

# The BP Magazine

THE INTERNATIONAL MAGAZINE OF THE BP GROUP

ISSUE 3 2007

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The rise of renewables

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Discovering the oceans' secrets

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Exploring the Second Life metaverse

# SOUL SURVIVORS

The BP Magazine reports from New Orleans, where, two years after Hurricane Katrina caused widespread devastation, the city is beginning to rebuild itself.





## COVER STORY

# SOUL SURVIVORS

One of New Orleans's musicians in full swing.  
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### THE BP MAGAZINE

The international magazine of the BP Group  
ISSUE THREE 2007

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# SPAIN

## AN ECONOMY IN BLOOM

Since joining the European Union in 1986, the Mediterranean country of Spain has seen economic and social growth beyond all expectations. Like any rapid rise, it brings challenges and with them the opportunity to find solutions. In Spain's case, this opportunity lies in its burgeoning renewable energy market – something BP is in a strong position to explore.

REPORT BY ADAM SMITH  
PHOTOGRAPHY BY SIMON KREITEM



**Shared source:** solar power is becoming an increasingly viable source of energy in Spain's domestic and industrial markets.



National surges of growth are not something you hear of much these days in Europe. With the continual world focus on Asian giants such as India and China, and the pair's booming economies and rapid industrialisation, you could be forgiven for thinking that Europe was a stagnant continent that has reached its full growth potential both in terms of social and cultural change, and the energy industry.

But this is not the case. The division of the former Soviet Union, Yugoslavia and Czechoslovakia and creation of new states, coupled with the extension of the European Union (EU) trade bloc and new member states in 2004 have been catalysts for previously untapped growth opportunities.

The legislation allows nationals of recent EU member states, such as Poland, Bulgaria and Latvia, to move to more established nations in search of employment and to take advantage of their thriving economies.

While the primary beneficiary of this immigration policy may on the surface appear to be the individual, a host government should have the know-how to harness the influx of migrant workers to further cement its country's position as one of Europe's 'big hitters'.

Spain is a prime example of how best to utilise this new manpower and, at the same time, slip comparatively under the radar.

Ask people to list which they think are the most powerful business prospects in Europe and the chances are Spain will languish behind the UK, Germany, France and, perhaps, even Italy.



**Solar expansion:** in March this year, BP announced it was to increase the capacity at its solar plant in Madrid. By 2010, it will have become a 300MW-cell plant.

## Spain facts:

**Population:** 40,448,191.

**Land area:** 499,542sq km (192,874sq miles). The cities of Ceuta and Mellila are considered autonomous, as are 17 other communities, including the Balearic and Canary Islands.

**Coastline:** 4,964km (3,084 miles).

**Languages:** Castilian Spanish is the official national language, while regional dialects include Catalan, Galician and Basque.

**Climate:** temperate; clear, hot summers in interior, more moderate and cloudy along coast; cloudy, cold winters in interior, partly cloudy and cool along coast.

**Natural resources:** coal, lignite, iron ore, copper, lead, zinc, uranium, tungsten, mercury, pyrites, magnesite, fluor spar, gypsum, sepiolite, kaolin, potash, hydropower, arable land.

However, the reality is the Spanish economy is growing at its fastest annual rate in five years. Spain is also the most rapidly developing producer of wind energy in the world, and has Europe's second largest demand for solar energy. These are phenomenal statistics when you consider that it wasn't until 1986, when Spain joined the EU, that it was truly able to begin transforming itself into a business-driven, diverse capitalist economy.

"The economy in Spain is growing three times faster than the average of the EU, which equates to about 3.5% per year," says Ignacio Pérez-Arriaga, professor and director of the BP chair on sustainable development at the Instituto de Investigación Tecnológica at Madrid's Universidad Pontificia Comillas.

"This is partly down to a lower per capita rate, but also the immigrant population that is coming. In Spain, we have gone from a population of 40 million people to 45 million in the past six years – this is an incredible growth. Before that, we were growing very slowly – probably the slowest in the EU."

Pérez-Arriaga says most immigrants came to Spain initially from Latin America, with Ecuador, the Dominican Republic,

Colombia and Bolivia accounting for the bulk of new arrivals. However, since 2004, more and more Bulgarian and Romanian communities are springing up in *la piel de toro*. Such factors mean Spain's 'energy intensity' – and with it, room for domestic business development and expansion – is considerable.

'Energy intensity' is a theory derived from the country's need to establish better infrastructure quickly against a backdrop of gross domestic product (GDP) that is, on a per capita basis, just 80% of the biggest western European nations.

"It is the ratio of energy demand divided by GDP – in other words, how much energy you need to produce wealth," explains Pérez-Arriaga. "This has been stable or growing in Spain in recent years, while in the rest of the EU, it has always been steadily diminishing. The probable reason for this is we needed to invest in infrastructure – roads and railways.

"This, in turn, has caused a boom in the construction industry and, in the past five or six years, between 4-5 million new dwellings have been built – more than in England, France and Germany put together. Of course, it also follows that »



“Energy intensity is the ratio of energy demand divided by GDP — in other words, how much energy you need to produce wealth. This has been stable or growing in Spain in recent years, while in the rest of the EU, it has been steadily diminishing. The probable reason for this is we needed to invest a lot in infrastructure — roads and railways.”

Ignacio Pérez-Arriaga



construction needs a great deal of energy across the board – cement, transportation, manpower, etc. So, in general, Spain has seen brisk, strong growth because of a surge in the population and the economy.”

Nowhere is the magnitude of this physical growth more apparent than on the outskirts of Madrid, where the offices of BP España sit on a modern industrial estate complete with its own bowling alley, cinema and eateries.

The estate – already home to some of the world’s leading companies – is bordered by one of the city’s main arterial highways and swathes of scaffolding, as tower blocks, offices and condominiums take shape as far as the eye can see.

It’s a physical metaphor that’s not lost on Alfredo Barrios, BP’s head of country, who is confident that the company’s presence and the right acquisition at the right time has it well positioned to reap the benefits of Spain’s growth.

“The Spanish economy, and particularly the energy industry, was really liberalised when the country joined the EU in 1986,” he explains. “This was also the start of a period of significant growth for BP in

Spain. The company had been here for quite a number of years, but the acquisition of Petromed (Petroleos del Mediterraneo) in 1992 allowed us to buy into the Spanish market at exactly the right time and acquire what was effectively a well-balanced fuels value chain and a portfolio of high-quality assets.”

It was this 1992 deal that gave BP the solid foundations on which to build today. Commissioned by the Spanish authorities, refineries were always located close to a niche market or centre of demand, meaning this agreement saw BP not only get its hands on a refinery, but also ready-made markets for each of its products.

“As the monopoly was broken up, we also had the opportunity to negotiate how the assets were split, so that we could choose the ones that made sense for us, based on the location of our refinery and the strategy for growth,” adds Barrios.

“Since 1992, we have been fine-tuning our asset base by divesting in places from which it made sense for us to withdraw and by investing in others which concentrated and improved our footprint in the country.”

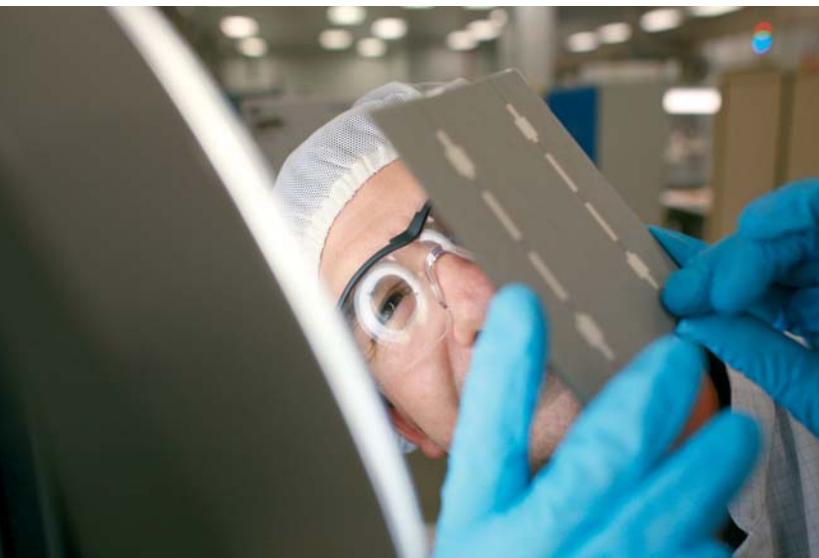
Barrios is well aware that Spain’s meteoric growth will inevitably plateau,

but until then, he firmly believes there is longevity in the business, drawing a parallel with Pérez-Arriaga’s thinking. He continues: “If you look at the growth opportunities here, Spain is one of the large European countries, with one of the largest market growth rates. And it’s not had all its growth yet, it also has the potential to expand further based on the level of its energy consumption per capita compared with the rest of the EU.”

But there is much more to Spain’s phenomenal growth than the construction of vast offices, holiday resorts and homes for retiring European expatriates and migrant workers.

Over the past decade, Spain has slowly turned into a competitive industrial nation, and while no-one can put a finger on exactly how long it can sustain an annual »

**Renewed supply:** although Spain relies heavily on imported oil and gas, it is making great strides in its renewable energy use. By 2004, such sources accounted for 6% of the country’s energy supply.



# Spain

economic growth of 3.5%, it's clear that this is no boom and bust country.

Within months of joining the EU, Spain was fully integrated in the European Space Agency programme and its goods were being exported all over the world.

"We thought that Europe was developed and that we were left behind somehow, but then we realised that we could do things as well as other Europeans," explains Pérez-Arriaga. "We entered into different types of businesses, were competing in European markets and developing products that would be sold all over the world. We realised that Spain was not that different and was not lagging behind in industrial terms." From this moment on, things were very different for the country, as its borders opened on a social and business level.

But how Spanish growth will continue to be fuelled – and therefore harnessed – is anyone's guess.

Today Spain, although heavily reliant on imported energy, has a real interest in all major power generation projects, thanks mainly to a history of focusing all efforts on one area until saturation point and then moving on to the next field, according to some analysts.

While oil and gas imports from Algeria and Nigeria make up most of the country's energy supply, with the usage of both rising by 125% between 1990 and 2004, there has also been a huge increase in the proliferation of renewable energy. By 2004, it accounted for 6% of the country's energy supply – considerably



**Diverse mix:** Spain's population grew by 5 million in just six years, largely thanks to the rise in the number of immigrants, most of whom come from Latin America.

higher than the EU average. Its 12,000 megawatts (MW) of installed wind power generation also means it is the second largest producer of this type of energy in the world. And, as if another variable were needed, domestic diesel demand has risen by 25% in the past five years.

For academics like Pérez-Arriaga, it's not easy to predict the country's energy mix over the next decade. "We do have a lot of energy dependence but, at the same time, we have the means to avoid an immediate crisis with regard to security of supply," he says.

"This is the result of concentrating exhaustively on one agenda at a time. For a period, everything was coal, then nuclear, then natural gas – the combination of all these cycles gives a diverse mix."

But such diversity has not stopped the nation from falling into a rather precarious position regarding the European Emissions Trading Scheme and the Kyoto Protocol. Quite simply, Spain's rapid growth to date has come at a significant price – soaring carbon dioxide emissions.

With the highest 'energy intensity' in Europe borne of the need to improve its infrastructure, Spain's national carbon emissions are above the levels imposed by the European authorities.

"Until now Spain has been fairly careless in terms of energy efficiency," says Pérez-Arriaga. "As a country, we did not issue robust building codes until a few months ago, and all the while we have been constructing these new houses there »



“The academy and the BP scholarship have given me the opportunity to take my music to a new level – something I would not have been able to do at home in Serbia.”

Mirka Scepanovic



## SUPPORTING WORLD CLASS TALENT

When you think of the great classical music hotspots of the world, the former Soviet states, Germany, Italy, and, of course, Austria probably spring to mind. Spain wouldn't generally be very high.

However, mirroring the rapid surge in its economy, the Escuela Superior de Música Reina Sofía (part of the International Institute of Chamber Music of Madrid) has been nurturing some of the world's brightest musical prospects so successfully, and at such a rate, that after just 15 years in business, it is ranked as one of the top three chamber music schools in the world.

Founded and still run by its director, Paloma O'Shea, the institute attracts people from all over the world to study at the renowned campus just outside Madrid's bustling city centre.

The school – at which BP sponsors a chamber quarter of musicians through a scholarship scheme – is different from many others in that it provides individual study programmes for each student in order to guarantee close contact with the relevant music professors.

“BP was the first company to strike such a sponsorship agreement,” explains Emilio Estrada, the company's deputy head of country. “Just like the Spanish economy has grown and developed, so have world-class institutions like the Escuela Superior de Música Reina Sofía. As with top-level business, it is vital to invest in talent if Spain's business and cultural potential is to be realised.”

“It's fair to say that this is a kind of dream team,” enthuses academy director Fabián Panisello. “We have the top students from all over the world here and they are being tutored by the top professors in their field.”

Mirka Scepanovic, a 25-year-old violinist studying there, adds: “The academy and the BP scholarship have given me the opportunity to take my music to a new level – something I would not have been able to do at home in Serbia.”



has been no pressure to save energy or increase efficiency whatsoever.”

According to Pérez-Arriaga, there was little inclination for prudence as the cost of energy in Spain is so low compared with its neighbours and many were more concerned with the impact of oil and gas imports on GDP than creating infrastructure efficiently.

Pérez-Arriaga continues: “Our commitment to the Kyoto agreement meant our carbon emissions were only supposed to increase by 15% between 1990 and 2012. Allowances were made for the country’s growth [the rest of the EU was capped at 8%] and because our energy consumption per capita was quite low, we were allowed to increase to 15% – but by 2005, we had already seen an increase to 53%.”

Spain’s carbon emissions were down to 49% above the 1990 benchmark at the end of last year, showing some improvement – but experts attribute this mainly to an unusually wet year.

“I do think though that the government is taking the issue very seriously,” continues Pérez-Arriaga. However, we need to put in a lot more effort in terms of reducing emissions. The current aim is to limit the 2012 emissions to 37% above the 1990 agreement and buy emissions trading

credits for the rest – but even that is going to be very difficult because of the growth of the population and the economy.”

But with every challenge comes an opportunity or even potential solution. For Spain, this is the wealth of renewable energy resources it boasts. “I think we are heading for a strong penetration of renewable energy, particularly solar projects,” says Pérez-Arriaga.

Such a view must be music to Barrios’s ears. In March, BP announced it was to pump millions of dollars into expanding its Tres Cantos photovoltaic base – BP Solar’s European headquarters – into a 300MW cell plant by 2010.

The site – 30km (18 miles) outside Madrid – will be one of two flagship cell plants for BP, the other being in Bangalore, India. “The expansion of our cell capacity in Tres Cantos is a clear sign of commitment to the solar business in Spain and that we see it as one of the key centres for BP,” Barrios explains. “The Tres Cantos growth is so significant that I think it is going to be a step-change for our business.”

Solar is becoming an increasingly viable form of energy, both on an industrial and domestic level in Spain. The attraction of a one-off outlay for solar modules and

recouping the initial investment by selling energy back to the national grid is particularly strong, and one which is spreading to the rest of the Mediterranean.

“Things are extremely promising,” says Ben Hill, performance unit leader of Spain and southern Europe. “There is a high growth rate in the photovoltaic market and we’re sure that Italy and Greece will have a similar, if not better, growth rate than Spain – we just have to be prepared for it.”

This growth in domestic solar energy markets has not only done much to enhance BP’s reputation in the region, but also to address the concerns of many environmental groups.

“We’re the one major foreign oil company in the country and also the one which is leading on the environmental front,” says Barrios. “We’re seen as a company that has brought Spain a lot of know-how and advice because of its multinational experience as the Spanish energy sector has evolved.”

What’s clear from this is that Spain will only grow to become more carbon-friendly over time, just as it has become more capitalist and one of the world’s bright renewable energy prospects. A greener and cleaner Spain won’t emerge overnight and there will always be a place for traditional hydrocarbons in the energy mix.

Barrios and his team can see this bigger picture and that continued investment in refining is required if the country’s entire energy needs are to be met.

As with solar, Spanish demand for diesel is huge. Today’s estimates suggest that 70% of all new vehicles sold have a diesel engine, with 35% of the country’s demand for the fuel being imported from either Russia or Italy.

**“BP’s commitment in Spain is clear and there are many big challenges for all of us. We have to make sure that as we grow, we invest significantly in our operations, while at the same time making sure we don’t lose focus on our other agendas, such as safety and operations.”**

Alfredo Barrios



BP España's strategy is to exploit this demand through a massive \$300 million project to build and install a new coker at its Castellón refinery – the largest single investment in the asset since it was built 40 years ago. Now in the building phase, the coker will be commissioned next year.

Running alongside the thirst for diesel is a slow-down in the demand for fuel oil – a bottom-of-the-barrel product used primarily for power generation. The result is a harmonious shift in production.

Jorge Lanza, refinery manager, explains: “The coker project increases the diesel production on the back of fuel oil. So, we are upgrading the bottom of the barrel and are going to eliminate fuel oil production at the same time as increasing diesel production to meet the new market demand. At the moment, we're producing 17% fuel oil and we're going to increase diesel from 35% to roughly 50%.

“It's easy to stand back and think Spain can import these quantities comfortably on a yearly basis, but it doesn't always work like that to keep a country running day-to-day and having a local supply is always important. So, as you can imagine, this puts us in a very good position.”

And a happy bonus for BP is a relatively low-value by-product of the process – coke. Used across the construction industry in materials such as cement, all of Spain's demand is presently imported from the US. The coke derived during the process can now also be sold directly to local markets, adding further value to the project.

So, in a nation with such diverse energy needs, projects and opportunities, how does Barrios assess BP's future in this burgeoning country. Surely there has to come a time when its remarkable growth will plateau?

He concludes: “BP's commitment in Spain is clear and there are many big

challenges for all of us. We have to make sure that as we grow, we invest significantly in all our operations, while at the same time making sure we don't lose focus on our other agendas, such as safety and operations.

“We see this as a growth market and one with great potential. Spain is a key centre for BP in Europe for renewables and a key country for alternative energy globally.” **BPM**

**Changing face:** while traditional hydrocarbons will play a significant role in Spain's economy for many years to come, the country is becoming more carbon-friendly, and is now the world's fastest growing producer of wind energy.





An interview with...

# Andy Inglis

Chief Executive of  
BP Exploration and Production

Heading up BP's Exploration and Production business in London and living in Houston might not seem that conducive to a sensible work-life balance, but as devoted family man Andy Inglis explains to JUDI BEVAN, it's all about stamina and personal drive.

**W**hen Andy Inglis and his family go skiing in America, he likes to race with his 12-year-old daughter Paula. "We set up a slalom race course and compete," he says with a fond smile. "She just about beat me last time if you take into account her lighter body weight."

Inglis (pronounced Ingalls) is a comfortable-looking father of five, however, beneath the laid back exterior, lurks a highly competitive animal, who is out for whichever team he is leading and, most of all, for BP.

"I want BP to win," he says in his hybrid accent, hovering between the north of England and North America. "Performing to a high level is important to me. I believe BP has the assets and the people to deliver what we promise." Colleagues admire his clarity, ability to break down complex problems and his sheer tenacity.

Inglis took over from Tony Hayward as

head of BP Exploration and Production last February when Hayward was named BP's chief executive designate. He had been Hayward's deputy since 2004. For much of his career, he has travelled the world, encouraging and motivating BP's individual business leaders, negotiating with government officials and visiting the operations. Competitive he may be, but his style is to set goals and then stand back. "He is good at giving people the space to get things fixed," says David Clarkson, the performance unit leader for the new Tangguh gas project in Indonesia. "He lets the team take the credit for success, which motivates everyone."

