Climate change and resilience

Impacts of disruption on the core infrastructure investor

March 2018

IN BRIEF

- Investors must reflect a changing climate in their base case assumptions, and recognize that infrastructure investments are susceptible to faster-than-expected shifts.
- Infrastructure assets could be vulnerable to rising temperatures, higher sea levels and more extreme weather events.
- Utilities could benefit from incentives to invest in resilient systems.
- Political, regulatory and investor responses to faster climate change could also have significant ramifications, especially for fossil fuel-centric investments.

DISRUPTION THREATENS ALL INVESTORS. EVERY INDUSTRY AND SECTOR FACES DISRUPTION RISKS FROM NEW TECHNOLOGIES, COMPETITORS, POLITICS AND REGULATIONS. We believe that core infrastructure investments are relatively less vulnerable because they are grounded in physical assets that provide essential services.[1] Nevertheless, they are not immune. Investors should consider the potential for disruptive changes in every underwriting, both for the individual asset and the broader portfolio. As always, a diversified portfolio is central to mitigating downside risk.

Here, we explore climate change's risks and opportunities for infrastructure investors. Many implications of climate change are clear and direct: rising temperatures, higher sea levels and more extreme weather events like storms and droughts. The pace of climate change, however, will depend on the political will to cut greenhouse gas (GHG) emissions and the progress of technology that could undercut GHG producers. Below, we evaluate which infrastructure sectors are most vulnerable, and those likely to be beneficiaries.

AUTHOR

Stephen Leh
Infrastructure Research,
J.P. Morgan Asset Management

VULNERABLE TO DISRUPTION FROM GLOBAL WARMING

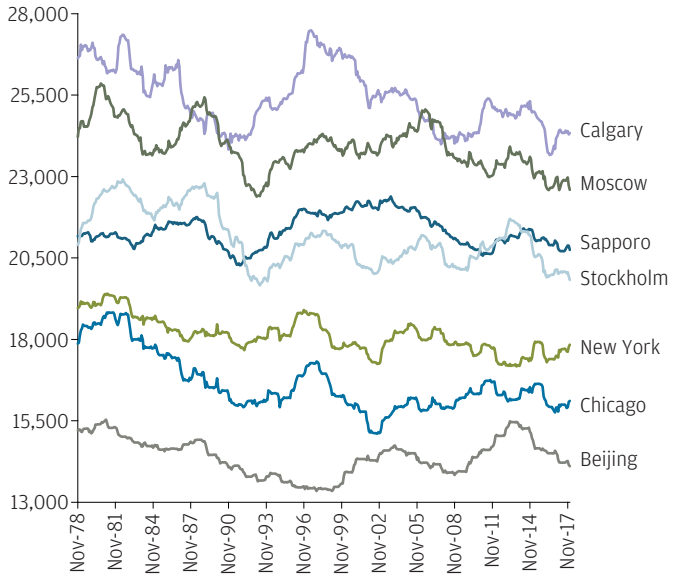
Heat suppliers

Warmer weather would reduce demand for heat. Indeed, it already has, albeit at varying rates for different locations (**EXHIBIT 1**). Heat distribution networks would suffer to the extent that their revenues are linked to the amount of heat they supply. If demand for heat fell enough, utility assets could be left stranded (nonperforming before the end of their expected life span) as customers shifted to less efficient but less capital-intensive technologies, such as electric heat pumps. The risk of stranded assets is currently low because efficient natural gas and district heating networks typically wield a significant cost advantage over competing technologies.

[1] We consider investments to be core if their cash flows are forecastable for at least 10 years with a low margin of error.

Residential and commercial heat demand have fallen around the world

EXHIBIT 1: ROLLING 5-YEAR HEATING DEGREE DAYS*

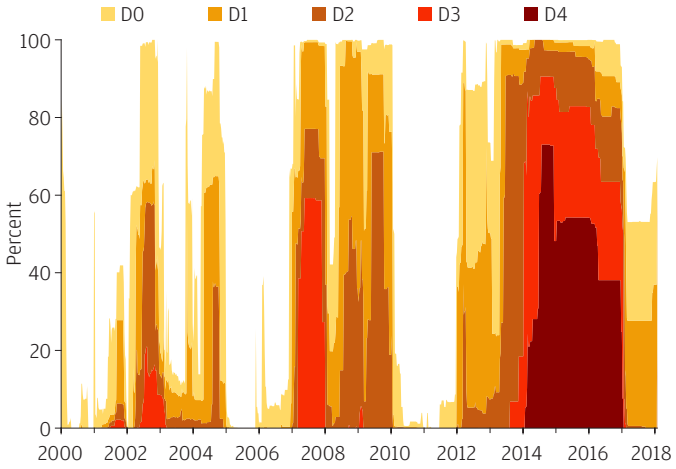


Source: Bloomberg, J.P. Morgan Asset Management; data as of February 2018.

*A temperature-based proxy for residential and commercial heat demand.

