

## Investment Focus

# Infrastructure Management and Sustainability

## The Benefits of Keeping the Horse Before the Cart

### Executive Summary

Economic decisions by businesses can translate to significant gains for the environment. This runs counter to how sustainability advances are usually envisioned, emphasizing environmental considerations as the priority and often viewing any economic advantages as an afterthought or a fringe benefit. Some of the most dramatic examples of business decisions producing substantial benefits for the environment are found in infrastructure investing, as demonstrated by the experience of Morgan Stanley Infrastructure in managing its assets. In a number of instances, operational improvements have led to the achievement of high standards of environmental responsibility. In such diverse cases as an upgrading of electronic parking meters in Chicago that resulted in reduced battery waste and automobile exhaust to conversion of residences in Madrid to natural gas that resulted in reduced CO<sub>2</sub> emissions, business as usual has had significant ecological benefits.

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### Background

In 1985, Boeing Aircraft flew a brand-new version of its flagship 747 that boasted a single difference from the previous version: a small “winglet” that swept up from the tip of each wing. Those few feet of bolted-on metal, which counteracted the vortex of air created by the wing, reduced the amount of fuel consumption and increased the range of the new 747 by 3.5%.<sup>1</sup> As most business travelers know, winglets are now almost ubiquitous on long-range aircraft flown around the world, no surprise given that fuel costs are air carriers’ biggest operating expense. What business travelers might not think about, however, is that a reduction in fuel consumption also means a reduction in harmful emissions such as carbon monoxide and unburned hydrocarbons—and a bonus reduction in noise levels on takeoff

<sup>1</sup> Aero Magazine, Boeing Co., January 2001.

of up to 6.5%.<sup>2</sup> A hardheaded economic decision by big business translated into serious gains for the environment.

This runs counter to how sustainability advances are usually envisioned, and to the general approach taken by the sustainability industry. Both emphasize environmental considerations as the priority and often seem to view any economic advantages as an afterthought or a fringe benefit. Take the World Economic Forum's report on its Green Investing project, which "explores ways in which the world's leading investors can most effectively engage in the global effort to address climate change."<sup>3</sup> The report allows that investors should be able to "sustain their long-term corporate assets and shareholder value," but it does not acknowledge this as a critical part of the corporate mission. At the same time, it appears willing to compromise on long-run value by calling for investment in energy technologies that "may not yet be fully competitive with fossil fuels."

The "Sustainable Business" blog of the *Guardian* newspaper wrote that the rising number of global 500 companies moving to reduce their carbon footprint "highlights an acceptance that business as usual is simply no longer an option."<sup>4</sup> Indeed, Morgan Stanley as a firm has taken a highly proactive approach to ensure that its business units take sustainability into account—and it was one of three financial institutions that founded and drafted The Carbon Principles.<sup>5</sup>

The Environmental Defense Fund, the largest non-profit advocacy group in this field, cites five "Key Environmental Performance Areas," or KEPAs, that have been selected "because they are critical to protecting the environment and human health, have significant business impacts and are broadly applicable across a wide range of companies."<sup>6</sup> The KEPAs are:

1. Greenhouse Gas emissions (GHGs)
2. Waste
3. Water
4. Forest products
5. Chemicals

<sup>2</sup> Aero Magazine, Boeing Co., Third Quarter, 2009.

<sup>3</sup> "Green Investing: Towards a Clean Energy Infrastructure," World Economic Forum, 2009.

<sup>4</sup> A new model of business leadership for a low carbon economy," The Sustainable Business Blog, The *Guardian*, September 14, 2011.

<sup>5</sup> Guidelines established by Morgan Stanley, JP Morgan Chase, and Citigroup for meeting the energy needs of the United States that balance cost, reliability, and greenhouse gas concerns. The principles focus on a portfolio approach that includes efficiency, renewable and low carbon power sources, as well as centralized generation sources in light of concerns regarding the impact of GHG emissions, while recognizing the need to provide reliable power at a reasonable cost to consumers. For more information, see [www.carbonprinciples.org](http://www.carbonprinciples.org).

In 2013, Morgan Stanley Investment Management became a signatory to the United Nations Principles for Responsible Investing, a collaborative effort among institutional investors to incorporate active consideration of environmental, social, and governance issues within investment decision-making and ownership practice.

<sup>6</sup> "Green Returns: Implementation Workbook," Environmental Defense Fund.

