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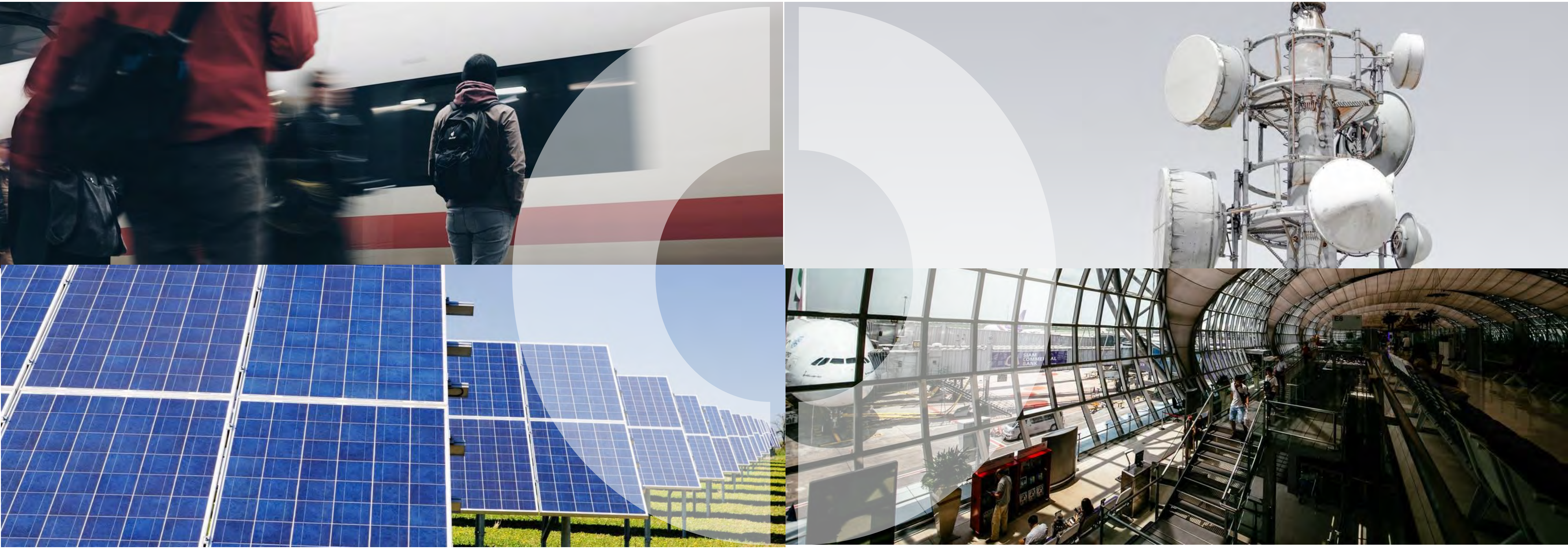


Why ESG is more than just a marketing term

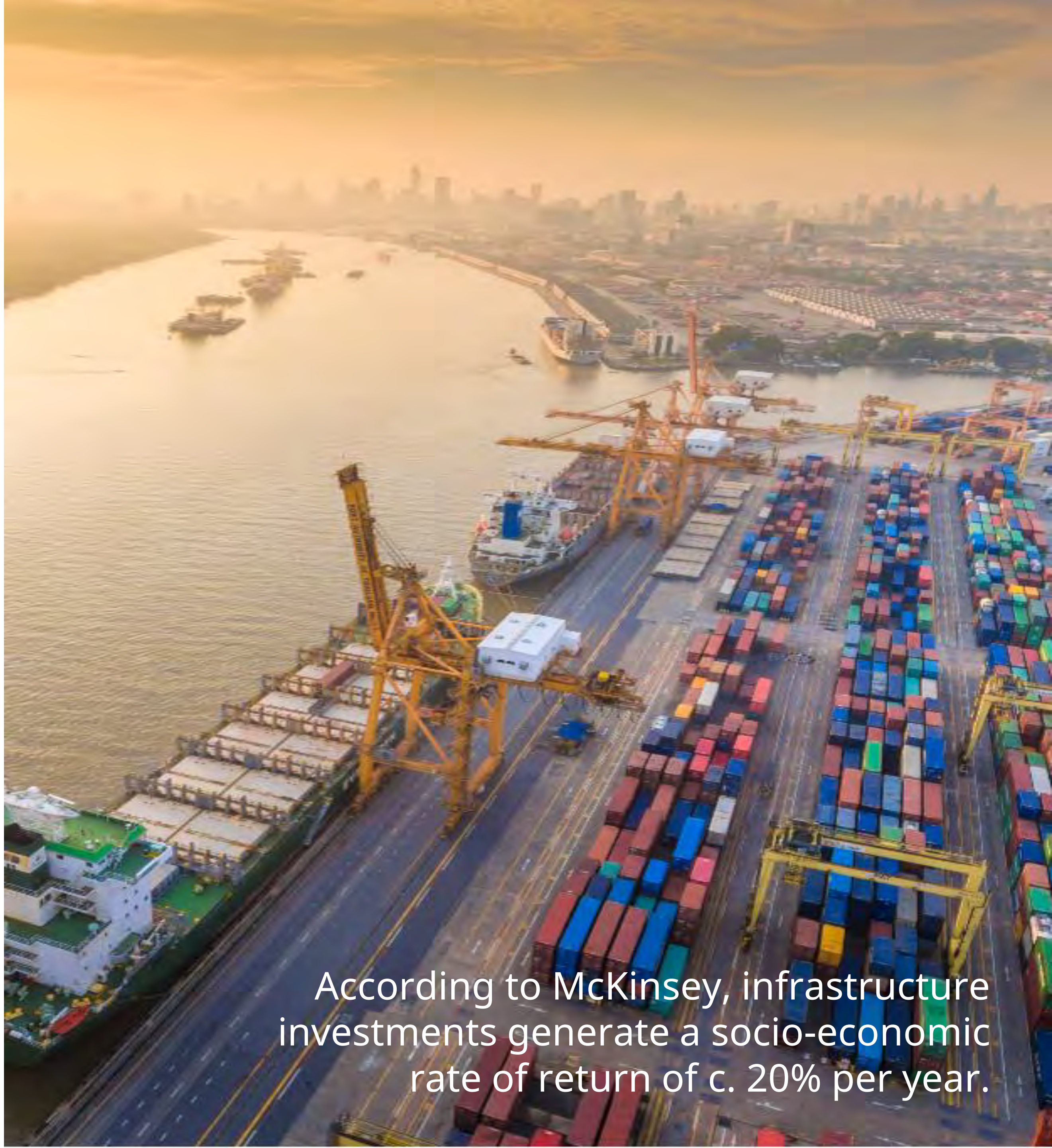
Claire Smith, Alternatives Director Infrastructure Finance

