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BERLIN—When considering climate change, most people think wind turbines and solar panels are a big part of the solution. But, over the next 25 years, the contribution of solar and wind power to resolving the problem will be trivial—and the cost will be enormous.

The International Energy Agency (IEA) estimates that about 0.4 percent of global energy now comes from solar and wind. Even in 2040, with all governments implementing all of their green promises, solar and wind will make up just 2.2 percent of global energy. This is partly because wind and solar help reduce greenhouse-gas emissions only from electricity generation, which account for 42 percent of the total, but not from the energy used in industry, transport, buildings and agriculture.

But the main reason wind and solar power cannot be a major solution to climate change stems from an almost insurmountable obstacle: We need power when the sun is not shining and the wind is not blowing.

This has major implications for claims about costs. For example, wind power, we are repeatedly told, is just about to be cheaper than fossil fuels—or even, as a recent global news story claimed, that it is now cheaper than fossil fuels in Germany and the United Kingdom.

This is mostly a mirage—large-scale wind power will not work anytime soon without subsidies. As Warren Buffet says: “[W]e get a tax credit if we build a lot of wind farms. That’s the only reason to build them. They don’t make sense without the tax credit.” The IEA estimates that the annual bill for global wind subsidies will increase over the next 25 years, not decrease or fall to zero.

One reason is that cheaper wind in Germany and the United Kingdom is true only for new construction. Most existing coal and gas suppliers cost about half or less than wind and could run for decades; instead, we half-close them to accommodate wind. Whereas the new, cheap German wind-energy producers cost $80 per MWh ($0.08 per kWh), the average German spot price in 2014 was just $33 per MWh.

More important, wind is cheaper only when the wind blows. When the wind is not blowing, wind-generated electricity is the most expensive electricity of all, because it cannot be bought at any price.

Installing more wind generators makes the electricity they produce less valuable. The first wind turbine brings a slightly above-average price per kWh. But with 30-percent market share, since all wind producers sell electricity at the same time (when the wind blows), the electricity is worth only 70 percent of the average electricity price. Solar prices drop even faster at similar market shares. So wind and solar generators have to be much cheaper than the average price to be competitive.

Moreover, wind and solar make fossil-fuel-generated electricity more expensive. Some people may think that is a good thing; but, if our societies are to continue functioning in cloudy, windless weather, that means relying on some fossil fuels. The IEA estimates that 56 percent of electricity will come from fossil fuels in 2040, with nuclear and hydro accounting for another 28 percent.

Significant wind and solar usage reduces the number of hours gas and coal generation operates; with large fixed costs, this makes every kWh more expensive. In a real electricity market, this would result in much higher electricity costs on windless evenings. But this is politically problematic, which is why markets are often constructed to spike much less.

In Spain, gas plants were used 66 percent of the time in 2004, but only 19 percent of the time now, largely because of more wind use. Because the plants must be kept running 57 percent of the time to avoid losses, many are likely to close. Across Europe, possibly 60 percent of all gas-fired generation is at risk.

Keeping the lights on means either accepting much higher prices or emulating what many European governments are beginning to do—subsidize fossil-fuel plants. For example, in 2018 alone, the United Kingdom will pay nearly £1 billion ($1.5 billion), mostly to

fossil-fuel-based generators, to keep backup capacity available for peak power usage. Building more wind and solar generating capacity with subsidies means societies end up paying thrice for power—once for the power, once for subsidies to inefficient renewables, and once more to subsidize our now-inefficient fossil fuels.

Many will say, “But at least we cut CO2.” That is true, although the reduction is perhaps only half of what is often touted, because the backup power needed to smooth intermittent wind and solar is often more CO2-heavy. Moreover, we pay dearly for these cuts. In 2013, the world produced 635 TWh of wind electricity and paid at least $28 billion in subsidies, or $76 per avoided ton of CO2, and likely twice or more than that. When the estimated damage costs of CO2 are about $5 per ton, and a ton of CO2 can be cut in the European Union for about $10, we are paying a dollar to do less than 7-13 cents of good for the climate.

And its positive impact on the climate is negligible. Consider two worlds: In the first, all governments implement all their green promises, as indicated by the IEA, and increase solar and wind energy more than sevenfold by 2040; in the second, not one new solar panel or wind turbine is purchased over the next 25 years.

The difference in subsidy spending between the two worlds is more than $2.5 trillion. Yet the difference in temperature increase by the end of the century, run on the United Nations climate panel’s own model, would be a mere 0.0175°C (0.03°F).

One day, when the wind price has fallen much further and solar is almost as cheap as wind, significant investments in wind and solar could be a great idea. But even after decades of capital reallocation, these sources might account for a bit less than a quarter of our electricity.

In short, a world powered by solar and wind—one that has resolved the climate challenge—is very unlikely anytime soon. Project Syndicate

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