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Renewable Energy Project Finance in the U.S.: 2010-2013 Overview and Future Outlook

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Produced in Collaboration with GTM RESEARCH

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1 EXECUTIVE SUMMARY

The Mintz Levin law firm and GTM Research are pleased to provide an analysis of project financing trends for utility-scale renewable power projects and advanced project financing biofuel refineries constructed in the United States, as well as forecasting the anticipated supply and demand levels sought through 2013.

1.1 Hindsight: 2010 & 2011

Since the fourth quarter of 2008, U.S. renewable power project's ability to secure both equity and debt project financing dropped precipitously due to the systemic turmoil experienced in the global financial markets. As we approach the third anniversary of that economic crisis, the prospects for project financing have improved considerably due to several market trends and significant legislative policy support mechanisms:

- Increased liquidity in the debt markets,
- Lower costs of capital attributable to reduced debt spreads,
- The availability of longer tenors for term-debt,
- The Payments for Specified Energy Property in Lieu of Tax Credits (2009 Recovery Act, Section 1603 Cash Grant Program "1603 Cash Grants") originally authorized the American Recovery & Reinvestment Act,
- The U.S. Departments of Energy & Agriculture's Loan Guarantee Programs, and
- Emergence of Strategic Equity to Supplement Venture Capital and Private Equity Investments.

1.2 Foresight: 2012-2013

In forecasting capital markets and availability for renewable project developers seeking to secure non-recourse project financing, the three (3) most dispositive factors impacting future capital formation trends will be:

- The December 2011 expiration of the 1603 Cash Grants,
- The December 2012 expiration of the Production Tax Credit ("PTC") for wind, and
- Macro-trends in tax equity financing, which are highly correlated to the financial health of a limited number of large financial institutions.

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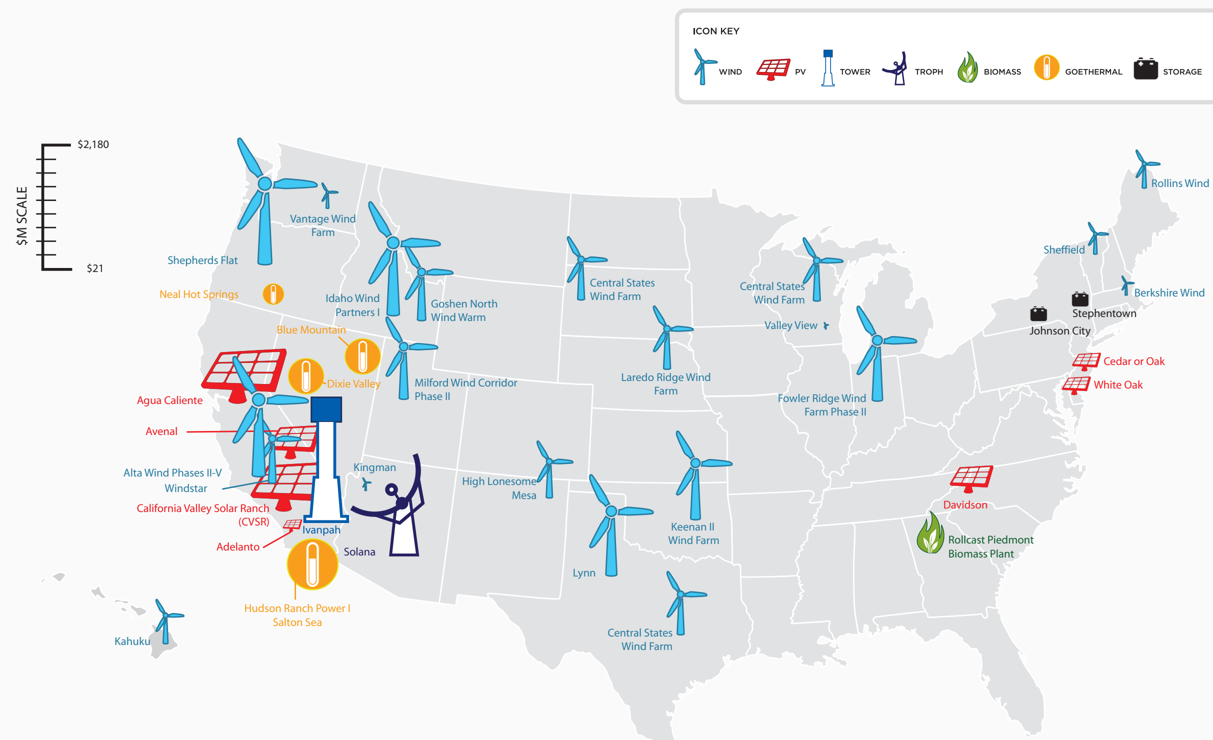
Figure 1-1: MAP OF RENEWABLE ENERGY PROJECT FINANCE TRANSACTIONS THAT CLOSED IN 2010



CSP PROJECTS	
Ivanpah	$2,180
Solana	$1,967

STORAGE PROJECTS	
Stephentown	$69
Johnson City	$24

WIND PROJECTS	
Shepherds Flat	$2,128
Alta Wind Phases II-V	$1,953
Idaho Wind Partners I	$391
Green Frontier Wind Farm	$377
Lynn	$376
Fowler Ridge Wind Farm Phase II	$348
Keenan II Wind Farm	$319
Milford Wind Corridor Phase II	$312
Goshen North Wind Warm	$285
Windstar	$275
Central States Wind Farm	$255
Laredo Ridge Wind Farm	$200
High Lonesome Mesa	$190
Record Hill Wind	$153
Kahuku	$148
Rollins Wind	$140
Sheffield	$136
Vantage Wind Farm	$116
Berkshire Wind	$66
Kingman	$24
Valley View	$21

PV PROJECTS	
Agua Caliente	$1,719
California Valley Solar Ranch (CVSR)	$1,637
	$241
Avenal	$173
Davidson	$150
Cedar or Oak	$50
White Oak	$50
Adelanto	$32

GEOTHERMAL PROJECTS	
Hudson Ranch Power I Salton Sea	$401
Dixie Valley	$286
Blue Mountain	$282
Neal Hot Springs	$129

BIOMASS PROJECTS	
Rollcast Piedmont Biomass Plant	$208

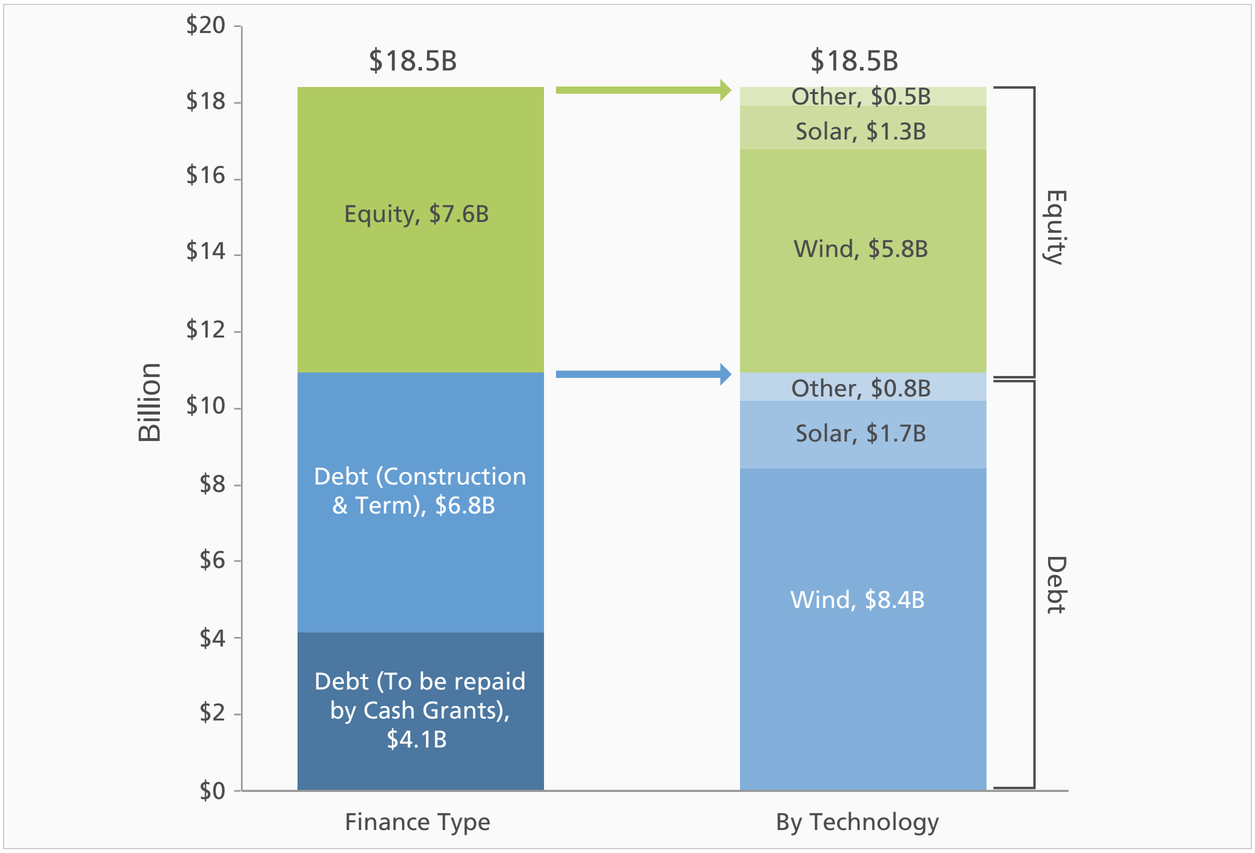
Source: Source: GTM Research

2 KEY FINDINGS

2.1 Hindsight

- In 2010, renewable energy projects secured a total of $18.5 billion in debt and equity capital.

Figure 2-1: U.S. Renewable Energy Project Finance Debt and Equity by Technology in 2010



- From 2009 – 2011, the 1603 Cash Grants provided significant liquidity to renewable project developers by allowing thousands of projects to directly monetize the 30% and 10% Investment Tax Credits ("ITC") , alleviating the need to identify a tax equity partner.
- Since its inception through November 2011, $9.78 billion in 1603 Cash Grants were distributed to 4,254 projects. Assuming private sector investments constituted the remaining ~70% of projects costs, the 1603 Cash Grants catalyzed approximately $22.8 billion in additional investment for a total deployment of approximately $32.6 billion.

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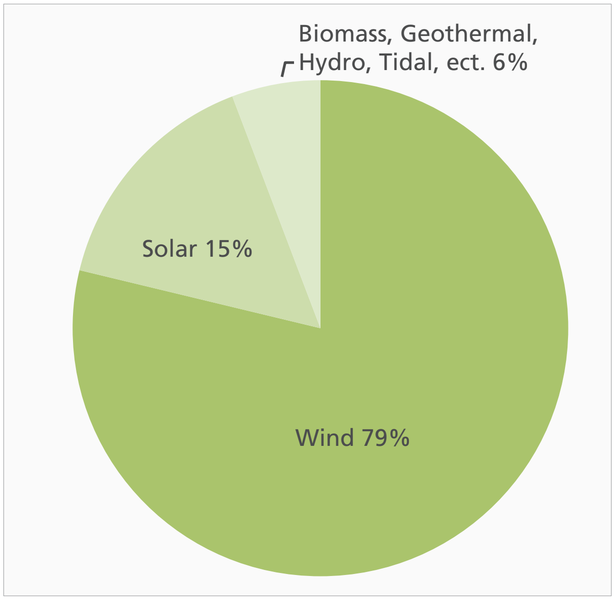
Figure 2-2: Cash Grants Issued Under Section 1603 (Inception in 2009 to November 16, 2011)

Type	# of Projects	Total Amount Awarded ($M)	$M/per Project
Wind	231	$7,704	$33.4
Solar	3,617	$1,512	$0.4
Biomass, Biofuels, Geothermal, Hydro, Tidal, etc.	176	$566	$3.2
Total	4,254	$9,782	$2.3

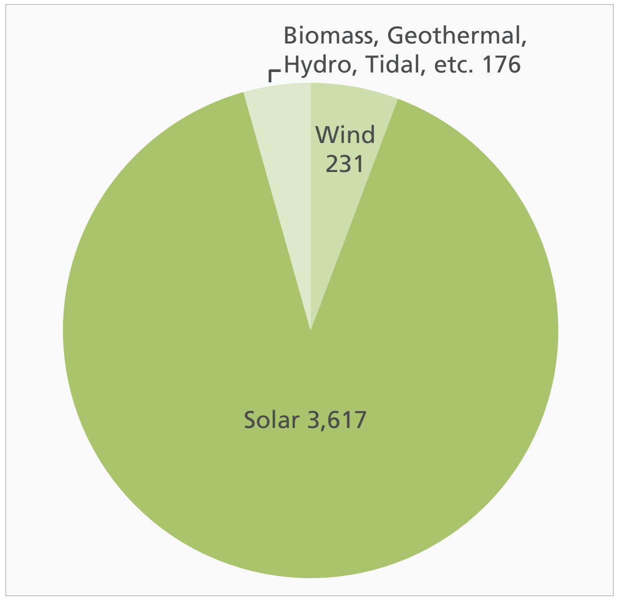
Source: U.S. Department of the Treasury, GTM Research

Figure 2-3: Percentage Awarded by Technology



Source: U.S. Department of the Treasury, GTM Research

Figure 2-4: # of Projects Awarded Cash Grants By Technology



Source: U.S. Department of the Treasury, GTM Research

2.2 Foresight: 2012-2013

2.2.1 Macro Trends

- For 2012-2013, we anticipate the renewable power sector to seek over $90 billion in project financing. We also predict—stipulating significant uncertainty exists for domestic energy policy and global capital markets— the capital demands of renewable projects seeking project financing will continue to grow at a compounded annual growth rate (CAGR) of approximately 16.2% over the next two (2) years, increasing to $41.2 billion in 2012, and $48.9 billion in 2013.

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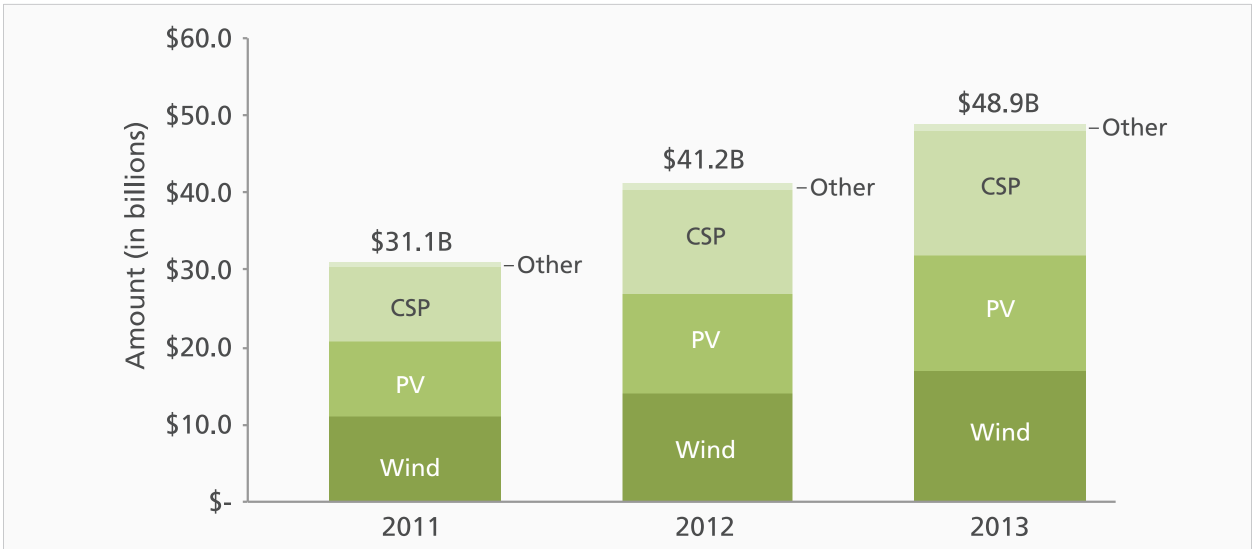
Figure 2-5: U.S. Renewable Energy Project Finance Demand, Estimates 2011-2013



Type	2011	2012	2013
Other	$0.6B	$0.8B	$1.0B
CSP	$9.9B	$13.4B	$16.0B
PV	$9.5B	$12.9B	$15.0B
Wind	$11.2B	$14.1B	$17.0B

Source: GTM Research

- Of the more than $90 billion in anticipated project financing costs sought by large-scale, renewable projects in the U.S. through 2013, the ratios and availability of debt, tax equity, and direct equity in project finance structures will be attributable to several variables, including:
  - Interest rate trends in commercial debt markets,
  - Profitability, financial health—and therefore tax appetite— of institutions providing tax equity, and
  - Congressional legislation (or inaction) related to Federal financing programs and tax incentives.
- High-quality projects sponsored by experienced developers will have signed power purchase agreements (“PPAs”) from credit-worthy off-takers will continue to secure project financing through 2013.
- Project financing constraints are likely to disproportionately impact smaller projects, less established developers, and/or projects with higher technology or regulatory risks.

