

INFRASTRUCTURE

Infrastructure Investing: Why Now?



In the infrastructure space, a convergence of trends—some that investors have been focused on for years, others more recent—should continue to drive investment opportunities in high-quality assets.

Recent developments include a massive data investment opportunity, the global push toward decarbonization, and the midstream sector falling out of favor due to ESG concerns. These are playing out amid longer-term trends such as aging utilities that require significant capital upgrades, and governments worldwide seeking solutions to their ballooning debt.

At Brookfield, we focus on infrastructure

assets that provide the backbone for essential services supporting vital economic and social activity. Prominent examples include electricity transmission and distribution; water distribution; midstream systems; ports, rail and roads; and communications and data networks.

Given their essential nature, these assets often provide investors with stable and secure cash flows, downside protection,

diversification from other asset classes, inflation protection and long-term liability matching. By focusing on essential operating assets, an infrastructure strategy should be resilient in most economic environments. While we believe that infrastructure is compelling for investors across a variety of market conditions, today's climate appears to be particularly rife with opportunity.

70%

of electricity transmission and distribution systems are well into the second half of their lifespans

Aging Utilities and a Widening Funding Gap

We continue to observe traditional asset operators in the utilities sector seeking alternative sources of funding. Their capital needs are significant as they look to replace older operating assets and address decarbonization goals.

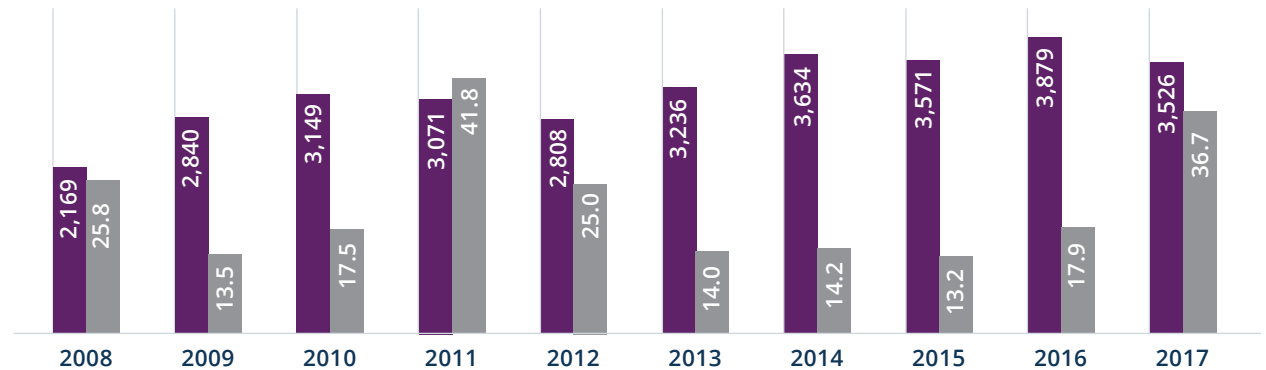
The state of the U.S. electrical grid highlights the aging of infrastructure assets generally. According to the American Society of Civil Engineers' *2021 Infrastructure Report Card*, 70% of electricity transmission and distributions systems are well into the second half of their lifespans.¹ As a result, the U.S. is experiencing numerous outages affecting a substantial number of customers across the country (see Figure 1). Within the U.S., many utility operators today are still publicly owned and federal-, state- or municipal-run.

These challenges come at a time when developed economies around the world have taken on historically high levels of debt—a trend that long preceded the pandemic and global economic shutdown associated with it. Poor demographics (including shrinking and aging populations), expanding entitlement programs and an extended period of low interest rates have encouraged borrowing that has led to unprecedented government deficits in the U.S. and many countries in the European Union (see Figure 2).

