

Frontier International

Infrastructure research trip observations

The green industrial revolution is in full swing in Europe

August 2024

About Frontier

Frontier Advisors has been at the forefront of institutional investment advice in Australia for almost thirty years and provides advice on around \$700 billion of assets across the superannuation, charity, public sector, insurance and university sectors.

Our purpose is to empower our clients to advance prosperity for their beneficiaries through knowledge sharing, customisation, technology solutions and an alignment and focus unconstrained by product or manager conflict.



Manish Rastogi

Head of Real Assets

Manish Rastogi is the Head of Real Assets with Frontier. He has over 20 years of experience in global funds management, investment banking, advisory and the telecoms industry.

Manish leads a team of real assets professionals that provide portfolio advice, investment research and support to clients on infrastructure, real estate and timberland.

Prior to Frontier, Manish worked at IFM Investors as Vice President in the Infrastructure Investment team, and previously in M&A advisory with O'Sullivan Partners (now Lazard) in Sydney and with Lehman Brothers in its TMT M&A team in London.

Manish holds a Bachelor of Engineering (Honours) in Computer Engineering from the University of Melbourne, and an MBA (Finance major) from the London Business School.



Dan Cave

Senior Consultant

Dan joined Frontier as a Senior Consultant in August 2023 and is a member of the Real Assets Team.

Dan has responsibility for undertaking investment and manager research with a focus on infrastructure and property. Prior to Frontier, Dan worked at Zenith Investment Partners for six years undertaking manager research.

He had sector lead responsibilities across listed infrastructure, listed property and real assets. Prior to this Dan worked as a financial adviser for two years. Dan holds a Bachelor of Business (Economics and Finance) from RMIT and is RG146 compliant.

Introduction

In May 2024, we undertook an infrastructure research trip to Europe to gain insights on the infrastructure landscape. Europe was impacted by the energy security crisis of 2022, which led to the European Union (EU) fast-tracking the energy transition and decarbonisation agenda.

The European infrastructure sector became a significant beneficiary of EU's largesse and has spawned a plethora of energy transition managers and strategies. As a result, our secondary objective was to identify attractive energy transition and higher-return investment strategies for investors.

We met with a wide variety of infrastructure managers, institutional investors, portfolio company management teams and conducted asset tours in Copenhagen, London and Paris. We also explored investment ideas across core and value-add infrastructure in diverse sectors such as renewables, waste, digital and transport across the European, global and emerging markets.

Our research insights were telling on the future direction of infrastructure investment in Europe. The primary takeaway is that energy security is a key priority for the continent, which then lead to other priorities such as decarbonisation, renewable energy generation and energy innovation. European Governments are also focussed on positioning European industrial firms (e.g. Enel, Iberdrola, TotalEnergies, Vestas) as green industrial champions.

We observed regional distinctions in investment capability, driven by regional advantages, history of innovation, long-term investment trends and support from domestic institutions. For example, London has long-established its credentials as a regional headquarters for infrastructure investment firms; Nordics has a track record in renewable energy innovation; and Paris is emerging as a centre for value-add investing, supported by French industrial firms.



Macro-level observations on the state of the European Union economies and infrastructure

It became abundantly clear from most of our interactions that the fundraising environment had slowed considerably from the highs of 2021 and 2022. However, investment firms were relatively sanguine about the prospects for the infrastructure asset class over medium to long term. After all, the EU has made a significant monetary commitment to decarbonise European economies, which will continue to benefit infrastructure. The operating environment remained robust across all infrastructure sub-sectors, including transport, energy, communications, utilities, renewable energy, waste and water. There was a common view that central bank interest rates had peaked and rate cuts in the EU would follow. In early June, following the completion of our trip, the European Central Bank lowered its interest rates by 25 basis points. Moreover, inflation and the supply chain issues had eased, and the energy security crisis of 2022 was well and truly in the rear view mirror.

According to investment firms, political risk was not identified as a key risk for infrastructure, despite a swathe of European Council and national elections during 2024. A case in point being the French elections where the far-right gained popularity and seats but the two-round election resulted in a hung-parliament. The final outcome, though, is less likely to impact the operation of unlisted infrastructure in the near future.



UK regulation in the spotlight: OFWAT versus private investors

As the UK's water regulator, OFWAT prepared to deliver its draft regulatory review during the northern summer, the headlines and recriminations about the woes of Thames Water continued in London's daily papers. This follows the bruising battle between the regulator and Thames Water's private investors. OMERS Infrastructure from Canada, USS pensions from the UK, and China Investment Corporation chose not to inject new equity into the company leading to a debt default in May 2024. It is a timely reminder that all parties may face unintended or adverse consequences if they do not reach consensus on fair and reasonable regulatory outcomes. Subsequently, OFWAT has chosen to put the company under a special "turnaround oversight regime" which will have special conditions that the existing management team needs to deliver and which only complicates matters further between the parties.

