



## PAAL FRISVOLD

Chairman of the Board of Bellona Europa asbl

Thank you very much William, and good evening everyone. It is a pleasure to be invited to this distinguished audience and this distinguished group. I represent the Bellona foundation. We were founded some 25 years ago after the Chernobyl accident by a very stubborn Norwegian who was tired of working in Greenpeace because he claims that we as environmentalists have to stop just pointing to the problems. We have to start pointing to the solutions because one of our core philosophies is not 'we' that is going to do the job it is you the industry that is going to earn money on making good products that do not destroy the climate.

Our mantra is clean energy for all, and we say, 'You have to go green by black numbers' and this particularly relevant now that we are in a stalemate in Durban where we see that the United Nations Conference on Climate Change is not really able to deliver for a variety of reasons. We can blame the Americans, we can blame the Chinese, they all have their legitimate points of view, but reaching a consensus understanding is getting more and more difficult with so many nations involved. I am here to talk a little bit about what we do here in Bellona and how we see the world and how we see some of the solutions that can be brought about.

We see things from a very holistic point of view. The fact is that we need to reduce emissions, we know that, but we also know that 80% of the world's energy is based on fossil fuels and that the global energy demand is increasing rapidly and vastly and that there are nearly two-thirds of the global population that does not have adequate access to energy. There are one billion people in the world without energy and the question is what we do about that. How do we allow all the people who do not have access to energy to grow out of poverty?

Having said that we also have the situation that was presented by the International Energy Agency in Paris which sends, at least to us environmental organisations, some shockwaves when we saw these figures for the first time, that we are in a race that is going to lead us to a six degrees change in temperature by the end of this century. That will be detrimental to the climate and to world development, so what are the options that we have to ensure availability of energy and at the same time meet the emissions reductions.

I believe that Bellona is different from many other environmental NGOs in the sense that many NGOs talk about the need for a sustainable energy chain and we obviously share that view, but on the other hand we see that we will need so much energy to produce the solar cells, selenium for the solar cells, the steel and the cast iron for the windmills, fertiliser for the biomass that this transition is a very energy intensive road.

Our organisation suggested in 1992, when a lot of people were looking at us and laughing because they said it was impossible, that you could actually decarbonise fossil fuels. You can capture the CO<sub>2</sub> and you can store it safely under the ground and we know that your fellow company Statoil due to a CO<sub>2</sub> tax in the North Sea found it to be economically beneficial to store the CO<sub>2</sub> 2000 metres under the sea bed and has done so with 12 million tonnes of CO<sub>2</sub> since 1996. It has been monitored by internationally renowned research organisations and they have not found any significant leakage problems.

We saw this at a very early stage and we have been working hard to advance the technology and the policies linked to advancing this technology in Norway, in the EU where I lead our work, in Russia and in Washington DC. That is why we believe that we have to use all the available technologies that are there. This is what many people refer to as an and-and conversation without we need all the energy sources.

We did what Lord Stern said when he came out with his alarming report in 2008, I believe, where he said we do have all the existing technologies available to us but we have to deploy them, we have to make them economically viable for



the industry to deploy them. We took all the technology options that we saw were there and we put them together to arrive at a scenario where we have a reduction of 85% CO<sub>2</sub> emissions by 2050.

Very few countries are able to achieve energy efficiency. When the IEA presented its report a fortnight ago on the energy outlook of 2011, Fatih Birol said that all the countries that have put energy efficiency at the top of their policy agenda, because it is the lowest hanging fruit, etc, no one has been able to prove or show that they have gained in energy efficiency compared to the increase in demand. While it remains a top priority and while it certainly remains a low-hanging fruit it has yet to be proven because of the vast increase in our energy demands and the difficulties there are in making energy efficiency measures.

The other thing I wanted to point out is that obviously renewable is very important, but so is CCS and this is to use fossil fuels with carbon capture and storage. I will come back to that later on as we believe that we need to move towards a situation where we become carbon negative, where we combine the sustainable growth of biomass, coal-fired first but later on replacing fossil fuels that can allow us to actually remove CO<sub>2</sub> from the atmosphere. The EU's decarbonisation road map is familiar to most of you. Commissioner Oettinger will on Tuesday next week in Strasbourg publish the road map for the energy sector. This is for the overall society and he will talk about the road map for how the EU will reduce emissions from the power sector down to a very low level in 2050. The EU is committed to reducing emissions from its power sector by 85% within the EU without using the CERs and the mechanisms under the Kyoto protocol which we are unsure will survive.

This gives you a picture of the daunting task that we have ahead of us and obviously the power sector is one of them, by far the largest sector with industry, but if we look at 2050 it will be agriculture that will represent the largest source of emissions. Now I mentioned CCS as an important tool in the transition. At least when we first talked about CCS that was our mantra that it would be a bridging technology, how to get us from a fossil based society to a truly renewable energy sustainable chain.