FIGURE 1

The U.S. Has Been Challenged by Numerous Electrical Outages

● Total Number of Outages ● People Affected (in Millions)



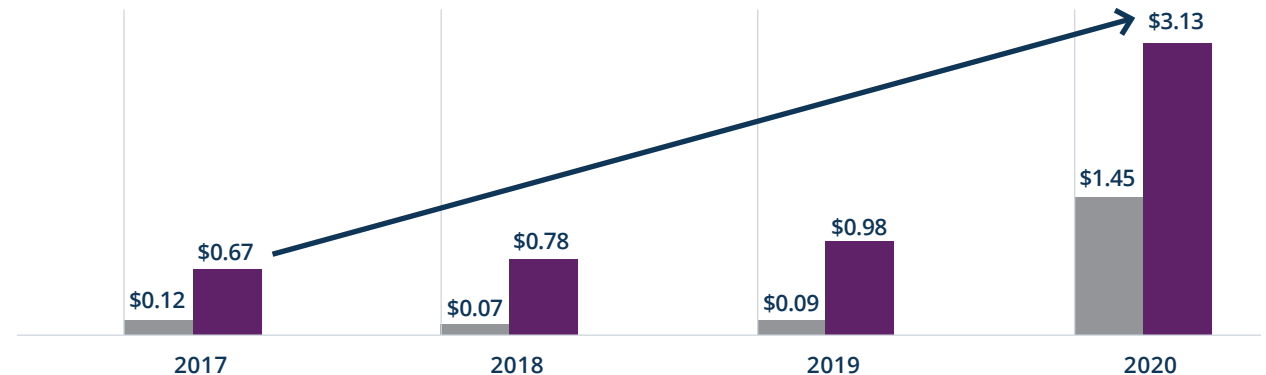
Source: 2017 Eaton Blackout Tracker.

FIGURE 2

Governments Are Facing Increasing Budget Deficits

Government Deficit (\$ Trillion)

● EU ● U.S.



Sources: U.S. Department of the Treasury, Congressional Budget Office, International Monetary Fund, World Economic Outlook Database, October 2020.

The pandemic, and the strain it has put on government finances, has made this issue even more urgent.

Many traditional asset operators across the infrastructure space are contending with a wide funding gap to maintain their systems. For example, the American Society of Civil Engineers estimates the U.S.'s total cumulative funding gap at \$2.5 trillion between 2020 and 2029 (see Figure 3).

Governments can address this challenge in three primary ways. They can increase taxes, but there is a limit to how much additional revenue that can produce. They can also turn to the private sector to deliver services, or they can sell assets and use the proceeds to help rebuild their balance sheets. As private investors, we expect that the latter two options should create numerous opportunities for those with operational expertise and access to large-scale, flexible capital.

FIGURE 3

U.S. Infrastructure Assets Will Require Over \$2.5 Trillion of Investment from 2020–2029

(All Values in \$ Billions)

Infrastructure System	Total Needs	Funded	Funding Gap
Surface Transportation	\$2,834	\$1,619	\$1,215
Drinking Water/Wastewater/Stormwater	\$1,045	\$611	\$434
Electricity	\$637	\$440	\$197
Airports	\$237	\$126	\$111
Inland Waterways & Marine Ports	\$42	\$17	\$25
Dams	\$94	\$13	\$81
Hazardous & Solid Waste	\$21	\$14	\$7
Levees	\$80	\$10	\$70
Public Parks & Recreation	\$76	\$10	\$68
Schools	\$870	\$490	\$380
TOTALS	\$5,937	\$3,350	\$2,588

Source: 2021 Infrastructure Report Card, American Society of Civil Engineers.

The U.S.'s total cumulative funding gap is estimated at \$2.5 trillion between 2020 and 2029

Data Networks Require a Massive Upgrade

Demand for data has grown rapidly—faster than any other commodity in both developed and developing markets—and this growth shows no signs of plateauing.