The snap UK election announced by then Prime Minister Rishi Sunak, amid our research trip, led to a heavy defeat for the incumbent Conservative Party. The Sir Keir Starmer led Labour Party is expected to let the market and regulators resolve issues with UK infrastructure. Regardless of differences, private investors need to treat their social license, financial and operational obligations with utmost care. While regulators need to be cognisant of private investors' preference to invest in UK public infrastructure for its transparent regulatory environment and the ability to generate a reasonable rate of return for their shareholders. A less than stable regulatory setting and a lower returns expectation has created an unwelcoming environment for private capital. This is a less-than-ideal outcome for post-Brexit UK when it most needs capital for its growth and decarbonisation ambitions.

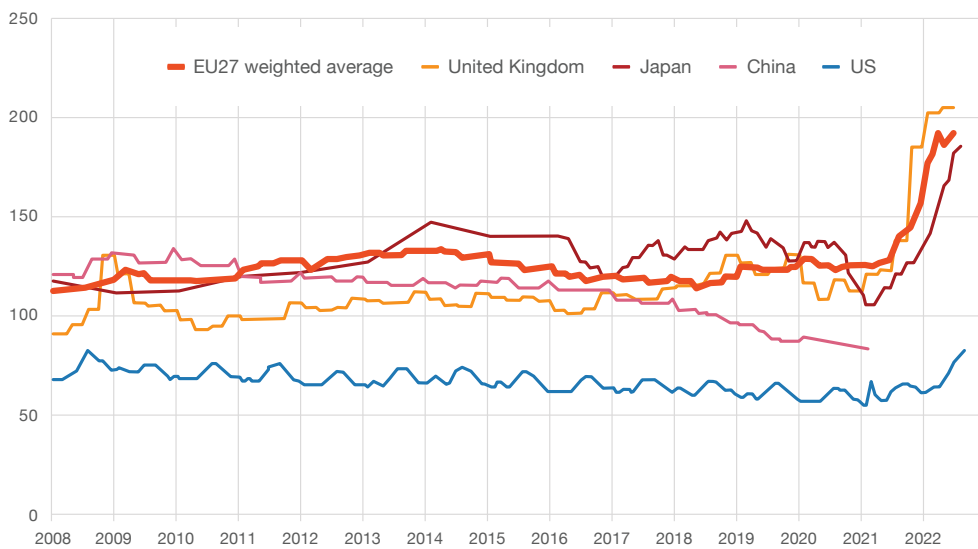
Energy transition drivers

Russia-Ukraine War

Another observation of the trip was the urgency to transition Europe away from fossil fuel to renewables over the medium term. This was brought into sharp focus during the 2022 Russia-Ukraine war, where several European nations lost access to Russian natural gas, leading to the European energy security crisis. In response, European states including Germany, shifted imports from Russia to the US and the Middle East. They built new LNG import, processing and storage terminals in quick time to maintain security of low-cost energy supply and to reduce the cost of electricity. In fact, in mid-2022, the EU classified natural gas and nuclear as sustainable energy sources in its Taxonomy Regulation.

Chart 1 illustrates the sharp rise in energy prices brought on by the Russia-Ukraine war.

Chart 1: Industrial retail electricity price trend for the EU27, the US, the UK, China and Japan (EUR/MW/hr)



Source: S&P Platts, Eurostat, US DoE, Ener data (NBS, E-Stats, BEIS, KESIS), International Energy Agency

Electrification

The electrification of transport is also evident with the build-out of EV charging infrastructure. The three cities we visited had EV charging infrastructure available with different revenue models including: pay-per-use, subscription, and automobile manufacturers, creating EV charging alliances with preferred partners. For example, Volkswagen has partnered with BP to roll out fast-charging points in Germany and UK and for those to be included in Volkswagen EVs in Europe.

On-street EV charging infrastructure in action in Copenhagen, London and Paris.



