

MANAGING CLIMATE CHANGE

FINANCIAL TIMES SPECIAL REPORT | Monday November 28 2011



Online
Carbon capture and storage is seen as a way of stopping the release of large volumes of carbon dioxide emissions

www.ft.com/climate-change-2011 | twitter.com/ftreports

Kyoto protocol at risk in Durban

Agreement on further commitments to reduce green house gases is unlikely, reports **Pilita Clark**

People have been talking about the death of the Kyoto protocol for at least a decade.

But this week, as thousands of people head to South Africa for the latest United Nations climate summit, which starts in Durban today, fears for the pact's future are once again widespread.

"The conditions under which the Durban meeting will take place could not be more challenging," says Juan Costa Climent, global climate change and sustainability services leader at Ernst & Young.

Nick Robins, head of HSBC's climate change group, is equally pessimistic. "Ambition levels are low and policy differences among industrialised and emerging economies remain acute," he says.

The potential for "high profile" clashes at Durban, over everything from the Kyoto protocol to climate finance "remains high".

Indeed, economically and politically, the situation ahead of this year's annual summit is arguably among the worst since the treaty was first agreed in 1997 in the Japanese city that gave it its name.

Yet it is a critical time for the treaty, whose first phase commits wealthy countries to cut their emissions by nearly 5 per cent from 1990 levels, but only until the end of next year.

Global energy-related emissions of carbon dioxide jumped



Floods devastated areas around Bangkok in November. Many nations are struggling with financial conditions that make dealing with climate change seem a low priority

Getty

5 per cent in 2010 to record levels, according to the International Energy Agency, despite the 2008-2009 banking and economic crisis.

Also, for the first time in many years, there was an increase in the world economy's carbon intensity, or emissions per unit of gross domestic product, say consultants at PwC.

"Instead of moving too slowly in the right direction, we are now moving in the wrong direction," says the professional services firm, explaining there will now need to be carbon intensity cuts of at least 4.8 per cent every year until 2050 if global temperature increases are to be kept to no more than 2C above

pre-industrial levels. It had been hoped a second phase of the Kyoto pact, obliging countries to agree a fresh round of emissions reductions, would have been negotiated by now.

But efforts to do that have failed since the protocol entered force in late 2005, most spectacularly at the 2009 Copenhagen summit, when world leaders from Barack Obama, the US president, down left the talks without agreeing a legally binding deal.

Now, a year before that 2012 expiration date, hardly any prominent leaders are expected in Durban, not least because many are struggling with volatile financial conditions that

make climate change seem a low priority.

The global economy is still recovering from the last downturn just as an unfolding euro-zone debt disaster threatens to wreak further havoc. That bodes ill for another important 2012 deadline concerning the money that rich countries have pledged to give poorer ones to help the latter deal with climate change.

At the Copenhagen summit, wealthy countries promised \$30bn a year in "fast-start" funding to poorer countries by the end of 2012, and then scale it up to \$100bn a year by 2020.

Although non-profit bodies, such as the International Institute for Environment and Development,

have calculated that \$25.5bn has been raised for fast-start funding, they say most of it has been promised for projects that counteract climate change, whereas poorer countries want funds to help them adapt to it.

And with the final year of the fast-start funding phase approaching, they worry that rich nations are showing little of the commitment required to reach the \$100bn a year target.

On top of this, the US is heading into a presidential election year in which Republican contenders are unsure if climate change exists, let alone whether the US should sign up to a global treaty to tackle it. Texas

governor Rick Perry has said "a substantial number of scientists... have manipulated data", while Minnesota's Michele Bachmann called global warming a hoax.

A year ahead of next year's presidential election, it seems impossible for the Obama administration to offer much, even if it wished to do so.

There is little new in this. The US signed the Kyoto protocol in 1997 but did not ratify it, after many in Congress argued it would be wrong to commit to a deal that obliged the US to lower its emissions, but not big emerging rivals such as China.

