Building a More Sustainable Commodity Allocation

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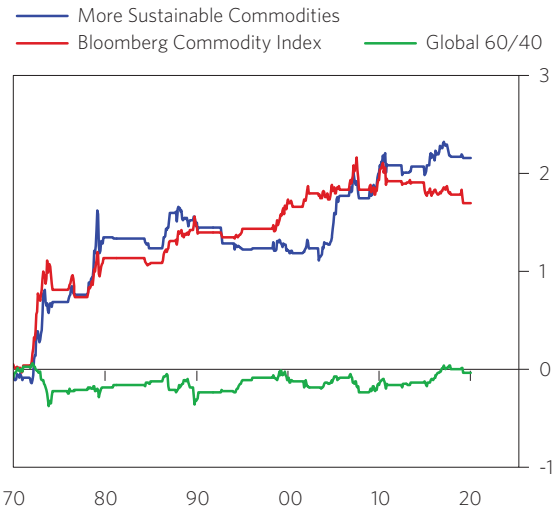
Commodities are an important part of investor portfolios because they are one of the few assets that can provide protection against rising inflation. With a growing number of investors designing their portfolios to achieve both financial and sustainability-related goals, **we discuss how investors can approach building a more environmentally and socially sustainable commodity allocation that can provide valuable inflation protection to portfolios.**

In recent years, we have done substantial research into sustainable investing, with a particular focus on how institutional investors can pursue both financial and sustainability goals. Commodities are both important and especially challenging in this regard. Raw materials are and will remain critical inputs to economic activity for the indefinite future and are therefore necessary for sustainable development (e.g., to build greener infrastructure). At the same time, production of commodities is by and large not done sustainably today, and many typical commodity allocations are highly exposed to some of the least sustainable commodities, like fossil fuels. We have developed a process to examine both:

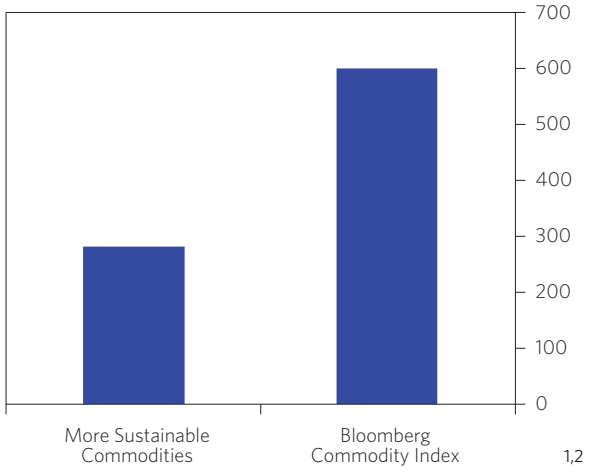
1. **The sustainability of commodity production**: the environmental and social footprint and business practices when the commodity is being produced.
2. **The sustainability of commodity consumption**: what the current and future uses of the commodity are.

These assessments can be made for individual commodity production projects (e.g., a specific mine), for individual commodity producers, or for a commodity in aggregate. Using this process, investors are able to build a sustainable commodity allocation that provides them with protection against rising inflation with a significantly reduced carbon footprint and other improved sustainability characteristics.

Cumulative Excess Returns from Rising Inflation Periods (ln)



CO_2 Emissions Intensity from Commodity Production (kt/$Bln)



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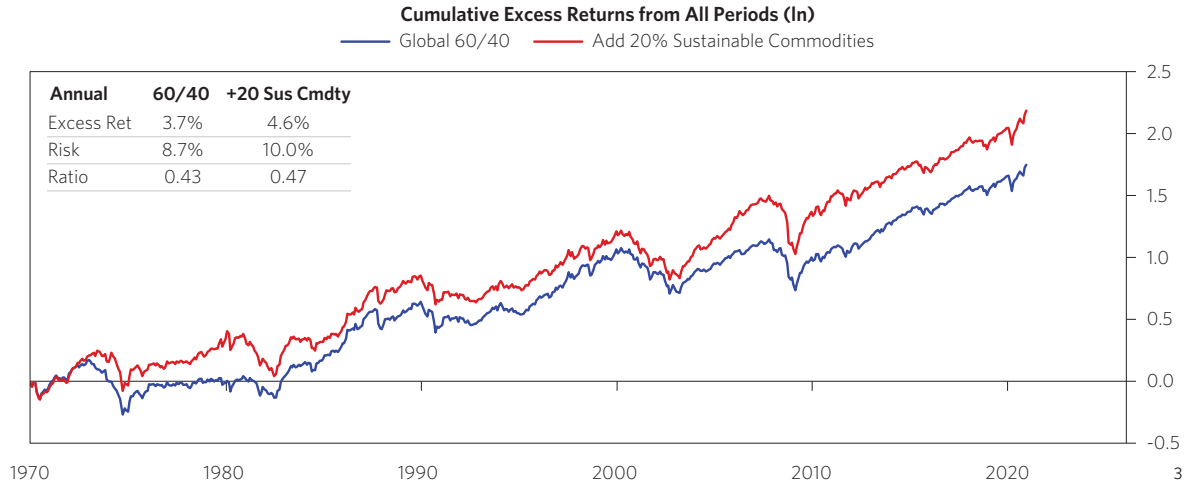
[1] In these charts and elsewhere throughout the document, "More Sustainable Commodities" refers to a simple portfolio of commodities, including precious metals and industrial metals, that have been assessed to be sustainable based on the process described above. "More Sustainable Commodities" is not a product being offered by Bridgewater. Please see the important disclosures located at the end of the this report.

