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THEMA

## GOING GREEN

THE FUTURE  
HAS BEGUN

Collected Articles



## In Spite of Copenhagen – The Green Future Has Begun

The high expectations prior to the Copenhagen Climate Summit could imply that now, after the failure of the conference, those enlightened on questions of climate change are extremely downcast. In spite of criticism aimed at the failure of governing elites to act, this does not seem to be the case. Is this a sign of cynicism? Or a sign of confidence in the fact that the green transformation of industrial society will proceed one way or the other?

No doubt, Copenhagen was a major setback. Whether or not there will be an internationally binding treaty to supersede the Kyoto Protocol is an open question. In order to achieve this, it would be necessary for the old industrial powers, especially the United States, and the emerging powers such as China and India, to budge more than just a little bit. Other than the far too intricate mechanisms of UN climate negotiations, which provide that 192 countries have to agree on one resolution, it was, above all, the conflicts of interest between the old and the new industrial powers that made the conference a failure.

Since the 1997 signing of the Kyoto Protocol, the scales between old and new powers have further tipped. The US is weighed down by a huge trade deficit, national debt, antiquated infrastructure, and energy-intensive and thus uncompetitive industries, while China, on the other hand, has become the United States' largest creditor. West Europeans set out earlier on a course of green modernisation and are thus in a better position, yet they too have to struggle with huge economic and financial problems. Thus, both Europeans and Americans insist that, at least in the mid-term, the newly industrialised countries will have to reduce their emissions of greenhouse gases so that they will lose their competitive advantage of having emission rights for free.

The Copenhagen Summit followed the old logic, which perceives of climate protection as an economic burden. The tug-of-war was about how to share the load between First, Second, and Third World: Who has to commit to what amount of emission reductions, who is going to pay for the transfer of environmentally-friendly technologies to developing countries, and who will back the investment necessary for adaptation in the poor countries most threatened by climate change. Yet, this logic is on the rocks – and it is that, which gives hope. The insight, that climate protection is a source of new wealth is gaining traction. The transition from the fossil-based industrial age to an era of renewable energies, resource efficient products, and smart green technologies is a potential fountain of youth for the old industrialised countries. The green industrial revolution will, on a grand scale, create new products, services, and jobs. It will replace the import of oil, gas, and coal with energy saving technology, wind and solar power, and it will transform the look of our cities and remake our transport systems. This opens up vast possibilities for researchers, engineers, entrepreneurs, farmers, urban planners, producers, and consumers.

Although much remains to be done, the great transformation is on its way: within the energy sector, in construction, in industry – and in Europe, the US, and China alike. To be sure, political decisions will be a major factor in how swiftly and powerfully change will occur. Yet, the future is not the exclusive domain of governments. All of us can be and will have to become actors in an ecological turnaround.

*Ralf Fücks, Co-President, Heinrich Böll Foundation*

## Contents

Böll.Thema Debate	Perspectives	
<b>«We Need a Radicalism of the Centre»</b> Anthony Giddens, author of The Third Way, in conversation with Ralf Fücks	<b>4</b>	<b>16</b>
Smart Technologies		
<b>Swarm Intelligence of the Small –          or a Cartel of the Powerful?</b> By Hannes Koch	<b>7</b>	<b>16</b>
<b>Desertec – A Part of Tomorrow’s          Global Security Framework</b> By Gerhard Knies	<b>8</b>	
<b>Africans on Desertec</b> Voices from Morocco, South Africa, and Ethiopia	<b>9</b>	
Contra + Pro		
<b>Contra CCS</b> By Ingrid Nestle	<b>10</b>	
<b>Pro CCS</b> «Coal-fired Power Plants Need Radical Change through Carbon Capture and Storage» By Eivind Hoff	<b>10</b>	
Böll.Thema Essay		
<b>Can Economic Growth and Climate          Protection be Reconciled?</b> By Claudia Kemfert	<b>12</b>	
New Alliances		
<b>The American Way of Change</b> By Till Kotter	<b>13</b>	
<b>The Blue-Green Alliance</b> By Frauke Thies	<b>14</b>	
<b>Risks and Side Effects of Eco-protectionism</b> By Reinhard Bütikofer	<b>14</b>	
<b>A Bright Future for Solar Energy in China</b> By Sun Xiaohua	<b>15</b>	

## «We Need a Radicalism of the Centre»

*Anthony Giddens, author of The Third Way, in conversation with Ralf Fücks about the politics of climate change, the reshaping of our civilisation, the relationship between utopianism and realism, climate policy beyond left and right, and the role of the state.*

*RF: Anthony Giddens, your book The Politics of Climate Change opens with the statement: «At present we have no policy of climate change.» After all these conferences, after lots of national and international legislation, after a first boom of renewable energies, promoted by the German red-green coalition government – how can it be that we have no policy of climate change?*

AG: What struck me, was how little political scientists discuss the issue of climate change in the context of the democratic institutions. How to go forward in a system with conflicting political parties; how to get sustained politics over time; how to develop something we're not used to anymore – long-term planning – when planning failed, some 30 years ago. What kind of institutional changes do we need to do this? What are we going to do about the countries that are not fighting climate change?

We are dealing with an issue, which is different from any issue we had to deal with in our whole history. It demands a truly global response, yet a lot will have to be done on a national level because there is no global system of sanctioning. Of course, it's worthwhile having international agreements, but they operate against the background of power, which pits nations and regions against one another and at the same time promote some collaboration.

We will have to look for new sanctioning mechanisms. International agreements are pretty worthless if you can't back them up. We know that even the EU has a lot of trouble implementing the Lisbon Agenda. We will have to be as innovative and creative politically and internationally with our institutions as we are on the level of technology.

*RF: In your book you write about a fundamental transformation of civilisation...*

AG: We agree on that, don't we?

*RF: Yes, we do. Yet I was wondering – you state that we will have to work within existing institutions and respect parliamentary democracy. Parliamentary democracy seems to be a value we don't want to sacrifice in the course of saving the climate. You explicitly say: «More of the same will be needed, not less.» How do you reconcile your call for fundamental change with that?*

AG: I have this overall approach I call «utopian realism.» We have to combine those two things. It's no good being a pure utopian, because you have no purchase on reality that way. It's no good just being a realist because you miss the elements that have transformative value.

I've come across the notion that we need a more authoritarian system to cope with climate change; I'm very unconvinced by that. Only an open society will be able to develop the kind of creativity and innovation we need.

We'll need a certain element of utopianism because we do have to think of a different world. We cannot just suppose that

renewable energy is going to save the day. We need to make pretty substantial changes in lifestyle. We don't know where that will lead us.

The American model has reached a terminus. Cheap energy and cheap credit – we can't let that go on. But how do we replace it? China can't simply recapitulate the development of the West. Even the Chinese leadership has become aware of that.

*RF: I agree. Open, democratic societies are better equipped to come up with creative solutions. At the same time: Is a democratic system with political parties able to introduce a long-term perspective into both politics and economics? Parliamentary systems have an inherent tendency to favour short-term effects and avoid difficult decisions. How can we get past this impasse?*

AG: The future is open, yet we must think long-term. I can't see any other society apart from an open society, which is able to reconcile those two things. Third sector groups have got to play a key role in monitoring what the political parties do.