Continued on Page 2

Inside this issue

IPCC report

The causes of global warming are still difficult to pin down, according to the Intergovernmental Panel on Climate Change

Page 2

Shale reserves

A golden age could be about to dawn for gas

Page 2

South Africa

The country harbours hopes of brokering a Kyoto-style deal in Durban

Page 3

Mass extinction

Mankind's exploitation of the world's resources could threaten

the existence of the species

Page 3

Silicon imports

Cheap photovoltaic cells from China are leading to lower-priced solar panels

Page 4

China focus

The country has set out ambitious plans to cut carbon and polluting emissions in a new five-year plan

Page 4



Spotlights. And catwalks.
Incredible India is in vogue through the winters!



Incredible India

www.incredibleindia.org

Tiger sighting in Corbett National Park

Managing Climate Change

Gas seen as bridge between old and new forms of power

Shale reserves

A golden age is dawning for the fuel, reports Mike Scott

The world is set to enter a golden age for gas, according to the International Energy Agency, that will see it start to rival coal as the main fossil fuel.

It is easy to see the attractions, not just for the environment but also in energy security terms.

Coal is widely dispersed and cheap – but it is the most polluting fossil fuel in terms of greenhouse gases and other pollutants that affect air quality and can cause acid rain.

Oil, while less polluting, is overwhelmingly concen-

trated in the politically insecure Middle East and Russia and has seen huge volatility as well as dizzying price rises.

Until recently, much the same was true of gas – global reserves were dominated by Russia, Iran and Qatar, and supplies from existing suppliers such as the UK, Norway and Algeria are being used up fast.

But the global gas market has been transformed by the advent of technology that has enabled the exploitation of huge shale gas reserves – particularly in the US, which has moved in less than a decade from being one of the world's biggest importers of gas to being self-sufficient and even preparing to become an exporter.

Significant reserves of shale gas have been

identified around the world, from Australia to Austria, as well as in key emerging markets such as China and India.

Ostensibly, this is good news for efforts to tackle climate change – CO₂ emissions are far lower from burning gas than coal and it is a much more flexible fuel. Not only can it be used for everything from heating to transport, but gas-fired power stations can be run as “always on” baseload supply

A shale gas extraction plant in Poland

and also as quick-response “peaker plants”.

The Center for American Progress, a US think-tank, says gas is a “bridge fuel” that can ease the transition to a low-carbon economy. The IEA suggested this year that demand could rise by more than 50 per cent by 2035.

“Global natural gas resources are vast, widely dispersed geographically and can help improve energy security,” the IEA pointed out.

However, it also sounds a note of caution. “While natural gas is

the ‘cleanest’ fossil fuel, it is still a fossil fuel,” says Nobuo Tanaka, former executive director of the IEA.

“Its increased use could muscle out low-carbon fuels, such as renewables and nuclear – particularly in the wake of the incident at Fukushima and the likelihood of a reduced role for nuclear in some countries. An expansion of gas use is no panacea for climate change.”

Ben Caldecott, head of European policy at Climate Change Capital, the investment group, says: “Some say we should focus on gas now, and then in 2030 we will have all these low-carbon technologies to replace it. But if we don't invest in low-carbon technologies now, we are not going to get them up to scale.”

One reason for the focus

on gas is that prices are low, particularly in the US, and there is hope the exploitation of shale gas reserves elsewhere will help keep them that way.

“There is a kind of shale gas mania, with everyone saying it will transform the energy sector,” says Mr Caldecott. “It has had a huge effect in the US, but the prospects for Europe and Asia have been subject to considerable hype.”

Yields are likely to be lower in these regions because of denser populations, more challenging geologies and stricter planning regimes, he adds.

There are also concerns about the environmental impacts of shale gas – from water contamination and methane leakage to the possibility that drilling may cause earthquakes.

Further, gas prices are

not expected to remain at their current low levels, not least because of the retreat from nuclear power in Japan, Germany and elsewhere after Fukushima.

