COMMERZ REAL

Part 1
OF OUR
3-PART SERIES

# Connected with the future

## Infrastructure and transformation

Whitepaper — 01.2025

**Henning Koch**
Chief Executive Officer, Commerz Real AG

# Foreword

**Dear Readers,**

Here at Commerz Real, we ask ourselves the following fundamental question: what does a future look like in which we as humans want to live? When viewed in its entirety, the topic of infrastructure represents one of the crucial aspects in terms of sustainably networking and designing environments. It forms the basis of our communities and links the major issues of our time, such as energy supply, urban development and safeguarding prosperity.

Despite the social, political and economic challenges of recent years, infrastructure transformation is increasingly gaining momentum – and in Germany, for example, there is currently a huge need for investment.

**The reliable expansion of roads, railways, waterways, electricity supply and telecommunication networks benefits everyone – the state, citizens and companies.**

Innovative excellence and a network of strong partners are needed to make this happen. At Commerz Real, we focus on established technologies and assets. In recent decades, we have developed comprehensive expertise in the areas of property and renewable energies – two key segments with exceptional relevance for all aspects of infrastructure. It has long been clear that property and renewable energies are inexplicably linked, which is why we need to develop holistic approaches tailored to people's needs. These approaches support us on the journey to net zero and open up new income streams.

As we are aiming to provide a comprehensive picture of the global infrastructure market in this white paper, we have produced a three-part series. This first part examines the changing market and the opportunities it offers to institutional and private investors. Part two explores the influence of infrastructures on the energy transition, whereas part three centres on how they affect people and cities.

I hope you discover exciting and structured insights.

Best wishes,
Henning Koch

# Contents

# 60%

of the population associate the topic of infrastructure with transport and mobility, according to a forsa study conducted on behalf of the Federal Foundation of Baukultur in July 2023.[1] It is, however, much more, as it connects almost all areas of our lives. And does so around the world.

See page 21 for an explanation of references

# The core purpose of infrastructure.

## It’s time for a transformation.

The infrastructure transformation has to be about more than just decarbonisation.[2] This white paper aims to provide a broad overview in order to illustrate that infrastructure doesn’t just need to be reshaped with a view to decarbonising energy systems and industrial processes, but also with a view to improving resource efficiency and effecting socio-economic change. Deep-rooted infrastructure changes provide an opportunity to make progress in all these areas, which is why projects need to pursue a variety of environmental and social objectives.

**A fundamental definition.**
The term ‘infrastructure’ refers to all public and private facilities that are classed as being necessary for adequate service provision and economic development. It is usually broken down into technical infrastructure (e.g. transport and communication infrastructure, energy and water provision, disposal) and social infrastructure (e.g. schools, hospitals, sport and recreation facilities, shopping facilities, cultural amenities).[3]

**Cornerstone of our society.**
High-performance infrastructure is the basis of good and fair living conditions in our communities. In its latest report, the Federal Foundation of Baukultur goes as far as to say that ‘high-performance infrastructure is the cornerstone of our democracy’.[4] It facilitates connections and networks at many different levels. As such, the yardstick for measuring technical and social infrastructure is its availability. As this criterion is location-specific, however, it is not identical everywhere. Instead, what matters is that services are easily accessible and – as regionally and locally appropriate solutions – ensure fair living conditions.

**Decarbonisation and resource efficiency.**
This is about the global transformation to a holistically climate-friendly and resilient infrastructure. In order to meet our climate targets and boost our resilience, it is imperative that we maintain, renovate and expand existing infrastructure. What’s more, all construction projects need to make a future-oriented contribution.[4]

See page 21 for an explanation of references

# Drivers of transformation.

How global dynamics are shaping the investment landscape.


**More transformation. More opportunities.** In macroeconomic terms, inflation and high interest rates have made the market more complex. The transformation is not only enlarging the infrastructure investment spectrum, but also opening up new investment opportunities and, therefore, the prospect of actively helping to shape social transformation.

The six megatrends shown harbour major change dynamics and touch upon complex social structures, cultural value systems and a range of economic conditions. Transformational forces are emerging in every society, prompting and shaping new networks of the future.[5] Alongside social well-being and quality of life, the energy transition is the key component of the transformation and, as a result, the same can be said of the decarbonisation of electricity generation and transport, the transition to renewable energies, the efficient use of natural resources and the improvement of energy efficiency.

Figure: own chart/megatrends based on Future:System, The Future:Project, Future:System Transformation beyond Megatrends, March 2023
See page 21 for an explanation of references

# Structural diversity.

An overarching view of the infrastructure market.

## Energy

**Generation**
- Photovoltaics
- Onshore and offshore wind energy
- Hydroelectric power
- Heating

**Storage**
- Batteries
- Heating

## Supply and disposal

**Energy grids**
- Electricity supply
- Gas distribution
- Hydrogen
- Heating distribution

**Disposal/treatment**
- Waste
- Water

## Transport

**Development and transport**
- Transport routes
- Urban and rural mobility (public transport, trains)

**Road and rail**
- Trunk roads and local roads
- Railway routes
- Waterways

**Transport structures**
- Airports
- Ports
- Railway stations
- Parking, filling and service stations
- Tunnels
- Bridges
- Supra infrastructure

## Information technology and communication

- Radio towers
- Networks
- Fibre-optic networks
- Satellites
- Data centres
- Telecommunication towers

## Social (golden) infrastructure

- Education and knowledge
- Health and social care
- Recreation and culture
- Community meeting places
- Justice and administration
- Civil protection and emergency management

## Blue/green infrastructure

- Climate-friendly cities and adapted spaces (e.g. roof and facade greenery, rainwater infiltration, water storage facilities)
- Flood defence

Figure: own chart/based on the Federal Foundation of Baukultur, Baukultur Bericht Infrastrukturen 2024/25, June 2024

