



The Fundamentals Of Climate Investing For Families

**NOVEMBER
2023**

Anna-Liisa Goggs and Daniel M. Matross

With contributions from
**Régine Clément, Melissa Pennings,
Jason Scott, Kobi Weinberg, Christian Zabbal**



ACKNOWLEDGMENTS

With special thanks to CREO members for their time, expertise and assistance throughout all aspects of the evolution of this work and for sharing their perspectives.

DISCLAIMER

The information provided in this document is for informational purposes only and does not constitute a solicitation, offer, or sale of securities. Neither the investment examples cited or CREO's mention of examples constitute investment advice or a recommendation to purchase or sell any securities. CREO is not, and does not provide services as, an investment advisor, investment analyst, broker, dealer, market-maker, investment banker, or underwriter. The information contained in this report has not been tailored to the specific needs, investment objectives, or personal and financial circumstances of any recipient. CREO recommends to all persons considering the information in this document to obtain appropriate independent legal, tax and other professional advice. Certain products and services are subject to legal restrictions in particular jurisdictions and cannot be offered worldwide on an unrestricted basis. Although all information in this document was obtained from sources believed to be reliable and in good faith, no representation or warranty, express or implied, is provided in relation to the accuracy, completeness or reliability of the information, nor is it intended to be a complete statement or summary of the developments referred to in it. Neither CREO nor its directors, employees or agents accept any liability for any loss or damage arising out of the use of all or any part of this document. All information and opinions expressed in this document are subject to change without notice. CREO does not receive any compensation or fee for citing investment examples in this document or any consideration because of any discussion or transaction with respect to any such investments.

DESIGN

Studio diplomat

TABLE OF CONTENTS

CHAPTER 1	
TEN YEARS OF LEARNING	4
MESSAGE FROM CREO'S CEO	4
CHAPTER 2	
CLIMATE CONTEXT	6
CHAPTER 3	
INVESTOR LANDSCAPE	8
THE ROLE OF FAMILIES IN CLIMATE INVESTING	8
THE ROLE OF OTHER INVESTORS IN CLIMATE INVESTING	9
DYNAMICS DRIVING DISRUPTION FOR THE MARKET	10
DYNAMICS DRIVING DISRUPTION FOR FAMILIES	12
CHAPTER 4	
INVESTMENT STRATEGIES	14
BRIDGING TO A NEW APPROACH	15
THE FIVE ARCHETYPES	16
NEXT STEPS	28
CHAPTER 5	
APPENDIX	30
GLOSSARY	30
FOOTNOTES	32

CHAPTER 1

TEN YEARS

OF LEARNING

MESSAGE FROM CREO'S CEO

For the first time, CREO is documenting and sharing key observations and insights gained from supporting its members (family offices, family foundations, and family-controlled businesses) to accelerate the decarbonization transition. CREO was launched in 2011 by a small group of American family offices actively investing in Cleantech¹ with the idea that members would be more effective advancing climate-related goals when sharing information about such activities amongst each other.

Today, CREO is a 501(c)3 non-profit with offices in New York City and London. CREO partners with approximately 200 members in over 30 countries to document and facilitate the sharing of information among them as they invest billions of dollars² into climate and sustainability solutions in the transition to a decarbonized economy. As a community, CREO's members now boast a climate and sustainability investment portfolio of over 1,500 companies and 300 funds. CREO members are exceptional in their ingenuity, adaptability, and dedication. Current policy and macroeconomic trends indicate that stakeholder demands for a cleaner environment are only growing, regulatory tailwinds are increasing, and technological progress is accelerating.

Now is the time to discuss how CREO members have navigated this new era of investing in the decarbonization transition in the effort toward limiting Earth from warming by more than 1.5 degrees.

Documenting the activities of CREO members as they develop and execute their climate investment strategies has generated many insights. In particular CREO has observed that there is no “one size fits all” strategy for investing in climate solutions. Family wealth profiles, capital structures, historical choices and legacy and operating business scenarios are important determinants for how each family approaches their climate portfolio. But some insights are universal.

Building on past publications (such as “Pathways to Sustainable Investing” co-authored with Cambridge Associates in 2019³) and recent experience supporting members, CREO shares its concrete observations and takeaways here, in three sections:

1. *Climate Context.* Increased investment into climate is needed to meet scientific targets. The repercussions of human-induced warming are already here; they are severe and should be understood in real time. See pages 6-7.
2. *Investor Landscape.* Even families experienced in climate investing are facing a myriad of new challenges, which is changing how they approach an increasingly competitive investment market environment for climate solutions, how they set their climate investing goals and how they understand and evaluate their climate impact. See pages 8-13.
3. *Investment Strategy Observations.* CREO has defined a set of *Five Archetypes* (page 17) that showcase strategies employed by our members. By identifying an archetype that speaks to their own circumstances and goals, members and non-members alike can define and implement their own tailored strategies (investment and engagement such as policy, philanthropy) that may lead to the impact they seek. Our observations have been that members embody multiple archetypes, and some will transition from one to another over time. CREO's experience with its members indicates that those who are most successful in reaching their climate goals have embraced the notion that there is no idealized, steady end state in climate investing. Science, societal action and markets are too dynamic. See pages 14-27.

We hope this report offers useful insights that will provoke important conversations. We look forward to supporting our growing community of active investors, philanthropists, and operators to drive the decarbonization transition forward. The initial theory of CREO still rings true: we are stronger in advancing climate goals on a global scale together.



RÉGINE CLÉMENT
CREO PRESIDENT AND CEO

CHAPTER 2

CLIMATE CONTEXT

Earth's climate is rapidly warming. Reams of scientific papers demonstrate that our planet has already warmed by 1.1°C (1.9°F) over baseline pre-industrial temperatures entirely due to human activity.⁴ Geology provides historical context for this temperature rise, proving that the global average temperature is at the edge of the range, unseen in the last 10,000 - 12,000 years (that is, before human civilization). The modern-day period during which human activities have impacted the environment enough to constitute a distinct geologic change is known as the Anthropocene.

The repercussions of anthropogenic (human-caused) warming are here and severe. For example, in 2022 alone, air temperatures in Europe hit 50°C (122°F), forest fires scorched 134,000 hectares in California⁵ over months, and the heaviest rains in decades flooded China (surpassed only by the rains in 2023). Last year brought 421 catastrophic weather and climate events that caused some \$313 billion in financial losses.⁶ Since 2000, cumulative economic losses amount to nearly \$7 trillion.⁷ The fires of 2023 (such as those in Canada, Maui and Greece) and floods (in California, Vermont, Spain, India) are sure to add hundreds of billions more. What was once a scientific abstraction is now an alarming reality for billions of people.

Conditions are only expected to worsen. Current trajectories indicate that the global temperature will rise by 3°C (5.4°F),⁸ something the world has not experienced in 3 million years. Modeling suggests that such a world would look and feel much different than today's. For example, sea levels would rise by 10 meters (33 feet) or more, heatwaves would be deadlier, human migrations would be ever vaster, diseases would proliferate, and infrastructure would be torn apart. The destruction of natural capital and financial capital would be irreversible.

To avoid the repercussions of a changing climate, the economic status quo must change. It is likely that operating all current and planned fossil fuel infrastructure will put the world at a 2°C (3.6°F) temperature rise.⁹ The scale of change needed is massive, global, and costly, especially to well-entrenched incumbents.

There is urgency to act now – as the costs of needed action increase the longer society waits. In 2006, Lord Nicholas Stern released his ground-breaking (though controversial at the time) economic research that put the annual cost to address climate change at an estimated 1 percent of global gross domestic product (approximately \$500 billion in 2006).¹⁰ In 2022, McKinsey estimated that capital spending flows for low-emission energy and land-use systems would require an additional \$3.5 trillion annually through 2050, with more spending now than later to achieve a “net zero” transition.¹¹ Other recent research estimates suggest that \$2–2.8 trillion will be needed annually by 2030.¹² Regardless of which research is most accurate, the enormity of the challenge is clear.

Creating solutions to avoid the perils of climate change will redirect resources and require oversight to ensure a just transition. Economic upheaval and infrastructure changes will likely be concentrated in middle- and low-income countries (such as China, India, and Brazil) and areas that produce fossil fuels (including the Middle East, Canada, and Indonesia). Areas transitioning away from legacy industries and assets must reposition to maintain or uplift local lifestyles and values. Sectors that contribute most to climate change (such as oil and gas, steel, and cement), which represent 20 percent of global GDP (about \$19 trillion in value), will experience a substantial financial and employment-related impact. Workers in these sectors must reskill to benefit from new industries, perhaps causing short-term political upheaval and consumer pain. Meanwhile, anti-ESG rhetoric further delays the push to halt climate change. In the long-term, acting now will ultimately cost far less — financially, politically, and socially.

