

Infrastructure REITs Towering Over the 5G Economy

Benjamin Morton, Head of Global Infrastructure and Senior Portfolio Manager

Humberto Medina, CFA, Vice President
Senior Research Analyst

Thomas Bohjalian, CFA, Head of U.S. Real Estate and Senior Portfolio Manager

Ji Zhang, CFA, Vice President
Senior Research Analyst

Over the next decade, wireless applications powered by fifth-generation (5G) network technologies are expected to disrupt nearly every sector of the economy, requiring massive investments in communications infrastructure.

We believe cell tower and data center owner-operators will be key beneficiaries of 5G-related spending, providing critical assets to carry economies into the next digital era.



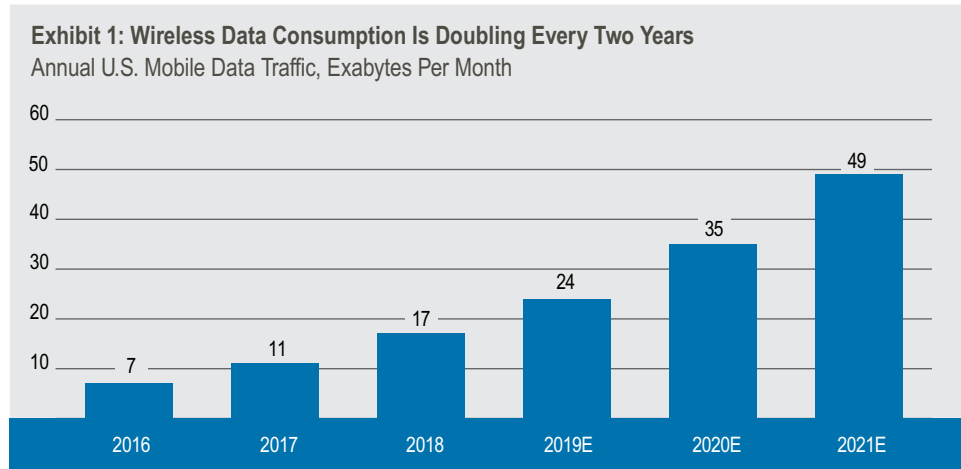
What 5G Is and Why It's a Game Changer

The introduction of 4G wireless broadband paved the way for smartphones that could access the web at high speeds, creating a surge in data consumption (Exhibit 1). In response, wireless carriers have invested in continuous upgrades to relieve network stress and satisfy consumer demand. But even as they continue to expand and improve 4G coverage, these companies are looking ahead to deliver even faster data speeds and other enhancements through the development of 5G networks, with early rollouts in select cities starting this year.

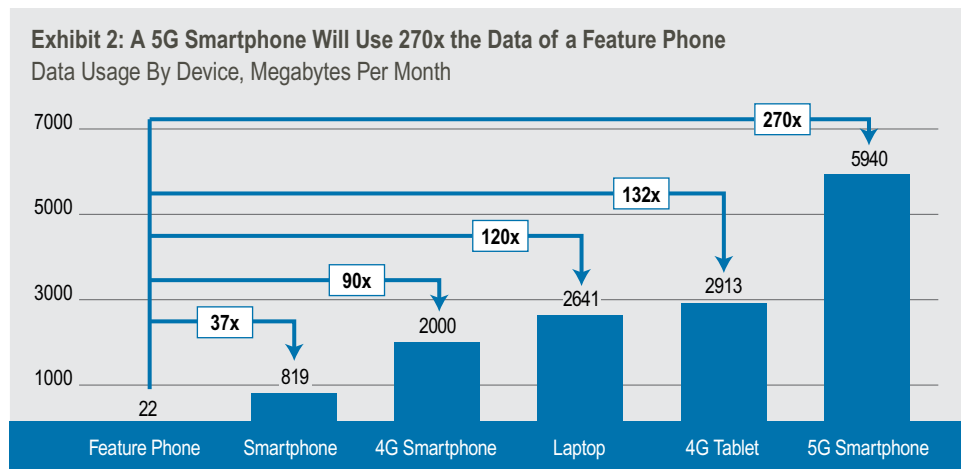
5G technology works in tandem with existing 4G networks to deliver speeds similar to wired fiber connections, while essentially eliminating lag times and drastically reducing power consumption. Initial 5G smartphones are expected to consume 270 times the data of 2G-era feature phones and roughly 3 times the data of current phone models (Exhibit 2).

“What we will see over the next couple of decades is a meaningful amount of traffic moving to machine-to-machine communications in industrial settings in every vertical market... I am not aware of a single industry that is not working on wireless applications.”

