

Why infrastructure is the key to our energy transition

The existing infrastructure in many countries is often decades old which is one factor leading to 27% of the global population being dissatisfied with their national infrastructure. And while satisfaction levels are around 40% there is still room to increase this level through measures such as modernising the current infrastructure.¹

In recent years, the global push towards sustainable energy solutions has gained significant momentum. Despite shifting levels of political support, many countries around the world are continuing to invest in renewable energy sources such as

solar, wind, hydroelectric power, and green hydrogen and are promoting research in disruptive green technologies. This shift however also requires significant investments in infrastructure.

Driving decarbonisation

The energy crisis caused by the Russian invasion of Ukraine has emphasised the importance of security of supply not just for Europe, but for the whole world. The energy transition has the potential to significantly reduce Europe's dependence on (fossil) energy imports and replace them with green electricity and green gases produced in Europe. Furthermore, it contributes to the climate neutrality goal of many countries worldwide. According to the International Renewable Energy Agency, investments of USD 150

trillion in transition technologies and infrastructure by 2050 are needed in the 1.5°C Scenario, which amount to USD 5.3 trillion per year on average.²



Marta Perez
Head of
Infrastructure



Claus Fintzen
CIO
Infrastructure
Debt



Andrew Cox
Co-Head
Infrastructure
Equity



Michael Pfennig
Co-Head
Infrastructure
Equity



**Transforming
Infrastructure**

Alongside energy generation, the decarbonisation of the transport sector is an important pillar on the path to climate neutrality, which envisages the substitution of fossil fuels with green gases and electricity. The transportation sector accounts for ca 20-25% of all greenhouse emissions worldwide (see Figure 1). If this is not tackled, transport-related emissions will double by 2050, which shows the need and opportunity to make a fundamental change in this sector.³ With the help of sustainable private capital, such as from Allianz and other long-term institutional infrastructure investors, many projects can be undertaken that will have a meaningful impact on emissions reductions.

At the end of 2023, for example, the world's first battery-powered trains were put into regular service in the North of Germany. These battery-electric multiple-unit trains are replacing the diesel trains that were previously in operation due to a lack of electrified lines. This could save ten million litres of diesel and around 26,000 tonnes of CO₂ per year.⁴

Global energy consumption is projected to grow by 50% by 2050, with developing countries and emerging economies seeing an increase of up to 70%.⁵ To ensure this growth is environmentally sustainable and climate-neutral, a comprehensive energy transition is essential. Green hydrogen next to "green electrons", and other green molecules such as biogas and biomethane, which are climate-neutral and versatile for hard-to-abate sectors such as cement, steel, and fertilizers which make up ca 25% of global CO₂ emission⁶ and energy

Figure 1: Global annual carbon emission (2022)

