

DIALOGUE

GREENFLATION: ARE COMMODITY PRICES ACTUALLY RISING?

SUMMARY

What impact does inflation have on environmental sectors? Economists have recently raised concerns about “greenflation,” a term coined to describe rising commodity prices associated with going green, due to a higher demand for sustainable materials. The implementation of more carbon-neutral regulation and increasing environmental, social, and governance (ESG) practices may contribute to these rising costs. On January 26, 2022, the Environmental Law Institute hosted leading experts for an in-depth economic discussion about greenflation, regulations, and ESG practices. Below we present a transcript of that discussion, which has been edited for style, clarity, and space considerations.

Michael Curley (moderator) is a Visiting Scholar at the Environmental Law Institute.

Urvashi Kaul is an Adjunct Assistant Professor in the School of International and Public Affairs, Center for Environmental Research and Conservation, Columbia Climate School.

Doug Vine is Director of Energy Analysis at the Center for Climate and Energy Solutions.

Sara K. Orr is a Partner at Kirkland & Ellis LLP.

Michael Curley: Welcome to this discussion on an increasingly important topic: how money is going to affect people’s efforts on climate change and other elements of environmental sustainability. We have three fabulous panellists today.

Urvashi Kaul works in non-credit risk advisory at Capital One. Prior to this, Urvashi was an assistant director for economic research and analysis at the New York City Economic Development Corporation. Urvashi also served as the standing advisor to the New York City Labor Market Information Service at the Center for Urban Research at the City University of New York.

Doug Vine is the director of energy analysis at the Center for Climate and Energy Solutions (C2ES). Doug leads the center’s work on energy decarbonization policies and technology analysis. He is currently researching pathways toward decarbonizing power and industrial-sector emissions, including widespread electrification and the use of low-carbon fuels like hydrogen.

Sara Orr is a partner in the Chicago law office of Kirkland & Ellis. Sara advises clients around the world on environmental, social, and governance (ESG) issues. She has almost two decades of experience working with private equity, corporate, and financial institutional clients on thousands of transactions. Her practice specifically focuses on corporate sustainability programs, public company

environmental and social governance reporting, environmental and social governance litigation risk analysis, and shareholder activism, corporate governance, ESG due diligence, and supply chain and human rights.

Urvashi Kaul: If you told me that I was going to be talking about prices, inflation, commodities prices, and logistics on a Thursday afternoon, I might not have been excited. However, when you throw ESG into the mix, it increases the interest level tremendously.

ESG has evolved. It means different things to different people. Sometimes it’s been used as an acronym for socially responsible investing and corporate social responsibility, impact investing, triple bottom line, and so on. Simply put, ESG criteria are a set of standards for assessing the impact of sustainability and business practices of a company, the impact on its financial performance, as well as its operations.

I’ll attempt to provide a bit of color to each of the ESG criteria. When I say environmental, I mean the company’s impact because of its use of natural resources that has an impact on the environment. That’s what the environmental criteria try to measure—whether it’s pollution, waste, the use of natural resources, energy efficiency, etc.

When I say social, I am referring to the company’s interactions with communities. Whether it’s human rights issues in its logistics and supply chain, whether there is a positive or a negative community impact, or whether the impact is because of the inherent nature of what the company produces, or its policies and practices. Work force and product safety, privacy, and such issues are within the realm of social criteria.

Lastly, governance refers to the internal decisionmaking and legal compliance of a company. It deals with board quality, independence, and diversity; it deals with shareholders’ rights, how much the highest paid employee or

executive is making in compensation relative to the lowest paid employee, and the like.

What sets the use of ESG criteria apart is really the data-driven aspect of the methodology. Increasingly, there are ever-evolving standards and metrics that help you measure risk, on the downside, as well as opportunities to generate returns. There's both measuring and mitigation of risk, and there's a creation of value. It has garnered interest because ESG integration into business analysis or investment decisions has resulted in mitigating risk and optimizing returns.

As I said, ESG has evolved and reached a point now where almost everyone is thinking about it. I started talking about ESG formally in 2012 or 2013, when I was at the Robert F. Kennedy Center. There, I started a program working with investment managers and asset owners to implement ESG criteria into their decision making process.

At that time, I would spend the first meeting with people explaining what ESG is and why it is relevant. I don't seem to have to make that argument anymore. Things have evolved. ESG market is growing. Bloomberg estimates that ESG assets under management are expected to account for one-third of all global assets under management in 2025 at about \$53 trillion.¹ This is really a midline estimate. They have a low, a high, and a medium, and the rate of growth in the ESG assets that they extrapolate to get to this number is actually more conservative than the rate of growth we have seen in the past few years.

Rather than going into detail about macro trends that might be impacting the interest in ESG, I want to focus on the manifestation of some of the macro trends that humanity as a whole is experiencing. There is an increasing shareholder acceptance of the importance and relevance of ESG. By stakeholders I mean investors, business leaders, consumers, and employees. All of these stakeholders acknowledge the importance and relevance of ESG. That's not to say that every business leader and every investor recognizes this, but it's enough to build a momentum.

There is an EY report on the proxy season of 2021.² ESG generated the biggest headlines. There was a PwC survey at the end of last year that said the majority of consumers, 83%, think companies should be actively shaping ESG practices.³ They're willing to pay the premium for it. A majority of business leaders think, via their company, that they have a responsibility. Employees think the same.

In addition to this corporate stakeholder trend, governments and international and multilateral organizations are driving some of the focus. At an international level,

there is the Paris Agreement,⁴ for example, that obliges its 195 signatories to reduce the risks and impacts of climate change. There's an objective to get to net zero by 2050—or declining toward net zero through mitigation and carbon removal efforts by 2050.

The Principles for Responsible Investment,⁵ which have about 2,500 signatories that are asset owners and investment managers, have ESG objectives and policy commitments. They are not investing in fossil fuel, increasing reporting and disclosures, and so on.

Then, there are the 17 United Nations Sustainable Development Goals.⁶ They also have about 169 associated targets. They're aspirational. They impact the commodities sector as well in their aspirational targets. They have targets such as sustainable management and efficient use of natural resources, reducing the amount of fossil fuel subsidies, and so on.