I'm in favour of the political parties developing a kind of concordat. The British have now got a legally binding system whereby every successive government is obliged to reduce emissions. That is an attempt at least to create a kind of institutional structure.

Neither the return to more authoritarian, top-down politics, nor a bottom-up led system will do. You must have a certain amount of co-ordination of power alongside bottom-up power to be able to deliver a long-term programme.

*RF: You hold that climate change is not an issue of left or right. Does that mean that climate change is not a class issue? I'm reminded of a slogan from the early years of the green movement: «We are neither left, nor right, we are ahead.» Environment and climate do not fit into the old left-right mould.*

AG: That's my view. We need a radicalism of the centre. I don't think you can identify radicalism simply with the left or the right. We will need pretty substantial public support to introduce the measures that are going to allow us to contain climate change. That means you must go beyond left and right. It's dangerous if this is not happening. Take the US. There climate change has become a powerful left-right issue. Many Republicans see Obamas policies as a package – health care, intervention in the economy, climate change. That is a natural tendency in democratic countries. So we have to build a long-standing consensus.

Ideologically climate change has nothing much to do with left and right, but the issues that the left has focused on like inequality and poverty plainly overlap with climate change. But when the left says: Climate change is our project – that's a big mistake because then you get political polarisation. The left has a certain responsibility to recognise that you have to limit political polarisation regarding climate change.

*RF: So, combating climate change shouldn't become a Trojan horse for a kind of new anti-capitalism?*

AG: No. There is a connection between climate change, the critique on consumerism, the reaction to the financial crisis... But trying to turn this into a new radicalism or to replace a failed leftist project by an environmental one – for me that is not the way forward.

*RF: What do you mean when you say the state will be an all-important actor in reorganising the markets and in supporting new technologies? What will be the relationship between state, markets, and civil society?*

AG: The reason why I stress the state so much is the lack of enforcement mechanisms in the international system. The nation states retain an enormous amount of power and they are the main source of law. We do have international law but it doesn't have very strong sanctioning mechanisms. So a lot has to be carried by the major nations collaborating with one another, not necessarily universal Kyoto-style, but regional collaboration, too.

Given the urgency we've got to go for what we can achieve. We have to limit greenhouse gas emissions by whatever means. And that to me affects technology. I presume you are sort of anti-nuclear but I don't think things are that straightforward. Some countries are just not going to be able to totally reduce their greenhouse gas emissions without nuclear power. In that area, we shouldn't make the best the enemy of the good. The same with some forms of conversion from coal-fired to gas-fired power stations.

Germany is not a typical country. Sometimes it's right, for a certain time, to go for nuclear power. The key point for every industrial country should be: No more coal. A real danger for the world is an expansion into coal. At the moment, coal-fired energy has increased far more than any other energy – partly because of China. But if a country like Germany comes along and says: No more coal-fired power stations ... well, how are you going to cope for the next ten, fifteen years? Every country has to explore its own energy mix with the overriding goal of reducing emissions.

*RF: About more conceptual issues: The politics of the third way and New Labour were much about the enabling state. Now you are taking a new step – I'm not sure whether to call it «backward» or «forward»? You are using the term «ensuring state,» that is, the government has to make sure that there is a definite outcome in terms of reducing emissions and transforming our economy. All in all, this seems to assign a more powerful role to the state compared to what you postulated fifteen years ago.*

AG: I don't think you should identify me with New Labour. The things I argued helped to build a bit of a framework for them in a period I worked very closely with them. But politicians make their own decision. I always thought there should be more regulation of the financial system; I always thought you should tax the wealthy more; and I always thought the super-rich should help the super-poor.

*RF: For me and for many reform-oriented Greens The Third Way was a very important book.*

AG: The idea was traduced by many people. Labour followed a fairly liberal line and people identified The Third Way with that, which was a mistake. The Blair-Schröder paper was a hopeless thing because it only focused on one half. It didn't focus on social justice and other things that were my priorities.

*RF: Another key concept in your new book is that we have to create synergies between climate policy and other political aims. One of the most important synergies is the link between climate and energy security.*

AG: Most people are not doing very much about climate change. It is too remote. A thousand pictures of polar bears sliding down

ice flows will not mobilise many. Yet, most people respond quite well to the idea of clean energy and energy security. Insofar as we can mobilise them and thus reduce greenhouse gas emissions, we should do so.

We have to use whatever is available to us while trying to couple it to a more utopian vision. We have to look for areas of convergence, areas where we can couple realism and utopianism – that is where things get really interesting.

*RF: So one of the core messages is that we have to turn negatives into positives, turn risks into opportunities?*

AG: That's a bit too utopian for me.

*RF: But it is not about frightening people, it is about encouraging them. Martin Luther King didn't say «I have a nightmare,» he said «I have a dream.»*

AG: Some things really surprise me. Most of my friends in academia are actually climate change sceptics. They don't accept that climate change is caused by humans. And although they're all well-educated, they don't even know the mechanism of global warming. We still have a long way to go...

*RF: You are rather critical towards green ideas. In your book, you propose a strong link to a pre-industrial romanticism, an anti-modernist position. To me, this a caricature, something more to do with the beginnings of the movement, than with the reality of green politics today.*

AG: At the least I'm ambivalent about the Greens. The reasons are: They developed from extra-parliamentary movements. Now you have green parties, fine, but they are mostly small parties. If we want to do something about climate change we need consensual political support on a large scale. The core political parties will have to carry most of the burden. Also, it is not about saving the planet. What we're talking about is saving a decent way of life.

*RF: As soon as the Greens are in parliament, in government they lose their status as outsider. Still, their ideas, aims, and values make them distinct. They are not conservative, liberal, or socialist. And there are many urban regions – not only in Germany – where we already win 20% of the vote or more; the Greens are really beginning to compete with the traditional major parties.*

AG: This is a process of normalisation, isn't it? And by that token the Greens are losing some of their identity and people in the movement have ambivalent feelings about that. For me green politics are too vague, too many issues are lumped together. So I avoid using the term «green.»

*RF: Much success with your book! Although, in one respect, I'm afraid, it will not succeed. «Green,» the metaphor you are trying so hard to avoid, has already become the slogan for the kind of change you are calling for.*

### **Anthony Giddens**

British sociologist Anthony Giddens is possibly the last «public intellectual» (as he calls himself) whose writings are greeted in academia and press alike. Many hold that he has coined the catch-words that define our age.

Giddens was born in 1938 near London. From 1997 to 2003 he served as director of the London School of Economics. He came to the attention of a wider audience by his programmatic work

for and interpretation of Tony Blair's New Labour policies. In his book *The Third Way* (1998) he tried to overcome the engrained dichotomy between, on the one hand, «liberal capitalism» and «traditional socialism,» on the other. While liberal capitalism is permanently asking too much of the individual («Everyone forges their own destiny»), traditional socialism is demanding too little of the individual as it perceives of it as nothing but a victim, a pure «object of circumstance.» On a theoretical level, *The Third Way* postulates that individuals are befallen by manifold occurrences, yet they themselves are part of the circumstances they are being shaped by.

At least since the turn of the millennium Giddens has been acutely aware of the challenges posed by climate change, a development he perceives of as a central problem of modernisation and globalisation. His latest book, *The Politics of Climate Change*, has been published in 2009.