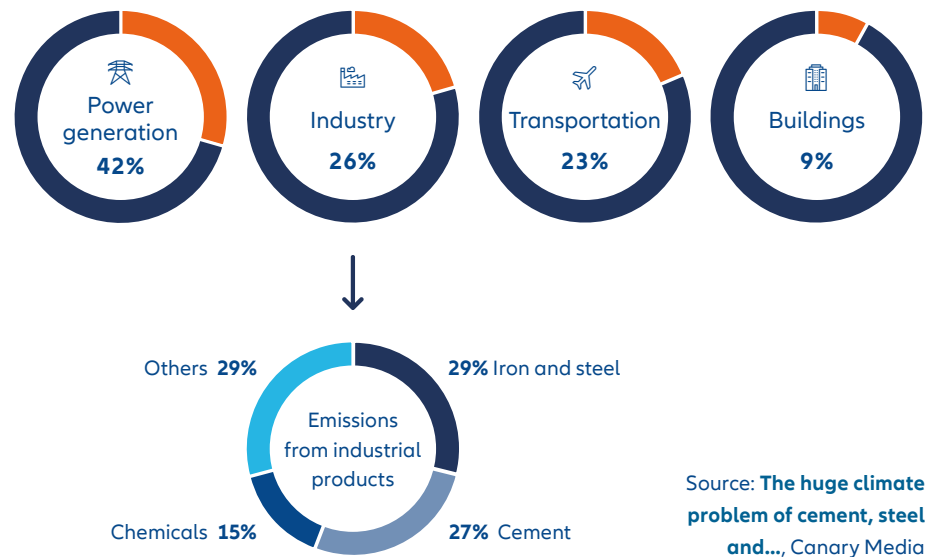
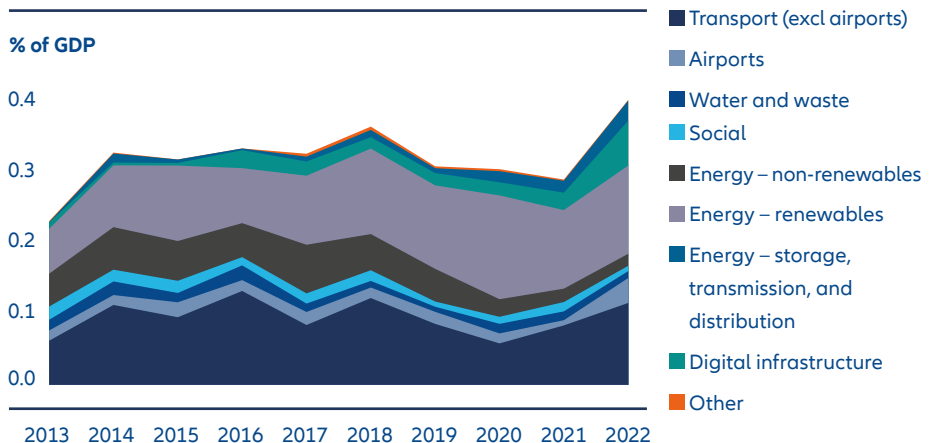


Figure 2: Private investment in infrastructure projects by sector (% of GDP)



Note: 'Other' includes environment and infrastructure (general) sectors.

Source: cdn.github.org/umbraco/media/5416/infrastructure-monitor-report-2023.pdf

storage, could all play an important role in this transition. Many governments are already developing hydrogen strategies, recognising hydrogen's potential in energy supply, heavy goods transport, aviation, and shipping. Producing hydrogen requires electricity, and there is a general consensus that this increased demand should be met by renewable energy sources to create green hydrogen or its derivatives.

More energy needs more grids

Of course, the rising energy consumption needs more green energy production. More green power plants – largely solar and wind farms – need to be built or repowered. But that will not be sufficient without adapting the transmission and distribution grids too. Without

the expansion of electricity grids, charging stations, but also storage technologies and gas grids, eg, for the transport of green gases such as green hydrogen, the system will not be able to accommodate these new and more intermittent forms of power generation. To meet national climate targets, grid investment needs to nearly double by 2030 to over USD 600 billion per year after over a decade of stagnation at the global level, with an emphasis in particular on digitalising and modernising the distribution grids,⁷ as well as new high-voltage power lines to connect offshore facilities, transport onshore to industrial centres, and ensure interconnectivity between countries.

In order to build the infrastructure of tomorrow, projects need to be initiated now. Given the increasing pressures on national budgets, private capital sources will be essential to finance these developments (Figure 2). Besides just the financial investment, a more rapid planning approval process and a reliable and stable regulatory framework to support these investments are crucial to bring these projects to life. Partnering with experienced long-term infrastructure investors, who can coalesce other sources of institutional capital around them, can significantly enhance the success of these initiatives.

One example is the NeuConnect interconnector, which will be the first submarine electricity connection between Germany and the UK that celebrated its ground-breaking ceremony in the first half of 2024. Launched in 2017, its completion is planned for 2028.⁸ The owners include institutional investors such as

Allianz, who invest their policyholders' pensions and life insurance policy holders' money with a long-term investment horizon. The regulatory frameworks put in place by both the UK and German energy regulators enabled this project to be investable by such long-term low-cost capital.

Hydrogen as an important part of the green energy mix

Many hopes are pinned on green molecules such as hydrogen and its derivatives in terms of energy security, the energy transition, and competitiveness, especially for hard-to-abate sectors. Thanks to its storage capacity, hydrogen can also secure the power supply in times of low feed-in from renewable energies. However, we will not be able to produce all the green hydrogen we need ourselves. Some regions of the world that can rely on cheap renewable sources such as solar, wind, and hydropower are more advantaged for the cost-effective production of green hydrogen while other countries will

need to import if they cannot produce it themselves.

