



White paper

PRIVATE GROWTH EQUITY FOR CLIMATE PROTECTION

Combining highly attractive returns with a
positive climate contribution



ZERO
CARBON
FUTURE

Summary

- There is an urgent need to rapidly move to a net-zero future, which highlights the **necessity for financial support** to scale up technology that already exists and which has proven effective at reducing carbon emissions.
- These technologies are either mature or in the early stages of adoption and represent the many untapped **climate-related growth equity opportunities** found in Europe.
- There are **four primary structural trends** that drive these climate-related growth equity opportunities:
 1. Decarbonisation of industry
 2. Evolution of energy generation and the management of sustainable and complex decentralised energy systems
 3. Advancement of sustainable transport
 4. Emergence of the circular economy
- Successfully investing in these areas requires the expertise and support of an experienced investment team capable of navigating these newly emerging markets.
- Growth equity investors can not only unlock attractive financial returns, but also actively contribute to a cleaner and more sustainable world by supporting these crucial areas and directing more capital into this asset class.

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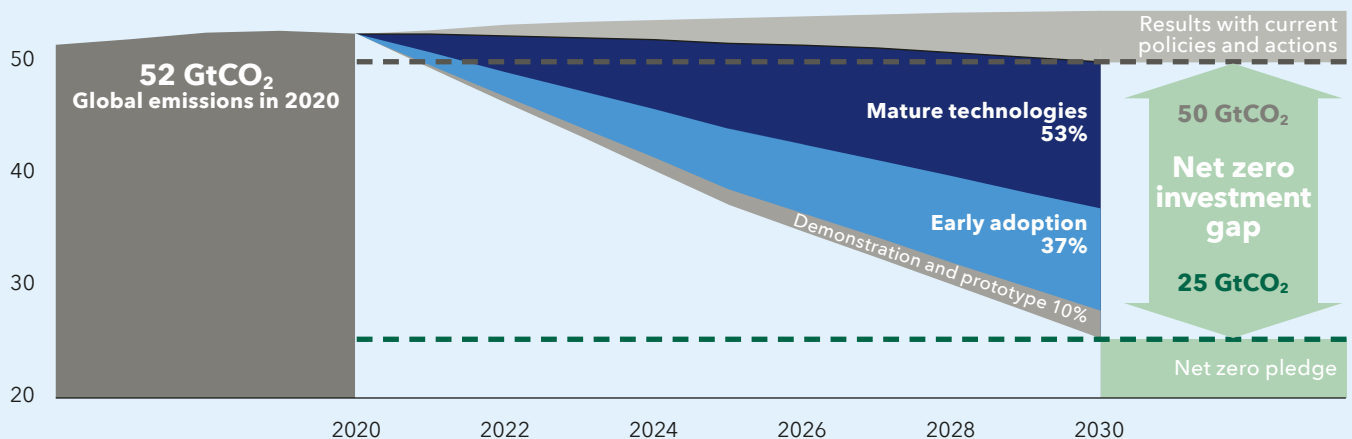
Introduction

The world faces a formidable challenge. If we aim to reach net-zero carbon emissions by 2050, scientists estimate that carbon emissions would need to be cut by 50 percent in just seven years to stay on track (see Figure 1).

Figure 1

TECHNOLOGIES NEEDED TO MEET NET-REDUCTION TARGETS BY 2030¹

(IEA estimates)



Fortunately, significant progress has been made in the renewable energy sector. Generating clean energy has become an established, cost effective and well-regulated industry. The leveled cost for generating renewable energy has fallen so much that it now makes economic sense for energy companies to invest in renewable energy infrastructure.²

However, despite renewable energy generation being a huge success, it is not enough. It will only account for around 60 to 70 percent of the progress required to fully meet net-zero carbon emissions by 2050 - a common pledge many nations have committed themselves to meet.³

To successfully reach net-zero, carbon emissions will also need to be cut across the entire supply chain and not just at the point where renewable energy is generated. This could be achieved by improving energy efficiency, promoting carbon capture technologies, along with measures that could boost the supply of biofuels, promote the use of electric vehicles, and battery storage.