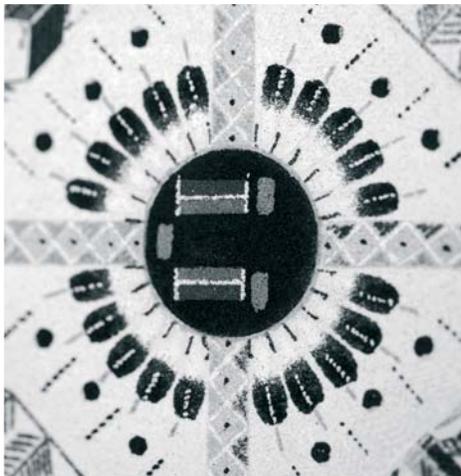
In Angola, Mary Shafer-Malicki, who heads the business unit there and joined BP during the merger with Amoco, agrees and says she has not been surprised by his rise through the ranks. "There was always something different about Andy – a drive and ambition you only feel when you meet an obvious leader."

Despite suffering a severe back injury on the rugby field in his second year at Cambridge, Inglis displays considerable stamina, spending roughly a third of his time at BP's St James's Square headquarters in London, a third visiting operations worldwide and a third with his family in the US. "When I am at home, I am at home: at work, I work," he says. "I fiercely defend my weekends and rarely make calls or send emails."

Alaska has strong ties for his family as it holds memories of tragedy as well as happiness.

He was first posted to Alaska in 1994 and, shortly afterwards, his first wife died suddenly. He was left with two-and-a-half year old Georgina, baby Paula »





and a responsible job as head of the Kuparuk field there.

“It was the biggest thing I had ever dealt with and it shaped me hugely,” he says. “It showed me that I had no control and that life deals some really tough blows.” He found BP as an organisation, and his then boss, John Morgan, greatly supportive. “John helped me hugely at the time,” he says.

Just before he was due to leave Alaska after two years, a colleague introduced him to Bobbye. They married a year later in 1997 and “she has been my soulmate ever since.” Together, they have a six-year-old daughter, Grace, baby twin boys born eighteen months ago, as well as Georgina and Paula.

Inglis was born in Sale, Cheshire, but grew up in Lytham St Annes, one of the homes of the British Open golf championship. It rubbed off and he started playing at the age of 10. He recalls being able to see the course from the classrooms of the King Edward VII grammar school he attended. His father was a director of British Nuclear Fuels and an engineer like Inglis. Both he and his father are fellows of the Institute of Mechanical Engineers and of the Royal Academy of Engineering. The family connection means a lot to him. “There are a very small number of fathers and sons in the Academy,” he says proudly.

At school, he excelled at maths and science and showed early leadership qualities, captaining the rugby team and becoming head boy. He took maths, physics and chemistry at A-level, gaining a

place at Pembroke College, Cambridge – the third oldest college at the university. He took a year off before going up, spending his time at a craft training centre. It might not be every student’s dream of a gap year, but he loved it. “I worked as a fitter’s mate and spent a year in oily coveralls, which was a great way to start an engineering degree at Cambridge,” he says with genuine enthusiasm.

Today, he still takes pleasure in basic engineering and has a talent for communicating with operators on drilling rigs and construction sites. “There are two Andys,” says David Clarkson. “There is the focused, analytical businessman in the office, but when he is out in the field, you can see him light up. He really enjoys talking to engineers and touching the hardware.”

Inglis was attracted to the oil industry because he wanted to build substantial projects. “My attraction was to engineering that made a lasting difference.”

Although he was sponsored through Cambridge by the Central Electricity Generating Board, he was not impressed by the job the organisation offered him. The North Sea was ‘hot’ and, inspired by the success of British operators, he applied to Shell and BP, finally taking the BP offer. Yet, when he arrived, he was sent to the engineering department in North Britannic House, which he describes as a Victorian workhouse with about 40 desks in rows facing each other. Bravely, for a young recruit, he complained to his manager that a life of bureaucratic pen-pushing was not



what he had signed up for and the very next day he found himself headed north to the Shetland Islands to work on the Sullom Voe oil terminal, at the time, the largest construction site in Europe. To his delight, he was given responsibility for building one of the oil tanks. “I had a fantastic 18 months and learned a huge amount about the oil industry.”

All did not go smoothly, though, with labour strikes and various other forms of industrial disputes, but it taught him a great deal. “It was the real world of actually getting something of that scale built.”

He moved on to various roles in the North Sea and praises the training he received as a young engineer. “It was very high quality and it is a huge priority now. In the upstream business alone, we take on more than 500 graduates a year, so it is vital that they get grounded in a discipline and given deep experience in the workplace.”

In 1994, he was posted to Alaska and a short time ago he was back on the North Slope to celebrate BP’s 30 years in Prudhoe Bay. He believes there are another 50 productive years ahead. “There is a great future for gas and heavy oil in Alaska,” he enthuses.

He was brought back to London in 1996 as chief of staff for the upstream business, before being posted to the Gulf of Mexico, where production from the deep water was just getting under way

“There are two Andys. There is the focused, analytical businessman in the office but when he is out in the field you can see him light up. He really enjoys talking to engineers and touching the hardware.”

**David Clarkson**



“If you are bringing something to a country that it needs, you are not just a contractor, you have a mutual agenda. We can then build a long-term partnership with the government and other stakeholders.”

with output of 50,000 barrels of oil a day. Now production is approaching 300,000 barrels a day. “At heart, we are an engineering and technology company and the pace of change is hugely exciting,” he says. “When I started, we were working in 915m [3,000 feet] of water and we thought that was difficult. Now, the Atlantis field will start up in 2,100m [7,000 feet] of water.”

He has since been involved in all BP’s new areas, including Azerbaijan, Angola, Trinidad, Egypt, Algeria, the Far East and Russia. So what is the secret to operating in fast-growing and sometimes unstable regimes?

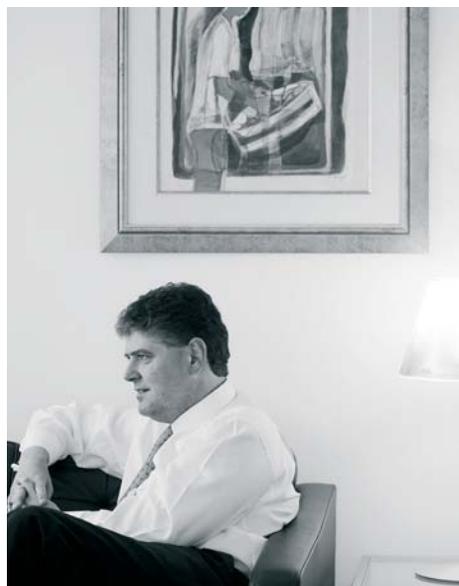
“Mutual advantage,” he says without hesitation. “If you are bringing something to a country that it needs, you are not just a contractor, you have a mutual agenda. We can then build a long-term partnership with the government and other stakeholders.”

He cites Russia as an example where BP made four key promises, firstly, to grow production, second, bring capability and technology, third to bring good governance and fourth, to be good citizens and pay taxes. TNK-BP has paid more than \$40 billion in tax since it was formed, he points out. “When we meet President Putin, he goes through that list.”

In Azerbaijan, the country has been transformed by developing its oil. “We

have brought technology as well as achieving high international standards in terms of environmental and social performance.”

Inglis believes passionately that it is BP’s technical expertise that will continue to win it new projects such as the recent acreage in Libya and a tight gas play in Oman. “In Oman, we were able to

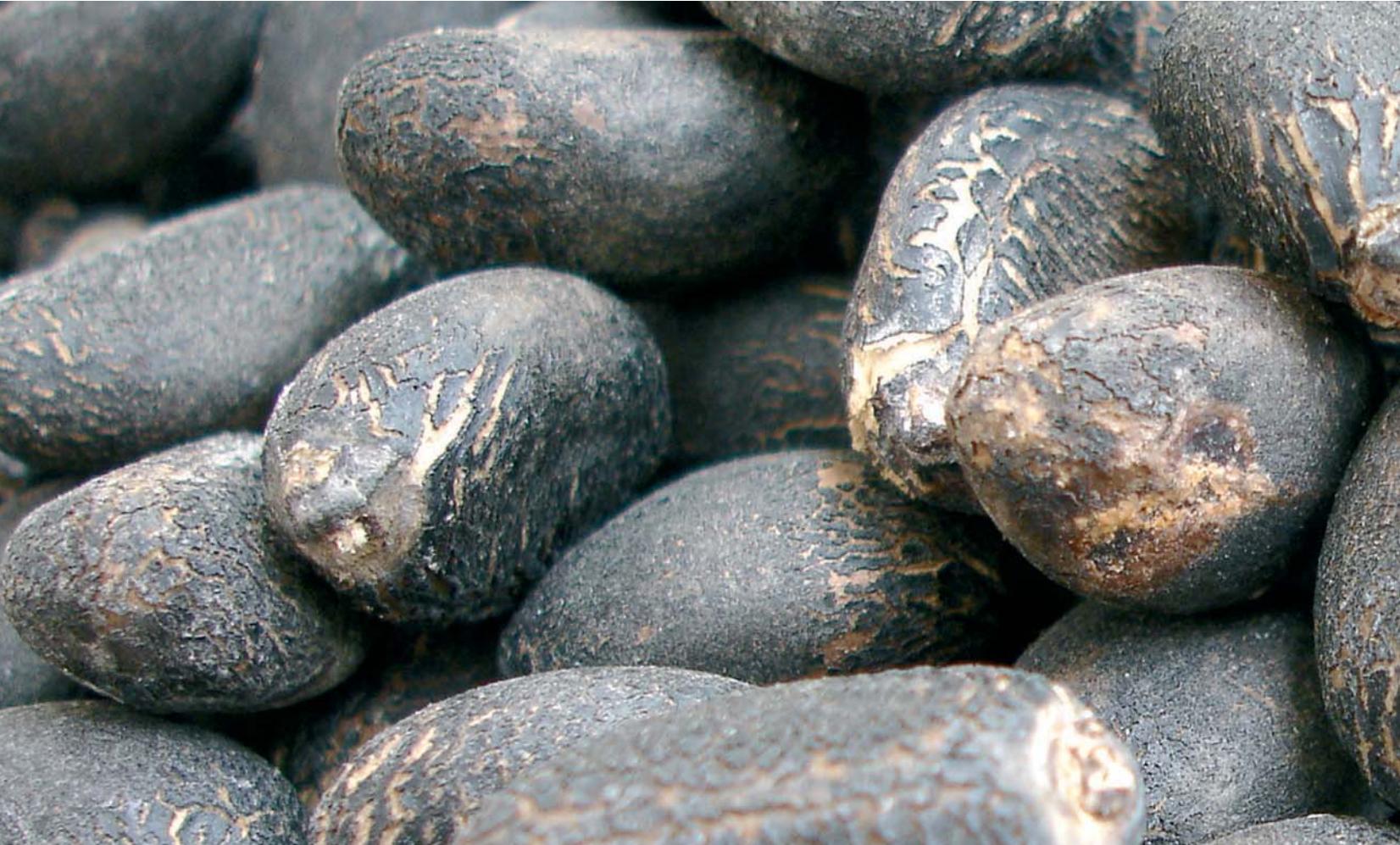


demonstrate that we are the best tight gas company in the world because of our experience in North America.”

For the moment, Inglis’s life, split three ways, looks complicated, but he has ways of simplifying it. In London he owns no car and after a short Pilates routine for his back, he walks the half hour to and from his flat to St James’s Square to keep fit. He does not have enough time for playing golf these days but he finds skiing an ideal family sport – although it will be a couple of years before they put the twin boys on skis. “The family is hugely important to me,” he reflects. “When you lose something, it makes it more valuable. The challenge is how you manage a full business career with a full family life.” Luckily, he is someone who enjoys a challenge. **BPM**

#### Writer biography >

**JUDI BEVAN** is a journalist and author. A former deputy City editor of the *Sunday Times*, she wrote profiles of leading businessmen for the *Sunday Telegraph* for six years and is the author of *The Rise and Fall of Marks & Spencer*.

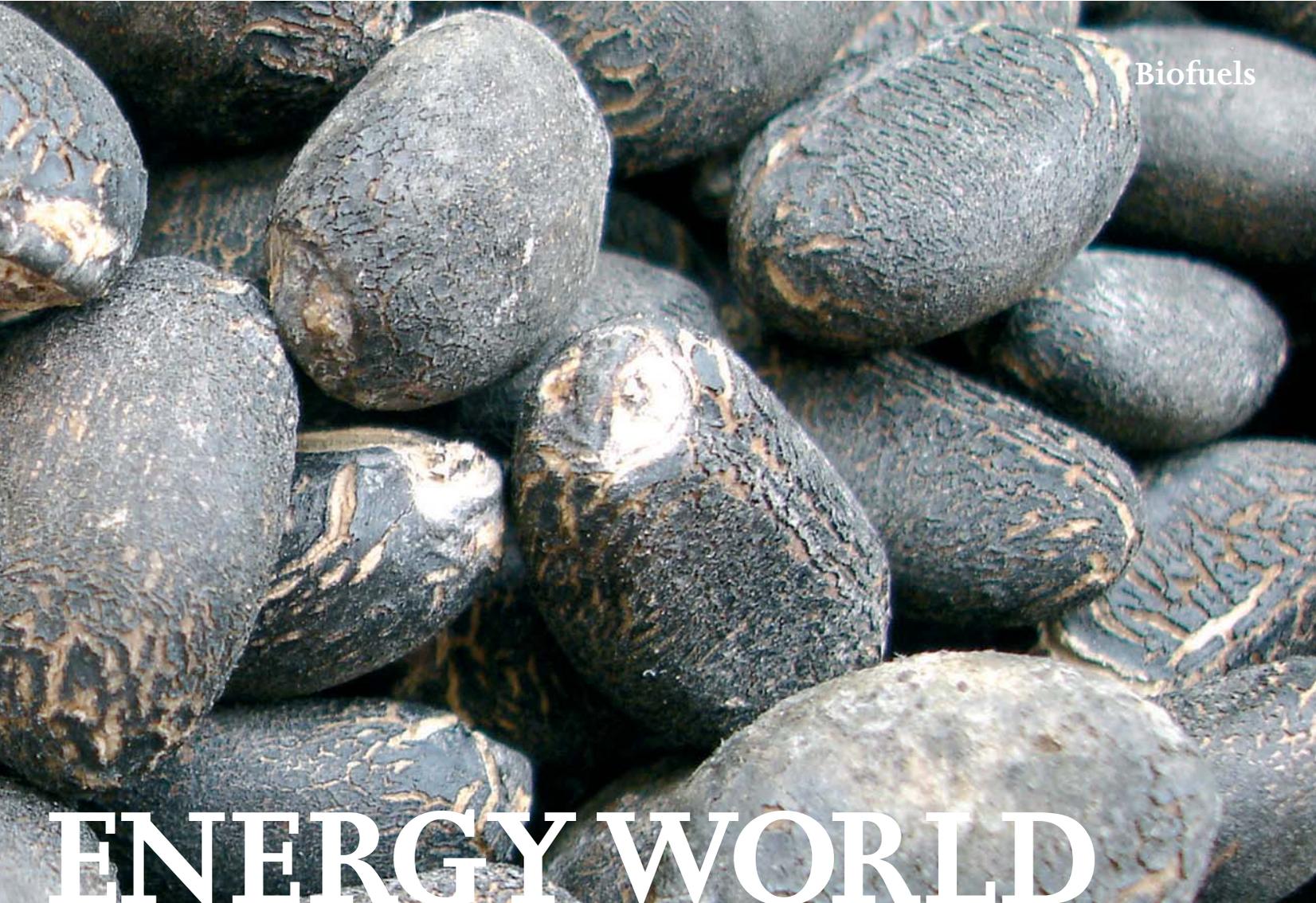


# HARVEST FOR THE

BP is securing deals with key partners to shape the future of the biofuels industry. **Ian Valentine** reports on the significance of these deals and what all the partners hope to achieve.

PHOTOGRAPHY BY GEORGE JAWORSKJ/D1 OILS





# ENERGY WORLD

**Natural source:** the oil-bearing seeds of the jatropha plant (above) can be used to produce biodiesel. Below, wheat feedstock will play a key role in a new deal between BP, Associated British Foods and DuPont.





**There is nothing new about biofuels. Indeed, when our cavemen ancestors started burning wood and straw, they were cooking and warming themselves with the earliest form of biofuel. Aladdin, Florence Nightingale and Ebenezer Scrooge all used fuel derived from biological matter to burn in their lamps. Nikolaus August Otto, inventor of the four-stroke internal-combustion engine, ran his first engine on ethanol. Fellow German inventor Rudolf Diesel – who gave his name to the diesel engine – fuelled his prototype on peanut oil. Even Henry Ford originally designed his Model T to run completely on ethanol.**

Only with the proliferation of crude oil sucked up from the ground in the 1930s and beyond, did biofuels take a back seat to fossil fuels, although in times of scarcity or high prices, some nations did revert to blending biofuels with petrol or diesel. However, biofuels, especially bioethanol or biodiesel derived from vegetable matter, have recently returned to the spotlight. As the world's oil supplies begin to gurgle and the public seeks alternatives to fossil fuels,

governments are looking to biofuels to provide the solution.

“We were faced with a choice on biofuels. We could either resist a new technology that would potentially cannibalise our core product of the past 100 years,” says Philip New, the president of BP's global biofuels business, “or we could embrace it and be at the forefront of its development.”

He is referring to BP's commitment to biofuels following the announcement of

two joint ventures with key partner companies in the bioethanol and biodiesel arenas. One deal comprises a \$400 million investment plan with Associated British Foods (ABF) and DuPont to produce 420 million litres of ethanol a year from wheat feedstock at a new plant to be based at BP's existing chemicals site near Hull, UK. The other \$160 million contract allies BP with D1 Oils plc, expert in the cultivation of *Jatropha curcas*, a drought-resistant, inedible, oilseed-bearing tree, whose oil can be converted into biodiesel.

“Energy and agriculture, two of the biggest value chains in the global economy, are on a collision course like giant icebergs,” New continues. “There will be repercussions as they collide, but the challenge is to learn how to build bridges between the two. There is no company with experience in both value chains, so we must make lasting partnerships if we are to turn this opportunity into great business.”

The bioethanol plant in Hull on the east coast of England will be ideally located to take advantage of local farmland, as the farmers in nearby Lincolnshire and Yorkshire are the primary producers of excess wheat in the UK. “Hull already provides a steam capability, which is integral to the production of bioethanol,”



**Taking root:** wheat (far left) starch produces sugar which can be turned into ethanol. Above and left, jatropha crops produce an oil that can be processed into biodiesel.

explains Chris Wilks, who has been leading the BP team negotiating the deal. “So, we have immediately reduced our capital outlay. Likewise, there is already a port jetty to ship out the ethanol, or ship in wheat if needs be.”

BP and ABF subsidiary British Sugar will each hold a 45% share, with US chemical giant DuPont owning the remaining 10%. “ABF is experienced in the agriculture supply chain – traditionally sugar beet – but they know their way around the UK ‘agri’ marketplace better than we do,” says Wilks. “ABF also owns a 50% share in Frontier – the largest supplier of cereal feedstocks in the UK – and AB Agri, a specialist in the animal feed markets into which by-products from ethanol production are placed.”

Due to be completed in late 2009, the plant will initially produce ethanol, a colourless liquid fermented from the

sugar derived from wheat starch. This biofuel is usually blended with petrol at concentrations of 5-10 % for use in standard engines. The partners will also look at the feasibility of converting the plant to produce a next-generation biofuel – butanol – once the required technology is available.

Butanol has a lower vapour pressure than ethanol and its resistance to water contamination in gasoline blends enables it to be used in existing gasoline supplies and distribution channels. It has the potential to be blended into gasoline at larger concentrations than current biofuels without the need to retrofit vehicles, and it offers better fuel economy than gasoline-ethanol blends, improving a car’s fuel efficiency and mileage.

To that end, the BP site in Hull has also been selected as the preferred location for a planned biobutanol demonstration

plant, funded and owned equally by BP and DuPont. The demonstration plant will be key in supporting and accelerating the development of a production process for butanol, which is ready for deployment at commercial scale.