2.2.2 Tax Equity Market

- The tax equity markets have improved, but are not expected to exceed pre-financial crisis levels of approximately $6 billion by 2013. For the foreseeable future, traditional tax equity investors will continue to demonstrate a reduced tax appetite while new, non-traditional entrants may continue to enter and grow the market.
- New entrants to the tax equity markets from non-financial industries such as oil, technology, and utility companies will experience steep learning curves which will limit their participation, but will continue to investigate investment opportunities in renewable project assets.

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- Tax equity investor participation will be limited to the largest renewable energy projects orproject portfolios. Tax equity investors will conduct protracted diligence on projects to minimize risk exposure, and seek guaranteed or increased returns on their investment as a condition of their continued participation.

2.2.3 Impact of 1603 Cash Grant's Expiration

- The 1603 Cash Grant Program expired on December 31, 2011. Because Congress did not extend this incentive, many more renewable energy projects will be competing for the limited amount of available tax equity. In addtion, tax equity investors are likely to prefer wind projects through 2013, limiting the solar sector's ability to monetize Federal tax incentives.
- A return to the tax equity market will undoubtedly raise renewable project developers' capital costs due to the frictional costs that accompany a more complex transaction. We estimate that the cost of third party tax equity participation will add approximately 300 to 800 basis points (bps) to project capital costs.
- Solar Projects:
  - The 1603 Cash Grants expiration would negatively impact the solar sector to the largest degree, as we estimate over 65% of projects planning to commence in 2012-2013 would be solar energy systems.
  - If, at some point during 2012, Congress does extend the 1603 Cash Grants beyond 2011, we believe the solar sector will be the primary beneficiary of the program's continuation. An extension of the 1603 Cash Grant has been predicted to catalyze an additional 2 – 7.4 GW in installed capacity through 2016. (SEIA, 2010)
  - With 85% of Concentrating Solar Power (CSP) projects expected to seek project financing through 2013 exceeding ≥100 MW of nameplate capacity, the 1603 Cash Grants would enable project developers to secure financing that otherwise might not be available if only the ITC were available.
- Wind Projects:
  - Based on onshore, utility-scale wind developer's relatively lower participation in the 1603 Cash Grant program compared to other technologies, we do not expect the program's expiration to heavily impact the pipeline of wind projects in the United States in 2012. Based on project economics, 25% of wind projects today with a choice between electing the cash grant or the PTC still utilize the underlying tax incentive over the cash grant.
  - An extension of the 1603 Cash Grants could potentially be of greater significance to the nascent U.S. offshore wind industry. However, given the current regulatory uncertainty facing developers, it is unclear if even a one year extension of the 1603 Cash Grant program could provide the policy certainty necessary to utilize the incentives.
  - The expiration of the wind PTC at the end of 2012 is a much more pressing policy issue to the onshore wind industry. In the absence of legislative action, the Federal government would no longer provide any tax incentives to utility-scale, onshore wind projects after 2012.

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3 OVERVIEW: RENEWABLE PROJECT FINANCE

Both renewable power generation and biofuel project developers often finance projects using an asset-based financing structure commonly referred to as project finance. Project developers have preferred project financing structures either because: (a) funding projects entirely on a corporate balance sheet is an economically unfeasible or suboptimal approach, and/or (b) independent power projects present a more attractive investment as a stand-alone project. From an investor's perspective, the primary factors influencing where a project will be financeable are:

- Projected future cash flows
- Commercial terms and creditworthiness of the power purchase agreement ("PPA") or off-take agreement
- An engineering, procurement and construction ("EPC") contract
- Perceived technology risk
- Availability of Federal & State tax and non-tax incentives.

A common development milestone renewable energy project developers must reach to secure any amount of project financing is a signed long-term PPA for power, or an off-take agreement for biofuels. Projects without PPAs maybe financeable, but at lower leverage ratios, higher debt costs, and only for select projects developed by experienced developers with a proven track record of managing market risk. Biofuels projects without off-takes are virtually not financeable.

3.1 Corporate Structure

In a typical project finance structure, debt and equity are provided directly to a company formed solely for the purpose of developing a renewable energy project, rather than to a project sponsor (e.g., parent company) or other equity investor. The project company is typically a limited-liability company (LLC) or, in some cases, a limited partnership (LP) owned by project equity investors.

A project company holds title to all of a project's assets, is entitled to a project's available Federal & State tax incentives, and is liable for contractual rights and obligations arising out of project activities. As an LLC or LP, equity investors are shielded from personal liability should the project fail to meet its loan servicing obligations, or other events triggering a default.

For debt providers extending credit to a project company, project-level loans are non-recourse or limited recourse in nature, meaning project debt is secured generally by the project's assets (collateral), and paid off by the project's cash flow. Non-recourse lenders are entitled only to repayment from the profits of the project and in the event of default have virtually no ability to pursue non-project assets owned by the developer and other equity investors.

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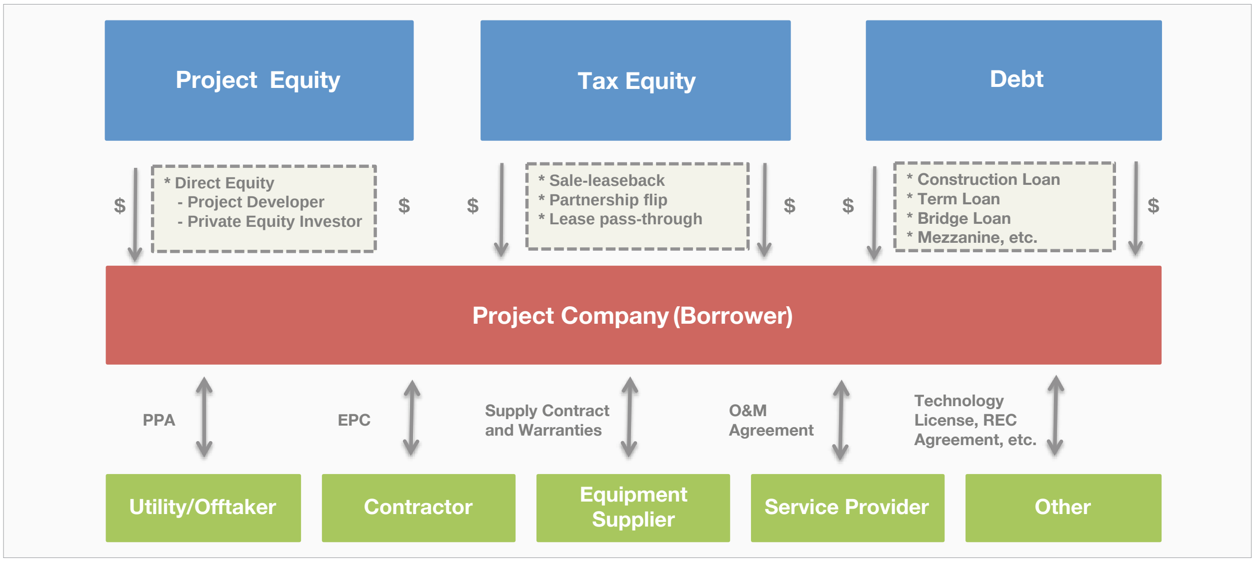
Figure 3-1: Typical Project Finance Structure for Renewable Energy in the U.S.



Source: GTM Research

3.2 Capital Formation

Although historically ad hoc and varying project by project, U.S. renewable energy projects generally rely upon a combination of four different sources of capital:

- Direct Equity
- Tax Equity
- Project Debt
- Non-Traditional Sources.

Based on robust data collected via public filings, press releases, project focus articles, and discussions with banks and developers, we assess the current market rates and returns required by those capital providers to invest in U.S. renewable energy projects.

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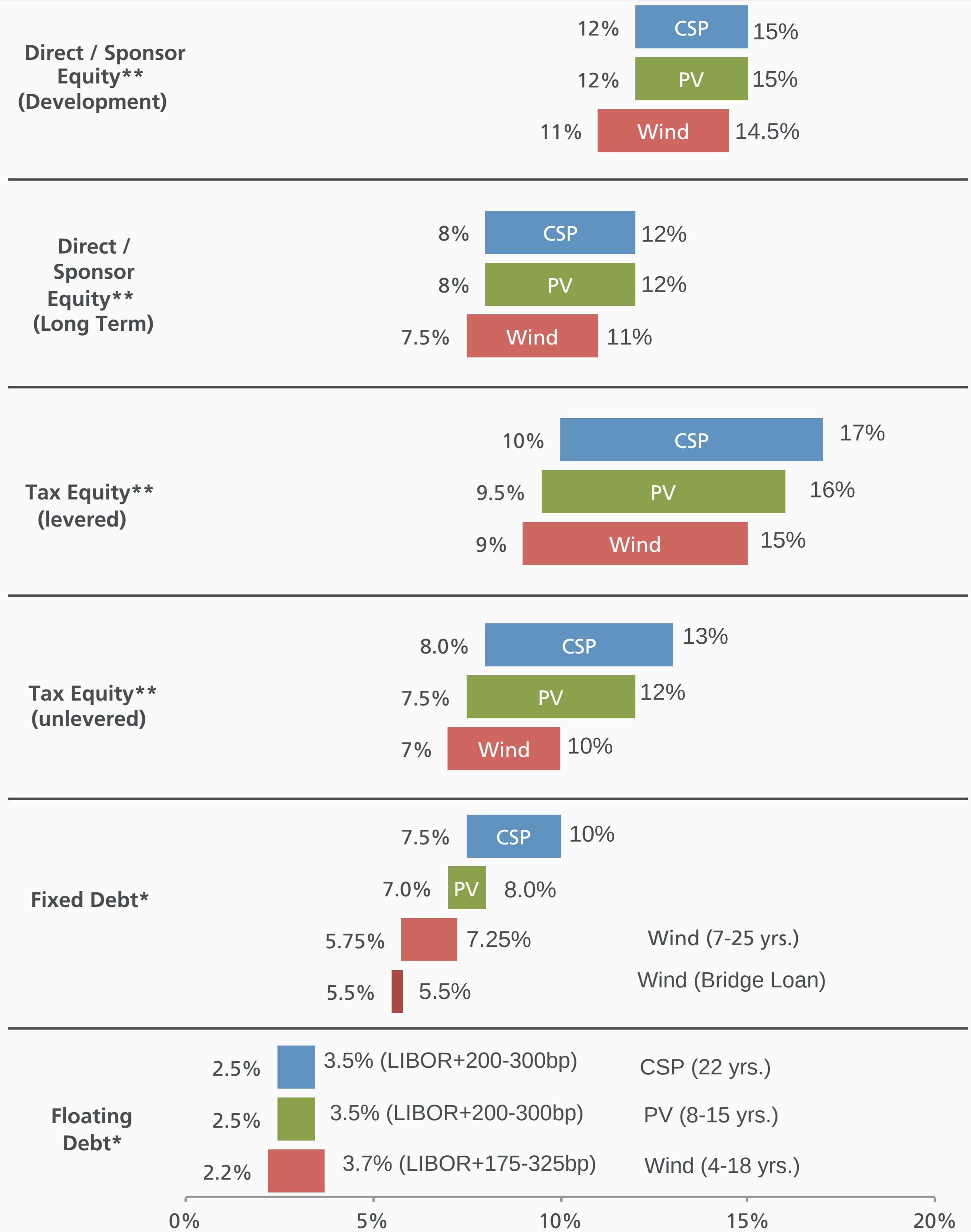
Figure 3-2: Estimates of Current Debt and Equity Terms



* Debt has an upfront fee of 200-275bp
** Equity returns are after-tax. Tax equity investors may also request a small, e.g., 2% annual cash return in addition to tax credits.

Source: GTM Research, Dealogic, Project Finance Magazine

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3.2.1 Direct Equity

A component of essentially all project financings, project equity ("cash equity" or "private equity") is invested by project sponsors as well as other private equity investors. Generally, direct equity investors provide a specified amount of capital in a project in return for a share of the project's future cash flows.

The amount of equity provided by a project sponsor's equity contribution will depend on a projects sponsors' financial strength and the scope of participation by other debt, tax equity, and equity providers.

3.2.1.1 Terms & Availability

Expected returns vary widely for direct equity investors who may accept lower returns in order to secure PPAs — the typical condition precedent to securing other sources of capital.

Currently, hurdle rates (the required rate of return on investment) for direct equity participants in renewable energy projects are largely contingent on project size and type of technology deployed.

Figure 3-3: Direct Equity Investor Hurdle Rates for Renewable Energy Projects by Technology

Project Technology	Hurdle Rate
Onshore Wind	7.5 -10%
Solar: PV & CSP	8.0 -15%
Geothermal	10 - 15%
Biopower & Biofuels	
Energy Storage	

The lower bound for direct equity returns is typically associated with larger projects using proven technologies and attracting numerous equity investors competing to participate. Smaller projects or projects using more nascent technologies with higher perceived investor risk (due to lack of operational track record and technology performance) would command returns approaching the upper hurdle rate bound.

3.2.1.2 Market Trends

The single largest direct equity investment in 2010 was an $835M equity contribution from an undisclosed foreign investor in the CanTex wind development in Texas. The second and third largest equity investments were project developers taking significant equity positions in their own projects – Spanish-based Abengoa invested over $500M its Solana CSP plant in Arizona, and Caithness invested $351M in its Shepherds Flat wind project in Oregon which when placed in service will be the largest wind project in the world.

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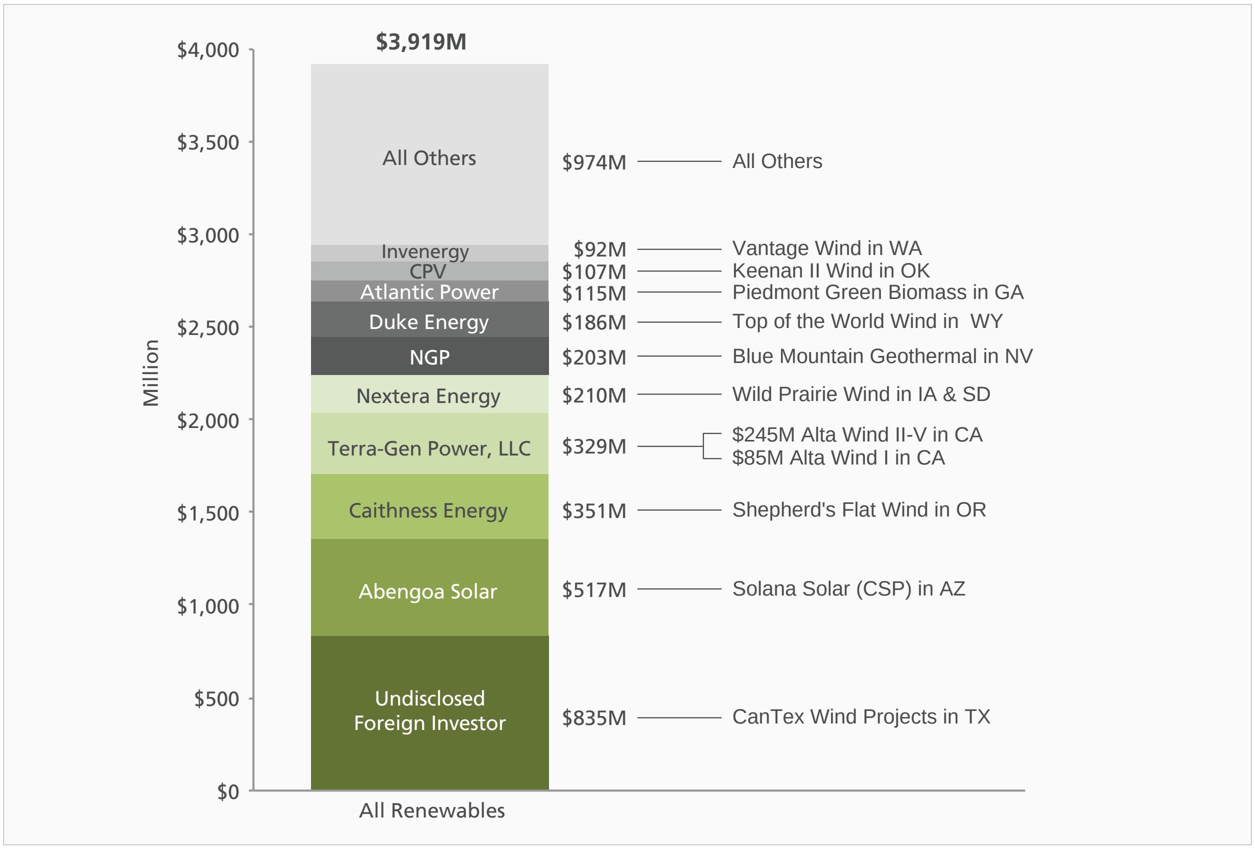
Figure 3-4: Top 10 Providers of Direct Equity to Renewables Projects in 2010



Source: GTM Research, Project Finance Magazine

3.2.2 Tax Equity

A tax equity market exists because the renewable energy industry does not often possess a significant level of tax liability—a prerequisite to fully realizing the maximum value of the primary Federal policy support mechanisms for renewable energy - tax incentives.

