Deutsche Bank
Chief Investment Office

PERSPECTIVES

Special

May 2025

Energy Transition: Utilities and electricity grids

Contents

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Key takeaways

- Increases in electricity consumption are reshaping power markets. Higher demand will need to be met by low-emission sources, but this will create challenges.
- Grids will need to be expanded to incorporate dispersed renewables generation, and modernized to enhance efficiency, reliability and security.
- This creates a long-term investment case for Utilities, with potential re-rating vs. the overall market. Higher capital expenditure is likely to translate into substantial earnings growth.

01

Introduction

Electrical power consumption is now increasing at its fastest pace for many years, driven by factors including industrial electrification, data centre expansion and electric vehicle (EV) adoption. Meeting this increased demand will involve major changes to the electricity supply mix, with a greater contribution from renewable energy sources. But it will also involve updating and fundamentally reshaping the role of power grids to integrate new energy sources while maintaining system stability and resilience. This will require substantial investment in transmission infrastructure, digital grid modernization, and energy storage solutions.

Utilities have faced valuation pressure in recent years, in part due to higher interest rates and concerns around some renewable energy projects. But faster growth in electricity demand, combined with grid expansion, may now be changing investment dynamics. Utilities, if they can successfully finance infrastructure improvements, may enjoy higher earnings growth.

In this report, we first provide an overview of electricity and grid development, followed by a summary of investment trends in grid expansion, capital expenditure requirements and regulatory developments. We then set out the investment case for Utilities and the potential risks.

02

Electricity demand and supply

Electricity consumption is now increasing at its fastest pace in decades. Over 2025–2027, the International Energy Agency (IEA) forecasts grow at an annual rate of nearly 4%, adding 3,500 terawatt-hours (TWh). This increase is equivalent to adding an entire economy the size of Japan to the world's electricity consumption each year.

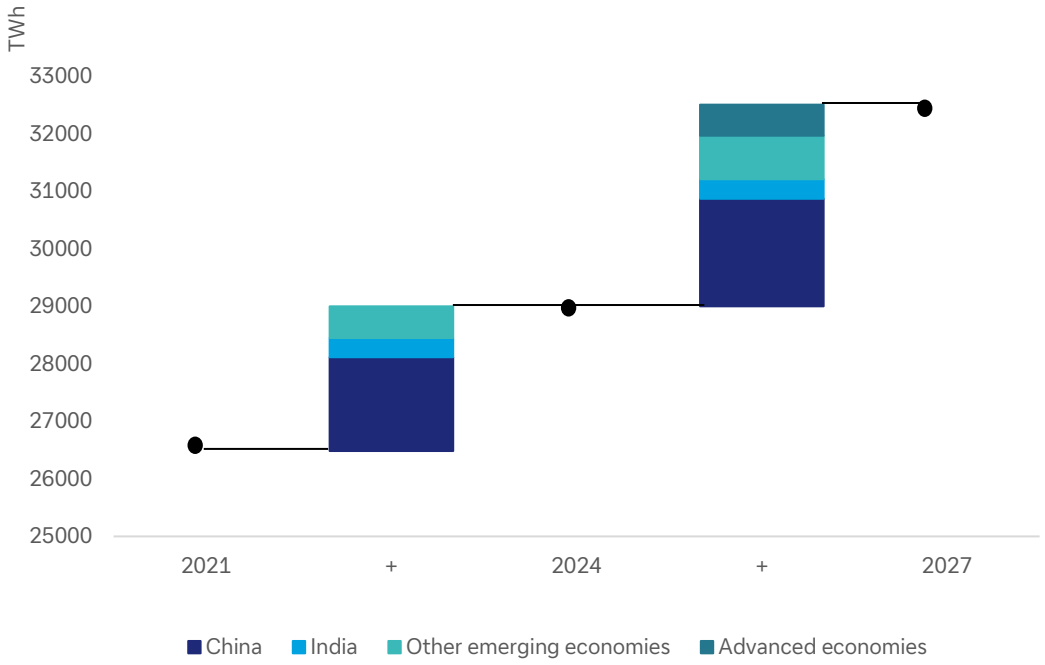
Figure 1 shows the **regional distribution** of electricity consumption growth. At a country level, China is the primary driver, with the IEA forecasting an average 7% growth through to 2027. India will be close behind, with 6.3% projected annual growth.[1]

In **China**, the share of electricity in final energy consumption has reached 28%, significantly higher than the respective consumption in the U.S. (22%) and EU (21%). Between 2022 and 2024, industry accounted for nearly 50% of China's electricity demand growth. Ironically, clean energy technologies' manufacturing are also contributing to demand growth: the manufacturing of solar PV modules, batteries, and EVs in China consumed over 300 TWh of electricity in 2024, comparable to Italy's entire annual electricity consumption.[2]

Demand for electricity in **advanced economies** is also picking up. U.S. electricity demand is now forecast to grow at an annual rate of 2% through 2027. In the EU, electricity consumption, which declined in both 2022 and 2023, has started to grow again, supported by increasing heat pump and EV adoption. In Japan and South Korea, electricity consumption is also rising after some years of stagnation, driven by industrial demand and extreme weather-related cooling needs.[3]

Data centre demand is just one factor driving electricity demand, but an important one. In the U.S. their share of total electricity demand is forecast to rise from around 8% now to 14% by

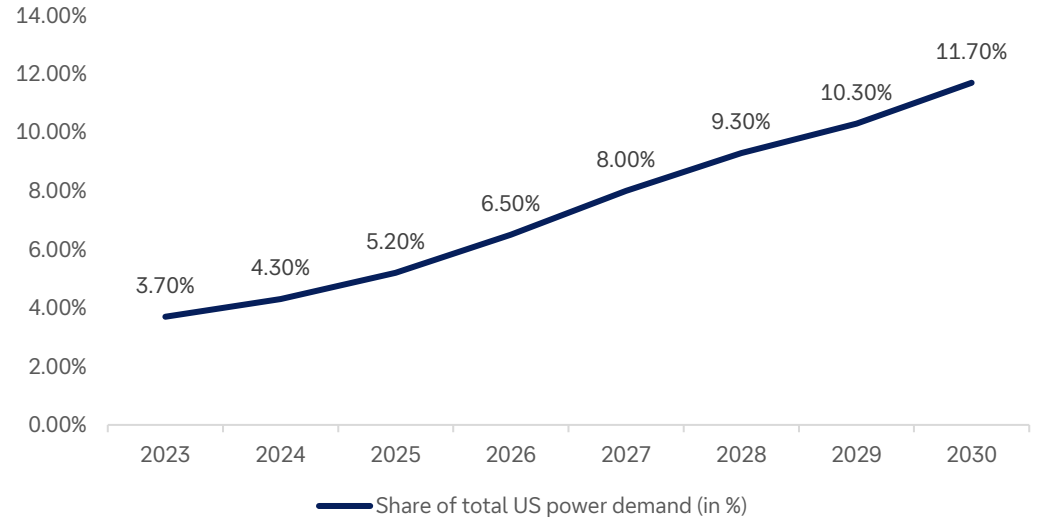
Figure 1: Change in electricity demand by region, 2021-2027



Source: IEA, Deutsche Bank AG. Data as of April 2025.

