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SIX QUESTIONS TO WOLF-PETER SCHILL

»Electric Mobility Should Be Linked to an Additional Expansion of Renewables«

1. Dr. Schill, the German government plans to significantly increase the number of electric vehicles in Germany. How many electric cars are there on the German roads at the moment and how many are planned for the future? First, we have to be clear about what is actually meant by an electric car. Nowadays, there are quite a lot of hybrid vehicles in Germany. Electric cars in a narrower sense are those which have a plug and are powered by electricity from the grid. Last year, Germany's fleet of such electric vehicles was around 20,000 strong. The German government would like to expand this fleet to one million vehicles by 2020 and six million by 2030.

2. How much energy would be required for this number of electric vehicles? Our simulations assumed a fleet of four to five million electric vehicles for 2030. The analysis demonstrated that electricity consumption of a fleet of that size would be around two percent of Germany's total power demand. Over the year, therefore, the power consumption of electric vehicles is not particularly high.

3. So the German power grid should easily be able to absorb the additional load? That is too sweeping a statement. It depends heavily on how these electric vehicles are charged. If vehicle users simply plug their vehicles in and recharge the batteries immediately after they return home, this would coincide with periods when electricity consumption is already high. Such uncontrolled charging could result in dangerous increases in peak loads in the power system, particularly during the evening hours. Consequently, even relatively small fleets could lead to major problems for security of supply as installed power generation capacities are already largely exhausted during these periods. A charging mode that optimizes system costs by recharging the vehicle at night when demand is lower and at midday where solar power generation is high would, in contrast, be unproblematic.

4. Running an electric car can be zero emission as long as the charging power is generated by renewable energy sources. Where does the electricity to charge these vehicles come from in reality? In our simulations, we assumed that the power plant fleet would continue to develop as currently foreseen in the scenario framework of the German Grid Development Plan. According to this framework, the power for charging electric vehicles is predominantly produced by lignite- and hard-coal-fired plants which can generate electricity at relatively low cost and, at the same time, are available at times when electric vehicles are being charged. In fact, the power to charge electric vehicles can only come from renewables if additional renewable energy sources are integrated into the electricity system.

5. What are the net carbon emissions of electric vehicles? This largely depends on how the emissions of conventional internal combustion engine cars develop in future. As a result of stricter regulation, there will be continual improvements in this area too. As part of our current research project, calculations carried out by our colleagues at the Institute for Applied Ecology (Öko-Institut) demonstrate that the net CO_2 emissions of electric vehicles can only be positive if the introduction of electric mobility is linked to the expansion of additional renewable energy sources.

6. What opportunities are provided by electric mobility? Particularly in the long term, electric mobility opens up a range of opportunities. Electric cars are considerably more energy-efficient than internal combustion engines and produce lower levels of local air pollution such as nitrogen oxides and particulate matter. Potential reductions in carbon emissions depend on the charging current. Electric vehicles (alongside other technologies) also enable us to use renewable energy sources directly without having to rely on biofuels. This, in turn, allows us to move away from using mineral oil in the transport sector and toward the direct use of domestic renewables.

Interview by Erich Wittenberg

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