## Swarm Intelligence of the Small – or a Cartel of the Powerful?

By Hannes Koch

*Concepts of decentralised energy production such as Lichtblick and the centralised approach of the Desertec consortium to produce solar energy in the desert do not have to clash.*

At first glance the difference could not be greater. The Hamburg-based Lichtblick company has proposed a revolutionary scheme for energy production. In a few years, miniature power stations could at once produce electricity and heat in hundreds of thousands of homes. Whenever needed, the electricity will be fed into an intelligent grid and the heat will be either used or stored. For this Lichtblick has coined the term «swarm electricity» – a great number of autonomous energy citizens will be the backbone of future supply.

The Desertec consortium on the other hand plans to build huge solar power stations in the African desert, and corporations such as Deutsche Bank, E.ON, and RWE contemplate investing billions. A new grid traversing the Mediterranean is meant to connect Africa with Europe.

Both concepts are fascinating. Yet, does one not have to worry that the likeable decentralised approach will once again be overpowered and sidelined by big money and its centralised structures? Will the greenwashed power of energy giants and high street banks not push out such forms of energy that are not only clean, but have also been produced independently?

Those are points made by Hermann Scheer, president of the Eurosolar association. He castigates Desertec as a project that will only reinforce the megalomaniac structures within the energy sector and obstruct the, to date, successful expansion of renewable energies in Germany.

Lichtblick's concept of swarm electricity is a boost for decentralised structures. When the Hamburg-based company announced that its miniature power stations will go on sale for 5,000 Euros, «we were inundated with requests,» thus Brigitte Rosenboom. She is a customer adviser at the Lichtblick headquarters located in a former brewery near Hamburg's port and receives calls from potential customers asking for information concerning the new power stations.

«Many people want to buy the machines straight away,» says Rosenboom. There are many motives: Some customers want to take up the offer in order to cheaply replace their ageing oil-fired heating system, others like the idea to outwit traditional suppliers such as Vattenfall. Up until now, Lichtblick has received around 28,000 requests concerning their miniature power stations. All of them received a sobering reply: The machines will only go on sale in 2010. At what point in time cities other than Hamburg can be supplied remains to be seen.

Regarding possible competition from Desertec, Lichtblick CEO Gero Lücking is sanguine: «We have a business model – they have a concept,» thus referring to the production of electricity in the desert as something far in the future. For Lücking the two concepts are all but incompatible: «Electricity from the desert does not challenge our plans.»

Max Schön of the Desertec Foundation's advisory board concurs. The entrepreneur from Lübeck, an activist in many ways, does not think the two approaches are at loggerheads. His central argument: «Even the stage projected for the year 2050 by the German Aerospace Center assumes that the power stations in the desert would only provide 17% of the EU's energy consumption.» 80% of the green energy produced would be used by African countries – among other things to desalinate salt water and improve water supply.

Considering Desertec's target to import 17% of electricity, Lichtblick CEO Lücking's calculation is simple: «The remaining part, that is 83% of electricity consumption, can be supplied by other and local providers of regenerative energy.» This, according to Lücking, makes it clear that the two concepts are complementary.

Nikolaus Supersberger at the Wuppertal Institute for Climate, Environment and Energy agrees. For him the «polarisation between decentralised and centralised is difficult and untenable.» Many energy experts regard the supposed antagonism as a vain war of words. According to Supersberger, to tackle climate change and stop global warming will take great efforts. Thus, the focus has to be on producing a sufficient amount of clean energy and on replacing fossil fuels.

Yet, one has to be realistic and keep in mind that the corporations, which today dominate the energy sector, will not just go away but will try to cut in on lucrative future deals. In addition, there will be ample capital in the order of several hundred billion Euros on the financial markets looking for profitable investments to back. Those are the dimensions aimed at by the Desertec Foundation and the recently founded Desertec Industrial Initiative, which, among other things, will oversee the construction of some reference projects.

Max Schön denies that the Desertec project is about centralised energy production. With their research, development, and planning the foundation and the presently participating companies would create the foundation for further companies to join. «This is no centralised plant,» says Schön, «there will be many power plants based in a number of countries and using various technologies.» The transmediterranean power grid of the future will create the possibility to connect to it at many a different point.

That may be as it is. The major energy corporations, banks, and technology companies will certainly succeed in shaping Desertec according to their wishes. Only the future will show what will then remain of other participating companies.

For the time being many crucial questions remain unanswered. One central point is voiced by the Wuppertal Institute's Supersberger: «A major challenge is regulation.» Technically and politically it may be possible to erect solar and wind power plants in the desert and build an energy grid traversing the Mediterranean. However, who will be in control? What institution will make sure that the «many power plants» Schön is talking about will be able to feed their electricity into the European-African grid at a fair price? What network agency will supervise the transit fees and create competition – even against the interests of E.ON, RWE, and Deutsche Bank.

Even just within Germany, the energy market is difficult to control. On the European level such efforts are only just beginning. This, one has to keep in mind, in order to appreciate what a Herculean

task it will be to construct a transcontinental grid for the benefit of as many countries, companies, and customers as possible.

Meanwhile Desertec's Schön supposes that the future structure of the energy sector will be very different from what we have today. «New actors are at the ready,» says Schön. And he points at the declared intent of communications giants such as Cisco and Google to invest in intelligent power grids.

Against the background of such developments the old question of «centralised or decentralised» may indeed become obsolete. Maybe E.ON will find a real competitor in Google. To ensure that technological and economic power do not give rise to monopolies, governments south and north of the Mediterranean will have to supplement Desertec with a model for regulation. Companies do not care for that – it is a task politics will have to tackle. Max Schön admits: «The question of regulation is still open.»

## Desertec – A Part of Tomorrow's Global Security Framework

*By Gerhard Knies, initiator and chairman of the supervisory board, Desertec*

With giant strides humanity is approaching a population level of ten billion. Yet, even today, water and food are scarce in many parts of the world. Fossil fuels have been almost fully exploited, and, should we continue at the current rate, within 25 years the atmosphere will not be able to absorb any more greenhouse gases without raising temperature levels by more than 2° Celsius. Should this threshold be passed, the self-reinforcing dynamics of climate processes could lessen the earth's capability to sustain human life to under five billion people.

Humanity thus needs a global security strategy that will enable it to produce additional water and food on a grand scale, preserve biological diversity, and stabilise the earth's climate. In addition, such a security strategy should give the world's poor – about 80% of the global population – the chance to catch up on development and create wealth on a level that may end the further growth of humankind.

Whether such a strategy will succeed, is an open question. Drinking water, food, and a certain level of prosperity for all could theoretically be achieved through technology and additional energy – provided the latter is available and can be rapidly and cheaply deployed. It is possible to preserve biological diversity and stabilise the climate, yet only, if we stop using fossil fuels right now; the fight to end poverty will be a more drawn-out process.

The livelihoods of a global population of ten billion are at stake. A worldwide transition to renewable energies has thus to be a number one priority and must be speedily implemented. Desertec's approach to tap the as yet unused solar and wind energy of the desert on a grand scale could make such a transition feasible. Already today, the cost of renewable energies would be below that of fossil-based energy – if the environmental damage caused by the latter were part of the price. The chances to avoid self-reinforcing climate change will be the greater, the more we succeed in using and blending all forms of renewable energy, thus

achieving a very speedy transition. When it comes to security, cost is usually not the first consideration. As with emergency medical care, it is all about swiftness.