# Global need and demand.

**Transport**
**USD 50 trillion**

**Energy**
**USD 28 trillion**

**Communication**
**USD 9 trillion**

**Water**
**USD 6 trillion**

Investment demand by sector[6]

The estimated global investment needed in infrastructure amounts to USD 94 trillion in the period to 2040.[6] According to Siemens Infrastructure Transition Monitor, high speed is the only appropriate tempo, with cities and municipalities, companies and governments having a greater collective responsibility than ever before for reshaping the world.[7]


94

**USD 94 trillion of investment estimated to be needed worldwide by 2040[6]**

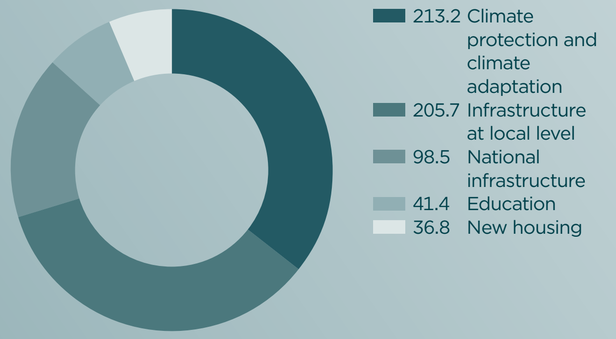
Investment demand by region[6]

See page 21 for an explanation of references

# An investment in Germany.

**How much Germany needs to invest in the next ten years**

In billions of euros




Source: IW, IMK

**‘The German economy is facing monumental challenges. We now need the courage to move away from the piecemeal approach and get the country ready for the future.’**

**Michael Hüther**
Director of the German Economic Institute (IW)

**8 out of 10**

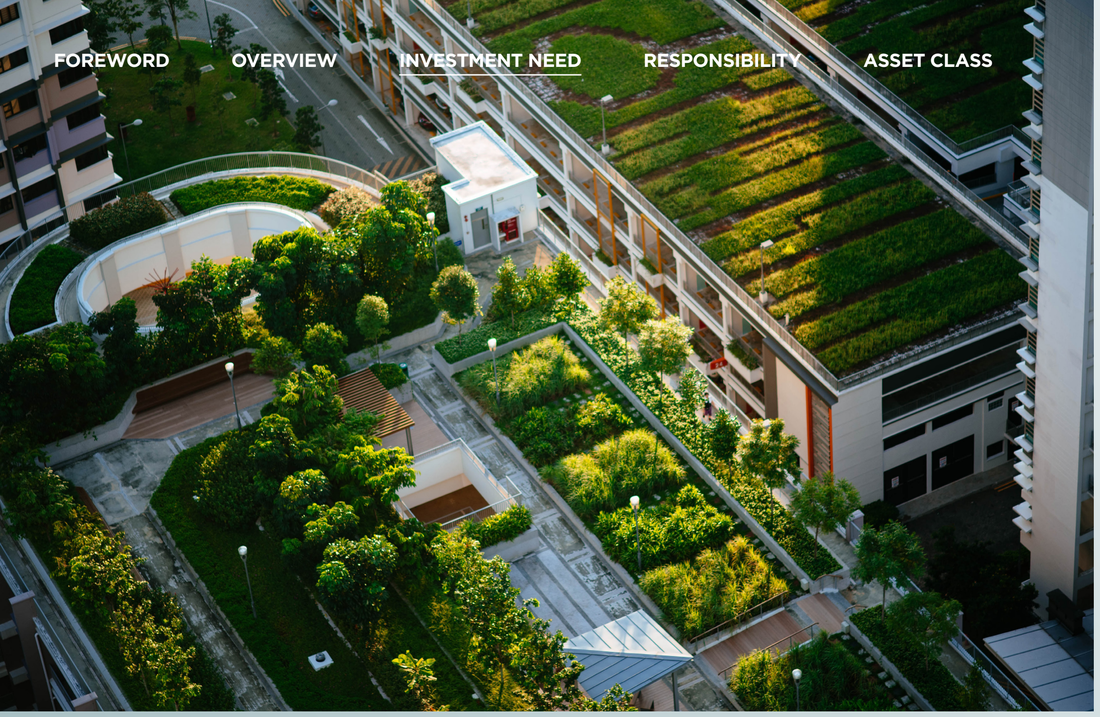
**companies in Germany, according to a 2022 IW survey, feel that their operations are regularly hindered by infrastructure problems.[8]**

600

**600 billion euros.**
This sum could enable Germany to make strides in the next ten years in terms of improving the education system, removing investment backlogs in cities and municipalities, developing roads and railways and facilitating decarbonisation. This is the finding of a new study carried out by the German Economic Institute (IW) in conjunction with the Macroeconomic Policy Institute (IMK) and the Hans Böckler Foundation. Both institutes had previously estimated the additional public investment needed over a ten-year period in 2019; back then, they arrived at a figure of at least 460 billion euros. Since then, the pressure to invest has intensified, including as a result of the Russian war of aggression against Ukraine.[9]

**The challenges.**
Although federal government spending is continuously increasing, this does not translate into more building work. Because even though spending has risen by almost 70 per cent in absolute terms compared with 2015, this has all been eaten up by the inflation of recent years. And the need for investment is growing all the time.[10]

See page 21 for an explanation of references



# More resilient structures.

## Resilience
of infrastructure projects[11]

**Adaptation to climate change:**
Infrastructure must be designed to be robust and adaptable in order to withstand climatic changes.

**Maintenance and renovation:**
The conversion and renovation of existing infrastructure should be prioritised over demolition and new construction. This saves more resources and conserves so-called ‘grey energy’.

