

Investors' guide to defining infrastructure

Expanding the infrastructure definition
to support today's investment portfolio

KPMG in Canada

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At a glance

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Assets at a glance

Today, infrastructure can be categorized into four core asset classes, each of which encompasses industry specific sub-sectors, as listed below:

Transportation



Roads



Airports



Rail



Ports



Shipping & logistics

Social



Healthcare



Government



Education



Recreation



Aerospace & defense

Digital



Wireless



Towers



Fibre



Network & systems



Data Centers & storage

Energy & Natural Resources



Power & utilities



Storage



Timber & agriculture



Mining



Renewables & waste



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A new landscape

Investors have long regarded infrastructure as a predictable and resilient asset class, one that can be relied upon for its low-risk profile and stable cashflows. Years of socio-economic and technological advancements, however, have expanded the definition of infrastructure well beyond its initial scope.

In short: it's time for investors to take a fresh look at this evolving category.

Infrastructure is no longer simply about roads and buildings. The term now encompasses a wide range of innovations, technologies, and assets that help people connect, drive economic growth, and provide essential services in our daily lives. This expanded definition means investors have more options to capitalize on emerging opportunities; however, it's important that they avoid treating this definition as a catch-all and gain clarity on how modern infrastructure is truly defined.

KPMG's Investors' Guide to Defining Infrastructure helps provide this clarity and bring investors closer to the true, modern definition of infrastructure. This guide offers a new framework for investors to follow when identifying infrastructure assets, additionally demonstrating the application of the new definition across various infrastructure asset classes.



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The evolution of infrastructure



At a glance

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Investment economics

In times of record-low interest rates and high capital availability, infrastructure investment activity was centered around a limited number of desirable - or "blue chip" - assets. But as rates of return were squeezed on these assets due to growing competition, investors turned their attention to assets with higher risk profiles to meet their portfolio mandates. These include assets that may contain a development component, lack initial positive cash flows, or operate in markets whose capabilities are still emerging.

Socio-economic change

Infrastructure is rightly considered essential to the functioning of society; as our social needs, priorities, and environments change, our infrastructure adapts to support it. Views of what is essential are dynamic and expand to account for new surroundings and environments. Over time, new infrastructure categories and asset classes are deemed essential.

Today, a renewed focus on purpose over profits has stimulated innovations in infrastructure with sustainability and equity at their core. With this in mind, investors are seeking to invest in sustainable infrastructure that creates both a social and environmental impact, while stimulating portfolio growth.

Technological advancements

Technology has been pivotal to the changes in infrastructure investments through the emergence of new asset classes, sectors, and growth within existing assets. In the modern investment landscape, technology has been integrated across all infrastructure asset classes and has become a top priority when evaluating investment and growth opportunities. As technology continues to develop, evolve, and scale, infrastructure investments will become more efficient, integrated, and supportive of economic growth globally.

Infrastructure re-defined:

The modern definition

Infrastructure is “**modern** physical assets that are **essential** for a country, region, or organization to function, that contribute to a **sustainable** future, and that foster an **opportunistic** investment landscape”.

The characteristics below underpin today’s definition of infrastructure.

Modern

Modern infrastructure refers to emerging technologies and innovative approaches that help drive value-add enhancements. It also encompasses new technology assets and modern upgrades to existing assets.

Essential

Essential infrastructure supports and sustains the communities it serves. However, what is considered "essential" changes over time to support new ways of living, working, and playing. As such, essential infrastructure reflects today's priorities.

Sustainable

Sustainable infrastructure enables operational longevity and supports a sustainable future. It leverages sustainable practices to help achieve net-zero emissions targets and foster greener, healthier, and more equitable communities.

Opportunistic

Infrastructure that provides opportunities, such as investing in emerging markets and technologies and innovative projects with higher risk profiles with an aim to provide value upside and ongoing returns.



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Infrastructure re-defined:

The modern checklist

The following represents **key criteria** of a modern infrastructure asset.

Large Scale	<ul style="list-style-type: none">• Exists within well-established or regulated markets• Has a high barrier to entry• Requires public-private collaboration to build, operate, and maintain
Real Assets	<ul style="list-style-type: none">• Is physical in nature• Requires large-scale construction• Meets critical needs
Predictable	<ul style="list-style-type: none">• Has contracted revenue sources• Has low output variability• Provides stable cash yields
Low Risk	<ul style="list-style-type: none">• Demonstrates resilient operating conditions• Has low volatility and correlation to the broader market
Modern	<ul style="list-style-type: none">• Is digitally connected• Is aligned with new and emerging technologies and processes• Utilizes innovative approaches
Essential	<ul style="list-style-type: none">• Seeks to support evolving community needs• Supports connectivity of physical and non-physical assets
Sustainable	<ul style="list-style-type: none">• Aims to mitigate unequitable impacts on communities• Has a positive impact on the environment• Is equipped to handle future climate pressures
Opportunistic	<ul style="list-style-type: none">• Provides opportunities for ongoing revenue / cash flow• Has value-add capabilities• Supports regional/national economic growth

 Key criteria of the traditional definition of infrastructure.

 Key criteria of the modern definition of infrastructure.



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Transportation



Roads



Airports



Rail



Ports



Shipping & Logistics



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The modern definition



What has changed: Transportation has been the longstanding foundation of infrastructure investments. It is divided into two sections: 1) infrastructure that facilitates the movement of people; and 2) infrastructure that enables the movement of goods.

