

# INFRASTRUCTURE CONSTRUCTION AND EQUIPMENT FINANCE OPPORTUNITIES





The Foundation is the only research organization dedicated solely to the equipment finance industry.

The Foundation accomplishes its mission through development of future-focused studies and reports identifying critical issues that could impact the industry.

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## Equipment Leasing & Finance Foundation

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## I. Preface

### A. Purpose of This Study

The Equipment Leasing & Finance Foundation commissioned a report on the outlook for equipment finance opportunities within the infrastructure segment. IHS Global Insight was selected to research the demand for equipment associated with the construction of infrastructure. While the construction industry is still struggling with the aftermath of the residential collapse and the lingering downturn in nonresidential structures, infrastructure is the one segment that holds growth opportunities for equipment leasing and financing.

This report provides an outlook on infrastructure construction and offers a review of the current situation as well as an analysis of future trends. In addition, this study discusses current legislation or policies that may impact infrastructure construction, provides insight into the impact of infrastructure construction on equipment demand, and examines the opportunities this landscape presents for equipment finance.

In preparing this report IHS Global Insight utilized its pre-existing expertise in analyzing and forecasting drivers of construction equipment. In addition, broad knowledge of the macroeconomic environment and of the various markets crucial to the construction industry provided a foundation for the report.

### B. Primary and Secondary Information Sources

Information used in this outlook comes from several sources:

- United States Census Bureau
- United States Energy Information Administration
- United States Federal Reserve Board
- United States Department of Energy
- United States Army Corps of Engineers
- United States Department of Transportation
- United States Environmental Protection Agency
- Reports and analysis from media sources
- Interviews with ELFA members and equipment manufacturers

## II. Executive Summary

Infrastructure construction includes the construction of highways and streets, power and communications, sewer and water, and other heavy and civil engineering. US infrastructure is in dire need of increased investment, but significant obstacles exist. The economic downturn has severely strained federal and state budgets, minimizing the amount of funds available for new infrastructure investment. Furthermore, Congress has been focused on issues such as health care, financial reform, immigration reform, and environmental regulation, delaying legislative action regarding infrastructure repair.

- The American Society of Civil Engineers estimates that it will require approximately \$2.2 trillion over the next 5 years to restore US infrastructure to good condition. The current gap between actual and necessary construction investment suggests that there is upside potential for the construction equipment market.
- Stimulus bills such as the American Recovery and Reinvestment Act will give infrastructure construction a small, temporary boost. However, with funding stretched thinly across the nation, and state and local budgets in disarray, the stimulus bills will not provide a long-term solution.
- The future of infrastructure investment depends heavily on federal legislation. Currently, Congress is targeting the highways and streets, power, and rail segments.
- The prospect of public-private partnerships and the development of a national infrastructure fund designed to attract private investors is becoming more enticing as government agencies struggle with fiscal troubles.
- Highway and street construction is burdened by a depleted Highway Trust fund, which is financed by declining federal gas tax receipts. Congress has not yet proposed a long-term solution, but as the most visible infrastructure segment, highway and street projects will continue to attract public and private attention.
- Power construction will struggle over the next several years as the power industry transitions from oil and coal to cleaner technologies which are still in their research and development phases.
- Rail is quickly gaining momentum as a preferred mode of transport. With the support of the Obama administration, high-speed rail studies are sprouting up across the nation, but actual construction will not occur immediately.

- The downturn in the US economy has been particularly harmful for the construction industry. Total construction fell 12.5% in 2009, leaving many construction companies short of cash. Some fleet owners are delaying purchases of new equipment or renting until the economy stabilizes and construction projects return.
- Operating on a lower-risk model, financial institutions are requiring that borrowers have top credit quality. They are also giving preference to long-standing clients.
- Lack of work forced many companies to lay off workers and idle or sell their equipment. Utilization rates among construction equipment fell to around 60% compared to around 80% during normal economic times.
- Interim Tier 4 regulations, which place strict limits on engine emissions for construction machinery, come into effect on January 1, 2011. The typical pre-buy that accompanies the implementation of new environmental regulations may be tempered by a slower economy and lack of cash flow in the industry.
- Equipment manufacturers are developing new engine technology to reduce emissions and telematics to track and monitor the equipment. The new technology will not significantly impact equipment sales growth in the short run, as prices of the new equipment will be much higher than existing technology. In the long run, the technology will become less expensive, and owners will be able to take advantage of the machines' longer usable lives and higher residual values.

### III. US Infrastructure Construction Market Outlook

#### A. Overview

Years of neglect and delayed maintenance have left US infrastructure in dire condition. In their quadrennial infrastructure report card, the American Society of Civil Engineers (ASCE) gave the national infrastructure system a D grade. More than a quarter of the nation's bridges are structurally deficient, and US dams and locks along inland waterways have an average age over fifty years. Unfortunately, aging infrastructure is not likely to garner much attention unless there is a massive failure like the I-35 bridge collapse in Minneapolis. The 2007 disaster stunned the nation and brought to light the critical state of US infrastructure. A growing population and continued heavy use will place increasing strain on national highway, power, water and wastewater, and other heavy engineering systems. While the task of repairing, modernizing, and sustaining the country's existing infrastructure is extremely daunting, the US can ill-afford to postpone investment much longer and push current systems further along the edge of disaster.

#### B. Current Conditions

Though the primary objectives of the American Recovery and Reinvestment Act (ARRA) were job creation and economic stimulus, the nation's aging infrastructure will also receive a small, temporary boost from the additional funding. Approximately \$144 billion of the ARRA's \$787 billion total is designated for infrastructure construction projects. Transportation projects would receive 34%, water and environmental projects 14.5%, and the remainder will fund technology and energy-related projects. The stimulus is not a long-term solution to infrastructure investment, and given its size, it is unlikely to make a significant splash in the market. The \$144 billion in ARRA funding pales in comparison to the estimated \$2.2 trillion required over the next five years to restore the national infrastructure to good condition. The gaping investment deficit suggests that there remains upside potential in infrastructure construction for equipment suppliers, lessors of that equipment, and financial institutions.

The largest hurdles for infrastructure construction remain state and local budget crises. The first round of stimulus disbursements in 2009 allowed state and local governments to proceed with planned projects. However, given the extent and duration of state and local budget crises, the federal injection of money is merely cushioning the decline in state and local revenue, not creating more opportunity. Tax receipts began falling in mid-2008, owing to mounting job losses and business closures. Revenue from capital gains taxes has been insignificant as most investments lost value this year, and excise taxes have also yielded less across the board as households reined in spend-

ing. Though receipts increased in the final quarters of 2009, they were down 5.5% for 2009 as a whole compared to 2008. Meanwhile, government expenditures fell only 1.5% as the social safety net saw increased need, and state budgets are under even more strain entering 2010. The fiscal situation is unlikely to improve until the general economy turns, leading to infrastructure spending declines in 2010 and 2011. Since budgets for 2011 are being written in the weak revenue climate of 2010, there is little expectation of planned increases in state and local infrastructure spending in 2011.

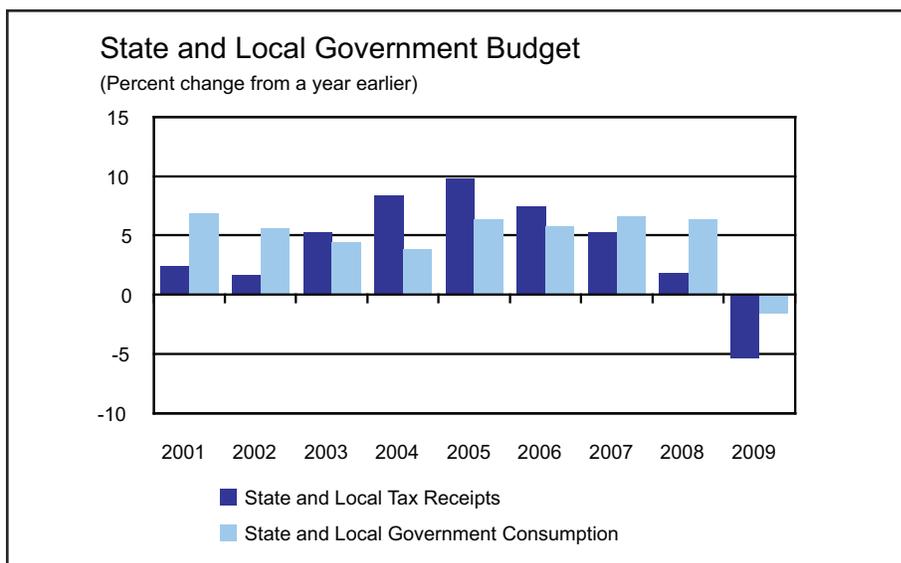


Figure 1

### C. Residential Market Influence

Demand for new infrastructure will also receive further impetus from the housing market recovery. A brighter future is emerging for residential construction, particularly in the single-family segment. Housing permits posted strong gains in the final months of 2009 and early 2010, indicating that builders are planning to increase production in anticipation for a surge in demand. Home sales tumbled after the expiration of the original first-time homebuyers' tax credit at the end of November; however, a second tax credit was passed which extended the deadline of the first credit and expanded its benefits to many current homeowners.

Despite its limited impact, the second tax credit is expected to jump-start sales, primarily by shifting sales from the second half of 2010 into the first half. Driven by the need to replenish inventory, a gradual pickup in household formation, and job growth, single-family housing starts will rebound in 2010. Multi-family starts will improve as well, but only because they fell to alarmingly low levels in 2009. Housing will gain sustainability as the job

market improves in the latter part of 2010. As housing starts begin to climb again, investment in new infrastructure will increase as well. New water and sewer systems will need to be installed, new streets paved, and new transportation infrastructure added to accommodate additional capacity.

