

GLOBAL X INSIGHTS

Infrastructure & Environment: Building the Foundation of Tomorrow

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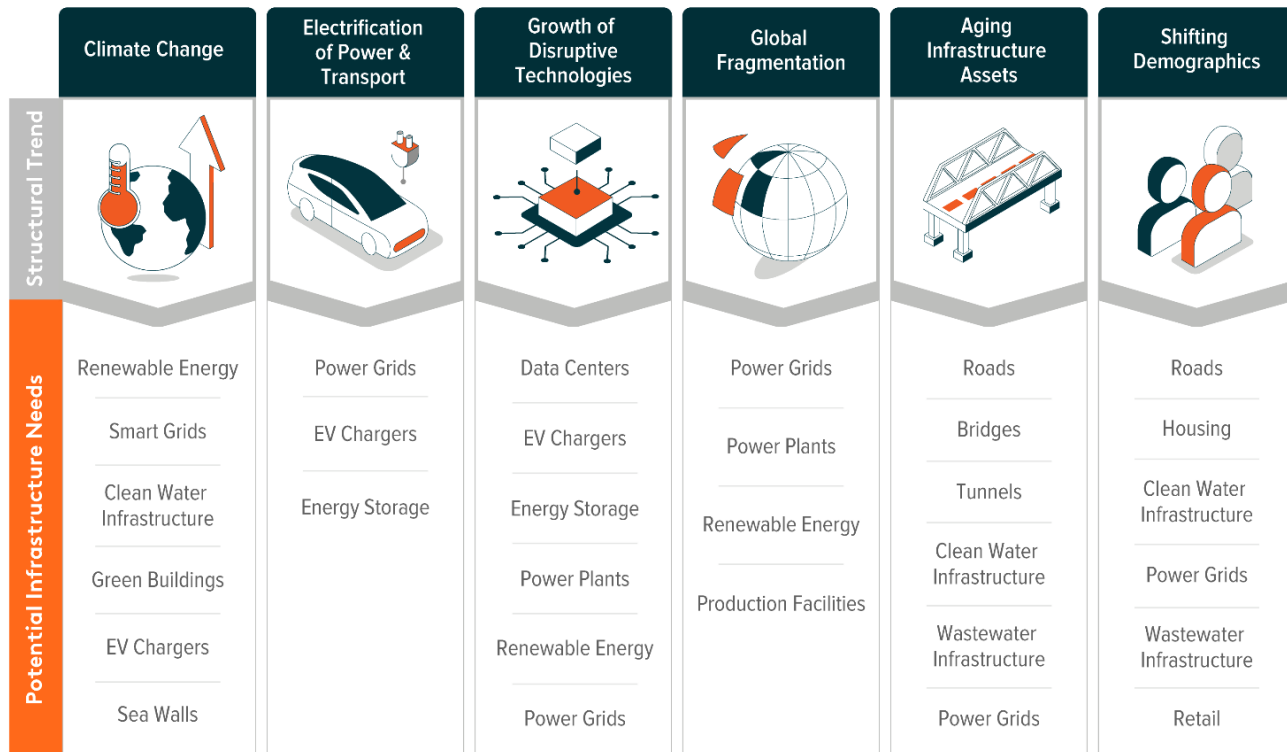
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Topics: [Thematic](#), [Charting Disruption](#), [Infrastructure & Environment](#)

This piece is part of a series that dives deeper into the most prevalent themes of this year's iteration of our flagship research piece, [Charting Disruption](#). The Infrastructure & Environment section focuses on [infrastructure](#), cleantech, and mobility. For additional insights from the project, please click [here](#).

Infrastructure development across the globe is witnessing significant demand, as several powerful structural trends converge. These trends, from the escalating challenges of climate change to the rapid adoption of disruptive technologies like artificial intelligence (AI), renewable energy, and electric vehicles, are reshaping the way we think about and build the essential systems that underpin modern society. Government policies aimed at addressing growing energy demands, climate change, and technological progress are also driving trillions in both public and private investments toward the development and enhancement of infrastructure assets globally. As infrastructure needs and potential investments continue to grow, opportunities for companies across the infrastructure development, clean technology, and mobility value chains are expected to increase.

INFRASTRUCTURE DEVELOPMENT: CENTRAL TO STRUCTURAL FORCES



Sources: Global X ETFs with information derived from: Brookfield. (2024, June 17). Why Infrastructure Is a Compelling Investment for All Cycles.



Key Takeaways

- Driven by the pressures of multiple influential global trends – such as climate change, electrification, shifting demographics, and the aging of existing assets – the United States, as with many nations around the world, likely stands on the brink of an infrastructure renaissance.
- Global consensus dictates that limiting warming to 1.5°C-2°C remains crucial to avoid severe climate change impacts. Achieving this requires an estimated \$150 trillion in investments for emissions-reducing technologies between 2023 and 2050.¹
- Electric vehicles (EVs) have transitioned from a niche segment within the transportation sector to a more mainstream presence, yet there remains significant potential for further growth with increased affordability and technological advances.²

Paving the Path to Tomorrow: Investing in Infrastructure

Infrastructure development is a key global concern, with aging assets posing challenges worldwide. For example, in the United States, nearly half of all power grid assets are over 20 years old, and one in three bridges needs major repairs or replacement.^{3,4} To meet modern demands, substantial investment is required to update and maintain the infrastructure systems that have become outdated. However, global infrastructure investment must go beyond simple repairs and upgrades. In many parts of the world, shifting demographics towards larger and increasingly urban populations will require a significant buildout of infrastructure assets. By one estimate, 60% of the infrastructure required to support the projected global population in 2050 has yet to be constructed.⁵

Additionally, as new technologies such as AI emerge, they will demand more sophisticated and resilient infrastructure to function effectively. This includes not only the development of large data centers but also the construction and expansion of power generation facilities and semiconductor fabs. Addressing this multi-faceted challenge will require comprehensive planning that integrates technological advancements with energy and infrastructure development.

