

# Fossil Fuels as a Financial Risk: The Carbon Bubble



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The Greens | European Free Alliance  
in the European Parliament

## **Fossil Fuels as a Financial Risk: The Carbon Bubble**

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The financial industry is promoting a CO<sub>2</sub> bubble by investing in CO<sub>2</sub>-intensive financial projects without taking climate change mitigation measures into account. Investors are pumping money into fossil fuel businesses because they believe it will be possible to exploit their fossil fuel reserves for financial gain in the future. This is driving up share prices. However, these investments could soon turn out to be fools' gold. If we limit the warming of the atmosphere to 2°, it will simply not be possible to burn most of these reserves. Sooner or later the so-called 'carbon bubble' will burst and the value of the investments will plunge.

Since the end of 2012, I have been studying this climate and finance issue. The very first thing that needs to be done is to study the possible impact of the carbon bubble on the European financial system. The study which the Greens/EFA Group in the European Parliament commissioned from Profundo and the Sustainable Finance Lab accordingly looked at the top 20 European banks, the top 23 European pension funds and the insurance

industry. The study illustrates investments by these undertakings which harm the climate and tests them against a series of energy and climate policy scenarios. The results ought to ring alarm bells. They show that an active climate policy would be the least costly option for investors. This ought to trigger a rethink in financial circles.

The carbon bubble is still a relatively new subject. I should be happy if this little brochure were to help to launch a European debate on the subject and forge worthwhile new alliances between Greens, NGOs, students, financial undertakings and other parties.

Reinhard Bütikofer

*Reinhard Bütikofer*



## Contents

The 2° target: a minimum consensus which represents economic dynamite	3
The carbon bubble: why a dirty energy bubble could burst	5
What has happened to date: an unusual coalition is combating the carbon bubble	7
Our study: what impact will the carbon bubble have on the EU financial system?	9
And what about Germany? Why the biggest Member State is an “invisible elephant”	12

# The 2° target: a minimum consensus which represents economic dynamite

**The world is agreed: the temperature of the atmosphere must not rise by more than 2°C. However, this means that most oil, gas and coal reserves are valueless.**

The international community has committed itself to an unequivocal target: the Earth's atmosphere must not warm by more than 2°C by the end of the century. At the 2010 UN Climate Conference in Cancún, Mexico, representatives of 194 States committed themselves to this target. Even the USA and China, which never signed the Kyoto Protocol, supported the decision, as did all other major greenhouse gas emitters.

The 2° target refers to the rise in temperature relative to the pre-industrial level. However, as the mean temperature has already risen by 0.8° since then, the climate must not warm by more than 1.2° between now and the end of the century. How this can best be achieved is the subject of much controversy. However, there is a large measure of consensus that it must be achieved in order to limit the impact of climate change to a level which humanity can bear. The Intergovernmental Panel on Climate Change (IPCC), where hundreds of international scientists analyse climate change and propose countermeasures, has on a number of occasions stressed the

urgency of consistent measures to keep the Earth on track towards the 2° target.

The 2° target will not be easy to achieve and will only be feasible by determined action from the global community. At the same time, however, climate researchers say that 2° constitutes the borderline not between 'tolerable' and 'dangerous' climate change, but rather between 'dangerous' and 'very dangerous' climate change. Even with a warming of 'only' 2°, Arctic ice sheets will melt, and biotopes and cultural regions will be destroyed. Island states and indigenous peoples in particular, consider the 2° target to be inadequate and are calling for the more stringent target of 1.5° to be adopted. The 2° target is therefore by no means an over-ambitious project dreamed up by environmentalists – it is a consensus that is accepted worldwide as representing the maximum warming that can be allowed if the very worst is to be prevented from happening.

But what does the 2° target mean in concrete terms? How much CO<sub>2</sub> can humanity emit into the atmosphere without jeopardising its attainment? A joint study by the Carbon Tracker Initiative and the London School of Economics has produced a detailed answer: Between now and 2050, only 900 gigatons of CO<sub>2</sub> can be emitted if the 2° target is to be attained with an 80% probability. In the second half of the century, only a further 75 gigatons can be emitted. If more CO<sub>2</sub> is emitted, the probability of remaining

within the 2° limit falls rapidly. With 1075 gigatons by 2050, the probability is only 50%.

Naturally, these values are only estimates. As far as their order of magnitude is concerned, they are largely uncontentious among climate researchers. Their explosiveness only becomes apparent when one compares them with the quantities of CO<sub>2</sub> contained in the oil, gas and coal reserves, which States and big business have secured for themselves. This means all sources which are either already being exploited or have been earmarked for exploitation. If calculated how much CO<sub>2</sub> they contain altogether, we arrive at a figure of 2890 gigatons. This is around three times the maximum

which our climate could bear. There is therefore an alarming disparity between the 2° target adopted by the international community and the action which is being taken by States and businesses.