To overcome tax inefficiencies resulting from the disconnect between Federal policy mechanisms and targeted beneficiaries, renewable energy project developers often construct project financing models to attract participation by third-party tax equity partners who—due to their large tax liabilities (appetite) —are better positioned to utilize Federal tax benefits accruing to renewable energy projects under current Federal tax policies. Such an arrangement provides a structure in which renewable energy project developers may leverage their tax incentive as a capital formation tool, while an investor with a large tax appetite may gain access to an additional tax incentive to reduce their corporate liabilities.

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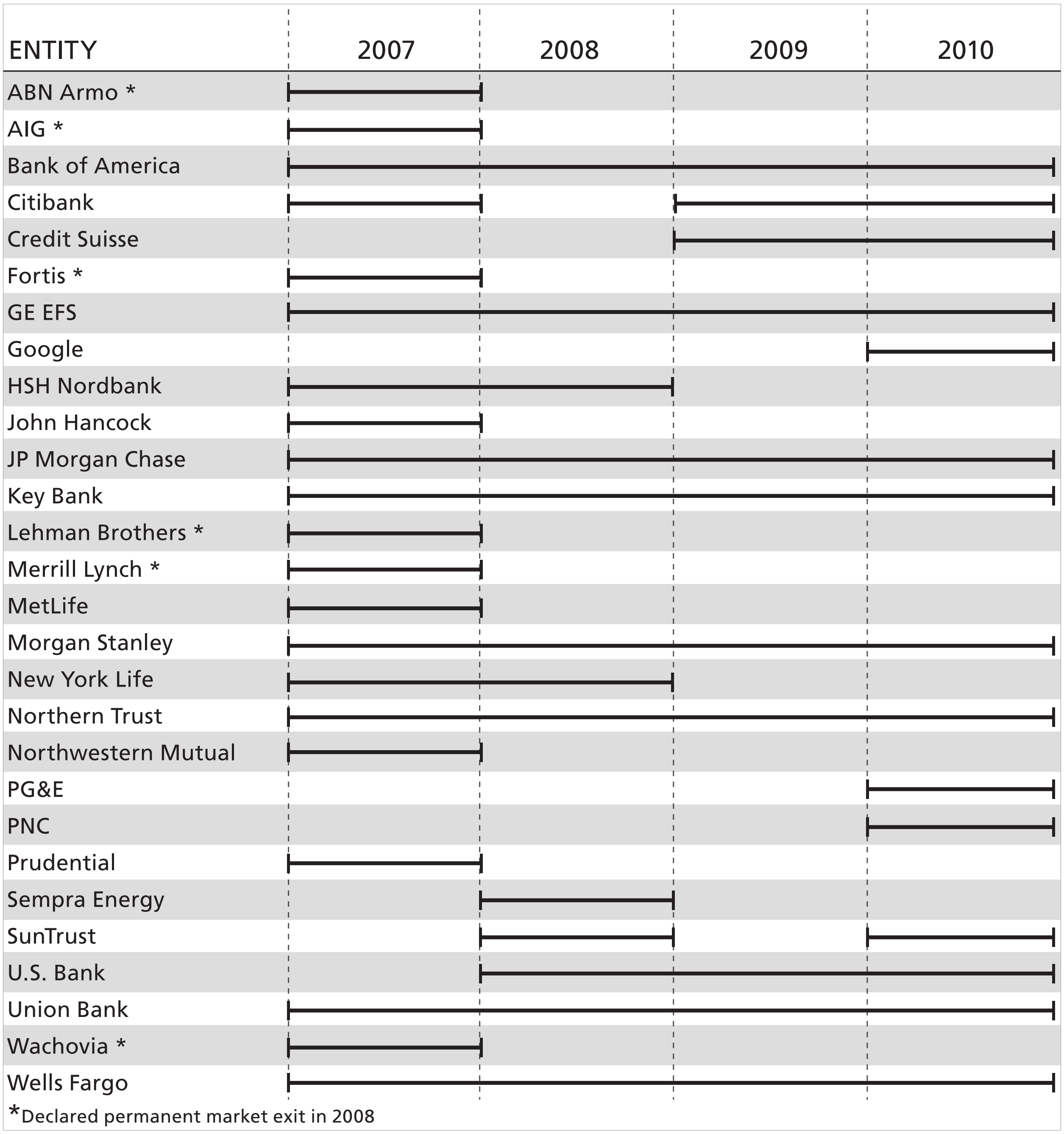
The tax equity market is comprised of a limited number of large financial institutions such as investment banks, commercial banks and insurance companies seeking to offset some portion of their expected tax liability. Therefore, the tax equity market for renewable energy project developers is largely dependent on the economic health and tax appetite of a small percentage of the largest financial institutions.

Figure 3-5: Active Players in the U.S. Tax Equity Market for Renewable Energy by Year



Source: U.S. PREF

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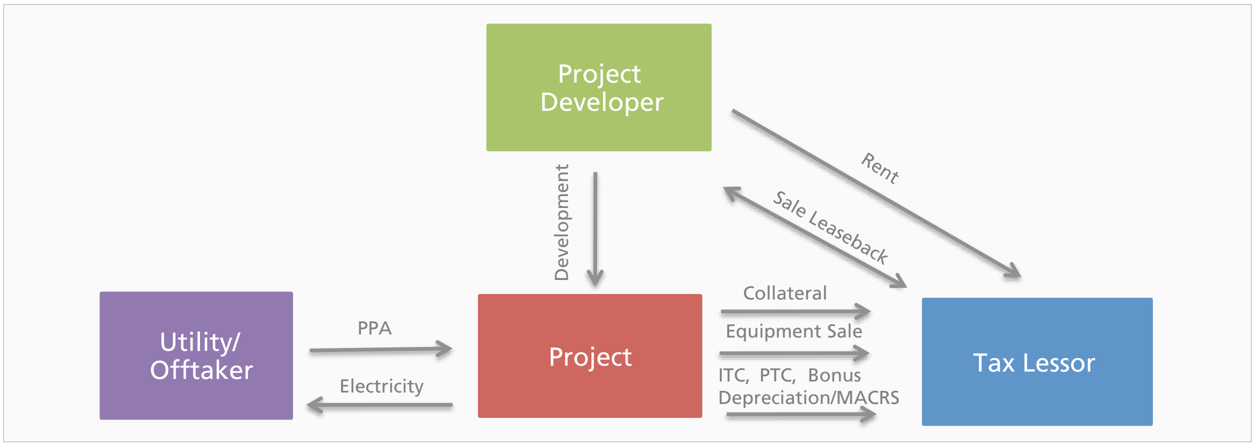
3.2.2.1 Tax Equity Financing Structures

The two most commonly used tax equity financing structures for renewable energy projects in the U.S. are (a) the sale-leaseback model, and (b) the partnership-flip model.

A. Sale-Leaseback Model.

Figure 3-6: Typical Sale-Leaseback Model



Source: GTM Research

In a sale-leaseback project financing structure, a renewable energy project developer will finance and construct a project, then arrange to sell the equipment eligible for Federal tax incentives to a third party tax-equity partner at fair market value ("FMV") within 90 days of the project being placed in service.

After executing the sale, the tax-equity partner— now holding title to the renewable energy equipment—leases the equipment back to the developer at a fixed rent for a period equal to or exceeding the PPA or off-take contract.

The developer (now a leasee) continues to operate the project, and uses project revenues to repay the rent owed to the tax-equity partner (now a lessor) for leasing the equipment. At the end of the lease term which is typically longer than 15 years for renewable power projects, the tax equity investor (lessor) has the option to retain ownership of the project equipment, or sell it to the developer at its fair market value.

A sale-leaseback project finance structure model can be mutually beneficial to both the project developer and the tax equity investor. For the tax equity investor, owning title to the renewable energy project equipment entitles that entity to claim all available Federal tax incentives and environmental attributes (e.g., renewable electricity credits) associated with the project, offsetting other tax liabilities incurred by the entity during the fiscal year and generating another source of revenue through direct or indirect participation in various renewable energy credit ("REC") markets. For the project developer, a sale-leaseback structure affords the developer an ability to recoup its entire equity investment in a project, plus a development fee, when the project is placed in service.

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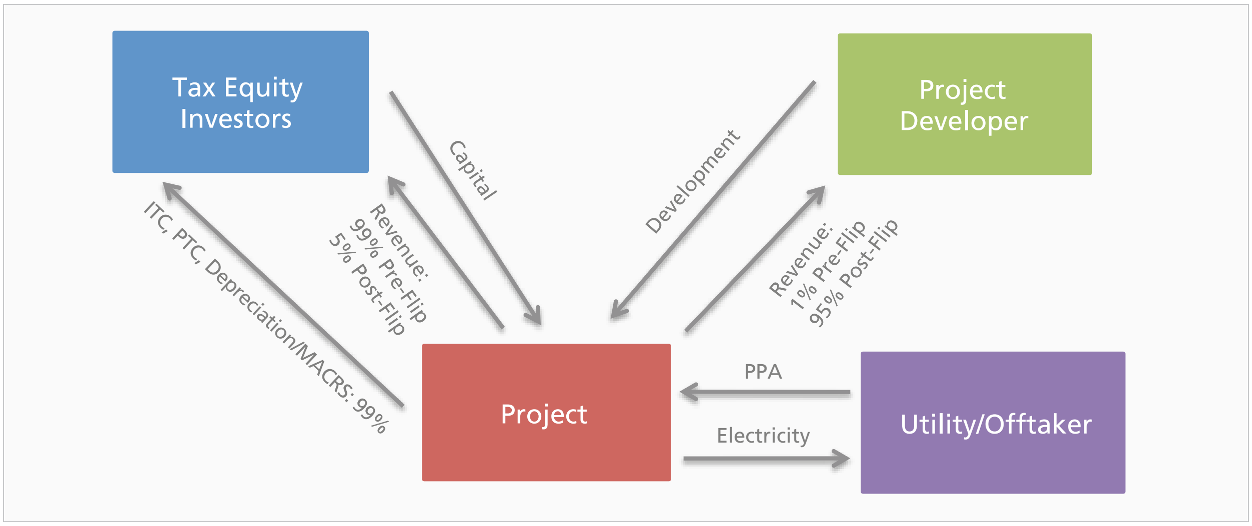
B. Partnership Flip-Model.

Figure 3-7: Partnership Flip Model Under IRS Safe Harbor



Source: GTM Research

In a partnership-flip model, a project developer and tax equity investor create, capitalize, and co-own a special purpose entity formed to build and operate a renewable energy project. This entity is usually a partnership, which collects all project cash flows revenue and tax benefits.

At the outset of a partnership-flip venture, the tax equity investor makes a disproportionately larger equity investment in the partnership (99%) in exchange for all near-term project revenues and Federal tax incentives generated by the project. The distribution of future revenues and tax credits from the partnership to the tax equity investor, project sponsor, and other investors is negotiated on a project-by-project basis, and can vary significantly.

In all partnership-flip structures, the tax equity investor will require a certain internal rate of return ("IRR") for his participation, often designed to be achieved at the point in time when all known, available Federal tax incentives to a project have been realized. Once the tax equity investor realizes the negotiated IRR, the allocation of the project's cash flows "flips", and the developer is allocated the majority (~95%) of project revenues realized by the partnership vis-à-vis the negotiated PPA agreement.

After the partnership flips, the project developer often holds an option to buy out the tax equity investor's remaining post-flip equity stake (~5%) at fair market value, positioning the developer to realize all future project revenues free and clear of the tax equity investor.

3.2.2.2 Terms & Availability

The three primary project characteristics that will determine the availability of tax equity are project:

- Size
- Technology maturity
- Gearing ratios (debt to equity ratios commonly referred to as project leverage).

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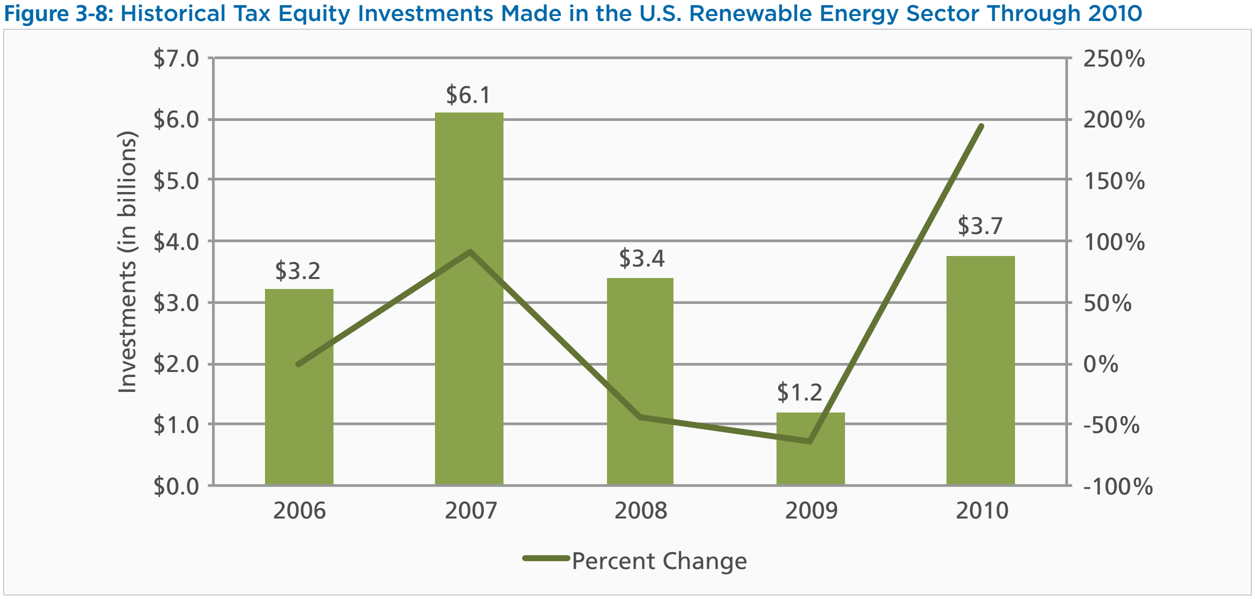
Tax equity yields are primarily market driven, although some correlation between commercial interest rates and tax equity yields exists. Additionally, tax equity investors also may seek a small, (~2%) annual cash return on top of revenues generated from monetizing Federal tax credits.

U.S. tax equity supply for renewable energy projects essentially disappeared in late 2008, but has begun to experience a resurgence as institutional banks return to profitability and reaching $3.7 billion in 2010. While this growth trend is a positive, tax equity capacity remains far below pre-crisis levels which peaked at $6.1 billion. Near-term capacity constriction can be attributable to creation of the 1603 Cash Grant Program in 2009.

Figure 3-8: Historical Tax Equity Investments Made in the U.S. Renewable Energy Sector Through 2010



Source: U.S. PREF, GTM Research

Leveraged projects incorporating project-level debt increase the cost of tax equity capital by 200-500 bps, and reduce a project's ability to attract investor participation. Projects with higher gearing ratios present a higher risk profile to tax equity investors, as lenders stand are in a senior position in the event of a default.