All of this is to say that many ESG actions historically would have been considered voluntary, niche, or sector-specific, but all of these trends, whether it's business, consumer interest, government, and multinational or multilateral organization interest, have resulted in ESG criteria finding a way into regulations and laws. In a few cases at least, ESG reporting is becoming mandatory.

Even if not a publicly listed company, there are more and more financial institutions, for example, that have also started incorporating an ESG policy that restricts lending or investment in certain industries, whether it be coal mining, fossil fuel extraction, private prisons, etc.

All of this has been exacerbated, if you will, in the past two years because of the COVID-19 pandemic. We can't really ignore it. It's the big elephant in the room that has highlighted socioeconomic issues. I think the focus that there's been an opportunity to build a more sustainable future has also been reinforcing and accelerating these targets and objectives. So, why now? Because there is a confluence of all these trends.

The incorporation of ESG criteria and recognition of them as important has implications. It affects all industries, and commodities are no exception. It's one of the biggest opportunities and challenges that commodities pricing or commodities demand and supply might face. There's no denying that commodities are here to stay. We need commodities. Now, there's an expected increase in demand because of large initiatives. We have to maintain and replace our aging infrastructure. We have to combat climate change. We have to transition to carbon-neutral technologies.

1. *ESG Assets May Hit \$53 Trillion by 2025, a Third of Global AUM*, BLOOMBERG INTELLIGENCE (Feb. 23, 2021), <https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/>.

2. Jamie Smith, *What Boards Should Know About ESG Developments in the 2021 Proxy Season*, EY (Aug. 3, 2021), https://www.ey.com/en_us/board-matters/esg-developments-in-the-2021-proxy-season.

3. PwC, BEYOND COMPLIANCE: CONSUMERS AND EMPLOYEES WANT BUSINESS TO DO MORE ON ESG (2021), <https://www.pwc.com/us/en/services/consulting/library/consumer-intelligence-series/consumer-and-employee-esg-expectations.html>.

4. United Nations Framework Convention on Climate Change, *The Paris Agreement*, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (last visited Mar. 4, 2021).

5. See *Sustainable Commodities—A New Reality?*, REEDSMITH (June 30, 2020), <https://www.reedsmith.com/en/perspectives/2020/06/sustainable-commodities-a-new-reality>.

6. Transforming Our World: The 2030 Agenda for Sustainable Development, G.A. Res. 70/1, U.N. GAOR, 70th Sess., U.N. Doc. A/RES/70/1 (2015), https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf. See also United Nations Department of Economic and Social Affairs, *The 17 Goals*, <https://sdgs.un.org/goals> (last visited Feb. 14, 2021).

All of these events, all of these trends, are occurring simultaneously as there is an increasing concern about environmental and social impacts of our collective actions. “Our actions” include corporate actions and government actions. And, depending on how it’s done, the life cycle of a commodity, like the process of acquiring commodities, whether it’s via extraction or sourcing them from regions where there might be a conflict supplying them, transporting them halfway around the world, or even using them, as you know, we use coal and gas as fuel.

Each of these separate actions can have an adverse consequence for the environment. It could raise governance issues. There could be some employee discrimination issues, for example. There could be social issues, having exploited the labor conditions, for instance, which has been in the news. All this is, to my mind, going to point toward the fact that there will be an increased scrutiny of ESG policies and performance.

Supply chain transparency will become more and more important to all stakeholders. The farm-to-fork framework is widely talked about now where you want to know what you’re using, where it started off, and where it ends up.

All in all, while the demand is increasing, supply is constrained because investment is, like I said before, curtailed in certain types of activities, such as mining or extraction. Then there are all these supply chain limitations, among other reasons, but these are the most relevant for the conversation today.

Bottom line: There’s a higher demand. There’s a reduced or constrained supply. So, you would expect some pressure on prices, an inflationary pressure.

There’s a spectrum of opinions here, and I would like to leave you with a sampling of these opinions. I read an article that going green could save the world, but we’re all going to have to pay for it.⁷ At least some have that view. There are worries that government policies and focus on ESG translate into higher costs for consumers. And we have a term for it, “greenflation,” whether accepted by all or not, but increasingly being used, and the topic of our conversation today.

Ruchir Sharma, who is the chief global strategist at Morgan Stanley, wrote in *Financial Times* that this new government-directed spending is driving up demand for materials to build a cleaner economy.⁸ At the same time, there is tightening in regulation, which means there are limits on investment in mines, and so forth. The unintended consequence here is greenflation, or rising prices for metals and minerals that we need to build our green infrastructure.

Jack Manley at J.P. Morgan Asset Management said in an article that there is an upward pressure for costs for

going green or as a result of being green.⁹ So this is one side of the spectrum.

There’s no denying that all eyes are on inflation, from cars to electricity, housing, phones, and food. We are paying more. Americans are paying more than they’ve had to pay in a long time. In fact, so much so that worries about greenflation might even have impacted Sen. Joe Manchin’s (D-W. Va.) willingness to stall the climate and social spending bill because of fears of accelerated inflation. So, it has real-life impacts.

One view is that there is evidence that some of these price increases are due to climate action. Doug may go into this in more detail. As an example, coal is more expensive because fewer U.S. miners are producing coal and not enough to meet demand, steelmakers are cautious because of their carbon footprint, and so on.

But I don’t think all inflationary pressures can be attributed to greenflation. Greenflation is not everywhere. I don’t think increasing oil prices can be 100% attributed to greenflation. There are other interests at play here in an effort to keep the prices high by the Organization of the Petroleum Exporting Countries, for example.¹⁰ Or even the supply chain issues. There are shipping bottlenecks that continue to impact global trade that go beyond the energy transformation or greening of the space.

Some people think that these pressures may be short term. For example, greenflation may be a concern in the short run because of decreasing costs of financing green projects and economies of scale. In the long term, they will balance out the increasing costs.

There are others who talk about a “green premium,” such as Bill Gates in his book *How to Avoid a Climate Disaster*.¹¹ This green premium, or “greenium,” is defined by Gates as a difference in cost between a product that involves emitting carbon and an alternative that doesn’t. According to him, phasing out coal and rolling out electric vehicles will be expensive. In the short run especially, some greenium is inherently inflationary. We must accept that in the short run.

