CMS Infrastructure Index 2023

Partnerships, policies and geopolitics

BEGIN

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Foreword

In our 2021 Index, we celebrated the resilience that the infrastructure market had shown in the face of Covid. We couldn't have foreseen that, just two years later, we would be celebrating its continuing resilience in a new world of energy inflation, higher borrowing costs and greatly increased levels of government debt – a world in which unexpectedly rapid advances in artificial intelligence are offering investors a whole new spectrum of opportunity and threat, while an unexpected war continues to rage in Ukraine.

Yet the market has remained resilient. Infrastructure is an attractive asset class. In February 2023, Institutional Investor magazine reported that the average target allocation to infrastructure in a survey of 792 institutional investors was 6.6%, compared with 4.6% just over a year earlier.

The inability of the world's nations to finance its infrastructure needs on their own gives such investors enormous opportunities to participate in infrastructure development around the globe and across a variety of sectors.

The CMS 2023 Infrastructure Index is designed to help investors understand the environment they may encounter in 50 different jurisdictions. It highlights potential advantages and opportunities that may lead to successful project implementation.

We also look at developments in some of the nations included in the Infrastructure Index, this year highlighting in particular the situation in our top-ranked country Germany and the need for reconstruction in Ukraine.

A report like this always raises questions which can ultimately only be answered by the actions of the infrastructure investment community. For example, how should we achieve the right balance between 'old' infrastructure classes such as roads and water – asset classes still vital for development in a world where, for instance, 3.6 billion people lack safe sanitation – and 'newer' classes such as renewables and digital infrastructure, which currently seem better at attracting private sector money. And how will that distinction between old and new blur, as traditional infrastructure assets get increasingly green and smart?

Perhaps the biggest question of all is how the huge infrastructure investment gap can be closed. As our associates at the GIIA remind us in their **reflections** on this year's Index: "The challenge of addressing the world's infrastructure investment gap is one shared by policymakers, regulators and investors. It is only through long-term partnerships that we can hope to close it."

We hope you find this year's Infrastructure Index interesting and would be delighted to discuss or debate any of it with you. Our thanks go to all those who contributed to it, particularly our five interviewees for sharing their personal views on the infrastructure sector in their respective markets.

As our associates at the GIIA remind us in their reflections on this year's Index: "The challenge of addressing the world's infrastructure investment gap is one shared by policymakers, regulators and investors. It is only through long-term partnerships that we can hope to close it."

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Infrastructure Index rankings and overview

The CMS Infrastructure Index analyses data across 50 jurisdictions against nine key criteria to create a guide to the most attractive destinations for infrastructure investment.

The nine criteria have been ordered following the weighting attached to each of them as is further described in the Methodology piece:

21%	Economic status
15%	Political stability
13%	Private participation
10%	Infrastructure environment
10%	Protectionism
10%	Ease of doing business
9%	Market size
6%	Sustainability and innovation
6%	Tax environment

[1] Considered as an independent market for the purposes of this analysis.

#1	**Germany** ▲ 2021 (**2**)	**11**	Sweden	**31**	India
#2	**Netherlands** ▲ 2021 (**3**)	**12**	Austria	**32**	Malaysia
#3	**US** ▲ 2021 (**4**)	**13**	Czech Republic	**33**	Romania
#4	**UK** ▲ 2021 (**6**)	**14**	Norway	**34**	Philippines
#5	**Singapore** ▼ 2021 (**1**)	**15**	Hong Kong[1]	**35**	Indonesia
#6	**Finland** ▲ 2021 (**10**)	**16**	South Korea	**36**	Thailand
#7	**Japan** ▲ 2021 (**13**)	**17**	Belgium	**37**	Oman
#8	**Australia** ▼ 2021 (**5**)	**18**	UAE	**38**	Peru
#9	**Canada** ▼ 2021 (**8**)	**19**	Slovakia	**39**	Colombia
#10	**France** ▲ 2021 (**11**)	**20**	China	**40**	Mexico
		21	Portugal	**41**	South Africa
		22	Spain	**42**	Morocco
		23	Italy	**43**	Brazil
		24	Poland	**44**	Uzbekistan
		25	Qatar	**45**	Turkey
		26	Hungary	**46**	Ukraine
		27	Chile	**47**	Kenya
		28	Kuwait	**48**	Egypt
		29	Saudi Arabia	**49**	Angola
		30	Bulgaria	**50**	Mozambique

Top scorers by category

The highest score possible is 100. The countries below have the best score in their category.

For protectionism, Hong Kong's high score means it is the least protectionist country in the index.

- Economic status **Singapore** (**95.6**)
- Infrastructure environment **Netherlands** (**93.3**)
- Market size **China** (**100.0**)
- Political stability **Singapore** (**94.3**)
- Protectionism **Hong Kong** (**81.4**)
- Sustainability and innovation **Sweden / UK** (**100.0**)
- Private participation **Peru** (**80.8**)
- Ease of doing business **Norway** (**100.0**)
- Tax environment **UAE** (**100.0**)

Biggest risers

- Philippines (**+8**)
- Japan (**+6**)
- Finland (**+4**)

Trends, transitions and transformations

The infrastructure world is not short of developments that are worthy of comment. Here we highlight just a few that occur and recur in different forms throughout this year's Infrastructure Index.

1. Net zero

The energy transition is probably the greatest single challenge facing the infrastructure investment community.

Since our 2021 Infrastructure Index was published, the world has largely embraced the goal of net zero emissions, at least in principle. Practically every nation in the Index has at least a partly-developed plan for carbon neutrality, even if many are currently not on track to fulfil them.

But the race towards net zero has many hurdles, from political pressures to supply chain constraints. Above all, it requires massive investment – not only in renewables themselves, but to deal with the broader social and economic consequences of a move away from fossil fuels.

2. Digitalisation

Another key transition is in digital infrastructure. With every sector in the economy investing heavily in digital platforms, the amount of data that has to be stored, processed and analysed – whether locally or in the cloud – has exploded.

Future applications that need data in real time, such as driverless vehicles, will require even more capacity and close-range infrastructure to be successfully rolled out.

Even recent developments that are now taken for granted in developed nations, such as streaming and working from home, will continue to require significant investment in the digital infrastructure that makes them possible.

3. AI and smart infrastructure

Digital expansion and the net zero transition are also interconnected, with developments such as artificial intelligence thriving where they intersect.

Although digital growth itself has a climate impact thanks to the energy it requires, digital developments are an important part of the net zero toolkit. Smart grids and smart cities are obvious applications, while the potential value of AI in the predictive maintenance of infrastructure, the management of systems and the delivery of increased energy efficiency is increasingly clear.

AI can additionally be used to help optimise asset performance, or extract insights from huge datasets. But there are also concerns that hostile actors may be able to harness its power to launch attacks on infrastructure.

4. The investment gap

The global infrastructure investment gap – the difference between the infrastructure investment the world needs and the infrastructure investment it gets – is universally recognised as huge. While estimates vary, the World Bank's projection of a USD 15 trillion shortfall between now and 2030 is fairly typical.

Private sector finance is vital for closing the gap. But the global gap is a headline figure that conceals big variations between sectors, nations and regions. The Catch-22 of infrastructure investment is that the more a place needs to attract finance because of a wide gap, the less likely it is to appeal to the investors who might be able to provide that finance.

Trends, transitions and transformations

5. Finance reform

One of the most pressing reasons for closing the investment gap is the disproportionate effect it has on emerging markets and developing economies, which can typically only access capital at a much higher costs and on less favourable terms than most of the countries in the Infrastructure Index.

Combined with the shortage of funding that accounts for the investment gap, this can entrench existing social and economic disadvantages.

The Bridgetown Initiative launched at COP27 is pressing for "urgent and decisive action to reform the international financial architecture", partly to reduce the "excessive risks" that these nations have to accept when borrowing.

6. Sustainability

This is hardly a new topic in the field of infrastructure. It has been widely discussed for years. But a number of governments – our report highlights some in the Americas – have recently taken serious steps towards building factors such as sustainability and social justice into their infrastructure plans and budgets.

It is too soon to say whether this presages any permanent or systemic change. But there does appear to be increasing acceptance of the need to ensure a just transition, and to make sure that infrastructure investment observes ESG best practices. Exactly how this may affect the other trends we have discussed is something that will become clearer over time.

7. Competition and security

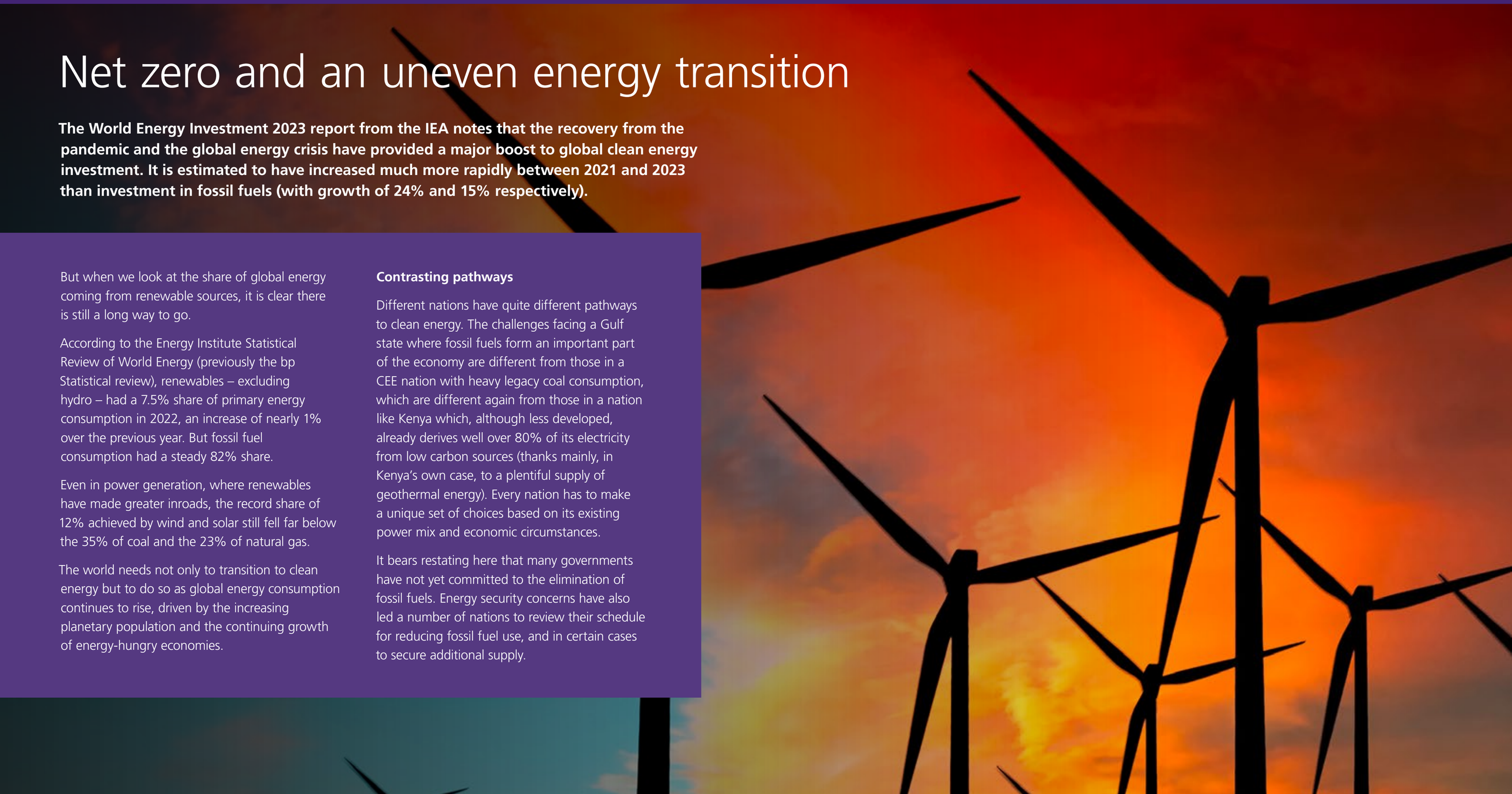
Recent shocks such as the pandemic and the war in Ukraine have led many nations to reassess their approach to issues such as energy and food security and the control of critical infrastructure and manufacturing capacity. Some FDI is coming under additional scrutiny because of these concerns.

The EU, meanwhile, has been pushing back against FDI from businesses that are more generously subsidised by foreign governments then their EU equivalents, or that enjoy cost advantages arising from carbon policies that are less advanced than those in the EU.

Governments and businesses are also increasingly concerned about the potential vulnerability of critical infrastructure to physical attacks or cyberattacks.

Net zero and an uneven energy transition

The World Energy Investment 2023 report from the IEA notes that the recovery from the pandemic and the global energy crisis have provided a major boost to global clean energy investment. It is estimated to have increased much more rapidly between 2021 and 2023 than investment in fossil fuels (with growth of 24% and 15% respectively).



But when we look at the share of global energy coming from renewable sources, it is clear there is still a long way to go.

According to the Energy Institute Statistical Review of World Energy (previously the bp Statistical review), renewables – excluding hydro – had a 7.5% share of primary energy consumption in 2022, an increase of nearly 1% over the previous year. But fossil fuel consumption had a steady 82% share.

Even in power generation, where renewables have made greater inroads, the record share of 12% achieved by wind and solar still fell far below the 35% of coal and the 23% of natural gas.

The world needs not only to transition to clean energy but to do so as global energy consumption continues to rise, driven by the increasing planetary population and the continuing growth of energy-hungry economies.

Contrasting pathways

Different nations have quite different pathways to clean energy. The challenges facing a Gulf state where fossil fuels form an important part of the economy are different from those in a CEE nation with heavy legacy coal consumption, which are different again from those in a nation like Kenya which, although less developed, already derives well over 80% of its electricity from low carbon sources (thanks mainly, in Kenya's own case, to a plentiful supply of geothermal energy). Every nation has to make a unique set of choices based on its existing power mix and economic circumstances.

It bears restating here that many governments have not yet committed to the elimination of fossil fuels. Energy security concerns have also led a number of nations to review their schedule for reducing fossil fuel use, and in certain cases to secure additional supply.

Net zero and an uneven energy transition

A reminder of vulnerability

The invasion of Ukraine in February 2022 significantly impacted global energy markets, leading to a dramatic spike in fossil fuel prices, as well as concerns about the supply of natural gas from Russia. But the likely long-term effect of the war on Europe's energy transition is still unclear.

On the one hand, fossil fuel use has increased in the short term. Indeed, the World Economic Forum has pointed out that in order to reduce reliance on natural gas in the face of high prices, the use of coal may need to increase. Ironically, too, the war has had a negative impact on the viability of some renewable projects, particularly those with low locked-in electricity prices, as it has pushed up construction and maintenance prices throughout the supply chain.

On the other hand, the transition to a net zero economy may be accelerated. The war has highlighted the risks of fossil fuel reliance and the need to transition to a greater use of renewables. In March 2022 the EU set out its plans to become completely independent from Russian fossil fuels by 2030, emphasising the need to shift towards renewable energy through steps such as increasing the use of solar panels and heat pumps and reducing rollout times for renewable projects. Shortly afterwards, the UK released its own energy security strategy.

New technologies

To make the energy transition a reality, the development and adoption of new technologies needs to accelerate. We may see a greater roll-out of carbon capture and storage schemes if these can be made commercially viable at scale. We will certainly need battery capacity to store and distribute excess renewable electricity.

