On the Road to Paris: The Shifting Landscape of CO₂ Reduction

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Amidst the United States’ withdrawal from the Paris Agreement and the Trump administration’s move to replace the Clean Power Plan (CPP) with the less restrictive Affordable Clean Energy (ACE) plan, we asked last year whether the U.S. power sector might still meet the goals of the Paris Agreement.1 We showed that, thanks to low natural gas prices and subsidies for renewable energy, it was still possible to meet the CPP’s 2020 and 2025 requirements, but that meeting the 2030 reduction targets would require even lower natural gas prices or more proactive regulatory activity.

We find ourselves now a year later, with the compliance target landscape largely unchanged, but a market environment materially different. It is not only the current market environment that has changed, but also expectations about the future that have changed. We called for a “light-touch” regulatory approach that preserved as many options as possible, and by examining the challenge of CO₂ reduction as it stands now, we see how this approach is validated.2 We’re still on the road to Paris, even if the terrain has required us to change vehicles and take a different route.

To evaluate 2020, 2025, and 2030 compliance, we used data from the U.S. Energy Information Administration’s 2019 Annual Energy Outlook (AEO) to examine projected power sector CO₂ emissions under different scenarios. The most striking finding is that the trend in falling emissions that had been in place for nearly 15 years has abruptly stopped. For years, falling natural gas prices drove falling CO₂ emissions, as the growing economic competitiveness of gas-fired generators prompted the retirement of older coal-fired generators. But with natural gas prices hovering at multidecade lows, their ability to drive further CO₂ reductions beyond the 2030 targets through fuel switching was limited.

Further, as Figure 1 illustrates, CO₂ emissions continue to decrease even under a projected increase in future natural gas prices. While our analysis last year required the low natural gas price scenario from the 2017 AEO to meet the 2025 CPP mass target, the updated forecasts in the 2019 AEO reveal a surprisingly different picture: CO₂ emission levels are now near the 2030 target by as early as 2020! And even in a constrained natural gas scenario, where prices nearly double from current levels, 2030 emissions are projected to be well below the CPP’s 2030 target.

Just because the gains from low natural gas prices had run their course, it did not mean that the ability of the market to adapt had reached its limit. The discussion of natural gas as a bridge fuel was intended to suggest that cheap, lower CO₂-emitting natural gas would buy us time while renewable energy technologies became cheaper and more efficient. With the aid of modest subsidies for renewable energy, the bridge has been wildly effective, and the price of renewable energy has plummeted. The levelized costs for wind and solar have fallen by double-digit annual percentages over the last two years, as their capital costs have decreased and generation has increased.4 As a result, wind and solar levelized costs (including current tax credit levels) are now lower than the costs of new natural gas combined cycle generators, and they have been the driving force behind the significant reductions in CO₂ emissions that have been realized.

A light touch indeed! A policy of encouraging lower natural gas prices, while continuing to extend subsidies to renewable energy, has facilitated the low-CO₂ refreshment of the U.S. fleet in a cost-effective and unpredictably quick way. Preservation of options—including natural gas, wind, and solar—has allowed us to stay on the road to Paris by switching vehicles and routes as the changing terrain requires.

But the very opportunities that permit this achievement also show its vulnerabilities. Look at the changes to our outlook in just two years between the 2017 and 2019 AEOs. We stand in...
front of a future fraught with uncertainty. Today, the machinations of chance closed one door (gains from falling natural gas prices), while opening another (gains from declining renewable power costs). Tomorrow, nature may work more unanimously against us. Or not.

So where do we go from here? It is more important than ever to ensure that uncertainty is reflected in policy planning. Policymakers must also take steps to attempt to “lock in” our current gains through 2030, while simultaneously extending the planning horizon now out toward 2050 to target the Paris agreement’s ultimate objectives. We must ensure that many paths to our future goals remain open so that short-term lock-in does not limit the options available for long-term gains. Extending the planning horizon beyond 2030 will require the U.S. to confront the loss of its existing carbon-free nuclear fleet beginning in the 2030s. Achieving deeper reductions in CO₂ emissions may require deployment of carbon capture and sequestration for gas-fired plants. As the terrain changes, we must have a flexible plan to adapt.

A key policy decision point in this process involves how politicians and regulators will now choose to balance applications of the carrot and stick. To this point, the carrot-heavy approach of tax credits and support for low natural gas prices has worked wonders. As Figure 1 illustrates, however, we remain far from the deeper reductions in CO₂ emissions being proposed. It will become increasingly difficult to achieve those reduction levels in the time frame required without making more difficult choices.

We must acknowledge that our gains to date have been achieved because the policies we have pursued have been aligned with CO₂ reduction, rather than explicitly targeting it. Price is the lever of markets, and without an actual value placed on carbon reduction, the ability of incentives alone to deliver further gains may be insufficient given the distance we have yet to cover. We can—and should—continue to offer the carrot of investment in new technologies, but if the pace of improvement is not fast enough, the only alternative to market forces that is not hostage to the vicissitudes of chance may be the regulators’ stick.

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Notes

The authors declare no competing financial interest.

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