#### **D. Potential Legislation**

In addition to the ARRA, the federal government is also debating other measures that could bolster investment on infrastructure projects. On March 25, 2010, President Barack Obama signed a one-year, \$38-billion jobs bill into law. Under one of the provisions, highway and transit programs would receive another \$20 billion in funding. Infrastructure projects—transit projects in particular—require heavy investment. The \$20 billion provided by the jobs bill will be distributed among a variety of projects across the nation. With the money stretched so thinly, it is doubtful that the bill will have a strong impact on infrastructure investment without help from other sources. Indeed, the money allocated to transit can be regarded as seed money that will largely fund feasibility and design work for future construction rather than lay track in the immediate future.

The jobs bill also provides short-term funding support for the embattled Highway Trust Fund, which pays for most road and transit projects in the country. Though the nature and size of the funding has yet to be decided, the bill will contribute to the Highway Trust Fund through the end of 2010. Extended support for the Highway Trust Fund, however, will require the enactment of a new transportation bill, on which debate has only just begun. The previous bill—2005's Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—was set to expire at the end of September 2009; however, Congress extended its federal programs through a series of stop-gap measures with more debate regarding the new bill still ahead. A substantial obstacle in rewriting the transportation bill is determining where to find funding. Currently, the Highway Trust Fund is financed by federal gas tax receipts; but as the gas tax has remained flat since 1993, revenues have failed to keep pace with inflation and government spending. The highway fund is projected to end fiscal year 2010 more than \$1 billion short, and unless an alternative source of funding is established, it will be roughly \$11.6 billion in debt by the end of fiscal 2011. Government officials are disinclined to raise the gas tax, and the need to raise money has prompted some in Congress to consider seeking private investment.

In his proposed budget for fiscal year 2011, which begins October 1, 2010, President Obama requested \$4 billion to seed the creation of a national infrastructure bank to support major transportation and rail projects. The National Infrastructure Innovation and Finance Fund will award grants to large-scale capital projects that benefit national or regional economies. The concept was

first proposed in 2007 by Senators Christopher Dodd (D-CT) and Chuck Hagel (R-NE). Though the idea is not new, it has gained momentum recently as many states, business groups, and industry groups have joined in support of it. The bank would issue bonds and other financial devices designed to attract private investors who tend to shy away from supporting public projects. Some states are independently pursuing public-private partnerships in which maintenance and operations on public infrastructure, such as toll roads, are outsourced to private companies.

**E. Infrastructure Market Outlook**

IHS Global Insight forecasts for infrastructure construction do not assume passage of any legislation currently before Congress. The immediate foci of Congress and the Administration remain on financial reform, immigration reform, and environmental regulation, not infrastructure. With mid-term elections in the fall, it is by no means clear that legislative action will be forthcoming in 2010.

In the near-term, infrastructure construction spending will be constrained by the slow economy and strapped state and local government budgets. The first round of ARRA disbursements allowed states and municipalities to proceed with already-planned projects in 2009, most of which were paving projects that had been delayed owing to high oil and gas prices in 2008. The second round of stimulus payments in 2010 will support the construction of larger-scaled projects that were designed in 2009. A major correction in the power sector will drag total infrastructure down 8.5% in 2010 and 3.0 in 2011. Excluding power construction, total infrastructure declines a more moderate 1.8% in 2010 and is slated to return to growth in 2011, expanding by 6.1%.

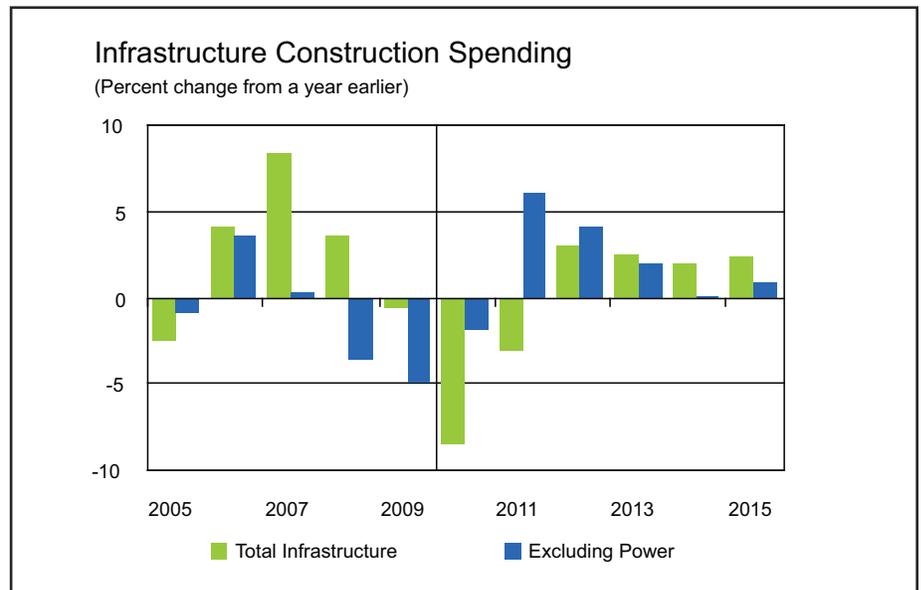


FIGURE 2

Despite the headwinds, infrastructure investment could receive a major boost from federal legislation. Congressional efforts to stimulate the economy have pulled into focus the urgent need to repair and maintain the nation's infrastructure. The path of any legislation is uncertain and relies on the strength of support. Only time will tell if current measures will result in federal action, but renewed advocacy for a national infrastructure fund along with short-term stimulus bills and a pending rewrite of the national transportation bill present ample opportunity to invest in the segment.

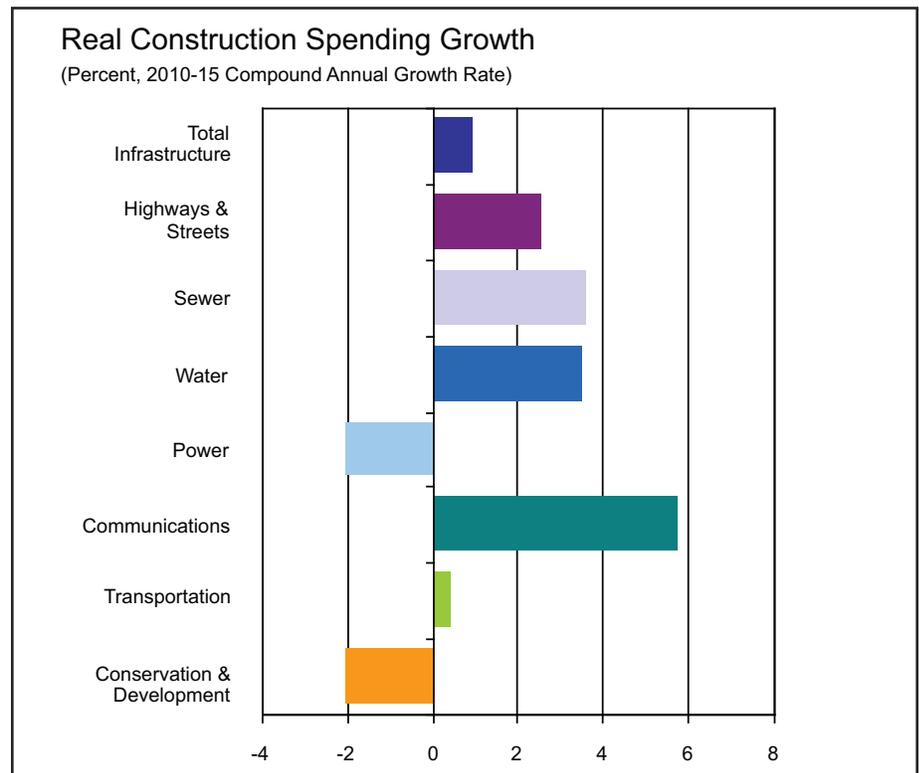


Figure 3

**i. Highways and Streets<sup>1</sup>**

For many Americans, highway and street projects are the most visible evidence of federal stimulus dollars at work. There are currently nearly 7,800 ARRA highway and street construction projects underway in the US with more to follow. Despite strong 3.5% and 6.7% growth in the second and third quarters, respectively, construction spending on highways and streets still fell a slight 0.5% in 2009 and began 2010 by contracting 5.0% in the first quarter. Though the segment is expected to recover as the year progresses, IHS Global Insight still projects highway and street construction spending to tum-

<sup>1</sup> Highways and streets construction put-in-place includes pavement (highways, roads, streets, culverts, gutters, and sidewalks), bridges, overhead crossings, lighting, rest facilities, retaining walls, tunnels, toll/weigh stations and maintenance buildings.

ble 4.9% in 2010. Positive growth will return to the sector with increases of 3.6% in 2011 and 5.3% in 2012.