Within six hours the world's deserts receive as much solar energy as, at present, humanity uses within a year. Appropriate technology will enable us to turn this into electricity and distribute it via grids all over the world. In addition, a number of desert regions have ample wind energy resources. With regard to global security, some of the decisive qualities of desert-based solar energy are:

High-voltage direct current enables us to provide over 90% of the global population with solar energy from the deserts.

Thermal energy storage makes it possible to provide electricity from solar thermal energy sources all around the clock.

With fossil emergency backup, hybrid power stations can provide solar thermal energy at all times.

Desalination and co-generation enable us to produce drinking water for the quickly growing populations in arid regions.

The opening up of the deserts' energy potential by industrial countries will thus provide cheap resources for developing countries.

All the technologies needed are available and have been in use for years. If, by 2050, we want to meet about 50% of the then possible global demand of electricity of 60 petawatt hours (Germany currently uses 0.5 petawatt hours p.a.) through solar thermal energy, it will be necessary to produce solar collectors at a rate of one gigawatt of capacity per day. Automation, as used in car manufacturing, will make this possible. If we follow such a course, we will be able to phase out the fossil-based production of electricity over the course of 25 years. The investment necessary will have to be made anyway – be it in fossil, nuclear, or solar power stations.

If the speedy global substitution of fossil fuels with local renewable sources of energy, as well as with Desertec, is being pursued, the challenges regarding supply and stability posed by a world population of ten billion can be resolved. The co-operation between the peoples of the technology belt and those of the sunbelt necessary to achieve this may become an important element in a future global security framework.

Further information: [www.desertec.org/en/](http://www.desertec.org/en/)



## Africans on Desertec

### Morocco So Much Hope

*Rabat should get involved in Desertec right away. A vision of the future. By Said Mouline, managing director of Morocco's Renewable Energy Development Centre (CDER).*

«We want to be among the leading countries for this project. And we want to be quicker than others.» Said Mouline welcomes the European plan to harvest solar energy in the Sahara desert and demands a leading role for his country.

Mouline's hope is that Desertec will bring investments and jobs to Morocco and thus reduce the country's dependency on oil. He thinks that thousands of the mirrors needed for Desertec could be produced by new factories in Morocco. Local production would guarantee low costs and reduce the poverty that forces millions of Moroccans to emigrate to Europe. «To produce mirrors is not a very sophisticated job. For us more work means less unemployment and thus less emigration.»

Spanish firm Abengoa is already building a major power station fed by a mixture of combined-cycle gas and solar mirrors near Morocco's border with Algeria. Said Mouline says that for Desertec, whose aim it is to provide, by 2050, 15% of Europe's energy, locations have been identified south of the High Atlas mountain range.

Source: Alibaba.com, July 16, 2009

## South Africa

### «There are Encouraging Signs»

*On South Africa's potential to develop solar energy. Elisabeth Kiderlen in conversation with Saliem Fakir, WWF South Africa.*

*What are your hopes and fears concerning a project such as Desertec?*

It's still early days for Desertec. The project's aim seems to be to generate power for Europe. It only becomes affordable and feasible if the main purpose is to supply Europe. Besides, even if there were benefits, most would be limited to North Africa. The advantage for Africa as a whole would be the learning process involved. I like the imaginativeness of the Desertec project. Its proposed scale is impressive.

*Africa seems to be the perfect continent for solar energy. Will it be possible for the continent will skip the industrial age and jump directly into the solar age?*

There are over 50 states in Africa, each with its unique limitations and opportunities. The cost of solar technology will have to come down and there has to be more mass utility. Currently, biomass is still the biggest source of energy for African households. There is a lack of central infrastructure; there are few power grids. It thus seems to me that the best opportunities will be in off-grid solutions.

*Is the West supporting such developments?*

There are various development agencies looking for opportunities to expand the scope of renewable energies in Africa. These include, among others, the World Bank, the UK's Department for International Development, Germany's GTZ. Most of the

commercial developments, though, are occurring in developed and emerging economies such as China, India, and Brazil.

*Are African countries much interested in renewables?*

There are promising signs. Some wind projects are in the pipeline for countries such as Egypt, Kenya, and Ethiopia. Brazil has just agreed with Mozambique to develop a hydro project. A number of concentrated solar power sites are being reviewed for Algeria, Egypt, and Morocco. Morocco seems to be ready to make significant investments – it just unveiled a one billion dollar fund for renewables and energy efficiency. South Africa's solar tower project is back on track. Funding will come from the World Bank's Clean Technology Fund. However, there is still scope for more investment.

*What are the main obstacles?*

The main stumbling block is affordability, though there are technical problems, too. For instance, if you want to go into wind power you will have to gather data and chart wind maps. Then there's the hurdle of finance. Often there is insufficient experience, or even if there isn't, a government is unable to provide guarantees because its own finances are in disarray.

In some countries, technical expertise has to be imported – which will push up costs. One must distinguish between large, medium, and micro-solutions. Off-grid solutions seem to be an interesting niche and they are evident in both the private and the public sector. There are some great emerging micro-solutions for households within the one to five watt range – the so-called pico-PVs. They have great potential for charging small appliances such as mobile phones and radios. These, combined with ultra low-power white emitting diodes (LEDs), could bring about major breakthroughs because of mass applicability, costs, and easy rollout.

## Ethiopia

### Plenty of Sun and No Solar Industry

*An appeal by Hilawe Lakew, Managing Director of the Ethio Resource Group, an energy and environment consulting company.*

Countries such as China and India have increased their use of renewable energy as well as their manufacturing base, yet Africa lags far behind. The gap between resources and utilisation is nowhere more striking than in the field of solar energy. In Africa, solar energy is still confined to a small number of rural applications.

There is a global move towards renewable energies. Projects such as Desertec trigger the fear that in an era of renewables, Africa may yet again become nothing but an exporter of resources. African governments must wake up to the new opportunities. They must go beyond mere statements and act now.

Paradoxically, only 15 years ago, Africa was a significant market for solar energy, accounting for a quarter of photovoltaics sales worldwide. The reason for the explosion of solar power in Europe is the incentives provided by feed-in tariffs. Many African countries have policies that support solar energy. Such statements of intent are, however, not being backed up by mechanisms to ensure implementation.

Policies need to be bold and practical. Incentives to invest in solar energy are a priority. This will enable the development of a market, which in turn will drive the demand and supply for technologies and human capacity.

## Contra CCS

By Ingrid Nestle

In Germany, the coalition treaty between Christian Democrats (CDU) and Liberals (FDP) provides that subsidies for the extraction of coal will continue until 2018. Additional subsidies for new coal-fired power plants will come from the implementation of EU rules on carbon capture and storage (CCS) and from income generated by emissions trading. The irony is, that for years the FDP had rallied for the abolition of coal subsidies. Thus, the current German government is promoting an increase in coal-fired power plants, a policy that undermines climate protection. The idea seems to be to greenwash coal by means of CCS.

