

We don't have to accept grid congestion

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“Grid congestion” is plaguing the Netherlands, Germany, and now recently, Belgium as well. Today, thousands of companies and consumers cannot connect to the electricity grid and are resorting to diesel generators as fall back.

Jan Rosenow, Europe's leading expert on the energy transition, described this recently as a sign of success: it shows that numerous bottom-up electrification initiatives are underway, ranging from solar installations and wind farms to the electrification of industrial processes. The bottleneck is shifting from renewable energy production to its transport and distribution.

So yes, from a distance it looks like good news for electrification, but grid congestion is undeniably bad news for Europe's economic growth and for global warming. We don't have to resign ourselves to it or wait until new high-voltage lines are finally built.

The European Commission recently presented an ambitious plan to tackle grid congestion. By 2040, it aims to massively scale up grid capacity through a mix of major infrastructure projects, simplified TEN-E rules, cross-border cooperation and faster permitting procedures.

The Commission now also requires grid operators, when deploying cross-border networks, to examine the potential of “non-wire solutions”. These are often digital solutions such as digital twins, granular data, sensors and AI that allow us to monitor, plan and adjust transmission and distribution networks in real time.

Think of it like a typical traffic jam problem: installing extra cables is like widening the motorway, whereas grid-enhancing technology is like adding flexible rush-hour lanes combined with Waze. It provides a real-time, detailed overview of the areas of the network that are not yet saturated.

Grid technologies can create an estimated 20 to 40% of additional capacity in the very short term. It is good news that Europe now requires this on cross-border networks, but the biggest gains naturally lie in the national grids.

The cost of grid-enhancing technology is barely 10% of what it costs to build a new line. Across Europe, the potential savings are estimated at an astonishing EUR 700 billion in expansion costs.

Sounds too good to be true? Belgium-based scale-up Ampacimon managed to avoid USD 23 million in congestion costs on a single high-voltage line in the United States.

The difference in lead time is equally impressive. Connecting offshore wind through the traditional route can easily take 15 years. A drone installs a sensor in 10 minutes that increases the capacity of an existing line.

Technology is not a magic fix. We do need new infrastructure. But such infrastructure is technically complex and extremely time-consuming. We cannot afford to wait for years. By then, the damage would be beyond control.

Betting on two horses: infrastructure and technology

The good news is that we do not need to choose between infrastructure and digitalisation.

We can quite easily bet on both: build new lines and lay new cables, and at the same time rapidly unlock extra capacity on the existing infrastructure. The technology is proven and immediately deployable; financing is available through existing EU instruments and the European Investment Bank. Grid-enhancing technologies and general digitalisation result in a more robust grid, faster connections, faster electrification and lower energy bills. However, accelerated implementation of these technologies often requires a regulatory shift.

While billions and trillions are the talk of the town, we can achieve major economic, ecological and societal benefits in the short term with relatively “small” investments. What’s the saying again? Look after the pennies...