



Energy consumption in an aging population

Exploring energy use and behaviour of low-income older Australians

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Green Heart Wisdom (LIEEP program)

- Funded by the Australian Government
- November 2013 to February 2015
- 1,647 Participants:
 - Live in the Brisbane City Council Local Government Area
 - Over 60 years old
 - Hold a current Pensioner Concession Card
- Recruitment:
 - Brisbane City Council
 - Community Service Providers
- This presentation:
 - Initial program survey
 - Household electricity consumption data (12 months prior to initial survey)

Sample demographics

| PARTICIPANTS | SAMPLE | BRISBANE LGA |
|------------------------------------|---------------|---------------------|
| Females | 73.5% | 54.7% |
| Aged 70 and above | 77.2% | 49.7% |
| Home owners | 81.7% | 67.3% |
| Household income under AUD\$41,599 | 68.1% | 69.4% |
| HOMES | | |
| Three or more bedrooms | 75% | 80% |
| AGE OF HOMES | | |
| Less than 10 years old | 5% | 18% |
| Over 60 years old | 18% | 12% |

Energy Sources

- 48% participants did not use gas and/or solar energy
- 32% use gas
 - 19% have gas hot water systems
- 26% use solar
 - 12% have solar hot water systems (compared to 8.4% Brisbane households)



Energy attitudes and behaviour

| Behaviour | N | Mean | SD |
|---|------|------|-------|
| Switch off the lights in rooms that are not being used | 1577 | 4.72 | 0.556 |
| Hang out clothes to dry naturally | 1000 | 4.59 | 0.826 |
| Run the dishwasher with a full load only | 533 | 4.43 | 1.047 |
| Wash clothes in cold water | 1572 | 4.40 | 1.176 |
| Use fans or natural ventilation for cooling the house | 1581 | 4.30 | 0.895 |
| Close off areas that do not need to be cooled in summer or heated in winter | 1437 | 4.16 | 1.197 |
| Shut blinds/curtains to reduce heat getting into/out of the home | 1559 | 4.11 | 1.141 |
| Consider energy efficient ratings when buying new appliances | 1343 | 4.03 | 1.202 |
| Run the washing machine with a full load only | 1567 | 4.02 | 1.181 |
| Turn appliances and devices off at the power point | 1626 | 3.76 | 1.268 |
| Set the air conditioning to 25°C or more in summer | 410 | 2.15 | 1.414 |
| Set the heater to 18°C or less in winter | 801 | 2.15 | 1.499 |
| Use the clothes dryer | 867 | 1.98 | 0.846 |

Thermal comfort, affordability and energy efficiency

| Measure | Likert-scale | Group | Statistics | Comparison |
|--|--|--------------------|--------------------------|----------------------------------|
| Level of comfort at home without cooling/heating systems | 1=Not comfortable to 5=Very Comfortable | No air-conditioner | n=439; M=3.85, SD=1.29 | T-test=13.39 df=1516; p<0.001 |
| | | Air-conditioner | n=1079; M=2.80; SD=1.42 | |
| Could NOT afford appropriate heating or cooling | 1=Never; 2=Rarely; 3=Sometimes; 4=Often and 5=Always | No air-conditioner | N=458; M=1.78;SD=0.054 | T-test=3.12 df=1529; p<0.01 |
| | | Air-conditioner | N=1073; M=1.60; SD=0.029 | |

- Within the study sample, older participants (80 years and above) were less likely than younger participants (under 80 years) to have air-conditioning at home.
- Penetration of air-conditioning in seniors' homes may rise over time.

Household electricity consumption

| | Model 1 | Model 2 |
|---|---------------------|---------------------|
| Age of home | 40.44(25.74) | 30.91(25.85) |
| Number of bedrooms in the home | 324.90***(66.33) | 357.42***(66.64) |
| Number of people living in the home | 961.01***(77.36) | 909.59***(78.07) |
| Home has air-conditioner | 418.61***(113.08) | 276.68*(118.53) |
| Home has gas water heating | -1534.92***(128.94) | -1555.36***(130.09) |
| Home has solar water heating | -1352.98***(159.34) | -1195.44***(160.27) |
| Number of refrigerators in the home | 492.13***(87.30) | 448.17***(87.68) |
| Home has a dryer | 560.81***(100.92) | 428.85***(102.70) |
| Self-report level of control over energy bills | | -154.12***(44.08) |
| Self-report level of comfort without heating/cooling appliances | | -80.28*(36.50) |
| Level of self-rated energy efficiency | | -343.68***(60.08) |
| _cons | 354.08(261.54) | 2813.81***(388.98) |
| N | 1050 | 999 |
| F-value | 74.57 | 62.00 |
| P-value | 0.001 | 0.001 |
| R ² | 0.36 | 0.41 |
| Adj. R ² | 0.36 | 0.40 |

Conclusion

- Appliance use:
 - 35% sample had more than one fridge
 - 70% sample had air-conditioner
 - Large reliance in air-conditioner for thermal comfort
 - Decrease low-cost adaptive measures
- Energy efficient use of heating and cooling systems
 - 40% of energy consumption in Australian households
 - Typical advice of energy efficiency experts regarding what constitutes ‘ideal’ energy efficiency behaviour
 - Balance low and high energy demand solutions to achieve thermal comfort, health and well-being

Thank you

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