The transportation investment landscape has evolved to address changing societal, environmental, and technological needs, with a focus on sustainability, smart infrastructure, multimodality, resilience, social equity considerations, and globalization. These changes facilitate greater opportunities for today's investors to modernize existing assets in the value chain or capitalize on emerging mobility trends to meet the transportation needs of the future and maximize long-term and sustainable returns.

Modern

Modern transportation leverages value from technology investment in core assets to enhance the connectivity of broader transportation networks. Large-scale capital projects (e.g. expansion and automation) allow investors to create value-add opportunities to boost returns.



Sustainable

Sustainable transportation prioritizes efficiency and environmental stewardship regarding the movement of goods and people. Current focus areas include EV's, expanding public transportation systems, and government incentive programs geared towards reduced carbon emissions. Investors should look to support transportation businesses that meet current environmental goals and build transport solutions that will fulfill future targets.



Essential

Transportation continues to be a fundamental part of infrastructure investing. The industry showed extraordinary resilience and adaptability throughout the pandemic, and demonstrated the capacity to provide investors with stable returns.



Opportunistic

The global increase in population will continue to drive the need for improved methods of transportation of both goods and people. This provides investors with potential long-term value investments that not only add portfolio value, but help enhance the strength of the broader economies they surround.



Transportation

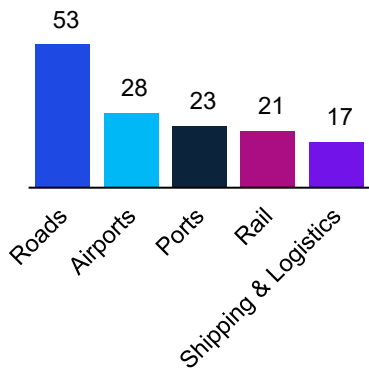
Market trends



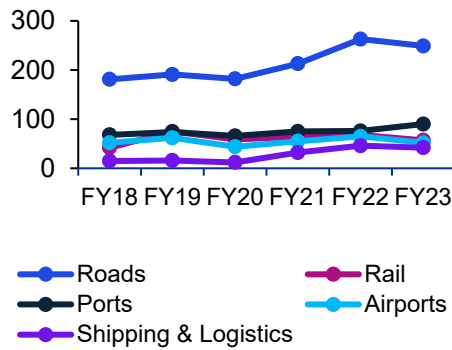
\$142b

Transportation Transaction Value (FY23)

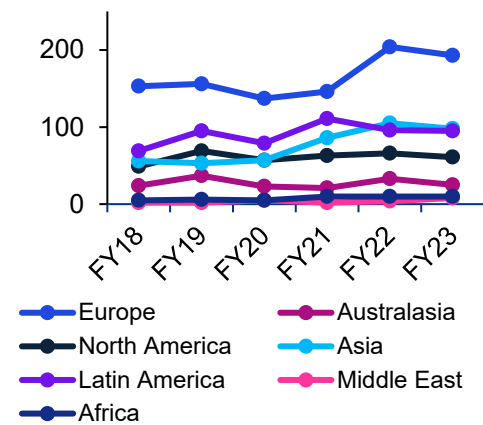
Deal Value by Sector (FY23, USD billions)



YoY Growth in Deal Volume by Sector



YoY Growth in Deal Volume by Region



2,586

Transportation deals closed between FY18 and FY23

6%

Annual growth in Transportation transaction volume from FY18 to FY23

Key transactions

Top 5 deals by value during FY23

Transaction	Acquirer / Financier	Target / Asset	Subsector	Value (USD)	Geog.	Deal Type
Triton International Sale	Brookfield Infrastructure Partners	Triton International	Shipping & Logistics	\$12.3B	USA	M&A
JFK Airport Redevelopment	Skanska (Developer & Equity Provider)	JFK Ring Road / Parking Lot	Airports	\$10.0B	USA	Greenfield
Northvolt Ett Gigafactory	Consortium of banks	NorthVolt gigafactory	EV Infrastructure	\$4.2B	Sweden	Greenfield
S-Bahn Munich Development	LHI Leasing	Deutsche Bahn	Rolling Stock / Rail	\$3.1B	Germany	Greenfield / Financing
GCT US East Coast Terminal Portfolio Sale	CMA CGM	Global Container Terminals	Ports	\$3.0B	USA	M&A

