



University of
South Australia



Barbara Hardy
Institute

Frank Bruno

Research Profile

Research Area Specialisation

Phase change materials, air conditioning, refrigeration, thermal storage, heat pumps, heat transfer and solar thermal.

Contributing to a better and sustainable environment

The next decade is an exciting period for research in Concentrating Solar Power (CSP), the first renewable energy power generation technology with low cost storage. These future power plants need to store heat at high temperature. Frank is leading the development of thermal storage systems using phase change materials, which is recognised as the most promising cost-effective solution for CSP.

Frank is also leading the development of phase change storage systems for low energy refrigeration and air conditioning applications. Recently Frank led the development of a phase change thermal storage system for a refrigeration application that is now being commercialised and is involved in monitoring a full scale plant installed in a farming environment.

Within five years, Frank expects to have phase change thermal storage systems commercialised for a wider range of refrigeration and air conditioning applications, and to have developed significant intellectual property for using phase change materials in thermal storage systems.



Barbara Hardy
Institute

*Great Research
into Sustainability*

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People

- Our researchers are scientists, engineers and social scientists
- We work collaboratively on real-world issues
- Over 100 researchers and 130 research students

Projects

- Multidisciplinary projects focused on sustainability
- We work in partnership with government, industry and academia
- Extensive testing and evaluation services and consultancy expertise
- Our work is underpinned by community participation and education

Research Abstract

Frank is involved in establishing a world-class high temperature thermal storage test facility to test prototype high temperature storage systems up to 900°C. This project also involves designing, constructing and testing two thermal storage systems that incorporate new phase change materials and heat transfer techniques with the aim of reducing the cost of high temperature and high density storage systems.

Work is also underway on a project titled '*Patterns of Electricity Use for Medically Required Cooling by Australians with Multiple Sclerosis*'. This project analyses the energy consumption of air conditioning in homes of people with Multiple Sclerosis to determine if they require the use of more energy for air conditioning.

Frank is collaborating with the Uniting Communities, Lin Andrews Real Estate, Sustainable Focus, SA Power Networks, South Australian Department for Manufacturing, Innovation, Trade, Resources and Energy and Community Data Solutions on a project funded by the Low Income Energy Efficiency Program. This project includes the monitoring of energy for air conditioning in 200 homes across Adelaide.

Research areas of interest

- Thermal storage
- Air conditioning
- Energy efficiency in buildings

Barbara Hardy Institute

Working in the Barbara Hardy Institute provides opportunities to learn about and collaborate with other researchers within the Institute on new research projects.

Keywords to describe Frank's research

- Phase change materials
- Air conditioning
- Thermal storage
- Energy in buildings



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"The development of thermal storage systems using phase change materials is the most promising cost-effective solution to store heat in power plants"