

# **Making the Green Energy Switch at a Time of Crisis**

**Dorette Corbey MEP**

**David Hammerstein MEP**

**Sirpa Pietikäinen MEP**

**Vittorio Prodi MEP**

**Graham Watson MEP**

With a foreword by **Graham Watson**

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## **Foreword by Graham Watson MEP**

The threat of climate change presents today's policy-makers with the greatest ever peace-time challenge. Their task is quite literally to save our planet. Since the industrial age human activity has increased the amount of greenhouse gases released into our atmosphere, raising the global temperature and altering the balance of the ecosystem. As the world population continues to rise, and the economies of developing countries grow larger, the threat of irreversible climate change and climate catastrophe becomes correspondingly greater.

In order to deal with the problem, we require broad recognition of its scope. In that respect, we have come a long way in a short time. There are few issues that can bring together politicians from across the political spectrum to form a broad consensus, but climate change is one of them. This pamphlet captures that consensus in print. MEPs from the European People's Party, the Party of European Socialists, the Alliance of Liberals and Democrats for Europe and the European Greens have all contributed essays, because all share a common understanding of the causes of climate change and the urgency to act now. After all, the current recession may lead to a short-term decline in greenhouse gas emissions, but that is a mere blip in the long-term trend. At the heart of each contribution lies a common conviction that the most urgent need is to diversify our energy supply, moving away from fossil fuels and towards renewable energy sources.

Each contributor also acknowledges - explicitly or implicitly - that tackling climate change effectively will require coordinated action at the international level. After all, global warming does not respect national borders. The European Union is well-placed to lead the world by taking the steps necessary to cut greenhouse gas emissions, and set an example for others to follow. It is in that context that the EU concluded its climate change package in December 2008: an ambitious programme that aims to reduce carbon emissions by 20% by the year 2020.

In the articles that follow you will hear the contributors' views on the strengths and weaknesses of that package, further initiatives that should be taken at the European level, and policy ideas for action at other levels of national and supranational government. These are politicians who agree on the problem, and on many of the possible solutions too, but through each chapter we gain different perspectives on how to chart the best course to a green energy future.

Dorette Corbey uses her chapter, *European Power: Renewable Energy as a Two-edged Knife*, to argue that a common EU energy policy is required to ensure sufficient public investment in renewable energy sources to scale-up their production. She contends that an EU-wide energy policy should also reflect government responsibility better to regulate the energy market and guarantee "fair" competition, arguing that this is necessary to ensure that multinational energy giants "play by the rules" and deliver the lowest possible prices for consumers.

In *Energy and Climate in a Time of Crisis: Cutting Demand, Improving Supply and Reducing Carbon Emissions*, David Hammerstein calls for a fundamental rethink of our energy production and consumption. He presses for a comprehensive review of our approach to climate change, superseding the current "superficial" green thinking with a far-reaching recipe for greening our energy supply. His ideas include an EU administered "price floor" on oil, and the use of smart technology to develop an "intelligent and informed" exchange of electricity between homes and the grid. He also stresses the importance of laws and regulations as the guarantors of green progress.

Sirpa Pietikäinen argues in her contribution, *Three Pillars: Constructing a Sustainable Future for Europe*, that current fossil fuel consumption hits hardest those who are most vulnerable, and that the true costs of climate change are not reflected in the price of carbon-intensive fossil fuels. She urges action on the "three pillars" of sustainability: energy efficiency, energy conservation, and greater use of renewable energy sources.

Reforming current EU policy and reorienting international institutions are key components of Vittorio Prodi's vision of a sustainable future in *Energy for the EU and the World: Visions for a Sustainable Future*. He contends that Europe's Emissions Trading Scheme is too compartmentalised, restricting competition between individual sectors, and not fully exploiting the market mechanism. He advocates a change of approach to allow competition between sectors too. This chapter also proposes making the fight against climate change a key defined aim of the United Nations, the World Trade Organisation, the World Bank, and the International Monetary Fund.

Lastly, in my own chapter, *Sustainable, Affordable and Secure: Our Possible Energy Future*, I present the case against fossil fuel consumption on the basis of its damage to the environment, the dysfunctional, unpredictable, and distorted nature of the fossil fuel markets, and the worrying trend in energy dependence that it has created. I go on to make the case for a largely renewables-based Supergrid in the Euro-Mediterranean region by the year 2050 as an effective and innovative solution to these problems.

There is still time to develop the policy solutions we need to prevent dramatic climate change. But that narrow window is closing. I hope that this pamphlet stimulates further debate about the role Europe's parliamentarians can play, and demonstrates our willingness to come together to achieve that common and necessary goal. I am grateful to all of the MEPs who contributed to this publication.



**Dorette Corbey MEP**

Party of European Socialists

European Power:  
Renewable Energy as a Two-edged Knife



## **Dorette Corbey**

Dorette Corbey was born in Eindhoven in the Netherlands. Initially, she trained and practiced as a general nurse, before graduating from the University of Amsterdam with a higher degree in social geography, and the State University of Leiden with a doctoral degree in law and international relations.

Ms Corbey has worked in the building and timber industries, both as a policy adviser and a project co-ordinator. She has also pursued her long-standing interest in foreign affairs as a researcher for the Netherlands Institute for International Relations ("Clingendael") in The Hague, and through her membership of the European Integration Committee of the Advisory Council on International Affairs.

In 1999 Ms Corbey was elected to the European Parliament as an MEP for the Partij van de Arbeid, sitting in the Socialist Group.

She is currently a member of the Committee on the Environment, Public Health, and Food Safety, the temporary Committee on Climate Change, and the Delegation for Relations with the People's Republic of China. She is also a substitute member on the Fisheries Committee, and the Committee on Industry, Research and Energy.

# European Power: Renewable Energy as a Two-edged Knife

If Europe could develop an effective common energy policy, multiple benefits would follow. It would help us to fight climate change and defend our interests against an increasingly assertive Russia. But in January 2009 such a policy seems a distant vision. The initial EU reactions to the disruption in supply of Russian gas at the start of this year were weak. It took over 100,000 citizens being left in the cold for several days before the EU was persuaded to show its muscle and act to get the gas flowing again. Solidarity between Member States was non-existent.

So is the case hopeless or are there reasons to be optimistic about a future European energy policy? There are - and we must be. Let me distinguish between the three elements of energy policy: (1) reducing our dependence on imports from volatile regions, (2) reducing greenhouse gas emission in order to fight climate change and (3) creating a functioning internal market in which no monopolies exist and the lowest possible energy prices result from effective competition. It is important to stress that the pillars mutually re-enforce each other, especially the first and second. In order to explain how we can achieve a common energy policy, each pillar needs to be assessed: where do we stand and where do we need to go?

## **Reduce dependency on imports from instable regions**

This winter, gas from Russia stopped flowing. Many EU-member states were left in the cold because of a conflict between Russia and Ukraine and once again, our dependence on fossil fuels from volatile regions became painfully clear: the same happened in 2006. This episode shows precisely why we need a common EU energy policy. But since 2006 there has been little, if any, progress towards a common foreign energy policy. Various Member States signed bilateral deals with Gazprom and a group of Member States pushed for the Nord Stream pipeline between Russia and Germany, very much against the will of Poland. A real solidarity mechanism is non-existent after Member States blocked the possibility in 2006 due to fear of losing control over national gas reserves. But recent experience should serve as a wake up call and a spur to shaping a real European solidarity mechanism under which Member States share their emergency supplies of gas in difficult times. For the moment a coordinated policy in this field is still, unfortunately, very far away. Solidarity requires infrastructure, in order to let the gas flow from north to south and from west to east. Even more so, it requires storage capacity. Dependence on foreign import is also high for oil. Europe needs to change this and replace diesel and petrol for road transport by electricity, hydrogen or biofuels.

## **Climate change: 2020**

Europe leads the world wide fight against climate change and has committed itself to a 2020 target: 20% fewer green house gas emissions by the year 2020, as well as 20% renewable energy and 20% more energy efficiency. Just before the Christmas break the European Parliament and the Council reached an agreement on six directives to implement these targets. This climate change package contains measures to make cars and fuels clean, to improve the emissions trading scheme for European industry and a directive that will oblige member states to massively boost renewable energy. By 2020 one-fifth of all energy consumed in the EU must come from renewable sources. The establishment of the first binding EU-wide renewables target - though it is notable that the target has been divided into twenty seven separate national targets - is a landmark decision marking the beginning of an ambitious EU renewable energy policy in the decades to come.