This is the investment gap that needs filling. Here the opportunity lies with numerous privately-owned companies that are already directly engaged in efforts to decarbonise the rest of the economy. Often these companies have developed viable and commercially attractive technologies that are essential to reach net-zero. What they now require is investment to scale up and expand.

If successful, their solutions could help lead to a rapid reduction in global carbon emissions and generate a healthy return for investors. The rapid growth that they are likely to experience from scaling up will accelerate progress towards net-zero emissions by 2050.

Referred to as growth equity opportunities, these companies possess the means to expedite a commercially feasible and accelerated pathway towards a transition to climate sustainability.

1 International Energy Agency (IEA) (2020)

2 BloombergNEF. <https://about.bnef.com/blog/battery-powers-latest-plunge-costs-threatens-coal-gas/>

3 International Energy Agency (IEA). (2021). Net-zero by 2050: A Roadmap for the Global Energy Sector.

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This white paper is broken into two parts:

Part one addresses the importance that climate-related growth equity investments will have in accelerating progress towards global net-zero. It also explains the investment rationale for investing in this asset class as well as the fundamentals and catalysts supporting investments in this area.

Part two devolves into the four structural trends mentioned in the summary of this white paper and then continues to present a selection of attractive investment opportunities that investors can find in climate-related growth equity.

1. Part one: How growth equity could accelerate the journey to net-zero

In private markets, growth equity refers to providing capital to established companies with proven business models, innovative technologies, or services experiencing rapid growth. These companies typically have a track record of generating revenue and demonstrate strong potential for expansion in the future.⁴

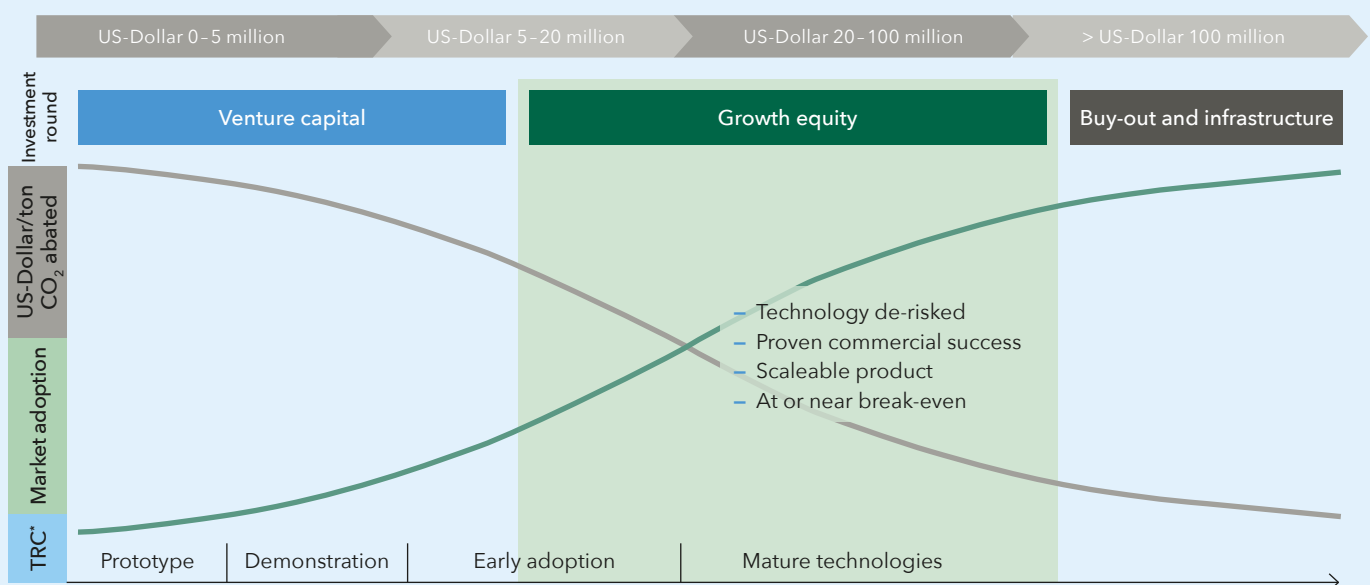
Growth equity investments aim to accelerate the growth of these businesses by providing the necessary financial resources and strategic support to scale up their operations and/or enter new markets.

