

Clean Transition Investing: From Managing Risk to Unprecedented Opportunity

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June 2023

The global energy transition is challenging. Since 1950, the world's population has tripled, leading to a quintupling of global energy consumption and a quadrupling of global carbon emissions. Deep decarbonization will require significant innovation and meaningful changes in both business practices and consumer behavior.

KEY TAKEAWAYS

- ➔ For investors considering exposure to the clean transition, we see significant opportunities to generate attractive, diversified returns in a number of sustainability-related sectors, while driving real, positive change in the world.
- ➔ To address the global energy transition, the world requires substantial, immediate, and ongoing investment in both businesses and technologies which support decarbonization, the transition to cleaner sources of energy, and a more sustainable level of consumption.
- ➔ This will require unprecedented levels of investment. No matter how it's calculated, the capital required to facilitate the energy transition by 2050 is enormous: Per the International Energy Agency (IEA), \$150 trillion. Per McKinsey, \$275 trillion. Per PWC, approximately \$1,000 per year for every person on the planet.¹
- ➔ Because climate risk can affect every business, in every sector, globally, Apollo views investment in efforts to decarbonize as an overarching theme rather than a specific asset class. Solutions will require investments across the capital stack and with all forms of capital—including equity, debt, and various real-asset structures—from both public and private sources.
- ➔ Last year, Apollo announced the launch of a comprehensive sustainable investing platform focused on financing and investing in energy transition, decarbonization, and sustainability. We believe we can effectively deploy \$50 billion in clean energy and climate-related opportunities through 2027, and see an opportunity to deploy as much as \$100 billion by 2030.²

1. Sources: International Energy Agency (IEA), McKinsey, and PWC. Data as of 2022-2023.

2. There can be no assurance that the targets described herein will be achieved as expected or at all.

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According to the Intergovernmental Panel on Climate Change, the warming threshold of 1.5 degrees Celsius is currently perceived as the tipping point at which damage caused by climate change likely becomes irreversible. Unfortunately, the world has not made much progress in slowing its ramp towards 1.5 degrees and, indeed, we may have already surpassed it. At 2 degrees and higher, the impacts become potentially existential threats to humanity.³

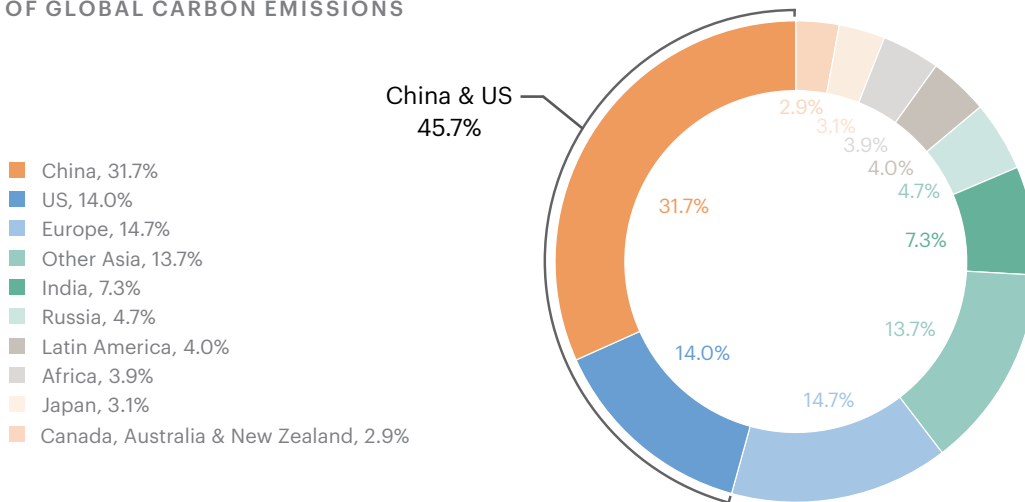
While every country needs to be part of the solution, a reasonably small number of countries are responsible for the vast majority of the growth in global emissions. In 2020, it was estimated that China alone generated 32% of 2020 global carbon emissions, while the US, the next-largest individual contributor, produced 14% (**Exhibit 1**). Developing countries also contribute to the problem, but currently have limited resources with which to address its effects. As a result, Multilateral Development Banks will almost certainly need to provide financial support to emerging market decarbonization efforts.

The correlation between carbon emissions and increasing temperatures has been well documented for decades. Deep decarbonization will require radical reductions in global carbon emissions, and that will require significant coordination among governments around the globe.

We are not currently on track to cap the global temperature increase at 1.5 degrees. While over 130 countries⁴—representing 83% of global greenhouse gas (GHG)

Exhibit 1: The US and China contribute nearly 50% of global emissions

2020 SHARES OF GLOBAL CARBON EMISSIONS



Sources: Bloomberg New Energy Finance (BNEF), Global Carbon Project, Hadley Centre, International Energy Agency (IEA).

3. Source: Intergovernmental Panel on Climate Change, 2023.
 4. Source: The United Nations, Paris Agreement. Data as of 2022.

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CLEAN TRANSITION INVESTING: FROM MANAGING RISK TO UNPRECEDENTED OPPORTUNITY

emissions— have made commitments to decarbonize, very few have visibility into how best to deliver on those commitments. Moreover, as a result of ongoing geopolitical conflict, Europe currently prioritizes energy security over sustainability; however, conflict is already accelerating Europe’s clean energy efforts as clean/renewable energy sources are critical for energy independence. Likewise, ongoing energy inflation also supports investment in energy transition as countries seek to reduce costs amidst persistently high commodity prices. As a result, Europe— along with the rest of the world—has numerous reasons to continue global energy transition efforts.