Existing assets for transmission and distribution also require investment and upgrading. Electricity grids must be able to handle higher weather-dependent volatility in generation.

Backup systems, likely using natural gas, will need to be operational and resourced until the new technologies supporting expanded renewable generation are bedded in.

A transition from nothing

The analysis above is largely based on the situation of developed nations that need to upgrade their assets. It is worth recalling that some other nations do not have such secure foundations to build on – and that about 675 million people, mostly in sub-Saharan Africa, are without access to electricity.

It will be possible to serve some of them by extending national grids, but in rural areas, where the majority live, when access comes it will probably be delivered via mini-grids (stand-alone grids with local power sources, such as solar or small hydro schemes, and typically with some storage capacity) or microgrids (essentially small mini-grids, often with just a few users).

Other nations may not have to connect significant numbers of off-grid citizens but will struggle to raise climate finance in anything like the amounts available to more developed economies.

Research last year from BloombergNEF, commissioned by the Glasgow Financial Alliance for Net Zero, shows that emerging markets and developing economies (not counting China) need an additional annual USD 1 trillion of investment by the end of the decade in order to transition to net zero.

These nations have had some recent success in mobilising domestic investment for renewable energy, but overall levels of investment including international investment have been essentially stagnant – unlike energy transition investment in developed nations, which grew 24% year-on-year in 2021. In the words of the Glasgow Alliance: "the climate finance mobilisation gap is widening."

We will certainly need battery capacity to store and distribute excess renewable electricity.

Going digital

Digital infrastructure has rapidly evolved from a relatively niche interest to a building block for the future economy.

Infrastructure funds are deploying considerable amounts in a field they now consider part of their core portfolio. Institutional investors, including many pension funds, are now keen to back digital infrastructure such as data centres. It's no longer possible for governments, financial institutions, businesses or individuals to imagine operating in a non-digital world.

And as the ways in which we work and live continue to be transformed by the ever-increasing use of data, automation, AI, robotics and greater connectivity, the importance of a reliable and resilient network – regardless of location or population density – is increasingly apparent.

The technology required for such a network ranges from data centres through fibre optic cables, mobile phone towers and wireless equipment to satellites. Much of it will – as in the energy transition – be funded by the private sector.

The cost of connectivity

There is still, however, a digital divide. Communities lacking dependable broadband connectivity were 'left behind' during the pandemic. As **Ada Cerne** notes, the realisation of this brought digital connectivity to the forefront of investment programmes in many advanced economies, which began rolling out towers, fibre and fibre-to-the-home in rural areas and isolated communities with renewed vigour.

It also exposed the growing inequalities and disparities in connectivity between developed and developing countries. With many countries lacking a comprehensive modern telecommunications infrastructure, the universal provision of good quality broadband would have a significant cost. The IMF has calculated that around USD 418 billion would be needed to connect all unconnected citizens globally.

Given that price tag, the digital divide between advanced and developing economies looks set to widen still further with the adoption by the former of technologies such as 5G.

It seems increasingly possible that the existence of the reliable and resilient network imagined above – fit-for-purpose, secure and reliable – will be determined on a country-by-country basis rather than globally.

Going digital

Regulation in transition

While the pandemic stressed the critical nature of the network and its need for resilience, the war in Ukraine has furthered the debate on how to keep it safe from interference. Whether the information in data centres belongs to governments, public bodies, businesses or individuals, it has to be secure. (Military and security organisations themselves, of course, have additionally exacting standards and network requirements.) This means that investors in digital infrastructure may not only have to consider issues around data privacy and security but may also face regulatory regimes governing the ownership of critical infrastructure such as the network and its elements.

However, while some countries already have foreign investment control mechanisms in place or plan to introduce them, in some jurisdictions they are not even under consideration. Overall, the current situation is a hotchpotch of complex and highly political processes and laws.

Securing the future network

To provide the safety and resilience needed for a network that is essential to daily life, the equipment supply chain needs to expand beyond the relatively few providers that currently underpins today's network.

One possible solution to this security problem is the Open Radio Access Network (Open RAN). The goal of Open RAN is to separate the wireless network into interoperable parts, thereby fostering competition and innovation among the existing providers and potential new entrants and marginalising the risk of breach by multiplying the number of actors and limiting the impact of a breach on a single one of them. By promoting interoperability, network operators can build the best network solution for their service area rather than accepting the offering of a single supplier which may not be wholly fit for purpose. States and supranational organisations see this meanwhile as a means to strengthen the network.

Achieving Open RAN is a technologically complex undertaking which will transform the current network. While this is still at trial stage under the watchful eye of governments which are pouring funds into it for this purpose, the investment required to build the new physical infrastructure will be significant. Towers – or at least the equipment on them – will need to be upgraded. Additional fibre will need to be installed, both as backhaul and direct service to home and businesses, and new sources of funding will be needed.

INTERVIEW:

Ada Cerne

Managing Director and Head of Digital Infrastructure, Edmond de Rothschild Asset Management

Ada Cerne leads the Digital Infrastructure Investment Strategy of BRIDGE, an independent capital raised Infrastructure Debt platform with a strong track record and valued AUM of over €5.0+billion. Cerne joined BRIDGE in 2014 shortly after inception of the first vintage and states that the team was among the first to finance infrastructure assets in sectors such as renewable energy, green mobility, social infrastructure, the broader energy efficiency and transition, the decarbonisation of utilities and, of course, digital infrastructure, as it was a conviction that such sectors was a key part of the infrastructure play. She notes that digital infrastructure now accounts for more than 20% of BRIDGE's investments.

Cerne says that the huge expansion in fibre-to-the-home (FTTH) network deployment in Europe during the last few years has led to some overexposure to this segment amongst European banks and institutional investors. Now, the growth in digital infrastructure debt financings will come from data centres (DC) and tower portfolios as these institutions try to rebalance their digital exposure. DC-related financings range from large, pan-European DC portfolio refinancings to niche transactions for the financing of a single asset. The offtakers range from global hyperscalers to SMEs in the case of edge DCs, hence providing a risk/reward spectrum for both conservative and yield-seeking investors.

According to Cerne, an ongoing trend in the sector will be the spin-offs of infrastructure assets. Mobile operators have spun-off tower portfolios for decades now and, more recently, fixed-line operators have divested fibre networks. She indicates that new types of spin-offs are creating financeable assets, such as the spin-off of switches and local exchanges from operators' fixed line networks as well as spin-offs of active equipment, located in the towers, from mobile operators. Cerne says that, in the towers sector, land consolidators are emerging to acquire land plots where towers are located and then benefitting from the long-term leases with tower operators.

Cerne notes that the COVID-19 pandemic brought the importance of digital connectivity to the forefront of European economies' investment programmes. The first lock down in 2020 resulted in the isolation of entire communities which did not have fast and reliable connectivity as adults were unable to work from home and students of all ages could not participate in online education. She stated, "suddenly, the much talked about "digital divide" was no longer the fancy heading of specialist telecoms journals, but a social issue to be prioritised".

Despite the recent return to pre-Covid routines, Cerne believes that Governments' focus on digital connectivity will continue. She says, "It is now clear that the vital role of the digital sector to society can no longer be ignored and BRIDGE is proud to have anticipated the need from the inception of the platform and to be a significant debt investor in its growth".

The gap trap

One word that occurs frequently in this year's Index is 'gap'. Even developed economies are experiencing a gap between funds available for investment and their infrastructure needs. For many emerging markets and developing economies, the gap has assumed the proportions of the Grand Canyon.

According to the United Nations Conference on Trade and Development (UNCTAD), for example, developing countries need annual renewable energy investments of about USD 1.7 trillion but attracted only USD 544 billion in clean energy FDI in 2022. Investments in renewables have nearly tripled since 2015, but the money has largely gone to developed countries.

And when they do have opportunities to close the gap, developing nations often find they can only do so on difficult – if not prohibitive – terms. According to UNCTAD, the least developed nations rely on external sources for almost three-quarters of their energy investment, but pay up to seven times more than developed countries to access international capital markets.

Valuable virtues

To some extent the variability of the gap reflects the traditional economic and regulatory virtues that help to determine our Infrastructure Index rankings. Countries with the best governance, disclosure and transparency around their processes tend to be those that find it easiest to attract financing. But precisely because of those virtues, they are often not those whose need for financing is most acute.

Few people would want a world in which funds were effectively limitless – it would lead to a proliferation of ill-conceived and unviable projects. But that is a problem we are miles away from having. Instead we are in a situation where, in many nations, vital infrastructure is going undeveloped while 'dry powder' levels in infrastructure funds are at record levels.

Some in the market see this as not a question of whether finance is available, but of how individual markets and projects can be structured to attract it.

Creating incentives

An extension of this argument is that, if governments can get better at identifying and structuring projects that are capable of attracting private sector investment, they can then focus their own resources – and those from entities such as development banks – on supporting the most socially, economically and environmentally important projects that struggle to meet private sector investment criteria. But this argument has been around for a long time, and the neat division of funding it implies has yet to come about (partly because creating the incentives required to generate the right level of investor return can be tricky due to risks presented by a myriad of governance and implementation factors).

Furthermore, it is not always politically acceptable to permit the private sector to 'cherry-pick' the most attractive projects. In some places there is still strong resistance to privatisations and sell-offs, even if they benefit customers. **Juan Carlos Quiñones** has noted the ironic challenge of needing to convince public opinion that private sector involvement in some infrastructure projects is not a privatisation of public facilities but the operation and maintenance by the private sector of a facility that belongs to the public.

The Bridgetown Initiative

Will we see a determined effort by developing nations to challenge the status quo? There have already been some efforts in this direction, notably the Bridgetown Initiative, led by Mia Mottley, the prime minister of Barbados.

Launched at COP27, Bridgetown aims to reform the global financial system in a way that enables it to respond to challenges such as SDGs and climate change with the provision of inclusive and resilient finance. The Loss and Damage Fund agreed at COP27 was one Bridgetown demand.

In 2023, the Paris Summit for a New Global Financial Pact saw the launch of the Bridgetown Agenda 2.0, with proposals ranging from immediate liquidity support measures to reform of the governance and operations of international financial institutions. Bridgetown proposals are certain to be debated at COP28, which is also expected to see proposals from the UAE Presidency aimed at 'fixing climate finance', which is one of the Presidency's four priority action pillars.

Belts, roads, partnerships and gateways

‘Where’s the money coming from?’

With the growth of financing initiatives backed by geopolitical blocs, that question seems more pertinent than ever.

Many governments are struggling more than ever to fund their infrastructure needs, due to lingering fiscal burdens and higher interest rates. Public-private partnerships and investor placements focused on infrastructure projects have been increasingly sought as a way to fund infrastructure, but these arrangements carry their own challenges.

As a result, official development assistance (ODA) remains the primary way for many developing countries to progress their infrastructure plans. More developed nations also increasingly look to ODA-style schemes, which sometimes involve a combination of lending and aid, and frequently include private sector partners.

In June, Japan became the latest to revamp its Development Cooperation Charter in a way that enables it to approach developing nations with offers of assistance, rather than waiting for requests. It is particularly keen on supporting clean energy and digital projects. But the nation that has by far the largest support portfolio is, of course, China.

The Belt and Road Initiative

China’s Belt and Road Initiative (BRI) was launched in 2013 and represents an extraordinary outreach and commitment to economic development. Over the last ten years, BRI has helped finance an estimated USD 1 trillion in a variety of projects around the globe. According to China’s latest white paper on BRI, marking its tenth anniversary, the initiative “has inspired more than 150 countries with the zeal to realise new dreams”.

China has been adept at expanding BRI from its initial focus on traditional heavy infrastructure such as roads and rail. It has signed numerous MoUs on digital development with its Belt and Road partners, built 5G base stations and data centres, promoted the digital transformation of ports and energy networks, laid international submarine cables and developed digital corridors.

There has also been increasing emphasis on greening the Belt and Road. In May 2023, China Eximbank and a dozen other financial institutions launched the Initiative for Supporting Belt and Road Energy Transition with Green Finance, aiming to strengthen support for green and low-carbon energy transition. By the end of 2022, more than 40 large global institutions had signed the Green Investment Principles for the Belt and Road.

Belts, roads, partnerships and gateways

‘Competition’ for BRI

For some years China went more or less unchallenged in this arena, but that is now beginning to change.

The G7 launched its Partnership for Global Infrastructure and Investment (PGII) in June 2022 with a goal of supporting ‘quality infrastructure’ projects. The characteristics of these projects are economic viability, transparent disclosures and low ESG risks.

Roughly USD 600 billion in public and private funding through to 2027 is expected from the G7, with USD 200 billion pledged by the US, the nation which has done the most to bring PGII into being.

PGII’s primary objective is now described as “narrowing the infrastructure gap in low- and middle-income countries to enable inclusive and sustainable growth and promote economic activity and prosperity.”

A PGII portfolio

PGII is already involved in a number of projects, including the Trans-African Corridor (aka the Lobito Corridor) and the new Zambia-Lobito rail line, which are intended to connect southern Democratic Republic of the Congo and northwestern Zambia to regional and global trade markets via the port of Lobito in Angola.

A few of the schemes in the PGII portfolio are apparently pre-existing ones that have been rebranded. And rather as Belt and Road quickly became an umbrella term for any Chinese lending or investment, PGII appears to be absorbing other initiatives from its member nations. The UK’s Green Cities and Infrastructure Programme, for example, is now being described as part of its contribution to PGII.

Similarly, the EUR 300 billion that the EU’s Global Gateway initiative hopes to mobilise by 2027 now constitutes the EU element of PGII. (This is quite separate from any support that the EU budget provides to infrastructure projects in EU member states – Global Gateway projects are all outside the region and are chosen to “boost smart, clean and secure digital, energy and transport links and strengthen health, education and research systems across the world”.) The first Global Gateway deliverable was its Africa-Europe Investment Package, with EUR 150 billion in investments across Africa funded by bilateral aid, grants, loans and private funding. Investments have also been made in Latin America and the Caribbean, the Middle East and Asia Pacific.