They occupy a unique position within the private equity landscape, sitting between venture capital and buy-out investments. Unlike venture capital, which targets early-stage companies with unproven business models and higher risk profiles, growth equity focuses on more mature businesses that have already demonstrated some level of success in the market (see Figure 2).

Conversely, they differ from buy-out investments, which generally involve acquiring controlling stakes in mature companies with stable cash flows and lower growth prospects, often with the goal of optimising operations and financial performance.

Figure 2

THE DIFFERENCE BETWEEN GROWTH EQUITY VERSUS VENTURE CAPITAL AND BUY-OUT INVESTMENTS⁵



*TRC = Technology Readiness Categories as per definition

⁴ Hinckley, M. (2023, January 31). Growth Equity Primer: Investment Strategy, Industry, Career. Growth Equity Interview Guide.

<https://growthequityinterviewguide.com/what-is-growth-equity>

⁵ Aquila Capital Investmentgesellschaft mbH

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1.1 Where might the best climate-related growth equity opportunities lie for investors?

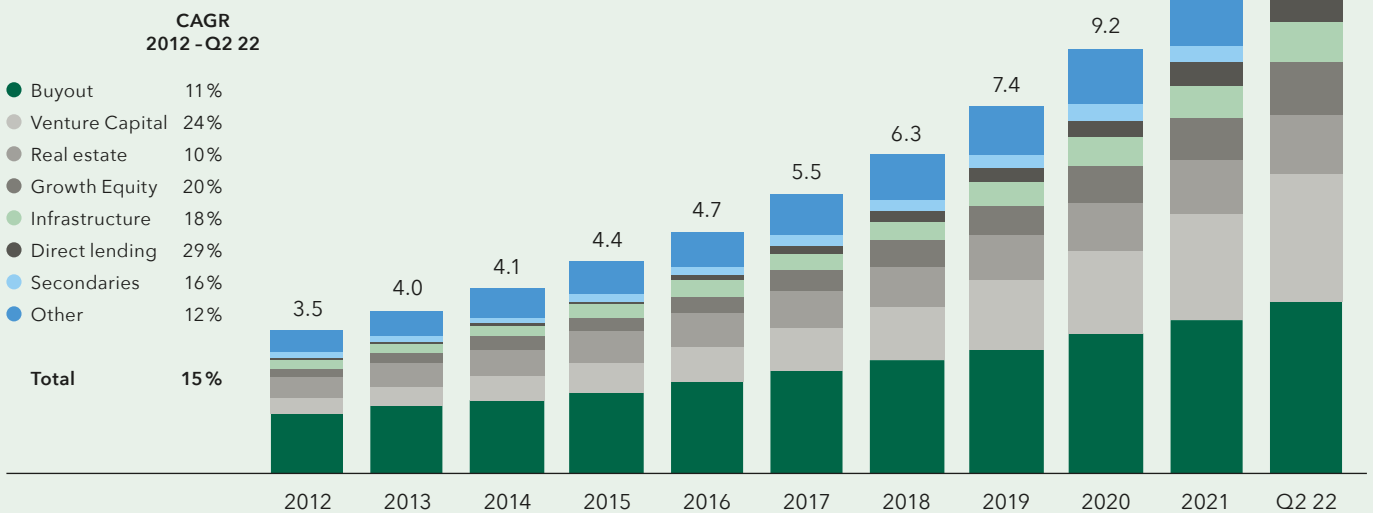
As we have already discussed, climate-related growth equity investments hold great promise in accelerating the transition to net-zero, as companies in this sector could experience exponential growth.