Figure 3-9: Tax Equity Rates of Return Spreads

Project Technology	Unleveraged Hurdle Rate	Leveraged Hurdle Rate
Onshore Wind	7.0 -10%	9.0 -15%
Solar: PV & CSP	7.5-13%	9.5-18%
Geothermal	10-12%	12-17%
Biopower & Biofuels		
Energy Storage		

Source: GTM Research

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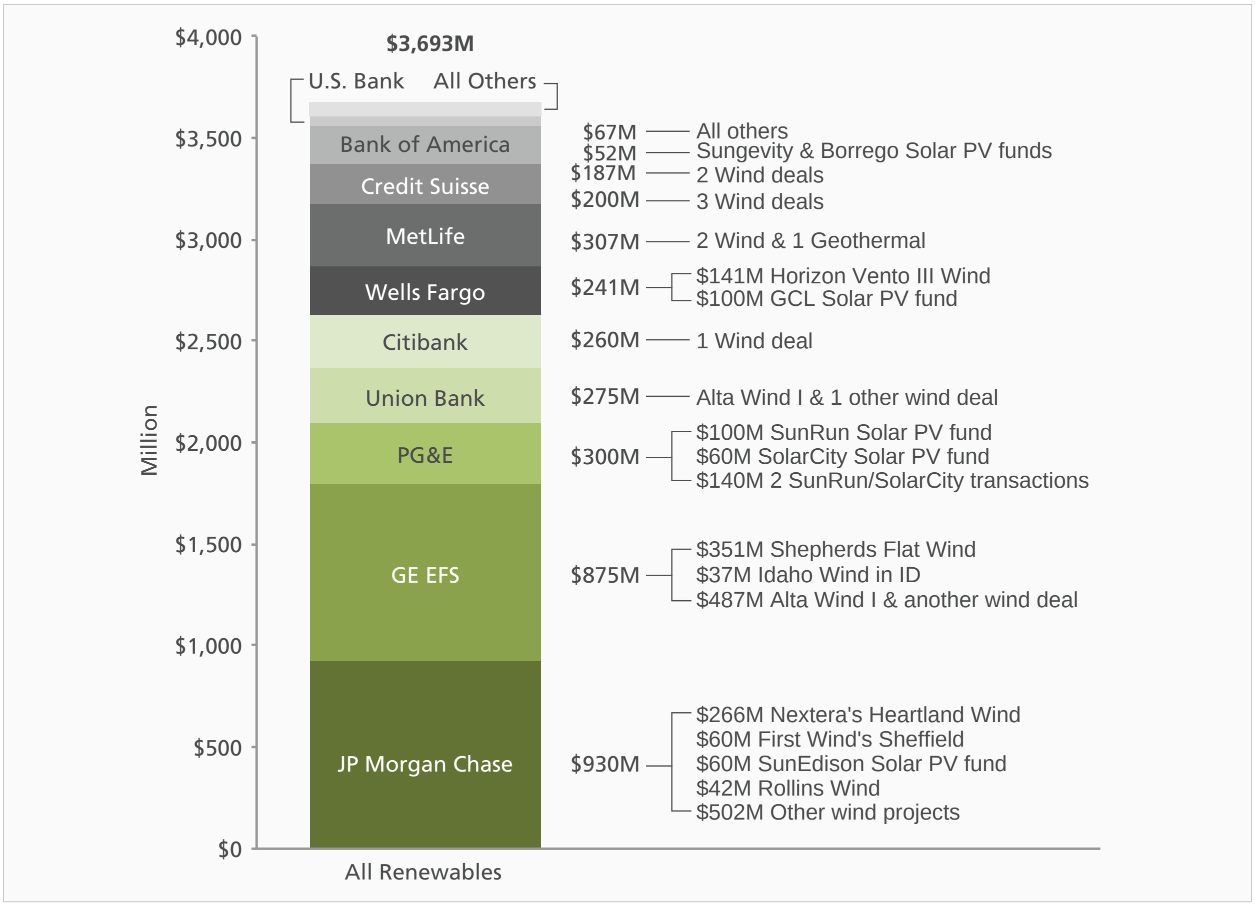
3.2.2.3 Market Trends

Approximately nine (9) established, and sixteen (16) total, tax equity investors continue to actively pursue deals, primarily in the U.S. wind market. The number of players has decreased considerably during the financial crisis as a result of insolvencies, bankruptcies consolidations, and weakened tax bases.

However, profitable non-financial services companies in conventional energy, industrial, and utility sectors are beginning to enter or consider entering the tax equity market. The most notable market entrant was Google, whose entrance to the tax equity market marked a departure from Google's historical renewable investment strategy, which has been focused on equity investments in early stage companies.

For wind projects using proven technologies, tax equity is fairly accessible. However, securing tax equity for projects deploying either PV or more advanced solar technologies is more difficult. In particular, smaller projects requiring less than $100 million of tax equity will experience the most difficulty in securing such financing.

Figure 3-10: Figure III 10: Top 10 Providers of Tax Equity to U.S. Renewables in 2010



Source: GTM Research, Project Finance Magazine

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A. Institutional Investors

The number of traditional tax equity investors is likely to remain limited over a near to medium-term time frame. The existing tax equity market is niche, and only appeals to a small number of large, profitable institutions with large tax liabilities. Finally, the potential expiration of the PTC for onshore wind in 2012 — the most common type of project involving tax equity investors — would significantly impact the size of the tax equity market.

B. Non-Traditional Investors

Technology companies and utilities represent the newest interest in the tax equity market for renewable projects. Google's entrance into tax equity is a positive indicator, but insiders question the speed with which non-traditional tax equity investors will enter the market—new entrants have a high learning curve, limiting initial investments.

Google's total investment in renewable energy projects now exceeds $700 million, with the majority of their participation as a tax equity investor. The company's initial foray into the market occurred in 2010, with a $40 million tax equity play in two wind farms developed by NextEra Energy Resources in North Dakota. Then, it invested $168 million into BrightSource's Ivanapah Solar Plant, DOE's first renewable project loan guarantee recipient.

Utilities such as Duke Energy, Pacific Gas and Electric (PG&E), and Southern California Edison (SCE) are increasingly opting to own renewable energy projects themselves. This trend is largely attributable to amendments to the PTC/ITC eligibility made by the Recovery Act in 2009, increasing the appeal of developing projects on their own balance sheet.

Companies like Google and utilities like PG&E also are gravitating toward a business model in which they capitalize funds to provide debt financing for distributed, solar residential solar systems. These tax equity funds serve as debt financing facilities for solar installers like SunRun, Sungevity, and SolarCity. The solar market is poised for significant growth due to the policy stability of the solar ITC through 2017, and the significant drop in PV prices over the last two years.

However, exiting barriers to other non-institutional investors (i.e., "passive-loss" and "at-risk" rules) will persist, and discourage high-net worth individuals with large tax appetites from participating in tax equity partnerships because they cannot directly on their personal income taxes.

3.2.3 PROJECT DEBT

Project debt is supplied by a bank or syndicate of banks or other financial institutions, which is lent against the expected future cash flow of a project, and secured only by project assets associated with the loan.

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Figure 3-11: Main Players in the U.S. Debt Market for Renewable Energy

2007	2008	2009	2010
Banco Santander	Banco Espirito Santo	Banco Espirito Santo	Banco Santander
Bayern LB	Banco Sabadell	Banco Santander	Bank of Montreal
BBVA	BBVA	BNP Paribas	Barclays
Dexia	BTMU	BTMU	BBVA
Fortis	Calyon (Credit Agricole)	Calyon (Credit Agricole)	BTMU
HSH Nordbank	Citibank	CoBank	Caja Madrid
JPMorgan Chase	Dexia	Credit Suisse	Citibank
Mizuho	HSH Nordbank	Dexia	Credit Agricole
Natixis	ING	Helaba	Credit Suisse
Nord/LB	Lloyds TSB	HSH Nordbank	Deutsche Bank
Prudential	Morgan Stanley	John Hancock	Dexia
RBS	Nord/LB	Key Bank	Helaba
Union	Prudential	LBBW	ING
	RBS	Lloyds TSB	John Hancock
	Scotia Bank	Nord/LB	Key Bank
	UniCredit	Prudential	LBBW
	Union	RBS	Morgan Stanley
		Scotia Bank	Natixis
		Societe Generale	Prudential
		UniCredit	Rabobank
		Union	RBS
		WestLB	Societe Generale
			UniCredit
			Union
			WestLB
			=Non-US entity

Source: U.S. PREF

3.2.3.1 Loan Characterization

Debt packages vary by project size and technology, but most renewable power generation projects incorporate one or more of the following debt components:

A. Construction Loans

Construction loans are generally disbursed in several installments triggered by certain project milestones. Over the term of the construction loan, the borrower makes interest-only payments from borrowed funds. When construction is complete, the entire loan matures. In some cases, construction loans will convert to term loans once the project achieves commercial operation. Construction loan interest rates are generally higher than term loans because investor risk prior to commercial operation is typically higher than after a project is placed-in-service.

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B. Equity Bridge Loans

Furnished by debt or equity investors until a project's primary source of capital is secured, equity bridge loans are short-term credit arrangements which provide financing enabling projects to proceed through their construction phase. Once a developer receives the identified capital, the bridge loan is repaid. Equity bridge financing spreads are similar to construction debt spreads, and have grown in popularity and significance since the inception of the 1603 Cash Grant program in 2009. Because Treasury disburses cash grants covering 30% of a project's eligible costs within 60 days after the project is placed in service, developers have utilized equity bridge loans to finance construction costs prior to receipt of the cash grant.

C. Term Loans

Project finance term loans are securitized commercial loans with project assets serving as collateral. Term loans typically have floating rates based on a spread above LIBOR, with monthly or quarterly repayment schedules. Term loans for renewable energy projects require long tenors ranging between 10-20 years, although banks have been reluctant to extend loans with such long tenors.

3.2.3.2 Terms & Availability

Tenors on term debt can range widely depending on the technology employed and the firms involved. Term loan tenors contracted significantly following the financial crisis, but have started to lengthen again.

Project debt continues to be available for high-quality wind and solar PV projects, while remaining more difficult for CSP technologies due to higher associated technology and resource development risks. Best-in-class developers and projects can obtain project debt for CSP projects. However, project developers in 2010 relied primarily on government-guaranteed debt to finance large CSP projects. Term debt interest rate spreads for wind projects trended downward in 2010 and early 2011 as the debt markets continue to thaw, but still require an upfront fee of 200-275 bps.

Figure 3-12: Floating & Fixed Project Debt Rates by Technology

Project Technology	Floating Rate LIBOR +	Fixed Rate
Onshore Wind	1.75-3.25%	5.5-7.25%
Solar: PV & CSP	2.0%-3%	7.0-10%
Geothermal	3.25%	n/a

Source: GTM Research, Dealogic, Project Finance Magazine

3.2.3.3 Market Trends

Due to market maturity and favorable policy schemes abroad, foreign banks—particularly European banks and insurance companies—represent the majority of U.S. renewable project lenders. Other than U.S. Government financing, only six (6) of the 26 primary renewable energy private sector lenders inactive in the market during 2010 were U.S financial institutions.

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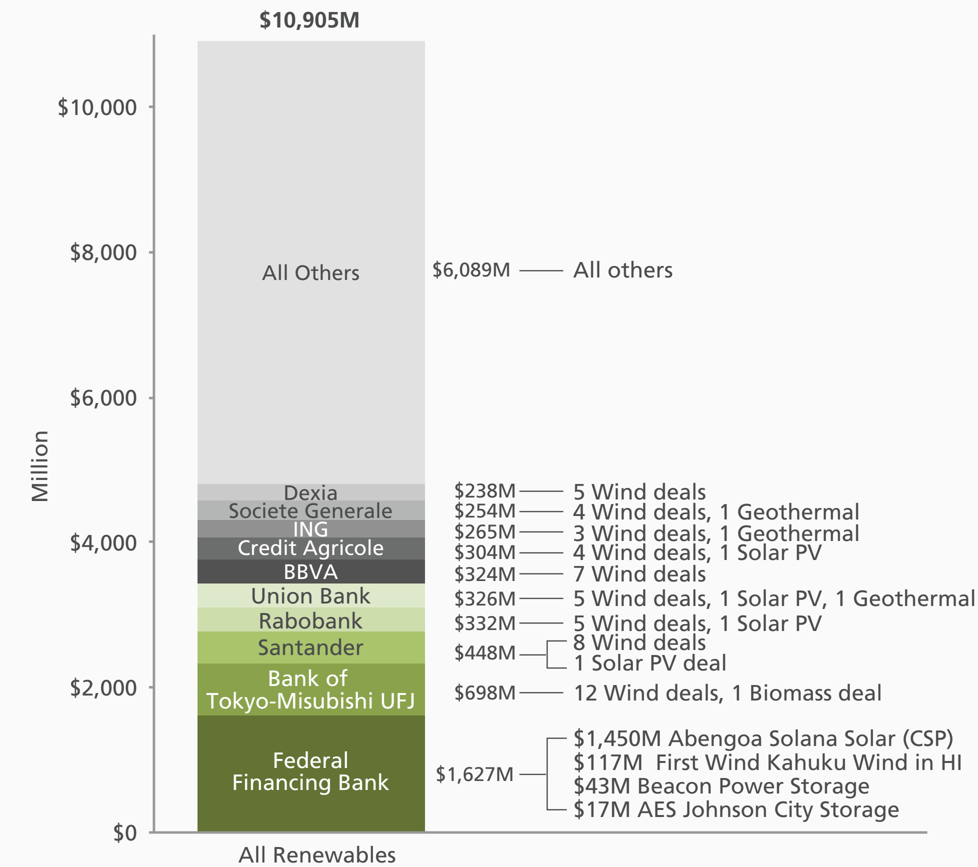
Figure 3-13: Top 10 Project Debt Providers to U.S. Renewnable Energy Projects in 2010



Source: GTM Research, Project Finance Magazine

However, the number of domestic lenders to renewable energy projects has increased in recent years, filling a financing gap formed as European banks scaled back their exposure in U.S. markets. In particular, Union Bank, a wholly owned subsidiary of The Bank of Tokyo-Mitsubishi UFJ (BTMU), recently has provided significant debt financing for U.S. renewable energy projects.

Finally, the largest single provider of debt to renewable energy projects is the United States government. The U.S. Department of Energy and the U.S. Treasury's Federal Financing Bank have supplied more than $40 billion to renewable power generation, manufacturing, transmission, and storage projects through loans and loan guarantees since 2009.

3.2.4 Non-Traditional Financing Structures & Instruments

Several other niche financing structures and instruments are available in the commercial market for renewable energy projects such as tax-exempt bonds, private placement bonds, mezzanine debt, and energy savings performance contracts. While this report focuses on traditional project finance structures, a short description of one non-traditional capital pool—tax-exempt bonds—is discussed below.

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Tax-exempt entities such as municipalities, local governments, and utility co-operatives who cannot take advantage of tax credits have utilized Clean Energy Renewable Bonds ("CREBs") until the program expired in November 2010. The list of qualifying technologies was generally the same as that used for the federal renewable energy production tax credit ("PTC").

The borrower (a public entity) pays back only the principal of the bond at maturity, and the bondholder receives federal tax credits in lieu of the traditional bond interest. The tenor of a CREB is between 15-16 years. The "tax credit" received by the bondholder is calculated by Treasury. It is based on a formula that would permit issuance of such bonds without discount and interest cost to the issuer (e.g., public entity).

Treasury determines rates for CREBs based on general assumptions about credit quality of the class of potential eligible issuers and other factors such as general credit market yield indexes. In practice, Treasury has applied a 70% discount rate on yield estimates for outstanding bonds with investment grade ratings between "single A" and "BBB" for bonds of a similar maturity.

In March 2010, Congress allowed CREB issuers to irrevocably elect to receive a direct payment from the Treasury, instead of issuing tax credits to bondholders. Bondholders now would receive a taxable interest payment (paid by the subsidy) in lieu of a tax credit. The latest round of CREBS authorized in 2009 under the Recovery Act had a "volume limit" of $2.4 billion, which has been allocated fully based on a statutorily prescribed formula.

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4 FEDERAL TAX INCENTIVES & PROGRAMS

4.1 Investment Tax Credit ("ITC")

Owners of commercial renewable energy generating can receive an investment tax credit for eligible business expenditures related to the development of qualified renewable energy facilities based upon nameplate capacity, placed in service date, and technology. The ITC ranges from 10% to 30%, and applies to solar electricity and thermal technologies, small wind (<100 kW), geothermal electricity and thermal technologies, microturbines, fuel cells, combined heat and power. The credit expires at the end of 2016 for all technologies, except for solar, wind, and geothermal technologies, which have no expiration date.

Figure 4-1: ITC by Technology

RESOURCE TYPE	ITC AS A % OF BASIS	MAXIMUM INCENTIVE	MINIMUM / MAXIMUM SIZE	PLACED IN SERVICE DEADLINE
SOLAR (WATER & SPACE HEAT, THERMAL ELECTRIC, PV)	30%			12/31/16
FUEL CELLS	30%	$1,500 PER 0.5 KW	0.5 KW OR GREATER	12/31/16
SMALL WIND	30%		100 KW OR LESS	12/31/16
GEOTHERMAL (ELECTRIC, HEAT PUMPS, DIRECT-USE)	10%			12/31/16
MICROTURBINES	10%	$200 PER KW	2 MW OR LESS	12/31/16
CHP/COGENERATION	10%		50 MW OR LESS	12/31/16

Source: GTM Research, DSIRE

4.2 Production Tax Credit (PTC)

Owners of commercial renewable energy generating assets are eligible to receive a 1.1 - 2.2 ¢/ KWh of electricity produced for 10 years after the facility is placed in service. Eligible technologies include wind, solar, geothermal, landfill gas, qualified hydropower, marine and hydrokinetic technologies, open and closed-loop biomass, and municipal solid waste technologies. PTC eligibility is limited by size in some instances (open-loop biomass and marine & hydrokinetic < 150 kW). The credit expires at the end of 2012 for wind, and the end of 2013 for all other PTC-eligible technologies.