4 June 2019

Investments with a strong social impact

Roads
Bridges
Tunnels
Railway track
Rolling stock
Airports
Ports
Parking lots
Ferries
Electricity distribution
Wind farms
Solar parks
Hydroelectric power generation
Energy from waste
Gas distribution
Gas storage
Oil storage
Pipelines
Water distribution
Metering services
Sewage water
Waste treatment
FTTH Fibre networks
Telecom towers
Schools
Hospitals
Public lighting
Administrative buildings

Source: Schroders, April 2019.
For illustrative purpose, this list of infrastructure assets and services is not exhaustive – McKinsey Global Institute, Bridging the infrastructure gap, Full report June 2015 – p12.

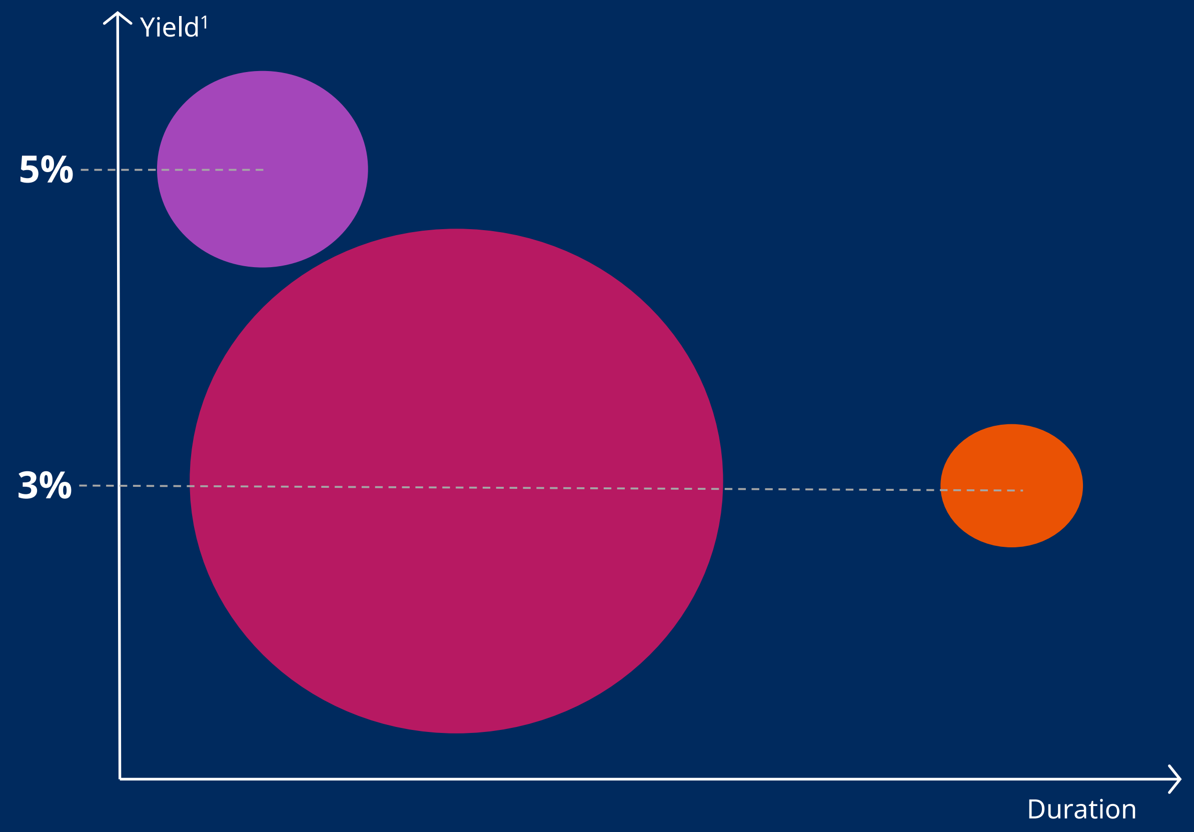


Investment strategies in debt

Solutions for:

- Liability matching
- SCR adjusted-return
- Risk adjusted-return
- Credit diversification
- Social impact

Segmentation of the infrastructure credit universe



Source: Schroders, May 2019. For illustrative purposes only – size of bubbles in chart right are indicative of relative market segment size [1]Yield expressed in Euro in the European market.