CHAPTER 3

INVESTOR LANDSCAPE

THE ROLE OF FAMILIES IN CLIMATE INVESTING

Families are particularly well-positioned to take advantage of sustainable investing trends. They actively manage their portfolios, and many have already allocated capital to sustainable investing. Multi-generational families have successfully managed large assets, whether capital or operating assets, and see themselves as custodians for future generations and their communities. When compared to large financial institutions, they are unregulated and can quickly adjust their strategic approaches to risk and opportunity. For financial assets, this understanding of long-term risk and opportunity makes families particularly suited to investing in climate solutions. Sound estimates are scarce, but families have a stock of wealth that likely now exceeds “\$10 trillion”,¹³ having grown substantially in the past five years. On average, these families are allocating more of their capital to sustainable investments,¹⁴ particularly in climate, and this is projected to increase as one-third of them believe they should be allocating even more to sustainable investments.¹⁵

A reasonable estimate is that families are allocating more than \$1 trillion of their capital to sustainable investments globally — an important capital flow.

By 2023, a survey sample of 53 CREO members had deployed or reallocated at least \$35 billion into climate investments. The total marketplace of private (that is, non-government) dollars directed into sustainable investments globally between 2018 and 2020 was approximately \$3.6 trillion.¹⁶ Even a small sub-set of CREO members can contribute a meaningful amount of new capital into sustainable investing.

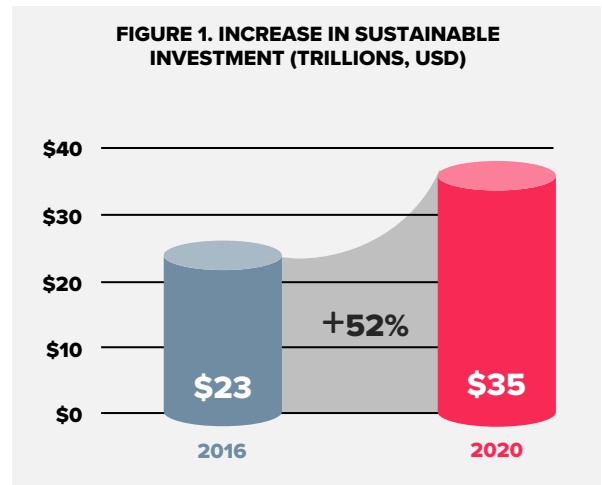
Family-controlled businesses are some of the largest companies in the world and family representatives on the board can be especially forceful in helping the company push the decarbonization and sustainability agenda.¹⁷ Despite the costs and challenges involved, many CREO members are leading such decarbonization efforts. One shipping family has decided to fully divest its liquefied natural gas (LNG) assets to redirect effort and investments to net zero solutions, while another is setting targets to reduce their carbon emissions by 50 percent by 2030, and to have a zero-emission fleet before or by 2050.¹⁸ In a further sub-set of 12 CREO members polled across different sectors, more than half reported having net zero plans in place and almost all had implemented energy retrofits, efficiency, and circularity measures in their operating businesses.

In fact, family investors are forging other paths for institutional investors to participate in climate investing: they are deploying philanthropic dollars, often mingled with investment dollars, to launch new initiatives and limit investment risk. In the United States, families are putting in dollars through program-related investments (PRIs) to accept initial project losses. Globally, families are strategically layering market-rate and philanthropic capital together to yield outsize impact and create “additionality.” Beyond the capital, families also bring knowledge and experience — gained from operating businesses, building technology companies, financing investments, advocating for climate policy development and adoption, or participating in a certain community/geography — that is relevant to the climate solutions in which they invest and benefits other investors due to the improved risk-return profile resulting from the family’s leadership position.

THE ROLE OF OTHER INVESTORS IN CLIMATE INVESTING

It is not just families investing in climate. While large institutions are typically slower to adjust to risks, the growth of net zero commitments and investment strategies marks the trend. In the past two years, 550 institutions, with balance sheets totaling \$150 trillion (or nearly one-third of global financial assets), have joined the Glasgow Financial Alliance for Net Zero (GFANZ). The Alliance requires that organizations commit to reduce their financed emissions based on climate science.¹⁹ More than 300 GFANZ members have established science-based targets to reach net zero emissions.

In parallel with such commitments, the deployment of capital into sustainable investments is accelerating. Sustainable assets under management reached \$35 trillion in 2020 — up from \$23 trillion in 2016.²⁰ (See Figure 1) An estimated \$200 trillion of capital will be deployed into climate-stabilizing investments over the next 30 years.²¹ Compared to these tens of billions in sustainable investing capital annually, “only” \$6–10 billion of philanthropic giving was dedicated to climate mitigation in 2020.²²



Narrowing the focus from sustainable investing specifically to climate investing demonstrates even more resilient growth compared to the broader market. Investments in decarbonization (mostly projects) have grown steadily, with roughly 12 percent compound annual growth rate (CAGR) between 2014 and 2020. Since 2020, the CAGR has accelerated to 33 percent.²³ During a similar period, climate tech venture capital investment grew even more rapidly, showing a 47 percent CAGR between 2014 and 2020 and a 68 percent CAGR since then.²⁴ The CAGR trajectory in private market climate investing is expected to continue. Several climate funds successfully raised capital over the last two years but have yet to spend it, meaning that there is still considerable “dry powder” in the private equity markets, even as private equity valuations dropped with the recent monetary tightening cycle.

To put it in context, however, this investment amounts to less than 10 percent of the global capital stock and is concentrated (80 percent) in the US and Europe.²⁵ The annual flow of capital into sustainable investments also competes with the flow going towards emitting industries. In 2022, energy transition investment amounted to \$1.1 trillion — reaching the same level as fossil fuel investment worldwide for the first time.²⁶ Within that \$1.1 trillion, \$119 billion came from public and private equity financing for climate tech companies,²⁷ of which \$40–70 billion came from venture capital and early growth equity. The remaining \$981 billion primarily funds low-carbon technology deployment.²⁸

DYNAMICS DRIVING DISRUPTION FOR THE MARKET

Assessment of Climate Risk and Opportunity

Investors increasingly recognize the material systemic risk posed by climate change and challenge the Modern Portfolio Theory tenet that climate risk cannot affect beta (a portfolio’s susceptibility to systematic risk). In other words, an allocation to sustainable investments as a diversification strategy is insufficient to reduce the risk of climate impacts on a portfolio.²⁹ More and more investors are regularly integrating assessments of climate risk — a combination of physical risks (such as catastrophic events like flood, drought, and wildfire) and transition risk (social events like climate policy, regulation, and carbon pricing) — into investment diligence. Meanwhile, the view of BlackRock’s Investment Institute for Transition Scenario (BIITS) is that higher-carbon investments can still be managed by prudent planning including diversification, but that tectonic shifts in consumer and investor preferences toward sustainable products and assets will widen the spread in financing costs between high- and low-carbon assets. If the status quo continues for capital flows, unprepared asset owners will face capricious risks from climate change and the socioeconomic response to it.³⁰ Market drivers like climate risk and climate asset returns have ultimately prompted investors to care about externalities, and the shape and timing of financial opportunities will depend on macroeconomic trends, regulations, policy, and the speed of technology deployment.

Regulations

Regulators in many of the largest economies in the world have or likely will impose legislation requiring investors and companies to act on climate. In the EU, Sustainable Finance Disclosure Regulation (SFDR) sets parameters for “green” investments.³¹ The US Securities and Exchange Commission (SEC) has proposed rules on how to mandate businesses to disclose their emissions. Among governments, 92 countries that are responsible for 78 percent of global emissions have committed to net zero targets.³² In situations where regulation does not have influence on climate action or where countries do not make commitments, shareholder activists apply pressure and find traction. For example, 20 percent of shareholders’ ESG proposals achieved 50 percent or more proxy votes. Perhaps anticipating regulation, shareholder action, and lawsuits, companies worldwide are disclosing climate metrics. The Carbon Disclosure Project has 9,600 companies disclosing carbon emissions, and the Science Based Targets initiative has more than 2,400 companies committing to its criteria (up from 115 in 2016).³³ Whether the momentum stems from internal or external pressures, markets are moving.