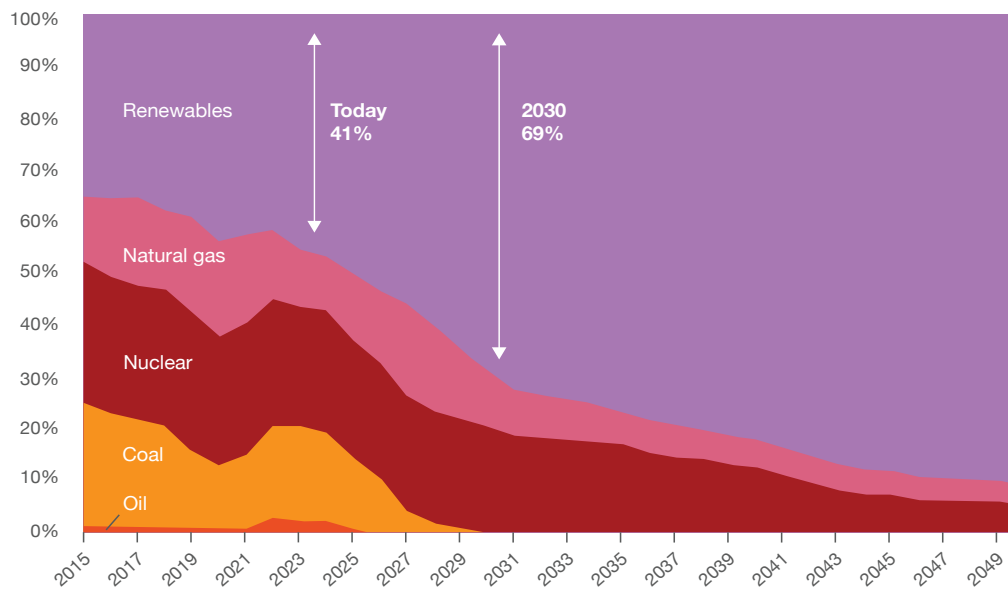
Source: Frontier Advisors

Renewables build-out

Europe and the UK introduced a range of policy initiatives such as 'REPower EU', to fast-track the build-out of renewable energy generation and phase out dependence on Russian fossil fuel imports.

Europe and UK now need to expand the capacity of their electricity transmission networks. The growing supply of new, decentralised solar and wind farms and stand-alone battery energy storage systems (BESS) need additional electricity network capacity to meet the evolving and growing electrification demand. In Australia, the electricity transmission network needs to be extended and expanded to connect distributed generation¹.

Chart 2: Forecast growth of renewables in the European fuel mix for electricity generation



Source: Bloomberg NEF, New Energy Outlook 2022, November 2022; Manager data

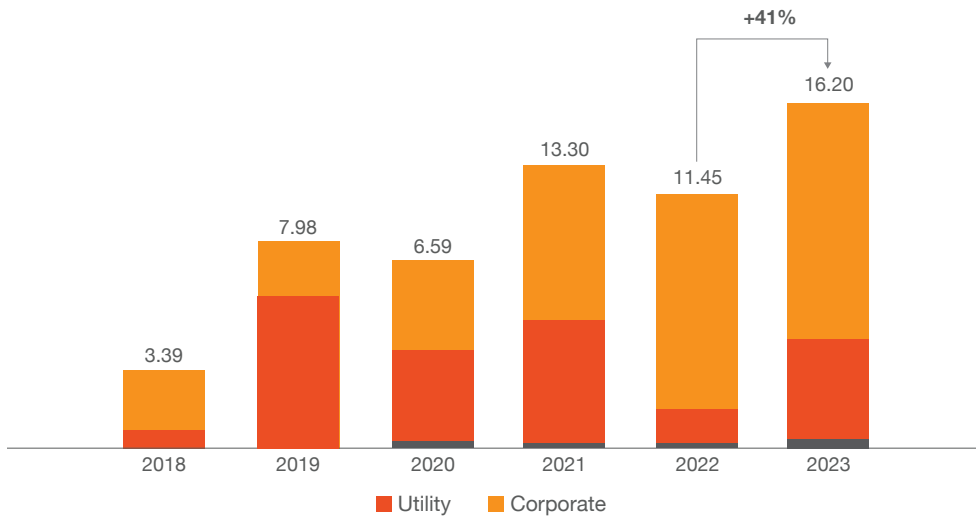
While European governments have enacted strong policies for energy transition, the on-the-ground reality is different. According to infrastructure managers we met, there is a range of issues to overcome: there is slow implementation of policies; slower than anticipated adoption by industry²; reduction in the availability of debt financing; and lack of capacity in national electricity transmission systems. In the UK, the National Grid is so overwhelmed with the volume of new connection requests, that it would take ten to fifteen years to connect new projects, at the current rate of connection approvals.

¹ 2024 Integrated System Plan

² The corporate and utility power purchase agreement (PPA) markets, while growing steadily, had yet to take off to make up for the material cuts in subsidies or feed-in-tariff (FIT) frameworks that supported the commercial viability of greenfield renewable projects to date.

While the private industry PPA market is growing in the UK, it is growing slower than necessary to fast-track energy transition.