Figure 4-2: PTC by Technology

Resource Type	Eligible In-Service Dates	PTC Ammount
Wind	1/1/2009-12/31/12	2.2¢/kWh
Closed-Loop Biomass	1/1/2009-12/31/13	2.2¢/kWh
Open-Loop Biomass (150 kW or larger)	1/1/2009-12/31/13	1.1¢/kWh
Geothermal	1/1/2009-12/31/13	2.2¢/kWh
Landfill Gas	1/1/2009-12/31/13	1.1¢/kWh
Municipal Solid Waste	1/1/2009-12/31/13	1.1¢/kWh
Qualified Hydro	1/1/2009-12/31/13	1.1¢/kWh
Marine & Hydrokinetic (150 kW or larger)	1/1/2009-12/31/13	1.1¢/kWh

Source: GTM Research

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4.3 Accelerated Depreciation (MACRS) & Bonus Depreciation

In addition to the ITC or PTC, renewable energy project developers also can utilize accelerated depreciation schedules for qualifying renewable energy equipment authorized under the tax code. Further, in 2010, Congress passed legislation providing “bonus” depreciation for certain qualifying renewable energy equipment.

4.3.1 Accelerated Depreciation

Accelerated depreciation allowances are provided under the modified accelerated cost recovery system (“MACRS”) for investments in certain energy property. Generally, 95-100% of solar, wind, microturbines, geothermal, CHP, and fuel cell property have permanent, 5-year depreciation schedules under the existing MACRS. Taxpayers must reduce their basis in property by ½ the value of the ITC/1603 Cash Grant, but no reduction is required for projects electing the PTC. Therefore, 85% - 100% of property can benefit from accelerated depreciation.

MACRS provides a significant tax benefit to renewable energy developers. It reduces a project’s taxable income considerably in the first six (6) years of operation and thus improve the project’s overall return on investment. However, developers have not typically used accelerated depreciation to reduce their own tax liability. Instead, they have monetized this incentive in conjunction with other Federal tax incentives to secure capital provided by tax equity investors.

Lawrence Berkeley National Lab (LBNL) estimated that prior to the Recovery Act, accelerated depreciation represented up to 25-27% of installed project costs (in conjunction with either PTC/ITC election), but only 6.8% - 12% of which is due to acceleration (LBNL, 2010). Even after enactment of the 1603 Cash Grant Program, project developers continued to monetize accelerated depreciation to secure additional debt financing in the tax equity markets.

4.3.2 Bonus Depreciation

Since 2008, Congress has authorized, amended, and reauthorized bonus depreciation allowances for qualifying renewable energy property on multiple occasions—and sometimes retroactively—allowing 50% - 100% bonus depreciation during the first year of operation (after reducing the value of ITC/1603 Cash Grant). For eligible projects placed in service before September 8, 2010, the bonus was 50%, and for projects through the end of 2010, project developers could fully depreciate 100% of a project’s adjusted tax basis in the first year of operation.

4.4 Department Of Energy Title XVII Loan Guarantee Program (Section 1703) Program

Section 1703 of Title XVII of the Energy Policy Act of 2005 authorized the Department of Energy (due) to provide financial support in the form of loan guarantees for innovative clean energy technologies that avoid, reduce, or sequester air pollutants or anthropogenic emissions of GHG gases, including: biomass, hydrogen, solar, wind/hydropower, nuclear, advanced fossil energy coal, carbon sequestration practices/technologies, electricity

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delivery and energy reliability, alternative fuel vehicles, industrial energy efficiency projects, and pollution control equipment. Under the Title XVII program, DOE characterizes technologies with more than three (3) implementations or operating for more than five (5) years in the United States and "commercial", and therefore not eligible for a loan guarantee under the Section 1703 program.

The Section 1703 program provides loan guarantees for up to 100% of 80% a project's eligible capital costs. At least 20% of the total project costs must be attributable to private sector sourced equity. In instances where the Department of Energy commits to guarantee 100% of 80% of a project's eligible capital costs, OMB policy and DOE regulations require the Loan Programs Office ("LPO") to use the Department of Treasury's Federal Financing Bank ("FFB") which issues a direct loan to the project sponsor. The policy justification for issuing a direct loan is that if the DOE guarantees the full cost of a commercial loan, commercial lenders would not be taking any project risk, and commercial rates would essentially approximate FFB rates, with a slight premium to reflect the fact that it is agency paper.

While the program had been authorized for five (5) years prior to 2010, the Section 1703 program remained essentially dormant until 2009, and was not used by any renewable energy projects until the passage of the Recovery Act.

4.5 Department of Agriculture's Biorefinery Assistance (9003) Program

Title IX of the 2008 Farm Bill authorized the U.S. Department of Agriculture ("USDA") to administer several financing programs to support private sector investment in renewable power and biofuel projects in the United States. Although the DOE's Title XVII loan guarantee programs can support biofuel projects, USDA's Biorefinery Loan Assistance Program (9003 Program) made significant headway in 2010 by rewriting program rules to allow developers and lenders to utilize more innovative financing structures.

4.5.1 Overview

Largely modeled on the USDA Business and Industry (B&I) program, USDA's Section 9003 program can guarantee private sector debt issued for project costs for the development, construction, and retrofitting of advanced bioenergy and bioproduct commercial-scale refineries.

From 2009-2012, Congress authorized $320M in mandatory funding for Section 9003 Program's credit subsidy costs provided by the Credit Commodity Corporation, and $600 million in discretionary funding for the program which—leveraging 3-4x in anticipated private sector investment—would support over ~ $1 billion in projects. From 2008-2010, Congress did not appropriate any authorized discretionary funding.

The Section 9003 Program can guarantee up to $250 million of senior debt per project. However, until recently, and still in most cases, this funding will not cover more than 80% of the total project costs. Although the program issued a series of Notice of Funding Announcements ("NOFAs") from 2008-2010, the program had not issued a rulemaking for the program until April 2010. Instead, it had used the series of NOFAs to provide the rules for the program.

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However, the network of USDA applicants—mostly small agricultural, U.S. regulated commercial banks— were unable or unwilling to offer competitive commercial loans at the low interest rates and long tenors necessary for amortizing the large advanced biofuels projects Congress envisioned when supporting Section 9003. As a result, advanced biofuels projects were unable to utilize the 9003 Program to attract the necessary debt financing from the commercial lending market.

4.5.2 Program Rules & Bond Financing Structures

In response to the Section 9003 Program's demonstrable difficulties fulfilling the policy objectives originally intended for the program, USDA issued a proposed rule in April 2010, and an interim final rule in February 2011 that ushered in a host of significant changes to the Section 9003 Program. These new rules included an ability to use a novel project financing structure, developed entirely by Mintz Levin, Stern Brothers and Krieg DeVault, allowing capital-constrained projects to access the $1 trillion bond market, providing biofuel project developers access to a much larger pool of capital from an essentially untapped source.

Under the new Section 9003 rules, USDA signaled it will now guarantee up to 90% of eligible project costs under certain conditions, and subject to the program's $250 million funding ceiling per project. More importantly, the USDA—acting upon the significant input of Mintz Levin, Stern Brothers, and Krieg DeVault—designed a unique bond financing mechanism to enhance the Section 9003 Program.

Under the new Section 9003 Program's bond financing structure, a project sponsor would issue up to 100% of the debt guaranteed by USDA in the form of credit-enhanced project company bonds (commercial debt) for sale to qualified private investors such as high net worth individuals and larger institutional investors (e.g., hedge, mutual and pension funds). A commercial lender that would have traditionally underwritten a loan guaranteed by USDA would now serve in a new capacity— as a "trustee" for the proceeds of an advanced biofuel project's bond sale, the bonds' legal title and other project securities. In the new bond structure, a project issues and sells the bonds in the market, using the sale proceeds to fund project costs, now held in trust by the project's lending institution, whose trustee status allows the bank to participate in the Section 9003 Program with very little risk exposure.

In the event of additional or unforeseen project costs, a project company may use the bond financing structure to secure further capital by placing additional bonds for sale—still guaranteed by USDA—to secure new proceeds in lieu of seeking a new loan, or modifying/increasing its existing loan.

The proposed bond financing structure approved by USDA has several advantages that will enable commercial-scale bioenergy and bioproduct projects to attract and secure historically elusive debt financing at lower capital costs, and with longer tenors by allowing more liquid, sophisticated, and less risk-averse bond investors to participate in the Section 9003 Federal loan guarantee program.

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4.5.3 Impact

From December 2009 – January, 2011, the Section 9003 Program has announced six (6) conditional loan guarantees commitments with four (4) of the six (6) commitments reaching closure:

- $54.5 Million to Sapphire Energy (closed)
- $80 Million Range Fuels (closed)
- $75 million to INEOS Bio (Bond Financing) (closed)
- $80 million to Enerkem (Bond Financing)
- $250 million to Coskata (Bond Financing)
- $13 million to Freemont Community Digester (closed)

Figure 4-3: USDA Section 9003 Biorefinery Assistance Program Loan Guarantees

Company	Project Name	Location	Letter of Intent	Date Issued	Expected Comp. Date	Cellulosic ethanol prod. (M of gallons/yr)	Gross electricity prod. cap. (MW)	Amount ($M)	Total Project Cost	Status	Feedstock
Sapphire Energy	IABR	Columbus, NM	Dec-09	Oct-11		1		$55	$135	Closed	Algae
Range Fuels		Soperton, GA	Jan-09	Mar-11	2Q2011			$80		Closed	non-food biomass (wood chips)
INEOS Bio	BioEnergy Center	Vero Beach, FL	Jan-11	Aug-11	2012	8	6 MW	$75		Closed	Citrus fruit, vegetable & yard wastes
INDUS Energy	Fremont Communuty Digester	Fremont, MI					3 MW	$13	$22	Closed	food waste
Enerkem		Pontotoc, MS	Jan-11			10		$80		Pending	Municipal solid waste
Coskata		AL	Jan-11			55		$250		Pending	Woody biomass
Total						74	9 MW	$552			

Three (3) recipients used the new credit-enhanced 100% bond financing mechanism in lieu of commercial loans for their respective projects. Because the Section 9003 Program's authority is available until 2012, previously unexpended authority is available until the program's expiration.

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5 THE AMERICAN RECOVERY & REINVESTMENT ACT OF 2009

The most consequential Federal investment and incentive package for renewable energy in U.S. history, the Recovery Act fundamentally impacted the project finance landscape in 2010 through a series of grant programs, loan guarantees, and amendments to existing tax incentives.

5.1 Title XVII Section 1705 Loan Guarantee Program

5.1.1 Overview

The Recovery Act amended DOE's Title XVII Program by authorizing a new, temporary program designed to stimulate job creation. The Section 1705 program, unlike the Section 1703 program, authorized loan guarantees for commercial renewable energy systems, electric power transmission systems and biofuels projects that commenced construction no later than September 30, 2011.

In addition to general technology and economic due diligence, LPO emphasized two (2) criteria factors when assessing projects under the Section 1705 program: (i) "Readiness to Proceed", a factor arising out of the Recovery Act's overarching policy objective to stimulate job creation, and (ii) if a project presented "a reasonable prospect of repayment" to the Treasury, a statutory requirement codified in Title XVII of the Energy Policy Act of 2005. Projects DOE determined were both eligible, and good candidates and for a loan guarantee under Section 1705 first received a conditional commitment, with the loan closing in a relatively short, two to eight month time frame.

5.1.1.1 Credit Subsidy

Title XVII also specifies DOE must receive either an appropriation for the credit subsidy cost or payment of that cost by the borrower – the expected long-term liability to the U.S. Government in issuing the loan guarantee. Until the Recovery Act, Congress had not provided DOE with credit subsidy funding—a key obstacle to renewable energy developers utilizing the program. Under the Recovery Act, Congress did so appropriate $5.965 billion in credit subsidy costs, but reprogrammed the monies twice over the life of the program. Initially, $2.5 billion for the "Cash for Clunkers" program, and an additional $1.5 billion for emergency state aid programs, netting out roughly $1.7 billion – less than half the originally intended amount, for use in the loan guarantee program.

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5.1.1.2 Financial Institution Partnership Program

In order to expedite the Section 1705 loan guarantee process and expand senior credit capacity for commercial renewable energy generation projects, DOE allowed qualified financing institutions—which would be providing the underlying loan guaranteed by DOE—to apply with project sponsors as co-applicant/lenders under the Financial Institution Partnership Program ("FIPP"). The policy rationale for instituting the FIPP program was that it allowed financial institutions to identify and pre-screen promising projects. The FIPP Program also had financial institutions perform traditional credit and project risk due diligence routinely performed by financial institutions, before submitting them to the DOE.

In a FIPP financing arrangement, DOE limited project debt to 80% of total project costs (with at least 20% required to be equity), and guaranteed up to 80% of that debt component, requiring renewable energy generation project lenders to hold at least 20% of the unguaranteed credit exposure to the project, aligning lenders interests with the Department and project sponsors by putting "skin in the game".

While much more could be said about the Section 1703 and Section 1705 programs' nuances, the Section 1705 program has expired as of September 30, 2011. Further, the future of DOE's role in financing large-scale renewable projects under the Section 1703 program are highly uncertain given the default of the first two (2) loan guarantee recipients (Solyndra and Beacon Power).

5.1.2 Impact

In 2010, the LPO program issued its first conditional commitment for a renewable power project recipient to BrightSource Energy, project sponsor for the largest CSP project in the world. As shown in Figures V-1, DOE issued 28 loan guarantees between the 1705 program's inception and its end date of September 30, 2011, for a total of $16 billions in loan guarantees.

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Figure 5-1: DOE 1705 Loan Guarantee Awards Closed (inception to end of program)

Project Name	Developer (Owner)	System supplier	FIPP?	Debt Providers	Loan Guarantee Amount ($M)
Solar Manufacturing					
1366 Technologies			N		$150M
Abound Solar			N		$400M
SoloPower			N		$197M
Solyndra			N		$535M
Energy Storage					
Johnson City	AES		N		$17M
Stephentown	Beacon Power	Beacon Power	N		$43M
Biofuel					
Bioenergy Biomass of KS	Abengoa	Abengoa	N		$132M
POET			N		$105M
Geothermal					
Blue Mountain	NGP	NGP	FIPP	John Hancock	$99M
Neal Hot Springs	US Geothermal	US Geothermal	N		$97M
Ormat Nevada	Ormat	Ormat	FIPP	John Hancock	$350M
Solar Generation					
Agua Caliente	First Solar (NRG)	First Solar	N		$967M
Alamosa	Cogentrix	Amonix	N		$91M
Antelope Valley	First Solar (Exelon)	First Solar	N		$646M
Crescent Dunes	SolarReserve	SolarReserve	N		$737M
California Valley SR	SunPower (NRG)	SunPower	N		$1,237M
Desert Sunlight	First Solar (NextEra, GE EFS)	First Solar	FIPP	Goldman Sachs, Citigroup	$1,460M
Genesis Solar	NextEra		FIPP	Credit Suisse, BBVA (LOC)	$852M
Ivanpah	BrightSource (NRG, Google)	BrightSource	N		$1,600M
Mesquite Solar 1	Sempra		N		$337M
Mojave Solar	Abengoa	Abengoa	N		$1,200M
Prologis (Project Amp)	NRG		FIPP	Bank of America	$1,400M
Solana	Abengoa	Abengoa	N		$1,446M
Transmission					
One Nevada Line	LS Power		N		$343M
Wind Generation					
Granite Reliable	Brookfield		FIPP		$169M
Kahuku Wind	First Wind		N		$117M
Record Hill Wind			N		$120M
Shepherds Flat	Caithness/GE	GE	FIPP	11 banks	$1,300M
Total					$16,146M

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Project Name	Total Cost ($M)	Debt as % of Total	MW-ac	Cost ($/W-ac)	Locations	Date of Closing
Solar Manufacturing						
1366 Technologies					MA	Sep-11
Abound Solar					CO & IN	Dec-10
SoloPower					OR	Aug-11
Solyndra					CA	Sep-09
Energy Storage						
Johnson City	$24M	71%	20	$1.20/W	NY	Aug-10
Stephentown	$69M	62%	20	$3.45/W	NY	Aug-10
Biofuel						
Bioenergy Biomass of KS	$176M	75%			KS	Aug-11
POET	$140M	75%			IA	Sep-11
Geothermal						
Blue Mountain	$282M	35%	36	$7.83/W	NV	Sep-10
Neal Hot Springs	$136M	71%	23	$5.91/W	OR	Feb-11
Ormat Nevada	$467M	75%	121	$3.86/W	NV	Sep-11
Solar Generation						
Agua Caliente	$1,719M	56%	290	$5.93/W	AZ	Aug-11
Alamosa	$145M	62%	30	$4.83/W	CO	Sep-11
Antelope Valley	$1,360M	48%	230	$5.91/W	CA	Sep-11
Crescent Dunes	$983M	75%	110	$8.93/W	NV	Sep-11
California Valley SR	$1,581M	78%	250	$6.32/W	CA	Sep-11
Desert Sunlight	$2,607M	56%	550	$4.74/W	CA	Sep-11
Genesis Solar	$1,520M	56%	250	$6.08/W	CA	Aug-11
Ivanpah	$2,180M	73%	370	$5.89/W	CA	Apr-11
Mesquite Solar 1	$602M	56%	150	$4.01/W	AZ	Sep-11
Mojave Solar	$1,600M	75%	250	$6.40/W	CA	Sep-11
Prologis (Project Amp)	$2,600M	54%	733	$3.55/W	28 States	Sep-11
Solana	$1,967M	74%	250	$7.87/W	AZ	Dec-10
Transmission						
One Nevada Line					NV	Feb-11
Wind Generation						
Granite Reliable	$225M	75%	99	$2.28/W	NH	Sep-11
Kahuku Wind	$148M	79%	30	$4.93/W	HI	Jul-10
Record Hill Wind	$153M	78%	50	$3.06/W	ME	Aug-11
Shepherds Flat	$2,300M	57%	845	$2.72/W	OR	Oct-10
Total	$22,984M		4,707			

Source: GTM Research, DOE

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5.2 ITC Election for PTC Property

The Recovery Act authorized PTC-eligible renewable energy property to elect the 30% ITC. This amendment significantly altered Federal incentives for some technologies deployed in 2010, and resulted in greater incentive parity across renewable energy systems. Specifically, wind-energy systems of all sizes—not just smaller systems less than 100 kW–qualified for the 30% ITC through December 31, 2012—the PTC in-service deadline. Certain geothermal and open-or closed- loop biomass systems (including biomass CHP projects qualified at 10%) also qualified for a 30% ITC through their respective PTC placed-in-service date of December 31, 2013.