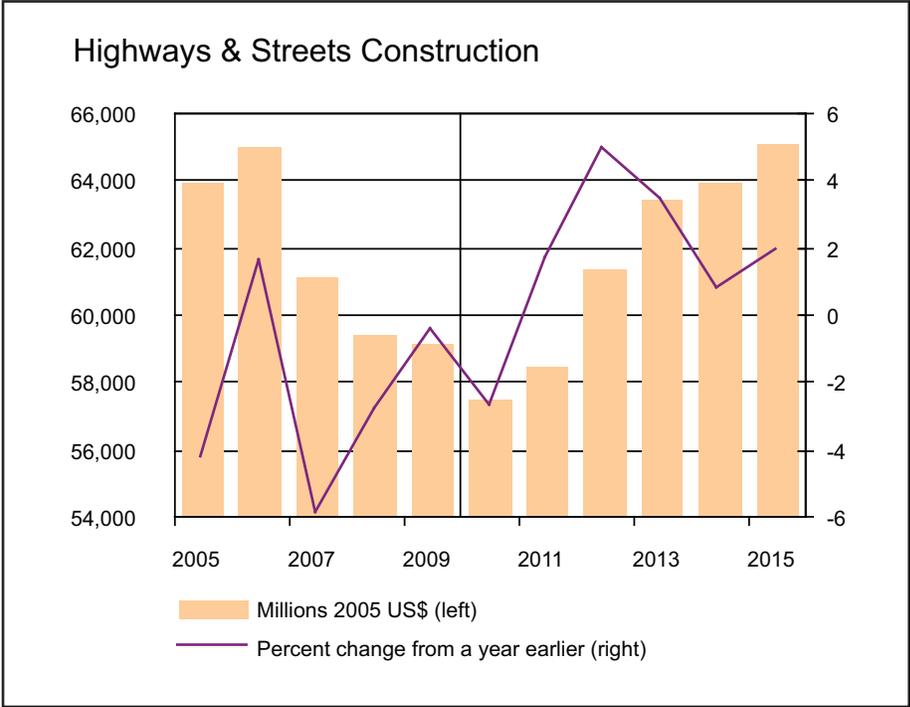


Figure 4

As the United States is increasingly dependent on its system of highways and streets for commerce as well as leisure, maintaining maximum efficiency is a necessity. Highways and roadways in the United States face critical challenges, including congestion, overuse, and poor road conditions. Americans waste an estimated 4.2 billion hours per year stuck in traffic, and total fuel wasted jumped 70% from 1.7 billion gallons in 1995 to 2.9 billion in 2005. Increased road congestion translates to a loss of \$78.2 billion as a result of additional time and fuel costs.<sup>2</sup> Traffic conditions are exacerbated by continually increasing demand. From 1980 to 2005, total vehicle miles traveled for automobiles and trucks have doubled while highway lane miles have grown a mere 3.5%. The expansion of truck-borne freight traffic has also added further strain to America's roadway system. While the percentage of roads classified to have "good" ride quality has been steadily climbing, the percentage of roads with at least "acceptable" ride quality has been on the decline, with the lowest ride quality found in heavily-trafficked urban areas. Significant investment is necessary to maintain and repair the national roadways and reverse the deteriorating trend.

<sup>2</sup> American Society of Civil Engineers. *Infrastructure Report Card* (2009)

Currently, road rehabilitation projects are primarily financed by the Highway Trust Fund, which is in debt despite various emergency injections by Congress. The fund was established in 1956 to pay for road repair and construction and is financed by revenues from excise and gas taxes. High oil prices coupled with the recession altered consumer preferences and intensified the nation's focus on fuel efficiency. Average miles per gallon is trending upward as consumers turn to more fuel-efficient cars, while vehicle miles traveled fell in 2008 and 2009 as consumers turned to public transit options or curtailed travel altogether. The combination of reduced gasoline consumption and a stationary gas tax means that revenues are down, and the fund's coffers are drained. Thus far, Congress has only passed short-term resolutions—including an \$8-billion emergency injection in August 2009—to try to keep the Highway Trust Fund solvent. A long-term funding solution has yet to be determined. In 2006, the National Surface Transportation Policy and Revenue Commission recommended raising the gas tax by \$0.05 to \$0.08 per gallon<sup>3</sup>, but many are reluctant to approve such a move and, given the present aim to reduce the nation's dependence on oil, the measure would only prove to be a short-term fix.

As the most visible segment of infrastructure, highway and street construction will be one of the prime targets of federal legislation. While the economy remains downtrodden, highway and street projects will serve the dual purposes of repairing damaged infrastructure and standing as tangible evidence of government action. The segment's emblematic importance will also make it a popular option for public-private partnerships, or PPPs. The overall size of the PPP market is not well-known, but the more prominent projects tend to be toll roads and other sponsored highway segments. Reconstruction of the 7.8-mile Chicago Skyway Bridge connecting Illinois and Indiana, which began in 2002, was the first time an existing toll road in the US had been privatized. The economic downturn has made public agencies more receptive to private funding, thus there is upward potential for private sector involvement.

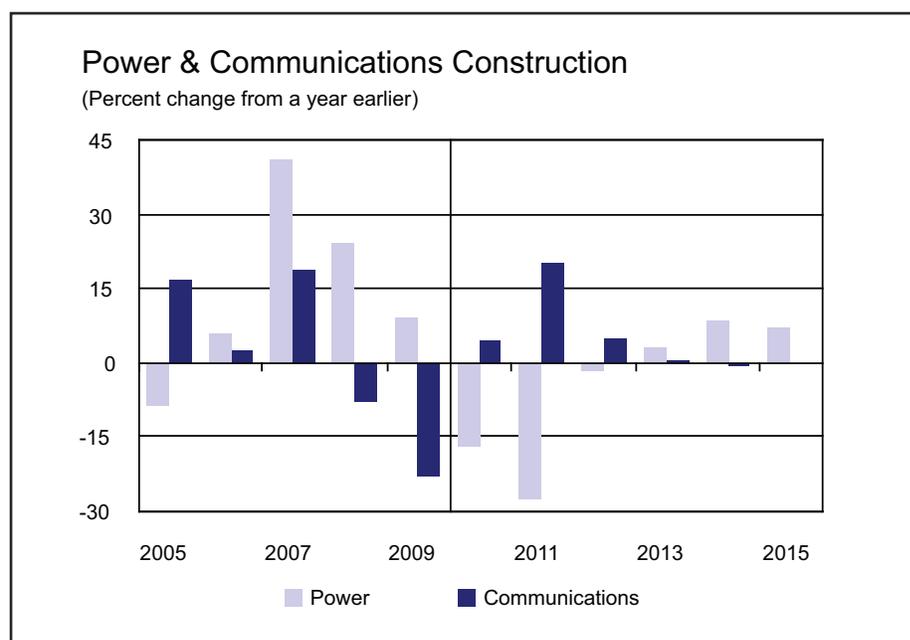
## ii. Power and Communications<sup>4</sup>

Investment in the power sector will dominate infrastructure construction spending on power and communications. The power sector achieved astonishing growth during the commodities boom in 2007 and 2008, expanding 41.0% and 24.1%, respectively. These plants were planned prior to what has become known as the Great Recession, hence the tremendous surge in construction generated overcapacity in the market that will need to be absorbed

<sup>3</sup> Report of the National Surface Transportation Policy and Revenue Study Commission—*Transportation for Tomorrow*, Volume II, December 2007

<sup>4</sup> Power and communications construction put-in-place includes wind and solar energy facilities; buildings and structures for the distribution, transmission, gathering, and storage of natural gas and crude oil; nuclear, oil, gas, coal, wood, and hydroelectric power plants; nuclear reactors; electrical distribution systems; electrical substations; switch houses; transformers; transmission lines; telephone, television, radio distribution and maintenance buildings and structures.

before expansion can begin anew. Moreover, the power industry is undergoing a transition from traditional power sources such as coal and oil to cleaner technologies, such as wind and solar. Consequently, the next several years will be a struggle for the power industry, as the latter is only now in its research and development phase and its viability will be driven in part by legislative activity that is still uncertain. Uncertainty breeds reluctance to invest; moreover, even the planning and permitting period leading up to actual construction of power plants can take at least two years. For coal or nuclear plants, the process can be much longer given their environmental footprints. These factors contribute to prolonged weakness in the power sector.



**Figure 5**

The power industry will be under greater scrutiny as the domestic and global economies increasingly turn their attentions to developing "clean" power technology. In December 2009, delegates from 193 nations gathered in Copenhagen, Denmark for the United Nations Climate Summit to coordinate efforts to curb greenhouse gas emissions and address global climate change. The conference ended with a vague nonbinding statement which does not require any nation to meet specific emissions targets. In the statement, a small group of industrialized nations—the US included—pledged approximately \$30 billion over the next 3 years to help developing nations produce lower-carbon technologies and alleviate the effects of global climate change. The US also agreed to a 17% reduction in emissions, compared to 2005 levels, by 2020.

Despite the uncertainty surrounding the final statement issued at the Climate Summit, many US states are preparing a shift toward lower-carbon fuels, and many companies in energy-intensive industries are investing heavily in lower-carbon technologies and drawing out long-term plans to reduce their carbon emissions. On the regulatory side, various legislative attempts to set up a cap-and-trade system have appeared in Congress. Though many of these bills remain stuck on the Senate floor, for businesses, they represent a clear edict that the US is focused on lowering greenhouse gas emissions. Coal and other greenhouse gas emitting power generation facilities stand to lose revenue and growth potential as the byproducts of their business are regulated, taxed, or capped.

In contrast, there is a vested interest in new clean technology. The push to lessen the nation's dependence on foreign oil has sparked major interest and investment in renewable and non-petroleum-based power technologies, such as wind, solar, hydroelectric, and nuclear. The Environmental Protection Agency (EPA) has been adamant about the need to find alternatives to petroleum and have stated that they would impose environmental regulations to address the health risks associated with greenhouse gases if Congress does not act. Moreover, of the US Department of Energy's \$36.7 billion in stimulus money, \$16.8 billion is designated for improving energy efficiency and renewable energy infrastructure. While stimulus funding will have a major impact on energy research, its impact on overall power construction will be subdued until the new technology is made viable on a broader scale. One highly-anticipated innovation in the power industry is a \$400-million cell being developed by Bloom Energy, which would ultimately boast low production costs and run on bio-fuel.

With regard to existing technology, the federal government devoted almost \$1 billion of ARRA stimulus funds towards developing carbon capture and scrubbing technology at three coal burning power plants around the country. Other clean power projects, such as Cape Wind—a \$900-million, 130-turbine wind farm off the coast of Massachusetts—will also receive funding. Moreover, the US is considering expanding nuclear power generation to meet future demand; the Clean Energy Act of 2009 recently introduced in Congress has an aggressive nuclear component, seeking to double the share of nuclear power on the domestic grid in twenty years. Much of the projected growth will be driven by regulation, policy decisions, and tax incentives. Spending in the near-term will be primarily directed to research and development and on retro-fitting existing structures to meet clean energy and energy efficiency requirements. The development of new power technology will encourage the use and development of new equipment to meet construction needs.