It should not be difficult to see the congruence between business and environmental goals here. Certainly, environmentalists want to reduce GHGs because of their potential impact on the climate. But businesses also have a clear motivation to reduce GHGs, even in the absence of carbon taxes, effluent fees, etc. – a financial one. GHG emissions such as CO<sub>2</sub> result from burning fuel in industrial and commercial applications. As a matter of financial self-interest, any owner of a fuel-burning operation should also be trying to reduce fuel consumption and thereby also GHGs. As water becomes limited or very expensive in industrial use, companies that reduce their water "footprint" gain significant economic advantage, too.

In fact, there are countless examples of business decisions that were not motivated directly by environmental concerns, but produced substantial benefits for the environment. Boeing's winglets are just one case among many.<sup>7</sup>

## Infrastructure and Sustainability

Some of the most dramatic examples are found in infrastructure investing, the acquisition and management of large, tangible assets providing essential services to society. For the largest infrastructure investors, a central strategy is to add value to their investments through operational improvements. These improvements can bear "green" fruit. The experience of Morgan Stanley Infrastructure provides some insight in this regard.

In general, MSI targets the highest possible environmental and ecological standards for all its portfolio assets across their multiple, respective sectors. This accords with many investor mandates to strive to meet environmental/social/governance (ESG) goals. Nevertheless, the guidance received from our investors is to pursue appropriate risk-adjusted investment returns as a priority, a reflection of the fiduciary responsibility held by any financial firm. Yet, our experience has shown that the two are not incompatible goals. MSI's asset management team is tasked with working closely with portfolio companies to make upgrades, leverage new technology, and find efficiencies. In numerous cases, such improvements have led to the achievement of high standards of environmental responsibility. The following are case studies from our own portfolio.

## Chicago Parking Meters

In 2008, the City of Chicago granted a concession to Chicago Parking Meters, LLC ("CPM") to operate and collect revenues from all on-street parking in the city. CPM is majority owned by Morgan Stanley Infrastructure Partners. The company replaced over 36,000 single-space coin-operated parking meters with about

<sup>7</sup> Many examples in the transport sector can be found in the report, "The Good Haul: Innovations that Improve Freight and Protect the Environment," Environmental Defense Fund, 2010.

4,700 multi-space, solar-power Pay-and-Display meters (“P&Ds”) that allow payment by credit card as well as coins.

The economic benefits to CPM of this upgrade have come in several forms. The installation of the P&Ds allowed more vehicles to park, since the old meters were evenly spaced at intervals to accommodate the largest vehicles. The electronic real-time system, with a wireless connection to a central database, optimized collections, provided data for “true-up” calculations, and decreased meter downtime as a result of more efficient maintenance. In fact, average turnaround for repairs swiftly dropped to less than two hours and operational uptime of the entire system climbed to an average of 99.96%. But apart from its fiscal logic, the system upgrade has produced numerous environmental benefits, some obvious, some unexpected.

### Rechargeable batteries and solar panels

The original coin meters used traditional single-life batteries, meaning some 45,000 lithium and 9-volt batteries were being disposed of each year. The new P&Ds feature rechargeable batteries whose lives are extended by solar panels located on the tops of the units. This extends the batteries’ use to as much as three years.

### Collection and maintenance efficiency

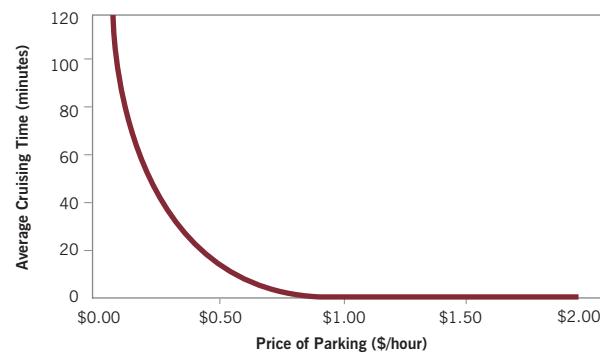
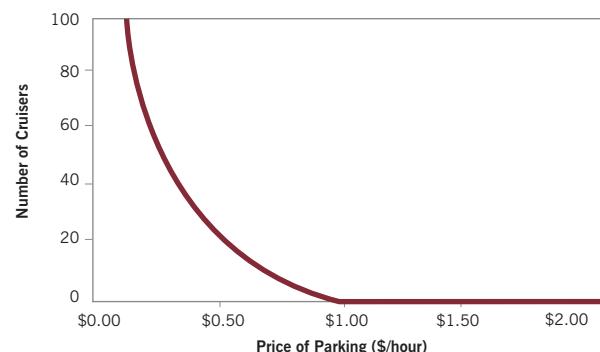
Because the P&Ds take credit cards and notify operators wirelessly when they require collection or are broken, collection and maintenance has become far more efficient. Reducing the number of meters in the system—and deploying ones that encourage electronic payment rather than currency—led to a dramatic cut in trips to collect coins and perform maintenance. (In addition, electronic devices don’t have as many moving parts and are less prone to break down.) CPM also moved the maintenance vehicles’ base from the outskirts of the city to its headquarters downtown where meter density is highest. Fewer maintenance crews driving fewer maintenance vehicles fewer miles has translated not only into personnel and fuel savings, but a vastly reduced carbon footprint. CPM calculates that 310,000 fewer miles are driven annually, reducing CO<sub>2</sub> emissions by 410,000 pounds.