5.3 Section 1603 Cash Grant Program

5.3.1 Overview

The Recovery Act provided taxpayers an ability to receive a cash grant equal to 10-30% of the qualified project costs for technologies eligible under the ITC and PTC. Although set to initially expire in December 2010, the program was extended until December 31, 2011. Projects placed-in-service from 2009-2011 must submit their Section 1603 application by October 31, 2012. However, projects do not have to be completed by December 31, 2011 to remain eligible for the cash grant.

Figure 5-2: Cash Grant by Technology

Technology	Cash Grant as % of Basis	Placed in Service Deadline
Solar	30%	1/1/2017
Wind	30%	1/1/2013
Geothermal (Electricity)	30%	1/1/2017
Biomass	30%	1/1/2014
Fuel Cells	30%	1/1/2017
Landfill Gas	30%	1/1/2014
Trash to Electricity	30%	1/1/2014
Hydro	30%	1/1/2014
Marine & Hydrokinetic	30%	1/1/2014
Geothermal Heat Pumps	10%	1/1/2017
Microturbine	10%	1/1/2017
Combined Heat and Power (CHP)	10%	1/1/2017

Source: GTM Research

Projects commencing construction after Recovery Act enactment but before January 1, 2012 can remain eligible for the Section 1603 Cash Grant so long as they are placed-in-service by the underlying ITC/PTC credit termination dates. The Section 1603 Program also includes a “safe-harbor” rule allowing projects that expend at least 5% of a project’s total eligible costs by December 30, 2011 an ability to remain eligible for the cash grant so long as they submit their respective applications to Treasury by October 1, 2012.

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5.3.2 Impact

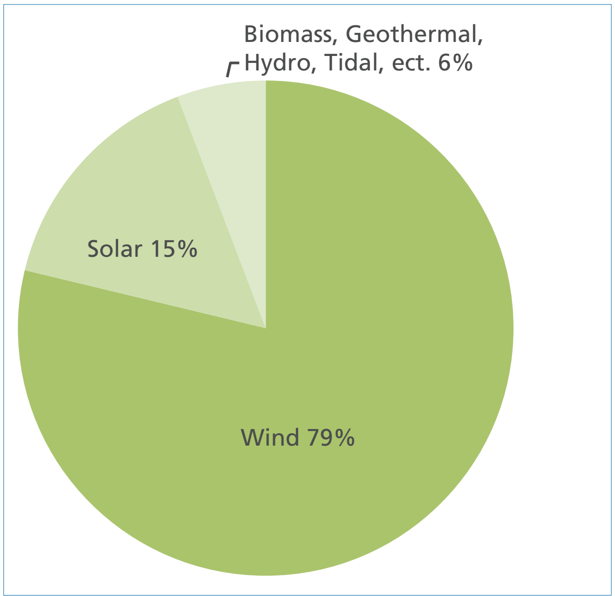
The Section 1603 Cash Grant Program facilitated significant private sector investment in renewable power projects. From the program's inception to November 16, 2011, Treasury distributed $9.78 billion cash grants to 4,254 projects. Assuming private sector investments constituted the remaining ~70% of projects costs, the Section 1603 Program catalyzed $22.8 billion in additional investment for a total deployment of $32.6 billion.

Figure 5-3: Cash Grants Issued Under Section 1603 (Inception in 2009 to November 16, 2011)

Type	# of Projects	Total Amount Awarded ($M)	$M/per Project
Wind	231	$7,704	$33.4
Solar	3,617	$1,512	$0.4
Biomass, Biofuels, Geothermal, Hydro, Tidal, etc.	176	$566	$3.2
Total	4,254	$9,782	$2.3

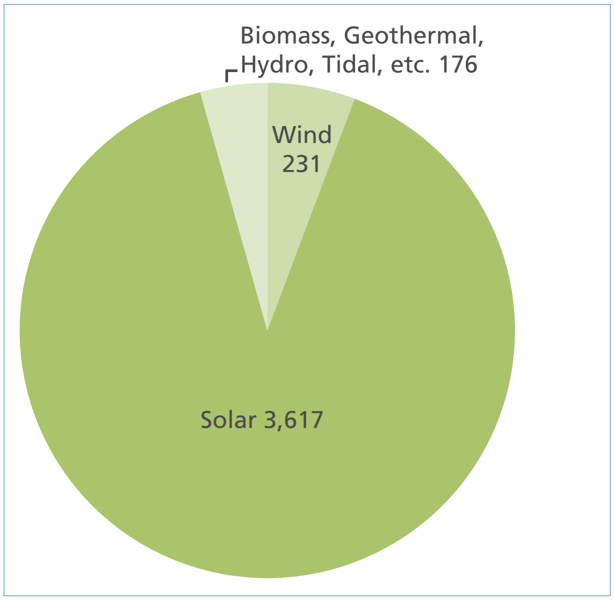
Source: U.S. Department of the Treasury

Figure 5-4: Total Amount of Cash Grants Awarded by Technology



Source: U.S. Department of the Treasury

Figure 5-5: Total Number of Cash Grants Awarded by Technology



Source: U.S. Department of the Treasury

The option to monetize the ITC in the form of a direct cash grant valued at ~30% of total project costs provided significant liquidity to the renewable energy market, as the Section 1603 Cash Grant program reduced renewable project developer's dependence on scarce and/or costly third-party tax equity participation. Cash grants also simplified financing structures and reduced "frictional" (transactional) costs associated with tax equity structures by an estimated 300 basis points (bps) for renewable energy projects, but often higher depending on technology and specific project risks. It is also important to recognize renewable energy project costs have fallen drastically with capital expenditures, decreasing ~40% for wind projects and ~70% for PV projects on an average, per-installed watt basis.

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From a budgetary and policy perspective, the Section 1603 Cash Grant Program proponents continue to argue the incentive is essentially revenue neutral because providing the cash grant in lieu of an underlying, existing tax credit should result in the same net impact on government revenues. However, due to reduced frictional costs, Bloomberg New Energy Finance and the Bipartisan Policy Center concluded that cash grants for renewable energy projects are significantly more efficient than other tax-incentives, asserting the U.S. government would only need to spend about half as much in cash grants to achieve the same deployment levels as using the PTC.

5.3.2.1 Onshore Wind

Although utility-scale wind projects only represented 6% of Section 1603 Program recipients since inception, the wind industry clearly benefited the greatest financially from the program. Two-hundred thirty one wind projects received a significantly disproportionate amount of total cash grants awarded— 79%, or $7.7 Billion. On average, 200 MW+ projects installed costs per watt ("W") ranged from $1.82/W to $2.10/W, based on publicly available data.

Figure 5-6: Top 10 Largest Cash Grant Awards to Wind Projects (Inception 2009 to November 16, 2011)

Project Name	Developer	Capacity (MW)	Cash Grant ($M)	Estimated Cost ($/W)	State
E.ON Climate & Renewables North America Inc.	E.ON		$543		TX
Windy Flats Partners, LLC	Cannon Power Group	400	$218	$1.82/W	WA
Pattern Gulf Wind LLC	Pattern Energy	283	$178	$2.10/W	TX
Streator-Cayuga Ridge Wind Power LLC	Iberdrola	300	$170	$1.89/W	IL
Big Sky Wind, LLC	Edison Mission	239	$144	$2.00/W	IL
FPL Energy Illinois Wind, LLC	NextEra	227	$139	$2.04/W	IL
Milford Wind Corridor Phase I, LLC	First Wind	204	$120	$1.96/W	UT
Blackstone Wind Farm II LLC	Horizon	200	$116	$1.93/W	IL
Penascal Wind Power LLC	Iberdrola	207	$114	$1.84/W	TX
Meadow Lake Wind Farm LLC	Horizon	200	$113	$1.89/W	IN

Source: GTM Research, U.S. Department of the Treasury

While utility-scale wind developers elected to use the underlying tax credit (PTC) more than any other renewable energy technology, the majority of the 5.1 GW of new onshore wind generating capacity installed in 2010—representing 26% of all new electric generating capacity installed in the United States—utilized the Section 1603 Program.

A 2009 Lawrence Berkely National Lab (LBNL) analysis concluded as of until March 1, 2010, 64% of all 2009 large-scale onshore wind projects eligible under the Section 1603 Program elected, or planned to elect, the cash grant, in lieu of the PTC or ITC.

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5.3.2.2 Solar

While 3,617 solar projects represented the largest number of installations receiving cash grants by technology representing 85% of total Section 1603 Program recipients, only 15% or $1,512 million of cash grants since the program's inception were awarded to construct solar projects. This high volume, but low grant award per project can be attributed to the more diffuse nature of solar sector applications and technologies utilizing the Section 1603 Program, varying drastically from distributed PV commercial systems of less than 1 kW to large utility-scale PV and CSP projects like SunPower's 19 MW Greater Sandhill PV project and NextEra's Martin CSP 75 MW Next Generation Solar Center.

Figure 5-7: Top 10 Largest Cash Grant Awards to Solar Projects (Inception 2009 to November 16, 2011)

Project Name	Developer	Capacity (MW)	State	Property Type	Cash Grant ($M)	Estimated Cost ($/W)
Martin Next Generation Solar	FPL	75	FL	Solar Thermal	$123.8	$5.50/W
DeSoto NG & Space Coast	FPL	35	FL	Solar Electricity	$62.4	$5.94/W
Pacific Energy Capital 1, LLC	SunRun		CA	Solar Electricity	$30.4	
SunRun Pacific Solar LLC	SunRun		CA	Solar Electricity	$29.8	
Greater Sandhill I, LLC	SunPower	19	CO	Solar Electricity	$25.4	$4.45/W
Solar Tenant I, LLC	SunRun		CA	Solar Electricity	$22.7	
Sierra SunTower	eSolar	5	CA	Solar Thermal	$19.5	$13.03/W
SunRun Solar Tenant IV, LLC	SunRun		CA	Solar Electricity	$19.4	
National Bank of Arizona			AZ	Solar Electricity	$19.0	
SPP Fund III Master Tenant, LLC	SPP		AZ	Solar Electricity	$18.4	

Source: GTM Research, U.S. Department of the Treasury

5.3.2.3 Geothermal

From the program's inception through November 16, 2011, 48 geothermal projects received $282 million in cash grants under the Section 1603 program, representing 3% of all cash grants awarded.

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Figure 5-8: Top 10 Largest Cash Grants to Geothermal Projects (Inception 2009 to November 16, 2011)

Project Name	Developer	Capacity (MW)	State	Property Type	Cash Grant ($M)	Estimated Cost ($/W)
ORNI 18 LLC			CA	Geothermal Electricity	$108.3	
NGP Blue Mountain I LLC	NGP	49.5	NV	Geothermal Electricity	$65.7	$4.43/W
Enel Stillwater, LLC			NV	Geothermal Electricity	$40.3	
Thermo No. 1 BE-01, LLC			UT	Geothermal Electricity	$33.0	
Enel Salt Wells, LLC			NV	Geothermal Electricity	$21.2	
Geysers Power Co., LLC			CA	Geothermal	$5.7	
Epic Systems Corporation			WI	Geothermal Heat Pump	$3.4	
Beowawe Binary, LLC			NV	Geothermal Electricity	$1.7	
Gebbers Farms			WA	Geothermal Heat Pump	$0.3	
Wheeler Terrace Development LP			DC	Geothermal Heat Pump	$0.3	
All other Geothermal					$1.7	
Total Geothermal					$281.6	

Source: GTM Research, U.S. Department of the Treasury

5.3.2.4 Biopower

Seventy three power plants utilizing biomass, landfill gas, or waste-to-energy technologies received $227 million in cash grants under the 1603 program in 2010, representing 2.3% of all cash grants awarded since the program's inception, the largest of which was the Evergreen Community Power project in Pennsylvania.

Figure 5-9: Top 10 Largest Cash Grants to Biopower Projects (Inception 2009 to November 16, 2011)

Project Name	Developer	Capacity (MW)	State	Property Type	Cash Grant ($M)
Evergreen Community Power LLC			PA	Biomass (open loop, cellulosic)	$39.2
Seneca Sustainable Energy, LLC			OR	Biomass (open loop, cellulosic)	$18.6
Pratt Paper (GA), LLC			GA	Biomass (open loop, cellulosic)	$18.5
Simpson Tacoma Kraft Company, LLC			WA	Biomass (open loop, cellulosic)	$17.4
Ameresco, Inc.	Ameresco		CA	Landfill Gas	$16.1
L'Anse Warden Electric Company			MI	Biomass (open loop, cellulosic)	$11.7
Rio Grande Valley Sugar Growers, Inc.			TX	Biomass (open loop, cellulosic)	$10.2
Multitrade Rabun Gap LLC			GA	Biomass (open loop, cellulosic)	$8.5
Concord Nurseries, LLC			MA	Biomass (open loop, cellulosic)	$8.0
Thompson River Power, LLC			MT	Biomass (open loop, cellulosic)	$6.5
All others					$72.2
Total Biomass/LFG/W-to-E					$227.0

Source: GTM Research, U.S. Department of the Treasury

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5.3.2.5 Other Renewable Cash Grants

From the program's inception through November 16, 2011, Treasury awarded the remaining $58 million under the Section 1603 Program, representing 0.6% of cash grants to 53 projects deploying other qualifying technologies. These technologies included stationary fuel cells, certain combined heat and power systems, and water technologies (marine, hydrokinetic, and incremental hydropower).