“DuPont brings great experience in biotechnology and bioengineering,” says Wilks, “which is a skill base we don’t currently have at BP. We’re pushing ahead with design of the demo plant to ensure that as soon as we have the new fermentation catalysts, which are the heart of the new butanol process, we can get straight on with testing them at scale. Butanol will play a big part in the biofuels strategy, so we don’t want to hang around on this.”

The ethanol plant will create about 70 new jobs, while the demonstration plant will add another 15. To begin market development of biobutanol, the partners will import small quantities of the liquid, sourced from an existing first-generation manufacturing facility in China. The first product is expected to arrive by the end of the year and will be used to carry out infrastructure and advanced vehicle testing. This process will build upon initial laboratory engine tests, using butanol produced from non-renewable resources, which have indicated that it has similar fuel performance properties to unleaded »

“We were faced with a choice on biofuels. We could either resist a new technology that would potentially cannibalise our core product of the past 100 years. Or we could embrace it and be at the forefront of its development.”

**Philip New**

## Biofuels

petrol. In addition, work will be undertaken to gather comprehensive data on the environmental footprint and sustainability of this next-generation fuel.

“These three initiatives at Hull represent a significant first step in delivering BP’s strategy for biofuels,” says New. “As a UK-based company, BP is delighted to be the first energy company to commit significant resources to building this important market of the future in the UK and, at the same time, bring a new product of global relevance closer to reality.

“Hull is the obvious place for us to house this new technology, since much of the expertise is already in place, and these assets will serve us well in the future. You cannot learn about a new industry by analysing it from afar, you must get involved. The only way to develop great business partnerships is by showing commitment.”

BP has also expressed its desire to play a key role in the biodiesel market by announcing its joint venture with D1 Oils. Under the terms of the agreement, the partners will invest \$160 million over the next five years. D1 Oils will contribute its 175,000 hectares of existing plantations in India, Southern Africa and Southeast Asia and the elite jatropha seedlings produced through its plant science programme. Some 1 million hectares of the oil-bearing tree will be planted over the next four years, with an estimated 300,000 hectares per year thereafter.

Jatropha curcas, also known as the Barbados nut or Physic nut, is a drought resistant shrub, capable of thriving on a mere 600mm (23 inches) of rain a year. Ploughing and planting are not needed regularly as this shrub has a life expectancy of approximately 40 years. “Jatropha is an equatorial plant that needs lower soil quality and less water to grow than some other tropical plants, such as palm,” explains Olivier Mace, BP’s business manager with responsibility for establishing the jatropha joint venture. “It is inedible, containing a toxin called curcin, so it does not get drawn into the fuel versus food debate, which centres on the increasing price and decreased availability of food due to the emergence of biofuel feedstocks. Jatropha thrives in poor soil, which cannot support intensive feedstock farming.”

Mace explains that if you drew a band 30° north and south of the equator, then jatropha would likely grow there, except in mountainous regions where it is



**Tasty prospect:** once all the plantations are established, the joint venture between BP and D1 Oils is expected to produce up to 2 million tonnes of oil per year from the jatropha seed.

“In many developing countries, the seeds will not be cultivated mechanically, only picked by hand, so it is manual labour intensive, which provides jobs and revenue for the local community.”

**Olivier Mace**

susceptible to frost. Therefore, areas of Southeast Asia, including the Philippines, Indonesia, Thailand and China; Swaziland, Zambia and Madagascar in Africa; and large regions in India have already been planted by D1 Oils. “There is also potential for jatropha in Australia and parts of Central and South America, where the plant originates,” he adds.

Mace’s task in establishing the jatropha joint venture is symbolic of the challenges facing BP. While he is experienced in running hydrocarbon-based projects for the company, he finds himself in a totally new field. “I am having to come up to speed very quickly,” he says. “But that is why we have gone into this joint venture with a talented partner. It would be foolish to think we can do this alone or expect to understand the industry from day one.

“I think it is of interest too, that we are entering into a deal with a company that is relatively new and small but dynamic. This deal will allow us to pool the best qualities from both sides. Smaller, entrepreneurial companies have the advantage that they can identify a niche and go for it faster than, say, a big company like BP. But we have the financial muscle to back up these good ideas.”

Founded in 2002, D1 Oils is just such an entrepreneurial company and, according to its chief executive officer, Elliott Mannis, the deal with BP has been “a transforming event for us. BP’s decision to join us in



this new venture is a significant endorsement of our strategy to develop jatropha as a global raw material for the production of sustainable biodiesel. It shows we have come a long way. BP's proven logistical, managerial and financial support will enable a significant enhancement and acceleration of the scope and pace of jatropha planting."

Jatropha oil produced from the plantations will be used to meet both local biodiesel requirements and for export to markets such as Europe, where domestic feedstock produced from rapeseed and waste oil is unlikely to be sufficient to meet anticipated regulatory-led demand for biodiesel of around 11 million tonnes a year from 2010. Once all the planned plantations are established, the joint venture is expected to become the world's largest commercial producer of jatropha feedstock, producing up to 2 million tonnes of oil a year.

The case for planting jatropha also stacks up on ethical grounds. It can grow on a wide range of land types, including that which is marginal, waste or suboptimal for arable crops. It can then be planted in soil that is not fertile enough for food crops. It also enables poor soils to retain moisture, enabling food crops to grow between the young plants. "It works well intercropped," says Mace. "In other words, there can be rows of food crops grown between the rows of jatropha plants. In many developing countries, the seeds will not be cultivated mechanically, only picked by hand, so it is manual »



**Prize specimen:** rows of food crops can be planted between rows of jatropha plants (top), while nurseries like the one above will help D1 Oils generate some 1 million hectares of plantation in the next four years.



“Over and above the investment and jobs we will bring, and the markets for local produce this will create, we can help people to grow food for themselves... We have an opportunity to shape this industry and we must shape it correctly. Biofuels done well can be a force for good.”

## Philip New

labour intensive, which provides jobs and revenue for the local community.”

Jatropha avoids many of the accusations levelled at tropical plants, such as palm, which are farmed in water-rich areas that can produce food. These tropical oil-bearers have also been blamed for a rise in the deforestation of rainforests. “Because this is a new crop, we have the opportunity to put the right standards in place, in line with BP’s existing policy on sustainability,” says Mace. “Economically, it makes sense too, as there is the bottom line to consider after all. While there is not the same yield as palm, which cultivates six tonnes of oil per hectare – jatropha yields less than half that – the cost of production is lower and it is a strong economic proposition in its own right.”

The jatropha oil is converted into biodiesel using a simple chemical reaction

called transesterification. The biodiesel is then mixed with regular diesel to create a 5% by-volume blend that can be used in an unmodified diesel engine. Alternatively, there is a more expensive procedure, which hydrogenates the oil, making it molecularly almost identical to hydrocarbon diesel and can be used like for like.

New believes these announcements herald the start of an exciting period in BP’s business strategy. “It is up to us to play a significant role in shaping the future energy mix. At the moment, about two thirds of the earth’s crude oil is used in transport fuels and over 95% of transport fuels currently come from crude oil. These fuels account for around a fifth of manmade CO<sub>2</sub> emissions. By 2030, biofuels could provide 30% of the world’s road transport fuel, and cut as much as 80% of greenhouse gas per litre compared with a litre of petrol.”

**Sunny climes:** the jatropha plant can be found in many locations lying close to the Tropics, including Swaziland (top right) where D1 has plantations.

For modern consumers, transport fuel is the most accessible way to cut down on greenhouse gas. “For example, if you switch on a light, there is no obvious way of knowing how that electricity was generated. However, you know exactly what you are putting in your tank. So this is both populist and practical.”

There is an ethical incentive too. “We must always be asking ourselves how we can operate as a force for good in the local community,” says New. “Over and above the investment and jobs we will bring, and the markets for local produce this will create, we can help people to grow food for themselves – so for every two metres of jatropha, there could be a metre of, say, cabbages. We have an opportunity to shape this industry and we must shape it correctly. Biofuels done well can be a force for good.” **BPM**

### Writer biography >

**IAN VALENTINE** is a feature writer with a background in nature and conservation. He is based in Oxfordshire.





# Rebuilding the Ark

## An encounter with the natural world

For the past 17 years, BP has been closely involved in an initiative designed to help young conservationists study, understand and potentially save some of the world's rarest species.

**Alex Learmont** meets a few of these unique individuals benefiting from the Conservation Leadership Programme.



PHOTOGRAPHY BY ALEX LEARMONT AND MINGHAI DONG

I am sitting at the back of a noisy South African bus, humming with loud and vigorous conversation. We are on our way back to the coastal city of Port Elizabeth after a rest day spent at the nearby Addo National Park. My companions come from all over the world, each having been given an award by the Conservation Leadership Programme (CLP). Some received their honours this year, while others are CLP alumni.

These young men and women, mostly between 25 and 30, are all self-starters. They are independent conservationists, who have identified an ecological need and has created a related, practical conservation initiative.

They may represent many different disciplines, but they share a common passion – a profound dedication to the welfare of the natural world. Like a tourist in a human game reserve, I have spent the day observing them, talking to them, getting to know them, in the hope that I would understand what drives them.

The day has revealed a great deal. As we



**Precious life:** Margarita Islanders (above) dress up as the yellow-shouldered parrot (below) as part of a festival. The community has been vital in helping conservationists protect the endangered bird.

toured the Addo reserve, home to more than 400 elephants, it was clear that the group's interest in everything around them was intense. Elephant or insect, bird or bush, are all seen as indivisible threads of one great and complex fabric.

The group have been brought here by the CLP – the initiative that funds each of their projects. CLP is a unique five-way partnership between Birdlife International, Conservation International, Fauna & Flora International, the Wildlife Conservation Society and BP.

BP's involvement dates back some 17 years, and now the focus falls on conservation initiatives in Eurasia, Africa, Asia, Latin America and the Caribbean – in 20 different countries where BP is actively involved.

Marianne Carter has managed the CLP for the past seven years – she explains the aims of the programme. “We are working to develop the potential of future biodiversity conservation leaders – these are men and women who will certainly grow into positions of influence.





We're helping them, through training and long-term support, to build their capacity – to move beyond academic research into the kind of practical conservation that will significantly change the way in which individuals and communities think about their environment.”

The early part of this week has been spent on various training courses, building up the practical skills that will support the ecological initiatives – how to manage the business end of things, raise funds, involve local communities, and use the media to their advantage. Media specialist Julian Teixeira explains his teaching involvement: “There is such a lot to be gained from media exposure – it’s the best way to generate public interest and to bring in funding by communicating the business value of conservation. But they’ve got to learn how to shrink the thick pages of academic research into something that will grab the attention of the man in the street!”

And now the presentation skills are tested. A screen lights up the darkness of a conference room as this year’s CLP award winners introduce their different projects. At times, as the speakers move across the screen, the beam from the overhead projector bathes them in images of their research. As he tells us about his work, Brazilian José Garcia appears to swim with the sharks he studies in the waters off the Atlantic Island of Francisco do Noronha. Maps of surviving post ice-age forests in Georgia reflect on the face of botanist

Levan Mumladze. Threatened bird species fly across the face of ornithologist Wang Jie, who lives and works in Laojunshan, China.

As the presentations unfold, there is a buzz of conversation, as interpreters bring the message home to those delegates who don’t speak English. Robson Chiambiro is a Zimbabwean computer science specialist, educated in Cuba and China. “Interpreters have to do a lot of preparation – getting on top of the specialist vocabulary. I love this process, because I learn so much beyond my own discipline.”

**T**he scope of the projects is excitingly wide, but a single theme runs through them all – the certain knowledge that any real success is dependent on the involvement of local communities. Securing their co-operation is a first step. Ben Han, who is studying a rare moustached toad in China’s Yunnan province, sums it up: “We cannot expect rural communities to abandon a food source, for example, which has been there for thousands of years, unless we give them a good reason. We need to work with them. Convince them. It is often difficult and slow – but only if we bring them around will we succeed.”

In the lunch, break we go down to the Cape Recife beach, so I can take a picture of the group. On the path through the dunes, the delegates seem to conjure up a hidden life out of what appears to me to be a barren landscape. Suddenly, through »

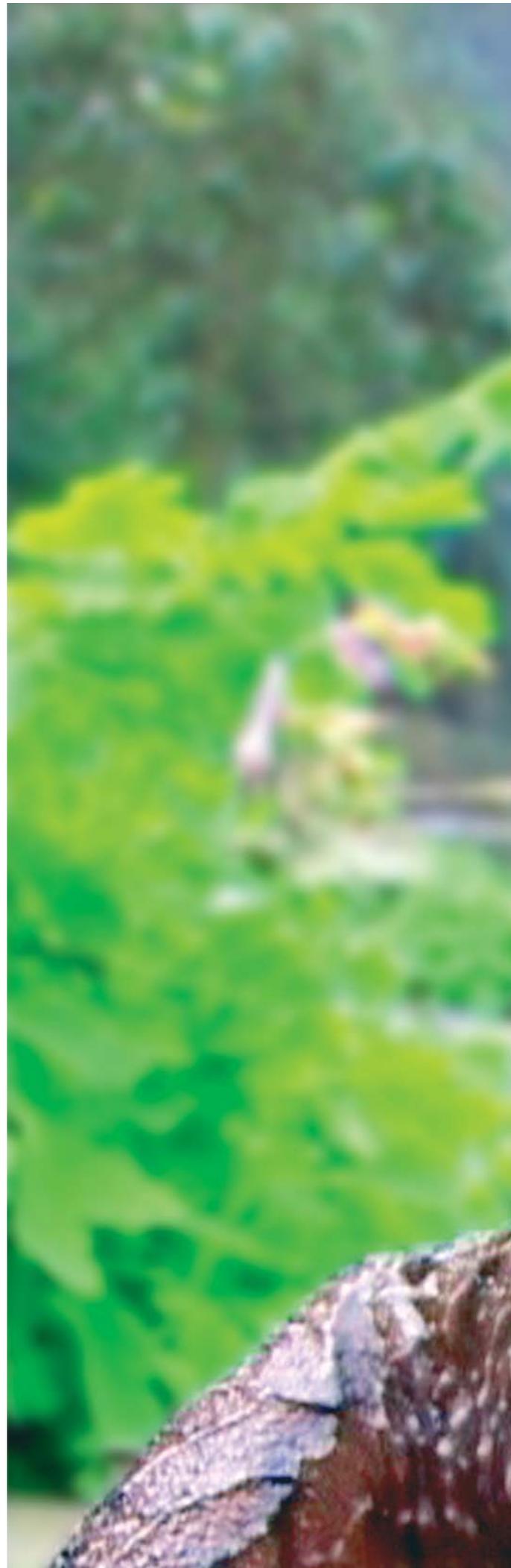
“We are working to develop the potential of future biodiversity conservation leaders – these are men and women who will certainly grow into positions of influence. We’re helping them, through training and long-term support, to build their capacity – to move beyond academic research into the kind of practical conservation that will significantly change the way in which individuals and communities think about their environment.”

**Marianne Carter**

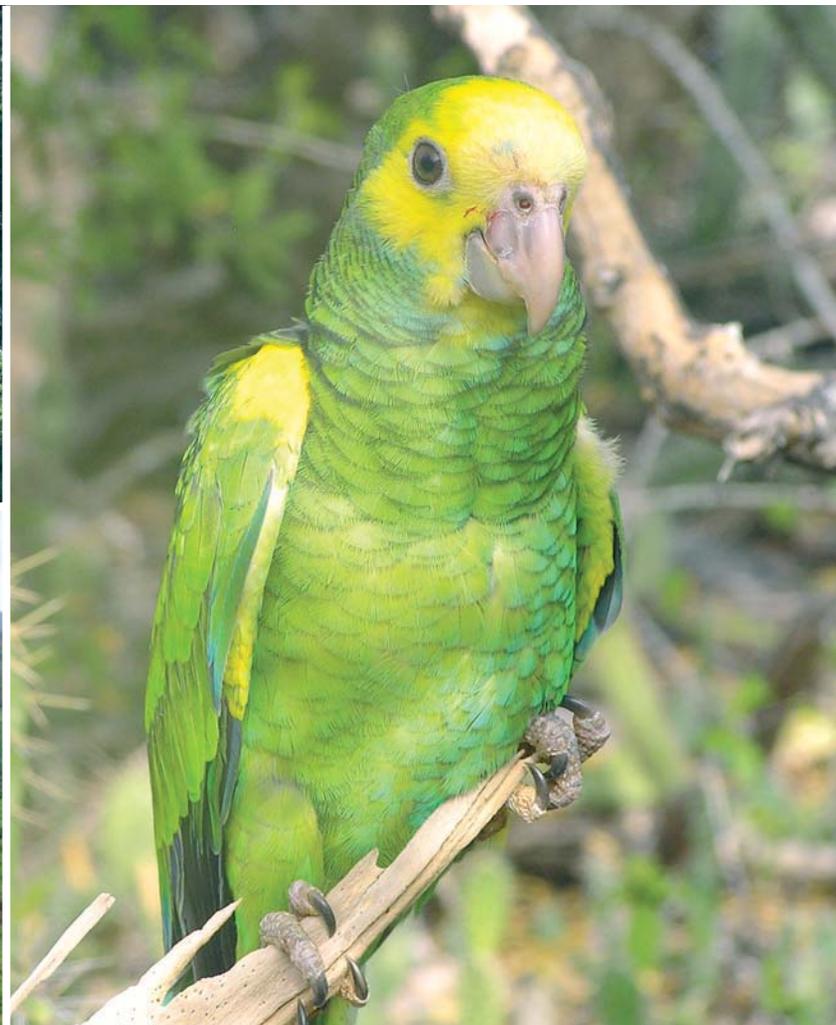
Conservation  
South Africa



**Active participation:** the *Negaprion brevirostris* (far top), also known as the lemon shark, is studied by a conservationist, while the group below learn about radio telemetry. Right, the extremely rare moustached toad can be found in China's Yunnan province.







their eyes, I am aware of living things all around me – creatures that I should know and recognise. I feel both shame and elation all at once. A tiny frog, at home in the dunes, brilliantly disguised, becomes the centre of attention. It briefly poses for pictures, on the palm of a human hand, before being gently released back into its habitat. I take the group picture and we leave. When we set out for the beach, this land and seascape had appeared to me to be inert – now, as I leave, I am aware that this world of sky, wave and sand teems with fragile life. I am humbled, not so much by my ignorance of nature, but by my blindness to it.

Later, I talk to Carter and her organisational team about the impact of many of the projects. The spotlight falls on a particularly successful breeding programme for the yellow-shouldered parrot, an endangered Venezuelan bird. The initiative has succeeded in doubling the population from 750 to over 1,600 birds. But just as the world has its share of joy, it also has moments of darkness. We are interrupted by the news, received by SMS, that last night, 26 chicks were stolen from their nests – not by the highly involved and sympathetic local community,

**Group effort:** this year's CLP participants (below) met at Cape Recife in South Africa. During their visit to the Addo National Park, they spotted Lichtenstein's Hartebeest (top left). Above right, Venezuela's yellow-shouldered parrot has doubled in numbers in recent years, thanks to conservation efforts.



but by organised raiders, who find a ready market in buyers who seek to cage a life that is far, far beyond the limits of rightful human ownership. Project leader José Manuel Briceño-Linares is devastated. "How can people be so cruel – so greedy – so blind?" For a moment he clearly looks lost, desperate to rejoin his team on Venezuela's Margarita Island. "They may think they have beaten us now – but in the end, we will win."

There is a reason why the 2007 CLP gathering is being held in Port Elizabeth. It is the venue for the 21st annual meeting of the Society for Conservation Biology. In the future, CLP will piggy-back on this annual international gathering, wherever it is held, so that the young award winners will have the opportunity to network within the world's most important assembly of practical conservationists.