### **Transition from fossil to renewable energy**

Generating a fifth of our energy from renewables will be a big step forward considering that, according to European Commission figures, just under 7% of all energy consumed by the EU in 2005 was produced by renewable sources. But the renewables directive also includes flexibility mechanisms for member states, which can work together in various ways to achieve their national targets. It is permitted for example for one Member States to build wind turbines in another Member State. The energy produced by the wind turbines will be consumed in the Member State where they are built but the added renewable capacity counts towards the target of the Member State that paid for the turbines. For a small country like Luxembourg it therefore becomes possible to achieve part of its renewable target of 11% - current renewables share is 1% - by building wind turbines in Bulgaria where there is more physical space for such projects.

But even if we reach the 20% target for renewables, we will not have gone far enough. The European Parliament must support the Commission where it can to ensure that the directive is being properly implemented and compliance is being monitored, but for the years after 2020 a renewables target of at least 30% in 2030 and 70% in 2050 is needed.

More “home grown” renewables will help us fight climate change, create jobs in a highly innovative sector and reduce our energy dependency on Russia and the Middle-East.

But will the European energy policy succeed in generating enough renewable energy to reach these goals within the foreseeable future? It certainly has the potential to do so. The proven technologies of wind and solar energy are being applied on an ever greater scale. Solar energy production is growing by 40-50% on a yearly basis and wind power is growing rapidly too (9000MW new capacity across Europe in 2007 and more or less the same figure for 2008). Denmark is already getting 20% of its electricity from wind power and has multiple offshore wind parks. Germany and Spain are also investing heavily. The Netherlands is slowly following with a total of 2200MW wind power produced and a goal to reach 10,000MW in 2020. Offshore wind parks will play a big role. Since 2005 the Netherlands has built two that deliver energy to 200,000 homes. The construction of the so-called “wall socket in the sea” to simplify the transport of energy from wind parks as well as a less complicated permit application process will enhance investment in offshore wind. In the near future the United Kingdom will also benefit from heavy investments in similar projects.

### **Cleaner fossils**

Of course energy from fossil sources will still be necessary over the next few decades. But we need to ensure that these fossil fuels are as clean as possible and that the price of CO<sub>2</sub> pollution will be incorporated in the cost of fossil energy. Hopefully this will be achieved through the revised European emissions trading scheme directive. Electricity companies will have to pay for their pollution from 2013 onwards. Firstly, this gives renewable energy an advantage compared to fossil fuels, and secondly, it is a strong incentive to produce power that is as clean as possible. Coal power plants are heavy polluters. Carbon capture and storage (CCS) is a new technique to be developed, and the approval of the CCS-directive as part of the December climate package deal is a big step in the direction of cleaner fossil energy. With the CCS directive the capture and underground storage of CO<sub>2</sub> will become a reality by 2020.

Where it can, EU policy must influence important decisions on tomorrow's energy mix. New coal, gas and nuclear fired power plants will be in operation for at least thirty five years. Hopefully CCS can be made obligatory for new coal fired power plants in the new European Parliament legislature between 2009 to 2014.

Another tool to make energy from fossil sources cleaner is the fuel quality directive, also approved by the European Parliament at the end of last year. The new law obliges gas and oil suppliers to cut CO<sub>2</sub> emissions by 10% per litre by 2020. Oil companies can do this by blending in biofuels that are more efficient, by improving their refineries, by stopping flaring of waste gasses, or by offering cleaner energy for road transport. The directive is a strong incentive for using electricity as a transport fuel, since it is on average two and a half times cleaner

than burning petrol or diesel. Also, the new directive will encourage more biofuel production, with good CO<sub>2</sub> savings. There has been an intense debate about the advantages and disadvantages of biofuels and lessons have been learned. The EU has therefore agreed on a set of environmental and social criteria that set minimum standards for biofuel production. In the future no tropical forest will be cut down to make space for growing biofuel crops, and crops that are needed in food chain will not end up in the tanks of vehicles. A third beneficial consequence of the fuel quality law is a cleaner oil production chain as oil companies now have incentives to reduce gas flaring.

### **Getting the prices right**

Until the early nineteenth century, energy production was largely a local and private matter. Every village and town had its own energy production from windmills and water power, and later its own electricity generation from coal or wood-fired power stations. In time, energy supplies became so crucial that governments increasingly took over production by establishing public utility companies. This led to a heavily concentrated sector. Today, energy production is again largely privatised, but there is a new cycle of enlargement of scale occurring, this time at the European level. But keeping energy prices low does not occur naturally where fair competition is not guaranteed. That is why an active regulatory role for governments is indispensable. Only a common European energy policy can guarantee the lowest possible prices for consumers by forcing multinational energy giants to play by the rules.

The European energy market is now dominated by around a dozen gigantic companies that have strong regional market positions. Privatising and liberalising the energy sector has not led to a perfect market in which energy can be freely transported across national boundaries or where everyone has access to the distribution networks. Small companies are clearly disadvantaged. They often have difficulty gaining access to the networks, which in many countries are in the hands of the large energy concerns. The separation of production and distribution from transport is a solution for this problem. The European Commission proposed that this should happen across all of Europe, and a fierce debate ensued in the Parliament. Ultimately, a majority supported the separation. The legislation is still pending but in the end it will lead to a better functioning energy market with the lowest possible prices for consumers.

Networks and grids are a public service. They should enable SMEs, local producers, and even individual households to produce electricity, and to sell their surplus back to the grid. Power to the people! New technologies in solar energy, wind power, and thermal heating are indeed small scale. In the future the role of big energy companies may evolve into service providers.

## **Innovation for future energy**

Public investment in energy infrastructure is needed, especially in innovative energy technology. In Spain there has been a great increase in the scale of wind power but also in solar energy. In March 2007, a solar power tower built with support from the European Union went into service in Seville. By using mirrors to concentrate sunlight on a single point, a much greater amount of energy can be generated (concentrated solar power or CSP). Similar towers will be built in the future. Some people are urging large-scale investment in concentrated solar power in the Sahara. Electricity could be transported to Europe via high-voltage DC cables. This is not yet a simple matter, and government intervention is therefore needed, to make an electricity supergrid connecting south and north, east and west, a reality.

One outstanding difficulty is that electric current is difficult, if not impossible, to store. When the wind blows hard, there is suddenly a lot of energy that has to go somewhere. A better connection between the national networks can contribute to better storage and use of this renewable energy. A good example of this is the electric transmission cable that has been constructed between Norway and the Netherlands as well as the cable that is going to connect the wind parks off the Belgian coast with Belgium and the United Kingdom. There are plans for the construction of a European supergrid of transmission cables that will connect the countries of the North Sea, the Baltic Sea, and the Mediterranean and thus make large scale wind parks at sea much more efficient. A group of members of the European Parliament has proposed making this one of the top priorities of the EU in the coming years. Wind energy might also be used for charging the batteries of electric cars. A great deal of innovation will be needed in order to achieve this, but there are already signs of progress being made.

In addition to innovative use of proven renewable technologies, there is need for intensive research into other renewable solutions, such as energy from wave power and from the interaction between fresh and salt water (blue energy). At the University of Delft in the Netherlands, former astronaut Wubbo Ockels is working on so-called ladder wind turbines which make use of powerful winds at high altitudes to generate electricity. Much research and development is still needed, both in order to give new technologies like this a chance to really break through and to improve existing technologies. An annual climate prize for the best new idea or invention could offer a stimulus. More research money is needed for technical universities and other academic institutions that undertake innovative research and demonstration projects. The establishment of a European technology institute has already been approved, in which one of the core tasks would be to research and produce new solutions for climate change.

## **Conclusion**

Our energy policy today must be targeted at ensuring a better tomorrow. We need future generations to look back and think: "Europe made the right choices back then by creating a European energy policy that brought us clean energy for a good price, many good jobs and independence from Russia and the Middle-East". We are not there yet and we still face many challenges. In the field of energy security a lot more work needs to be done. A successful renewable energy policy is taking shape to help tackle the climate crisis but it needs to be developed further. Twenty per cent renewable energy is just not good enough in the long term. But even achieving this twenty per cent will need a strong public commitment. The credit crunch has made it more difficult for companies throughout Europe to get funding for investment in renewable energy. This is why government policy on a European scale is crucial. One united European energy policy can overcome the challenges of climate change and lack of energy security and I am confident that we will achieve our goals.

**David Hammerstein MEP**

European Greens - European Free Alliance

Energy and Climate in a Time of Crisis:  
Cutting Demand, Improving Supply and  
Reducing Carbon Emissions



## **David Hammerstein**

David Hammerstein began his studies at the University of California in 1973 and graduated in 1978 with a degree in Sociology.

