

Morgan Stanley Infrastructure

Investment in U.S. Infrastructure:
A Review of the Recovery Act of 2009

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Disclosure

The shape of the stimulus will undoubtedly continue to evolve as new regulations are passed and as the Obama Administration continues to appropriate funds under the Recovery Act. Accordingly, we note that the information contained herein is current as of the last quarter of 2009.

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AUTHORS

WAIDE WARNER

Partner, Project Finance Group
Davis Polk & Wardwell LLP
waide.warner@davispolk.com
+1 212-450-4460

PO SIT

Partner, Tax Group
Davis Polk & Wardwell LLP
po.sit@davispolk.com
+1 212-450-4571

SECTION I

Introduction and Overview

“[E]verywhere we look, there is work to be done. The state of the economy calls for action, bold and swift, and we will act—not only to create new jobs, but to lay a new foundation for growth. We will build the roads and bridges, the electric grids and digital lines that feed our commerce and bind us together... We will harness the sun and the winds and the soil to fuel our cars and run our factories.”

President Barack Obama, Inaugural Address, January 20, 2009

It was 1844, fully seven years since he had first approached Congress to build a telegraph system across the United States. Despite the excitement generated when he had transmitted “What hath God wrought!” in a Capitol-building demonstration, Samuel Morse was not surprised when he got the news that Congress would not finance his telegraph. After all, a number of Congressmen had preferred a cheaper French system of semaphore stations that didn’t work at night or in the rain.¹

Even what is arguably the country’s most successful public-private partnership, the transcontinental railroad, was long a hostage to politics. First proposed by Asa Whitney in 1845, it took the Civil War to break the deadlock over a northern or southern route. It then took a secessionist movement in California to provide the strategic imperative for federal land grant support of private investment in the drive to unite the country by rail.

The frustrations of Morse and Whitney echo today for those waiting for the various agencies of the federal government to jumpstart private infrastructure investment. Although the United States invested strongly in transportation after World War II, and continued to make significant investments in infrastructure compared to other developed countries throughout the 1970s and 1980s, the United States invested less in electricity, gas, water, transportation and communication relative to the size of its economy than the average OECD country during the first half of this decade.² Before the American Recovery and Reinvestment Act of 2009 (“Recovery Act”) was passed, the Urban Land Institute estimated that infrastructure investment in the United States was suffering from a \$170 billion per year funding deficit.³

The effects of this underinvestment have become increasingly evident. According to the American Society of Civil Engineers, one in four bridges in the United States is structurally deficient or functionally obsolete, one in three roads is in poor or mediocre condition, 36% of the nation’s major urban highways are congested and the United States loses an average of 7 billion gallons of drinking water per day to leaking pipes.⁴ The United States has been left with a significant and growing need for transportation, energy and telecommunications projects. The amounts required to fund those projects, however, dwarf what is available through traditional means: tax-exempt bonds for state and local infrastructure projects and corporate and asset-based finance for energy and telecommunications projects. At the same time, the continued strains in the credit markets have reduced the availability of leverage to boost returns for project equity investors. Fortunately, the political will for substantial infrastructure investments in energy, transportation and telecommunication systems has been steadily growing.

In these circumstances, the Recovery Act comes at a propitious moment, but infrastructure investors are right to be concerned that the direct benefits for them may be relatively few and far between. The primary purpose of the Recovery Act is to revive the U.S. economy and boost domestic employment. The breakdown of appropriations in the \$787 billion Recovery Act is shown in Figure 1 on the following page.

1 Kenneth Silverman. *Lightning Man: The Accursed Life of Samuel F.B. Morse*. 2003.

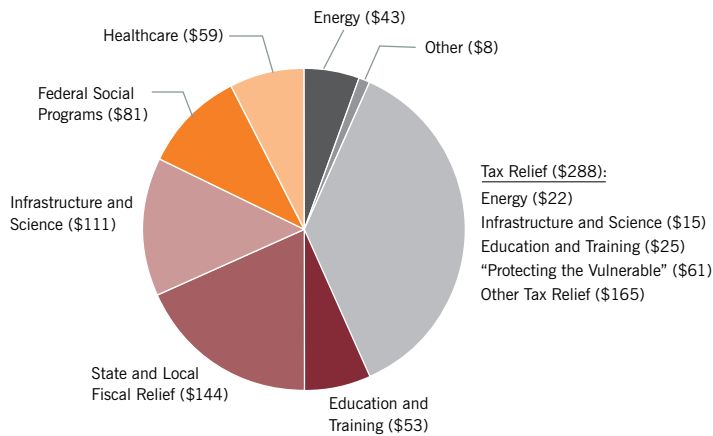
2 Organization for Economic Co-operation and Development. *Going for Growth 2009*, Page 168. March 3, 2009.

3 ULI—the Urban Land Institute and Ernst & Young. *Infrastructure 2008: A Competitive Advantage*. April 29, 2008.

4 American Society of Civil Engineers. *2009 Report Card for America’s Infrastructure*. March 25, 2009.

SECTION I

Figure 1: Breakdown of Recovery Act by Sector (\$ billions)



Source: www.recovery.org

The focus on immediate economic impact tends to work against the development of build-own-operate and other concession-based projects, which typically require relatively long lead times for planning and implementation. As a result, most of the infrastructure dollars from the Recovery Act have gone to state and local governments for “shovel ready” road repairs and other projects allocated by a political formula rather than by comprehensive policy planning. Only the cash grant and other tax-related provisions of the Recovery Act appear to provide substantial near-term support for privately financed infrastructure. Many of the other initiatives funded under the Recovery Act may be more likely to crowd out private infrastructure investment than to enable it.

In addition, even the private sector projects already in the pipeline have found it difficult to negotiate the often overlapping and uncoordinated federal, state and local approval and oversight processes needed to take full advantage of the Recovery Act’s provisions. The Department of Energy, the Department of Transportation and other government agencies allocating Recovery Act funds will be hard-pressed to reach the employment and infrastructure investment goals set by the Obama Administration if the measured pace of Recovery Act implementation demonstrated thus far continues.

The Recovery Act will nonetheless be relevant to many infrastructure investors, since it is likely to have many long-term effects on the transportation, energy and telecommunications sectors. On the positive side, many Recovery Act programs target innovative projects that would not receive financing in the private market. If any of these projects prove to be profitable, they could have an outsized impact on the infrastructure market by attracting private investments or further subsidized investments, particularly in areas such as renewable energy and electricity transmission, where there is likely to be a political willingness for further government support. On the negative side, (1) the greater risk inherent in innovative projects means they must clear higher, and often insurmountable, bureaucratic hurdles, and (2) funds for more traditional projects such as building roads have so far gone mostly to state and local governments, producing few public-private partnership opportunities and potentially squeezing out private investment.

This paper will focus on those programs under the Recovery Act that provide opportunities for infrastructure investment. It will describe certain key features of those programs and potential roadblocks, providing suggestions for how those programs might evolve to better facilitate infrastructure investment and forecasting certain effects of the Recovery Act on U.S. infrastructure generally.

SECTION II

Transportation

“Throughout our history, there have been times when a generation of Americans seized the chance to remake the face of this nation. It’s what we did in the midst of civil war by connecting our coasts with a transcontinental railroad. It’s what we did in the midst of depression by putting up a golden bridge in San Francisco and electrifying rural America and completing a great dam in the southwest. It’s what we’re doing once more by building a 21st century infrastructure that will make America’s economy stronger and America’s people safer... That’s the purpose of our recovery plan. That’s the cause of my presidency.”

President Barack Obama, Department of Transportation, March 3, 2009

A core objective of the Recovery Act is to strengthen America’s transportation network for the 21st century. This objective, coupled with a desire to promote “shovel ready” projects and stimulate the job market, has caused a significant amount of the transportation sector funding under the Recovery Act to be directly allocated to the states for the improvement of local highway infrastructure.

Nevertheless, private investment opportunities under the Recovery Act do exist in discrete transportation sectors, namely highways, high-speed rail and port projects, where funding has been allocated to bolster or kick-start existing federal government initiatives. These infrastructure initiatives rely heavily upon the delivery of projects based upon public-private partnership platforms; an investment model that allocates key risks to the private sector while preserving accountability and serving the goals of the public interest.

The potential private investment opportunities under the Recovery Act for highways, high-speed rail and port projects fall into two categories: those created by the Transportation Infrastructure Finance and Innovation Act of 1998 (“TIFIA”) and those created by the Passenger Rail Investment and Improvement Act of 2008 (“PRIIA”).

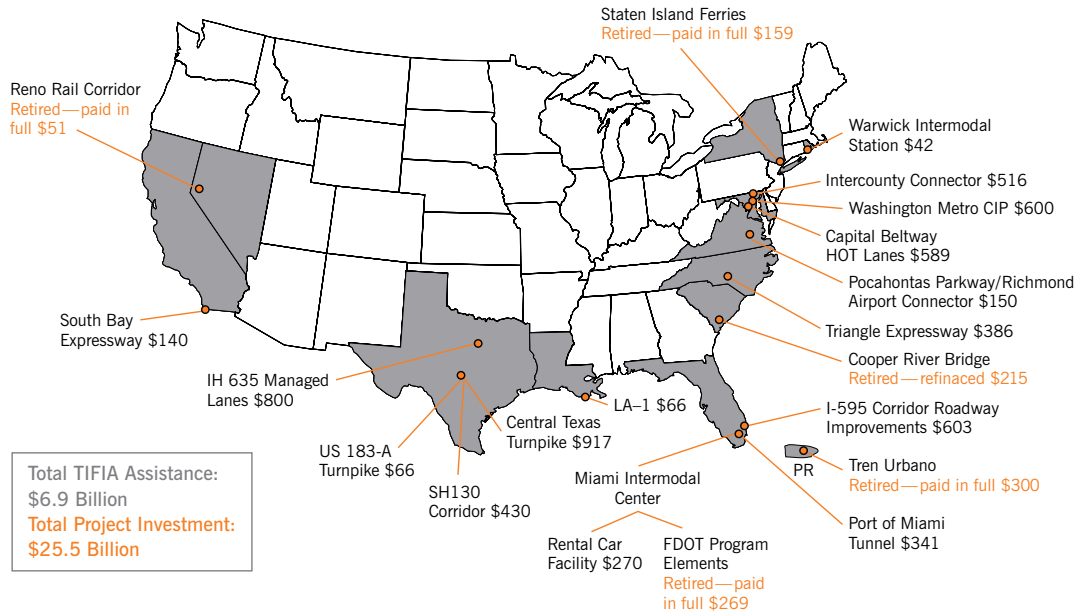
TIFIA

The Recovery Act allocates \$200 million to the U.S. Department of Transportation (“USDOT”) to supplement the credit subsidy cost (and administrative expenses) associated with the federal credit program created under TIFIA. This allocation is designed to aid capital investments in surface transportation infrastructure with a significant impact on the nation.

TIFIA encourages private investment in this sector via concessional credit assistance, by way of secured (direct) loans, loan guarantees or standby letters of credit, eligible highway, transit, rail and intermodal freight projects. TIFIA credit assistance is intended to facilitate the financing of those projects that would have otherwise been significantly delayed because of funding limitations or difficulties associated with accessing the commercial bank and capital markets.

SECTION II

Figure 2: Existing TIFIA Investments (\$ billions)



Source: Department of Transportation⁵

The total amount available to TIFIA participants under the Recovery Act is meaningful because of the “multiplier” effect that results from USDOT’s calculation of the credit subsidy cost for funded investments. The credit subsidy cost represents an estimate of USDOT’s potential losses associated with its grant of credit assistance (typically calculated in the range of 8–13% due to the investment grade rating given to the project’s senior debt) and accordingly constitutes a reserve against potential losses. Thus, the \$200 million allocation made to TIFIA under the Recovery Act represents a much larger availability of TIFIA funding to participants; closer to \$2 billion.

TIFIA has proven to be a successful supplemental tool for private participants investing in U.S. surface transportation infrastructure. TIFIA credit assistance can be used by public-private partnerships in combination with other funding sources, such as the enhanced tax benefits applicable to private activity bonds under the Recovery Act (as described on page 29 under “Tax-Advantaged Bonds”). The key features of TIFIA are detailed in Appendix 1.

⁵ TIFIA Projects: TIFIA Instruments in millions. <http://tifa.fhwa.dot.gov>.

TIFIA, prior to and after the Recovery Act, has primarily been utilized in the development of toll road projects through public-private partnership platforms. For example:

- On October 15, 2009, the Florida Department of Transportation, Miami-Dade County, the City of Miami and Miami Access Tunnel, a joint venture between the French investment fund Meridiam Infrastructure and French construction company Bouygues Travaux Publics, reached an agreement to build and maintain the Port of Miami Tunnel Project providing direct access between the Miami Seaport, I-395 and I-95. This public-private partnership project is the first project in the United States to be financed on the basis of “availability payments” from a government agency. Under this payment structure, Miami Access Tunnel will receive regular payments during the 35-year operating concession for providing vehicle access through the Port of Miami Tunnel, subject to satisfying certain performance criteria. This payment structure differs from the more traditional collections-based payment structures where the private operator’s return upon investment is linked to the collection of tolls from vehicle users. The expected total cost of the project is approximately \$1 billion, financed by a \$340 million senior debt tranche and a \$340 million TIFIA loan⁶
- On December 20, 2007, the Virginia Department of Transportation (“VDOT”) and Capital Beltway Express, a joint venture between Fluor Enterprises and Transurban, reached an agreement to construct, operate and collect tolls on a 14-mile stretch of I-495 Capital Beltway High Occupancy Toll (“HOT”) Lanes. The five-year construction process began in July 2008. This public-private partnership project introduces a dynamic pricing mechanism to manage traffic flow in the HOT lanes with a variable toll based on the level of congestion. The expected total cost of the project is approximately \$2 billion, financed as shown in Figure 3 below. In addition to being the first HOT lane project in Virginia, this was also the first project to see private activity bonds used in conjunction with a TIFIA loan.⁷

Figure 3: Financing for Virginia HOT Lanes Project

AMOUNT	PERCENT	SOURCE
\$585 million	30%	TIFIA low-interest loan
\$409 million	22%	VDOT grant
\$349 million	18%	Equity investment by sponsors
\$586 million	30%	Private activity bonds

Source: www.virginiahotlanes.com

- The first TIFIA loan for a private toll road was awarded in 1991 in the amount of \$154 million for the construction of the South Bay Expressway, a 10-mile stretch of express toll road in San Diego, California, which opened in 2007. In addition to the TIFIA loan, the South Bay Expressway project received additional financing of \$321 million of bank debt and \$160 million of equity. The project benefits from a 35-year lease from the state of California.⁸

⁶ Frequently Asked Questions—General. <http://www.portofmiamitunnel.com>.