We attend the opening ceremony. The venue is the sports centre of the University of Port Elizabeth. The huge space is full – white cloth banners stretch across the vast roof, creating a fantastic tent. This is the premier global gathering for conservationists – there are thousands of natural scientists here. Our group sticks together, awed by the size of the event and the reputation of many of



**Abundant life:** during a group photo shoot – ornithologist Soumar Dakdouk from Lebanon and Armenian herpetologist Levon Aghasyan discover a true South African – *Tomopterna delalandii*, – the Cape sand frog (above).

its delegates. But after the speeches and the traditional dancing, everyone melts into the crowd, determined to use the next few days to draw on new knowledge and build relationships.

Outside, under a bright South African night sky, I talk with ornithologist Evgenie Murzachanov. Our conversation is translated in and out of Russian by herpetologist (the study of reptiles and amphibians) Levon Aghasyan from Armenia. Murzachanov speaks about the immeasurable value of the past week – of being able to break out of the isolation of his own programme into a powerful global community of like-minded people, now his colleagues and friends.

**H**e feels that he has become part of a powerful, lasting network. “I have learned so much from the others in our group – in the way they do things and how they think. I will leave here renewed. You have no idea how good it is to know that I am not alone!”

The connections that have been made in Port Elizabeth will last and grow. Beyond the global communications network that CLP makes possible, interest groups are forming, making the connections permanent – creating channels, which

enable conservationists to share their separate experience and expertise, their ups and downs and, most importantly, their best practice.

For the CLP award winners, the rest of the week will be one of total involvement in the international conference, where knowledge is gained and given. It is also a time for encouragement and perhaps revelation. On its completion the delegates will go back to their projects, but definitely not to the loneliness of the long-distance conservationist.

For myself, after what has been a truly mind-expanding experience, I am left with one very clear thought – it is not only the work of governments or large organisations that will save the threatened richness of biodiversity that surrounds us, but also the energy and passionate commitment of individuals, as represented by these young men and women, that will secure our natural world. They are the true captains of a new Noah’s ark. So much of the fabric of our planet – the complex, vulnerable web of life – has been ravaged by a flood of ignorance, greed and apathy. But if the CLP delegates have their way, and they will if we continue to support them, then we may look forward with hope and confidence. **BPM**

**Writer biography >**

**ALEX LEARMONT** is a feature writer, photojournalist and documentary film maker, based in Cape Town, South Africa.



# NEW ORLEANS THROWS OFF THE BLUES

**MUSIC'S RECOVERY BROUGHT THE CITY BACK TO LIFE**

In August 2005, Hurricane Katrina ripped across the southern US, wreaking havoc wherever she went. Worst hit was New Orleans – a city loved for its musical heritage. Its strong connections to the oil and gas industry – it is a major supply hub for the Gulf of Mexico – brought an immediate response from companies including BP offering disaster relief. Two years on and that support continues, in BP's case, through prominent projects such as the construction of Musicians' Village. PAULA KOLMAR visits the city to find out more.

PHOTOGRAPHY BY MARC MORRISON



**Soul food:** New Orleans's history can be traced through its music. Before Katrina hit, music accompanied everything, from festivals to funerals. Today, it – and the city's vitality – is starting to reemerge.



# HELPING A CITY REBUILD ITSELF

In the immediate aftermath of Hurricane Katrina, BP was one of the companies to come forward with disaster relief funds. The money was used for a number of things, including much-needed shelter and rebuilding the battered education system. Below is a breakdown of that assistance.

## KATRINA STATISTICS

**233,000**  
square-kilometre  
(90,000 square-mile)

Disaster area - almost as large as the UK

**1,836**

Number of fatalities

**\$81.2 billion**

Cost of damage

**3 million**

People left without electricity

## HURRICANE RELIEF

**\$6,813,762**

- Donation to American Red Cross \$2,000,000
- BP Employees/Retailers gifts to American Red Cross \$1,269,000
- Expense of LSU Post-Rita Aerial Survey \$6,762
- Donation to Natural Gas Relief Fund \$15,000
- Donation to United Way Hurricane Fund of Chicago \$25,000
- Donation to Red Cross for Baton Rouge, Lafayette and New Orleans \$1,000,000
- Donation to Houston Katrina Relief Fund \$1,000,000
- Donation to Texas Disaster Relief Fund \$1,000,000
- Donation to United Way of Mainland Communities (Texas City) \$150,000
- Donation of 100,000 gallons of fuel to Louisiana; tanker truck of fuel in MS; fuel for Texas City evacuees \$225,000
- ARCO Aluminum donated cans containing water \$100,000
- Donation for fuel for stranded hurricane evacuees \$3,000
- Donation to Operation Blessing \$20,000

## COMMUNITY RECOVERY FUND

**\$3,407,411**

- Donation for Mississippi blood services mobile unit \$45,411
- Donation to Acadian Community Foundation \$20,000
- Donation to southeast Texas Emergency Relief Fund \$50,000
- Donation to Mississippi Coming Home Fund \$50,000
- Donation to National Urban League \$3,157,000
- Donation to Nature Conservancy - Breakwater Building Project \$85,000

## HOUSING

**\$475,000**

- Donation to Rebuilding Together \$225,000
- Donation to Habitat For Humanity \$250,000

## SUPPLIES FOR EVACUEES

**\$74,435**

- Donation of Wal-Mart gift cards and AMEX gift checks to evacuees in Louisiana \$13,435
- Donation to Goodwill Industries of Acadiana (Lafayette, Louisiana) \$61,000

## EDUCATION SUPPORT

**\$1,267,900**

- Donation to Serve! Baton Rouge After School programme for evacuee students \$60,000
- Donation to Grand Lake High School - Lake Charles \$50,000
- Donation to Houston Independent School District \$50,000
- Donation to Katy Independent School District \$55,000
- Donation to St. Edward's Catholic School \$2,900
- Donation to Xavier University \$250,000
- Donation to Dillard University \$100,000
- Donation to New Schools for New Orleans \$700,000

## SHELTERS

**\$171,622**

- Donations to Texas shelters \$8,000
- Donation to CASA of Lafayette \$5,000
- Donation to Point Coupee Parish, Louisiana Shelters \$50,000
- Donation to Morganza, Louisiana Relief Shelter \$5,000
- Donation to St. Aloysius Catholic Church Relief Shelter \$5,000
- Donation to three Logansport area shelters \$7,500
- Donation to Bayou Civic Club Lafourche Parish, Louisiana \$30,000
- Donations to Houston-Galveston area shelters \$51,162
- Donation to two East Texas area shelters (Hwy 80 Rescue Mission, Longview, and Mission Carthage, Carthage) \$10,000



Some say music is food for the soul. In New Orleans, it is the heart of the city, beating a rhythm of tradition, cultures, love, sadness, laughter and weeping. Through the centuries, New Orleans has had its share of bad times, but none as pervasive, destructive and sorrowful as those that followed Hurricane Katrina's landfall in August 2005. A major port city on the Gulf of Mexico (GoM) and a centre for both offshore and onshore oil and gas, New Orleans and nearby locales are home to people who work in the energy supply industry, including BP employees. In the weeks following Katrina, BP used many resources to assist the recovery efforts. And then it went further, continuing to help rebuild the New Orleans area alongside many others.

New Orleans cannot be defined as fitting neatly into one category, but as a mixture of singular and blended genres. History-changing events and multiple national identities, past and present, make the city unique. It has a rich history, near boundless depth and scope of culture, passionate people, and an abundance of nature's resources and its wrath.

New Orleans has many fathers in its past, which gives it a delicious, flavourful personality that threads its way through everything and everyone. To visit this unique city in the state of Louisiana is to lose oneself in an atmosphere of such extremes that, upon returning home, the experience can seem unreal, astonishing, fanciful and unbelievable.

To understand why New Orleans offers so much variety in music, food, arts, language, architecture and traditions –

such as Mardi Gras – one has to visit the city's childhood, as well as its adult years.

New Orleans was born of French parents on a stretch of low land between a mighty river, a giant lake, and an ocean. Nearby, were several Native American settlements. Thus began its struggle with Mother Nature and the first cultural mingling.

While city ownership passed between France, Spain and America, immigrants from Ireland, Europe, Africa, French Canada and the Caribbean Islands stirred the palette of cultures. Some were absorbed, some were isolated, but all made an impact on creating New Orleans. And so did the bounty and forces of nature.

Many ports and towns dot the coastline of Louisiana. The state's southern portion sits on the Gulf of Mexico between the states of Texas and Mississippi. Key to BP's offshore exploration and production are Houma, Port Fourchon and Grand Isle.

About 100km (60 miles) southwest of New Orleans and 115km (70 miles) northwest of Grand Isle, Houma is a city of about 32,000 that serves as the hub for transportation and logistical support of BP's GoM platforms. Port Fourchon and Grand Isle actually extend into the gulf and are sites where pipelines carry GoM hydrocarbons inland for BP and other energy companies.

These areas developed just as New Orleans grew into a major US city and port site during the 19th century.

An old city by US standards, New Orleans was founded in 1718 by Canadian-born Pierre le Moyne d'Iberville and his brother Jean-Baptiste Le Moyne de Bienville. They followed the footsteps of

many European explorers from as early as 1519 in search of the muddy mouth of the Mississippi River, as an entryway to the middle of North America from the GoM and the Atlantic Ocean.

From the start, the objective was to populate New Orleans and Louisiana, named after France's duc d'Orleans and King Louis XIV of France, respectively, and to make a productive commercial port.

The original city, now called the French Quarter or Vieux Carré, sits on a small patch of high ground beside the Bayou St John, which connected the Mississippi to Lake Pontchartrain and provided more direct access to the GoM. Sourced 3,735km (2,320 miles) north in the US, the Mississippi enabled shipments to travel from cities through the entire length of the country.

During the 18th century, the Louisiana territory, including New Orleans, was traded, bought and sold several times over. France gave the territory to Spain gaining an ally in its war against England, while Spain acquired a buffer between its wealthy territories to the west and south and English colonies in the eastern region of the US.

The French flavour of New Orleans remained intact during this period of rule, but the architecture became uniquely Spanish. In the late 1700s, fires damaged much of the old city. The quarter was rebuilt in a Spanish style, which is the structural version you see today.

Napoleon Bonaparte of France retook control of Louisiana in 1800, just as the new United States of America – formerly English colonies – began expanding westward towards the Mississippi. New Orleans had a growing economy by then: »



SIPA PRESS/REX FEATURES



**Disaster area:** New Orleans has been hit by hurricanes throughout the years. While Katrina caused devastation through a large proportion of the city, it missed the traditional French Quarter.

Bonaparte needed money to fund his wars, the US wanted to gain the port, so a deal was struck. In 1803, the entire Louisiana territory was sold to the US for \$15 million.

New Orleans has been an American port city ever since, except for a few years in the 1860s when all the southern states seceded from the US. Americans began living and building successful businesses in New Orleans. They, along with a large influx of Africans brought in as slaves and immigrants from Ireland and the European continent, arrived in great numbers during the 1800s. From these people, came new traditions and customs, adding enormous vigor to the French Creole culture and way of life.

For decades, French Canadians, known as Acadians, relocated in and around New Orleans. At the time, there was a much-perceived difference between the two peoples and their lifestyles. Cajuns, as the Acadians came to be known, carried on their way of life as shrimpers, fishermen and trappers around the Louisiana territory, while the Creoles developed the agricultural industry. The Cajun contribution to New Orleans's mixture of music, food and language endures, and its influence continues to grow today throughout the US.

In 1718, de Bienville probably knew but overlooked the hazards of flooding and



mosquito-borne illnesses that often occur in warm, wet, humid climates, when he made the historic decision to start a community and develop another strategic port in North America.

By the mid-1800s, the population spilled beyond the higher ground of the French Quarter and into lower lands throughout the waterlogged region.

Flooding is a natural aspect of the Mississippi River when it overflows its banks. It has occurred through the ages and created lands below sea level; New Orleans is built on that land. Ravaging floods and random hurricanes plagued the city and its port. Levees were built to tame the river and keep Lake Pontchartrain from overflowing into the city.

Despite having escaped a direct hit from any hurricanes of great magnitude, New Orleans has suffered the mayhem and destruction of the fast, water-laden winds surrounding the eye, or centre, of the storm. Many hurricanes have made landfall through the Louisiana coast over the past 40 years: Hurricanes Betsy – 1965, Camille – 1969, Andrew – 1992, Ivan – 2004, Katrina – 2005, Rita – 2005, all caused damage and brought losses to the New Orleans area and to coastal businesses and communities, including Houma, Port Fourchon and Grand Isle.

**Contrasting scenes:** the floats and costumes of the Mardi Gras festival (above) are synonymous with New Orleans. Left, Katrina's devastation affected many industries.



LOUISIANA: USA REX FEATURES

## PRESERVING LOUISIANA'S PRECIOUS COASTLINE

Vital to storm protection of the mainland, key national industries, wildlife and environment, the coastal wetlands of Louisiana are eroding at a rate of about 77square km (30 square miles) per year, according to the US Geological Survey.

Wetland erosion multiplied when Hurricanes Katrina and Rita battered the coastline with pounding waves and massive tidal surges, sweeping away acres of sediment into the Gulf of Mexico (GoM).

At first glance, surface land loss of the coastline and islands is an ecological tragedy. Loss of Louisiana's wetlands, however, is also a danger to the petroleum and fishing industries, national energy security and the safety of inland communities.

The area undergoing the greatest wetland loss is the Barataria and Terrebonne basins, south of New Orleans. Barataria and Terrebonne wetlands are the first defense against hurricanes and storms for New Orleans.

Storms are mitigated when they hit the barrier islands dotting Louisiana's coastline. According to the US Census Bureau, about half of Louisiana's 4.5 million people live in coastal areas. Without wetlands to buffer storms, both people and property are at risk.

The wetlands provide protection for oil and gas infrastructure and the pipelines bringing oil and gas in from the GoM. Continuing erosion has the potential to impact national energy security: coastal Louisiana is the home of US Strategic Petroleum Reserve Sites, critical in national emergency situations.

The Mississippi River once deposited huge amounts of sediment as it entered the GoM, creating barrier islands, marshes and swamps, but natural causes and human activities have vastly altered



**Culinary delights:** many of New Orleans's cafés and restaurants have since reopened, including the famous Café du Monde, known for its chicory coffee and powder-sugar-covered beignets.

Hurricanes bring extraordinary winds, water, tidal surges and flooding to everything in the system's path. Winds are rated on a five-point scale: a category five rating indicates winds greater than 250km (155 miles) per hour. Katrina's centre missed New Orleans but its wrath did not.

Intense winds wreak havoc on everything in the way, but the surging sea around the hurricane pounds coastlines for miles, bringing waves of immense power that travel up rivers and flood inland areas. For New Orleans, the levee system kept Katrina's massive waves away from the city

as she hit east of the coastline on the night of Sunday 28th August 2005.

By Monday morning, however, some sections of the levees were breached by the awesome pressure of the sea. Lake Pontchartrain flowed into and devastated several parts of New Orleans, including the Ninth Ward, and areas near the 17th Street canal floodwalls.

Then the Mississippi River's gulf outlet overflowed, flooding eastern New Orleans and St Bernard Parish. The river itself stayed within its banks, keeping parts of New Orleans flood-free, including the French Quarter and the Garden District.

In the weeks following the floods of Katrina, BP employees and businesses around the US as quickly began supporting the wider effort to provide aid.

Initially, the needs were basic – help find and rescue stranded people and animals (including pets, strays and the animals from the New Orleans zoo), get medicine, food, water and supplies to the thousands who were trapped in the city, locate shelter, and deliver power and fuel to the city.

Aid was offered in many ways to many victims, but BP's focus was to first take care of employees' needs. Material losses, emotional shock, and having homes swept away were among the experiences of BP employees, but none died as a result of the disaster and evacuations were efficient.

One month after Katrina, Hurricane Rita struck parts of the Texas coastline and Louisiana, bringing more flooding for the struggling city and leaving its pumps without power. The water dumped by Katrina stayed in the bowl of New Orleans.

BP employees worked out the logistics of getting BP-donated diesel fuel transported from sites around the country for emergency generators to supply power to pumping systems in New Orleans, to help the city remove tonnes of flood water. Fuel was also delivered to the neighbouring state of Mississippi to help get power utility grids back into operation.

ARCO Aluminum – part of BP – joined the Aluminum Association in donating cans for water. ARCO also supplied metal »

**“This is my backyard we're talking about, literally, and it's falling into the sea at an alarming rate. Katrina caused more damage to the wetlands but also helped put this higher on our nation's priority list.”**

**Tab Benoit**



**THE NUMBERS**

- 4,920** square km of coastal land lost in the 20th century
- 1,812** square km of coastal land lost by 2050 without effective restoration
- \$14** billion – estimated cost to restore Louisiana's coast over 40 years
- \$100** billion – estimated cost to infrastructure alone without action
- 88** square km eroding per year during the period 1956-2000
- 40** percentage of continental US total wetlands are in Louisiana
- 66** percentage of Barataria/Terrebonne area's state wetland loss 1990-2000
- 1963** year projects were completed and first major coastal land loss observed
- 67** percentage decrease in vital sediment deposits since 1963
- 50,000** acres of wetlands protected or restored since Breaux Act inception
- 28** percentage of US commercial fisheries harvested from Louisiana's coast
- 2** endangered species in Louisiana's wetlands – the bald eagle and brown pelican
- 25** approximate percentage of US natural gas production in coastal Louisiana

the coast since the early 1900s. Rebuilding the wetlands is underway, with funding from the US Coastal Wetlands Planning, Protection and Restoration Act of 1990, commonly known as the Breaux Act.

Perhaps not fast enough, though, according to Tab Benoit, a popular around-the-country musician, who hails from Houma. “This is my backyard we're talking about, literally, and it's falling into the sea at an alarming rate. Katrina caused more damage to the wetlands but also helped put this higher on our nation's priority list.”

Founder and president of Voice of the Wetlands, a non-profit organisation bringing awareness to the true threat of Louisiana's coastal erosion, Benoit is passionate when he speaks of this issue. “As a native of Louisiana, as an American, as a responsible citizen, I am extremely concerned about the outcome if we, as a country, don't fix this quickly.

“Communities, fishing industries, wildlife habitats, and, maybe most importantly, national energy security, are at significant, imminent risk – now. Today. Tomorrow could be too late,” implores Benoit. His voice echoes the concerns of many individuals, organisations and businesses from Houma to Washington DC.

to make more than 10 million cans, to be used for drinking water for hurricane victims and relief workers.

Those are only two of many business lines that helped in countless ways (see page 34). More than \$12 million has been donated over the past two years, not only for first response, but to help New Orleans rebuild for a future.

Key to that future is teaching the city's youth. About \$700,000 was donated to help reconstruct the education system. Additionally, BP donated major funds to help rebuild Xavier and Dillard Universities. Today, both are accepting student applications for every semester, and are seeing gradually increasing student enrolment, according to Dr Kenneth St Charles of Xavier and director of development Gia Soubllet of Dillard.

**T**he city's history can be traced through its music. Every culture that embraced New Orleans brought its own unique sound to the Crescent City. In pre-Katrina New Orleans, music was everywhere and accompanied everything: festivals, parties, funerals, weddings, steamboat rides down the Mississippi River.

When the music began to return, little by little, to a post-Katrina New Orleans, a big part of the city's vitality reemerged, bringing with it hope for the future. Musicians and bands, from jazz and rhythm and blues to Creole, Cajun and Zydeco, are returning the sound of New Orleans to citizens and visitors alike.

BP found a way to be part of this critical investment in rebuilding New Orleans.

"As one of the biggest oil and gas operators in the GoM, BP is a close neighbour of New Orleans," says Hugh Depland, director of strategic policy implementation. "We clearly demonstrated that in our post-Katrina relief efforts, both in corporate donations and employee volunteerism."

He continues: "The musical heritage of New Orleans is an extremely important part of the city's economic base – the tourism industry. We view Musicians' Village as an important step in rebuilding



New Orleans and restoring its deep-rooted cultural heritage."