Mr Hammerstein pursued his interests in the environment as a natural economy and geography teacher at secondary level in Godella, 1991-1999. From 1999-2003 he worked as an environmental adviser.

Within party politics, he served as Spokesman for Els Verds del País Valencià (Valencian Greens), 1998-2003 and International Spokesman for Los Verdes (Spanish Greens), 2000-2004. He was also a Spanish delegate to the European Federation of Green Parties/European Green Party, 2000-2004.

Mr Hammerstein was elected as a Green Member of the European Parliament in 2004. During his time there he has served as a member of the EP Research and Industry Committee, coordinator of the Greens in the Petitions Committees and a member of the Delegation for Relations with Israel and the Euromediterranean Parliamentary Assembly.

# **Energy and Climate in a Time of Crisis: Cutting Demand, Improving Supply and Reducing Carbon Emissions**

## **Introduction**

To deal successfully with climate change and with the energy crunch at the same time we need some challenging economic, regulatory and fiscal changes. This is the challenge of our times.

Without overcoming the present, all-encompassing and superficial “green” thinking, meeting that challenge will be impossible. Business as usual with just a few technical adjustments, some eco-marketing and an occasional solar panel is merely a recipe for further trouble. But we must be clear that there is no pure technological fix: there is no magic wand nor single invention that will help us confront the twin headed energy-climate monster.

In order to make progress we need to be prepared for serious social conflict and political controversy.

We need a complex mix of government policies, regulations, research funding and tax incentives, creating a system for innovating, generating, and deploying clean energy, efficiency, and productivity. Further, we desperately need an ethic of conservation and a new culture of sufficiency that calls into question many of the basic premises of our contemporary societies. We must learn that conservation is not necessarily the opposite of consumption. In order to consume more, we must conserve more.

## **The economic downturn: eco-friend or eco-foe?**

To start with it would seem that the economic crisis has come to our rescue by sinking oil prices and reducing CO<sub>2</sub> emissions. In 2008 world CO<sub>2</sub> emissions will retreat by around 3%: the economic depression of the 30s made emissions go down 35%. By cutting energy demand, the present recession may mean that many countries therefore have an easier time in meeting their Kyoto targets. But of course this ignores much of the South (and part of the North) that suffers energy poverty and totally overlooks the need for structural changes in our way of producing and consuming energy - and we need to address these things in order to be prepared for the next economic upswing. What the energy crunch does tell us is that our climate crisis is intimately entwined with our insatiable consumption patterns, the very force that until now has been the cornerstone of economic growth. We urgently need a way out of this destructive logic and into a “sustainable physical de-growth” that is compatible with a vibrant economy.

According to some voices the fight against climate change should be set aside until our economy improves. This is totally mistaken and utterly counterproductive. On the contrary, at the centre of our very response to the economic crisis should be a “green new deal” that regulates and channels public and private funding into clean development and industrial reconversion. Millions of new jobs can come from the green restoration of homes, from the building of public transport, from the massive extension of intelligent electricity grids and the retrofitting of our dirty and inefficient industrial base.

Tackling our energy-climate crisis is also about injecting our economy with real innovation, goods and services. By contrast, today’s economy has plunged into crisis thanks, in part, to financial speculation while simultaneously over-heating the climate. Junk loans have created literal junk by fuelling spending beyond real means, and toxic banks have funded toxic gases by promoting risky over-consumption that was not backed up by real spending power. Reorienting our economy to become carbon-conscious implies financial regulation that restricts the irresponsible spending and fiscal policies that internalise hidden environmental costs.

### **A carbon tax: funding the affordable alternative**

In recent months many have been overjoyed at the news of oil prices plummeting in face of dwindling demand. Nevertheless, for renewable sources and energy efficiency measures to attract massive investment and really take off, we need a price floor on oil that will guarantee a degree of stability for investments in the alternatives. We cannot allow the price context for renewable energy to be constantly fluctuating on the unstable market price of oil. When oil goes under a certain price - say \$100 a barrel - a special floating climate tax, on an EU level, should be levied. This would prevent the price of oil from falling further and provide badly needed public revenue to support economic recuperation in a post-carbon, and post-recession society in Europe.

This could also be a way of solving the EU’s lack of financial autonomy, providing no-strings-attached revenue and liberating it from the constant renegotiation of financial perspectives with member states. The proposal for a universal carbon tax has been supported by many of the world’s leading economists and the United Nations. It would be a way of helping the South make the jump to clean technologies and, additionally, it could provide financing for reaching agreed Millennium goals.

## **Beware of false “friends”**

We should also be cautious towards some possible false and bothersome “friends” of the climate-energy fix. Nuclear, agrofuels and carbon capture are three of them.

**Nuclear:** A massive switch to nuclear power would take all our investment and innovation power to build hundreds of new nuclear plants which would lead us to economic ruin and perpetuate a highly-centralised and dangerous source of energy that has simply too many problems and risks attached to merit our real consideration. The nuclear option is even less viable in the context of the economic recession due to its upfront costs and capital-intensive, labour-poor nature when compared with other sources of energy.

**Agrofuels for transport:** This is the last resort to save the conventional internal combustion engine on the part of car manufacturers that are in deep trouble. Hybrid and electric cars hold out much more promise for reducing CO<sub>2</sub> emissions, taken alongside tax measures levied on high-carbon cars and the strong promotion of public transport. According to most studies many agrofuels make little or no dent in reducing climate change gases but, at the same time, can have very negative impacts on forests, farmlands and food prices.

**Carbon capture and storage:** Our present coal power plants must be modified to become much cleaner than they are at present. However, the promise of the still immature CCS technology is being used as a catch-all marketing spin to fool people into more and more coal power plants and irrational mining operations. Serious risks and technical problems remain. CCS might work - both environmentally and financially - but it will be ten years at least before we know for sure.

## **Demand and supply: a smart and efficient grid, smart and efficient homes**

One of our biggest challenges is distributing our electricity in an efficient and intelligent manner. Most of our present regulators and power utility operators follow a perverse and inefficient system. Currently, the more energy they sell the better. More power lines and power plants built mean more clients signed up and more energy consumed. More investment is the result of greater consumption and there is little incentive for energy conservation. As the over-supply of energy mounts, so too do the profits.

For example, Spain produces around triple the amount of average energy consumed each year. They produce to serve peak demand of consumers instead of orienting demand to the times of peak production. It is generally a linear, one way process on the grid. There is practically no feed back: there is very little energy contribution from consumers and practically no information on the energy consumption patterns of the consumer flowing back to the regulators. There are real advantages to saving, efficiency and renewable energy production, but maximising these is impossible when almost no economic dialogue exists between consumers and providers.

We desperately need a “decoupling” of consumption from the profits of energy suppliers. Energy auditors under EU or national guidance could establish compensation funds for achieving efficiency and savings for consumers. They should subsidise change in appliances, climatiseurs and light fixtures. It should be noted that the cost of generating each new kilowatt of electricity is more than five times that of saving one.

Especially important is the great void that exists in the integration of information technology and our daily energy system. Information technology and electricity convergence could reduce energy consumption radically in the building sector, which represents 40% of our current electricity consumption. IT could match electricity needs with the time when the energy is available. Why shouldn't a washing machine or other appliances be programmed to work at off-peak hours when there is surplus production and supply of electricity? And why can't we make alter the supply and demand pattern of electricity by using IT to create a modulated pricing system? Wouldn't these ideas greatly reduce CO2 emissions and eliminate the need for hundreds of new power stations at a stroke?

Our homes can be the centre of our fight against climate change. The global production of cement produces around as much CO2 as all the passenger calls in the world. The standards for building homes (materials, energy efficiency, life-cycle analysis) should be as important as the CO2 emissions of cars. Too many of our buildings are enormous energy consumers when they could be net energy producers. This demands a clear tax structure to promote new bioclimatic designs, a new materials economy low in carbon, and an intelligent and informed exchange of electricity between homes and the grid.

## **The firm hand of the law**

Laws and regulations are primordial. For example, each Californian produces half the emissions of his or her fellow American, but this is not due to the triumph of personal choices. It is down to policies on CO2 emissions from cars, efficiency norms on appliances, and similar restrictions on machines. This has meant billions in savings and has had a positive effect on the economy.