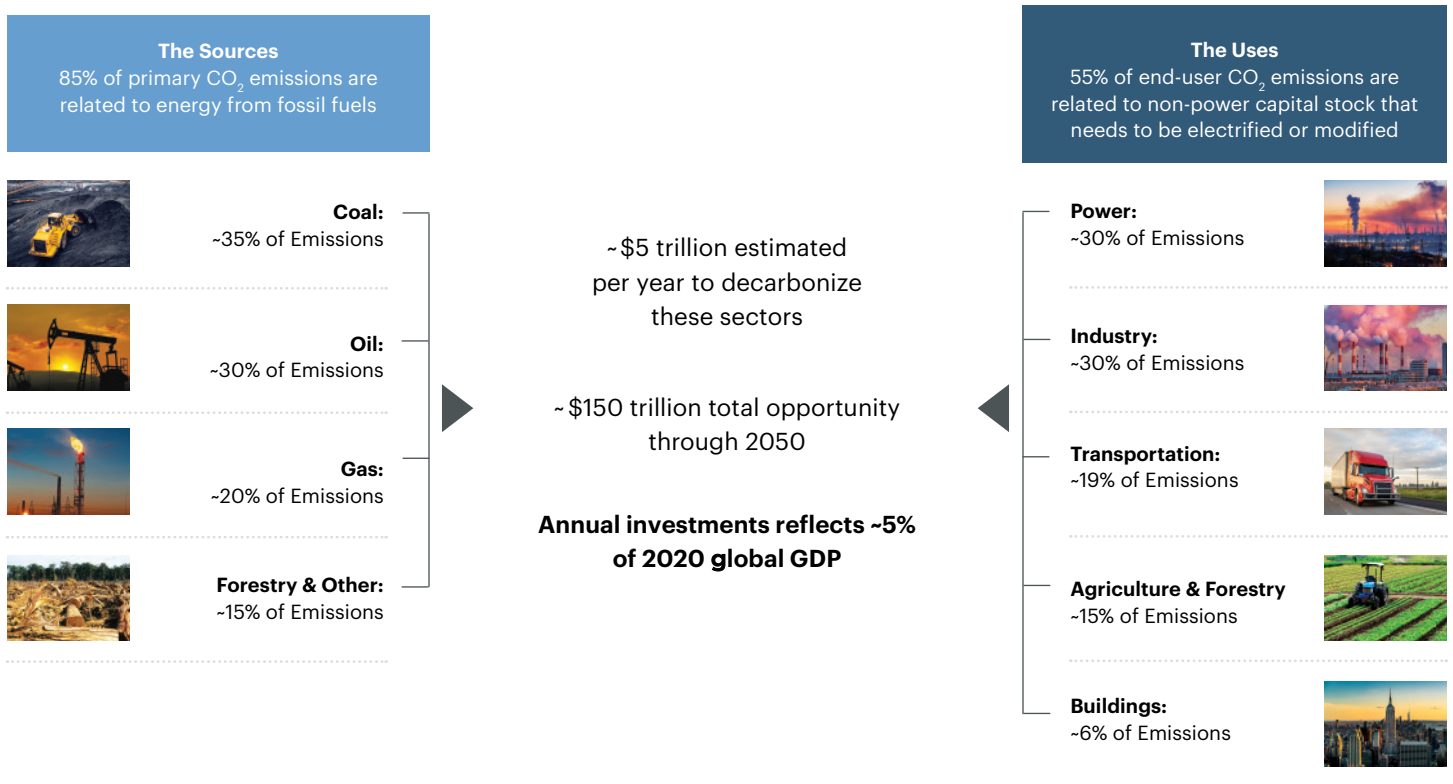
In short, the impacts of climate change are expected to significantly worsen in the future, with phenomena likely to have both economic and social impacts—on property, capital, and human well-being.

Outsized investment opportunity growing ever more favorable

The market opportunity in global decarbonization is immense and multi-faceted—large portions of the private sector are already redesigning their products and services around energy usage and decarbonization. Currently, 85% of primary CO₂ emissions are related to energy from fossil fuels (**Exhibit 2**) and 55% of end-use CO₂ emissions are related to non-power capital stock that needs to be electrified or retrofitted. Addressing both the sources and the uses of emissions will require an estimated \$5 trillion per year. That represents a potential “investable universe” of nearly \$150 trillion over the next three decades.

Businesses are redesigning their business models and strategies to compete more effectively in the clean transition. This will likely include introducing new design/build

Exhibit 2: The decarbonization market opportunity is immense and diverse



Sources: McKinsey, Goldman Sachs, Bloomberg New Energy Finance (BNEF), World Bank. Data as of 2022.

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processes that reduce emissions, embracing the circular economy, and rethinking supply chains. New approaches to financing these efforts will also be critical. We believe that these efforts—and related and new technologies—represent a unique business opportunity for investors.

In fact, since 2020, the size of the \$5 trillion-plus annual total addressable market may well have increased. The conflict in Ukraine, underinvestment in hydrocarbons throughout the COVID-19 pandemic, and higher inflation rates have all altered the investing landscape by raising commodity prices. While crude has decreased from the decade-plus highs realized in 2022, prices remain elevated versus historical averages. The specter of conflict involving major economies and the corresponding risk of acute disruptions to supply chains have further heightened the focus on security and resilience.