⁷ Projects: I-495 Capital Beltway HOT Lanes. <http://www.transportation-finance.org>.

⁸ Fact Sheet: South Bay Expressway (Formerly State Route 125 South). <http://southbayexpressway.com/>. <http://tifa.fhwa.dot.gov>.

SECTION II

The principal challenges that private participants encounter when seeking or deploying TIFIA credit assistance include:

- The application process can be burdensome, and some participants have noted USDOT's lack of commercial responsiveness in facilitating the execution of innovative financing transactions. To that end, USDOT sought public comment on implementing an expedited process in respect of TIFIA loans for certain eligible highway projects developed pursuant to concession agreements with senior bank and/or bond debt facilities.
- While typically TIFIA credit assistance is secured by a lien that is "junior" to the lien securing debt of the project's other financiers, such as commercial bank and capital market debt, the TIFIA statute requires that in certain circumstances, such as upon the occurrence of a bankruptcy-related event, the nonpayment of debt service when due for more than one year or a foreclosure by the project's other financiers on project assets, USDOT's junior lien must "spring" to parity with the project's other financiers' senior lien. As a result, this "springing" requirement causes many of the rating agencies to disregard the "subordinated" nature of USDOT's lien.
- Recipients are required to comply with numerous federal laws, including "Buy American" provisions, the Federal Credit Reform Act of 1990, Davis-Bacon and environmental legislation.

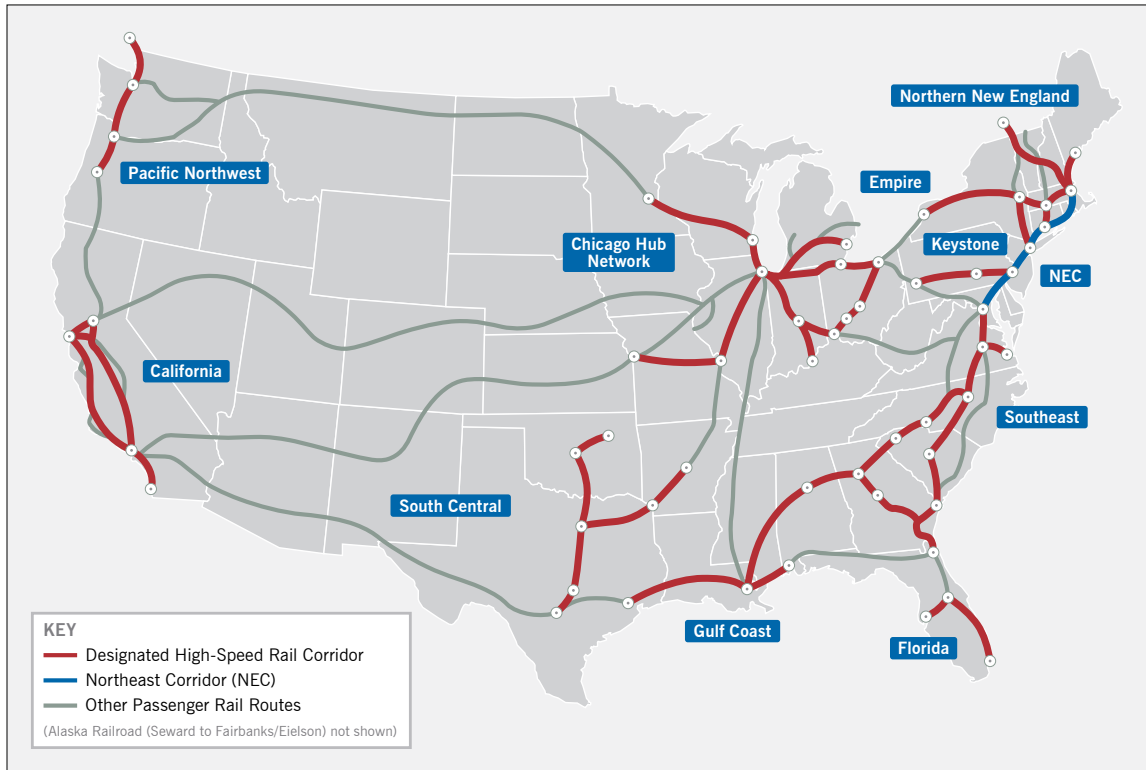
See the "Regulatory Oversight and Procurement" section on page 32 for further details on some of these legislative requirements.

High-Speed Passenger Rail Corridors

The Obama Administration's vision of a network of high-speed rail corridors across America represents a significant investment opportunity for the private sector, but with substantial uncertainties. The initial \$8 billion investment in high-speed rail corridors, while unprecedented, has been characterized as merely a "down payment" in the context of the development of a comprehensive high-speed rail network that will require a significant, long-term financial commitment at both the federal and state levels, in partnership with private investors.

USDOT has been allocated \$8 billion under the Recovery Act for capital investments in intercity and high-speed passenger rail projects. The Recovery Act appropriates funding to the high-speed rail program authorized by PRIIA and, as such, utilizes an existing regulatory framework. The key features of the high-speed rail program are detailed in Appendix 1.

Figure 4: Long-Term Federal Plan for High-Speed Rail Corridors



Source: Department of Transportation

As an indication of the scale of investment required to develop the country's high-speed rail corridors, the California High-Speed Rail Authority ("CHSRA") currently estimates a total cost of \$45 billion to construct a high-speed rail service linking Southern California, the Sacramento San Joaquin Valley and the San Francisco Bay Area. CHSRA was recently authorized to issue up to \$9.95 billion in bonds to fund the initial development of that 800-mile project. The California high-speed rail project was recently put on hold, however, due to the inability of the state of California to sell bonds in light of its budget crisis and attendant concerns regarding its creditworthiness.

CHSRA Executive Director, Mehdi Morshed, would like to see California's high-speed rail service developed through a public-private partnership platform, with profits projected to reach \$1 billion per year, if the system can be completed as planned.⁹ The CHSRA finance team anticipates that the public-private partnership platform would additionally open opportunities for up to \$7 billion in private and debt financing, vendor financing and system operations contracts.¹⁰

9 High-Speed Rail Executive Director Promotes Public-Private Partnerships in Discussion with Governor Schwarzenegger. <http://www.businesswire.com>.

10 Financing California's High-Speed Train System. <http://www.cahighspeedrail.ca.gov>.

SECTION II

Figure 5: Proposed High-Speed Rail Lines in California



Map based on 2005 Statewide Programmatic EIR/S preferred route, and staff recommendation to Authority Board December 19, 2007. Mapping Sources: U.S. Census 2000; A Dept. of Conservation, Farmland Mapping and Monitoring Program 2000; California Resources Agency Legacy Project 2002; CA Dept. of Fish and Game 1999.

The key challenges that private investors face when seeking to participate in projects funded under PRIIA primarily flow from the eligibility requirement that excludes purely private investment. Although private investors must form partnerships with states in order to obtain PRIIA funding, many states lack the necessary enabling legislation for such partnerships. Other challenges include: restrictions on the types of projects eligible to receive funding and the burdens of compliance with federal regulations. These key challenges are set out in further detail in Appendix 1.

SECTION III

Energy

“The third pillar of this new foundation is to harness the renewable energy that can create millions of new jobs and new industries.”

President Barack Obama, Georgetown University, April 14, 2009

The central purpose of the Recovery Act is to stimulate economic development, but an important ancillary goal is to increase domestic production of renewable energy. To attract more renewable energy investors, the Recovery Act enhanced existing renewable energy tax credit and loan guarantee programs and implemented certain new programs. Both the Obama Administration and Congress are considering further measures that, if implemented, would favor the development of clean energy sources and could significantly improve the competitive landscape for renewable energy projects. In June 2009, the House of Representatives passed a bill that, if enacted, would regulate greenhouse gas emissions under a national cap-and-trade program and mandate that a certain percentage of energy come from renewable sources. The Senate is currently considering companion legislation, and, even in the absence of federal legislation, the Obama Administration has proposed greenhouse gas regulations that, if finalized, would be implemented as early as March 2010.

Renewable energy facilities accounted for \$155 billion of the \$250 billion of total energy investments globally in 2008.¹¹ Although renewable energy investments in North America declined by approximately 42% in 2009,¹² the Recovery Act seems to have mitigated the effect of the financial downturn somewhat on the renewable energy market, as total venture capital investments in the United States declined by approximately 47% over the same period.¹³ Because renewable energy companies have been unable to obtain capital during the economic downturn, however, it is possible that companies in later stages of development are currently looking for investors, presenting unique investment opportunities.

The Recovery Act’s renewable energy provisions are intended to expedite the recovery of the renewable energy sector. An early energy success story of the Recovery Act is Solyndra, Inc., a solar photovoltaic systems manufacturer. Unlike conventional solar panels, Solyndra’s systems use cylindrical modules that can capture sunlight across a 360-degree surface. These systems can be mounted close together on flat surfaces, which make them well suited for commercial rooftops. In September 2009, Solyndra became the first recipient of a Department of Energy (“DOE”) loan guarantee under the Recovery Act for a loan that will be used to build a photovoltaic panel fabricating plant.

The U.S. government predicts that the Recovery Act’s renewable energy tax provisions, along with its expansion of the loan guarantee program, will increase renewable energy production by approximately 100 billion kilowatt-hours per year by 2012, approximately doubling projected 2009 renewable energy production in the United States. (See Figure 10 on page 19 in the Department of Energy Loan Guarantee Section.) Renewable energy sources, and the attendant investment opportunities, are not evenly distributed throughout the country. As a result, the renewable energy provisions of the Recovery Act are likely to have a disproportionate effect on those regions of the United States that are rich in renewable energy sources (although other factors, including electricity demand, transmission availability and applicable regulations, will also affect the geographic placement of renewable energy projects).

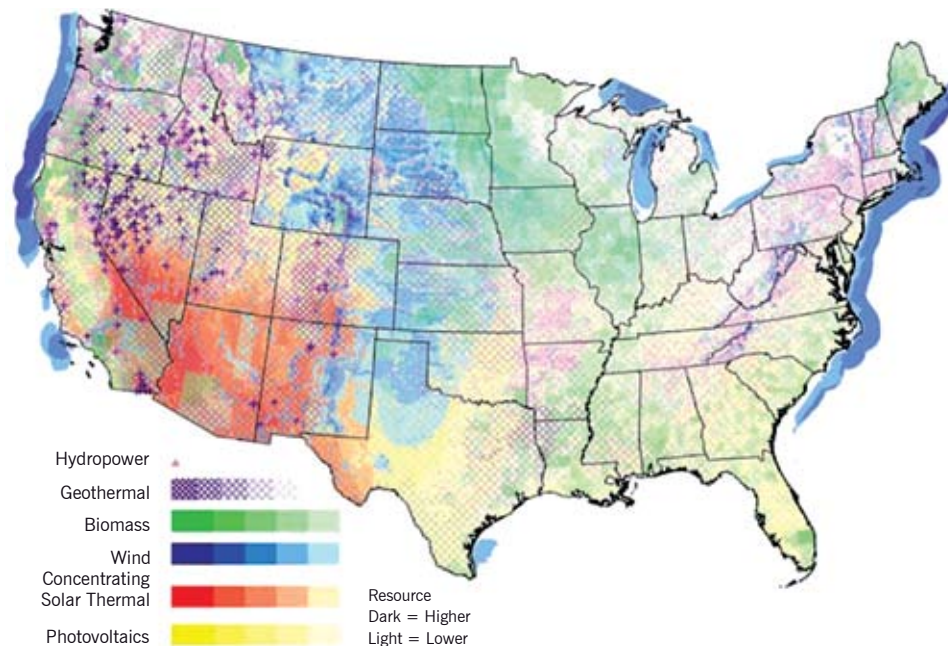
11 New Energy Finance/United Nations Environment Programme, *Global Trends in Sustainable Energy Investment 2009*. Figure 4. June 3, 2009.

12 Cleantech Group, LLC. Clean technology venture investment totaled \$5.6 billion in 2009 despite non-binding climate change accord in Copenhagen, finds the Cleantech Group and Deloitte. Press Release, January 6, 2010, <http://cleantech.com>.

13 National Venture Capital Association. Despite Fourth Quarter Increase Venture Capital Industry Experiences Slowest Annual Period for Dollars Committed Since 2003. News Release, January 11, 2010, <http://www.nvca.com>.

SECTION III

Figure 6: U.S. Renewable Resources



Source: National Renewable Energy Laboratory, NREL. (2009) *Renewable Energy Technology Resource Maps for the United States*. PowerPoint Presentation. http://www.nrel.gov/gjis/docs/resource_maps_200905.ppt. Accessed November 19, 2009.

Market participants have experienced various delays and difficulties in applying for the renewable energy programs covered by the Recovery Act, however. As a result, the jury is still out on whether DOE and other federal agencies can meet the Recovery Act's job creation goals over the next 12 months. Meeting those goals would require the federal government to significantly remake the DOE's practices in implementing the loan guarantee program, which resulted in DOE taking four years to issue its first renewable-energy loan guarantee. The logistical, siting and permitting issues that accompany all major energy projects are exacerbated by layers of bureaucratic procedures, not only at the federal level but at the state and local levels as well. Unless these matters are effectively addressed, the Obama Administration's goal of nearly doubling domestic renewable energy production to 100 billion kilowatt-hours per year by 2012 will be even more difficult to achieve than originally thought.