### Parking efficiency

Urban planning experts have long recognized the relationship between on-street parking rates and traffic congestion. A study by engineers at UC Berkeley found that activities related to parking alone add 10% to the CO<sub>2</sub> emissions of the average automobile.<sup>8</sup> The higher rates demanded by the concession

agreement in Chicago, as well as the additional spaces freed up in the move to multi-space meters, has made the system more efficient, and likely contributed to a reduction in “cruising” for parking spaces. Donald Shoup, a professor of urban planning at UCLA known as the “Parking Guru,” quantified this relationship in his seminal book, *The High Cost of Free Parking (Display 1)*.

### Display 1: Estimated Impact of Parking Efficiency on “Cruising”



Source: The High Cost of Free Parking, Planners Press, Chicago, 2005.

In fact, a major survey taken in 2011 of over 8,000 commuters in 20 cities worldwide found that Chicago drivers required the least amount of time to find a parking space (13 minutes, with 28% of drivers finding a spot in under five minutes).<sup>9</sup> An associated “parking index,” which ranks emotional and economic costs of parking and was released along with the survey, ranked Chicago number one of all cities studied. An exhaustive report on privatization released in April 2012 ascribed these achievements to the benefits of private-sector management of the parking meter system.<sup>10</sup>

<sup>7</sup> Many examples in the transport sector can be found in the report, “The Good Haul: Innovations that Improve Freight and Protect the Environment,” Environmental Defense Fund, 2010.

<sup>9</sup> Global Parking Survey, part of the Commuter Pain Survey, IBM, September 2011.

<sup>10</sup> “Annual Privatization Report 2011: Local Government Privatization,” Reason Foundation, April 2012.

How this translates to cutting pollution is still being calculated by CPM. But an analysis of New York City's parking conducted by Morgan Stanley Infrastructure indicates the extent of possible reductions. It found that more efficient parking in Manhattan could reduce cruising time by as much as nine minutes, 23% of the average travel time into the city, eliminating 2.5 million pounds of CO<sub>2</sub> emissions every year.

### Mass transit benefit

The old meter system encouraged commuting workers to drive to their jobs and use on-street parking spaces, given the low rates and proximity of spaces to workplaces. Essentially, taxpayers were subsidizing a particular class of citizen. The upgraded system turned the cost-benefit calculation in favor of mass transit for commuting workers. This freed up space for shoppers making shorter trips, an obvious boon to them and to the businesses they frequented. But more important from a sustainability perspective, it increased the use of more environmentally friendly public transportation.

It's important to note that while many of the economic gains provided by the upgrade to CPM were in efficiencies—that is, cost-cutting—many were not. For instance, the switchover to devices that accepted credit cards—a move, remember, that reduced the amount of currency transactions and thus the collections trips necessary and thus the amount of emissions—allowed parkers to maximize their purchase of time available, a cheap form of “insurance” against receiving a ticket, which thus maximized revenues for the system.

## Montreal Gateway Terminals

Montreal Gateway Terminals (“MGT”), majority owned by Morgan Stanley Infrastructure Partners, is the second-largest container facility in Canada and a long-time devotee of corporate sustainability. It is Green Marine certified, which means MGT meets various operational standards and takes an active leadership role in the search for best environmental practices that align with long-term sustainable development objectives. It is also the first privately owned container terminal operator in North America to have received ISO14001 recognition for its environmental management system, and the only privately owned container shipping terminal in Canada with both certifications. MGT was also recognized in 2013 as “best in breed” by Green Marine.

