

# The End of Oil

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## Abstract

It is now plausible to envision scenarios in which global demand for crude oil falls to essentially zero by the end of this century, driven by a combination of improvements in clean energy technologies and adoption of increasingly stringent climate policies. This paper asks what such a demand decline might mean for global oil supply once the industry adopts a belief that the decline is upon it. One concern is the well-known “green paradox” effect: because oil is an exhaustible resource, producers may accelerate near-term extraction in order to beat the demand decline. This reaction would increase near-term CO<sub>2</sub> emissions and could possibly even lead the total present value of climate damages to be greater than if demand had not declined at all. However, because increasing or even maintaining the rate of oil production requires investments in wells and other infrastructure, and because such investments can be long-lived, the opposite effect may also occur: an anticipated demand decline causes firms to reduce their investments, hence decreasing near-term production and CO<sub>2</sub> emissions. I develop a tractable model that incorporates both of these effects in a market with heterogeneous producers—while also capturing industry features such as exercise of market power by low-cost OPEC producers and marginal drilling costs that increase with the rate of drilling—and examine quantitatively which effect is likely to outweigh the other. Preliminary results indicate that for model inputs with the strongest empirical support, the disinvestment effect dominates the traditional green paradox effect. In order for an anticipated demand decline to substantially increase near-term global oil production, I find that industry investments must have very short time horizons, and that producers must have discount rates that are comparable to U.S. treasury bill rates.