Policy

Clean economy policy is on a fast track around the world. In the United States, the Infrastructure and Jobs Act and the approximately \$370-billion Inflation Reduction Act (IRA) together incentivize and develop government programs for renewable energy, green hydrogen, carbon capture and storage, carbon removal, electric vehicles, batteries, and several other climate-related technologies and manufacturing processes. The IRA is the largest-ever US government action and injection of subsidies in climate solutions. In the EU, new goals are being codified under REPowerEU for wind, solar, biomethane, and green hydrogen to enable the region to reach its ambitious *Fit for 55* green transition targets.³⁴ In light of the 80 percent concentration of sustainable investments in the US and EU, these newly enacted policies significantly influence investment decision-making. The mechanisms, agencies, and pace for government capital deployment are being developed alongside the policies’ passage. In other words, they are building the boat as they row.

Technology

There is a time lag between the frontier of technology, what is financeable today and what is needed to meet scientific targets. Many technologies that address climate change, like wind and solar generation, are already commercialized. In other words, the techno-economic characteristics and accessibility of these renewable assets match the requirements of the energy market, are deemed investable by institutional investors (sufficient guarantees, underwriting, and debt provision), and have reached scale (minimum 150 megawatts). Roughly 80 percent of new power sector investment is going into renewables,³⁵ further standardizing and commercializing them as project investments and placing global power generation in a transition fast lane as demand doubles by 2050.³⁶ The well-established market gives investors modest³⁷ returns with premiums priced for governance, currency, geography, and other risks.³⁸ These project investments in renewables characterize what is widely financeable today, though the necessary buildout will require more than \$1 trillion per year for the next 30 years.³⁹

Growth of Cleantech

Venture capital, a signal of technology and innovation trends, has moved decisively into Cleantech. In 2022, \$40–70 billion was invested into more than 1,000 climate-venture deals and more than 2,000 climate-venture funds. Investments spanned hardware and software for energy (such as hydrogen, novel photovoltaics, and advanced nuclear), industry (such as EV chargers, green steel, and supply chain carbon management), food and agriculture (such as cold chain, aquaculture, agricultural inputs, and alternative protein), carbon removal (such as ocean-based removal, direct air capture), and several other areas. The investment pace for venture capital is likely to continue, with \$37 billion of “dry powder” (that is, unallocated venture fund capital) as of 2022.⁴⁰ Venture portfolios offer a glimpse of what may be financeable by the mainstream tomorrow.

Non-venture investors can also find appropriate opportunities and possibly generate outstanding financial returns by understanding and engaging in major market trends around electric transportation, industrial decarbonization, carbon credits, green hydrogen, advanced nuclear, and other climate-driven technology segments.

Within Cleantech, a rich seam of investments exists today, in between high-risk venture and low-risk renewables project finance. The speed at which technologies scale, moving across the spectrum from venture to mainstream finance, will govern how closely the world can adhere to the timelines demanded by scientific targets. Similarly, if venture technologies scale to mainstream faster, then the financial rates of return to investors in those technologies may be higher.

DYNAMICS DRIVING DISRUPTION FOR FAMILIES

Against the backdrop of rising urgency and a much wider opportunity set, families now face new challenges internally and externally and these are affecting their competitive positioning in the market relative to returns and impact.

On the internal side, the growing and more competitive market for climate investing is intersecting with the changing demographics of families. Across the world, wealth and decision-making are being transferred to the next generation, who are accelerating changes in the way that money flows into climate solutions, demanding quantifiable impacts and seeking ways to amplify those impacts. More and more of these families, especially in the global south, are taking to climate investing. As the diversity of families pursuing climate coincides with a steadily growing supply of climate-specific vehicles for everything from equity to real assets, strategies are blossoming well beyond the heavy historical emphasis on philanthropy and venture capital as a means of addressing climate change.

Externally, although families have demonstrated that they occupy a critical niche leading the climate finance ecosystem, the newfound interest from institutions means that some families have exited assets that have outgrown them in terms of ticket size and risk and are continuing their catalytic role in the next phase of the energy transition. In 2023, a family-controlled group and its family investment fund sold an offshore-wind energy platform to a large power generation company. The transaction allowed the group and its fund to refocus on onshore wind, solar, hydrogen, enabling services and upcoming technologies needed for the energy transition.⁴¹

Responding to demand, many more traditional advisors now offer sustainable investments, giving investors the option to leverage external management far more than they could have a decade ago.⁴² But by outsourcing, families must more diligently question whether they are creating real impact. Furthermore, because objective track records are still scarce, the market heavily favors those managers it perceives to be experienced and/or promising. For families, that means it can be quite competitive getting allocations into certain funds.

In summary, those members seeking meaningful impact have clarified their strategic choices, embraced the new market drivers of climate risk and asset returns, and plan to remain nimble and innovative in an evolving and competitive marketplace.

CHAPTER 4

INVESTMENT STRATEGIES

Ten years ago, some early investors in Cleantech took risks with their investments. Generation's main fund (Global Equity Fund) is reported to have returned an annualized 13.7 percent (net of fees) since its inception in 2005 through to year end 2021, versus 8.6 percent for its benchmark,⁴³ and Vision Ridge Partners sold Vanguard Renewables to BlackRock Real Assets for \$700 million in 2022 ⁴⁴ (among other significant exits).

These are just two examples of investment funds, portfolios and individual investments connected to early CREO members. Dozens more exist across asset classes, geographies and strategies including foundational investments in Tesla, First Solar, Beyond Meat and Nest Labs. Today, families have many more avenues to invest in climate solutions and the decarbonization transition efficiently and confidently.

But naturally, given the inherent complexity and uncertainty of climate, there is still disagreement about how to measure the effectiveness of investing in climate solutions. Even though the tools that financial professionals apply to determine the balance of risks and rewards specific to climate investing are becoming more sophisticated, climate is still a new financial domain where scorekeeping is done in degrees as well as dollars. Thus, it will take time to “prove” the validity and impact of newly professionalized investment processes such as stress tests and outcome measurement (among others).

Family investors moving into climate want to understand how similar investors such as CREO members have applied their investing experience and processes into climate to guide their own efforts. Therefore, CREO has put together a list of the common activities it has observed its members, constituted of family offices, family foundations and family-operating businesses, undertaking.

Beyond that, CREO has documented the strategies, derived from the experiences of members, that such members anticipate will lead to meaningful climate impact and attractive financial returns. With this in mind, CREO has defined Five Archetypes to showcase ways to get started and to help CREO members and similar families navigate the increasingly complex journey to invest in climate solutions.

BRIDGING TO A NEW APPROACH

Personal values remain a major impetus for families to allocate capital into climate, and members of the next generation are bringing new concerns and different preoccupations to the process of matching assets to values. However, based on our observations of CREO members, there are common threads that link climate investments with traditional portfolio allocation. Whatever the size, strategy or level of experience, family investors are approaching their setup, their assets and their expected outcomes in similar ways:

All Families

Setup

- Creating a narrative that fits family values across generations.
- Implementing internal control and decision-making processes (including family involvement).
- Creating efficient structures to grow, manage and align a diversified portfolio (and in some cases philanthropy and family-controlled operating businesses).
- Accessing experienced and knowledgeable resources.
- Managing stakeholder and reputational concerns (clients, employees, etc.).

The assets

- Gaining access to high-quality deals and achieving competitive financial returns.
- Securing sufficient funding to underwrite the investments and offer follow on financing.
- Building trusted relationships to access external equity financing and non-dilutive financing.
- Identifying progressive public policies that support investments and the sectors in which they operate.

The outcomes

- Identifying exit options and liquidation of assets.
- Addressing climate-related investment risks (climate physical and transition risk).
- Assessing the impact of their investments.

Additionally Observed in CREO Families

Setup

- Matching industry standards for teams to reward performance and align incentives.
- Structuring assets and entities to be flexible enough to accommodate evolving climate investment strategies over long time horizons.

The assets

- Using platforms and networks such as CREO to build a trusted network and access to climate and sustainability deals.
- Managing risk and liquidity through portfolios that may include all asset classes but with actual allocation that is different from traditional portfolio allocation.
- De-risking climate tech and novel financing structures to accelerate the energy transition.
- Leading the decarbonization of their family-controlled businesses.
- Using social capital, philanthropy and advocacy to advance climate policy.

The outcomes

- Exiting to re-invest in companies supporting the energy transition that have not yet scaled adequately to access infrastructure capital.
- Agreeing from the outset on the expected outcome for investments and the metrics by which they will be judged.

THE FIVE ARCHETYPES

The *Five Archetypes* define the strategies that other CREO members have implemented. CREO believes that every member and non-member alike can see themselves in at least one of these, in whole or part, whatever the stage or experience of their climate-investing or philanthropic activities. Identifying an archetype can help direct next steps in developing a climate-investing strategy. Most members embody multiple archetypes, and some will transition from one to another over time.

