ACORE

CREIA

US-CHINA
QUARTERLY MARKET REVIEW

WINTER 2011

US-CHINA
QUARTERLY MARKET REVIEW

WINTER 2011

A COLLABORATIVE REPORT BY:

American Council On Renewable Energy (ACORE)
1600 K Street NW, Suite 700
Washington, DC 20006
www.acore.org

Chinese Renewable Energy Industries Association (CREIA)
A2106 Wuhua Plaza
Che Gong Zhuang Dajie A4
Xicheng, Beijing 100044
www.creia.net

CREIA:
Li Junfeng, Contributor
Ma Lingjuan, Editor & Contributor
malingjuan@creia.net

ACORE:
Michael Eckhart, Contributor
Tim Cronin, Primary Editor & Contributor
cronin@acore.org

SECTION AUTHORS:

U.S. Renewable Energy Markets
Navigant Consulting
Andy Wickless
andy.wickless@navigantconsulting.com

U.S. Renewable Energy Policy
David Gardiner & Associates
Margot Littlehale, Bill White, Ryan Hodum
ryan@dgardiner.com

U.S. Renewable Energy Finance
Orrick, Herrington & Sutcliffe
Thomas Glascock, Michael Meyers, Christopher Gladbach
cgladbach@orrick.com

China Renewable Energy Markets
GL Garrad Hassan
Chris Elkinton
chris.elkinton@gl-garradhassan.com

China Renewable Energy Policy
Milbank, Tweed, Hadley & McCloy
Shepard Liu
shepard.liu@milbank.com

China Renewable Energy Investment
Covington & Burling
Tim Stratford, Chris Angell, Ellen Eliasoph
eeliasoph@cov.com

US-CHINA PROGRAM

ACORE's US-China Program (USCP) is dedicated to increasing understanding of renewable energy policy, finance, and markets among industry participants and policymakers in the U.S. and China, with the aim of expanding renewable energy markets and promoting effective renewable energy policy.

ACORE members who are leading voices in the U.S. and Chinese renewable energy industries are invited to join USCP as partners. Our partners actively shape program direction through consultation with other partners, the USCP strategic advisors, and ACORE staff.

We thank the USCP partners for their special effort toward this Winter 2011 US-China Quarterly Market Review (QMR).

Applied Materials
Lisa Yang
lisa_yang@amat.com

DuPont
Stanley Merritt
Stanley.D.Merritt@usa.dupont.com

GCL-Poly Energy
Shell Jiang
Shelljiang@gclsolarenergy.com

Hudson Clean Energy Partners
Camilla Sharples
camilla.sharples@hudsoncep.com

Orrick, Herrington & Sutcliffe
Clara Rodriguez
clrodriguez@orrick.com

ACORE additionally thanks the USCP strategic advisors for their input to the QMR:

Shi Dinghuan
Chairman, Chinese Renewable Energy Society
Eric Martinot
Visiting Scholar, Tsinghua University
Li Junfeng
Secretary-General, CREIA
Joanna Lewis
Assistant Professor, Georgetown University
William Wallace
Senior Project Leader, NREL
Victor Yuan
CEO, Horizon Research Consultancy
Margret Kim
China Program Director, California Air Resources Board
Qin Haiyan
Secretary-General, Chinese Wind Energy Association
Louis Schwartz
President, China Strategies
Jing Su
Vice President, ENN Group North America

Dear Participants in the US-China Program:

We are pleased to present the second US-China Quarterly Market Review from the US-China Program (USCP) of the American Council On Renewable Energy (ACORE), prepared in cooperation with the Chinese Renewable Energy Industries Association (CREIA).

The Quarterly Market Review presents executive-level information on the U.S. and Chinese renewable energy markets in the areas of policy, market development, finance, and investment. By providing this information, USCP aims to increase understanding of these complex competitive landscapes among industry participants and observers.

USCP hopes to build not only market understanding, but also partnerships between U.S. and Chinese firms. As this Quarterly Market Review demonstrates, the opportunities in the U.S. and Chinese renewable energy markets are vast, and the benefits of collaborating to develop technologies, raise capital, and develop renewable energy projects are clear.

