such as affordable housing / subsidy, reduced mortgage repayments, rent capping, reduced operating costs, etc). These benefit consumers by increasing potential for disposable income. As an example of monetising this, the value of housing subsidy (i.e. the average difference in private rental to social housing) was used as a proxy for additional disposable income (Zon and Molson, 2015). The benefit measure is to be calculated as relevant for each project.	1. Market price for housing price 2. Price of proposed housing solution	Market price for locality Price to be charged for outcome provided	**Calculation** • Apply as per project = Market Price - Intervention price per annum	Apply per project	Per household per year		Monetising discretionary spending stemming from housing cost savings is complex. There may be potential to develop alternative measures for example, the ability to meet essential daily needs and improve quality of life (through improved ability to spend on healthier food, comfort and education, etc). Research could monetise the impact of high housing costs on households forgoing essentials such as medications, health visits, food, heating, transport, recreational activities, housing quality and educational investment.
Environmental	**Climate impacts associated with reduced resource and energy consumption**								
	HIGH ● **s** **Env1:** Reduced infrastructure demand	Avoided infrastructure investment costs to government due to a 25 per cent reduction in energy demand per household. A reduction in household energy demand of 25 per cent is attributed to every star increase on the NatHERS rating system. This contributes to decreased peak demand and need for energy infrastructure investment. Research by the CSIRO cited by ASBEC and Climate Works (2018) has estimated that a household decreasing peak demand by one kilowatt (kW) would save $1,000 in required investment in electricity system infrastructure, and would reduce electricity prices. The benefit should be calculated based on the energy saved in the intervention project. The parameter values and benefit calculation is provided as an example comparing the reduction for a 4.5 NatHERS rating home and compared to below, based on available data.	1. Average percentage reduction of kWh of 4.5 NatHERS home and above compared to below 2. Avoided infrastructure investment costs to government	Difference of average daily energy consumption rating 4.5 NatHERS and above versus below 4.5 stars in SA = 2.5523[40] Saved network costs due to 1 kW reduction in required investment in electricity system infrastructure = $1000[41]	**Calculation** • Recommended calculation Kw saved per intervention project x $1,000 • Example calculation for 4.5 NatHERS and above compared to below = kW saved 2.5523 x $1,000 = $2552.30	Calculate per project Example = $2552.3	Per household per year	Energy consumption data limited by information available.	Potential to develop measurements to compare impact of different star ratings based on available information and with consideration of SA renewable energy context.
	MED ● **s** **Env2:** Reduced greenhouse gas emissions	Value of reduced greenhouse gas emissions per household. Australia does not have a formal carbon price. The Clean Energy Regulator (Australian Government) calculated the average price of carbon to be $16.94 per ACCU (2021) which is used as a proxy. The benefit should be calculated based on the energy saved in the intervention project. The parameter values and benefit calculation is provided as an example comparing the reduction for a 7 star NatHERS home compared to a typical home built before 2003, based on available data.	1. Value of reduction of greenhouse gas emissions for a 7-star NatHERS home compared to a typical home built before 2003	Average Australian carbon credit units price = $16.94[42] Average annual reduction in CO2 emissions of 7-star NatHERS home compared to home built before 2003 = 15 tonnes of carbon[43]	**Calculation** • Recommended calculation = ACCU x average annual reduction in CO_2 emissions of intervention project • Example calculation = ACCU 16.94 x 15 tonnes = $397.50	Calculate per project Example = $397.50	Per household per year	A social cost of carbon has not yet been calculated for South Australia.	The average price of carbon estimated by the Clean Energy Regulator does not factor in the broader value of avoided carbon emissions and therefore underestimates the true cost of carbon emissions. Research has estimated the social cost of carbon in the ACT (Hutley, 2021), which is a more comprehensive measure of the damages avoided from every reduced tonne of carbon emissions. There is need for an estimate of the social cost of carbon in SA to provide a more robust value. For example, Chapman (2017) estimates the social cost of carbon in New Zealand to be $88 / tonne. There is potential to develop measurements to compare impact of different star ratings based on available information and with consideration of SA renewable energy context.

