

GLOBAL WARMING: SECOND THOUGHTS OF AN ENVIRONMENTALIST

Professor Fritz Vahrenholt

The Global Warming Policy Foundation

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Global Warming: Second Thoughts Of An Environmentalist

Professor Fritz Vahrenholt

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Fritz Vahrenholt is one of the fathers of Germany's environmental movement. He studied chemistry and started his professional career in the 1970s at Germany's Federal Environmental Protection Agency in Berlin and the Ministry for the Environment in the state of Hesse and was Minister for the Environment in the state of Hamburg until 1998. In 2001, he founded the wind energy company REpower and is now director of RWE's renewable energy division Innogy, one of Europe's largest renewable energy companies. His book, *The Cold Sun: Why the climate catastrophe will not happen,* was published earlier this year in German.

Welcome Address

Dr Benny Peiser

Director of the Global Warming Policy Foundation

Dear Professor Vahrenholt,

Distinguished Guests,

Excellencies, Ladies and Gentlemen,

As the Director of the Global Warming Policy Foundation, it is my great pleasure to welcome you tonight to the 3rd Annual GWPF Lecture.

It is my particular honour to welcome Professor Vahrenholt, who has travelled here from the Ruhrgebiet, one of the industrial heartlands of Germany.

In recent months, Fritz Vahrenholt has made headlines around the world because of his brilliant new book: *Die Kalte Sonne* (The Cold Sun). The subtitle of his German bestseller gives away much of the gist of his GWPF lecture: *Why the climate catastrophe will not occur*.

Admittedly, most people in the English-speaking world have never heard of Fritz Vahrenholt. But for most Germans, he has been a public figure since the late 1970s.

In the summer of 1976, a spectacular chemical accident at a chemical factory in Seveso near Milan became one of the founding events for Europe's environmental movement. Shortly afterwards, in 1978, Vahrenholt, who is a chemical scientist by training, wrote his first bestseller: Seveso ist ueberall: Die tödlichen Risiken der Chemie (Seveso is everywhere: The deadly risks of chemistry) which made him one of the key protagonists of Germany's fledgling green movement.

No other chemical disaster has burned itself into Germany's collective memory. The industrial accident, and Vahrenholt's book, ensured that Seveso has become synonymous for German's chemical angst, a fear that the dangers of chemical plants are great.

In 1990, his party, the center-left Social Democratic Party (SPD), chose Dr Vahrenholt as environment senator in the city-state of Hamburg. In 2001, he founded the wind energy company REpower and later he became the director of RWE's renewable energy division Innogy, one of Europe's largest renewable energy companies.

Later this year, Vahrenholt will step down as CEO of RWE Innogy (he will remain on its Supervisory Board) and will become president of the German Wildlife Foundation.

Until fairly recently, Fritz Vahrenholt was a supporter of the IPCC and the conventional CO2-paradigm. In 2010, Vahrenholt was invited to review a special IPCC report on renewable energy. He noted many errors and then discovered that a Greenpeace member had edited a main part of the report's summary. He started wondering how other IPCC reports were produced and how reliable the whole process actually was. As the saying goes, the rest is history.

Vahrenholt is, of course, not the only prominent Social Democrat who has become more critical of the IPCC and its pronouncements in recent years. Former Chancellor Helmut Schmidt, Germany's most respected elder statesman, and a fellow Social Democrat, has also cast serious doubt on the integrity of the IPCC. He has called the fear about global warming "hysterically overheated, especially by the media."

Neither Helmut Schmidt nor Fritz Vahrenholt question the basic science of the greenhouse effect. What both of them

share is a deep concern for scientific credibility, moderation and objectivity that has been woefully lacking in the climate debate for far too long.

Ladies and Gentlemen, please join me in welcoming our distinguished speaker, Professor Fritz Vahrenholt!

Global Warming: Second Thoughts Of An Environmentalist

Professor Fritz Vahrenholt

I thank you, Lord Lawson, and the Royal Society for the opportunity to talk to this august audience.

Until the publication of my book The Cold Sun: Why the climate catastrophe will not occur, I was hailed in the media and in the German public as one of the fathers of the environmental movement in Germany. Now I have mutated into a controversial scientist, because I questioned the thought structure of the IPCC.

And in fact, I had taken, as senator for the environment, as CEO of Deutsche Shell and the founder of one of the most successful wind energy companies, REpower, the theses of the IPCC at face value.