“Basing long-term energy plans on current low gas prices would be misguided,” says Bruce Jenkyn-Jones,

‘More gas use could muscle out low-carbon fuels, such as nuclear’

chief investment officer at Impax, an investor in clean technology. “Gas is a finite resource and if we use too much, the price will go up.”

And at the same time, the price of renewable sources of energy is falling rapidly. The cost of electricity

from an average onshore wind farm will be competitive with power generated from coal, gas and nuclear power plants by 2016, according to Bloomberg New Energy Finance, while the cost of silicon used in solar panels has fallen 93 per cent from \$475 a kilogramme three years ago to \$33 now.

Gas and renewables can work well together, with gas plants that provide baseload power being able to switch to fill in the gaps when the wind is not blowing or the sun not shining.

“The spectre of shale gas hangs over the [renewables] sector everywhere. That rapidly-ramping gas capacity is the perfect complement to intermittent renewable energy is being largely ignored,” says Michael Liebreich, chief executive of Bloomberg New Energy.



Hard to pin down precise causes of the effects

IPCC report

The time to start preparing for adverse conditions is now, says Jessica Twentyman

The message from the Intergovernmental Panel on Climate Change (IPCC) is clear: the world must prepare for more frequent and more dangerous extreme weather events caused by climate change.

Storms, floods, droughts and heatwaves could wipe billions off national economies' incomes and destroy lives, say the team of more than 150 climate



Extreme weather events such as drought could wipe billions off national economies' incomes Getty

scientists who collaborated on the summary report, released by the IPCC on November 18.

Their stark warning is laced with caveats, however, reflecting the continuing challenge of attribution that climate scientists face. In other words, it is hard to pin specific weather events to man-made (or anthropogenic) global warming, when such things can and do occur naturally.

A good starting point, say some researchers, is looking at weather variability. At Princeton university, David Medvigy, an assistant professor in the department of geosciences, has found day-to-day weather conditions have become more erratic over the past generation.

Existing climate change models have been evaluated historically against monthly averages, an approach that hides variability, says Mr Medvigy. “Monthly averages reflect a misty world that is a little rainy and cloudy every day. That is very different from the weather of our actual world, where some days are very sunny and dry,” he says.

By using daily satellite and surface measurements relating to solar radiation and precipitation, his research shows that across the world, extremely sunny or cloudy days are more common now than in the early 1980s and that swings from thunderstorms to dry days have risen considerably since the late 1990s.

These swings could affect the efficiency of solar-energy production, have dire consequences for the control of pests and diseases, and, ultimately, inhibit the ability of plants to remove carbon dioxide from the atmosphere, he says.

This research adds to the body of evidence that weather actually is changing, but the question of what is causing those changes remains, says Kathryn Maskell at the Walker Insti-

tute for Climate System Research at the University of Reading in the UK: “We can't assume all changes we see in weather and climate are because of greenhouse gases. We still have to tease out the natural variations from the changes that people are causing.”

At Oxford university's Environmental Change Institute, Professor Myles Allen says it makes sense to think in terms of probability. Could human activity have loaded the dice in favour or against the occurrence of a particular flood or heatwave, for example?

“It's impossible to say exactly what the chances would be of a particular weather event happening in a world without climate change. What we can say – and this is the focus of much of

‘We can't assume that all changes we see in weather and climate are because of greenhouse gases. We still have to tease out the natural variations’

our work – is how much the risk may have changed as a result of climate change.”

His research focuses on developing methods to assess what external drivers – including anthropogenic climate change – could be affecting the risk of severe weather events.

Such methods are generally based on computer-intensive modelling, using complex algorithms and supercomputers, says Malcolm Roberts, head of high-resolution global climate modelling at the Met Office.

These resources are scarce and expensive, but the work of scientists from the Joint Weather and Climate Research Programme (JWCRP), of

which Mr Roberts is a team member, has had a recent boost in the form of access to extra supercomputing resources.