[2] Returns shown in excess of cash. Data through February 2021. A rising inflation month is defined as a month in which the current rate of inflation is greater than the 12-month moving average rate of inflation.

Commodities Play an Important Role in Investor Portfolios and Facilitating Sustainable Development, but Production Is Relatively Unsustainable

Commodities provide valuable diversification for investors in rising inflation environments, whereas traditional portfolios do poorly in these environments. For investors, commodity exposure is critical for protecting against periods of rising inflation—both monetary inflation (particularly in the case of gold and precious metals) and raw input/supply-side inflation (in the case of industrial commodities widely used as inputs in economic activity). Adding a 20% sustainable commodity allocation to a global 60/40 portfolio helps to improve financial performance, as shown in the chart below.



Commodities are necessary inputs for the global economy and thus are an integral part of any sustainable future. It is impossible to achieve a clean energy transition or build sustainable cities without industrial metals and other such materials.

> ***UN PRI, Responsible Investor's Guide to Commodities****: "Raw materials, energy sources, and nutritional staples fuel human activity, and their continued, sustainable provision will be critical for the indefinite future."*

However, even those commodities required for a sustainable future are often produced unsustainably today, particularly from an environmental and labor standpoint. Commodity extraction as a whole remains a large contributor of global greenhouse gas emissions, while production of some commodities is also associated with modern slavery and human rights violations.

> ***World Bank, Minerals for Climate Action****: "The mineral intensity of low-carbon technologies should not be overlooked. We know that to date, the mining industry consumes up to 11% of the global energy use, while 70% of mining projects from the six largest mining companies operate in water-stressed regions. Increasing demand for minerals and metals would only push these figures higher unless we adopt a radically different, climate-smart approach."*

> ***United Nations, Report of the Special Rapporteur on Contemporary Forms of Slavery****: "The mining and forestry sectors have also been cited in reports on forced labor in supply chains. Here, risks include vulnerability arising from the isolated nature of workplaces, the role of private security firms, the presence of organized criminals attracted by high value commodities such as gold or other minerals, and the growth of illegal, unlicensed, or unregulated mines and forestry operations that benefit from weak regulation and law enforcement."*

[3] "Add 20% Sustainable Commodities" refers to a Global 60/40 portfolio with an additional 20% sustainable commodity allocation.

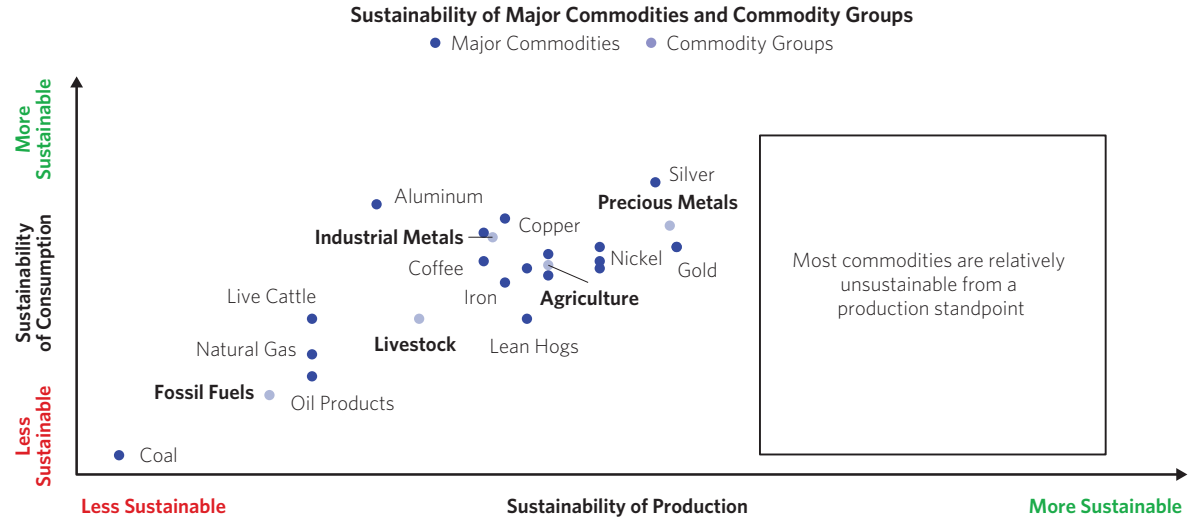
Building a Framework for Commodity Sustainability