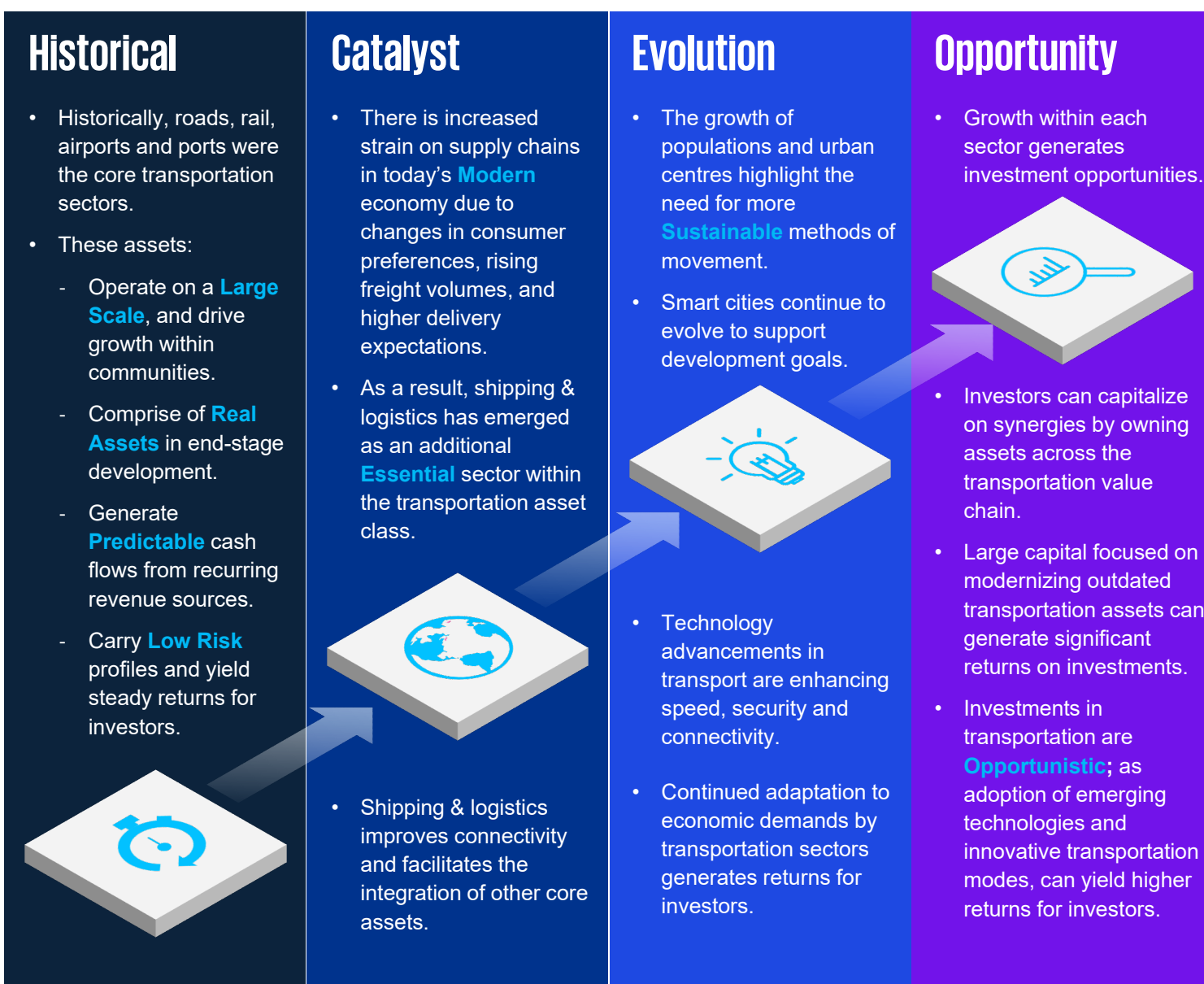
Unless otherwise noted, all data and transactional information was gathered through [infralogic.inframationnews.com](https://www.infralogic.inframationnews.com)

Transportation

Evolving investment landscape



Sector growth: The definition of transportation infrastructure has expanded in scale and scope. The following depicts Transportation's modernization path, growth within key sectors, and new characteristics.



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Social



Healthcare



Government



Education



Recreation



Aerospace & Defense

The modern definition



What has changed: Social infrastructure is vital to domestic economic growth and socio-economic growth on a global scale. Rapid urbanization and the corresponding rise in urban population density will continue to test the resilience of healthcare, education, and government systems. As such, there is an urgent need for improved social infrastructure to support these social institutions.¹

The call for updated social infrastructure has prompted a demand for smart infrastructure and disrupted the traditional investment landscape in this asset class. Despite slightly lower returns, investors can still expect predictable cash flows, consistent returns, and low-risk profiles from assets in this re-defined class.

Modern

Modern societies demand continued improvements to their social infrastructure. Herein, Investors have an opportunity to support innovative and transformative solutions that increase the efficiency of existing infrastructure. Opportunities also exist to fund large-scale capital investments that improve the longevity, efficiency, and social impact of current facilities.

Sustainable

The growing importance of sustainable social infrastructure has shifted investment expectations. Today, investments that focus on social contributions are the priority, and they benefit investors through a less cost-focused model that leads to higher project margins.



Essential

The global pandemic underscored the need for well-built, well-equipped and well-functioning public facilities. Investment opportunities exist in connection with initiatives that accelerate socio-economic growth while maintaining public health, safety, and well-being.

Opportunistic

As social infrastructure assets age, many global governments are relying more on private capital collaboration to address infrastructure needs. This dynamic provides investors with the potential to increase portfolio value through access to new markets as government projects continue to evolve.

1) "Social Infrastructure from challenge to opportunity for investors", Long-Term Infrastructure Investors Association (github.org) (October 2021)

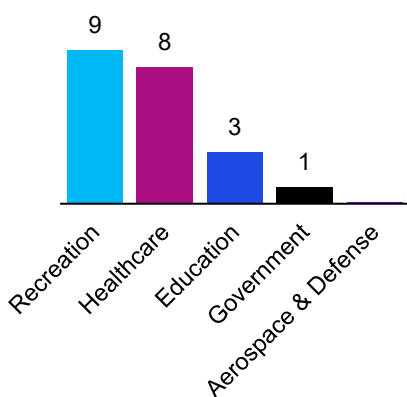
Market trends



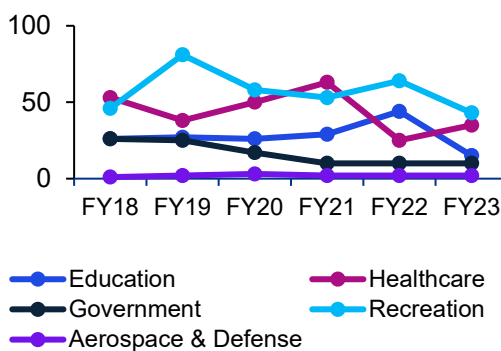
\$21b

Social Transaction Value (FY23)