Chart 3: PPA deal flow by disclosed capacity - 2018-2023 (GW)

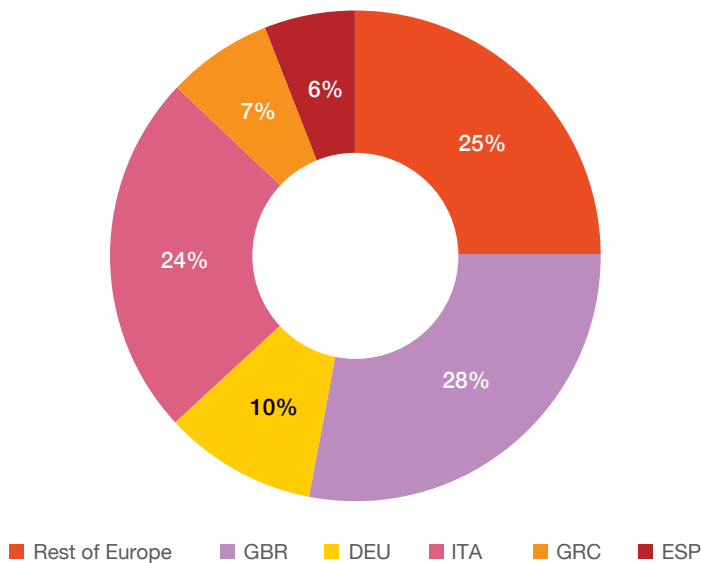


Source: Nuveen Infrastructure

Despite this, renewable energy-focused infrastructure managers are buoyant about the long-term future for renewable energy generation and storage. Integration of BESS into the electricity networks remains an opportunity area (highlighted in Chart 4), but Europe is lagging the US, Australia and even the UK, which has made significant progress in BESS adoption. BESS can provide capacity availability, Frequency Control Ancillary Services (FCAS), energy arbitrage and renewable integration. Infrastructure managers cited that the UK is most advanced for the increasing prevalence and sophistication of BESS deployment. Germany and Italy are emerging as attractive BESS investment markets in continental Europe due to Government support and availability of capacity tolling contracts.

Chart 4: Expected European market share of installed BESS capacity % (2030)

Expected installed grid-scale BESS capacity in Europe of 42 GW (Aurora central case)



Source: Nuveen Infrastructure

Centres of expertise and innovation

United Kingdom: regional headquarters

London remains a critical financial hub for Europe, serving as global or regional headquarters for many investment managers. London has continued to welcome global managers and investment talent. Numerous North American and UK-based infrastructure investment firms maintain their European hub in London while serving continental Europe with satellite offices in key regional European cities. In Europe, differences in language and cultural nuances continue to necessitate regional specialisation in the origination of investments and asset management. In this regard, investment managers can play to London's strengths as a global centre for finance, with a well-established infrastructure eco-system. Firms can build teams with diverse pan-European skill sets and relationships in London and then choose to expand in continental Europe with satellite offices as required.

Nordic region: renewable energy innovation

The Nordic region has a strong commitment to the natural environment and has built a reputation for innovation in clean energy infrastructure. Denmark in particular, has a strong heritage and technical capability in renewables, more specifically wind-powered energy generation (both onshore and offshore). Offshore wind generation is visible from the air, as one arrives in Copenhagen.

Elkraft, a predecessor firm of Orsted (a Danish-headquartered global renewable wind energy developer listed on Nasdaq Copenhagen) built the first commercial offshore wind farm in Vindenby in Denmark in 1991. Since this time, Orsted (previously DONG Energy) has grown into the largest offshore wind developer globally with an operating portfolio of 8.9GW and a pipeline of another 10.3GW in construction or development. Swedish, Norwegian and Finnish state energy utilities Vattenfall, Statkraft and Fortum, respectively, are also prolific developers of renewable energy in Europe and globally.

Frontier met with key Danish parties in the wind energy ecosystem including developers, manufacturers, investment firms and pension funds that finance the industry. Vestas Wind Systems (Vestas) is a publicly listed national champion, as the world's leading wind turbine manufacturer. Vestas was incorporated in the 1940s as a manufacturing agricultural machinery and household appliances and pivoted to researching and developing commercial wind turbines in the 1970s. Today, Vestas manufactures wind turbines and ancillary equipment at numerous global plants to suit different markets, climatic conditions and operating environments. It is also a developer and an operations and maintenance (O&M) service provider for wind farms globally. Hence, Vestas is an important player in the energy transition thematic.

110.4MW Lillgrund offshore wind farm located at Öresund, between Sweden and Denmark.



Frontier visited the Lillgrund offshore wind farm up close via fast boat.