Native sons Harry Connick Jr and Branford and Ellis Marsalis, all well-known artists around the world, were aware of the importance of music to the city's recovery. But along with thousands of other New Orleanians, many of the musicians lost their homes to Katrina. Without a place to live, there isn't a way to come home.

Working with Habitat for Humanity, the men conceived a Musicians' Village to be built in the Upper Ninth Ward, where homes and properties were destroyed or damaged beyond hope of repair. Homeowners would include displaced musicians and other qualifying families.

Sponsoring the building of four homes in Musicians' Village, BP has donated \$250,000 and many employees volunteered in constructing several other homes.

One belongs to Daisy Griffin, a nursing assistant in New Orleans. Restoring a life following tragedy often starts with rebuilding a home. "I know how it feels to be homeless," says Griffin. Having lived in a temporary trailer for many months, she is settled in her house and was emotional when talking about her move to a permanent place to call home. "I looked forward to walking through the front door of my new house." She chose BP colours for the exterior paint.

Paving the way for musicians and other residents to return to New Orleans is a considerable move in the right direction for the city.



Musician and soon-to-be Musicians' Village homeowner Smokey Johnson lost everything in Katrina's floods. Born in 1936, he became a drummer with greats including 23 years with Fats Domino's band, the original Dukes of Dixieland, Lillian Boutté, Lloyd Lambert and Ed Frank. He lost records, notes, and memorabilia that can never be replaced. "I had to leave because of Katrina. My condo was near Lake Pontchartrain and I lost everything," says Johnson. He currently lives with his daughter, who rents a house in New Orleans.

**I**ndependence has always been important to Johnson. He lived in Detroit playing for a studio for a while but quit so he could return to New Orleans. He worked with singer Lillian Boutté in Germany for a long time, but his heart was in New Orleans, so he returned once again. He travelled for over two decades with Fats, but always came home to New Orleans at the end of the gigs. For Johnson, New Orleans is where it's at; even Katrina couldn't keep him away.

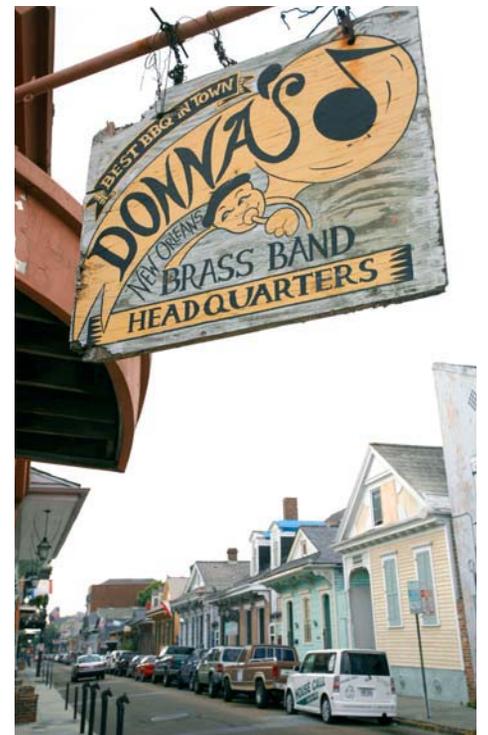
"It's home," says Johnson. It's also

**"The musical heritage of New Orleans is an extremely important part of the city's economic base – the tourism industry. We view Musicians' Village as an important step in rebuilding New Orleans and restoring its deep-rooted cultural heritage."**

**Hugh Depland**



**Full regalia:** Mardi Gras stilt dancers Shaka Zulu and his daughter, Na'imah (both pictured left), moved to Atlanta after losing their home to Katrina. They have since returned to New Orleans to continue their traditional displays.



where the music is. In 1993, Johnson had a massive stroke, resulting in a leg amputation and the loss of use of a hand. Drummers can't play without both hands working out the complex jazz and R&B rhythms, but according to music producer Aaron Fuchs: "Smokey can't help but exude rhythm, and still shakes some wicked beats on his tambourine."

While he has physical limitations, Johnson's enthusiasm for life and music is limitless. Musicians' Village is a great match for the drummer. "I can walk a short distance, but I rely on these motorised chairs. My house in the village had to be specially adapted for me. It has a ramp, wider doorways and a special bathtub. And there are musicians there, too," Johnson says with a sparkle in his eyes.

Back in the city, most of the culinary establishments have returned to business including Café du Monde, recognised for its chicory coffee and delectable powder-sugar-covered beignets; Commander's Palace, one of America's top restaurants and where famous chefs Paul Prudhomme and Emeril Lagasse launched their careers; Pascal's Manale, home of the renown

barbequed shrimp dish; and Antoine's, New Orleans's oldest restaurant, built in 1840.

The French Quarter never flooded, but was looted during the madness that followed Katrina. Today, its hotels, shops, most art galleries, music stores and horse-drawn carriage tours are in full operation.

**M**ardi Gras – translated as Fat Tuesday – is a deeply rooted tradition dating back to the city's original French origin in 1699, when the Louisiana territory was claimed for France on Lundi Gras or Mardi Gras eve. The world-famous gaudy, exhilarating celebration continues to be held each year. Mardi Gras World, builder extraordinaire of the massive colourful parade floats, expects Mardi Gras 2008 to be better than ever.

These are signs of a healthy recovery for the Big Easy, though tourist numbers are speculated by various merchants and hotels to be down by 50% from pre-Katrina business.

About 80% of the region's population evacuated during Katrina's journey inland. City official Dr Brenda Hatfield reports that, as of mid-2007, approximately half of

the people have come back. Applications for home and building permits continue to increase, signalling a future for New Orleans through its people and businesses.

A major challenge facing the city is developing housing at affordable prices. Without this basic element, economics prevent average-wage working people from returning.

"Housing is a critical issue in New Orleans," says Karl Connor, BP's government affairs director for Louisiana. "More than half of New Orleans's pre-Katrina population – about 250,000 people – remain displaced in the aftermath of the storm."

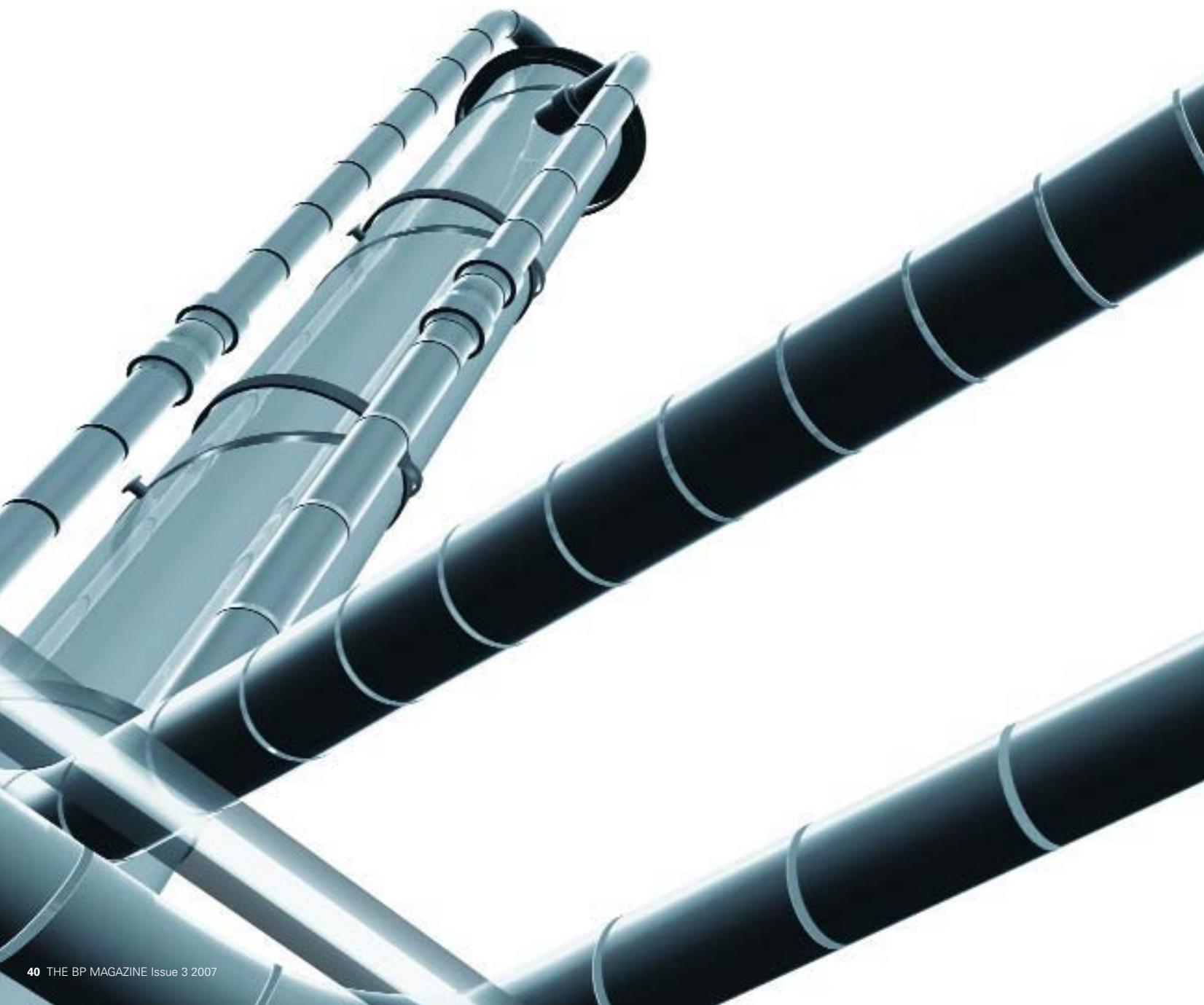
Now in its second hurricane season since Katrina, New Orleans is still exposed to tidal waves, flooding and hurricanes. The opportunity exists to design and build a modern system to protect people, property and business. How and when it can be achieved rests in the hands of the US nation, industries such as oil and gas, and the people of the 'new' New Orleans.

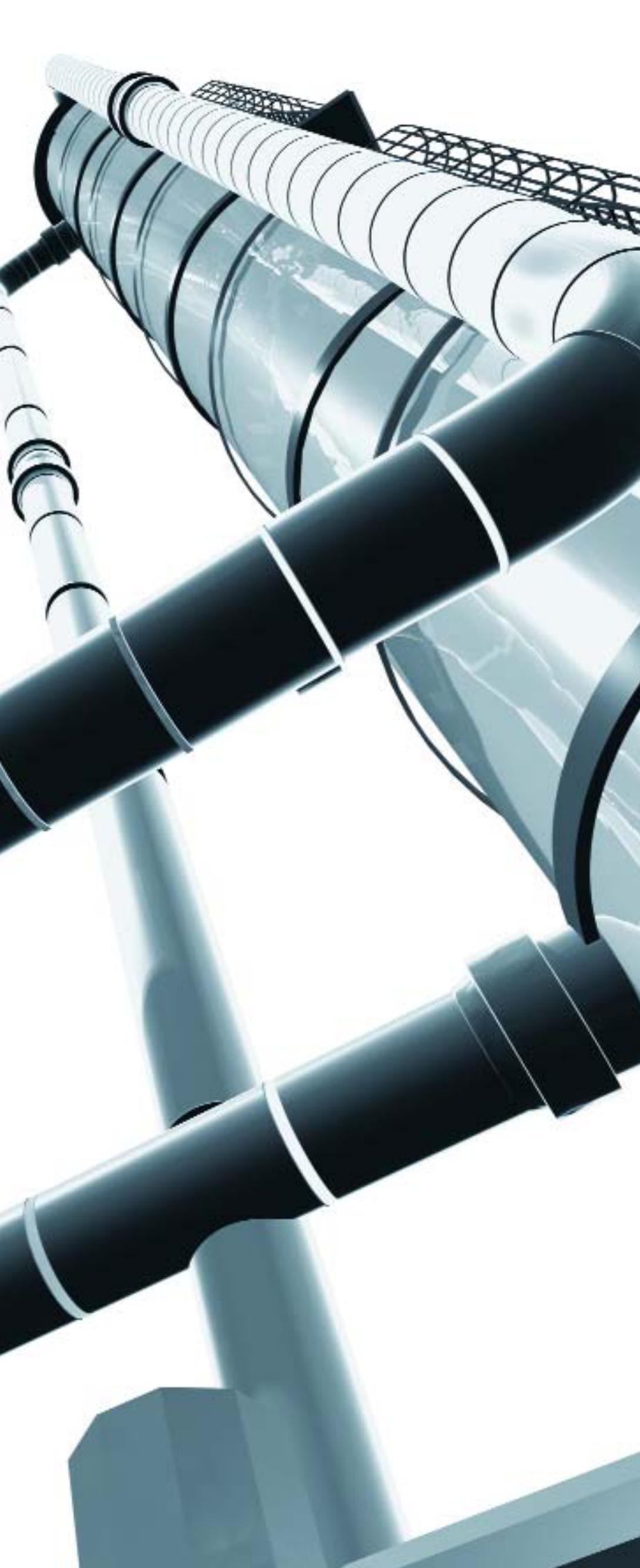
Keep the music playing and the rhythm that is New Orleans will beat a tune of hope for a safe, prosperous future. **BPM**

# NEW POWER GENERATION

BP and Rio Tinto have created a joint venture called Hydrogen Energy to develop clean power worldwide. ROBIN KNIGHT describes how the new company plans to turn theory into reality.

Illustrations by **Atticus Design & Media**





There are certain statistics that concentrate the mind. One involves power generation.

Every four days, a new coal-fired power station opens in China. According to the International Energy Agency, the demand for power generation capacity globally is projected to almost double by 2030. As a result, carbon dioxide (CO<sub>2</sub>) emissions from the power sector are projected to increase by two-thirds over the same period.

Then there are other indicators. Eleven of the past 12 years rank among the warmest on record. Levels of greenhouse gases, such as CO<sub>2</sub>, methane and nitrous oxide, have increased more than a third since before the 19th century Industrial Revolution to 380 parts per million today. This, stated a 2007 report by the Intergovernmental Panel on Climate Change is “a result of human activity.” Soon after, climate change reached the agenda of the United Nations Security Council for the first time. There is an emerging consensus that the global average temperature rise should be limited to 2°C above preindustrial temperatures in order to reduce the risk of dramatic climate change effects.

The power industry stands at the centre of mankind’s energy predicament. Worldwide, there is growing demand for energy. There is also a desire to combat climate change. Power generation accounts for more than 40% of the energy sector’s CO<sub>2</sub> emissions, by far the largest contributor and roughly twice the emissions from transport. “And yet, because many power plants are coming to the end of their lives, around two-thirds of the power capacity likely to be needed in 2030 is yet to be built,” notes Vivienne Cox, BP’s executive vice president for Gas, Power and Renewables. “These are big plants requiring big investments. So the carbon footprint of power can be influenced with relatively few key decisions.”

This is where a ground-breaking new venture linking two of the world’s leading resource companies, BP and Rio Tinto, comes in. Set up to develop decarbonised power projects, Hydrogen Energy aims to convert hydrocarbon fossil fuels, such as coal or natural gas, into hydrogen and CO<sub>2</sub> gases, and generate low-carbon power from the hydrogen. The carbon dioxide produced in the process will be captured and stored deep underground, either in old oil or gas field reservoirs or in other geological structures, such as saline formations.

Most of the technologies needed to produce hydrogen from coal or petroleum coke – a coal-like »

*“We believe that CCS can mitigate CO<sub>2</sub> emissions on the scale needed to meet the targets being set worldwide to deal with climate change. No one should underestimate the complexity of what we are proposing. But we’re not talking about radical solutions far into the distant future. We can’t wait that long.”*

**Lewis Gillies**

refinery by-product – already exist. In a related alliance earlier this year, for example, BP and GE agreed to work together to apply GE’s proprietary gasification and turbine technologies to a number of hydrogen power plants using petroleum coke or bituminous coal as feedstock. “This alliance combines the expertise and resources of two industry leaders to demonstrate that our companies’ leading-edge technologies can produce low-carbon power from fossil fuels for commercial applications in a manner that is efficient, reliable and economical,” says John Krenicki, chief executive officer of GE Energy. “These technologies, combined with policy support from governments, will ensure it happens now, changing the way we envision our global energy future.”

**W**hat is innovative about the initiatives Hydrogen Energy proposes is the combination and integration of the component technologies on a huge scale. Potentially, the impact is dramatic. The full integration of carbon capture and storage (CCS) technology into these new power plants would ensure that some 90% of the carbon contained in the fossil fuel would be safely captured as CO<sub>2</sub> and permanently stored deep underground.

“We believe that CCS can mitigate CO<sub>2</sub> emissions on the scale needed to meet the targets being set worldwide to deal with climate change,” says Lewis Gillies, chief executive of Hydrogen Energy and formerly head of BP’s hydrogen power business. “No one should underestimate the complexity of what we are proposing. But we’re not talking about radical solutions far into the distant future. We can’t wait that long.”

“Hydrogen power, with carbon capture and storage, has moved to the forefront of discussions about how we should mitigate climate change,” says Steve Westwell, chief executive of BP Alternative Energy. “But hydrogen power plants are complex. We believe that delivering a successful hydrogen power strategy needs partners who share our interest in enabling the concept at commercial scale.” Westwell believes the combination of complementary skills and experience that the two organisations offer will allow “us to accelerate development and

deployment of carbon capture and storage technology.”

Based in Weybridge in southern England, Hydrogen Energy aligns two companies with similar views on sustainable development. “We bring complementary skills to the table,” says Preston Chiaro, chief executive energy at Rio Tinto. “Ours lie in fuel finding and gathering, and feedstock provision, while BP’s are in chemical processing, hydrogen power and underground reservoir storage.”

On completion of the deal in June, Rio Tinto made a cash payment to BP of \$32 million, subject to post-completion adjustments, in recognition of the contribution to the new company made by BP’s hydrogen power business unit, whose staff are now employed within the new venture. Much of this relates to work done over the past couple of years to progress the world’s first major projects in this area.

The most recent project for which





plans have been proposed is in Western Australia at the Kwinana industrial zone 45km (28 miles) south of Perth. Announced in May 2007, it would involve building and operating a commercial-scale decarbonised power plant based on coal, linked to carbon storage in a geological formation. Some 500 megawatts of new clean power capacity based on hydrogen would be generated.

CO<sub>2</sub> captured at Kwinana would likely be stored offshore Perth in a deep saline formation. This is not a new idea – 2,800 tonnes of carbon are already injected daily into a saline formation at the Sleipner oil and gas field in the North Sea.

According to Gillies, it is hard to exaggerate the potential impact of these projects. For instance, the Kwinana project would provide enough electricity for about 680,000 Western Australian homes.

Each hydrogen-fuelled power plant will take about three years to build and, depending on size and location, is likely to typically cost around \$1.5-2 billion. All being well, the first plants could be in commercial operation in 2012-2014.

“We feel there is a compelling business case for these projects,” says Gillies.

“Essentially, it’s about responding to need – that is, that energy supply is sufficient to meet people’s needs; that it is as local and secure as possible; and that it is clean.

Decarbonised energy with CCS offers a way to reduce the environmental impact of coal – and coal, for reasons of energy security, is going to remain

an important part of the global energy equation for decades to come.”

Another factor giving impetus to the projects is the regulatory pressure building up in many parts of the world to reduce the carbon footprint of power generation. The European Union (EU), to give one example, wants a dozen CCS projects up and running by 2015 and it would like to see all new power plants in the EU include a CCS element by 2020.

Such ambitious targets add a real sense of urgency to the challenges facing Hydrogen Energy. They are already multiple and complex. One involves ensuring the technology will work on the scale necessary. Another – inevitable in the creation of a new industry – involves guiding ground-breaking industrial concepts through the maze of planning obstacles and the lack of CCS regulation. A third centres on the need for government action to establish long-lasting policy mechanisms that provide sufficient financial incentive to make these projects viable and attractive for companies to invest in this new industry. Some of this support may be provided via international mechanisms created by the Kyoto Protocol and part of it may come via support from »

“Hydrogen power with carbon capture and storage has moved to the forefront of discussions about how we should mitigate climate change. We believe that delivering a successful hydrogen power strategy needs partners who share our interest in enabling the concept at commercial scale.”

