Higher price for CO2 lowers Europe's CO2 emissions during the pandemic
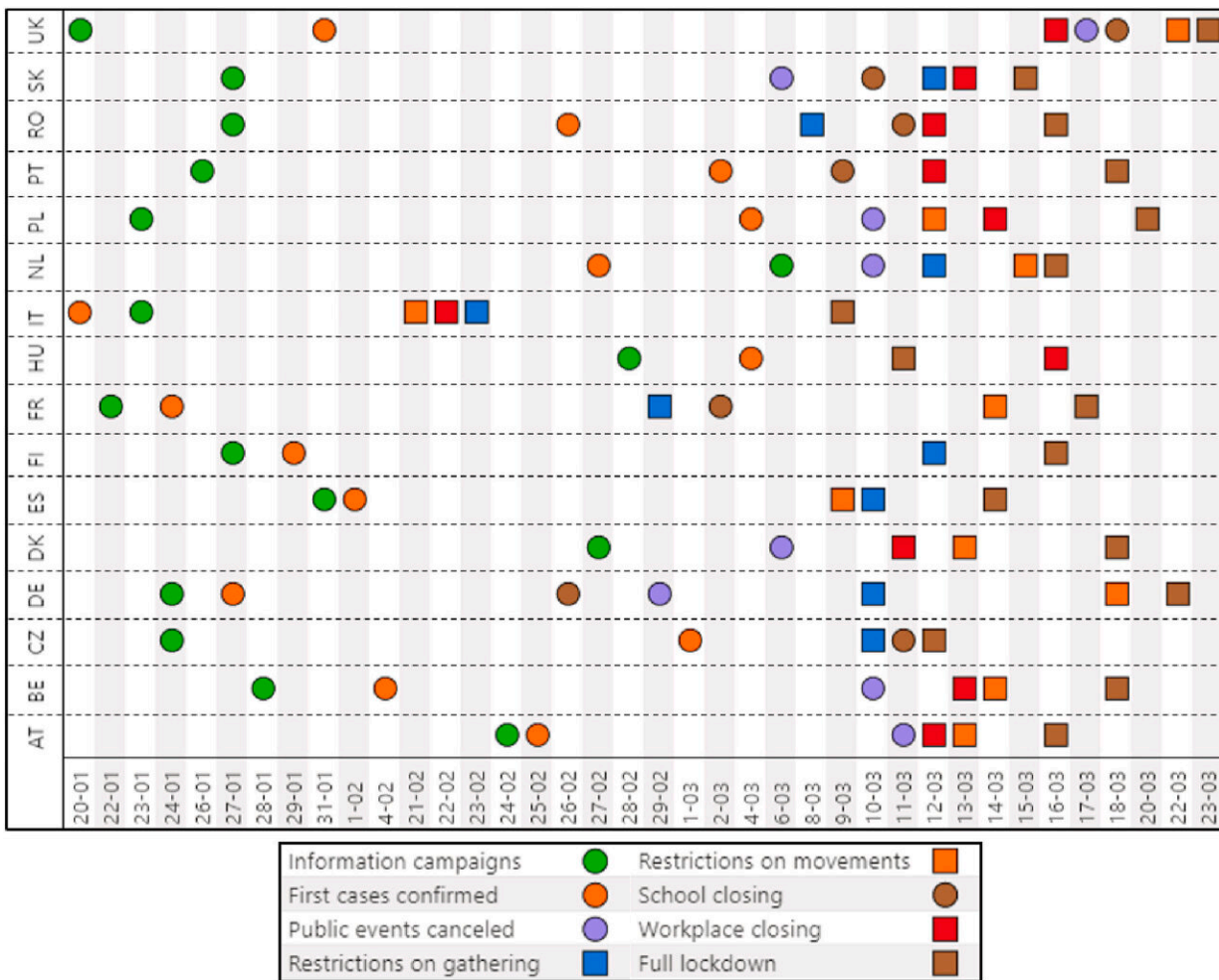
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Fig. 1. History of implemented containment measures. Credit: DOI: 10.1016/j.enpol.2021.112392

Public life and economic activity was reduced to a minimum as part of measures to tackle the coronavirus pandemic, which changed the demand on the energy market. Energy consumption and CO_2 emissions fell sharply to levels never seen before in times of peace. This reduction, however, was not constant in all regions, as CO_2 emissions in Europe fell lower than those in other regions on the planet. Economists at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and in Switzerland have been investigating how the reduction in demand for energy affected CO_2 emission levels in Europe.

During the entire lockdown, the demand for electricity fell by up to 19 percent and CO_2 emissions even fell by 34 percent per hour. This data from 16 EU states and Great Britain was collected and evaluated for the time between January and March 2020. The researchers discovered significant differences. The drop in CO_2 emissions in various countries varied greatly, depending on which source of energy suffered the drop in demand and how intense the 'demand shock' was.

The countries where the reduction in CO_2 emissions was most noticeable were those whose energy supply heavily relies on coal. These include Poland and Great Britain, but also Germany. If the certificates that must be purchased for increased CO_2 emissions are expensive, the drop in demand ensures that the more expensive 'dirty' electricity is replaced by alternative energy sources on the market. As the coronavirus pandemic spread across Europe at the beginning of last year, the price of these certificates was high and less electricity was being generated using coal, which led to a significant drop in CO_2 emissions.

In countries without high prices for CO_2, gas as a source of energy for electricity production was pushed out of the market. This resulted in a lower drop in CO_2 emissions as gas produces less CO_2 than coal. "Our research demonstrates that the reduction in emissions caused by a reduction in energy demand is significantly higher in cases where an

appropriate price for CO_2 is used than in cases where no CO_2 pricing or low CO_2 pricing is in place," explains Prof. Liebensteiner.

It is feasible that the reduction in CO_2 emissions will only last for as long as it takes for the economy to recover from the pandemic, as was the case during the global financial crisis in 2009. Even though there was a reduction in carbon dioxide emissions, no structural changes have been made towards lower carbon content energy sources. The researchers have published their findings in the journal *Energy Policy*. "Our results demonstrate that a sufficiently high price for emissions would immediately increase the efficacy of measures to improve energy efficiency," says Prof. Liebensteiner. "In the long term, this could herald structural change in electricity supply by means of incentives for investments in technologies that produce fewer emissions."

More information: Adhurim Haxhimusa et al, Effects of electricity demand reductions under a carbon pricing regime on emissions: lessons from COVID-19, *Energy Policy* (2021). DOI: 10.1016/j.enpol.2021.112392

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