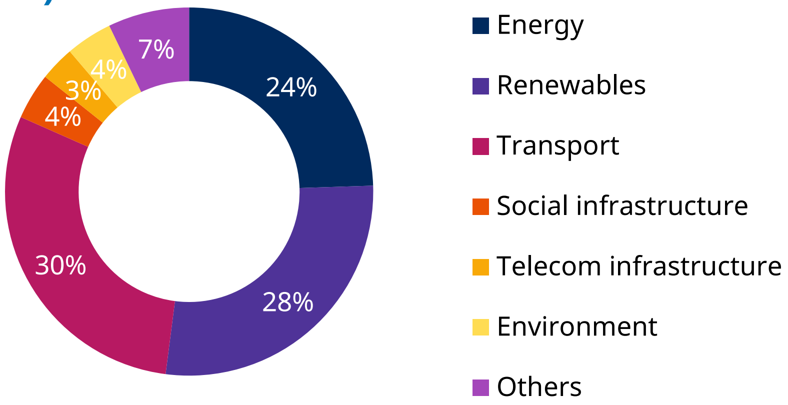
Infrastructure assets

Where and what?

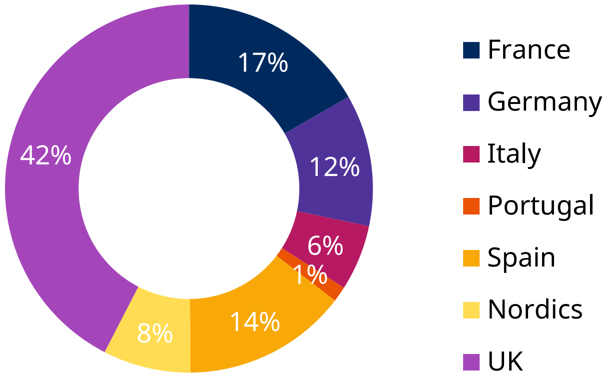
Volume of transactions by geography (2017)

	North America	Latin America	Africa	Europe	Middle East	Asia	Australasia
Greenfield	US$36.62bn	US$31.92bn	US$14.26bn	US$34.29bn	US$4.49bn	US$39.34bn	US$16.86bn
Brownfield	US$45.91bn	US$15.97bn	US$2.95bn	US$89.66bn	US$7.74bn	US$11.35bn	US$19.57bn
Refinancing	US$20.38bn	US$12.90bn	US40.03bn	US$59.80bn	US$1.66bn	US$9.79bn	US$16.20bn

Volume of transactions by sectors in Europe (average of 2015–2017)



Volume of transactions by European countries (average of 2015–2017)



Source: Infranews, December 2018.

Schroders

Our mission

Improve societal cohabitation

Invest in regional infrastructure and services

Improve the competitiveness of countries through infrastructure development.

Enhance the attractiveness of regions and cities by modernising assets.

Stimulate the growth of local economies and create sustainable jobs.

Schroders

Our priority

Prepare for the future

Modernising and diversifying economic structures

Accelerating the ecological and energy transition.

Develop the digital economy through the deployment of new equipment and technology.

Invest in mobility solutions to prepare the city of tomorrow.

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Assessing and monitoring ESG in infrastructure

A core component of our due diligence process

Thematic research
Examines key sustainability trends and challenges current thinking

ESG
Focusing on understanding key ESG issues and evaluating their impact on the investment case

Access to Schroders’ ESG Team and resources
Accessing Schroders’ experienced ESG team, tools and resources

Proprietary ESG Tools
ESG factors are incorporated into our internal scoring tool

Monitoring
Ongoing monitoring of companies to identify emerging issues and candidates for engagement