Closer to home the difficulties of pushing a rational climate policy is becoming evident. The tremendous campaign against stricter car emission standards in the EU - waged by car manufacturers and some member states - has been successful in markedly weakening the EU Directive. This sad development is simply a reflection of the lack of political will on the part European politicians to take the energy-climate crisis seriously. At the time of writing the EU Council has just backtracked and watered-down key elements of the whole EU climate-energy package that must guide us toward the 2020 objective of a 20-30% reduction in CO2 emissions.

## **Conclusion: looking inward and outward**

Both within Europe and outside it, there exists a myth that the path to progress requires the right to pollute: we need to end that idea and create a sustainable future. That means action in our own backyard, but coupled with strengthened ties to the South of us, especially within the Mediterranean region, and embarking on clean energy integration and technology transfer projects that create common purpose and economic viability. It is possible to save the economy and the planet at the same time if we have the courage to propose a reorientation of our economy towards crucial environmental and social objectives. Determination, innovation, and legislation: we will need them all to make the progress that must be achieved.



**Sirpa Pietikäinen MEP**

European People's Party

Three Pillars:  
Constructing a Sustainable Future for Europe



## **Sirpa Pietikäinen**

Sirpa Pietikäinen is a Christian Democrat member of the European Parliament, and sits in the EPP Group. Previously, Ms. Pietikäinen served in the Finnish Parliament (1983-2003) and as Finland's Environment Minister (1991-1995). Environmental, social and welfare issues have been the focus of her work throughout her career.

Ms. Pietikäinen has a long track-record in the field of promoting sustainable development. She was one of the negotiators of the Rio process, leading to the Climate Convention. She also participated in the Rio follow-up process, Rio+5. She also has a special interest in environmental economics, combining environmental and business success. In this context she has, inter alia, chaired the Finnish Environmental and Business Association. Throughout her career, Ms. Pietikäinen has actively co-operated with the international environmental movement, e.g. Earth Action.

Ms. Pietikäinen has an MSc (Business), and teaches university courses on negotiations theory and practices. She has also served as Chairman of Finland's United Nations Association, as well as a Member of the Board of the World Federation of United Nations Associations (WFUNA). She is a current member of the Board of IDEA International, and Deputy Chairman of the Association Promoting Fair Trade in Finland.

# Three Pillars: Constructing a Sustainable Future for Europe

## Introduction

Game theories are very useful in explaining how rules of action affect people's decision-making and choices. Sensible and well-meaning people make choices that affect them and their surroundings negatively if the incentives and rules are tuned to support such behaviour. If greediness and short-sighted action are rewarded by the system, at the same time as long-term stability and altruism are repelled, the results will not favour the long-term solutions that would benefit us all.

The global environmental crisis highlights serious flaws in the current way of thinking and acting. A lack of global rules and regulations means that the real costs of human action - the way we produce and consume - are not included in the prices we pay. The profits are enjoyed by a few, while the costs and risks are borne collectively by all of us. As Nicholas Stern proved in his trail-blazing study (2006) the market has failed to incorporate the huge cost of climate change created by the use of fossil fuels. Unfortunately those less capable of reaping the benefits of the current system are the ones most affected by the adverse effects.

## The real cost of fossil fuels

Affordable energy is one of the main factors behind economic prosperity. However, with oil production close to its peak, the industry would need billions in investment just to keep the supply at the same level as today, and these costs would be reflected in rising prices. As it is volatile oil prices have dramatic effects on the world economy. In addition, costs of offsetting the impact of climate change, brought about by burning oil and coal are growing ever greater. Were the real costs of burning fossil fuels included in the price, the bill for using these sources of energy would be heavily increased.

The Stern Report estimates that the price of continuing on the path of business-as-usual would lead to costs equivalent to losing at least 5% of global GDP per year. If the wider risks and further possible impacts are taken into account the damages could rise up to 20% of GDP or even higher. The burden on health care and the adverse effects on human health must be taken into account. For example, evidence published in Science 2001 shows that fossil fuels are sickening or killing millions in both the developing and developed worlds. The annual death toll for global air pollution is estimated to be nearly 700,000, in addition to which acute and chronic illnesses restrict the daily activities of

millions of people. The other costs of fossil fuels are impossible to estimate: it is not easy to put a price tag on the loss of biodiversity, pollution of seas and other ecological degradation. The same cheap energy illusion applies to nuclear power: if the costs were properly determined and included in the price, no one could afford to build a nuclear power plant. The long term costs of treating and storing nuclear waste, not to mention the huge possible costs of a nuclear accident, are not factored into the price paid for nuclear energy - but they should be

### **The three pillars of sustainability**

The future European and global system of sustainability needs to be based on three pillars: energy efficiency, energy conservation, and environmentally sustainable production using renewable energy sources.

If the existing potential for energy efficiency potentials was maximised, the possibility of reducing the demand on primary energy would be huge: from 72.000 PJ/a as estimated in 2003 to around 46.000 PJ/a in 2050. This requires a revision in how we manufacture goods; rethinking how we construct houses, cars, and electric appliances. These changes are already on the way with many countries drafting legislation on permissible energy consumption for buildings, and electric goods. For example, Britain's then housing minister Caroline Flint announced at the beginning of 2007 an ambitious plan to make all new non-domestic buildings in Britain zero carbon by 2016. In France also, all new buildings must produce more energy than they consume, but by the year 2020.

The extended EU directive on the energy performance of buildings will be a step in the right direction, as will be the revision and enlargement of the directive on energy using appliances to cover energy-related appliances too. However, the revision of the latter directive represents a retreat from the Commission's earlier, ambitious plans to cover an even wider variety of products. Nevertheless, these pieces of new legislation clearly show the direction that Europe is about to take. The directives on energy using and energy-related appliances have implications that go well beyond the EU's borders: producers in, for example, China will not have two different manufacturing lines for products going to Europe and for products going elsewhere. If products that do not comply with the European legislation are banned from entering the market, all producers world wide have to take this into account. A lot can and must be done policy wise to bring appliances in Europe up to the highest possible level of efficiency. An example for reaching this goal could be found in Japan, where the country's "top runner" programme is acknowledged to be a very efficient and dynamic way of increasing the appliance efficiency standards.

According to a study by McKinsey Global Institute, the economics of investing in energy productivity are very lucrative. The additional investment of \$170 billion through 2020 in energy productivity could generate energy savings amounting to \$900 billion annually. According to the study the average internal rate of return is around 17%. Investing in energy efficiency is also a cost-effective way of combating climate change. The study states that: "Capturing the energy productivity opportunity could deliver up to half of the abatement of global GHG required to cap the long-term concentration of GHG in the atmosphere to 450–550 parts per million". The sum of investment might seem enormous out of context, but when compared to the savings in money and CO<sub>2</sub>, it is a fair investment in a cleaner future with smaller electricity bills.

A lot can be done to improve the energy efficiency of buildings. The popularity of so-called zero energy houses is increasing. These are buildings which - in a normal year - have a net energy consumption of zero. The design of the house is adapted to the climate and the position of the building related to the daily and seasonal position of the sun. Various ways of creating energy to cover for the building's energy and heating or cooling needs can be chosen, varying from solar to wind and thermal energies. The energy efficiency of various household appliances can be further boosted, and the consumption of energy proportioned to the varying overall demand on energy through so called smart grids.

Rethinking the transport system is also an integral part of improving energy efficiency. Much more can be done to change the way people get around: more efficient public transport systems, making city streets bike-friendly, faster trains, and hybrid or electric cars are all key areas.

The shift to sustainable production requires a revolutionary change in thinking. An economy based on constant consumption, discarding goods and buying new models is not sustainable. According to an IEA commissioned study, increasing recycling rates and moving to the most efficient manufacturing systems worldwide could reduce energy use in the petrochemical industry by 32%. Similarly, efficient recycling in the steel and cement industries would reduce the energy usages of these industries by tens of percent. Introducing landfill taxes has proved to be an efficient means to encourage recycling, as well as more aggressive information campaigns and making recycling as easy as possible for the consumers and the industry, but we need these ideas to be pushed further still, and additional ones added, if we are to make the progress needed.

## **Europe powered by renewable energy sources**

Nowadays Europe is largely powered by big, centralized power plants which use fossil and nuclear fuels. Around 80% of the primary European energy supply comes from fossil fuels. The emissions resulting from this power generation are more than 1.2 billion tons of CO<sub>2</sub> and over 2,600 tons of radioactive waste every year. More than half of the European operating plants are over twenty years old. The investment decisions taken on the new plants will be heavily affected by the decisions taken on European level, and so the need for formulating ambitious and binding policies now is apparent.