So far, CCS is nothing but wishful thinking by major energy companies who are hopeful that one day it might be feasible to have climate-friendly coal-fired power plants. Yet, there are weighty reasons why CCS technology will never be an option, neither within Germany, nor worldwide:

CCS will inevitably lead to a higher consumption of fossil fuels. To capture and store CO<sub>2</sub> requires considerable amounts of energy, thus leading to a marked drop in the efficiency of power plants.

In order to assess how climate-efficient CCS may be, it does not suffice to look at CO<sub>2</sub> alone; other greenhouse gases such as methane and nitrous oxide are also part of the equation. If one looks at the complete chain from extraction, transport, and the processing of coal up to the storage of CO<sub>2</sub>, CCS can, according to what we know today, only capture between 67 and 78% of greenhouse gases emitted by coal-fired power plants.

Unwieldy power plants are incompatible with renewables produced in fluctuating amounts by wind and solar power stations. Coal-fired power plants, especially those burning lignite, are slow in powering up and down. To operate them becomes only efficient where there is a high annual utilisation – and CCS technology will further increase such inflexibility. New coal-fired power plants using CCS will nothing but obstruct the turnaround in energy policy and hamper the expansion of renewables.

CO<sub>2</sub> storage requires geological formations, which at least in part are necessary for forms of sustainable energy production such as geothermal power, compressed-air energy storage, bio-gas storage etc. Such storage facilities are important to balance the fluctuating energy production of wind and solar power. We thus face a clash of two incompatible modes of usage.

In Germany, main locations for CO<sub>2</sub> storage would be geological formations in the Northern Lowlands. It is an open question whether they are suitable for the long-term storage of CO<sub>2</sub>. There is always the danger that today's CO<sub>2</sub> stores will be tomorrow's sources of CO<sub>2</sub> emissions. Money invested in CCS technology will be taken from other projects; there is a risk that other strategies to fight climate change will be thus neglected or obstructed.

Germany needs no commercial CCS technology. We should not burden future generations with CO<sub>2</sub> storage, which would come on top of other legacies such as nuclear waste. In order to keep global warming below the threshold of two degrees centigrade, CO<sub>2</sub> may not exceed the level of 350 parts per million (ppm) in the atmosphere. Presently, we have already reached a level of 385 ppm, and each year two ppm are being added. This means that global emissions will have to peak between 2015 and 2020 – and then decrease rapidly. On this, all politicians concerned with the environment agree. The quarrel is about whether or

not to use CCS technology. In this regard, it is interesting that the opponents of CCS focus mainly on Germany and Europe, while its proponents look at the increasing number of coal-fired power plants in the newly industrialised countries.

## «Coal-fired Power Plants Need Radical Change through Carbon Capture and Storage»

By Eivind Hoff, head of the Brussels office of the Oslo-based Bellona Foundation

### Pro CCS

In 2050, three billion more people than today will inhabit the earth, while at the same time a large section of humanity will need greater access to energy in order to escape poverty. We must therefore do whatever is possible to reduce emissions. Eventually, we will have to become «CO<sub>2</sub> negative» by capturing CO<sub>2</sub> from the atmosphere and channelling it back underground.

80% of our present energy consumption comes from fossil fuels. No fossil fuel causes as much pollution as coal. Coal is easy to come by, especially for the developing countries that, over the next decades, will increase their energy consumption the most. We will therefore have to find ways of how to continue burning fossil fuels for a certain time without causing emissions. It is possible – with the help of carbon capture and storage (CCS).

CCS involves storing CO<sub>2</sub> more than 800 metres underground. Only there, pressure is high enough to make CO<sub>2</sub> act as if it were a fluid, thus making it less volatile. Possible storage locations are former oil and gas wells, yet the potentially most sizable storage facilities are in porous formations – the so-called saline aquifers. The United Nations' Intergovernmental Panel on Climate Change (IPCC) most cautious estimate is that there is a global storage capacity of around 1,700 gigatons; worldwide there are about 30 gigatons of CO<sub>2</sub> emissions.

CO<sub>2</sub> is already being successfully captured from flue gas. Large quantities of the captured CO<sub>2</sub> are then conveyed and stored for many years underground. So far, this process has not been applied to conventional coal- or gas-fired power plants, for which CCS could be a crucial intermediary step on the way into a renewables-only future. Yet, it is to be expected that by 2050 CCS will be able to reduce global CO<sub>2</sub> emissions by a third.

The potential of CCS goes beyond cleaning fossil fuels. Should we be able to develop sustainable biomass – biomass that does not run counter to food production, nor depletes nature (e.g., by cultivating marine algae in the Sahara desert) – then CCS would enable us to build biomass power plants. As long as they grow, trees and plants extract CO<sub>2</sub> from the air. Thereby, CO<sub>2</sub> is captured from the air and stored where carbon originates – underneath the earth.

In addition, CCS offers the only way to reduce CO<sub>2</sub> emissions from industry, e.g. from steel and cement factories, which will be needed to build our future solar and wind power plants. Even

steel and cement factories that operate exclusively with renewable energies will, in the process of manufacturing, release large quantities of CO<sub>2</sub> that can only be disposed of through CCS.

Of course, the future of carbon capture and storage is unknown; the technology will first have to be used on a grand scale. We are convinced by this technology because all emission projections that postulate a maximum ceiling of two degrees of global warming assume the use of CCS. We are also convinced because experience thus far has shown that CCS works and is safe. It is high time to get down to business.

# Can Economic Growth and Climate Protection be Reconciled?

By *Claudia Kemfert*

*German Institute for Economic Research*

We have almost used up our emissions budget. Until 2050, according to WBGU, an advisory body to the German government, we may globally emit another 750 billion tons. On a per capita basis, this means another nine billion tons for Germany. Should we continue to emit at the current rate, our budget will be used up within ten years. Thus, we have to ask ourselves: Is continuous growth the right approach? Can we afford more economic growth? Will our economic system be able to solve these questions? Is our present economic system able to increase and sustain wealth on a worldwide scale?

Our social market economy will be able to further increase wealth – from a purely economic point of view, that is. Even free world trade can help to improve wealth and welfare worldwide. Yet, as the financial crisis has clearly shown, rampant greed, faulty rules, and self-indulgence can lead to more inequality and thus cause a crisis. It is not growth as such that is the problem, the question is: What growth? Rampant economic growth that consumes limited fossil resources is wrong. An increase in the quantity and quality of environmental protection, health, access to drinking water and clean energy, on the other hand, is important and right. The growing use of renewable energies, climate-friendly transport, health care, and technologies that provide safe drinking water can lead to an increase in wealth. With such an approach, we may be able to solve the problem of climate change – and have growth at the same time. There is no necessary link between economic growth and the use of fossil fuels. We will have to unthink the dogma that wealth can only be measured on a scale of economic growth.

Climate change proceeds unceasingly as the percentage of fossil fuels used in energy production is further on the rise. Rapidly growing economies such as China's, but also Russia's and India's, use ever-greater amounts of fossil fuels. It has to be kept in mind, though, that three quarters of all greenhouse gas emissions worldwide are caused by the developed economies in the US, Europe, and Japan. The marked increase in the use of coal is a major factor. Frequently, the use of fossil fuels is being subsidised, leading to more waste of energy.