Reporting
Providing detailed quarterly report update for each of investment

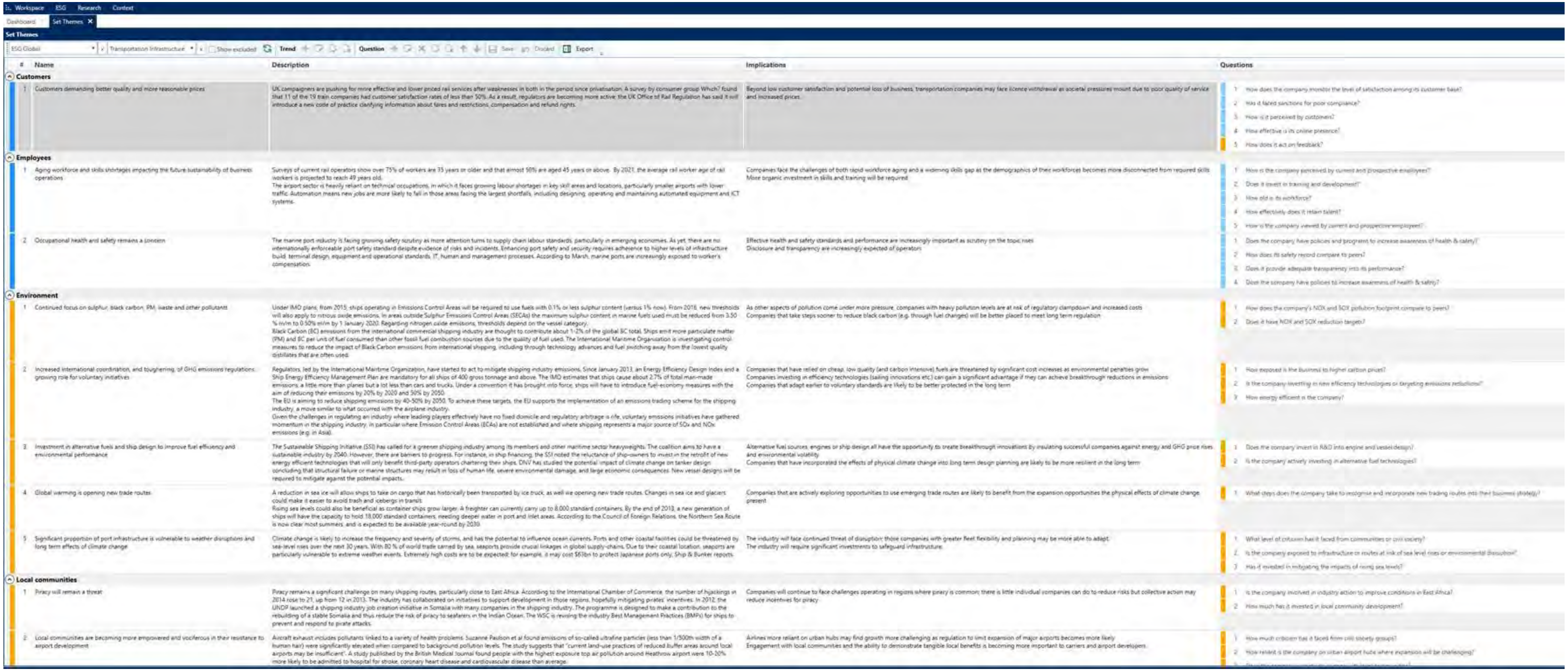
Infrastructure investment universe
- **Sector coverage**: transport, energy distribution, storage facilities, power generation, renewable energy, environmental and social infrastructure, telecommunications
- **Geographic focus**: Europe only

Assess and score investments
- **CONTEXT –** use of central Schroders system to track ESG trends and their impact on sectors
- **Scoring:** 13 carefully selected ESG factors impacting overall score

Final Portfolio

Source: Schroders, May 2019.

CONTEXT: sector ESG considerations



Workspace | ESG | Research | Context

Dashboard | Set Themes

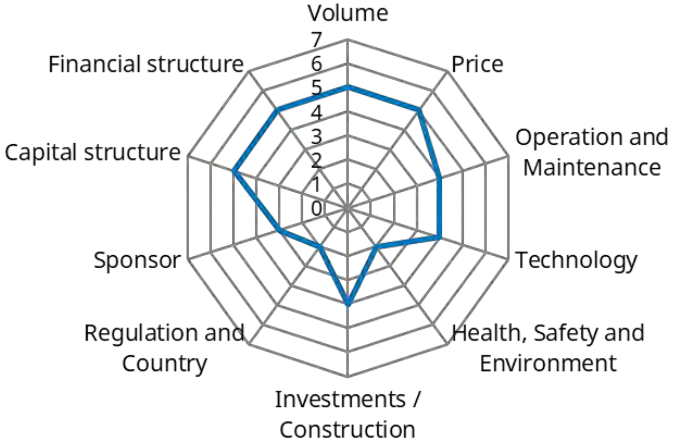
Set Themes

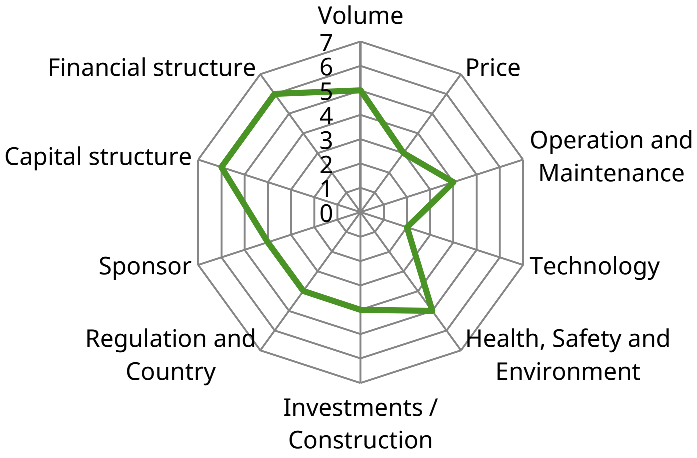
ESG Global | Transportation Infrastructure | Show excluded | Trend | Question | Save | Discard | Export

