Our vision and mission

The building sector is the largest energy consumer in most countries and is responsible for 35% of worldwide energy consumption and almost 40% of energy-related greenhouse gas emissions.

We are designing Smart Net-Zero Energy Buildings that maximise renewable energy use and generate zero carbon emissions. In this way, we seek to create healthier and more comfortable lives for residents while minimising environmental impact.

Our approach

The optimal design of Smart Net Zero Energy Buildings requires a sound understanding of the complex interplay between multiple variables, such as energy demand and consumption, energy efficiency, internal and external conditions, and environmental impact.

To address this, we are building a data-centric approach that draws on the expertise of computer scientists, electrical engineers, and civil engineers from across the University of Sydney.

Our research

A key Enabling Research Theme of the Net Zero Initiative (NZI) is 'Emissions Reduction through Demand Reduction'. Under the pillar 'Smart Net Zero Energy Buildings', our researchers are developing a holistic energy management framework. This novel framework employs advanced computational techniques to map and optimise interactions between multiple variables involved in building design, construction and use. As part of this effort our experts are pursuing the following activities:

- Building distributed computing platforms to collect, process and store data.
- Developing energy management systems by focusing on fully utilising renewable energy and enhancing energy efficiency.
- Integrating cutting-edge sensing techniques to continuously monitor data of interest via onsite computing to allow for fast decision making.

Meet our research experts

Our interdisciplinary research team leverages outstanding capabilities and infrastructure. Experts working under this pillar include:

School of Computer Science:
Professor Albert Zomaya: Specialises in distributed computing and complex systems

Dr. Wei Li: Specialises in sustainable computing and decision making.

School of Electrical & Information Engineering:
A/Prof. Jin Ma: Specialises in Smart Grid technologies.

A/Prof. Weidong Xiao: Specialises in sustainable energy.

A/Prof. Daniel Dias-da-Costa: Specialises in sustainable energy

How your business will benefit

By partnering with us, your business will be able to:

- collaborate with leading academic and industry experts from the University of Sydney to address the challenges faced by your business;
- help shape the next generation of postgraduate students with skills relevant for your business needs;
- host one or more of our talented PhD students, who can be placed in your business for up to one year; and
- benefit (pending eligibility) from the Australian Government's R&D Tax Incentive Scheme.

Past projects

Examples of our ongoing success in this space include our work on energy informatics and demand response technologies. This is a bilateral government-funded (Australia and China) project to increase sustainable energy usage in daily use and helps to reduce the electricity bill of users.

Our researchers have also developed new generation computing technologies for sensing and data gathering, as well as lightweight machine learning for fast decision making in smart homes. Our work has also led to advances in guarding against cyber attacks in smart home environments. Moreover, our software-defined provisioning of Internet of Things has applications in smart buildings.

Contact us

For further information or to discuss in greater detail, please contact:
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