To incorporate sustainability considerations in commodity investments, our approach is to assess both the sustainability of commodity production—e.g., the environmental and social footprint and business practices when the commodity is being produced—and the sustainability of commodity consumption. These assessments can be made for individual commodity production projects (e.g., a specific mine), for individual commodity producers, or for a commodity in aggregate. A high-level overview of our methodology is below. In all, we examine more than 70 indicators across 19 commodities and ~600 commodity producers, drawn from a range of industry, academic, and intergovernmental sources and covering global production and consumption.

Framework for Commodity Sustainability

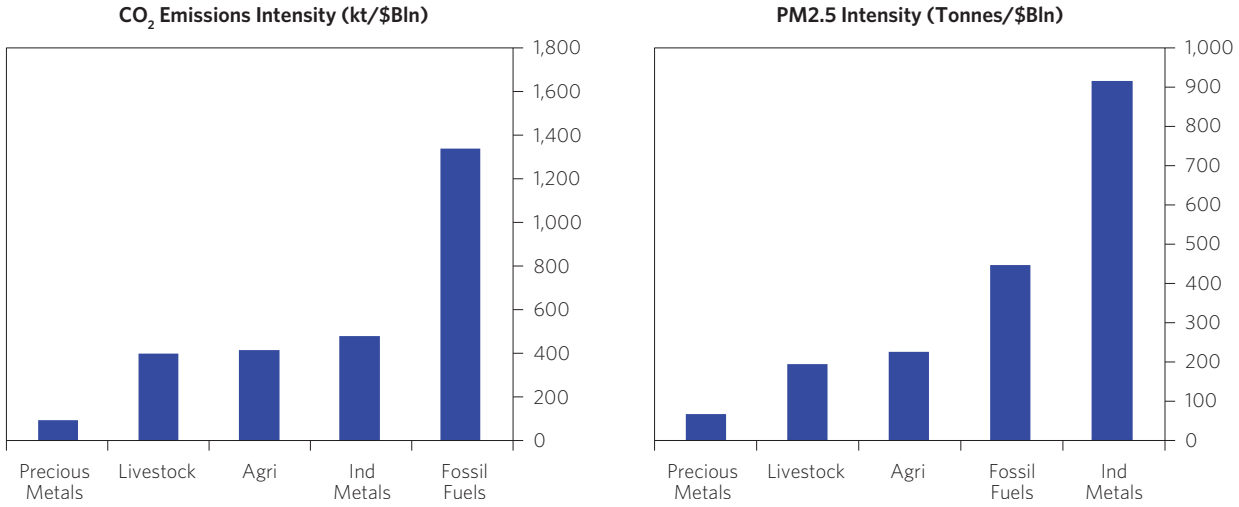
Sustainability of Production		Sustainability of Consumption	
Inherent Sustainability	**Business Practices**	**Current Uses**	**Future Uses**
We measure the environmental footprint associated with direct production of each commodity (i.e., what is being produced).	We measure the sustainability of business practices associated with production of each commodity (i.e., how it is being produced).	We measure the sustainability profile of each commodity's supply chain, in terms of intermediate and end use.	We measure the alignment of each commodity with a range of sustainable development scenarios through 2100.
Sample Indicators	**Sample Indicators**	**Sample Indicators**	**Sample Indicators**
• PM 2.5 Emissions • Greenhouse Gas Emissions • Land and Water Use	• Evidence of Modern Slavery • Evidence of Labor Violations • Sustainability Certifications	• Renewable Energy Generation • Amount Wasted • Sustainable Alternatives	• Climate Change Scenarios • Energy Transition Scenarios

Our analysis shows that most commodities fall short of alignment in terms of sustainability of production, although precious metals come closest due to their relatively lower environmental footprint on a dollar-weighted basis. In general, most commodities are more aligned in terms of sustainability of consumption, especially metals and agriculture (which are both essential to a sustainable future).