#	Name	Description	Implications	Questions
Customers				
1	Customers demanding better quality and more reasonable prices	UK campaigners are pushing for more effective and lower priced rail services after weaknesses in both in the period since privatisation. A survey by consumer group Which? found that 11 of the 19 train companies had customer satisfaction rates of less than 50%. As a result, regulators are becoming more active: the UK Office of Rail Regulation has said it will introduce a new code of practice clarifying information about fares and restrictions, compensation and refund rights.	Beyond low customer satisfaction and potential loss of business, transportation companies may face licence withdrawal as societal pressures mount due to poor quality of service and increased prices.	1 How does the company monitor the level of satisfaction among its customer base? 2 Has it faced sanctions for poor compliance? 3 How is it perceived by customers? 4 How effective is its online presence? 5 How does it act on feedback?
Employees				
1	Aging workforce and skills shortages impacting the future sustainability of business operations	Surveys of current rail operators show over 75% of workers are 35 years or older and that almost 50% are aged 45 years or above. By 2021, the average rail worker age of rail workers is projected to reach 49 years old. The airport sector is heavily reliant on technical occupations, in which it faces growing labour shortages in key skill areas and locations, particularly smaller airports with lower traffic. Automation means new jobs are more likely to fall in those areas facing the largest shortfalls, including designing, operating and maintaining automated equipment and ICT systems.	Companies face the challenges of both rapid workforce aging and a widening skills gap as the demographics of their workforces becomes more disconnected from required skills More organic investment in skills and training will be required	1 How is the company perceived by current and prospective employees? 2 Does it invest in training and development?" 3 How old is its workforce? 4 How effectively does it retain talent? 5 How is the company viewed by current and prospective employees?
2	Occupational health and safety remains a concern	The marine port industry is facing growing safety scrutiny as more attention turns to supply chain labour standards, particularly in emerging economies. As yet, there are no internationally enforceable port safety standard despite evidence of risks and incidents. Enhancing port safety and security requires adherence to higher levels of infrastructure build, terminal design, equipment and operational standards, IT, human and management processes. According to Marsh, marine ports are increasingly exposed to worker's compensation.	Effective health and safety standards and performance are increasingly important as scrutiny on the topic rises Disclosure and transparency are increasingly expected of operators	1 Does the company have policies and programs to increase awareness of health & safety? 2 How does its safety record compare to peers? 3 Does it provide adequate transparency into its performance? 4 Does the company have policies to increase awareness of health & safety?
Environment				
1	Continued focus on sulphur, black carbon, PM, waste and other pollutants	Under IMO plans, from 2015, ships operating in Emissions Control Areas will be required to use fuels with 0.1% or less sulphur content (versus 1% now). From 2016, new thresholds will also apply to nitrous oxide emissions. In areas outside Sulphur Emissions Control Areas (SECAs) the maximum sulphur content in marine fuels used must be reduced from 3.50 % m/m to 0.50% m/m by 1 January 2020. Regarding nitrogen oxide emissions, thresholds depend on the vessel category. Black Carbon (BC) emissions from the international commercial shipping industry are thought to contribute about 1-2% of the global BC total. Ships emit more particulate matter (PM) and BC per unit of fuel consumed than other fossil fuel combustion sources due to the quality of fuel used. The International Maritime Organisation is investigating control measures to reduce the impact of Black Carbon emissions from international shipping, including through technology advances and fuel switching away from the lowest quality distillates that are often used.	As other aspects of pollution come under more pressure, companies with heavy pollution levels are at risk of regulatory clampdown and increased costs Companies that take steps sooner to reduce black carbon (e.g. through fuel changes) will be better placed to meet long term regulation	1 How does the company's NOX and SOX pollution footprint compare to peers? 2 Does it have NOX and SOX reduction targets?
2	Increased international coordination, and toughening, of GHG emissions regulations; growing role for voluntary initiatives	Regulators, led by the International Maritime Organization, have started to act to mitigate shipping industry emissions. Since January 2013, an Energy Efficiency Design Index and a Ship Energy Efficiency Management Plan are mandatory for all ships of 400 gross tonnage and above. The IMO estimates that ships cause about 2.7% of total man-made emissions, a little more than planes but a lot less than cars and trucks. Under a convention it has brought into force, ships will have to introduce fuel-economy measures with the aim of reducing their emissions by 20% by 2020 and 50% by 2050. The EU is aiming to reduce shipping emissions by 40-50% by 2050. To achieve these targets, the EU supports the implementation of an emissions trading scheme for the shipping industry, a move similar to what occurred with the airplane industry. Given the challenges in regulating an industry where leading players effectively have no fixed domicile and regulatory arbitrage is rife, voluntary emissions initiatives have gathered momentum in the shipping industry, in particular where Emission Control Areas (ECAs) are not established and where shipping represents a major source of SOx and NOx emissions (e.g. in Asia).	Companies that have relied on cheap, low quality (and carbon intensive) fuels are threatened by significant cost increases as environmental penalties grow Companies investing in efficiency technologies (sailing innovations etc) can gain a significant advantage if they can achieve breakthrough reductions in emissions Companies that adapt earlier to voluntary standards are likely to be better protected in the long term	1 How exposed is the business to higher carbon prices? 2 Is the company investing in new efficiency technologies or targeting emissions reductions? 3 How energy efficient is the company?
3	Investment in alternative fuels and ship design to improve fuel efficiency and environmental performance	The Sustainable Shipping Initiative (SSI) has called for a greener shipping industry among its members and other maritime sector heavyweights. The coalition aims to have a sustainable industry by 2040. However, there are barriers to progress. For instance, in ship financing, the SSI noted the reluctance of ship-owners to invest in the retrofit of new energy efficient technologies that will only benefit third-party operators chartering their ships. DNV has studied the potential impact of climate change on tanker design concluding that structural failure or marine structures may result in loss of human life, severe environmental damage, and large economic consequences. New vessel designs will be required to mitigate against the potential impacts.	Alternative fuel sources, engines or ship design all have the opportunity to create breakthrough innovations by insulating successful companies against energy and GHG price rises and environmental volatility Companies that have incorporated the effects of physical climate change into long term design planning are likely to be more resilient in the long term	1 Does the company invest in R&D into engine and vessel design? 2 Is the company actively investing in alternative fuel technologies?
4	Global warming is opening new trade routes	A reduction in sea ice will allow ships to take on cargo that has historically been transported by ice truck, as well we opening new trade routes. Changes in sea ice and glaciers could make it easier to avoid trash and icebergs in transit. Rising sea levels could also be beneficial as container ships grow larger. A freighter can currently carry up to 8,000 standard containers. By the end of 2013, a new generation of ships will have the capacity to hold 18,000 standard containers, needing deeper water in port and inlet areas. According to the Council of Foreign Relations, the Northern Sea Route is now clear most summers, and is expected to be available year-round by 2030.	Companies that are actively exploring opportunities to use emerging trade routes are likely to benefit from the expansion opportunities the physical effects of climate change present	1 What steps does the company take to recognise and incorporate new trading routes into their business strategy?
5	Significant proportion of port infrastructure is vulnerable to weather disruptions and long term effects of climate change	Climate change is likely to increase the frequency and severity of storms, and has the potential to influence ocean currents. Ports and other coastal facilities could be threatened by sea-level rises over the next 30 years. With 80 % of world trade carried by sea, seaports provide crucial linkages in global supply-chains. Due to their coastal location, seaports are particularly vulnerable to extreme weather events. Extremely high costs are to be expected: for example, it may cost $63bn to protect Japanese ports only, Ship & Bunker reports.	The industry will face continued threat of disruption: those companies with greater fleet flexibility and planning may be more able to adapt The industry will require significant investments to safeguard infrastructure	1 What level of criticism has it faced from communities or civil society? 2 Is the company exposed to infrastructure or routes at risk of sea level rises or environmental disruption? 3 Has it invested in mitigating the impacts of rising sea levels?
Local communities				
1	Piracy will remain a threat	Piracy remains a significant challenge on many shipping routes, particularly close to East Africa. According to the International Chamber of Commerce, the number of hijackings in 2014 rose to 21, up from 12 in 2013. The industry has collaborated on initiatives to support development in those regions, hopefully mitigating pirates' incentives. In 2012, the UNDP launched a shipping industry job creation initiative in Somalia with many companies in the shipping industry. The programme is designed to make a contribution to the rebuilding of a stable Somalia and thus reduce the risk of piracy to seafarers in the Indian Ocean. The WSC is revising the industry Best Management Practices (BMPs) for ships to prevent and respond to pirate attacks.	Companies will continue to face challenges operating in regions where piracy is common; there is little individual companies can do to reduce risks but collective action may reduce incentives for piracy	1 Is the company involved in industry action to improve conditions in East Africa? 2 How much has it invested in local community development?
2	Local communities are becoming more empowered and vociferous in their resistance to airport development	Aircraft exhaust includes pollutants linked to a variety of health problems. Suzanne Paulson et al found emissions of so-called ultrafine particles (less than 1/500th width of a human hair) were significantly elevated when compared to background pollution levels. The study suggests that "current land-use practices of reduced buffer areas around local airports may be insufficient". A study published by the British Medical Journal found people with the highest exposure top air pollution around Heathrow airport were 10-20% more likely to be admitted to hospital for stroke, coronary heart disease and cardiovascular disease than average.	Airlines more reliant on urban hubs may find growth more challenging as regulation to limit expansion of major airports becomes more likely Engagement with local communities and the ability to demonstrate tangible local benefits is becoming more important to carriers and airport developers	1 How much criticism has it faced from civil society groups? 2 How reliant is the company on urban airport hubs where expansion will be challenging? [illegible]