In 2021, hydrogen demand was around 94 million tons, primarily grey hydrogen (hydrogen produced from natural gas with no CO₂ abatement). By 2050, the demand for low-carbon hydrogen (Figure 3) is expected to rise dramatically to between 350 and 530 million tons per year. To meet this demand, governments and companies need to invest approximately USD 6 trillion to USD 12 trillion from 2025 to 2050 for the production and transportation of low-carbon hydrogen, according to BCG estimates.⁹

As part of this process, not only storage infrastructure, but also electrolysis capacities and pipelines are currently being planned where institutional investors can play a vital role to accelerate these developments as for example Allianz, who is already investing in green hydrogen projects in Norway and Finland to advance the transition.



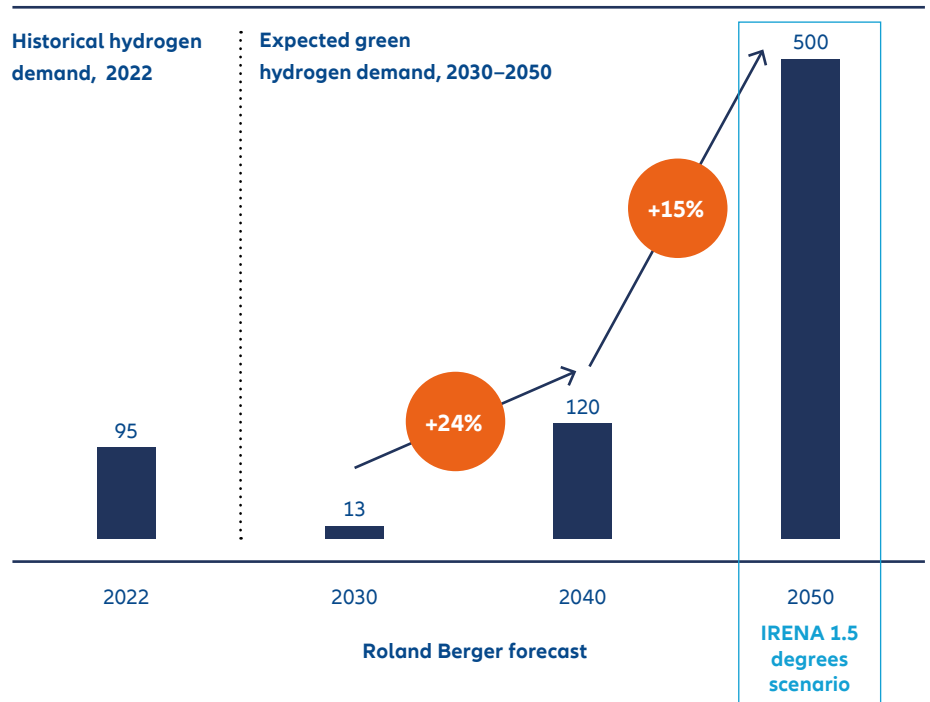
No transition without scale up capital

Most new energy transition technologies are capex-heavy with investment requirements estimated around EUR 2-3 trillion just in Europe by 2050. Europe in particular suffers from relatively underdeveloped capital markets and a lack of scale-up capital.¹⁰ Many energy transition business models such as production of green molecules, energy storage, EV charging battery, carbon capture and storage, industrial heat, and even circular economy processes can be structured as infrastructure-like and be financed with cost-competitive long-term institutional money.

Private capital from long-term institutional investors can therefore be crucial for the implementation of the energy infrastructure transition and to provide scale-up capital for energy transition companies.

The energy transition remains on top of the agenda of many countries. With national budget deficits on the rise and the demand for investments to accelerate the modernisation of infrastructure against the backdrop of driving the energy transition will require private capital. Institutional investors with a long-standing track record in infrastructure and a long-term view can be the drivers of future financial and economic performance.

Figure 3: Expected global demand for green hydrogen (mtpa)



mtpa = million tonnes per annum (of LNG)

Source: IRENA (International Renewable Energy Agency), Roland Berger Hydrogen Market Model

Did you know that...?