Growth equity, however, constitutes only 20 percent of the assets held within the private sector. It nevertheless continues to be an influential force, carving out a substantial niche that is vital to helping the world get to net zero as it focuses on firms that are scaling rapidly. The asset class also helps finance remarkable breakthroughs and nurtures clean energy enterprises that could become the giants of tomorrow. (see Figure 3).



Figure 3 GROWTH EQUITY ONLY ACCOUNTS FOR 20 PERCENT OF PRIVATE ASSETS UNDER MANAGEMENT⁶

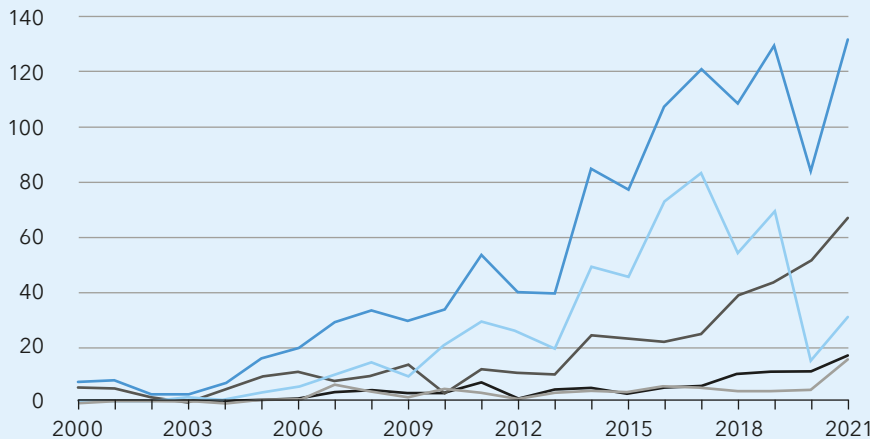
(Global AUM by asset type in US-Dollar Trillion)



In Europe, the growth equity market is notably underserved compared to North America, which presents an opportunity to uncover interesting investment prospects. In 2022, North America received over 60 percent of what was invested in private equity growth globally in 2021, while Europe accounted less than 20 percent of these investment flows (see Figure 4).

⁶ Global Private Equity Report 2023, Bain & Company

Figure 4
GROWTH EQUITY FUNDRAISING BY REGION OF FOCUS⁷
(billions)



	2016-21 CAGR, %	2020-21 growth, %
Total	4.2	56.6
North America	24.6	29.3
Asia	-15.5	101.3
Europe	23.6	48.1
Rest of world	20.6	222.6

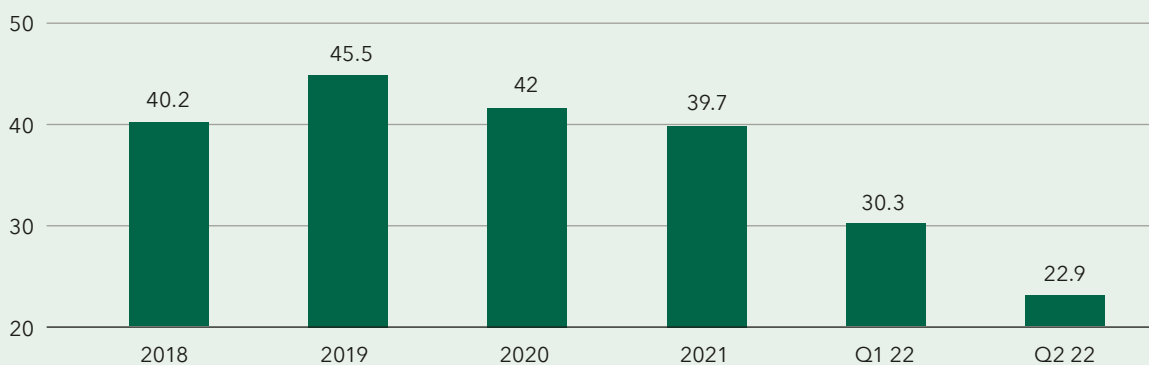
For investors interested in taking advantage of well-established growth equity opportunities in Europe, there are locally based specialised investment teams on the continent who are adept at identifying exclusive climate change-related investment prospects.