Renewable Energy Tax Credits

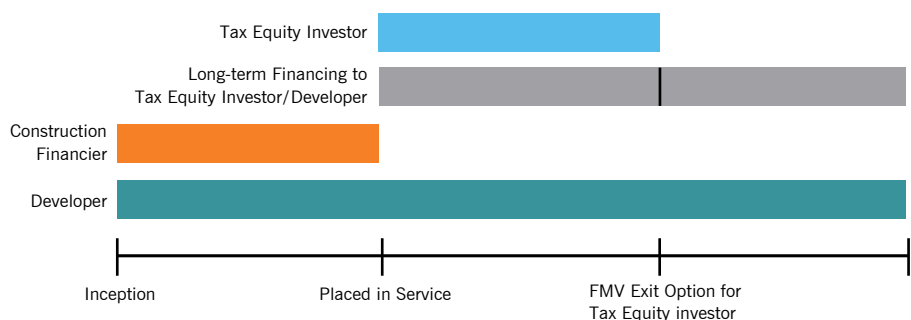
In recent years, federal income tax credits have provided valuable subsidies for private investment in renewable energy projects. The Recovery Act's extension and expansion of these subsidies enhance investment opportunities in renewable energy production.

In general, there are two types of tax credits for renewable energy: the production tax credit and the investment tax credit. The production tax credit is generally equal to 2.1 cents per kilowatt-hour of electricity produced and is available for the first 10 years after a project is placed in service. The investment tax credit is generally equal to 30% of the cost of renewable energy property and is available in the year the project is placed in service. In addition, the Recovery Act provides the option of electing cash grants in lieu of tax credits.

Renewable energy investments generally depend on four types of investors: developers who provide expertise and management for the project; construction financiers who provide short-term loans during the construction phase; long-term lenders; and “tax equity” investors who provide capital when the project is placed in service. While the newly implemented cash grant program is intended to reduce reliance on tax equity investors, the election of tax credits rather than cash grants may still be optimal for some projects, and tax equity investors will still be needed to maximize the use of available tax benefits in all projects. In Appendix 2—“Renewable Energy Tax Credits,” Exhibits 1 and 2 depict two typical structures used in renewable energy investments: the partnership “flip” structure and the sale-leaseback structure.

Developers often partner with venture capital or private equity firms and, when sufficiently established, seek capital from the public market.

Figure 7: Lifecycle of an Investment in a Renewable Energy Facility



The expansion of tax subsidies for renewable energy investment represents an attempt to compensate for the constricted credit market and the lack of traditional investors due to the economic downturn. The Recovery Act also addresses certain criticisms levied against energy tax credits, namely, that they encourage inefficient and complex financing structures; that their periodic lapse creates planning uncertainty; and that they do not encourage American manufacturing activity. In addition, the tax credits have synergies with other sections of the Recovery Act, such as the DOE Loan Guarantee program and Smart Grid appropriations.

The Recovery Act made five major changes to the tax credits available for renewable energy investments. These changes are described below and technical details are provided in Appendix 2—Renewable Energy Tax Credits, Exhibit 3.

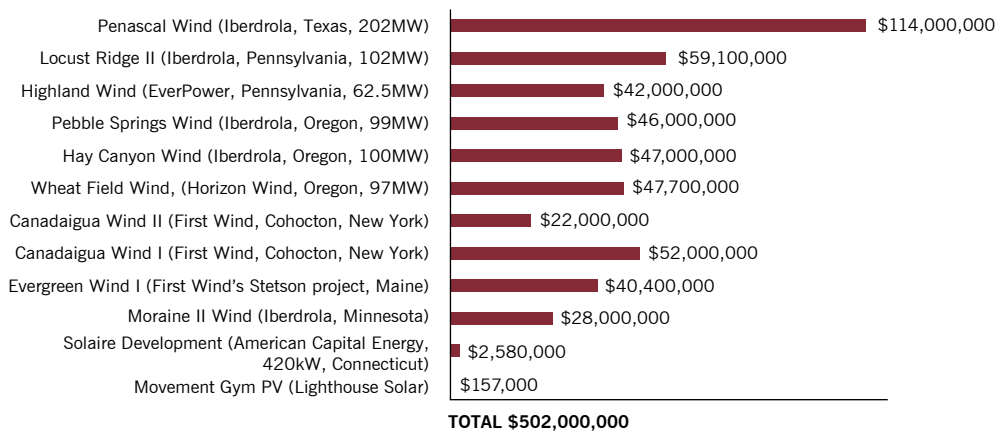
Cash Grants in Lieu of Tax Credits

Most notably, the Recovery Act responded to the current economic crisis by creating a temporary investment subsidy that does not rely on investors’ tax capacity: the cash grant program. The cash grant is available to investors in lieu of a tax credit and is calculated as a percentage (30% in most cases) of the cost of certain depreciable property used in constructing the renewable energy project. Further details are provided in Appendix 2—“Renewable Energy Tax Credits,” Exhibit 4.

SECTION III

On July 31, 2009, the Treasury Department began accepting applications for cash grants. The application guidelines provide crucial detail about the program requirements, such as what it means to “begin construction.” Grants are to be issued within 60 days after the application is submitted. Over \$1 billion has already been awarded through the grant program’s first two rounds, with most being awarded to wind projects. To illustrate, Figure 8 shows the beneficiaries of the first round of grant disbursements; all but approximately \$3 million were awarded to wind projects. Treasury has estimated that it will ultimately issue \$3 billion in grants that will support approximately 5,000 renewable energy investments under the current program.

Figure 8: First Round of Cash Grant Disbursements



Source: Department of Treasury

The cash grant program was designed to compensate for the sudden decline in the participation of tax equity investors in the marketplace. To utilize traditional renewable energy tax credits, renewable energy developers (who had insufficient tax liability themselves to benefit from the credits) would partner with tax equity investors that had sufficient taxable income to take advantage of the tax incentives. While nearly 20 entities have historically participated in the renewable energy tax equity market, only four or five of these 20 were reportedly willing to make equity investments in 2009, and the amounts that these remaining few were willing to invest declined.¹⁴ In the current economic climate, the cash grant may be more valuable to renewable energy developers than tax credits because its value does not depend on the investor’s tax capacity, and it reduces transaction costs associated with raising capital.

Certain private equity players have claimed that the denial of grants to pass-through entities with tax-exempt partners will limit private equity investment in renewable projects. However, the guidelines make clear that cash grants are available to otherwise disqualified investors (such as tax exempts and government entities) that invest through a “blocker” structure.

14 John D. McKinnon. U.S. News: Some Breaks for Business Raise Concerns. *The Wall Street Journal*. Feb. 5, 2009.

Although the effect of the grant program on aggregate investment in renewable energy is difficult to predict in light of broader economy-wide trends, the cash grant program should interest those investors that have limited ability to utilize traditional tax credits, but that would otherwise invest in renewable energy projects.

Expanding Eligibility for the Investment Tax Credit

Wind, waste, geothermal, biomass, hydropower and marine and hydrokinetic facilities qualify for the investment tax credit under the Recovery Act (in previous years, these facilities qualified only for the production tax credit). Following the Recovery Act, these facilities are eligible for either the production tax credit or the 30% investment tax credit (or, alternatively, for the 30% cash grant described above).

For any given project, the choice between the investment tax credit and the production tax credit will depend on the character of the energy property. The investment tax credit tends to become more valuable than the production tax credit as the cost of the energy property increases relative to its expected electrical output. The production tax credit becomes more valuable as the amount of expected electrical output increases relative to the cost of the project. Recent modeling by the National Renewable Energy Laboratory suggests that the production tax credit is optimal for geothermal projects, the investment tax credit or cash grant is optimal for open-loop biomass projects, and the optimal credit for wind, landfill gas and closed-loop biomass will depend on the cost and the expected electrical output of the particular project. (The models do not, however, take into account the fact that the production tax credit requires an investor to have taxable income for 10 years to benefit from the credit.) See Appendix 2—“Renewable Energy Tax Credits,” Exhibit 5, for details on the expanded availability of the investment tax credit and Exhibit 6 for more detail on the differences between the two credits.

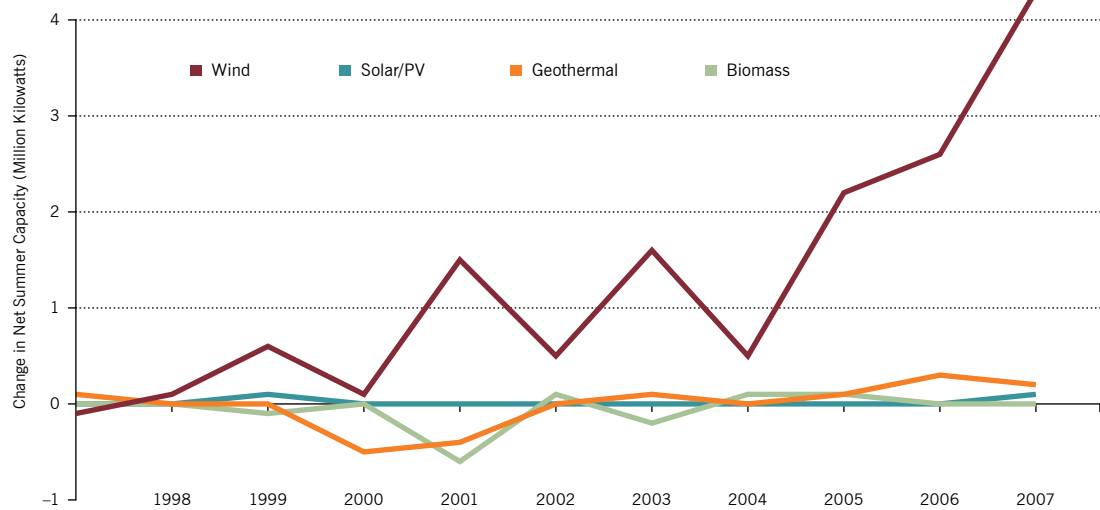
Extending the Sunset Date for Tax Credits for Wind, Waste, Geothermal, Hydropower, Biomass and Marine and Hydrokinetic Energy Sources

The Recovery Act extends the availability of tax credits through 2012 for wind and 2013 for waste, geothermal, biomass, hydropower and marine and hydrokinetic facilities.

The three-year extension of the sunset provisions is notable for its length. Since the federal production tax credit was established in 1992, Congress has extended the credit by only one- to two-year increments, which have been considered insufficient to cover the multi-year development phase of renewable energy projects. In addition, Congress has let the credit lapse three times, presenting a significant risk to investors in long-dated projects. Figure 9 on the following page depicts the fluctuations in growth of wind power during the periodic lapsing of the production tax credit; the production tax credit lapsed in 2000, 2002 and 2004, years that correspond to dramatic decreases in the growth of wind power.

SECTION III

Figure 9: Wind Investment Variability Caused by the PTC



Looming expiration dates and short-term extensions for energy tax credits have been blamed for creating a “boom and bust” cycle of development in renewable energy. The small windows of opportunity compress demand for investment and drive up supply and installation costs, as manufacturers struggle to increase production and achieve economies of scale and as producers attempt to plan rationally for transmission expansion in the face of tax law uncertainty. According to one commentator, since 2001, installed wind costs rose significantly, with power sales prices rising as well. In addition, commentators have contended that the short-term extensions of the credits perpetuate reliance on foreign manufacturing and discourage R&D expenditure on wind technologies.

It is hoped that the longer extension of the sunset provisions in the Recovery Act will improve confidence in the continuity of the credits.

Repeal of the Investment Tax Credit “Haircut”

The Recovery Act enhances the investment tax credit by eliminating a provision that reduced the credit amount based on the use of subsidized financing (such as state and local grants and loans) in the project. Prior to the Recovery Act, if an energy developer financed a renewable energy project with subsidized financing, the amount of the financing would be excluded from the cost of qualified property for purposes of calculating the investment tax credit. For example, if 40% of the financing for \$100 million of qualified energy property were provided through industrial development bonds or another subsidized financing program, the amount of the investment tax credit would be the applicable percentage (30% or 10%) of \$60 million, the portion of the investment that was not purchased using subsidized financing. Now, the amount of the investment tax credit would be the applicable percentage of \$100 million. Unlike the investment tax credit, however, the production tax credit remains subject to a similar provision that reduces the credit amount proportionally based on the use of subsidized financing.

The repeal of the investment tax credit haircut may allow investors access to subsidized financing using public-private partnerships and to obtain the full benefit of state and local incentives without reducing the amount of the investment tax credit.

New Advanced Manufacturing Investment Tax Credit

The Recovery Act establishes a new tax credit for investments in facilities used to manufacture renewable energy-producing property, intended to encourage expansion of U.S. manufacturing of renewable energy property, such as solar panels and wind turbines. On January 8, 2010, President Obama announced the recipients of all \$2.3 billion of Advanced Energy Manufacturing Tax Credits provided for by the Recovery Act. Although the current allotment of credits has been exhausted, the White House has announced plans to provide another \$5 billion of credits. Further details about this new tax credit are provided in Appendix 2—Renewable Energy Tax Credits, Exhibit 7.

In addition to this new credit, it is likely that energy property manufacturers will also benefit from the expansions to the other renewable energy tax credits. Although the production tax credit and investment tax credit are nominally received by investors engaged in renewable energy production, there is considerable evidence that much of the ultimate benefit of investment tax incentives flows not to investors, but to capital goods suppliers through higher prices. Researchers find that a 10% investment tax credit increases equipment prices by between 2.5% and 7%.¹⁵ Thus, investors in energy property manufacturing facilities may expect to benefit not just from the new tax credit, but from the spillover effects of the investment tax credit and production tax credit on energy property prices.

The Recovery Act's expansions of the tax subsidies for renewable energy investment were billed as a "green stimulus," but were also part of an agenda to encourage development of renewable energy technology and infrastructure in the United States. This is consistent with the government's recent policy pronouncements, including the Obama Administration's recent proposal to repeal existing subsidies for fossil fuels in order to stimulate demand for renewable energy in fiscal year 2010, and the American Clean Energy and Security Act that passed the U.S. House of Representatives in June 2009, which would set federal standards for the percentage of energy produced from renewable energy sources and cap emissions of greenhouse gases.

Department of Energy Loan Guarantee Program

Renewable energy projects that use innovative technologies are inherently risky, which makes it difficult for them to obtain debt financing at competitive interest rates. To enable more commercial lending for such projects, Congress established a DOE loan guarantee program in 2005. DOE, however, did not finalize its first loan guarantee under the program until September 2009.

