



Sandra Eager,
technology manager
in BP Alternative Energy



Green thinker

BP renewable energy expert Sandra Eager talks to *Hester Thomas* about her long-standing commitment to help the world make greater use of cleaner energy sources

At just nine years old, Sandra Eager, now technology manager in BP's Alternative Energy business, was already working on environmental issues. She joined a sponsorship scheme to raise money for charity. It involved checking her home against a 'green' credentials list – ensuring there were no leaking taps wasting water, and that unneeded lights were switched off to save electricity. 'I've always been interested in the environment,' she says simply. 'I'm committed to it.'

It is not surprising then that she has worked in renewable energy during her eight-year career with BP. 'Renewable energy has to be a major part of the solution to the world's energy problem,' she states. 'I cannot see a future without it.'

She talks confidently about her subject but is diffident when talking about herself. Her self-deprecating manner, combined with a

gentle sense of humour, give the impression that she is still rather surprised by her achievements.

Following a degree in chemistry and German, Eager planned to find a job in the renewable energy sector. However, her university supervisor had a different idea. She persuaded Eager to study for a PhD in chemical engineering through the UK government-funded Postgraduate Training Partnership (PTP) programme.

Although registered as a student with the University of Manchester Institute of Science and Technology, Eager spent the majority of her time pursuing her PhD at EA Technology, a power asset management company. 'The company was looking at energy efficiency and cleaning up energy processes – areas associated with my own interests.

'The PTP programme is a complete win-win situation. I received an enhanced grant. >

“BP invests more in renewable energy than any other major international oil company – we can make a big difference”

– Sandra Eager



› I worked in a community of postgraduate students within EA Technology, gained three years' industrial experience which included management training and, on top of that, I received a PhD.'

Sun and wind

Following a three-month round-the-world trip, Eager was keen to launch herself directly into renewable energy and joined BP Solar in 2001 as a photovoltaic technologist in the European Technology Centre. Despite its lofty title, this was a modest office tucked away on an industrial estate just a mile from BP's main technology centre in Sunbury. 'It was more like being in a small company than a multinational,' she explains.

Nevertheless, it housed a group of high-powered researchers and technologists. Eager worked as part of this team, researching advanced production techniques in the manufacture of silicon solar cells. She notched

up a breakthrough success when she evaluated environmentally friendly coatings for a solar cell, leading to the introduction of a new silver coating. This went into trial and underwent thermal cycling and humidity testing before being scaled up for production at BP's Tres Cantos manufacturing site in Madrid.

In 2004, when the European Technology Centre transferred to Spain, Eager opted to stay in the UK. She moved out of laboratory work to become a performance analyst in the then gas, power and renewables business of BP. Located at BP's main offices in Sunbury, the 'small' company environment suddenly became large. 'The job provided an excellent overview of BP and its extensive technology portfolio – including solar,' she recalls.

By her own admission, this was not her finest hour. 'It was a business-focused role tracking financial information and project performance – among other things. I remember poring over spreadsheets one day and wondering when I'd

signed up to be an accountant,' she says, wryly.

Fortuitously, she became involved in work that led to the launch in 2005 of BP Alternative Energy. Drawing together all of BP's interests in zero- and low-carbon power generation, including wind, solar, biofuels and carbon management, the new company combined everything that Eager was passionate about.

She applied for a job and became a technology manager in the wind sector. 'This was the perfect job. I was in the heart of the renewables business, working in the rapidly growing market of wind power and at the forefront of technology – assessing how we could best use and develop it to improve BP's business.'

Green ventures

This was a particularly exciting time which saw her travelling extensively in Europe and the USA carrying out due diligence on wind turbine suppliers, providing business development support for the wind business, and working on a

Seismic wager

In *Frontiers'* anecdotal series from BP's Technical Advisor community, *John Etgen*, senior advisor on seismic processing, relates the tale of how a simple wager led to a step change in the complex world of seismic imaging

UK government technology strategy board-funded project developing technology for the holistic condition monitoring of wind turbines. 'We carried out a substantial amount of work understanding the supply chain in wind energy,' she explains, 'dealing with small and large companies and ensuring equipment was reliable.'

Although BP's business has since grown significantly, developing major projects onshore in the USA, it has not ventured offshore – despite extensive offshore experience in its oil and gas business.

'Those companies that had built offshore wind farms were discovering that onshore turbines worked less well offshore,' she notes. 'The problem of maintaining turbines when they're inaccessible due to bad weather and high waves was just one of the issues that showed the need for a different approach offshore.'

Eager drew together a panel of external offshore wind farm experts – turbine suppliers, cable manufacturers and vessel companies – to talk to BP's offshore oil and gas experts. The former highlighted the full range of challenges for an offshore wind farm. 'Those of us in BP then discussed whether or not we could solve all the problems with our internal experts,' she explains. 'We decided we could.'