2028 (Figure 2). Rising data centre demand has particularly important implications for renewable energy providers, both though prioritizing long-term renewable energy procurement to meet decarbonization targets,[4] and the need for new grid infrastructure to connect data centres to power sources. In Texas alone, there are over 80 GW of transmission interconnection requests, with 59 GW attributed to data centres and 21 GW linked to industrial facilities.[5]

Figure 2: Data centres as a % of U.S. power demand



Source: McKinsey, Deutsche Bank AG. Data as of April 2025.

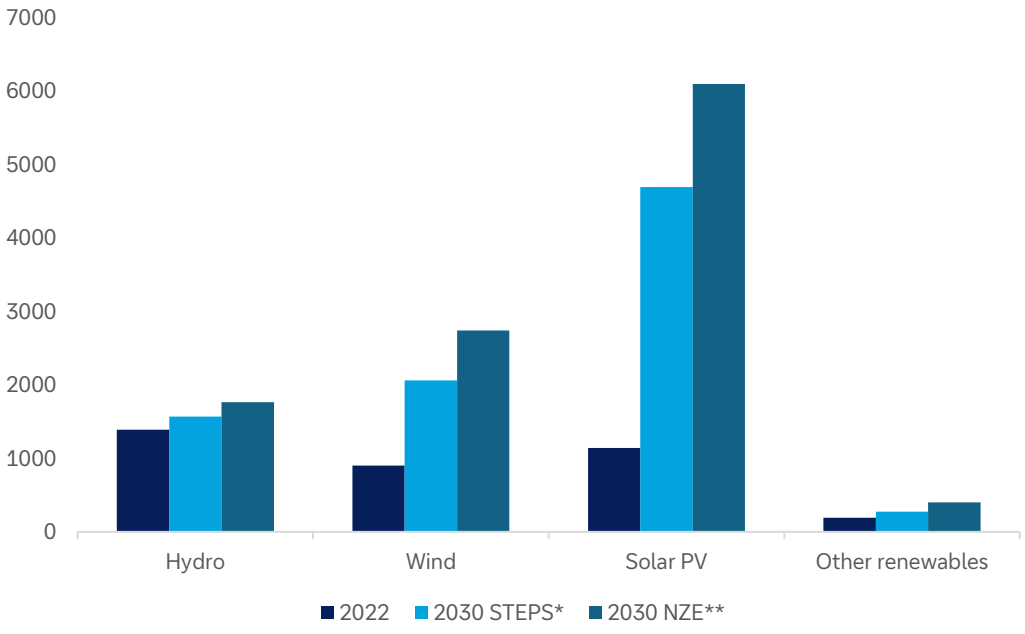
In **lower-income emerging markets**, access to electricity remains a challenge. Although progress has been made, 600 million people in sub-Saharan Africa still lack reliable electricity.[6] Addressing energy access while managing the rapid increase in demand in other parts of the world will be a key challenge for policymakers and utilities alike.

Rising demand is reshaping power markets with higher demand for more reliable and flexible power sources, such as renewables paired with storage. Power pricing approaches are also shifting, with corporate power purchase agreements (PPAs) playing a larger role in securing long-term supply, particularly among technology firms seeking carbon-free electricity to power AI applications and data centres. In the EU, decarbonization policies are driving a greater emphasis on grid flexibility and energy storage investments, with the electrification of an increasing number of technologies (from heating and cooling to transport and industrial processes) continuing to drive up the demand for electricity.

Growth in electricity demand in most markets is likely to be met by **renewables or other low emission sources**. The IEA suggests that the share of low-emission sources – renewables and nuclear – in generation is expected to rise from 41% in 2024 to 47% in 2027.[7] Solar photovoltaic (PV) and wind energy will play dominant roles in this transition, with nuclear power also important. In 2024, global electricity generation from renewable sources increased by 10% year-on-year (YoY), with solar PV generation rising by 30%. More than half of this expansion came from China.

Hydropower rebounded by 4% in 2024 after a 2% decline in 2023 due to droughts, driven by higher precipitation in China and Europe. However, its long-term growth is limited by geographical and environmental factors. Nuclear power rose by 3.5% in 2024, led by France and Japan, with projected growth of 2.3% annually through 2027, driven by new reactors in China, India, Korea, and Europe. Coal-fired generation hit a record high in 2024 but is expected to stagnate. Natural gas-fired generation increased by 2.6% in 2024, driven by the Middle East, China, and India, despite mixed future prospects.[8]

Figure 3: Global renewable energy capacity by scenario, 2022 and 2030 (in GW)



Source: IEA, Deutsche Bank AG. Data as of April 2024.

03

Electricity grids

The electricity grid is central to meeting rising demand for electricity and its importance remains underappreciated. It has three components: generation, transmission, and distribution. Once generated, electricity is transported via high-voltage **transmission** lines to consumption centres. At regional substations, voltage levels are reduced before electricity enters the **distribution** network, which delivers power to homes, businesses, and industrial facilities.[9]

Historically, grids were designed for centralized power generation, where large power plants produced electricity continuously via fossil fuels and fed it into transmission networks that distributed it in a stable and predictable manner. The rise of renewable energy is changing this structure. Unlike fossil fuel or nuclear plants, wind and solar power fluctuates based on weather conditions and seasonality. This so-called **intermittency** requires a more flexible and intelligent grid capable of balancing supply and demand in real time.