This had been awarded by the Partnership for Advanced Computing in Europe (PRACE), an EU-funded association that has created a computing infrastructure for large-scale scientific and engineering research. Its Stuttgart-based supercomputer, Hermit, will host to 144m core hours of JWCRP research.

A core hour is a standard measure of usage in supercomputers, which commonly have several hundred thousand processors, or “cores”. Each processor, when run for an hour, equals one core hour of computing time.

This will be a huge help in enabling JWCRP scientists to do a better job of predicting how weather conditions might change in a warmer world, says Mr Roberts. In particular, since extreme weather often derives from small-scale weather systems, the team's modelling work will increasingly focus on smaller geographic areas, he says.

Meanwhile, businesses worldwide need to consider the risks extreme weather might pose to their organisations, says Guy Battle, head of sustainability services at management consultancy firm Deloitte.

Companies reliant on water should consider the impact of increasing water scarcity. Those with big property or infrastructure portfolios, such as oil and gas companies, should think about effects on asset life and insurance costs. Those dependent on agriculture, especially in developing countries, are more likely to suffer from droughts and flooding – as seen in the rise in cotton prices this year after bad weather in producer nations.

And the time to start preparing, the IPCC report suggests, is now.



MOMS KNOW GLASS CAN BE TRUSTED. “We make little choices every day—what to buy, what to eat—that affect our health and our lives,” says Mirella Guedes Campelo. “I try to choose the best things for my family. For me, food that comes in glass is just healthier. I think it's safer. It's a small step, but it matters to me.”

GlassIsLife.com

GI makers of pure, healthy, trustworthy glass packaging

© Owens-Illinois, Inc.

Kyoto protocol at risk in Durban

Continued from Page 1

China and all developing countries were exempted from emissions reductions when the Kyoto treaty was agreed. But China's insistence that only rich countries should face binding obligations has made it unpopular with countries that ratified the treaty, especially since China overtook the US as the world's biggest emitter in 2007.

At last year's Cancun climate summit in Mexico, Japan stunned the conference by saying that, even though it hosted the birth of the Kyoto protocol, it would not support a second commitment period.

Russia and Canada have since made similar suggestions.

That has left the European Union, and a smattering of other countries, as the only potential members of the Kyoto Club. Even the EU, which has long been at the head of climate policy-

making, now says it will only support a second phase of the treaty so long as all countries – including the US and China – agree to a plan in which all make some form of binding commitments by a certain date.

Connie Hedegaard, EU climate commissioner, says developed countries could still do more than developing ones in such a scenario. But the world has to move beyond the “traditional 20th century thinking” that divided the world into a rich north and poor south, she adds.

There seems little sign that either the US or China is willing to sign up to even this modest EU proposal.

China and other developing countries continue to insist there must be a second Kyoto commitment period for rich countries.

They have even threatened to withdraw support for measures such as the Clean Development Mechanism, the Kyoto protocol

scheme that allows companies in wealthy countries to offset carbon emissions by buying credits generated from carbon reduction projects in poorer nations.

The EU has itself added to growing fears of confrontation, because from January it is going to start charging all airlines flying

Connie Hedegaard: developed countries could still do more

into its airspace for their carbon pollution.

This move, though approved years ago, has prompted a backlash from many countries.

In a statement issued after a meeting about the Durban summit this month, the Basic group of countries – Brazil, South Africa, India and China – declared that “unilateral” measures such

as the EU's emissions trading scheme, “jeopardise the effort of international co-operation in addressing climate change”.

So what happens if, as seems likely, the Durban summit ends in acrimonious failure? Can the UN climate negotiations proceed from that point? Or will it be time to give up and concede defeat?

Tim Baines, senior associate at Norton Rose, the legal firm, says: “I think barring all but a completely catastrophic outcome on Durban, and assuming the Kyoto question remained unresolved, there probably would continue to be discussions in relation to this issue next year.”