Greenpeace estimates that by switching to renewable energy sources by 2050 - with the share of renewables reaching 70% in the electricity sector - Europe's power sector would go down from being the biggest source of European CO<sub>2</sub> emissions to less than 20%. Moreover, the potential for powering Europe exclusively from renewable energy sources is established by many prominent studies. Presently about 10% of the existing potential within Europe is exploited. According to a study by the German Aerospace centre (DLR), Europe has the economic potential to produce green power well over the current power demand, and also over the estimated electricity demand in the future; the total economic potential amounts to around 145% of the estimated future energy demand. Coupled with the huge potential of solar power generation in North-Africa and Middle East, the supply-side well exceeds the demand. The Trans-CSP study by DLR estimates that a well-balanced mix of renewable energy sources from Europe together with solar electricity imports from the Middle East and North-Africa could provide Europe with 80% of its energy consumption from green energy by 2050. There are multiple possibilities for backing up the system in case of demand peaks or unexpected shortfalls in supply. One of the most promising alternatives is to store electricity in water. It has been estimated, for example, that the store capacity in Norway would be around 90 TWh.

Europe's renewable energy systems are not only abundant, they are diverse. While Scandinavia and the central Alpine countries have the highest potentials for hydropower, solar energy potential is concentrated in the Mediterranean region. Wind energy potential is significant on the long Atlantic coastline as well as in Great Britain and Ireland. North and North-East Europe have potential for more energy production from biomass.

The greatest potential comes from the production of wind and solar energy. The European Wind Energy Association (EWEA) estimates that - given the right policies, favouring renewable energy sources - the wind industry would have an installed capacity of 300 GW, which includes 120 GW of offshore wind. This translates to 935 TWh worth of electricity production, which would meet up to 20-28% of total EU electricity demand. The DLR study estimates that the potential of solar electricity from the both sides of the Mediterranean Sea could be extended to 700 TWh per year by 2050.

## **The renewable energy economy**

The economic benefits from turning to renewable energies are enormous. Reducing the dependency on oil with its volatile prices would provide the European economy with a stable base. The positive impact on employment would be significant too. By 2010 the renewable energy sector is expected to provide around 700,000 jobs in the field of energy generation. According to the DLR study the mix of sustainables mentioned above would lead “to less expensive power generation than the business as usual strategy in a time span of about 15 years”.

The economic and technical potential for exploiting renewable energy sources exist, what is lacking at the moment is sufficient political will to help the renewables break even with the conventional sources of power. The disadvantaged position comes from decades of large financial and structural support given to the fossil and nuclear power plants. According to the Worldwatch Institute, world coal subsidies alone total \$63 billion per year. All in all it is estimated that conventional energy sources receive \$250-300 billion in subsidies every year. In Europe, of all subsidies given to energy sectors, 90% go to fossil fuels or nuclear energy, and only 10% to renewables. In addition, what has made the wide use of nuclear energy possible, are years of research and development which have swallowed billions of euros of tax-payers' money. Despite all of these efforts, nuclear power is still far from being a safe and unproblematic source of energy. In Europe, over 50% of the current R&D budget supports the conventional energy mix of fossil fuels and nuclear and only 8% is given to the R&D of different forms of renewable energy.

If the same amount of R&D funding had been given to fund the development of renewable energy sources, these would now be more technically viable and cheaper than they are today. Reform of the distorting subsidies system will be an essential part of a reformed European energy system. The examples of Germany and Spain prove the efficiency of feed-in tariffs which, after the initial stage, can be slowly phased out. Subsidising renewables should in fact be seen as a public investment into cleaner and ultimately cheaper energy sources. This is in stark contrast to continuously growing subsidies for conventional energy companies.

## **A Supergrid**

The European grid structure is built for large, concentrated power plants. In a situation where the infrastructure and the power plants are owned by the same actor, there is no real drive for competition and development of alternative sources. Renewable energy sources have long been in a disadvantageous position when it comes to grid access and administrative burden. The unbundling of the European energy sector and the deconstruction of administrative barriers are on their way thanks to recent EU legislation but, again, more far-reaching policies are needed in order to achieve fundamental change e.g. preferential access guarantees for renewable energy.

Currently there are only a few transnational grids within Europe. In addition to this, the currently more widely used alternating current (AC) grid is poorly suited for transferring renewable energy over long distances. In order to transfer solar electricity from the Middle East and North-Africa to Europe via hydrogen, and in order to make sure renewable energy can be fed in to the European electricity system wherever it is produced, a change in the European grid structure is obligatory. The switch from the conventional AC grid to a high voltage direct current (HVDC) grid provides the solution. HVDC is already in use in some parts of Europe, linking the British and French national grids, and connecting Scandinavia, North-Germany and the Netherlands together. The renewable energy revolution requires these transmission lines be expanded to cover the whole of Europe and link the other side of the Mediterranean Sea to the European transmission lines.

The advantages of HVDC over the AC grid are notable. Most importantly, the HVDC transmission lines lose only about 3% of the electricity transmitted over every 1,000 kilometres. The transfer capacities of the traditional low voltage AC grids, in contrast, are much more limited as the electricity is dissipated as heat due to the resistance of the conductors. For example, over a distance of 3,000 kilometres, about 45% of the solar energy generated in the Mediterranean region would be lost via AC. The capacity to transport electricity over long distances considerably increases the security of supply by making it possible to compensate for blackouts of large power stations through distant backup capacity. The traditional AC grids have a role to play in addition to the HVDC grid, as the electricity would be transferred to the end users using these lines. Also the small scale energy suppliers - for example buildings generating more energy than they use - could feed electricity into the system through them. This could also be encouraged by different forms of feed-in tariffs.

Solar imports from North-Africa would benefit both the North-African countries and Europe. The DLR study estimates that by 2050 the region could save up to \$250 billion in energy costs, and solar energy imports from North Africa to Europe are suggested to be cheaper than coal from the very beginning of the estimated starting year of 2020. The study calculates the cost of the HVDC grid at around €45 billion, which, in a time span of twenty years, comes out at just €5 per person.

## **Conclusion**

Climate change is moving faster than most experts ever envisaged. Europe and the rest of the world have no other chance than to revolutionise the way we produce, consume and live. The technical possibilities for this revolution exist, and many studies prove that early action transforms into economic benefits. In contrast, the longer we wait the more the change and adaptation will cost, amounting to enormous sums. The old rules rewarding short-sighted, self-serving action over the benefit of the whole of mankind must be reversed as soon as possible by determined political action.

Europe stands at a crossroads. It has the chance to invest in the future by turning to more sustainable production and consumption patterns, or it can cling on to the current disruptive patterns and unsustainable ways of producing energy. The huge costs of the second option can already be seen, and there is no question that these costs will become unbearable unless we change the whole global system.



**Vittorio Prodi MEP**

Alliance of Liberals and Democrats for Europe

Energy for the EU and the World:  
Visions for a Sustainable Future



## **Vittorio Prodi**

By profession, Vittorio Prodi is a physicist and researcher in the field of environmental protection.

He became active in politics in 1992, and he was one of the founders of the political movement “L’Ulivo”. In 1995 Mr Prodi was elected President of Bologna Province and, in 2004, he was elected to the European Parliament where he sits in the ALDE Group.

As an MEP Vittorio Prodi has combined his professional background with his political career by serving as Vice-president of the temporary Committee on Climate Change, a full member of the Committee for Environment, Public Health and Food Safety and a substitute member of the Committee for Industry, Research and Energy. He is also the current Chairman of EU-South Africa Delegation and substitute member of the EU-Palestinian Legislative Council Delegation.

# Energy for the EU and the World: Visions for a Sustainable Future

## Introduction - facing up to our unsustainable habits

In recent years the concept of sustainability has been widely abused but it has never been more necessary to consider the finite and entropic character of natural resources when planning for our energy future. A system based on the continuous exploitation of finite materials is bound to reach a dead end. This surely cannot be our vision for the future and, if indeed it is not, the central question that today's policy-makers must address is this: how can we ensure that we pass on to future generations the same capacity to develop that previous generations have enjoyed?

In the energy aisle of the European supermarket the challenges look daunting: oil prices are unpredictable, CO<sub>2</sub> emissions appear untameable, (notwithstanding new and more precise efforts to control them), and global warming seems to herald the approach of an ecological Judgement Day. These are set against the backdrop of geopolitical tensions in the Middle East, the escalation of third world countries' debt and an economic downturn that has pushed many countries to the edge of the financial abyss. These problems are inter-connected: we need to change our behaviour in order to solve them and guarantee the future development of our continent.