To take this to the other extreme of the argument, I read an analyst talking about borrowing for the Joe Biden Administration’s Build Back Better.¹² That’s okay because even though the green and fiscal stimulus will end up in an uptick in prices, it is worth it because the alternative is more dismal. It’s more bleak. There is a different kind of inflation if we don’t do this—a potential for volatile or uncontrolled food prices driven by extreme weather events or a spike in the cost of everything from housing, insurance, and so on.

7. Jael Holzman & Heather Richards, “*Greenflation*: Could Climate Action Overheat the Economy?, E&E News (Nov. 17, 2021), <https://www.eenews.net/articles/greenflation-could-climate-action-overheat-the-economy/>.

8. Ruchir Sharma, “*Greenflation* Threatens to Derail Climate Change Action, FINANCIAL TIMES (Aug. 2, 2021), <https://www.ft.com/content/49c19d8f-c3c3-4450-b869-50c7126076ee>.

9. Holzman & Richards, *supra* note 7.

10. *Id.*

11. BILL GATES, HOW TO AVOID A CLIMATE DISASTER: THE SOLUTIONS WE HAVE AND THE BREAKTHROUGHS WE NEED (2021).

12. Steven Desmyter, *The Greenflation That Markets Should Learn to Love*, FORBES (Mar. 25, 2021), <https://www.forbes.com/sites/stevendesmyter/2021/03/25/the-greenflation-that-markets-should-learn-to-love/?sh=76d1495b3cab>.

Doug Vine: I'll briefly introduce myself and my organization. Then, I'll talk about the challenge of climate change, the basic plan for decarbonization, and the opportunities and challenges that we face in decarbonizing the economy, including the challenge of greenflation.

I am the director of energy analysis at C2ES. I've been with the Center for 10 years now. My work largely focuses on energy decarbonization policies and technical analysis with a particular focus on reducing emissions in the power and industrial sectors.

C2ES is now in its 24th year. We are an independent, nonpartisan, and nonprofit organization focused on strong policy and action to address climate change. Our core mission is to forge practical solutions to reduce greenhouse gas emissions, expand clean energy, and strengthen resilience to climate impacts. We have a long history of bringing together diverse stakeholders and producing accessible content and publications to help promote climate solutions.

One of the unique features of C2ES is our Business Environmental Leadership Council. We believe that business engagement is critical for developing efficient, effective solutions to address climate change. The council includes top companies in the electric power, manufacturing, high tech, transportation, oil and gas, and finance sectors. It's the largest U.S.-based group of companies devoted solely to addressing climate change.

I should point out that although C2ES is supported by institutional funding from a variety of businesses, foundations, and individual donors, we are solely responsible for our positions, web content, and publications.

Let's take a look at the challenge before us. I'll go into a little more detail, as I think some of this information will be useful in the upcoming discussion. We, the United States and the world, need to decarbonize economywide by 2050. Increasing global temperatures, a result of burning fossil fuels at an accelerating rate since the beginning of the Industrial Revolution, are having a profound effect on our climate. Today, the world collectively emits around 50 billion metric tons or 50 gigatons of carbon dioxide (CO₂) equivalent each year.¹³ That's more than 40% higher than emissions in 1990, when they were around 35 gigatons.¹⁴

Once CO₂ is in the atmosphere, it takes centuries to break down and dissipate—on the order of 100 to 200 years. We are injecting CO₂ and other greenhouse gases into the atmosphere faster than they are breaking down. As a result, atmospheric concentrations of CO₂ are now greater than 410 parts per million.¹⁵ They've increased fairly dramatically since the 1960s when they were only around 300 parts per million.¹⁶ And just for a point of reference, pre-industrial levels were around 270 or so parts per million.¹⁷

13. Hannah Ritchie & Max Roser, *Greenhouse Gas Emissions, OUR WORLD IN DATA*, <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions> (last updated Aug. 2020).

14. *Id.*

15. Rebecca Lindsey, *Climate Change: Atmospheric Carbon Dioxide*, CLIMATE.GOV (Oct. 7, 2021), <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>.

16. *Id.*

17. *Id.*

As a result of increasing concentrations, we've seen a commensurate rise in global temperatures. The average global temperature in 2021 was about 1.1 degrees Celsius or 2 degrees Fahrenheit above the pre-industrial era, making 2021 the seventh hottest year on record.¹⁸ 2020 tied 2016 as the hottest year on record.¹⁹ Basically, the past seven years, I believe, have been the hottest years on record. With each subsequent decade, we are seeing hotter or warmer temperatures. The warmer air and water are causing the sea level to rise and extreme weather events to be more frequent and intense, and rising CO₂ concentrations are making the ocean more acidic.

Climate change impacts as we see on a fairly regular basis are here and now. In 2021, there were 20 weather/climate disaster events, with losses exceeding \$1 billion each, that affected the United States.²⁰ The events included one drought, two flooding events, 11 severe storm events, four tropical cyclone events, one wildfire event, and one winter storm event.

Our time to act and avoid the worst impacts of climate change is limited. Many studies have shown that we need to completely decarbonize the United States and global economy and achieve carbon neutrality by 2050.

As you can see in Figure 1, here in the United States we have a lot of work to do. The figure shows U.S. energy-related CO₂ emissions since 1990. This is from the Energy Information Administration (EIA) Annual Energy Outlook. EIA produces an outlook every year, and it usually comes out in January or early February. It shows the reference case in the solid lines and the business-as-usual forecast as dashed lines.

We have seen some declines in emissions since 2005 economywide. Energy-related CO₂ emissions have fallen about 19%. Power-sector emissions, which make up around 30% of total energy-related CO₂ emissions, have fallen by around 35%. These are preliminary numbers. We will have the official numbers around March for 2021. It's kind of a rough calculation.

A combination of market and policy forces have led to the emissions decline over the past dozen years. We can get into more detail on that. However, the EIA forecast shows that, absent new policies, we are not expecting to see further emissions declines. The dotted lines in Figure 1 are indicative of where emissions need to get to by 2050, so you can see the turn that we need to make. We believe, and many others believe, that policy is required, and that market forces alone are not going to get us there.