Purpose and Insights

Each archetype has an element of generalization and fluidity and we do not expect that any one archetype will properly characterize all families, considering family wealth profiles, capital structures, historical choices and legacy and operating business scenarios. What is clear from CREO research is that there is no one path for any family to achieve climate impact through investing, even when families share similar characteristics and impact and financial goals.

In reviewing the archetypes, families may want to consider which strategy they are currently executing, the strategy they could develop today, and the strategy they would, ideally, like to pursue in the future. Every family will have practical constraints that need to change to accommodate financial, technological, or policy realities, or to ensure successful execution.

CARVEOUT**“I want some exposure to climate”**

Carveouts allocate a percentage of total assets under management (AUM) to climate-related activities with clear impact and investing goals.

Key Insights

Carveout investors can get started very quickly, without extensive preparation. However, a family must be clear on impact goals, return goals, and practical constraints of the whole portfolio to expand beyond Carveout.

SPECIALIST**“I have a particular passion or expertise in a sector or asset class related to climate.”**

Specialists allocate a percentage of AUM to a specific sub-sector or asset class of climate investing with particular impact and investing goals.

Key Insights

Specialists find it easy to define what they are doing, and their clear goals can attract people and help build community and co-investment networks. Specialists can pivot to other strategies or asset classes and apply learnings elsewhere. Those deploying a greater percentage of AUM will have to balance solving a specific problem with cash flow or liquidity needs.

INNOVATOR**“I had to create my own product to achieve the impact I sought or to maximize my own contribution to climate.”**

Innovators develop investment products, platforms and services that engage other investors in a specific product, platform or service (including generating fees for these products and services).

Key Insights

Innovators find that external capital provides a financial scale, access to talent, and synergies with broader capital markets that are harder to achieve in a single-family office. However, product creation will change the market perception of a family and may take longer than expected. And the transition from being principal to a third-party asset aggregator requires a different team to meet the demands of fundraising, marketing and external reporting.

DECARBONIZER**“I need to decarbonize my operating business (in a hard-to-abate sector).”**

Decarbonizers deploy GHG-reducing strategies within an operating business to meet specific emission reduction goals over time.

Key Insights

CREO is seeing rapidly growing interest from members with full control of their operating businesses to commit to net zero plans. Powerful synergies exist where a family can also leverage its investment portfolio to support decarbonization goals. However, managing stakeholder alignment and transition risk while maintaining liquidity and performance is challenging.

ALIGNER**“I want to align for impact and returns across all my entities and assets.”**

Defined strategy to align all investing and activities (such as shareholder engagement, philanthropy and policy) across total financial and (where applicable) operating assets to achieve specific financial and impact goals over time.

Key insights

Full alignment is highly challenging and best undertaken in stages. In the short term it will almost certainly require trade-offs. Today, more families are considering alignment earlier in their climate investing journey because they can now pursue a whole portfolio approach including real estate, public equities, fixed income and bonds, and alternative investments.

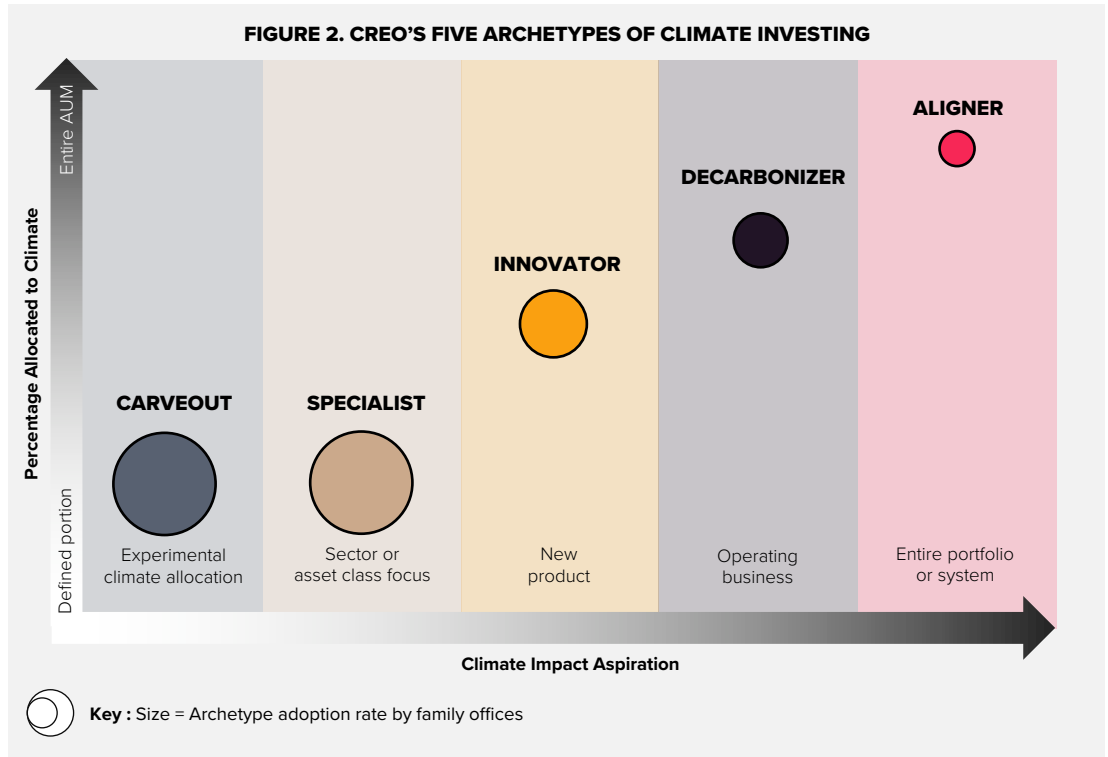
Comparing Impact, Assets Under Management and Adoption Rate

The size of the bubbles in Figure 2 (seen on p. 19) indicates the rate of adoption of each archetype. At present, we see that more families define themselves as Carveout or Specialist archetypes than as Decarbonizers. The rate of adoption of the Innovator archetype has been growing quickly as more families build products. Meanwhile, fewer families to date have fully adopted the Aligner archetype because it is highly challenging and inherently long-term. But it has corresponding high-impact aspirations as a result of focusing all its resources on reaching its goals and finding synergies. A family identifying as a Decarbonizer will typically dedicate a greater proportion of AUM to successfully transitioning its business, because the family appreciates that the process requires significant investment. Greater impact aspirations for the business will be created by net zero plans that feature emissions targets, a strategy to manage climate risks and opportunities and a program for building capabilities to monitor external conditions. As a result, the Decarbonizer bubble sits close to the Aligner bubble in Figure 2.

Recent experience with families indicates that those investing in climate for the first time are coming to CREO with more ambitious climate aspirations. They invest a greater percentage of their AUM in climate, try different strategies and move through the archetypes more quickly than was observed before. This shift may be as a result of the benefit they gain from the learnings of other families, the increasing opportunity set in climate that offers multi-asset class strategies, or because they see the urgency of climate change and its associated risks and opportunities.