But, he adds: “If there was a complete failure along the lines of Copenhagen, then it might fall into doubt as to whether the [UN climate framework] should remain the central process for finding a climate change agreement.”

Humans could join list of threatened species

Mass extinction

Jane Bird asks if mankind could be about to go the way of the dinosaurs

It is 65m years since an asteroid is believed to have wiped out the dinosaurs, along with three-quarters of the species in existence at the time. Now, some scientists believe we are in the middle of another period of mass extinction and this time it could include us.

In 1953, there were about 2.5bn people on earth. Today there are 7bn. We have nearly trebled our numbers in half a century.

Mankind's expansion has led to overexploitation of natural resources, causing a series of potentially devastating effects, including climate change, ocean acidification, ozone depletion and the spread of invasive flora and fauna.

Douglas Crawford-Brown, director of the Cambridge Centre for Climate Change Mitigation Research in the UK, estimates the earth is losing about 20,000 species a year. "The real cause of this loss of diversity is habitat destruction, driven by the number of people and how much they're consuming."

His view is shared by Prince Charles, who referred to himself as a member of an "endangered species" in his inaugural speech as president of the Worldwide Wildlife Fund in September.

He said that without biodiversity, which is severely threatened, we will not be able to survive, and he called for a "sustainability revolution" that



Total wipeout: 20,000 species are being lost each year. The cause of these extinctions is being blamed on the number of humans and their consumption habits

Getty

would transform the world economy, so that growth does not come at the expense of nature.

However, not everyone takes such an extreme view. While civilisation as we know it may collapse, complete extinction of the human race is unlikely, says Niles Eldredge, curator emeritus at the American Museum of Natural History, New York. "The species would probably cling on, rather as in the Amazon there are still tribes speaking languages related to those of the Mayans and the Incas."

Dr Eldredge suggests the "system" would collapse first, as happened in ancient Egypt, Greece, and Rome.

"On the other hand, nobody could imagine extinction of the passenger pigeon in the US – there were millions," he points out. The last died in a Cincinnati zoo in 1914, and the same almost happened to American bison, which, from millions in the 19th century, at one point fell to a few hundred individuals.

"We can't say just because

there are 7bn people it would be impossible to erase them."

Scientists believe the planet could support up to 13bn or 15bn, possibly even more. But protecting the human race is partly a matter of sharing resources more equally, says David Nally, geography lecturer at Cambridge university, UK.

"The number of obese is higher than the number of starving, and there is lots of surplus; the amount of waste in the US alone would be enough to feed the world's malnourished."

Dr Eldredge agrees the distribution of wealth needs to be more even. "In the mid-1990s, Americans had more than their share of the world's resources, and now they have more – and wealth is now concentrated in a smaller percentage of the US population."

Although the Horn of Africa is rich in minerals such as diamonds, gold and uranium, its land is being bought by countries such as Yemen, Saudi Arabia and China for their own use. So resources are not being used

for the benefit of local people.

Legislation is needed to protect farmland, for example by requiring the use of crop rotation and natural means of fixing nitrogen in soil, says Mr Nally. "We need regulations so resources can't be pillaged with impunity."

A different economic approach is needed, he says. For example, he suggests the ending of agricultural subsidies in rich countries that make farming uneconomic in the developing world. Companies selling pesti-

cides and fertilisers say they are essential to feed the world's population. However, Mr Nally says: "But in costing such systems, we don't take into account the destruction of habitats or how nitrogen causes acidification when washed into lakes, rivers and the sea." He adds: "The good news is that if we can have a negative impact, we can also have a positive one."

Economic prosperity, along with education and a culture of women working, tends to lead to a reduction in birth rates, he points out.

There are promising signs. Mr Crawford cites financial incentives being introduced to stop the burning of forests to plant crops. "The European Union has taken a big lead in this, and the UK has tried hard too, with programmes that pay people to keep virgin forests in the Pacific Islands."