**Interconnection with technical infrastructure:**
Public infrastructure projects should be designed to promote the common good and remain usable over the long term.

## Sustainability
of infrastructure projects[11]

**Holistic life cycle approach:**
Efficient design of construction projects across the entire life cycle. This includes, for example, sustainable materials, renewable energies and recyclable construction materials.

**Space-saving development:**
New construction projects should not be developed on unused land, but rather within existing structures in order to prevent further space from becoming impervious.

**Added environmental value:**
Projects should make a positive environmental contribution, e.g. urban green spaces and nature-based flood protection solutions.

**A greater focus on resilience is required in order to manage disruptions more effectively.**
The massive global shocks impacting infrastructure, such as climate change, the pandemic and cyberattacks, necessitate the development of greater resilience, both during crises and in more stable periods. The price of inaction – in terms of human lives, money and social disruption – could be huge. According to a study commissioned by the UN Office for Disaster Risk Reduction, natural disasters cost the countries affected an estimated USD 2.2 trillion between 1998 and 2017.[12] Furthermore, managing COVID-19 in the United States, which has fewer than three hospital beds per 1,000 people, was far more challenging than in South Korea, where there are more than 12 beds per 1,000 people.[12] Cyberattacks on critical infrastructure, such as power grids in Ukraine and the SWIFT global payment system, had devastating consequences. Infrastructure that fails in an emergency or that is unable to adapt to changing circumstances can impede disaster prevention, paralyse social cohesion and throttle economic growth.

**How does infrastructure need to be developed (and improved) in order to ensure its long-term existence?**
The construction of new infrastructure to reflect sustainability and resilience – and the retrofitting of existing infrastructure and its use with new operating models (see the investment chapter ‘Types of investment’) – has to potential to deliver far-reaching benefits. In a report published in 2019, the World Bank estimates that low- and medium-income countries could generate an economic benefit of USD 4.2 trillion by investing in more resilient infrastructure. This equates to a return of USD 4 for every dollar invested. These benefits can not only be generated by avoiding costly repairs, but also by minimising the impact on the daily lives of millions of people.[13]

See page 21 for an explanation of references

# Infrastructure … and action!

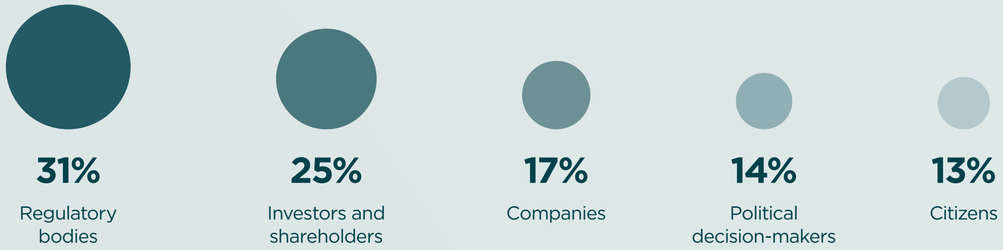
**Who is responsible for the infrastructure transformation?**
Technical and social infrastructure falls chiefly within the remit of the federal government, state governments, cities and municipalities. For the population, however, what matters is the result – and not who is responsible.[14] Traditionally, infrastructure provision was regarded predominantly as the job of the public sector, but in light of capital productivity, strained government budgets and a colossal need for investment in renovation, privatisation and the resulting access to private capital are playing an increasingly pivotal role.

A challenge for regulatory bodies. In most cases, the agenda for such bodies is set by governments, but political upheavals can soon turn priorities on their head. It is therefore vital that official bodies provide companies with security and assurance in respect of the underlying political conditions, as this promotes investment and maintains the speed of infrastructure transformation.[15]

**Differing priorities.**
According to a Siemens Smart Infrastructure survey, citizens often support infrastructure transformation until it starts impacting their immediate environment; this is referred to as the 'not-in-my-backyard' problem. They are often more concerned with the direct consequences of infrastructure transformation, e.g. the loss of jobs or rising energy costs. Companies, on the other hand, frequently attach more importance to the long-term effects of infrastructure transformation, e.g. the cost of new technologies and the necessity to adapt to a changing climate.[15]

**We need a new collective culture.**
In an increasingly fragmented and polarised society, strengthening community spirit becomes a central challenge for the future. This might, for instance, entail new forms of political participation, such as opportunities to actively help shape an enlightened society; this can ensure that key strategic decisions are given more legitimation and can transcend short terms of office.[16]

How should responsibility for making progress in the infrastructure transformation be attributed?




Source: Siemens Infrastructure Transition Monitor 2023

**'We are all responsible for infrastructure transformation. Some people, however, have greater influence to bring about change.'**

**Siemens Smart Infrastructure**

See page 21 for an explanation of references

FOUR QUESTIONS FOR

# Kristina Jeromin

## Why does Germany need success stories?

**Kristina Jeromin** is an expert in transformation financing and a member of the German Federal Government's Sustainable Finance Advisory Committee.

**— You are a member of the Sustainable Finance Advisory Committee of the Federal Government. In your view, who should be responsible for the ongoing development of infrastructure?**
Complex business location policy and economic developments, such as the conversion and expansion of infrastructure, do not fall within the responsibility of individual actors. They take their impetus from society, business and politics and depend on myriad factors, from the decision-making stage through to their concrete implementation. In making this argument, I am not seeking to relieve any of the aforementioned actors from their responsibility, but rather to foster an understanding for their democratic interdependency. It is clearly the responsibility of politicians to create reliable underlying conditions for business and society. But it is not merely incumbent on business and society to demand such conditions, but also to work actively on their development and implementation.

