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The renaissance of coal vs climate policy necessities

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Bonn, 16 January 2012. The Durban Climate Summit did not bring any good news for the world's climate, because a new climate protection agreement will not enter into force until 2020 at the earliest. But can the climate wait that long? According to the internationally recognised budget approach suggested by the German Advisory Council on Global Change (WBGU), the world has a greenhouse gas budget ("global budget") of 750 gigatonnes of CO_2 equivalent left until 2050 to meet the 2°C target agreed in Cancún in 2010. All the more worrying are the statements by the International Energy Agency in the current edition of *World Energy Outlook*: after falling in 2009 as a result of the financial crisis, CO_2 emissions reached 30.4 gigatonnes in 2010, the highest level ever.

Yet it is not only the climate diplomats who, through their actions, show they want nothing to do with the necessities dictated by climate research. The expansion of energy generation capacities is also cause for concern: the first decade of the 21st century saw a renaissance of coal, despite the commitments agreed in Kyoto in 1997 to reduce greenhouse gas emissions. Since 2000 global demand for coal has risen by 55 per cent. Coal still forms the backbone of global electricity generation, With a share of 40 per cent in 2009 coal still forms the backbone of global electricity generation which caused 43 per cent of global CO_2 emissions.

Coal will dominate global electricity generation for years to come

As coal-fired power stations remain in operation for up to 40 years, the resulting greenhouse gas emissions are "locked-in" for decades to come. Even more questionable is that three quarters of the coal-fired power stations that exist today have less than 40 per cent efficiency; technically feasible is an efficiency rate of up to 47 per cent for hard coal- and up to 45 per cent for lignite-fired power stations.

Of the 90 gigawatts of coal-fired power stations currently under construction in China, one third have a technically obsolete efficiency of less than 40 per cent. In India things look even worse: almost all its coal-fired power stations are less than 40 per cent efficient. This is all the more serious as the two countries already have the most coal-intensive economies in the world. China alone consumes five times more coal per USD of gross national product than the rest of the world.

Today's investment decisions determine tomorrow's emissions

By opting to invest in technically obsolete power stations, the two countries are "locking-in" large quantities of additional emissions into the global budget for many years to come. This makes the obstructive role played by China and India in Durban all the more questionable. The reason they gave, that the industrialised countries had an historical debt to pay when it came to climate protection, was right at the time when the Kyoto Protocol was adopted, and so no reductions were required of developing countries.

But today the situation is different. The driving forces behind the additional demand for coal and the growing greenhouse gas emissions are the non-OECD countries, led by China and India. Both need enormous quantities of energy and have ambitious plans for the expansion of their energy infrastructure. Increasingly, they are also relying on the expansion of renewable energy sources. In 2010, for example, China invested USD 48.5 billion in renewables, more than any other country in the world. As a result, renewables now account for 18 per cent of electricity generation and 9 per cent of primary energy consumption in China.

Technically obsolete coal-fired power stations still being built

Nonetheless, both countries still rely on coal-fired power stations that are not state-of-the-art. Highly efficient coal-fired power stations are, after all, more expensive than obsolete technology, mainly because higher efficiency requires higher temperatures and pressures in the boiler, and that means higher material and construction costs. As

long as coal is cheap, that investment does not pay off. The cost of both coking coal and hard coal may have risen steadily since 2005, with a short-term dip due to the financial crisis, but China pays the world's highest coal consumption subsidies – USD 2 billion in 2010 – to offset the cost. That amount may be small compared to the USD 409 billion paid in subsidies for fossil energies worldwide, but it does mean that technically obsolete coal-fired power stations remain profitable and investment in new technologies is avoided. By comparison, Germany granted subsidies totalling EUR 1.46 billion in 2009 to assist sales by the hard coal-mining industry, which is to close down by 2018.

Unlike Europe, where the EU Emissions Trading System existed since 2005, China and India do not put a price on greenhouse gas emissions. But if, on the one hand, the emission of greenhouse gases is restricted and, on the other hand, a price is put on the "right to pollute" at the stock exchange ("cap and trade"), a completely new starting position emerges for the calculation of the cost of new power stations: it is then worth changing energy sources or building a highly efficient power station.

Also seen as a technical option for reducing greenhouse gas emissions from coal-fired power stations is carbon capture and storage (CCS). Not only the fossil-fuel industry but many politicians, too, were banking on this technology, which was initially expected to be available in 2020. There is no talk of that any more: the technical and political challenges are too great. As CCS would, for example, reduce the efficiency of a power station by as much as 15 per cent, electricity generated from coal would be more expensive than that generated from renewables.

The inconvenient truth

Although half of new energy generation capacities in 2010 were already renewables-based, they contribute only 16 per cent of final energy. When taking away the traditional biomass used in developing countries renewables as a whole account for 6 per cent of final energy consumption. The inconvenient truth is therefore that for the time being it will not be possible for all electricity to come from renewables. Fossil energies will continue to dominate for many years to come, primarily in the non-OECD countries. If, then, conventional power stations are built, whether natural-gas- or coal-based, they must achieve the highest conceivable level of technical efficiency. But as long as the price of fossil energy sources is artificially reduced, investment in obsolete technology will continue.

As decided at the G20 summit in Pittsburgh, governments must therefore reduce subsidies on fossil energy sources, with the aim of abolishing them altogether. The cost of greenhouse gas emissions must be internalised through the introduction of an emissions-trading system or through taxation. This will make the microeconomic calculation worse for coal-based electricity, whereas the calculation in the case of capital-intensive renewable energy sources will be simpler, which makes economic sense.

Until the external costs associated with fossil and nuclear fuels are internalised, renewable energy sources will need clear political conditions, so that they become more widely used. Only then can they replace fossil and nuclear energies in the medium to long term. Without such political conditions, the climate protection targets and a sustainable energy supply will fade into the distant future. Politicians must take action, not only in the industrialised nations, but also in non-OECD countries, principal among the large emerging economies, such as China, India, South Africa and Brazil.