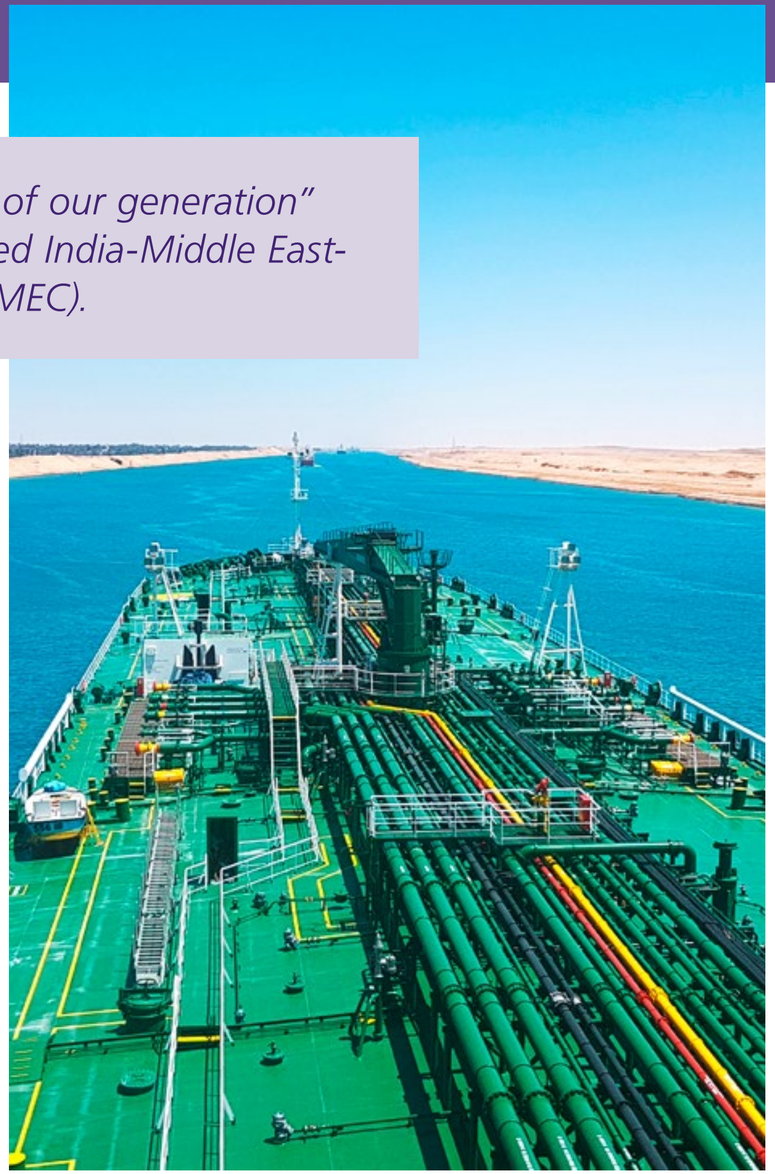
“the most ambitious project of our generation” – PGII is backing the proposed India-Middle East-Europe Economic Corridor (IMEC).

IMEC

In what may be its biggest deal yet – one described by EU President Ursula von der Leyen as “the most ambitious project of our generation” – PGII is backing the proposed India-Middle East-Europe Economic Corridor (IMEC).

This corridor would link India, Saudi Arabia, the United Arab Emirates, Jordan, Israel and the EU through shipping ports and rail routes. (In a reminder of the issues that can attend projects involving cross-border connectivity, Turkey’s President Erdoğan reportedly declared that “there can be no corridor without Turkey” and then pressed the case for an alternative route through Turkey and Iraq.) It is also intended to have a clean hydrogen pipeline and power and data cables.

IMEC was announced in September 2023 at the G20 summit in New Delhi, with an MoU signed by the EU, France, Germany, India, Italy, Saudi Arabia, the UAE and the US. Whether it continues as planned after the more recent terrible events in the Middle East remains to be seen.



Belts, roads, partnerships and gateways

Smaller, local solutions

Initiatives like BRI and PGII are at one extreme of infrastructure finance. At the other is a long playlist of financing options, into which projects for which access to finance is a challenge sometimes dip.

Some of these are location-specific attempts to mobilise local capital. As **Alex Traube-Childs** mentions, significant gains may be possible if such new sources of long-term domestic capital can be unlocked. In certain cases, they may be even more attractive for projects backed by municipalities or regional governments than they are for national government schemes. (Another advantage of such fundraising is that it is possible to reduce capital exports to more developed economies if attractive domestic investment opportunities can be created.) But where domestic capital markets are unsuitable or non-existent, it becomes much harder to structure such initiatives in a cost-effective way. Notably, transaction costs are likely to be large in relation to the funds raised and the size of the project.

Tokenisation

One potential solution which is of increasing interest to all parties is tokenisation – in other words, the creation of a bond or a share in a project as a blockchain-based security. By making the size of a minimum investment much smaller, tokenisation can open up new capital flows from retail investors. And its electronic format and integration with mobile devices can greatly reduce the costs of issue and subsequent management.

The World Bank has published a report noting that tokenisation "has the potential to transform infrastructure financing", not least by democratising access to markets, increasing information flows and performance tracking, and ensuring fairness and security. (The bank itself issued its first blockchain-based bond as long ago as 2018.) But it also notes a number of obstacles to tokenisation, including significant legal and regulatory challenges.

While such obstacles can be real enough, the advantages of tokenisation are real too. Even in nations where traditional investment opportunities and systems may be limited, anyone can potentially become a micro-investor in a tokenised project. Kenya's M-Akiba programme, for instance, raised funds for infrastructure finance through the issue of retail bonds which could be bought by anyone with a mobile phone, with coupon payments made through the same channel.

Solutions and partnerships

There are myriad other potential solutions to such financing problems, including blended finance, loans with longer maturities, innovative risk hedging and risk sharing mechanisms, local currency guarantees and other local currency structured products from development institutions, and the pooling and securitisation of smaller projects.

What such solutions all require – as do the many others not mentioned here – is a degree of partnership between borrowers and lenders (or guarantors, donors or other parties), with a shared understanding of both respective and common goals.

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Security, state aid and carbon borders

National security has become an increasingly hot topic in investment regulation, with Western nations leading a trend towards greater scrutiny of FDI. The EU has also taken regulatory steps to prevent unfair competition from subsidised and carbon-intensive businesses.

Safeguarding national security

Global trade agreements and international trade and investment law have long recognised the delicate balance required to maximise the free movement of goods, money and people while at the same time enabling individual countries to protect their national security and preserve their economic priorities, through both tariff and non-tariff measures.

But after decades of a general trend towards liberalisation, with fewer controls on imports and exports and fewer restrictions on the foreign ownership of assets, some governments, prompted principally by national security concerns, have started to adopt a less permissive line.

Like the US – where the overhauled Committee on Foreign Investment in the US (CFIUS) system had its first full year in 2021 – nations such as France, Germany, Switzerland and Australia have all pursued policies involving more scrutiny of incoming FDI in recent years. The general experience with these tighter FDI rules is that, although additional due diligence has been required on these investments, in most cases the new rules did not prevent them from going ahead.

The UK has had a slightly different experience. Its FDI legislation, the National Security and Investment Act (NSIA) came into force in January 2022 but applied retrospectively to November 2020 when the legislation was first proposed. The reach of the NSIA is not strictly limited to FDI transactions. It also potentially applies to other commercial and financing arrangements on the assumption that these too could be a route for an adversary to damage the UK's national security.

The NSIA resulted in five prohibitions during its first year of operation, three of which related to the semiconductor industry. Of the five prohibitions, four related to investors from China or Hong Kong. In addition, to date there have been 11 clearances based on stringent conditions being imposed, including requirements for UK government board observers, continuity of supply to UK government programmes, and information sharing restrictions.

The areas of the economy where the UK government has intervened include energy, satellite and space technology, communications, quantum technologies, computing hardware, advanced materials, cryptographic authentication, critical suppliers to the government and emergency services, academic research and development in higher education, military and dual use, and defence. Whether such far-reaching enforcement will become a model for other countries remains to be seen.

Security, state aid and carbon borders

Groundbreaking EU rules target subsidies

The EU's Foreign Subsidies Regulation (FSR) is now in operation, introducing new tools to tackle foreign subsidies that cause distortions and undermine the level playing field in the internal market.

The FSR requires disclosure of government subsidies that have been received up to three years previously by foreign businesses seeking to participate in EU M&A deals valued at over EUR 500 million or public procurement contracts worth more than EUR 250 million. (The European Commission can also launch ex officio investigations if it believes such subsidies may be distorting the internal market.) Where there have been subsidies, appropriate FSR approvals are needed before the transaction can complete or the procurement contract be awarded.

EU companies are already restricted in terms of state aid requirements and are often denied EU funding for projects because of those rules. The FSR is an attempt to close loopholes which allow other firms to take part in significant EU-focused M&A or procurement despite receiving subsidies from their own governments which provide them with an unfair advantage when participating in the EU marketplace against non-subsidised EU market players.

Filings for FSR-related activities began in October 2023. Companies involved in cross-border tenders must now plan for these requirements and undertake appropriate due diligence on foreign subsidies received – preferably far in advance of a first potential filing, which could otherwise cause significant delays.

Levelling the carbon playing field

The EU has also now embodied its decarbonisation policy in its international environmental policies. The transition period for its carbon border adjustment mechanism requirements (CBAM) has begun. The goods that have been currently identified as falling within the CBAM are important for infrastructure, including cement, iron and steel, aluminium, fertilisers, electricity and hydrogen. However, the EU envisages extending the scheme to cover other categories.

Without the CBAM, goods imported from outside the EU would clearly have a cost advantage over those produced by EU-based companies which incur the higher costs of carbon pricing in the EU's Emissions Trading System (ETS). When the CBAM is fully phased in, it should capture significantly more than 50% of the emissions in sectors covered by the ETS.

Importers now have to register with the Transitional Registry, and both importers and third country exporters have to comply with very detailed compliance and reporting requirements.

Importers must submit a quarterly CBAM report detailing the previous quarter's quantity imported, total direct and indirect embedded emissions, and the carbon price paid in the origin country. As a result these new requirements must be factored into supply chains.

The CBAM will not begin to levy fees on contained carbon until January 2026. After that point, a fee will be charged on the imported carbon, bringing its cost in line with that of the EU. The end result is that non-EU goods, which are not subject to the requirements of the EU's ETS, will effectively no longer benefit from a cost advantage arising from less strict carbon policies in other countries.

The EU's intent with the CBAM, and its green legislation more broadly, has been to enact a regime that can be replicated around the world, thereby eliminating carbon leakage globally in those industries which are the greatest emitters. Since companies outside the EU will need to certify the level of carbon contained in their goods, this type of regime is likely to expand, as no country will want its own companies to continue to be disadvantaged in its home markets by cheaper, more carbon-intensive goods. For example, the UK is already considering its own CBAM to preserve the competitiveness of its own firms against cheaper higher-carbon imports.

Critical math

There is no universally accepted definition of 'critical' infrastructure.

The US Cybersecurity and Infrastructure Security Agency (CISA) identifies 16 sectors – ranging from nuclear and dams to financial services and commercial facilities – as critical and in need of resilience planning. The UN Office of Disaster Risk Reduction includes homes and education assets as part of its definition of the critical infrastructure needed to keep a society functioning optimally.

In truth, as societies become ever more complex and interrelated, it becomes increasingly difficult to find any infrastructure that is not critical to significant aspects of their operation. And this is a truth that emphasises the need for back-up systems and well-planned disaster recovery processes.

Climate and cyber threats

The growing effect of climate change on critical infrastructure seems to be demonstrated on a regular basis around the globe, as weather-related disasters cause more damage every year.

And while the threat that some extreme weather events can pose to infrastructure is obvious, the world as a whole has not yet adjusted to the idea that all weather extremes present danger. Droughts can force hydropower projects to shut down, but floods can overwhelm their dams. Increasingly, it is clear that much of our current critical infrastructure was designed for a 'Goldilocks' world of stable mediums that does not really exist anymore. The investment implications of this are profound.

There has also been a higher frequency of cyberattacks on infrastructure assets and critical systems, which may increase further as smart features and AI are embedded in more infrastructure. Although companies and governments have increased their investments in security measures to fend off these incursions, there is still a notable lack of visible cooperation among governments to prevent them.

Colonial Pipeline and Nord Stream

The 2021 ransomware attack that led to the shutdown of the Colonial Pipeline in the US for several days – prompting President Biden to invoke emergency powers to deal with the situation – is perhaps the clearest demonstration to date of the vulnerability of critical infrastructure to attack, even before developments such as AI are factored into the equation.

Incidents such as the 2022 sabotage of the Nord Stream pipelines have also sent shudders through governments and businesses alike.

It is one thing to protect core IT systems or a defensible asset such as a single building or site from attack. It is quite another to safeguard infrastructure assets that may stretch over hundreds of miles or be situated in remote or inaccessible places. Technology offers monitoring solutions, but prevention is more problematic.

And, of course, critical infrastructure can fail through accident or error. Undersea cables, for instance, are certainly potential targets for sabotage, but they may also be damaged inadvertently by trawlers or by ships dragging their anchors.

Key calculations

There is an important calculation to be made here. What proportion of infrastructure cost should be spent on ensuring resilience?

And beyond that, what – and how – should governments be spending on broader infrastructure protection?

The pandemic was a harsh reminder that many nations with straitened finances have been inclined to cut what they spend on various aspects of disaster prevention and control (or, in other cases, were never able to afford it in the first place).

Defence against future threats – ranging from runaway global warming to quantum computers that may one day be able to crack legacy encryption systems – tends to lose out when competing against more immediate demands for funding.

It is more important than ever that governments and other players should invest to maintain, upgrade and protect their key assets.

SPOTLIGHT:

#1 Germany

Germany has moved up one place to claim the top spot in the 2023 Infrastructure Index. Its creditworthiness and business environment make it very friendly to investors. Its position as a globally competitive manufacturer of advanced technologies is a reason why it scores highly on sustainability and innovation, the level of private participation and its infrastructure environment.

Overall score	77.0

Economic status Rank 3	90.1	**Protectionism** Rank 8	76.9
Political stability Rank 10	80.2	**Ease of doing business** Rank 8	86.9
Private participation Rank 6	75.5	**Market size** Rank 5	53.8
Infrastructure environment Rank 7	77.9	**Sustainability & innovation** Rank 6	91.7
		Tax environment Rank 44	28.9

SPOTLIGHT:

#1 Germany

Government policy towards advancing decarbonisation of the economy has played a central role in the infrastructure sector. Beginning in 2010, the country adopted its energy transition policy, the *Energiewende*, for which the core elements are renewable energy and energy efficiency.

Energy transition

Germany has made concrete progress related to its energy transition. It reached its goal of eliminating generation via nuclear power in April 2023 and has committed to 80% renewable power generation by 2030. The government is actively promoting the development of hydrogen as a clean fuel in transportation.

Although the country has made substantial investments in LNG to replace lost Russian gas imports, it is simultaneously expanding its capacity for renewable power, with 30GW intended to be in offshore wind. In early 2023, Germany auctioned a 7GW wind site, which was won by bp and TotalEnergies for projects expected to total EUR 12.6 billion. There are many solar parks in construction around the country. New power lines are being planned to handle the additional renewable generation capacity. Projects related to strengthening grid connections in the west and south are in progress and will also facilitate the expansion of power generation from renewables. Germany has also become a global leader in the development of battery storage.

The government is actively promoting the development of hydrogen as a clean fuel in transportation.