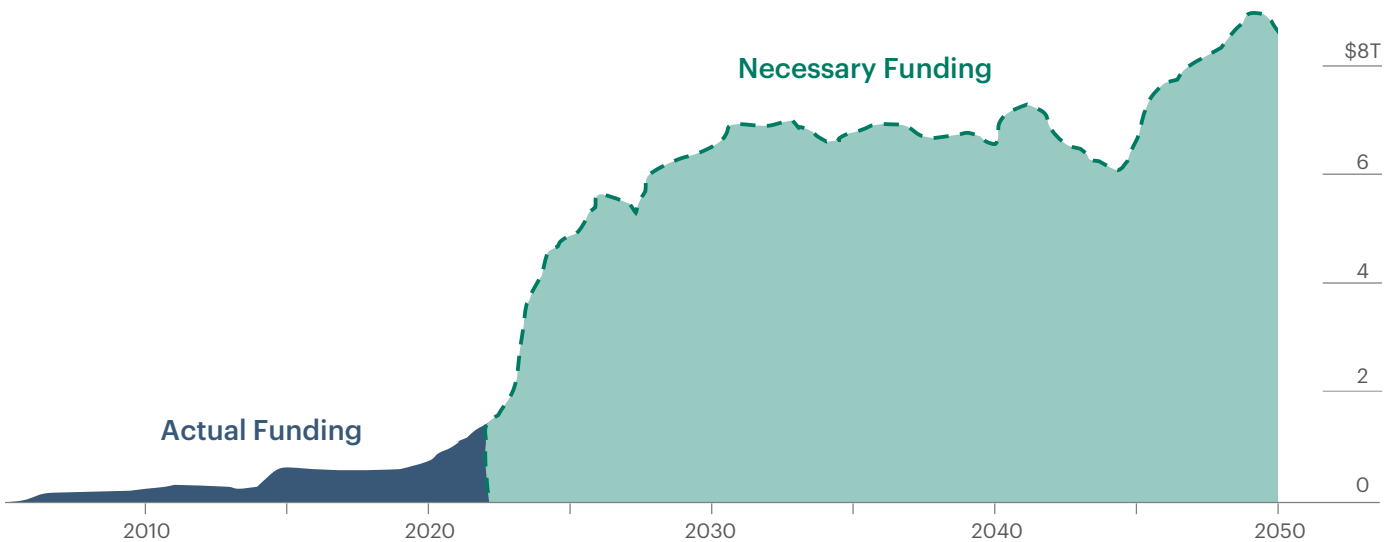
We also expect recent developments in Washington to spur investment. In August 2022, President Biden signed the Inflation Reduction Act into law, which includes approximately \$390 billion in projected new spending on climate solutions. The duration of many of the programs,

such as 10-year renewable energy tax credits, provides better visibility around these regulatory support mechanisms. Taking this lead, we believe that the expansion of similar frameworks globally should also help spur future investment.

This increase in public capital availability, however, is only a beginning. The estimated \$5 trillion-plus per year needed to meet decarbonization goals is too large an amount for public funds alone—particularly as current US and European Union public financing mechanisms for energy transition only aggregate to roughly \$500 billion over the next decade (**Exhibit 3**). Private capital can and will be instrumental here, given flexible capital, longer hold periods, and a single-shareholder model that can create value and drive change. Not only can private capital provide financing for these sectors and themes, but it can also invest capital to transition and transform “gray” assets and companies into “green” ones.

In response to accelerating capital needs required for decarbonization, global markets have evolved and expanded. According to *Bloomberg New Energy Finance*, \$1.5 trillion in sustainable debt instruments were issued in 2022, with green

Exhibit 3: Current climate investment falls well short of what is required to achieve the energy transition and must accelerate quickly



Sources: BNEF, Apollo Analysts. Data as of April 2023.

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bonds representing \$572 billion of that total. Sustainability-linked loans reached \$1 trillion in cumulative issuance in 2022, just five years after the first loan was issued. It took green bonds nearly 12 years to reach the \$1 trillion level, while the category surpassed a cumulative \$2 trillion in issuance in 2022. The total public sustainable debt market is on the verge of reaching \$5 trillion in cumulative issuance.⁵ Additionally, the private debt market provides incremental liquidity with direct lenders of all sizes now offering climate credit solutions.

The equity markets continue to provide a strong source of funding for a broad range of industries seeking to decarbonize. In 2022, Pitchbook analysts counted 1,304 venture capital-backed climate tech capital raising rounds, totalling \$56.2 billion. That represents a significant up-tick from 2021, when \$44.8 billion was raised across 1,130 deals. That being said, the recent shuttering of Silicon Valley Bank—historically, a meaningful source of capital for many clean transition businesses—creates a funding gap that can potentially be filled by private capital over the near-term.

Finally, as technologies and business models have matured, private capital has begun to play an increasingly important role. Larger alternative asset managers provide longer-duration capital, allowing businesses to achieve scope and scale while simultaneously benefiting from the operational excellence that the replicable private-equity playbook can provide. As the clean energy transition market opportunity accelerates, we expect this source of capital to grow—both in size and in importance—for years to come.

Finding unprecedented opportunity in the transition

Action began with early efforts to reshape the global energy landscape, including large investments in renewable power and related technologies that, together, form the basis of what is often referred to as the energy transition. Today, that transition extends further to the broader industrial economy, which still depends heavily on the consumption of hydrocarbons, as well as to transportation, agriculture, and the built environment.