Water shortages have become more frequent and more severe in populous areas like California

EXHIBIT 2: SHARE OF CALIFORNIA'S POPULATION AFFECTED BY DROUGHT INTENSITY LEVELS 0-4



Source: U.S. Drought Monitor, J.P. Morgan Asset Management; data as of January 2018. The National Centers for Environmental Information's U.S. Drought Monitor ranks drought intensity as: D0 = short-term dryness; D1 = moderate drought with high fire risk; D2 = likely crop losses, very high fire risk, water shortages; D3 = extreme drought with major crop loss, extreme fire risk, widespread water shortages; D4 = exceptional, widespread drought emergency.

Utilities may mitigate the impact of lower volumes by periodically increasing the price per unit of heat during regulatory reviews. Utility regulators could also adapt by raising the share of fixed revenues while lowering the share of revenues that fluctuate with usage. Industrial customers can provide an additional bulwark against global warming-related losses because their consumption is typically independent of outside temperatures.

Storm-exposed assets

Rising seas and severe storms pose a risk to a number of waterside assets, as amply demonstrated by the tsunami-induced disaster at the Fukushima Daiichi nuclear power plant. Even inland assets can incur storm damage, as Puerto Rico's electric grid did in 2017. Assets without adequate insurance coverage are clearly most vulnerable. Extreme weather events may cause business interruptions. Companies may need to increase spending on redundant systems and backup suppliers.

Selected water utilities

Droughts could become more frequent and severe in many areas. California has suffered repeated droughts over the last two decades (**EXHIBIT 2**), while Cape Town, South Africa, could run out of water altogether. Water utilities whose revenues are linked to end-user consumption may suffer if customers—by mandate or by choice—use less during times of scarcity.

LIKELY BENEFICIARIES OF DISRUPTION

Utilities that enhance resilience

Governments may react to global warming by pressing for greater investment in resilient infrastructure. Regulators may permit water utilities to invest in new pipes to reduce leakage, to construct alternative supply routes to protect against storms or even to build desalination plants. Electric utilities may be mandated to move critical infrastructure to safer ground. Utilities should be permitted to incorporate such investments into their rate bases.

Gas-fired peaker plants

Higher temperatures could spur greater demand for air conditioning. A grid's minimum reserve capacity is a function of demand on the hottest days of summer. Even small increases in summer highs could force utilities to raise capacity prices to retain older peaker plants, which provide reserve capacity when demand peaks.

POTENTIAL EFFORTS TO SLOW CLIMATE CHANGE

Higher carbon pricing

Should higher carbon taxes be passed, base load coal plants would be particularly hard hit. Base load natural gas plants would also be affected. Their early retirement could drive power prices higher, benefiting the producers—carbon-neutral and newer, cleaner natural gas—that remain. Higher carbon pricing could also hurt investments in carbon fuel infrastructure: e.g., oil refineries, pipelines, tankers and trains; natural gas pipelines and liquefied natural gas (LNG) terminals; coal ports and wagons.

New regulation might include direct subsidies for new clean-energy construction, which could depress energy prices, a negative for all existing assets with exposure to merchant power (entities that sell power on a speculative basis, not through long-term contracts)—including renewables.

Higher hurdles for new projects

If activist pressure mounts, so could political and regulatory obstacles. Greenfield fossil fuel-centric developments would be most at risk, as illustrated by the debates over the Keystone XL pipeline and Adani's proposed Galilee Basin rail project in Australia.

Enhanced investor focus

Greater sensitivity to environmental, social and governance (ESG) principles could push valuation multiples higher for renewables and other carbon-neutral investments. Meanwhile, institutional investors' reluctance to fund "dirty" projects could lead to diminished exit multiples for carbon-intensive assets.

INVESTMENT IMPLICATIONS

Disruptive forces are often interrelated, and one shift may help to offset another. For example, advances in battery storage may mitigate the effects of climate change. Moreover, many sources of disruption—with the notable exceptions of global warming and political unrest—support economic growth. If a diversified infrastructure portfolio is negatively affected by disruption, an investor may see offsetting gains in other asset classes. We believe core infrastructure assets are less vulnerable to disruption than many other investments, especially when coupled with long-term contracts and stable regulatory frameworks. Past underinvestment in infrastructure gives governments a strong incentive to encourage private sector capital. Nevertheless, investors should constantly assess new risks and diversify to mitigate volatility.

IMPACTS OF ACCELERATING WARMING ON INFRASTRUCTURE INVESTMENTS*

Vulnerable	Likely to benefit
Heat suppliers	Utilities that enhance resilience
Storm-exposed assets	Gas-fired peaker plants
Selected water utilities	Renewable and carbon neutral projects
Older base load coal and natural gas plants	New, cleaner natural gas plants
Associated oil, coal and natural gas infrastructure	ESG-consistent investments
Greenfield fossil fuel developments	

*Assuming political, regulatory and investor responses to climate change.

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NEXT STEPS

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We would like to thank Serkan Bahceci, Ph.D., for his contributions to this article.

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