The global energy transition will also depend on physically **expanding the grid**. Renewable resources such as offshore wind and solar farms are often located far from demand centres, requiring substantial new investments in transmission infrastructure. The IEA estimates that to achieve net-zero emissions by 2050, the total size of the global electricity network will need to double. Insufficient capacity already prevents renewable energy from being fully utilized. In the U.S., for example, renewable energy projects face interconnection delays due to grid constraints.[10] In Europe, bottlenecks within and between countries limit trade in electricity, increasing costs and slowing decarbonization efforts.

Grid modernization is needed to enhance electricity reliability and security. As Figure 4 shows, in advanced economies at least 40% of the grid is already more than 20 years old.[11] Ageing grids may be less resilient and less capable of handling increasingly extreme weather conditions and shifting supply patterns. This is increasingly starting to become a reality as, for example, in Spain and Portugal, where in April 2025 a grid malfunction caused a national blackout for several hours.

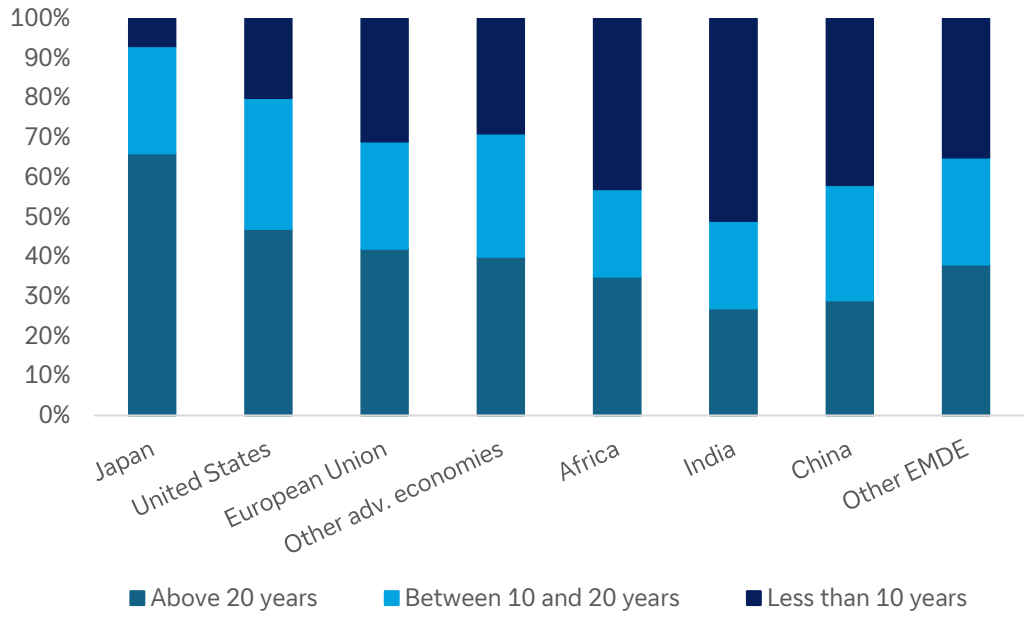
In this context, the deployment of **smart grids**, which integrate sensors, automation, and AI, can improve real-time grid management and enhance the efficiency of transmission and distribution networks. Smart grids also enable demand response solutions, where consumers adjust electricity usage in response to price signals or supply conditions, helping to balance fluctuations in renewable generation.

Other innovations include the increasing use of **high voltage direct current (HVDC) transmission**, particularly for long-distance transmission and interconnections between countries. This requires converter stations at both ends of the transmission line but reduces transmission losses and improves stability – particularly valuable for transmitting electricity long distances from large renewable hubs to urban centres.[12]

China has led global HVDC development, constructing more than 100,000 kilometres of HVDC transmission lines over the past decade and being the only country operating HVDC lines at scale.[13] In Europe, several undersea HVDC interconnections are enabling cross-border electricity trade, but most transmission networks in Europe and North America operate at 400–500 kV (compared to over 800 kV in China), with relatively lower efficiency over long distances.

Material selection also plays a role in grid efficiency. Aluminium is the primary conductor material used in high-voltage transmission lines, as it is lightweight and cost-effective, despite being less conductive than copper. Copper is typically used in distribution networks, where space constraints and higher conductivity requirements are critical. Superconducting high-voltage cables could play a role in reducing energy losses. This could be particularly relevant as electricity losses during transmission and distribution range between 8–15 % globally.[14]

Figure 4: Share of transmission length by age and by country/region in 2023



IEA, Deutsche Bank AG. Data as of April 2025.

04

Grid investment

Figure 5 shows IEA estimates for needed investments by 2050 to modernize and expand global electricity grids in their Announced Pledges Scenario (APS):[15] the total cumulative investment involved is over USD20tn, almost 20% of global GDP in 2024.

China continues to lead the world in grid investment, spending approximately USD110bn in 2023 on grids and storage. The country has constructed 500,000 kilometres of new transmission lines in the past decade, including some of the most advanced ultra-high-voltage (UHV) direct current lines. In 2024, China launched the 800kV Gansu-Zhejiang DC line, which will transmit 4GW of renewable electricity annually.[16]

India is also prioritizing transmission expansion to accommodate its fast-growing renewable sector. The country has added 180,000 kilometres of new transmission lines over the past decade. It recently completed a 765-kV transmission line connecting Khavada to Bhuj and is working on an 800kV corridor linking Gujarat and Maharashtra, which is expected to support 8GW of renewable capacity upon completion in 2026.[17]