Clean transition-related investing is among the largest investment opportunities in history, and one that we believe will persist for more than a generation. Because this transition will require public policy as well as private capital, we expect these markets to be more resilient to market forces and cycles. We believe this support should create opportunities for new industries and companies to be built and financed, leveraging the flexibility and scale of private enterprise and capital. Over the coming years, we believe sustainability-focused investments can generate favorable returns.

Accelerate: The power of private capital

Opportunities to diversify fuels within the power and transportation sectors are more abundant than ever. Renewable energy and electrified transportation have become more cost competitive, particularly as the price of oil—among other commodities—has increased. Continued innovation in these markets has reduced costs compared to incumbent power and transportation solutions.

We believe these factors will create a lasting upward shift in baseline commodity prices, with ongoing geopolitical tensions driving episodic spikes in pricing. As renewables have quickly progressed down the cost curve, the deflationary pricing trend in hydrocarbons has reversed, creating a powerful and positive economic picture for renewables investors—even amidst occasional supply-chain pressures.

Global financial and regulatory support—exemplified in the United States through the Inflation Reduction Act—can provide further momentum for the deployment of renewable energy and electric vehicles. A broader installed base of zero and low-carbon resources can help enhance cost competitiveness, as companies produce more power and benefit from increasing economies of scale.

This theme can create numerous opportunities for capital providers. The development and deployment of decarbonizing infrastructure can create opportunities for project developers and financiers of this buildout. Service providers and suppliers may also be able to now capitalize on the opportunities in this burgeoning market.

5. Bloomberg New Energy Finance, “2H 2022 Sustainable Finance Market Outlook: Growth in the Era of Skepticism?,” August 2, 2022.

Strengthen: Financing a more robust supply chain

The speed with which industry can build renewable energy projects, electric vehicles, and other sub-verticals is constrained by the global supply of natural resources and equipment. Those constraints can have demonstrable effects: Prices for key metal inputs to batteries have skyrocketed. This challenge will be exacerbated by the concentrated reliance on certain countries for key minerals, materials, and products (**Exhibit 4**). With global geopolitical tensions rising, the energy supply map may need to be redrawn. Indeed, various global industrial conglomerates have announced large projects to “reshore” production of key raw materials and manufacturing facilities away from distant (and cheaper) geographies.

The establishment of new supply chains can create meaningful investment opportunities, including the mining and processing of key raw materials, the manufacturing of components and products, and the buildout of new transportation infrastructure for liquefied natural gas (LNG) and high-voltage electric transmission.

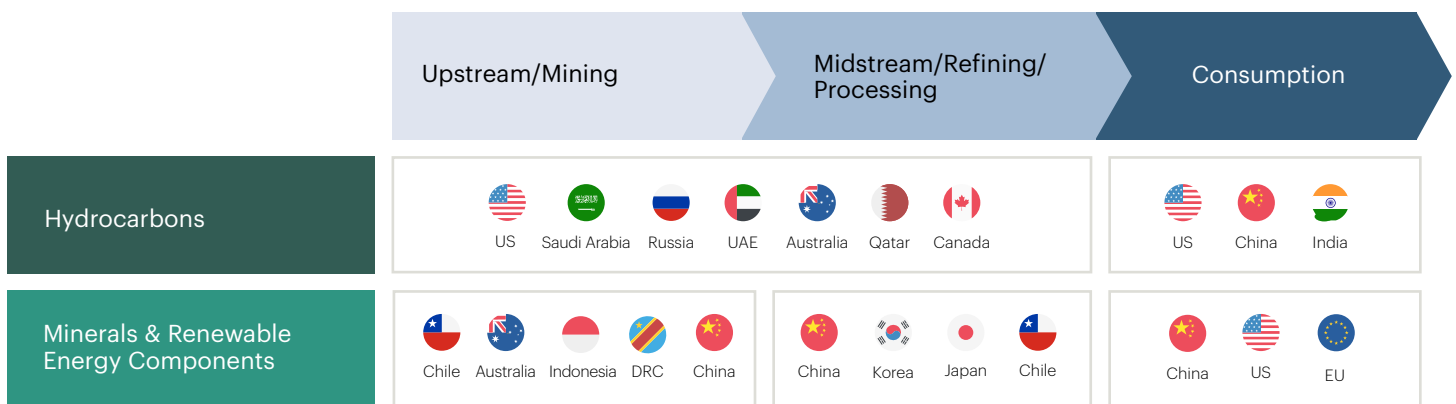
Establish: New markets are gaining traction

We see significant, if nascent, opportunities in new markets and technologies that supplement and expand existing products and services. We believe that corporations will be a driving force in scaling opportunities, as hard-to-abate sectors such as steel, chemicals, and aviation seek ways to decarbonize while remaining cost competitive.

We indeed may realize enhanced decarbonization impacts by the end of this decade as new technologies expand. These include carbon capture, utilization, and storage, where technologies such as direct air capture add a new approach to addressing decarbonization. They also include innovation in the generation and consumption of energy, such as advanced electronic systems with greater efficiency than incumbents or further advances in long duration clean-energy storage and transportation using hydrogen.

We are excited and inspired by an opportunity set that is vast and actionable over many years. Private-market investment can play a critical role, bridging venture capital and infrastructure finance in addressing this challenge.

Exhibit 4: The geopolitical map is being redrawn for key commodities, elevating the focus on supply-chain security and resilience



Source: International Energy Agency (IEA). Data as of May 2021.