When the earth's population was smaller, gross energy consumption was smaller too, and the impact on planetary resources was negligible, generating widespread belief that infinite development was possible as well as desirable.

For two reasons, there are few who hold to that theory today. First, it is now widely recognised that the technologies we need in order to discover, recover, transport, refine and produce energy for a wide spectrum of applications, have created an addiction to fossil fuels which is giving rise to future scarcity. An intense and uncontrolled speculation provoked a steep increase in oil prices and distorted the original fair balance between fuel demand and supply, until demand dropped back in recent months, falling below supply as a consequence of the economic slowdown.

Second, it has become impossible to ignore the limited ability of our planet to metabolize the waste that our societies are generating. This is particularly true of the nuclear sector, where dangerous waste is difficult to dispose of, and the subject of contentious debate. Further, pollution streams have a direct impact on human health and greenhouse gases produced by the increased use of fossil fuels have resulted in global warming accompanied by irreversible climate change.

Some say that we have already reached the “tipping point” of no return and that confining the rise in global temperatures to 2°C is already an unattainable goal. However, there are many others who say that we still have a narrow timescale in which we can take action to stop that point being reached and keep the effects of global warming within a manageable range. We must therefore take our chance by acting now.

### **What can we do? The need for energy saving, energy efficiency and energy diversification**

First of all, we need to reduce our emissions through energy saving, energy efficiency and energy diversification.

Energy saving and efficiency measures are commonly known and expanding at a rapid rate. Progress has been made in the use of new materials in the building sector: allowing, for instance, better insulation of houses and public buildings, leading to reduced heat loss. Meanwhile, new superconductors herald new horizons in the development of more efficient electric grids and appliances, as well as nanotechnology in fuel cells and photovoltaic plants, all aimed at reducing the consumption of precious raw materials.

But the greatest challenge comes from the need to diversify our energy supply. Given the material scarcity of fossil fuels, Europe needs to find alternatives which do not alter the balance of the earth: namely, renewable energy sources.

Renewables are more flexible and their application can be organized in a decentralized system, by involving and empowering people who should be enabled to contribute self-generated power to local grids. This technology allows communities to produce all or part of their own electricity and does not involve some of the key weaknesses of traditional large power plants which are more vulnerable to blackouts and which make more credible targets for terrorist attacks. Additional advantages of this approach include improved hydraulic, geological and fire safety, in addition to reducing the threats associated with the recurrence of extreme meteorological events such as heavy rains, droughts, and fires, all of which are set to increase in light of global warming.

We must adopt a systemic approach that combines energy applications (including the aspects of energy saving and energy efficiency) with territorial care. The energy potential embedded in solar, photovoltaic, thermal, geothermal, thermodynamic, wind, wave, hydraulic, and biomass sources is enormous: we “only” have to learn how to harness them, and this will require a strong effort in research and investments.

But proper funding for green R & D is necessary if we are to reap the green rewards. For example, by investing in technology, renewable energy sources could form the basis of a distributed electric energy production system in which energy efficiency is boosted through co-generation and tri-generation applications.

Renewables are also the source that will allow us to reduce emissions and afford a real climate change mitigation plan.

### **The ETS in Action**

In the European context, the European Emissions Trading Scheme (ETS) framework plays a crucial role in this endeavour: its “cap and trade” system is designed to cut greenhouse gas emissions. Allowances are traded according to a market mechanism in order to make the reduction effort both attractive and sustainable.

The European Commission has proposed to issue allowances through auctions that would be traded at the level established by the market but the ETS approach may well be too compartmentalized (it affects, separately, electric energy production, aviation, automotive, energy intensive industries and, soon, the shipping sector). The market mechanism is not fully exploited, since the competition is restricted to individual sectors.

A simpler and more general system would include every use of fossil fuel within the ETS discipline: in this way the competition could develop between different sectors as well as within them. A “sustainable” level, approximately one fifth of current emissions, should be issued free of charge and in an equitable way, based on the principle of “one person, one emission allowance”: this formula would acknowledge the right of every human being to the access and use of natural resources.

Developing countries could also trade their population-based allowances in order to obtain the financial resources required for investments in the adaptation measures that are necessary to deal with impact of inevitable climate change. After all, developing countries are often less responsible for global warming yet more susceptible to its devastating impacts, including desertification, increased sea level, floods, and water scarcity. Some of the proceeds from the auctions could be devoted to compensate the countries with rain forests or with areas characterised by extensive biodiversity: these could then be preserved as true carbon depositories.

## **Can we afford to do it? We can't afford not to**

Scarcity of fossil fuels and their higher rate of profitability over recent years has encouraged many countries to plan a reversion to the intense exploitation of their coal reserves. This however does not represent a real solution to the problem of security of supply, and more coal means more atmospheric pollution, more health problems and soil degradation.

Coal exploitation can be made more environmentally friendly by the process of gasification. However, this requires huge investment and is not a viable option in the immediate term.

Further mass exploitation of fossil fuels is simply unaffordable for our environment. Those who object to the vision of green energy from green technology often ask whether we can we afford to make the switch at a time of financial crisis that is threatening to develop into a deep economic recession. The answer is definitive: yes we can.

The history of the Great Depression in the twenties and thirties teaches us that the time is now ripe for long term investment in infrastructure: Keynesian spending policies are what we require today. Moreover, investments in energy independence could foster growth in development and jobs in the renewable energies sector and, as a welcome side effect, ease the inflationary pressure linked to the import of fossil fuels.

Energy independence also has massive implications for the security of supply. Historically, wars have been fought to ensure sufficient supplies to energy-dependent countries. Renewables and new energy vectors like hydrogen could change this equation by removing the source of conflict. Defusing current tensions associated with energy supply and security could also lead to positive developments in the field of international cooperation. The EU has long sought a central, leading role in the promotion of peace both on its borders and, more recently, around the world. If fossil fuel dependence were to be eased it might alter the balance of power in our dealings with Russia, Middle Eastern countries and others, in a way that would be positive for our fledgling foreign policy.

## Blue Skies Thinking

### But what kind of technologies do we need in order to get there?

A prime example is the “Desertec” project based in the belt of North African countries. This is a concentrated solar power network for the production of electricity which could be a potential energy supply for Europe and beyond. By using the available technology, the electricity produced by solar plants could even ease the problem of water shortage, through desalinization processes, and open the way to development for some African countries. By promoting and sustaining the development of countries on the Southern shore of the Mediterranean Sea, the massive migrations of people from that region - projected in light of future climate change and the associated lack of resources - can be scaled back, representing an ease in the threat to stability in those countries and to the integration and social model of those European countries that would otherwise receive them.

Moreover, it is not just a question of developing existing technologies, but being brave enough to put nascent theories into actual practice and to explore new and visionary ideas. For example, substantial scientific research suggests that we could soon produce energy from both sea and still water algae. This is in the realm of bio-fuel options, commonly arranged in the hierarchy of first, second and third generations. These produce varying degrees of power yield (first generation generally producing least, and third generation most), depending on the crop or source e.g. sugar beets, rapeseed, corn and other plants that are less commonly known to us including jatropha (a kind of succulent plant widely spread in India, Africa and North America, very resistant to drought and pests, with seeds containing up to 40% oil).

There are those who criticize the intense use of crops for the production of energy on the basis that we should not be using crops to feed machines when they could instead be used to feed people, and that this practice is unsustainable. There are three flaws in their argument. First of all, the distinction between “generations” is misleading because it is based on only one treatment process that does not make whole use of the plant. Secondly, most of the recent imbalance in cereal costs has not been the consequence of biofuel production, but rather of uncontrolled speculation in world markets. Thirdly, there are already market-ready viable options based on the treatment of organic waste, including residues from agricultural activities and forests/ green area maintenance, ergo non-food crops. A virtuous cycle for the production of energy can be established from the anaerobic digestion of waste, producing gas for heating and cooling applications and re-capturing its own CO<sub>2</sub> component for fertilizing greenhouses and algae farms. It is through schemes like this that we can dramatically reduce emissions, and confront and defeat the prospect of dramatic increases in the global temperature.

Naturally, this requires swift action and a global consensus on the definition of aims and methods: such an agreement should be based on fair and equitable burden-sharing leading to what is often called “climate justice”. A global consensus requires a wider acknowledgement of the interdependence of all countries, because a unilateral approach simply will not work.