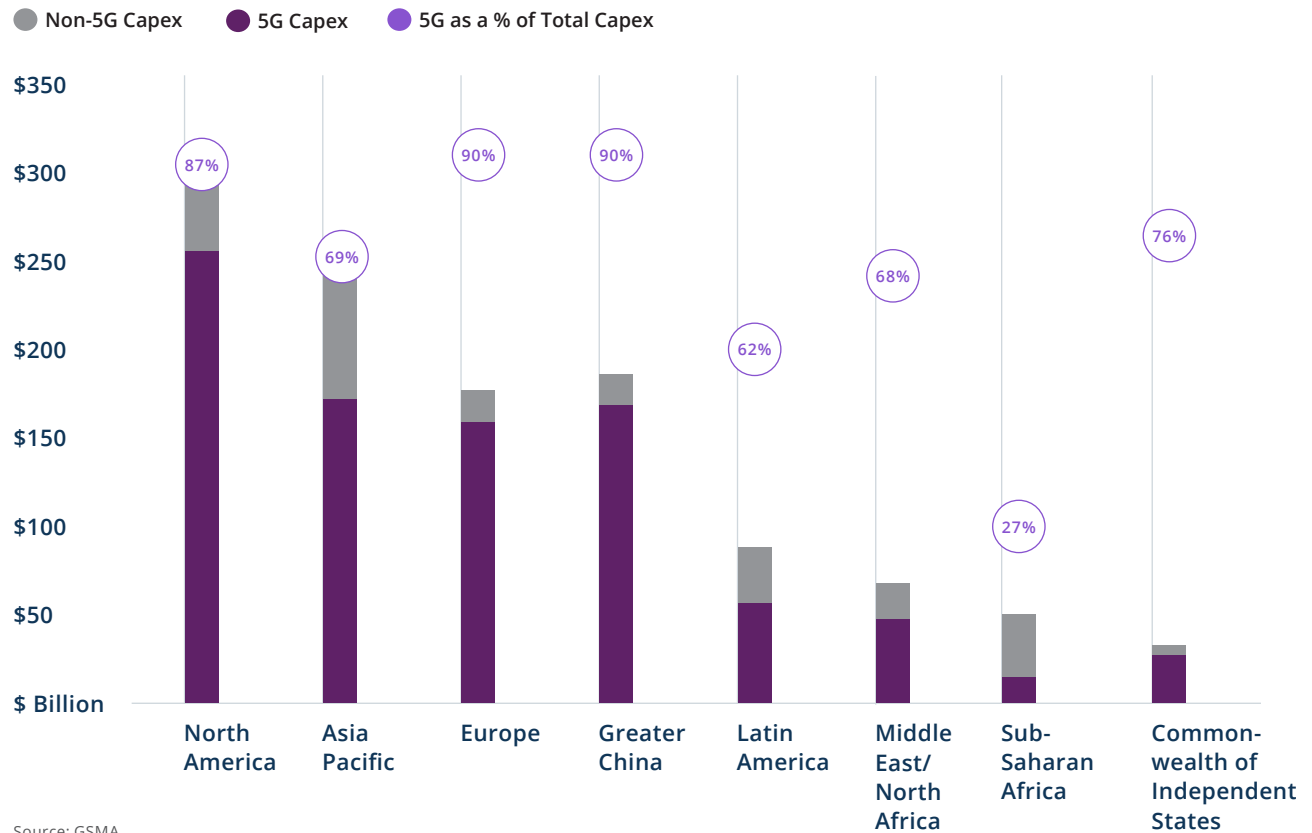
Much of this data is still being transported globally across an outdated network. While the telecom industry has seen a huge transformation from its copper backbone infrastructure to fiber optic, that shift still needs to extend to the “last mile”—the end-user’s doorstep, whether it’s an office, retail location or residence. Getting to the point where the industry can meet the ever-increasing demands for capacity and speed will require a significant amount of investment.

In addition, as the world moves to roll out 5G, many more mobile communications towers and data centers will be required. At the same time, telecommunications companies are selling interests in mature assets to specialist infrastructure investors to fund expansion projects. Such arrangements enable the

FIGURE 4

5G Will Help Drive \$1.1 Trillion of Investment In Global Networks Over the Next Five Years

Capex 2020–25



Source: GSMA.

telecommunications companies to secure long-term access with experienced third-party operators, while providing these operators with stable long-term cash flows.

We expect at least \$1 trillion of investment will be required over the next five years alone to upgrade data infrastructure globally (see Figure 4), an enormous undertaking.

