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Views From the Stream

May, 2021

The Monthly Letter covers two topics this month. First, we take a look at Green Energy and how the wholesale move to these technologies likely will create a commodity boom. These technologies are surprisingly commodity intensive and thus, with their rapid adoption, they create a Demand Shock for a variety of Commodities. With mine exploration and development taking years, such a Demand Shock will likely produce a multi-year period of Supply chasing Demand. Second, the South China Sea continues to heat up. China, since the change in US Administration, continues to ramp up its challenge to the U.S. as a test of the Biden Administration. This comes in the form of rising violations of Taiwan's airspace and increasing encroachment into The Philippines territorial waters. With the US possessing a Mutual Defense Treaty with The Philippines and an obligation under the Taiwan Relations Act "to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan", a potential confrontation with China, similar to the Cuban Missile Crisis, could erupt at any time. And Third, as always, we close with brief comments of interest to our readers.

Commodities: Thank You For The Green Energy Driven Boom

> "*This land is your land, this land is my land*
> *From California to the New York Island*
> *From the Redwood Forests to the Gulf Stream Waters*
> *This land was made for you and me.*"
>
> This Land Is Your Land
> Words and Music by Woody Guthrie, 1944

The environmental movement came into its own in the 1960s, literally sparked by a series of environmental disasters. These included the Houston Ship Channel catching fire, the impact of mercury from power plants in Japan, and the Love Canal toxic chemical waste disaster in Niagara Falls. Out of incidents such as this, coupled with the publishing of Rachel Carson's Silent Spring in 1962, the environmental movement was born. As the basic, fundamental issues of clean air, clean water, and clean earth were addressed in the 1970s and 1980s, the environmental movement looked for new causes to champion. Their initial target was coal produced power, which creates all kinds of emissions unlike natural gas or nuclear power. Through a series of regulatory moves, the environmental movement forced coal power producers to address the emissions from the smokestack, driving up the cost of coal energy in

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the US relative to natural gas, nuclear, and hydropower. In doing so, the economics of coal no longer justified building new plants in the US. In addition, hydropower, which was a cheap source of power, became impossible to grow, as the environmental movement targeted dams which blocked the movement of fish along streams. Instead, incremental power demand and replacement power demand in the US was met through a combination of waste to energy plants, natural gas plants, and Green Energy in the 1990s and 2000s.

Unfortunately, the environmental movement did not figure into its calculations the massive growth in Emerging Markets. These countries looked to cheap coal power to drive their economic growth and industrialization without regard to the emissions issues they created. In doing so, Emerging Economy Emissions exploded upward, more than compensating for the drop in the US and Europe. Overall, Global CO2 Emissions grew from 25.1 billion tons in 2000 to 36.5 billion tons in 2019, the last year for which global data is available. (Please see https://ourworldindata.org/co2-emissions for year by year data.) However, this growth becomes a tale of two groups, Developed Economies and Emerging Economies. Despite the significant growth in Western economies, US CO2 Emissions fell from 6 billion tons to 5.3 billion tons over this time frame while the EU lowered its CO2 Emissions from 3.6 billion to just 3.0 billion tons. In total, Developed Economies dropped their CO2 Emissions by between 1.5 billion and 2.0 billion tons over the past 20 years, depending on how this is measured. However, Emerging Economies grew their CO2 Emissions by 13+ billion tons. China, alone, saw its CO2 Emissions rise from 3.4 billion tons to 10.2 billion tons. And India saw its CO2 Emissions rise from less than 1 billion tons to over 2.6 billion tons. Thus, Emerging Markets added more than 6x the CO2 Emissions that Developed Markets cut over the past 20 years. The following chart illustrates this issue:

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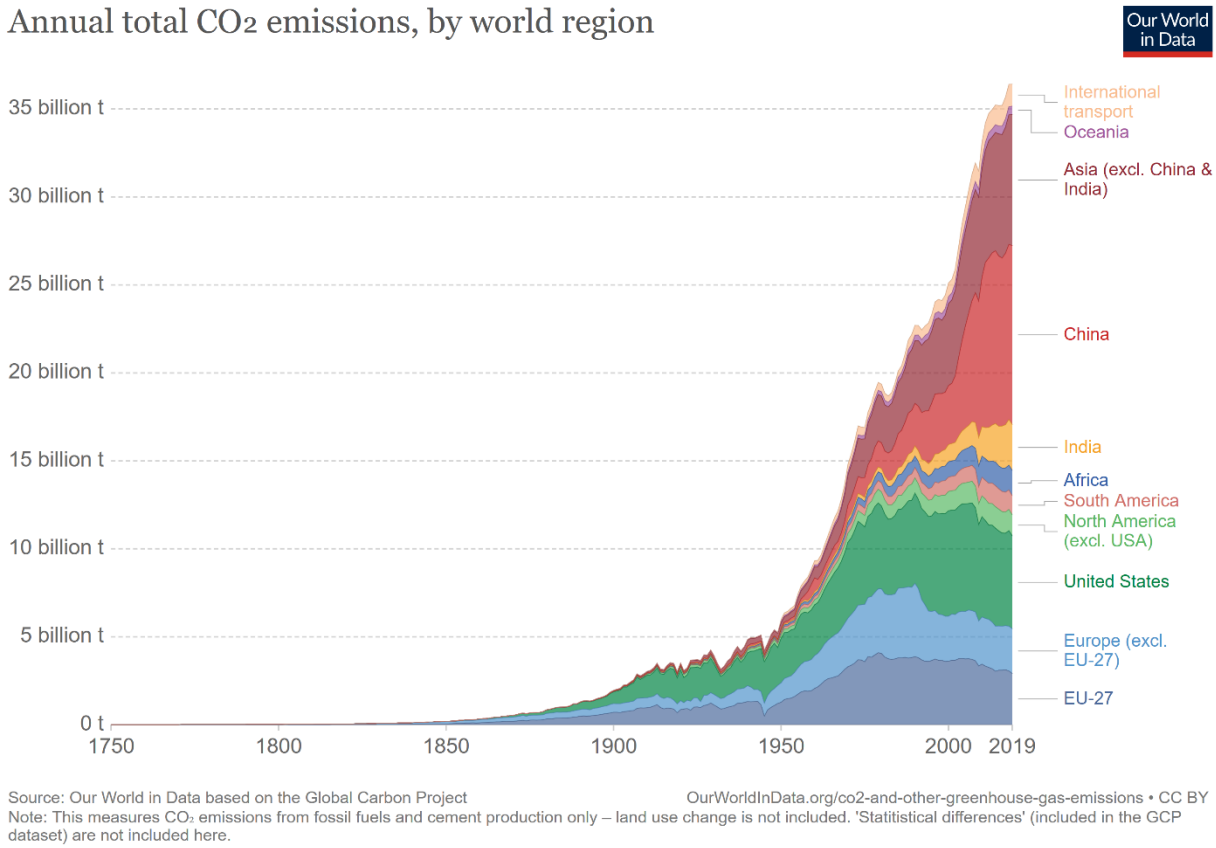

Chart courtesy of Our World In Data and can be found at https://ourworldindata.org/co2-emissions .

And with countries like China continuing to rapidly grow their CO2 Emissions, whatever Developed Economies do will end up swamped by the growth in Emerging Economies, as they emit over 60% of all CO2 globally today.

Realizing the error of their ways, the Environmental Movement refocused on CO2 Emissions over the past decade. This refocus allowed them to create a narrative that CO2 Emissions represent a threat to humanity through Global Warming and thus need to come under control and shrink. While the science appears to support the link between CO2 Concentrations in the Atmosphere and Global Temperature, the projections of the rise in Global Temperature based on this theory have vastly exceeded the actual increase. This may be due to the science behind Global Temperature variations over long periods of time which scientists theorize vary due to the Milankovitch Effect and the Ice-Albedo Effect. Other theories relate to the amount of Solar Radiation that reaches the Earth's surface while other theories focus on

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variations in the surface temperature of the Sun. Whichever of these theories is correct, the following chart illustrates the Global Temperature variation over the past 500,000 years:

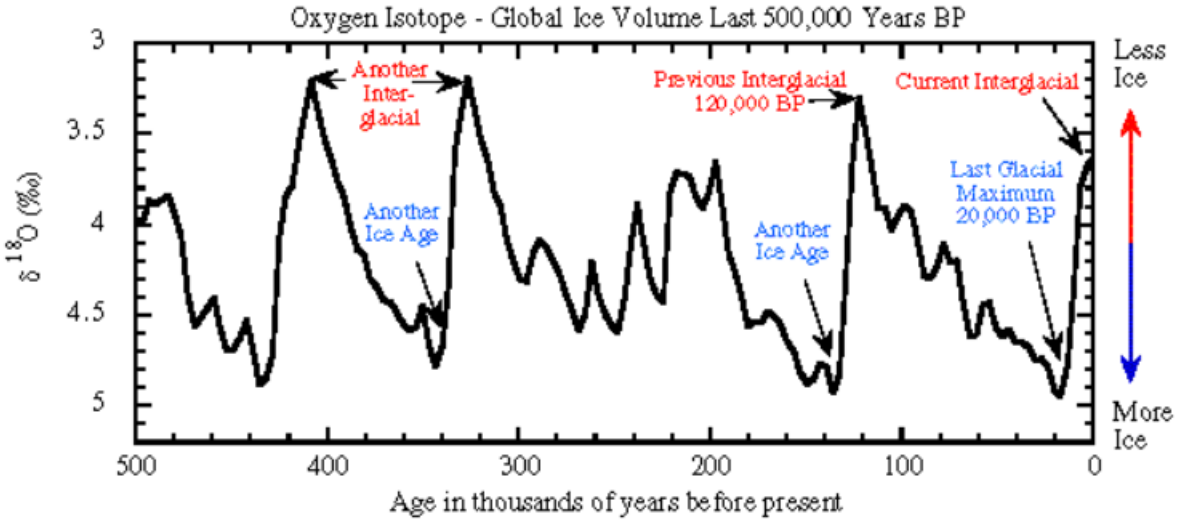

Chart courtesy of the University of Washington and can be found at https://a.atmos.washington.edu/academics/classes/2001Q1/211/Group_projects/group_D_F00/index.html .

However, when Global Temperatures are viewed on a shorter time horizon, such as the last 2,000 years, the picture looks vastly different:

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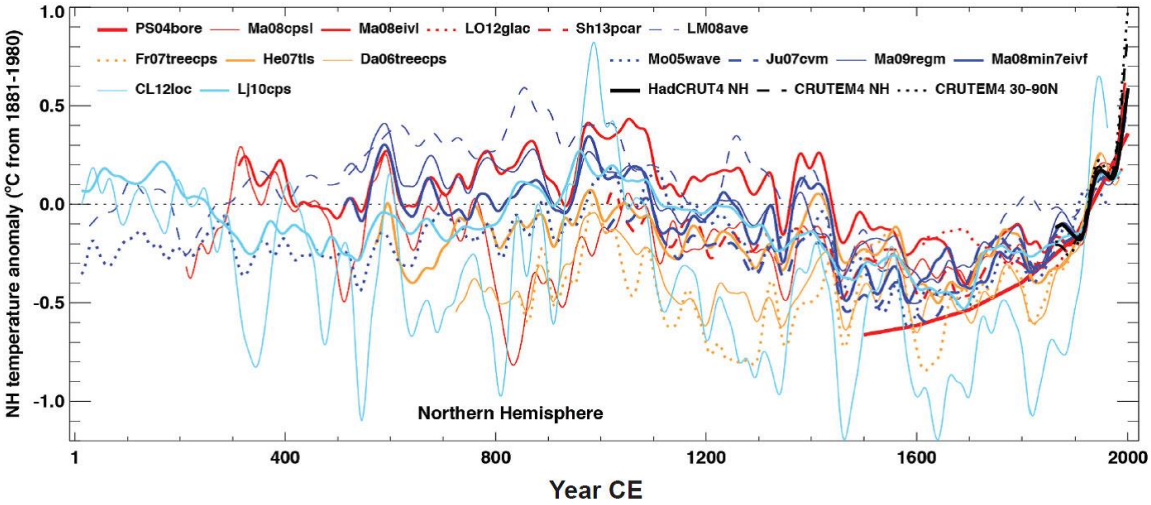

Chart courtesy of National Oceanic and Atmospheric Administration and may be found at: https://www.ncdc.noaa.gov/global-warming/last-2000-years .