Essentially what this means is that if all fossil reserves were to be burned, our climate would warm by far more than 2° – with disastrous consequences for humanity and our planet. The alternative is for States to ensure compliance with the 2° target, as agreed at the World Climate Conference in Cancún. That in turn would mean that the bulk of oil, gas and coal reserves cannot be burned, and are therefore worthless to their owners.



# The carbon bubble: why a dirty energy bubble could burst

**When investors realise that a large part of fossil fuel reserves cannot be burned, energy undertakings could lose 40 to 60% of their value on stock exchanges.**

For investors, shares in energy companies have been good business in recent years. Their share prices have risen in an apparently ceaseless manner. But can they continue to do so for ever? The share prices of energy multinationals such as BP, Shell or Statoil are partly based on the size of their oil, gas and coal reserves and on investors' assumptions regarding the price at which these reserves can be sold in due course. But what will happen if many of these reserves prove to be worthless? What impact would this have on share prices?

HSBC, Britain's largest bank, has calculated the answer. It estimates that the principal energy companies could lose between 40 and 60% of their stock exchange value if the 2° target is enforced. A study by business consultants - McKinsey and the Carbon Trust, have yielded a similar finding. It forecasts a possible loss of 30 to 40%. What will cause such massive losses? According to the study by HSBC, BP, for example, would be unable to burn a quarter of its reserves if the 2° target were enforced. This would turn these reserves into 'stranded assets',

or worthless investments. That alone would substantially reduce its share price. There would be a second effect too: Because of the over-supply of fossil fuels, their price would fall. Businesses might therefore only be able to sell part of their oil, gas and coal reserves – and would moreover receive a lower price for what they did sell.

To date, businesses have failed to respond to this danger. In 2012, a further USD 674 billion was spent on prospecting and developing new sources of fossil fuels. Likewise, investors remain willing to invest their money in fossil fuels. But how can this be? Ought they not to adjust their behaviour in the light of the facts? Nicholas Stern, the former chief economist of the World Bank, who is now teaching at the London School of Economics, gives the following explanation: "Either the market has not yet thought the matter through properly, or it is assuming that governments will not do much – or a combination of the two."

It may be the case that businesses and investors are assuming that governments will not attain the 2° target, however, that would not only be a cynical wager, but would also be a serious economic risk. As soon as it becomes clear that governments are stepping up their measures against climate change, investors could panic and withdraw their capital. If this happens, the bubble would burst –

and share prices would plunge. Another explanation for the fact that investors are continuing to back fossil fuels is that the danger is simply not yet sufficiently perceived on stock exchanges. Many funds, for example, are guided by indexes such as the British FTSE 100. As the large energy companies are assigned a substantial weighting, money virtually automatically flows into oil, gas and coal. In order to prevent this, scientists, politicians and NGOs are drawing greater attention to the danger of a potential carbon bubble.



## What is the carbon bubble?

The carbon bubble describes a possible bubble on financial markets. Investors pump their money into fossil energy companies because they believe that it will remain possible to sell their fossil fuel reserves in future. This drives up share prices, which encourages yet more investors to invest in these companies. This perpetuates the bubble. The fact that not all of the reserves can be burned, because of global climate targets, is either not clear to investors or else they are speculating that they themselves will be able to sell their investments before the share price falls. The bubble is therefore based on false expectations on the part of investors and on their over-estimation of themselves. As soon as doubts about the true value of reserves gain the upper hand, a sudden panic may break out on the markets. Investors would withdraw their money and the bubble would burst.



# What has happened to date: an unusual coalition is combating the carbon bubble

**Scientists, investors, NGOs and politicians are warning of the danger of a bubble. A movement is coming into being which is calling on investors to withdraw their money from fossil fuels.**

**July 2011:** The Carbon Tracker Initiative, a London NGO set up by financial analysts, publishes the first study of the carbon bubble scenario. It shows that a large part of fossil fuel reserves cannot be burned if the 2° target is to be attained. The danger of a carbon bubble is described in detail for the first time.

**January 2012:** In an open letter to the Bank of England, a coalition of investors, politicians and scientists warn of the dangers of a carbon bubble and call for the 'systemic risk' to the British financial system to be investigated. In his reply, the Governor, Sir Mervyn King, concedes that this is necessary.

**July 2012:** The American journalist Bill McKibben published an article on the carbon bubble in Rolling Stone ('Global Warming's Terrifying New Math'), causing a considerable stir. No previous article in the magazine has ever been shared on Facebook more times. The report sets in motion a worldwide 'divestment' movement, calling on

institutional investors in particular to withdraw their money from fossil fuels.