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Impact name	Description	Measurement	Parameter values	Benefit calculation method	Benefit	Unit	Dependencies / Constraints	Further development
Household benefits associated with improved environmental performance								
Environmental								
HIGH ● *i* **Env3:** Improved energy efficiency - 7-stars NatHERS	Reduced housing operating cost expenditure for households due to improved energy efficiency. This benefit measure is applied to new housing and retrofits which meet the National Construct in Code (2022) and should not be used in conjunction with Env4. The Climate Council (2022) estimates that these features will have a payback period of 4.6 years compared to the additional costs of build.	1. Average heating and cooling bill savings per household per year for increasing to an all-electric 7-star home compared to a 6-star NatHERS Star rating home.	Average bill savings for Adelaide for 7-star compared to 6-star NatHERS Star rating home = $460.41[44] **Data used in the study:** 1. Modelling of heating and cooling costs (Climate Council, 2022) for average new home in Adelaide in square metres (CommSec, 2022).	**Calculation** • Average bill savings $460.41	$460.41	Per household per year	Research based on modelling of 7-star and 6-star dwellings.	Potential for higher value to be sourced for retrofitting an existing dwelling that is lower than 6-star NatHERS rating.
HIGH ● *i* **Env4:** Improved energy efficiency - zero net carbon	Reduced housing operating cost expenditure for zero net carbon (ZNC) homes. This benefit measure is applied to new housing and retrofits which achieve zero net carbon and should not be used in conjunction with Env3.	1. Minimum savings for ZNC compared to 6-star NatHERS Star rating home.	Minimum energy cost savings modelled for ZNC homes compared to business as usual = $1,004.00[45]	**Calculation** • $1,004.00	$1,004.00	Per household per year	Research modelled energy performance of 39 ZNC homes in Victoria compared to BAU (6-star NatHERS Star rating home).	Potential for more robust value to be sourced as further modelling done of ZNC homes compared to business as usual homes.
HIGH ● *i* **Env5:** Reduced car ownership	Reduced household car related costs due to lower rate of car ownership when housing is appropriately located in proximity to employment, education and public transport, and walkable neighbourhoods. This benefit measure is applied to new housing that is an accessible location and promotes alternatives to car ownership, such as walking, public transport, and car or bike share. The benefit should be calculated based on the average car ownership rate for the locality of the project intervention.	1. Difference between rate of car ownership for locality of intervention versus average car ownership for Greater Adelaide / regional South Australia.	Weekly average cost of running a car = $378.65[46] **Data used:** 1. Estimate of weekly fuel, registration and licensing, car insurance, maintenance and service, car loan and depreciation calculated by RACQ. Average car ownership for Greater Adelaide = 1.6 cars per household[47]	**Calculation** • Yearly car cost 378.65 x 52 = $19,689.80 • Adjusted for 2021 inflation* = $20,425.23 • (Average cars per household 1.6 x $20,425.23) - (Average cars per household in proposed locality)	Apply rate of car ownership in proposed locality from Australian Bureau of Statistics to benefit calculation method	Per household per year	Car ownership costs are based on national data.	There is potential to further develop benefits based on proximity of housing to jobs. This could monetise the value of time saved commuting to work / impact of congestion, or reduced emissions from reduced car based travel. There is opportunity to identify specific car ownership costs for Adelaide / South Australia.
HIGH ● **s** **Env6:** Improved rental return	Residents are willing to pay increased rent for housing with improved energy saving measures as a result of improved insulation. Research asked residents about hypothetical scenarios for improving energy saving measures (Banfi, Farsi et al. 2008). They found that residents were willing to pay an increased rent of 1 per cent for an enhanced insulated window and 3 per cent for an enhanced facade insulation, compared to standard insulation.	1. Percentage increase of willingness to pay for rent due to improved insulation.	Willingness to pay increased rent of 1-3 per cent for improved insulation.[48]	**Calculation** • 1 - 3 per cent increased rent x market rent	Calculate per project	Per household per year	Utilises data from Switzerland.	There is potential for this to be monetised calculating the market rent x percentage increased rent. There is potential to expand upon this research identifying willingness to pay for a variety of improvements to housing with respect to energy efficiency.