For the purposes of this study, however, it is the deployment of new technology that is of interest. MGT constructed a special storage area for refrigerated containers (“reefers”) and in July 2012 began installation of 288 electrical reefer plugs that allow temperature-controlled containers to run on hydroelectric-generated energy rather than diesel-generated energy. At full capacity, MGT projects that the conversion could save 1.5-2.5 million gallons of diesel fuel annually, a potential cost savings of

83%. In addition, the simpler and more efficient electric reefers reduce maintenance costs and crew size, and allow stacking up to four units high, reducing the footprint used by each container and thus increasing overall capacity.

### Diesel vs. Electric Reefer Containers

#### Estimated Annual Costs

	LOW USAGE	HIGH USAGE
<b>Diesel container</b>	\$17,640	\$30,240
<b>Electric container</b>	2,952	5,052
<b>Fuel saved (gallons)</b>	5,040	8,640

Source: Container Technology Inc. and MGT

The conversion should have profound consequences for the environment. The reduction in the burning of diesel fuel could prevent up to 55 million pounds of CO<sub>2</sub> from entering the atmosphere each year. In addition, the lower maintenance demand reduces the carbon footprint of crews and their materials.

As part of the conversion process from diesel to hydroelectric, MGT is also refitting its rubber-tired gantries. Management estimates that, when completed, this refitting will result in a potentially significant reduction of GHG emissions and will also reduce the carbon footprint of crews and materials. An interesting added benefit is that MGT's high profile within the port industry may lead other operators to emulate such conversions, thus multiplying the effect.

## Madrileña Red de Gas

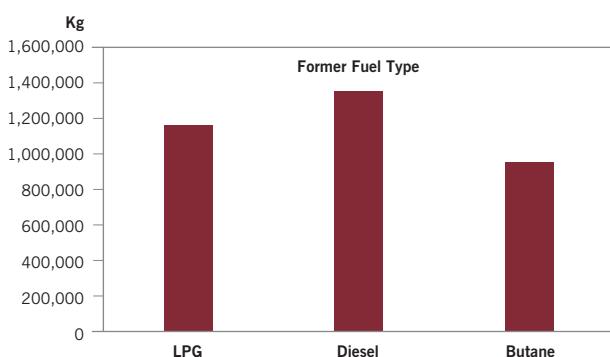
Madrileña Red de Gas (“MRG”) is a regulated, low-pressure gas distribution company that serves municipalities in and around Madrid, the capital of Spain. Majority owned by Morgan Stanley Infrastructure Partners, it was carved out of the assets of Gas Natural in 2009 as a result of a regulatory ruling, and through June 30, 2013 it has grown to 835,000 connection points through internal growth as well as a bolt-on acquisition in 2011. It was the first stand-alone gas distribution company in Spain and is the second-largest distributor in Madrid and the third-largest in the country.

Because MRG's revenue comes in part from the growth of activity with its network, as defined by a formula set by the government, a key component of MRG's business development strategy is to encourage the efforts of supply companies to promote the conversion of consumers to natural gas. An average of 7,000 residential and business customers were added to the MRG network in its first three years of operations, converting to natural gas from various other energy sources. The advantage to the customers is the generally lower cost of natural gas. Newly

converted residential customers saved an average of €457 on their utility bills for the year.

The happy side effect of these conversions is a dramatic reduction in CO<sub>2</sub> emissions, given the far smaller carbon footprint of natural gas as compared to that of LPG (liquefied petroleum gas), diesel, and butane. MRG calculates that, as a result of the conversions, an average of 654 fewer kilograms of CO<sub>2</sub> are released into the atmosphere per home per year. That translates to a total of 3.5 million kg.

