PROJECT SYNDICATE

Gone with the Wind

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COPENHAGEN – Efforts to stem global warming have nurtured a strong urge worldwide to deploy renewable energy. As a result, the use of wind turbines has increased ten-fold over the past decade, with wind power often touted as the most cost-effective green opportunity. According to Connie Hedegaard, the European Union's commissioner for climate action, "People should believe that [wind power] is very, very cheap."

In fact, this is a highly problematic claim. While wind energy is cheaper than other, more ineffective renewables, such as solar, tidal, and ethanol, it is nowhere near competitive. If it were, we wouldn't have to keep spending significant sums to subsidize it.

In the United Kingdom, for example, wind remains significantly more costly than other energy sources. Using the UK Electricity Generation Costs 2010 update and measuring in cost per produced kilowatt-hour, wind is still 20-200% more expensive than the cheapest fossil-fuel options. And even this is a significant underestimate.

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As the UK and other developed countries have rushed to build more wind turbines, they have naturally started with the windiest places, leaving poorer sites for later. At the same time, people increasingly protest against the wind farms in their backyards. Local opposition has tripled over the past three years, and local approval rates for new wind farms have sunk to an all-time low.

Most people believe that a few wind turbines can be attractive, but it is an entirely different matter when turbines are scattered across the countryside, or when massive, industrial wind farms extend for miles. Complaints have also increased about enormous new wind turbines' low-frequency noise.

Given souring public sentiment, most of the future increase in wind turbines is expected to take place offshore, where there is less opposition, but where costs are much higher.

With its "20-20-20" policy, the EU has promised that, by 2020, it will cut its carbon emissions by 20% below 1990 levels, and increase its reliance on renewables by 20%. For the UK, this requires a dramatic increase in wind power, especially offshore.

This will be surprisingly costly. The UK Carbon Trust estimates that the cost of expanding wind turbines to 40 gigawatts, in order to provide 31% of electricity by 2020, could run as high as £75 billion ($120 billion). And the benefits, in terms of tackling global warming, would be measly: a reduction of just 86 megatons of CO_2 per year for two decades. In terms of averted rise in temperature, this would

be completely insignificant. Using a standard climate model, by 2100, the UK's huge outlay will have postponed global warming by just over ten days.

Moreover, this estimate is undoubtedly too optimistic. Wind frequently does not blow when we need it. For example, as the BBC reported, the cold weather on December 21, 2010, was typical of a prolonged cold front, with high-pressure areas and little wind. Whereas wind power, on average, supplies 5% of the UK's electricity, its share fell to just 0.04% that day. With demand understandably peaking, other sources, such as coal and gas, had to fill the gap.

Making up for a 5% shortfall in supply is manageable, but the situation will change dramatically as the UK increases its reliance on wind power to reach the 31% target by 2020. Wind power becomes much more expensive when we factor in the large supplies of power that must be created for backup whenever the wind dies down.

The cheapest backup power by far is provided by open-cycle gas plants, which imply more CO_2 emissions. Thus, wind power will ultimately be both costlier and reduce emissions less than officially estimated. (This is also why simple calculations based on costs per kWh are often grossly misleading, helping to make wind and other intermittent renewables appear to be cheaper than they are.)

This has been shown in recent reports by KPMG/Mercados and Civitas, an independent think tank. A new report by University of Edinburgh professor Gordon Hughes for the Global Warming Policy Foundation estimates that 36 GW of new wind power would cost £120 billion for just 23 megatons of CO_2 reduction per year. In other words, temperature rises would be postponed by a mere 66 hours by the end of the century.

Contrary to what many think, the cost of both onshore and offshore wind power has not been coming down. On the contrary, it has been going *up* over the past decade. The United Nations Intergovernmental Panel on Climate Change acknowledged this in its most recent renewable-energy report. Likewise, the UK Energy Research Center laments that wind-power costs have "risen significantly since the mid-2000's."

Like the EU, the UK has become enamored with the idea of reducing CO_2 through wind technology. But most academic models show that the cheapest way to reduce CO_2 by 20% in 2020 would be to switch from coal to cleaner natural gas. The average of the major energy models indicates that, downscaled for the UK, achieving the 20% target would imply a total cost of roughly £95 billion over the coming decade, and £18 billion every year after that. Of course, these figures include reductions in areas other than electricity, as well as higher energy prices' total cost to the economy.

Nonetheless, the lesson is clear: if the goal is not just to cut CO_2 emissions, but also to use renewables to do it, the models show that the cost balloons to £188 billion for this decade and £36 billion every year after 2020. In effect, insisting on wind power means using energy that is far from competitive, does not help to avert climate change, and costs an extra £92 billion for the UK alone.

For any country, this seems like a very poor choice.