Due diligence forms an essential component of this process, with each growth equity opportunity undergoing careful analysis. Possessing the required expertise, these specialist investors can pinpoint climate-related investment prospects in the growth equity space that have not yet been explored. Consequently, they can uncover untapped investment opportunities in the market globally, providing investors with an alternative source of alpha.

1.2 Further catalysts driving interest in climate-related growth equity

Russia's invasion of Ukraine significantly impacted Europe, particularly in terms of energy security. This event has raised awareness about the region's heavy dependence on fossil fuels from potentially hostile countries, as illustrated in Chart 4. Considering these circumstances, there is now a stronger motivation to prioritise sustainable and self-reliant energy production. However, achieving this goal requires more than just generating clean energy. It also involves strategically allocating capital across the entire supply chain to accelerate the transition towards a sustainable energy future, especially in Europe. As a result, privately owned growth equity companies have gained renewed attention and significance in Europe.

Figure 5
SHARE OF EUROPEAN UNION NATURAL GAS IMPORTS FROM RUSSIA⁸
(in %)



7 Preqin/ McKinsey Global Private Markets Review 2022
8 Statista 2023



Heat exchanger in oil and chemical refinery plant
image: Adobestock/supakitmod

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Part 2: How to invest in climate-related growth equity opportunities

There is a myriad of growth equity investment opportunities that are linked to climate-related themes. However, understanding the intricacies of where and how to invest requires the experience of a seasoned investment team.

We see four primary structural trends that underpin these opportunities in this market. These include the decarbonisation of industry, the evolution of energy generation and management, the advancement of sustainable transport and the emergence of the circular economy.

Recent legislative initiatives launched by the US and EU

Another very powerful potential catalyst for change could come in the form of recent legislative initiatives launched by both the US and EU.

The EU Green Deal Industrial Plan and US Inflation Reduction Act (IRA) are significant policy frameworks designed to facilitate the transition to a low-carbon economy. These initiatives offer substantial subsidies and incentives for clean-energy industries, particularly those involved in renewable energy, electric vehicles, batteries, hydrogen, and carbon capture technologies. These are all areas where growth equity companies already have proven and established technologies that require scaling up.

Both initiatives reduce the financial barriers to investors willing to invest in these companies.

A positive impact and generating highly attractive risk-adjusted returns

For investors, growth equity investing is attractive due to the alignment between having a positive impact on climate change and receiving potentially attractive risk-adjusted returns. Typically, these companies offer proven products and services in large fast-growing markets with established business models and are operationally break-even or on the verge of being so.

From an investor's standpoint, these companies have de-risked and exhibit a lower probability of default, setting them apart from earlier-stage ventures with yet unproven technologies. What these companies require is capital to scale-up their operations to fully realise and ramp up their already successful business cases.

In part two, we will delve into the opportunities that our investment team sees in relation to climate-related growth equity investing.

2.1 The decarbonisation of industry

The transition to renewable energy is crucial for minimising the environmental impact of industries and reducing the risks associated with moving towards a net-zero future. This transition risk encompasses financial risks resulting from policy changes, market shifts, technology advancements, reputational impacts, and financial implications during the shift to a low-carbon future.

As mentioned earlier at the start of this paper, a significant amount has already been invested in generating renewable energy. In fact, renewable energy has become so cost effective that in terms of economics it stands on its own, independent of its climate-change tackling merits.

The challenge industries face now is that they need to decarbonise across their entire supply chain and not just at the point where renewable energy is generated. We believe, This could be achieved in several areas by helping growth equity companies scale up their businesses.

Energy efficiency

From an investor's standpoint, the energy efficiency sector represents a highly attractive investment opportunity. These companies cater to commercially interested clients eager to reduce costs and enhance operational energy efficiency.