Two features in particular have constrained more widespread use of the program: (1) only a project using innovative technology is eligible, and (2) the borrower must pay a fee, calculated by DOE with the approval of the Office of Management and Budget ("OMB"), based in part on the estimated risk-of-default, which could impose a significant and unpredictable additional project cost. The Recovery Act expanded the loan guarantee program to respond to both of these constraints.

For projects eligible under the Recovery Act's expanded program, Congress appropriated approximately \$6 billion to cover risk-of-default costs, alleviating that direct burden on borrowers. Congress estimated that the \$6 billion appropriation would support approximately \$60 billion in underlying loans. As a practical matter, however, the need for OMB's approval of the estimated loan default risk on each project in order to allocate the Congressional appropriation requires additional due diligence and negotiation with a separate governmental agency—an agency with a policy mandate different from DOE's. (For a discussion of the OMB approval process, see "Regulatory Oversight and Procurement—Federal Credit Reform Act of 1990" on page 33.) Consequently, the DOE loan guarantee program remains slow and difficult, despite an announcement in February 2009 by DOE of a streamlined, rolling application process.

15 Austan Goolsbee. Investment Tax Incentives, Prices, And The Supply Of Capital Goods. *The Quarterly Journal of Economics*. Vol. 113(1). Pages 121–148 (1998).

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In an effort to stimulate renewable energy production and power transmission generally, the Recovery Act also temporarily expanded the scope of projects eligible for loan guarantees beyond those utilizing innovative technology. As a result, the loan guarantee program encompasses the following categories of projects, regardless of whether the underlying technology is innovative or already in commercial use:

- Renewable energy systems and facilities that manufacture related components;
- Electric power transmission systems, including their upgrade and replacement; and
- Certain biofuel projects that produce relatively low greenhouse gas emission transportation fuels.

(See Appendix 3 for additional details on these project categories and a summary of other key program requirements.)

DOE's authority to enter into loan guarantees for such projects expires on September 30, 2011, and eligible projects must commence construction by that date, although DOE has in some cases interpreted "commence construction" as not necessarily requiring physically breaking ground.

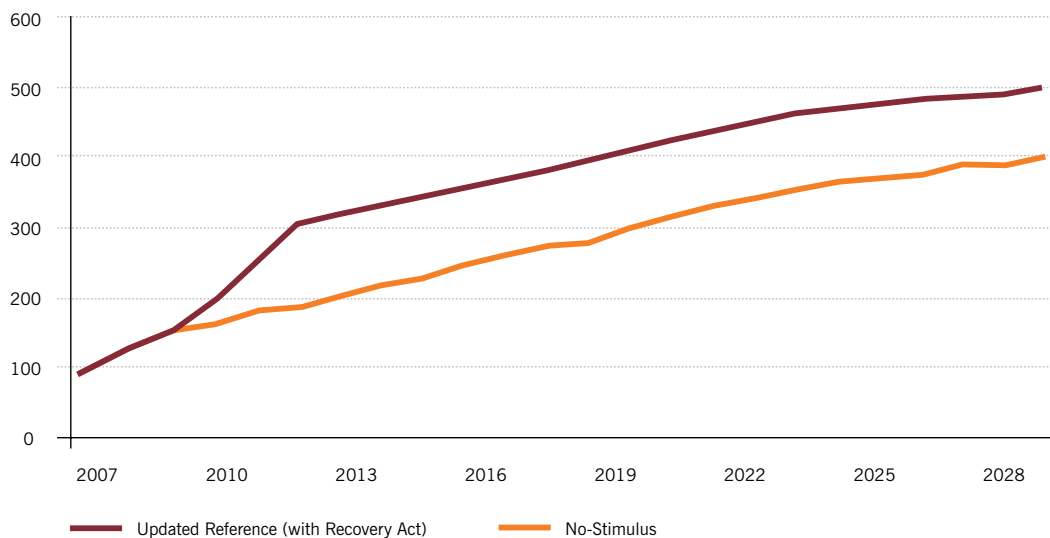
In March 2009, DOE announced its first "conditional commitment" to guarantee a \$535 million loan to Solyndra, the California-based manufacturer of solar photovoltaic systems discussed previously, for the construction of a new fabricating plant. The loan was finalized six months later after the company raised an additional \$198 million in equity financing. The U.S. Treasury Department's Federal Financing Bank is issuing the guaranteed loan.

In July 2009, DOE announced two additional conditional commitments. The first would guarantee a \$16 million loan to Nordic Windpower USA to expand its wind turbine assembly plant in Idaho. The second would guarantee a \$43 million loan to Beacon Power Corp. for the construction of a 20-megawatt flywheel-based energy storage plant in New York. Both underlying loans are expected to be issued by the Federal Financing Bank. In December 2009, DOE announced its fourth conditional commitment, which would guarantee a \$245 million loan to Red River Environmental Products, LLC to build an activated carbon manufacturing plant in Louisiana. DOE is also in negotiations with Tenaska, Inc. for a \$2.6 billion loan guarantee to support the development of a low-emission coal-fueled power plant in Illinois that would employ coal gasification and carbon capture and sequestration technologies.

The renewable electricity generation and power transmission sectors are also the subject of several other current and proposed initiatives, including proposed regulation under the Clean Air Act and possible climate change legislation currently being considered by Congress. If enacted into law, the climate bill passed by the House of Representatives in June 2009 would further modify the DOE loan guarantee program to encompass advanced electricity transmission projects and renewable fuel pipelines. The proposed legislation also would create a new Clean Energy Deployment Administration that would provide and facilitate financing for a wide array of clean energy technologies, including through the issuance of loan guarantees. In addition, other aspects of the Recovery Act itself, including the investment and production tax credits and the Smart Grid measures discussed in this paper, also affect investments in these sectors.

The U.S. Energy Information Administration recently modeled the expected effect of the stimulus package as a whole on renewable energy generation and predicted a significant uptick in renewable generation, despite the recent economic downturn, in part because of the expanded loan guarantee program and tax credit provisions. See Figure 10 on the following page.

Figure 10: Projected Non-Hydroelectric Renewable Generation (billion kilowatt-hours)



Source: An Updated Annual Energy Outlook 2009 Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook, Energy Information Administration, April 2009 (internal citation omitted).

These estimated trajectories suggest that there should be continued growth in renewable generating capacity, and corresponding demand for the manufacture of related components and extension and improvement of energy transmission systems. Given these forecasts, and the general political support for stimulating the development of “green” sources of energy, the Recovery Act’s expansion of the DOE loan guarantee program, coupled with the Recovery Act’s tax credit and Smart Grid provisions and the implementation of any of the renewable energy and climate change initiatives currently working their way through Washington, should ultimately spur growth in private investment opportunities in the renewable electricity and power transmission sectors.

There remain certain key challenges to the loan guarantee program’s success. First, it is important to remember the existing program’s historical ineffectiveness. While the Recovery Act and DOE have made certain reforms, it is unclear whether these changes will be sufficient to reduce substantially the backlog of loan guarantee applicants. Second, the program’s expiration date of September 2011 may prove difficult to meet, especially given the long planning process typically required to launch renewable energy projects. Third, on August 6, 2009, Congress redirected \$2 billion of the \$6 billion originally appropriated to the program to replenish the “cash for clunkers” program, effectively cutting the funding available for loan guarantees by one third. Unless those funds are replaced, this reduction in funding will significantly curtail the loan guarantee program. Lastly, through the loan guarantee solicitation process DOE made available \$2.5 billion of the appropriated funds to projects that employ innovative technologies, thereby effectively reinstating one of the principal constraints on the original program.

Additional program limitations are imposed through the applicable regulations and the requirements incorporated into the underlying loan guarantee solicitations. In particular, those newly eligible projects that use commercially available technology have been made subject through their solicitations to a set of requirements similar to the existing regulations but tailored to permit the use of such technology. Future solicitations are expected to follow this same path.

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The existing regulations and solicitations require, among other things, that: (1) the face value of the underlying loan not exceed 80% of the total project costs, (2) the borrower and other principals make a “significant” equity investment, and (3) prior to closing, OMB review and approve DOE’s calculation of the risk-of-default fee. Because DOE’s approach has evolved through successive solicitations, certain of the program’s other requirements now vary depending on the terms of the governing solicitation.

DOE’s newest solicitation introduced the Financial Institution Partnership Program, or FIPP, in which lenders—not borrowers—apply for loan guarantees. By capitalizing on private lenders’ expertise in underwriting such renewable energy projects, DOE expects lenders will screen all but the most finance-worthy projects. This should enable DOE to concentrate its limited resources, thereby streamlining the loan guarantee process. The FIPP exhibits some of the flexibility and innovation that federal agencies must have to work successfully with the private sector on infrastructure projects. Unfortunately, the program imposes important limitations on participating private lenders, including transfer restrictions and curtailed voting rights, that may inhibit the widespread use of the FIPP.

Smart Grid

Smart Grid is not an entirely new concept, but there is a new urgency surrounding its implementation. Many current electrical systems operate on infrastructure established more than 100 years ago. As Carol Browner, assistant to the president for energy and climate change, recently commented, “the current [electric grid] system is outdated; it’s dilapidated.”¹⁶ This antiquated infrastructure struggles to meet rising demands for energy, and its inefficiency is a contributing factor to greenhouse gas emissions. The Smart Grid provisions in the Recovery Act respond to both of these concerns while also presenting new opportunities for information technology, networking and clean-technology investors.

Elements of Smart Grid

The Smart Grid concept incorporates a series of improvements to the nation’s electricity infrastructure. Smart Grid technology endeavors to:

- Increase the use of digital information and controls technology;
- Deploy and integrate distributed resources and power generation, including renewable resources; and
- Deploy real-time, automated, interactive technologies for metering, communications concerning grid operations and status, and distribution.

Increased reliability and efficiency of electricity transmission and distribution systems will eliminate many wasteful aspects of the existing system. Currently, over half of the energy generated and transmitted throughout the country is lost due to grid and appliance inefficiencies. Smart Grid technology seeks to enable individual consumers to monitor more actively their electricity use and may decrease per-person energy demand. Utility companies may also ultimately benefit from the technology through lower overall production costs and the ability to alter their pricing scheme in order to charge consumers more when energy demand is highest throughout the day.

¹⁶ Joseph Weber. Obama: \$3.4B for ‘smart’ power grid. *The Washington Times*. Oct. 27, 2009, <http://www.washingtontimes.com>.

The Recovery Act appropriated \$4.5 billion to modernize the electric grid and for implementation of programs authorized under the Energy Independence and Security Act of 2007 (“EISA”). Approximately \$4 billion of the appropriated funds will support two Smart Grid programs authorized by EISA: the Smart Grid Investment Grant Program and the Smart Grid Demonstration Initiative.

The Smart Grid Investment Grant Program

Approximately \$3.4 billion of the \$4 billion is being made available under the Smart Grid Investment Grant Program. On October 27, 2009, President Obama announced that all \$3.4 billion would be awarded to 100 private companies, utilities, manufacturers, cities and other entities for Smart Grid-related projects.¹⁷ Individual grants range from \$400,000 to \$200 million. The grants will be matched by \$4.7 billion in private investment resulting in an aggregate investment of over \$8 billion to help upgrade the nation’s power grid. The funds will support the installation of “smart” components such as advanced meters, transformers and electrical substations, modernization of the electrical grid itself and manufacture of related Smart Grid equipment. DOE’s awards tended to favor multicompany teams in which different companies are responsible for discrete parts of a common project.

At the time, this was the largest award made in a single day under the Recovery Act. It was made possible by a number of reforms to the program originally contemplated by EISA. First, the Recovery Act increased the financing available for “qualifying Smart Grid investments,” detailed in Appendix 4, from 20% to 50%. Second, the Recovery Act permitted grants instead of cost reimbursement thereby benefitting recipients without ready access to financing.

Lastly, the Recovery Act broadened the scope of qualifying Smart Grid investments by altering certain tax requirements for qualification. Previously, under EISA, investments or expenditures for Smart Grid technologies that were *eligible* for tax credits or deductions were not considered qualifying investments. Now, however, only investments that *utilize* tax credits or deductions are not considered qualifying Smart Grid investments. As discussed on page 13 in “Renewable Energy Tax Credits,” in a weak economy, many investors do not have positive earnings and are therefore unable to take advantage of tax credits. This change enabled investors to choose tax credits or deductions, where available, or an immediate opportunity to receive up to a 50% government subsidy for qualifying Smart Grid investments.

The Smart Grid Demonstration Initiative

DOE is distributing approximately \$620 million of the \$4 billion under the Smart Grid Demonstration Initiative. This initiative provides financial assistance of up to 50% of the cost of qualifying advanced grid technology investments with a funding cap up to \$100 million based on the nature of the project. Qualifying advanced grid technology investments include:

- Regional demonstrations that quantify Smart Grid costs and benefits, verify technology viability and examine new business models at a scale that can be readily adapted and replicated around the country; and
- Utility-scale energy storage demonstrations that include a variety of technologies.

17 DOE. President Obama Announces \$3.4 Billion Investment to Spur Transition to Smart Energy Grid. Press Release, Oct. 27, 2009, <http://www.energy.gov>.

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On November 24, 2009, DOE released the list of 32 projects receiving awards.¹⁸ In addition to the \$620 million in federal funds, another \$1 billion is being provided through private, state and local funding. Half of the winning projects will support fully integrated Smart Grid systems that are expected both to test the viability of existing Smart Grid models and to further industry's and DOE's understanding of how best to implement these technologies. The other 16 awards will fund energy storage projects, such as flywheel, battery and compressed air systems.

With 135 applicants, the demonstration initiative was significantly oversubscribed. Under EISA, the demonstration initiative was only available to the electric utility that owned the grid in the area where the demonstration project was to be carried out. The Recovery Act expanded this scope to include other parties provided they carry out the demonstration project in collaboration with the local electric utility.

With the newly available funds, Smart Grid projects that have been in the planning phase are gaining momentum. Florida Power & Light Company has been working in partnership with Miami-Dade County, General Electric, Cisco and Silver Spring Networks to develop Energy Smart Florida. The \$578 million project will supply homes and businesses with more than 2.6 million "smart" meters and other advanced grid monitoring and control equipment, enabling Florida Power and its customers to track and adjust electricity supply and demand. Florida Power received a grant of \$200 million under the Recovery Act to cover a significant portion of the project's costs.¹⁹ The comprehensive plan also includes solar panel installations to help meet energy needs, as well as Florida Power's deployment of 300 plug-in electric hybrid vehicles.

