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UCT steps up energy sustainability efforts linked to reducing carbon emissions by 2030

The University of Cape Town (UCT) is preparing a new energy sustainability plan that is intended to significantly reduce energy consumption and net carbon emissions by 2030. The university initiatives will likely consist of a programmatic approach including:

- Extensive energy audits of building energy consumption;
- Intensified energy metering and monitoring;
- Improved, automated building management systems;
- Energy efficient lighting and Heating, Ventilation and Air Conditioning installations and retrofits;
- Solar photovoltaic (PV) installations across campuses on rooftops and parking areas - currently the feasibility study is underway to determine which buildings and locations this is most feasible for;
- New buildings that are certified green buildings and are highly energy efficient ; and
- Plans for the Jammie Shuttle to shift from diesel to electric buses.

Over the past 10 years UCT has already taken positive steps to make improvements, including:

- Converting electric hot water boilers in UCT residences to energy-efficient heat pumps;
- Conducting a few energy audits in some existing buildings since 2017;
- Retrofitting energy-efficient lighting fixtures in one residence;
- Committing in 2012 to green designs for all new buildings that are independently certified by the Green Building Council South Africa, beginning with the New Lecture Theatre, which opened in 2016 on upper campus and the Graduate School of Business conference centre at the V&A Waterfront, which was opened in July 2019.

UCT's new director of environmental sustainability, Manfred Braune, is working closely with faculties and departments across all campuses, as well as the Property and Services Department, with the goal of achieving close to net-zero carbon emissions by the period spanning 2030-2050. This will be done by gradually reducing usage of electricity from the South African grid, which is currently very carbon intensive. This will not only contribute

towards reducing greenhouse gas emissions and air pollution, but will ultimately save the university millions of Rands every year.

This work creates an ideal opportunity to link these projects to research and learning activities in future turning the UCT campus into a "Living Lab". The faculty that is most closely involved with these measures is Engineering and the Built Environment (EBE), which proposed a pilot project in 2015 that involved placing PV cells on the roof of just one building. Braune, an EBE alum, joined UCT in April 2019 to consider, among other things, how the university can save more energy and produce renewable energy on site. "The intention behind establishing an office that is dedicated to environmental sustainability is to grow the institution's efforts and deliver on its commitments in this regard," Braune said.

He said there were different commercial models for rolling out solar PV, all of which UCT would explore in the current feasibility study that UCT is conducting with the help of a specialist engineering consulting firm. One possibility might be to lease UCT roof space to solar power providers, which could generate electricity that UCT could use without having to invest capital in the infrastructure itself. "Alternatively, UCT could invest in the infrastructure and see the full Rand savings every month with a very good return on investment," Braune said.

His work will open up new areas for future energy research by staff and students across the university. Since the 1970s, the EBE faculty in particular has placed a major research focus on energy issues, including energy sustainability, climate change and the relationship between water and energy. These issues are multidisciplinary and a proper investigation of them usually relies on collaboration between different departments and faculties.

Professor Alison Lewis, the EBE dean, said: "Given the huge importance of energy in the economic life of the country, UCT is considering how to best serve these national interests. One proposal we are considering is to consolidate our energy activities from various departments in future, perhaps under the umbrella of a single hub. This reflects UCT's recognition of the interdisciplinary work that is needed to address the energy problems facing our country."

Cleaner energy production and energy storage cuts across many spheres, including chemistry, physics, electrical engineering, mechanical engineering, civil engineering, and socio-economic and environmental issues, so a cross-disciplinary approach across various faculties is logical and necessary.

As part of this wider plan, EBE has begun to review its footprint in energy research with a view to facilitating greater interdisciplinary collaboration similar to how the Future Water Institute has been established. With the establishment of the Environmental Sustainability Unit under the auspices of Dr Reno Morar, UCT's chief operating officer, this provides the university with a new opportunity for integrated futures work in energy.

As part of this wider plan, EBE has begun to restructure elements of the Energy Research Centre (ERC) to ensure the future financial viability of its projects. Since its formation, the ERC has investigated the overlapping challenges in environmental protection and socio-economic development, to deepen knowledge and understanding of energy and development needs, problems, challenges and innovative solutions. These important projects and their research staff are being migrated to teams and units that have an appropriate shared focus.

UCT research into the environment and sustainability is renowned worldwide, through key entities such as the Climate System Analysis Group, which consults to the United Nations; the Future Water Institute and the African Climate and Development Initiative.

These initiatives aim to improve energy sustainability for communities across South Africa and the world. Braune commented that UCT itself will benefit from an integrated approach to energy and the environment: "The university's own campus needs better integrated environmental management and care. This concerns much more than waste management; it's also about water and energy efficiency, human health, green investment and good citizenship," he said.

UCT's research focuses on energy through EBE initiatives such as:

- Hydrogen Fuel Cell Research (in HySA Catalysis);
- Biofuel Research (Centre for Bioprocess Engineering);
- Environmental and Process Systems Engineering Research;
- Eskom Specialisation Energy Efficiency;
- Eskom Power Plant Engineering Institute;
- Power Systems Research;
- Machines and Power Electronics Research;
- Urban Water Management;
- Waste Water Research; and
- Multi-disciplinary research through the Future Water Research Institute.

ENDS

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