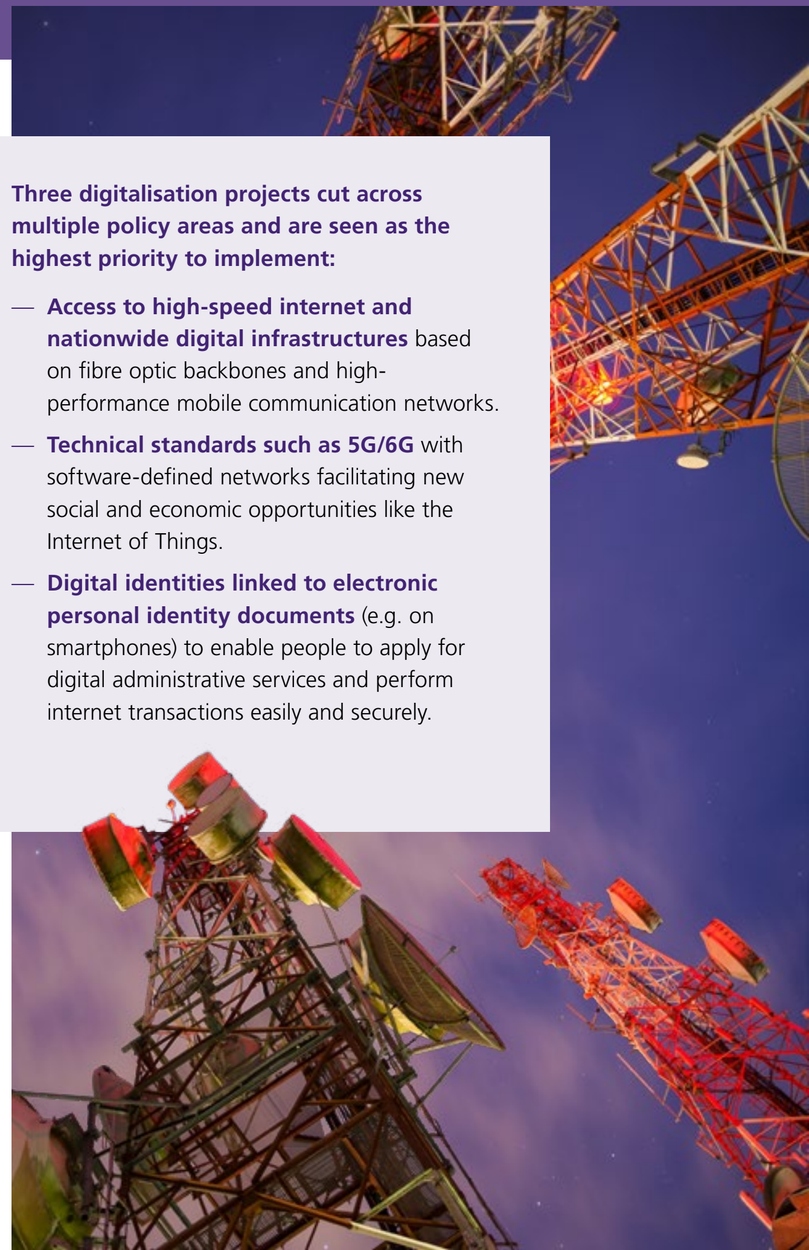
Transportation

Germany's transportation sector has been given a high priority in terms of infrastructure expansion. The country is now halfway through the Federal Transport Infrastructure Plan 2030 which was slated to invest EUR 270 billion between 2016 and 2030 on transport infrastructure. Rail and roads are receiving the bulk of the funding and the initiative includes multiple autobahn projects, along with the Stuttgart and Hamburg rail projects and an expansion at Frankfurt airport.

Europe's longest undersea tunnel (18 km) for combined road and rail is currently under construction between Germany and Denmark. The Fehmarnbelt Fixed Link, which is due to come into service in 2029, will include two double-lane highways and two electrified rail tracks.

Digitalisation

In addition to energy and transport, a focus on digitalisation is also underway. Germany now has a national Digital Strategy which it plans to implement by 2025 and is constructing data centres to handle the new load. The strategy identifies 25 digital policy areas and provides funding for 18 'lighthouse' projects.



Three digitalisation projects cut across multiple policy areas and are seen as the highest priority to implement:

- **Access to high-speed internet and nationwide digital infrastructures** based on fibre optic backbones and high-performance mobile communication networks.
- **Technical standards such as 5G/6G** with software-defined networks facilitating new social and economic opportunities like the Internet of Things.
- **Digital identities linked to electronic personal identity documents** (e.g. on smartphones) to enable people to apply for digital administrative services and perform internet transactions easily and securely.

SPOTLIGHT:

#1 Germany

CASE STUDY:

First direct power link between Germany and Great Britain

The NeuConnect project will link the British and German energy markets for the first time via a 725 km subsea high voltage direct current link. The project aims to deliver 1.4GW of electricity interconnection capacity, enough to power 1.5 million homes. It is expected be operational from 2028.

As a project financed electricity interconnector, the NeuConnect is the first of its kind and will help to optimise usage of offshore wind assets in Germany and Great Britain. Ultimately, it will contribute to the goals of expanding renewable energy and decarbonising the EU and UK economies.

CMS has acted as project counsel since 2017 and was able to draw on its extensive PPP and project financing knowledge to create innovative solutions for the project, such as incorporating a multijurisdictional structure for a project that passes through UK, Dutch and German waters.

CMS activities included drafting, negotiating and concluding the construction, O&M services, interface and construction management arrangements and associated documentation and supporting the procurement process for the converter stations and cables. CMS advised on the electricity transmission system connection arrangements with National Grid Electricity System Operator. It helped acquire land rights for the converter stations and cabling.

CMS also advised on the project company joint venture and corporate structuring arrangements and providing due diligence reporting to lenders and extensive support to lenders' advisers.

NeuConnect reached financial close in July 2022 for GBP 2.4 billion (EUR 2.8 billion) with a consortium of over 20 national and international banks and financial institutions.

The project was named Power Deal of the Year 2022 by Project Finance International, which described it as "…the largest privately financed interconnector [that will] support the energy transition by enabling carbon emission reductions, increase competition among generators, and strengthen security of supply across the two countries".

SPOTLIGHT:

#1 Germany

CASE STUDY:

Iberdrola offshore wind

CMS is advising on the development of the offshore wind farm project called Baltic Eagle which is located 30 kilometres north-east of the island of Rügen, Germany in the Baltic Sea. The project launched in 2021 and is Iberdrola's second largest offshore wind development.

Upon completion, the wind farm will generate 476 megawatts of power, enough to supply 475,000 households with electricity from renewable sources. The project is expected to be operational in 2024 and is valued at EUR 1.6 billion.

CMS has been involved in drafting and leading negotiations for all project agreements, including the agreements with suppliers, installation companies and the responsible network operator. Various CMS offices outside Germany were involved with regard to questions on the transfer of ownership of components and the provision of securities by foreign contractual partners.

Ukraine reconstruction underway

Despite the ongoing war with Russia, Ukraine remains focused on expansion and reconstruction. This offers numerous compelling opportunities for investors, as the country's infrastructure and economy are rebuilt and modernised to European standards.

Recognising this, Ukraine's government is actively advancing legislation aimed at enhancing investment protection and opportunities, and implementing economic reforms to align Ukraine with EU regulations.

Ukraine reconstruction underway

Financing reconstruction

The National Recovery Plan 2022-2032, announced by the government of Ukraine at the Lugano conference in July 2022, estimated that over USD 750 billion of funding would be needed for a three-stage post-war recovery, with approximately two-thirds coming from partners such as governments, international financial institutions and donors in the form of grants, debt and equity. (The possibility of using frozen Russian assets to fund reconstruction is also being explored.) Private investment would mostly occur in the later 'modernisation' stage of the plan, although some is also envisaged for the 'recovery' section.

The plan naturally includes physical reconstruction and remediation, but also includes many measures to assist in the broader national recovery, modernisation, and EU integration, from energy efficiency programmes and the modernisation of water and wastewater systems to financing for cultural initiatives.

As the war continues, the plan's estimates will need to be revised. A second Rapid Damage and Needs Assessment (RDNA2) released in March 2023 by the government of Ukraine, the World Bank, the European Commission and the United Nations estimated that the cost of reconstruction and recovery alone covering the first year of the war amounted to USD 411 billion. This was well up on the USD 349 billion figure in the first Rapid Damage and Needs Assessment, which covered the period from the start of the war to 1 June 2022. Inevitably, RDNA2 has also been overtaken by events, particularly the destruction of the Nova Kakhovka hydroelectric dam and the subsequent extensive flooding, which means that any estimate made today would be higher still.

A recent World Bank report suggests that, if Ukraine undertakes a range of significant pro-competition reforms and interventions, the opportunities for private financing of RDNA projects could reach USD 130 billion by 2033, with another USD 282 billion of other opportunities, nearly half of them in energy and extractives.

Partner funding

Ukraine has already received some partner funding and more will follow. The European Parliament recently endorsed a proposed EUR 50 billion facility to support Ukraine's recovery, reconstruction and modernisation from 2024. And Ukraine is now able to benefit from a number of EU programmes – for example, it is participating in the Connecting Europe Facility, enabling Ukrainian project promoters to seek financial support from the EU for projects that are of mutual importance in the transportation, energy and digital sectors.

The National Recovery Plan 2022-2032, announced by the government of Ukraine at the Lugano conference in July 2022, estimated that over USD 750 billion of funding would be needed for a three-stage post-war recovery.

Ukraine reconstruction underway

Developing transportation

Two of the sectors likely to attract the most private sector investment are transportation and energy.

Ukraine has a strategic location on trade routes between Europe, the Middle East and Asia. Its robust transportation infrastructure includes a well-developed railway network, national highways, significant sea and river ports, and key airports.

Russia's blockade of sea ports initially stopped maritime exports but, at the time of writing, Ukraine's three Black Sea ports are again exporting some grain and other cargo. Certain cargoes are also exported using ports along the Danube or inland routes connecting Ukraine with the EU.

A current emphasis on logistics hubs reflects not only humanitarian and military needs but also the increasing need for export capacity. This includes investments in dry terminals, industrial parks, intermodal logistics projects and other initiatives, such as the EUR 200 million investment by Ireland's Kingspan Group in a facility to manufacture advanced materials for use in energy-efficient buildings. Indeed, the substantial construction work necessary meet Ukraine's rebuilding and infrastructure needs will provide an opportunity for the whole construction materials industry to thrive, both domestically and through nearshoring.

Ukraine's State Agency for Restoration and Infrastructure Development has highlighted road, bridge and port projects which will be open to incoming investment. The road and bridge projects are a mix of new construction and reconstruction and will require funding in the range of USD 15-20 billion. Feasibility studies are underway for potential concession projects to include a national tolling system, as well as highway and tunnel construction, which together will require more than USD 7 billion.

The development of the Danube river ports and merchant fleet is slated to cost USD 400 million, with another USD 250 million needed to enable the resumption and expansion of shipping on the Dnipro. Ukraine's deepest port, Yuzhny, requires USD 140 million of investment for modernisation. The Ust-Dunaisk Seaport has been privatised and other privatisations may follow.

There are additional medium-term opportunities in railway infrastructure investment. These include the extension of four Trans-European Transport Network (TEN-T) railway corridors from the EU through Ukraine, using the standard European railway gauge rather than Ukraine's broader gauge. Track electrification, the construction of freight cars and the purchase of locomotives are also on the agenda, and a high-speed passenger service connecting Ukraine's regional centres and the renewal of existing tracks are under consideration.

Finally, investment is needed in export logistics infrastructure. New checkpoints and repairs to bridges and roads will need nearly USD 500 million, with the repair and reconstruction of main roads costing a further USD 1.3 billion. Railway projects worth USD 700 million include both newly built and reconstructed track, the increased electrification of rail lines, the addition of intermodal terminals and expanded handling capacity.

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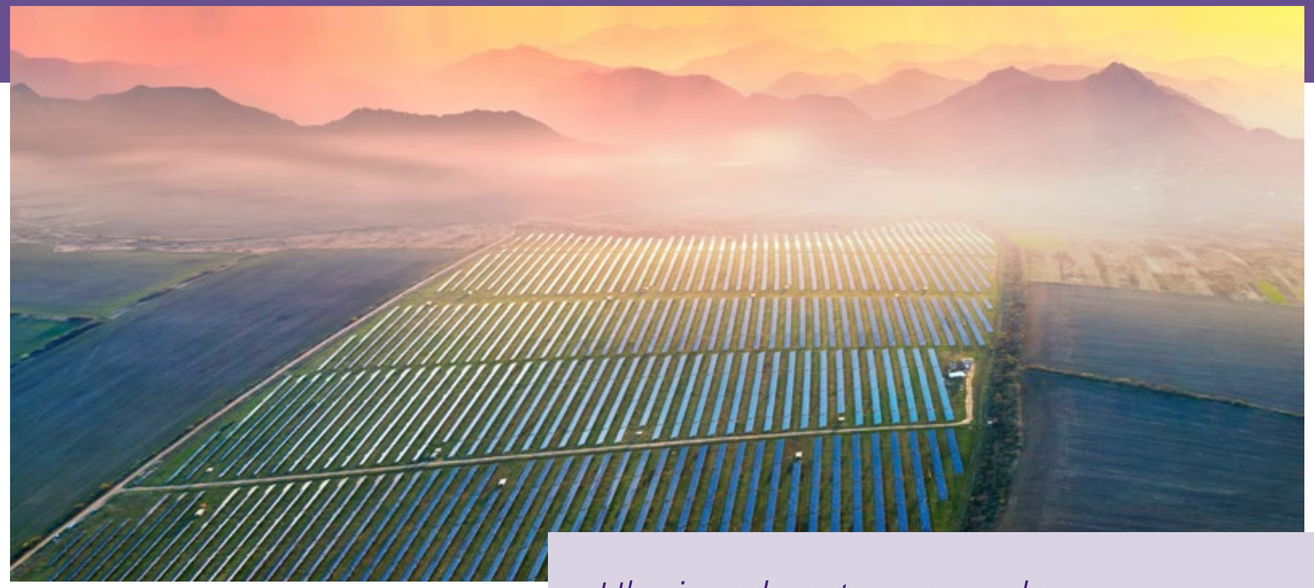
Ukraine reconstruction underway



Promoting renewable energy

In 2022 nuclear power was responsible for about 55% of Ukraine's electricity generation, with coal accounting for 22% and hydro 11%. Renewables and natural gas each provided about 6%. But the government has big plans for renewables, describing the transition to carbon-free energy as "the cornerstone of the recovery of Ukraine's energy sector".

Ukraine plans to grow solar energy output from 6.6 GW in 2022 to 38 GW by 2030, and to increase wind power from 0.4 GW in 2022 to 59GW by 2032.

A slew of regulatory changes have already facilitated more investment in renewables. The government is also encouraging the development of local manufacturing capacity by making sites available for the production of solar and wind power components, targeting 95% local production for solar and 90% for windfarm equipment.

The necessary upgrades to the transmission system are valued at around USD 2 billion. Again, Ukraine hopes to manufacture 95% of the equipment domestically. It also plans to construct 38 GW of storage capacity and to manufacture 80% of the equipment needed for that.

It is estimated that Ukraine has sufficient reserves of lithium and graphite to produce cathode and anode materials for lithium-ion batteries with a capacity of 1000 GWh, equivalent to operating nearly 20 million electric vehicles annually.

Ukraine also has significant potential to produce biomethane, a sustainable alternative to conventional natural gas. It has adopted EU standards for biomethane production and the European Investment Bank is supporting the construction of five new biomethane plants in 2023, with the same number set to be financed in 2024. Ukraine's first biomethane facilities have already been connected to the gas distribution network.

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Looking ahead

Ukraine is not one of the countries at the top of the 2023 Infrastructure Index. But its unique situation may see it rise rapidly up the table in future years, as reconstruction and modernisation create numerous investment opportunities.
As its ties with the EU develop further and the government continues to promote economic and regulatory reform, Ukraine looks set to become increasingly attractive to infrastructure investors.

Ukraine: Preparing for a Green & Resilient Reconstruction

INTERVIEW:

Cheryl Edleson Hanway

Regional Industry Senior Manager,
International Finance Corporation (IFC)

"It will be necessary to create public-private partnerships and instruments to partially de-risk the opportunities for investors to make projects bankable."