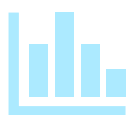
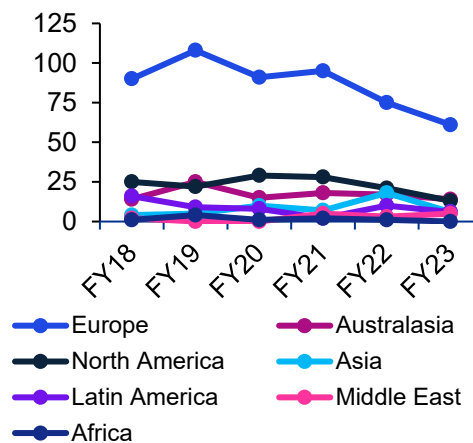
Deal Value by Sector (FY23, USD billions)



YoY Growth in Deal Volume by Sector



YoY Growth in Deal Volume by Region



886

Social deals closed between FY18 and FY23

7%

Annual decline in Social transaction volume from FY18 to FY23

Key transactions

Top 5 deals by value during FY23

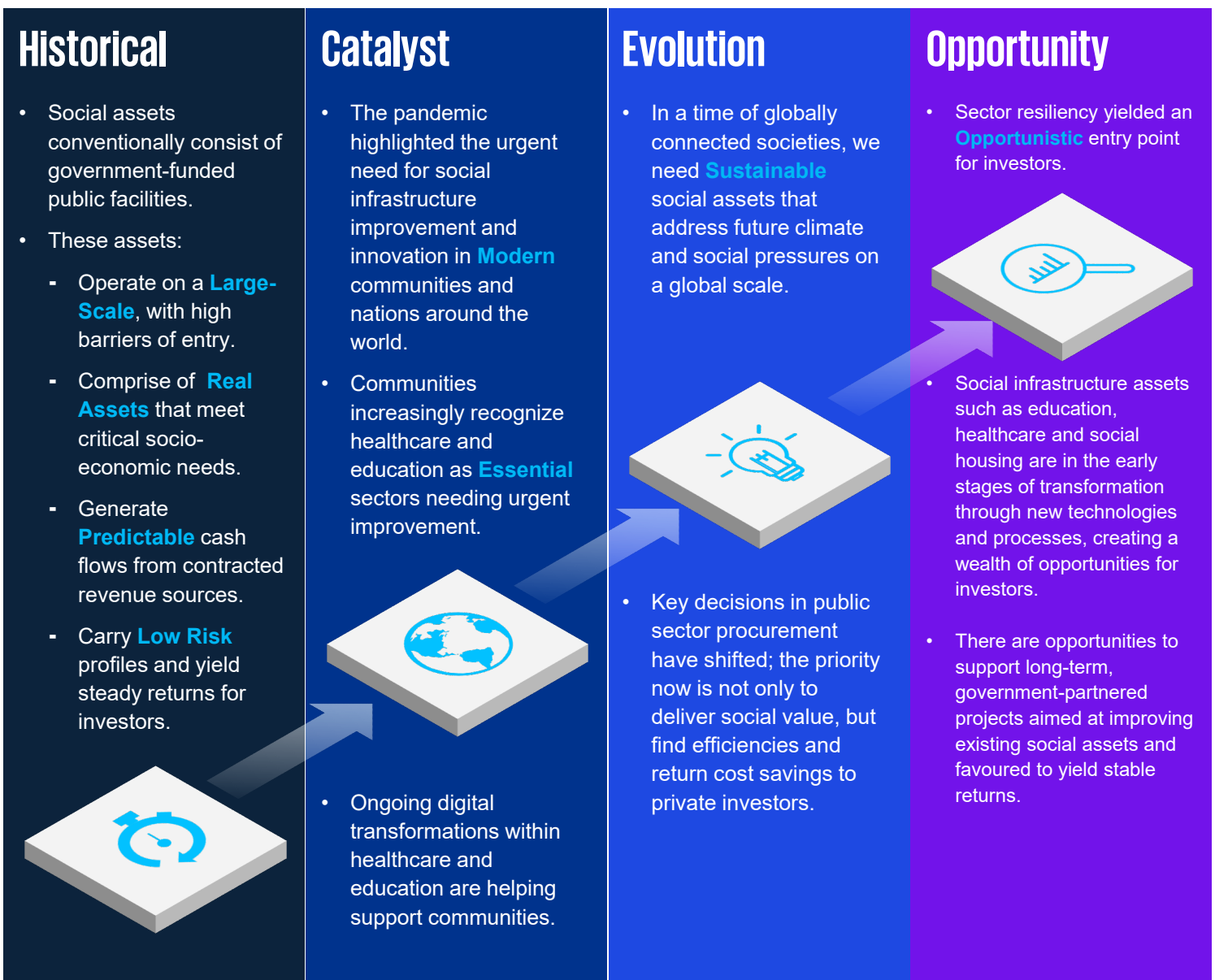
Transaction	Acquirer / Financier	Target / Asset	Subsector	Value (USD)	Geog.	Deal Type
NEOM Temp. Village PPP	Alfanar	NEOM Temp. Villages	Accommodation	\$2.7B	Saudi Arabia	Greenfield
SBB Sale (51% Stake)	Brookfield Super-Core Infrastructure Partners	SBB (Education Portfolio)	Education	\$1.5B	Sweden	M&A
Royal Adelaide Hospital PPP Refinancing	Consortium	Celsus Securitisation Pty Ltd	Healthcare	\$1.5B	Australia	Refinancing
NEOM Temp. Village PPP	Tamasuk	NEOM Temp. Villages	Accommodation	\$1.3B	Saudi Arabia	Greenfield
Alliance Medical Group Sale	iCON Infrastructure Partners	Alliance Medical Group	Healthcare	\$1.1B	United Kingdom	M&A