Steve Westwell



national and regional governments. In total, the level of support the early projects need is broadly equivalent to what a number of governments already provide to other forms of alternative, or clean, energy. Cost reductions are expected to reduce the level of support those projects would need.

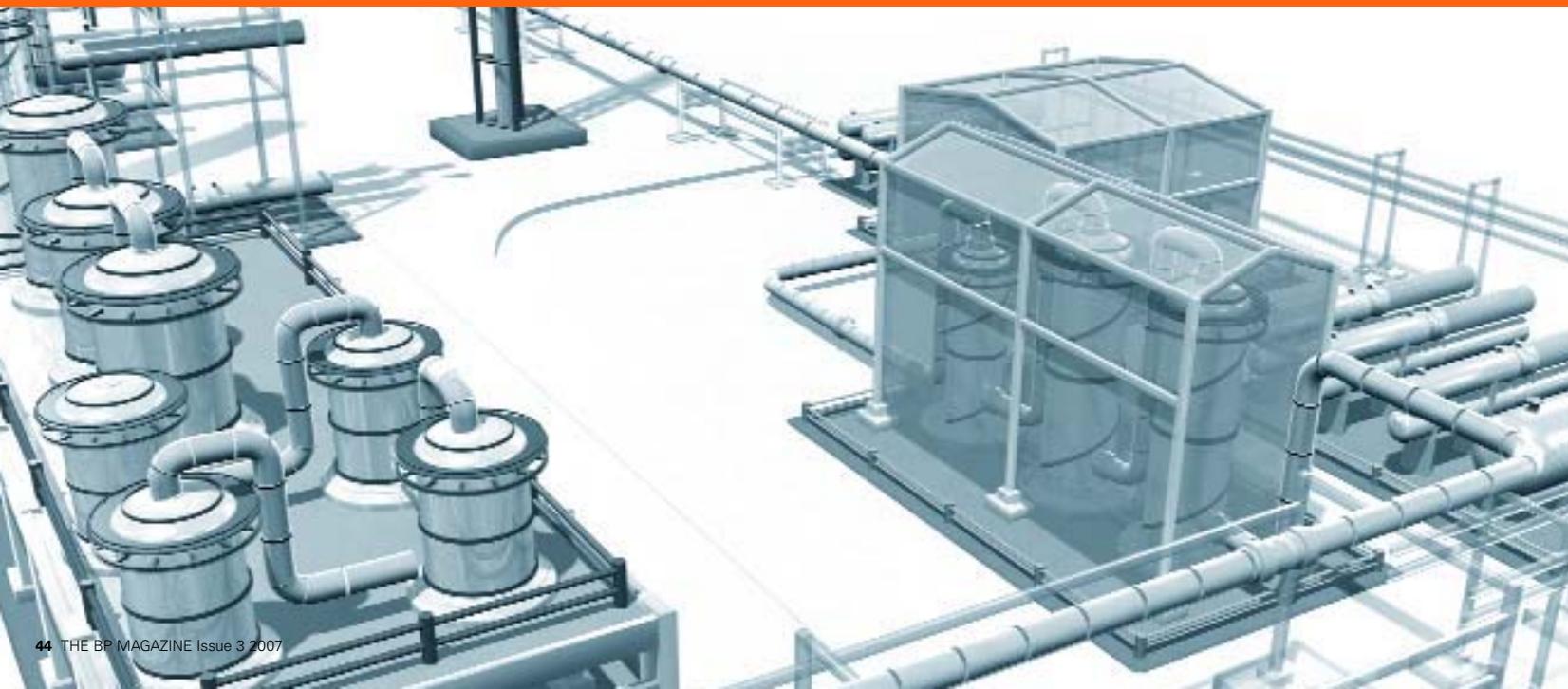
“The unavoidable fact is that ‘clean’ power is more expensive than ‘dirty’ power,” says Gillies. “We are not asking governments for a subsidy. There are all kinds of ways the extra cost we’re taking can be recognised – for example, by passing it on in the price of electricity or through incentives from central governments direct to the projects. No single ‘solution’ is likely – things will vary from country to country. But we do need incentives in place before we start plant construction, because we’re facilitating an entirely new industry – not just building a demonstration hydrogen-fuelled power plant here or there. That isn’t going to fix climate change.”

**I**n the long run, Gillies asserts, costs will come down and the price of carbon will rise. “At some point, the lines will cross and projects like the ones we’re proposing now will become viable without explicit support. But this isn’t likely to happen in less than 20 years. Our view is that the world can’t wait that long to begin to take action.”

That puts the onus for action firmly on governments, as well as companies. In numerous countries, both government officials and politicians recognise the substantial contribution CCS can make to tackling climate change and are moving to find ways to support this new industry. Nevertheless, as Gillies is aware, with projects of the scale and complexity such as those Hydrogen Energy

*“The challenge is to scale up today’s alternative energy industries and innovate to bring down costs and increase efficiency.”*

**Vivienne Cox**



proposes, it can be difficult for governments and others to translate positive intentions into timely, concrete policies to support their development, not least because projects may have particular needs. In the UK, the first hydrogen-fuelled power plant proposed by BP at Peterhead in Scotland was linked to a storage facility within a field set for decommissioning – the timing of which ultimately proved out of step with the policy process.

Situations like these seem bound to shadow Hydrogen Energy's prospects for some time to come – one of the hazards of creating something entirely new. Offsetting this are other factors which explain in large measure the mood of quiet optimism so evident at the company's headquarters.

First and foremost is the interest in CCS now evident in many parts of the world. "We're exploring options for future projects all over the place – in Europe, the US, Australia and the Middle East," Gillies notes. "There's massive interest in this technology and its potential to impact climate change." This is reflected in Hydrogen Energy's young and highly qualified workforce, many of whom express an almost evangelical belief in their tasks.

Second, slowly but surely the international community is edging towards agreement on the various mechanisms needed to create a true market price for carbon and so enable CCS to take off. "The key is longevity – it's crucial that all support mechanisms that governments put in place have a 20-year or more lifespan to match the expected life of the power station," explains Jane Paxman, Hydrogen

Energy's policy and communications manager. "That will give us the certainty to make what are major investments in something that will provide a real difference."

Third, there is already a strong business case for low-carbon power – and it is expected to become increasingly more so in the coming years. "Other forms of alternative energy are profitable today where policy encourages it. That's why wind capacity worldwide has risen 15 times in the past decade and solar capacity is growing at 23% a year," says Cox. "The challenge is to scale up today's alternative energy industries and innovate to bring down costs and increase efficiency."

For a major coal producer such as Rio Tinto, there are other viable reasons for backing decarbonised energy. As Chiaro puts it: "We want to secure the future option value of coal in a world that is likely to put a price on carbon, and where the competition for resources and capital is becoming evermore fierce. Investing in Hydrogen Energy means that we will be well-placed to create value from opportunities in the emerging clean power market."

So Hydrogen Energy has been born and, with it, the hope of a new energy industry for the 21st century. Hydrogen is the most abundant element on the planet. It's everywhere, it's inexhaustible. And it's clean. Hydrogen Energy offers a real chance to generate clean electricity on a massive scale. It does seem a prize well worth winning. **BPM**



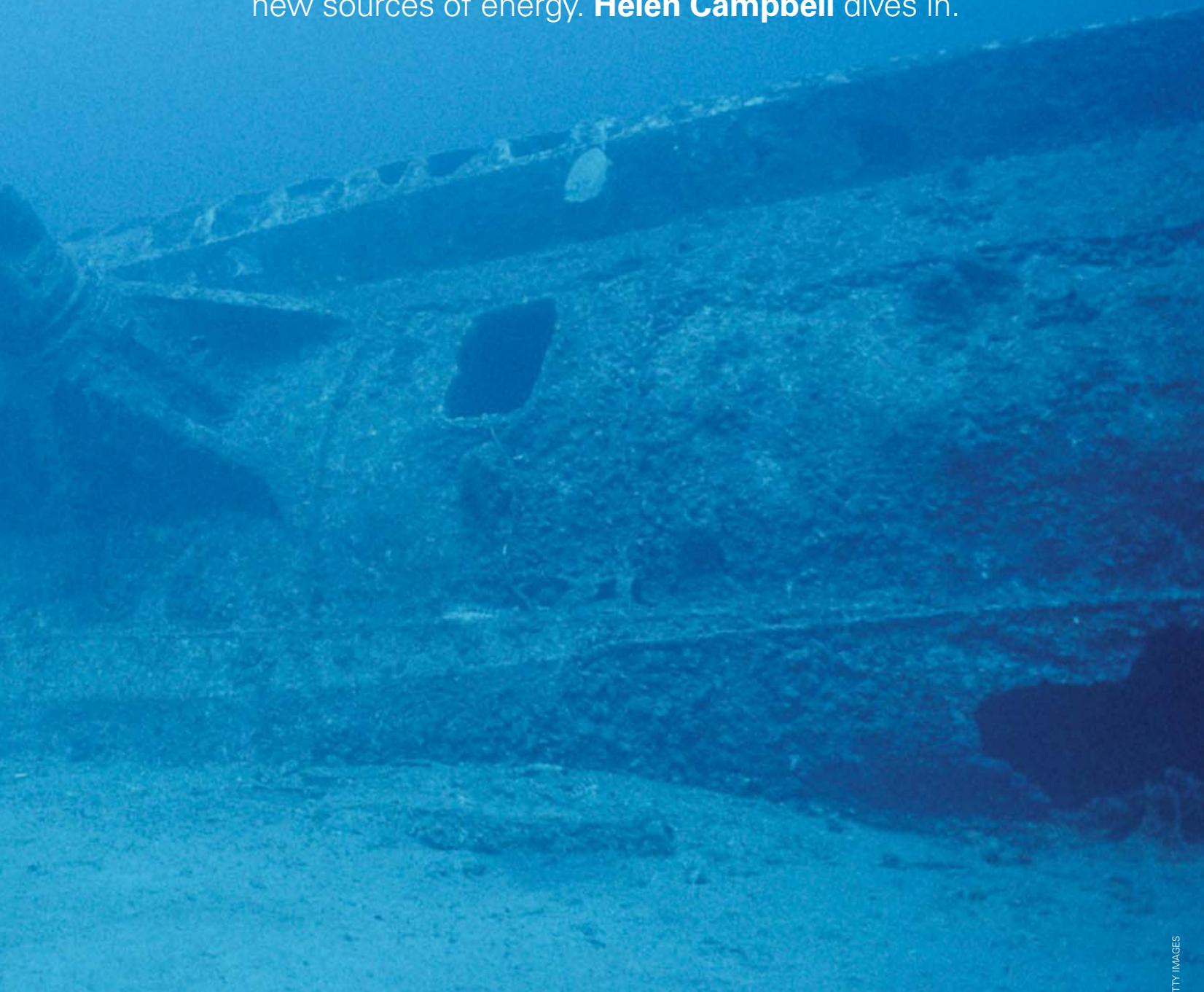
## Underwater discoveries

A large, dark, cylindrical object, likely a submarine wreck, is visible on the seabed in deep blue water. The object is oriented horizontally and appears to be a section of a submarine hull. The water is clear but has a deep blue tint, and the seabed is sandy and slightly uneven.

**Underwater museum:** there are many World War II wrecks around the globe, including this German submarine. It is similar to *U-166*, which was discovered in the Gulf of Mexico.

# DISCOVERIES OF THE DEEP

The world's oceans have always held a mystery about them, thanks to their murky depths. Occasionally, they reveal a secret or two – a new species of fish or a missing wreck. Sometimes, that revelation comes about with a helping hand from oil and gas companies such as BP, which have found themselves moving farther into those depths in search for new sources of energy. **Helen Campbell** dives in.



Home to the world's greatest living museum, the mysteries of the 'deep blue', with its mysteries, endures as one of the planet's most intriguing secrets. No one has yet found that legend of legends, the lost city of Atlantis, but there is plenty to be seen from the remotely operated vehicles (ROVs) contracted by BP and other oil companies surveying the oceans as they perform operational and maintenance activities, while detecting and avoiding hazards.

Through collaborations with scientists and unintentional encounters while working offshore, the oil sector is contributing to an understanding of the undersea environment far greater than could ever be achieved by explorers and academia alone. Far from being a dark, depressing and inhospitable place, the seabed is teeming with life, and history.

One of those collaborations, the groundbreaking SERPENT (Scientific and Environmental ROV Partnership using Existing Industrial Technology) project, is resulting in a huge number of sightings of 'new' species – until now unseen, unfiled and, in some cases, still unidentified. SERPENT was established in 2001, with BP a founding member, as a partnership between the oil and gas industry and the scientific community. The project, based at the UK's National Oceanography Centre in Southampton, aims to make cutting-edge ROV technology and data more accessible to scientists, share knowledge and progress deep-sea research.

"It has been really successful working with the offshore groups," says research scientist Daniel Jones. "The project is giving us a great opportunity to access the ROVs, use them to dive down and see the species and interact with them."

"This has moved us onto the next phase of scientific understanding, beyond just the observational, as has happened in the terrestrial world. Until now, we have not had the opportunity to go down and view these species in the deepest waters, conduct experiments and learn about their habitats and reproduction, and the subsea ecosystem. ROVs are our eyes and hands on the seafloor."

From footage sent in by hundreds of subsea workers around the world, SERPENT scientists have, among other things, learnt of several new depth records for certain fish; discovered a whole new range of behaviours of monkfish; been able to study the breathing rates of fish; and discovered that the squat lobster, common in West of Shetland, is not a

sediment feeder, but an active and vicious predator!

"We have also seen a lot of footage of species we cannot immediately identify," Jones adds, citing six new species of amphipods, small shrimp-like crustaceans, filmed off Angola. "In addition, we are trying to work with the oil companies to monitor underwater ecosystems to assess and mitigate the impact of disturbance, whether manmade or naturally occurring, such as iceberg ploughing or deepwater storms."

For those viewing the ROV cameras' live feeds, it is a privilege to be party to life many, many metres below the surface. The Gulf of Mexico (GoM) is the most surveyed body of water in the world, so it is no surprise that operations there have shown up a number of interesting sights.

Paul Gulgowski was the BP engineer in

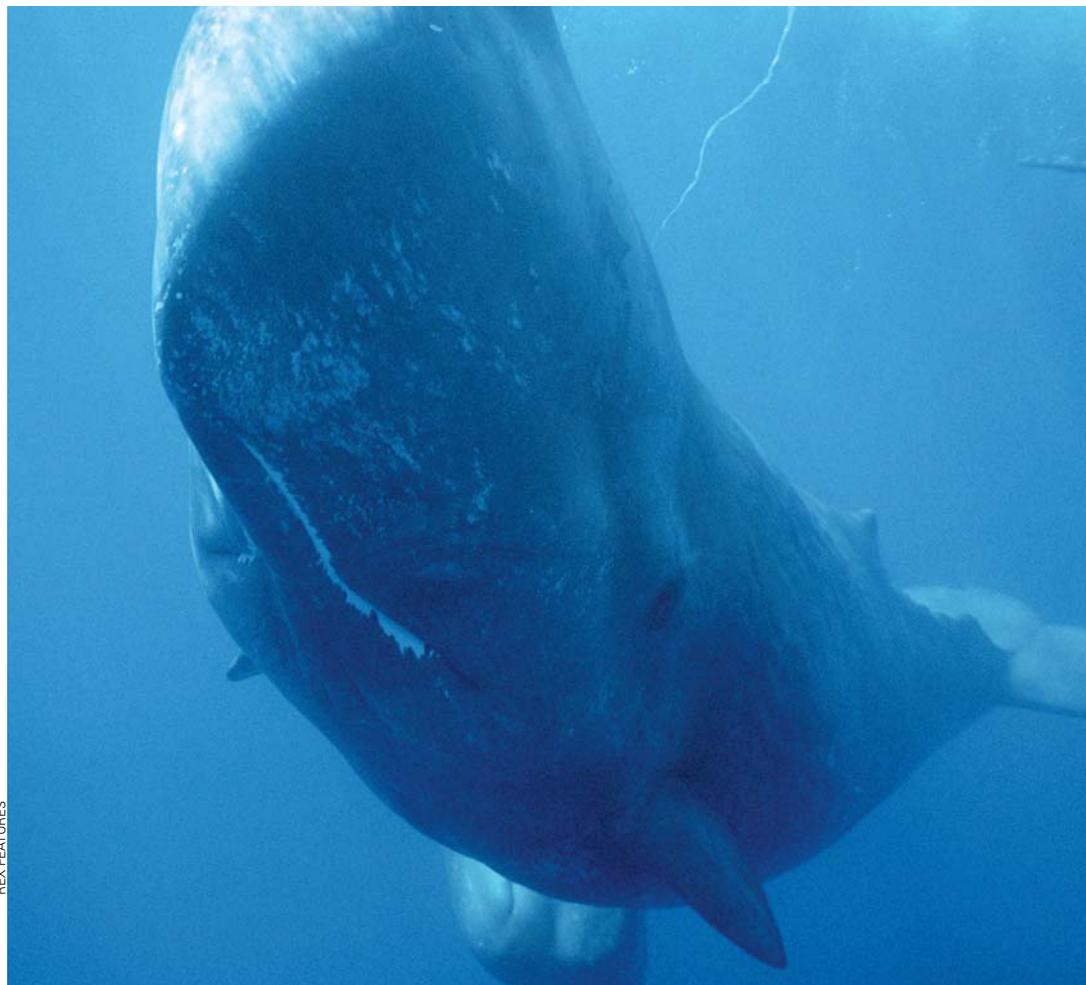
charge of a 2004 operation to retrieve an item of equipment on the Aspen field – later sold by BP – when he was lucky enough to see a curious sperm whale. The experience took his breath away.

"I just thought, 'wow!'" he says. "Typically, ROV pilots get to see a lot, but to encounter a whale at this depth, 60-150m [200-500 feet] down, was incredible. We stopped the job immediately, returned the ROV to its cage and watched the whale on the sonar. When it was a safe distance away, we restarted and finished the job. We handed the footage over to BP's HSE team and it was then passed on to SERPENT."

"Many people pay a fortune to go whale watching in Alaska, while here I was at work and I got to see it for free!"

In August 2006, BP contractors on the *Deepwater Horizon* survey vessel came across a Greenland shark, far away from its usual home in the much colder climes of the Arctic. The 3-3.5m (10-12 feet) long shark was filmed by an ROV in 1,424m (4,672 feet) of cold water, and the observation is believed to be the first record of such a shark in the Gulf of Mexico. In addition, scientists identified it as a female, a fact suggesting that it may be breeding in the Gulf.

A month later, a team on the *Glomar Explorer* filmed a reddish brown substance in the water that turned out to be the six-metre (20 feet) long tentacles of a jellyfish. Later identified as a



REX FEATURES

*Stygiomedusa gigantean*, or Giant Medusa, this mysterious animal had not previously been seen in the Gulf of Mexico, and has caused much excitement amongst marine scientists.

In addition to providing the SERPENT project with ROV video in 2005, the team appraising BP's Puma discovery in the GoM, this year acquired a benchmark ROV study of chemosynthetic organisms – tubeworms and mussels, which derive their energy from natural hydrocarbon seepage – and their habitat.

Due to their apparent paucity, these organisms – when they occur in abundance – are protected in many parts of the world, the GoM included. As hydrocarbon seepage is common in the Puma area, the potential exists for the presence of high-density chemosynthetic communities (or chemos for short).

The 2007 Puma ROV study is unique in its reach and quantitative documentation of both the occurrence and abundance of chemos with relation to seafloor habitat and non-habitat. At more than 12km (eight miles) in length, it is thought to be by far the longest chemo-specific ROV survey currently in existence.