For instance, there are growth equity companies that specialise in providing tailored energy management systems, utilising digital technologies like AI and machine learning to help achieve energy efficiency. By employing these systems and technologies, a company can analyse and improve its manufacturing processes, reducing energy waste and increasing overall efficiency at an operational level.

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There are also companies that specialise in providing energy-efficient equipment. This could be through more energy-efficient machinery, heating, or lighting equipment. Each of these can help companies reduce their energy consumption and associated emissions.⁹

Recovering waste heat

Waste heat recovery also presents a compelling growth equity investment opportunity, as it addresses a critical aspect of energy efficiency in industrial processes. Many of these processes generate waste heat, which, if left untapped, represents a significant loss of potential energy. Companies specialising in waste heat recovery can assist large industrial companies in capturing and reusing this valuable energy resource, thereby improving overall efficiency and reducing emissions.

Several waste heat recovery technologies are available to facilitate this process, including heat exchangers, organic Rankine cycles, and heat pumps.¹⁰

Emissions capture and reduction technology

Another important aspect of the clean energy transition in industry is emissions capture, -reduction, and use or storage. By investing in companies that develop technologies and practices to minimise greenhouse gas emissions from infrastructure, investors can support the creation of a favourable environment for sustainable industrial investments, in collaboration with governments and businesses. In heavy emitting industries such as steel and cement, however, the effective use of emissions capture, usage and reduction technology will be an essential building block towards a sustainable transformation.

Monitoring and reporting technology

Monitoring and reporting technology represents another promising investment opportunity. Advanced software integrated into supply chain systems - often supported by sensors - can help collect vast amounts of data, enabling detailed reporting on energy consumption and emissions.

The data collected by these sensors provides invaluable insights for companies, allowing them to identify inefficiencies during their production processes and implement targeted measures to reduce energy consumption. This information-driven approach not only contributes to enhanced sustainability but also results in cost savings and improved operational performance.

2.2 Energy generation and management

Investment in energy generating management systems represents a compelling growth equity opportunity as they play an essential role in accelerating the clean energy transition and moving towards net-zero. Key areas of investment are decentralised generation and storage, automated trading and management, intermittency management, carbon accounting and reporting, and battery storage technology.



Heat exchanger on the roof of a factory
image: Adobestock/geoki



Carbon capture CO₂ emissions removal technology
image: Adobestock/aicandy

Decentralised generation and storage systems

Decentralised generation and storage systems can enhance the efficiency and resilience of the energy infrastructure in a country. They achieve this by reducing transmission and distribution losses while offering backup power during grid outages. By localising the production and consumption of energy, these investments alleviate grid pressures and pave the way for more localised and sustainable energy production. Ultimately, these investments play a crucial role in facilitating the shift towards a low-carbon economy.

⁹ IMF, "Reaching net-zero emissions", <https://www.imf.org/en/Blogs/Articles/2021/07/22/blog-reaching-net-zero-emissions>
¹⁰ Rankine cycle - Energy Education. (n.d.). https://energyeducation.ca/encyclopedia/Rankine_cycle



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Automated trading and intermittency management systems

Automated (intra-day) trading and management systems have the potential to significantly contribute to the transition towards a net-zero emissions economy, effectively increasing the capacity of the grid without significant capital expenditures. These systems leverage cutting-edge technologies such as artificial intelligence, machine learning, and advanced analytics to optimise trading and management in the volatile renewable energy sector.

Intermittency management involves techniques and technologies to address the fluctuating nature of renewable energy sources, such as solar and wind power. It ensures a stable and continuous energy supply by balancing the grid through energy storage, demand response, and grid management systems. Investments in these companies offer growth equity investment potential, given their pivotal role in the renewable transition and increased demand for their services.

Carbon accounting

Transparent and accurate carbon accounting and reporting practices can ensure greater accountability during this critical transition to net-zero. It can help businesses track their own progress as well as their supply chains and make data-driven decisions to reduce their emissions further.