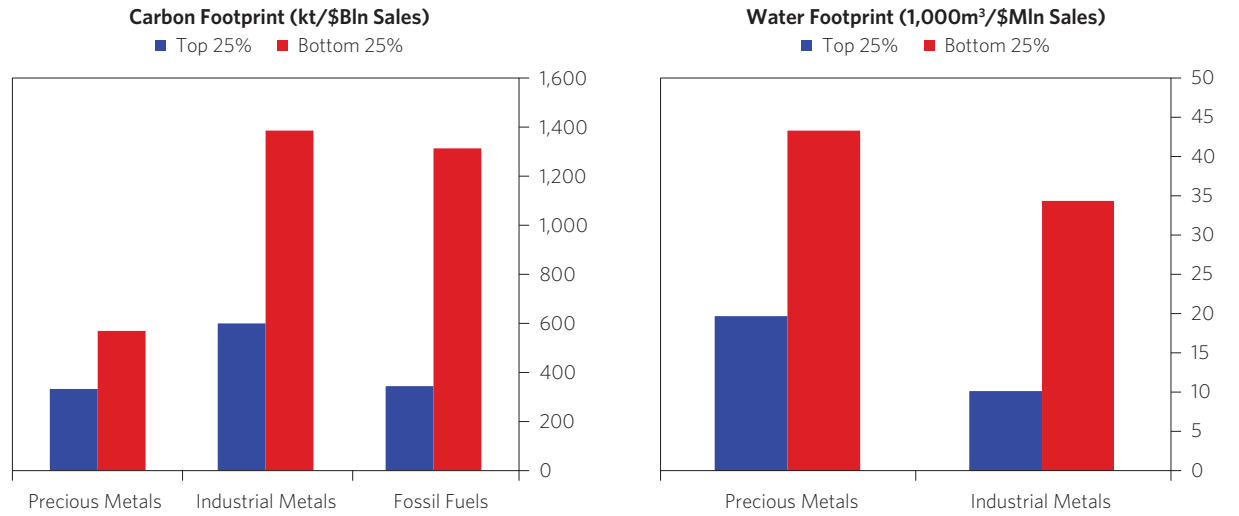


Below, we give a few brief examples of this approach.

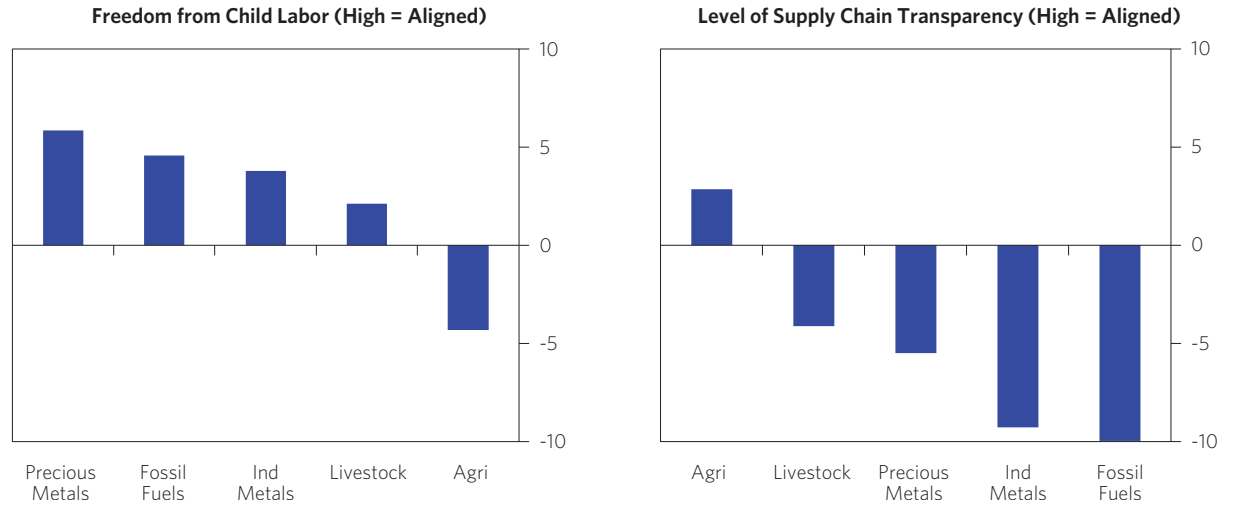
Sustainability of Production: To understand the inherent sustainability of commodity production, we measure the environmental footprint associated with the direct production of each commodity (i.e., what is being produced). To do this, we aggregate raw data from commodity production in each country to the global level and calculate indicators such as greenhouse gas intensity (e.g., CO2, CH4, N2O), air pollution (PM2.5, PM10, NOx), as well as land and water use. As shown below, precious metals have a relatively lower environmental footprint on a dollar-weighted basis, although all commodities generate significant negative externalities via production.