At IFC's Regional Office for Europe in Vienna, Cheryl Edleson Hanway outlines a role that is constantly evolving. One that has put her at the heart of commercial financing in emerging markets over the past two decades, "I've spent much of my career in infrastructure finance, initially focusing on Latin America, and more recently in Europe. Our work in emerging Europe, which includes Ukraine as a key country, spans across the project cycle: we offer early-stage engagements through advisory and project preparation activities, do traditional transaction execution across debt and equity products and I also supervise our portfolio in the region."

Hanway manages IFC's infrastructure investment business across Europe. She oversees a team responsible for energy, transportation, telecommunications, media, technology, and environmental infrastructure projects. Together they play a crucial role in the development, advisory, and investment activities that drive private sector activity across the regions they serve.

As part of the World Bank's broader response to Russia's invasion of Ukraine in February 2022, IFC's board approved a $2 billion Economic Resilience Action (ERA) program for Ukraine to support the Ukrainian private sector. "Under this program, we have committed over $570 million for three vital areas: sustaining critical sectors and supplies, facilitating urgent repairs of housing, and bolstering vital economic infrastructure," says Hanway.

IFC is working closely with the government of Ukraine to ensure that its $2 billion program is fully aligned with the state priorities for reconstruction and essential infrastructure. Much of this the backbone of Ukraine's recovery plan – including renewable energy, transportation, and municipal infrastructure.

"In the renewable energy sector, for example, we are working with leading renewable energy producer Scatec" says Hanway, "to roll out an innovative distributed energy solution of solar panels and batteries which can provide localized clean and reliable power." Amidst Russia's invasion of Ukraine, IFC's collaboration with stakeholders like Scatec is designed to bolster the private sector which will have a critical role to play in the country's reconstruction.

IFC also advises the Ukrainian government on maximising private finance for reconstruction. This includes support in structuring successful transactions to build investor confidence as well as thinking through programmatic approaches to crowd in capital at scale during the rebuild. IFC's engagement with the Chornomorsk port, one of the largest in the Black Sea region, aims to increase **Ukraine's** import and export capacity, whilst IFC's partnership with the Danube Shipping Company will help boost maritime commerce by upgrading, expanding and 'greening' the company's fleet. "The private sector accounted for 60 to 70% of GDP prior to the invasion." notes Hanway. "There is tremendous potential for private sector investment in the country. If the right conditions are created - and initially appropriate de-risking approaches are strategically deployed – we estimate that as much as one-third of Ukraine's post-war reconstruction investment needs could be met with private sector financing. Together with the World Bank and Ukraine's government, we have just presented a **report** that shows Ukraine can generate up to $130 billion in private financing to help address reconstruction needs identified in the Second Rapid Damage and Needs Assessment (RDNA2)."

Hanway elaborates, "Under a scenario proposing increased reforms, sectoral interventions, and EU integration, Ukraine can generate additional private sector opportunities totaling $282 billion."

"To make projects attractive to the private sector and also bankable," says Hanway, "it will absolutely be necessary to create a whole new array of public-private partnerships and co-investment schemes and also to develop and deploy instruments to partially de-risk opportunities for investors. Instruments that mitigate investor risks will pry open the door to future investments."

Climate is a fundamental theme when considering rebuilding opportunities. Hanway envisages Ukraine not just rebuilt, but with a "build back greener" ethos, intertwining climate action with reconstruction. In the face of the massive, estimated outlay of Ukraine's reconstruction – estimated at $411 billion, the private sector, international institutions, and donor communities must unite, she asserts.

With IFC as a strategic advisor to the Ukrainian government, Hanway and her team continue to explore and are starting to conceive such avenues to attract private capital. She is hopeful, even against the backdrop of such a challenging environment, that commercial investors – including domestic and international banks and institutional investors – can become linchpins of long-term financing, "Over time, we expect and absolutely need to see commercial long-term financing. We are already looking at various mechanisms that could de-risk, standardize and crowd-in larger institutional investors, potentially even by eventually tapping into the capital markets."

Africa

Participants in the African Continental Free Trade Area (AfCFTA) Business Forum estimate that the continent requires USD 130-170 billion annually to improve its infrastructure but that the funding gap is in a range of USD 68-108 billion.

41	South Africa
42	Morocco
47	Kenya
48	Egypt
49	Angola
50	Mozambique

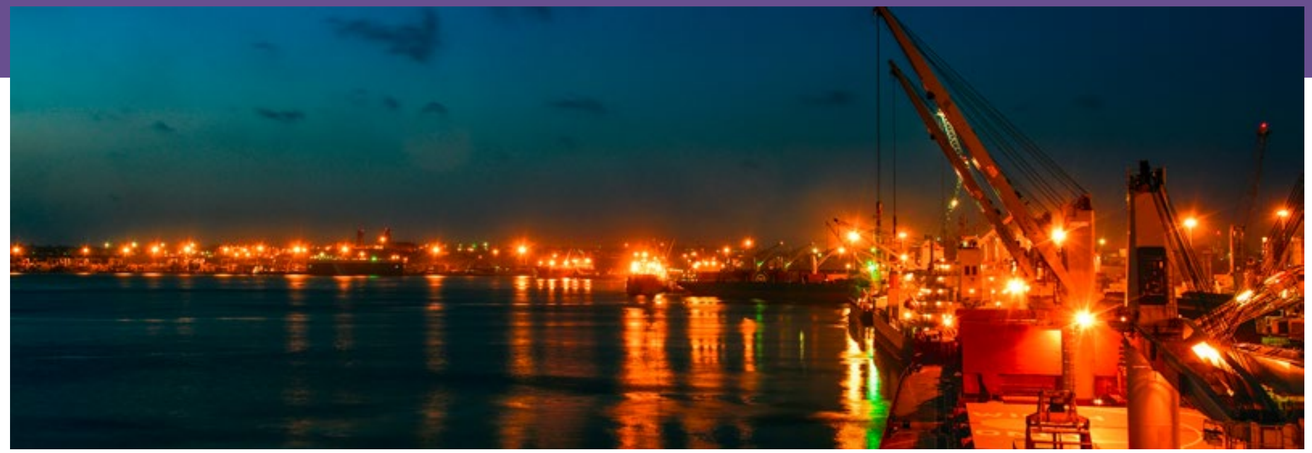
The 2nd Dakar Financing Summit for Infrastructure, held in February 2023, sought to address this with a focus on building public-private partnerships and leveraging technology to modernise infrastructure. The summit generated USD 65 billion worth of interest in a variety of initiatives, including projects to support developing transportation networks, constructing energy infrastructure and improving internet connectivity.

Frontier markets

Some countries have worked to strengthen their frameworks for investment, with Kenya and Mozambique notable examples. Because many of the continent's economies are considered 'frontier markets', they do not have access to the considerable funds that might be deployed by institutional investors so must depend chiefly on funding from multilateral institutions, other national governments and public-private partnerships.

African countries have investment ties with regions across the globe. Nearly all are part of China's Belt and Road Initiative. Japan is working with Mozambique and Kenya on enhancing the ports of Macala and Mombasa respectively. The Biden administration supports the African Union's Agenda 2063 and has committed US funds to progress it. The European Union's Global Gateway programme promotes investments in clean energy, biodiversity, agri-food systems, climate resilience and disaster risk reduction. Countries in the Middle East are utilising their energy expertise and ample funds to promote growth, particularly in Egypt.

Africa



The power mix

Energy projects are a key focus for many countries, with a mixture of oil and gas alongside wind and solar.

In early 2023, Angola and Zambia discussed the potential to fast-track the development of an oil and gas pipeline, a rail and road corridor, and an electricity transmission line. In Mozambique, the Central Térmica de Temane project includes a 450MW natural gas power plant and a 25 km interconnection line. Solar power projects are helping to power reservoir pumping stations. Power from Morocco's 900MW Dakhla onshore wind project will also be used for a desalination plant.

Egypt currently generates more electricity than it consumes and is creating grid connections with other countries within the region and around the Mediterranean. Through the Sovereign Fund of Egypt (TSFE), it is pursuing partnerships with the private sector in renewable energy, green hydrogen, green ammonia and desalination.

South Africa announced numerous projects during 2022, including a smart city, a green hydrogen plant, the fifth and sixth rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), and the Seriti coal mine windfarm project. The Just Energy Transition Partnership with the UK, France, Germany, the EU and the US, which was announced two years ago at COP26, guarantees it at least USD 8.5 billion to support its plans for climate action and energy transition.

Developing connections

In Kenya, upgrading airports is a key focus as is creating new commuter bus and rail lines in and around major cities. In addition to the port refurbishment ongoing in Mombasa, China is funding the construction of a new port at Lamu in the north.

Morocco plans to extend the Al Boraq high s peed rail line, which currently links Tangier, Rabat and Casablanca, to include the cities of Marrakech and Agadir. Another spur is intended to link Rabat to Meknes, Fes and Oujda.

In South Africa, a greenfield deep-water port at Boegoebaai is slated to cost USD 2.8bn once its related rail infrastructure is taken into account. Other projects include national roads in the Eastern Cape and port infrastructure development.

Communications needs

Although there is progress in some areas of digital development, particularly in mobile payments and other fintech, Africa still lacks basic communications infrastructure. The cost of connectivity is high and the extent to which businesses and individuals use the internet in their day-to-day activities varies widely, both within and between countries.

Although there is progress in some areas of digital development, particularly in mobile payments and other fintech, Africa still lacks basic communications infrastructure.

Africa

INTERVIEW:

Alex Traube-Childs

General Counsel & Head of Business Integrity, InfraCo Africa

InfraCo Africa mobilises investment for infrastructure projects in Sub-Saharan Africa, investing directly into early-stage projects and providing development leadership. With its ISO 37001 certification for anti-bribery management, the organisation seeks to embed high standards of business integrity in its projects and business partners, some of which are start-ups in challenging emerging markets.

InfraCo Africa actively supports the energy transformation and expansion of green technologies and is wholly committed to renewables, focussing on sustainability and expanding renewable energy generation both on- and off-grid. Traube-Childs explains, "Solar power and battery storage are becoming more affordable and faster to deploy. This is enabling us to deploy mini-grids in rural and remote areas as well as delivering larger, on-grid solar developments. InfraCo Africa is also developing other renewable energy sources such as geothermal and hydro power."

Transport and logistics is one focal point, particularly expanding electric mobility and marine transport designed to reduce emissions and open up regional trade. InfraCo Africa is supporting the scale-up of Zembo's urban motorcycle taxi business in Uganda and Mobility for Africa's robust electric three wheelers in rural Zimbabwe, where it also delivered business integrity training. Traube-Childs says, "We are working to develop the whole ecosystem for EV to thrive, developing optimised business models, new charging infrastructure, systems for battery refurbishment and recycling and training initiatives for drivers as well as building businesses with strong business integrity and Health, Safety, Environment and Security practices."

As a key driver of economic development, digital access is another area of and connectivity for InfraCo Africa. "Our investment into Mawingu Telecoms in Kenya seeks to scale the company's delivery of fixed connectivity broadband access for homes, businesses and public service providers through its solar-powered telecoms towers which can be deployed in remote and rural areas."

Traube-Childs notes that investors are trying to scale their impact by unlocking new sources of long-term domestic capital. InfraCo Africa has complemented the work of its Private Infrastructure Development Group sister company, GuarantCo, by supporting InfraCredit Nigeria with equity to scale its offering and engaging with Cardano Development in establishing a credit enhancement facility in Kenya. Traube-Childs says, "PIDG's support for specialist credit enhancement facilities is starting to bear fruit for infrastructure developers who previously struggled to secure local currency finance of sufficient tenor length to make their projects bankable."

As to how ESG considerations fit into the work of the organisation, Traube-Childs says, "At InfraCo Africa, we are committed to reporting on our emissions and those of our portfolio projects to better understand our impact and to make changes in the way that we work to drive down our emissions and maximise the climate resilience of our investments."

"At InfraCo Africa, we are committed to reporting on our emissions and those of our portfolio projects…"

Africa

CASE STUDY:

Proler in Mozambique

PROLER is the Project for Promotion of Auctions for Renewable Energies which was launched in 2020 by the government of Mozambique in collaboration with Agence Française de Développement.

All renewable energy projects awarded in Mozambique to independent power producers (IPPs) were previously granted via direct award. PROLER aims to provide an element of increased competitiveness in awarding these tenders and is therefore a game changer.

The main objective of PROLER is to design a sound technical, financial and legal framework which is attractive to the private sector so that the bidding for solar and wind energy projects is accomplished through a transparent and competitive process. An added benefit for the government of Mozambique is that PROLER is intended to enable the public entities involved in the energy sector – MIREME, ARENE and EDM – to develop the capacity to fully manage the procurement of renewable energy projects in the future.

PROLER consists of four renewable energy projects – three solar and one wind – which are projected to have a total installed capacity of around 120MW. The contracts will be awarded to private IPPs through the launching of public tenders. Dondo, a solar project with a planned capacity of 40MW, is the first project to pass the tender stage.

PROLER also has broader, positive implications for the economy overall. The three solar power plants planned for construction are expected to supply enough electricity to power 300,000 households while reducing the country's CO2 emissions by 25,000 tonnes annually. The power supplied will be a high-quality service, provided at a reduced cost, thereby strengthening the competitiveness of Mozambique's economy.

One of PROLER's projects is the Manje Photovoltaic Solar Power Plant, which Electricidade de Moçambique says "is a part of the government's policy and EDM's strategic objective of achieving universal access to electricity by 2030 and developing renewable energy projects to be connected to the national electricity grid in order to reinforce the availability of energy in the Tete region."

The main objective of PROLER is to design a sound technical, financial and legal framework which is attractive to the private sector so that the bidding for solar and wind energy projects is accomplished through a transparent and competitive process.

Americas

Countries from this region score well in the Index in terms of welcoming private investment and providing an environment conducive to sustainability and innovation. But compared with those in other regions, many still experience low levels of investment compared to their GDP.

03	United States
09	Canada
27	Chile
38	Peru
39	Colombia
40	Mexico
43	Brazil

The US is the clear regional leader in our rankings. As our colleagues from GIIA note in their **afterword**, the Biden administration's Infrastructure Investment and Jobs Act and Inflation Reduction Act have had a huge impact on the US investment environment, particularly in relation to net zero-related projects.

Further south, other nations in the region show a contrasting mosaic of approaches. Following the pandemic, most looked to infrastructure development as a way to promote economic recovery, and as a result are implementing programmes dedicated to improving logistics and transportation, as well as increasing access to clean water and electricity. In some cases, the geography of South America is a particular consideration in terms of infrastructure projects.

Digitalisation is becoming a higher priority, with governments taking the leap to increase connectivity and take advantage of 5G capabilities. And, as **Federico Torres** mentions, ESG goals and net zero are very important across the region, with climate change resilience increasingly being incorporated into development plans.

Americas

Brazilian ambition

In August 2023 President Lula da Silva of Brazil unveiled a massive 'growth acceleration' plan, combining USD 76 billion of government funding with broadly similar levels of investment by state-owned companies and over USD 120 billion of private sector money, to be attracted partly by an increasing use of public-private partnerships.

In total, nearly USD 350 billion of investment is envisaged, with about 80% happening between 2023 and 2026. Nearly all of the funding will be directed towards infrastructure projects, with USD 125 billion earmarked for the creation of sustainable and resilient cities, USD 111 billion for energy projects, USD 72 billion for transportation (including waterways and ports), and smaller sums for investment in areas such as education, healthcare, water, and digital inclusion and connectivity. There will also be a strong emphasis on achieving environmental goals.