The public-private partnerships that have enabled Energy Smart Florida are expected to be characteristic of other Smart Grid projects. Similar partnerships are springing up in cities across the country as governments, private investors and companies join forces in the hope of securing funding under the Recovery Act. DOE has also entered into public-private partnerships with leading proponents of Smart Grid, including Intelligrid, Galvin Electricity Initiative and GridWise Alliance, a coalition of Smart Grid stakeholders.

DOE has also identified five fundamental technologies that will be essential in the implementation of the Smart Grid:

- Integrated communications for real-time information and control;
- Sensing and measurement technologies to support faster and more accurate response;
- Advanced components to apply the latest research technologies;
- Advanced control methods to monitor essential components, enabling rapid diagnosis and precise solutions; and
- Improved interfaces and decision support.

¹⁸ DOE. Secretary Chu Announces \$620 Million for Smart Grid Demonstration and Energy Storage Projects. Press Release, Nov. 24, 2009, <http://www.energy.gov>.

¹⁹ Florida Power & Light Co. President Obama joins FPL for commissioning of nation's largest solar PV power plant; announces \$200 million in smart grid funding for FPL's "Energy Smart Florida." Press Release, Oct. 27, 2009, <http://www.fpl.com>.

Concerns over standards and security may delay action on these technologies, however. Currently, there are no clear Smart Grid interoperability standards, which many believe will be critical to allow the broad array of evolving Smart Grid technologies to work together seamlessly. As a result, investors are likely to wait to invest only in those technologies that emerge as “winners.”

Additionally, doubts remain about the ability to ensure security on a national Smart Grid system. Although the Smart Grid industry is working to address this concern, some technology experts recommend that the deployment of the Smart Grid be slowed until security of the system can be assured.

The implementation of the Smart Grid system should improve the overall market for renewable energy sources. Currently, the electric grid lacks storage capacity, resulting in both an inability to harness excess power and the necessity for a back-up electrical source to help meet demands when renewable supplies are insufficient (such as at night for solar generators or in windless conditions for wind turbines). Smart Grid technology improvements to grid efficiency and reliability, together with continued investment in energy storage technology, could make such sources more economically compelling.

In the third quarter of 2009, venture capital investments in green technology increased over 60% from the previous quarter, in part due to the promise of the availability of the stimulus funds. Although solar power continues to be the leading green technology sector for venture capital investment, notable increases in such investments emerged in the Smart Grid and energy efficiency arenas. It is likely that this trend will continue as the Recovery Act’s funds catalyze technological advances in these areas.

Figure 11: Venture Capital Green Technology Investments 3Q 2009 (\$ millions)

GREENTECH SECTOR	FUNDING	NUMBER OF DEALS
Solar	\$575.5+	29
Biofuel/Gasification/Cleaner Coal	\$512.8+	17
Energy Efficiency/Demand Response/Smart Grid	\$159.7+	14
Automotive and Transportation	\$158.1+	5
Batteries/Fuel Cells/Energy Storage	\$114.9	11
Green Buildings	\$104.5	3
Green Materials	\$100.3	6
Lighting	\$46.6	4
Green Information Technology	\$41.2	3
Geothermal	\$25.0	1
Water	\$20.0+	5
Wind and Tidal	\$19.4+	6
Nuclear	\$9.0	1
Green Consumer Products	\$3.2	2
Carbon Markets	\$2.0+	2
Miscellaneous	\$25.2	3
TOTALS	\$1.9 billion	112

Source: Greentech Media, Inc.

SECTION IV

Broadband

“[T]o retrofit America for a global economy... means expanding broadband lines across America, so that a small business in a rural town can connect and compete with their counterparts anywhere in the world.”

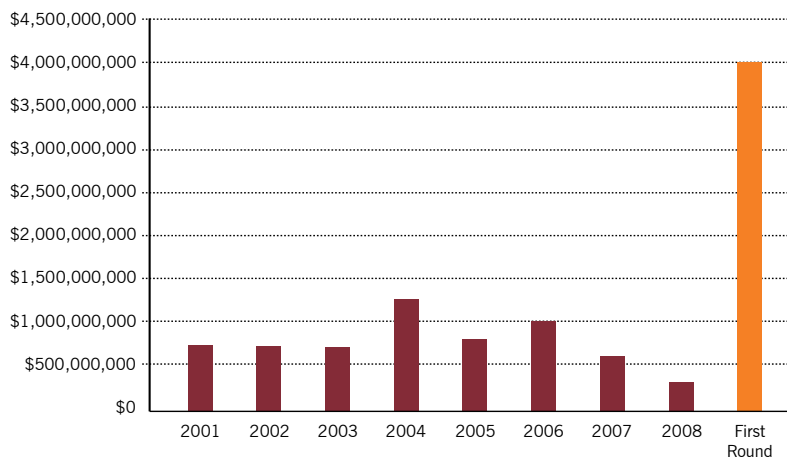
President Barack Obama, George Mason University, January 8, 2009

The broadband programs under the Recovery Act are geared primarily toward fiscal stimulus, attempting to stimulate economic development in rural areas by increasing the ability of people in those areas to conduct business effectively over the Internet.

The United States lags behind many industrialized nations in Europe and Asia in providing inexpensive and fast broadband access to a large portion of its population. Two likely explanations are the United States’ low population density, which reduces the profitability of building broadband networks in rural areas, and the relatively small percentage of GDP that the U.S. government has historically allocated to developing telecommunications infrastructure.

The broadband programs under the Recovery Act attempt to address this deficiency by allocating approximately \$7.2 billion to the development of broadband networks in underserved areas, through low interest rate loans and loan guarantees, and grants for up to 80% of eligible project costs. The ability of the Department of Agriculture (“DOA”) to make loans or loan guarantees allows the DOA to leverage its \$2.5 billion share of the broadband appropriation through the “credit subsidy” mechanism used in the DOE and TIFIA programs. This requires compliance with intricate and potentially burdensome OMB regulations, as discussed under “Regulatory Oversight and Procurement—Federal Credit Reform Act of 1990” on page 33. Broadband loan and grant programs existed prior to the Recovery Act, but the Recovery Act dramatically increased the number of federal dollars available, as demonstrated by Figure 12 below, comparing the amount of federal funds invested in broadband from 2001 to 2008 to the amount available in the first round of funding under the Recovery Act.

Figure 12: Federal Broadband Expenditures



Source: Department of Agriculture and Department of Commerce

The Recovery Act contains two distinct broadband programs: the Broadband Technology Opportunities Program (“BTOP”), which is administered by the National Telecommunications and Information Administration (“NTIA”), and the Broadband Initiatives Program (“BIP”), which is administered by the DOA. NTIA and DOA plan to distribute the broadband stimulus funds in two rounds. Under the first Notice of Funding Availability, published on July 1, 2009, DOA and NTIA adopted many similar rules and definitions for the two programs, which makes it easier for applicants to receive funds for a single project under both programs.

Participation of Major Telecommunications Companies

The broadband stimulus dollars will likely have little impact on the direction of the broadband market if they are distributed mostly to major telecommunications companies to fund normal network-expansion. In addition, to the extent that the broadband stimulus funds are distributed to major telecommunications companies—which tend to have greater access to bond and bank debt financing and financing through retained earnings than start-up companies—the broadband stimulus programs will likely produce few partnering opportunities for other infrastructure investors.

Certain provisions of the Recovery Act suggest that the statutory requirements for the existing DOA broadband program under the Rural Electrification Act (“REA”) might apply to loans made under BIP, including a prohibition on giving loans to any applicant that serves more than 2% of the telephone subscriber lines in the United States. The first Notice of Funding Availability, however, makes no reference to that prohibition in setting forth the eligibility requirements for applicants. The first Notice of Funding Availability also makes it clear that virtually any private company can participate in BTOP—the only requirements for eligibility are that the applicant be willing to promote the goals of the Recovery Act and comply with the statutory requirements of BTOP.

Certain conditions, however, may discourage investors that seek near-term returns from participating. In particular, (1) any project that is funded with grants may not distribute earnings to its investors while the project is receiving funds under BTOP or BIP, and (2) any project that receives grants or loans may not be sold or leased within 10 years from the receipt of those funds, except for a sale or lease that was part of the initial application for funds or a lease to another service provider.

The major telecommunications companies unsuccessfully lobbied against the adoption of (1) strong net neutrality regulations that would prohibit the companies from discriminating against bandwidth-intensive websites and potentially from charging websites for favorable treatment, and (2) robust interconnection obligations that would require them to do business with competitors on similar terms to other customers. If the major telecommunications companies nonetheless participate in the Recovery Act’s broadband programs, the robust interconnection obligations likely mean that start-up service providers will benefit, as they will be able to connect to the national networks run by the major telecommunications companies in lieu of having to build their own national networks.

Impact on the Broadband Market

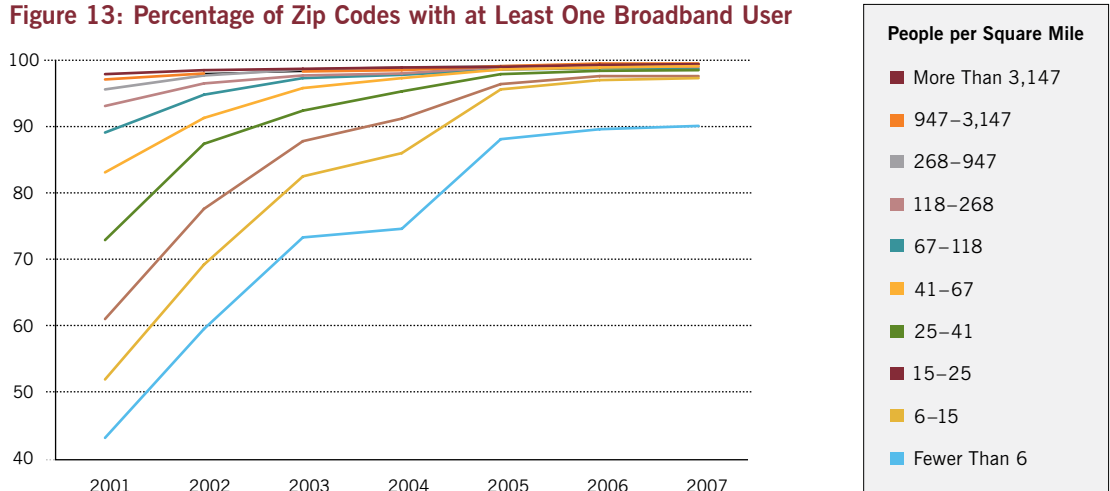
Many commentators expect that the growth in broadband availability will continue to slow because the rapid rise in broadband subscribership over the past decade was largely driven by converting dial-up Internet users, of whom fewer than 11 million remain in the United States.²⁰

²⁰ Morgan Stanley Research North America. Broadband Outlook: 1Q Subscriber Growth “Less Bad” Pricing Watch On. Exhibit 8. April 17, 2009.

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Most of the increase in broadband availability over the past 10 years has been in rural areas (see Figure 13 below), and the areas that remain completely without broadband access are increasingly remote.

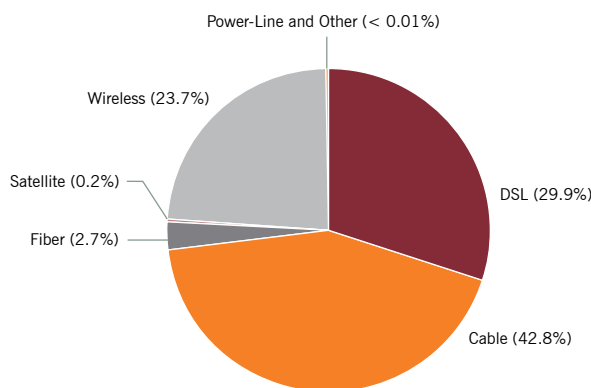
Figure 13: Percentage of Zip Codes with at Least One Broadband User



Data Source: Federal Communications Commission

Although all of the broadband stimulus money is devoted to creating broadband networks in underserved and unserved communities (or “middle-mile” networks that connect to underserved or unserved areas), \$400 million of grant money in the first round of BIP funds is set aside for networks that serve “remote” unserved areas, defined as areas (i) that are located more than 50 miles from any city or town with over 20,000 people or any urbanized area that is next to a city or town with over 50,000 inhabitants, and (ii) where fewer than 90% of the inhabitants have access to broadband. Since it is expensive to build terrestrial networks that can reach such remote areas, technologies such as satellite and broadband-through-power line will have a significant advantage in applying for those funds. Satellite and broadband-through-power line are currently extremely small participants in the broadband market (see Figure 14 below). If the \$400 million of remote area grants are able to demonstrate the viability of those technologies in serving rural customers, the stimulus programs could have a disproportionately large impact on the direction of the broadband market.

Figure 14: Broadband Market Share by Technology



Data Source: Federal Communications Commission

Broadband-Through-Power Line: IBM-IBEC Partnership

In February 2009, IBM announced a partnership with International Broadband Electric Communications (“IBEC”) to establish broadband-through-power line networks for almost 200,000 customers in rural areas of Alabama, Indiana, Michigan and Virginia, which is almost 40 times the current number of broadband-through-power line users in the United States.^{21,22} Broadband-through-power line technology uses modified radio signals to transmit data over existing power lines. The IBM-IBEC partnership has already received low-interest loans from the preexisting DOA broadband loan program and has suggested that it will apply for further funds under the Recovery Act. IBM claims that while cable and DSL networks generally need at least 15 people per mile of transmission line to be profitable, broadband-through-power line can be profitable in areas with five people per mile of transmission line and, with the benefit of grants, possibly fewer, making broadband-through-power line an attractive candidate for the “last mile” loans and grants under BTOP and BIP targeted to rural areas.