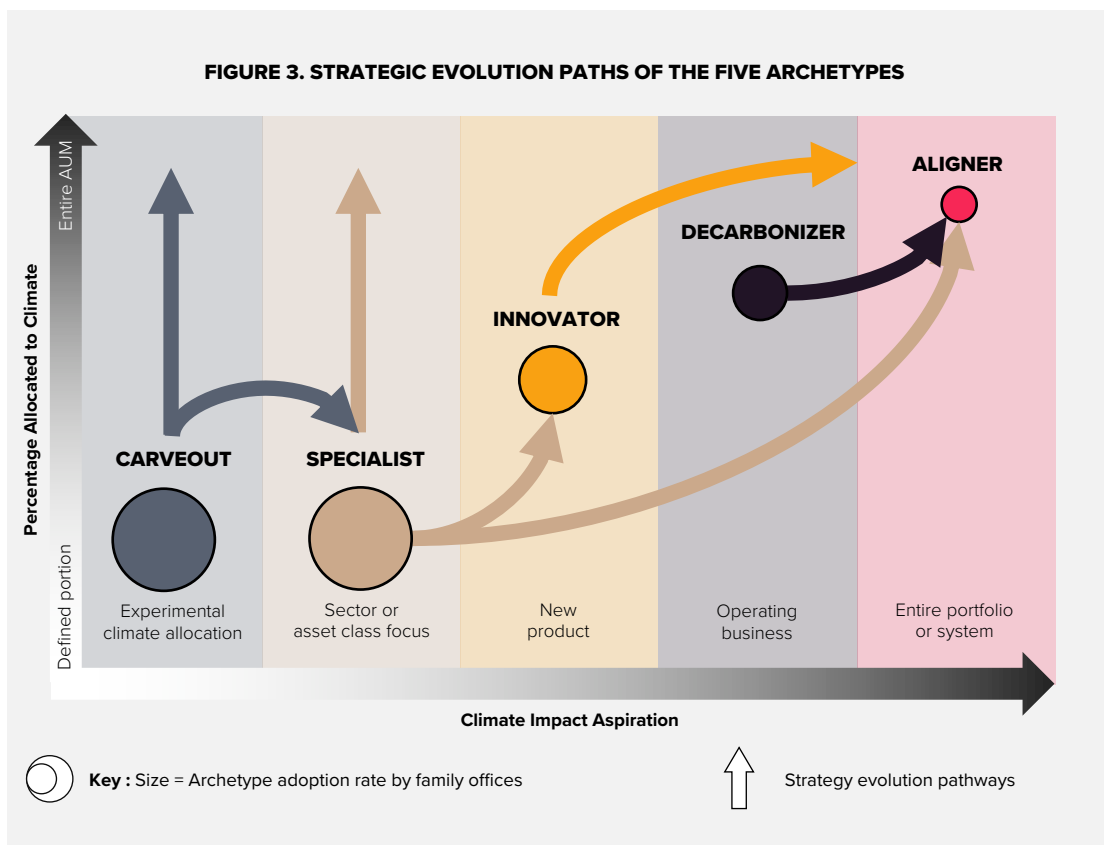
We have also seen families attempting to address the root causes of systemic problems through their investing. This can be done through any of the five archetypes. Some investors are testing highly risky systemic approaches with defined portions of their overall portfolio, while others have attempted to drive systems towards a low-carbon future across all assets and entities. In all cases, a highly diversified portfolio and support of the broader ecosystem is recommended, as systems cannot change through a single investment or initiative.

Figure 2 is not meant to define any one archetype as more desirable than another, nor to convey that progression towards alignment is necessary to successfully address climate change. CREO is not expressing an opinion about whether one is more suitable than another. Families within CREO have successfully remained as Carveout or Specialist archetypes while creating returns and impact.



After more than a decade spent tracking CREO families, it appears that the paths CREO members take are fluid. Families evolve to and from different archetypes, may function across several approaches and may experiment with different strategies through different entities and structures while they look to optimize their outcomes. Most families tend towards a primary archetype that drives their decisions, and a clear aspiration as to the direction in which they are headed.

Figure 3 below shows some of the more popular strategic evolution paths taken by our families. A Carveout may initially follow the path of allocating a greater proportion of its family's wealth to climate, and then gravitate toward the Specialist archetype. A Specialist may find that transitioning to an Innovator is a natural step that allows it to further scale its impact. Or a Specialist may align its philanthropic efforts and remaining assets to climate impact goals. An Innovator, driven by personal conviction, finds it natural to pursue other activities that support its investment product and move it toward the Aligner archetype. Meanwhile, a Decarbonizer that controls a business following a net zero plan may gradually apply those learnings across all the family's assets and entities over time, and simultaneously create a new Carveout to test an experimental strategy. The analysis charts that follow Figure 3 provide a detailed comparison of each archetype.



Detailed Analysis of Archetypes

Any examples of investments, strategies or risk/return profiles cited below are by way of illustration only and do not constitute investment advice or a recommendation to pursue any particular investment strategy or purchase or sell any securities. They have not been tailored to the specific needs, investment objectives, or personal and financial circumstances of any recipient.

	CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
Adoption Rate by CREO families	○ ○ ● Low Medium High	○ ○ ● Low Medium High	○ ● ○ Low Medium High	○ ● ○ Low Medium High	● ○ ○ Low Medium High
% Overall AUM	● ● ○ Low Medium High	● ● ○ Low Medium High	○ ● ○ Low Medium High	○ ● ● Low Medium High	○ ○ ● Low Medium High
Sector/ Asset Class Focus	● ○ Agnostic Specific	○ ● Agnostic Specific	○ ● Agnostic Specific	○ ● Agnostic Specific	● ○ Agnostic Specific
Investment Portfolio Composition	● ○ Defined Entire AUM AUM allocated to climate is invested in public and/or private markets, copying a conventional asset allocation or experimenting on a deal-by-deal basis. No impact on strategy for remaining AUM.	● ○ Defined Entire AUM AUM allocated to climate is invested in a specific sector/asset class. Often allocates additional philanthropic or concessionary capital also aligned with sector focus. Remaining AUM more diversified to meet risk/return goals.	● ○ Defined Entire AUM AUM allocated to climate is invested in an investment product/platform that can attract external capital to create scaled impact. Remaining AUM likely more diversified to meet risk/return goals.	● ○ Defined Entire AUM Operating budget or dividends are allocated to decarbonizing an operating business including synergistic investments designed to support the transition. Remaining AUM more diversified to meet risk/return goals.	○ ● Defined Entire AUM Entire AUM includes all family-owned investment assets, endowment or trusts, and in some cases operating businesses. Allocation must consider portfolio correlation across long-term assets to meet risk/return goals (100 percent alignment is a long-term process).

**Synergies and Engagement
(Philanthropy, Advocacy, Policy)**

CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
● ● ○ Low Medium High Learnings can be translated from a Carveout to the rest of the portfolio with good communication between key decision-makers. Opportunities for synergies may be greater if a Carveout is focused on a specific climate outcome.	○ ○ ● Low Medium High There are significant opportunities for impact by focusing on specific investment sectors. This opportunity can be further enhanced where the investment is complemented by catalytic capital, philanthropy and policy.	○ ● ● Low Medium High Building a product can raise visibility in a sector or asset class and thereby enhance the profile and impact of aligned policy advocacy and philanthropy. Some families will do this work with personal wealth where fund structure or return demands of raising third-party capital can prevent fully integrated catalytic or philanthropic investments.	○ ● ● Low Medium High Significant opportunities for impact exist if key stakeholders across family and business entities are aligned. Ability to coordinate across stakeholders will define the ability of philanthropy and policy to be impactful on climate goals. Policy advocacy and partnerships with peers in the same industry can significantly increase scale of impact (such as shipping families aligning around catalytic capital pools, policy or philanthropic efforts).	○ ● ● Low Medium High Alignment strategies are inherently long-term because of the time frame needed to transition all of AUM. Typically, alignment strategies are executed alongside robust philanthropy and policy strategies, catalytic capital efforts and engagement to manage risk and the long-term impact goals of the portfolio. Stand-alone investment alignment strategies may be less impactful.

	CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
Risk Profile	Typically low risk to overall portfolio returns due to defined portion of total AUM deployed. Most Carveouts are benchmarked to market rate risk-adjusted returns, but occasionally families decide to take more risk to seek greater financial and impact returns.	Typically higher risk than a Carveout, due to single sector or asset class focus. But still usually a defined portion of AUM which may limit risk to overall portfolio. May often include market rate, sub-market rate, and concessionary returns to maximize impact within sectors.	Risk profile will depend on sector/asset class focus but usually targets benchmark returns for asset class to attract third-party capital. While families usually commit a small allocation of overall AUM, the risk of failure can be higher once third-party capital is successfully raised. Some families are also experimenting with pooled vehicles for catalytic capital.	Return profiles of investments will depend on many factors that can influence the speed and success of decarbonization. Decarbonization should be a risk mitigator and alpha generator, but it is highly dependent on the sector, successful implementation of strategy, and policy environment. Business transition can be hard so there may be more inherent risk than in other strategies.	Full alignment should be a risk mitigator for portfolios but there is no dispositive evidence as yet to prove this. Impact on returns is highly dependent on the specific alignment process, goals, time frame and asset and sector allocations over the long term.
Impact Risk Profile	There is opportunity to create outsized direct impact and financial returns through individual investment positions. This can translate to significant potential impact through demonstration effect if executed successfully. But impact can be low without specific climate goals.	Investing in a specific sector or asset class can create outsized returns, help manage risk (by being segmented from the remaining family assets) and create significant impact. When combined with aligned catalytic capital, policy advocacy and philanthropy, the potential for impact in a sector or asset class is enormous.	Innovating and even transforming a sector or asset class by scaling a strategy with third-party capital can be very impactful. But even short-term underperformance can slow down or end capital deployment (and therefore impact). Product innovation tends to be more risky than managing a single family's capital where time frames are longer and there is more patience for inconsistent, short-term performance.	Transition risk is real, so decarbonization should be a risk-mitigating factor, with the potential for outsize returns and impact for the business and even for entire industries. But the time frames for this to happen vary enormously and stakeholder alignment and patience are critical.	Aligning a whole portfolio with climate goals will have a high demonstration impact if it can be achieved with strong financial performance. This will include mitigating risks to avoid the stranding of assets. But performance factors are long-term and cyclical, and there may be performance challenges the family must navigate.

	CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
Range of Financial Return Approaches	 Low  Medium  High A Carveout can have a large range of financial return expectations. At one extreme, strategies might include a small set of allocations to established funds mirroring traditional asset allocation strategies, or, at the other extreme, might be highly experimental, with small checks in a concentrated set of high-risk direct company investments.	 Low  Medium  High A Specialist is constrained by sector/asset class strategy but can stack different types of returns (concessionary, market rate, among others) based on the family's preference.	 Low  Medium  High Approach will be governed by what external investors will accept, which is almost universally market rate risk-adjusted returns.	 Low  Medium  High All approaches require financial prudence. A Decarbonizer may choose an approach with greater risk-taking and leadership; or avoid a drop in financial performance by choosing a slower transition that continues to benefit from high carbon energy sources.	 Low  Medium  High Alignment with market-rate benchmarked returns can be achieved with conservative investments such as green bonds or a multi-asset class, multi-strategy approach. By aligning all assets and entities, even those with a more risky strategy may see returns within a reasonable band of risk.
Resources (Time and Expertise)	 Low  Medium  High Minimal for certain strategies if external managers and advisors are properly engaged. Some Carveouts can be team- and advisory resource-intensive depending on uniqueness, impact goals and level of family engagement in execution.	 Low  Medium  High It can be time- and resource-intensive to create a new team and access technical expertise to dig deeply into a sector or asset class. At the low end, the Specialist has a tailored investment strategy managed through a separate account. In the middle range, this is an internal team in combination with external managers and consultants. At the high end, this is building best-in-class internal teams.	 Low  Medium  High Requires a best-in-class team and industry standard structures, policies and reporting. These elements are expensive and will increase pressure for the strategy to create returns and impact. Cultural and compensation changes are usually needed to raise third-party capital, retain talent successfully, and navigate existing relationships.	 Low  Medium  High Well-defined time and financial resources are required to build expertise and establish a decarbonization plan. Review of capital expenditures and dividends will be needed to ensure continued alignment of cash flow and distributions to shareholders. Execution is paramount and can be risky.	 Low  Medium  High Significant work can be done with investment advisors, consultants and third-party service providers. But successfully internalizing strategy usually requires a strong culture, management buy-in and an aligned family (and family entities) over the long term. Specific expertise is needed for corporate engagement with portfolio companies and will be time-consuming if done well.

Family Alignment and Control	CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
	   Low Medium High A Carveout can be separate and different from the core strategy, intentionally or not, disconnecting any underperformance from other family assets. Usually the family funds a Carveout and enables its oversight. Direction and guardrails can provide better chances for financial and impact alignment.	   Low Medium High To create sector-focused strategies, families may need to address fiduciary issues and be clear about alignment of impact and financial returns with remaining family assets. The same is true of outside wealth managers and advisors, who often have competing goals to maximize financial returns and may not have the necessary sectoral knowledge.	   Low Medium High More common with first-generation wealth owners. May be harder for multi-generational families, for financial and cultural reasons, to agree to take third-party capital into related entities. Third-party capital providers will influence level of alignment by demanding certain management practices and investment strategies.	   Low Medium High Depends on the level of family involvement in operating businesses, but to be well executed it requires deep cultural and practical alignment of internal and external stakeholders.	   Low Medium High Clarity on role allocation between family members and key professional decision-makers may support effective strategy roll-out and evolution over time.
Impact Measurement	  Light Active Measurement can be light if based on reporting from fund managers or companies. Can be more active and specific if a Carveout is managed internally or via expert third parties.	  Light Active A much more active approach to collecting and reporting on expected impact is typically seen when focused on a specific sector. There are usually more frameworks/ methodologies to leverage as well. May employ a mix of bespoke qualitative and standardized quantitative analyses. Tracks sector/climate KPIs at a minimum.	  Light Active Active approach given the regulated environment and presence of external capital. Some approaches are similar to Specialist, others more robust based on recognized frameworks such as Life-cycle assessment (LCA) with processes verified by external parties.	  Light Active Measuring, tracking and reporting needs to be standardized between the business and impact goals. It may include carbon accounting to assess, categorize and report on emissions; setting net zero targets; putting net zero plans in place; and providing annual progress updates. Implementing solutions to reduce emissions in heavy industries such as carbon credits can further complicate measurement.	  Light Active Measurement will be derived from climate-related policy statements at the investment committee level and should inform all investment decisions. It can be hard to quantify impact on an aligned portfolio because of the necessary strategic breadth and diversity. Specific measurement tools may use intensity metrics or absolute financed emissions. Intensity-based targets allow asset class coverage expansion as data availability and calculation methodologies improve over time.

Example Strategies	CARVEOUT	SPECIALIST	INNOVATOR	DECARBONIZER	ALIGNER
	10% of AUM allocated to climate impact through private equity, venture capital and alternative real assets funds.	Own direct VC investing strategy for food and agri-tech.	Long/short public equity fund for high conviction climate-impact companies.	Investing in emerging tech to promote rapid decarbonization, meanwhile holding a diversified portfolio with synergistic tech and sector investments.	Multi-asset class investment strategy that includes divestment, alignment to net zero goals, and engagement in public markets and with private market fund managers to accelerate transition.
	20% of endowment allocated to climate impact mimicking risk/return and asset class allocation of core endowment.	Launch high-impact technology fund across climate sectors.	Sustainable organic grains fund to support transition to lower carbon farming. European seed and series A fund that only invests in companies that meet Article 9 SFDR requirements.	Investing in existing assets that are at risk of becoming stranded, and using their reliability to support the energy transition.	100% aligned endowment that mimics risk/return/asset class attributes of conventional foundation portfolio.
	Endowment investing in climate-aligned managers while grantmaking to climate-related causes.	Develop and transform complex real assets to capitalize on the global energy, transportation and agricultural transition.	Fund that stacks different types of capital (concessionary, market-rate among others) for qualifying high-impact projects targeting GHG emission reduction.	Reallocating capital towards business portfolios with healthier climate and economic segments, and mitigating risks by working with other institutions to innovate and advance climate solutions.	Systems-based strategy that undercuts fossil fuels while investing in major environmental and health outcomes.

NEXT STEPS

This paper introduces the work of CREO families, and yet it barely conveys the depth and nuance of the expertise and innovative thinking that the CREO team supports on a daily basis through its families. To learn more about our work, review our Next Steps below and access CREO's research via our website: <https://www.creosyndicate.org/research>.

For family offices and foundations looking to dive deeper into CREO and connect with families that contributed to this paper, contact CREO via our website: <https://www.creosyndicate.org/engage>.

Preliminary Steps

Resources

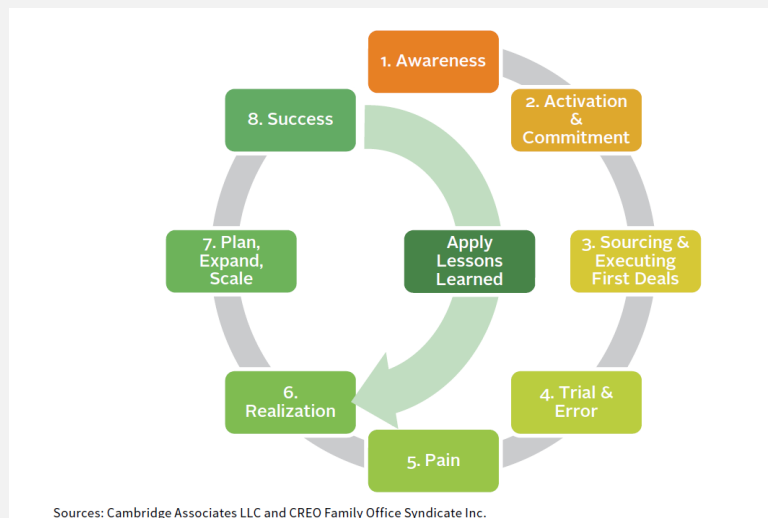
Organizations such as the ImPact and the University of Zurich's Center for Sustainable Finance & Private Wealth are well suited to formally supporting the preliminary steps a family must tackle prior to attaining family buy-in, mapping legacy assets, establishing a family office, or including impact in an investment policy statement and diligence processes. These organizations have created many helpful resources.⁴⁵

Early Experimentation Stage

Resources

CREO's co-authored paper, *Pathways to Sustainable Investing*, which focuses on families who navigated and helped build out the early Cleantech landscape,⁴⁶ offers a helpful Sustainable Investor Path (SIP) Wheel with insights into the early experimentation stage. The inner loop of the SIP Wheel, showing the application of lessons takeaways and successful investing, is now the path most climate investors tread if they are connected in the investment ecosystem.