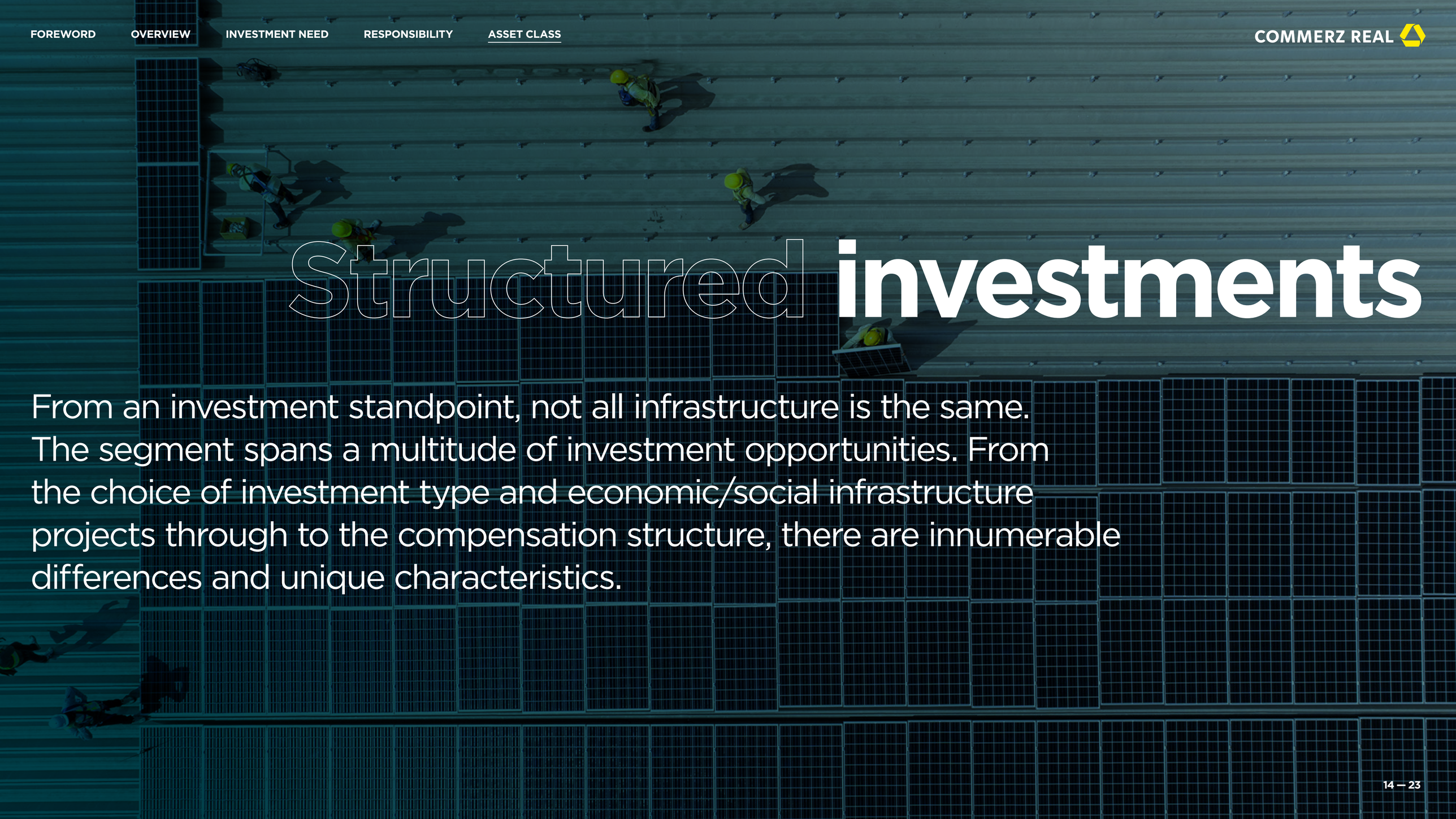
**— You are an expert on transformation financing. How can genuine transformation succeed? Who or what is needed?**
A shared understanding of the status quo and the desired aim is essential in order to make transformation a success. A science-based debate is of great importance in this regard, allowing actors from business, society and politics to take part in an informed democratic process of negotiation concerning the action that needs to be taken. It is, of course, crucial in this regard to keep sight of the social acceptability of the process and to create ongoing opportunities for dialogue and participation. One could write a dissertation about this question, which is why I can hardly do it justice here. When it comes to financing transformation, I can say that reliability in terms of planning and expectations is imperative for financing providers, especially as investments in this area are usually made on a long-term basis.

**— You are co-head of the Made in Germany 2030 initiative, which is funded by Stiftung Mercator. When you think about Germany as a place to do business, what challenges do you see, but also what opportunities, and what can we start doing today?**
Germany's economic strength is based on its high-performance, competitive and diversified industry. It can look back on a long history in this regard. Whether mechanical engineering, electrical


equipment or chemical manufacturing: all over the country, you encounter businesses and products with a long tradition that are synonymous around the world with innovation and outstanding quality. It is no coincidence that the ‘Made in Germany’ label enjoys such a superb reputation. In recent years and decades, industrial companies have repeatedly demonstrated their ability to change and adapt. Decarbonising our value chain represents a transformational challenge, which we can make into a success story by working together. Germany is gradually becoming a climate-neutral industrial nation and is linking this with its ambition to continue playing a leading role on global markets with its products and services. It is now imperative to mobilise the capital required – and this is where Made in Germany 2030 comes in. The aim is to develop a cross-party strategy for financing a competitive and future-proof German industrial location. The recommendations contained in this strategy are designed to underpin an industry policy debate with regard to the expansion of competitive and decarbonised value chains. To be frank, I would replace the ‘start doing’ in the question with ‘do’, as we are anything but ahead of the game.

