

SUSTAINABLE SYDNEY

Australia's focus on environmental issues intensified throughout 2008, spurred by warnings from officials and scientists that the world is facing accelerated climate change. The University of Sydney is at the forefront of those developing solutions for these pressing challenges.

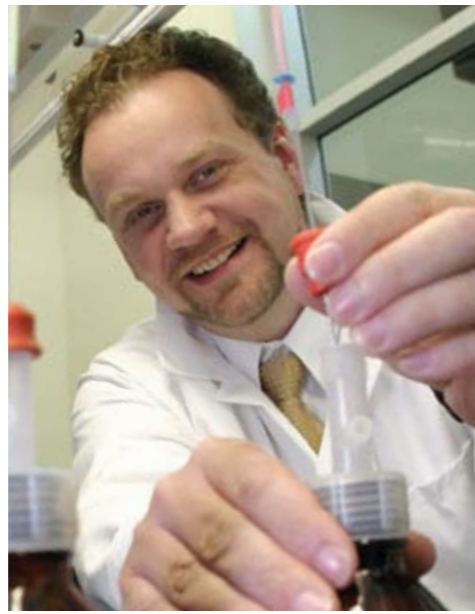


Courtyard of the new Jane Foss Russell Building, which houses most of the University's student support services and is a key part of the Campus 2010 infrastructure project. The Campus 2010 buildings use a number of technologies to keep their carbon footprint to a minimum.

“ More solar energy reaches the earth in one hour than the world needs for a year. This is a source of energy we need to employ for global good. ”

**Professor Thomas Maschmeyer
School of Chemistry**

SUSTAINABLE SYDNEY



Some of the researchers who are part of the University's Institute for Sustainable Solutions. *From left to right:* Professor Thomas Maschmeyer, who hopes to help address the world energy crisis with a solar powered process; Associate Professor Ruth Colagiuri, who has made a significant contribution to sustainability through her extensive work in chronic disease prevention and control in the Pacific Islands; Professor Robyn Overall, an expert in plant cell biology who is exploring the cellular processes that underpin plant growth.



In early 2008 rain in some cropping areas briefly alleviated the impact of Australia's worst drought in more than 100 years, but dry weather soon returned to blight the Murray-Darling river system, while the impact of climatic conditions across the rest of the country – from torrential flooding in the north to drought-fuelled fires in the south – have caused widespread disruption.

Although environmental issues often capture most attention, the future sustainability of our way of life faces many challenges: for example, the availability and price of food, or the health and economic consequences of overpopulation. The University of Sydney is at the forefront of those developing solutions for these challenges.

In the middle of 2008, the University created the Institute for Sustainable Solutions (www.usyd.edu.au/sustainable_solutions) which groups researchers around four thematic areas – energy, environment, development (including security, law and economics) and health.

To list just a few of the researchers linked to the institute underlines the breadth of issues being examined – and the widespread potential for cross-disciplinary solutions.

One of the institute's two interim directors is ARC Federation Fellow Professor Thomas Maschmeyer, a technical chemist who specialises in catalysis – accelerating chemical reactions. Maschmeyer hopes to help tackle the world energy crisis with third generation biofuels and solar-powered processes. For example, he can harness sunlight to generate hydrogen gas from waste water by using a non-carbon emitting process which addresses concerns about climate change and can also be an integral step in recycling degraded water supplies.

"More solar energy reaches the earth in one hour than the world needs for a year. This is a source of energy we need to employ for global good," explains Maschmeyer.

Demonstrating how the Institute for Sustainable Solutions brings together research on similar themes from different disciplines, Maschmeyer's fellow interim co-director, Associate Professor Rosemary Lyster, is looking at how to reduce greenhouse gases from a legal perspective.

An associate professor in the Law School and director of the Australian Centre for Climate and Environmental Law, Lyster's research focuses on how the law can be used to regulate escalating energy sector emissions, for example through energy and carbon taxes, tax incentives, or participation in international or national emissions-trading schemes.

But Sydney researchers cover a much broader range of sustainability issues than just emissions. For example, the institute houses research on breeding plants that can deal with climate change, examining the security implications of climate change, and studying how we can learn from history when tackling overpopulation.

It doesn't only group individual researchers, but also encompasses work done by the George Institute for International Health, which aims to deliver health improvements where they are most urgently needed, such as in the low- and middle-income countries of Asia and in Indigenous populations of Australia.

Other researchers have already changed how the University itself operates. In August 2008, the University published its first 'triple bottom line' report, based on work developed by the Centre for Integrated Sustainability Analysis (ISA) in the School of Physics.