What prompted me to reconsider my position?

I was appointed as CEO of RWE Innogy in 2008, a newly formed subsidiary of the RWE Group for Renewable Energies. We invested over one billion Euros per year in renewable energies, mostly in on- and offshore wind turbines in the UK, Germany and the rest of Europe. But to our surprise, the results left lots to be desired - the wind in Northern Europe in 2009, 2010 and 2011 was 10-30 percent below our expectations (Slide 2).

We had to get to the bottom of the matter. Was this already the beginning of global climate change?

A look in the bible of climate alarm, the IPCC report, did not help us because there it was written that winds should increase in northern latitudes.

Together with some meteorologists, we found the cause: There was a correlation between solar cycles, cold winters and European wind conditions. The west winds, which are significant for Europe, are controlled by the air pressure difference between Greenland and the Azores, the so-called North Atlantic Oscillation (NAO). As Figure 1 shows, there is a 60-year cycle of the NAO, which correlates very well with the wind energy yield in northern Europe. A positive NAO leads to an increase in westerly winds; with a negative NAO, the westerlies are pushed to the south and winters will be cold with a lack of wind. And in fact, we could show that the wind energy yield in Spain and Southern Europe behaved inversely to the north. Michael Lockwood has shown that there is a statistically reliable correlation between solar activity, the NAO and British winters. In the IPCC reports, I found, however, that the numerical mathematical models were not able to reproduce the cyclical nature of the NAO. The IPCC models for the NAO revealed nothing more than a straight line for decades. But how can models, which failed in the past, predict the future accurately?



And then I found another surprise. According to the IPCC climate models, there should be an increase in global temperature of 0.2 degrees Celsius per decade. But if you look at the data series of satellite-based temperature measurements and the data from the British Hadley Centre (HadCRUT), you find that since 1998 there has been no warming; the temperature has remained at a plateau. (Figure 2)



World leaders met in Copenhagen, and not a single scientist told them and the public: our models do not reflect the actual temperature development. Momentous, billion-dollar programs and financial transfers are agreed upon, and no one made this fact public? We know how mainstream climate scientists would answer this question: 15 years is not a climate signal, it must happen for 30 years. But there must be an explanation for the unexpected absence of warming! We have an explanation. It is the exclusion of solar activity and decadal oscillations, which lead the climate models to give erroneous results. More about that later.

There is no doubt that the global temperature has increased by 0.8 degrees Celsius over the past 150 years.

I want to point out that this development moves upwards in 60-year cycles. There have been cooling and warming phases. By the way, the last cooling phase in the 1960s and 1970s caused many warnings of a new ice age. The older among you will recall that newspapers and journals warned of a cooling of the Earth which would threaten mankind.

In fact, an air component has increased in parallel to the

warming: the concentration of carbon dioxide (CO2) has increased from 0.028% to 0.039%, or, to make it sound more alarming, from 280 parts per million (ppm) to 390 ppm.

But at the same time another parameter has also increased as much: solar activity (Figure 3).



In the second half of the last century, the magnetic field of the sun - a measure of solar activity - has increased to a strength not seen for hundreds of years. You can see the weak solar activity at the time of the Little Ice Age from 1650 to 1750 (Maunder Minimum) and of the Dalton Minimum around 1810 in the graph.

We know that CO2 can absorb infra-red radiation, leading to warming. On the other hand, who would deny that the sun, which provides 99.98% of the energy budget of the earth, affects the climate, too? This raises the question of how much does CO2 and other greenhouse gases contribute to the warming of the past 150 years and what contribution does the sun make?

For the IPCC, the matter is clear: as diagramm 2.4 on page 39 of the Synthesis Report of Fourth Assessme shows, CO2 and other greenhouse gases are responsible for 95% of the warming and the sun only for 5%.

How does the IPCC arrive at such a judgment? As the following chart (Figure 5) shows, the sensitivity of CO2 - the ability to warm the earth by x degrees Celsius for a doubling of CO2 concentration – has been estimated quite differently, ranging from 1 to 10. Interestingly, physically CO2 alone has only a sensitivity of 1.1 degrees Celsius.



Only if the amplifier effects caused by an increase of water vapour in the atmosphere are taken into account do you get to higher values, although the complex relationship between increased water vapour and (cooling) cloud formation is not yet well understood and also cannot be reproduced in climate models. But IPCC cares little about that and puts the climate sensitivity of CO2 at an average of 3, which means the temperature of the earth's atmosphere should rise by 3 degrees Celsius when the CO2 concentration doubles.