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Climate and clean transition investing is a theme

We view climate and clean transition investing as a theme rather than an individual or specialized sector or asset class, as climate change can impact all sectors, geographies, and peoples around the globe for decades to come. We believe that investors should explore these opportunities across asset classes, as climate and clean transition-financing needs span credit, equity, and real-asset structures.

Specifically, Apollo is focused on four distinct themes that we believe can generate strong, repeatable returns: Energy Transition, Industrial Decarbonization, Sustainable Mobility, and Sustainable Resource Use (**Exhibit 5**).

Energy transition

We believe investment in renewables and battery storage can deliver attractive returns and will be critical to facilitate the shift in the global power-supply stack away from coal and

towards cleaner energy generation. The electricity sector emitted 12.3 gigatons of CO₂ in 2020 (30% of all energy-related emissions) and coal remains the largest source of electricity sector emissions: Coal contributes just over one-third of electricity supply but is responsible for nearly three-quarters of electricity sector CO₂ emissions.⁶ We expect that the power sector will continue to pivot away from coal, while the ongoing decarbonization of the electricity sector requires a massive continued surge in the deployment of renewables, natural gas, and liquified natural gas. Globally, growth in renewable capacity is expected to further accelerate over the next five years, accounting for almost 95% of new global power capacity additions.⁷

The Inflation Reduction Act can provide critical support for the buildout of renewables in the US. The bill provides for approximately \$183 billion in support of clean energy generation, including a 10-year extension of key renewable energy tax credits and the expansion of tax credits to new areas including standalone energy storage, hydrogen, and nuclear power. An additional \$40 billion will support the

Exhibit 5: Clean transition investing isn't an asset class; it touches almost all areas of human endeavor

SUSTAINABLE ECONOMY ACTIVITIES

Energy Transition	Industrial Decarbonization	Sustainable Mobility	Sustainable Resource Use
<ul style="list-style-type: none"> • Renewable Energy • Biofuels • Low-Carbon Energy • Hydrogen • Energy Storage • Electric Grid Infrastructure • Enabling Services & Technologies 	<ul style="list-style-type: none"> • Sustainable Manufacturing • Energy Efficiency/ Electrification • Emissions Management/ Reduction • Enabling Services & Technologies 	<ul style="list-style-type: none"> • Electric Vehicles • Electrification Infrastructure • Enabling Services & Technologies 	<ul style="list-style-type: none"> • Circular Economy • Water & Waste Management • Sustainable Metals & Mining • Smart Agriculture • Climate-Change Adaptation • Enabling Services & Technologies

Source: Apollo Analysts.

6. IEA, World Energy Outlook, 2021.
 7. IEA, 2021. Renewables 2021 Report.

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domestic manufacturing of solar panels, wind turbines, batteries, and critical minerals processing. Large-scale and long-term federal support through this and other policies (**Exhibit 6**) can further solidify not only the environmental but also the economic advantage of renewables over fossil-fuel generation.

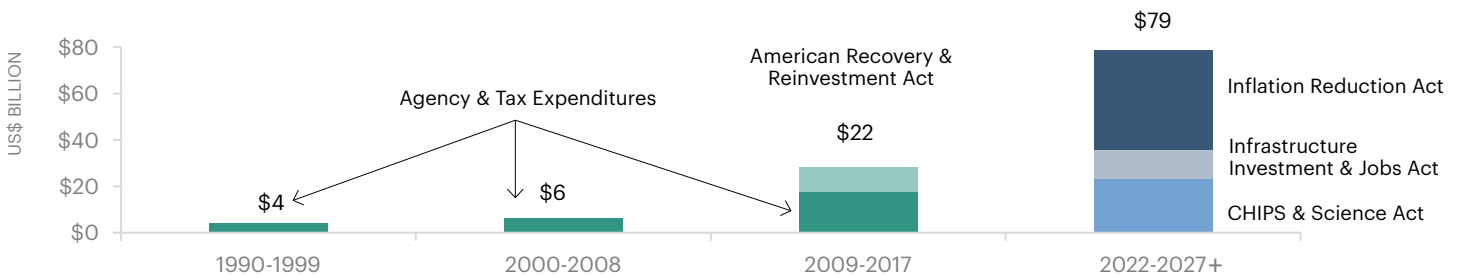
Similarly, advanced batteries and energy-storage systems are enabling the increased adoption of renewable energy sources by helping solve the energy intermittency problem. The parallel drives for energy security and cleaner power can drive further adoption of advanced batteries and energy storage solutions, resulting in a significant increase in annual energy storage installation globally (**Exhibit 7**).

We believe this confluence of regulatory support, increasing demand, and improved economics relative to fossil fuel generation is creating the most favorable environment for clean-energy investing that we have ever seen. The need for flexible private capital is vast—the International Renewable Energy Agency estimates that more than \$20 trillion of investment in new renewable capacity will be required through 2050.⁸ Of course, that is simply the funding for a small subset of the overall investable universe described in this white paper, which is expected to approach or exceed \$150 to \$275 trillion in the final analysis.