A Global Push Toward Decarbonization

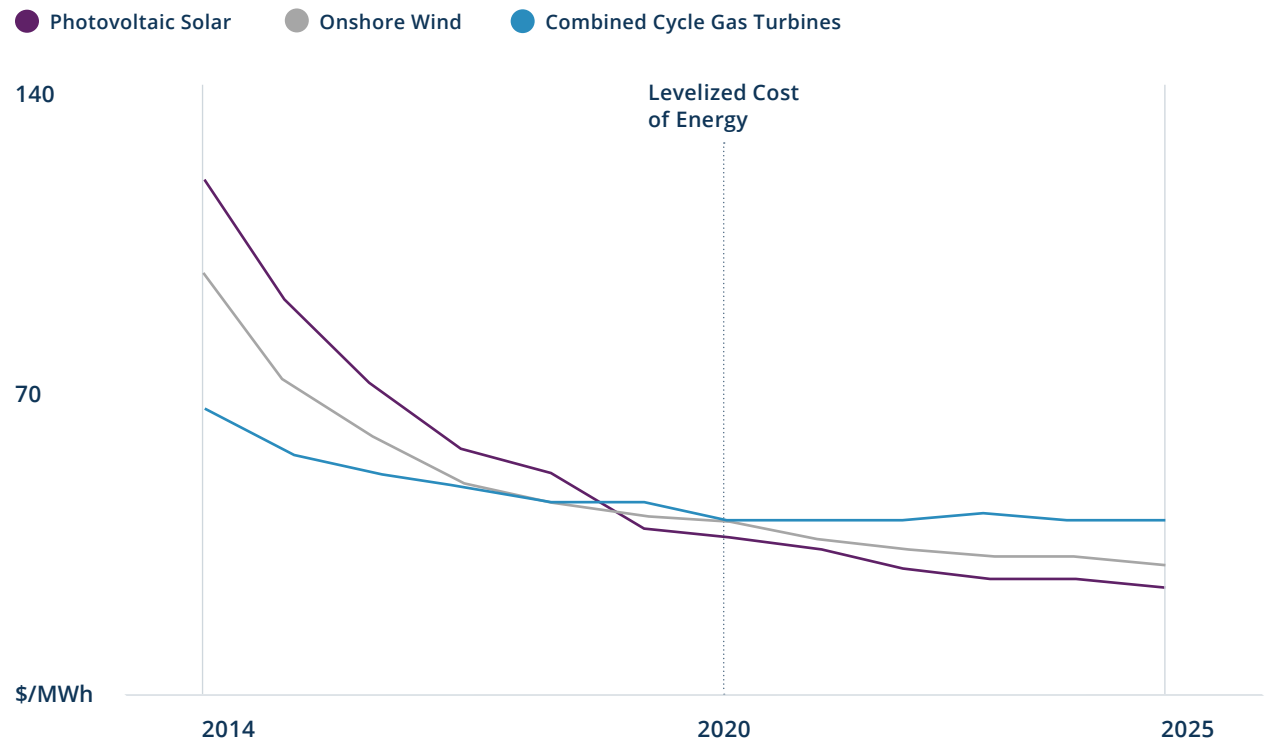
The worldwide effort to slow climate change is resulting in an outsized market opportunity in renewable energy sources.

The global consensus is that carbon emissions must be reduced across all aspects of modern life. We continue to see governments commit to decarbonization targets, as well as the private sector voluntarily setting its own objectives.

The good news is that the cost of renewable energy—particularly solar and wind—has dropped dramatically in recent years (see Figure 5). We have reached the point where a profitable investment in renewables can be achieved without support from the government.

Goldman Sachs estimates that as much as \$16 trillion of total investment will be required by 2030 to limit global warming to 2°C.² Given the magnitude of these decarbonization initiatives, we believe that significant opportunities will emerge for investors with scale and expertise in clean energy solutions. As the renewables sector continues to mature and attract private capital, we believe there will also be ample prospects for acquiring cash-flow-generating, operational renewable assets.

FIGURE 5
Wind and Solar Are Now the Cheapest Sources of Bulk Generation



Source: Bloomberg New Energy Finance.

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Contrarian Opportunities in the Midstream and Transport Sectors

Given the momentum behind the global transition to net-zero emissions and the transformation of the energy mix required, market participants have soured on midstream energy assets.

Yet, because the process of converting effectively to a renewable and sustainable platform will continue to require the use of midstream assets in the years ahead, fossil fuels will remain an important part of the energy mix for the foreseeable future (see Figure 6). They help support the growth of low-carbon energy alternatives like wind and solar.

