Dear Professor Helm,
I listened to *BBC Radio 4* **Costing the Earth** „Grid Lock?" and your statements about the cost involved in the transfer from a carbon to renewables. I know that such interviews are too short for an in depth argument, but the cost side you spoke about can only be one aspect of a larger picture.

1. Carbon/nuclear energies generally do not include so-called external costs. EU-studies indicate these are 6-8 c€ per kWh for oil and coal generated electricity. Compared to the minimum price for wind in Germany in 2008, 8.1 c€, these costs are very high, even if generators are cheap to operate. New generation from carbon which will have to include these costs as well as the capital cost, cannot compete with wind, especially if prices for carbon fuels continue to rise.
2. It is fundamental how the transition is organised. At the moment we have large generators who have vested interests in not allowing renewables into „their" market. These generators dominate policy, try (and succeed) to put a legal framework into place that closes the market to newcomers.
   It takes strong legislation – and political vision – to create a legal framework that opens this market. One of these is the Minimum Price Law or Feed-In-Tariff that the Danes initiated in the 80ies, and Germany adopted in 1990. Initially it was to allow small generators (small hydro, small wind) into a monopolised market in which prices and conditions were dictated by large utilities that controlled the grid and generated practically all of Germany's electricity.
   FiT legislation was based on two principles: 1. a minimum fixed price (90% of the average consumer price); 2. priority access to the grid for renewables. The law consisted of two A4 pages – and started a revolution that even those in favour of the law could not have foreseen. (When the utilities realised the effect, they attacked it in all the courts, finally losing the battle in the European courts in 2001.)
3. The law was so effective because it follows liberal economic principles: the state sets a legal framework that lays down the rules, enterprise generates the investments. A simple law like this made small projects bankable. Even bankers who know nothing of the subject understand calculations in which the income is defined for 20 years. This allowed start-ups and small businesses to make investments locally and regionally. Not just those projects with huge profit margins (which large companies require) were financed and built, but also those organised by locals who accepted that profits of 6 or 8% were much better than returns from a savings account.
   Decentralised, locally produced electricity is produced close to the consumer; it reflects the decentralised structures of renewables (which are plentiful, but generally not in great bulk in any one place). Locally produced electricity run and financed by local people and local banks generates local and regional income, especially in rural areas.
4. The great number of regional projects generates demand for better technology. With their initial program of investment subsidies to wind turbine owners and the minimum price law, Denmark generated a wind industry that was ready to produce for the Californian market in the 80ies – and became world leader subsequently (and Vestas still is). In Germany demand for turbines and services generated more than 82.000 jobs in the wind industry alone (2006) – and export rates of 80% in a market that is growing faster than manufacturing capacities. (All renewables 235.600 jobs in 2006.) Spain followed the same line with Gamesa becoming a leading international player within a few years in a strong home market.
5. The minimum fixed price has created an industrial revolution in Germany. We now have 14% of our electricity from renewables. More than 7% of that is wind (with bioenergies and solar are growing fast). Most of that electricity from wind in produced by new enterprises financed largely by citizens' participation schemes. We never had that much "privately" generated electricity since before World War II.

It has generated thousands of new businesses – and has mobilised an astonishing amount of private money invested in this field. In local participation schemes it has turned people into investors and entrepreneurs who would not see themselves as business people and who had never invested money into anything in their life.

6. Yes, there are costs involved. For the average household in Germany it is roughly 12 € per household per year for the minimum price regulations. That is much less than price rises due to higher costs for gas and oil households had to cope with.
The Renewables Energies Law of 2000 (Erneuerbare Energien Gesetz or EEG) put in specific prices for specific renewables, because we need a mix of renewables, not just wind and small hydro. Only a mix of renewables (and decentralised co-generation) will solve the problems of intermittency. (It is a problem, by the way, that carbon/nuclear generators also have: if a large power station has a technical problem, large backup must step in. Wind, by comparison, is much more predictable.)
The minimum price was set at a declining level with no allowance for inflation. This was to keep the pressure on the industry to become more efficient. From 2000 the fixed price for wind dropped by 1% each year for new installations; and from 2004 by 2% per year, forcing projects to become some 4% cheaper every year, if you include inflation. So if your wind turbine was commissioned in 2004, a price of 8.7 €c was fixed for 20 years, if you commission it 2008, the price is fixed at just above 8 €c for 20 years.
As far as I know, this price is much lower than for wind in the UK (at 12-13 €c per kWh?) – despite much better wind conditions in the UK. The minimum price system is not just more efficient in producing volume (UK 2.000 MW in 2006 / Germany 21.000 MW); it is also less expensive than the UK framework. Clearly it is not the resource, but the legal framework that is the problem in the UK.
The EEG is to be reviewed at 4 year intervals, i.e. 2004 – and 2008. This review is in parliament right now. It is consensus in the industry that the ambitious degression of prices cannot continue due to the fact that prices for steel and copper have risen dramatically since 2004 – and have made turbines 30% more expensive. Demand for turbines world-wide has also increased dramatically since 2004. It is a sellers market now with delivery times of two years or more. This must be reflected in the price which the industry sees at 9.5 €c for new onshore wind. It is fixed much higher, at 14-18 €c, for off-shore.
7. A grid system that does not discriminate between established carbon/nuclear generation and renewables, is structurally conservative, i.e. in favour of those generators who are in the system already. To foster innovation and new investment in renewables, priority access and priority grid management in favour of renewables is required to speed up the transition process. Additional grid costs are part of reconstructing a grid to fit for the new structures of renewable generation; just as the existing grid and costs are the results of setting up a grid structure adapted to centralised large carbon/nuclear generation facilities. That is the price we had to pay for the existing infrastructure – and one that we will have to pay for the new infrastructure. No one would dispute that such costs have to be borne by the tax payer when we speak of road/motorway infrastructure. What is so different about roads and motorways for electricity if simple access is granted for all, even small, generators?
8. The German government also gave priority to renewable energies in planning. This put renewables on one level with large power stations that already had been given such privileges in the 50ies. To put is simply: if no "hard" reasons for not grating planning permission exits (i.e. existing protected areas), that building permission must be granted by law – unless a local authority or region has designated an area for exclusive use for wind generation in their local or regional planning.