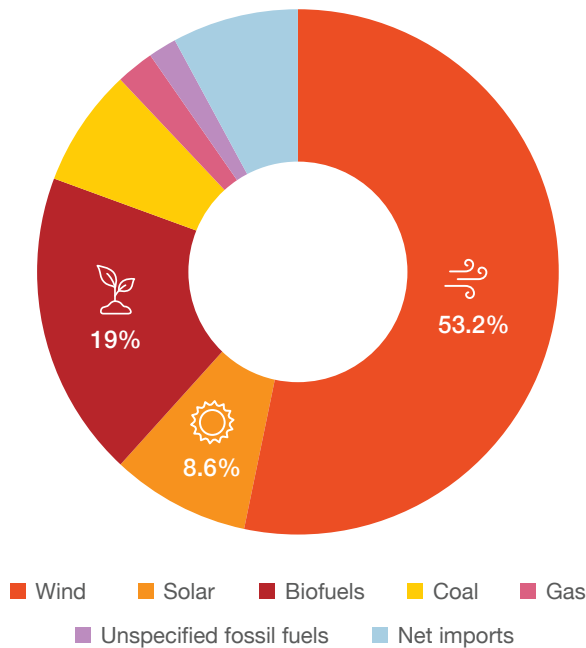


Source: Frontier Advisors

Denmark has capitalised on this industrial and energy innovation to build a relatively clean energy-powered economy with over 80% of electricity derived from low carbon generation, with approximately 53% generated by wind in 2023.

Not surprisingly, the Danish renewable managers Frontier met with had leveraged innovation, and the industry expertise to build teams and businesses with strong technical capabilities. We found these technical capabilities to be sophisticated and a competitive advantage against those of diversified infrastructure managers that comprise investment personnel with typical investment backgrounds.

Chart 5: Input sources of electricity generation in Denmark in 2023



Source: <https://lowercarbonpower.org/regionDenmark>

Paris: epicentre of European core plus and value-add

Over the years, Paris has emerged as a hub for infrastructure in continental Europe. Paris hosts numerous high-quality core-plus, value-add infrastructure investment firms including several energy transition specialists. France is home to large multinational utilities such as Électricité de France SA (EDF) and Engie; supermajor oil and gas companies, TotalEnergies; industrial developers such as Alstom and Veolia; as well as multinational banks such as BNP Paribas and Société Générale. This provides a rich environment for infrastructure demand, development and financing. Similar to Frontier’s observations in Denmark, we observed strong engineering and commercial pedigree at French infrastructure managers, with energy and utilities backgrounds prevalent.

This vibrant ecosystem has created a fertile ground for French infrastructure managers to (i) hire engineering and commercial talent, and (ii) to acquire infrastructure assets from industrial firms who need to regularly recycle capital. Higher risk/return focussed French infrastructure managers can extract a premium above ‘core returns’ by carving out businesses or non-core assets from industrial firms and either growing and/or derisking the assets. Frontier met with high-quality infrastructure managers with a focus on Europe in essential sectors such as transport, waste, childcare and schools, as well as contemporary sectors such as fibre networks, data centres and renewable energy.

Investment strategies

Renewables and energy transition strategies

We observed a range of investment opportunities available for renewable generation and executing energy transition.

- Investment managers are focussed on building renewable portfolios by developing assets from the ground up to harness the development premium. The manager typically comprises investment staff, asset management staff and in some cases, technical engineering capability.
- Sophisticated and experienced managers are focussed on developing large-scale renewable platforms with their in-house development, engineering and asset management teams. These platforms may be spun out into an independent power producer (IPP) in the future. The IPP model is popular in Europe as large utilities and fossil fuel-producing companies are willing to acquire self-sufficient IPPs to meet their decarbonisation objectives.
- Several Nordic managers had a pedigree and capability in offshore wind and had assembled in-house specialist teams to develop offshore wind assets globally. This is necessitated by the technical, commercial and legal challenges for offshore wind development, which are vastly more complex than developing onshore wind assets.
- Higher risk/reward focussed investment managers invest in renewable energy developers as opposed to projects. The aim is to significantly boost the developers' investment, deployment and engineering capability to convert the developer into an IPP. The manager then exits the IPP to a larger cap infrastructure investment firms or a corporate in a pre-agreed timeframe.
- Other renewable managers are blending strategies of acquiring brownfield operating assets with development opportunities in emerging technologies such as hydrogen or new/periphery markets (Greece, Eastern Europe, Baltics).
- We also encountered energy transition managers focussed on BESS arbitrage, developing green data centres, building portfolio of rooftop solar assets for consumer & industrial (C&I) customers, and in an interesting case, even financing 100% renewable powered 'green steel' manufacturing plant in the Arctic circle.