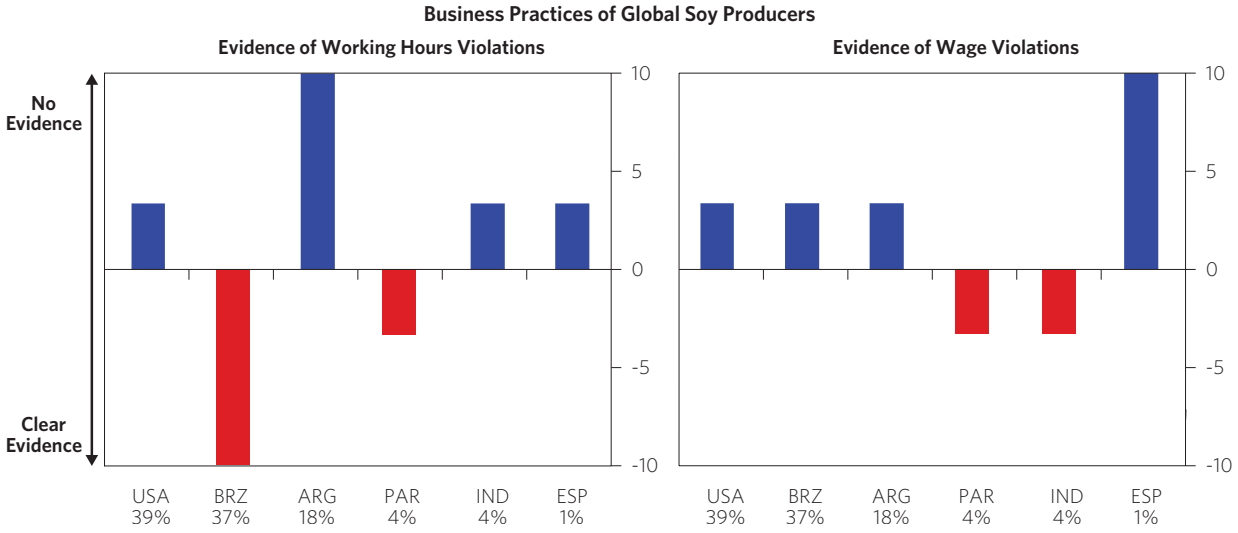
While the charts above show these assessments for commodity groups overall, it is important to note that the environmental footprint associated with production of each commodity can vary significantly across sites of production, as a result of differences in energy mix, extraction techniques, or type of deposit. For example, carbon emissions associated with the extraction and processing of Canadian oilsands are more than double the North American average, while segments of aluminum production in countries like China can generate up to three times more carbon emissions than production in Europe and North America. The charts below show the divergence between the top 25% and bottom 25% of producers across each commodity group in terms of carbon and water use.



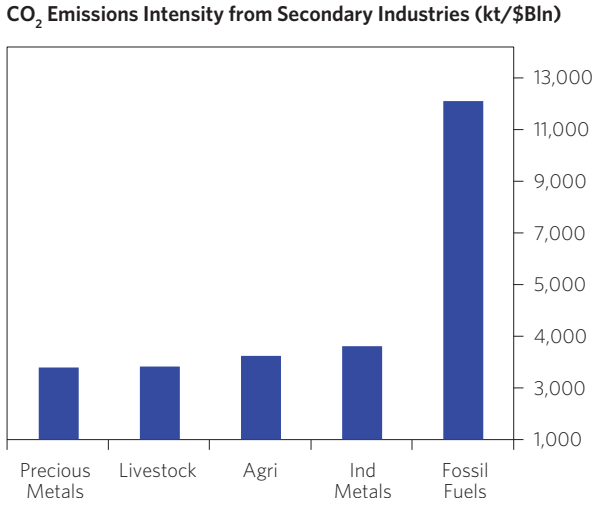
Business Practices: Having a low environmental footprint does not in itself make production of a given commodity sustainable—for example, if its production involves child labor or modern slavery. As such, in addition to looking at each commodity's inherent sustainability, we also examine the sustainability of their business practices, which unsurprisingly differs across countries and sites of production. This includes violations of labor standards (e.g., minimum wage laws) or environmental regulations (e.g., water pollution laws), as well as the level of certified sustainable production or supply chain transparency. We show some examples below. For simplicity, we aggregate these results by commodity group, but there are significant differences within them (e.g., within agriculture, coffee and cotton production are far less sustainable than wheat or soy production).