Industrial decarbonization

With the industrial sector responsible for roughly one-third of domestic GHG emissions in the US,⁹ industrial decarbonization is becoming an increasingly critical

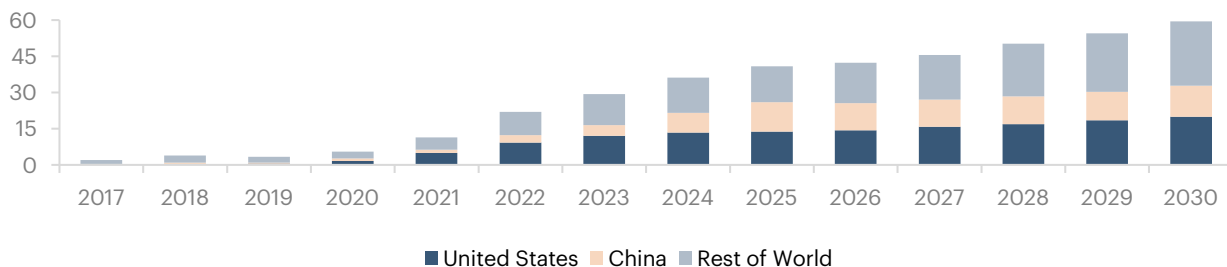
Exhibit 6: US government spending will accelerate the buildout of renewables



Source: International Energy Agency (IEA).

Exhibit 7: The US and China are leading the global charge in energy-storage installations

ANNUAL ENERGY-STORAGE INSTALLATIONS BY REGION (GW)



Source: IHS Markit.

8. Source: IRENA, <https://www.irena.org/financeinvestment/investment-needs>. Data as of March 2023.

9. Sources: McKinsey, Goldman Sachs, Bloomberg New Energy Finance (BNEF), World Bank. Data as of 2022.

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component to achieving a clean economy (**Exhibit 8**). We believe there is a compelling investment opportunity in this space that could transform the industrial sector. Industrial decarbonization remains relevant across a wide range of industries focused on energy efficiency and emissions reductions via investment in decarbonization drivers and green real estate. Illustrative investment examples include support for non-core disposal processes or sector disruptions that accelerate decarbonization such as industrial electrification, low-carbon fuels, feedstocks, and energy sources, as well as carbon capture, utilization, and storage.

We see material demand in the heaviest GHG emitting industries such as chemicals, energy, and metals and mining where industrial energy consumption is highest. For instance, the chemicals industry has historically been classified as “hard to abate” given its use of hydrocarbons as feedstock

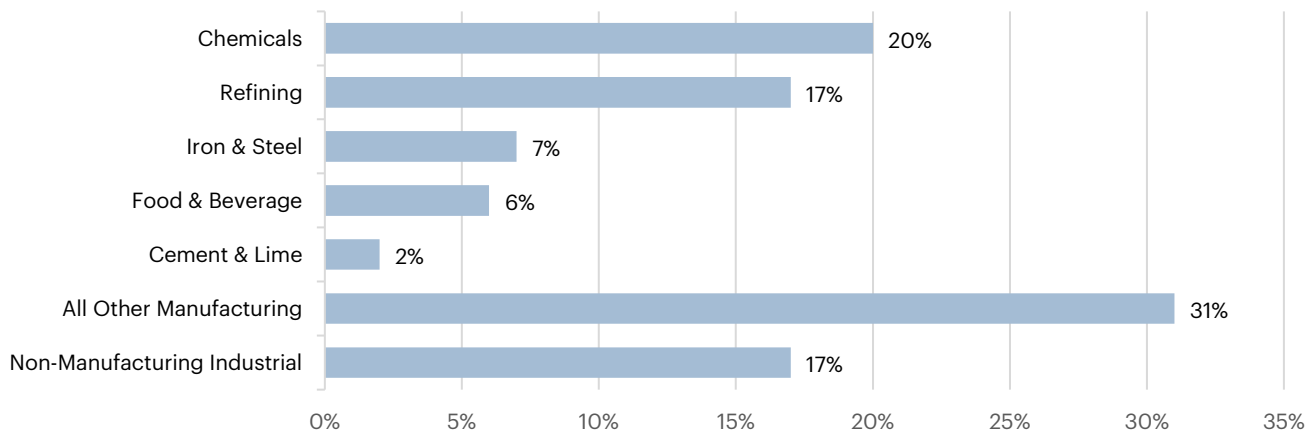
and as a source of energy; however, there are increasing numbers of large-scale waste-to-fuels projects as well as other resource recovery projects in the industry, driven by government commitments such as the EU Green Deal which includes a specific European chemical sector carbon neutrality commitment.¹⁰ In addition to what are now referred to as “gray-to-green” programs aimed at reducing the carbon footprint of heavy-emitting industries, we expect increasing demand for “end of term” asset programs, including facility retirement programs such as coal plant retirements.

Sustainable mobility

Transportation, broadly defined, accounts for 19% of carbon emissions globally.¹¹ While a variety of solutions will be required, emissions reductions over the medium-term could be achieved through further electrification within the developed world. *Bloomberg New Energy Finance* projects

Exhibit 8: Industrial decarbonization is critical

KEY COMPONENTS OF INDUSTRIAL EMISSIONS



Source: “Annual Energy Outlook 2021 with Projections to 2050,” US Energy Information Administration, Feb. 3, 2021.

10. Source: IEA, 2021, <https://www.iea.org/topics/transport>.

11. Sources: McKinsey, Goldman Sachs, Bloomberg New Energy Finance (BNEF), World Bank. Data as of 2022.

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that electric vehicles will account for approximately 40% of new vehicle sales by 2030, without the assumption of any new government policies.¹² The shift from internal combustion engines to electric vehicles is one of the largest industrial transformations in modern history and will require a minimum of \$630 billion of investment through 2030 (**Exhibit 9**) and significantly more by 2050.