Broadband-through-power line networks have often been used in Europe and the Middle East to support Smart Grid applications, such as measuring consumption and identifying outages. For example, Echelon Corp. installed broadband-through-power line to read smart meters that it installed in 27 million homes in Italy as part of a joint Smart Grid-broadband project.²³ The IBM-IBEC broadband-through-power line project includes Smart Grid trials as well, and similar projects combining broadband-through-power line and Smart Grid may be eligible for stimulus funds under both the Smart Grid and broadband sections of the Recovery Act. If the Recovery Act is successful in promulgating either broadband-through-power line or Smart Grid technology, the other will likely benefit indirectly.

Satellite

Satellite networks tend to be slower than terrestrial networks due to the long distance that signals must travel and interference from weather. The low speed threshold of 768 kilobits-per-second for downloads and 200 kilobits-per-second for uploads in the definition of “broadband” under the Recovery Act, however, will increase the likelihood that satellite projects will be eligible for funds (although the evaluation criteria favor projects that operate at higher speeds). Furthermore, funds under both programs are allowed to be used for capital expenditures and capital leases for up to five years but are not allowed to be used for operating expenses, thus favoring satellite projects, which require disproportionately high amounts of upfront capital expenditures for putting satellites into orbit. Also favoring satellite technology is the fact that the cost of providing broadband access by satellite to rural areas is the same as the cost of providing access to urban areas.

21 IBM. IBM and IBEC Initiate Broadband Access to 200,000 Rural Americans. Press Release, February 18, 2009, [http:// www.ibm.com](http://www.ibm.com).

22 Federal Communications Commission Industry Analysis and Technology Division Wireline Competition Bureau. High-Speed Services for Internet Access: Status as of June 30, 2008. Table 1. July 2009.

23 Greentech Media. Will Smart Grid See a Push for Power-Line Networking? December 3, 2008, <http://www.greentechmedia.com>.

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Under the DOA broadband program under the Rural Electrification Act, DOA reportedly refused to fund any project that created overlap with another network, which effectively prohibited satellite projects from qualifying. By contrast, NTIA and DOA have expressed willingness to consider funding satellite projects under BTOP and BIP, and an NTIA official stated at a public meeting on the broadband stimulus programs that funding satellite projects under BTOP may be a very attractive way of providing service to currently unserved areas.²⁴ Satellite and wireless broadband providers accounted for a large percentage of applicants for the first round of funding, and no major telecommunications companies applied. On December 17, 2009, the White House announced the first \$182 million of broadband stimulus grants, which were awarded predominately to fiber-optic, middle-mile projects, including a \$33.5 million grant to deploy a fiber-optic ring in Georgia; a \$25.4 million grant to build a 1,100-mile fiber-optic network in Maine; a \$39.7 million grant to expand a fiber-optic network in New York; and a \$20.6 million grant to expand a fiber-optic network in South Dakota. A \$25.3 million grant was also awarded to provide mobile broadband service in Alaska. The remaining \$2 billion in the first round of funding is expected to be awarded by the end of January 2010.

²⁴ Transcript of Department of Commerce NTIA Meeting, March 10, 2009, page 53 (Statement by Dr. Bernadette McGuire-Rivera, Associate Administrator of NTIA), [http:// www.ntia.gov](http://www.ntia.gov).

SECTION V

Tax-Advantaged Bonds

Many of the bond provisions under the Recovery Act are directed squarely at providing fiscal stimulus, focusing largely on areas that suffered the most in the recession, although some of the provisions serve other goals as well, such as stimulating investment in infrastructure and renewable energy.

The Recovery Act seeks to achieve these goals by repealing certain limitations on private activity bonds and by creating new categories of tax-exempt private activity bonds and tax credit bonds. These changes are expected to provide opportunities to reduce the cost of financing development in infrastructure, particularly in economically distressed areas.

Tax-Exempt Bonds

Interest on bonds issued by state and local governments is generally not subject to U.S. federal income tax. As a result, issuers of tax-exempt bonds borrow at significantly lower interest rates than do private issuers of comparable debt.

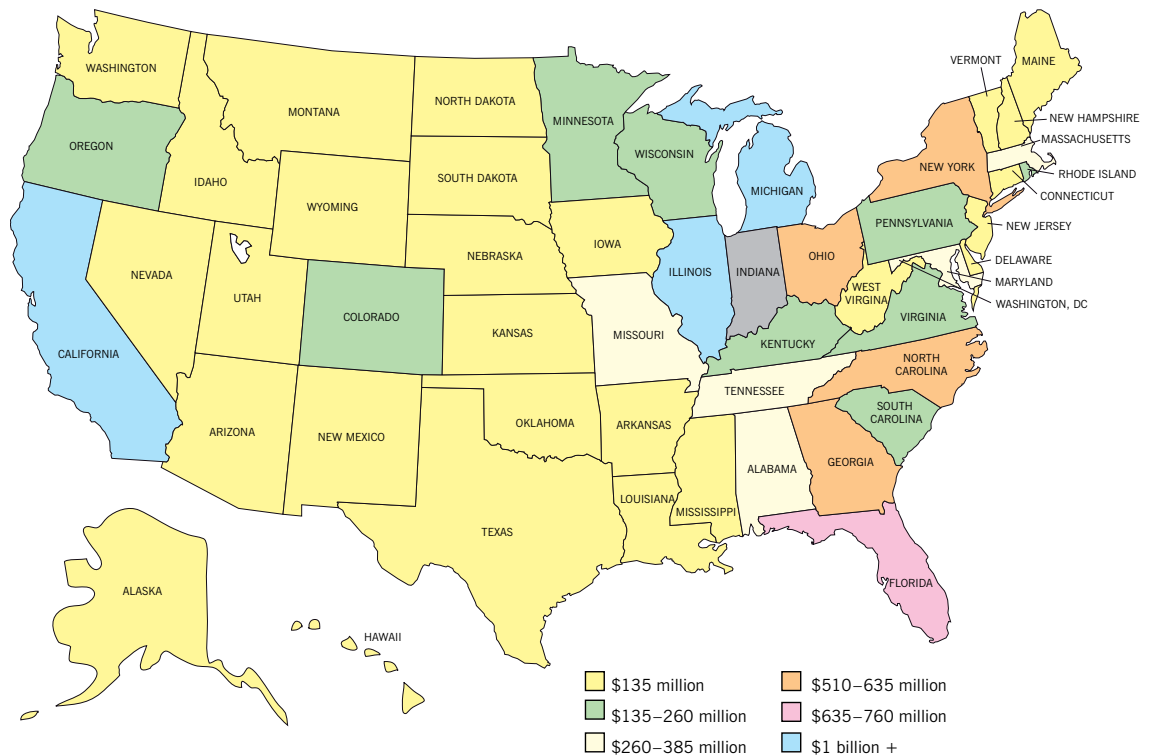
While tax law generally limits the ability of private entities to benefit from these reduced interest rates, the U.S. tax laws provide, in limited circumstances, for the issuance of tax-exempt “private activity bonds,” which are bonds issued by state or local governments serving as financing conduits for local private participants. However, only certain types of projects (for example, construction of mass transit facilities) may qualify for tax-exempt financing, and the total volume of tax-exempt private activity bonds that may be issued by each state is subject to annual caps. Moreover, although interest on these private activity bonds is exempt from regular income tax, historically investors that are subject to the alternative minimum tax have been required to include the interest in income.

The Recovery Act modifies the tax-exempt bond rules by excluding interest from income for purposes of calculating alternative minimum tax liability on tax-exempt private activity bonds issued in 2009 and 2010. This change is expected to further decrease market interest rates for tax-exempt private activity bonds, enhancing the benefits to borrowers and encouraging investment in infrastructure.

The Recovery Act also increases the availability of tax-exempt private activity bonds by creating a new category of these bonds, “Recovery Zone Facility Bonds,” which are designed to provide a low-cost source of financing for general capital investment in economically distressed geographic areas. Although Recovery Zone Facility Bonds are not subject to the state volume limits applicable to other tax-exempt private activity bonds, total issuances will be capped at \$15 billion, and the bonds must be issued prior to January 1, 2011. Treasury has allocated the \$15 billion cap among the 50 states based on relative employment declines in 2008. Figure 15 illustrates this allocation. States receiving significant allocations include California, Michigan, Illinois, Florida, Ohio, New York, Georgia and North Carolina.

SECTION V

Figure 15: Allocation of Recovery Zone Facility Bonds



Data Source: U.S. Department of Treasury

Congress has previously encouraged fiscal stimulus by expanding the availability of tax-exempt financing. After Hurricane Katrina's devastation of the Gulf region in 2005, Congress allowed local businesses to finance redevelopment projects with tax-exempt private activity bonds. Among the issuers of these "Gulf Opportunity Zone Bonds" were Dynamic Fuels, a joint venture between Tyson Foods and Syntroleum Corporation, which borrowed \$100 million to finance construction of a new biodiesel plant, and Marathon Oil, which borrowed \$1 billion to expand one of its oil refineries. By issuing tax-exempt bonds, both of these projects were financed at significantly reduced costs.

Tax Credit Bonds

The Recovery Act expands the availability of tax credit bonds, or bonds for which investors receive a federal tax credit instead of, or in addition to, interest payments. Unlike tax-exempt private activity bonds, interest and tax credits are treated as taxable income to the investors. However, the direct and indirect federal subsidies involved make tax credit bonds attractive financing tools for state and local governments.

Most tax credit bonds pay no interest and only provide a tax credit to investors. As a result, the borrower's cost of financing is entirely subsidized by the federal government. Two new categories of municipal bonds created by the Recovery Act, Build America Bonds and Recovery Zone Economic Development Bonds, work similarly to tax credit bonds but require issuers to make interest payments to investors. In addition to the interest payments, investors also receive a federal tax credit. The tax credit feature allows the borrower to pay interest at significantly reduced rates.

Most tax credit bonds generally may not be private activity bonds. Thus, while the tax credit bond provisions of the Recovery Act create new investment opportunities for municipal bond investors and new financing opportunities for state and local governments, the opportunities to finance public-private partnerships with tax credit bonds are limited.

The following table summarizes the key provisions of tax-advantaged bond programs that were created or expanded by the Recovery Act.

BOND	PAYMENT STRUCTURE	RESTRICTIONS ON ISSUANCES
Recovery Zone Facility Bonds	Interest payments are not subject to income tax and are not included in income for purposes of calculating alternative minimum tax.	<ul style="list-style-type: none"> • Proceeds must be used to finance investment in depreciable property in a state-designated "recovery zone." • Must be issued before January 1, 2011. • Total issuances are limited to \$15 billion and are allocated to states according to relative employment declines in 2008.
Build America Bonds	<ul style="list-style-type: none"> • Investors receive interest payment and federal tax credit; both interest and tax credit are taxable income to investor. • For certain bonds issued prior to January 1, 2011, in lieu of tax credit, issuer may elect to receive federal cash grant equal to 35% of interest payment. 	<ul style="list-style-type: none"> • May not be private activity bonds. • Must otherwise qualify for tax-exempt status.
Recovery Zone Economic Development Bonds	<ul style="list-style-type: none"> • Investors receive interest payment and federal tax credit; both interest and tax credit are taxable income to investor. • In lieu of tax credit, issuer may elect to receive federal cash grant equal to 45% of interest payment. 	<ul style="list-style-type: none"> • May not be private activity bonds. • Proceeds must be used to fund development in a state-designated "recovery zone." • Must be issued before January 1, 2011. • Total issuances are limited to \$10 billion and are allocated to states according to relative employment declines in 2008.
Qualified Energy Conservation Bonds	Investors receive federal tax credit in lieu of interest, which is treated as taxable income.	<ul style="list-style-type: none"> • Subject to certain limited exceptions, only 30% of issuances in any state may be private activity bonds. • Total issuances are limited to \$3.2 billion, and are allocated to states according to relative population.
New Clean Renewable Energy Bonds	Investors receive federal tax credit in lieu of interest, which is treated as taxable income.	<ul style="list-style-type: none"> • May not be private activity bonds. • Total issuances are limited to \$1.6 billion.

SECTION VI

Regulatory Oversight and Procurement

The unprecedented level of funding available to the private sector as a result of the Recovery Act has attracted a corresponding level of reporting and oversight to ensure transparency and proper accounting for federal funding. As a result, private participants must navigate a variety of regulatory compliance requirements designed to achieve the following goals:

- that funds are awarded and distributed in a prompt, fair and reasonable manner;
- that the recipients and the uses of all funds are transparent to the public;
- that the public benefits of these funds are reported clearly, accurately and in a timely manner;
- that funds are used for authorized purposes and that instances of fraud, waste, error and abuse are prevented;
- that projects funded under the Recovery Act avoid unnecessary delays and cost overruns; and
- that programs meet specific goals and targets, and contribute to improved performance on broad economic indicators.

Private investors seeking to take advantage of the opportunities created by the Recovery Act must also take into account the potentially burdensome regulatory environment of multiple oversight and investigatory federal agencies. Specifically, private investors will be faced with increased compliance costs and potential exposure to liability and embarrassing public disclosures. This section will outline some of the more critical compliance considerations facing private investors, and summarizes the key oversight mechanisms mandated by the Recovery Act or adopted by federal agencies.

Fixed-Price Contracts

All contracts funded under the Recovery Act should be “fixed-price” contracts awarded on a competitive basis. This fixed-price requirement is consistent with the goals articulated in a Presidential Memorandum dated March 20, 2009, in which President Obama stated that the ability of a project to “achieve economic stimulus by optimizing economic activity and the number of jobs created or saved in relation to the Federal dollars obligated” should be demonstrated according to merit-based criteria that executive departments and agencies must consider when awarding contracts under the Recovery Act. Contracts that are not “fixed-price” and awarded competitively must be summarized and posted on the Obama Administration’s Recovery Act website, www.recovery.gov.

The general risks inherent in fixed-price contracts may be greater for Recovery Act programs because of the inability to quantify costs due to often ill-defined or unclear contract requirements and the lack of opportunity to conduct adequate due diligence. As a result, the combination of a requirement for fixed-price contracts and the preference of federal agencies for projects that are “shovel ready” will tend to exacerbate the exposure to cost overruns.