—Crown Castle CEO Jay Brown, March 2019



As of June 30, 2019. Sources: Cisco VNI Mobile Visual Networking Index 2017-2022 (released February 2019), American Tower (June 2019), Ericsson Mobility Report (June 2019), Cohen & Steers estimates based on average use per device and projected increasing penetration of wireless devices based on historic trends.



As of June 30, 2019. Sources: Cisco VNI Mobile Visual Networking Index 2017-2022 (released February 2019), American Tower (June 2019), Ericsson Mobility Report (June 2019), Cohen & Steers projections based on historic trends assuming step change in demand with each new device version.

We believe that deploying 5G networks will require not only increased investments in traditional “macro” cell towers, but also small-cell nodes, interspersed to provide capacity in areas of higher population density. These nodes can be placed on macro towers or existing structures, such as traffic lights, street lamps and rooftops, connected to local data centers via underground fiber.

Once in place, these networks will have the potential to open entirely new commercial applications that are already taking shape.

5G Use Cases



The Internet of Things (IoT): Embedded 5G hardware will enable any computerized item to interact with other objects over the Internet, creating a global wireless network of interconnected “things.”



Autonomous vehicles: A single driverless car could generate as much data in a typical day as about 30,000 current-model smartphones.⁽¹⁾ That means high data speeds, reliable connections and low lag times will be critical to allowing cars, buses, trains and ambulances to communicate with other vehicles or with existing city infrastructure—roads, bridges, parking garages and traffic lights, all fitted with sensors to direct and reroute traffic.



Smart cities: Connected infrastructure could become the backbone of entire smart cities, able to deliver targeted, hyper-efficient municipal services, from public transportation to snow removal, based on granular real-time information.



Augmented reality (AR) and remote robotics: AR is expected to be a \$100 billion market by 2020, powering applications as diverse as surgical tools, immersive entertainment, educational simulations and virtual tourism, delivered through simple headsets.



Smart manufacturing: Entire factories could become 5G enabled through a single roof antenna, letting manufacturers monitor every aspect of the production process in real time—from the assembly line to quality control to equipment troubleshooting—correcting costly inefficiencies early in the fabrication stage and shortening the production cycle.⁽²⁾



Agriculture monitoring: Real-time monitoring of crop, soil and livestock conditions and precision forecasting of weather patterns could help farmers optimize crop yields, identify early signs of livestock disease and manage acreage while controlling farm labor costs.

(1) **At June 28, 2019.** Source: Intel, Statista, Cohen & Steers. Assumes 4TB of data generated every 90 minutes of autonomous vehicle operation, representing typical daily use; 4GB of typical monthly data usage for current-model smartphones.

(2) “How 5G will transform manufacturing,” Kottasová, Ivana, CNN Business, March 22, 2019.

Economic Competition Driving 5G Urgency

Increasing mobile connectivity has historically benefited a country's economic output, and we expect that to be even more important with 5G. Global auditing and consulting firm Deloitte projected that early adoption and development of 5G technologies could bring more than a decade of GDP growth leadership for first-mover countries.⁽¹⁾ One country in particular has recognized this potential and has moved aggressively to establish early dominance.

Between 2015 and 2018, China outspent the U.S. by \$24 billion on 5G-ready infrastructure and built 350,000 individual tower sites—more than 10 times the number built in the U.S. during that period. In all, China has earmarked \$400 billion solely for 5G investment under its current Five-Year Plan, not only for domestic infrastructure needs, but also to develop standard essential patents that may consolidate market leadership as 5G expands worldwide.

The relative spending shortfall in the U.S. has led to calls to accelerate investment to close this gap, or potentially face longer-lasting economic effects. Consulting firm Accenture estimates that U.S. wireless companies will invest \$275 billion in building 5G networks, which is expected to create 3 million new jobs and add \$500 billion to the economy.⁽²⁾

Investing in 5G Infrastructure REITs

In our view, rapid growth in data usage in the late-4G environment and the urgent demands of the approaching 5G era are likely to require massive investments to expand communications infrastructure capacity over the next decade. We believe this stands to directly benefit the cell tower industry, where public U.S. companies hold dominant market positions. In addition, we expect the spike in both wireless and wired data traffic to drive sustained demand for data centers.

