

# The pivot toward sustainability finance

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At the start of the year, it's always a good idea to look around and see what has changed during the previous 12 months. In mid-December, energy consultant Amy Myers Jaffe examined the state of sustainability finance in a terrific article titled "[This Was the Year Investors and Businesses Put Big Bets on Climate: A lot of individuals, institutional](#)

[investors and companies hope to profit from reducing emissions.](#)"

This is no surprise. My Columbia colleague, Professor Satyajit Bose, created and leads our certification program in sustainability finance, and he, our students, alums, and faculty engaged in this area have been working to develop and grow this field for about a decade. The [piece](#) by Amy Myers Jaffee presents several data points worth noting:

"Investor demand for climate-friendly stocks has surged in the past couple of years. Tesla Inc., for instance, had a [market value](#) of more than \$1 trillion as of Friday, up from \$300 billion in the summer of 2020. Hydrogen-fuel-cell firm Plug Power Inc. had a market capitalization of \$19 billion, up from \$270 million in 2018. The stock price of First Solar Inc., a U.S. integrated solar firm, was near its five-year high at \$97 a share, rising steadily from barely \$30 at the start of 2017. Clean-energy ETFs hit more than \$25 billion in total assets in the first half of 2021, making their ownership as preponderant of a trade as technology stocks were during the dot-com craze (although I'm certainly not implying an inevitable collapse)."

Of course, some of these increases must be viewed as part of an overall market rise. Nevertheless, not only are investors interested in these green stocks, but they are less interested in fossil fuel companies. I strongly believe that the only way for fossil fuel companies to survive is to redefine themselves as [energy companies](#) and gradually self-divest of fossil fuels. The organizational capacity of these firms should be utilized to get into the renewable energy business as quickly as they can. I am confident that an oil company executive reading this will think I am some kind of naive environmental academic, and perhaps I am. But they might want to remember Kodak, a company that helped invent electronic photography, but went bankrupt because they were unable to market their own inventions in photo technology and did not understand changing consumer preferences. Contrast that to AT&T—a monopoly

broken up by the [federal government](#) but surviving to this day because it moved from telegraphs to land-line phones and then to cell phones, defining itself as a communications company and surviving through multiple technological revolutions. Fossil fuel companies can lobby Congress all they want, but in the end, they will either adapt or eventually go out of business. They don't need to believe me, but they should focus on what the financial markets are saying.

Fossil fuel companies are losing ground to renewable energy firms in attracting new capital, as Amy Myers Jaffe reported in the [Wall Street Journal](#):

"When it comes to investing in real, nonfinancial assets, the shift is even more stark. Private-equity firms that were previously focused on traditional oil, gas and coal assets are pivoting to green portfolios as a selling point to institutional investors, especially [pension funds](#). The firms raised \$52.2 billion for new renewable funds in 2020, up from \$44.6 billion in 2019. That contrasts with conventional oil, gas and coal funds, which brought in \$8.3 billion last year, down from \$20.9 billion in 2019... In contrast to the money being made on this climate-change mania, fossil-fuel-company stocks have fallen out of favor. Even with \$70 oil, oil and gas stocks barely make up 1% of the S&P 500, down from 4% a year ago and over 11% a decade ago."

The financial movement is an indication that [climate science](#) has been accepted by smart people who have decided to bet their livelihood (or at least their client's money) on the necessity of addressing global warming. Investors are reflecting trends in society as a whole; they are not leading anything here. Pension funds and university endowments have been directed to invest in the green economy. Some are under pressure to divest from fossil fuels, but the market performance of the [fossil fuel companies](#) would drive [institutional investors](#) away anyway.

One would think that the recent terrifying super-charged tornado in Kentucky and several other midwestern states and a suburban drought-induced late December flash-fire in Colorado might bring climate skeptics to at least a grudging acknowledgment that something new and disturbing is happening here on Earth. The stark and horrifying images of destruction will not fade from memory, and the human suffering of thousands of Americans will impact our conscience and our politics.

The effort to decarbonize the world economy will be a generation-long struggle, but it's very clear that 2021 represented a turning point of sorts. There is massive renewable energy and climate adaptation investment embedded in President Biden's U.S. government-wide green procurement policy and in the trillion-dollar bipartisan infrastructure law. Those moves mark a stark departure from the climate denialism of the Trump years. The U.S. government has tremendous influence and can create an investment environment that reinforces market tendencies. I think we are seeing that now.

As a sustainability educator, I am struck by the need for professionals in this field to be educated in a number of disciplines if they are to be successful in understanding and advising investors about environmental risks and opportunities. The typical finance student in our business schools tends to know very little science. Occasionally you'll see a business school student with an engineering or computer science background, but they rarely know much about climate science, climate modeling, ecology, and earth systems science. Even those with an engineering background may not understand renewable energy and microgrids. Unlike standard investment analyses, looking at consumer demand, debt structure, revenue, earnings, return on investment, [production processes](#) and even political risk is insufficient. Environmental risk is complex. And no single professional can understand all the science they need to know to correctly advise and invest. What we need are professionals who know what they don't know

and are good at tapping into the expertise needed to evaluate environmental impacts along with the usefulness and feasibility of emerging green technologies. At Columbia, we are working to educate such professionals in our sustainability management, environmental science and policy and sustainability finance programs.

The effort to reduce [greenhouse gasses](#) from energy production and consumption is only the first phase of our effort to eliminate human-induced climate change. Much more challenging work will follow. Greenhouse gases such as methane are produced in part by landfills and livestock. They will need to be controlled. Carbon dioxide is produced by cement manufacturing, and other industries that emit greenhouse gases will also need to be addressed. Additionally, green technology is increasing demand for minerals that are being mined in destructive ways. Unlike energy generation, some of these production processes have not received a great deal of attention, but once the momentum behind green energy is established, we should expect to see increased attention paid to these critical environmental issues.

Over the next several decades, the transition to a renewable resource-based economy will require massive infusions of capital. That can only be accomplished if financial market professionals understand enough science to navigate uncertain conditions and new technologies. A clear regulatory environment is needed to assure investors that we are serious about mitigating climate change. The U.S. plays a critical role in leading climate policy. My hope is that even if a conservative American national government abdicated climate leadership once again, the market forces we saw in 2021 will be too deeply established to deter.

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