Currently, every week, China puts about one new coal-fired power plant on line. For 40 to 60 years to come, such power plants will cause more emissions detrimental to the climate. In addition, transport is on the increase, too, and this is especially true for private transport, which predominantly relies on petrol. Each year, in China, 18 million people migrate to the cities. Within 30 years, 200 mega cities will be built in China, i.e. cities of a million or more inhabitants (Europe has 35). At present four out of 100 people in China drive their own car; in the US and Europe the figure is 80 out of 100. This shows to what degree the rapidly growing economies will affect the amount of greenhouse gas emissions.

Even today, China is already emitting more greenhouse gases than the US. Per capita emissions in China and India, though, are still far behind those in the industrialised countries. The per capita consumption of energy in the US is the highest in the world and energy saving measures there would be a simple and cheap way to reduce emissions.

China will continue to grow and is dependent on new technologies. The key to solving the problem is co-operation and innovation. Energy production and mobility will have to become climate-friendly. We need energy that is, at the same time, carbon dioxide-free, safe, and affordable; we also need new propellants and transport technologies. Germany can develop such solutions – and then offer them to the world.

Climate protection is the solution and the way out – climate protection creates jobs and growth. As it turns out, the financial crisis is not so bad after all. It has demonstrated that markets are not self-regulatory; when markets fail, we do need able political decisions. Although we should have had begun much earlier to promote innovation and to research and roll out concepts for sustainable transportation, it is still not too late. Quite the contrary. Now we will be able to tackle three crises at once: the financial, the energy, and the climate crisis. In order to do this, politicians will have to set the course towards an energy efficient, sustainable, and climate-friendly economy. Renewable energies will have to be subsidised and promoted, and there should be cash incentives for saving energy.

Buildings offer great opportunities to save energy. Financial and tax incentives and improved possibilities for property owners to shift costs could point the way. Within transport there is much room for improvement, too: Rail traffic and public transport have to be backed, air travel should be included in emissions trading, and the German car industry has to be made sustainable. Instead of paying out scrappage bonuses, car companies that introduce new climate-friendly models and propellants should be eligible for subsidies.

The current Swedish EU presidency is lobbying for more climate protection and aims to make, within a few years, energy production independent of fossil fuels. Great Britain plans to double the amount of renewable energies it produces, and even the US is spending 150 billion Euros on renewables and climate protection. China, too, is planning to expand its renewables sector and works with the US in climate protection. Everybody has grasped that it is up to politicians to offer the right incentives.

The business community has, for some time, backed climate-friendly approaches. Companies, though, need a framework that is reliable in the long-term. In sectors such as heat insulation and related energy-saving measures in construction, renewable energy technologies, environmentally friendly coal technologies, or sustainable transportation, Germany still is the world's leading economy. Yet for how much longer? The global race for the most innovative approaches is under way. Growth is a solid basis for this to succeed: Growth creates great opportunities to invest in energy efficiency, circular economies, sustainable water management, in climate-friendly energy technologies and propellants, as well as in sustainable transportation.

We will exhaust our emissions budget and nobody will stock it up again. It is thus even more important to get started today. We are faced with climate insolvency – and there are no bail-outs in sight. The financial crisis was the final reminder. Ten years remain to roll out new technologies. Climate protection is the way out of the crisis; climate protection stimulates the economy and creates jobs. If we succeed, our emissions budget will suffice. Climate protection is a great opportunity; it might well be our last chance, too.

## The American Way of Change

Researchers, entrepreneurs, and venture capitalists go beyond politics to find, on their own account, openings for green energies.

By Till Kotter

It is ironic. While the US is being internationally lambasted for its lame climate policies, nationally Al Gore has to justify himself for his investments in renewable energies. Critics in the Republican Party claim that the Nobel laureate's support for stricter climate policies has mainly financial reasons. They point to the former vice president's investments in low-emission technologies that might make him – should new energy and climate laws be passed – the first green billionaire in economic history.

The fact is: For years Gore has not only been a backer of new energy policies, he has also put his money where his mouth is. The public may know Gore mainly as the founder of the Alliance for Climate Protection and the author of yet another successful book (*Our Choice. A Plan to Solve the Climate Crisis*), but he is also a business consultant for leading companies such as Apple and Google. As co-owner of the venture capital firm Kleiner Perkins Caufield & Byers (KPCB) he is backing new green technology companies. The aim is to provide them with solid investment and give them the time and means to get ready for the market. The passing of the Clean Energy Jobs and American Power Act, currently under review in the Senate, would make the US market, starting in 2012, the globally largest marketplace for emissions trading. The resulting cost of CO<sub>2</sub> emissions would provide billions to be invested in low-emission technologies and renewable energies. Al Gore seems to be backing a winner: the power of the American economy to press home.

The criticism voiced by the adversaries of Al Gore, the venture capitalist, is late in coming. Business leaders within the US are supporting a green transformation. George Soros, philanthropist and former broker, intends to inject a billion of his own money into renewable energies and a new climate foundation. Billionaire Warren Buffett has a 10% share in Chinese battery and car manufacturer BYD – and has thus far made a 1.6 billion dollar profit out of his investment. While BYD's e-cars will not be introduced to the US market before 2010, Buffett predicts rapid growth for the combination of e-cars and renewable energies. The chances of BYD, to become the world's biggest car manufacturer, are not so bad. The major US car companies, Chrysler, Ford, and General Motors, are aware of this and are vying with each other to introduce hybrid cars and e-cars to the US market.

Intel is considering millions of investments into new technology to predict wind levels so that e-cars could be predictably powered by wind energy. In the third quarter of 2009, across the US, private investment into low-emission technologies from batteries to intelligent grids has risen by a whopping 46%. «Going green» is the new slogan of US companies. For some it is nothing but a PR exercise in greenwashing, for others a profitable venture capital investment; most, though, have realised that it is a solid concept with future potential.

Further changes are under foot, if only slowly, and many a promising company is as yet unknown. On November 17, 2009, in San Francisco, for the fourth time a winner was announced in

the Clean Tech Open, in which 277 companies had participated. Largely unnoticed by the media, the aim is to identify and nurture innovative new founders of companies. The organisers are convinced that technical and financial pioneers will help the US to master the economic crisis – and the climate crisis, too. They want to follow in the steps of their sponsors, erstwhile nerds such as the founders of Google. Today, the Californian internet giant is not only a global force on the web, but also pioneers energy efficiency. The company has managed to reduce its energy consumption by 50% and is investing millions into small and medium-sized businesses such as eSolar and BrightSource Energy. Such investments will also profit the winner of the 2009 Clean Tech Open, EcoFactor. The Silicon Valley-based company has developed software enabling intelligent grids to control heating and air conditioning in private homes. There is a lot of potential in this: A third of all emissions within the US could be avoided, if energy were being used more efficiently.

Such auspicious investment opportunities may soon silence Al Gore's critics. They might still attack Al Gore, the activist, but they already concur with Al Gore, the venture capitalist. Their vociferous criticism is possibly nothing more than a last effort to avert something that has been proven beyond a reasonable doubt: Investments into low-emission technologies will not only save the climate, but also pull the US economy out of its malaise.

## The Powerful US Chamber of Commerce and Climate Legislation

By Frauke Thies

Parts of the economy, among them the powerful US Chamber of Commerce, did all they could to prevent new climate legislation. Then, last November, things began to change: The Chamber of Commerce, one of the most powerful lobby organisations in the US and second only to agribusiness, moved away from its fundamental opposition against climate legislation. Only a few months earlier it had harshly criticised the climate law passed by the House of Representatives and warned it would bring about high energy costs and entail competitive disadvantages for US businesses. This led to opposition within the Chamber because quite a few of its members do demand measures to protect the climate.