Communications construction did not experience the same fervent pace of growth as power and thus will not suffer a large correction; however, given their relative sizes, any growth in communications will be overwhelmed by sharp declines in power. Investment in communications construction is closely tied to residential and office activity. The housing downturn dragged spending down in 2008 and the decline was accelerated by the commercial downturn in 2009. With a housing recovery expected in late 2010, communications is poised for a modest rebound. A stronger upturn is expected in 2011 as commercial activity mends and the industry catches up on deferred activity, giving continuing improvements in technology.

### iii. Sewer and Water<sup>5</sup>

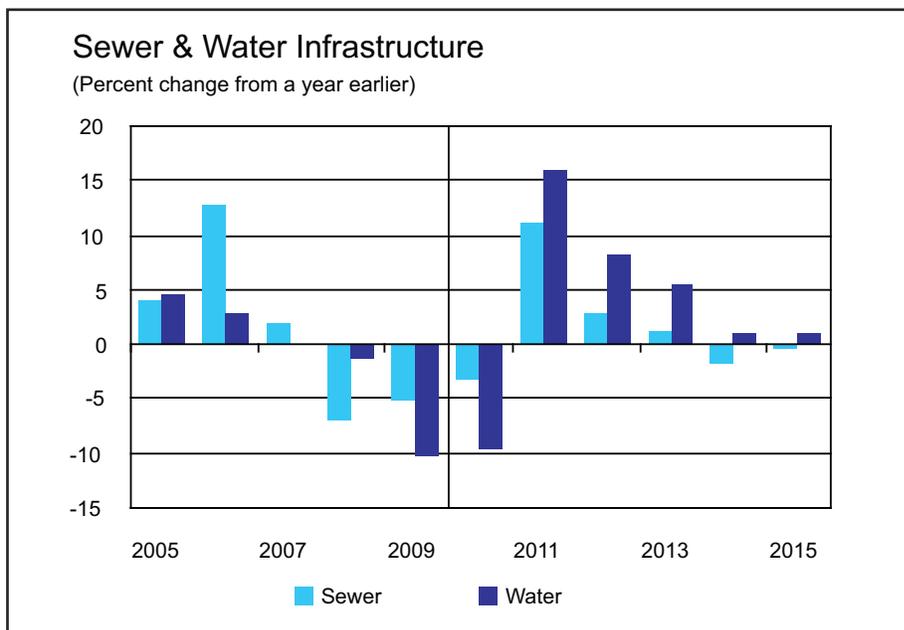
In their quadrennial report card, the American Society of Civil Engineers (ASCE) gave a mark of D- to five infrastructure segments, including drinking water and wastewater. A good portion of the nation's major sewer and water systems are nearing the century mark in terms of age, and the remaining piped water and sewer infrastructure in the US was built in the years following World War II when the population and housing spiked. Though some of the older masonry and steel construction have proved extremely durable, most of the infrastructure has aged beyond its useable lifespan. The ongoing depreciation of water and sewer infrastructure is also severely costly; according to the US Geological Survey, nearly 2 trillion gallons of water are lost each year due to poor infrastructure, which is equivalent to a \$2.5-billion annual loss.

Aging pipes do not garner the same visibility as roads, bridges, or passenger transit. Thus, despite the urgent need for repair, federal support for water and sewer infrastructure is generally mixed. To illustrate, two bills currently in front of the Senate would contribute an additional \$1 billion each to the Drinking Water State Revolving Fund (DWSRF) and the Clean Water State Revolving Fund (CWSRF). These two programs were first introduced in 1996 to help states provide loans and other assistance to public water projects. Each state receives an annual capital grant which, combined with a 20% state match, goes to support installation and replacement of treatment facilities, distribution systems, and storage facilities. The state revolving funds typically support new water and sewer infrastructure; in order to be eligible for funding, replacement projects must be necessary to maintain compliance or to ensure public health standards. While some in the Senate are pushing legislation to add funding, the White House is looking to lower overall contributions. President Obama's proposed budget for FY2011 would cut \$700 million from both the DWSRF and the CWSRF. Political wrangling

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<sup>5</sup> Sewer and water construction put-in-place includes sewage treatment and disposal plants, sewage pipelines, lift and pump systems, resource recovery and recycling centers, pond sewage systems, water filtration and treatment plants, water lines, water pump stations, wells, potable water reservoirs, and water storage tanks and towers.

will likely result in moderate investment, but it will not be enough to keep pace with demand.



**Figure 6**

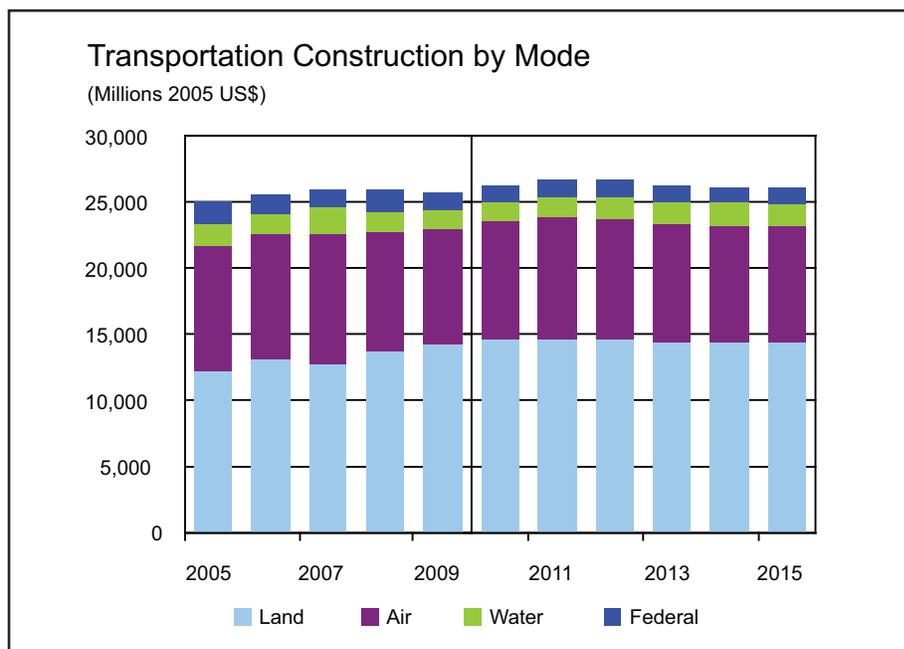
The outlook for sewer and water infrastructure construction will rely on government funding as well as new residential construction. At the moment, government budgets across the country are strapped, but the residential market is beginning to improve. As housing returns to a sustainable recovery, new utilities need to be added to keep pace with new developments, which will give a boost to new water and sewer construction. Both single- and multi-family housing starts are expected to pick up in 2010; sewer and water infrastructure construction, however, is not projected to return to growth until 2011.

With the housing market in decline since 2005, some necessary sewer and water infrastructure has already been put in place, as it is generally installed before construction of new housing units. Total housing starts reached a high of 2.073 million units in 2005. In anticipation of another record year in the residential market, sewer construction spending jumped 12.8% in 2006 while water construction climbed 2.8%; the bulk of this expansion occurred in the first quarter. By the second quarter of 2006, starts had fallen well below their 2005 pace, and sewer and water infrastructure investment moderated as well. The contraction in sewer and water infrastructure construction spending was mild in comparison to the 73.3% peak-to-trough decline in housing from 2005 to 2009. Thus, a short lag between the recovery of the housing market and recovery in the sewer and water infrastructure segment is to be expected given the pre-installation of some piping.

**iv. Other Heavy and Civil Engineering**

**a. Transportation<sup>6</sup>**

Transportation construction spending is typically large in scale and long in duration. Because of the political nature of the funding and support behind these projects, trends are generally slower moving and less volatile, which means that growth in the segment will not occur overnight. Real spending growth in transportation construction is expected to struggle for the next several years owing to strained government budgets at all levels. Over the next five years or so, construction spending in the segment will be sustained by the promotion and construction of a high-speed rail system and port renovations induced by the expansion of the Panama Canal. Transportation construction grew a slight 0.58% in 2009 and will recover with healthy 5.2% growth in 2010. Beyond 2010, transportation construction spending in real terms will be relatively flat.



**Figure 7**

**1. Land Transportation<sup>7</sup>**

Rail is gaining momentum as a preferred mode of transporting freight and people. Shippers are looking to combat rising fuel costs by switching to a more efficient alternative to trucking. On the passenger side, high oil prices and the economic recession have led many Americans to turn to public transit

<sup>7</sup>Land transportation construction put-in-place includes mass transit (light rail, monorail, streetcar, and subway facilities); bus and railroad passenger terminals; railroad (tracks and bridges), vehicle maintenance facilities; bus, railroad, or truck freight terminals; and private land transportation, including private rail.

as a means of saving. Unfortunately, the increased demand for public transportation comes at a time when state and local governments are battling severely strained budgets. The gap between supply and demand has widened, as municipalities have reduced transit staff and service—thereby reducing investment in infrastructure—in order to remain solvent. While the need is present for mass transit investment, the current fiscal situation faced by much of the country is not allowing for great strides to be made. One of the few significant light-rail projects underway is Minnesota's Central Corridor transit line between St. Paul and Minneapolis, estimated to cost \$956.6 million in total. Construction is expected to begin in summer 2010 and the system is expected to be operational by 2014.