**January 2013:** HSBC, Britain's largest bank, published a study which calculated the possible impact of a carbon bubble on energy companies. It indicated that businesses such as Shell, BP or Statoil could lose 40 to 60% of their market value.

**April 2013:** The divestment movement achieved its first successes. The Australian 'Uniting Church of New South Wales and ACT' withdrew its money from oil, gas and coal and instead invested it in renewable energies.

**May 2013:** In the context of the 'Green New Deal' and 'Climate Core' working groups of the Greens/EFA Group, I proposed the idea of commissioning a study to analyse the impact of the carbon bubble on the European financial system.

**October 2013:** Former US Vice-President and Nobel Peace Prize winner Al Gore warns: 'We have a carbon bubble, and it will burst.' He compares the carbon bubble to the 2007/2008 bubble that led to the global financial crisis. In that case too, investors had for a long time failed to recognise what in retrospect appeared obvious.

**January 2014:** The carbon bubble was debated at the World Economic Forum in Davos. The audience included not only investors, but also central bankers. The danger of a “commodities bubble” is now also being debated by the economic and political elite.

**March 2014:** The Greens/EFA Group, published ‘The Price of Doing Too Little Too Late’; a study which investigated the impact of the carbon bubble on the European financial system. The study was presented at a high-level conference at the European Parliament with contributions from Bill McKibben of 350.org and Bevis Longstreth, the former Commissioner of the US Securities and Exchange Commission. They advocated greater divestment and welcomed the Greens’ study.

**March 2014:** The Norwegian Government set up a committee of experts to investigate whether the state investment fund which is fed by large parts of the country’s oil and gas revenues ought to cease to invest in fossil fuels. The fund is the largest state fund in the world, with assets of more than USD 800 billion.

**March 2014:** Exxon Mobil became the first oil and gas company to agree, in response to pressure from investors, to investigate the possible impact of a carbon bubble on the company and its investments and to publish the findings. Ten other energy companies, including Chevron, have received similar demands from their shareholders.



# Our study: what impact will the carbon bubble have on the EU financial system?

**Banks, insurance companies and pension funds have invested more than a trillion euros in fossil fuels. They run the risk of big losses, particularly if political decision-makers do not act with determination.**

We, the European Greens, advocate remaining within the 2° limit. We are concerned, not only on environmental, but also on economic grounds, about the fact that this limit has so far not been reflected in the actions of fossil energy companies and investors.

In order to assess the possible impact of a carbon bubble on the EU financial system, we commissioned a study from the Sustainable Finance Lab at the University of Utrecht and the research specialists at Profundo. It examined the money trail, investigating how much banks, insurance companies and pension funds have invested in businesses that make their money from fossil fuels. If the carbon bubble were to burst, the impact would be felt not only by energy companies themselves, but also by those who have invested in them - The EU financial market included.

**How banks, pension funds and insurance companies drive the bubble**

For the study, the 20 largest banks in the EU, the 23 largest pension funds, and the insurance industry were analysed. If one extrapolates the findings about the banks in order to estimate how much the entire banking industry in the EU has invested in fossil fuels in the form of loans, bonds and shares, the total comes to between €460 and 480 billion. The study also reveals which of the largest banks have invested particularly heavily in oil, gas and coal in relation to their own balance sheet total. The list is headed by the French BNP Paribas (2.4%) and the British Standard Chartered (2.3%). Others which are likewise particularly committed to fossil fuels are the Société Générale (France) and BBVA, Spain's second largest banking institution. At the other end of the list, with less than 0.5% of their balance sheet total, come Danske Bank (Denmark), the Rabobank (Netherlands) and Santander (Spain).

In the case of pension funds, the amount which the industry has invested in fossil fuels is between €260 and 330 billion. Here too, the degree of dependence on oil, gas and coal varies from institution to institution. If the carbon bubble were to burst, the pension funds that would be hit hardest

are the British Universities Superannuation Scheme (12% of its total investments are in fossil fuels) and another British fund, BAE Systems Pensions (nearly 10% of its total investments are in fossil fuels). In addition to British pension funds, many of their Dutch counterparts have also invested above-average amounts in oil, gas and coal.

It was impossible to analyse the position of individual insurance companies due to limited available data. However, an estimate on the basis of samples suggests that the industry as a whole has between €300 and 400 billion invested in oil, gas and coal. Together, banks, pension funds and insurance companies therefore have more than a trillion Euros invested in fossil fuels.

## **How dangerous the bubble is will also depend on governments**

But what does this mean for the institutions? What losses would they face if the carbon bubble were to burst, and what consequences would those losses have for the stability of financial markets within the EU? As these questions cannot be answered in general terms and as the answers are also heavily dependent on the conditions established by political decision-makers, we worked out three possible scenarios enabling us to outline the potential impact of a carbon bubble.