The chart illustrates the Global Warming during the Middle Ages, the Mini Ice Age from 1500 – 1800, and the recent Global Warming. If we look at an even shorter time horizon, the data appears even more dramatic:

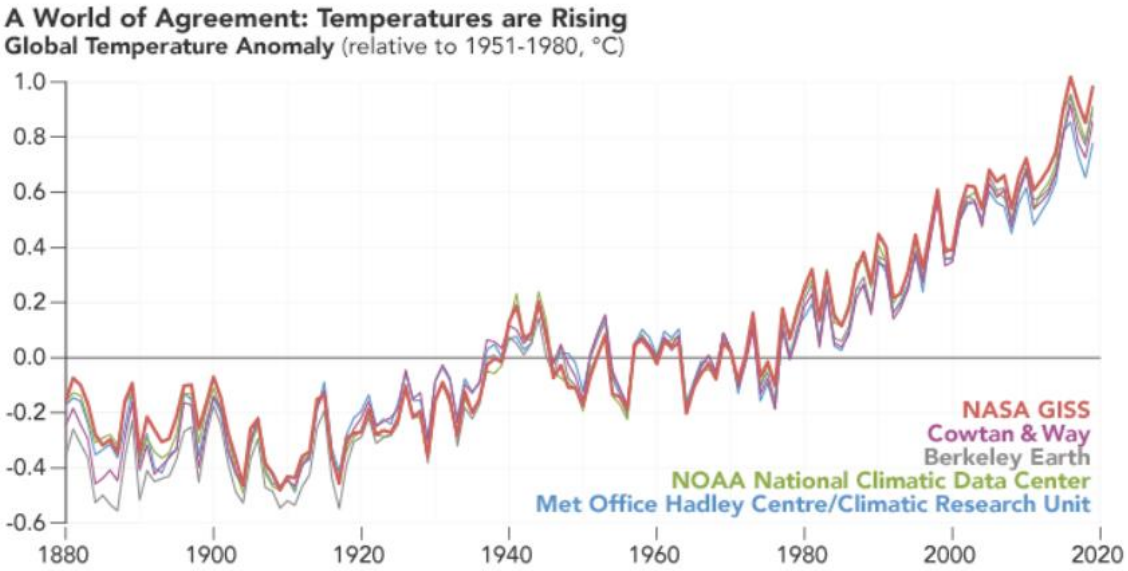

Chart courtesy of NASA and can be found at: https://earthobservatory.nasa.gov/world-of-change/global-temperatures

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As these different time horizons illustrate, how one views the recent rise in Global Temperatures depends on the time horizon selected. The shorter the time horizon, the more alarming the data appear.

These differing perspectives matter little in the real world as a majority of scientists, over the past 20 years, united behind the link between CO2 Emissions and Global Warming. Thus, with the rapid rise in CO2 Concentrations in the Atmosphere correlating well with Global Warming, man made activity became the cause of Global Warming. As such, governments could alter the trajectory by reducing CO2 Emissions. Thus, the Environmental Movement focused on reducing CO2 Emissions in order to slow Global Warming and then reverse it. The solution comes in multiple flavors. These flavors vary from Solar Power to Windmills to Electric Vehicles to Hydrogen Fuel Cells. All of these various approaches will produce lower CO2 or Carbon Emissions on an ongoing basis.

However, as with all things, there exists The Law of Unintended Consequences. It turns out that all these technologies possess a commodity intensive nature. And thus, while reducing CO2 Emissions across a variety of areas, other environmental impact will occur in order to meet the primary goal. A simple example will make clear how meeting environmental goals can create serious side effects. In 1986, the Northern Spotted Owl became a focus of the Environmental Movement. In order to save the Owl, environmental organizations wanted to shut down logging on vast areas of the U.S. Pacific Northwest. The logging industry saw this as a threat to its existence and fought back hard. After 4 years of litigation and fighting at the Federal Government level, the EPA added the Northern Spotted Owl to the Endangered Species List as a Threatened Species. Under this regulation, the timber industry was required to leave 40% of any old growth forests intact within a 1.3 mile radius of any Spotted Owl nest on private land. In addition, the Federal Government shut down logging in Federal Forests. Thus, overnight, log production in the Pacific Northwest fell over 80%. While there existed softwood logs in the South, they were no substitute for the old growth mature hardwoods in Washington and Oregon. Not surprisingly, prices for logs rose significantly, by over 6 times, and continued to rise until supply elsewhere in the world could ramp up to compensate for the lack of production in the US. For consumers, wood costs rose dramatically and did not return to earth for many years. This tale stands as a reminder that Commodity Cycles possess long time horizons until Supply can catch up with Demand.