CCS is receiving a lot of resistance. It is suffering from a lack of public support. We are working very hard to change that paradigm and how the angle, the way we look at CCS is not only focusing on power because there is indeed a lot of new possibilities that CCS will allow us. First of all there is the in-house oil and gas recovery. We know that in the North Sea we are very sceptical about exploiting oil and drilling for gas in the Arctic so we prefer to provide CO<sub>2</sub> to increase the absorption, the extraction of fossil fuels in the North Sea in existing wells because of the characteristics of CO<sub>2</sub> that makes it even more efficient to get out more oil and gas than using natural gas which is the case today, along with massive amounts of water.

We also have the coalbed methane recovery. That is a very interesting concept. When we can start to inject CO<sub>2</sub> in very low deep coalbeds and extract the methane which can be burned, capture the CO<sub>2</sub> again and reinject it. Then we can get access to vast amounts of new energy which is not currently calculated in today's energy overviews. If we use one of the three mechanisms which we used pre-combustion we can use vast amounts of hydrogen for kick-starting the hydrogen economy. We even, and I think this ship is actually chartered by Total, *The Viking Lady*, it runs on a fuel cell with natural gas and that was one of the projects that Bellona worked on many years ago.

We were also talking about low-hanging fruit - CCS in industry. Germany, for instance, has a huge problem with accepting CCS that refuses to transpose the directive on geological storage of CO<sub>2</sub>. However, nevertheless Germany has more CO<sub>2</sub> emissions from its industry sector than any other EU country has from its power sector except for Poland. Germany just cannot decarbonise without using CCS and therefore in smelting industries, cement, petrochemical plants, refineries, etc.

Just a parentheses, but China, since this is a global conference, it has been claimed that three per cent of the total CO<sub>2</sub> emissions in the People's Republic of China comes from coal fires that they cannot put out. The only way to put out a coal fire in a coalbed is to use a massive amount of CO<sub>2</sub>, so that is also an interesting feature.

What I am very concerned about, particularly now we are in a situation where the global economy or society is unable to reach any agreement is we have to use the option of carbon negative. James Hansen is one of the leading economists at NASA and he said many years ago that we in the rich world who have spent all the fossil fuels to get up



to our standard of living, we have to introduce measures that can allow others to use a similar energy source. How can we say that the Chinese or the Indians are not allowed to use coal to reach our level of standard of living? One of the ways of doing that is catching the CO<sub>2</sub> from the fossil sources which is why we believe that the EU and Norway and America and Australia need to develop this technology. However, we have to do more. James Hansen said that we have to go carbon negative. We have to reduce more emissions than we emit and we do that by combining sustainable production of biomass.

I just want to give you a taste of what we call restorative growth. Now so far we have worked with how to deal with climate change. What are the technologies, what are the options that we have. Due to the pace of climate change and the pace of emissions increase we believe that we have to go beyond sustainability and to go towards restorative growth.

As you know, all these questions are linked together – population growth, energy consumption, CO<sub>2</sub> emissions, food, water scarcity, absolutely, and also arid areas. This trend we believe must be turned around. I think it was Einstein who said we need to find new ways to tackle the problems of yesterday and we cannot use the same thoughts that invented the problems to solve the problem.

This is the concept. We have had a generation of extracted use of resources. We are in the middle of trying to make it more sustainable, but now we have to move over to restorative use. I mentioned biomass. Microalgae is a very energy intensive biomass source. It is one that will not compete with food production or other land used for forestation and food. The percentage of crop land of one unit of energy from microalgae compared to sugar cane, soya beans, corn, gasoline, means it has a vast potential to replace fossil fuels.

Then we looked at what the world needs. We need to develop forms of biomass. We need to use the existing technology of solar power, concentrated solar power and we need to create two billion jobs from here to 2050. What are the best ways to do this? We have worked on something called the Sahara Forest Project where we bring salt water into the desert and into salt water greenhouses which allows us to evaporate the salt water and create fresh water and this evaporation will create outside vegetation which is a source of biomass which can be used for fuel, for feed stuff and can also be burnt to make electricity with concentrated solar power.

This is our vision. We are already starting to build that. My boss called it Jordan Valley. It is a project we are launching in Jordan. You use what you have enough of to make what we need more of: seawater, sun, nutrition and CO<sub>2</sub> to produce electricity, human air which can create new vegetation, fresh water, biomass and which again produces food and bio oil. This has received strong international support. We have been very lucky to be broadly covered by many important publications and we also work with some important names in industry such as Yara who are building a new fertiliser production site in Qatar.

Qatar wants to use the income from their exports of oil to produce new energy sources that are based on renewable energy sources. We are working with Qafco in Qatar and we are lucky enough to have been given a piece of land by the King of Jordan so right now we have begun to create the Sahara Forest Project in Jordan where we have a memorandum of understanding with the local authorities, partly financed by the Norwegian Minister of Foreign Affairs.

What we intend to do is not a solution but it will allow us to ask all the questions that we need to answer because we need to develop restorative growth. We need to provide new sources of biomass. That is why we are working with the industry. We are working with the universities in the States, in Europe and in the region because this will be, we think, the way we need to go. Restorative growth and new energy methods have to be good for people, for the environment and it has to be good for the investors. It has to be bankable, if not we are not going to be able to see this. I invite you, if you are coming to the next COP which will take place in Qatar, we will bring many people out to visit our Sahara Forest Project in that region. Thank you very much.