While there is scepticism in some quarters about the ability of Nova Pac – as the plan is termed – to deliver fully on its goals, with concerns including capacity and potential bottlenecks, many investors have reacted positively. There is certainly agreement on the ambition of the plan, which has been widely compared with the initiatives of the Biden administration in the US.

Green Chile

There is a high level of transparency embedded in Chile's procurement policies, and its business environment encourages private participation in infrastructure projects. The government's most recent investment portfolio, which welcomes foreign investors, includes projects that are primarily related to roads and airports, but also includes light rail, cable cars, buses and a tsunami warning system.

Chile is also moving forward with its goal of being carbon neutral by 2050. Companies have already committed to retiring thermal power plants by 2040 and the government has set a target for 70% of power to come from renewable sources by 2030. The government is also promoting energy storage and has a green hydrogen initiative that envisions Chile as a top global exporter of hydrogen by 2050.

In May 2022, the government announced its Chile Digital 2035 strategy which aims to reduce digital inequality and to achieve 100% digitalisation of public services by 2035, up from 86% at the end of 2022.

Americas

Colombian transformations

Colombia has made great strides in providing continuity for infrastructure development, regardless of political administration. The Financiera de Desarrollo Nacional (FDN) is a development bank that promotes infrastructure projects and encourages private sector participation.

However, Colombia is also a test case for some of the difficulties of the energy transition. The government of President Gustavo Petro has ambitious plans to pivot away from fossil fuel consumption. But many investors see them as unaffordable – and are wary of the government's aim to end new spending on fossil fuel exploration, not least because fossil fuels account for roughly half of Colombia's exports.

Colombia's 2022-2026 national development plan (Plan Nacional de Desarrollo) envisages USD 250bn of investment. Its funding is expected to be driven by national and subnational governments, with further contributions from the private sector and international organisations.

Unlike previous development plans, which have been based around sectors, the plan has as pillars five so-called transformations: territorial planning around water and environmental justice; human security and social justice; a human right to food; productive transformation, internationalisation and climate action; and regional convergence. What effect this innovative approach may have on implementation – or on coordination between the various public sector bodies and tiers of government which will be involved – is not yet clear.

Mexico's planes, trains, trucks and ports

President López Obrador used his fifth annual informe in September to highlight many of the projects that have progressed under his government, including rural roads and major infrastructure projects like the **Mayan Train**, as well as several other rail projects and a number of airport schemes.

Other important projects include the Interoceanic Corridor (a logistics project connecting the Pacific coast with the Gulf of Mexico), and the Dos Bocas oil refinery. Much of the rest of the country's infrastructure spending goes on electricity-related investments.

Investments related to nearshoring have been flowing into Mexico recently. UNCTAD data shows FDI of USD 35 billion in 2022, up 12% year-on-year. The increased participation of foreign investors in the economy has underscored the need for the country to upgrade aspects of its infrastructure, particularly port capacity.

Mexico's Digital National Strategy 2021-2024 aims to bring digitalisation to the public sector and to increase broadband access throughout the country.

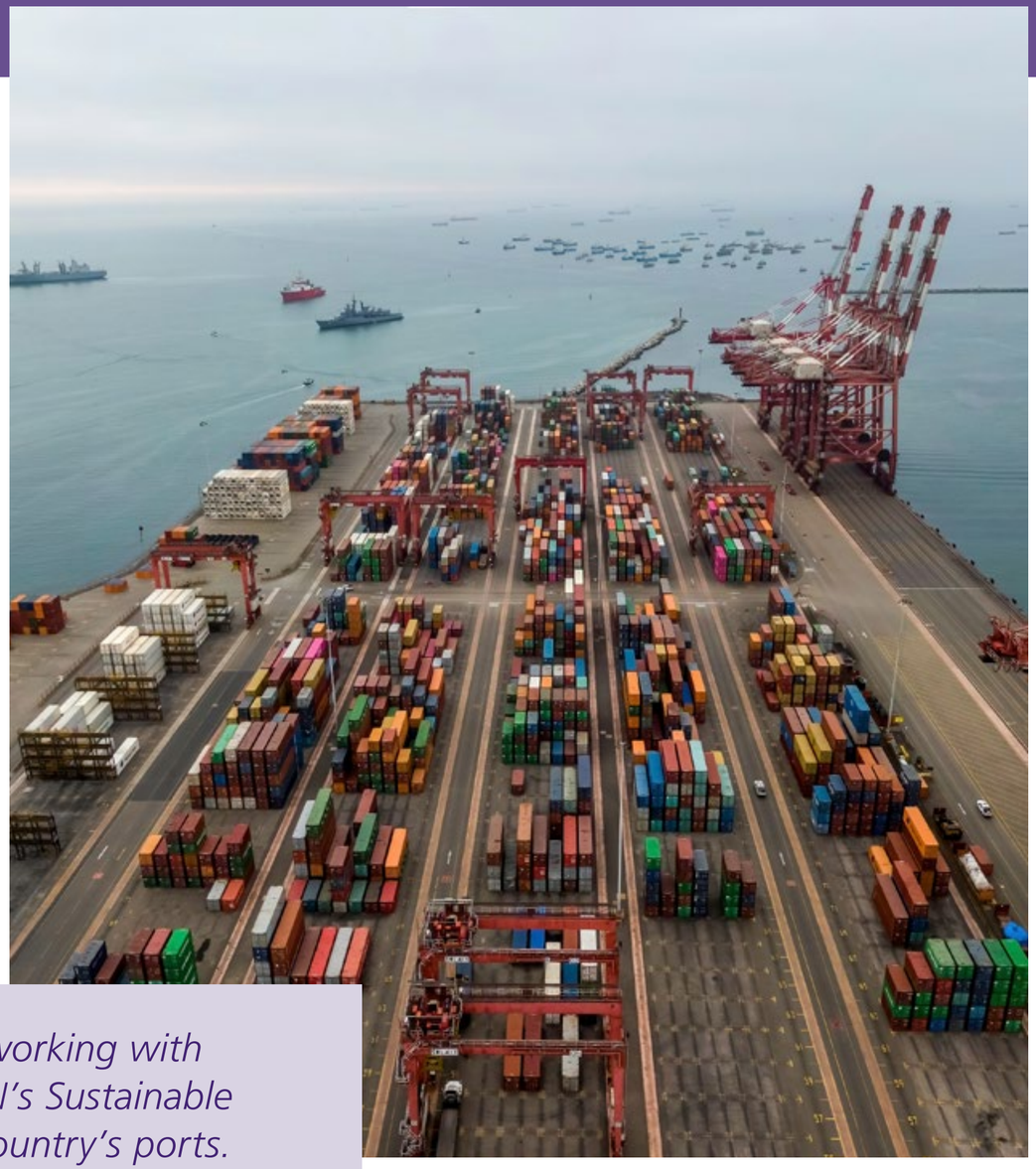
Americas

Sustainability in Peru

Peru's National Infrastructure Plan for Competitiveness was drafted in 2019. Broadened to incorporate more social and environmental concerns, it has been reborn as the National Sustainable Infrastructure Plan for Competitiveness, currently focused on project goals and objectives for 2022-2025.

The revised plan includes 72 projects to be prioritised, including 26 which are to be achieved through public-private partnerships requiring some USD 19.5 billion in investment. There is a focus on sectors including water and sanitation, health and transportation.

The National Port Authority is also working with UNCTAD on embedding the UN's Sustainable Development Goals at all the country's ports. The projects include using solar energy for electricity at the Internacional del Sur Port Terminal and for supporting maintenance activities at the Muelle Sur Container Terminal. The port of DP World Callao is building a power supply system for ships which, when completed, will allow ships to cut their engines while in port, reducing carbon emissions.



The National Port Authority is working with UNCTAD on embedding the UN's Sustainable Development Goals at all the country's ports.

The regional investment gap

In 2021 the Inter-American Development Bank estimated that Latin American and Caribbean nations need to invest USD 2.2 trillion in water and sanitation, energy, transportation and telecommunications infrastructure in order to meet the UN's Sustainable Development Goals by 2030. This would equate to over 3% of the region's GDP every year – a big step up from the average of 1.8% that was invested between 2008 and 2019. More comprehensive infrastructure investment would necessitate an even bigger step.

Americas

INTERVIEW:

Juan Carlos Quiñones Guzmán

Chief Legal Officer, Colombian Chamber for Infrastructure

The Colombian Chamber for Infrastructure is comprised of private sector participants in infrastructure projects, including concessionaries, contractors and service providers. The primary focus of the chamber is currently transport infrastructure but also extends to water facilities, hospitals, housing and schools. The chamber not only represents the private sector in its relations with the government regarding infrastructure projects, but it also offers recommendations to enhance transparency for public contracts and improve the government contracting process overall.

Colombia is an attractive destination for investment which Quiñones says is due to the country's strong institutions and a clear legal framework. Following enactment of the Public Private Partnerships Law, in 2012, the government created a new entity to manage its projects, the National Agency for Infrastructure. This body is staffed by technical professionals and there is high transparency regarding public bids.

Because of this expertise-driven structure, the private sector and investors have clear expectations in dealing with the government, which is particularly important given the long-term nature of infrastructure projects.

Quiñones explains that the history of public-private partnerships in Colombia goes back to 2014 when the government offered the '4G concessions project' which referred to four generations of concessions in Colombia. There were 29 projects, all toll roads. Twenty were public initiatives while nine were private. The current pipeline contains seven more toll road concessions.

A recent area for public-private partnerships is in improving and expanding a number of the country's airports. The project for the expansion of the existing Cartagena airport is now in the final phase of contracting. ANI is also assessing unsolicited proposals for a new airport in Cartagena, an expansion of Bogotá airport and new concessions for San Andres and Cali.

When asked about challenges to transport infrastructure in Colombia, Quiñones noted that, in some parts of the country, toll roads are perceived as representing private equity and financial institutions, but they are the operators not the owners of the road. He states that "the important challenge is to convince public opinion that private sector involvement in infrastructure is not a privatisation of public facilities but that the private sector is operating and maintaining a facility that belongs to the public."

Commenting on the role of ESG and climate-related issues related to financing, Quiñones stated that contractors must adhere to the ESG standards for their project. "Equity investors are conscious they have to comply with national and international entities regarding green financing and ESG standards. It is an opportunity for Colombia to learn about international experiences and adopt best practices."

"Equity investors are conscious they have to comply with national and international entities regarding green financing and ESG standards."

Americas

INTERVIEW:

Federico Torres

Head of Americas South division of Arup, Bogotá, Colombia

Arup is a multinational company with 90 offices in 50 countries. They have all types of engineers and architects who work on the design of infrastructure projects and buildings.

The Americas South division of Arup covers work in the south of the United States and Latin America. Torres notes that, in Colombia, there has been a shift from the previous focus on road and rail projects to include renewable energy projects.

Colombia is viewed as an attractive destination for infrastructure investment and is receiving a lot of attention from investors outside the country. Companies from the US, UK and Spain have been traditionally involved in projects. China is also working in Colombia, most recently on the Bogotá metro rail project.

National funding is provided by the Financeria de Desarollo Nacional (FDN) which is primarily owned by the Ministry of Finance and other national financial institutions.

In addition, there are minority shareholders – Sumitomo-Mitsui of Japan, the International Finance Corporation (IFC) and CAF, a development bank focused on Latin America and the Caribbean.

Public-private partnerships have been the primary way of funding infrastructure projects in Colombia. External funding comes from many different sources, including local banks, global banks, pension funds and international lenders, such as the Inter-American Development Bank.

Much of the infrastructure focus in Colombia has been on rebuilding roads to new standards, thereby replacing infrastructure from the 1950s and 1960s. The Duque government planned projects for airports and rail and the current administration of President Gustavo Petro has continued this work.

Torres notes that the overriding goals for ESG and net zero are very important across the region and Arup has a team dedicated to this in Colombia. The concept of social licence is taken into account and considers communities and the environment. “ESG standards for financing are driven by the lenders and financiers. These are incorporated as the project requires.”

Inequality is high throughout the region so countries have varying needs in terms of social infrastructure. Torres says “Communities will eventually get to the same standards as the US and Europe. They are able to learn from best practices elsewhere and implement in their own projects and investments.”

As to the outlook for infrastructure investment in Latin America, Torres believes that transportation and energy will continue to be the highest priorities. Although digital connectivity is important and certainly desirable, it is less of an urgent need than many social infrastructure projects.

“ESG standards for financing are driven by the lenders and financiers. These are incorporated as the project requires.”

Americas

CASE STUDY:

Tren Maya, South-East Mexico

Tren Maya – the Mayan Train – is one of Mexico's most ambitious infrastructure initiatives. Its aim is to stimulate economic growth and promote tourism in the south-eastern region of the country.

Construction on Tren Maya began in 2020 and is scheduled to be completed in 2024. Tren Maya is funded by the Mexican federal government through its National Tourism Fund (FONATUR).

The project must respect the environment and the cultural heritage of the Maya people. The Mayan Train is one of the world's most extensive ongoing infrastructure projects and holds the distinction of being the largest of its kind in Latin America. Total investment is expected to amount to nearly USD10 billion, with more than 1,500 km of rail track to be laid.

The project is expected to have considerable economic influence in the south-eastern region, with anticipated gains of more than USD 1.9 billion in productivity arising from its operation.

"Preserving the biodiversity and natural ecosystems along the route of the Mayan Train is crucial for the long-term sustainability of the project," noted Víctor Manuel Toledo Manzur, Former Mexican Secretary of Environment and Natural Resources.