2.2 Quantified housing benefits

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	Impact name	Description	Measurement	Parameter values	Benefit calculation method			Dependencies / Constraints	Further development
Social	**Health and mental health impacts associated with affordable and secure housing**								
	HIGH ● *s* **Soc19 :**Improved preventative physical health	Improved preventative health due to increased financial ability to visit doctors. People in insecure housing are 6 times more likely to postpone doctors visits due to cost.	1. Difference in rate of postponing doctors visit for people in insecure housing compared to those in secure housing	Increased likelihood of postponing a doctors visit due to insecure housing = 6 times average	**Quantification** • 6 x (average doctors visit delay)			Utilises data for Washington State, USA.	There is potential for quantification to be further developed and monetised if a value of cost to society of delayed doctors visit can be estimated. Rate of people postponing doctors visit in Australia = 2.4 per cent[49]
	HIGH ● *i* **Soc20:** Improved mental health	People experience a decline in mental health scores when in insecure housing.	1. Difference in self-assessed mental health score due to housing move	Decline in self-reported mental health on SF-36 (HILDA) due to forced move = 1.7 per cent[50]	**Quantification** • 1.7 decline in mental health SF-36 score				There is potential for quantification to be further developed and monetised as avoided cost to government if the service demand attributed to decline in mental health could be estimated. A number of potential reforms to housing to improve mental health are discussed in the Productivity Commission, Mental Health Inquiry Report (2020) which estimates benefits and costs nationally. There may be some data that can be linked to assist with monetisation of benefit. There may also be potential to monetise the value of happiness / life satisfaction related to mental health scores. Research by Kim and Burgard (2022) also find people with insecure housing are at least 14 percentage points more likely to have had a recent anxiety attack, and those who experienced eviction were 13 percentage points more likely to meet criteria for depression.
	HIGH ● *i* **Soc21:** Improved mental health	People experience a decline in mental health scores when in unaffordable housing.	1. Difference in self-assessed mental health score due to unaffordable housing	Decline in self-reported mental health on SF-36 (HILDA) due to forced move = 0.5 per cent[51]	**Quantification** • 0.5 decline in mental health SF-36 score				See Soc20.
	MED ● *i* **Soc22:** Improved physical health	Improved physical health associated with secure housing. People in insecure housing are twice as likely to self report poor or fair health status.	1. Likelihood of self-reported poor health due to insecure housing	Increased likelihood of poor health due to insecure housing = 2 times average[52]	**Quantification** • 2 x (Average self reported health score)			Utilises data for Washington State, USA.	There is potential for quantification to be further developed or monetised. This could be as avoided health cost to government due to improved health, or avoided loss of productivity to absenteeism. If number of additional personal leave days attributed to insecure housing could be identified, there is potential for loss of productivity value to society to be calculated. This calculation would need to consider employment rates and appropriate wage to apply, as well as minimise double counting with other related monetised benefits.
Social	**Improved health impacts associated with good quality and well performing housing**								
	HIGH ● *i* **Soc23:** Improved mental health	Improved mental health due to thermal comfort attributed to insulation. A cost benefit analysis of insulation programs in New Zealand found a significant higher mental health score among people who received retrofitted insulation compared to those who did not (Chapman, Preval et al. 2017).	1. Reduction in risk of poor mental health on self assessed score	Reduction in risk of poor mental health due to improved insulation = 44 per cent[53]	**Quantification** • 44 per cent decline in risk of poor mental health			Utilises data for New Zealand.	There is potential for quantification of the impact of housing qualities to be further developed and monetised. This could be as avoided mental health cost to government if service demand attributed to decline in mental health could be estimated. Alternatively it could monetised be as loss of productivity value to society if possible to associate reduction in risk of poor mental health with absenteeism. There may also be potential to monetise the value of happiness / life satisfaction / willingness to pay related to improved mental health. SA's Department for Health and Wellbeing may have relevant data.
	HIGH ● *i* **Soc24:** Improved mental health	Decreased depression due to housing with access to adequate daylight. Research has found that residents of dwellings with inadequate light are more likely to experience depression.	1. Reduction in depression and symptoms of depression assessed by a doctor.	Reduction of risk of depression due to improved daylight = 1.3 times less likely[54]	**Quantification** • 1.3 times less likely to experience depression			Utilises European data.	This could be further monetised if service demand attributed to decline in mental health could be estimated. This could be as avoided mental health cost to government if service demand attributed to decline in mental health could be estimated. Alternatively it could monetised be as loss of productivity value to society if possible to associate reduction in risk of poor mental health with absenteeism. SA's Department for Health and Wellbeing may have relevant data.