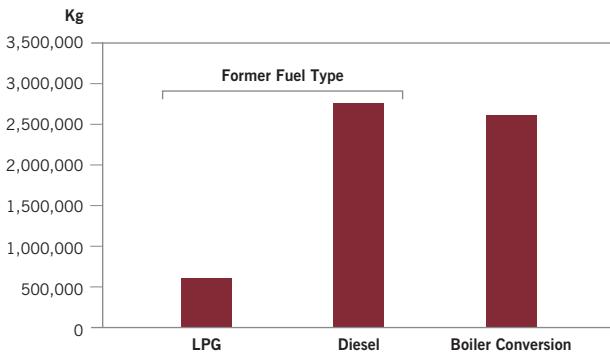
#### Display 2: Estimate of CO<sub>2</sub> Reduction as Result of Conversion to Natural Gas – Residential



Source: Madrileña Red de Gas

On the non-residential side, the gains are even greater. In addition to straight conversion of small businesses (hotels, supermarkets, schools, etc.) to natural gas from other energy sources, MRG also helps apartment complexes with central boilers to convert to natural gas and to convert complexes with older central boilers already using natural gas to newer condensation style boilers that are 20% more efficient. In aggregate, this resulted in a reduction last year of more than 6 million kg of CO<sub>2</sub> emissions for business customers.

#### Display 3: Estimate of CO<sub>2</sub> Reduction as Result of Conversion to Natural Gas – Commercial



Source: Madrileña Red de Gas

For all of MRG's ultimate end-users together, almost 10 million kg of CO<sub>2</sub> were prevented from entering the atmosphere. Each new customer converted will translate to similar gains in the future.

## Medical Area Total Energy Plant

Medical Area Total Energy Plant (“MATEP”) is a long-term contracted electricity, steam, and chilled water utility in Boston, Massachusetts, majority owned by Morgan Stanley Infrastructure Partners. MATEP is the sole provider of essential tri-generation to off-takers in one of the busiest medical zones in the U.S., serving major regional hospitals and nonprofit academic institutions in the 200-acre Longwood Medical Area. The five major hospitals in MATEP’s service territory have more than 2,000 beds and serve 85,000 inpatients and 50,000 outpatients per year.

In light of the critical nature of the services provided by MATEP’s customers, the plant pursues a target of 100% reliability – a goal that makes good business sense as well. Because it is outfitted to employ diesel fuel in the event its natural gas-fired combustion turbines are down, minimizing outages is more cost-efficient in light of the higher cost of diesel over natural gas. What’s more, it is also more environmentally friendly, given diesel’s higher amount of CO<sub>2</sub> emissions.

In addition, MATEP targets a high level of plant efficiency. Following acquisition in 2010, an experienced management team was recruited and \$15 million in capex and maintenance activities were instituted annually. This included new training programs for operations and maintenance personnel, changing the culture from reactive and corrective to maintenance and preventive, the adoption of new operational and maintenance protocols and safety measures, new IT, control, and maintenance software systems, and an upgrade of the gas turbines with new, state-of-the-art equipment. The result of these efforts was the attainment of an annual average plant efficiency rate of 75.4%, a level that is considered superior in the industry.

In recognition of these efforts, the Environmental Protection Agency (“EPA”) announced in 2013 that MATEP had won a prestigious Energy Star CHP Award,<sup>11</sup> specifically citing the high level of operating efficiency as a factor in the plant requiring approximately 24% less fuel than if electricity were supplied from the grid and if steam were produced with a boiler. In its statement, the EPA observed that MATEP “has demonstrated exceptional leadership in energy use.” It pointed out that the system prevents emissions of air pollutants, including an estimated 117,500 tons of CO<sub>2</sub> emissions annually, equal to that from the electricity used by more than 13,000 homes. In other words, the pursuit of operational efficiency has fulfilled both MATEP’s business goals as well as its environmental goals.

<sup>11</sup> Energy Star CHP Awards are part of the EPA’s CHP Partnership, a voluntary program that seeks to reduce the environmental impact of power generation by promoting the use of cost-effective combined heating and power systems.

## Eversholt Rail Group

Eversholt Rail Group, partially owned by Morgan Stanley Infrastructure Partners, is one of the three leading rail rolling stock companies in the U.K., with approximately 27% of the total current British rail fleet. Eversholt's efforts to minimize energy and water usage, waste, and use of materials led to a BREEAM assessment of Excellent (BREEAM is an internationally recognized environmental assessment method and rating system). Eversholt also formed a sustainability steering group and a "green awards" scheme to tackle sustainability issues for both the corporate working areas and the rolling stock fleet.