There are programmes that encourage farmers to plant diverse crops rather than the same few strains of rice, corn and wheat. It is difficult to ensure funds end up in the right place, but progress is being made, Mr Crawford says.

He is not convinced that we are facing the sort of mass extinction that would follow an asteroid hitting Earth. That goes beyond what science can determine, he says, but loss of biodiversity deserves just as much attention as climate change.

For the developed world, protecting biodiversity tends to mean nature conservation, saving pandas and tigers, says Dr Crawford. "But for the vast majority of the 4bn people living at the bottom of the economic pyramid, in aching poverty, when the ecosystem is damaged it affects their livelihood."

Host nation aims to win rich visitors over

South Africa

The country harbours hopes of a new Kyoto deal, says Simon Mundy

South Africa's hosting of the Conference of the Parties (COP) in Durban will cap an eventful year in foreign relations for the continent's biggest economy.

With last year's successful football World Cup still fresh in the memory, the nation wants to co-ordinate an event that achieves substantial progress on tackling climate change, fostering its desired status as one of the most influential developing countries.

It entered 2011 as the newest Brics club member, after being invited to join Brazil, Russia, India and China last year. While the alliance is informal, and South Africa was widely seen as having been inducted primarily as a representative for Africa, the country's prestige was



Building support: Jacob Zuma, South Africa's president

Getty

boosted by its presence at April's Brics summit in the Chinese resort of Sanya.

Those relationships could prove important at the Durban conference. The Basic group – consisting of all the Brics nations except Russia – was formed in 2009 to lobby for shared interests at the Copenhagen climate talks. It will do so again in Durban, arguing rich countries should offer financial and technical assistance to developing countries to help curb carbon emissions.

The key aim for the hosts will be to achieve a legally binding agreement to extend the Kyoto protocol beyond next year, when it is due to expire. Attempts to do so at Copenhagen, and at last year's summit in Mexico, were unsuccessful.

President Jacob Zuma has been building support for a deal: Norway announced its backing for the plan when Mr Zuma visited in September, and Australia followed suit a month later. But the plan is expected to meet resistance from some developed countries with high carbon emissions.

South Africa's negotiating position is likely to benefit from the country's willingness to be an early mover in laying out national plans to curb emissions. In 2009, the government pledged to reduce significantly its pace of growth in carbon emissions, bringing them in 2025 to 42 per cent below the previously predicted figure.

Its ambitious target is partly a reflection of a desire to burnish its credentials as Africa's voice on the global stage – a theme it has promoted since taking a seat on the UN Security Council this year.

Africa is likely to be among the regions worst affected by climate change, through drought and desertification, and South Africa's status as the continent's biggest carbon emitter gives it a "moral obligation in the context of Africa", says Alf Wills, the country's chief negotiator at the COP. The green agenda is also attracting business support. Senior figures have set up the South African Corporate Leaders Group on Climate Change, which aims to reduce emissions at home and internationally.

"Given the high carbon intensity of our economy, this is a challenge we must

South Africa may benefit from its willingness to lay out national plans to curb emissions

understand and attack with creativity and intensity," wrote Mike Brown and Mark Cutifani, chief executives of Nedbank and AngloGold Ashanti in a recent article.

But South Africa will find it difficult and expensive to cut emissions, as more than 90 per cent of its electricity comes from coal. Introducing cleaner technologies will require additional finance and expertise – both of which must be provided by developed countries, South Africa says.

This is a view shared by other emerging economies, which will hope South Africa can use its host status to sway representatives of the richer nations.

LET'S CLEAN FENG'S CLOTHES WITH CLEANER ENERGY.

When used to generate electricity, natural gas is the cleanest-burning fossil fuel. In fact it is about 50% cleaner than burning coal, and there could be enough to last for the next 250 years. Shell is helping to deliver natural gas to more countries than any other energy company. This includes China, where the fast-growing economy needs cleaner energy. It's another example of how we're trying to build a better energy future. Let's power our future with gas. www.shell.com/letsgo

LET'S GO.



