Wind power with benefits

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Photo: Wind farm in Zafarana, Egypt. Credit: Flickr / Creative Commons

Which renewable energy sources should be funded in developing and emerging countries? A team of scientists headed by Tobias Schmidt from the ETH Zurich's Department of Management, Technology and Economics (D-MTEC) looked into this question. The researchers calculated and compared what it would cost to generate a tenth of the electricity demand with wind power or photovoltaics for six selected countries in the south. The result: with one franc or dollar of funding, you can produce more electricity in all the countries examined – Brazil, Egypt, India, Kenya, Nicaragua and Thailand – if the money is invested in wind power plants.

Their study is linked to the climate protection measures that industrial countries will be funding in developing countries in the next years. We are talking large sums of money here: from 2020, 100 billions of dollars

are to be channelled every year into the south from the north in the name of climate protection, as the nations agreed at the 2010 climate conference in Cancun. Part of this money will be set aside to cover the additional costs of renewable energies compared to their fossil counterparts. It is therefore intended as a carrot for developing countries to encourage them to switch over to the more expensive green technologies. Where and how this funding should be invested usefully, however, is currently a subject of great debate among scientists and politicians alike.

Even cheaper than status quo

The ETH-Zurich researchers also compared their calculations for wind and solar power in the individual countries with the present electricity mix – with astonishing results: in Kenya and Nicaragua, producing electricity with wind power plants would even be cheaper than it is now. As the study reveals, not only would a green switch make sense there for climate reasons, but also purely economic ones. Both countries rely partly on diesel generators. Because of the currently high price of oil, this increases the cost of producing electricity enormously.

“It is the case that wind is cheaper than the present electricity mix in these countries if you base the calculations on the global market price for fossil fuels,” says Schmidt. In practice, however, natural gas and crude oil are subsidised in many countries. Egypt, for instance, supplies its own natural gas to the electricity companies at about half the global market price. Also in other countries, there are hidden subsidies. Kenya, for example, maintains the electricity price at a low level and covers the deficits in the production of power caused by the rising oil prices with tax money.

“Reduce subsidies”

Consequently, Schmidt also recognises a political demand in the study. “Subsidies for fossil fuels need to be reduced,” he says. After all, as long as fossil fuels are subsidised directly and indirectly to the extent they are today, thereby rendering fossil-fuel power plants cheaper than renewable energy, we would be cross-subsidising crude oil and natural gas with the climate protection funding. This would defeat the whole purpose of the climate protection funding. “Therefore, it is important to attach certain conditions to the funding, such as the southern countries disclosing their subsidies, and for these to be taken into consideration in determining the funding.”

However, the conversion of the power supply in the developing countries will not happen overnight, even with these funds. “Most probably no existing fossil-fuel power plants will be replaced with new wind power plants in the next ten years,” says Schmidt. Initially, they will supplement the existing power plants. After all, the power requirement in developing and emerging countries is increasing parallel to their economic growth. “The idea is to build fewer additional fossil-fuel power plants in the next few years and pave the way for a future expansion of the renewable technology by creating the corresponding structures in these countries,” says Schmidt.

The study by the ETH-Zurich scientists is the first in which the costs of a partial switch to wind and solar power is calculated in detail for individual countries in the south and compared with today’s energy production costs. The previous studies either had a broader focus – such as the global costs of an energy shift – or a narrower one – the viability of individual projects. The ETH-Zurich researchers only considered large power stations in their study, excluding decentralised, off-grid wind turbines and photovoltaic plants. They will address off-grid technologies in an upcoming study.

More information: Schmidt TS, et al: Assessing the costs of

photovoltaic and wind power in six developing countries. *Nature Climate Change*, 2012, doi: 10.1038/nclimate1490