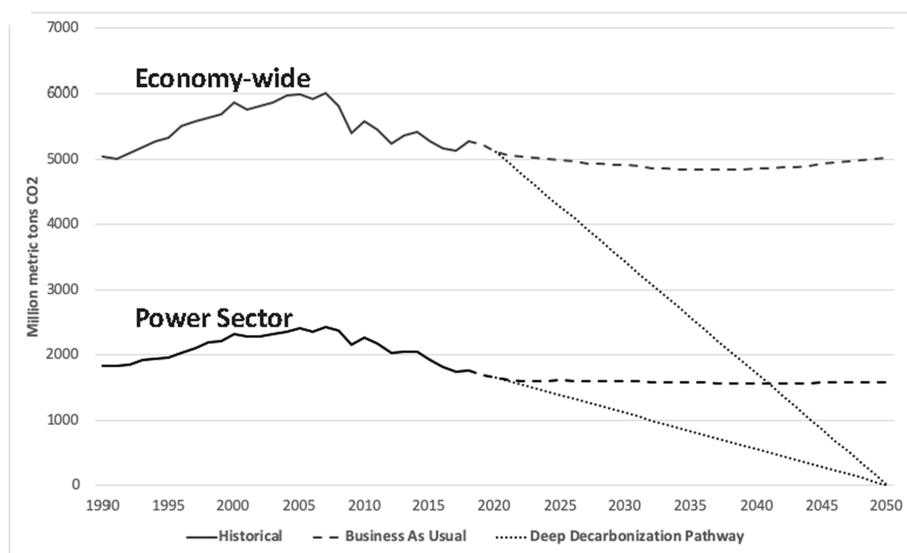
Now, on to this decarbonization challenge. What's the plan? How are we going to decarbonize the economy? Pathways to deep decarbonization generally focus on three equally important activities. The first is increasing deployment of energy efficiency. There's a lot we can do in making

18. 2021 Joins Top 7 Warmest Years on Record: WMO, UN News (Jan. 19, 2022), <https://news.un.org/en/story/2022/01/1110022>.

19. *Id.*

20. NOAA National Centers for Environmental Information, *Billion-Dollar Weather and Climate Disasters*, <https://www.ncei.noaa.gov/access/monitoring/billions/> (last visited Apr. 4, 2022).

Figure 1. U.S. Energy-Related CO₂ Emissions, 1990-2050



Source: U.S. EIA, Annual Energy Outlook 2019 (2020) (on file with speaker).

our buildings, industries, and transportation more efficient than they currently are and this is driving it. We need to reduce the total amount of energy that we are consuming. We can be a lot better at that than we currently are.

The next pillar is energy supply decarbonization, which involves decarbonizing the electric power sector. Finally, we need to promote and use fuel switching primarily to electric sources. For example, what we're seeing now is switching from gasoline- and diesel-powered vehicles to electric vehicles in the transportation sector. We've seen a lot of movement in this area, with just about every major global car company announcing billions of dollars of investment in new electric models, and battery factories as well.

In other sectors, we need to use more electrically driven appliances. For example in buildings, we need to use more electric water heaters and heat pumps in residential and commercial buildings. But importantly, there are challenging sectors to electrify, like industry and aviation for example. There are some end-uses that cannot be practically electrified. They can be, but they would come at extreme costs or there's significant challenges and hurdles in doing so. In these instances, we are considering paths of less resistance, like using fuels such as hydrogen, biofuels, renewable natural gas, and synthetic fuels.

A lot of people out there think and promote the idea that we can electrify everything. But as a practical matter, electrifying heavy-duty trucks, aviation, and industrial heat are really, really hard. So, we are considering using some alternatives to that. That's a key point that I'd like to get across. Also, that developing those fuels is in addition to having a non-emitting power sector and a greatly expanded power sector because it's going to be relied upon for much more than it is today.

There are many opportunities to continue to make progress on decarbonization. I pointed out that we have made

decarbonization progress, but we need to really accelerate the progress that we're making. This is going to lead to the discussion that we are having today.

The power sector is where the most progress has been made; yet we still have quite a way to go. Some of the contributing factors to the progress that we've made include federal research for decades in development, demonstration, and deployment of a range of technologies from solar electricity to batteries, to things like horizontal drilling and hydraulic fracturing. That has led to significant advances and cost reductions, and has allowed the commercialization of many technologies. Those have all resulted in emissions reductions that we're currently seeing.

On top of that, there have been some federal programs, federal tax credits, for example, like the production tax credit and the investment tax credit, that have incentivized and helped to speed the pace of clean technologies deployment.

Additionally, state policies have helped to promote clean technologies. Many states, beginning in the late 1990s and in the early 2000s, adopted renewable portfolio standards requiring that a specific amount of electricity should be generated by renewable sources. Over time, the standards have increased in ambition. A handful of states now have clean electricity standards that allow other types of electricity, like large hydro and nuclear power, to count toward the state's clean energy goals. At the same time, many companies have clean energy targets too. This is helping to drive demand and deployment of clean electricity.

Arguably, because of federal research and incentives as well as state and corporate policies, solar costs have dropped dramatically and deployments are accelerating. Every year, we're seeing a new record in solar capacity additions in the United States and globally. I should also mention that international targets like those set through the United Nations Framework Convention on Climate Change are

helping to keep the focus on decarbonization efforts.²¹ The United States has a new pledge to the Paris Agreement of reducing its net economywide emissions 50%-52% below 2005 levels by 2030.²²

Yet at the same time, there are many challenges. We currently lack comprehensive, or I would say strong, federal policy to combat climate change in the United States. There are some policies and climate-related incentives, as I've mentioned, but nothing like a price on carbon or an economywide clean energy standard that would really move the needle on removing CO₂ from the atmosphere.

Also, we lack solutions, good solutions or practical solutions, in some sectors and applications. We need to do more in innovation in helping to build up commercialization of hydrogen and other liquid fuels and gaseous fuels as well that will have important applications.