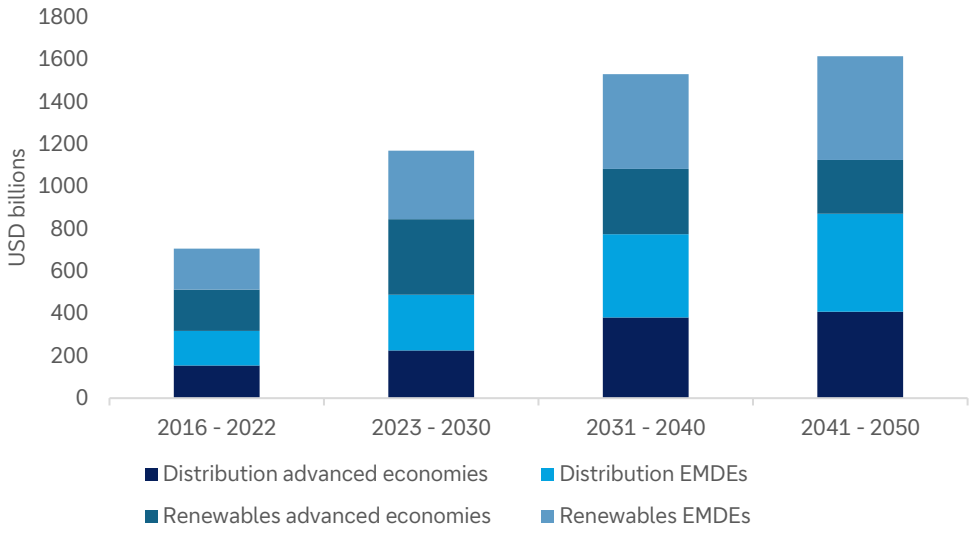
In **Latin America**, Brazil has taken a leading role in expanding transmission infrastructure. The country auctioned 10,500 kilometres of new transmission lines in 2023, the largest expansion in its history, with China's State Grid Corporation winning a significant portion of these contracts.[18]

Europe is investing heavily in cross-border interconnections to improve electricity trade and grid flexibility. The North Sea is now a hub for offshore wind transmission. The European Grid Action Plan aims to double interconnection capacity, enabling more efficient use of renewable energy across member states.[19] Lastly, the German government new stimulus package will be partially directed at infrastructure investments, including grid modernization and expansion.

The **U.S.** has also recognized the urgent need for grid expansion, but permissioning delays and regulatory hurdles remain a major bottleneck. The Inflation Reduction Act has provided funding

for grid modernization, and the USD2.5bn Transmission Facilitation Program aims to accelerate the approval of large-scale projects. However, thousands of renewable projects remain stuck due to inadequate transmission capacity.[20]

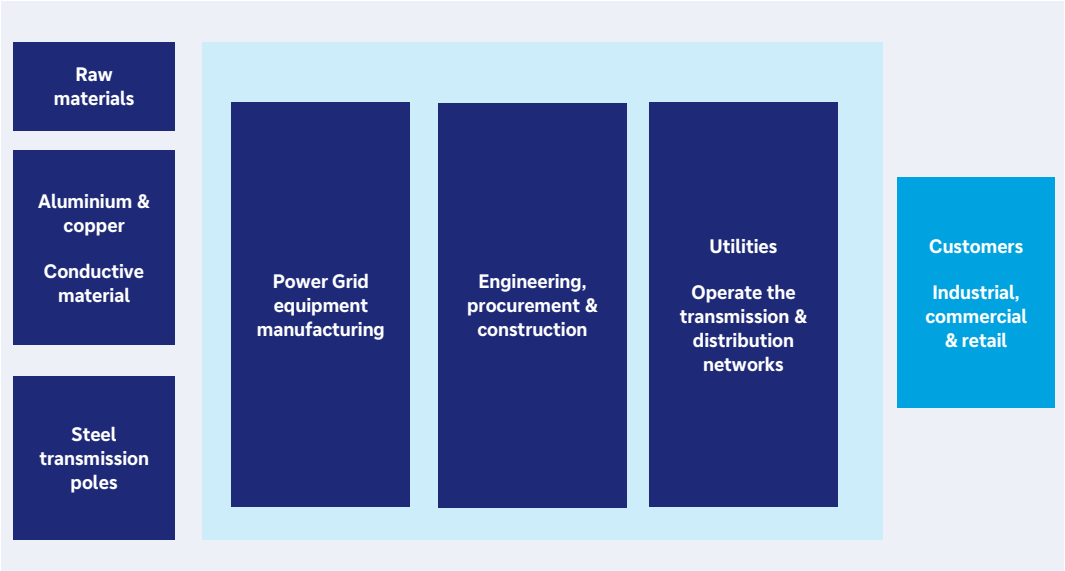
Figure 5: Average annual investment in grids and renewables by regional grouping in APS, 2011-2050



Source: McKinsey, Deutsche Bank AG. Data as of April 2025.

Emerging markets face a particularly steep investment challenge. The IEA projects that grid investment in developing economies must triple over the next decade to meet energy demand growth. Some progress has been made – sub-Saharan Africa added 6.5 million new grid connections in 2023, a 60% increase from 2021 – but much more is needed. The ASEAN Power Grid initiative aims to improve regional electricity trade, while India and China are expanding cross-border electricity interconnections with neighbouring countries.

Figure 6: Value chain segments for electricity grid



Source: UBS Research, Deutsche Bank AG. As of April 2025.

For the reasons discussed above, we believe the value chain for power infrastructure, shown in Figure 6 presents significant long term investment opportunities. As outlined, raw materials such as aluminium, copper, and steel play a foundational role in grid expansion, but most value-creation will happen further downstream. Power grid equipment manufacturing, including the production of wires, cables and transformers is likely to benefit directly from rising infrastructure investments. In this report we focus on Utilities, a sector where we see substantial opportunity going forward. As we mention, there are different types of different types of utilities with relatively different business models and different exposures to fossil fuels vs. renewable energy generation. This heterogeneity underlines the importance of taking a closer look at each company, without inferring a perfect representation of the Energy Transition theme within the sector.