## **Europe, Climate Change and International Relations**

Where should we begin? With Europe’s role in international relations. This has to change dramatically. We need new tools for a multi-polar world including a reformed United Nations organisation with a more democratic Security Council, where discussions on climate change and energy would involve all stakeholders, including the more vulnerable ones. The roles of the World Trade Organisation, the World Bank and the International Monetary Fund should also be redefined, considering that the liberalisation of the market is not an aim per se but a way of gathering as many countries as possible in a strong, peaceful and cooperative system; and tackling climate change is a key factor in achieving that aim. Equally, Europe must not countenance the denial of progress to developing countries: neither the EU nor any other force from the developed world should limit the right of Chinese, Indian or Brazilian people to a better life.

## **Conclusion**

Ultimately, we must all be prepared to change our way of life, to consume less and to perform the alchemical transformation pursued since the dawn of material exploitation: from gold digging to the knowledge-based society. Global warming is just the outrider for further planetary challenges to come - think about food, water or technological materials. This is an age of change: we are suspended between peace and war. We have to learn how to manage scarce resources and preserve the rights of every human being to a decent future. If we do not succeed by those peaceful means, wars will decide on the allocation of vital resources.

**Graham Watson MEP**

Alliance of Liberals and Democrats for Europe

Sustainable, Affordable and Secure:  
Our Possible Energy Future



## **Graham Watson MEP**

Graham Watson was born in March 1956 in Rothesay, Scotland, the son of a Royal Naval officer and a teacher. He was educated at the City of Bath Boys' School and at Heriot Watt University, Edinburgh, where he gained an Honours degree in Modern Languages.

From 1983 to 1987 he served as Head of the Private Office of the Rt. Hon Sir David Steel MP, the then Leader of the Liberal Party in the UK. Before entering Parliament, Graham Watson worked for the Hong Kong and Shanghai Banking.

Graham Watson was the first British Liberal Democrat to be elected to the European Parliament, From 1994 to 1999 he was a member of the Committee for Economic and Monetary Affairs and Industrial Policy and of the Budgets Committee. From July 1999 to 2002 he served as Chairman of the Committee on Citizens' Freedoms and Rights, Justice and Home Affairs.

On 15 January 2002 Graham Watson was elected Leader of European Liberal, Democratic and Reform Group in the European Parliament. After the European Elections in 2004, Graham was re-elected as President of the newly formed Alliance of Liberals and Democrats for Europe. He represents the South-West of England and Gibraltar.

# **Sustainable, Affordable and Secure: Our Possible Energy Future**

## **Introduction: No change, no chance**

The threat posed by climate change has captured the public imagination in a way that few other contemporary phenomena have managed. James Lovelock's Gaia Hypothesis, devised in the 1960s was a key stage in the development of green thought, but for decades to come, environmentalism would still be regarded by many as a fringe concern for academics. Today, however, climate change is at the epicentre of public discourse, proven beyond reasonable doubt by a wide array of reliable studies by some of the world's most respected scientists. Governments at local, national and international level are competing with one another to be seen as eco-friendly, and the business sector is also spending ever larger amounts of money on green themed schemes and campaigns. Sound and noise are, however, no substitute for action, and the reality is that leading figures in the worlds of politics and business are all too often deploying green rhetoric as a means to satisfy public anxiety, without taking the tangible steps that would certainly cut carbon emissions.

For example, Austria's government signed up to the Kyoto Protocol which obliges it to cut its greenhouse gas emissions by 13% from their 1990 levels by the year 2012. However, last year Austria's Federal Environmental Protection Bureau confirmed that in 2006 emissions had actually grown by 15.1% from their 1990 starting point, almost certainly making Austria's Kyoto target unreachable. Meanwhile, on the corporate front, one major energy company launched an advertisement in 2008 extolling the virtues of its investment in alternative and renewable sources as essential for the energy mix of the future, but made no allusion to the fact that the company remains primarily focused on its carbon-intensive petrochemical interests, at the end of a record year for profits. It seems that a shock on the scale of the 9/11 attacks on New York and Washington can move some national governments to fight multiple wars in the quest for security, including a conflict in Iraq that Joseph Stiglitz has estimated at a cost of up to three trillion dollars. Yet without an image as terrifying or iconic as the collapse of the twin towers, those same governments have not invested the equivalent amount of capital in tackling climate change, which poses just as great a threat to human security as terrorism.

This is not to say that no progress is being made. Just weeks before this pamphlet went to print, the European Union agreed terms for a 20% cut in greenhouse gas emissions by the year 2020. That is a welcome development, and comprises the biggest single international agreement yet reached. But it is not nearly enough. A 20% cut in EU emissions will not avert the infamous “tipping point” of a 2°C rise in global temperatures which will wreak irreversible damage on the world climate system. When the international community sits around the negotiating table at the UN Climate Change Conference in Copenhagen later this year, its members must show courage by striking a deal that will deliver deep and significant cuts in emissions at the global level. This will require nation states to put a long-term vision of green, sustainable growth ahead of the fast and easy growth that has fuelled a continued and rapid rise in carbon emission levels over recent years. Major polluting nations, including China, India and the United States - all of which refused to sign the Kyoto Protocol - must set aside the climate change game theory which has been used as an excuse for inaction up to this point. They must lead the way in imposing strict but fair emission reduction targets on the public and private sectors alike, complete with effective enforcement mechanisms, and they must be upfront about the modest short-term reduction in GDP growth that will entail. This makes long-term economic sense. The 2006 Stern Review concluded that by spending an additional one per cent of world annual GDP on tackling climate change now, governments can head off a loss of up to a fifth of global GDP by the year 2050. Further prominent studies have also shown that failure to grasp the challenge of mitigation and adaptation at this point will lead to a significant net loss of money in the future.

### **Phasing out Fossil Fuels**

Meeting ambitious emission reduction targets will require new and innovative thinking: a green revolution for the twenty first century. Increased energy efficiency, carbon capture and storage, and new methods of industrial and agricultural production will all form part of the flow of ideas. But it is impossible to imagine a meaningful cut in carbon emissions without vastly reducing our dependence on their key source: fossil fuel consumption. We need energy production that is sustainable, but we need it to be affordable and secure too. As time goes by fossil fuels are proving progressively less able to meet any one of these three criteria.

By contrast, renewable energy sources are becoming ever more attractive. That is why the European Union has committed to generating 20% of its electricity supply from renewable sources by the year 2020. However, the “20-20-20” target is conservative: by examining the relative merits of fossil fuels versus renewables we can see that the case for an energy mix based predominantly on renewables is not only in our interests, but also within our reach.

## **A Sustainable Alternative**

The US Energy Information Administration has estimated that 86% of primary energy production in the world comes from burning fossil fuels. This process produces around 21.3 billion tons of carbon dioxide each year, while the earth's natural capacity to absorb CO<sub>2</sub> is estimated at around half of that level. It is therefore unsurprising that the IPCC has spoken of the "virtual certainty" that fossil fuel consumption is driving climate change. Fossil fuel consumption also releases other air pollutants including nitrogen oxides, sulphur dioxide, volatile organic compounds and heavy metals, and the rate of global emissions has increased eight-fold since the end of the Second World War. Further growth in the world economy, particularly in emerging economies, means that fossil fuel consumption is set to grow and carbon emission levels will soar yet further.

By contrast, renewable energy sources have a carbon footprint of near zero. By harnessing sources including biomass, solar, wind, tidal and geothermal power, we can generate an infinite supply of power that neither depletes the earth's resources nor produces significant quantities of harmful by-products. In many instances this can involve a direct substitution of fossil-fuel generated power for renewable electricity. In other instances, the direct substitution of conventional power for green energy is not yet possible. However, by pushing forward the boundaries of science, the potential for renewables grows ever greater. The race is on, for example, to develop affordable and reliable cars that run on battery power or second or third generation biofuels, and in December 2008 Air New Zealand conducted a two hour aircraft flight, powered in part by vegetable oil. It is up to governments to take a lead by investing in renewables and incentivising and rewarding green innovations, in order to maximise and speed up the switch to green power.

## **An Affordable Alternative**

One of the commercial attractions of fossil fuel has been its relative cost, but 2008 may well be remembered as the year that awakened the world to a harsh reality: cheap oil, coal and gas are set to become a thing of the past. Last summer gas prices shot up, the cost of coal reached \$150 per short ton and oil prices hit a record high of \$147 dollars a barrel, providing a flash of our inevitable future if demand for fossil fuels continues to grow. As finite resources with points of peak production, the long-term trajectory for these energy sources is upwards in accordance with the basic laws of supply and demand. Many experts predict oil prices in excess of \$200 a barrel within a matter of years. As the global economy expands, and demand increases, consumers will be faced with ever higher costs not just for oil products, but also for any goods that require transportation, including food, leading to increased inflationary pressure as the world witnessed in the past twelve months. Higher prices also make further fossil fuel production more profitable, leading to more carbon-

emitting exploration, and the consumption of yet more carbon-emitting resources. What has evolved is a tragic irony in which current GDP growth pushes up energy costs for consumers and cranks up the pressure on the global ecosystem.