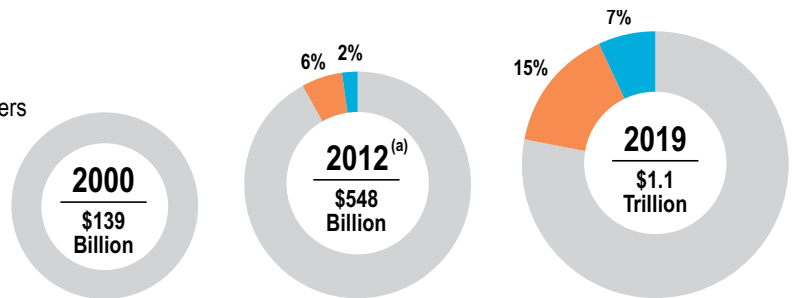
Public data center and tower operators, which are structured as real estate investment trusts (REITs), span both the listed infrastructure and real estate universes. Their sector weights over the past decade reflect a broader evolution of the U.S. REIT market, which increasingly consists of new and differentiated property types. The first data center REIT, Digital Realty Trust, was listed in 2004, while American Tower was the first tower company to convert to REIT status in 2012. Today, tower and data center REITs make up nearly a quarter of the U.S. REIT market, valued at \$1.1 trillion (Exhibits 3).

Meanwhile, communications infrastructure—tower operators alone—represent around 8% of the listed infrastructure market.⁽³⁾

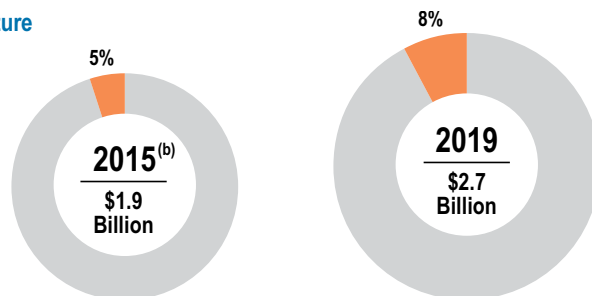
Exhibit 3: Sector Weights and Market Capitalization

U.S. REITs

- Towers
- Data Centers



Global Infrastructure



New economy assets represent a growing part of the U.S. REIT and global listed infrastructure markets

At June 30, 2019. Source: Nareit, FTSE, Bloomberg, Cohen & Steers.

(a) 2012 marks the year that the first tower company converted to REIT status, and the year that Nareit designated Infrastructure as a standalone REIT sector. (b) FTSE Global Core Infrastructure 50/50 Index share data was as of its inception in March 2015. See back page for index definitions and additional disclosures.

(1) "5G: The chance to lead for a decade," Deloitte, 2018. (2) "How 5G Can Help Municipalities Become Vibrant Smart Cities," Accenture, January 2017. (3) Source: Cohen & Steers, FTSE

Cell Towers



The Core of 5G

Cell towers are the physical foundation of nearly all wireless connectivity. Tower companies own the vertical real estate—usually a tower or pole—often with the land parcel underneath and the dark fiber cable underground. Wireless carriers lease space on the tower to mount equipment such as cell transmitters or antennas. In addition to these traditional towers (known as macro towers), tower companies may own small-cell nodes, designed for short-range, high-frequency 5G signals.

Company examples

- **American Tower:** Converted to a REIT in 2012, surpassing Simon Property Group as the world's largest REIT by market capitalization
- **Crown Castle International:** Converted to a REIT in 2014, with roughly 40,000 towers and 60,000 route miles of fiber across the U.S.; America's largest operator of small-cell networks
- **SBA Communications:** Owns tower assets in all 50 States, throughout Canada and in Central and South America; filed as a REIT in 2016

Tenants

- **Wireless carriers** (Verizon, AT&T, Sprint, T-Mobile)
- **Government agencies** (police, emergency medical services)
- **Broadband data providers/cable companies**

Barriers to supply. Two major barriers stand in the way of new entrants into the tower business, starting with local zoning restrictions. There is a legacy of municipal opposition to new towers, enforced under “eyesore laws” designed to protect property values. This often induces carriers to install equipment on existing towers to avoid drawn-out zoning battles. Secondly, tower customers tend to be sticky, rarely moving equipment between tower operators. So new market entrants have fewer potential customers to target in a market where an incumbent tower company is already in operation.