Following that, Eager became part of the team that created a plan for an offshore wind business. It was accepted and given the go-ahead by BP's senior management. She then worked with the business to prepare BP's bid for the UK government's Round 3 development of offshore wind farms.

Then, in October 2008, with a global recession and oil prices falling, BP reassessed its decision on offshore wind. The focus now is onshore in the USA where the company already has six wind farms. These deliver over one gigawatt of clean, renewable electricity, enough to power 300,000 average American homes, and there are plans for more.

As a result, Eager's job has changed. She is part of the BP Alternative Energy ventures team taking an innovative approach to finding and investing in novel technologies that will enhance the performance and competitiveness of BP's wind and solar businesses – in a clean technology sector that is changing fast.

She has also joined the UK's Energy Technologies Institute (ETI) strategic advisory group, representing BP. Additionally, she is involved in one of the ETI-funded projects, working alongside power systems company Rolls-Royce and the power and gas company E.ON, looking at innovative ways of investigating the reliability of wind turbines.

Looking to the future, Eager takes both short- and long-term views. For the short term, she is concentrating on her second baby – due in August – and taking maternity leave.

As for the longer term back at work? 'I want to stay in renewable energy,' she says. 'BP invests more in this area than any other major international oil company. We can make a big difference and it will take a big company to do that. Renewables are what I believe in.' ■

Our story starts in the mid-1990s. An enthusiastic 'junior scientist' in BP was optimistic about the promise of his new seismic imaging algorithm. But a certain 'senior scientist' wasn't going to let on that he had his doubts about it. These two had recently attended a technical meeting where one of the company's asset teams had a new offshore gas discovery that they wanted to develop, but the seismic image was confusing at best. A debate had started among the seismic experts – should the company acquire new seismic data, what sort of acquisition techniques should we use, and in what direction would we sail the seismic survey vessel?

The junior and senior scientists decided the best way to settle this argument was to build a computer simulation of the options and then let the technical community decide based on the results. To make it more interesting, junior and senior scientists also made a side bet and simulated a few 'innovative' acquisition techniques as well. Junior scientist bet that with his latest and greatest imaging algorithms, the acquisition direction or style wouldn't matter – senior scientist was sure they would.

The computer was put to work. Since this was one of the first simulations at this scale in the industry, a month or so passed. Finally the results were in. Among the confusing and sometimes poor seismic images that resulted, no clear winner emerged. But the bottom line was evident: acquisition style really did matter. Senior scientist was right.

A few years later, with BP actively exploring and developing subsalt fields in the Gulf of Mexico, the two scientists recognised that much of what troubled them about the subsalt imaging problem of the day was very similar to their old

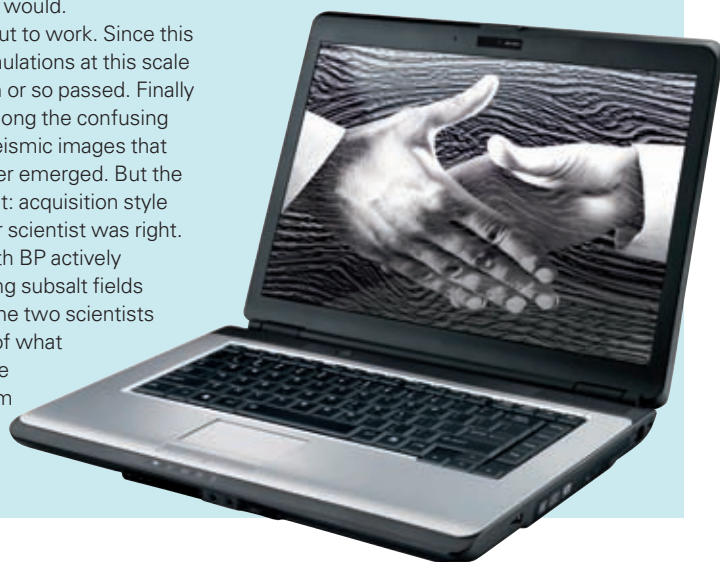
bet. Using higher powered computers they revisited seismic acquisition design, this time targeted at subsalt fields. Along with the advanced seismic imaging team in BP, they quickly narrowed the potential solutions down to two new innovative seismic acquisition methods. It was a risk, but BP tried both of these methods in 2004–2006 at its Mad Dog and Atlantis fields, and not

surprisingly, given the computing power available, they showed major improvements over the methods of the past.

These new techniques, now enhanced still further by BP,

have put the company at the forefront of the industry in imaging below subsurface salt formations – ultimately leading to greater exploration success, improved well planning and better reservoir management. And what of the two scientists? Carl Regone, recently retired senior advisor, and John Etgen, senior advisor and the 'junior scientist' in the story, this year won the Society of Exploration Geophysicists' most prestigious award, the Virgil Kauffman Gold medal, for their work in pioneering applications of wide azimuth marine seismic acquisition techniques. And it all started with a bet. ■

The scientists made a wager over whether the seismic acquisition style would matter



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