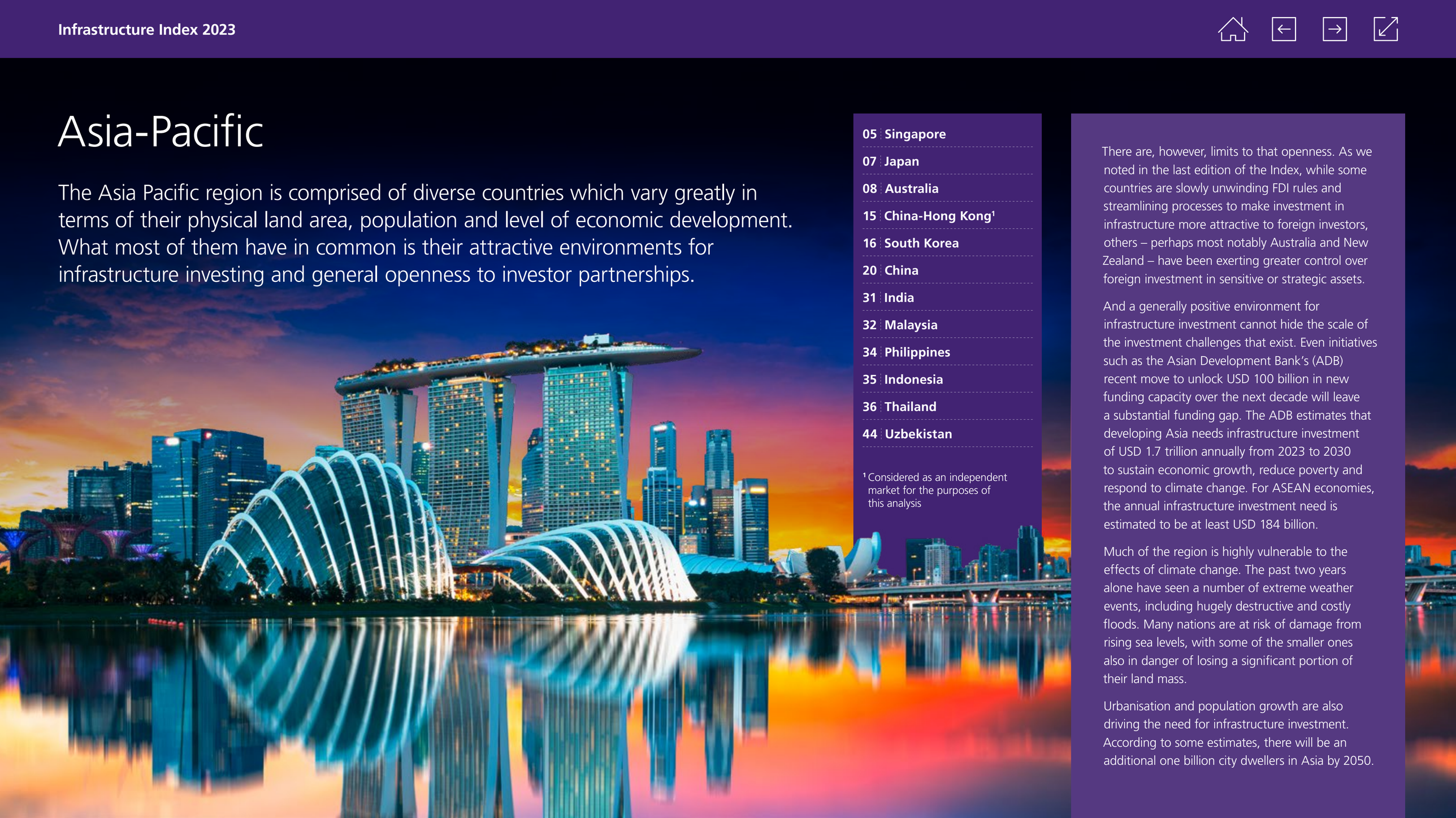
CMS Mexico provided legal advisory services to the Executive Branch, acting through FONATUR, in the meticulous structuring and execution of the project, taking charge of critical procurement procedures and playing a key role in formulating and devising the contracts pertaining to the railway construction, train acquisition and stations.

Image: www.gob.mx

"Preserving the biodiversity and natural ecosystems along the route of the Mayan Train is crucial for the long-term sustainability of the project"

Asia-Pacific

The Asia Pacific region is comprised of diverse countries which vary greatly in terms of their physical land area, population and level of economic development. What most of them have in common is their attractive environments for infrastructure investing and general openness to investor partnerships.



05 Singapore
07 Japan
08 Australia
15 China-Hong Kong[1]
16 South Korea
20 China
31 India
32 Malaysia
34 Philippines
35 Indonesia
36 Thailand
44 Uzbekistan

[1] Considered as an independent market for the purposes of this analysis

There are, however, limits to that openness. As we noted in the last edition of the Index, while some countries are slowly unwinding FDI rules and streamlining processes to make investment in infrastructure more attractive to foreign investors, others – perhaps most notably Australia and New Zealand – have been exerting greater control over foreign investment in sensitive or strategic assets.

And a generally positive environment for infrastructure investment cannot hide the scale of the investment challenges that exist. Even initiatives such as the Asian Development Bank's (ADB) recent move to unlock USD 100 billion in new funding capacity over the next decade will leave a substantial funding gap. The ADB estimates that developing Asia needs infrastructure investment of USD 1.7 trillion annually from 2023 to 2030 to sustain economic growth, reduce poverty and respond to climate change. For ASEAN economies, the annual infrastructure investment need is estimated to be at least USD 184 billion.

Much of the region is highly vulnerable to the effects of climate change. The past two years alone have seen a number of extreme weather events, including hugely destructive and costly floods. Many nations are at risk of damage from rising sea levels, with some of the smaller ones also in danger of losing a significant portion of their land mass.

Urbanisation and population growth are also driving the need for infrastructure investment. According to some estimates, there will be an additional one billion city dwellers in Asia by 2050.

Asia-Pacific

Hydrogen focus

In many countries in the region, a limited land area and high population density are not conducive to the installation of large solar fields. There is thus strong interest in promoting the export of renewable energy from nations such as Australia, Indonesia and Philippines, where the expansion of solar is possible.

One way to facilitate energy transport is through liquids. LNG has historically been a key import for many countries, but the region is increasingly exploring the use of renewable power to create green ammonia, which can then be transported elsewhere to be converted into clean hydrogen energy. Indonesia, in particular, is hoping to expand its ability to export its renewable electricity in this way. Singapore, already a regional financial centre, is working towards becoming a hydrogen trading hub.

A major obstacle to reducing the use of carbon is the outright cost of the transition and its effect on societies.

Just transitions

A major obstacle to reducing the use of carbon is the outright cost of the transition and its effect on societies. Just Energy Transition Partnerships (JETPs), in which advanced economies support a coal-dependent emerging economy in reaching its decarbonisation goals, have become one way to help middle and lower income economies make progress in this area.

In November 2022, a JETP was launched between Indonesia and an International Partners Group which comprises the EU, the US, Japan, Canada, Denmark, France, Germany, Italy, Norway and the UK. To achieve Indonesia's targets for the energy sector transition, an initial USD 20 billion in both public and private financing has been pledged over three to five years.

Data centres

As in the rest of the world, the increased digitalisation of the global economy has resulted in the need for more data centres. But with some governments in the region recognising the increased load data centres can place on already constrained electricity networks, construction has slowed.

Regional giants

No discussion of infrastructure in Asia would be complete without mentioning China and India. While they are not the highest ranking Asian nations in the Infrastructure Index, their size – they are by a huge margin the world's two most populous nations, each over four times as big as the US – means they dominate the region. And while neither is usually counted as a developed economy, the heft of their GDP – China is already the world's #2, and India is widely expected to take the #3 crown from Japan by 2030 – makes them key infrastructure players.

China's Belt and Road Initiative has been the subject of much commentary, including our remarks above. It is less often noticed that India's project lending has increased dramatically in recent years, especially in South Asia. While not at BRI levels, it seems a clear indication that – like China – India is aware of the political and policy advantages of infrastructure lending, with funding coming not only from India's ExIm Bank but via investments from some of its major private sector companies. And, as already noted, India is a key participant in the huge IMEC scheme that is being promoted by the new Partnership for Global Infrastructure and Investment.

China has been an infrastructure investment powerhouse for decades, using spending on domestic projects to help maintain its outstanding record of economic growth.

China has been an infrastructure investment powerhouse for decades, using spending on domestic projects to help maintain its outstanding record of economic growth.

The recent cooling of its economy has left it seeking to stimulate private investment in clean energy, transport, water and other 'major national projects'. It is still a formidable presence in the energy transition supply chain, being by far the largest global player in electric vehicles, lithium batteries and solar panels.

Asia-Pacific

CASE STUDY:

Data centres in Asia-Pacific

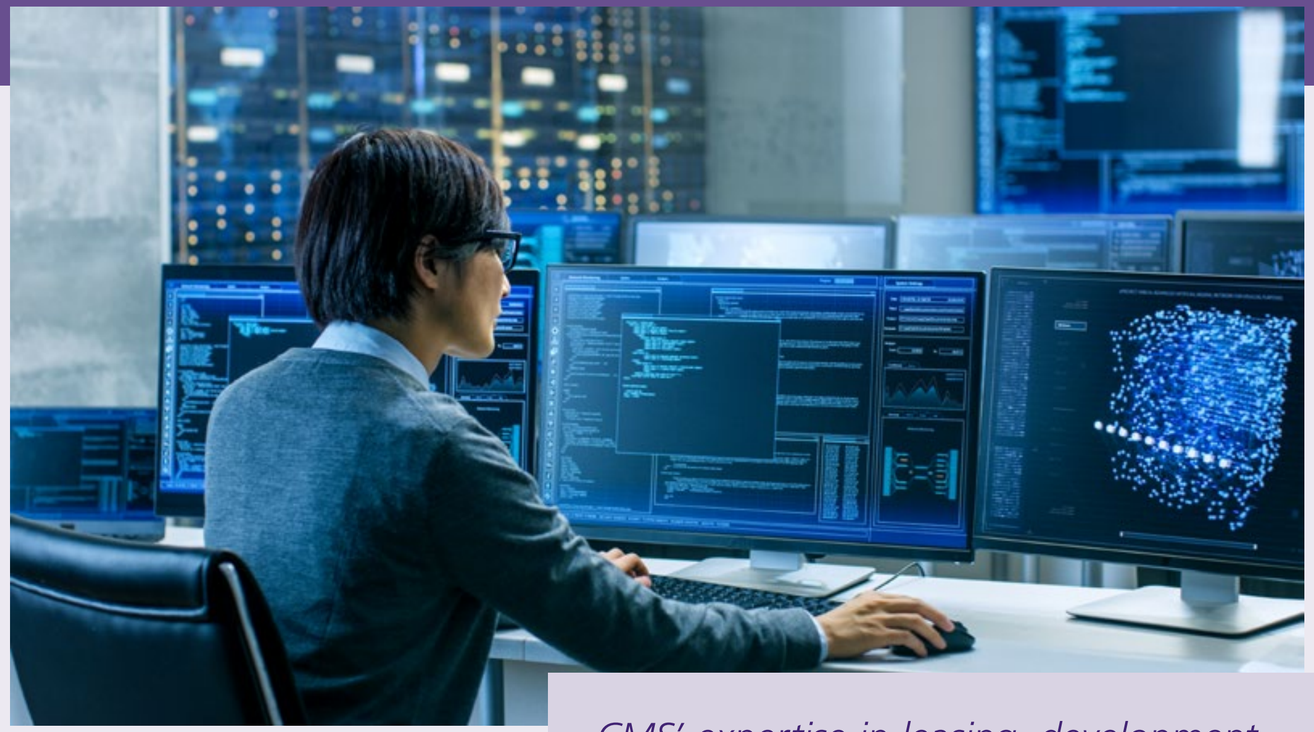
CMS advised on the lease and construction of Equinix's first Indonesian data centre JK1, located in Jakarta's Central Business District and in close proximity to major internet exchanges. JK1 is an eight-storey facility scheduled to open by the second half of 2024.

Equinix is one of the world's premier digital infrastructure companies, having invested more than USD 25 billion in its data centre platform, and calls its data centres International Business Exchanges (IBX).

In Asia, Equinix's ambitious plan for developing data centres now extends across locations including Australia, China, Japan, South Korea, Hong Kong, Singapore, India, Malaysia and Indonesia. This provides access to Asia's thriving banking, commerce, manufacturing and telecommunications marketplaces.

CMS' expertise in leasing, development and construction in this space and its deep knowledge of local regulatory issues have assisted Equinix in achieving its goal in the Asia Pacific region.

CMS has also advised EverYondr, a USD 1 billion joint venture between the Everstone Group and the Yondr Group, on its development and operations of a hyperscale data centre part of the Amanthin Info Parks in Mumbai. This venture combines Everstone's local real estate expertise and Yondr's global experience in developing hyperscale data centres globally, to transform India into Asia's data centre corridor.



CMS provided legal support not only in structuring but also in interfacing design contracts with key supply contracts and the eventual construction contracts. In doing so, CMS rendered advice on a range of complex issues including groundworks, substation, supply and insurances, for compliance with the upstream user requirements of a tech giant. The facility is an eight-storey building and is set to complete in 2025.

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Asia-Pacific

CASE STUDY:

Electricity importation project, Singapore

Since 2021, the Energy Market Authority (EMA) has embarked on a project to select and appoint competent importers to import and sell electricity from low-carbon sources in Singapore via new interconnectors between Singapore and the source country. The initial target is for delivery of up to 1.2GW of electricity by the end of 2027, with a larger target being delivery of up to 4GW by 2035.

This project is a watershed moment for Singapore's green energy ambitions and is part of its roadmap to achieve net zero greenhouse gas emissions by 2050. This electricity importation exercise is intended to work alongside other steps the country is taking to meet its international commitment under the 2015 United Nations Paris climate agreement, which include solar energy, carbon offsets and hydrogen. Potential sources of electricity include Malaysia, Indonesia, Cambodia and Laos.

CMS, in collaboration with engineering firm DNV, has been retained by the EMA to provide legal and commercial advisory services for the project. The initial requests for proposals were streamlined into a single phase where respondents were requested to submit a non-binding expression of interest (EOI). The EOI focuses on the overall design proposal covering the generation, sources of electricity supply, interconnections, delivery plan, timeline, and associated economics.

The EMA intends to issue conditional approval in response to the EOI, which may see it issuing full importer licences to participants should they meet certain obligations and condition precedents.

This project is a watershed moment for Singapore's green energy ambitions and is part of its roadmap to achieve net zero greenhouse gas emissions by 2050.

Europe

European countries have been at the forefront in the drive to achieve net zero emissions.

01	Germany
02	Netherlands
04	United Kingdom
06	Finland
10	France
11	Sweden
12	Austria
13	Czech Republic

14	Norway
17	Belgium
19	Slovakia
21	Portugal
22	Spain
23	Italy

24	Poland
26	Hungary
30	Bulgaria
33	Romania
45	Turkey
46	Ukraine

Europe

The European Climate Law, enacted in July 2021, set legally binding emissions targets for countries within the EU. The Fit For 55 package, also from July 2021, contained measures for a 55% reduction in emissions by 2030 and was a catalyst for additional investment in both renewable power and cleaner transport. The UK has set a net zero emissions target for 2050 and has devised concrete plans to reach that milestone.

A key part of the EU's decarbonisation strategy was using Russian gas as a bridge to reaching 50% renewable power generation by 2050. This element of the strategy was fundamentally shaken by the Russian invasion of Ukraine. The EU responded quickly with its REPowerEU initiative, which focused on four key elements. Diversifying suppliers and securing affordable supply were progressed together by effectively eliminating Russia as a fuel supplier via the approval of new LNG terminals. The other two elements were to save energy and reduce usage, which prompted renewed calls for investment in renewables.

Renewables concern

While the war in Ukraine elevated energy security to a higher priority, it has also solidified the region's commitment to expanding renewable power and electrification. That said, although the desire to increase renewable generation is sincere, the support for projects, particularly wind energy, has not been as enthusiastic as hoped. Permitting processes are not consistent across countries and are lengthy and fraught with political pressure. The costs of installing renewable power are high, which also erodes support. However, Europe has the advantage of a nascent manufacturing supply chain, so more investment will be forthcoming if the volume of renewable projects can be expanded.

Alongside increasing renewables generation there is also the need to invest in grids and energy storage. Access to electricity grids is not universal and the ease of connectivity can vary widely. Upgrading grids and increasing capacity is a feature of some countries' energy transition plans and will be necessary to accommodate the fluctuations in renewable power generation. Storage is another important element of the renewable energy picture since both wind and solar power are weather dependent and less predictable than either gas or coal generation.

An upgraded road to net zero

Transportation is responsible for about one-quarter of greenhouse gas emissions and the EU and UK are, once again, well ahead of the curve in terms of adopting electrification. Much of the funding for infrastructure investment has been allocated to transportation infrastructure, in particular upgrading roads and rail lines as well as expanding rail access to replace vehicle transport.