But as one can easily see from Figure 6, there was only one period in the past 60 years, from 1977 to 1998 (only 20 years), in which the temperature developed parallel to the continuous increase of CO2.



In light of this large uncertainty, how did the IPCC succeed in blaming primarily CO2 for the warming and ignore the sun's contribution to the climate?

In the third IPCC report, the hockey stick by Michael Mann (Figure 7) appeared as a central line of argument.



How often has this hockey stick been used as proof for the anthropogenic causes of climate change in recent years! Al Gore used the hockey stick in his infamous film *The Inconvenient Truth*. Thousands of copies of this film were bought by the German Environment Minister to be shown to school children. Countless school children have been dragged into cinemas to watch this film. And even I fell for this hockey stick.

We now know, thanks to Steve McIntyre and Ross McKitrick, that the statistical methods used by Michael Mann were flawed, and that many of the used tree-ring data were

questionable.

The hockey stick had only one goal: to show that the temperature was flat - as the handle of a hockey stick - for centuries and only rose steeply because of the CO2 emissions of the industrial age.

We all should have been more sceptical. Where in the hockey stick was the Little Ice Age of the 16th to 18th centuries, when it was bitterly cold in Europe and the successors of the Swedish king, Gustav Adolf, could carry out their conquests by marching on foot across the frozen Baltic Sea to Denmark because the Baltic Sea was frozen over in winter for decades? It was bitterly cold in Europe, famines dominated Europe, and on the frozen Thames winter fairs took place. The Breughelschen pictures of Dutch winters are evidence of this. We know today that it must have been as much as 2 degrees Celsius colder than currently.

And where in the hockey stick graph was the Medieval Warm Period, when Erik the Red settled Greenland, where agriculture was possible, and for 100 years a high culture developed? Recently, the retreating glaciers have released the remains of the bishop's see of that time. And Norwegian scientists told me that recently drinking water wells from that period have been found which are frozen in the lower part. It must therefore have been warmer in Greenland 1,000 years ago than today. As a climate scientist so (in)famously wrote in an e-mail: "We have to get rid of the Medieval Warm Period". Only in this way, could one create the impression that CO2 alone influenced the climate during the last 150 years. Before that, it was claimed, there were obviously no significant temperature fluctuations and the influence of the sun was reduced to zero.

But 10 years after the fateful hockey stick publication, from which the IPCC and many climate scientists have still not distanced themselves clearly and publicly, there are actual temperature reconstructions, as you can see in Figure 8 of Ljungqvist (2010).



I have contrasted these temperature reconstructions with the reconstruction of solar activity (Steinhilber 2009). Two things are noteworthy. Every time when solar activity was low, there were periods of cold weather; whenever the sun was strong (like in the current warm period, the Roman Warm Period and the Medieval Warm Period), there were warm periods. Secondly, there is obviously a 1,000-year cycle with alternating hot and cold periods.

Gerard Bond could trace back these 1000-year cycles for 10,000 years during the Holocene from a core sampled from the Atlantic (Figure 9). You can see the parallelism of temperature and solar activity as measured by the Carbon14 activity of the core.



How did the climate establishment react to Bond's discovery from the year 2001 (the same year in which the hockey stick was published in the Third IPCC report)? Stefan Rahmstorf, a German climate scientist, spoke for many scientists and the IPCC when he declared it were a local peculiarity, and the Little Ice Age was only a European phenomenon.

There are now dozens of scientific publications that show the pattern of the 1,000-year cycles are found in all continents; we see the Medieval Warm Period and the cooling of the Little Ice Age in Tibetan mountains, in Australian swamps, in stalagmites in Oman, in Chile, in Germany, in many places of the earth (Figure 10). At that time there were no man-made CO2 emissions, so who or what could produce such global changes? It's the sun, stupid.



I have picked an example from China (Liu et al., Figure 11). You can see the Little Ice Age and the Medieval Warm Period. But the Chinese scientists also risk a forecast; they predict that the temperature will fall slightly this century.