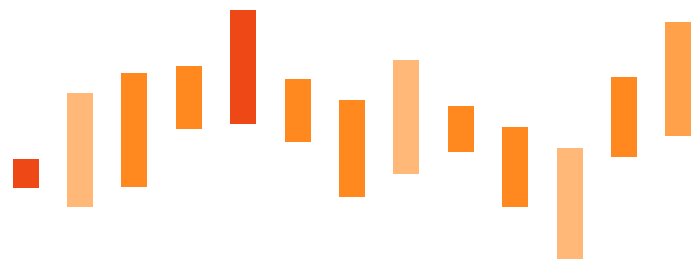
Frontier visited a C&I rooftop solar facility in Val-de-Marne on the outskirts of Paris



Cold-storage facility with C&I solar power solution and grid connected equipment



The breadth of European renewables and energy transition strategies revealed unique insights and confirmed our thesis of seeking specialist managers with specific skillsets and dedicated strategies. Several European institutional investors we met also confirmed a preference to allocate to renewable and energy transition strategies via specialist managers.



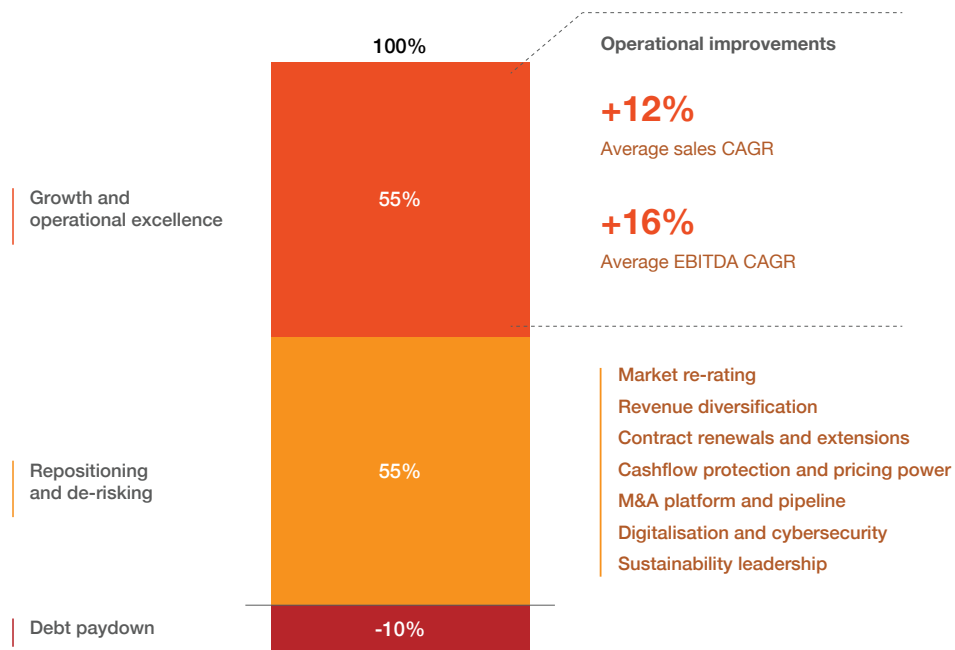
Value-add infrastructure strategies

European value-add infrastructure is supported by strong tailwinds such as:

- The region offers a large opportunity set across a variety of markets, sectors and regulatory structures. Infrastructure is supported by European government policy, economic pillars and a large institutional capital base.
- The value-add ecosystem is supported by mid to large scale European industrial firms that develop new infrastructure and are reliant on recycling capital to infrastructure managers. These are often value-add managers that are able to grow the asset or derisk the cash flow profile to extract premium returns upon exit.
- There is a plethora of growth-oriented, value-add strategies across the size spectrum (mid-market, large and mega-cap) to suit all investors.
- Managers employ high growth strategies (organic, bolt-on, buy-and-build, development) to infrastructure and 'infrastructure-like' assets. Traditional value-orientated private equity (PE) strategies such as turnarounds, distressed asset acquisitions are not prevalent.
- Value-add strategies may provide better downside protection relative to PE strategies, since they incorporate the defensive infrastructure characteristics, with the optionality to convert growth focussed assets into cash-yielding assets (i.e. 'sweat the asset base'). 'Derisking' assets to sell to core investors is a key driver of returns.
- Infrastructure sectors such as digital, social, energy, waste management and industrial lend themselves well to value-add strategies, and these are almost always implemented in close-ended fund structures.
- There is a proven track record of managers attaining attractive returns commensurate with value-add risk.