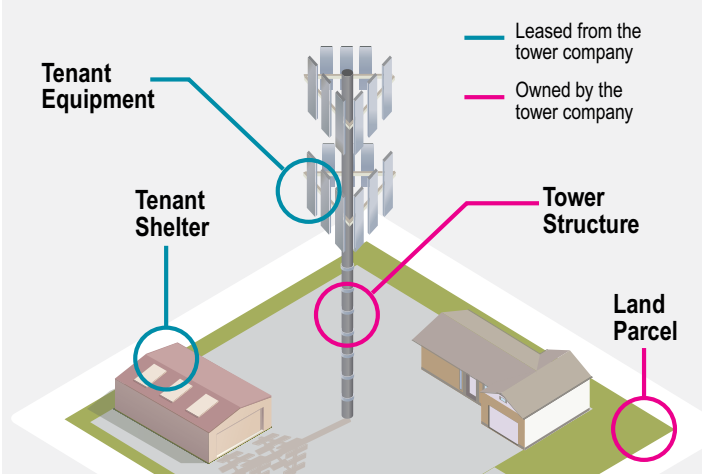
Cash flow profile. Cell tower leases typically start at 10 years with rolling 5–7-year opt-outs. Tenants have tended to experience a 98–99% renewal rate upon expiration, resulting in relatively stable cash flows for the asset owner. Leases also commonly feature annual escalators or inflation-linked adjustments. The combination of these factors has contributed to a generally consistent history of revenue generation for tower companies.

Growth drivers. More data usage requires improvements to existing network infrastructure, and this feeds growth in the cell tower industry. The expansion of mobile broadband coverage to underserved areas could accelerate this trend. Adding more transmitters to existing networks (“densification”) to allow the transmission of higher-frequency 5G signals is also a growth driver. Tower revenue growth has three main components: escalators, colocation and amendments to existing leases.

How carrier consolidation affects tower companies.

Cell tower share prices have historically been sensitive to reports of planned carrier consolidation. The pending merger of Sprint and T-Mobile, and possible synergies from the phaseout of redundant tower leases, has raised questions over the potential impact on cell tower valuations. Longer term, we believe that the urgency of 5G buildout needs, as well as a pledge from pending merger partners to accelerate nationwide coverage (especially in rural areas, where macro towers provide the most effective structural support for cell transmitters), could pull 5G investment forward, further supporting cell tower fundamentals.

Every piece of equipment installed on a cell tower generates revenue for the tower company



Source: American Tower, Cohen & Steers.

Data Centers



Landlords of Virtualization

Data centers are heavily secured warehouses containing rows of equipment racks designed to house network equipment and servers that are critical for data storage and cloud connectivity. These facilities provide sophisticated technical amenities like backup generators, industrial air conditioners and optical connections for linking to business partners and service providers.

Company examples

- **CyrusOne:** Founded in 2012, with 45 data centers worldwide
- **Digital Realty:** Owns more than 200 data centers in the U.S. and Europe
- **Equinix:** Global leader in colocation services; owns 200 data centers in 24 countries on five continents

Tenants

- **Cloud services** (Amazon, IBM, Microsoft, Oracle)
- **Internet** (eBay, Facebook, Google, Netflix)
- **Financial services** (JPMorgan Chase, Morgan Stanley)
- **Communications** (AT&T, CenturyLink, NTT Communications)

Barriers to supply. While data center shells are simple and straightforward to construct, the cost and complexity of interior infrastructure—cooling, generators and hardwired equipment—involve high initial capital expenditures and operating expertise that constitute high barriers to entry.

Cash flow profile. Data center leases are typically based on electricity/wattage usage in addition to square footage and often include annual rent increases. Leases tend to span 5–10 years depending on the size of the tenant, with historically high retention rates due to the complexity and cost of moving. New development has historically been a key driver of cash flow growth for data centers, often with some portion of the facility committed to a tenant before construction completion.

Growth drivers. Data center growth is being fueled primarily by the need for companies to connect to cloud-based platforms and other business partners. Tenants often form a network ecosystem through colocation that may increase the value of a data center as more tenants locate there. As 5G-era tenants seek to distribute their data storage over a wider geography—closer to end users and to fiber infrastructure—we believe these resulting network effects may become increasingly valuable.

The cloud lives in buildings...

By 2021, data traffic from the cloud is expected to account for 95% of total traffic from data centers to end users, compared to 88% in 2016.

Source: Cisco Global Cloud Index, 2016–2021, updated 2018.

One example of this competitive siting is Equinix's Miami data center NAP of the Americas, which is ideally situated along an underground highway of dark fiber lines and subsea cable landings. The data center is home to more than 600 collocated enterprises, 125 networks, 125 cloud service providers and 40 content and digital media companies, all interconnected to enhance tenant business needs. We believe this type of colocation model could be a standard of differentiation for data centers over time, with location premiums justifying higher valuations.

Implications for Investors

We believe communications infrastructure companies represent an attractive long-term opportunity, driven by potentially massive investments in the 5G buildout in coming years. These sectors have grown to become a significant portion of the public markets today, highlighting the evolution of investable properties tied to the information economy.

Within real estate portfolios, we believe the growing influence of secular themes—whether technology, logistics or demographic trends—may be shifting the REIT market to become less sensitive to economic cycles. In our view, this could enhance the potential of REITs to serve as portfolio diversifiers, particularly in periods of economic uncertainty.