But how does the sun influence the climate? The activity of the sun varies in cycles. (Figure 12)



We are in the 24th Cycle, which develops as the weakest 11-year cycle for 100 years. One of the main arguments of the IPCC climatologists against the role of the sun is that the total radiation of the sun (Total Solar Irradiance, TSI) only varies by about 0.1% during the 11-year cycles. (Figure 13)



This is true, but if we look closer we see solar influences which fluctuate more. Thus, the UV radiation varies by up to 70%. We know that UV light influences very strongly the stratosphere and ozone formation. The sun's magnetic field varies greatly. We can show this by the strength of the penetration of cosmic rays. A strong solar magnetic field shields the earth from the cosmic rays while, with a weak solar magnetic field, the cosmic rays can penetrate more abundantly into the atmosphere. Cosmic rays can vary by 10 to 15% during a solar cycle. Even the earth's magnetic field, which is also influenced by the solar



magnetic field, varies more than the TSI. (Figure 14)

There is considerable need for more research about the way in which the sun amplifies its effect on the earth's atmosphere. A theoretical approach by the Danish scientist Svensmark assumes that cosmic rays, which enter the atmosphere more forcefully in low solar magnetic field, may form aerosol particles, which can lead to increased cloud formation. (Figure 15)



The European research centre CERN in Geneva is currently investigating this approach and has demonstrated in the first part of the investigations that cosmic rays may form small aerosol particles. Whether these particles can clump together to form larger particles and then lead to increased cloud formation will be studied in a second step. It is instructive, after all, that the intensity of cosmic rays has declined during the course of the 20th Century and is now increasing again since the turn of the century (Figure 16, next page). In certain latitudes, there has been a correlation between clouds and cosmic rays in the past.



Besides the sun, there is a second factor, which the IPCC does not consider sufficiently. The 60-year cycle of the North Atlantic Oscillation (NAO), which I have described above, is also present in other oceans. There is a 60-year cycle that alternates between hot and cold periods in the Atlantic (Atlantic Multidecadal Oscillation) and in the Pacific (Pacific Decadal Oscillation). (Figure 17, next page)



We see (Figure 18) that the cooling phase of the earth in the last century always took place during a cold phase of the PDO while the phases of rapid temperature increased occurred during periods of positive PDO.



These 60-year cycles have no relevance for the IPCC in its projections. Quite the contrary; this slide (Figure 19, next

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page), taken from the last IPCC report, should suggest that the temperature increase seen over the century was 0.05 degrees Celsius (green line) and then increased more and more to never-seen increase of 0.18 degrees Celsius (yellow line). How confusing! Sebastian Lüning and I have inserted two red dashed lines showing a similar increase into the graph of the IPCC. The "unprecedented warming" from 1977 to 1998 occurred from 1860 to 1880 and from 1910 to 1940; coinciding always with the ascending period of the PDO, whose sinusoidal oscillation is easily recognizable in the temperature chart.



And here lies the critical mistake of the IPCC. As Figure 20 (next page) shows, the temperature curve oscillates by a rising trend of about 0.5 degrees per century. This warming trend has two causes: the recovery of the temperature due to the end of the Little Ice Age and the transition to the Modern Warm Period (Eddy solar cycle) and, secondly, the contribution of the CO2. The IPCC, however, makes the error to simply continue the warming of the period from 1977 to 1998. It then arrives at the catastrophic forecasts of temperature increases between 2 and 4.5 degrees Celsius by the year 2100. But if we perpetuate

the trend and take into account the cyclical nature of temperature, we arrive at a warming of no more than 1 degree Celsius in this century. Our conclusion is therefore: the climate catastrophe will not occur. We will have even a slight cooling for the next few decades because the decadal oscillations have turned to their cold phases and the sun has started a weaker activity phase.



Such a development has implications for energy policy.

The sun gives us time to transform the energy supply with common sense and good judgment. We do not have to follow a perilous policy so that we can stop using fossil fuels in two to three decades. It is wise to use energy more efficiently and,, with less CO2 emissions, it is wise to make renewable energy more competitive and to expand them. It is necessary to reduce import dependency and it is certainly necessary to develop new technologies, from shale gas to fusion research.

No country in the world will follow Germany's phase-out of coal, oil and gas.