When it comes to carbon emissions, however, not all fossil fuels are equal. Natural gas produces far less pollution and carbon emissions than coal, and can serve as a complement to a growing renewable power system. Gas is easy to store and responds rapidly if the wind isn't blowing or the sun isn't shining, which is essential for avoiding brownouts and blackouts.

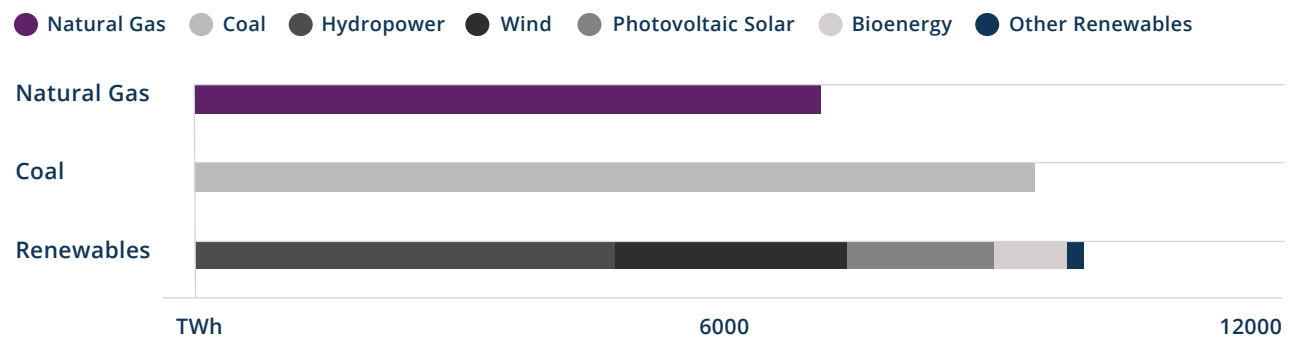
Natural gas is exposed to volatile pricing and, as a result, tends to fall in and out of favor with

investors. To avoid such volatility, investors can focus on highly defensive, contracted and stable assets, such as midstream pipelines or liquid natural gas liquefaction and re-gasification facilities. Volatility can also provide opportunities for private investors to access the sector at attractive entry points. Although these assets can have a finite life, we believe they will play a crucial role in the transition to net-zero emissions for decades to come and can present an attractive investment opportunity. Gas transport networks may also help enable the emergence of green hydrogen and carbon sequestration in the future.

FIGURE 6

Natural Gas Will Continue to Play a Major Role in Electricity Generation

Estimated Electricity Generation by Technology Source in 2025



Source: International Energy Agency.

Meanwhile, the pandemic has cast an unprecedented level of uncertainty over the transport industry. Travel restrictions globally resulted in lower volumes of passengers and goods passing through airports and ports, and along highways. Investors understandably shied away from this asset class amid questions about when demand might return to pre-pandemic levels. As the vaccine rollout remains in its early days in many countries, the global picture for the industry remains far from clear.

However, as an owner and operator of ports and toll roads, Brookfield has seen firsthand that these assets can perform well during a period of disruption with the necessary contractual agreements in place. And given the negative sentiment surrounding this asset class, we believe there may be an opportunity to acquire high-quality assets at attractive valuations.

Looking Ahead

As much of the world continues to recover from the COVID-19 pandemic, and economies reopen and expand, inflation is becoming a central focus. As a result, infrastructure managers with a long-term investment horizon must place a strong emphasis on ensuring cash flows have either direct or indirect inflation protection.

For managers who understand these risks and can structure mitigating protections, the current economic backdrop could create a favorable environment to support continued strong performance across high-quality infrastructure assets and promote additional investment opportunities.

While there continues to be increased competition for infrastructure assets globally, managers that remain disciplined in their capital deployment, and have the necessary resources and scale, ESG awareness, and established sourcing and operational capabilities, should be well positioned to capitalize on attractive infrastructure investment opportunities going forward.

Disclosures and Endnotes

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Investors should consult with their advisors prior to making an investment in any fund or program, including a Brookfield-sponsored fund or program.

1. American Society of Civil Engineers, "2021 Report Card for America's Infrastructure," 2021.
2. Goldman Sachs Equity Research, "Carbonomics: The Green Engine of Economic Recovery," June 2020.

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