Unless otherwise noted, all data and transactional information was gathered through [infralogic.inframationnews.com](https://www.infralogic.inframationnews.com)

Evolving investment landscape



Sector growth: Investing in social infrastructure has evolved to encompass a broader range of areas, funding sources, and considerations. The graphic below depicts the modernization of the Social infrastructure definition and the progression within its sectors.



Digital



Wireless



Towers



Fibre



Network & Systems



Data Centers & Storage

The modern definition



What has changed: Digital transformation is taking shape within every facet of our lives, making connectivity goals a priority amongst societies across the world. As such, opportunities for digital infrastructure expansion exist within both developed and developing regions, where there is an increased focus on enhancing bandwidth, connecting populations, and using digital technologies to stimulate economic growth.

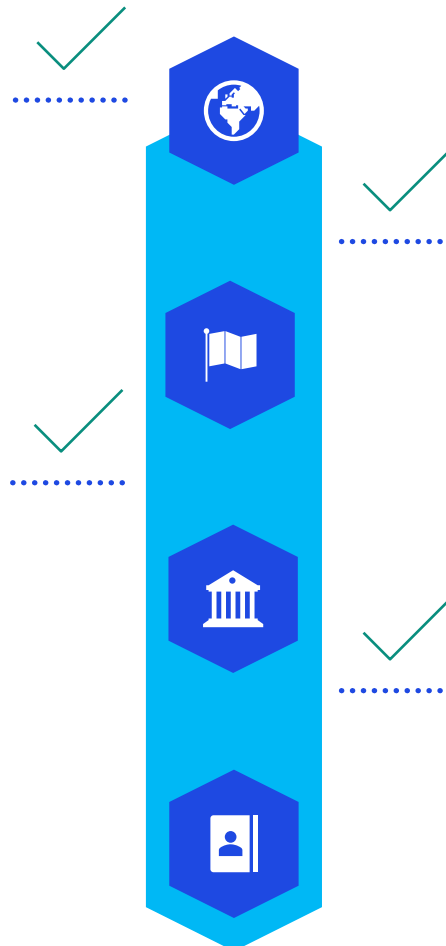
Despite the push for greater connectivity, digital infrastructure continues to be significantly underserved. Estimates suggest an additional \$50 billion in supply is required to meet current demands for connectivity services, and this amount is expected to grow to nearly \$1 trillion by 2040.¹ This ever-growing demand for connectivity has made digital assets an essential part of infrastructure's modern definition.

Modern

Digital infrastructure drives connectivity and innovation across all infrastructure asset classes, making it crucial to continued human and business development.

Sustainable

Digital infrastructure has been shown to drive positive social, economic, and environmental outcomes that help reduce economic inequality. As advanced technologies become fundamental in shaping the digital infrastructure landscape, infrastructure investors have the opportunity to drive positive social change while earning strong rates of return.



Essential

With the continued adoption of new technologies and new ways of connecting, digital infrastructure has emerged as an integral component of society. Connectivity and innovation will continue to drive growth and support the expansion of this asset class.

Opportunistic

In many respects, digital infrastructure is still in the adoption phase. Investors have the opportunity to capitalize on long-standing returns as the market matures.

1) "Digital Infrastructure Analysis", AIB (January 2020)



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Evolution

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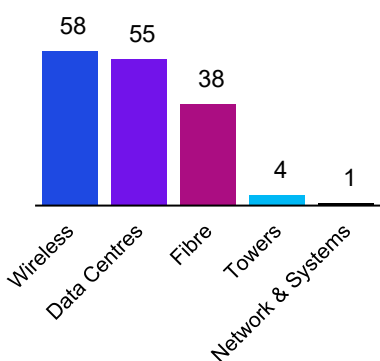
Market trends



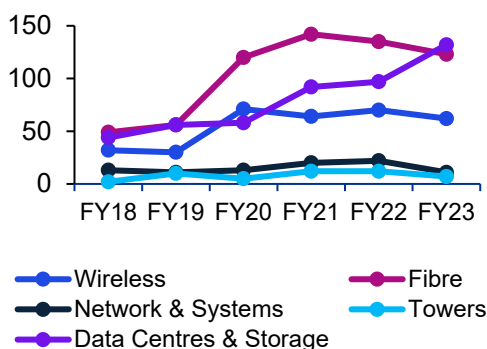
\$156b

Digital Transaction Value (FY23)