Figure 21 (next page) shows the chances of a global

agreement to limit CO2 emissions. Only the European Union, Australia and New Zealand are ready for such a binding agreement. These countries represent 14.3% of global CO2 emissions. China, India, USA, Russia, Japan, Canada and the rest of the world do not follow the EU. China is now responsible for 25% (27% in 2011) of worldwide CO2 emissions. Even per capita, China, with 6.8 tons (7.2 t in 2011) of CO2 per capita, has surpassed France and will soon surpass England, then Germany and, at the end of this decade, the United States, whose emissions have decreased significantly due to heavy use of shale gas. You see the same picture in the future development of CO2 emissions (Figure 22, next page). Take the example of Germany. With greatest financial efforts we will be able to reduce the emissions in Germany by 30-35% by 2030. This corresponds to the growth of CO2 emissions in China in three months.



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Let us explore the opportunities and risks of Germany's energy policy.

The federal government has set itself the goal of reducing CO2 emissions from electricity generation by 80% by 2050. The share of renewable energies should therefore grow from 20% today to 80%. How can this be achieved?

As you can see in Figure 23 in order to achieve the goal, about 20% of electricity consumption should be saved. Is that realistic?



Electricity is a modernization of energy. To conserve energy and reduce CO2 emissions you need electricity. This applied, for example, to the replacement of coal by electricity-based processes in steel or copper production. This applies to the saving of heat energy by heat pumps; it applies to the electric car. Or think of the rise of communication technologies. Already, 10% of electricity consumption by private households is needed for internet use, mobile phones and ipads; and this percentage is rising. In addition, an aging society needs more electricity to meet the comfort and safety needs of older people. I have just had an electrically operated garage door and a security system installed in my house. My neighbour is a sprightly pensioner, who purchased an electrically powered bicycle. 20% savings in electricity consumption - this is very ambitious.

In the next step, the federal government wants to import 25% of the electricity by 2050. Germany already imports 95% of oil, 85% of natural gas, and now even electricity. We will make ourselves dependent on our neighbours. We phase out nuclear power plants in Germany and import nuclear power from the Czech Republic and France, on whose security philosophy we have no control over.

In this wonderful way, we will have lost almost 50% of German electricity by 2050. Is that wise? Soon a Russian nuclear power plant will start producing electricity in Kaliningrad. Do we seriously believe we could block the flow of electricity from Kaliningrad on the border?

What is completely overlooked, however, is the structure of the German electricity demand. 75% of electricity goes to industry and business. Only 25% of electricity is used by households. How can you reduce half of the commercially-used electricity, when companies have operated as energy-efficiently as possible for many years due to cost reasons, in a country whose industry contributes by far the largest share to GDP in

Europe?

Let us talk about the cost. Unfortunately, Germany has decided to expand the most expensive technology to meet its own target: photovoltaic (PV) (Figure 24).



The market price for electricity in Germany is 5-6 €cents/kWh. On-shore wind energy costs about 6-9 €cents/kWh, PV has made significant progress, but still costs18-20 €cents/kWh. This rate is guaranteed by law for the photovoltaic owner for 20 years and has priority over conventionally generated electricity. The result is remarkable. Germany has now 30,000 MW of PV capacity, almost 50% of world capacity, while Germany has a solar radiation comparable to Alaska. This is very expensive for German electricity customers. They will have to pay 120 billion Euros for this policy decision over the next 20 years. These additional costs are imposed on the electricity price. Together with subsidies for other renewable energy sources, this adds up to 3.5 €cents / kWh today with an increasing trend. In the coming years it is to be feared that this power allocation grows to 5 €cents/kWh - so then the market price for electricity will double. (Figure 25, next page)



But the whole thing also has social consequences. All private households must pay the 5 € cent/kWh subsidy, including the poor who live in apartment buildings and cannot afford a solar roof. It is a wealth transfer from the poor to the rich. A welfare recipient in Berlin pays the rich house owner in Bavaria, who can afford a solar roof, for his investment. 6 billion Euros per year will be transferred from the poor to the rich in this way.

But there are other faults. Onshore wind in Germany has 2,000 full load hours, offshore wind has 3,500 hours and PV 800 hours. We need backup capacity because the year has 8,750 hours. Wind and sun do not always produce electricity when their power is needed. In Figure 26 you can see an example from January this year.