Contributors

Piitta Clark
Environment
Correspondent

Sarah Murray
Contributing Editor

Simon Mundy
Companies Reporter

Leslie Hook
Beijing Correspondent

Jane Bird
Mike Scott
Jessica Twentymen
Contributors

Charles Batchelor
Online contributor

Adam Jezard
Commissioning Editor

Steven Bird
Designer

Andy Mears
Picture Editor

For advertising details, contact:

Liam Sweeney
Phone +44 020 7873 4148
Fax +44 020 7873 4006
Email:
liam.sweeney@ft.com
or your usual representative

FT Reports are available on FT.com. Go to:
www.ft.com/reports
Follow us on twitter at
www.twitter.com/ftreports

Managing Climate Change

Demand for solar power heats up as prices fall

Renewable energy

Cheap cells will be good for the industry in the long run, says **Sarah Murray**

For established manufacturers of solar panels, this has proved a difficult year, in the face of falling demand and a wave of cheap imports from China.

Chinese manufacturers have benefited from a big fall in the price of silicon, the main raw material, which makes up more of their costs than at European and US rivals.

The general fall in commodity prices because of the weak global economy has been exacerbated in the case of silicon by shrinking demand following the reduction of subsidies, or "feed-in tariffs", in several countries.

However, while there is disarray in the short term, many argue that, in the long run, the availability of cheap photovoltaic cells, which are used to make solar panels, will be good for the development of the industry as a whole.

Solarbuzz, a consultancy, forecasts that growth in the global photovoltaic market will grow from \$46.3bn to almost \$96bn by 2014.

Even in the short term, healthy growth is expected, with IMS Research predicting global solar photovoltaic installations will rise 24 per cent in 2011 to reach 24 gigawatts, up from 19 gigawatts in 2010.

Much of this short-term growth is likely to take place outside Europe. European solar

installations will rise by only 3 per cent this year, according to the IMS research, which also revealed that Italy would displace Germany as the world's largest solar market.

"The next several quarters are going to be challenging," says Gil Forer, global leader of Ernst & Young's Cleantech practice. "You'll see companies looking at their business strategies and deciding what they're going to do," he says. "And you'll also see some consolidation."

As margins have been squeezed across the industry, there have been casualties. In August, Solyndra, a California-based solar panel producer, filed for bankruptcy, as did Massachusetts-based Evergreen Solar.

And while the fall in the cost of solar panels has been driven by a number of factors – including economies of scale, increased efficiency of solar cells and technology advances – Chinese production has made a significant contribution to the price decline.

European and US manufacturers have accused China of unfairly subsidising its solar industry. In the US, some have called for anti-dumping tariffs to be imposed on Chinese photovoltaic cells, while the commerce department has said it will investigate claims that photovoltaic cells are being priced unfairly low or are illicitly state-subsidised.

In Europe, where many governments subsidise their solar industries through feed-in tariffs, the purchase of solar products from China means they are also effectively subsidising Chinese producers.

"The vast majority of the modules installed in Europe to



Some way to fall: installers have benefited from subsidies and the declining cost of panels

make solar stations come from China," says Patrick Charignon, chief executive of Europe Solar Utility, which invests in photovoltaic plants in Italy, France and the UK. "So a significant chunk of European subsidies is flowing back to China."

On the face of it, this might seem to be an argument for

'A significant chunk of European subsidies is flowing back to China'

cash-strapped administrations to accelerate the phasing out of subsidies – which is occurring in some places, as solar power moves towards grid parity (the point at which it becomes at least as cheap as grid energy).

However, Mr Charignon points out that the purchase of solar panels accounts for only a

third of the investment costs of a solar farm, with the other two-thirds being made up by "balance of system" equipment, – generally procured locally – and labour.

"The fact that the Chinese are providing so many cheap modules to Europe at an ever-decreasing price is, in my view, beneficial to the industry," he says.

