Desert 'riches' the key to our future?

At a recent symposium in Alice Springs, Australian physicist Dr Barrie Pittock presented a vision of the nation's deserts as vast power plants providing clean, renewable energy not only for Australia, but also for Asia, at the same time creating indigenous employment opportunities in remote communities.

With Australia having some of the highest sunlight intensities anywhere, Dr Pittock estimates that 'an area no larger than 50 kilometres square could meet the nation's entire electricity needs', citing new developments in solar thermal, hot rock geothermal and tidal energy.

While the construction of high-voltage, low-loss direct current (DC) transmission lines to industrial and urban centres would be relatively costly, they would provide the capability for Australia to deliver energy across thousands of kilometres via cheaper buried and undersea cables – stretching to Asia – with minimal losses.

Dr Pittock says installing low-loss powerlines to deliver renewable energy is cheaper and less exposed to safety and financial risks than developing nuclear reactors or building the next generation of coal-fired power stations which rely on the success of geosequestration.

At the same event, an advisor to the United Nations Environment Programme (UNEP) proposed that scientists turn to deserts and the natural phenomenon of biomimicry to find solutions to environmental problems.

John Scanlon cited the unique properties of the Namibian Desert beetle, which 'can teach us how to recycle steam from cooling towers, based upon the way this creature harvests water from fogs.'

Apart from sun and hot rock energy, living creatures in Australian deserts could hold the key to new water saving and cooling technologies. CSIRO ScienceImage/Willem van Aken

'Then there is Africa's resurrection plant, which dehydrates itself when there is no rain and then rehydrates again after rain.

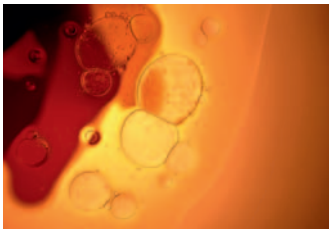
'Somehow this plant can go into a state where it is dehydrated and it stays alive, and biomimicry is looking at producing vaccines (for poorer countries) that can stay alive without refrigeration based upon the plant's properties.'

Plants to wean chemicals industry off crude oil

CSIRO is working with a large biotechnology consortium to help develop crops that will produce plant-derived oils as alternatives to the crude oil extracts currently used in the chemicals industry.

The consortium aims to modify non-food oilseed crops so that they produce wax esters, which are more resistant to high temperatures and pressures than normal plant oils. This will substantially increase the industrial potential of plant-derived oils.

The Industrial Crops producing added value Oils for Novel chemicals (ICON) consortium involves leading scientists from 23 partner organisations in 11 countries.



An international consortium is working to develop industrial plant-derived oils to replace crude oil extracts. iStockphoto/Chris Fertnig

CSIRO's contribution will be identifying the novel genes for wax synthesis in crop plants. Researchers are developing crops that will provide renewable materials to replace petrochemicals through another joint venture, the Crop Biofactories Initiative.

While there are a range of alternatives to using fossil fuels for energy, only biological materials can replace petroleum-derived lubricants and industrial chemicals.

Salt-tolerant wheat hybrid and saltbush for farming salinised land

Researchers from the Universities of WA and Adelaide have used traditional crossbreeding techniques to develop a salt-tolerant wheat hybrid that could allow farmers to crop land lost to salinity.

Working through the Future Farm Industries CRC (FFI CRC), the researchers have bred the hybrid from sea barley grass – a wild relative of wheat that grows in water almost as salty as sea water – with a traditional wheat variety to create a plant that will tolerate both high salt levels and soil waterlogging.

While grain from the trial crops has shown promise in its first WA field trial, its quality makes it suitable only for stock feed. Researchers are aiming for a product of high enough quality to be milled into flour.

Saline land can be vegetated by saltbush – which also acts as a nutritional supplement for sheep – and now a salt-tolerant wheat strain. CSIRO ScienceImage/Gregory Heath

In another WA salinity project, FFI CRC researchers have demonstrated the potential of saltbush as a nutritional supplement for sheep. Sheep grazing saltbush had five times the plasma vitamin E – an antioxidant that prevents fatal heart and muscle damage – than sheep in a neighbouring paddock.