Chart 6: Value creation via organic growth, de-risking (contracting renewals and extensions, debt refinancing, active management, ESG initiatives)

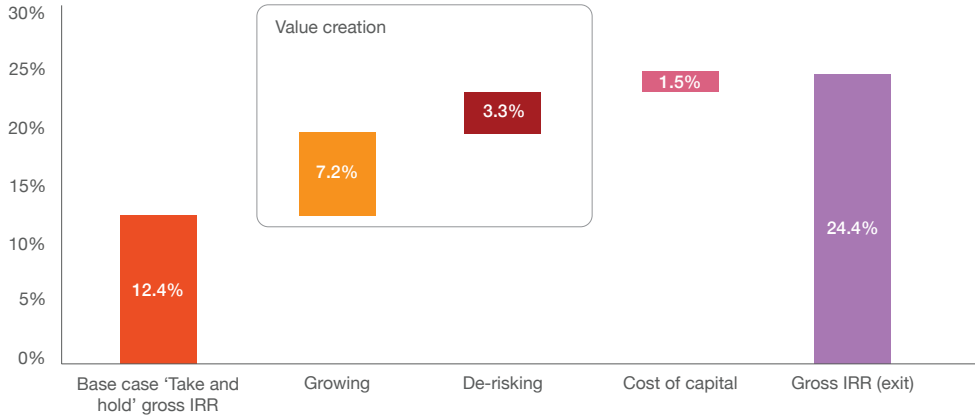
Source of value creation



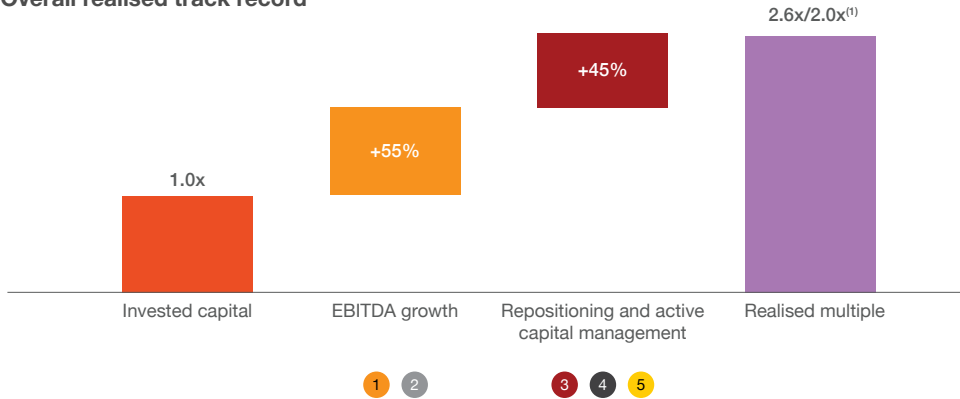
Source: Manager presentations

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Value creation bridge



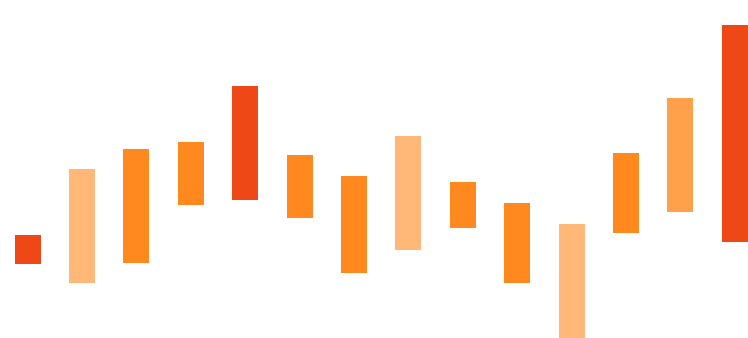
Overall realised track record



Legend:

- 1 Organic growth initiatives and operational performance
- 2 Value accretive M&A activity
- 3 Identification of overlooked or less crowded infrastructure sub-sectors
- 4 Active capital management
- 5 Repositioning for lower cost of capital buyers to achieve attractive returns

Source: Manager presentations



The final word



Given the impetus and advances in rollout of renewable energy generation and energy transition, Europe provides a fascinating window to the effort and collaboration required from governments, developers, investors and private industry in executing one of the greatest challenges: energy transition.

Our trip highlighted that Europe is determined more than ever to achieve energy security and societal decarbonisation on a grand scale by transitioning to clean renewable energy. The EU learnt valuable lessons from the 2022 energy security crisis and has fast-tracked policy, investments and development of its electrical power infrastructure to support the doubling and tripling of its renewable energy generation base over the coming decade.

Infrastructure managers are responding to EU's energy policy and funding initiatives. Several hundred renewable energy and energy transition funds have been launched in the last several years supported primarily by European institutional investors.