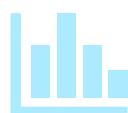
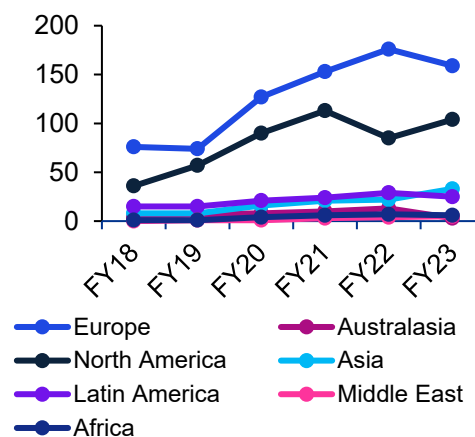
Deal Value by Sector (FY23, USD billions)



YoY Growth in Deal Volume by Sector



YoY Growth in Deal Volume by Region



1,571

Digital deals closed between FY18 and FY23

19%

Annual growth in Digital transaction volume from FY18 to FY23

Key transactions

Top 5 deals by value during FY23

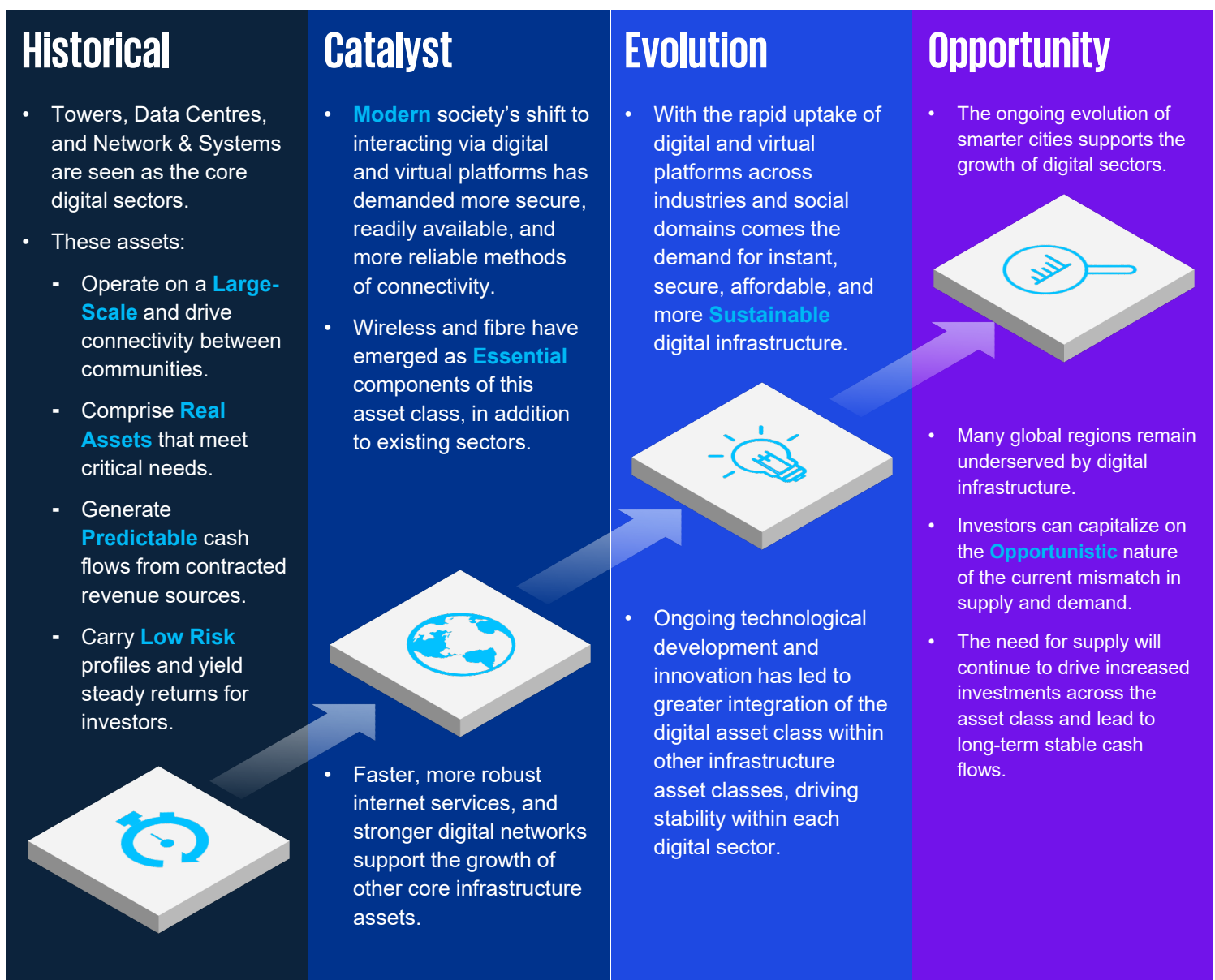
Transaction	Acquirer / Financier	Target / Asset	Subsector	Value (USD)	Geog.	Deal Type
Sale of Shaw Communications	Rogers Communications	Shaw Communications	Wireless Trans.	\$17.7B	Canada	M&A
GD Towers Majority Stake Sale (51%)	Digital Bridge & Brookfield Asset Management	Deutsche Telekom – GD Towers	Wireless Trans.	\$11.7B	Germany	M&A
Vantage Towers Sale	GIP & KKR Consortium	Vantage Towers	Wireless Trans.	\$10.4B	Germany	M&A
Compass Datacenters Sale	Brookfield Infrastructure Partners & OTPP	Compass Datacenters	Data Centres	\$5.7B	USA	M&A
Data4 Data Centres Sale	Brookfield Super-Core Infrastructure Partners	Data4	Data Centres	\$3.8B	France	M&A

Unless otherwise noted, all data and transactional information was gathered through [infralogic.inframationnews.com](https://www.infralogic.inframationnews.com)

Evolving investment landscape



Sector growth: Digital infrastructure is a critical enabler of economic growth, innovation, and progress. The graphic below depicts the modernization of the Digital infrastructure definition and the changes within its sectors.



