Halving cycle times

Burns, the optoelectronic properties of GaN (described by some as the most important material since silicon) can also produce the white light needed for LEDs (it is anticipated that these will replace domestic light-bulbs in the not too distant future). Elsewhere, other companies are exploring the possibilities of using GaN to fuel 'deep UV' LEDs that could be used for solar-powered water-purifying lasers — a development with the potential to transform living conditions for millions of people in the developing world.

In line with these trends, the life-time of the heaters used within MOCVD machines has been increased to around 8,000hr — a four-fold increase compared with previous units. Cambridge Electron Beam is one of only a few companies with the experience and manufacturing technology needed to meet the increasing demand from this exciting new sector.

Machine operator Andy Howell with the new Sodick machine

Producing environment-friendly electricity

Non-contact torque sensors from Oxfordshire based Sensor Technology Ltd (Tel: 01295 730746) are playing a key role in the development of commercial-scale in-stream tidal turbines produced by the Irish company Open Hydro. It is using these sensors, which are based on surface acoustic wave (SAW) technology, to measure rotational speed and friction forces in a simulator for the turbine bearings.

Open Hydro's vision is for 'farms' of tidal turbines around the world, dependably generating electricity at no cost to the environment. Its turbines make no noise, and because they are submerged at a considerable depth, they present no hazard to shipping. Perhaps their best feature is that their output is totally predictable; they are not affected by the weather or the seasons, like other sources of renewable energy.

Reliability is a prime consideration for open-centre turbines operating on the sea-bed, so Open Hydro undertakes a comprehensive evaluation of all components. For the bearings, this involves the use of a simulator, and when it came to measuring the torque in a shaft that drives the bearing being tested, the company found that TorqSense RWT320 sensors from Sensor Technology provided an ideal solution. When an RF signal of the correct frequency is applied to the transducer — consisting of two thin metal electrodes in the form of interlocking 'fingers', on a piezoelectric substrate — surface acoustic waves are set up, and the transducer behaves as a resonant circuit; but if the substrate is deformed, the resonant frequency changes. When the transducer is attached to a drive shaft, the deformation of the substrate (and hence the change in resonant frequency) will be related to the torque applied to the shaft. In other words, the transducer operates as a frequency-dependent strain gauge.

Kevin Harnett, mechanical engineer at Open Hydro, says: "We chose the RWT320 because of its convenient wireless operation, and because it was easy for us to fix in line with an existing shaft in our experimental set-up. In addition, this model of sensor has integral electronics and a serial output, which means that we can link it directly to a lap-top computer in our test laboratory. This is a very straightforward and convenient arrangement."

Proof that this work is paying dividends was provided in November, when Open Hydro deployed the first commercial-scale in-stream tidal turbine in the Bay of Fundy, Canada, for Nova Scotia Power.