**Do you have a paragon in mind when it comes to possible pioneering roles in infrastructure development or transformation?**

I think it’s important to recognise that each and every transformation is unique. I am often asked what other financial markets do better than Germany when it comes to transformation financing. I don’t think much of these comparisons. Every business location has its own unique structure. How large is the share of manufacturing? Is more capital procured through banks or via the capital market, etc.? It is key that all actors involved are on board and that they stick by the decisions taken when times are more challenging and criticism becomes vocal. Don’t get me wrong: we need to develop a healthy tolerance of errors and remain ready to readjust. We cannot, however, fall into the trap of believing that we can turn back the clock – this would be economically and socially fatal.



# Structured investments

From an investment standpoint, not all infrastructure is the same. The segment spans a multitude of investment opportunities. From the choice of investment type and economic/social infrastructure projects through to the compensation structure, there are innumerable differences and unique characteristics.

# 152 %

**The number of infrastructure funds on the market rose from 263 in January 2021 to 662 in October 2024.[17]**

# An attractive asset class.

**An in-demand market.**
Investments in infrastructure are investments in the future. If we consider the global investment market, we can once again see a clear trend towards more infrastructure.

The Infrastructure Investment Network's Global Investor 75 ranking reflects the commitment of the world's 75 largest investors and, as of December 2023, totals more than USD 723 billion in the infrastructure segment. Of this figure, almost USD 300 billion originate in North America. At USD 512.7 billion, the allocation of pension funds in infrastructure investments takes first place, way ahead of other institutional investors. By comparison, insurance firms come in second at USD 93.6 billion. Overall, infrastructure accounts for 7.2 per cent of AUM among the 75 largest investors; among the top ten companies, this figure rises to 10.7 per cent.[18]

The prospects are similarly optimistic: according to Mercer's 2024 Large Asset Owner Barometer, 54 per cent of respondents are looking to increase their infrastructure allocation.[19]

**What tangible value contribution do infrastructure investments make within a portfolio?**

**Stability**

Infrastructure investments can enable stable, long-term cash flows. Generally speaking, the services provided benefit from uninterrupted demand, irrespective of the economic conditions.

**Inflation protection**

Infrastructure investments can provide natural protection against inflation, as they involve tangible assets that are often linked to inflation by means of state licensing agreements and contracts.

**Diversification**

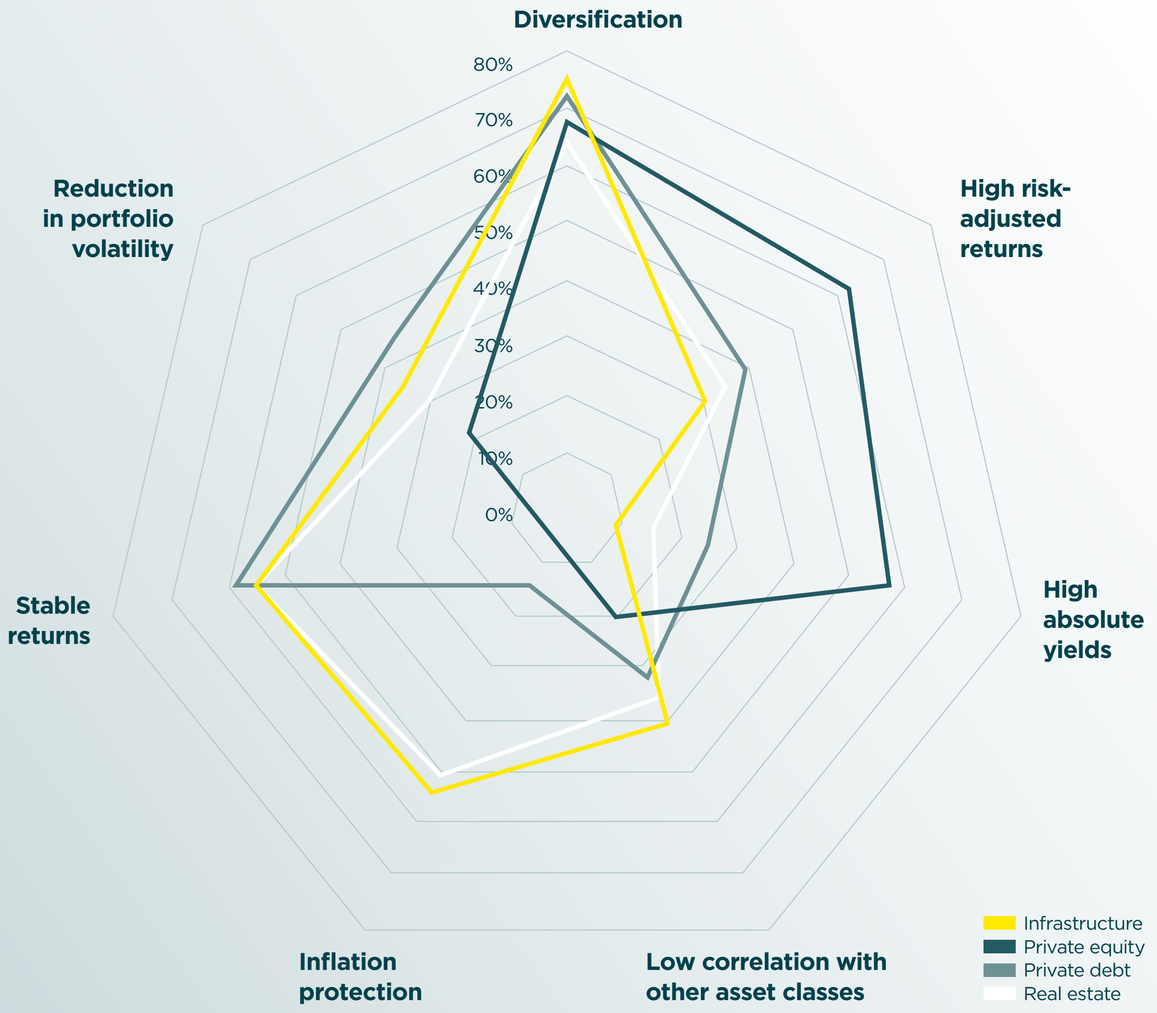
Infrastructure investments can diversify traditional portfolios, with investments in listed assets, and lower the overall risk due to their low correlation with such assets.