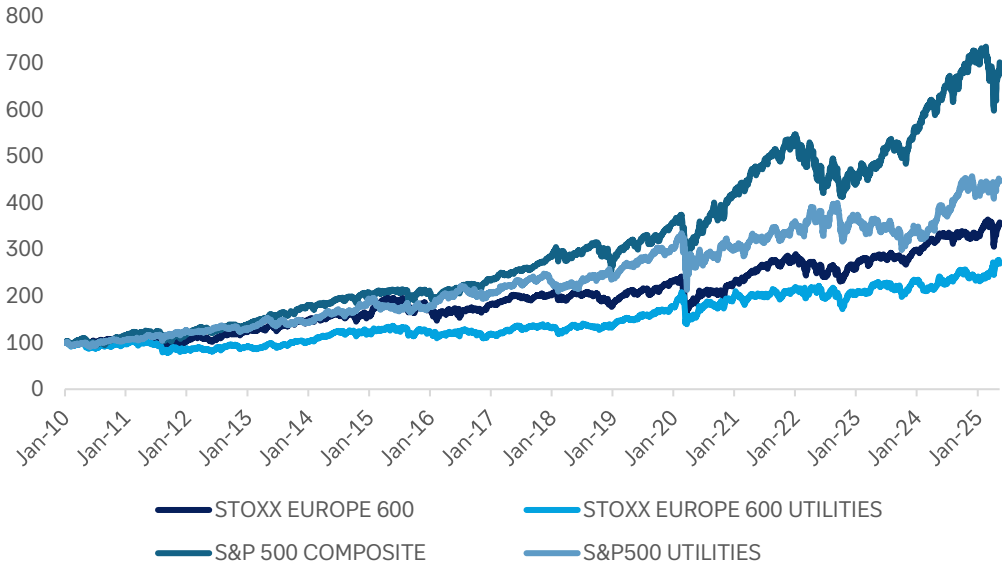
05

The investment case for Utilities

As shown in figure 7, over the last few years, Utilities have generally underperformed broader equity markets. Macroeconomic factors, such as rising government bonds, and idiosyncratic ones as policy uncertainty and short-term execution risks in renewables have created a range of challenges for the sector, together with added costs due to integrating renewables into existing grids..

In 2019-2020, investor enthusiasm for clean energy had pushed valuation multiples significantly higher, reflecting optimism about long-term decarbonization trends and government incentives. The changing macroeconomic backdrop proved to be a difficult testing ground for such hopes, bringing the sector to underperform during the last years.

Figure 7: Relative performance (total return in local currency) of US and European Utilities vs. markets



Source: Partners Group, Deutsche Bank AG. Data as of December 9, 2024.

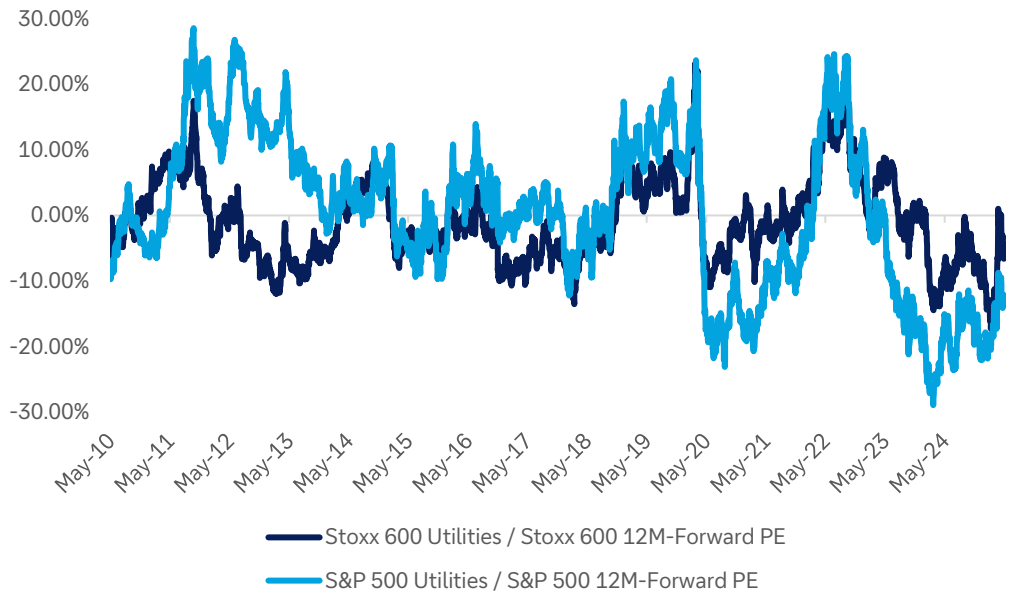
Utilities stocks have often been regarded as **bond proxies** for their relatively slow but stable price returns, combined with consistent dividends due to the nature of their services. This means their relative investment attractiveness decreases when bonds yields increase, offering higher risk-free returns. In addition, the “defensive” properties of the sector become less appealing during periods of robust economic growth and increasing bond yields, as experienced in the years after the pandemic, contributing to Utilities’ underperformance.

Types of power utilities

Power utilities can be broadly categorized into three main types: regulated utilities, merchant utilities, and independent power producers (IPPs). **Regulated utilities** operate under government oversight and typically own and maintain transmission and distribution infrastructure while generating power in a monopolistic market, with pricing rates set by regulatory bodies. **Merchant utilities**, by contrast, operate in deregulated markets, selling electricity at market-based rates. **Independent power producers** (IPPs) generate electricity but do not own transmission or distribution network, instead selling power through long-term contracts (such as PPAs) or on wholesale electricity markets. (Some utilities operate in a hybrid model, combining regulated and deregulated assets, allowing them to diversify risk and revenue sources.)

Valuations: As bond yields rose sharply in 2022-2023, capital-intensive sectors such as renewables suffered from higher costs of financing and higher discount rates, compressing valuations. Another downwards force on valuations came from losses on – or the cancellation of – offshore wind and large-scale solar projects after cost overruns, supply chain disruptions and financing pressures. European companies, for example recorded impairments above USD5bn on U.S offshore wind projects, but projects had to be cancelled due to unfavourable economic conditions in UK and Germany too.[21]

Figure 8: Valuation discount/premium for U.S. and European Utilities



Source: LSEG Deutsche Bank AG. Data as of May 12, 2025.

One problem was that developers who had locked in PPAs before the 2022 inflation spike found that increasing costs made the projects unviable: many utilities opted to simply write them off. In Europe, the situation was exacerbated by permissioning delays and shifting regulatory frameworks.[22] Windfall profits for some generators following the Russian invasion of Ukraine and the increase in energy prices were also not sustained, creating further pressure on merchant renewable developers.