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Europe

Hopeful for hydrogen

The EU has continued to incorporate hydrogen into the policies designed to meet its net zero commitments and kicked off its hydrogen strategy in July 2020. In March 2023, the EU created its Hydrogen Bank which will hold its first pilot auction for competitive bid in autumn 2023 under the Innovation Fund. In the UK, the Scottish government set out a strategy in December 2022 which aims to utilise hydrogen in fertiliser, refinery and distillery operations.

Securing the future network

Up to now, digital infrastructure has developed on a country-specific basis. Data centres are everywhere and the transition to 5G is ongoing. Several major EU telecommunications companies signed an MoU in 2021 to work towards Open RAN. Some pilot programmes have been launched in Europe, but more progress has been made in the UK, which is an innovator in this space. The major EU firms plan to implement larger deployments by 2025, following the implementation of the security controls that are needed to make Open RAN a reality.

CASE STUDY:

bp Aberdeen Hydrogen Project

bp and Aberdeen City Council have formed a joint venture to deliver the Aberdeen hydrogen hub. The joint venture intends to deliver a scalable green hydrogen production, storage and distribution facility in the city, powered by renewable energy.

CMS supported bp in its successful bid to become Aberdeen City Council's joint venture partner.

Europe

CASE STUDY:

Carbon capture – UK

CMS advises on most of the carbon capture, usage and storage (CCUS) projects around the North Sea basin, from northern Scotland to the south-east of England. The prospective scale of the new industry is driving a huge need to innovate.

CMS is advising on selected projects in the UK which are pioneering the changes ahead. For example, one of the projects, the Northern Endurance Partnership (led by bp, Equinor and TotalEnergies), would service an immense industrial cluster collecting CO2 in Teesside, north-east England. The project involves the legal challenges of designing bespoke revenue stream arrangements for the offshore storage, transport infrastructure and the connections for the emitters such as the anchor facilities for power generation and capture, along with the hydrogen producers. This means CMS is also well versed in the innovative incentivisation mechanics for the CO2 capture and hydrogen producing entities forming this cluster.

Alongside this, a whole new regulatory, industry, legislative and contracting/commercial framework is being developed, driving on precedents from a large number of parallel sectors.

CMS also advises on the exciting Northern Lights project in Norway which is pioneering the cross-border shipments of CO2, thus creating a whole new industry in the North Sea basin. This project seeks to create flexibility in how captured CO2 can be stored in the places that have the best ability to offer this service, and is thereby helping the formation and shape of a new global industry in the international shipping of CO2.

CMS advises on the exciting Northern Lights project in Norway which is pioneering the cross-border shipments of CO2.

Europe

CASE STUDY:

Data centres in Europe

CMS advised the lending group on two separate multi-hundred million pound financings of the data centre business of Ark Data Centres (ADC) in the UK.

ADC provides low cost, private-campus fibre connectivity to some of the world's leading cloud providers. One of the financings related to ADC's established portfolio of businesses. The other was for a new development, for a hyperscale tenant, financed on a stand-alone basis. CMS' extensive experience with fibre and data centre projects enabled these two very large financings to come together on time, despite short timescales, and within budget.

The project had a high degree of complexity, involving cross-practice advice from a technology, commercial, competition, regulatory, real estate, energy and finance perspective. CMS' multi-jurisdictional and multi-discipline practice made us almost uniquely well placed to deliver this first-of-its-kind to market financing as a one-stop-shop solution.

CMS also advised a syndicate of lenders on a multi-hundred million euro financing of Atlas Edge's data centre expansion across multiple jurisdictions in Europe. Atlas Edge is a pan-European data centre platform, a joint venture between Liberty Global and Digital Edge, with locations spanning Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Poland, Spain and Switzerland.

CMS' extensive experience with fibre and data centre projects enabled these two very large financings to come together on time, despite short timescales, and within budget.

Europe

CASE STUDY:

New water supply Oslo project, Norway

Oslo municipality has initiated a EUR 2.5 billion project for the development and construction of a new water supply solution to provide service to roughly 700,000 of its citizens. The project is scheduled to be completed in 2028 and is the largest investment ever undertaken by the city of Oslo.

CMS Kluge is continuing to advise Oslo municipality as it progresses the various phases of the project.

The project consists of three main parts:

- Creating two tunnels, approximately 9 km long, between Holsfjorden and Oslo for water transport;
- Building a new water treatment plant in Oslo; and
- Constructing new water mains for the distribution of clean drinking water.

The New Water Supply Oslo Project will ensure access to a second source of drinking water for Oslo, in the event that the existing water source or water treatment plant fails.

In addition, as the city's population expands in the coming decades, the project will meet the expected increase in demand for drinking water. Amongst the main suppliers to the project are Skanska (Sweden), Sarens (Belgium) and Herrenknecht (Germany).

Middle East

Countries in the Middle East with wealth from oil and gas operations are investing some of it to meet their infrastructure needs. Infrastructure investment in the region is taking many forms and includes expanding logistics, promoting renewable energy and building out social infrastructure.

18	United Arab Emirates
25	Qatar
28	Kuwait
29	Saudi Arabia
37	Oman

The five Index countries in the region represent five of the overall top ten Index jurisdictions in terms of tax environment, and score in the top twenty for their ability to fund and implement infrastructure investment.

Middle East

The ease of doing business is improving across the region, reflecting an effort to reduce state involvement and encourage private sector investment from both within and outside the region.

This region potentially has the most adjustment to make in terms of the transition away from fossil fuels so economic diversification is a high priority. The natural endowment of warmth and sunlight is fostering investment in multiple solar energy projects as well as nature-based solutions for removing carbon from the atmosphere.

Another key area for investment is in water management. Projects for efficiently managing water use as well as utilising the abundant energy resources for desalinisation of sea water are prominent.

Saudi Arabia moves towards its Vision

Saudi Arabia is by far the region's largest economy. Under its Vision 2030 initiative, launched in 2016, the country is making great strides in not only diversifying its economy away from fossil fuels but also reducing the involvement of the state in the economy.

Saudi Arabia is actively promoting public-private partnerships and recently announced a project pipeline consisting of 200 projects in 17 sectors in which both local and international investors are encouraged to participate.

A large number of healthcare projects are being rolled out across the country including long-term care and skilled nursing homes, medical rehabilitation hospitals, home healthcare, new maternity and children's hospitals and 224 primary health centres.

Water services are another major focus of the country's infrastructure programme, with four projects now awarded to upgrade water networks in the Eastern Province.

The plan of creating 59 logistics zones by 2030 has progressed, with 21 already operational. A new high-speed railway linking Riyadh and Doha in Qatar is moving forward. A feasibility study is exploring a new high-speed railway connection between Saudi Arabia and Kuwait. But – partly because some large projects have been completed – overall government spending on this type of infrastructure and transportation fell in 2022 and is expected to fall further in 2023. These falls also reflect the growing involvement of the private sector in infrastructure projects.

Saudi Arabia is actively promoting public-private partnerships and recently announced a project pipeline consisting of 200 projects in 17 sectors.

Middle East

Other visions of a brighter future

Kuwait is progressing its Vision 2035 agenda. The initiative includes making it easier to get a business licence, increasing the share of renewable energy to 15%, adding 8,000 hospital beds and increasing the amount spent on infrastructure. Although the country's infrastructure is already well-developed, its ports and airports need to expand capacity. The country is actively promoting PPPs and encouraging foreign investors to participate.

Oman recently released its Oman Vision 2040 programme which aims to reform to its regulatory structure, build world-class infrastructure facilities and create an education system responsive to a low-carbon world. Prior to the pandemic, plans were announced to generate at least 30% of Oman's electricity through renewable independent power projects (IPPs). An economic free zone is planned for Muscat airport. The state budget in 2023 included PPPs that would focus on education, healthcare and highways. In addition, Oman and the UAE are cooperating to establish a rail link between the port of Sohar and the UAE national railway network.

Qatar National Vision 2030 was launched in 2008 and is a long-term road map for the type of economic development the country wants. The softer sides of infrastructure, namely education and healthcare, are strong priorities in the long-term plan. Infrastructure investment accelerated in 2010 after the country won the rights to host the 2022 FIFA World Cup, as substantial investment in transportation, roads and ICT was necessary to make the event a success. The focus in the coming years is expected to be on creating a knowledge-based economy and expanding ICT infrastructure which will allow a transition to smart cities.

The UAE's Vision 2021 has been succeeded by a plan called We the UAE 2031. This goes far beyond infrastructure to cover many aspects of national life in very broad terms. In infrastructure, it highlights a wish to be "the most seamlessly connected country in the world", with both advanced physical infrastructure and next-generation digital infrastructure.

COP28

This Infrastructure Index report is being published just a few weeks before the UAE hosts COP28 in Dubai. One of the key themes at COP28 will be the first Global Stocktake, a comprehensive assessment of progress on climate action since the Paris Agreement was adopted in 2015 and the basis for discussions of what actions should be taken next.

Reports that the UN has published to support to the stocktake process have painted an uncomfortable picture of a world that is not currently on track to limit global warming to 1.5C above pre-industrial levels. But suggestions that, for example, scaling up renewable energy and phasing out all unabated fossil fuels are 'indispensable elements' of just energy transitions to net zero emissions are likely to prove controversial with some of the parties at COP28. And while delegates might accept a general sentiment, such as 'access to climate finance in developing countries needs to be enhanced', they may find it harder to agree on the form that enhancement might take.

Infrastructure investors and professionals watching the COP process will be aware that some of the potential initiatives being floated – such as unlocking and redeploying trillions of dollars to meet global investment needs, and rapidly shifting financial flows globally to support a pathway towards low greenhouse gas emissions and climate-resilient development – would be revolutionary if they were adopted. It seems unlikely. And yet the direction of travel is clear, and there is strong pressure for action.

The UN report even suggests, rather like the Bridgetown Initiative, that a transformation of the financial system is needed, and that momentum is growing for "fundamental and impactful improvements to public financial institutions".

We will probably see new targets come out of COP28. But will we also see new financing initiatives, or pledges of systemic change? We will soon know.

AFTERWORD:

Reflections from the Global Infrastructure Investor Association

When we published the last Infrastructure Index in 2021, we were all living in hope that the tragedies of the Covid pandemic would be followed by a period of relat`ive economic calm and prosperity.

Little could we have known that, as the beginning of 2024 nears, we would find ourselves in the throes of a new period of disruption and uncertainty, one marked by rising geopolitical tensions, persistently high inflation and surging debt costs. In the meantime, the need to deliver the trillions of dollars' worth of investment required to address the net zero, digitalisation and critical infrastructure challenges discussed in this year's expert report has grown even more urgent.

Despite the myriad challenges faced, global infrastructure investors continue to deliver: providing improvements to utility, transport, broadband and energy networks around the world, as well as robust returns topension savers.

As an asset class, private infrastructure remains buoyant – interim fundraising hit a new high of USD 45 billion in the second quarter of this year, with fresh records set to be achieved for the largest funds dedicated to renewable energy and digital investment.

Notable among this year's risers is the US, where the Biden administration's Infrastructure Investment and Jobs Act and Inflation Reduction Act have shifted the global dial when it comes to net zero policymaking. The USD 369 billion worth of green incentives and tax breaks contained in the latter have proved particularly effective at crowding in private investment, while funding from the former is rightly designed to help promote collaboration between states and investors at the local level. Which is not to say that the nation has ticked every box when it comes to facilitating private investment: public-private partnership legislation remains underdeveloped at the state level, permitting processes remain too cumbersome and whilst incentives have spurred a boom in solar capacity across the nation, that success has not been replicated across other renewables.

For policymakers within countries further down this year's list, especially those in nations with strained balance sheets, it should be remembered that non-fiscal measures – especially developing the right regulatory frameworks – can be equally effective at raising investor appeal. Whether through incentives or regulatory reforms, one thing is for certain: governments will only meet their net zero and infrastructure targets through working closely with private investors. With public finances stretched around the world following the pandemic, the need to do so is especially pressing.

As such, this latest Index also rightly highlights how a rising tide of new requirements linked to scrutiny of international investment is impacting funds. Whether it be measures linked to the Foreign Subsidies Regulation in the EU, National Security and Investments Act in the UK, or measures imposed by the Committee on Foreign Investment in the US, it is vital that well-intentioned initiatives designed to deter malicious actors do not inadvertently deter the legitimate inward investment which is so urgently needed.

The more we can avoid a wildly varying global patchwork of regulations and requirements around infrastructure investment, the more we can accelerate change.

Removing the unnecessary regulatory barriers which deter investment globally is a must. So too is greater dialogue between governments and investors, but also between governments themselves. The more we can avoid a wildly varying global patchwork of regulations and requirements around infrastructure investment, the more we can accelerate change.

The challenge of addressing the world's infrastructure investment gap is one shared by policymakers, regulators and investors. It is only through long-term partnerships that we can hope to close it.

Jon Phillips
CEO, GIIA

GIIA Global Infrastructure Investor Association
Promoting Private Investment in Infrastructure

Methodology

This Infrastructure Index provides an effective tool for identifying the attractiveness of 50 countries around the world for infrastructure investment.

This report presents results for two aggregate measures: the Infrastructure Index score and the Infrastructure Index ranking, which is based on the Infrastructure Index score.

The scores measure an economy's performance with respect to nine main indicators and 24 sub-indicators (see below). These scores have been calculated using an indexing methodology called 'distance to frontier score', which captures the gap between an economy's performance and a measure of best practice across a wider sample of countries. A score of 100 signifies best possible performance, while a score of zero signifies worst possible performance.

The 2023 Index includes three new metrics comprised of seven new data series. The data for the six existing metrics are unchanged wherever possible. If a series has been discontinued, a comparable data series has replaced it. The weightings for the Index in 2023 have changed to accommodate the three new metrics but have largely retained the relative importance of the prior categories.

The countries covered by the Index have changed in order to provide more regional balance as well as reflect developments in the infrastructure sector globally.

— In Africa, Algeria has been dropped. Angola, Kenya and Mozambique have been added.

— In Europe, Portugal and Sweden are now included. Russia was dropped.

— In Asia, Uzbekistan, Bangladesh, Cambodia, Iran and Vietnam have been dropped. Kazakhstan has been added.

— In Middle East, Egypt has been added.

The parameters of the Infrastructure Index are based on the nine main indicators and further sub-indicators. The table following indicates the weightings of each of components:

Economic status	**21%**	Credit rating and outlook	14%
		Interest rates	4%
		Annual trade (% of GDP)	3%
Political stability	**15%**	Governance and stability	8%
		Regulatory stability	5.5%
		Rule of law	1.5%
Private participation	**13%**	Size of private sector	5%
		Procuring infrastructure PPPs	4%
		Gross fixed capital formation (% of GDP)	4%
Infrastructure environment	**10%**	Quality and condition of infrastructure	5%
		Planning for future projects	5%
Protectionism	**10%**	FDI regulatory restrictiveness index	5%
		Average tariff rate	2.5%
		Non-tariff measures	2.5%
Ease of doing business	**10%**	Ease of doing business	6%
		Transparency/corruption	4%
Market size	**9%**	GDP	3%
		Gross fixed capital formation	3%
		Population	3%
Sustainability and innovation	**6%**	Environmental performance	4%
		Innovation	2%
Tax environment	**6%**	Corporate tax rate	2.5%
		Complexity	2.5%
		Resource drain	1%

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