Under the first scenario, 'low-carbon breakthrough', we assume that industry rapidly and definitively switches to methods which do not harm the climate. Thus we suppose that political decision-makers will act quickly and decisively, giving businesses

and investors a clear framework for their decisions. Even though, to date, no such approach has been perceptible either at global or at European levels, we still consider it both necessary and feasible.

With a low-carbon breakthrough, the pension funds would on average lose between 2.5 and 3.4% of their value. Certain individual institutions, such as the British Universities Superannuation Scheme, would be likely to lose a good deal more of their value (up to 7%), because of their high exposure to fossil fuels. The bursting of the carbon bubble would therefore perceptibly reduce the old-age pensions of many EU citizens.

The losses suffered by insurance companies would be somewhat smaller (2%), while banks would lose far less (0.4%). The latter is mainly due to the fact that banks tend to lend money to energy companies in the form of short-term loans, which would be less affected by the bursting of the carbon bubble. Nonetheless, their value should not be underestimated. In terms of balance sheet total, it is equivalent to the annual profits of many institutions. Moreover, some banks would suffer greater losses than others. Those that would be hit hardest would be the French institutions BNP Paribas and Société Générale – two of the biggest banks in the EU.

Altogether, under this scenario, banks, pension funds and insurance companies would lose €350 to 400 billion. Thus the carbon bubble does not present a systemic risk to the EU financial market as a whole. For individual institutions which have invested particularly heavily in oil, gas and coal, the risk is significantly greater. Some Member States are also at greater risk than others: Britain and the

Netherlands on account of their pension funds, which have invested heavily in fossil fuels, and France, because of the likely losses which would be incurred by two of its banks, BNP Paribas and Société Générale.

## **The damage which would result from an indecisive climate policy is even greater**

But what will happen if political decision-makers do not act as decisively as we have assumed under the first scenario? What if the switch to alternative fuels not only takes longer but is also attended by a high degree of uncertainty? In the case of this second scenario – ‘uncertain transition’ – the impact is far more difficult to quantify. However, it is likely that the damage suffered by banks, pension funds and insurance companies would be incomparably greater. The main reason is that, in the absence of a clear lead from politicians, they will initially continue to invest in fossil fuels and the losses incurred if the bubble bursts will therefore be significantly greater.

Under a third scenario – ‘carbon renaissance’ – we assumed that politicians would fail to enforce the 2° target, and that instead, fossil fuels would make a comeback. While that would have a disastrous impact on the climate, it would permit energy companies to burn all their fossil fuel reserves. However, even on purely economic grounds, this scenario is not desirable from the investors point of view. The costs that they would incur as a result of climate change would presumably be significantly greater than the losses due to the decline in value of fossil fuels. For example, insurance companies would have to cover the



enormous costs of damage caused by flooding arising from unbridled climate change.

Overall, the study shows that ambitious and unequivocal climate targets are also desirable from an economic perspective and reduce the potential dangers of a carbon bubble. Although a carbon bubble does not in itself constitute a systemic risk to the EU financial market, the fact remains that, in combination with other shocks, it could unquestionably contribute to a disastrous chain reaction. Moreover, individual institutions and countries are particularly at risk. In order to be able to assess these dangers even more effectively, greater transparency and monitoring is needed. We therefore call for a CO<sub>2</sub> stress test for banks, pension funds and insurance companies. Such tests could be performed, for instance, by the European Banking Authority (EBA) and the European Insurance and Occupational Pensions Authority (EIOPA).

# And what about Germany? Why the biggest Member State is an “invisible elephant”

**In order to assess the danger of a carbon bubble even more effectively, greater transparency is needed. Yet in Germany in particular, vital data have so far remained unavailable.**

By means of our study, we have sought to arrive at a better assessment of the dangers which a carbon bubble presents to the EU’s financial market and those who operate on it. Such publicly accessible sources such as the Thomson One database were used for this purpose. We believe that, on this basis, it is possible to produce a sound estimate of the fossil fuel investments of banks, pension funds and insurance companies. The order of magnitude of potential losses can also be calculated with a reasonable degree of accuracy.

Nonetheless, more detailed data is desirable and urgently needed. This is particularly true in the case of Germany. Due to a lack of transparency, it was impossible to analyse two major pension funds – the Bayerische Versorgungskammer and the BVV Pensionskasse – the combined total of whose investments is around €80 billion. Germany is therefore the ‘invisible elephant’ in the room.

In most cases, the lack of transparency also makes it impossible for ordinary savers to judge the risk of what a potential carbon bubble presents to their assets. Hardly any German insurance company or pension fund states how much money it has invested in fossil fuels. We believe that greater transparency is needed from institutional investors, and should be mandated by means of legislation. We seek to bring this about.