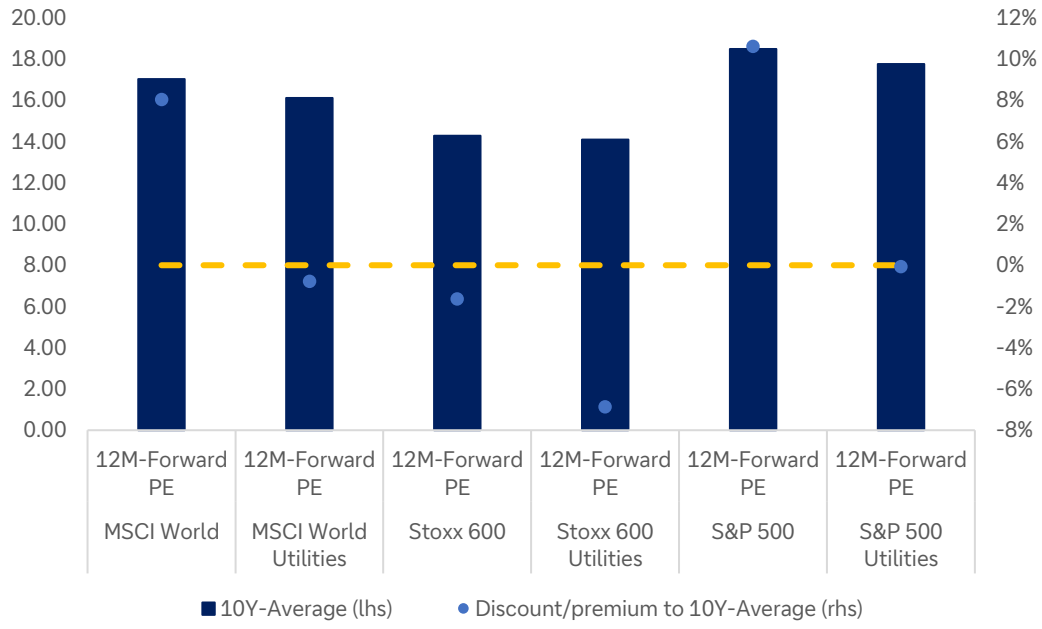
By the end of 2024, the Utilities sector was trading at an average **forward P/E multiple** of 11.9x in Europe, a meaningful discount relative to historical levels (-16% vs 10 yrs average). In the U.S., Utilities have also faced valuation compression, with P/E multiples declining from around 20x in January 2020 to approximately 17x in December 2024. Figure 8 above shows the evolution of the sectors' forward PE discount vs. the overall market.

However, we think there is now a long-term investment case for Utilities and expect at least some **rerating** vs. the overall market. This is supported by a number of factors. As we noted above, electricity demand is growing and the need to both expand the grid and modernize it (to incorporate renewables) will require larger and larger capital investment. The Utilities sector, always considered to be a defensive sector, could be looked at in a different light by investors with higher growth rates.

This is combined with some financial incentives for utilities to invest in renewable power. There are **price premiums** in some markets for clean power – in the U.S., according to a survey by Morgan Stanley, corporate buyers are paying an average premium of USD23 per MWh for firm, carbon-free power, while in Europe, the premium stands at USD18 per MWh. Although there is no guarantee that such price premiums will be sustained, this enhances profit margins for renewables' development projects. Another incentive to invest in renewables is that while gas-fired power plants typically take 5–7 years to build, renewables can be deployed in 1–2 years, allowing for much faster capacity buildup.

As the cost gap between solar/wind and natural gas power generation is narrowing due to rising capital costs and longer wait times for gas projects, renewables are becoming for utilities a more attractive option even without tax credits. Additionally, hybrid solutions combining solar with battery storage and grid connectivity are becoming more viable, providing flexibility and speed

Figure 9: 10 yrs average forward P/E for different indices and current discount/premium to those levels



*based on Bloomberg private market indices with quarterly data until Q4 2024.
Source: Bloomberg L.P., Deutsche Bank AG. Data as of April 29, 2025.

to market advantages. This ensures that investments for capacity additions are directed at assets which are not subject to the risk of becoming stranded within a few years.

In this context, utilities firms have already been increasing capital expenditure. In the U.S., annual capital expenditures by utilities are expected by analysts to have surpassed USD180bn in 2024, a 9.5% increase from 2023 and a 26% rise from 2022 levels. In Europe, utilities have been revising their capex guidance upward to reflect increased grid investment requirements, with some firms increasing capex budgets by 25% or more.

We believe higher capital expenditures will translate over time into substantial earnings growth. On average, analysts forecast EPS growth of 7.7% and 7.5% for U.S. and European Utilities for the upcoming 3-5 years, above average EPS growth for the past 20 years (~5.5% for U.S. and European Utilities).

However, as utilities increase capital expenditure, **balance sheet management** will become a more critical focus. Debt issuance remains the primary funding mechanism by utilities but, with the prospect of continuing relatively high interest rates, many firms have sought to optimize their capital structures by issuing new equity and divesting non-core assets to fund growth. Leverage ratios appear manageable, with net debt-to-EBITDA levels averaging ~5.5 (U.S. Utilities) and ~3.3 (European Utilities) across the sector as of last year. But investors will continue to look for evidence of capital allocation discipline in identifying investment opportunities.

These good prospects for earnings growth are coupled with historically low **valuations**, potentially creating attractive entry points for long-term investors. As shown in Figure 9 above, the sector's P/E multiples for European and U.S. Utilities currently stand at 12.9 and 16.8 respectively, below 10-year median values for the Stoxx 600 Utilities while aligned with historical values for the S&P 500 Utilities sector. These valuations appear to be pricing lower earnings growth than seems likely, given capital investment trends.
Taking a closer look at the different types of utilities, Regulated ones have continued to invest heavily in expanding rate base assets. These form the base on which their regulated rate of return is calculated and therefore are a primary driver of earnings expansion. In the U.S., the average regulated utility's rate base is projected to grow at 6%-8% annually through 2030 according to some analysts' forecasts and similar growth has recently been observed in European countries such as Germany, Spain and Italy.

In many jurisdictions, allowed return on equity (RoE) for grid investments has also been increasing so utilities can generate adequate returns despite higher funding costs. Spain, for example, is expected to raise allowed returns from 5.6% to 6.9% by 2026. Legislative support, coupled with the monopolistic nature of the service, is likely to underpin sector growth.