Federal Credit Reform Act of 1990

The cost of all loans and loan guarantees under the Recovery Act is reflected in the federal budget according to the methodology set forth in the Federal Credit Reform Act of 1990 (“FCRA”) and related regulations. Under FCRA, the cost of any loan, commitment to lend or loan guarantee is equal to the net present value, discounted at the Treasury security interest rate of comparable maturity, of all estimated cash flows under that contract. FCRA requires the applicable agency to estimate the probability of default by the borrower in accordance with detailed OMB guidelines, and the FCRA process can be a significant obstacle in the process of obtaining a loan or loan guarantee. According to the Department of Agriculture, in practice FCRA favors loan guarantees over loans, since loan guarantees tend to have lower subsidy costs and administrative costs than direct loans.

“Buy American” Provisions

The Recovery Act also imposes “Buy American” provisions, which in general terms prohibit the use of foreign steel, iron and manufactured goods in certain infrastructure projects funded by the Recovery Act. The Buy American provisions are broad in scope and extend to the products used in any alteration, maintenance or repair of a public building or public work. There is no indication that these provisions would apply generally to concession-based projects, renewable energy projects or the recipients of a renewable energy tax credit.

As a practical matter, the real impact of the Buy American provisions are likely to be limited in application as a result of various exemptions. For example, the relevant federal agency may exempt a project from compliance if it determines that application of the provisions would be inconsistent with the “public interest.” In addition, a finding by the relevant federal agency that the steel, iron or manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality, or that the inclusion of American-made steel, iron and manufactured goods would increase the overall cost of the project by at least 25%, would in each case free the project from the Buy American provisions. Projects in certain industries may be specifically exempt—for example, projects related to broadband infrastructure are the subject of one such exemption. Finally, if compliance with the Buy American provisions would be contrary to U.S. obligations under international agreements (such as the North American Free Trade Agreement or the World Trade Organization Agreement on Government Procurement), then the provision will be waived with respect to that project—thus, for example, the use of steel, iron and manufactured goods produced in European countries, Canada or Mexico may be permitted, while the same products sourced from China or India will likely be prohibited.

SECTION VI

Labor Requirements: Davis-Bacon Act

The Davis-Bacon wage laws apply to projects funded or assisted by the Recovery Act (except for recipients of the renewable energy cash grant). Davis-Bacon mandates that all laborers and mechanics employed by the recipients of Recovery Act funds and their subcontractors be paid at the “prevailing wage rate” as determined by the Department of Labor. As a result, private participants may be faced with a higher cost workforce for projects funded under the Recovery Act. That said, since many contractors were already subject to Davis-Bacon, the marginal impact of this requirement is, in many cases, negligible.

Below is a summary of certain key oversight measures contained in the Recovery Act.

KEY OVERSIGHT MEASURE	DESCRIPTION
Recovery.gov:	Public web portal created to: <ul style="list-style-type: none"> • educate the public on the Recovery Act; • show how, when and where the funding is being spent; and • provide data that will allow the public to evaluate the Recovery Act's progress and to provide feedback.
Designated Funding for Regulatory Oversight:	Additional funds are dedicated under the Recovery Act to improve oversight, including for the Inspectors General of the various federal agencies and the Government Accountability Office. Each of these governmental representatives or agencies is authorized to examine documents and interview private recipients.
Creation of Recovery Act Accountability and Transparency Board:	The Recovery Act Accountability and Transparency Board was created to oversee funding and has the power to audit, hold hearings and subpoena testimony.
Private Recipient Quarterly Reporting:	All private recipients must file a quarterly report with the relevant federal agency, providing: <ul style="list-style-type: none"> • the total amount of funding received; • the amount of funding expended or obligated; • a detailed description of the project, its status and an estimate of the number of jobs created or retained; and • details of any subcontractors to the project. These reports will be made public and are possibly subject to the False Claims Act pursuant to which a private recipient may be civilly or criminally liable for the submission of any false or fraudulent statement.
OMB Guidelines: Source: www.whitehouse.gov/omb	The Office of Management and Budget has issued several Guidance Memorandums regarding the planning and implementation of the Recovery Act. These memorandums supplement private recipients' reporting, award of contracts, performance and compliance requirements under the Recovery Act.

SECTION VII

Conclusion

Although the Recovery Act includes approximately \$150 billion of appropriations for infrastructure-related programs, a significant portion of that amount is available only to state and local governments. State and local governments could choose to partner with private investors, but the Recovery Act does not provide any incentive for them to do so, and may actually have a negative impact on the use of public-private partnerships by decreasing the funding needs of state and local governments. In addition, many of the programs under the Recovery Act that subsidize private infrastructure projects are subject to the same bureaucratic constraints that have hamstrung similar programs previously, hindering the ability of the Recovery Act to meet its goals of repairing and modernizing the nation's infrastructure and stimulating the economy. We believe that the programs under the Recovery Act that are likely to have the greatest short-term benefit on the infrastructure investment market are the cash grant and tax-related provisions. The Recovery Act is also likely to have a large impact on the infrastructure market by encouraging investment in innovative technologies, which could change the slope of the playing field in certain alternative energy sectors and potentially displace substantial private investments.

If we are to close the widening gap in infrastructure development between the United States and other OECD countries, governments at all levels in the United States will need to give greater consideration to the use of public-private partnerships and other concession-based project delivery methods. The Recovery Act signals a start in that direction but falls short of a real commitment to employing private sector participation in rebuilding the country's infrastructure.

SECTION VIII

Appendix 1

Transportation

The following table summarizes key provisions of TIFIA, as supplemented by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<ul style="list-style-type: none"> • Must be highway, transit, passenger rail, certain freight facilities or certain port projects, including intelligent transportation systems. • Total eligible project cost must exceed \$50 million (or \$15 million in the case of intelligent transportation systems). • Must have dedicated revenues for repayment, such as tolls or availability payments. • Must be included within the applicable state's long-term transportation plan and programs. • Senior debt must be rated investment grade.
Recipient Eligibility:	Public and private entities, including state departments of transportation and private consortia.
Availability of Recovery Act Funding of TIFIA:	The funds are available through September 30, 2011.
Use of Funds:	Eligible project costs, including development phase activities, construction and acquisition costs and financing costs, including capitalized interest. Costs incurred prior to application for funding are excluded, unless otherwise approved by USDOT.
Funding Limit:	Funding cannot exceed: <ul style="list-style-type: none"> • 33% of eligible project costs (other federal programs typically allow up to 80% of project costs to be funded); and • total senior debt of the project.
Repayment Terms:	<ul style="list-style-type: none"> • Typically, senior debt service, as well as senior debt reserves, are paid ahead of TIFIA debt service. USDOT can defer debt service for up to five years after substantial completion of the project.
Intercreditor Requirements:	<p><i>Ranking of Security Interest:</i></p> <p>TIFIA credit assistance may be, and is anticipated by USDOT to be, secured by a lien that is "junior" to the lien securing debt of the project's other financiers, such as commercial bank and capital market debt. However, importantly, TIFIA requires that USDOT's junior lien "springs" to parity with the project's other financiers' senior lien in the following circumstances:</p> <ul style="list-style-type: none"> • upon the occurrence of a bankruptcy-related event; • the nonpayment of debt service when due for more than one year; or • a foreclosure by the project's other financiers on project assets. <p><i>Silent Junior Lien:</i></p> <p>Generally, USDOT cannot accelerate repayment of its credit assistance or exercise remedies against project assets secured by its junior lien independently of the project's other financiers.</p>
Federal Law Compliance:	The project must comply with several key federal laws, including: <ul style="list-style-type: none"> • certain existing mass transit legislation relating to design, procurement and construction requirements; • "Buy American" provisions, relating to the inputs of a project; • Davis-Bacon, relating to wage laws; • civil rights legislation; and • environmental legislation.

PRIIA

The following table summarizes key provisions of PRIIA, as supplemented by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<p>Project must:</p> <ul style="list-style-type: none"> • be in a federally designated high-speed passenger corridor (currently, 10 corridors have been designated—see Figure 4); • benefit intercity passenger rail (approximate trip range of 100 to 600 miles); and • be reasonably expected to reach speeds of “at least” 110 mph.
Recipient Eligibility:	States, including high-speed rail governmental agencies.
Availability of Funds:	The funds are available through September 30, 2012.
Use of Funds:	All capital costs associated with an eligible high-speed rail project, excluding planning costs, operating expenses and cost overruns.
Funding Limit:	No limit on funds that may be granted to a recipient (only constrained by total funds available).
Matching Investment:	No matching investment by recipient. Project may be 100% federally funded.
Modifications of PRIIA:	<ul style="list-style-type: none"> • Recipient is not required to match federal funding (as above). • Project does not need to be in a State Transportation Improvement Program. • Interim detailed guidance from Federal Railroad Administration (“FRA”) to govern procedures and conditions of the program.

SECTION VIII

The following table summarizes key challenges facing participants in PRIIA, as supplemented by the Recovery Act.

KEY FEATURES	DESCRIPTION
Only States Are Eligible Recipients:	<p>Funding will be allocated directly to the states and not directly to private participants. Therefore, private participants will be reliant upon the states, including the relevant high-speed rail governmental agency, for implementing investment models, such as public-private partnerships (“PPP”), that attract and facilitate private sector participation.</p> <ul style="list-style-type: none"> • PRIIA encourages the use of PPP project delivery methods. As a result, the FRA has called for expressions of interest for PPP proposals for the financing, design, construction, operation and maintenance of high-speed rail services operating within federally designated high-speed rail corridors.
Limited to Federally Designated High-Speed Rail Corridors:	<p>Only projects within a federally designated high-speed rail corridor are eligible for funding:</p> <ul style="list-style-type: none"> • USDOT may designate only one additional high-speed rail corridor (10 corridors have already been designated). • Amtrak’s Northeast Corridor (linking Boston, New York, Washington and intermediate cities) has already received over \$4 billion in federal funding and will not be designated.
Application of Wage Requirements:	<p>Davis-Bacon wage laws apply to all laborers and mechanics employed by private participants and their subcontractors in connection with the project (see “Regulatory Oversight and Procurement—Labor Requirements: Davis-Bacon Act” on page 34).</p>
Application of “Buy American” provisions:	<p>“Buy American” provisions apply to steel, iron and manufactured goods used in the project by application of:</p> <ul style="list-style-type: none"> • the Recovery Act; and • federal mass transit legislation. <p>The “Buy American” provisions under both legislative sources are identical; however, the waiver requirements under the federal mass transit legislation are arguably stricter than the requirements under the Recovery Act. USDOT has yet to provide guidance on reconciling the application of the waiver requirements.</p>

SECTION VIII

Appendix 2

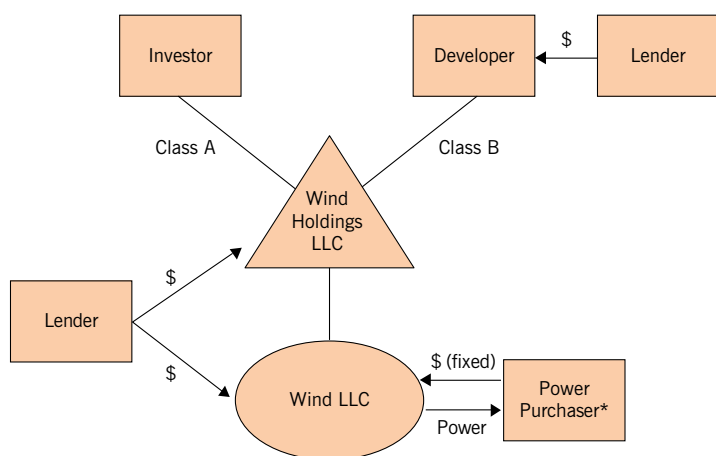
Renewable Energy Tax Credits

Renewable energy investments that utilize tax credits are structured to maximize the value of the tax credit, while investments that utilize cash grants provide flexibility for structuring. Exhibits 1 and 2 provide the typical structures and describe the tax and economic allocations of investments using the production tax credit and the investment tax credit, respectively. Exhibits 3 through 7 present the tax credit and cash grant provisions after the Recovery Act.

Exhibit 1: The Partnership “Flip” Structure

Production tax credit investments are generally structured as partnership “flip” structures. In a traditional partnership “flip” structure, the tax equity investor receives the lion’s share of income, loss and tax credit allocations until achieving a specified rate of after-tax return on its investment (the “flip point”), when the bulk of the allocations “flip” to the developer, as described in the figures below.

Traditional Partnership “Flip” Structure—PTC Projects



* In lieu of the power purchaser, the facility may sell energy into the local hourly spot market and enter into energy hedges with an energy trading desk to maintain a predictable income stream.

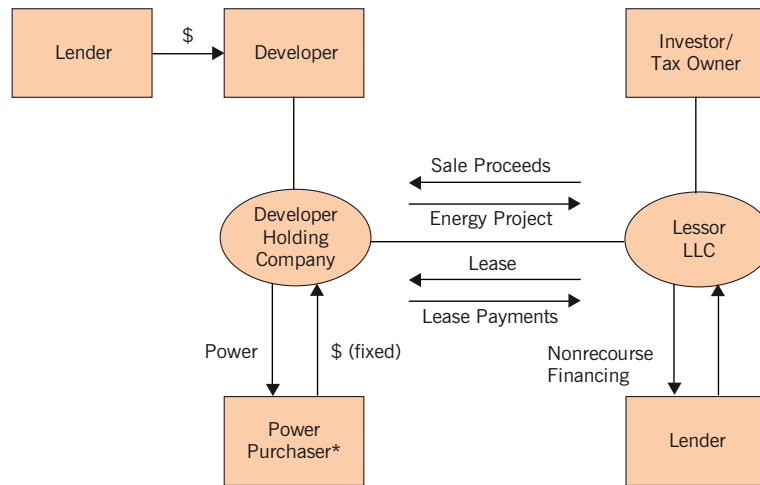
		DEVELOPER	TAX EQUITY INVESTOR
Before the Flip Point:*	Tax Allocations	1% of taxable income or loss and production tax credits	99% of taxable income or loss and production tax credits
	Distributions	100% of cash until Developer’s capital is recovered	Once Developer’s capital is recovered and until the Flip Point, 100% of cash
After the Flip Point:*	Tax Allocations	95% of taxable income or loss and production tax credits	5% of taxable income or loss and production tax credits
	Distributions	95% of cash	5% of cash

* The Flip Point is a preferred after-tax rate of return often occurring around the 10th year of the investment.