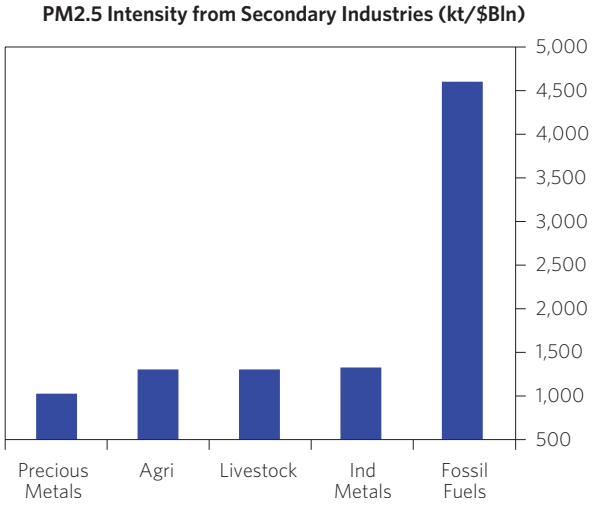


And as you'd expect, there is considerable variation across production sites. For example, while global soy production is largely aligned from a business practices standpoint, there have been reports of labor violations (e.g., working hours, decent wages) in countries like Brazil, Paraguay, and India.

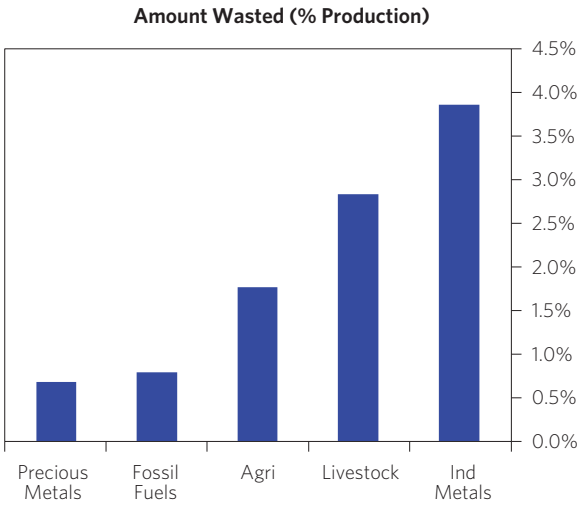


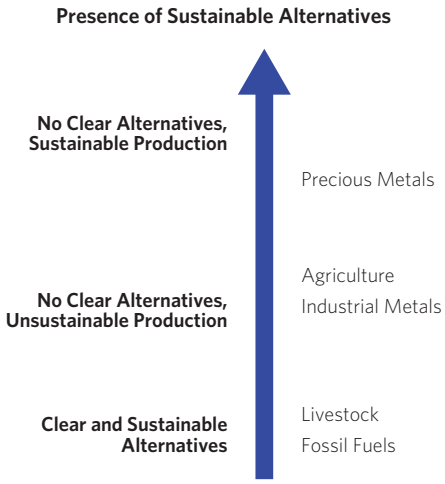
Sustainability of Current Uses: Because commodities are by and large extractive by nature (and thus associated with large negative externalities), almost no commodity production can be said to be sustainable in and of itself. However, a holistic approach also examines how commodities are consumed. In general, commodities are consumed to fuel economic growth, which raises standards of living. But some uses are more sustainable than others. We first consider the current uses of each commodity, which we determine by mapping out the supply chain of each commodity at a country level, and aggregating upward to the global level as before. For example, the charts below show the emissions of the various commodities as they are consumed, be it in manufacturing, energy generation, or services. Fossil fuels, unsurprisingly, stand out due to the high carbon cost of burning coal/oil/gas for energy.





Apart from indirect emissions, we also examine how much is wasted in the process of consuming the commodities, and whether more sustainable alternatives exist. For instance, precious metals are highly recyclable and rarely discarded (most gold that is bought and sold is already in circulation, and new mining is a small part of the market), and do not have clear sustainable alternatives.