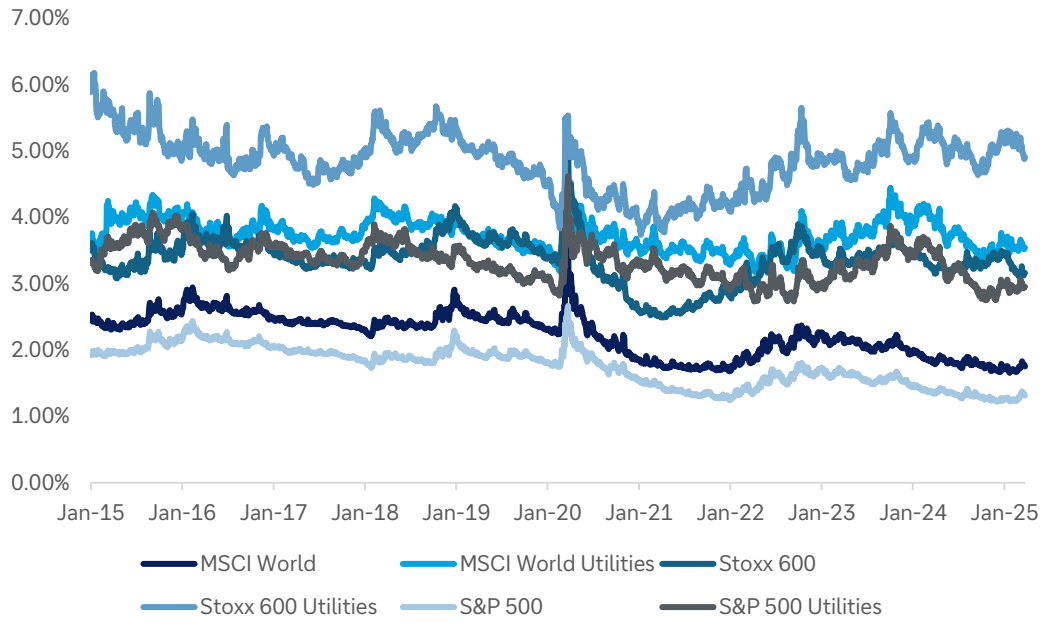
As in the past, the link of many grid investments to inflation-adjusted tariffs can help revenue streams grow in real terms. And even at current levels, the sector's bond-like characteristics is attractive for income-focused investors. In Europe, Utilities offer an average **dividend yield** of approximately 5.2%, with U.S. Utilities yielding around 3.2%. Figure 10 provides an overview of the average dividend yield during the past 10 years.

Lastly, Utilities have historically often performed relatively well during deteriorating market and economic conditions. In 2022, for instance, when investors were scared about a potential economic downturn following the inflation surge after the pandemic and the consequent monetary tightening by central banks around the world, the MSCI Utilities Index in 2022 lost around -4.5% compared to the MSCI World Index's -18% decline.

In this context and given the recent discussions about the potential direct negative impact of tariffs, it is worth noting that utilities are usually much less directly impacted by tariffs than other sectors – although they can have a major impact on the price of grid components.

Looking at integrated utilities, the key challenge may be balancing exposure to regulated and merchant businesses to optimize earnings stability while benefiting from periods of high-power prices. Many firms are increasing hedging levels to lock in favourable pricing, particularly for their renewable and nuclear assets, so attempting to ensure a predictable cash flow outlook even in volatile markets. Going forward, data centre-driven electricity demand and gas market tightness could provide further upside to power prices, particularly in regions where new capacity additions are constrained by permissioning and grid limitations.

Figure 10: Dividend yield across equity indices over the past 10 years



Source: LSEG, Deutsche Bank AG. Data as of May 12, 2025.

06

Key risks

The political and economic climate in key regions such as the U.S. and the European Union will continue to play a decisive role in shaping investment outcomes.

U.S. politics may have profound implications for the Utilities sector, particularly via changes to the Inflation Reduction Act (IRA), which has driven substantial investment in clean energy infrastructure. Over USD265bn in direct clean energy initiative have been announced, meaning that scaling back the act would impact industry momentum.[23] Recently announced U.S. tariffs will have implications for imports of (largely Chinese) solar panels and battery storage. While these measures align with U.S. energy security goals, they could drive up costs for utility-scale renewable projects, particularly in states with aggressive decarbonization targets.

As regards **European politics**, following the European Parliament elections, the growing influence of right-wing parties will slow the pace of regulatory expansion. Political shifts reflect broader concerns about energy affordability, industrial competitiveness, and bureaucratic overreach. The proposed EU Clean Industrial Deal seeks to enhance regulatory simplification, accelerate industrial decarbonization, and strengthen energy security. The outcome of these political debates will have direct implications for utilities, particularly in terms of cost recovery for grid investments and the pace of renewable energy deployment.

At an economic level, recently-announced **German economic stimulus** will be important. The German government has pledged to lower electricity costs through reduced taxes and transmission fees. In addition, the EUR500bn stimulus package (Sondervermögen) includes financing for infrastructure and climate investments over 12 years, with an allocation of EUR100bn to the Climate and Transformation Fund. However, if subsidies for industrial decarbonization distort market dynamics, utilities may face challenges in maintaining capital efficiency.

Within Europe as a whole, **gas price volatility** remains a concern, with the region vulnerable to any resurgence in geopolitical tensions, impacting utilities. Fluctuations in wholesale electricity prices are also relevant to merchant generator utilities. At a broader political level, the **high unit cost of electricity** for many Europeans (for German households it is nearly 3 times that in the U.S.) has raised concerns about the sustainability of current pricing structures, with some policymakers advocating for price caps or additional subsidies.

Higher **interest rates** have historically weighed on utility valuations, particularly for companies with high leverage. Our base case scenario is that elevated inflation during 2025 and 2026, limiting the Fed's scope for further easing, but more cuts may be needed to revive economic growth. In Europe, inflation is likely to transition towards the 2% target and lacklustre growth should convince the ECB to cut interest rates into neutral territory.

It is also possible that **technological shifts** could change power demand, notable that required by AI models. As noted above, data centres are expected to be a major driver of electricity consumption. But it remains possible that next-generation AI models may use less energy, reducing the expect expansion in energy consumption. This was one concern associated with introduction of DeepSeek, but consensus expectations are still for AI-driven power consumption to remain on an upward trajectory.

Climate-related risks pose significant challenges for utilities, particularly in regions susceptible to extreme weather events. In California, recurring wildfires have resulted in substantial financial liabilities for utility operators. If California's wildfire insurance fund, initially established to mitigate financial risk for utilities, is depleted, utilities could be directly exposed to multi-billion-dollar claims, potentially necessitating equity raises or restructuring efforts. Efforts to harden the grid – such as undergrounding power lines and implementing advanced weather monitoring – require substantial capital expenditures. The extent to which regulatory frameworks allow utilities to recover these costs through rate adjustments remains an open question.

07

Conclusion

Global electricity demand will continue to rise around the world. Growing use of renewables and other low-emission energy sources should be able to meet this increased demand. But there is also a pressing need to modernize and expand the electricity grid, to allow more reliable and efficient use of resources. Renewables energy sources can create a range of challenges – for example around intermittency and the geographical dispersion on renewables generation. Grid improvement is already happening across the major economies, but a varying pace.

