ENERGY USE STUDIED IN REMOTE AUSTRALIAN BUILDINGS TO ENHANCE RESILIENCE TO CLIMATE CHANGE

KEVIN WILLIAMS
COOPERATIVE RESEARCH CENTRE FOR REMOTE ECONOMIC PARTICIPATION
PO BOX 0154, KENT TOWN SA 5071
KEVIN.WILLIAMS@NINTIONE.COM.AU
PH: +61 409 102 209

PETER OSMAN
CSIRO ENERGY FLAGSHIP
10 MURRAY DWYER CIRCUIT, MAYFIELD WEST NSW 2304
PETER.OSMAN@CSIRO.AU
PH: +61 2 9490 5526

LISA HAVAS
CHARLES DARWIN UNIVERSITY CENTRE FOR RENEWABLE ENERGY
CASUARINA NT 0810
LISA.HAVAS@CDU.EDU.AU
PH +61 439 395 034

SUMMARY

The Cooperative Research Centre for Remote Economic Participation Energy Futures project is conducting case studies in Central Australia and Far North Queensland to find out what interventions can reduce energy costs and improve liveability in remote buildings under a warming climate. By 2090, areas around Alice Springs may have 83 days over 40°C (currently 17 days), while areas near Cairns may have 48 days over 35°C (currently 3 days) (www.climatechangeinaustralia.gov.au). While people and businesses in remote areas are resilient and already adapt to a very variable climate, there is a lack of reliable, locally-specific information about how to invest in *transformative* change that's positive, strategic and long-term. This project uses participatory research with local communities and businesses to inform what pathways are feasible and preferred – pathways that will lead to a more vibrant and economically enhanced future.

KEY FINDINGS

- Electricity consumption savings of up to 40 percent are achievable if out of hours' consumption is reduced by switching off appliances not being used or operating in standby mode; by isolating or eliminating appliance waste heat; and by replacing equipment with more efficient models.
- Electricity can be saved and comfort improved in buildings with air conditioning by upgrading building design by reducing drafts and insulating the walls and ceilings and using controlled forced ventilation at night in buildings with high thermal mass.
- Evaporative coolers although very efficient are too hazardous for use in remote locations due to lack of maintenance resources.
- Recommendations were also made on how the house energy efficiency design and rating tool, AccuRate, could be made suitable for designing thermally efficient enterprise buildings in remote Australia.

THE STUDY

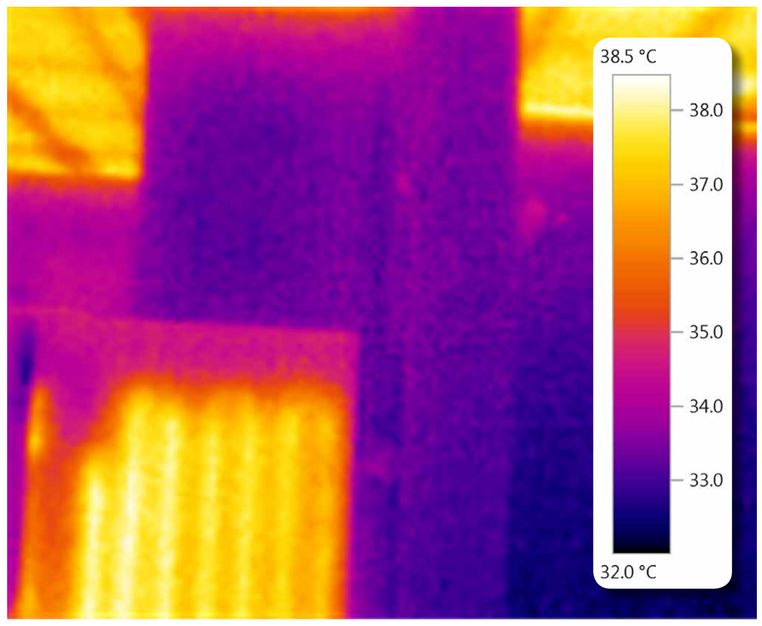
Two building types, besser block and steel frame, were investigated in both hot arid and hot humid climate zones of northern Australia. Aboriginal community art centre buildings were studied due to their accessibility and their important cultural and economic role in many remote communities.

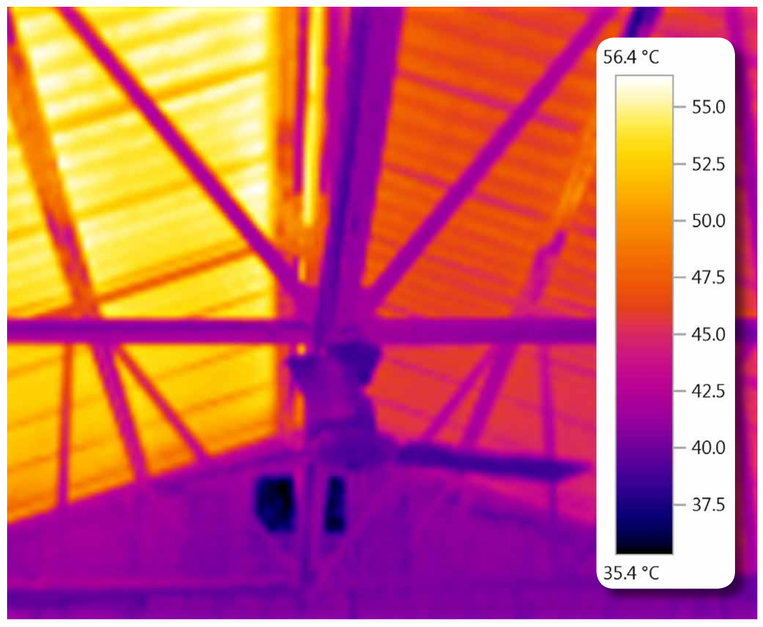
These community buildings have unique requirements. Electricity and transport are expensive, incomes are relatively low and maintenance services are almost non-existent. Additionally, building construction is largely reliant on building energy efficiency codes developed in the major cities where the climates are temperate or cool.

THE DATA

The data acquired included architectural drawings and photographs, temperature measurements, infrared photography and switch board sub-circuit electricity consumption measurements. Brief interviews were also conducted with each art centre manager. In return for assisting the study the building managers have received a report with recommendations on energy saving strategies focused specifically on their art centre buildings. Training was also provided so they could continue to monitor building performance after the study concluded.

(Image courtesy of Gary McWilliams, Mining Tenement Officer, APY)





SIGNIFICANCE

Much climate change adaptation research, including infrastructure research, is conducted in urban areas. Regional and remote areas have unique environmental, societal and infrastructural characteristics that will affect their ability to adapt to climate change. Through participatory research conducted in very remote locations, this study has developed data and findings that are useable by many stakeholders to increase resilience to climate change; from the Aboriginal managers of art centre buildings through to the engineers and architects that design and build infrastructure for extreme environments worldwide. By implementing the measures suggested by this study, remote enterprises would not only achieve energy cost savings, and have a positive impact on CO_2 emissions, but by reducing workplace temperatures, could increase the number of work days available to employees and clients alike.

KEYWORDS

- electricity
- temperature
- adaptation
- building design
- Aboriginal
- AccuRate
- comfort
- productivity
- business

Technical reports and fact sheets are available at:
https://crc-rep.com/research/regional-economies/climate-change-adaptation-and-energy-futures

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