

From sub-tech to Cleantech, the Australian invention putting renewable energy in the ascendancy at UN COP17 summit.

28 November 2011, Durban, South Africa – A renewable energy generator that mimics submarine technology to create enough electricity to power an entire city was unveiled today at the United Nations COP17 climate change summit in Durban, South Africa.

The Australian Hidro+ Hydrodynamic Power Technology [HPT] is the brainchild of James Kwok, a Chartered Professional Engineer and Fellow of the Institution of Engineers Australia. It is the only new Cleantech on exhibit at the annual convention which runs until 07 December. Like a submarineⁱ, it harnesses gravity, buoyancy, gas density differences and water-column hydrostatic pressure gradients to create ‘rise and dive’. Inside water-filled towers, large weights ascend and descend in a continuous Hydrodynamic Cycle. The free-fall velocity of the descending weight gravitational potential energy is converted into affordable green energyⁱⁱ.

The Hidro+ Hydrodynamic Power Plant has been designed to co-exist with current energy infrastructure to avoid transmission losses, add capacity to the energy grid and to achieve carbon neutral energy generation. Plants can be constructed anywhere in the world, ideally in one Megawatt (MW) modules. Each costs US\$ 3.75 million or one-thousandth of the price of a Seawolf subⁱⁱⁱ; is capable of generating 8,500,000 kilowatt hours (kWh) per year, enough continuous electricity for some 1,300 homes; and in doing so offers an annual saving of more than 19,000 tonnes of carbon and greenhouse gas emissions over traditional power generation, the equivalent of taking some 8,000 cars off the road^{iv}. Each also saves 30,000,000 litres of water – or 750 swimming pools – and 595 tonnes of dust particulates.

“The Hidro+ Hydrodynamic Power Technology satisfies the four pillars of power generation: Efficiency; Reliability; Availability; and Affordability,” Kwok says. “Hidro+ is unaffected by the costs associated with fossil fuels, consumables, upstream and downstream processes. It does not produce any emissions, CO², nitrous and sulphurous oxide or any other gases or chemicals. It only uses sea water or recycled water as a static-medium and not for operating cycles such as cooling and steam generation; so there is no volume depletion of the seawater from the tower. And it is not affected by fluctuations in the weather.”

The birth of the Hidro+ is a case of the old adage 'out of adversity comes creativity' – a common theme in Australian innovation; it has been suggested that the island continent's inventiveness springs from the nation's unique geography. Kwok holds Australia's first renewable energy certificate for a 20MWe Biomass plant – but when drought hit southeast Queensland in early 2003, a lack of feedstock and water meant the plant became unsustainable. It prompted the inventor to seek an alternative and more reliable source of sustainable clean energy.

After years of research and development, the first semi-commercial plant was finally deployed in Queensland last year. Having worked with leading Cleantech experts from various Universities in Australia and overseas to validate the patented Hydrodynamic Power Technology (HPT), the world first has since been showcased to governments around the globe. It is now ready for commercial roll-out to address power supply inefficiencies in regional and metropolitan areas, and power supply to remote areas.

In South Africa where the Hidro+ is currently on show, a government body has signed a longterm Power-Purchase Agreement (PPA). Back in the land down under, an AUD 4 billion in private investment has been secured by an Australian company for a clean energy generation project that will alone save 28.6 million tonnes of pollution from the atmosphere each year, the equivalent of taking 11.95 million cars off the road. And in Indonesia, where the National Energy Policy has targeted 25 percent of the Archipelago's 25,000 MW capacity to come from renewables by 2025, and Hidro+ is currently manufacturing a 10 Megawatt plant in the capital Jakarta^v.

Professor Simon Kaplan, formerly Executive Dean at QUT's Faculty of Science and Technology, says: "Innovation in Cleantech is about changing the way we manufacture, what we produce and how we consume it in order to decrease our environmental footprint, minimise pollution and maximise use of natural resources. Undertaken strategically, the uptake of Cleantech is a paradigm shift that can bring about economic growth and development while responding to global environmental and social challenges. What James is doing with the Hidro+ could bring about a step change in renewable energy."

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Notes to editors

Images: A 3D Construction Model of the 1 Megawatt Hidro+ plant on display at the United Nations Framework Convention on Climate Change (UNFCCC) COP17 Climate Change Convention. It is approximately 23 metres in height and has a 500m² footprint.