Energy & Natural Resources



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The modern definition



What has changed: Investing in energy and natural resources has evolved significantly over the years, driven by factors such as the shift towards renewable energy, technological advancements, changing market dynamics, increased focus on ESG factors, growing emphasis on energy efficiency, increased focus on emerging markets, social and geopolitical considerations, resource responsible practices, and changes in the regulatory landscape.

These changes have shaped the investment landscape in the energy and natural resources asset class, creating new opportunities and challenges for investors seeking to participate in this dynamic and rapidly growing industry.

Modern

The green revitalization of conventional energy infrastructure is crucial to economic growth. Innovations that repurpose waste and cultivate renewable energy more efficiently are driving the modernization of this asset class and expanding opportunities for investors.

Sustainable

Climate change pressures, in combination with population growth, are accelerating demand for cleaner energy generation, storage, and delivery. Investors can help to stimulate meaningful social and environmental change as this asset class is fundamental to sustainable development goals.



Essential

Communities rely on energy production to function. As communities worldwide commit to 100% renewable energy, and energy production evolves as targets are realized, investors are encouraged to focus on the longevity of their investments.

Opportunistic

Societies are prioritizing technology implementation to more efficient, and renewable energy solutions. Investors can capitalize on emerging technologies that meet these demands and drive higher rates of return.

Energy & Natural Resources

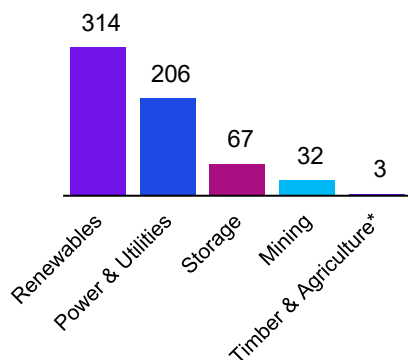
Market trends



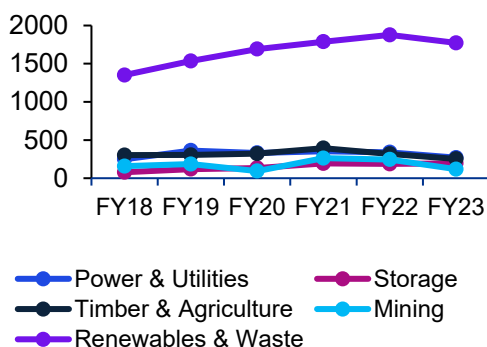
\$622b

Energy & Natural Resources Transaction Value (FY23)

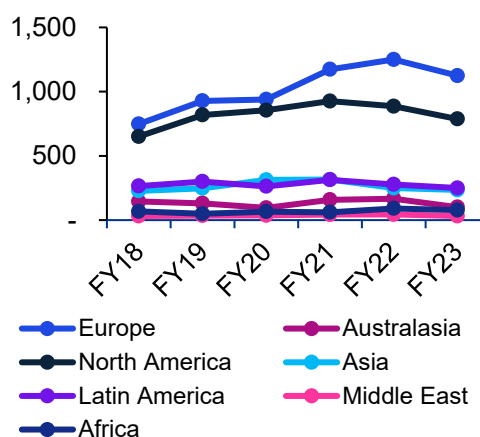
Deal Value by Sector (FY23, USD billions)



YoY Growth in Deal Volume by Sector



YoY Growth in Deal Volume by Region



15,786

Energy & Natural Resources deals closed between FY18 and FY23

4%

Annual growth in Energy & Natural Resources transaction volume from FY18 to FY23

Key transactions

Top 5 deals by value during FY23

Transaction	Acquirer / Financier	Target / Asset	Subsector	Value (USD)	Geog.	Deal Type
Rio Grande LNG Phase 1	Consortium of banks	Rio Grande LNG	LNG export terminal	\$19.2B	USA	Greenfield
Newcrest Mining Acquisition	Newmont Corporation	Newcrest Mining Limited	Gold mining	\$17.0B	Australia	M&A
SunZia 3.5GW Wind and Transmission Project	Consortium of banks	SunZia 3.5GW Wind and Transmission Project	Electricity Transmission	\$13.2B	USA	Greenfield
National Grid Gas Sale	Macquarie AM and BCI Consortium	National Grid Gas (60% Stake)	Gas Pipeline	\$9.9B	United Kingdom	M&A
Port Arthur LNG Phase One	Sempra Infrastructure Partners (SIP)	Port Arthur LNG Phase One	LNG Export Terminal	\$9.8B	USA	Greenfield

* Data for the mining and timber & agriculture sector has been sourced from Pitchbook. Unless otherwise noted, all data and transactional information was gathered through [infralogic.inframationnews.com](https://www.infralogic.inframationnews.com)