The argument was anti-NIMBY: i.e. we need turbines to clean up our electricity production and turbines require planning. This was seen as a national target. Locals can plan, but must plan positively for wind.
Paradoxically this has improved local acceptance as most projects are developed by regional companies who can take local conditions into account. A community north of Freiburg has 4 turbines now. The first two were developed and financed locally and found great acceptance so that the local council wanted four more, two of which have now been built. A big investor would not have gone for a project so small; and he would have met strong local opposition, had he come in with a finished product that did not include local financial participation.
But federal planning laws can be perverted by German states who want nuclear. Due to party political wrangling, turbines were seen as "Green", and so there was a strong impulse by conservatives to brand them as such and oppose them. So we do have negative planning, despite the federal law. In the background the political influence of the large utilities also plays an enormous role here. This became very visible when the EEG had its first review in 2004 – and a campaign especially against wind was initiated. And we also have had some large developers do what large developers do – and that was counter productive in some instances.
In the southern state of Baden-Württemberg we have below 1% wind in the system, while in other states, where the carbon/nuclear fraternity is less strong we have 40% wind (and it is not a question of resource here either).

Germany is not the paradise of renewables it is often portrayed to be. It has been a hard fight here – and still is. After "liberalisation" of the electricity market in 1997 we have seen the rise of the BIG FOUR, i.e. RWE, EnBW, Eon, and Vattenfall, who control the market and the grid, and who have been "consolidating" the market – and have been raising profits and prices after that consolidation was finished (so in some sense we are worse off that before liberalization when there were more larger players).
We have seen progress in renewables because of strong legislation and a vision, driven by private citizens who are using the legal framework to produce their electricity in their regions for their regions. The utilities are trying their best to undermine these structures and use their vast influence on policy makers to secure their hold on "their" market.
Having fought the EEG for long they seem to have changed tactics now, bringing large hydro into the system in 2004 (a questionable move as large hydro may not be competitive against old carbon/nuclear for the fist ten years, but with operating times of up to a century it is a licence to print money). Now they are pushing for large off-shore wind with tariffs well above on-shore (8 vs 14 €c per kWh) plus a grid that is provided free of charge 30 km into the North See (pushing costs to app. 18 €c per kWh for off-shore). The debate about the "high" price for wind energy that was viciously fought in 2004 against on-shore vanished from the media since off-shore entered the stage in 2006.
And we, too, have a debate about new carbon power stations and an extension of nuclear operations. The former is an attempt to establish large scale generation for another life cycle of new power stations, i.e. 40 years. If co-generation was really pushed – and thus efficiency really raised from 40% for new thermal power stations to 90% or more for co-generation – we will need just a very few larger power stations for grid management (gas turbines which could be converted to biogas). Then we would not have a generation problem, but a problem for the big four generators who would lose most of their generation, and who now realised that new carbon power stations will be more expensive to build (prices of steel and copper, etc) – and will not be competitive, if they have to internalise costs deemed external (e.g., for emitting CO_2).
The nuclear option in Germany (an extension of operation of existing nuclear) will slow down the transformation process for another 10 years. 10 years won by the powers that be, for the status-quo. That is why the big four are fighting hard for this. These ten years are

crucial, if climate change predictions are to be believed. These ten year will cost the nation dearly if Stern is right. And decommissioning even the test facilities for reprocessing and the fast breeder projects has already burdened the tax payer with staggeringly high costs.
Last year the increase of electricity from renewables in Germany was of the volume that a large nuclear power station produces. If we can keep that going – plus pushing co-generation, we can switch off nuclear, plus reduce generation from gas and coal.
It is striking that the nuclear programme in the UK and France will not be able to fill the gap created by decommissioning of old nuclear. If BWEA is right, only two nuclear power station will remain operational in 2016. As it does take ten years to bring a nuclear power station on line, the gap will have to be filled by other means. The UK has such a vast resource of wind that it should not be a problem to fill that gap (and there are other renewables like hydro and bioenergies, too). Or is it that there are other – military? – reasons for new nuclear power stations?
Given the right frameworks, renewables have always exceeded predictions, even those made in the industry. Our national target for renewable electricity for 2010 was 12.5%. In 2007 we have produced 14%. Our target for 2020 is 20%. To manage this, we need to slow down the development drastically. Cynics say that the EEG review is aimed at archiving this – and there is some truth in this. We will have to see how the debates in parliament will alter the proposed legislation. Projecting past experience into the future, wind alone should be at 20% by 2020 in Germany – and other renewables are also growing very fast.
Schumpeter spoke of creative destruction. We need this in the industry to facilitate and speed up the transition from carbon/nuclear to renewable energies generation. If we can overcome the strong vested interests in an industry dominated by large multinationals and re-regionalise our energy production, we will all benefit – and become more independent from imported energy. Stern tells us, the sooner we do this, the better. IPCC tells us it is our only chance to limit the effects of global warming.
It is simple. We just have to do it.

Contact:
Dr. Josef Pesch, fesa GmbH, Wippertstr. 2, D-79100 Freiburg, Germany
0049-761-400 1530 / pesch@fesa-gmbh.de