

# Renewable energy is 'where the future lies'

The recent World Future Energy Summit (WFES) held in Abu Dhabi, capital of the United Arab Emirates, left attendees in no doubt as to the future direction of the global energy sector.

The summit, attended by more than 16,000 people from 79 countries, focused on possible solutions to global energy security, with a particular emphasis on renewable energy. Renewable energy generation, primarily solar, wind and ocean power, as well as geothermal, biofuels and fuel cell technology, is where the future lies for energy generation.

Carbon capture and storage provided another rich source of debate and discussion.

According to solar power experts at the summit, solar technology is becoming increasingly economic, even when compared to fossil-fuelled energy generation. In less than a decade, it's predicted, solar power could achieve "grid-parity" in certain regions of the world. If the technology continues to advance at its current pace, and if governments are prepared to use subsidies and incentives in an appropriate manner, solar energy could one day absorb a lion's share of powering our cities.

There are three major technologies



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that dominate the solar power space – the silicon-wafer-based photovoltaic system, the thin-film photovoltaic system and concentrated solar thermal power.

The first two absorb light and turn it directly into electricity and the third uses mirrors to reflect light and heat water, which in turn drives a turbine. All three technologies have their benefits as well as their limitations and there is much debate on where technology companies and governments should invest.

Solar power has huge application in parts of the world that either have large solar resources themselves, or have access to such resources close at hand. For example, experts calculate

that just 1% of the solar energy trapped in the Sahara Desert could one day power the whole of Europe.

Unfortunately, it's still much cheaper to burn coal than it is to transfer this energy thousands of kilometres from the dry and hot Sahara to cities around Europe. But with continued progress in solar energy technology and with reductions in the costs of generation that come with time, the solar energy sector is expected to contribute more and more to meeting the world's energy needs.

Wind power as a form of energy generation has a very large scope in New Zealand. Our wind resources are among the best in the world and wind fits easily into our already predominantly renewable energy profile. Internationally, wind is the fastest-growing area of the global electricity sector. There is currently 100 gigawatts of wind generation worldwide, but this could increase nine-fold by 2020.

However, like solar, the development of wind energy needs a reduction in costs to drive demand if it is to truly compete with coal and natural gas. As one expert said:

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"Wind-farm development and construction must move from the boutique level to the industrial level if it is to ever reach 'grid parity'."

The International Energy Agency (IEA) predicted at the summit that global energy demand will increase by at least 50% by 2030. It's estimated this will result in a 57% increase in energy-related greenhouse gas emissions.

What's more, coal demand is expected to increase by 73%, primarily due to development in China and India.

So how do we balance this with our need to decarbonise the energy sector to avoid climate catastrophe?

One proposal is carbon capture and storage – capturing the carbon at the point source, such as a coal-fired power station, and then permanently

storing this gas away, either under the Earth's crust or in deep-sea bodies. Currently, carbon capture and storage is in its infancy, with much of the process untested. However, it is the only real known opportunity to effectively keep carbon dioxide out of the atmosphere on a large scale.

Experts claim carbon capture and storage could potentially contribute up to 20% of the global CO<sub>2</sub> mitigation by 2050. However, the technology needs to be advanced and costs need to come down to make carbon capture and storage viable.

Herbert Girardet, World Future Council director of programmes, captured the aspirations of the summit in his keynote address, saying "the common aim of worldwide energy policy has to be a complete switch to renewable". Obviously, fossil-fuel energy generation will continue to have a major role in meeting the world's energy demands, but, as the summit shows, the opportunities already exist and there may not be a better time to make the change than now.

■ Bryan Gundersen, a partner at Kensington Swan and leader of the firm's energy and climate change work groups, attended the 2nd Annual World Future Energy Summit in Abu Dhabi in late January.