**FIGURE 4.
SUSTAINABLE
INVESTMENT
PATH WHEEL**



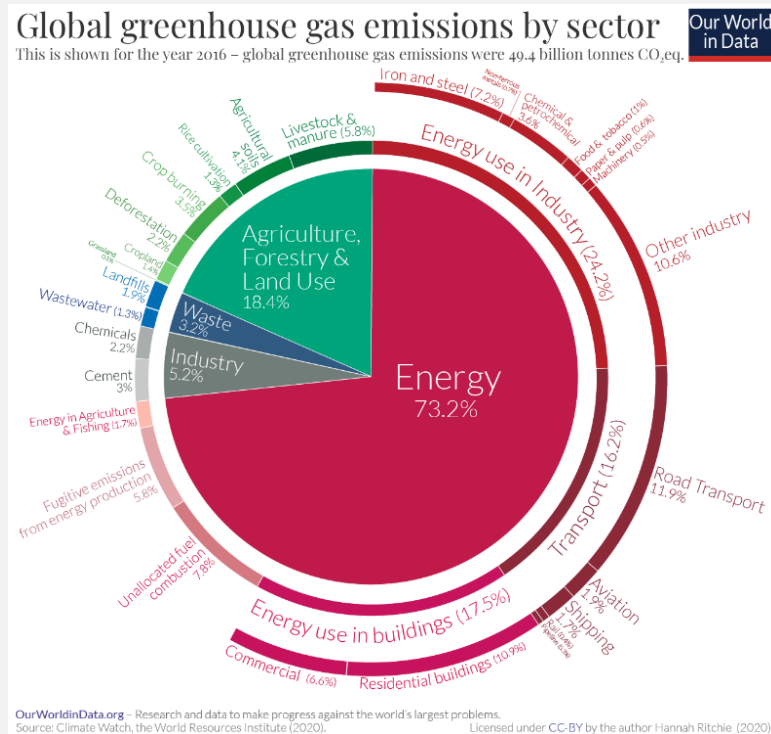
Translating Climate Goals to Investments through Current Sector Trends

Resources

CREO has produced extensive research, some of which is available on its website, on climate-investing goals such as improved resource management and protection of biodiversity, GHG mitigation, carbon removal, and climate resilience. These goals cut across sectors and form the basis for strategies developed by different archetypes. But companies, projects, assets, expertise, and investment dollars tend to cluster in sectors. Sectors are based on GHG emissions, as shown below in Figure 5, and offer the most investable and highest-impact opportunities today. CREO has produced a short guide to current sector trends.

Families can review this guide to [current sector trends](#), which may help to develop strategic direction.

FIGURE 5.
GLOBAL PRIMARY GREENHOUSE GAS (GHG) EMISSIONS BY SECTOR. 47 48



Implementing Strategic Choices

CREO Advisory Services can support families looking for bespoke strategic or implementation support: rbensonarmer@creosyndicate.org

CHAPTER 5

APPENDIX

GLOSSARY

Additionality: The degree to which a proposed climate solution causes GHG impact that would not have happened otherwise in a no-intervention baseline scenario.⁴⁹ For example, in forestry, acquiring and protecting land that is not in danger of being degraded or cleared may not bring additionality. For carbon credits, a forestry project is considered to have additionality if it delivers emissions reductions *beyond* what would have happened without the carbon market.

Anti-ESG: The anti-ESG rhetoric is part of a substantive and political movement that started in the United States. Reasons for being anti-ESG include cynicism around how ESG analysis plays into investment decisions and performance; being against a “woke, liberal agenda”; and pushing back against decreased investment in industries such as fossil fuels, tobacco, guns etc. See also ESG.

Carbon Disclosure Project: A nonprofit-operated global environmental disclosure system that allows companies and sub-national governments to track, report, and disclose their climate-related risks and liabilities.

Climate Solution: An intervention or innovation in a technology, product, service, device or process that may result in GHG impact.⁵⁰

ESG: This term stands for environmental, social and governance. It is primarily how the finance world attempts to measure the non-financial risks (and opportunities) to a company or investment stemming from environmental and social issues. The “G” represents how well a company manages the governance of these issues.

Greenhouse Gas (GHG) Emissions: Gases that absorb infrared radiation and trap heat in the atmosphere.⁵¹

Inflation Reduction Act of 2022 (IRA): The largest government investment to address climate change in US history. The law appropriates some \$370 billion to climate and energy projects, covering solutions from carbon capture to electric vehicles to soil conservation.

Infrastructure Investment and Jobs Act: US law passed in November 2021 that appropriates tens of billions of dollars for electric infrastructure, public transit, and environmental projects. The total appropriation into climate-related investments is ~\$100 billion over a decade.

Fit for 55: Fit for 55 refers to the EU’s target of reducing net GHG emissions by at least 55 percent by 2030. The Fit for 55 package of proposals aims to revise and update EU legislation to bring it in line with the 2030 goal.⁵²

Lifecycle Analysis / Assessment (LCA): A cumulative accounting of all GHG emissions connected to a particular product, including materials, manufacturing, distribution, use and disposal.⁵³

LP-GP Structure: A collective investment vehicle structure for venture capital and private equity. This structure is designed between two parties: limited partners and general partners. The limited partners furnish the capital but have their liability capped to the amount of their contribution. The general partners are the decision-makers with the authority to manage the fund. They bear the legal liability for the firm's debts and obligations, a liability which is mitigated by the formation of a limited liability entity to serve as a general partner.

Mitigation / Abatement: Often used interchangeably. *Mitigation* means slowing the pace of climate change through reduced emissions; *abatement* means going beyond mitigation to include strategies for negative emissions.

Net Zero: 100 percent reduction in GHG emissions by mid-century, as agreed at the 2015 Paris Climate Conference. The Net-Zero Standard is a blueprint for companies to base their net zero targets on climate science.

REPowerEU: An EU plan in response to Russia's invasion of Ukraine that aims to end the EU's dependence on Russian fossil fuels. It expands on the *Fit for 55* legislation with increased funding and targets related to renewable energy and energy efficiency.

Science Based Targets Initiative (SBTi): An initiative started in 2015 to define and promote best practices in emissions reductions and net zero targets in the private sector. It provides target-setting methods and guidance to nearly 2,000 companies in 60 countries.

Scope 1 Emissions: Direct GHG emissions that occur from sources owned or controlled by the reporting company, such as emissions from combustion of fossil fuels in boilers, furnaces, and vehicles.⁵⁴

Scope 2 Emissions: Indirect GHG emissions that result from the generation of purchased electricity, heat, or steam consumed by the reporting company.⁵⁵

Scope 3 Emissions: All indirect emissions that occur in a company's value chain, including upstream and downstream emissions.⁵⁶

Scope 4 Emissions: Emissions that could be reasonably avoided or are proven to be avoided by a proposed climate solution relative to an incumbent. Sometimes referred to as *avoided emissions*.⁵⁷

Sustainable Finance Disclosure Regulation (SFDR): An EU rule effective from early 2021 that imposes mandatory ESG disclosure obligations for asset managers and other financial market participants.

FOOTNOTES

1. Cleantech refers to technology that limits humanity’s impact on the environment. Such technologies support renewable energy, energy efficiency, and other greenhouse gas (GHG) reduction; they also enhance clean air and water treatment. In this paper, we also refer to “climate tech” where sources use this term, but it is generally understood to be more specifically about GHG mitigation.
2. All dollar references in this paper are to US dollars.
3. <https://www.creosyndicate.org/store/pathways-to-sustainable-investing>.
4. Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis*, August 6, 2021.
5. CAL FIRE 2022 Incident Archive, at <https://www.fire.ca.gov/incidents/2022/>.
6. Aon, *Weather, Climate and Catastrophe Insight*, 2023. At <https://www.aon.com/weather-climate-catastrophe/index.aspx>.
7. Aon, 2023. Calculated from cumulative losses reported by type of peril.
8. United Nations Environment Programme (UNEP), *Emissions Gap Report*, 2020.
9. IPCC, *Climate Change 2022: Mitigation of Climate Change*, April 4, 2022.
10. N. Stern et al, *Stern Review: The Economics of Climate Change* (London: HM Treasury, 2006).
11. McKinsey Global Institute, *The Net Zero Energy Transition*, January 2022.
12. Vera Songwe, Nicholas Stern and Amar Bgattacharya, *Finance for Climate Action: Scaling Up Investment for Climate and Development*, November 2022.
13. The UBS/Campden Wealth Report from 2019 suggested that families held \$9.2t of wealth in 2018, after this, Campden Wealth stopped announcing public estimates. Based on proportional growth to the change in the overall stock of capital assets from \$379t at the end of 2018 to \$469t at the end of 2020, as reported by the Financial Stability Board, family assets would have been \$11.3t at the end of 2020. A constant rate of growth would imply an asset base of \$13.9t by the end of 2022. For cross reference, the aggregate estimated total net worth of the Forbes Billionaires list is \$12.7t.
14. RBC/Campden, *Report*, 2022. Sustainable investments are defined to include Exclusion, ESG factor investing, and Investing for Impact; the \$6 –10b is out of a total of \$750b.
15. RBC/Campden, *Report*, 2022.