Of that \$630 billion investment, approximately \$267 billion will be required to build out battery manufacturing facilities globally, which will provide capacity to produce ~5,000 GWh/ year of lithium ion batteries by 2030.¹³ The remaining ~\$363 billion is required to build out charging infrastructure.¹⁴ But the \$630 billion figure is a conservative lower bound, as it does not include the significant investment required to build out

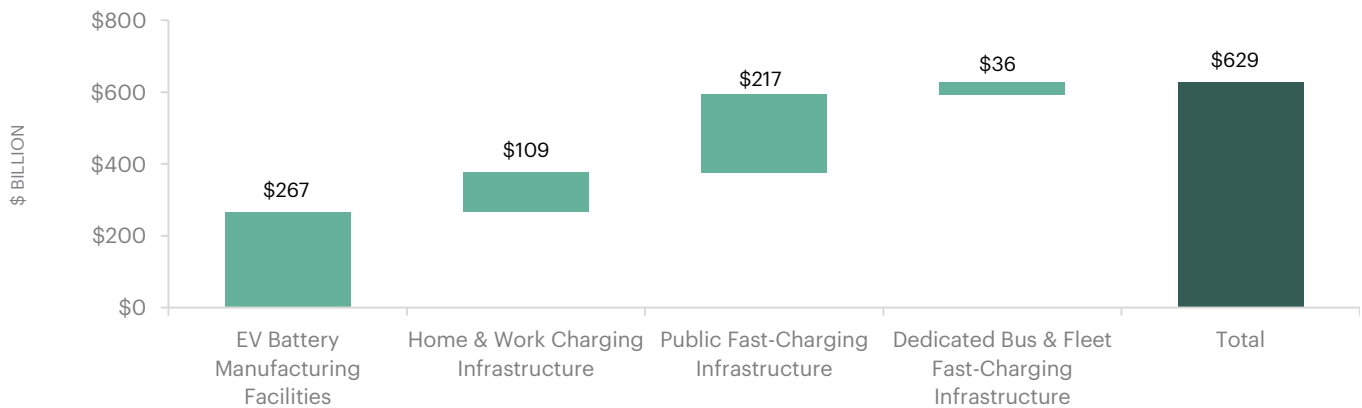
downstream businesses required to maintain reliable charging stations or upgrade grid infrastructure to handle substantial increases in charging load. Furthermore, the figure assumes no meaningful electrification occurs in the aviation or marine transportation sectors. If government policies or economics evolve to enable electrification in these sectors, substantial upgrades at ports and waterways will also be required.

Sustainable resource use

Sustainable resource use encompasses companies that reduce the need for, or impact of, primary-sourced non-energy natural resources, including agriculture and metals that support the energy transition. Broadly, this relates to the sustainable production and sourcing of natural products and raw

Exhibit 9: The shift from ICE to electric vehicles represents one of the largest industrial transformations in history

GLOBAL CUMULATIVE EV INFRASTRUCTURE BUILDOUT REQUIRED (THROUGH 2030)



Source: Wood Mackenzie. Data as of October 2022.

12. Source: Bloomberg New Energy Finance, 2022 Electric Vehicle Outlook. Assumes the “Economic Transition” case, based on projected economics, without any additional government support.

13. 5,000 GWh / year target is from Wood Mackenzie, 3/22/2022: Global lithium-ion battery capacity to rise five-fold by 2030. Incremental 4,200 GWh / year manufacturing capacity * assumed \$64 million capex per GWh/yr capacity.

14. Source: Wood Mackenzie. Data as of October 2022.

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materials, responsible disposal, recycling, or reuse of raw materials and finished goods via the circular economy, and the remediation of environmental damage that may already exist. Widening the aperture to include traditional waste management, electronic recycling, and advanced materials manufacturing helps form a broad, diversified opportunity that touches many related industries and types of businesses. We believe that there are maturing businesses in this space that represent ideal platforms to capitalize on the growth and technological advancements required to enhance efficiency and improve environmental and financial outcomes.

The case for a dedicated climate and clean transition-investing sleeve in both institutional and retail portfolios

Climate and clean transition investing is no longer a niche consideration. We believe this theme has the potential to touch nearly everyone in every sector and every asset class—bridging the entire capital structure—globally. It seems remarkable, then, that most investors do not have a specific climate and clean transition-investment allocation—particularly as Cambridge Associates recently identified climate as the dominant topic in sustainable investing, noting that “climate change is the defining investment theme of the next 20 years.”^{15, 16}

As significant new legislation is being enacted and more funding—both public and private—becomes available for climate-specific projects, we believe that investors should strongly consider deploying capital to strategies that focus specifically on climate and clean transition-related investment opportunities to allow for a more targeted approach.

Given that this is a massive and growing theme, we believe that formalizing its inclusion at the heart of an overall investment strategy could positively impact an investor’s portfolio. A climate and transition allocation that spans asset classes and capital structures could be advantageous because:

- Climate-related investment opportunities exist in nearly every sector of the global economy. The universe of investment opportunities can be enhanced when viewed through a climate lens.
- Climate risk decisions are beginning to influence corporate decisions for companies of all sizes. Investing in those companies that are addressing climate issues proactively and avoiding those that are lagging can be a form of intra-sector arbitrage.
- Government-sponsored climate policies are increasing demand for low-carbon technologies and infrastructure, shifting consumption and investment decisions towards cleaner alternatives.
- Climate change was identified as the number one risk facing the global economy over the next decade by the World Economic Forum’s 2022 Global Risk Report. Environmental-related risks took five of the top spots.
- Climate risks are projected to compound and progressively worsen over time. The entry price into the companies that are benefiting the most from this opportunity will likely rise as conditions deteriorate, in our view.
- Fiduciaries have a duty to balance their investment decisions over time, including intergenerational considerations in some instances. Climate change risks could affect pay-out obligations over time.
- Climate investments can be a key tool in helping investors achieve decarbonization goals. A wide range of metrics has been developed and can be reported to investors on an annual basis. These outputs include, but are not limited to, emissions reductions, avoided emissions, and carbon intensity. Whether measured by a point in time or collective improvement over a specified horizon, climate metrics can help investors quantitatively demonstrate the positive environmental impact of capital deployment.