The brown curve shows the power consumption, which varies between 20,000-50,000 MW during this period. Now let us look at the blue line, wind electricity, which was rising in that week from 7,000 to over 20,000. What happens to the price? Whenever renewable electricity, which is not traded at the electricity market, almost completely satisfies the demand, the electricity price drops steeply. We will then have too much power and we turn off most conventional power plants. The combined heat-power power plants, however, that are supposed to heat the houses, and hydro plants cannot be turned off. We have too much power in the system. So we offer the surplus electricity to our neighbours. But they are only willing to accept the German surplus electricity and to turn off their power plants if electricity prices are negative. This means that we pay the Dutch, the Czechs, the Austrians money to take our surplus power off our hands. The German electricity customers pay 5, 10 or even 50 € ct/kWh for the excess electricity that will be offered to our neighbours. That is hundreds of millions per year. But do not think that the neighbours are very happy about it; they have invested in power plants, which now earn no more money. EU Energy Commissioner Oettinger has received complaints from Poland and the Czech Republic. And the problem gets bigger because the goal of the federal government is to produce 52,000 MW of solar energy by 2020 and 50,000 MW of wind power by 2050.

It is clear that the expansion of renewable energies requires storage capacity so that excess power can be saved and be used when there is no wind and no sunshine (e.g. in winter and at night).

Storage costs extra money. Figure 27 on the next page shows how much.





The method of choice, pumped storage plants, cost some 7 €cents/kWh in addition. A future option is the electrolysis of water into hydrogen and oxygen. Hydrogen can be stored and fed into the gas grid to a limited extent. It costs about 20 to $30 \in \text{cent/kWh}$. The federal government shows great hope in the conversion of hydrogen with CO2 to methane (natural gas). The current cost is more than $70 \notin \text{cent/kWh}$. The reason is that hydrogen and CO2 do not particularly like each other; they only react with each other when one uses considerable energy. I am certain that engineers will be able to push these costs down through innovative techniques, to 50, 30 or 20 € cent/kWh. But for that we need time. 10, 20 or 30 years? How convenient that the sun gives us the time to develop this transformation. In this decade, this is certainly not an option.

That leaves only pumped storage plants to store energy. But how much capacity of pumped storage do we need in the scenario with 80% renewable energy? As Figure 28 shows, Germany needs 230 times the amount of current pumped storage plant capacity to ensure the power supply in case of a 10-day wind lull. And a 10-day wind lull happens in Germany several times a year. So you can imagine how big the problem is: You would need the water volume of Lake Constance (500 square kilometres and 100 meters deep) pumped at the height



To bridge a 10-day period with no wind in 2050, 230

of the Zugspitze (2900 meters) to overcome such a lull.

Of course, an electricity system that relies largely on renewable energy needs more power lines. Wind energy is harvested mainly in the north of the republic, solar energy in the south. But the power must be transported to the consumers, the big cities and the industrial areas. Therefore, five major North-South power lines through Germany are planned to bring volatile electricity to its destination. Not an easy task, since wherever the lines should be built, citizen protests emerge. Nobody likes a high-voltage line near him. Also the possibility to put the cables underground is met with citizens' protest. Because for such a cable a 32 meter wide corridor must be kept open in which neither trees nor ponds are allowed. Because one needs access to the cables for repairs at any time and place. In addition, this method is about 6 times more expensive than an overhead line. How big is this problem? In Figure 29 (next page) you will see that we have built 36 km of high voltage lines per year in Germany in the past. From 2015 onwards, we need to build 720 km of high voltage lines per year to transport the renewable electricity. An ambitious undertaking.



dena - a well known research agency - recommends 4,450 km of new high voltage grids; 214 km have been realised so far

> Since 2005 about 35 km grid per year have been built. In the upcoming 9 years 470 km per year will have to be built.

Ladies and gentlemen! I have decades of experience with renewable energies. I am of the opinion that renewable energies can be developed into an important pillar of future energy supply in Europe. I also believe that we can generate renewable energy at a cost of 10 € cent/kWh in the future. I also believe that we can develop innovative storage technologies. I also believe that we can build a European grid network, which can transport renewable electricity from the locations where they can be produced efficiently - wind mainly in northern Europe and solar power mainly in southern Europe - to the consumers. But for that we need time.

I am worried about the acceptability of renewable energy. For if we add renewable energy capacity too quickly and too much, and the citizens realize that this is associated with prohibitive costs, supply shortages, power cuts and in the end leads to the migration of the electricity-intensive industry with their jobs, it could result in a dramatic loss of acceptance for renewable energies.

Why do we not have more time for this transition?