**Sustainability**

Infrastructure investments in Article 8 and 9 funds (pursuant to the SFDR) offer an opportunity to contribute to the changeover to renewable sources of energy and thus to support a sustainable future.

See page 21 for an explanation of references

# From exclusivity to mainstream.




Source: Preqin | Alternative Assets Data, Solutions and Insights

## Why do institutional investors invest in infrastructure?

Institutional investors value the diversification effect, the consistency of the returns and the inflation protection offered by infrastructure investments.

# Infrastructure market opening up to private investors.

More and more fund issuers are responding to the increasing demand for infrastructure investments among private investors. Here, almost all funds advertise the benefits of investments in roads, trains, fibre optics, data centres, social infrastructure, etc. However, there are not currently any funds in the retail segment that offer direct and diversified infrastructure investments. Instead, the market exhibits three strategies:

1. Direct majority investments in assets – today, this is restricted solely to investments in the ‘renewable energies’ asset class
2. Fund-of-fund and/or co-investments in the form of minority investments and/or private debt
3. Active or passive investments in listed companies

Choosing the best option depends on individual investment goals, the risk profile and the investment horizon.

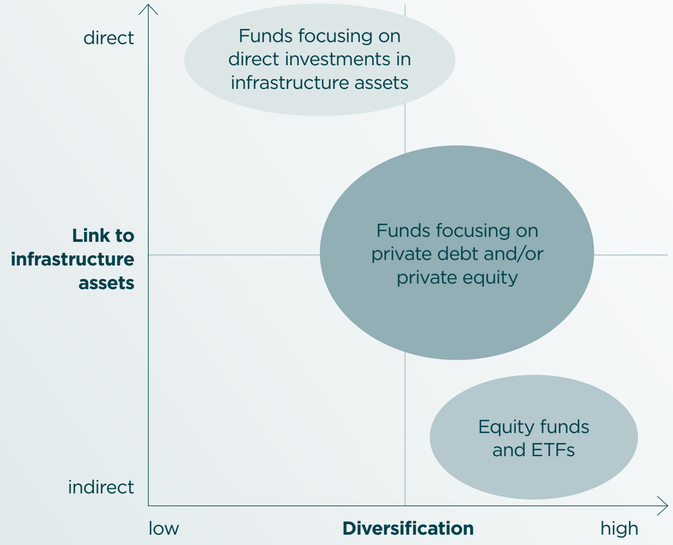



Figure: own chart

# The risk and return profile.

The complexity of the infrastructure segment at asset level.

The expected returns and risk appetite of investors result in numerous combinations in terms of portfolio strategy, with countless bespoke solutions. In turn, this gives rise to considerable complexity, taking both opportunities and risks into account.

## Compensation mechanisms

**Public–private partnerships (PPPs)**
These models offer the lowest risk, as the government safeguards long-term financing and usage for public purposes; this enables stable and predictable cash flows.

**Regulated**
In monopolised markets, e.g. grid-based infrastructure (electricity, gas, water), prices are set by public-sector regulatory bodies in order to create stable investment conditions and ensure long-term provision.

**Contractually determined**
Without state involvement, private-sector contracts such as power purchase agreements (PPAs) enable reliability and predictability through set purchase conditions, while limiting downside risks and, in some cases, leaving market opportunities open.

**Usage-based**
Projects with usage-based compensation, such as airports and toll roads, are extremely reliant on demand and economic conditions; they offer potential in growth phases, but also harbour greater risks and higher fee payments in times of crisis.