British sustainability guru John Elkington first coined the term triple bottom line (TBL) in 1997 to refer to reports that analyse an institution's social and environmental impact, as well as reporting the traditional financial bottom line. The Sydney model is unique because it calculates an institution's full footprint, including resources that its suppliers use to deliver products and services. For the University, this means tracking how it performs in terms of operating surplus and attracting research grants, and monitoring its own carbon footprint – as well as the performance of third-party suppliers such as building contractors and power generators.

For example, by using the ISA model the University knows that for every dollar it spent on wages between 2004 and 2006, another 27 cents was spent on wages in the supply chain, helping to create additional jobs and contribute to economic growth. Conversely, the increase in the University's activities over the three-year period led to an 11 per cent increase in energy consumption and a 10 per cent rise in greenhouse gas emissions.

"We do cause a lot of emissions, but we are a big organisation," notes the ISA's Dr Chris Dey, who developed the TBL methodology with Professor Manfred Lenzen. "To have no emissions would mean that we are doing nothing.

"For example, travel is important for us to reach out to international research partners. TBL reporting helps the University understand the extent of those emissions and address them responsibly."

TBL – sometimes referred to as 'people, planet, profit' – can be used as a reporting device to track institutional performance, but the real potential of the ISA work is as a strategic decision-making tool that helps organisations examine the environmental, economic and social implications of their future decisions, products and operations.

This is what Phase 2 of the University's TBL Project is already doing, explains Dey. Using ISA-developed software the University can analyse planned major initiatives to model their likely impact.

"For example, building the new Centre for Obesity, Diabetes and Cardiovascular Disease would obviously increase our carbon footprint, but the University could mitigate that through building eco-friendly facilities," says Dey. "Furthermore, TBL modelling would allow us to show the social and economic benefits of job and wages creation, not to mention the public health benefits that the centre will deliver through new research."

However, the impact will spread far beyond major multi-million-dollar projects. Individual faculties will be able to test various scenarios to forecast with greater accuracy the financial, social and environmental impacts of planned initiatives, and if necessary make changes before they are implemented.

"TBL shows the interdependent nature of economic, social and environmental decisions," says Bob Kotic, Chief Operating Officer and Deputy Vice-Chancellor. "It will help us to weigh up the benefits of decisions to ensure we manage our resources as efficiently and responsibly as possible, while continuing to improve the standards of teaching and research, sensitive and acutely aware of our environmental footprint and the impact of our planned initiatives."

The University has already taken action as a result of Dey and Lenzen's Phase 1 report, which concluded that while Sydney's performance across most of the academic and financial indicators was at or above the average of Group of Eight (Go8) universities, its greenhouse gas emissions were high, particularly those associated with electricity use and air travel.

In response, the University's Senate established a working group in November 2008 to drive reduction of the University's greenhouse gas emissions by measuring performance against emission reduction targets and examining energy use, particularly air-conditioning equipment.

TBL – sometimes referred to as 'people, planet, profit' – can be used as a reporting device to track institutional performance, but the real potential of the ISA work is as a strategic decision-making tool that helps organisations examine the environmental, economic and social implications of their future decisions, products and operations.

SUSTAINABLE SYDNEY

Left to right: Dr Joy Murray, Professor Manfred Lenzen, and Dr Chris Dey of the University's Centre for Integrated Sustainability Analysis.



Just like the Institute for Sustainable Solutions, the Senate working group draws on University expertise across a wide range of disciplines. As well as Lyster and Dey, its members include Geoff Frost, Associate Professor of Accounting, and Tony Vassallo, holder of the Delta Electricity Chair in Sustainable Energy in the School of Chemical and Biomolecular Engineering. Chaired by the University's Chief Financial Officer, they are joined by student representatives and non-academic colleagues from the University's Campus Infrastructure Services unit.

"It shows how the University's research is informing and being informed by the University's own experience as an institution," says John Lavarack, Manager Campus Sustainability, who oversees the University's water and energy savings plans.

"Heating, ventilation and cooling together account for around half of the University's direct energy consumption so it's critical we look at how we can reduce emissions."

Completion of the Campus 2010 project, which includes the Jane Foss Russell Building for student services and the new Sydney Law School building, is an important step along the way.

"The Campus 2010 buildings are state-of-the-art from a sustainability perspective, using energy-efficient technologies such as chilled beam air conditioning," says Lavarack. "All of this will help reduce our emissions."

"We know we can improve and we're committed to doing that."