Marine geohazards specialist Richard Weiland states that “until now, we could only infer potential chemosynthetic habitat based on geological interpretation of ‘metre-scale’ geophysical imagery of the seafloor acquired during our 2006 AUV [autonomous underwater vehicle]

“We have also seen a lot of footage of species we cannot immediately identify. In addition we are trying to work with the oil companies to monitor underwater ecosystems to assess and mitigate the impact of disturbance, whether manmade or naturally occurring, such as iceberg ploughing or deepwater storms.”

### Daniel Jones

survey of the Puma area. But the ROV observations allow us to confirm the presence or absence of chemosynthetic organisms down to the ‘millimetre-scale’, and their abundances.” Spatially linked, these two data sets allow the appraisal team to see the larger, interrelated picture between fauna, habitat and local geology at different scales of resolution.

While the AUV data identified significant areas of potential chemos habitat, the ROV observations have discovered far fewer occurrences of these lush communities than previously expected. “From an industry point of view, this was a great finding. It allows more potential development options for BP and our partners” says project engineering manager Gary Adams. “From an environmental perspective, we are just beginning to realise the full potential of these world-class, integrated geophysical and biological data.”

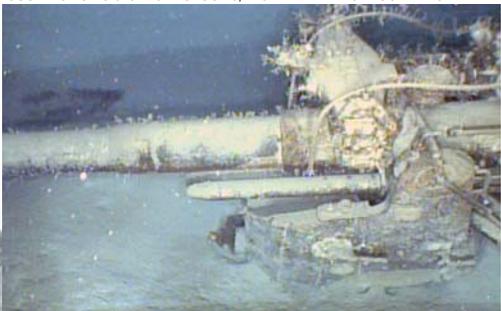
Providing perfect hideouts for the thousands of weird and wonderful species are such historical delights as the wrecked »



**Sea world:** sperm whales (far left) have been spotted by BP employees while using ROVs. Left, the *Thistlegorm* wreck in the Gulf of Suez. Above, an ROV is launched into the ocean during a SERPENT collaboration between Chevron, Transocean and Subsea7.



COURTESY OF C & C TECHNOLOGIES, INC. AND THE PAST FOUNDATION



**Battle ship:** the German *U-166* in action during World War II (left) and lying 1,400m below the surface (top). The vessel, the only submarine sunk in the Gulf of Mexico, was discovered by BP in 2001 .

hulls of galleons, holed submarines from later years, hoards of gold and other treasures. In fact, the United Nations' scientific and cultural arm, UNESCO, estimates that there are more than 3 million wreck sites around the world.

One interesting find is a German World War II submarine that BP stumbled across in 2001 in 1,400m (4,600 feet) of water, while surveying in preparation for the laying of part of the Mardi Gras pipeline network, again in the GoM. The *U-166*, sunk by a US depth charge in 1942, was the only submarine sunk in the Gulf of Mexico during the war.

The discovery was made by C & C Technologies' AUV on contract to BP and Shell. BP reported the wreck to the US government, which confirmed the find. The discovery of the vessel, and the subsequent notification to Germany of its location, meant that relatives of the 52 crewmembers who died when it went down, were able to have some closure, especially since the submarine had been lost for more than 60 years.

The Minerals Management Service (MMS), the US government agency that governs oil licences in the GoM, asked BP to consider funding a full exploration of the site, a request the company declined due to it being a war grave.

But BP also discovered another wreck nearby, this time a merchant vessel. The company works to ensure that it and its contractors comply with laws that provide for the preservation of such sites. When it learned that a contractor had disturbed a site in the GoM, it revamped its training programmes to prevent a recurrence and entered into an agreement with the MMS, which allowed the recovery of valuable artefacts from this unique site.

The MMS has its own marine archaeologists keeping track of the amazing historical finds that come up and that the oil companies pass to them. Dr Jack Irion, Social Sciences Unit

supervisor there, says there is generally a good partnership.

"Oil companies are not actively looking for wrecks," says Dr Irion. "Their primary purpose when they conduct their seabed surveys is to detect and avoid hazards to their operations. If one is detected, they typically will avoid laying pipelines close to the site. Every now and then, if there is a project in an area in which we are interested, we will ask if there is some downtime on the vessel and if they can check out a site for us. Quite often, they can accommodate this.

"There has been a good reaction from oil companies to making a positive contribution to science, that is basically unavailable with other industries. It is not often you have a whole industry out potentially locating archaeological sites for you!"

BP teams in Egypt have made some intriguing finds while surveying in the Gulf of Suez, one of the world's busiest shipping lanes. These include a wreck named the *Thistlegorm* containing a hoard of 1940s British motorcycles, aircraft wings, munitions, Lee Enfield 303 rifles, railway rolling stock, trucks and American jeeps. Nearby a 100-year old vessel, said to be not unlike the famous *Cutty Sark*, has also been found. These are two of the more historical finds, with shopping trolleys from a well known western supermarket chain bringing up the rear...

"Everything from China and Japan comes in and out of the Gulf of Suez," says BP diving and subsea adviser Richard Fyfe. "As well as the three convoys per day of cargo vessels, there are also a lot of American and

Coalition fleet vessels, destroyers, frigates, submarines and supply ships."

The motorcycles – all 'Birmingham Small Arms'-branded and in crates on the wreck of the *Thistlegorm*, sunk by a German torpedo plane out of Crete in 1941 – are of particular interest and the team would love to know more about them. However, the wreck is a British war grave, so it is a case of please look, but don't touch.

"The *Thistlegorm* was discovered by Jacques Cousteau in the 1950s and he highlighted it in his book *The Living Sea*," says Fyfe. "However, it was then lost again until the 1990s, when a combination of oil industry and other professional divers rediscovered her thanks to an article that appeared in *Diver* magazine in May 1993."

Offshore surveys very often turn up field debris, such as anchors, anchor cables, steelwork, lost gangways and pipework, accumulated over time from older oil projects. These usually need clearing, and can be home to some troublesome inhabitants.

"Unlike the North Sea, we are not plagued by conger or moray eels, but debris does become home to scorpion fish," Fyfe says. "They don't come hunting, but when divers disturb their homes, then they will, and do, attack. We take every step to ensure they are disturbed as little as possible."

Another vessel with a BP connection was discovered in Sweden in 1956. Anders Franzén, an employee at BP Stockholm, and an amateur archaeologist, found the wreck of the warship *Vasa* that sank in 1628 in Stockholm harbour. She was raised in April 1961. "They were most exciting days," *BP Shield* magazine quoted Franzén as saying in 1974.

The oil sector is believed to have in the region of 500 ROVs at its disposal around »

"There has been a good reaction from oil companies to making a positive contribution to science, that is basically unavailable with other industries. It is not often you have a whole industry out potentially locating archaeological sites for you!"

**Dr Jack Irion**



## Deepsea treasure

The *Thistlegorm* was sunk in the Gulf of Suez in 1941 and first found by Jacques Cousteau in the 1950s. However, it was lost again until the 1990s when a BP team came across it and its cargo of motorcycles, aircraft wings, munitions and jeeps.



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**Golden touch:** BP supplied chemicals to help preserve the *Mary Rose* (left) when it was lifted from the seabed in 1982. Above, one of the gold bars recovered from *HMS Edinburgh*. Below left, a scorpion fish. Below right, the *Vasa* warship was raised in 1961.

the world – far more than the academic and scientific community could ever hope for. The industry is called upon from time to time to help with salvage operations, by making expensive technology available, sometimes while on project downtime and sometimes in an emergency.

BP's subsea capabilities really came into their own in the immediate aftermath of a tragic ferry disaster in a storm in the Caspian Sea on 22nd October 2002, when more than 10 people lost their lives

The Mercury 2 ferry, belonging to the Caspian Shipping Company, capsized and sank while en route from Kazakhstan to Baku. BP crews on the *Dada Gorgud* semi-submersible drilling rig and the *Neftegas 62* support vessel picked up a distress signal, the *Neftegas 62* being the first boat to reach the incident area. She, and another BP-contracted vessel, the *Barra*, pulled five people from the water.

In addition to mobilising other vessels for search and rescue, and monitoring an oil spill from the wreckage with a helicopter, BP dispatched the *Gilavar* seismic vessel to provide sonar evaluation, which identified the wreck in about 150m (490 feet) of water. Following this BP mobilised the *Marcab* vessel to use its subsea camera equipment to survey the wreck, passing on the footage to the Azerbaijan State Commission.



CORBIS

The oil sector's advanced subsea technology was also called upon elsewhere in the former Soviet Union, but this time in the icy Barents Sea in the 1980s, when the KGB [former state secret service] was in charge. The British cruiser *HMS Edinburgh* served as escort during World War II for the Russian & North Atlantic Convoys, but she was torpedoed by a German U-boat on 2nd May 1942, taking 58 lives and 465 gold ingots weighing four tonnes down 240m (800 feet) with her.

The gold, Stalin's payment to the Allies for the logistical support provided to enable Russia to keep its war machine functioning, was destined partly for the UK and partly for the US governments. With the war at its height, the knowledge of her loss and likely location passed into history. Nearly 50 years, later when satellite navigation, dynamic vessel positioning and saturation diving technology had been advanced in support of the offshore industry, they were applied to relocate her, and recover the gold bullion. Then in 1981, after a number of delays, divers from Wharton Williams, or '2W', then one of the biggest names in North Sea diving services, finally participated in a salvage operation, very closely watched by the Russian and British governments and their 'agencies'.

Mike O'Meara Subsea 7's health, safety, environment quality vice president, was the 2W superintendent responsible for the diving operation. 2W, one of the founding companies which formed into Subsea 7 – is today a major contractor for BP.

"It was recognised that diving capabilities at the time would put the wreck within our grasp, but even then it was technically a very challenging operation," O'Meara says. "This was the deepest dive we had ever carried out and, apart from a



CORBIS

return salvage operation three years later, we have not carried out manned dives at this depth again. We are, however, operating with ROVs at depths of 3,000m [9,800 feet]. Initially, we recovered 431 bars, out of the 465 manifested. A further 29 were recovered during our second salvage operation in the mid-1980s, which left five bars unrecovered. Today, they would be worth around \$200,000 each.

The salvage consortium, including both the UK and Russian governments, received their share as a result of a successful recovery carried out under the salvage agreement.

It is not only equipment that is called upon. BP provided the chemicals – specifically 18 tonnes of polyethylene glycols – that have helped to preserve the timbers of the *Mary Rose*, Henry VIII's

ship that sank in the Solent off southern England in 1545. Raised in 1982, the ship had been protected by layers of silt that started to come away as she made contact with the air. BP's then subsidiary, Hythe Chemicals, supplied enough chemicals for a successful three-year pilot, and this experience has since led to the preservation of several other important finds, including the 2,500-year-old *Gela*, found off Sicily, and 'Seahenge' in Norfolk, England.

Such delights as submerged shipwrecks, with all their romance and intrigue, and sightings of huge whales are things that only a privileged few can normally experience. Greater access to the subsea world, facilitated in no small way by the oil sector's investments and capabilities, is of huge benefit in its own right, helping scientists to better understand the huge varieties of flora

and fauna that live in the deepest waters, the lie of the seabed and how it changes.

Through projects such as SERPENT and partnerships with historical institutions, oil companies can, at the same time, better understand the world in which they are working, and the impact of operations on marine communities and ecosystems, so that future projects can take these impacts into account. **BPM**

### Writer biography >

**HELEN CAMPBELL** is a UK-based journalist specialising in energy, geopolitics, conflict and the environment. She was a staff journalist reporting on energy markets and corporate news for four years, and has worked on a freelance basis for the past seven.





# WHEN VIRTUALITY BECOMES REALITY

Every so often, a technology comes along that gets everyone talking, although not all of them intrigue such a wide audience as the virtual community known as Second Life. LISA ANDREWS reports on the growing phenomenon and why companies like BP are starting to take notice.



**Creative streak:** anything is possible in the online world of Second Life – ‘residents’ have set up their own businesses, while big corporations such as BP and Sky are using it as a collaboration tool or an opportunity to talk directly to users.





Ever fancied holding a meeting in a treehouse? Perhaps not such a strange concept if you're a seven-year-old boy, but you'd think beyond the realms of possibility for an adult marketing executive.

Not so, says Catherine Smith, marketing director for Linden Lab – the creative force behind the now global virtual community known as Second Life. She is proud to call her 'in-world' treehouse her office. "At Linden Lab, we have all our meetings in-world," she explains.

In development since 1999 and launched commercially in 2003, Second Life does pretty much what it says on the tin. It allows internet users the ability to create a 'second life' within an application that you download to your desktop. Users create a virtual character known as an avatar, who then becomes a resident of Second Life. Once 'in-world', your avatar can then interact with others, move through different islands and worlds and, depending on the level of membership you take out, go on to buy land, create an island, build a house, even set up that business you've always dreamed of, creating your own little section of this brave new world.

Sound like a sci-fi story? You'd be forgiven for thinking so. In fact, *Time* magazine described Second Life back in 2003 as "a 3D online world where you can do whatever you want, build whatever you want and be whoever you want. It's *The Matrix* minus the evil machines." In reality, the concepts behind Second Life more closely mirror ideas found in the cyberpunk literary movement, in particular, Neal Stephenson's 1992 novel *Snow Crash*, which coined the term 'metaverse' as a way of describing how a virtual reality-based internet might one day look.

The Second Life metaverse has exploded in the past 18 months and today claims to have more than 8 million registered residents. Not bad, considering there were just 100,000 at the beginning of 2006. It's not clear how many of that 8 million are active, or whether one person controls more than one avatar, but what is evident is that there is a rapidly growing market for this kind of advanced social networking. "The moment I realised how big we were getting," says Smith, "was when we started to get the daily press cuttings and there were press releases being issued about stuff in Second Life we had no idea about."

Unlike other popular social networking sites, such as Facebook and My Space, Smith says there's more to Second Life »

than just meeting people. “It gives you the ability to live a completely different life – be things that you can’t be in real life.” This can have quite profound meaning when you learn that there are many residents who live with mobility problems in the real world. “It’s quite amazing how many dance classes go on in Second Life,” says Smith. And according to one story, an employee at a major IT company hired a Second Life ballroom, so he and his wheelchair-bound wife could dance. What is more, he was living abroad, at the time.

The real beauty of Second Life, and perhaps the reason for its meteoric rise in popularity, says Smith, is its freedom for creative expression. “It gives people the ability to take any crazy idea they’ve ever had and have total freedom to give it life.” Perhaps more importantly, the intellectual property (IP) rights for any new content lie with the individual resident and not Linden Lab. “Money wasn’t a part of Second Life when Philip [Rosedale – Second Life creator and Linden Lab chief executive] conceived it. He wanted to



**Virtual landowner:** once in Second Life, residents are able to buy land, create an island or build a house.

create a space that was always evolving, with people building things together.”

Pretty quickly though, a currency – the Linden dollar – was born (now exchangeable with ‘real-world’ US dollars) and, thanks to its unique approach to IP, Second Life’s economy began to boom. So, fancy floating down your virtual wedding aisle on a flower petal? No problem, hire a virtual wedding planner. Or, if you always thought of yourself as a bodyguard or a theme park designer, why not set up your own business?

“About 18 months ago, an avatar by the name of Kermit Quirk created a game called Tringo,” remembers Smith. “It was like a mixture of Tetris and Bingo and it took the in-world by storm, turning it into this big group experience.” So successful did Tringo become that a real-world company came along and licensed it from Quirk. Thanks to Linden Lab’s IP policy, Quirk got the proceeds. “I loved seeing that,” Smith says.

Quirk certainly isn’t the only one. In-world landowner Anshe Chung recently issued a press release announcing that she



## BP enters the metaverse

- BP first became interested in Second Life while looking for marketing ideas for Castrol and learning opportunities for its group compliance and ethics team.
- The company now owns a service station and oil installation in Second Life. The virtual property could help provide training for tanker drivers and offshore employees.
- One BP team has created a virtual ‘war room’ that helps promote collaboration between several countries.

had become the first Second Life millionaire. And, speaking on the Channel 4 film *Second Lives*, online designer Alayne Wartell explains how she went from making \$200 a month in the real world to \$1,000 a week in-world. "It's a thrill that people pay money for the things that you make... You feel they value those pixels you created."

Like the real world, there is a less wholesome side to Second Life – if you go looking for it. Sex and gambling are two of the biggest industries in-world and virtual riots and freedom fighters are not unheard of. There are growing concerns of potential terrorism and fraud and Linden Lab has been named in a lawsuit connected to an avatar's real-world identity.

It's fair to say not everyone is enamoured. One website called Get a First Life has sprung up declaring, 'Go outside, membership is free' and others have reported problems with the technology, such as computers crashing because it takes up so much bandwidth. Many companies simply won't let it through their internet

security 'firewalls', as the application cannot currently be hosted from their servers.

Fans of the concept though, argue that, just like any new technology, these glitches will be ironed out as it continues to develop. "It reminds me of how the internet was in about 1995-6," says Justin Bovington, chief executive officer of Rivers Run Red, the UK's first creative agency to develop Second Life-only content. "But Moore's law comes into play here. As people become more interested, it will become more robust."

As for security issues, Second Life does offer tools to limit who has access to your island and deal with inappropriate behaviour. "Reputation is how the world is moderated," says Smith. "It's too big for Linden Lab to govern, but we do have community standards and give residents the means to govern their own land, remove people or prevent them from creating content in your area."

Like so many technological developments, there are those who worry about the onset of a world where human

beings no longer know how to interact properly with each other. Others disagree. Speaking on the *Second Lives* film, John Palmer, creator of the in-world Support for Healing island, believes: "It is no more virtual than talking to someone on the telephone."

Even the Catholic Church has become involved in the debate. Writing in the Vatican-approved journal, *La Civiltà Cattolica*, Father Antonio Spadaro believes it is time religion embraces this new order as a means of helping lost virtual souls. "It is not possible to turn a blind eye to this phenomenon," he writes, "or offhandedly pass judgement glorifying or condemning it. Instead, it must be understood. The best way to do that is to enter it and live inside, to recognise its potential and dangers."

And there is a growing number of big corporate brands branching out into Second Life that suggests interest isn't ebbing away. While Reuters set up a Second Life news wire, Calvin Klein and Toyota both launched new products in-world simultaneously to their real-world release. Training shoe manufacturer Reebok has gone one step further in consumer engagement by testing new colours on Second Life residents, while last year, Starwood Hotels opened up a virtual hotel and asked residents to come and stay and give feedback before deciding whether to build the real thing. Also last year, the BBC's Radio 1 station, held its 'One Big Weekend' musical festival in-world, at the same time as 30,000 music fans descended on Dundee in Scotland to watch the 'real' thing.

In fact, the more you delve into the subject, the more activity you find. Earlier this year, Sky News launched a virtual newsroom at the Hay Literary Festival in the UK. It was built by Rivers Run Red and residents are able to move around the studio, learn about presenters and attend events, including a recent interview between political editor Adam Boulton and British member of parliament David Miliband. "The people who tend to come in are usually early adopters," says Simon Bucks, associate editor at Sky News. "They're not afraid of 3D technology. The challenge for us though, is to come up with the right events. It is a very event-led environment."

As far as Bovington is concerned, the possibilities that Second Life open up for corporations – particularly those with something to sell – is huge. "This is the internet that we were promised 15 years ago," he says. "It allows you to have a much richer experience. It is becoming much harder for brands to get their messages out to their audiences these days, people are watching less television





so they have to be more clever about how they communicate.” He believes these brands are custodians of content for the first time: “Second Life allows them the opportunity to give something back to their customers – it could be a party, access to the newsroom, or some information – but it allows consumers to become a bigger part of the process.”

Another early corporate adopter of the application is PA Consulting Group (PA). With the help of Rivers Run Red, PA opened a virtual office with the intention of carrying out both business-to-business marketing and recruitment. It was also the first company to hire ‘greeters’ – Second Life residents employed as office receptionists to welcome anyone interested in PA. “It’s a powerful concept,” says Claus Nehmzow, a senior partner at PA Consulting. “We don’t actually know who these people are in real life, but we interviewed them, hired them and trained them up all within the Second Life world. They do a great job. Having that real-time presence in our office is very important in a platform like this.”