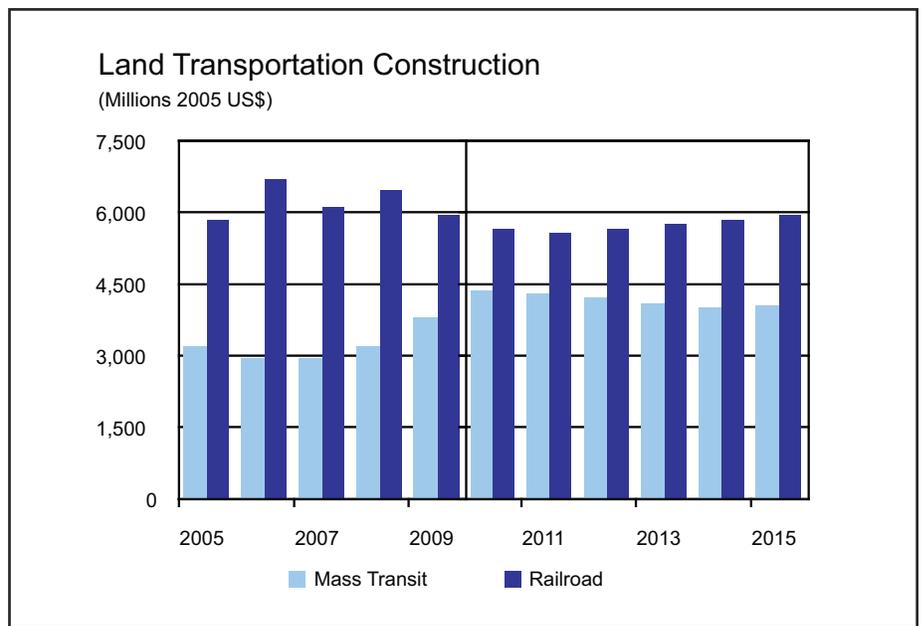


Figure 8

State and local budgetary issues may linger for another year or so, but land transportation will receive much-needed support from the federal rail initiative. The Obama administration is pushing for improved transit systems and a national high-speed rail system to alleviate roadway congestion and reduce fuel consumption. In early 2010, the US Department of Transportation distributed \$8 billion among 13 high-speed rail projects across the nation. The high-speed rail grant will fund, among others, a corridor connecting Tampa, Orlando, and Miami. California received \$2.25 billion—the largest single award—to develop a 790-mile high-speed system that would ultimately connect San Diego to Sacramento and a 520-mile system that connects Los Angeles and Anaheim to San Francisco. The third largest rail award went to Illinois for an upgrade of the Chicago to St. Louis rail line. The \$1.1 billion award will make improvements to the line, allowing for train speed of up to

110 mph, reducing travel time by close to 1.5 hours. Even so, the project has come under fire from critics who say that the line cannot be considered high-speed when compared to 220 mph lines found in Europe.

Investment in rail will provide support for transportation infrastructure construction over the medium to long term, but in the short run, many rail projects are in the research and development phase. Actual construction spending will not occur immediately. Another boost to the country's rail infrastructure could come from the proposed Freight Rail Infrastructure Capacity Expansion Act of 2009, which would create a 25% tax credit for investments that increase the nation's rail capacity.

## 2. Air Transportation

Demand for air travel rebounded from its September 11th downturn and reached new highs in 2007. Total individuals boarding domestic and international flights reached 769.9 million in 2007, up from 669.2 million in 2000. Since 2007, air travel has been hit hard. High fuel costs in 2008 forced airlines to raise fares, suppressing demand, and most airlines saw their profits dip into the red. To conserve fuel, airlines opted to lessen the frequency of flights, choosing to fly a larger, more fuel-efficient aircraft rather than multiple smaller regional jets. Some airlines managed to negotiate short-term price contracts with fuel suppliers but were locked into higher prices when commodity prices collapsed midway through 2008. To compound troubles, after oil prices fell, demand did not return as airlines had to battle the worst economic downturn since the Great Depression. Consumers and businesses alike curtailed air travel, and capacity cuts made by airlines during the height of the commodity boom remained in place.

Outdated and inefficient air traffic control systems create avoidable delays that cost the air industry hundreds of millions of dollars. In 2007, airlines reported on-time arrival percentage of 73.3%, the second worst in history behind the 72.6% recorded in 2000. The on-time record will likely improve in 2009; capacity cuts should help, and airlines have also begun to incorporate taxi and gate time in their estimates, thereby adding extra time to flight itineraries. The Federal Aviation Administration (FAA) is seeking to replace current systems with its NextGen system to reduce avoidable delays. Chicago's airports are already installing the new GPS-based air traffic control systems, but nationwide implementation has been met with congressional delay regarding federal funding programs.

Airports generate revenue through airport cash flow, general obligation funds, passenger facility charges and government grants—including the Airport Improvement Program (AIP). Combined, passenger facility charges and AIP grants account for 40% of annual US airport capital spending. The AIP expired in September 2007 and has been operating through a series of short-

term resolutions. Congress has continued to postpone reauthorization of the program, making long-term planning difficult. To support further growth of cargo carriers and the airline industry—which posted positive net profits in 2007 for the first time since 2000—the FAA and other sponsoring agencies need to invest in infrastructure and new technologies that will cut down on delays and increase capacity.

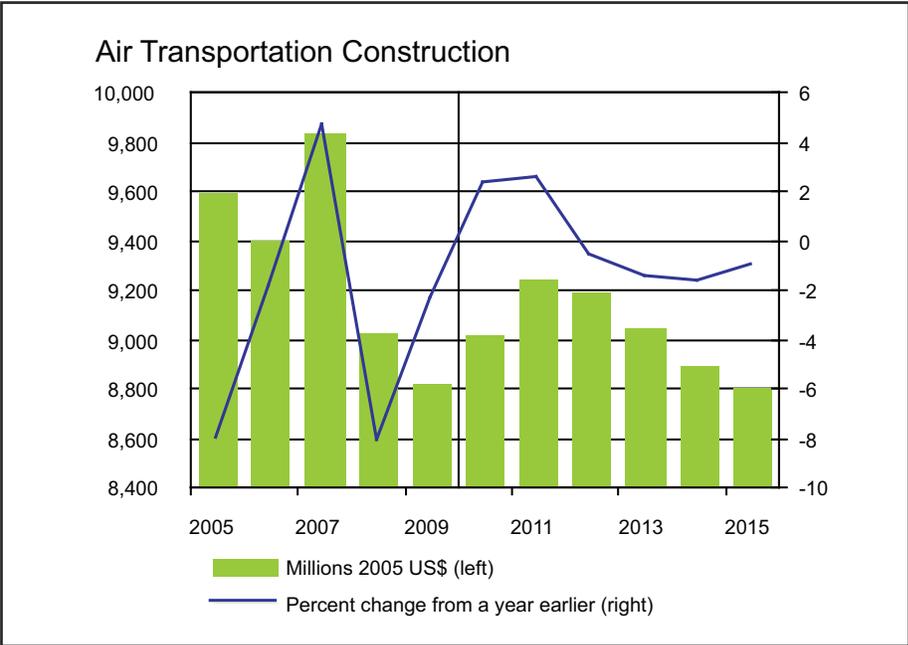


Figure 9

Due to its perceived convenience, time, and cost, air travel is often preferred to other modes of transportation. A steady and predictable flow of capital and a firm commitment to invest in airport infrastructure and new technologies, along with a strong voice, robust leadership, and a more streamlined approval process are necessary to maintain a successful aviation system.

**3. Water Transportation**

The 12,000 miles of navigable waterways in the US inland waterway system serve 38 states, including states along the Gulf and Atlantic coasts; the Mississippi River system makes up three-quarters of the entire network. Nearly 11,000 miles of waterways are funded by a federal excise tax on fuel; commercial operators who use these waterways pay a tax of 20 cents per gallon. Revenues from the excise tax contribute to the Inland Waterways Trust Fund (IWTF), which was established in 1978 and pays for half of new construction and major rehabilitation on inland waterway infrastructure.

Expansion of the Panama Canal will be a key driver of growth for water transportation infrastructure. The current addition of a third set of locks along the Canal will increase the capacity of passing containerships from 4,500-5,000 twenty-foot equivalent units (TEUs) to 14,500 TEUs, which means that each ship can carry up to 14,500 container boxes. The "panamax" measure, which describes the largest vessel that can fit through the canal, will be larger as a result, and the ports along the Gulf and East Coasts will need to be deepened if they are to accommodate larger ships passing through the Canal from the Pacific Ocean. For instance, the Port of Baltimore recently received \$1.3 billion in private equity funding to build a larger terminal in anticipation of increased trade traffic through the new locks, which become operational in 2014. The Port of Baltimore construction project is estimated to create almost 6,000 jobs and bring in more than \$15 million annually.