With CO2 and Carbon at the top of the environmental agenda, there exists a wholesale change in demand coming for existing raw materials and for new raw materials that must enter the supply chain to produce vehicles, whether cars for consumers or trucks for commercial use. In addition, given the significant need to recharge all these vehicles, a wholesale upgrade of the electric infrastructure must occur. And every country must build out a charging infrastructure to recharge these vehicles. If we add National Security on top of this massive change in the industrial supply chain, significant changes loom that will have a major impact on Commodities and their prices over the next 5 – 10 years.

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A look at the basic Commodities of Copper and Aluminum will illustrate this issue for existing raw materials. And a brief look at lithium and cobalt will illustrate the new materials demand that is exploding. Copper is known as Dr. Copper, as it accurately reflects the state of the US and Global Economy. To bring an expansion of an existing mine into production can take anywhere from 2 – 4 years. And for a new mine, this time period can reach 6 – 8 years, given the need to delineate the ore body, obtain environmental and other government approvals, finance the mine, and then construct the mining operation. Thus, lead times are lengthy, to say the least. Given this, much of the Copper supply situation is well known for the next 5 years. And while there can be some high grading, whereby miners mine higher grade ore to produce more metal, there is a limit to this and often the life of mine plan will not enable such actions due to the layers of ore being removed. A quick look at incremental demand from EV's explains why copper demand will explode over the next 5 years. And when juxtaposed against expected supply growth, it explains why Global Supply-Demand will likely remain tight through at least 2025 and potentially beyond, until new mine supply arrives:

Copper (000s mt)	***2020A***	***2025E***	***Change***
Mine Supply	*20,404*	*21,343*	*+ 939*
Recycled Scrap	*2,600*	*3,334*	*+ 734*
Total Refined Supply =	***23,004***	***24,677***	***+1,673***
Net EV/ PHEV	*170*	*874*	*+ 704*
Other Uses	*22,832*	*25,457*	*+2,625*
Total Demand	***23,002***	***26,331***	***+3,329***
Surplus/(Deficit)	***+ 2***	***(1,654)***	***(1,656)***

Data care of Jefferies, LLC as of February 24, 2021.

As the above table makes clear, the Copper market appears headed for significant deficit that only new mine supply can solve. Thus, prices must rise to encourage supply and to ration demand. While a recession would bring the market into temporary surplus, it would not solve the fundamental Supply-

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Demand imbalance. Once the recession ended, the fundamental imbalance would surface once more pushing prices higher to ration demand and to encourage the restart of mine development plans.

While most people do not think of Aluminum as directly related to Green Materials, it possesses a central role. Aluminum's light weight and ability to recycle its products make it a metal of choice in many applications, whether EVs, Solar, beverage cans, or wind. Over 75% of all aluminum ever produced remains in use today due to the ability to recycle the metal into virgin material as aluminum sheet and into aluminum parts. And due to the use of hydropower for much of its production, aluminum qualifies as low carbon production, making it particularly suited for the "Low Carbon, Green Metal" label as part of ESG. For aluminum, the change in the relative balance of Supply and Demand appears less dramatic. Given the massive portion of supply sourced through recycling, the market remains in a slight deficit of 1% - 2% each year from 2020 to 2025. While mined supply of Bauxite will not rise significantly over the period, higher prices must occur to encourage even higher recycling of the metal, as marginal supply must come online.

For lithium, which goes into batteries for everything from laptops to phones to EVS to …, demand continues to explode. Despite rising supply from multiple sources, the current surplus is projected to become a deficit in 2024 and continue rising through decades end:

Lithium Carbonate Equivalent *(000s of tons)*	***2020A***	***2025E***	***2030E***
Surplus/(Deficit)	***+ 47***	***(204)***	***(1,185)***
	====	====	====

Data care of Jefferies, LLC as of December 20, 2020.

With this profile, price will need to increase to encourage new mine production, given the government mandates around the world to increase EVs as a percent of overall sales. Fortunately, lithium ore bodies coat the earth, so significant opportunities to develop new supply exist.

As the above examples illustrate, the adoption of Green Energy to combat CO2 will drive commodity demand on top of normal demand growth. This will ensure that many commodities remain in deficit over the next 5 – 10 years. As a result, prices must rise to encourage both new mine supply and lower demand to balance the markets. For consumers, this will contribute just another factor to higher prices and inflation. But for mining companies, this should produce a boom. And in this boom, the mining companies will say. "Thank You For The Green Energy Driven Boom".

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The Great Game of Power: The Cuban Missile Crisis, The South China Sea, & The Contest for Global Dominance

"Igitur qui desiderat pacem, praeparet bellum."