Source: Schroders, May 2019. For illustrative purposes only.

Asset level risk analysis





Financial and ESG factors analysed side-by-side to give an overall 'Score' and ultimately determine whether the investment is made or not

Source: Schroders, May 2019. For illustrative purposes only.

ESG: what can go wrong?

Source: Fox news, Pacific Gas & Electric says it will aid wildfire investigators after power-line problem near origin of deadly blaze.

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Example of investment grade infrastructure portfolio

Sector	Jurisdiction	Capital position	Investment size	Fixed/ floating	Term/type	Yield[1]	Scoring[2]	Status	Execution
Renewables	Spain	Senior secured	EUR 15m	Fixed	19y amortizing	MS + 230bps	Baa2	Executed	2Q 2018
Transportation	France	HoldCo secured	EUR 20m	Floating	6.5y bullet	E + 250bps	Baa2	Executed	2Q 2018
Telecoms	Spain	Senior secured	EUR 35m	Floating	7y bullet	E + 301bps	Baa3	Executed	3Q 2018
Transportation	Germany	Senior secured	EUR 20.6m	Fixed	13y amortizing	MS + 160bps	Baa2	Executed	4Q 2018
Telecoms	France	HoldCo secured	EUR 40m	Floating (floor)	5y bullet	E + 265bps	Baa3	Executed	4Q 2018
Environment	France	Senior secured	EUR 40m	Floating (floor)	7y bullet	E + 275bps	Ba1	Executed	4Q 2018
Transportation	France	Senior secured	EUR 25m	Fixed	30y amortizing	MS + 140bps	Baa2	Executed	1Q 2019
Renewables	Portugal	Senior secured	EUR 30m	Fixed	17y amortizing	MS + 210bps	Baa3	Executed	2Q 2019
Transportation	Belgium	HoldCo secured	EUR 40m	Fixed	12y bullet	MS + 225bps	Baa3	Pending	2Q 2019
		Total	**EUR 265.5m**		**Weighted average spread**	**236bps**			

Source: Schroders, April 2019. Confidential. [1]E = Euribor; MS = Mid-swap. Spread expressed as average and all-in, including upfront fees/arranging fees when available [2]Scoring rating provided by Moody's RiskCalc tool. For illustration only. There can be no guarantee of future fundraising levels or activities. Actual terms will differ from above.