Always in the background, too, is this ongoing challenge in the power sector of resistance to building new transmission lines, which are critical for decarbonization. As large-scale projects, renewable projects, or otherwise, are moving closer to where people live, there's growing opposition to these new power generation projects.

Now, those I would classify as major challenges. But there's another one, too, and that's really the crux for today. At this point, I want to characterize inflation or greenflation as more of a speed bump, but it certainly could become a major challenge. I think it's something important to look at. It's the higher commodity prices, supply chain disruptions, and challenges procuring critical materials. For the first time, in the solar world at least, the price of solar panels is going up rather than down. After years and years of major price declines, they have suddenly become more expensive. We're seeing a price inflation for solar panels.

A little bit of background information. What exactly is inflation? It's rising costs of goods and services over time. Commodities are interesting. Commodities fluctuate quite a lot. Inflation is a little more sticky in that the prices actually stay high over time or for a longer period of time. Because of that, it's generally perceived as a bad thing, as it can raise the cost of living. Particularly, if your income doesn't keep pace with inflation, your buying power declines. Thus, lower-income families and people who live on fixed incomes are the most impacted by inflation.

One of the roles of the Federal Reserve Bank is to manage inflation to try to keep it below 2% on an annualized basis. It does not follow the price of a single item, but looks at a basket of goods. It's following something called the personal consumption expenditures price index, which covers a wide range of household spending. That index is produced by the U.S. Department of Commerce.

Inflation is very topical. It's in the news right now. It's at the highest level annualized that we've seen in 30 or 40

years, since the early 1980s, both because of the pandemic and the government's reaction to the pandemic. The Fed is expected to begin raising interest rates in March of this year. Some analysts expect four small interest rate hikes spaced out through 2022. I'm not really sure what happens beyond that. The Fed moves slowly and looks to see what impact that has over time; the impact of that will dictate what happens in 2023.

Why is it raising the interest rates? The theory goes that the hot economy that we have right now will cool down a bit and the demand for goods and services should lessen. Prices in some instances will recover, but some prices may stay higher because of things like wages that have to increase to retain workers. Though that's a little bit more sticky and could contribute to more permanent price rises for certain goods and services.

We've introduced a definition of "greenflation" as it relates to the energy transition. As the world accelerates toward the transition to low- or net-zero carbon emissions or decarbonization, demand for those infrastructure investments will lead to price shocks or rises associated with rising commodity prices, metal prices, energy costs, and even things like carbon taxes if we eventually have them here more broadly in the United States.

Effectively, everyone is competing for lithium, graphite, copper, silicon, and energy. It's too much money chasing after too few goods, so we're seeing price shocks. Interestingly, there was a big report by McKinsey and Company that came out yesterday.²³ It highlights the huge price tag to pay for all the changes that we need to have a global decarbonized energy system.

McKinsey looked at how much we would need to spend up to 2050. They've averaged it at about \$9.2 trillion in annual spending on physical assets out to 2060. Now, we'll spend a lot anyway, so that's important to consider. But it does represent about a \$3.5-trillion-more price tag than the world currently spends. That's not insignificant. That's about a 60% increase from what we're currently spending on power-sector infrastructure and other-sector infrastructure.

It's a fairly big price tag, but the signal is out there. I think we have some policy. We have price signals. We know the corporates have signaled what their intentions are. These are all the factors that are out there and contributing to inflation, or greenflation.

Sara Orr: It is a real pleasure to get to think about the economic impacts of the work that I've been doing full time as outside counsel to a number of different private equity firms, banks, and different corporations. It's very interesting to think about this as a global big picture.

Because I have a very typical lawyer brain and I need a tactile example of how this works, and I love shopping and fashion, I thought I would use the fashion industry

21. United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107.
22. THE UNITED STATES OF AMERICA NATIONALLY DETERMINED CONTRIBUTION REDUCING GREENHOUSE GASES IN THE UNITED STATES: A 2030 EMISSIONS TARGET (2022), available at <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>.

23. MCKINSEY GLOBAL INSTITUTE, THE NET-ZERO TRANSITION: WHAT IT WOULD COST, WHAT IT COULD BRING (2022), <https://www.mckinsey.com/business-functions/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring>.

and ESG issues in the supply chain as a case study of how greenflation might impact certain soft commodities like cotton.

A lot of the news covers greenflation in the context of hard commodities like minerals, oil and gas, and things that have a very tangible correlation to climate change and those types of impacts. Soft commodities, like cotton, are also natural resources that are impacted by a lot of the same trends and topics that my co-panelists already mentioned. Thinking about how ESG issues can be baked into regulatory actions that then might impact pricing of commodities and have a larger impact on supply chain issues will be our study here.

We're all wearing clothes right now. We all use products with textiles, so it's a very tangible example of something that requires the growth and production of raw materials. Cotton requires land to grow and lots of water. Some folks use different fertilizers and insecticides, and there are a lot of inputs into the production. Once it's made, it requires a lot of other natural resources and inputs to process it and manufacture it. Cotton mills might use a lot of water, a lot of energy. Again, there could be the use of chemicals. Then, human labor is important for both the production and processing of the raw materials, and throughout the supply chain for manufacturing.

When I look at ESG and I'm helping clients orient what's important, such as if I'm looking at an investment in an apparel manufacturer, there's so much to think about. It's nearly every single issue that impacts the environment and humans, and then humans' impact on the environment and other humans. We're just trying to boil it down to what is most important to a particular industry. We typically look at the Sustainability Accounting Standards Board standards as our go-to place to help orient materiality and look at other initiatives and voluntary frameworks that the fashion industry, for example, might choose to follow. Here, we're looking at four big issues, but we're going to zoom in on material sourcing and human labor.

The United States produces a lot of cotton. China is the number one cotton mill user. In terms of soft commodity sourcing, we're really thinking of China as one of the primary origins. A lot of this comes from Xinjiang. More than 85% of China's total cotton production is grown in this area of China.²⁴ A lot of companies in the cotton industry and suppliers downstream in the supply chain might have ties and might source goods and materials, including cotton, from this area.