European managers have made advances by in-sourcing specialist technical, commercial and ESG capabilities to navigate the complexities of planning for and deploying

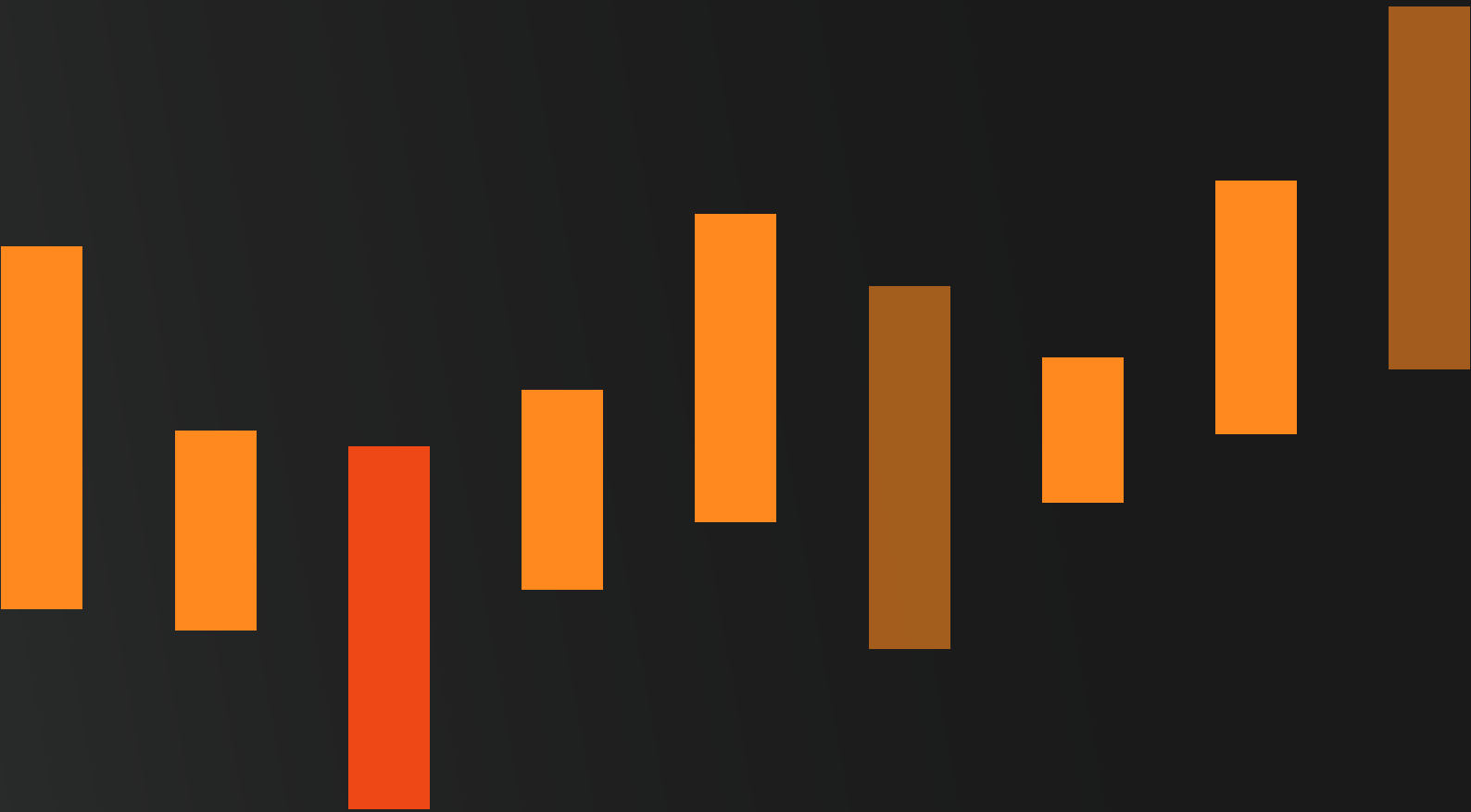
renewable energy plants. Furthermore, we witnessed significant innovation in technology (offshore wind, waste to energy) as well as in investment strategy (platforms, IPPs, investing in developers).

We believe Europe is a fertile ground for investment in the current environment and provides compelling opportunities in clean energy, transition and in the higher risk/return spectrum.



Want to learn more?

Frontier met with a number of high-quality managers for energy transition, and core plus/value-add infrastructure. Consequently, Frontier is very well placed to assist clients with their infrastructure deployment, portfolio development and diversification objectives. If you are interested in learning more, please reach out to your consultant or a member of the Real Assets Team.



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