Figure 5-10: Top 10 Largest Cash Grants to Other Projects (Inception 2009 to November 16, 2011)

Project Name	State	Property Type	Cash Grant ($M)
Bloom Energy 2009 PPA Project Company, LLC	CA	Fuel Cell	$23.5
Erie Boulevard Hydropower LP	NY	Hydropower (incremental)	$4.1
Adobe Systems Incorporated	CA	Fuel Cell	$3.6
FPL Energy Maine Hydro, LLC	ME	Hydropower (incremental)	$2.6
Smart Papers Holdings LLC	OH	Combined Heat & Power	$2.5
FirstEnergy Solutions Corp	OH	Fuel Cell	$1.7
The Alhambra Office Community, LLC	CA	Fuel Cell	$1.5
Odwalla, Inc.	CA	Fuel Cell	$1.5
Somerset Leasing Corp IV	IL	Fuel Cell	$1.4
Great Bay Hydro Corporation	VT	Hydropower (incremental)	$1.3
All others			$13.7
Total			$57.5

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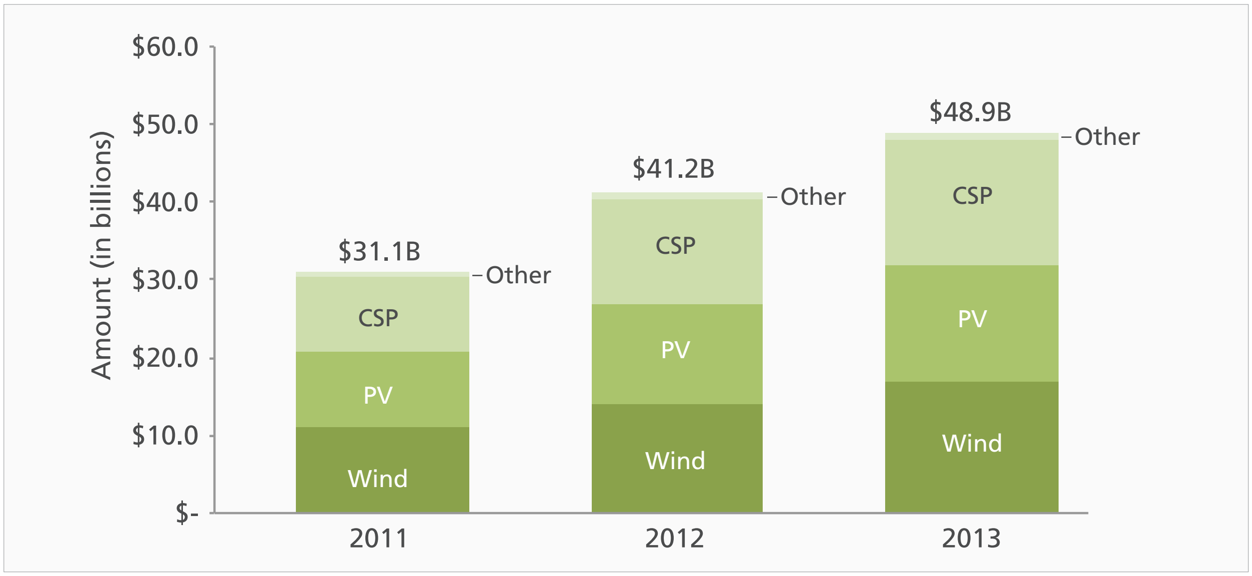
6 DEMAND SCENARIOS: PROJECT FINANCING FORECAST THROUGH 2013

From 2011-2013, we anticipate the renewable power sector will seek over $121.3 billion in project financing. We also predict—stipulating significant uncertainty exists for domestic energy policy and global capital markets— that the capital demands of renewable energy projects seeking project financing will continue to grow at a compounded annual growth rate (CAGR) of 16.2% over the next two years, hitting $41.2 billion in 2012, and $48.9 billion in 2013.

Figure 6-1: Project Financing to be sought by Renewable Energy Projects in the U.S., Estimated 2011-2013



Type	2011	2012	2013
Other	$0.6B	$0.8B	$1.0B
CSP	$9.9B	$13.4B	$16.0B
PV	$9.5B	$12.9B	$15.0B
Wind	$11.2B	$14.1B	$17.0B

Source: GTM Research

During the 2012-2013 timeframe, and based on our project debt and tax equity projections, the success rate of capital secured will decrease roughly by 5% annually, resulting in ~$30.2 billion in 2012 financing arrangements, and ~$34.2 billion in 2013.

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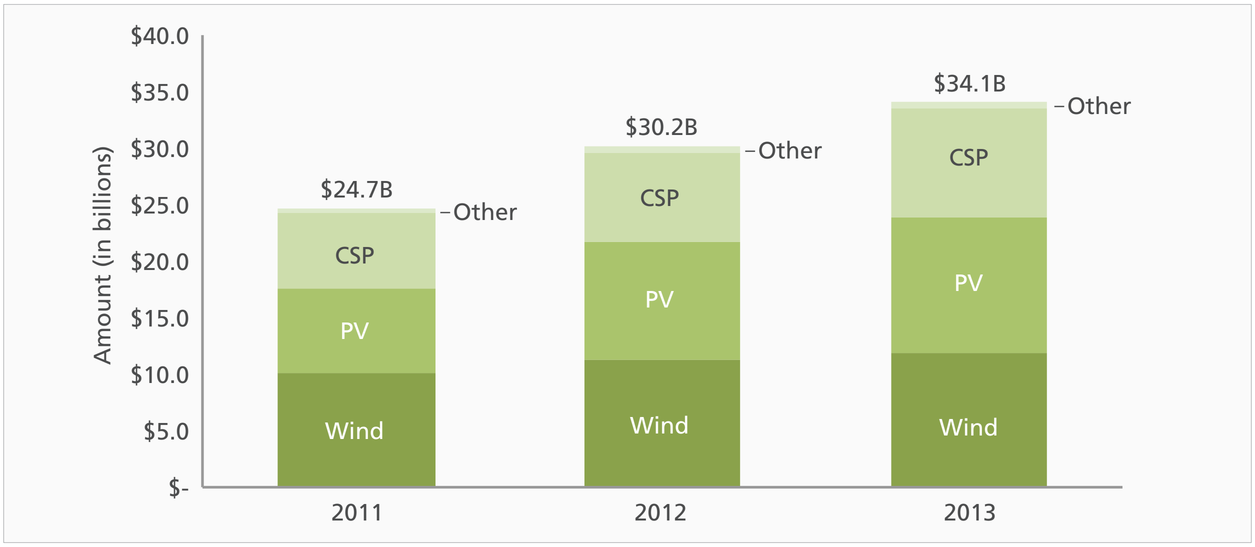
Figure 6-2: Project Financing to be secured by Renewable Energy Projects in the U.S., Estimated 2011-2013



Type	2011	2012	2013
Other	$0.5B	$0.6B	$0.7B
CSP	$6.5B	$8.0B	$9.6B
PV	$7.6B	$10.3B	$12.0B
Wind	$10.0B	$11.3B	$11.9B

In 2011, our preliminary research indicates the U.S. renewable power generation sector—primarily driven by the solar industry—sought $31.1 billion in project financing. However, renewable project developers were only able to secure 79%, or $24.7 billion in financing sought in the debt and equity markets.

6.1 Methodology

Our aggregate renewable project financing demand figures are based on "live" projects contained in databases compiled by GTM Research, the American Wind Energy Association ("AWEA"), and the Global Wind Energy Council. We define "live" deals as projects across various stages of development for which representatives are actively seeking project financing before 2014, and whose principals may be engaged in negotiations with potential financiers, but which have not yet reached financial closure.

We also recognize a certain margin of error will be present in our findings. Our data sets—as with all estimates—do not represent perfect market information, and projects may have inadvertently been excluded because they:

- Have not been made public
- May seek alternative, non-project financing structures (e.g. corporate balance sheets or Federal procurement)
- Have regulatory barriers that may impede project development -- such as permitting, or
- Have other requirements necessary to be considered "financeable projects

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To account for this margin of error, we applied a confidence factor for each sector to account for some projects not reaching the financing stage.

6.2 Forecasts by Technology: 2011-2013

6.2.1 Onshore Wind

We anticipate ~22 GW of utility-scale, onshore wind projects in the United States representing $42.3 billion of potential investment will seek to secure project financing by 2013. This includes 10.6 GW of announced utility-scale wind projects in the U.S. by credible developers and an estimated additional 11 GW of unannounced projects in the pipeline.

We forecast 5.3 GW of wind projects will actually close $10 billion in project financing during 2011, followed by 5.9 GW of projects closing $11.3 billion in 2012, and 6.6 GW closing $11.9 billion in 2013.

Figure 6-3: Forecast Amount of Project Financing to Be Sought by U.S. Wind Sector Through 2013

Wind	2011	2012	2013	2014	2015
Total MW Seeking Financing	5,874	7,434	9,441	– –	– –
Total Financing Sought ($M)	$11,161	$14,125	$16,995	– –	– –
MW That Achieve Financing	5,287	5,948	6,609	– –	– –
Financing Achieved ($M)	$10,045	$11,300	$11,896	– –	– –
Cost/MW ($M)	$1.9	$1.9	$1.8	– –	– –
Total MW Installed	5,116	7,049	7,930	8,812	9,693

6.2.1.1 Assumptions

Most of the identified assets are not yet associated with financing leads and are in various stages of development, though most aim to commence commercial operation by 2014. We expect onshore wind projects currently in discussions with potential financiers to attempt to reach financial close by the end of 2011, given the added incentive securing a Section 1603 Cash Grant while still available. For projects in advanced development that have either (a) not commenced construction, or (b) not signed PPAs, developers will seek financing in 2012. For projects also in advanced development that must still clear other development hurdles and have neither commenced construction nor signed PPAs, we assume developers will attempt to secure financing in 2013.

Installed wind costs in the U.S. are largely impacted by commodity price fluctuations (steel, etc.), and potential economies-of-scale improvements as turbine and wind farm sizes increase. However, we anticipate the installed cost of one MW of large-scale, onshore wind in the U.S. to remain relatively stable from 2011-2013, and our analysis does not assume significant changes to the wind industry's supply chain or manufacturing base.

To estimate the value of the onshore, utility-scale project pipeline, we assume an installed cost per MW of $1.9 million — the average installed cost seen in large-scale, onshore wind installations receiving Section 1603 Cash Grants to date. We assert that our cost estimates align with current industry standards for large-scale, onshore wind projects.

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6.2.1.2 Confidence Factors

To account for projects that are stalled or abandoned due to development and permitting issues, we apply a declining confidence factor of 10% in each of the next three (3) years. Assuming projects seeking to commence operation in the nearer term have greater visibility with regard to project permitting and feasibility than projects requiring longer development pipelines, we estimate 90% of projects securing financing in 2011 will be successful, 80% in 2012 and 70% in 2013.

6.2.2 Solar

We anticipate ~11.9 GW of utility-scale (>10 MW) solar projects in the United States representing $76.6 billion of potential investment will seek to secure project financing by 2013. When comparing the two leading commercially available solar technologies—we anticipate the projects will be split fairly evenly between PV and CSP technologies with 6.6 GW of PV representing $37.4 billion and 7.2GW of CSP representing $39.1 billion of potential project financing.

We forecast 3.7 GW of solar projects will actually close $14 billion in financing during 2011, followed by 5.2 GW of projects closing $18.3 billion in 2012, and 6.5 GW closing $21.5 billion in 2013.

Figure 6-4: Forecast Amount of Project Financing to Be Sought by U.S. Solar Sector Through 2013

PV	2011	2012	2013	2014	2015
Total MW Seeking Financing	2,712	3,912	5,008	– –	– –
Total Financing Sought ($M)	$9,491	$12,911	$15,025	– –	– –
MW That Achieve Financing	2,169	3,130	4,007	– –	– –
Financing Achieved ($M)	$7,593	$10,329	$12,020	– –	– –
Cost/MW ($M)	$3.5	$3.3	$3.0	– –	– –
Total MW Installed	1,228	1,738	2,384	3,264	4,253
CSP	**2011**	**2012**	**2013**	**2014**	**2015**
Total MW Seeking Financing	2,526	3,518	4,316	– –	– –
Total Financing Sought ($M)	$9,851	$13,368	$15,970	– –	– –
MW That Achieve Financing	1,677	2,106	2,584	– –	– –
Financing Achieved ($M)	$6,539	$8,002	$9,559	– –	– –
Cost/MW ($M)	$3.9	$3.8	$3.7	– –	– –
Total MW Installed	5	126	2,148	2,173	2,584

6.2.2.1 Assumptions

We expect solar projects in advanced development stages (i.e., with signed PPAs in place) and in discussions with potential financiers to seek financial close as soon as possible in order to begin construction.

Both PV and CSP are expected to experience cost reductions over the midterm. While current installed solar costs may seem high compared to onshore wind, a solar energy systems maximum output occurs during peak load periods during the day, Solar projects are therefore potentially more valuable to grid operators when compared to wind systems that typically generate more power during off-peak hours at night.

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To estimate the value of the utility-scale solar project pipeline, we assume an installed cost of $3.50/MW for PV and $3.90/MW for CSP. This assumption is in line with GTM Research's solar forecasts for average installed costs for large-scale PV and CSP projects.

6.2.3 Forecast for Other Renewable Energy Technologies

We anticipate ~600MW of other renewable energy projects in the United States representing approximately $2.4 billion of potential investment will seek to secure project financing by 2013. We forecast all other renewable energy technologies—but primarily biopower and geothermal projects—will seek $0.6 billion in project finance in 2011, $0.8 billion in 2012, and $1.0B in 2013.

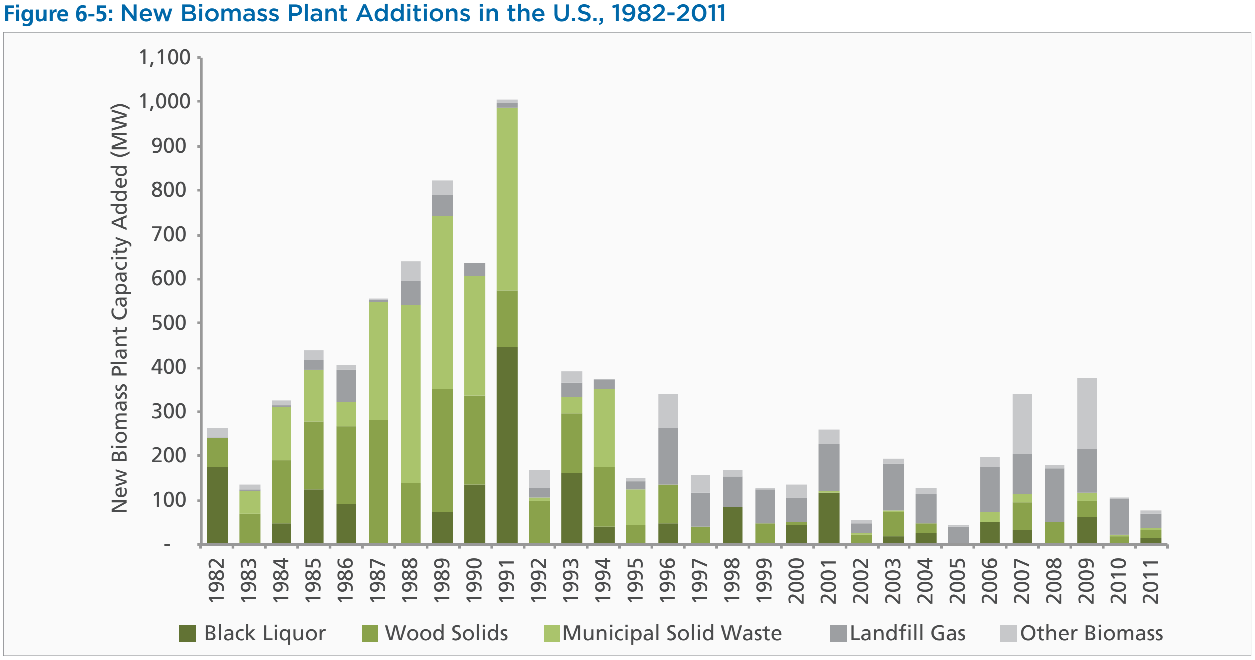
6.2.3.1 Assumptions

To estimate the value of the biopower and geothermal pipelines specifically, we assume an average installed cost of $4/W for biomass/geothermal.

While new biopower installations contracted in 2010, wood-fired, municipal solid waste ("MSW"), landfill gas and projects using other organic feedstocks remain more prevalent than solar and geothermal power projects, representing 11GW of total installed capacity in the U.S. While we anticipate continued growth in this category, our estimates show that it will remain under 3% of the total market for renewable energy project finance.

As shown in the chart below, the U.S. in 2010 added 100 MW of new biomass plant capacity. This amount is well below the 1,000 MW of new biomass capacity added annually in the early 1990s, but is still an improvement over the 40 MW added in 2005.

Figure 6-5: New Biomass Plant Additions in the U.S., 1982-2011



Source: GTM Research, DOE, EIA

6.2.4 Biofuels (Ethanol & Biodiesel)

While the primary focus of this report is renewable electricity generation, the size and project finance requirements of the biofuels industry are notable.

In terms of volume, ethanol represents 98% of all biofuels produced in the US, with biodiesel representing the remaining 2%. In the US in 2010, nameplate capacity for ethanol plants increased from 13.03 billion gallons per year to 13.77 billion gallons per year, a net increase of 0.74 billion gallons per year. This amount represents a 6% growth in total ethanol capacity in 2010, which is a significant reduction from the 20% growth in total capacity in 2009.

To build an ethanol plant costs ~$1.30 per gallon of annual capacity. This implies a total cost of $1.0 billion in 2010 CAPEX that was likely project financed. If the ethanol industry grows another 6% in 2011, that would represent additions of 0.83 billion gallons per year – which would require $1.1 billion of CAPEX. These historical and future financings are not included in this report's analysis, nor are they considered in the project finance forecasts.

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7 SUPPLY SCENARIOS: FINANCING AVAILABILITY FORECASTS THROUGH 2013

Of the more than $120 billion in anticipated project financing sought by large-scale, renewable energy projects in the U.S. through 2013, the ratios and availability of debt, tax equity, and direct equity in project finance structures will be attributable to several variables, including:

- **Interest rate trends in commercial debt markets,**
- **Profitability, financial health—and therefore tax appetite— of institutions providing tax equity, and**
- **Congressional legislation (or inaction) related to Federal financing programs and tax incentives.**

After taking expected cash grants into account, we anticipate the solar and wind sectors will require an additional $18.5 billion in debt and equity financing over the remainder of 2011, followed by $22.7 billion in 2012 and $33.5 billion in 2013. How much of this demand can be met by tax equity investments depends on the tax equity supply for renewable energy.