Let's go back to some of the ESG issues we think of from a materiality standpoint. One of the major material ESG issues we always think of or look at in any sort of commodity is supply chain commodity issues. Hopefully, this is not news to anyone that we have a lot of geopolitical press coverage, a lot of news and focus by this Administration and the prior administration, on how best to impact

through U.S. commerce the reported human rights violations in Xinjiang.

There's been a lot of press about forced labor programs and relocation efforts to force assimilation and have some sort of reduction of that specific population. There are also reports that indicate certain minority groups were forced to work at sites that include the production of cotton and cotton mills at wages that would be significantly lower than living wages. This naturally brought a lot of attention to this issue.

We now have a law, the Uyghur Forced Labor Prevention Act,²⁵ that was recently signed by President Biden. There was a lot of press about it on Christmas Day. It's one of a number of different federal initiatives that are trying to address this ESG issue of forced labor and human rights.

This brings me back to putting it in context for those of us who've been doing this for a couple of decades now: it reminds me of the Securities and Exchange Commission (SEC) disclosure rule on conflict minerals.²⁶ This new law is going to have a significant impact on any U.S. company that is going to be importing silica-based products. To Doug's point, anything within the solar industry is going to be relevant, and this will impact the solar industry quite heavily.

The law also covers cotton and tomatoes, and there are certain goods where importation might be prohibited. The Tariff Act²⁷ is going to be the primary driver. The Uyghur law is going to become effective on June 21, 2022, unless it's litigated and tied up by administrative actions, which is very likely to occur here in the United States. There will be a rebuttable presumption that anyone who's importing goods from China needs to be able to demonstrate clear and convincing evidence that the goods did not come from this region. What this means is that there's going to be a mandatory ESG supply chain due diligence requirement for any company in the United States that is going to be importing these specific goods.

Reframing it in thinking of conflict minerals, when the SEC finalized the conflict minerals disclosure regime in 2012, it was probably the first example of having public companies or other issuers in the United States having to disclose what their supply chain looks like with respect to those identified minerals and to do this type of due diligence process, which is good business first and foremost. But, secondly, that requirement then to have disclosure in an SEC filing brought the regulatory scrutiny to those types of issues very, very heavily. And that's where we are as well with respect to the Uyghur law.

The other interesting bill that was proposed around the holidays was the New York State Fashion Sustainability and Social Accountability Act.²⁸ This law, if passed and implemented, means that New York State fashion retailers doing business in the state with 100 million or more

24. U.S. Department of State, *Xinjiang Supply Chain Business Advisory*, <https://www.state.gov/xinjiang-supply-chain-business-advisory/> (last visited Apr. 13, 2022).

25. Pub. L. No. 117-78, 135 Stat. 1525 (2021).

26. 77 Fed. Reg. 56274 (Sept. 12, 2012) (codified at 17 C.F.R. §240.13p-1).

27. Tariff Act of 1930, 19 U.S.C. §§1304-1677f (Suppl. 2 1988).

28. S.B. 7428, 2021-22 Reg. Sess. (N.Y. 2021), <https://www.nysenate.gov/legislation/bills/2021/s7428>.

annual worldwide gross receipts will have to disclose what ESG policies they have, how they conduct due diligence on ESG issues in their supply chains, and how much of their raw materials (including cotton) are sourced and produced in these specific areas of the world where there are known human rights issues. If this were adopted, it would be the first example of comprehensive, prescriptive ESG due diligence law in the United States. So, I'm excitedly following this. I'm sure there will be a lot of attention on this as it goes through.

This is my attempt to be an economist when I'm not. I clearly spend my days doing strategic guidance and counseling to clients on how to actually operationalize these ESG issues. But my sense is that these takeaways are correct. I'll defer to Doug if it matches up with his analysis.

In my practice, I often hear sighs of annoyance, being so overwhelmed, and a willingness to just give up because there are so many different components of ESG. It's so top of mind for every single company and investor.

One way that we lawyers can help folks understand why it's important is to try to stay abreast of the major developments and make sure that we're breaking them down into bite-sized information for clients. Anytime I see anything happen with the New York bill or if I see additional things happen that might impact supply chain issues and implement some sort of regulatory implementation around human rights and due diligence, I'll send my clients an e-mail on that with links to the background documents. It's keeping people's attention on why these issues are important because they're finally being baked into hard law after years and years of voluntary initiatives. That's the number one thing that lawyers can help do.

The other, more commonsense thing is that we lawyers will be looking at different legal risks of compliance or failure to comply with these types of legislative and regulatory requirements. Again, so much of this has been voluntary in nature. There have been voluntary ESG disclosure frameworks for years. We expect that the SEC will have some sort of proposed rulemaking around ESG frameworks, hopefully later this year, so we can see the proposal.

We know there's a convergence now toward an international ESG disclosure standard. I hope to see that in my lifetime or before I retire. I think it will happen in the next two to five years. In the meantime, it's helping our clients balance the hard law and the soft law obligations, the different voluntary initiatives, and how they can make their businesses the most attractive from a long-term value-creation standpoint to harness the power of ESG.

Part of that is that a lot of companies have really robust supply chain diligence procedures already because it's good business to do so. While we set aside the economic impacts of perhaps adding some additional steps around auditing for specific human rights and forced labor issues in the supply chain, my sense is that this won't be a significant cost impact on companies, at least for those who have really sophisticated supply chains already.

But, again, I am not an expert in that area. What I am an expert in is helping develop due diligence procedures for our clients, and for companies, banks, and anyone

who needs to analyze what the potential risks are and the opportunities. That's something we corporate lawyers are: due diligence pros.

I love working with other consultants in this space. There are a billion ESG consultants, a lot of technical providers who have great software and great tools that can help companies map their supply chain and identify higher-priority areas where they should focus in terms of ESG sensitivities. It's a pleasure to get to work with those types of experts, too, to bring all the tools to our clients to help them manage and digest all of the potentially material ESG issues.

Michael Curley: Let me begin by thanking all three of you for these terrific and provocative presentations. There is a question from the audience: have there been any instances where the costs have been reduced with the implementation of environmentally friendly practices?