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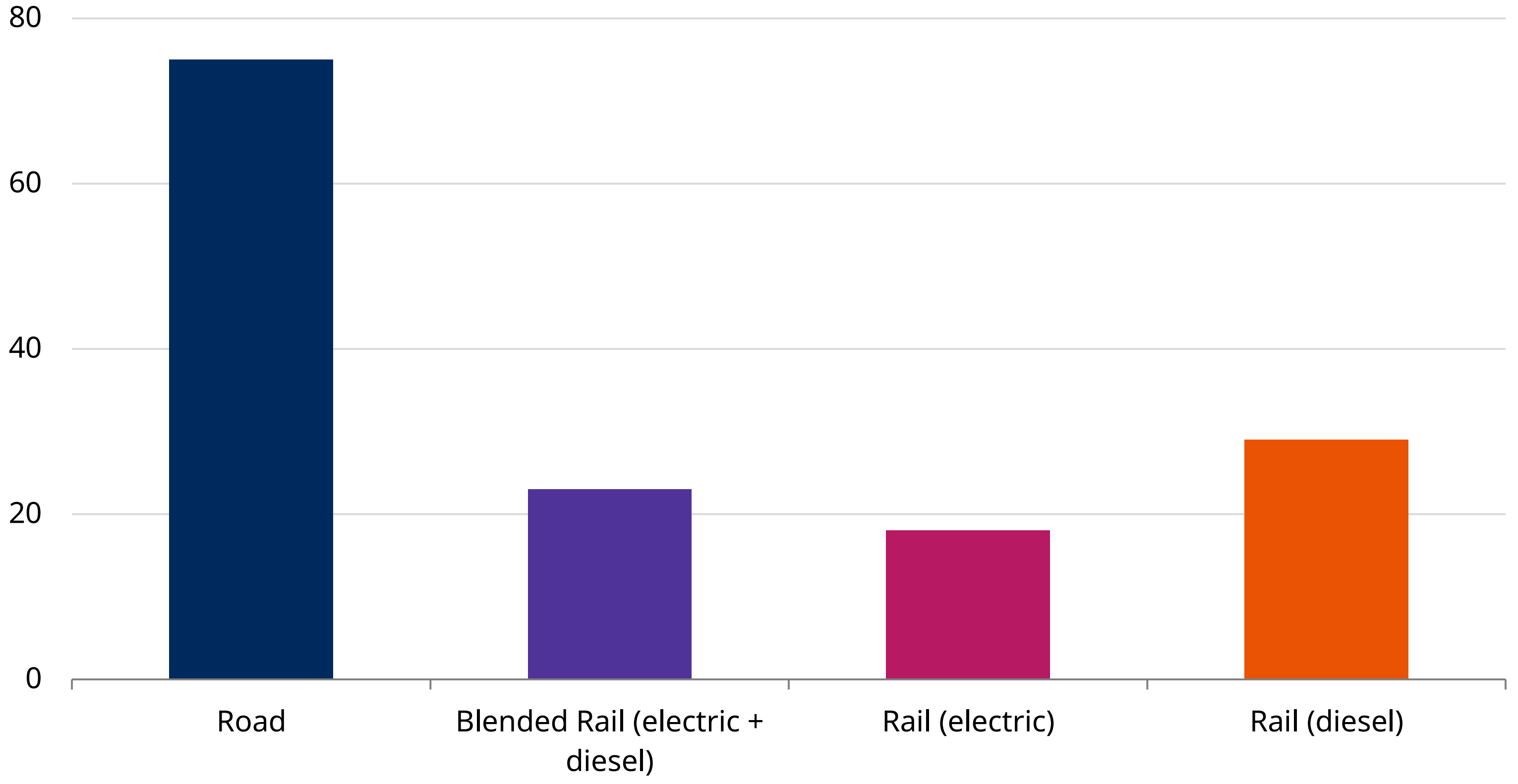
Case study: German rolling stock

In the European Union, the transportation sector is the largest contributor to energy-related carbon emissions (28.3%).

Importantly, the rail sector only accounts for c. 2% of this. In fact, rail generates close to 4 times lower carbon emissions than road per tonne-kilometre.



Source: European Court of Auditors.
Carbon emissions per tonne-kilometre in the EU in 2012.