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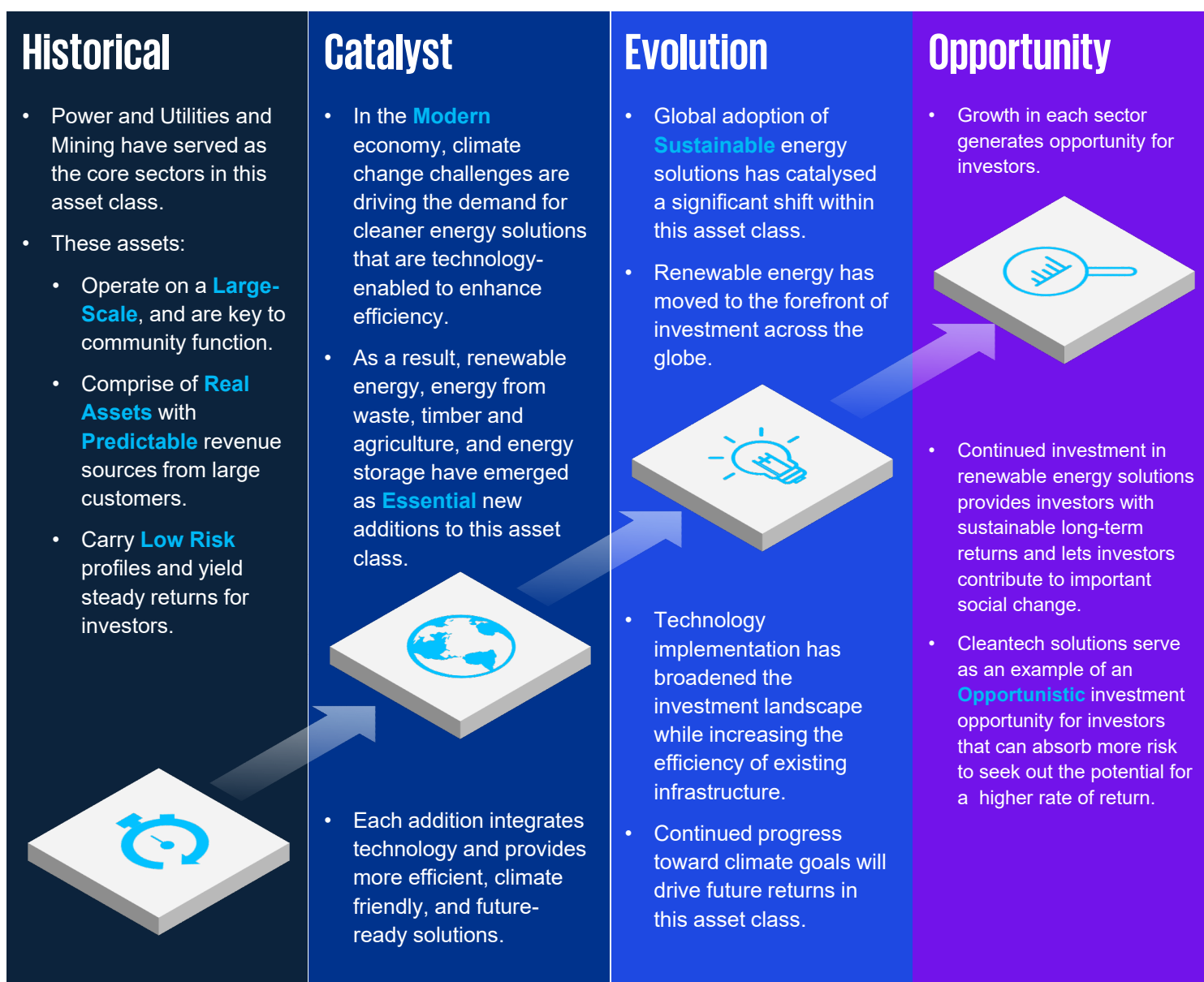
Energy & Natural Resources



Evolving investment landscape



Sector growth: Investing in energy and natural resources has evolved significantly over the years, driven by various factors and conditions; the graph below depicts how the definition of Energy & Natural Resources has changed and the progression within each of its sectors.



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What's next?

In an era defined by rapid change and evolving needs, three key future themes emerge in infrastructure development - an unwavering focus on climate, sustainability and inclusivity, a shift toward greater public-private collaboration, and a rapid pace of digitalization.

Undoubtedly, while traditional infrastructure projects hold the potential for consistent, long term returns, it's evident that the concept of infrastructure will continue to undergo a much needed transformation to meet the demands of an increasingly interconnected world. With emerging technologies, a growing commitment to environmental responsibility, and the need for adaptability, infrastructure will transform at an unprecedented pace. As we embrace these trends, we have an opportunity to build a world where infrastructure not only connects people and places but also harmonizes with the planet, ensuring a better and more sustainable tomorrow.

Transport

- Carbon efficient alternatives
- Modernization and integration

Social

- Increased private collaboration
- Smart & inclusive design

Digital

- Smart cities
- AI Integrated, agile networks
- IoT

Energy

- Cleantech focus
- Energy storage
- Disaster preparedness

For more insights on investing in infrastructure assets log on to kpmg.com/ca/infrastructure-investments

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Contact us



Jamie Samograd

Partner, National Industry Leader
Infrastructure

T: 416 777 3078

E: jwsamograd@kpmg.ca



Geoff Hayes

Partner, Deal Advisory
Infrastructure Investments

T: 416 777 3269

E: gdhhayes@kpmg.ca

kpmg.com/ca/infrastructure-investments



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