Sara Orr: Anecdotally, if I'm thinking of different wastewater reduction efforts and different water sourcing environmental regulations that have evolved over the past two decades, I've been doing this; I've certainly seen cost savings in oil and gas industry clients where they've had to adapt to those types of regulatory drivers. They ultimately saved money. It's the same with the reuse of methane and avoiding flaring for oil and gas operations and to be able to sell that gas as a separate product stream. I think there are a lot of examples of there not always being long-term cost increases. I'll defer, though, to my co-panelists.

Doug Vine: Sara alluded to it, but among the larger providers of our marketers of natural gas there's some initiatives that they've undertaken on their own. I'm not sure how. I think a regulation is coming for methane. It's going to be more widespread. But among the larger producers, the ones that have actually invested in cleaning up their distribution networks have been able to reduce leakage fairly significantly in their distribution systems. That's certainly been a positive because methane is an extremely potent greenhouse gas. When its fugitive emissions leak, its impact will be a lot more significant than CO₂.

Urvashi Kaul: Doug and Sara already gave concrete examples. Overall, I want to add that—whether it's in the U.S. markets when we had sulfur dioxide and nitrous oxide cap-and-trade or environmental emissions regimes—our experience time and again has been that if there are regulations or imminent regulations, the private sector usually responds in a much more nimble manner than anticipated typically by regulators or other analysts.

Whether it's medium term or even sometimes short term, price pressures do settle down. I'm not saying it is true for everything, but a lot of times, when the private sector has been given opportunities to adapt and especially if they're anticipating a change, companies don't start thinking about it before the regulation is in place. They think about it when the buzz starts. Often, years earlier.

So, there's a quick adaptation that leads to price reductions, sometimes drastically.

Doug talked about solar-powered generation. The price of solar cells went down from when Germany was the predominant producer to when China became the predominant producer, which led to the implementation or adaptation of solar power renewables. It helped because the prices fell so low.

It's the first time they've gone up in a while. They had been down for a long time. So, I think inherently the price pressure is a high price. Inflation pressure may not be long term, again, not for everything, but at least in certain cases.

Michael Curley: I'd like to ask the panel a question that's based on the work I do. A couple of you touched on the cost of energy efficiency moving in different directions. Let's use solar panels as an example. There are some programs where you can get financial assistance to put solar panels on your home or your property. However, I understand solar panels can come with 30-year warranties.

In project finance, the rule of thumb is that you never finance anything for longer than its service life, and that frankly you're dumb if you do it for shorter than its service life. Say you have a school bus that will last 10 years. If the school board tries to finance the bus for 20 years, they're nuts and you should replace them. But so should you replace them if they try and finance it for five. The idea here is that you finance things over their useful life. Banks don't particularly like this idea, but governments do.

The price difference of paying for a solar panel on a 10-year loan versus a 30-year loan is enormous. And the rule of thumb in environmental finance is, if you want to improve environmental quality, do more projects. The way you do more projects is by making them less expensive so more people can do them.

I'm cribbing this from a program that was started in Berkeley a few years ago called the Property Assessed Clean Energy (PACE) program. In the city of Berkeley, if you want solar panels on your house, you borrow the money from the city, and the city issues a bond. The bond is 30 years, not 10. And, as you may know, municipal bond rates are lower than any other rates in the marketplace. So, you've got the longest term and the lowest rate. And that's the goal, to get more projects done.

Here's the kicker. If you buy a solar panel and you get transferred to Seattle the next week or the next day or the next month, and you have a bank loan, you have to pay the bank loan off when you sell the house. If you do it through the PACE program, the solar panels stay with the house and so do the payments because they're collected by the city. They're collected with the annual real property tax payment. That's how the whole system works.

I wanted to give you this example because this is a terrific program that's gone absolutely nowhere. There are 14 states that have implemented something like a PACE program and a handful of cities. And that's it out of the entire country. We're talking about the environment and money here, the basics. Any comments on any of this in

terms of whether you see this as a major force having long-term effects?

Doug Vine: There's a lot of issues with regard to home solar. You look at cost for utility-scale solar versus residential solar. It's so much more efficient to do utility-scale solar. The price is so much cheaper.

I understand the desire of individuals to be self-sufficient and to contribute to using less. I think PACE would be great for things like getting people to convert from natural gas appliances and natural gas furnaces to heat pumps and electric hot water heaters, which would be more significant than putting solar panels on people's roofs. This is a huge challenge. It cannot be understated how much we need to do. With some of these pitched battles that we have, maybe it comes down to utilities.

The other real concern is when too many people start putting solar panels on their roofs. That creates issues in distribution networks for substations and very old equipment in a lot of neighborhoods that need to be upgraded and who pays for that. There's a lot of challenges that get introduced from that particular issue of residential self-generation.

Urvashi Kaul: It's interesting that you mentioned PACE. I was actually delving into it a couple of months ago for some projects. You probably know this much better than I do; you specialize in environmental project finance. PACE has some implementation issues that in my opinion have impeded the adoption. I think it's in three states now.

There's a dependence on private contractors and door-to-door sales by those contractors, and there are some pricing issues. A lot of consumer advocates have spoken about it and quote the National Consumer Law Center, which is a consumer advocate. Some of the criticism has been that there are private contractors that solicit and enroll homeowners in these loans without doing their due diligence about people's ability to pay. And of course a lot of these PACE liens may not be covered by the Truth in Lending Act, for example.

Based on how effective or how impactful it is in the lower low-to-moderate income (LMI) communities is also another issue here. Not to delve into much more detail about this, but, as an idea, PACE works. In terms of implementation, there have been some challenges.

Michael Curley: There's another impediment. If you did a PACE loan and you have a mortgage on your house, the PACE loan gets paid off by the city. It has a higher priority than the home mortgage does, which means the banks went nuts.

Urvashi Kaul: Fannie Mae and Freddie Mac also would not touch it.

Michael Curley: Yes, Fannie Mae, the godmother of all mortgage banks, stepped in. That has caused a bunch of states to have what they call C-PACE programs. The C is for "commercial" because they won't do home mortgages

because of Fannie Mae. Fannie Mae doesn't want your solar panels in front of their mortgage. But the C-PACE programs work.