Battery storage technology

Advances in battery technology could potentially revolutionise the clean energy sector and support the transition to electric vehicles as well as expand the capacity of the grid. By increasing energy density and optimising battery chemistry to utilise more abundant, cost-effective raw materials, the expense of clean energy storage and electric vehicle batteries can be significantly reduced. This not only contributes to the development of a more sustainable, efficient, and resilient energy system but also improves the affordability and range of electric vehicles, accelerating their adoption in the transportation sector.

2.3 The advancement of sustainable transportation

The quest for a cleaner and more sustainable transportation sector is also a catalyst for investment in this sector. Four particularly interesting areas that we see that are electric mobility, sustainable fuels, emissions capture and reduction technology, and lightweight materials.

Electric mobility

The expansion of electric vehicle (EV) charging networks and related digital and equipment solutions are crucial for promoting the widespread adoption of electric transportation, which can help reduce carbon emissions. Growth equity investments here can significantly contribute to this acceleration by providing capital and strategic guidance to companies specialising in different solutions supporting the electrification of mobility.

Sustainable fuels

Sustainable fuels, including biofuels and eFuels, derived from non-food waste sources, are a promising area of investment that support transportation and contribute to carbon emissions reduction. These low-carbon energy sources play a crucial role in mitigating emissions in hard-to-electrify transport sectors like aviation and shipping.

Lightweight materials

Growth equity investments in the development of lightweight materials for vehicle manufacturing can significantly contribute to sustainable transportation. These materials lead to increased fuel efficiency and reduce emissions by decreasing vehicle weight.

2.4 The emergence of the circular economy

The emergence of the circular economy is a vital trend that can significantly contribute to the global transition to a net-zero future by focusing on waste reduction, resource optimisation, and sustainable practices.

Hydrogen-based ammonia and methanol are sustainable fuels derived from renewable energy sources and present an attractive investment opportunity for growth equity investors. These fuels offer environmentally friendly alternatives for various industrial applications and are particularly relevant in hard-to-electrify sectors like aviation and shipping. Carbon recycling, which involves capturing carbon dioxide emissions and converting them into valuable products, supports both emissions reduction and the circular economy.

By focusing on these opportunities within the circular economy, including hydrogen-based fuels and carbon capture technologies, growth equity investors can actively participate in promoting resource efficiency, emissions reduction, and the development of sustainable solutions.

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image: Adobestock/kbarzycki

Conclusion

There are abundant untapped investment opportunities within climate-related growth equity companies, driven by strong structural demand from the global drive towards achieving net-zero emissions. These companies operate in growing markets and offer significant investment opportunities supported by proven business models.

Investing in these climate-focused companies not only addresses the urgent need to combat climate change but also aligns with the economic opportunity presented by the transition to a sustainable future. By supporting these companies, investors can actively contribute to both environmental preservation and their own financial success.

These growth equity companies possess solid foundations, with well-established business models and the potential for positive cash flows. Their technologies and solutions have already undergone rigorous development and testing, requiring only modest investments to scale up operations. This reduces the risk of default or failure, making them attractive investment prospects.

By recognising the economic rationale behind investing in these pivotal areas, growth equity investors can unlock attractive financial returns while actively contributing to the global shift towards a cleaner and more sustainable world. This unique opportunity allows investors to align their financial interests with the pressing environmental goals of our time, creating a lasting positive impact on both society and the planet.

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Markus Wandt is a seasoned investment professional in the growth equity and renewable energy sectors. Markus, along with his colleagues, Nienke Vledder and Maximilian von Arnim, is excited about the prospects of their Growth Private Equity Strategy.

Markus started his professional career in investment banking in London and later moved to RWE Innogy in 2008, where he built their corporate development and M&A franchise for renewable energy projects. He then worked for Mayfair, one of the largest family offices in Germany, as Investment Director for their direct private equity investments. Markus is the Chief Investment Officer for Aquila Capital Investment GmbH.

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