Transmissions lines growth and modernization will create many opportunities across the value chain, for manufacturers of components but also for utilities. In recent years, Utilities' valuation measures have lagged the overall market. Grid improvement and expansion could change this, particularly if utilities can demonstrate capital management skills.

There remains a number of **risks**, for example, around interest rates, regulatory uncertainty, and execution risks in renewable projects. But over the long term, we think the Utilities sector is well-positioned to deliver stronger earnings growth and returns. Utilities are expected to play a central role in facilitating this growth, with regulatory frameworks generally supportive in both the U.S. and Europe.

From a **valuation perspective**, Utilities currently trade at a discount relative to historical levels, which may help create attractive entry points for investors. Rising interest rates have also led to a sector de-rating in recent years. The immediate interest rate outlook is uncertain, given U.S. tariffs, but Utilities have outperformed broader markets in periods of declining interest rates, and we expect a similar trend to play out in the coming years. Dividend yields in the sector also remain appealing.

In the near term, we see opportunities in **regulated utilities** with high exposure to transmission and distribution infrastructure, as well as in some companies with strong renewable energy generation portfolios and/or long-term power purchase agreements (PPAs). Transmission system operators (TSOs) in Europe may be well-positioned; In the U.S., utilities with significant exposure to high-growth electricity demand regions – such as Texas and the Midwest – should benefit from increasing industrial electrification and data centre expansion.

Execution risks for offshore wind and large-scale solar projects remain and the market will look for clarity here (e.g. around the likely impact of U.S. tariffs on renewables technology imports). However, the underlying **structural growth drivers** for electricity demand and clean energy investment would seem to provide downside protection. Utilities historically have also been a defensive asset class, historically outperforming in periods of economic downturn. As the global economy moves toward electrification and decarbonization, we think that utilities are set to be a primary beneficiary of the energy transition, making them a critical component of many investment portfolios.

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*The **Stated Policies Scenario (STEPS)** by the IEA provides a projection of the future energy system based on current and announced policies. It offers a conservative benchmark, assuming that governments will implement their stated policies but not necessarily achieve all announced goals.

** The **Net Zero Emissions by 2050 Scenario (NZE)** outlines a pathway for the global energy sector to achieve net zero CO_2 emissions by 2050. It focuses on deploying clean energy technologies and achieving key Sustainable Development Goals, aiming to limit global temperature rise to 1.5°C.

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Glossary

Renewables are energy from sources that are naturally replenishing such as solar, wind, and hydropower.

Transmission Infrastructure refers to high-voltage power lines and substations that transport electricity from power plants to distribution networks.

Capital Expenditure (CapEx) are funds used by a company to acquire, upgrade, and maintain physical assets.

International Energy Agency (IEA) is an organization that provides policy advice on energy.

Terawatt-hour (TWh) is a unit of energy representing one trillion watt-hours.

Power Purchase Agreements (PPAs) are contracts between electricity producers and buyers to purchase electricity at predetermined prices.

High Voltage Direct Current (HVDC) is a type of power transmission that uses direct current for long-distance transmission.

Ultra-High Voltage (UHV) are transmission lines that operate at extremely high voltages for efficient long-distance electricity transport.

Smart Grids are electricity networks that use digital technology to monitor and manage the transport of electricity from all generation sources to meet varying electricity demands.

Emerging Markets and Developing Economies (EMDEs) are nations with lower per capita income and less developed infrastructure.

Announced Pledges Scenario (APS) is an IEA scenario that illustrates the impact of announced energy policies and targets.

Net Zero Emissions by 2050 Scenario (NZE) is an IEA scenario outlining a pathway to achieve net zero CO2 emissions by 2050.

Inflation Reduction Act is U.S. legislation aimed at reducing inflation, which includes provisions for funding grid modernization.

ASEAN Power Grid is an initiative to enhance electricity trade and grid interconnections among ASEAN countries.

Value Chain is the full range of activities required to create a product or service, from raw materials to final delivery to consumers.

Utilities are companies that provide essential services such as water, electricity, and natural gas.

STOXX EUROPE 600 is a stock index representing 600 large, mid, and small capitalization companies across 17 European countries.

Rate Base Assets are the value of property on which a utility is allowed to earn a specified rate of return, as approved by regulatory authorities.

Allowed Return on Equity (RoE) is the rate of return that a utility is permitted to earn on its equity investments, as determined by regulatory bodies.

Leverage Ratios are financial metrics that compare the amount of debt a company has to its earnings or equity, indicating the level of financial risk.

Net Debt-to-EBITDA is a ratio that measures a company's ability to pay off its debt with its earnings before interest, taxes, depreciation, and amortization.

Dividend Yields are the annual dividend payment divided by the stock price, expressed as a percentage, indicating the return on investment from dividends.

Transmission System Operators (TSOs) are entities responsible for transporting electricity through high-voltage power lines and ensuring the stability and reliability of the electricity grid.

Energy Transition is the global shift from fossil fuel-based energy systems to renewable and low-emission energy sources to reduce carbon emissions and combat climate change.

Capital Structures are the mix of debt and equity financing used by a company to fund its operations and growth.

Equity Issuance is the process of raising capital by selling new shares of stock to investors.

Appendix

Historical performance

Performance	14.5.2020 - 14.5.2021	14.5.2021 – 14.5.2022	14.5.2022 – 14.5.2023	14.5.2023 – 14.5.2024	14.5.2024 – 14.5.2025
MSCI World	46.9%	-8.1%	4.0%	22.3%	11.3%
MSCI World Utilities	23.1%	0.0%	-0.7%	3.0%	10.6%
Stoxx 600	35.4%	-2.0%	7.4%	12.1%	4.5%
Stoxx 600 Utilities	26.1%	0.0%	3.8%	-1.7%	7.1%
S&P 500	46.3%	-3.6%	2.5%	27.2%	12.2%
S&P 500 Utilities	18.7%	8.3%	-3.4%	3.6%	11.6%
10-Year U.S. Treasury	-6.9%	-10.2%	-0.4%	-4.3%	4.1%

Source: Deutsche Bank AG, Bloomberg Finance L.P., LSEG Datastream; Data as of May 14, 2025.

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Publication date: May 16, 2025

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