"If module prices were more expensive, feed-in tariffs would have to be higher and there would be a risk that some countries would say it's not sustainable and remove them."

Similarly, in the US, the solar industry includes a range of companies, including those putting the systems together and installing them on rooftops, that are benefiting from low solar module prices.

"Raising the total prices of the system might have the benefit of helping some local manufacturers, but it would raise the

cost to everyone else as well," says Craig Stevens, president of Solarbuzz. "Anything that causes prices to rise will slow growth in the US market."

So, for an industry that has set its sights on grid parity, low silicon prices help achieve the goal of cutting costs. "In that regard, any part of the world that contributes to that is a good stimulant to solar energy demand," says Mr Stevens.

Meanwhile, with analysts predicting the cost of solar panels will fall even further, the challenge for European and US manufacturers is to come up with innovative products, such as thin film solar panels, and to increase the efficiency of solar technology.

"Like any other industry, we have ups and downs, and right now we're in a challenging period," says Mr Forer.

"But those that can be smart will come out of this stronger."

China focus Five-year plan to cut pollution

Any visitor stepping off an aircraft in Beijing will instantly be aware of why climate change and pollution issues have become a priority for China.

The grey, metallic air that residents here and in other Chinese cities breathe is often described as "fog" in weather reports, but is deadly smog that has led to higher cancer rates and birth defects than any other large economy has experienced.

It should not be surprising then that the country has targeted pollution and carbon in its current five-year plan from 2011 to 2015.

The world's biggest emitter of carbon has pledged to reduce the amount emitted per unit of gross domestic product by 40 per cent by 2020, and also cut emissions of pollutants including sulphur dioxide and nitrogen oxides. But this determination to clean up at home has hardly translated into a leading role in the United Nations climate change talks in Durban.

China is a signatory to the Kyoto protocol and supports an extension of the agreement under which developed countries commit to binding carbon targets and developing countries commit to voluntary targets.

China has refused to sign up for binding carbon emission limits, while calling for funding and technology transfers from developed countries to help developing nations meet carbon goals.

Its own carbon targets are ambitious and powerfully enforced, negotiators say, making a binding international commitment unnecessary.

The seriousness with which China takes such targets was demonstrated last autumn, when emergency electricity cuts were implemented in parts of the country in a last-minute rush to meet an energy-efficiency target.

China has been the biggest single beneficiary under the Kyoto protocol's clean development mechanism, which allows companies to generate revenue by selling carbon emission reduction certificates.

Its companies, often wind farms or coal plants upgrading their technology, have received more than \$3.7bn under the scheme, which is set to expire at the end of next year.

In a white paper released in

advance of the Durban conference, Beijing sounded the alarm about the effects that hotter weather will have on China. "China is one of the countries most vulnerable to the adverse effects of climate change," the document said.

"Climate change generates many negative effects on China's economic and social development, posing a major challenge to the country's sustainable development."

There is also a further, and perhaps unique, incentive for China's leaders to prioritise climate change issues: to help rebalance the economy.

The country has long traded economic growth for environmental standards, but Beijing has begun to try to change that equation by raising environmental standards and slowing growth.

While few breakthroughs are expected in Durban, China will increasingly be the voice of the developing world and Beijing seeks to strengthen co-operation between developing nations on climate issues.

While China is the world's second-largest economy, it is still relatively poor in terms of GDP per capita, which Chinese negotiators cite as evidence it needs financial assistance to tackle carbon issues.

Nevertheless, this month, Chinese officials also unveiled a pilot programme under which the country will help to train 1,000 officials in other developing countries in climate change issues.

Lesley Hook



China has 'foggy' air



Europe.
Powered by Norwegian gas.

Gas production from the Norwegian Continental Shelf can supply millions of Europeans with power. Both industry and homes are connected to a cost competitive energy source, and will remain so for decades to come. Be enlightened goodideas.statoil.com. There's never been a better time for good ideas.