- 40% of Europe's distribution grids are over 40 years old¹¹
- Cross-border energy infrastructure projects can decrease generation costs by EUR 9 billion annually until 2040¹¹
- At least 3 000 gigawatts (GW) of renewable power projects, of which 1,500 GW are in advanced stages, are waiting in grid connection queues⁷
- Electricity outages already cost around USD 100 billion a year, or 0.1% of global GDP⁷
- Europe is global leader in energy transition patents, ahead of Japan and the US

Sources

- 1) <https://giia.net/insights/global-infrastructure-poll-reveals-public-concerns-over-climate-resilience-and-support>
- 2) **World Energy Transitions Outlook 2023: 1.5°C Pathway**
- 3) **mobility – Energy in Transition – Powering Tomorrow**
- 4) https://akkuzug.nah.sh/assets/Subsite3/Files/FAQ-Akkuzug-gesamt-final_Upload3.pdf
- 5) **Green hydrogen and Power-to-X products**, BMZ
- 6) **The huge climate problem of cement, steel and...**, Canary Media
- 7) **Executive summary: Electricity Grids and Secure Energy Transitions – Analysis**, IEA
- 8) **Project information – Enquiries – Construction activities**, NeuConnect Interconnector
- 9) **Infrastructure Strategy 2023: Building the Green Hydrogen Economy**, BCG
- 10) **Financing and commercialisation of cleantech innovation**
- 11) **Factsheet_EU Action Plan for Grids.pdf**

The document is for use by qualified Institutional Investors (or Professional/Sophisticated/Qualified Investors as such term may apply in local jurisdictions).

This document or information contained or incorporated in this document have been prepared for informational purposes only without regard to the investment objectives, financial situation, or means of any particular person or entity. The details are not to be construed as a recommendation or an offer or invitation to trade any securities or collective investment schemes nor should any details form the basis of, or be relied upon in connection with, any contract or commitment on the part of any person to proceed with any transaction.

Any form of publication, duplication, extraction, transmission and passing on of the contents of this document is impermissible and unauthorised. No account has been taken of any person's investment objectives, financial situation or particular needs when preparing this content of this document. The content of this document does not constitute an offer to buy or sell, or a solicitation or incitement of offer to buy or sell, any particular security, strategy, investment product or services nor does this constitute investment advice or recommendation.

The views and opinions expressed in this document or information contained or incorporated in this document, which are subject to change without notice, are those of Allianz Global Investors at the time of publication. While we believe that the information is correct at the date of this material, no warranty of representation is given to this effect and no responsibility can be accepted by us to any intermediaries or end users for any action taken on the basis of this information. Some of the information contained herein including any expression of opinion or forecast has been obtained from or is based on sources believed by us to be reliable as at the date it is made, but is not guaranteed and we do not warrant nor do we accept liability as to adequacy, accuracy, reliability or completeness of such information. The information is given on the understanding that any person who acts upon it or otherwise changes his or her position in reliance thereon does so entirely at his or her own risk without liability on our part. There is no guarantee that any investment strategies and processes discussed herein will be effective under all market conditions and investors should evaluate their ability to invest for a long-term based on their individual risk profile especially during periods of downturn in the market.

Investment involves risks, in particular, risks associated with investment in emerging and less developed markets. Any past performance, prediction, projection or forecast is not indicative of future performance. Investors should not make any assumptions on the future on the basis of performance information in this document. The value of an investment and the income from it can fall as well as rise as a result of market and currency fluctuations and you may not get back the amount originally invested.

Investing in fixed income instruments (if applicable) may expose investors to various risks, including but not limited to creditworthiness, interest rate, liquidity and restricted flexibility risks. Changes to the economic environment and market conditions may affect these risks, resulting in an adverse effect to the value of the investment. During periods of rising nominal interest rates, the values of fixed income instruments (including short positions with respect to fixed income instruments) are generally expected to decline. Conversely, during periods of declining interest rates, the values are generally expected to rise. Liquidity risk may possibly delay or prevent account withdrawals or redemptions.

March 2025

ADM-W4328910