

Engineering Week

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Desalination plants use between six and 10 times the energy used in sourcing ground water to produce a kilolitre of water — which is a downside with an upside for WA's renewable energy buffs.

The upside is the potential for the State's next desalination plant to become working proof for the viability of previously neglected renewable energy technology in WA, such as wave power.

The Southern Desalination Plant, to be built outside Binningup in the South-West, will deliver 50Gl of water a year, about 16 per cent of WA's total supply, with the ability to be expanded up to 100Gl a year.

Project director Nick Churchill said the total amount of energy that would be used to run the first stage of the plant (producing 50Gl a year) was about 200 gigawatts a year.

"Of this 80 per cent will be a commercially proven (renewable) energy source, like wind or biomass, while the other 20 per cent will be from commercially unproven sources such as wave power," Mr Churchill said.

Seven energy companies have been short listed by the Water Corporation to tender for the supply of 80 per cent of the renewable energy required.

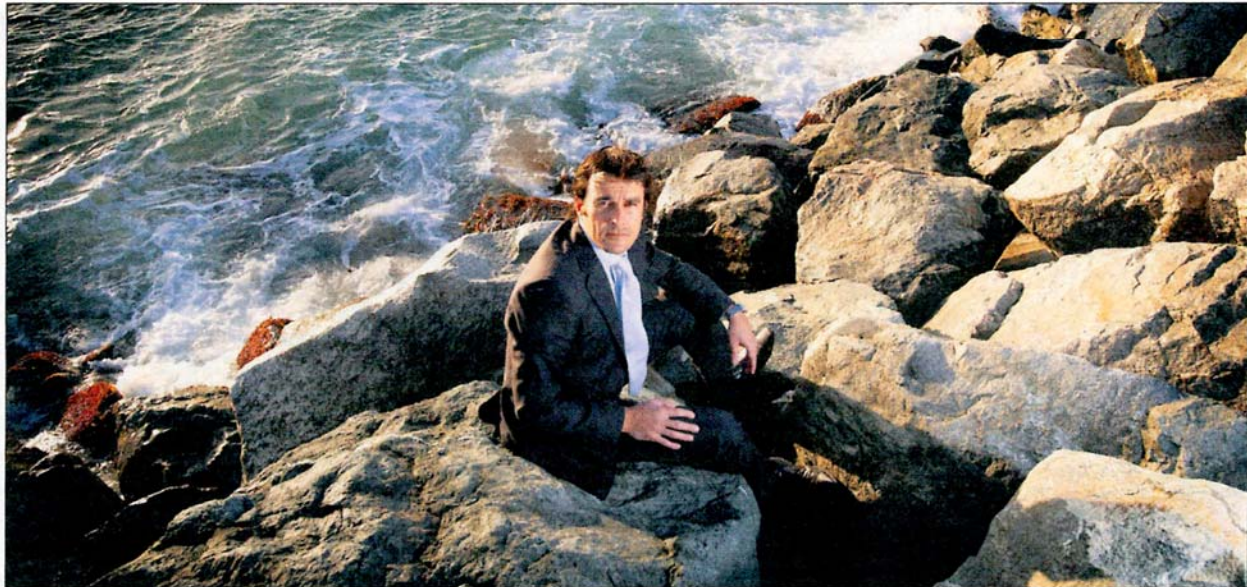
Four groups have been selected out of 18 that applied to pre-qualify to supply the 20 per cent — or 40GW a year — unproven portion, with final submissions due in September.

A decision will be made by the Water Corporation on which is most viable in November and there is potential for more than one source to be used.

Mr Churchill said several aspects would impact on the choice of power, including cost and ability to get it off the ground by 2011.

"Each company would have to address any issues related to the generation source so that the plant would not be impacted on variables such as wind, or waves," Mr Churchill said.

Carnegie Corporation's CETO wave power technology is one of those on the short list and the oil



Crest of a wave: Carnegie Corporation managing director Michael Ottaviano believes the ocean is the most powerful source of renewable energy.

Perth team buoyed by new wave energy

and gas engineering expertise in WA was crucial to its development.

Carnegie managing director Michael Ottaviano said the ocean was the most obvious source of sustainable, renewable power.

Tides are created by the relationship between the Earth's rotation and the gravitational attraction of the ocean to the sun and the moon.

"It is a very, very concentrated form of energy," Dr Ottaviano said.

"Solar and wind are relatively diffuse forms of energy and particularly with solar you have to concentrate it with mirrors to produce dense enough energy to be able to economically exploit it

— wave is in fact an already concentrated form of solar energy."

The CETO technology, invented by Carnegie chairman Alan Burns, involves buoys tethered underwater, which take the swell in the ocean's wave and create electricity by pumping high-pressure sea water ashore to spin the turbines.

"The CETO units replace the pumps that would otherwise be required for a desalination plant and the ocean's energy replaces the power station that would usually be required to power those pumps," Dr Ottaviano said.

"It's the only way that exists to produce zero-emission desalinated water, which is obviously a

challenge for the desalination industry currently."

Dr Ottaviano said the main challenge associated with CETO was the massive amount of energy generated during a storm.

Fortunately, Perth's big population of offshore oil and gas engineers has provided insight into storm survivability, as has the science originating in that industry, such as computational fluid dynamics, which enables the company to use computer-generated conditions to in tests.

"Effectively what we have got is a full-scale virtual ocean where we do all our initial testing before we move into the real ocean," Dr Ottaviano said.

Carnegie has about 35

employees ranging from oil and gas engineers through to divers and oceanographers.

"It doesn't happen through a single individual working on it, it requires all of those different facets to come together to produce a solution," Dr Ottaviano said.

"When you've got 35 different smart people with a whole bunch of different skills, the challenge is making sure you are making use of all of those skills."

Regular design sessions are held at Carnegie to bring the subsets of the team together and an internal wiki system — a collection of web pages that can be moderated by users — helps to store ideas.

"It's kind of like your old fashioned ideas log if you like, but it's a wiki, so the ideas stay alive and dynamic and develop," Dr Ottaviano said.

People looking at a career in ocean engineering should get out and do some fishing or surfing.

"That gives you a really good appreciation of the forces involved in the ocean, but a mechanical engineering degree is also a pretty good start," Dr Ottaviano said. "We've got a disproportionately high number of divers and surfers in the team. You can do research by sitting on a surfboard."