Let me go back to something that Doug said, I took a very general observation. How important is greenflation? How important is this to a family? Is this an academic exercise? What do you think the impact is in all different areas to the average family in the country?

Doug Vine: I'm not sure how important greenflation is. I'm a firm believer in being forthright and honest about renewable electricity being quite cheap relative to the alternative. But still a lot needs to be built that will need to be paid for, and amortized, and absorbed by ratepayers. The sheer act of an energy transformation will lead, in the short to medium term over some period, to higher electricity bills.

There is also the fact that there are fossil power plants that are not fully paid off, so that has to be paid for. And the fact that we need to pay for it as it transitions to account for a work force that needs to shift into other industries or other aspects of the clean energy transition. Those moves are all going to be felt by consumers.

When you enact policy like a carbon price and you actually get revenue, you can help to offset some of those price rises with dividends. I think that's quite a fair and important thing to do, especially for the lower decile households. But everybody could conceivably get some kind of dividend check under a carbon pricing scheme.

The greenflation aspect itself is there in that, if there are these periods where there are supply shortages or factory wages have to increase, then it actually winds up becoming a bit more expensive than the models forecasted. Also, these price shocks that get introduced only add to the price tag. I would say that that is probably a lot less significant than the price tag of building all the new infrastructure that we need. That includes transmission and new generation, swapping out appliances that are no longer green-compliant.

Urvashi Kaul: I think ESG trends overall—whether it's for energy transition or supply chain issues. Sara mentioned human rights issues and the supply chain of cotton growth, or tomato picking, for example. There are bound to be cost increases for companies that could ultimately be transferred to end-consumers in terms of higher-priced items. Supply chain issues for oil and gas or other hard commodities could result in some price increases for households, especially LMI households. In general, all households, but LMI households might just face the pinch a little bit more, like Doug said.

There are indirect impacts of these developments, definitely. To the extent that there is, at least in the short run, an inflationary pressure, and we will see it in consumer items too. But how much of it is because of overall ESG trends and greenflation? Or how much of it is just our current challenges with aging infrastructure and global trade flow issues that are beyond greenflation? That's not clear. Maybe truth is somewhere in the middle. It may

be a bit of both. As we know that the world is becoming smaller and smaller, these issues get complicated and can have global impacts. And the pandemic is not doing us any favors here either.

Michael Curley: We have another question from the audience. Urvashi mentioned it briefly, but how is the pandemic affecting commodity prices in the environmental sector and greenflation? What's the pandemic doing to us?

Urvashi Kaul: The pandemic has immediately stalled a lot of global trade flow because of transportation issues. It was especially huge last year when the pandemic began.

It has also highlighted and put in our face the socio-economic inequities and the complications of dealing with the global crisis. So, not only in terms of price pressures because of transportation limitations and global supply chain issues, but also in terms of what people focus on. The pandemic has brought to the forefront some of the socio-economic issues, which has then led people to pay even more attention to the "S" in ESG.

For example, health care and people with lower incomes where they—I don't want to be crude about it but—have higher death rates and higher hospitalization rates. Facts like that influence how people react to some of the issues that are impacting us. So, I think more focus on the "S" in ESG is a result of COVID.

Then, there is government spending not only for COVID, but on infrastructure as well. Climate and socioeconomic mobility is an integral part of whether the infrastructure is built to a certain extent. Also, Build Back Better, whatever happens to it, whether it passes or not, is in the political conversation. It's top of mind for a lot of people. That has an impact on people's lives, I presume. In terms of a direct link of COVID to price inflation, I feel that they are competing disparate trends that have come to play here.

Sara Orr: Again, the focus on "S" has been exponential because of the pandemic and because of the social justice movements around the world last summer. One thing we are seeing is an impact on the mental health and well-being of employees; with engagement programs, I'm looking at that from a real materiality standpoint. I'm looking at different companies with mergers-and-acquisition diligence or helping advise on ESG programs.

Mental health and impacts from the pandemic are something that each one of us can relate to. This is off topic and not related to greenflation, but when it's tied up in the serious impacts on earnings of major Wall Street banks or other employers who are experiencing significant impacts from the Great Resignation, presumably things will cost a bit more when the companies have to pay more for employees.

Urvashi Kaul: One of the other impacts that has been brought to light as a fallout of COVID-19 is a pressure on employee compensation, especially in the United States where people are demanding higher salaries or more com-

pensation for the same work. So, that also has a price or a cost pressure on companies.

At the same time, if the unemployment rate is as low as reported, then it means that people have more options and they can earn more for the same amount of work. It goes to say they may be compensated more. And at the same time, it has some indirect inflationary aspects as well. I forgot to mention that earlier, but that seems to be an important aspect as well.

Doug Vine: If I could add to that, a delay in project completion is a cost as well. Supplies are still backed up at the Long Beach port in California, but it's not quite as bad as it was. Still, if you delay deliveries from Asia into U.S. markets, then that's longer until projects get completed. Then, they wind up costing more as a result.

Some of the direct pandemic effects included factory closures, so there was lower production during a period. China had a zero-tolerance policy for COVID infections, so they'd shut down a city. If there is solar manufacturing in that area, then that's going to be impacted, or other green projects.

Michael Curley: Where do we go from here? What are the next steps that can be taken to avoid or mitigate price increases?

Doug Vine: Like a lot of the modeling that McKinsey and others did about how much it's going to cost, it's very hard to anticipate what impacts inflation is going to have. When you see what number they've come out with, you can assume that it's going to cost more because there are going to be periods of constraints and there are going to be price rises.

You have every major auto manufacturer in the world wanting to open up a gigafactory and produce batteries. There are elements, or minerals, or materials that they're all racing to acquire. It's not just semiconductor chips. It's basic materials like lithium and graphite. There is a serious competition for these minerals. The market signals are all there.

Developing mines and new sources of production are not easy to achieve. There will be a crunch for certain materials. It's hard to predict because the technology du jour is lithium ion batteries, but there could be a huge advance between now and 2030, and a better battery chemistry that might point to another material that has not been as developed as some of those materials today. There are so many unknowns in the path to decarbonization.