Because we have a fear-driven energy policy in Europe. The real driver for this energy policy is the fear of climate catastrophe. Only through this fear one can explain that we are importing wheat from other nations, which is turned into bio-ethanol. Only fear can explain that we subsidise ridiculously expensive photovoltaic technology in sun-starved Germany; that we use 20% of agricultural land for biogas and bio-fuel; that we sacrifice in Germany forests to build wind power plants there. The victims of this excessive policy are nature, the poor, industrial energy-intensive jobs and the competitiveness of the German economy.

But I also have some good news:

The cooling sun and the realization that CO2 is a much weaker climate-changing gas than the IPCC wants us to believe, give us time to develop, with sound judgment and reason, a more efficient and less carbon-based energy future in Europe. For this, all energy sources need to contribute: efficient fossil fuels with a higher proportion of natural gas, including shale gas, energy saving, inherently safe nuclear power plants, renewable energy sources and technologies that we will develop in the course of the century. The power of the sun as fusion energy on earth would be one of them.

Thank you for your attention.

Vote of Thanks

Lord Lawson

Chairman of the Global Warming Policy Foundation

Thank you very much Professor Vahrenholt and thank you all for coming. We will all express our gratitude in a few moments in the usual way to Professor Vahrenholt for a fascinating lecture, but I would like to particularly express our gratitude for the fact that he has been speaking in a language that is not his own, on an extremely complex subject, and he has managed to put it across brilliantly. That is quite an achievement! This is, as Benny said, the third of our annual lectures since the Global Warming Policy Foundation was launched. The first time we had a distinguished economist and politician, President Václav Klaus of the Czech Republic. I am glad to say the Czech Ambassador is here tonight and has asked a question. The second time we had a Bishop and Cardinal of the Roman Catholic Church and now we have an eminent scientist. I do not know how we are going to shake the kaleidoscope and get somebody completely different for next year but we will try and do so.

The science of global warming is of course very important. We do not primarily, in the Foundation, focus on the science. We call ourselves the Global Warming Policy Foundation because it is the policy that is our main and overriding focus, and it is the policy of course which affects people directly – whether it is raising energy costs and doing great damage to industry and consumers, particularly poor consumers, or whether it is those building wind farms over our beautiful English countryside and causing an environmental abomination. So, the policies are what impact most directly on people. But of course in deciding policy you have to base yourself on some understanding of what the science is. And therefore it has been particularly valuable that Professor Vahrenholt has spoken not just on what the science is, but on how certain we can be about the science.

To turn people's lives upside down, you need to be pretty certain that the scientific basis is sound. And what Professor Vahrenholt has shown very clearly is two things: first of all that the science is uncertain – the elements can be identified, but what is the relative weight of each of these different elements: it is not obvious, and it makes a huge difference to what it is sensible to do, quite apart from the difficulties that he has pointed to of getting international agreement for the policies that are pursued. He has also shown that the computer models that everything is based on are clearly wrong. They are wrong for two reasons - one is that the climate system, as the Professor has made clear, is so complicated that these computer models cannot possibly capture the climate system, there are huge over-simplifications. The second thing, as he also demonstrated, is that they do not have the capacity to predict. So we cannot rely on those.

Professor Vahrenholt is what a scientist ought to be. He is an old fashioned scientist. Instead of relying on computer models, he actually relies on the evidence. And when new evidence comes, he is prepared to change his mind, which is what he has done; and it has caused him great difficulty. He has been vilified – I am glad to say his book has been a great best seller in Germany – but the vilification he has had to endure for coming out and saying "I have changed my mind" is quite appalling, and intolerance is something which I find extremely distasteful.

At the end of the day, it is only time which is going to tell what is right, and the reason why I would like to go on living for a few more years is to see all this proved wrong, because the longer we go on with the computer models being falsified, the harder it is going to be for the obsessives and the alarmists to have a hearing. But of course we cannot wait that long, because if we are going to pursue wrong policies all that time, it is going to do great damage. So the Foundation does have a very important part to play, and it is not good enough to just sit back and wait for events to prove us right.

Anyhow, thank you very much indeed Professor Vahrenholt, and I hope that it will not be too long before your important book will be published in an English edition, so that the people of this country can read everything you have to say there.

Thank you so much!

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Our main focus is to analyse global warming policies and their economic and other implications. Our aim is to provide the most robust and reliable economic analysis and advice.

Above all we seek to inform the media, politicians and the public, in a newsworthy way, on the subject in general and on the misinformation to which they are all too frequently being subjected at the present time.

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