With its vehicles almost 100% leased and organic growth constrained by network capacity, a key business objective for Eversholt is to maintain the high leasing levels by enhancing the economic attractiveness of the existing fleet for potential lessees. So, Eversholt and its partners invested in the development of an engine standby mode that would reduce diesel consumption and maintenance costs. Nicknamed "The Carbon Cutter," the modified engines were implemented in 2011 across the entire Meridian fleet of East Midlands trains. Savings in diesel fuel were projected to be approximately 800,000 liters annually per engine. That translates to cost savings of about £1.2 million per engine every year. Clearly, this would make operation of the trains more attractive to present and potential operators. It would also translate to a reduction of up to 2.3 million kilograms of CO<sub>2</sub> emitted by the train engines each year, an obvious boon for the environment.

Happily, the experiment has proved a success beyond the original projections of the developers. The Carbon Cutter has saved an average of two hours of engine operation a day, equating to 1.2 million liters of fuel per year across the fleet, 50% better than projected. This translates to almost 3.2 million fewer kilograms of CO<sub>2</sub> being emitted into the atmosphere each year. With this success in hand, the Carbon Cutter could be rolled out to additional lines in Eversholt's fleet, multiplying the effect both for the business and for the environment.

## Conclusion

A number of interesting observations can be made. First, a distinction is being drawn here between corporate and operational stratagems, between initiatives that call for fluorescent lighting in offices or more recyclable coffee cups, and strategic direction for a portfolio asset company aimed at increasing profits. The former is certainly admirable, but its scope is necessarily limited. The latter's potential is restricted only by the size of the particular market.

Second, privately held infrastructure assets are uniquely suited to this kind of sustainability benefit through operational improvement. Infrastructure assets by their nature generally serve a large portion of the populace and possess a large footprint – both geographically and carbon-related. For many assets, every citizen is a current or potential customer. Thus, any gains will be far-reaching. In addition, private management is more easily able to make business decisions that have a large operational impact, including those that may result in economic advantages only over the long-term.

Third, and generally speaking, not every good economic decision leads to good outcomes for the environment. Industrial and commercial developments have often produced what economists call "negative externalities" or what laypeople simply call pollution. Accordingly, people have been used to seeing business enterprises and environmental groups in an adversarial relationship. This perspective is outmoded, though, particularly with respect to infrastructure investors and private equity firms. These ventures actually are more rather than less likely to find themselves on the same side of issues as environmentalists. There are strong connections between economic efficiency and environmental integrity.

Finally, while the examples given above all have fairly short timeframes, this should not lead to a conclusion that such gains cannot take place over years, if not decades. Winglets, for instance, are just a small part of long-term advances in airline fuel efficiency. Few recognize just how far that advance has been, since progress has resulted from incremental, almost continuous improvements in operating efficiency. The introduction of Boeing's jet-powered 707 in 1958 was a very visible technological change, and airline passengers were well aware of how much faster jet aircraft were than the propeller-driven aircraft they replaced. Yet, the latest Boeing aircraft are only slightly faster than the 707. Does that mean airliner performance has not changed much in other respects? Definitely not. Fuel burned per seat in one of today's jet airliners is about 70% less than that of the 707 of 1958. Greater engine and airframe efficiency have contributed to this enormous cumulative change, with winglets being only one of the latest tweaks. This has also meant that, per airline passenger mile traveled, GHG and other harmful emissions such as carbon monoxide and unburned hydrocarbons have been sharply reduced over time.<sup>12</sup>

As the dynamic between economic and environmental efficiencies is better understood, the rate of gains in sustainability will only accelerate. ■

<sup>12</sup> "Global atmospheric effects of aviation. Report of the proceedings of the symposium held on April 15-19 in Virginia Beach, Virginia," D. Albritton, et al, NASA CP-3351, Washington, DC.

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The risks associated with investing in infrastructure include: the risk of an impaired exit valuation in depressed markets; the potential for realized revenue volumes to be significantly lower than those projected and / or cost overruns; the risk that the nature of the concession fundamentally changes during the life of the project (e.g., the state sponsor alters the terms); and macroeconomic factors such as low GDP growth or high nominal rates raising the average cost of funding.

Since its first investment in Europe (Agorà Investimenti S.r.l.), Morgan Stanley Infrastructure Partners has set up a Netherlands-based structure with employees and office space, through which it owns and controls most of its non-U.S. investments ("Dutch platform"). The Dutch platform owns and controls the investments it holds through various additional operating and management subsidiaries and joint venture entities where appropriate. For purposes of simplicity, only Morgan Stanley Infrastructure Partners is referenced in this article, whereas in fact, the transaction targets were acquired by the Dutch platform and the operating and management subsidiaries.

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