The last straw was the Chamber's demand to install a scientific panel that should decide whether climate change was actually a serious threat to humanity. After this, IT company Apple and energy providers such as PG&E in California, New Mexico's PNM Resources, and the nuclear energy company Exelon resigned from the Chamber.

In early November 2009, the Chamber revised its position and began to back climate legislation – under certain conditions. Its repositioning was a powerful signal from the business community and gave vital support to Democrats. Leading environmental politicians such as Barbara Boxer, chairwoman of the Senate's Committee on Environment and Public Works, saw it as a decisive turnaround in the climate debate.

## The Blue-Green Alliance

An alliance between labour unions and environmental organisations wants to create jobs in the United States' environmental sector.

By *Frauke Thies*

The session is well attended as, in October 2009, David Foster, director of the Blue Green Alliance, formed by labour unions and environmental organisations, and former director of the United Steelworkers District 11, speaks in front of the Senate Committee on Environment and Public Works. There he states that «comprehensive climate change legislation should focus on the creation and retention of millions of new and existing, family-sustaining green jobs and should finance the transition to a clean energy economy.» And he adds: «Our partners agree that no course of action would be more destructive than to continue the energy policies that drove oil prices to 140 dollars a barrel in 2008, contributed to skyrocketing food prices and global food shortages, and resulted in unsustainable trade imbalances. Solving global warming will not be the economic calamity that some are predicting. Done right, the transition to a green economy will be the most important economic development tool of the 21st century.»

It was not the first time the Blue Green Alliance had been invited to Congress. Already, in April 2009, Foster had appeared in front of the US House Committee on Energy and Commerce. The Blue Green Alliance has become part of the Washington scene.

It started out as a loose co-operation between the United Steelworkers and the Sierra Club. Then, in 2006, the alliance was formed. Its aim is to combat economic and environmental problems through the creation of green jobs. Today two of the largest US environmental associations are members, as well as six important labour unions; altogether the membership is eight million.

In 2009, the alliance had a budget of about six million dollars, provided by membership fees and foundation grants. In addition to climate and energy policy, it focuses on trade, workers' rights, and a new «green» approach towards the use of chemicals.

Appearances in Congress and lobbying representatives is only part the alliance's activities. With public information, training programmes, and advertising, the Blue Green Alliance is trying to combat the widespread notion that environmentalism costs jobs. A special focus is the promotion of local initiatives – there already are regional Blue Green Alliances in eight states. Jointly with Al Gore's Alliance for Climate Protection, the Blue Green Alliance recently organised a «Made in America» tour. In 22 states they campaigned for green jobs and more effective climate legislation.

As David Foster speaks in front of the Senate Committee, it is mainly Democrats who give him the thumbs-up. Although the «blue» in the Alliance's name is for «blue collar» and does not refer to the colour of the Democratic Party, the alliance will not be able to convince all of the Senators. The importance of labour unions in the US has been on the decline for years, and environmentalists do not reach every part of the population either. Still, the alliance may play a crucial role in climate legislation. Many of the swing votes that will decide the fate of

climate legislation come from the rust belt, the country's oldest industrial area. This is the home of the heavy industries – iron, coal, and steel – that have been in crisis since the 1960s. A spokesperson for Republican Representative Debbie Halvorson from Illinois said to the New York Times that prior to the vote on climate legislation members of the Blue Green Alliance had frequently contacted her office. «They all stressed the potential, climate protection has for creating jobs,» she said, «especially in Illinois.»

In June 2009 climate legislation narrowly passed the House of Representatives. According to Foster, in the Senate, too, the alliance would do all it could to win approval.

Yet, not all supporters of the alliance agree on all the details of the climate laws. In front of the Senate Committee Foster declared that some energy intensive industries had to be protected and he demanded tariffs on imports from countries where climate protection was less pronounced.

It is not only President Obama who has warned against protectionism. In the Senate Committee, too, many criticised the demand to levy import tariffs. Yet, once controversy is centred on such questions it implies that there is an overall majority for climate protection – which would be great news in the US. For this to happen, the Green Blue Alliance's contribution is significant.

## Risks and Side Effects of Eco-protectionism

By *Reinhard Bütikofer*

On the day climate negotiators met in Copenhagen, economist and Nobel laureate Paul Krugman's op-ed in the New York Times demonstrated that much has changed in two years of climate debate – and that there actually is hope that we may «save the planet.»

Krugman's op-ed was titled «An Affordable Truth,» alluding to Al Gore's Oscar-winning film «An Inconvenient Truth.» Al Gore, in 2006, wanted to raise awareness of the impending climate disaster. Krugman, in 2009, states that a reduction in greenhouse gases is not only necessary, but also affordable. Even better: It will help us overcome the economic crisis.

This new economics-based approach, also known in green circles as «green new deal,» opens for climate politics the way to alliances with a majority appeal. The results of the Copenhagen conference have to be measured against the degree to which they will, or will not open up competition for energy and resource efficiency.

It would be fun to laugh with Krugman about conservatives who claim the market can achieve everything – except prevent climate change through emissions trading that puts a price on CO<sub>2</sub>. Yet, such a debate is rather for the United States. In Europe, especially in Germany, business has gone beyond that. The business community knows about smart green technologies, heat insulation, renewable energies, power-heat coupling, even about energy efficient transport. It has been told by consul-

tant after consultant that a green market economy will create numerous jobs. Craftspeople, too, have come to recognise that hope for their respective trades is «green.» In order to eradicate energy wasting antediluvians, we have to tackle the following question: Is it a precondition for the ecological modernisation of «our» economy that we have to thwart less ecologically oriented competitors – that else might undercut our costs?

In earlier pieces, Krugman has answered this in the affirmative and added that climate-based tariffs against carbon leakage, i.e. the shifting of emissions abroad, had to be brought into compliance with WTO rules. I do not want to categorically naysay this but point out a number of serious political risks:

Firstly, European industry has already been granted a number of exemptions from emissions trading and thus achieved considerable cost advantages. Additional climate tariffs would not be legitimate protection but protectionism.

Secondly, important industries such as car manufacturing have unfortunately already won pyrrhic victories against modernisation. Protective tariffs would only further encourage such obstructive behaviour.

Thirdly, important sectors that have to become more energy efficiency, construction for example, do not face international competition.

Fourthly, economic isolation is in skewed discrepancy to the necessity to internationally co-operate in the fight against climate change.

Fifthly and finally, it is not the aim of an ecological transformation to preserve existing economic imbalances in order to reinforce a one-sided orientation towards exports.

The fact that there is a debate about the best economic strategy for green innovation is auspicious; such controversy is always welcome.

## A Bright Future for Solar Energy in China

*By Sun Xiaohua*

China's solar energy industries are burgeoning. Dynamic growth due to the global fight against climate change has made China the world's number one producer of solar cells. In 2001, solar cells produced in China provided 3.000 kilowatts of electricity – in 2008, according to a report published by the Chinese Chamber of Commerce, production had reached two million kilowatts. This is an increase of over 600%. Over the past ten years, China's solar industry has seen annual growth of around 41%.