Similarly, within infrastructure portfolios, towers and data centers have shown relatively low sensitivity to macro factors, such as economic cycles and interest rates, while offering relatively attractive cash flow growth profiles. We believe this makes them a particularly appealing and critical element of a diversified infrastructure strategy.

About Cohen & Steers

Cohen & Steers is a global investment manager specializing in liquid real assets, including real estate securities, listed infrastructure, and natural resource equities, as well as preferred securities and other income solutions. Founded in 1986, the firm is headquartered in New York City, with offices in London, Hong Kong and Tokyo.

Index Definitions

An investor cannot invest directly in an index and index performance does not reflect the deduction of any fees, expenses or taxes.

U.S. REITs: FTSE Nareit All Equity REITs Index contains all tax-qualified REITs with more than 50% of total assets in qualifying real estate assets other than mortgages secured by real property that also meet minimum size and liquidity criteria.

Global Infrastructure: The FTSE Global Core Infrastructure 50/50 Index is a market-capitalization-weighted index of worldwide infrastructure and infrastructure-related securities. Constituent weights are adjusted semi-annually according to three broad industry sectors: 50% utilities, 30% transportation, and a 20% mix of other sectors, including pipelines, satellites, and telecommunication towers.

Important Disclosures

Data quoted represents past performance, which is no guarantee of future results. The views and opinions in the preceding commentary are as of the date of publication and are subject to change without notice. The information presented does not reflect the performance of any fund or other account managed or serviced by Cohen & Steers, and there is no guarantee that investors will experience the type of performance reflected. There is no guarantee that any historical trend illustrated herein will be repeated in the future, and there is no way to predict precisely when such a trend will begin. There is no guarantee that any market forecast made in this commentary will be realized. This material represents an assessment of the market environment at a specific point in time, should not be relied upon as investment advice, is not intended to predict or depict performance of any investment and does not constitute a recommendation or an offer for a particular security. We consider the information in this presentation to be accurate, but we do not represent that it is complete or should be relied upon as the sole source of suitability for investment. Please consult with your investment, tax or legal adviser regarding your individual circumstances before investing.

Please consider the investment objectives, risks, charges and expenses of any Cohen & Steers U.S. registered open-end fund carefully before investing. A summary prospectus or prospectus containing this and other information may be obtained by visiting cohenandsteers.com or by calling 800 330 7348. Please read the summary prospectus or prospectus carefully before investing.

Risks of Investing In Real Estate Securities. The risks of investing in real estate securities are similar to those associated with direct investments in real estate, including falling property values due to increasing vacancies or declining rents resulting from economic, legal, political or technological developments, lack of liquidity, limited diversification and sensitivity to certain economic factors such as interest rate changes and market recessions. Foreign securities involve special risks, including currency fluctuations, lower liquidity, political and economic uncertainties, and differences in accounting standards. Some international securities may represent small- and medium-sized companies, which may be more susceptible to price volatility and be less liquid than larger companies.

Risks of Investing in Global Infrastructure Securities. Infrastructure issuers may be subject to regulation by various governmental authorities and may also be affected by governmental regulation of rates charged to customers, operational or other mishaps, tariffs, and changes in tax laws, regulatory policies, and accounting standards. Foreign securities involve special risks, including currency fluctuation and lower liquidity. Some global securities may represent small and medium-sized companies, which may be more susceptible to price volatility than larger companies.

No representation or warranty is made as to the efficacy of any particular strategy or fund or the actual returns that may be achieved.

This commentary must be accompanied by the most recent Cohen & Steers fund fact sheet(s) and summary prospectus if used in conjunction with the sale of mutual fund shares.

Cohen & Steers Capital Management, Inc. (Cohen & Steers) is a registered investment advisory firm that provides investment management services to corporate retirement, public and union retirement plans, endowments, foundations and mutual funds.

Cohen & Steers Asia Limited is authorized and regulated by the Securities and Futures Commission of Hong Kong (ALZ 367).

Cohen & Steers U.S. registered open-end funds are distributed by Cohen & Steers Securities, LLC, and are available only to U.S. residents.

Cohen & Steers UK Limited is authorized and regulated by the Financial Conduct Authority (FRN 458459).

Cohen & Steers Japan, LLC is a registered financial instruments operator (investment advisory and agency business with the Financial Services Agency of Japan and the Kanto Local Finance Bureau No. 2857) and is a member of the Japan Investment Advisers Association.

Publication Date: **July 2019**. Copyright © 2019 Cohen & Steers, Inc. All rights reserved.