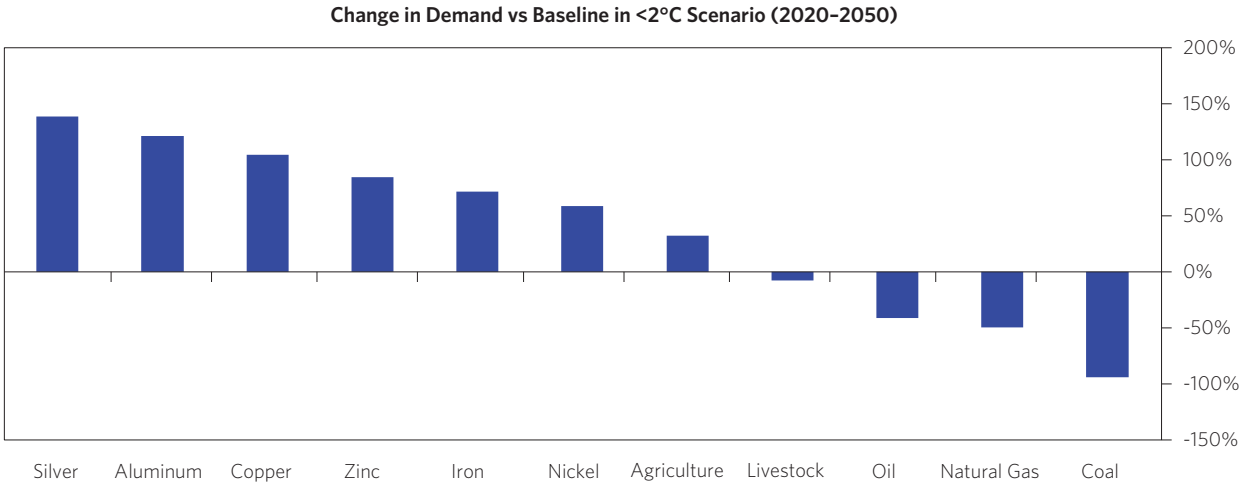




Sustainability of Future Uses: Finally, we assess the degree to which continued utilization of each commodity is aligned with a sustainable future. In particular, we look at different pathways for achieving the UN's Sustainable Development Goals (SDGs) by aggregating a range of sustainable development and energy transition scenarios from various intergovernmental and academic sources. Some of the recurring themes include:

- Industrial metals are necessary inputs for supporting sustainable development. As an example, steel and aluminum are critical inputs to building a green infrastructure of public transportation, supporting UN SDG 11 Sustainable Cities and Communities, and there are limited alternatives to these industrial commodities in modern manufacturing.
- Ensuring sustainable food production systems is an important SDG goal (SDG 2 Zero Hunger), and there are no viable alternatives to corn, wheat, and other plant-based foods in feeding the planet sustainably. In comparison, there are more sustainable food alternatives to livestock.

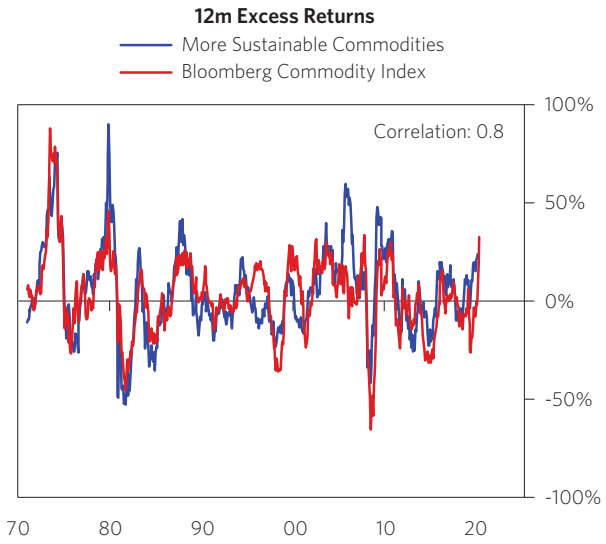
The chart below shows the average projected change in demand for major commodities under a climate-change-favorable scenario (e.g., shift to clean energy, increased use of electric vehicles), which limits the rise in global temperatures from preindustrial levels to less than 2°C. Under such a scenario, demand for various metals is expected to increase rapidly due to their importance as inputs into renewable energy, while agriculture is also likely to see rising demand as a more environmentally friendly source of nutrition and biofuels. By contrast, consumption of livestock and fossil fuels would need to decline significantly in order for the world to achieve the SDGs.