16. Estimating the total flow of dollars into sustainable investments is not trivial. One methodology follows the total global-asset flows determined in Dan Reicher et al., “Derisking Decarbonization: Making Green Energy Investments Blue Chip” (Stanford, 2017), p4 and fn5. Reicher et al. estimate that approximately \$3.4t capital flows worldwide from pensions, private individuals, and sovereign wealth funds. The Global Sustainable Investment Alliance (GSIA), per fn20, suggests that about 35 percent of investments are sustainable, implying that \$1–1.2t annually of the Reicher et al. annual flow is sustainable. Taken over three years, this equates to \$3.3–3.6t. This is probably an overestimate, in line with the Reicher et al. methodology. For cross-reference, the 2020 GSIA report shows a change in sustainable assets under management of \$4.6t over two years, between 2018 and 2020 (implying \$2.3t per year on average). On the other hand, the Climate Policy Initiative suggests private investment of between \$300 and \$350b per year, which would map to 30–40 percent of the difference in all. “Global Assets Under Management,” reported by the Boston Consulting Group. Regardless, the CREO member contribution is significant.
17. Robert G. Eccles, Mary Johnstone-Louis, Colin Mayer and Judith C. Stroehle, 2020, *The Board’s Role in Sustainability*. At <https://hbr.org/2020/09/the-boards-role-in-sustainability>.
18. This timetable is ahead of what is required by the IMO (International Maritime Organization) which regulates the shipping industry.
19. Mark Carney, “Climate Finance in a Polycrisis Era,” COP27 Finance Day, November 9, 2022, Sharm El-Sheikh.
20. Global Sustainable Investment Alliance (GSIA), *Global Sustainable Investment Review 2020*, published July 2021. This definition of sustainable investment reflects global assets under management using ESG investment approaches, a highly inclusive definition.
21. Bloomberg New Energy Finance (BNEF), *New Energy Outlook 2022*.
22. ClimateWorks, *Funding Trends 2021: Climate Change Mitigation Philanthropy*, October 2021.
23. CAGR calculated approximately, based on historical values reported in BNEF *Trends 2023*.
24. CAGR from HolonIQ, “Defying Gravity,” 2022
25. GSIA 2021.
26. BNEF, *Energy Transition Investment Trends 2023*.
27. BNEF *Trends 2023*.

28. The \$40b estimate is from Climate Tech VC, “\$40B and 1,000+ Deals in 2022 Market Downtick,” January 13, 2023, at <https://www.ctvc.co/40b-and-1-000-deals-in-2022-market-downtick/>. The \$70b estimate is from HolonIQ, “Defying Gravity, 2022 Climate Tech VC Funding Totals \$70.1B, Up 89% on 2021,” January 3, 2023, at <https://www.holoniq.com/notes/2022-climate-tech-vc-funding-totals-70-1b-up-89-from-37-0b-in-2021>.
29. AIQ The Macro Stewardship Edition, 2022, *Moving Mountains and Markets*, A new way to approach systemic risk at <https://www.avivainvestors.com/en-gb/views/aiq-investment-thinking/2022/09/markets-systematic-risk/>
30. Brazier, A et al. 2023. *Investment Perspectives – Tracking the low-carbon transition*. The BlackRock Investment Institute Transition Scenario predicts higher costs of capital and technology for higher-carbon assets. At <https://content.blackrock.com/i/od4FeO55PLUSSIGNvPLUSSIGN8E84ojNmAlEj7elkvkgDA1S5RuVSxARY9ZypmZHVMOtqy6oWgnqB1n9kLIY54bLuSBQILJZUhD5vFSxvmTwfnWqWDeZ2v3vnXKaTbYp7h2zNCsxd10>.
31. Additionally, in November 2022 the European Council adopted the Corporate Sustainability Reporting Directive, significantly broadening the scope of sustainability reporting requirements for “public interest” entities (such as large EU-listed companies and credit institutions) that are required to report such information.
32. World Economic Forum (WEF), *Winning the Race to Net Zero: The CEO Guide to Climate Advantage*, January 2022.
33. Science Based Targets dashboard, at <https://sciencebasedtargets.org/companies-taking-action>.
34. See CREO’s 2022 *EU Energy Policy Update* for details.
35. IEA, *World Energy Investment 2022*.
36. BlackRock’s Investment Institute Transition Scenario (BIITS) has based this prediction on the assumption that 90% new power capacity will be low-carbon and climate and industrial policy incentives will support low carbon fuels such as biofuels and hydrogen.
37. Feldman, D, Bolinger, M, Schwabe, P, July 2020, *NREL Current and Future Costs of Renewable Energy Project Finance Across Technologies*. At <https://www.nrel.gov/docs/fy20osti/76881.pdf>.
38. Egli, F, May 2020, *Science Direct Assets, Renewable energy investment risk: An investigation of changes over time and the underlying drivers*. At <https://www.sciencedirect.com/science/article/pii/S0301421520301816> and see CREO’s 2017 *Distributed Generation in India*.
39. IEA, *World Energy Investment 2022*.
40. Climate Tech VC, “\$40b...,” 2023, and Climate Tech VC, “New Dry Powder for a New Climate,” November 11, 2022, at <https://www.ctvc.co/new-dry-powder-for-a-new-climate/>.

41. Colryt SA, July 26, 2023, *Virya Energy finalises the sale of its offshore wind energy activities to JERA*. At <https://www.marketscreener.com/quote/stock/COLRUYT-N-V-5976/news/Colruyt-N-Virya-Energy-finalises-the-sale-of-its-offshore-wind-energy-activities-to-JERA-44427020/>
42. Eccles, R.G, Klimenko, S, May-June 2019, *The Investor Revolution* Shareholders are getting serious about sustainability at <https://hbr.org/2019/05/the-investor-revolution>; Bernow, S, Klempner, B, and Magnin C, October 25, 2017, *From 'why' to 'why not': Sustainable investing as the new normal* at <https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/from-why-to-why-not-sustainable-investing-as-the-new-normal>
43. Kishan, S and Buhayar, N, February 15, 2023, *Al Gore's Struggles with ESG Show the Messiness of Green Investing*. At <https://www.bloomberg.com/news/articles/2023-02-15/al-gore-esg-fund-generation-shows-messiness-of-green-investing?>
44. Rosengren, C, July 20, 2022, *Vanguard Renewables sold to BlackRock fund to fuel anaerobic digester expansion*. At <https://www.wastedive.com/news/vanguard-renewables-blackrock-anaerobic-digestion-biogas/627684/>.
45. See the ImPact's report with the University of Zurich's CSP, 10 Key Ingredients for Impact Investing.
46. CREO families were early investors in companies (such as Tesla and First Solar) benefiting from Department of Energy subsidies and loans.
47. Total emissions were 49.4 Gt/yr CO₂e in 2016, and are expected to rise to between 55 and 60 Gt CO₂e/yr in 2023. Source: Our World in Data.
48. H. Richie, M. Roser, and P. Rosado, CO₂ and Greenhouse Gas Emissions, at <https://ourworldindata.org/co2-and-greenhouse-gas-emissions>.
49. Definition sourced from Project Frame's glossary, at Glossary — Frame (<https://projectframe.how/>).
50. Ibid.
51. Ibid.
52. European Council of the European Union, European Green Deal Policies, Fit for 55, at <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/#:~:text=Fit%20for%2055%20refers%20to,line%20with%20the%202030%20goal>.
53. Definition sourced from Project Frame's glossary, at Glossary — Frame (<https://projectframe.how/>).
54. Ibid.
55. Ibid.
56. Ibid.
57. Ibid.