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Social	HIGH ● *i* **Soc25:** Improved physical health	Decreased risk of falls due to housing with access to adequate daylight. Research has found that residents of dwellings with inadequate light are more likely to experience a fall.	1. Reduction in falls.	Reduction of risk of falls due to improved daylight = 2.5 times less likely[55]	**Quantification** • 2.5 times less likely to experience a fall			Utilises European data.	This could be further monetised if service demand attributed to decline in health could be estimated. This could be as avoided health cost to government if service demand attributed to decline in mental health could be estimated. Alternatively it could monetised be as loss of productivity value to society if possible to associate reduction in falls with absenteeism.
Economic	**Productivity impacts associated labour market proximity**								
	HIGH ● *s* **Eco8:** Improved work productivity	Improved productivity working from home due to indoor air quality. A review of research by the World Green Building Council (2016) found that there are productivity benefits which stem from good indoor air quality. Improvements to ventilation in homes could therefore be assumed to improve productivity for individuals working from home.	1. Percentage productivity improved due to adequate ventilation of home.	Uplift in worker productivity associated with sustainably designed commercial buildings = 8 per cent[56]	**Quantification** • 8 per cent increase in worker productivity			This finding is based on a literature review of commercial buildings.	There is potential to extend this research into housing contexts and monetise the impact. Additionally, impact of ventilation on quality of life / life satisfaction could be quantified and monetised.
	MED ● *i* **Eco9:** Greater employment stability	Reduced chance of job loss due to secure housing. Desmond and Gershenson (2016) explored the role of housing insecurity for renters in causing employment insecurity. The research found that a forced move (attributed to eviction, landlord foreclosure or housing condemnation), increased the likelihood of a worker losing their job within a year to be 22 percentage points, compared to those workers who did not. The Productivity Commission (2015), also suggests that "Address changes are negatively associated with employment. The more times a person has moved over a 12-month period, the less likely it is they will be working at the end of that year" (p. 51).	1. Job loss associated with a forced move	Decreased risk of job loss within a year of a forced move = 22 per cent[57]	**Quantification** • 22 per cent decrease in risk of job loss			Utilises data from the USA.	There is limited research investigates how housing insecurity contributes to involuntary job loss. This study is the first to establish that housing insecurity may be an important contributor to employment insecurity, however further research is needed to explore these issues particularly for the South Australian context. There is potential to estimate the impact on individuals as long term loss of earnings or risk of long term unemployment. Research cited by Desmond and Gersenson (2016) indicates people who experience a job loss, on average earn 17 per cent less than if they were continuously employed. This can also contribute to declining mental and physical health. Business impacts which could be measured include increased recruitment and training costs and reduced worker productivity prior to dismissal.
	MED ● *s* **Eco10:** Increased productivity	Increased productivity due to reduced school absenteeism caused by respiratory illness due to poor thermal comfort of homes and reduced parents' carer's leave. A cost benefit analysis conducted in New Zealand assessed the number of days off school for households whose homes were retrofitted with insulation compared to a control group (Chapman, Howden Chapman et al. 2009). This is benefit measure is applicable to retrofitting and building new housing where relevant design / building standards are met / exceeded with respect to thermal comfort.	1. Reduction in school absenteeism due to avoidance of respiratory illness	Reduction in school absenteeism for high school students (12-18 year old) due to avoided respiratory illness = 1.3 days per year	**Quantification** • 1.3 less days off school due to avoided respiratory illness			Utilises NZ data. This is a conservative measure as the study only looked at absences due to respiratory illness and insulation.	This measure does not generate a high value in loss of days off school, however offers a promising way of exploring the impact of housing quality on absenteeism from school and work. There is potential for a measure which calculates the impact of school absenteeism due to housing quality on parent's carers leave. A potential calculation to monetise this could be 1.3 days off school x the likelihood of parent taking carer's leave x daily wage. Further research could investigate broader impacts of housing on school absenteeism, particularly relating to housing stress (for example, forced moves and decreased mental health). In addition, research could look at impact of walkable neighbourhoods on reduction in diabetes and obesity related school absenteeism. Potential measures for evaluating the effects of housing on education, include data from the Longitudinal Study of Australian Children (LSAC) and Longitudinal Study of Indigenous Children (LSIC).