Therefore, global infrastructure development must address challenges regarding existing physical assets as well as the technological and energy demands of the future. We believe this holistic approach is necessary to create systems capable of supporting the innovations that will drive progress in various sectors. Moreover, the energy required to power these advancements adds another layer of complexity. As the world transitions to more energy-intensive technologies, ensuring a sustainable and resilient energy supply is crucial.

CleanTech Winds Up: A Renewable Future

Global investment in energy transition technologies is estimated to need approximately \$150 trillion between 2023 and 2050 to limit global warming to 1.5°C, averaging about \$5 trillion annually.⁶ Given that 2024 projections estimate \$2 trillion for cleantech funding, worldwide commitments to such investments must increase to achieve these climate goals.⁷ One of the most significant investment gaps, and therefore opportunities, exists across the power grid.⁸ Reducing emissions and improving resilience throughout the power sector will require the widespread use of renewable energy and energy efficiency systems, as well as a significant buildout of energy storage and power grid infrastructure.

Fortunately, the clean energy transition is well underway. Projections estimate 89% of total capacity additions through 2035 could derive from wind and solar, driven by favorable policy environments, technological advancements, and continued cost declines.⁹ AI-driven power demand is also poised to boost growth across various power resources, including renewables. Additionally, energy storage capacity additions are forecast to increase from 44GW installed in 2023 to nearly 140GW in 2030, due to expected price declines and tech advancements.¹⁰

The low-carbon hydrogen industry is also gaining momentum globally, supported by favorable policies. While the project pipeline is advancing more slowly than expected, clean hydrogen production is forecast to grow at a 76% compound annual growth rate between 2024 and 2030.^{11,12,13} As the energy transition progresses, clean technologies and infrastructure assets will play a crucial role in enabling a sustainable, low-carbon future.

Driving Transportation Forward: EVs and Battery Tech

Over the past few years, EVs have transitioned from a specialized segment to an increasingly significant presence in the automotive industry. In 2024, EVs are forecast to account for nearly 20% of global passenger vehicle sales.¹⁴ As automakers introduce more affordable models, charging infrastructure networks expand, and consumer adoption continues to rise, EVs could potentially reach a market share of 55% by 2035.¹⁵ This surge is also likely to be driven by advances in battery technology, such as solid-state batteries, which promise to offer higher energy densities and faster charging times, further improving the performance, safety, and affordability of EVs.

However, at the heart of this electrification revolution lies a critical challenge: the demand for minerals essential to EV battery production, including lithium, copper, and cobalt. As the global adoption of EVs accelerates, concerns are growing surrounding the ability to meet the increasing demand for these materials. In fact, demand for lithium alone is projected to grow by over 150% by



2030.¹⁶ The supply chain for these minerals faces hurdles, including limited mining capacity and geopolitical risks. Addressing these challenges will be crucial to ensuring the continued growth of this market and the broader transition to a sustainable, low-carbon future.

Conclusion: Structural Forces Demand Infrastructure Development for Today and Tomorrow

The convergence of structural forces such as climate change, electrification, technology advancements, and aging assets is yielding new growth opportunities across a range of infrastructure assets. Climate change necessitates infrastructure that can withstand more extreme weather, while electrification demands robust grids to support renewable energy and EVs. Advances in technologies like artificial intelligence call for data centers, faster connectivity, more power generation, and integrated systems. Simultaneously, aging infrastructure in many regions requires upgrades to prevent failures and optimize performance. By laying the physical groundwork, infrastructure can support the deployment of transformative technologies that are enabling smarter cities, efficient logistics, and sustainable development.

Footnotes

1. International Renewable Energy Agency (IRENA). (2023, June). World Energy Transitions Outlook 2023: 1.5°C Pathway.
2. Rho Motion. (2024, October). EV & Battery Quarterly Outlook: Q3 2024.
3. International Energy Agency (IEA). (2023, October 17). Electricity Grids and Secure Energy Transitions.
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12. BloombergNEF. (2024, May 21). New Energy Outlook 2024.
13. Collins, L. (2024, May 23). US and Europe Will Lead Global Clean Hydrogen Production in 2030, with Little Support from Exporting Nations: BNEF. Hydrogen Insight.
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15. Ibid.
16. Albemarle. (2024, July 31). Albemarle Reports Second Quarter 2024 Results.

Information provided by Global X Management Company LLC.

Investing involves risk, including the possible loss of principal. Diversification does not ensure a profit nor guarantee against a loss.

Semiconductor fabs refers to semiconductor fabrication facilities, which are specialized manufacturing plants that produce semiconductor devices used in electronic components.

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