Global recession led to a substantial climb down in energy prices in the latter half of 2008, but those who are tempted to take comfort from this should think again. The reduced costs will last only as long as the economic downturn - hardly something to wish for - and the scale of the price cuts, particularly in the case of oil, also highlight the dysfunctional nature of the energy market. After its summer 2008 hiatus the oil price plunged to less than \$40 a barrel by the winter. In July OPEC came under pressure from world leaders to increase production in order to cut costs; in December it cut production by record levels in an attempt to keep the price up and avert crisis in the industry. It is plainly absurd that the prospect of a short-term global GDP contraction of 1%, 2% or even 3% should lead to a 73% drop in the value of oil. Industry requires certainty and predictability in order to prosper, but the fundamentals of the market are obscured by uncertainty - the point of peak oil, how much has been withdrawn, how much is left, how much companies and governments have squirreled away - which allows speculators to move in, and prices to show excessive volatility.

The cost of renewables is a very different story. As the price of fossil fuels rises, the relative cost of renewable sources naturally falls. But charges for green energy are already falling fast in real time too. Technological innovation and larger scale production are both pushing down the costs associated with renewable energy, a trend that will continue as demand grows. Ausra, the Australian-American solar thermal company says that it can produce electricity for \$0.08 per kilowatt hour (KWh), which is on par with wind and tidal power and, crucially, gas fired power stations. Although coal-fired power stations remain cheaper at around \$0.05 per KWh, they will almost certainly become more expensive over time, as opposed to solar thermal power which the US Department of Energy has suggested could become as cheap as \$0.03 per KWh by 2023.

It is true that standard photovoltaic solar power from conventional solar panels remains more expensive at \$0.20 respectively, but its price is also falling fast towards grid parity. Solar PV also provides an excellent example of the way in which government and industry can work to make the immediate take up of renewable electricity supplies more attractive to consumers. Increases in the German feed-in tariff for PV - which guarantees a good price over twenty years for solar energy fed into the grid - has led to a massive expansion in solar manufacturing: by 2006 55% of the global PV panel surface was located in Germany alone.

By investing in renewable infrastructure, and providing immediate financial incentives to make the switch to green energy, it is possible to reduce renewable supply costs in the medium and long-term, leading to significant savings for consumers with a properly functioning renewables market.

### **A Secure Alternative**

As demand for energy has risen and domestic supplies have proven inadequate, many domestic energy markets have become dangerously reliant on a small number of fossil fuel providers, and Europe provides a prime example.

In the 1970s European consumers suffered as OPEC deployed oil production as a political weapon against the west. Three decades later, and Russia's status as a key exporter of gas to Europe (Western Europe alone gets 25% of its total supply from Russia) has left many Europeans at the mercy of Russian decision-making, with knock-on implications for costs. Since 2004 Russia and Ukraine have disagreed over the appropriate price for gas and transit fees from the former to the latter, and Russia's monopoly provider, Gazprom, frequently threatens to cut supplies. When it did so in January 2006, and again in January 2009, there was deep suspicion that Russia's decision was as much to do with influencing Ukrainian internal politics as it was with settling a cost dispute with Kiev. Other European countries experienced secondary problems with supply (from Ukraine) and a rise in prices as a result of the 2006 cut in gas supply: the full implications of the 2009 action are yet to be played out.

Russia is also now advocating an equivalent of OPEC among major gas-producing nations - which, as the world's number one gas exporter, it would certainly seek to dominate - that would threaten further to distort world gas markets, and increase the political leverage of suppliers. Russia also possesses the second largest reserves of coal, which would give it even greater coal exporting power than it possesses today. Given Russia's disproportionate use of force in its 2008 war with Georgia, its unilateral decision to recognise the independence of Abkhazia and South Ossetia, and its use of cyber-attack tactics to intimidate other near neighbours it can hardly be seen as a reliable partner (nor indeed is Iran, another of Europe's possible major gas suppliers).

Europe's response so far has been confused. The Nord Stream gas pipeline is intended to connect Russian gas directly to Germany, by-passing the Ukrainian problem, while the proposed Nabucco pipeline would ultimately connect supplies from Iran, Iraq and Turkmenistan to Austria, via Turkey, by-passing the Russian problem. Meanwhile, the EU's updated energy strategy (published in late 2008) advocated diversifying gas dependence away from Russia. This will be difficult in the case of oil and will serve only to give greater impetus to reviving the coal mining industry in Western Europe: and coal is the most carbon-emitting of all fossil fuels. This approach will be costly - in terms of investment - and environmentally damaging.

Renewable sources offer a way out from this complex and dangerous dilemma of energy monopoly and reliance. Several studies, including two submitted to the German government by the German Aerospace Centre, the DLR, have shown that by harnessing the climatic conditions specific to countries and regions, it is technically possible to power the world's economy largely from renewable sources within two decades while also moving towards national and regional energy self-reliance. On a continental scale, again Europe provides an example of how this could happen. Sun-rich countries in the Mediterranean are well placed to increase their solar PV panel capacity and, when complemented by large desert expanses, to expand their provision of solar thermal power stations too. This is already happening, including the recent construction of the world's biggest solar tower plant - the PS20 - in Seville, Spain, where more than 1000 mirrors will reflect sunlight to superheat water at a central tower. The PS20 will generate 20 MW of electricity, enough to power 11,000 homes, and will generate electricity even at night by means of storing heat.

Islands like the British Isles and countries with substantial coastlines are well-placed to increase their provision for tidal power generation, and Britain along with other mountainous nations should also expand their wind farm developments to take full advantage of that resource. Inconsistency from some renewable sources like wind and solar PV could be underpinned through integrating them with energy storage systems like hydro dams: if additional storage capacity is required, the water could be pumped from a lower reservoir to a higher one, or seawater pumped into reservoirs on coastal hills, and then run downhill again through a turbine when energy is needed.

In combination with biomass, geothermal power, microgeneration, and other renewable sources, a revolution in power generation has the potential to make energy dependence a thing of the past for Europe, and other regions of the world - but only if their countries are able to pool their renewable power in order that its supply is consistent and reliable.

## **Conclusion: the European Supergrid - Europe's Possible Energy Future**

And that is precisely the idea that lies behind the proposal for a "European Supergrid".

This Supergrid would bring together the potent mix of renewable power from across Europe - and North Africa, and the Middle East too - and feed it into a new grid, supplying the region with power through high voltage direct current (HVDC) transmission lines. HVDC lines already connect the British and French national grids (as well as some other European countries), work well under water, and lose much less electricity in transit than traditional Alternating Current (AC power lines). HVDC efficiency will make it easier to connect remote power generators to the grid, and should offset the cost of the static inverters needed to convert AC to DC, and back again, as the Supergrid will require.

The authors of the German DLR study estimate that the Supergrid would save the region \$250 billion on its collective energy bill by 2050. Moreover, that calculation is based on the conservative estimate of a base price of \$25 a barrel of oil and \$49 a ton of coal, with an annual increment of just 1%. The savings could be much higher.

By sharing the burden of energy generation, and buying into a joint supply of green energy, Supergrid states become mutually reliant on their power supply. For Europe, that would mean a break with disproportionate reliance on Russia and, ultimately, cutting dependence on Middle Eastern oil too. Equivalent supergrids in Africa, the Americas or Asia could achieve the same thing if the political will and economic resources can be found to invest in them upfront.

The EU's 2008 energy policy update follows the logic of reducing external dependence, and increasing intra-European energy cooperation, but it does not go as far as fully endorsing the idea of a European Supergrid stretching from Scandinavia to North Africa. That is deeply unfortunate and not for the want of trying on the part of MEPs. In July 2008, twenty five Members of the European Parliament, including myself, wrote a joint letter to EU Commission President Barroso and to the then President of the European Council, Nicolas Sarkozy, asking them to consider this plan. There is still time to act, but time is running out. A European Supergrid is the most convincing idea on the table to ensure an energy supply for Europe that is sustainable, affordable and secure: European leaders must ask themselves if that is a chance that they can afford to pass up.