According to the same report, 98% of all solar cells were exported – mainly to the US and Europe. Not even 1% was used in China itself. But Wang Sicheng of the Energy Research Institute, the country's topmost strategic planning authority, is convinced that the focus of the Chinese solar energy industry will gradually shift from foreign to domestic markets. «In order to further advance the development of solar energy in China, the sizable domestic market has to be opened up.» And he adds: «The use

of solar energy in rural areas, in industry, as well as solar systems integrated into buildings should be the centre of further activity.»

According to sources within China's Energy Ministry, authorities have meanwhile simplified the process to grant operational approval to solar projects, while at the same time making it harder to get such approval for coal-fired, water, and wind power stations.

To boost solar energy a so-called «Golden Sun» programme was initiated. From now on and until 2011, the ministries for energy, finance, and science and technology will bear half of the construction and connection costs of on-grid solar power stations and 70% of the costs of off-grid stations. Earlier, subsidies had already been granted for installing roof-mounted solar systems that were used as pilot projects. In addition, many regional governments have created subsidy programmes, too.

Yet, according to Wang, not only is the Chinese solar industry dependent on imports of silicon, there are other problems, too – missing key technologies, pollution, and the dependency on the demands of foreign markets.

## Study 1: A Green Financial Reform to Pay the Deficit Caused by the Crisis

By *Damian Ludewig*  
*Green Budget Germany*

The ecological challenges are enormous. To reduce within 40 years CO<sub>2</sub> emissions by 95% is not something that can be done casually. The problem of species loss is unsolved, too: Currently 150 species go extinct every day. As long as there are financial incentives that point the other way, we will not be able to solve these and other environmental problems within a market economy.

State finances still draw to over two-thirds on taxes to do with the workplace, while taxes on the utilisation of nature account for less than 10%. State finances will have to be put on a new base. Instead of taxing something we would like to promote, i.e. jobs, we should tax what we would like to bring down, i.e. the depletion of nature. Against the background of demographic change, too, it does not make sense to base state finances on the ever decreasing number of jobs. In the mid-term, the state will have to generate its revenue from taxes on resource consumption and pollution.

When it comes to spending, non-ecological incentives prevail too: According to our calculations, subsidies for tax deductions detrimental to the environment (e.g. exemptions from eco-taxes) or direct payments to support ecologically harmful behaviour (e.g. subsidies for coal mining) add up to 34 billion Euros per year – and that in Germany alone! The German Federal Environment Agency even calculates the amount as 42 billion Euros – well above the amount Germany makes from eco-taxes or will contract as debt. Although regulatory laws are important in many sectors, it is clear that without a massive correction of such structurally false incentives we will never be able to save the environment and nature. The green tax reform was an important first step. Yet, in the meantime, the percentage of eco-taxes in relation to the budget as whole has almost dropped below the level reached the year before the green tax reform was introduced.

In the months to come a crucial question will be how the government is planning to finance the huge additional expenditure incurred through its stimulus packages. Will there be higher non-wage labour costs and a renewed increase of VAT – or will we take the opportunity to finance additional expenditure through smart taxation? So far, the German government has failed to spend sufficiently on ecologising the economy. According to a study published by us, only 13% of the two stimulus packages was money spent on sustainable projects. Further spending will seriously stretch the limits of what is feasible. Thus, additional spending necessary to achieve an ecological turn-around of the economy will have to come from incentives for greater resource efficiency. We need taxes that help solve problems, not taxes that create or even exacerbate them.

Green Budget Germany has therefore drafted a model for a socially acceptable ecological tax reform that, if implemented, could, in the mid-term, increase the states financial leeway by around 40 billion Euros. This would be a substantial portion of the amount necessary to finance the deficit caused by the economic crisis. In the mid-term other taxes or levies (e.g. non-wage labour costs) could be cut.

Overall, Green Budget Germany is suggesting changes in thirteen areas, most of them to do with energy and transport. For example, current practice is to give the greatest tax benefits to such users of company cars that purchase the most expensive vehicle with the highest mileage – and who use them most frequently for private business. The government thus loses nine billion Euros of revenue each year. This is not only a considerable financial, but also a costly ecological loss. Presently, over 60% of new cars are government or company-owned. Through such false incentives, the state subsidises out-dated motor pools and thus endangers the competitiveness of the German car industry. As company cars are being quickly resold they corner the market in second-hand cars, and this means that most low-income people have to buy petrol guzzlers, too. Consequently they are paying the price for subsidies handed out to those with the privilege of having a company car.

All things considered, a comprehensive green tax reform has the potential to contribute to solving the climate as well as the debt crisis, while also prompting ecological innovation and creating new job opportunities. In the face of considerable inertia, opposition will have to be overcome – yet it is certainly worth the effort.

The study is available in German:  
<http://www.boell.de/oekologie/marktwirtschaft/oekologische-marktwirtschaft-oekologische-steuerreform-8742.html>

Yet, according to Wang, not only is the Chinese solar industry dependent on imports of silicon, there are other problems, too – missing key technologies, pollution, and the dependency on the demands of foreign markets.

## Study 2: Sustainable Industrial Policy – Engine for a Green Transformation of the Economy

By *Christian Hochfeld and Claudia Kabel*  
*Öko-Institut, Berlin*

How can we switch our economy to a modus operandi that will not emit additional carbon dioxide into the atmosphere? How can we feed most resources back into a circular economy? What changes to key sectors of our economy are necessary to achieve this? A green transformation of industry and economy is one of the greatest challenges facing us in the 21st century. Even Günter Verheugen, former EU Commissioner for Enterprise and Industry, says that a «green industrial revolution» will be necessary to overcome these challenges.

Yet, it is exactly the EU's industrial policies, as defined in the Lisbon Strategy, that have so far largely failed to promote change. On the contrary, as shown in the case of coal subsidies, the EU's policies are the root cause for delaying a green transformation.

The current financial and economic crisis has done little to change this, although the huge stimulus packages will certainly have a sizable impact on further industrial policy. Measures, such as Germany's scrapping incentive are, in their current form, inadequate, though their aim was to pull the economy out of crisis and transform it by means of a Green New Deal. As the



stimulus packages in many other countries have shown, it is not possible to by-pass industrial policy – the chaotic processes of the market will create structural realities!

Against the background of progressing globalisation, the limited financial scope of governments, and the ever-narrowing room for manoeuvre caused by the climate crisis, the scarcity of resources, and the dramatic dwindling of biodiversity, we will have to fundamentally revise our industrial policies.

Based on these premises, the Öko-Institut, at the behalf of the Heinrich Böll Foundation, is currently working on a memorandum for a sustainable industrial policy with the aim to ecologically transform key sectors of the economy in Germany and in Europe. The memorandum will put up for discussion aims, guidelines, and possible structural instruments of economic policy that may effect a green transformation. In order to achieve this, it will be necessary to put industrial policies on a whole new foundation and to closely co-ordinate different policies – something that goes far beyond the current subsidies for environmentally friendly technologies.

The memorandum will be published in the first quarter of 2010. It will be the basis of a series of public debates on how to change the political frameworks governing individual key sectors of the German economy – sectors that are crucial for a desperately needed «green industrial revolution.»