Condidence level: HIGH MED LOW
Impact: ● = direct ● = indirect
Beneficiary: *i* = individuals, **s** = society, *g* = government
* *Using RBA, Inflation Calculator*

Impact name	Description	Measurement	Parameter values	Benefit calculation method			Dependencies / Constraints	Further development
Discretionary spending impacts associated with labour participation and affordability								
LOW ● *i* **Eco11:** Increased spending on food	Affordable housing enables households to have increased disposable income, which has been found to increase the amount of money spent on food. A US study has found that low-income households who struggle to secure appropriate, affordable and secure housing often settle for housing that costs more than they can afford and limit on daily necessities such as food Alexander, Apgar et al. 2014). Research found that households in the bottom expenditure quartile spent an average 39 per cent less on food compared to similar households in affordable housing.	1. Difference in amount of money spent on food by households in the lowest expenditure quartile compared to similar households in affordable housing.	Increased spending on food = 39 per cent[58]	**Quantification** • 20 per cent increased spending on healthy food			Utilises US data.	There is evidence that households in unaffordable housing forgo essential items such as food. There is greater potential to investigate the links between housing and spending on food, particularly for nutritious food. The impact could be monetised through increased potential to access healthy food and the long-term health benefit to the individual, and avoided health care costs to government. There may be additional links to children's diet and educational outcomes. It is important to ensure that this outcome is not double counted with other health benefits which have been monetised.
Environmental	**Climate impacts associated with reduced resource and energy consumption**							
HIGH ● **s** **Env7:** Reduced congestion and emissions	Reduced congestion and emissions where affordable housing located near public transport. Average reduction in travel by private vehicle due to improved proximity of housing to jobs and services can be monetised through reduction in emissions. MacLennan, Randolph et al. (2019) conducted modelling and estimation of productivity effects by comparing a "Better housing outcomes scenario" (BHO) with business as usual (BAU) in Sydney (described in Eco1). They found that residents in BAU locations had higher rates of private car usage over public transport.	1. Average reduction in travel by private vehicle living in BHO compared to BAU scenario.	Average reduction in private vehicle in BHO compared to BAU scenario = 8 per cent[59] **Data used in the study:** Transport for New South Wales data for the proportion of households located within small areas that commute by particular transport modes.	**Quantification** • 8 per cent reduction in private vehicle use			Utilises NSW data.	There is potential to monetise the impact to society utilising data from transport economics on value of reduced emissions attributed to reduced average commutes.

2.3 Qualitative housing benefits

Condidence level: HIGH MED LOW
Impact: ● = direct ● = indirect
Beneficiary: *i* = individuals, **s** = society, *g* = government
* *Using RBA, Inflation Calculator*

	Impact name	Description							Potential quantification or monetisation and further research
Social	**Improved health impacts associated with good quality and well performing housing**								
	HIGH ● **Soc26:** Improved health	Several studies have found attributes of poor quality housing such as thermal comfort, ventilation and mould and damp are associated with increased illness and mortality, including:[60] • Thermal comfort and ventilation is linked with an increase in respiratory illness, severity of allergies, and increased mortality related to heat. • One study found an 11 per cent increase in the odds of an asthma attack over a 12 month period was attributed to each unit increase in the Respiratory Hazard Index score of the home (Keall, Crane et al. 2012). • Exposure to noise is associated with an increased risk of hypertension, cardiovascular disease, migraines and asthma.							Avoided costs to government due to reduction in average medical service cost or hospitalisation risk due to improved housing quality. Improved quality of life due to improved health. Improved productivity due to reduced absenteeism from work and school.
	HIGH ● **Soc27:** Improved mental health	Several studies link exposure to noise with sleep disturbance and increased risk of depression, including:[61] • Increased noise exposure during the day contributed to greater sleep disturbance (Babisch et al. 2014). • The chance of sleep disturbance by noise results in a 100 per cent increase of depression (WHO, 2007). • The orientation of rooms near streets or other noise sources contributes to increased sleep disturbances.							Avoided costs to government due to reduction in average medical service cost due to improved housing quality. Improved quality of life to improved mental health. Improved productivity due to reduced absenteeism from work and school.
Economic	**Productivity impacts associated labour market proximity (also including agglomeration effects)**								
	LOW ● **Eco12:** Improved education	Research highlights insecure and unaffordable housing disrupts student education. Residential moves are associated with increased school absenteeism and decreased academic performance.[62]							Impact of absenteeism on learning outcomes, educational attainment or earning potential.
	HIGH ● **Eco13:** Increased earning potential	Increased lifetime earning potential has been attributed for low income children who live in social housing or are recipients of housing subsidies for private housing.[63] Research by Andersson, Haltiwanger et al. (2006) estimated the increase to adult average lifetime earnings at age 26 for each additional year a child received the housing support. They extrapolated that to an expected change in lifetime pre-tax earnings of $45,400 for females and $47,300 for males for public housing. This was $43,600 and $24,100 respectively for receiving housing subsidies.							There is potential that finding from US is not applicable to Australian context due to extremely low minimum wages in state where research conducted. There is need to further this research for outcomes in SA. There is evidence from the Productivity Commission (2015) that there is an increase in employment rates for individuals on the public housing weighting list and after they are in public housing in SA. There may be additional data pertaining to educational and employment outcomes of children residing in secure and affordable housing.