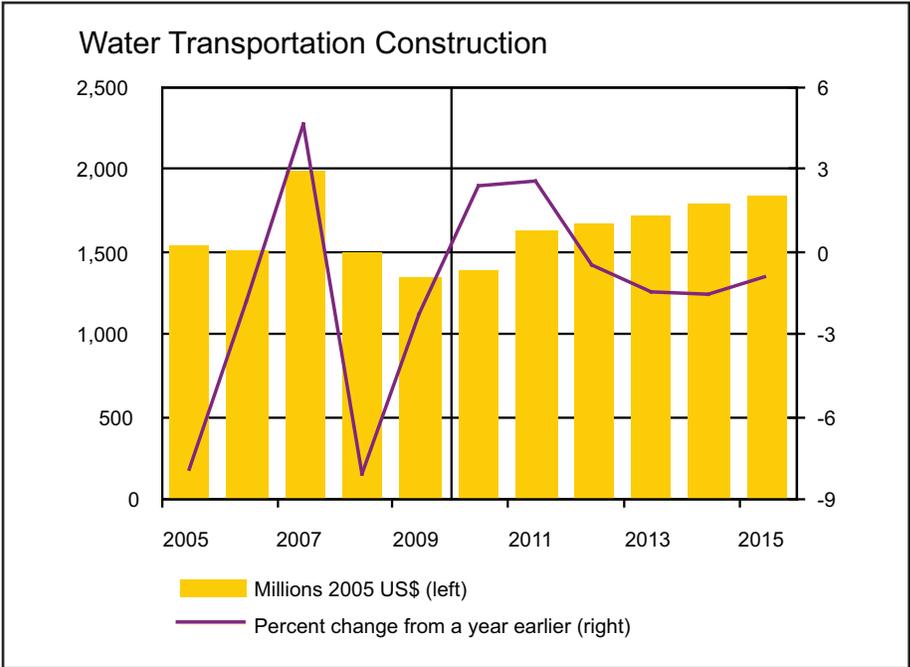
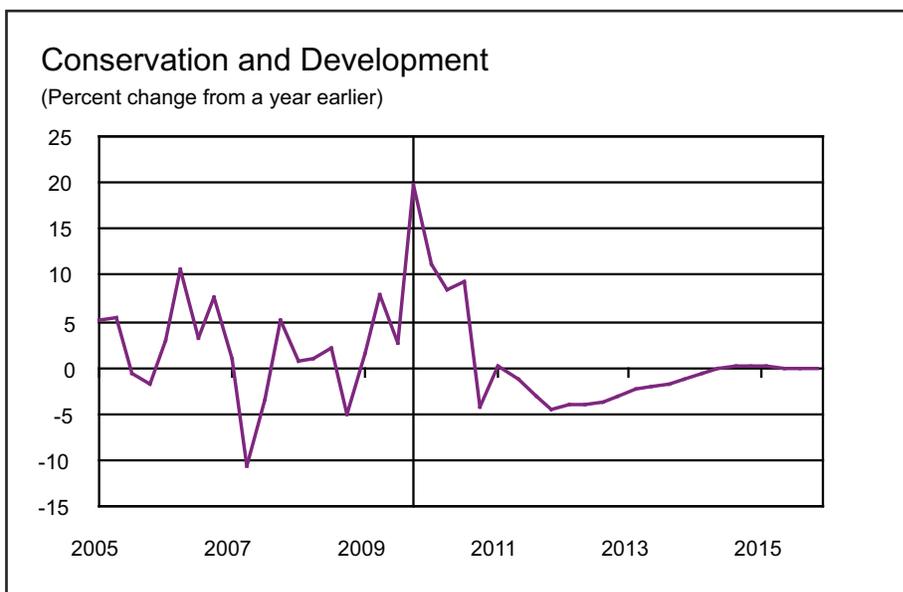


Figure 10

Water transportation is more cost-effective, yielding average savings of \$10.67 per ton compared to other modes of transport. Shippers and consumers use the waterway system to move approximately 630 million tons of cargo; total waterborne commerce is valued at more than \$73 billion per year and growing. Despite increasing usage, many landside facilities—such as terminals, wharves, rail yards, and harbor-side roadways—are beyond their design life of 50 years. Major investment is needed to shore up aging infrastructure and landside facilities. As it stands, aging and deteriorating conditions will hinder the system's ability to recover from any event of significance.

**b. Conservation and Development<sup>8</sup>**

Construction spending on conservation and development infrastructure increased 8.4% in 2009 and is expected to climb a more moderate 5.6% in 2010. Structures and components in this segment generally fall under the purview of the U.S Army Corps of Engineers (USACE) and include dams, levees, and locks. The nation's dams, levees, and locks all received poor to failing grades from the ASCE. For instance, of the 257 locks that are part of the inland waterway system, 47% were deemed functionally obsolete by the US Army Corp of Engineers. The USACE's \$180 million annual budget for lock repair is only enough to fund two or three projects per year, and 93 more existing locks will be classified as obsolete by 2020 barring major investment.



**Figure 11**

**1. Dams**

Of the nation's more than 85,000 dams, only 11% are federally owned. Oversight for the rest falls to states, cities, municipalities, and private entities. Many state dam safety programs lack sufficient funds or personnel to ensure proper construction and to perform inspections. Texas, which has more than 7,400 dams, has \$435,000 for an annual budget and staff of 7 engineers to regulate the entire system.<sup>9</sup> Some states have no safety programs at all or have state laws which specifically exempt dams from inspection. The number of dams said to have high hazard potential, or that would lead to loss of life given failure, now total 15,237, up more than 3,300 since 2007. New land development below dams contributes to greater risk and consequences of failure.

<sup>9</sup> Association of State Dam Safety Officials. *Statistics on Dams and State Safety Regulation* (2007)

In the 2008 Farm Bill, Congress provided \$100 million and authorized another \$85 million to be appropriated through fiscal year 2012 to support watershed rehabilitation. The US Department of Agriculture, Natural Resources Conservation Service (NRCS) plans to perform 400 dam assessments, develop 200 rehabilitation plans, and repair 120 watershed dams by the end of fiscal year 2012. There has been some improvement as a result of stronger national and state programs—including modest increases in budgets, staffing, and more safety inspections. However, the number of dams being repaired has not kept pace with the growing number of high hazard dams. Significant improvement will require Congress, federal and state dam safety programs, and other dam owners to develop and enforce effective inspection strategies and to seek further funding.

## 2. Levees

Currently, there is no record of the number of levees, nor is there any assessment of their conditions. Following Hurricanes Katrina and Rita in 2005, Congress enacted the Water Resources Development Act, which called for the creation and maintenance of an inventory of all US levees. The task of gathering information on federal levees has been assigned to the USACE, and information on nonfederal levees would be provided on a voluntary basis by state and local agencies. To date, the list is far from complete, as few state and local agencies have provided information. Further, little information has been collected regarding the condition and performance of federal and non-federal levees. Preliminary results released by the USACE in February 2009 show that about 9% of federally-inspected levees are expected to fail in case of a flood. The findings will evolve as the inventory continues.

Assessing the condition of the nation's levees is critical to public safety. The intensity and frequency of hurricanes and other coastal storms are expected to increase as a result of climate change, leading to greater risk for flooding.<sup>10</sup> Much remains unknown about the tens of thousands of miles of levees in the nation, and without a complete inventory of levees, a myriad of uncertainties remain concerning the location, performance, and conditions of levees and the threat they pose to the public. Thus far, there has been no formal oversight; Congress has only recently called for the development of new program guidelines to ensure levee safety. Future investment is necessary for maintenance, research, emergency planning, and security.

## F. Infrastructure Market Conclusion

The economic downturn has been both a blessing and a curse for infrastructure construction. While state and local government budget deficits remain overwhelming obstacles, federal efforts to stimulate the economy during the

<sup>10</sup> National Committee on Levee Safety. "Recommendations for a National levee Safety Program," January 2009

recession have been centered on infrastructure investment. As the most visible infrastructure segments, highways and streets and mass transit will receive the most congressional attention and support. The national and international focus on climate change and emissions control will also attract ample investment for the power industry even though new clean power technology is not yet commercially viable. Other infrastructure segments such as the nation's water and sewer systems, inland waterways, dams, and levees are vital to the health of the domestic economy and also in great need of repair and maintenance. Delay in addressing these needs jeopardizes public safety and leaves the country vulnerable to any event of significance.

Many funding issues linger before legislators but have thus far remained unresolved, and inadequate public funding is prompting states to seek out private investors. Though there is still opposition, many states, business groups, and industry groups have joined in support of public-private partnerships. Currently, at least 26 states, including Illinois and Indiana, have passed legislative measures which allow public-private partnerships on designated infrastructure projects. Near-term stimulus support will sustain infrastructure construction; however, a steady, ongoing stream of capital is necessary to close the ballooning gap between actual and necessary investment. Equilibrating supply and demand in the infrastructure investment market and restoring the nation's infrastructure to good condition will require tremendous cooperation between and support from both the public and private sectors.

The first round of ARRA distribution in 2009 primarily funded projects that were postponed due to economic hardship and research studies for other potential projects. Going forward, the number and scale of projects under construction will expand and create a larger ripple in the broader economy. Infrastructure investment will spark multiple layers of recovery in the private sector. Governments would pay private consulting or engineering services firms to inspect, research, and design various infrastructure projects and hire construction companies still reeling from the residential, then nonresidential, collapses to undertake the actual construction. As the number of projects picks up, companies will need more equipment and materials, thereby lifting the manufacturing sector and generating greater demand for equipment leasing and financing. On average, roughly 3-4% of infrastructure construction spending goes toward the leasing and rental of construction equipment. Thus, if the US spends what the ASCE deems necessary to restore national infrastructure to good condition over the next 5 years, this could potentially lead to a \$13-\$18 billion market for construction equipment.<sup>11</sup>

The need to invest in repairing US infrastructure must be acknowledged and addressed by the highest level of government. Increased investment in infrastructure will positively impact many industries and individuals: engineering

<sup>11</sup> ASCE estimates it will require \$2.2 trillion over five years to restore US infrastructure to good condition. This translates to an average of \$440 billion per year.

firms, construction companies, equipment manufacturers, materials manufacturers, and the general public. To effectively garner government support for infrastructure construction, industries must join together and focus on the collective benefits of infrastructure investment rather than its marginal benefit to one industry versus another.

## **IV. General Trends in Construction Equipment Leasing and Financing**

### **A. Changes in Fleet Management Behavior**

The collapse of the US economy had a significant impact on the market for construction equipment, leading to a number of behavioral changes among fleet owners. Total construction spending fell 12.5% in 2009, resulting in severe losses for construction companies. With few projects available, construction companies were left with little cash on hand to upgrade machines and invest in capital. Many fleet owners decided to operate machines longer than they would under normal economic circumstances. By forgoing repairs and upgrades, these equipment owners are hoping their machines will last until business picks up again and they can afford to invest in new capital. Other fleet owners chose to invest in used equipment rather than purchasing new equipment. Used machines are considerably less expensive than new machines and allow fleet owners to upgrade their existing machinery without making as large an investment.