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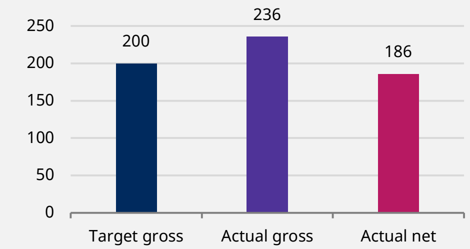
Example of investment grade infrastructure portfolio

Investment guidelines

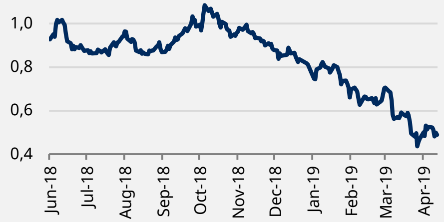
- €466m raised[3]
- Target yield of 3% (gross)
- Target spread of 200bps
- Geography and sector diversification
- Portfolio average rating in BBB area

Current portfolio return[1] (bps) – Delivering value in an environment of falling rates[2]

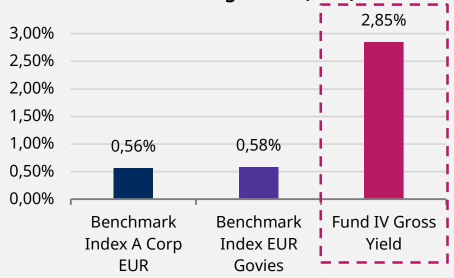
Current Portfolio Average Spread (in bps)



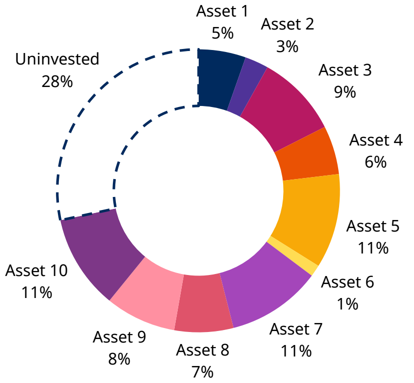
10y-Euro swap rate (%)



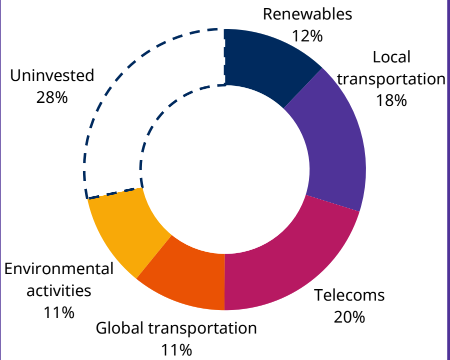
Current Portfolio Average Yield (in %)



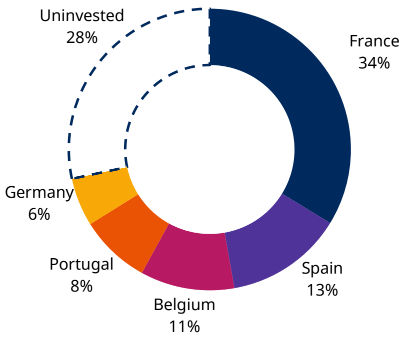
Diversified asset base[4]



Sector diversification[4]

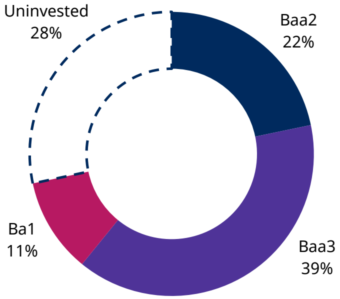


Geography split[4]



Ratings breakdown[4]

Scoring



Source: Schroders, May 2019. Past performance is no guarantee of future results. [1]Net spread assuming 40bps of fees and 5bps of costs. [2]Source: BoAML indexes as of 1/04/2019. [3]Including soft commitments. [4]Including 1 transaction for total value of EUR 40m that have been approved by IC and signed but not yet executed. Based on total hard commitments of €371m.

Summary

Infrastructure can generate both strong financial and positive socio-economic returns

ESG analysis should be considered alongside financial metrics and applied an appropriate weight

Ignoring ESG can have a real financial impact on investment returns

Source: Schroders, May 2019.

Risk considerations

Main risks associated with the asset class

Interest rate risk for fixed-rate instruments: interest rate volatility may reduce the performance of fixed-rate instruments. A rise in interest rates generally causes prices of fixed-rate instruments to fall.

Deterioration of the credit quality of the bond: caused by a change in the market environment (for commercial activities) or a change in law/regulation (for all infrastructure activities).

Risk of issuer default: a decline in the financial health of an issuer can cause the value of its bonds to fall or become worthless.

Prepayment risk: the capital may be repaid by the borrower before reaching maturity.

Exchange rate risk: where assets are denominated in a currency different to that of the investor, changes in exchange rates may affect the value of the investments.

Illiquid and long term investment risk: due to the illiquid nature of the underlying investments, an investor may not be able to realise the invested capital before the end of the contractual arrangement (which is likely to be long term). If the investment vehicle is required to liquidate parts of its portfolio for any reason, including in response to changes in economic conditions, the investment vehicle may not be able to sell any portion of its portfolio on favourable terms or at all.

Capital loss: the capital is not guaranteed and investors may suffer substantial or total losses of capital.

Greenfield risks: in contrast to 'brownfield' investments, investments in 'greenfield' infrastructure assets expose investors to additional risks, in particular construction risk (e.g. construction delays, cost overruns, etc.) and deployment risk (e.g. capital being deployed in several instalments during construction period rather than upfront for brownfield investments).

Operational risks

Trade cancellation risk: trades and settlements are made on a bilateral, negotiated basis. A last-minute trade cancellation can occur in the absence of standard trade and settlement processes via
clearing houses.

Service provider risk: investments can be at risk due to operational and administrative errors, or the bankruptcy of service providers.

Please check the relevant offering documents for a full list of risk factors.

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