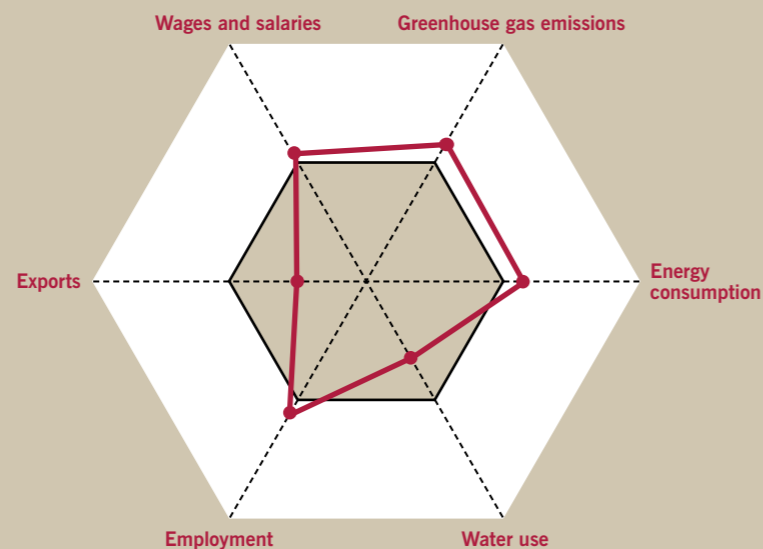
TBL PERFORMANCE

Benchmarking is core to analysing the University's Triple Bottom Line performance. ISA's 2008 report benchmarked the relative performance of the University in 2006 against the entire Australian education sector average. The groundbreaking nature of the report means that it is not yet possible to benchmark in the same way against other universities.

The University's performance against the sector average for each indicator is shown by the points on the diagram below. The closer the point is to the centre of the diagram, the better the University's performance. Individual points are linked by a red line.

"Our emissions are high compared to the whole education sector, in part due to the electricity use required to support the volume of research activity here. This doesn't occur to the same degree across the whole sector," explains ISA's Chris Dey. "However, we know that compared to other leading universities we are one of the lowest users of electricity, gas and water per student."

"In terms of salaries, again we're below the sector average but that's because we're comparing ourselves against the whole education sector and we have a greater proportion of expenditure on upstream suppliers and equipment than schools do, for example. That in turn has a positive impact on the University's economic stimulus, and our export performance – that is the revenue we derive from outside Australia – is also strong thanks to our popularity with international students."



Towards the centre indicates better than average performance
 — The University of Sydney's performance — average sector performance

SUSTAINABLE AGRICULTURE

The environment, energy, food and water resources are fundamental to our future, so it's no surprise that the Faculty of Agriculture, Food and Natural Resources is at the forefront of studying sustainable management of natural resources.

The faculty's activities attract national and international attention, as seen in October when Professor Ivan Kennedy and Dr Michael Rose received a major innovation award from the World Bank. Kennedy and Rose are working with the Institute of Agricultural Sciences in Ho Chi Minh City to lower rice farmers' costs by allowing crops to be grown with much less nitrogen fertiliser, potentially reducing emissions of the greenhouse gas nitrous oxide.

The University's work on sustainability received a major boost during the year, when alumnus David Coffey with his wife Judith donated \$4 million to establish a professorial chair in sustainable agriculture.

Coffey graduated from the University with a Bachelor of Engineering in 1947 before building a successful career in soil mechanics and foundation engineering. Coffey International is now an ASX 300 enterprise employing more than 4000 workers across Australia and overseas.

He stepped down as chairman in 1984, spending more time at the 1200 hectare NSW property that the Coffeys bought in 1975, where he learnt farming techniques for winter and summer crops, as well as sheep and cattle.

This conjunction of interests between agriculture and engineering reached fruition with the funding of the professorial chair. While Coffey is under no illusions about the level of challenges ahead, Mark Adams, Dean of the Faculty of Agriculture, Food and Natural Resources, says the Coffey donation is already having a major impact on sustainability studies and research at Sydney.

"The first holder of the Coffey professorship, John Crawford, is developing some tremendous concepts for graduate centres focused on interdisciplinary studies in sustainability that are getting buy-in right across the board, for example from physics, mathematics, biological sciences, social sciences, and economics."



"With the help of the Coffey donation we're getting together a program that offers master's degrees, high profile research training, interdisciplinary studies, and new technologies all focused on the issue of the day."

Professor Mark Adams
 Dean of the Faculty of
 Agriculture, Food and
 Natural Resources