Rental options have also become more attractive during the economic downturn. By renting, fleet owners can avoid long-term investments and not be concerned with maintenance or reselling. Renting allows contractors the ability to pay for a machine for a designated period of time and for a specific capability. Equipment rental is especially attractive when business conditions are uncertain and construction jobs are sporadic. Companies will typically meet their short-term needs through rental and then turn to leasing and financing options when they feel the recovery is secure. As such, rental activity is considered a leading indicator for leasing.

### **B. Credit Environment**

Poor credit conditions have been a major deterrent to new equipment leasing and financing. Companies are suffering from reduced cash flow due to irregular work and lower profit margins. Banks, worried about the ability of borrowers to pay, have demanded top credit quality, making it difficult for many contractors to get loans. Tighter credit requirements have also led to an increase in relationship lending. Lending institutions have become more risk-averse and are more likely to grant loans to clients with whom they have had successful interaction previously and whom they trust. Thus, on the demand

side, businesses can more easily gain access to credit when dealing with one bank—often with a local institution where they do most of their banking—rather than with multiple banks.

The strict credit environment has been especially difficult for small businesses. Smaller companies that are unable to meet the strict credit requirements are turning to asset-based lending, in which the borrower puts up equipment and other liquid assets as collateral. Since there is collateral backing the loan, borrowers with weak credit scores can still get loans. As this type of loan is quite risky, it is typically viewed as a last resort but has gained traction recently as credit has become harder to acquire.

To support small businesses, the federal government has passed legislative measures, specifically tax incentives, as part of the ARRA and subsequent short-term stimulus bills. Section 179 of the US tax code allows small business to write off \$125,000 of business equipment purchases; the ARRA bill doubled the maximum deduction amount to \$250,000. Moreover, if businesses spend more than \$250,000, they can immediately write off 50% of the purchases, and the rest of the cost can be depreciated over time. The tax break is phased out for businesses with capital expenditures over \$800,000. In March 2010, President Obama signed into law the Hiring Incentives to Restore Employment (HIRE) Act of 2010, which extended the tax break but not the 50% bonus depreciation incentive for 2010.

### C. Surplus Equipment

The equipment market was hit first by the residential market collapse and more recently by the commercial collapse. As housing starts plummeted in 2008, a large surplus of residential construction equipment developed in late 2008 and early 2009. Tight credit then spread to the commercial market, and soon, nonresidential construction projects were stalled, creating an even larger equipment surplus. Faced with fewer projects, construction companies have been forced to lay off employees and sell, or idle, equipment. The utilization rate among construction machinery stands at roughly 60%, compared to 80% during normal economic conditions.<sup>12</sup>

Excess capacity remains a significant issue in the market, dragging down demand for new equipment. Demand for equipment is gradually recovering—particularly on the residential side as housing starts rebound—but still has not returned to previous levels. Smaller equipment such as skid steers and small excavators are expected to turnaround soon, but larger equipment is still struggling. The glut of equipment in the market has also led to a drop in new equipment prices and, consequently, in used equipment prices as well. Surplus new and used equipment is likely to cause a slight delay in the recovery for construction equipment.

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<sup>12</sup> ELFA member interview

#### D. Emissions Regulations

In 1973, the first emissions regulations in the United States for on-highway engines were introduced by the Environmental Protection Agency (EPA). In 1996, the EPA standards were extended to non-road diesel equipment, including construction machinery. After a two-year phase-in period, the first set of regulations, or Tier 1 standards, were adopted for all equipment under 37kW. Tier 2 and Tier 3 standards took effect in 2004 and 2008, respectively, and were increasingly stringent. The EPA introduced the next stage of emission standards, Tier 4, in 2004. The final Tier 4 emissions regulations will take effect on January 1, 2014. The regulations will cut nitric oxide (NO) and particulate matter emissions levels to near-zero.

As with the other environmental standards, Tier 4 regulations will be phased in gradually. Beginning on January 1, 2011, new construction equipment will be required to comply with Interim Tier 4 emissions regulations, which require reductions of NO emissions and particulate matter emissions by 93% and 94%, respectively. The regulations will be applied to all machines manufactured in 2011 and beyond. Machines built prior to 2011 will not be subject to Tier 4 regulations. Major manufacturers have not yet begun to build Tier 4 compliant engines, but the technology is available and ready to be installed in new machinery.

Tier 4 EPA regulations are binding throughout the United States. However, some states have decided to implement statewide guidelines of their own. The California Air Resources Board (CARB), for instance, instituted its own set of regulations, which are even more stringent than those set by the EPA. If more states decide to write their own emissions regulations or choose to adopt standards that coincide with CARB rules, it could be a major issue for equipment manufacturers going forward. Manufacturers run the risk of having to build multiple engines, as engines that are Tier 4 compliant may not be CARB compliant. Thus, equipment manufacturers will either have to build machines that meet the strictest set of standards or build separate engines for different regions.

Though the downturn is not expected to delay the actual implementation of environmental standards, there has been some impact on the regulatory environment. In California, the Air Resources Board has decided to postpone enforcement of emissions restrictions on off-road diesel machinery that went into effect in March 2010. The decision came after strong pressure from construction groups, who argued that enforcement would be devastating to the state's construction industry while the economy is still struggling to recover. The delayed enforcement is a de facto extension of existing standards in California, but similar action is not likely to impact the enactment of new EPA regulations on January 1, 2011.

### E. Will there be a pre-buy?

Interim Tier 4 emissions requirements are only applicable to machines built before January 1, 2011; equipment owners will not be required to replace their older equipment when the new regulations take effect. With this exception in mind, many expect an increase in equipment sales to take place in 2010 as fleet owners "pre-buy" equipment to avoid having to purchase higher-priced Tier 4 compliant equipment.

A similar reaction occurred in the trucking industry, which experienced multiple rounds of tighter emissions regulations in January 2007 and 2010. The implementation of EPA regulations in 2007 resulted in a large pre-buy of trucks in 2006, followed by a severe decline in sales in 2007. Economic conditions in 2009 were more tenuous than they were in 2006. As a result, trucking companies had less cash flow and more limited credit options in 2009 than 2006; thus, the 2009 increase in sales from the pre-buy was on a smaller scale than the previous pre-buy boom. Moreover, trucking companies had already successfully gone through regulation changes in 2007 and were therefore not as concerned about the transition to new technologies.

Although many expect an increase in construction equipment sales in 2010, others have their doubts. Recently, construction projects have been few and far between, and companies are suffering from significantly reduced cash flow. The current fragile condition of the construction industry and strict credit requirements could dampen the size of the pre-buy in 2010.

### F. Technology

#### i. Operator Safety

A major selling point for equipment manufacturers today is operator safety and comfort. To gain a competitive edge, manufacturers are trying to go above and beyond to make sure operators are able to do their work in comfort. In particular, efforts have been made to reduce the operator's exposure to noise, dust, and vibration. Machines are built with sealed, ventilated cabs that cut down on dust and block out noise. Manufacturers have also automated the seats in the cab so that they adjust to vibration. To ensure the safety of those in close proximity to the operating device, construction equipment manufacturers are also improving the operator's sight lines.

#### ii. Emerging Engine Technology

##### a. Engine Sensors

Engines are becoming more efficient and eco-friendly through the integration of sensors and microprocessors. Sensors track engine speed, torque, temperatures, and flows. Microprocessors integrate that data with measures of speed and torque at points in the drive train, and with controls from the equipment operator in order to optimize engine response. This technology is essential for emissions reduction going forward, as engines must perform at peak levels in

order to efficiently cut down on pollutants. Sensors and microprocessors ensure that engines function properly. Given their efficiency, these new enhancements are likely to be a permanent part of engine technology.

#### ***b. Exhaust Gas Recirculation (EGR)***

One of the main engine technologies being developed is exhaust gas recirculation (EGR). During the EGR process, a portion of the engine's exhaust gases is recirculated back to the cylinders and displaces 15% of the oxygen. The reduced level of oxygen—which is a necessary element of the combustion process—means that less heat is generated from the combustions. Lower temperatures slow the rate of NO<sub>x</sub> formation, thus reducing the amount of NO<sub>x</sub> released into the atmosphere.

In order to capture particulate matter and further reduce NO<sub>x</sub> levels, the new engines are equipped with diesel particulate filters to capture particulate matter and further reduce NO<sub>x</sub>. In order to function properly, diesel particulate filters require diesel fuel with an ultra-low sulfur content of 15 parts per million (ppm). This is not a major issue for equipment used in developed areas such as the United States and European Union but could be problematic in less-developed areas where the highly refined fuel is not as common. The global market for equipment stands to be deeply affected by the difference in the sulfur levels, particularly as the EPA is contemplating regulation which would prohibit equipment that has been operating in areas with high sulfur content from returning and operating in the US or the EU. This will have a major affect on the resale market as well as international construction and leasing companies. Once again, manufacturers face the possibility of having to build separate machinery for different areas depending on whether the diesel fuel available in the region has high or low sulfur content.

#### ***c. Selective Catalytic Reduction (SCR)***

Another new engine process designed to cut down emission is selective catalytic reduction (SCR). Water-based urea is injected into the engine exhaust prior to passing through the catalytic device during the SCR process. A chemical reaction occurs between the urea and the NO<sub>x</sub> formed during the combustion process to produce non-polluting nitrogen gas and water. The conversion of some NO<sub>x</sub> molecules into nitrogen and water means that less harmful pollutants are released into the atmosphere.

Both EGR and SCR methods are capable of meeting Interim Tier 4 regulations, but it is not yet known if one is superior to the other. SCR may become the preferred method, as it is the basis for final Tier 4 compliance in 2014.

#### ***iii. Hybrid Technology***

The automotive industry has already latched on to hybrid technology while the construction equipment industry is just now joining this trend. With fuel

prices rising and strong regulatory pressure to reduce emissions, hybrid systems may be a viable solution. At the most basic level, hybrid technology involves the combination of internal combustion and electrical power sources.