Exhibit 2: The Sale-Leaseback Structure

Investment tax credit investments are typically structured as sale-leasebacks from the developer holding company to trusts or partnerships formed by tax equity investors, as described in the figures below.

Sale Leaseback Structure—ITC Projects



* In lieu of the power purchaser, the facility may sell energy into the local hourly spot market and enter into energy hedges with an energy trading desk to maintain a predictable income stream.

	DEVELOPER	TAX EQUITY INVESTOR
Cash Flows:	<ul style="list-style-type: none"> • Receives full repayment of investment up front. • Makes periodic rental payments throughout the lease term (likely lower than fair market value rent because the rate reflects the tax benefits to the tax equity investor). • May repurchase facility upon expiration of lease by exercising fair market value purchase option. 	<ul style="list-style-type: none"> • Purchases energy project up front (partially funded with nonrecourse financing). • Receives periodic rental payments throughout the lease term. • Must sell facility to developer on expiration of lease if developer exercises fair market value purchase option.
Desired Tax Consequences:	<ul style="list-style-type: none"> • Rental deductions. • Gain or loss on initial sale of facility. 	<ul style="list-style-type: none"> • Depreciation and interest deductions. • Tax credits. • Rental income. • Gain on sale of facility at end of lease term if purchase option is exercised.

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Exhibit 3: Changes Made by the Recovery Act

The following table summarizes the Recovery Act’s expansions and extensions of the available tax credits and the introduction of the cash grant program.

KEY FEATURES	DESCRIPTION
Cash Grants in Lieu of Tax Credits:	<ul style="list-style-type: none"> Allows investors to elect to receive federal cash grants in lieu of tax credits for certain renewable energy projects.
Election to Claim the Investment Tax Credit for Projects that Formerly Qualified Only for the Production Tax Credit:	<ul style="list-style-type: none"> Allows developers and investors to claim the investment tax credit for property used in certain renewable energy projects, such as wind, waste, geothermal, biomass, hydropower and marine and hydrokinetic projects that formerly could have qualified only for the production tax credit.
Sunset Dates:	<ul style="list-style-type: none"> Extends the sunset date for the production tax credit through 2012 and 2013 (the investment tax credit sunset provisions for technologies such as solar, fuel cells, certain geothermal and combined heat and power projects were extended through 2016 by the Energy Improvement and Extension Act of 2008).
Repeal of the Investment Tax Credit “Haircut”:	<ul style="list-style-type: none"> Enhances the investment tax credit by eliminating a provision that reduced the credit amount based on the use of subsidized financing (mainly state and local grants and loans) in the project.
New Advanced Manufacturing Investment Tax Credit:	<ul style="list-style-type: none"> Establishes a new tax credit for investments in facilities used to manufacture renewable energy-producing property, intended to encourage expansion of U.S. manufacturing of renewable energy equipment.

Exhibit 4: Cash Grants

The following table summarizes the cash grant program introduced by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<ul style="list-style-type: none"> Projects placed in service anytime before the expiration of the credit;¹ so long as construction begins in 2009 or 2010. Not available for “disqualified entities,” which include nontaxpaying entities, such as governmental entities, tax-exempts or partnerships in which a disqualified entity is a partner. However, such entities may own indirect interests in the project through a taxable C corporation. Accepting applications as of July 31, 2009.
Value:	<ul style="list-style-type: none"> 30% of the cost of certain property used in renewable energy projects qualifying for the production tax credit or the investment tax credit (other than refined coal), or 10% for combined heat and power projects and certain geothermal projects. Even though the grant is treated as a reimbursement of the cost of property and is not included in taxable income, the basis of the property is reduced by only 50% of the amount of the grant.
Limitations:	<ul style="list-style-type: none"> If the property is sold to a disqualified entity or ceases to qualify as “specified energy property” within 5 years after it is placed in service, a portion of the grant must be repaid. The taxpayer cannot also claim the production tax credit or investment tax credit. Any credit taken for progress expenditures must be repaid. In a sale-leaseback structure, property must be leased within three months of its placed-in-service date for the lessor to claim the credit.

¹ January 1, 2013, for wind; January 1, 2014, for waste, geothermal, biomass, fuel cells, hydropower, marine and hydrokinetic; and January 1, 2017, for fuel cells, solar, geothermal and combined heat and power projects.

SECTION VIII

Exhibit 5: Features of the Investment Tax Credit

The following table summarizes the investment tax credit provisions. After the Recovery Act, property that once qualified for only the production tax credit is now eligible for the investment tax credit.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<ul style="list-style-type: none"> Certain depreciable tangible property, such as wind property, that is an integral part of a qualified investment facility eligible for the production tax credit (other than refined coal).
Value:	<ul style="list-style-type: none"> Taxpayers may elect to take the investment tax credit in lieu of the production tax credit.
Limitations:	<ul style="list-style-type: none"> The investment tax credit reduces the basis of (and therefore depreciation deductions from) the property by 50% of the amount of the investment tax credit and is subject to recapture if the property is sold or abandoned within five years. While it is not entirely clear, the statutory language suggests that a taxpayer may elect to claim the investment tax credit as progress expenditures are made and subsequently claim the cash grant when the project is placed in service (subject to recapture of the investment tax credit). Guidance is provided in IRS Notice 2009-52 (June 5, 2009).

Exhibit 6: A Comparison of Production Tax Credits and Investment Tax Credits

The following table summarizes the differences between the production tax credit and investment tax credit.

KEY FEATURES	PRODUCTION TAX CREDITS	INVESTMENT TAX CREDIT
Eligible Technologies:	(1) Wind, closed-loop biomass and geothermal; (2) Open-loop biomass, municipal solid waste, hydropower, marine and hydrokinetic; and (3) Qualified refined coal.	(1) All production tax credit eligible technologies (other than refined coal), solar, fuel cells; and (2) certain geothermal and combined heat and power projects.
Availability of Credits:	Each of 10 years after the project is placed in service.	The tax year in which the project is placed in service. For projects that are expected to take more than two years to complete, credits for progress expenditures may be claimed as they are made.
Amount of Credit:	In 2009, 2.1 cents per kilowatt hour of electricity produced and sold from technologies in (1); 1.1 cents per kilowatt-hour of electricity produced and sold from technologies in (2); and \$6.20 per ton of qualified refined coal. The credit is adjusted annually and may be subject to a cap if electricity prices exceed a specified level.	30% of a project's qualifying costs for technologies in (1), excluding geothermal; and 10% of a project's qualifying costs for technologies in (2) and geothermal.
Limits:	Reduced up to 50% if project uses subsidized financing.	No reduction for use of subsidized financing.
Structuring Considerations:	Taxpayer must produce electricity to receive credit (partnership structures may be appropriate).	Taxpayer must own the energy-producing property but need not produce electricity to receive credit (partnership or sale leaseback structures may be appropriate).

Exhibit 7: Features of Advanced Energy Facility Credits

The following table summarizes the key provisions of the Advanced Energy Facility Credit, which was introduced by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<ul style="list-style-type: none">• Projects must be certified by the Treasury Department in a competitive application process.• Taxpayers must apply within two years of the Treasury's establishment of the certification program. Taxpayers have one year from acceptance to show that the Treasury certification requirements have been met.• After certification, applicants have three years to place the project into service.
Priority for Certifying Projects:	In deciding which projects to certify, the Treasury Secretary is directed to take into account: <ul style="list-style-type: none">• the commercial viability of the project;• the number of domestic jobs created;• the reduction in emissions and pollution caused by the project;• the expected time from certification to completion; and• the greatest potential for technological innovation.
Value:	30% of the cost of certain property used in qualifying advanced energy projects.
Limit on Number of Credits:	Maximum amount of credits available under the program is \$2.3 billion.

SECTION VIII

Appendix 3

Department of Energy Loan Guarantee Program

The following table describes the categories of projects eligible under the Department of Energy loan guarantee program as expanded by the Recovery Act and summarizes other key provisions of the program.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<p>The Department of Energy ("DOE") may guarantee loans for projects in the following categories:</p> <ul style="list-style-type: none"> • Renewable energy systems, including incremental hydropower, that generate electricity or thermal energy, and facilities that manufacture related components. • Electric power transmission systems, including upgrading and reconductoring projects. • Leading edge biofuel projects, using technologies performing at the pilot or demonstration scale, that DOE determines are likely to become commercial technologies and that will produce transportation fuels that substantially reduce life-cycle greenhouse gas emissions compared to other transportation fuels, provided that the aggregate funding for all such projects is limited to \$500 million.
Availability of Guarantees:	<ul style="list-style-type: none"> • DOE's authority to enter into loan guarantees expires on September 30, 2011. • Any project for which a guarantee is issued must commence construction before September 30, 2011. DOE has clarified that in some cases this requirement does not necessarily require physically breaking ground. • DOE announced on July 29, 2009, two loan guarantee solicitations for the following: (i) projects employing innovative energy efficiency, renewable energy and advanced transmission and distribution technologies; and (ii) electric power transmission infrastructure investment projects. <p>On October 7, 2009, DOE announced a third solicitation for commercial technology renewable energy generation projects under the Financial Institution Partnership Program. Additional solicitations are expected to be forthcoming.</p>
Factors for Evaluating Electric Power Transmission Projects:	<p>In evaluating eligible electric power transmission projects, DOE may consider:</p> <ul style="list-style-type: none"> • Viability of the project without guarantees; • Availability of other federal and state incentives; • Importance of the project in meeting reliability needs; and • Effectiveness of the project in meeting a state or region's environment (including climate change) and energy goals.
Application of Wage Controls:	<p>Davis-Bacon wage laws apply to all laborers and mechanics, including those employed by contractors and subcontractors, in connection with the project.</p>

Appendix 4

Smart Grid

The following table summarizes the key provisions of the Smart Grid Investment Grant Program, as enhanced by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<p>Qualifying Smart Grid investments generally include:</p> <ul style="list-style-type: none"> • Investments related to the electricity distribution system; • Home appliance manufacturers' expenditures associated with purchasing, designing or manufacturing components that allow appliances to engage in Smart Grid functions;² • The costs of installing or modifying specialized industrial or commercial equipment to engage in Smart Grid functions; • In the case of electric or hybrid-electric vehicles, expenses for devices that allow the vehicle to engage in Smart Grid functions; and • The costs of software that enables devices or computers to engage in Smart Grid functions.
Funding Limit:	<p>≤ 50% of the cost of qualifying Smart Grid investments.</p> <p>Awards were announced on October 27, 2009, for the following categories of projects:</p> <ul style="list-style-type: none"> • Advanced metering infrastructure. • Customer systems. • Electric distribution systems. • Electric transmission systems. • Equipment manufacturing. • Integrated and crosscutting systems.

The following table summarizes key provisions of the Smart Grid Demonstration Initiative, as modified by the Recovery Act.

KEY FEATURES	DESCRIPTION
Project Eligibility:	<p>Funding is available for:</p> <ul style="list-style-type: none"> • Smart Grid—regionally unique demonstration projects to quantify costs, benefits and cost effectiveness; verify technology viability; and validate new business models, at a scale that can be readily adapted and replicated around the country. • Energy Storage—major utility-scale energy storage projects that help establish costs and benefits, verify technical performance and validate system reliability and durability, at scales that can be readily adapted and replicated across the nation, including the following technologies: advanced battery systems, ultra-capacitors, flywheels and compressed air energy systems.
Recipient Eligibility:	<p>The Recovery Act expands eligibility beyond utility companies, but requires that private entities cooperate with local utility companies.</p>
Funding Limit:	<p>≤ 50% of the cost of qualifying advanced grid technology investments made to carry out a demonstration project. Awards were announced on November 24, 2009, for 16 regional demonstration projects and 16 energy storage demonstration projects.</p>

² Smart Grid functions, as defined under the Energy Independence and Security Act of 2007, include the ability to develop, store, send and receive digital information concerning electricity use and costs, and the ability to sense and localize disruptions or changes in power flows on the grid and communicate such information instantaneously and automatically.

SECTION VIII

Appendix 5

The following table compares the Broadband Initiatives Program (“BIP”) to the Broadband Technology Opportunities Program (“BTOP”), both of which were created by the Recovery Act.

KEY FEATURES	BIP	BTOP
Project Eligibility:	<ul style="list-style-type: none"> At least 75% of the coverage area must be (i) rural and (ii) without sufficient broadband access for economic development. 	<ul style="list-style-type: none"> Unserved or underserved areas. Funding available for no more than 80% of a project (unless financial need). Project would not have been undertaken without a grant. Project must be completed within 2 years of receiving a grant.
Definitions (applicable to BIP and BTOP):	<ul style="list-style-type: none"> “Broadband” means at least 768 kilobits-per-second download and 200 kilobits-per-second upload. “Unserved”: ≤ 10% of households have broadband access. “Underserved”: <ul style="list-style-type: none"> last mile projects: ≤ 50% of households have broadband access; no broadband service providing at least 3 megabits-per-second download speed; or ≤ 40% broadband subscribership. middle mile projects: connects to unserved or underserved last-mile area. 	
Recipient Eligibility:	<ul style="list-style-type: none"> Public and private; favors private. Priority to current/former borrowers under the REA. 	<ul style="list-style-type: none"> State and local governments. Nonprofit organizations. Private entities “in the public interest.”
Nature of Distributions:	Loans, Loan Guarantees, Grants.	Grants.
Priority for Evaluating Projects:	<ul style="list-style-type: none"> Results in a choice of more than one service provider. Provides service to the highest proportion of rural consumers without broadband access. Commences immediately upon approval. 	<ul style="list-style-type: none"> Provides the greatest broadband speed possible to the greatest number of users. Increases affordability of broadband.

NOTES

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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.

The authors, who are partners of Davis Polk & Wardwell LLP, are not employees of Morgan Stanley Investment Management ("MSIM"), and the forecasts and opinions expressed in the paper do not necessarily represent those of the Firm. Davis Polk & Wardwell LLP has advised Morgan Stanley Infrastructure in connection with infrastructure transactions.

Morgan Stanley Infrastructure
1585 Broadway
New York, NY 10036
www.morganstanley.com/infrastructure

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