Endnotes

1 Data source: Wood and Flatau (2016)
2 Data source: Johnson, Kuehnle et al. (2014)
3 Data source: Johnson, Kuehnle et al. (2014)
4 Equity Economics (2021)
5 Equity Economics (2021)
6 Martin, Reeve et al. 2021
7 Martin, Reeve et al. 2021
8 Zaretzky and Flatau (2013)
9 Zaretzky and Flatau (2013)
10 Zaretzky and Flatau (2013)
11 Services Australia (2022)
12 Phibbs and Young (2005)
13 ABS (2017)
14 Fair Work Ombudsman (2022)
15 Phillips, Janta et al. (2022)
16 Fair Work Ombudsman (2022)
17 Phillips, Janta et al. (2022)
18 Fair Work Ombudsman (2022)
19 Phillips, Janta et al. (2022)
20 Fair Work Ombudsman (2022)
21 Phillips, Janta et al. (2022)
22 Chapman, Howden-Chapman et al. (2009)
23 Data source: Chapman, Howden-Chapman et al. (2009)
24 Data source: Asthma Australia (2022)
25 Data source: ABS (2016)
26 Data source: Asthma Australia (2022)
27 Equity Economics (2021)
28 Chapman, Howden-Chapman et al. (2009)
29 Chapman, Howden-Chapman et al. (2009)
30 Fair Work Ombudsman (2022)
31 ABS (2016)
32 MacLennan, Randolph et al. (2019)
33 Transport for New South Wales (2018)
34 SGS (2019)
35 SGS (2019)
36 SGS (2019)
37 ABS 2021
38 Ravi and Reinhardt (2010) (This is a similar figure to 10 per cent in public housing cited by the Productivity Commission, 2015)
39 Ravi and Reinhardt (2010)
40 CSIRO (2012)
41 Australian Sustainable Built Environmental Council and Climate Works (2018)
42 Clean Energy Regulator (2022)
43 Climate Council (2022)
44 Climate Council (2022)
45 Sustainability Victoria (2021)
46 Savings.com.au (2019)
47 Id Community (2021)
48 Banfi, Farsi et al. (2008)
49 Productivity Commission (2022)
50 Ong ViforJ, Singh et al. 2022
51 Ong ViforJ, Singh et al. 2022
52 Stahre, VanEenwyk (2015)
53 Chapman, Preval et al. (2017)
54 Brown and Jacobs (2011)
55 Brown and Jacobs (2011)
56 World Green Building Council (2016)
57 Desmond and Gershenson (2016)
58 Alexander, Apgar et al. (2014)
59 MacLennan, Randolph et al. (2019)
60 Dannemiller, Gent et al. (2016); Keall, Crane et al. (2012); Wargocki, Sundell et al. (2002); Loughnan, Carroll et al. (2015); Daniel, Horne et al. (2019); Giles-Corti et al. (2015); SGS (2016)
61 WHO (2007)
62 Cohen and Wardrip (2011); Voight, Shinn et al (2012)
63 Andersson, Haltiwanger et al. (2016)

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