There is great potential for hybrid technology in machines that use repetitive motion. Machines with digging capabilities, such as excavators, wheel loaders, or backhoes, are of particular interest. While these machines use power for lifting, energy is lost during the arm's downward motion. Manufacturers hope to harness energy from the downward motion and store it in a battery, which will then power the machine. However, upfront costs are significantly higher for hybrid equipment, and batteries are expensive to replace. The technology is not widely used, but all major manufacturers are developing hybrid technology for the future.

#### **iv. GPS and Telematics**

The future of the construction equipment industry is in telematics—a technology that allows information to pass back and forth between the machine and remote computers. The first common application of telematics in the construction equipment industry was the installation of a global positioning system (GPS). By equipping machines with GPS, fleet owners are able to keep track of equipment at all times, which makes fleet management considerably easier and prevents theft of high-priced equipment.

Machines are also now equipped with highly advanced information systems that track nearly every machine function. Computers log engine hours, fuel consumption, fluid levels, pressures, temperatures, flow rates, filter conditions, component temperatures, load graphs for engines and other components, and maintenance information. All of this information is accessible by fleet managers from remote computers. Additionally, automated systems can detect necessary maintenance and send out an alert before a small issue leads to a failure or an expensive repair. Modern machines are also remotely accessible; when sensors detect problems such as excessive temperatures, pressures, or loadings, the machines can be shut down remotely in order to avoid failure. Service technicians can also access fault codes and run diagnostics checks from a computer, rather than conducting time-consuming and costly field checks of machines.

Real world applications of the technology can be seen in new products developed by major construction equipment manufacturers. Caterpillar and Komatsu each offer equipment monitoring services that perform similar functions. The main benefit of telematics is an increased lifespan for construction equipment. By preventing theft, reducing maintenance costs, improving efficiency, and preventing mechanical failure, telematics contribute to a significant increase in a machines useful life. Furthermore, telematics boosts the resale value of construction equipment; with a wealth of informa-

tion available for equipment, used machines will retain their values better, assuming the machine has been maintained properly.

#### v. Challenges for New Technology

The major challenges that emissions regulations present for the construction equipment industry are the cost of new technology and feasibility of implementing the technology. The cost of manufacturing Tier 4 compliant machinery is sure to be greater, with some estimates as high as 50% to 100% above current costs. Increased manufacturing costs will be passed on to consumers, who will be faced with higher equipment prices. Another consideration for equipment manufacturers is how to fit modified engines into their machines. Emission reduction technology includes new engine mechanisms that significantly increase the size of engines. Consequently, manufacturers have been forced to redesign equipment to accommodate the new, larger engines.

Construction equipment owners also face the challenge of how best to obtain and store the water-based urea required for selective catalytic reduction. It is unclear at this point how much demand there will be for urea and how it will be sold and stored. Companies with fleets are likely to store it on site which will translate to increased costs as these companies will have to build proper storage and dispensing mechanisms. The supply of urea will be a major concern for equipment owners once emissions regulations take effect and demand for the substance rises.

### G. Conclusion

Though the construction equipment industry has struggled recently due to the global economic recession, there is reason to believe that demand will return and the industry will regain momentum. In the near future, demand for equipment leasing and financing is expected to stay relatively low as companies turn to short-term rental options to meet their immediate needs. The looming introduction of EPA emissions regulations in 2011 could produce a spike in equipment sales in the second half of 2010, as equipment owners look to invest in cheaper machines that use older technology and are not subject to new EPA regulations. However, strict credit requirements and low cash-flow could dampen pre-buy activity.

The market for construction equipment is likely to remain suppressed until 2012 or 2013, when a full recovery is expected for the US economy. At that point, the glut of surplus equipment should be cleared, construction activity will grow, and demand for new equipment will increase with the introduction of new technology. Machines will continue to become more energy-efficient and easier to use. New information collection methods will allow manufacturers, fleet managers, and owners to monitor their equipment more closely and lower operating costs. Electronic maintenance tracking and alerts will help to extend the usable life of equipment and contribute to higher residual values at the end of leasing terms.

While technology is quickly reshaping the construction equipment industry, it is not likely to be a strong driver of growth in the short-run. Though the benefits to owners are apparent, the current state of the US construction market and credit restrictions will limit the growth of equipment purchases in the near-term. Tougher environmental regulations and increased construction activity are expected to augment demand for new technology in 2012 and 2013, as the immediate benefits of equipment innovations are progressively more evident.

#### **H. Questions Yet to be Answered**

This report examined the impact of infrastructure construction on the leasing and financing of construction equipment. For many infrastructure segments, demand for equipment does not end after the construction phase. Aside from construction equipment, for the highway and street and rail projects that have been the focus of legislation in recent months, there will also be continued demand for operational equipment such as rail cars, transit cars, and toll booths. The need for leasing and financing extends to this segment of the equipment market as well and was not addressed in this report.

As all levels of government struggle with strained budgets, the need for private investment is growing, and more states are turning to private sector support. This trend extends beyond the infrastructure markets covered in the report to institutional structures such as hospitals, schools, and other government buildings. Equipment needs for the construction and operation of institutional buildings represent another market of opportunity for the leasing and financing industry.

## V. Appendix

**Table 1: Infrastructure Construction Spending (Real 2005 US\$)**

	2008	2009	2010	2011	2012	2013	2014	2015
Total Infrastructure	212,081	210,453	194,990	188,402	193,133	196,946	200,463	205,396
Highways and Streets	59,391	59,088	56,185	58,191	61,290	63,109	63,538	65,053
Sewer and Water								
- Sewer and Wastewater	21,111	20,007	19,367	21,532	22,154	22,437	22,015	21,930
- Water Supply	14,181	12,714	11,496	13,328	14,427	15,199	15,334	15,475
Power and Communication								
- Power	65,733	71,596	59,440	43,037	42,283	43,513	47,220	50,617
- Communications	21,142	16,316	17,039	20,496	21,508	21,615	21,456	21,475
Other Heavy and Civil Engineering								
- Transportation	25,949	25,809	26,268	26,750	26,609	26,312	26,160	26,117
- Land	13,728	14,246	14,713	14,698	14,598	14,428	14,369	14,371
- Water	1,502	1,339	1,370	1,606	1,651	1,692	1,773	1,819
- Air	9,029	8,801	8,826	9,100	9,058	8,913	8,767	8,688
- Federal	1,690	1,422	1,359	1,346	1,302	1,278	1,252	1,238
- Conservation and Development	4,575	4,923	5,194	5,067	4,864	4,762	4,740	4,728

**Table 2: Infrastructure Construction Spending (Percent change)**

	2008	2009	2010	2011	2012	2013	2014	2015
Total Infrastructure	3.6	-0.8	-7.3	-3.4	2.5	2.0	1.8	2.5
Highways and Streets	-2.8	-0.5	-4.9	3.6	5.3	3.0	0.7	2.4
Sewer and Water	-4.8	-7.3	-5.7	12.9	4.9	2.9	-0.8	0.2
- Sewer and Wastewater	-6.9	-5.2	-3.2	11.2	2.9	1.3	-1.9	-0.4
- Water Supply	-1.5	-10.3	-9.6	15.9	8.2	5.4	0.9	0.9
Power and Communication	14.4	1.2	-13.0	-16.9	0.4	2.1	5.4	5.0
- Power	24.1	8.9	-17.0	-27.6	-1.8	2.9	8.5	7.2
- Communications	-7.9	-22.8	4.4	20.3	4.9	0.5	-0.7	0.1
Other Heavy and Civil Engineering	-0.3	0.7	2.4	1.1	-1.1	-1.3	-0.6	-0.2
- Transportation	-0.2	-0.5	1.8	1.8	-0.5	-1.1	-0.6	-0.2
- Land	7.6	3.8	3.3	-0.1	-0.7	-1.2	-0.4	0.0
- Water	-24.7	-10.8	2.3	17.3	2.8	2.5	4.8	2.6
- Air	-8.2	-2.5	0.3	3.1	-0.5	-1.6	-1.6	-0.9
- Federal	18.9	-15.8	-4.4	-1.0	-3.2	-1.9	-2.0	-1.1
- Conservation and Development	-0.6	7.6	5.5	-2.5	-4.0	-2.1	-0.5	-0.3

## About the Study's Authors

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# Future Focused Research for the Equipment Finance Industry

*Presented by the Source for Independent, Unbiased and Reliable Study*

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The Equipment Leasing & Finance Foundation, established in 1989 by the Equipment Leasing Association, is dedicated to providing future-oriented, in-depth, independent research about and for the equipment finance industry. Information involving the markets, the future of the industry and the methods of successful organizations are researched to provide studies that include invaluable information for developing strategic direction within your organization.

## Your Eye on the Future

The Foundation partners with corporate and individual sponsors, academic institutions and industry experts to develop comprehensive empirical research that brings the future into focus for industry members. The Foundation provides academic research, case studies and analyses for industry leaders, analysts and others interested in the equipment finance industry.

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- Credit Risk: Contract Characteristics for Success Study
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- US Equipment Finance Market Study
- Propensity to Finance Equipment – Characteristics of the Finance Decision
- Business Differentiation: What makes Select Leasing Companies Outperform Their Peers?
- Annual State of the Equipment Finance Industry report
- Evolution of the Paperless Transaction and its Impact on the Equipment Finance Industry
- Transportation Equipment Finance Series (4 studies)

### Resources: Identification of Emerging Issues

- Annual Industry Future Council report
- International Series: Identifying Factors For Success (5 countries)

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Published three times per year and distributed electronically, the Journal of Equipment Lease Financing is the only peer-reviewed publication in the equipment finance industry. Since its debut in 1980, the Journal features detailed technical articles authored by academics and industry experts and includes Foundation-commissioned research and articles. Journal articles are available for download through the Foundation website. Subscriptions are available at [www.leasefoundation.org](http://www.leasefoundation.org)

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