

RESEARCH GRANTS

Background Paper to First Round of Grants, March 2016

The ARBS Foundation grants program is designed to accelerate the translation of research discoveries directly into industry practice, as well as to address specific issues that Australian industry faces. The aim of the research program is to support Australian industry by providing Australian researchers with increased capacity to address research challenges that are at the forefront of industry practice.

Research Areas

The ARBS Foundation will consider all applications for research funding including those that address technical, scientific, policy and other issues the industry faces. However, from time to time, the Foundation will identify specific subjects or issues for research in which the Foundation would like to see proposals.

In its first round of funding, the following areas of research have been identified as ones where the Foundation would welcome proposals.

Solar Power & HVAC

Air conditioned environment has become an integral part of most people in the Western World, whether at home, at work or in indoor leisure and retail centres. Any mechanical cooling requires use of electrical or gas energy, which typically generates greenhouse gases. In Australia, about 21% of our greenhouse gas emissions from electricity generation arise from cooling. Solar load is a contributing factor in the determination of the cooling capacity for an air conditioning system.

- Is there a way that solar energy can be harnessed to operate aspects of the air conditioning systems?
- Can the cooling tower fans that assist in the heat rejection from water-cooled air conditioning system be solar powered?
- Can the home air conditioning system be powered by the energy from the sun?

Intelligent Building Controls

Building Management and Control Systems have come a long way in controlling the building services especially the air conditioning and ventilation systems. They incorporate various techniques to optimise the operation of the building systems to minimise energy usage and maintain indoor comfort. Following are some examples of research questions:

- What is the difference between the occupied zone temperature and the temperature at the wall? Is that difference dependent on the type of HVAC system?
- What is the basis of the set-point of 22.5 degrees C applied in most commercial buildings? Does it achieve the optimum comfort conditions using the measure of Predicted Mean Vote (PMV)?
- Can the temperature set-point be raised if air movement, say via ceiling fans, was increased?

Indoor Environmental Quality

Comfort has become an important factor in Indoor Environments and is featuring in various rating schemes such as Green Star Performance, NABERS IEQ and more recently WELL. Issues involving day lighting and glare, noise levels in open plan offices, air quality, VOC and CO₂ levels, optimum comfort conditions and other related topics are becoming important avenues of research. These can be carried out in Lighting, Acoustic or IEQ Laboratories or through Post Occupation Evaluations (POEs) in commercial applications.

The research issues include:

- Future enhancements - CO₂ sensing and demand control ventilation.
- Will 'comfortstats' replace thermostats?
- Use of occupant sensor controlled LED lighting and its impact on HVAC.
- Utilisation of Miniature data loggers to record temperature and humidity (every 15 minutes for up to three months) to evaluate optimum HVAC operating times when comfort conditions are attained.

Supporting Research Grant

Each grant will be limited to \$20,000 maximum to be utilised within a period of two years maximum. Progress reports will need to be provided to the Foundation.