While predicting the market and availability of different pools of capital utilized in renewable project financing structures through 2013 is an imprecise science. A variety of factors will impact the demand for the construction of renewable generating assets such as:

- **The general economic condition of the U.S. economy, which is directly correlated to electricity demand,**
- **Access and availability of transmission infrastructure, and**
- **The cost of competing conventional generation technologies and associated commidites, particularly natural gas prices, and**
- **The status of state-level policy mechanisms such as renewable portfolio standards (RPS) and tax incentives**

However, we assert the most consequential actor will not be the private markets, but policymakers in Congress. Recognizing the strong, historical correlation between Federal tax incentives and the scale and speed at which renewable energy is deployed in the United States, we will consider several scenarios assessing the impacts of a series of key, inevitable legislative events for renewable energy occurring over the next two (2) years:

- **Congress extends the 1603 Cash Grant for one year through 2012, or allows it to expire on time at the end of 2011, and**
- **The PTC for utility-scale wind is extended for one year through 2013, or allowed to expire on time at the end of 2012.**

7.1 Section 1603 Cash Grant Program

Congress will consider whether or not Section 1603 Cash Grant Program's demonstrable benefits — the acceleration of renewable energy deployment, job creation, and stimulative economic effects — outweigh the budgetary cost and overall contribution to federal deficits. The outcome of their decision will significantly impact a developer's ability to secure financing for renewable energy projects.

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7.1.1 Impact

Unless Congress extends the Section 1603 Cash Grant Program before December 31, 2011, projects unable to meet Treasury's construction deadline requirements will be ineligible to elect the cash grant. However, the PTC or ITC, which—absent a repeal— will remain authorized through 2013 except for utility-scale wind, which we discuss in the next section.

With only the underlying tax incentives available, renewable project developers seeking project financing would inevitably gravitate back to the tax equity market, which the U.S. Partnership for Renewable Energy Finance (USPREF) estimates could result in a 52% reduction in total financing available for renewable energy in 2012 (USPREF, 2011). The Solar Energy Industries Association (SEIA) has come to a similar conclusion that if the Section 1603 Cash Grant Program is allowed to expire 2011, Congressional inaction would reduce the availability of financing from an estimated $7.5 billion in 2011 to approximately $3.6 billion in 2012 – a reduction of more than 50% (SEIA, 2010).

A return to tax equity financing structures would also eliminate additional, ancillary benefits that accrue to developers with a cash grant incentive such as:

- Full Alterntive Minimum Tax (AMT) exemption. Taxpayers electing the PTC are only exempt from AMT for four years.
- Exemption from Subsidized Financing Reductions. Taxpayers electing the PTC must reduce the amount of the credit by the value of any grants, tax-exempt bonds, other forms of subsidized energy financing secured.
- Flexible Owner-Operator Requirements. Taxpayers electing the PTC cannot use sale-lease back structures because the taxpayer must own and operate the facility.
- Flexible Power Sales Requirements. Taxpayers electing the PTC cannot lease facilities to tax-exempt entities in a "behind-the-meter" arrangement because the power must be sold to an unrelated party.
- Exemption from "Passive Credit Limitations." Taxpayers (e.g. investors) not playing an active role in a renewable energy project cannot use the PTC to offset income that is not also classified as "passive", restricting the value of the credit.

While the anticipated contraction in available financing would negatively impact all renewable projects, the expiration of the Section 1603 Program would be signficant to the solar industry as the value of the cash grant is arguably more valuable to developers because it reduces the relatively high installation costs associated with PV and CSP technologies.

By comparison, the PTC can often generate more value than the cash grant over the life of a technologies with higher capacity factors and low upfront capital costs such as wind, who realize a larger benefit from the PTC because an incentive linked to the kWh units produced over the ten (10) year length of the PTC represent a larger percentage of a project's total, installed costs.

7.1.2 Assumptions

Based on cash grant and PTC incentives' relative values to wind and solar project developers, we assume that 75% of upcoming wind projects will elect the cash grant over the PTC and 80% of upcoming solar projects will opt to elect the cash grant over the ITC.

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For wind projects, this is a middle-of-the-road assumption grounded in a previously cited Lawrence Berkeley National Lab report and industry estimates which assert ~ 65% to 85% of utility-scale wind projects have opted to elect the cash grant over the PTC. We do not anticipate any wind projects to elect the traditional ITC over the cash grant.

We also assume that a project electing the Section 1603 Cash Grant incentive will be able to obtain the necessary bridge loans as part of its overall financing package, with the anticipation that the short-term debt will be repaid upon receipt of the cash grant. Because a project's financial closing typically occurs before a project begins construction, and a cash grant is awarded approximately 60 days after a project submits its application after being placed-in-service, bridge financing is often necessary to finance construction costs during that time frame. However, the availability of cash grants makes securing a cash grant bridge loan straight-forward for good projects.

Figure 7-1: Forecast Election of the Cash Grant in Wind and Solar if the Cash Grant is Extended Through 2012

	2011	2012	2013
Wind Project Achieved Financing Requirement ($M)	$10,045	$11,300	$11,896
Wind Projects Electing Cash Grant	75%	75%	0%
Cash Grant (as percentage of CAPEX)	30%	30%	0%
Wind Cash Grants ($M)	$2,260	$2,543	$0
Remaining Wind Project Financing Requirement (M)	$7,785	$8,758	$11,896
Solar Project Achieved Financing Requirement ($M)	$14,132	$18,331	$21,580
Solar Projects Electing Cash Grant	80%	80%	0%
Cash Grant (as percentage of CAPEX)	30%	30%	0%
Solar Cash Grants ($M)	$3,392	$4,399	$0
Remaining Solar Project Financing Requirement (M)	$10,740	$13,931	$21,580
Cumulative Cash Grants ($M)	$5,652	$6,942	$0
Cumulative Remaining Financing Requirements ($M)	$18,525	$22,689	$33,476

Source: GTM Research

Figure 7-2: Forecast Election of the Cash Grant in Wind and Solar if the Cash Grant is Not Extended Through 2012

	2011	2012	2013
Wind Project Achieved Financing Requirement ($M)	$10,045	$11,300	$11,896
Wind Projects Electing Cash Grant	75%	0%	0%
Cash Grant (as percentage of CAPEX)	30%	0%	0%
Wind Cash Grants ($M)	$2,260	$0	$0
Remaining Wind Project Financing Requirement (M)	$7,785	$11,300	$11,896
Solar Project Achieved Financing Requirement ($M)	$14,132	$18,331	$21,580
Solar Projects Electing Cash Grant	80%	0%	0%
Cash Grant (as percentage of CAPEX)	30%	0%	0%
Solar Cash Grants ($M)	$3,392	$0	$0
Remaining Solar Project Financing Requirement (M)	$10,740	$18,331	$21,580
Cumulative Cash Grants ($M)	$5,652	$0	$0
Cumulative Remaining Financing Requirements ($M)	$18,525	$29,631	$33,476
* Cash grant award timelines will not sync with financial close.			

Source: GTM Research

7.2 Extension or Expiration of PTC for Utility-Scale Wind

It should be noted that in forecasting wind project finance requirements, we have assumed that the PTC is—at a minimum—extended to the end of 2013. If the PTC for wind is not extended, as has occurred on several occasions over the past ten (10) years when Congress has allowed the incentive to expire, securing project financing will prove extremely difficult.

While wind is approaching cost parity with conventional generating assets in several U.S. energy markets, and State Renewable Portfolio Standards (RPS) will still provide a demand pull for the installation of renewable generating assets, the absence of the PTC would leave the wind industry with no Federal deployment incentives. After 2012, the absence of any Federal incentive for utility-scale onshore wind (and other PTC technologies a year later) would result in the ramping down of deployment, financing, component supply chains, and installation pipelines, causing demand-supply mismatches and corresponding price increases, as witnessed from 2004 to 2008 during the PTC "boom-bust cycle".

7.3 Other Novel Policy Concepts

While the Section 1603 Grant Program, PTC, and ITC represent the existing Federal incentives leveraged in project financing structures (in addition to MACRS) by developers to date, their future is all but certain in today's political climate.

While still nascent policy proposals, two alternative approaches to current Federal energy tax policy are at the very early stages of being socialized and developed: (1) allowing renewable energy projects to qualify as master limited partnerships (MLPs), and (2) overhauling and consolidating the current tax incentive structure into a technology-neutral, production cash grant.

While these proposals are intriguing, they would require new legislation and potentially budgetary offsets. And just like a simple extension to an existing tax incentive, Congressional appetite for considering such proposals is unclear.

7.3.1 Master Limited Partnerships

A Master Limited Partnership (MLP) is a publicly-traded partnership structure utilized by the energy and natural resources industry for over three decades. Currently, 72 energy-related businesses constitute 78% of all existing MLPs representing a market capitalization exceeding $220 billion — a 146% growth from 2009 -2010. In 2010, $13 of the $15 billion of capital raised by MLPs was related to oil and gas industry activities.

The primary tax advantage of an MLP structure over a C Corporation is that its income is not subject to a corporate income tax. Instead, MLP tax liability is "passed-through" to the partners, and taxed at their personal, ordinary income levels. Although renewable energy projects are not explicitly excluded from eligibility in the statutory language authorizing MLPs, an accompanying Congressional report in 1988 indicates the intent to restrict eligibility of qualifying income to projects involving exhaustible natural resources.

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Expanding the definition of "natural resources" in the Master Limited Partnership statute to include projects currently eligible for the Section 1603 Cash Grant Program would allow renewable energy project developers in the U.S. to utilize the same successful business structure—and associated tax status—actively used by the fossil fuel industries.

7.3.2 Technology Neutral Production Cash Grant

A more technology-neutral approach to energy tax policy could streamline the currently complicated, targeted incentives in the tax code and attract enough private investment to phase out the subsidies in a predictable, timely way, according to sources working in the renewable energy industry. In theory, such an incentive would be awarded on technology or feedstock characteristics, but rather on performance metrics such as emissions.

A well-designed mechanism would alleviate many concerns and inefficiencies inherent in the current Federal tax incentives for renewable energy such as the "picking winners and losers" argument (technology neutral), a need to engage the tax equity market (cash grant), awarding projects on production, and policy stability (orderly phase-out).

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8 CONCLUSION

Nearly three (3) years since the onset of the financial crisis, the availability of project financing to renewable energy projects in the U.S. has improved somewhat due to the thawing of the lending markets and the passage of the Recovery Act Programs. However, considerable uncertainty remains as the industry awaits final word on the potential extension of the the Section 1603 Cash Grant Program now, the PTC for wind in 2012, and as tax equity markets continue their tenuous rebound from their historically low, recessionary depths.

Overall, we predict the forecasted supply for project financing will not be able to meet the demand sought by the renewable energy sector through 2013. We believe that larger, high-quality projects from established developers with well-priced PPAs from creditworthy off-takers will continue to be able to access project financing at reasonable terms over the next several years. However, limitations or retrenchment in the project financing markets—whether for debt, tax equity or direct equity—are likely to constrain financings for smaller projects, less-established developers, and/or projects with higher technology or development risks.

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9 APPENDIX 1: 2010 PROJECT DATA

Figure 9-1: Shepherds Flat Wind Financing Summary

GENERAL	Project	Shepherds Flat		
	Type	Wind		
	State	OR		
	Developers	Caithness, GE EFS		
	Size	845 MW-AC		
	Signing Date	Dec-10		
	Construction Commencement	Apr-10		
	Est. Completion	Apr-12		
	Loan Guarantee Amount($M)/Conditional Commitment/ Close	$960	Oct-10	Dec-10
	Cash Grant Amount ($M)	$494.1		
	Cost/W	$2.52		
	Debt & Equity ($M)	$2,128.1		
EQUITY	Total Equity ($M)	$702.2		
	Equity Providers	Caithness Energy, GE EFS		
	Average Amount Provided ($M)	$351.1		
DEBT	Total Debt ($M)	$1,425.9		
	Debt Providers/Deal Margin	BTMU	Libor 137.5bp	
		Citibank		
		RBS	Libor 262.5bp	
		WestLB		
		Banco Sabadell		
		Bayern	Libor 70bp	
		CoBank		
		Dexia		
		Helaba	Libor 262.5bp	
		Santander		
		Scotia Capital		
	Average Amount Provided ($M)	$81.9		
	Tranches/Tenors/Value ($M)	Letters of Credit	7	$114
		Letters of Credit	7	$112
		Construction & Term	14	$540
		Construction & Term	14	$135
		Private Placement Bonds	21.5	$525
	Private Placement Bonds	Citibank		
	Amount ($M)	$525		

Source: GTM Research, Project Finance Magazine

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Figure 9-2: Idaho Wind Partners Project Financing Summary

GENERAL	Project	Idaho Wind Partners I		
	Type	Wind		
	State	Idaho		
	Developers	Exergy, GE EFS		
	Size	183 MW-AC		
	Signing Dates	Oct 2010 / Jan 2011		
	Construction Commencement	Unknown		
	Est. Completion	Unknown		
	Loan Guarantee Amount($M)/Conditional Commitment/ Close	None		
	Cash Grant Amount ($M)	$131 (est.)		
	Cost/W	$2.14		
	Debt & Equity ($M)	$390.8		
EQUITY	Total Equity ($M)	$149.8		
	Equity Providers/Amount ($M)	Reunion Power	$36.6	
		Atlantic Power	$40.0	
		GE EFS	$36.6	
		Exergy	$36.6	
DEBT	Total Debt ($M)	$241.0		
	Debt Providers/Deal Margin	BTMU	Libor 250-275bp	
		ING	Libor 250-275bp	
		Nord/LB	Libor 250-275bp	
	Average Amount Provided ($M)	$80.0		
	Tranches/Tenors/Value ($M)	Construction & Term	17	$139
		Cash Grant Bridge		$83
		Construction & Term		$19

Source: GTM Research, Project Finance Magazine

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Figure 9-3: Avenal Solar Project Financing Summary

GENERAL	Project	Avenal		
	Type	Solar PV		
	State	CA		
	Developers	Eurus Energy, NRG		
	Size	58MW-DC		
	Signing Dates	Sep-10		
	Construction Commencement	Oct-10		
	Est. Completion	Jun-11		
	Loan Guarantee Amount($M)/Conditional Commitment/Close	None		
	Cash Grant Amount ($M)	$80.5 est.		
	Cost/W	$4.16		
	Debt & Equity ($M)	$241		
EQUITY	Total Equity ($M)	$32		
	Equity Providers/Amount ($M)	Eurus Energy	$16	
		NRG Energy	$16	
DEBT	Total Debt ($M)	$209		
	Debt Providers/Deal Margin	Natixis	Libor 2bp	
		UniCredit		
		Credit Agricole	Libor 200bp	
		Mizuho		
		Santander		
		Sumitomo Mitsui		
	Average Amount Provided ($M)	$35		
	Tranches/Tenors/Value ($M)	Construction & Term	15	$132
		Cash Grant Bridge	1	$54
		Letters of Credit	8	$23

Source: GTM Research, Project Finance Magazine

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Figure 9-4: Ivanpah Solar Project Financing Summary

GENERAL	Project	Ivanpah		
	Type	Solar CSP		
	State	CA		
	Developers	BrightSource		
	Size	392 MW-AC		
	Signing Date	Apr-11		
	Construction Commencement	2010		
	Est. Completion	2012-2013		
	Loan Guarantee Amount($M)/Conditional Commitment/Close	$1,600	Feb-10	Apr-11
	Cash Grant Amount ($M)	None		
	Cost/W	$5.02		
	Debt & Equity ($M)	$2,360		
EQUITY	Total Equity ($M)	$760		
	Equity Providers	NRG Energy, Google		
	Amount Provided ($M)	$592, $168		
DEBT	Total Debt ($M)	$1,600		
	Debt Providers/Deal Margin	US Federal Financing Bank		
	Tranches/Tenors/Value ($M)	N/A		

Source: GTM Research, Project Finance Magazine

Figure 9-5: Solana Solar Project Financing Summary

GENERAL	Project	Solana		
	Type	Solar CSP		
	State	AZ		
	Developers	Abengoa		
	Size	280 MW-AC		
	Signing Date	Dec-10		
	Construction Commencement	2010		
	Est. Completion	2012-2013		
	Loan Guarantee Amount($M)/Conditional Commitment/Close	$1,450	Jul-10	Dec-10
	Cash Grant Amount ($M)	None		
	Cost/W	$7.03		
	Debt & Equity ($M)	$1,967		
EQUITY	Total Equity ($M)	$517		
	Equity Providers	Abengoa		
	Amount Provided ($M)	$517		
DEBT	Total Debt ($M)	$1,450		
	Debt Providers/Deal Margin	US Federal Financing Bank		
	Tranches/Tenors/Value ($M)	N/A		

Source: GTM Research, Project Finance Magazine

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