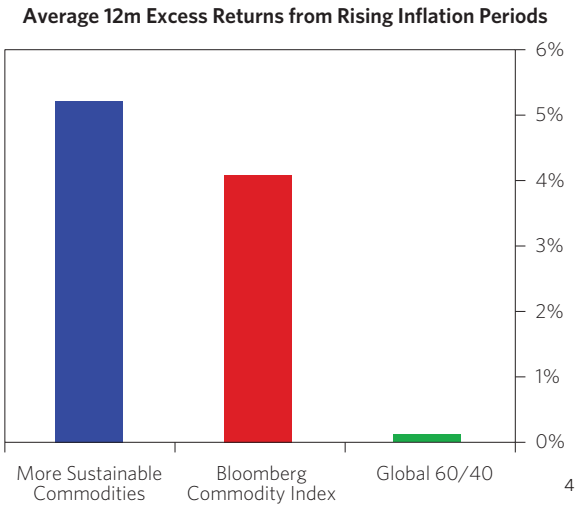


As a final note, although most sustainable future scenarios involve a gradual phasing out of fossil fuels by the end of the century, in the near term they nevertheless have a role to play in spurring economic growth and improved standards of living in many developing countries—as the United Nations' Sustainable Energy Division states, "rather than a 'non-fossil' only agenda, a more pragmatic approach that encourages all to use the broad range of resources available to them (i.e., energy efficiency, renewables, and fossil fuels in a sustainable manner) will create a more balanced approach."

Building a More Sustainable Commodity Allocation

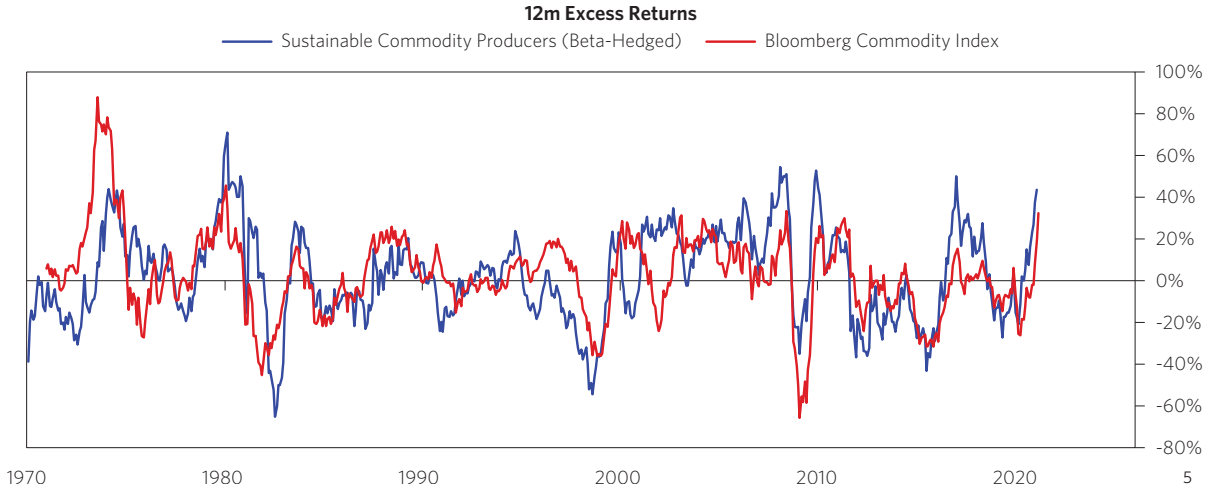
The most direct path for sustainability-conscious investors is to allocate their capital away from less sustainable commodities and toward more sustainable commodities. This can be done at the individual commodity level via futures/derivatives or at the intra-commodity level via specific "green" contracts (which capture a sustainable slice of global production). Over the last few years, we have seen an increase in third-party certifications of sustainable commodity supply chains, and investor support for these efforts is essential to helping them develop. We show an example below of how selecting the most sustainable commodities could still allow investors to maintain strong inflation protection in their portfolios.





[4] Returns shown in excess of cash. Data through Feb 2021. A rising inflation month is defined as a month in which the current rate of inflation is greater than the 12-month moving average rate of inflation.

A more granular approach involves looking at individual commodity producers and gaining exposure to the "best in class" producers for each commodity. Operating at the company level also allows investors to engage commodity producers on their environmental strategies and business practices. As before, this approach provides similar returns to the broader index, which again allows investors to balance their financial and sustainability goals.



[5] "Sustainable Commodity Producers" is based on a hypothetical allocation of sustainable commodity producers in which the equity-beta has been hedged. This hypothetical allocation does not account for transaction costs or fees. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ALSO ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. "Sustainable Commodity Producers" is not a product being offered by Bridgewater. Please see the important disclosures located at the end of this report.

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