“Second Life is so much more than a tool to get a brand message to consumers,” adds Earl Atkinson, also with PA. It can be used as a forum for businesses to gain

“Our introduction to Second Life began while seeking marketing ideas for Castrol and learning opportunities for our group compliance and ethics team.”

**Joe Little**

feedback on their real-life products, using ‘co-creation’. Second Life residents can not only suggest improvements to a business – they can actually show them in real time using the three-dimensional building tools and rich communication facilities available in-world.”

While PA’s initial interest was internal, they have since gone on to work with several other organisations, who now have some presence in Second Life, BP included. BP’s interest in Second Life is in its infancy and focused on the opportunities it offers in training and conferencing. “Our introduction to Second Life began while seeking marketing ideas for Castrol and learning opportunities for our group compliance and ethics team,” explains Joe Little, part of BP’s chief technology office. “We knew that military healthcare organisations already use similar tools to help them train their staff and it seemed logical in our industry as well.”

“One of the biggest industries inside Second Life is learning and development,” adds Mike Cawood, BP’s WebLearn manager. “We’re moving more and more towards simulation environments as a means of training staff, and Second Life could become a cost-effective option.”

Cawood believes many of Second Life’s possibilities are still at proof of concept stage, but the potential is clear. “We already have a BP-branded gas station built by PA Consulting and have acquired an oil installation.” The station was built to help tanker drivers learn how to manoeuvre their way around a forecourt. Likewise, the installation could potentially be helpful in providing health and safety training for offshore workers.

The other attraction for a company like BP is Second Life’s opportunities for collaboration. In project director Mike Boda’s team, a real-world meeting room

has been replicated – also with help from PA – as a virtual ‘war room’, complete with the same charts, maps and presentations that cover the physical wall. “We have colleagues all around the world who can feel quite disconnected when we’re having a teleconference. Having the replica virtual room helps engage everyone in the same conversation,” Boda explains. “As we walk around our physical room, so too might our overseas colleague walk around our Second Life room.”

Not everyone is convinced by this new form of collaboration, but, like Cawood, Boda believes it’s a concept worth pursuing. “It is not necessarily right for every meeting, but it could be good for certain types of conferences, or for tackling a problem in a creative way.”

So, one day might all major chief executives meet in Second Life to discuss their businesses in a way that physical calendars would never allow? Perhaps not in the immediate future, but there does seem to be both a time-saving and environmental opportunity that could become compelling for organisations looking to reduce their carbon footprint. “We recently held a large business conference in Second Life, with about 100 participants, and estimated the carbon emission savings due to elimination of travel to be about 65 tonnes,” says Nehmzow. “In the future, this will have a tremendous impact – it is the perfect way of bringing people together with content in a more environmentally friendly manner.”

Ultimately, like any new technology, a world in which Second Life is second nature is some way off. But, with the ever-growing need to reduce environmental footprints and the equally pressing issue of connecting our increasingly globalised world, perhaps applications like Second Life offer a way of balancing the two. See you in that treehouse. **BPM**



BP FACES >

Photography > Chingiz Samedzadeh

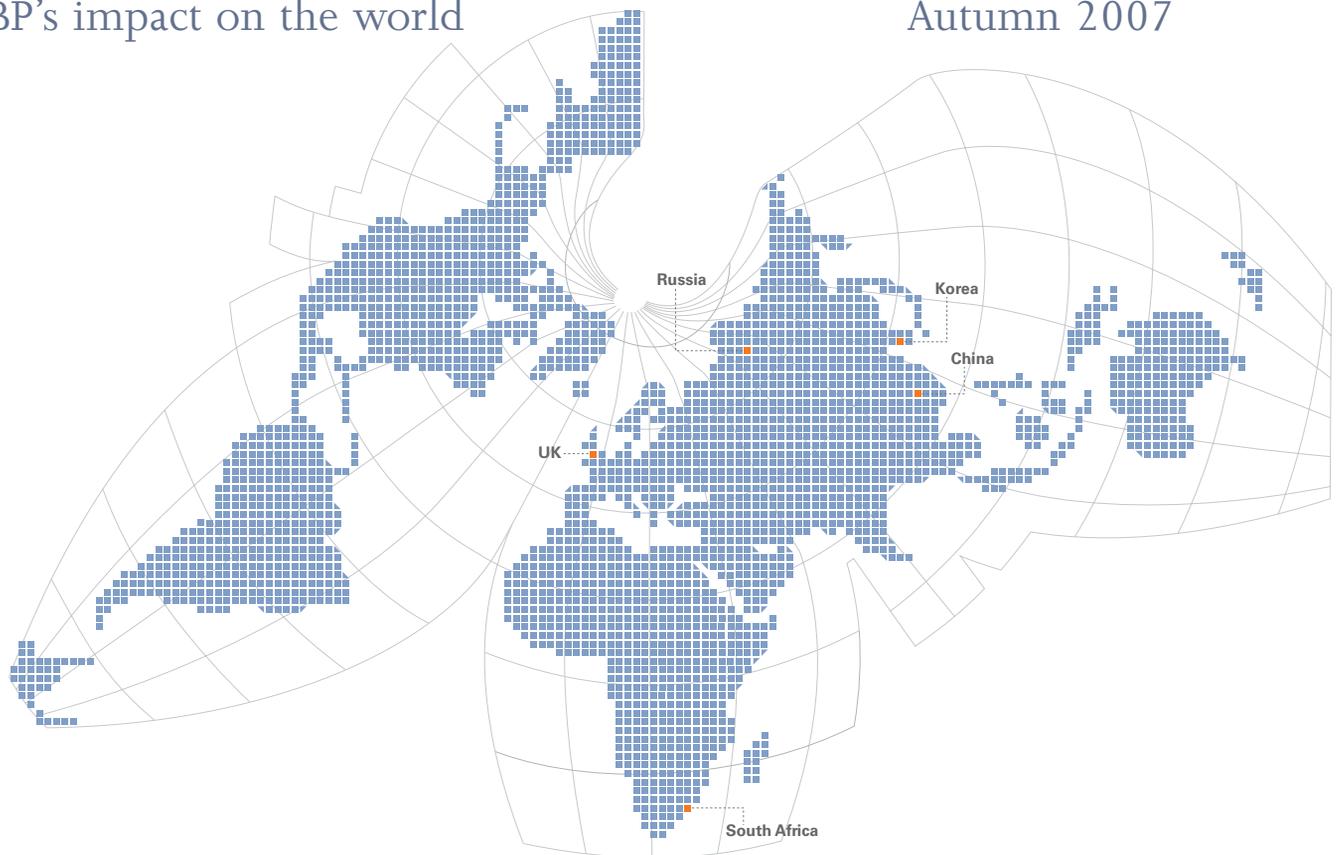
## Child's play **Ismail Miriyev** / ENERGY CENTRE MANAGER > CASPIAN

They say never work with children or animals, but for BP's Ismail Miriyev, his job wouldn't be the same without kids. Ismail manages BP's Caspian Energy Centre, located on the outskirts of Baku, Azerbaijan. The institution has been designed to bring science and the world of energy to life for Azerbaijani children, and since opening in May 2005, has received around 14,000 visitors. Not all of them strictly speaking children, either. "We have had our youngest visitor of two and our eldest who was 80 years old," says Ismail, who gets directly involved in creating the centre's exhibitions. "We collaborated with London's Science Museum, the Smithsonian Institution in the US and the Houston Museum of Natural Science to develop our content," he explains. But it's the children who make Ismail's job pleasurable. "Last year, we sent a team of four students to the UK to compete in the Lego MINDSTORM championships and they came fifth," he says proudly. "Their parents told us that our centre changed their children. Since visiting us, they have become more interested in their education and future careers." ●

# Worldview

BP's impact on the world

Autumn 2007



## 1. »China

### Clean energy

BP and the Chinese Academy of Sciences (CAS) have signed a memorandum of understanding to establish the Clean Energy Commercialization Centre (CECC).

CECC aims to accelerate the development of clean coal conversion technologies and investment opportunities through the commercialisation of key technologies, and management of large-scale demonstration projects, primarily using coal as feedstock.

Jiang Mianheng, vice president of CAS, said: "Building upon CAS's expertise in natural science research, and BP's experience and international best practices in technology commercialisation and project management, this new partnership will bring breakthroughs in the development of conversion and commercialisation, which will generate materially significant clean energy investment opportunities, contributing to the development of China's energy industry, its economic growth and environment."

## 2. »Korea

### Ship delivery

BP Shipping launched the *British Emerald* in July – the world's largest liquefied natural gas (LNG) carrier, and the first in a series of dual-fuel diesel-electric gas ships. The vessel was built by Hyundai

Heavy Industries in Ulsan, South Korea, with a capacity of 155,000 cubic metres.

The ship has been designed to be more fuel efficient than comparable LNG carriers, which will result in reduced fuel costs and greenhouse gas emissions. The

vessel will burn 40 tonnes of fuel per day less than a conventional LNG carrier of similar size.

*British Emerald* is the first of a fleet of four 'Gem' class LNG carriers; *British Diamond*, *British Ruby* and *British Sapphire* will be delivered in 2008.





### 3. »UK

#### Neutral position

BP's UK fleet of road tankers is being revamped to include targetneutral branding. The 225 fuel trucks driving more than 40 million kilometres a year to and from BP forecourts have signed up to the programme. The UK-wide initiative allows customers to offset their vehicle's carbon dioxide emissions through an annual contribution which funds carbon offsetting projects around the world.

"By having the trucks out on the roads illustrating targetneutral, we hope to encourage other motorists to think about the subject of neutralising their emissions as well," says Kerry Schrank, spokesperson for the programme.

### Quote of the quarter

"I believe the establishment of CECC will play a significant role in facilitating indigenous Chinese innovation capability to meet the environmental and energy challenges faced today by China and the world."

**Iain Conn, BP chief executive, refining and marketing**

### 4. »Russia

#### Strategic alliance

BP and TNK-BP have signed a memorandum of understanding with Russian gas giant Gazprom, with the intention of creating a strategic alliance. This would jointly invest in major long-term energy projects, or swap assets around the world.

The companies will establish a team to identify opportunities for investment, both overseas and in Russia. The intention would be to extend Gazprom's access to international markets and deepen BP and TNK-BP involvement in Russian oil and gas.

"We will initially be looking for projects of at least \$3 billion, but the potential for further growth could be very significant," said BP chief executive Tony Hayward.

"This historic agreement lays the ground for powerful co-operation between BP, TNK-BP and Gazprom."

### 5. »UK

#### Investment opportunities

BP is to pump significant investment into its southern North Sea business to bring about an increase in recoverable gas reserves

and create opportunities for further development offshore.

The Dimlington Onshore Compression & Terminals Integration project will see some \$250 million invested in new gas compression facilities at the BP-operated terminal. This new equipment will reduce pipeline pressure between the offshore fields and the terminal, allowing the gas fields to increase production. BP expects remaining recoverable reserves in West Sole and Amethyst fields to increase by around 30% as a result of this project.

A planning application has been submitted and, if approved, it is expected that the compression facilities would be in operation by 2009.

### 6. »South Africa Brand accolade

BP has won the top spot in the annual Markinor *Sunday Times* Top Brands survey as the number one brand in the petroleum sector in South Africa for the seventh consecutive year.

The awards, now in their 13th year, are based on feedback on a representative sample of people over the age of 16 from all walks of life.

## Autumn stats

10,126

The number of medium-sized hot air balloons that could be filled by the carbon dioxide offset so far through BP's targetneutral programme.

2.4%

The amount by which energy growth increased globally in 2006.

21%

The percentage of carbon dioxide emissions for which the transport sector accounts.

1,600+

The number of combined sites BP and TNK-BP own in Russia.



# CARING FOR THE COMMUNITY

Corporate social responsibility has become a hot topic recently, but it's not such a new concept, as the photos over the next pages demonstrate. Companies such as BP and Castrol have been working to care for employees, communities and the environment in which they operate for decades.



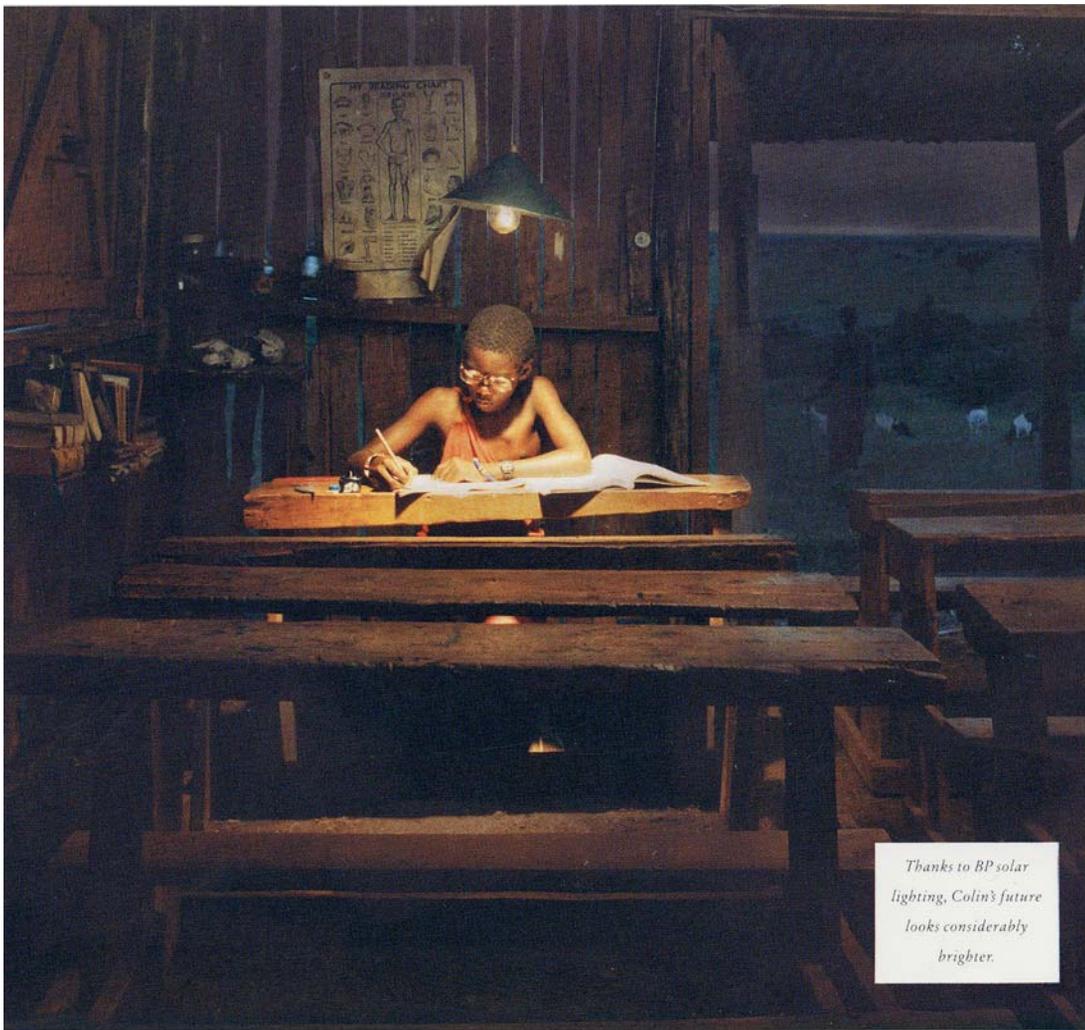


**Top left:** BP labourers wait for treatment at the Umm Said hospital, Qatar in 1955. **Below left:** a young man undergoes an X-ray at the Abadan Hospital in Persia in the 1950s. The hospital was one of the first set up to European standards. Dr MY Young had been in the region since the first concession was signed, and had spent a lot of time building relationships with Persian tribes. As a result, many men brought their families for vaccinations before returning to the hills. This had never succeeded before in such large numbers. **Above:** Burmah Oil built a number of schools during its time in Burma, including this one near to the Yenangyaung oil field. A booklet entitled *Visit of His Excellency, the Hon'ble Sir Archibald Cochrane, KCSI, DSO, Governor of Burma to The Burmah Oil Co Ltd (Scotland) Yenangyaung Oil Field. 11th July 1936* reveals that there were 2,056 scholars, 760 of whom were boy scouts, rovers and wolf cubs. **Below:** construction begins on the first employee house in High St, Abadan in 1911.



**Right:** an early example of a Kuwaiti team being given on-the-job health and safety training. **Middle left:** a nurse hard at work on the staff ward at Persia's Abadan hospital. **Middle right:** the living quarters – known as Nissen-type accommodation – of the single men working for BP in Iraq during the 1920s and 30s. **Bottom left:** hospital staff preparing for a fete. **Bottom right:** the Abadan technical school in the 1950s helped train many young men for careers in the oil and gas industry.





Thanks to BP solar lighting, Colin's future looks considerably brighter.



**Above:** driving safety is a key policy for BP and in 2001, it launched a campaign in Egypt to encourage local communities to wear their seatbelts. **Left:** advertising from the 1990s describing BP's programme of supplying solar-powered vaccine refrigerators and lighting systems to schools throughout Africa. **Below left:** BP-supported nesting spot for the rare Giant Leatherback Turtle, found in Matura, Trinidad & Tobago. **Below:** children gather round a water tap installed by BP through the municipal solar infrastructure project in the Philippines.

## Colin can read by sunlight even after the sun has gone down.

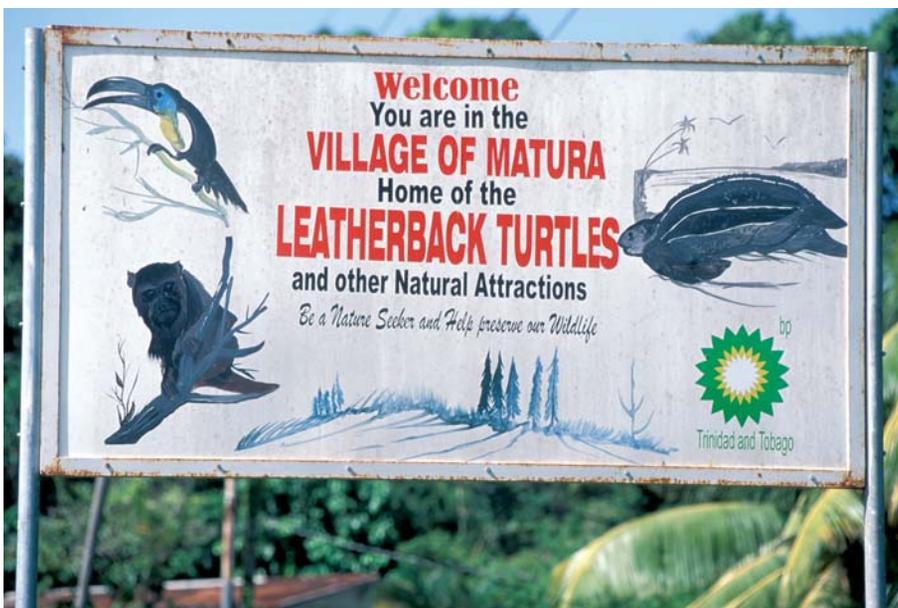
Colin lives in a remote African village. He has no light to study by at home, so after a full day of classes he remains at school to finish his homework. You may wonder where he gets the

energy. Actually it comes in the form of electricity generated by solar modules. Since 1981 we've supplied solar-powered vaccine refrigerators and water pumps to clinics, and lighting systems to

schools throughout the African continent. Solar technology may never eclipse conventional power sources. But it already promises the children of Africa a brighter future. Supplying solar power to remote parts of the world is one of the things BP is doing today, for all our tomorrows.



For all our tomorrows.



## Parting shot



**It's showtime:** Photographer Marc Morrison captures 5th generation stilt dancer, Na'imah dressed in her traditional Mardi Gras regalia. She and her father are part of a troupe that travels the world performing as both Mardi Gras Indians and cultural ambassadors of traditional African dance. All the costumes are handmade and can take up to one year to complete.