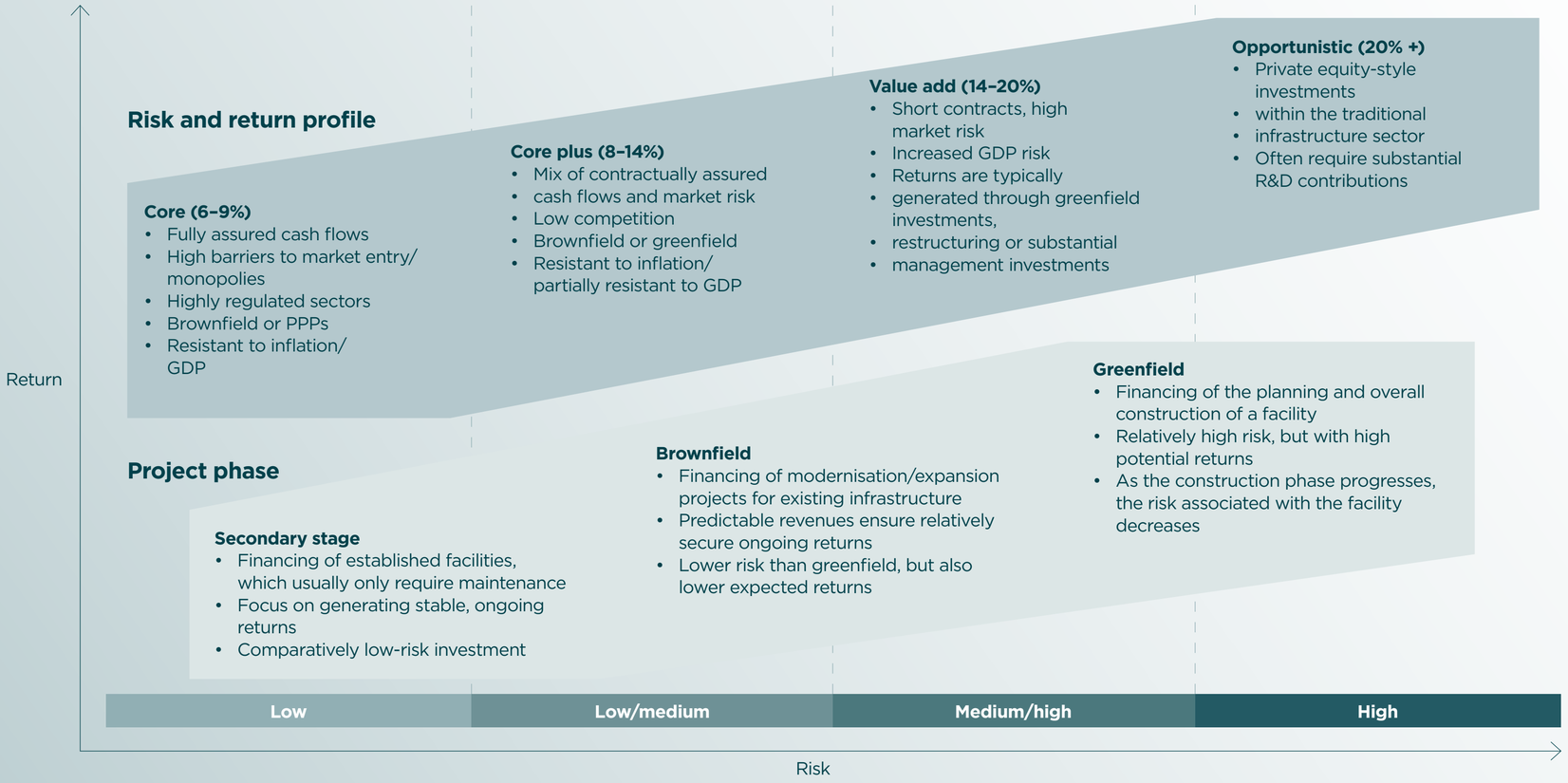



Figure: own chart

# Infrastructure is king. Networking is key.

To ensure sustainable growth, we need to design our infrastructure with intelligence and foresight. The rapid global changes require us to think and cooperate at an overarching level. Here, both private and institutional investors are indispensable in order to successfully spearhead the transformation. Innovative technologies and close partnerships will lay the foundation upon which we will develop an efficiently interconnected infrastructure that is equal to the demands of tomorrow.

The question is no longer property and energy – anyone serious about genuine sustainability and avoiding $CO_2$ has no alternative to taking an integrated approach to property and energy. We are already in the thick of things and look forward to taking further huge strides in partnership with you.'