15. Source: <https://www.newprivatemarkets.com/how-183bn-of-climate-focused-private-markets-capital-breaks-down/>. Data as of February 2022.

16. Source: <https://www.newprivatemarkets.com/sustainable-and-impact-investing-in-five-charts/>. Data as of February 2023.

- We believe that building climate-resistant strategies is a prudent way for fiduciaries to guard against financial risks to investors' portfolios, while offering an inflation hedge in the process.

Conclusion

The potential costs of climate change are expected to be significant. While this may be somewhat mitigated by the rapid decarbonization of the global economy by mid-century, it will nevertheless require urgent and meaningful changes to the broader energy and industrial economies. This imperative for decarbonization—the clean transition economy—forms the basis for a new, multi-faceted investment ecosystem that we believe will create attractive opportunities for private capital in the decades to come.

About the authors



Jonathan Silver
Senior Advisor, Chair of Apollo's
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Jonathan Silver is a Senior Advisor and Chair of the Global Climate Council at Apollo. Considered one of the country's leading climate-tech investors and advisors, Mr. Silver ran the federal government's \$40 billion clean energy investment fund where deals he and his team underwrote won Deal of the Year honors on multiple occasions. Prior to joining Apollo, Mr. Silver was a Senior Advisor at Guggenheim Partners, where he worked with global cleantech and clean-energy clients. Earlier, Mr. Silver founded Tax Equity Advisors, which invested capital in solar projects on behalf of Fortune 500 clients. He also co-founded Core Capital Partners, a leading venture-capital firm and served as Chief Operating Officer of hedge fund Tiger Management. He began his career at McKinsey. Mr. Silver has been a senior official in three US Cabinets: Energy, Commerce and Interior, and served as an advisor to the Secretary of the Treasury. He is currently on the board of directors at National Grid and Plug Power. Mr. Silver graduated with honors from Harvard University, and did graduate work at the Institute of Political Studies in Paris and the Graduate Institute of International Studies in Geneva while on Fulbright and Rotary Graduate Fellowships.



Scott McMurtry
Managing Director,
Institutional Client & Product Solutions

Scott McMurtry is a Managing Director in the Institutional Client and Product Solutions group at Apollo, where he leads product for the Firm's Sustainable Investing Group. Prior to joining Apollo in 2022, Mr. McMurtry was the Lead Product Specialist and Head of Asset Management for Angelo Gordon's energy strategy, and served as a founding member of Angelo Gordon's diversity council. Previously, he worked at RBC Capital Markets and in direct lending at D.B. Zwirn. He began his career in power and renewables investment banking at Citigroup. Mr. McMurtry holds a BA degree in economics from the University of North Carolina at Chapel Hill and an MBA degree from the McCombs School of Business at the University of Texas at Austin. He currently serves as an Executive Council member of New York for McCombs and as Co-Executive Sponsor of Apollo Pride, Apollo's employee network dedicated to promoting a safe, equitable, and inclusive environment for LGBTQ employees.

Apollo's Sustainable Investing Group

Apollo's Sustainable Investing Group, led by Olivia Wassenaar, Head of Sustainable Investing, leverages the Firm's deep expertise across asset classes to deploy capital in the key sectors driving today's energy transition and decarbonization. Across asset classes, Apollo targets deploying \$50 billion in clean energy and climate investments over the next four years and sees the opportunity to deploy more than \$100 billion by 2030. Apollo aims to be a leading capital partner to companies and communities globally.¹⁷

Over the last five years, Apollo-managed funds have deployed over \$23 billion¹⁸ into energy transition and sustainability-related investments, supporting companies and projects across clean energy and infrastructure, including offshore and onshore wind, solar, storage, renewable fuels, and electric vehicles, as well as a wide range of technologies to facilitate decarbonization. Apollo has also played an active role in helping to finance the transformation of certain traditional energy companies.

17. There can be no assurance that the targets described herein will be achieved as expected or at all.

18. As of April 2023. Reflects (a) for equity investments: (i) TEV at time signed commitment for initial equity commitments; (ii) additional capital contributions from Apollo funds and co-invest vehicles for follow-on equity investments and; (iii) contractual commitments of Apollo funds and co-invest vehicles at the time of initial commitment for preferred equity investments; (b) for debt investments: (i) purchase price on the settlement date for private, non-traded debt; (ii) increases in maximum exposure on a period-over-period basis for publicly-traded debt; (iii) total capital organized on the settlement date for syndicated debt and; (iv) contractual commitments of Apollo funds and co-invest vehicles as of the closing date for real estate debt; (c) for SPAC's, the total sponsor equity and capital organized as of the respective announcement dates; (d) for platform acquisitions, the purchase price on the signed commitment date and; (e) for platform originations, the gross origination value on the origination date.

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