("Therefore, let him who desires peace, prepare for war.")

De Re Militari
Flavius Vegitius Renatus
4th Century AD

For those who remember or have studied the Cold War, the Cuban Missile Crisis stands a key moment in time. It came out of nowhere, after a long confrontation between the US and Russia since the 1940s. And it risked all out direct war between the two, at a time when the two sides were engaged in proxy wars across the globe. It followed closely on the heels of the Berlin Crisis of 1961, where Russia demanded the Allies leave Berlin, as well as the construction of the Berlin Wall in late 1961, shutting the border between East and West Berlin. It also followed a series of confrontations in the Middle East, Latin America, Africa, and Asia, where the US and Russia vied for influence. In 1962, Fidel Castro requested that the Soviet Union place nuclear missiles in Cuba in response to the failed Bay of Pigs invasion in 1961. Nikita Krushchev agreed, given the US deployments of nuclear missiles in Italy and Turkey the prior year. In July, 1962 construction began on missile silos and other facilities in Cuba. Rumors of the construction of these facilities swirled for months, which the Kennedy Administration denied. Finally, in October, a U2 pilot photographed the SS-4 and SS-5 ballistic missile facilities, both completed and under construction. With these photographs and Cuba only 90 miles from the Florida coast, the Kennedy Administration could no longer deny the rumors and needed to act. On October 22, 1962, the US declared a "Naval Quarantine" on Cuba to prevent delivery of additional missiles and the needed equipment for the uncompleted silos under construction. The US would permit non-missile related deliveries of materials. This technically avoided a blockade and a state of war with Cuba. After a tense standoff, the Soviet Union agreed to remove its missiles in Cuba in exchange for the US removing its missiles in Turkey and agreeing not to invade Cuba. While the Cuban Missile Crisis ended peacefully, there existed no guarantee at the time, given the shooting wars that continued to occur around the world. And, for several days, the world held its breath, unsure as to whether a nuclear war would ensue.

Telescoping to today, another crisis appears brewing, this time between the US and China, as their global rivalry heats up. This potential crisis swirls around China's annexation of various Islands and Reefs, claimed by other countries, as well as the construction of military bases in the South China Sea.

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Furthermore, China continues to encroach on the recognized international waters of The Philippines. China's "fishing fleet", which answers to the Chinese Government and China's Navy, effectively set up a blockade of waters in the internationally recognized Philippines Exclusive Economic Zone (EEZ), denying Philippine fishermen access to their waters. This latter encroachment continues to create a domestic political crisis, as President Duterte refuses, to date, to confront China on this or ask for outside assistance. The Duterte Administration in The Philippines continues to follow the path of the Kennedy Administration, refusing to act until it possesses no choice.

While numerous pundits predicted the Biden Administration would take a more conciliatory response to China, similar to the Obama Administration, these hopes appear buried. The Administration, after reviewing the data from the Trump Administration, realized that to protect US interests around the globe, it needed to continue the policies put in place over the prior 4 years. For those hoping for a change, the reality of the global rivalry with China left the US no choice. Thus, the US continues to pursue policies around the world that buttress its interests, including formalization of the Quad Four and continuing Freedom of Navigation operations. In addition, for those watching the tariff front and the budding economic rivalry between the two countries, tariffs with China remain in place and future tariffs which will force up the price of goods from China and other countries continue to find a place at the table. These include concepts such as Forced Labor Tariffs and Carbon Tariffs. For those familiar with the concept of the DIME (Diplomatic, Informational, Military, Economic) as applied to policy, all these actions appear consistent with putting in place an overall strategy to address the Cold War with China.

However, historically, Cold Wars and Strategic Rivalries between countries typically do not stop at Cold Wars. They include Hot Wars, whether through Proxy Wars in third countries or direct confrontations. With the US having a disadvantaged military position in Asia today, including extended supply lines and difficult logistics, a direct confrontation with China today in the Pacific would not necessarily produce a positive outcome. And, while the US continues to move to solve this issue through creating new alliances, redirecting military resources, and developing new military technologies, this will not create a short term solution, but one over several years. In the meantime, the US will need to rely upon Diplomatic and Economic means to bring other countries to align with its interest in containing China.

