

NTU students find way to draw power from wastewater

Singapore's street lights could one day be powered by electricity generated by wastewater sludge.

The system that could make this possible was developed by two Nanyang Technological University undergraduates.

Called BAE – which stands for Biomass from Activated Sludge to Electricity – it has earned the pair a top spot in a national competition.

Mechanical engineering and economics student Charlene Lim, 22, and chemical engineering and economics student Chan Hao Yang, 24, submitted BAE to the annual Go Green in the City competition, held by multinational electrical equipment company Schneider Electric.

BAE harnesses existing microbial fuel cell (MFC) technology, which mimics natural bacterial processes to drive an electric current.

MFCs were first used as power supplies in 2007 and have been tested in rural settings such as African refugee camps, where urine was converted into electricity by an MFC system, Pee Power.

The BAE units, which contain



Mr Aditya Kumar, Schneider Electric's regional application centre leader, flanked by Nanyang Technological University students Chan Hao Yang and Charlene Lim, with a prototype of the system the two undergraduates came up with. ST PHOTO: MARCIA LEE

MFCs that have been scaled up and adapted for urban wastewater pipes, are able to retain 65 per cent of the energy produced by the activated sludge for use as electricity, said Ms Lim and Mr Chan.

This is more than three times the energy from the regular sludge treatment processes of fermentation and incineration, which retain

just 20 per cent of energy produced, according to the pair's research.

BAE also uses technology to integrate with Singapore's wastewater management ecosystem.

Now in its ninth edition, this year's event saw more than 23,000 university students around the world compete in four categories of green innovation: sustainability and access to energy, buildings of the future, (electrical) plants of the future and (electrical) grids of the future.

"We wanted to enter the energy category, and our research showed that unlike other forms of green energy – like solar, wind and geothermal energy – energy converted from wastewater hadn't been explored as much," Ms Lim told The Straits Times.

The duo beat 42 other Singaporean teams to get the chance to be mentored by Schneider regional application centre leader Aditya Kumar, and will compete in a regional final at the end of this month.

If they win, the pair will pitch their innovation in the grand finale at the Schneider Electric Global Innovation Summit in Barcelona, Spain, in October.

But, regardless of competition outcomes, their project stands a chance of becoming reality.

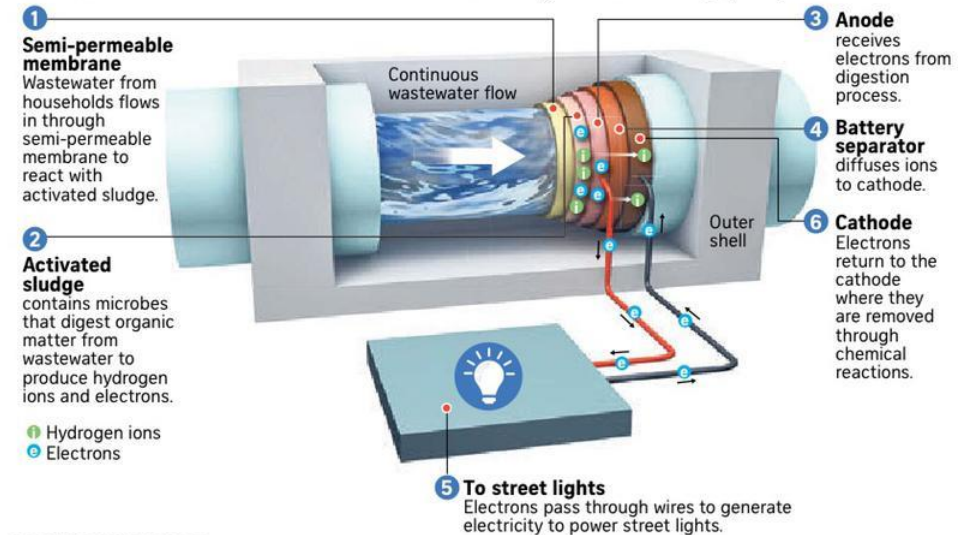
Said Schneider country director and head of human resources Karen Lim: "We could still continue to develop the system and pitch it to business sponsors. If it proves viable, we may roll it out in Singapore."

Marcia Lee

Putting waste to good use

Designed by Nanyang Technological University undergraduates Charlene Lim, 22, and Chan Hao Yang, 24, for the annual Go Green in the City competition organised by Schneider Electric, this microbial fuel cell (MFC) set-up efficiently converts activated sludge from wastewater to electricity for street lights.

Name of invention: **Biomass from Activated Sludge to Electricity (BAE)**



BY THE NUMBERS



Each BAE unit can power about 1,000 street lights.



The BAE process retains 65% of energy produced by the activated sludge, more than three times the 20% retained by current sludge treatment processes of fermentation and incineration.

Source: NTU STRAITS TIMES GRAPHICS: LEE HUP KHENG