**Henning Koch**
Chief Executive Officer,
Commerz Real AG

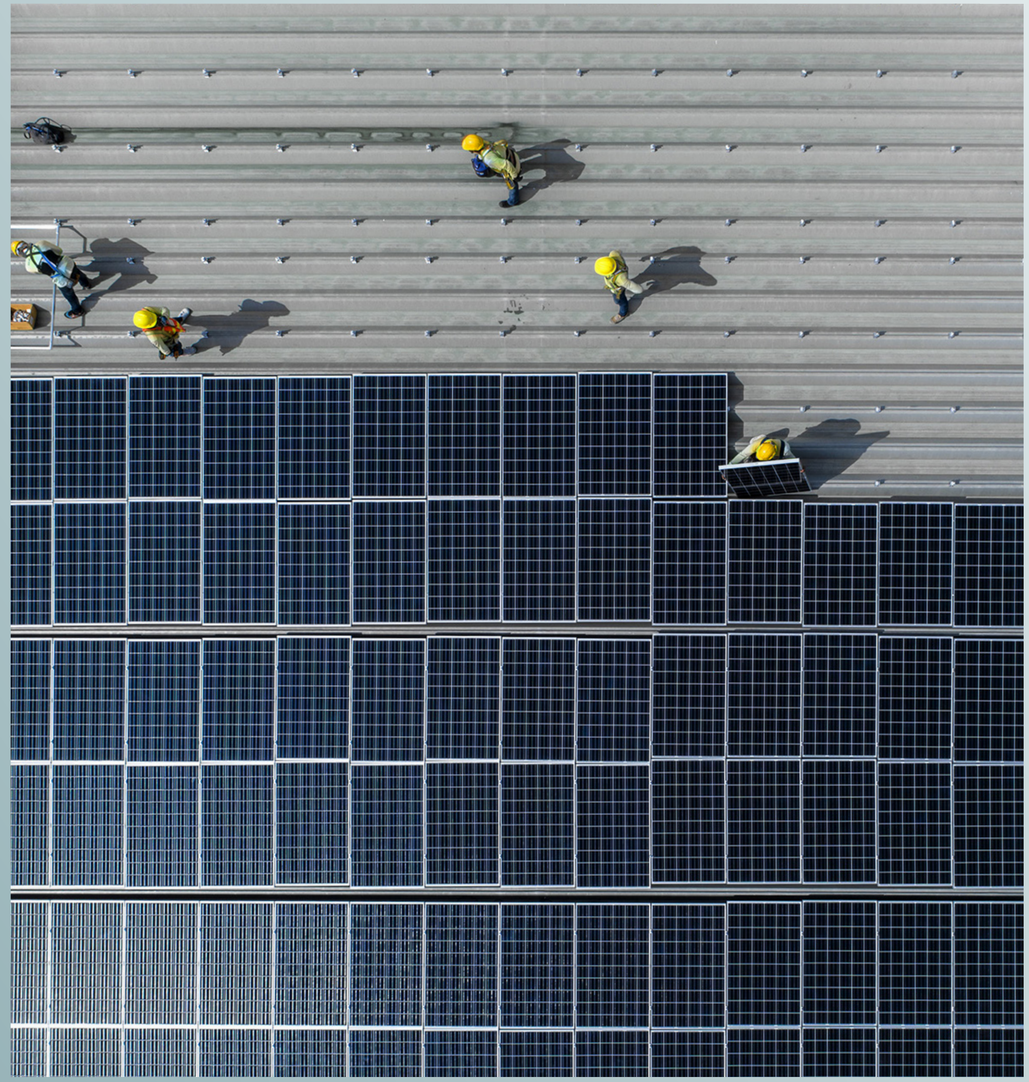
# Glossary

**Power purchase agreements (PPAs)**
are long-term contractual agreements between electricity producers (e.g. operators of renewable energy facilities) and purchasers (e.g. energy providers or other companies). A PPA stipulates that the producer will supply the purchaser with a specified quantity of electricity at a set price and over a set period. PPAs play a central role in the renewable energies sector, as they offer investment security in connection with the development and operation of energy projects. PPAs serve as an instrument for promoting the energy transition by mitigating the risk of market price volatility, creating a stable income stream for producers and enabling companies to meet their sustainability targets by procuring green electricity. In liberalised electricity markets and regions without subsidy models, PPAs are especially pivotal when it comes to financing new wind and solar power projects.

**Resource efficiency**
describes the reduction of consumption and resource wastage through the use of efficient and environmentally friendly technologies and processes. Although closely linked to energy efficiency, it nonetheless constitutes a separate concept. In particular, resource efficiency focuses on dematerialisation, i.e. the reduction of material usage while still maintaining the quality of products and services, and circularity. The latter seeks to achieve closed material cycles, e.g. by means of design strategies and the recycling, reuse, repair, regeneration, repurposing and reprocessing of materials.

**SFDR (Sustainable Finance Disclosure Regulation)**
The SFDR is an EU regulation that seeks to increase transparency in relation to sustainable investments. It obligates financial market actors and financial advisers to disclose how they incorporate sustainability risks within their investment decision-making processes and how these risks may impact returns. What's more, the SFDR promotes the comparability of finance products through the standardised disclosure of environmental, social and governance-related (ESG) aspects.

**Supra structures**
Supra structures are elements that build on and influence infrastructure. Traditionally, the term includes add-on structures, technical equipment and movable objects. The term is used particularly with relation to seaports: the infrastructure of a port includes, for example, docks, quays and railway tracks. Other facilities – such as warehouses, gangways, loading cranes, pallet jacks and trolleys – are classed as supra structure. In a wider sense, the term comprises everything from signal houses adjacent to railway tracks and roadside signs/lighting through to vehicles. Changes to supra structures (e.g. the size and weight of cars and freight trains or the draught of ships) impose new requirements on the underlying infrastructure.



# List of references


1 **Federal Foundation of Baukultur**, Baukultur Bericht Infrastrukturen 2024/25, June 2024
2 **Siemens Smart Infrastructure**, Siemens Infrastructure Transition Monitor 2023 – Die große Kluft auf dem Weg zur Klima-Neutralität, September 2023
3 **Federal Agency for Civic Education**, Duden Wirtschaft von A bis Z, Bibliographisches Institut Mannheim, 2016
4 **Federal Foundation of Baukultur**, Baukultur Bericht Infrastrukturen 2024/25, June 2024
5 **The Future:Project**, Future:System Transformation beyond Megatrends, March 2023
6 **Global Infrastructure Outlook** – A G20 INITIATIVE, as of: October 2024
7 **Siemens Smart Infrastructure**, Siemens Infrastructure Transition Monitor 2023 – Die große Kluft auf dem Weg zur Klima-Neutralität, September 2023
8 **IW – German Economic Institute**
9 **IW – German Economic Institute**, 600 Milliarden Euro für eine zukunftsfähige Wirtschaft, May 2024
10 **IW – German Economic Institute**, Verkehrsminsterkonferenz: Sechs Zahlen, die zeigen, wie schlecht es um die Infrastruktur steht, October 2024
11 **Federal Foundation of Baukultur**, Baukultur Bericht Infrastrukturen 2024/25, June 2024
12 **OECD**
13 **World Economic Forum**, Strategic Intelligence from the World Economic Forum – Transformation Maps, accessed in October 2024
14 **Federal Foundation of Baukultur**, Baukultur Bericht Infrastrukturen 2024/25, June 2024
15 **Siemens Smart Infrastructure**, Siemens Infrastructure Transition Monitor 2023 – Die große Kluft auf dem Weg zur Klima-Neutralität, September 2023
16 **The Future:Project**, Future:System Transformation beyond Megatrends, March 2023
17 **Prequin**, Infrastructure Q3 2024: Preqin Quarterly Update, October 2024 Infrastructure Q3 2024: Preqin Quarterly Update
18 **Infrastructure Investor**, Global Investor 75 Ranking, June 2024
19 **Mercer**, Large Asset Owner Barometer 2024, December 2023

# About us

WHAT SPURS US ON

## We create connected and sustainable life spaces that inspire. Success through responsibility.

**Commerz Real**
Commerz Real is the Commerzbank Group's asset manager for investments in tangible assets and has over 50 years of international market experience. More than 800 employees manage assets of around 34 billion euros at the headquarters in Wiesbaden and 17 other sites and subsidiaries in Germany and abroad. Commerz Real combines comprehensive asset management know-how and broad structuring expertise to create its characteristic range of tangible asset-oriented fund products and individual financing solutions. Our portfolio also includes entrepreneurial investments with investments in tangible assets in the key segments of real estate and renewable energies. In its role as the leasing service provider of the Commerzbank Group, Commerz Real also offers tailored equipment leasing concepts.

**commerzreal.com**



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