With The Philippines Administration under increasing pressure to reply to China, the opportunity for the US to re-engage with the country and use China's encroachment on The Philippines sovereign waters to rally support in the region continues to rise. And such an opportunity likely will arise sooner rather than later. On August 30, 1951, the United States and The Philippines entered into "*The Mutual Defense Treaty Between The United States and The Republic of the Philippines*". Article IV of the Treaty states:

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> "*Each Party recognizes that an armed attack in the Pacific Area on either of the Parties would be dangerous to its own peace and safety and declares that it would act to meet the common dangers in accordance with its constitutional processes.*"

While the Treaty states it is a "Mutual" Defense Treaty, no one expects The Philippines to come to the aid of the US. On the contrary, the true purpose, when enacted, was to create the legal framework for the US to come to The Philippines aid should it face any type of military threat or an attack on its territories.

This Treaty becomes relevant given recent actions by China. In January, China passed a law authorizing its Coast Guard ships to fire on foreign vessels in international waters and disputed territorial waters. The reason this appears to encompass international waters and other country's waters stems from China's claim of the whole of the South China Sea as its territorial waters. This includes international waters and waters belonging to the Exclusive Economic Zones of other countries bordering the sea. In addition, China imposed a fishing ban in the South China Sea from May 1 to August 16, including Philippines territorial waters. Should China move to impose this ban by sinking Philippine fishing vessels, the situation could rapidly escalate, especially if The Philippines requested assistance from the United States under the Mutual Defense Treaty. A confrontation between China and the US would ensue, with the US also calling on its allies to support its actions in defense of The Philippines, such as Japan. Such a confrontation would see Chinese and US naval ships, at a minimum, confronting each other at short range. This would look just like a repeat of The Cuban Missile Crisis. And any miscalculation by either side could result in the vessels firing upon each other. And should the Chinese military shoot missiles at the ships, either from the air or from the ground, such actions could result in a region wide conflagration.

While geopolitical events have not dominated the discourse politically or economically over the past 20 years, with the increasing moves by China to assert its role as a Great Power, by dictating terms in the Pacific and influencing events across the globe, events continue to bring this to the fore. Whether through territorial actions in the South China Sea, economic actions to set the next round of global technology standards, cyber attacks to grab information and research, or capital investments to attempt to dominate industries on a global basis, China continues to move to enhance its Global Strategic Position at the expense of the United States, Europe, Japan, and other Developed Economies. And with these countries and other countries, such as India, beginning to respond, The Contest for Global Dominance continues to heat up. Lastly, with the South China Sea beginning to resemble the Cuban Missile Crisis, events may take on a life of their own. Given all this, it appears The Great Game of Power is once more afoot, as nations compete to push their own interests ahead and dominate the spoils of the global system. (Data from public sources coupled with Green Drake Advisors analysis.)

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Bowled Over, Looking Good, Flattened, and Hold On To Your Tractor

Finally, we close with brief comments on Bowled Over, Looking Good, Flattened, and Hold On To Your Tractor. First, packaged food manufacturers continue to face the reality of reopening. With consumers flocking to restaurants and offices reopening, demand for goods at the supermarkets has begun to slow. To offset this slowdown in revenue, food companies are implementing price increases. This include significant rises in cereal prices as companies such as Kellogg, a major manufacturer of cereals, attempt to keep up their revenue growth. Given the price increases the consumer faces in the grocery aisle, we see them Bowled Over. Second, demand for Cosmetics appears to have bottomed as the economy reopens. Women clearly have begun to make sure they appear appropriate as they return to work with Color demand up 7% year-over-year. With Cosmetic demand beginning to rise, we see the consumer refocusing on Looking Good. Third, consumers continue to return to the air, with airlines and hotels consistently discussing business accelerating. While good for those with the travel bug, it may not turn out so well for RVs. RV foot traffic at dealers stopped growing over the past few months as 2 year stacked data show just 1% growth in 2021 compared to comparable month in 2019, pre-pandemic. With data showing a slowdown, we see the industry Flattened by the reopening. And Fourth, farm equipment prices continue to soar, given the rise in grain prices and the plans by US farmers to plant more acres in 2021. Used tractor prices are up 20% - 25% according to MachineFinder. Given this, we see farmers saying Hold On To Your Tractor.

In Closing

Should you have any questions on how the above issues or the items discussed in our accompanying cover letter impact your family's financial position or your business's future as well as the potential actions you could take in response, please do not hesitate to contact us. We welcome the opportunity to discuss this with you.

Yours Truly,

Paul L. Sloate
Chief Executive Officer