By reading this report—with its excellent contributions from ACORE members—we hope to aid your success in scaling up renewable energy in the U.S. and China and forging partnerships across the Pacific.

Sincerely,

Michael Eckhart
President
ACORE

Li Junfeng
Secretary-General
CREIA

TABLE OF CONTENTS

U.S. MARKET REVIEW

U.S. RENEWABLE ENERGY MARKETS: FOCUS ON TEXAS WIND

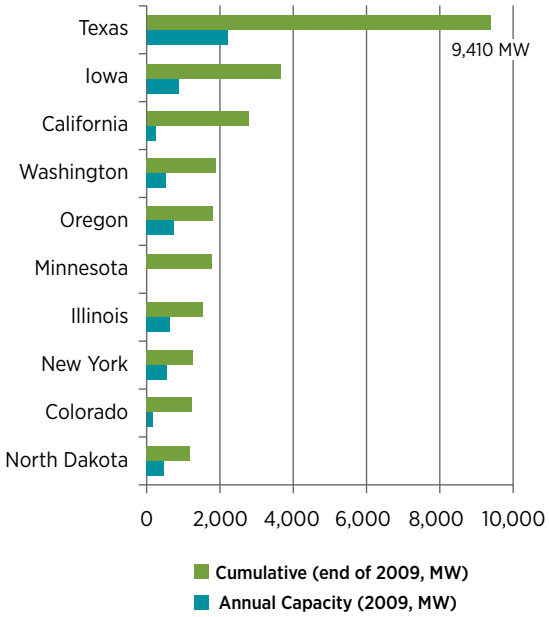
U.S. renewable energy markets in 2010 were mixed as compared to previous years. The U.S. wind market in 2010 is expected to fall to 4-6 GW from 10 GW in 2009. This is due, in part, to a slowdown in new project development following the 2008 financial crisis, the short-term nature of financial incentives, and a drop in electricity prices. This will mark the first time since 2004 that the U.S. wind sector would not surpass the previous year's growth. The U.S. solar PV market, however, is expected to double in 2010 (800-1000 MWp) as compared to 2009 (488 MWp). Demand in the PV market has been driven by lower system prices, state-level incentives, and the Section 1603 Treasury Cash Grant Program. According to the Geothermal Energy Association (GEA), it is unlikely that new geothermal capacity in 2010 will reach 2009 levels (176 MW). However, GEA forecasts that between 500 and 700 MW of projects will reach "advanced phases of construction" during Q4 2010 and 2011.

As wind continues to be the largest renewable energy market of any technology, this quarterly report will focus on the Texas wind market, one of the largest in the world.

TEXAS WIND MARKET

In 2006, Texas' installed wind capacity surpassed that of California. California had been the U.S. leader since 1981. As seen in Figure 1, by the end of 2009, Texas was still the leader in wind, both in new additions in 2009 (2.3 GW) and total installed capacity (9.4 GW). The closest state in either category was only 40% of that of Texas. If Texas were a country, it would rank sixth in the world in terms of cumulative installed wind capacity. Moreover, the largest wind farm in the world and the top six in the U.S. are in Texas.

Figure 1: TOP U.S. STATES — WIND CAPACITY



Source: AWEA

Texas wind development has seen steady growth in the last decade but is slowing as transmission capacity reaches its limitations. In installed capacity, Texas has experienced a '00-'09 CAGR of 48%, compared to the US average of 30%. However, as mentioned, 2010 is expected to be a slower year for the U.S. wind sector. According to the American Wind Energy Association (AWEA) projects database, only 322.1 MW have come online in 2010 and only 350.1 MW are currently under construction in Texas. Successful implementation of the Competitive Renewable Energy Zone (CREZ)-driven transmission infrastructure (to be discussed below) will likely return the Texas wind market to previously seen growth rates.

DRIVERS OF WIND DEVELOPMENT IN TEXAS

Wind power growth in Texas is driven by both renewables-specific drivers as well as wind-specific drivers. Drivers of renewable energy development, as compared to conventional energy resources include:

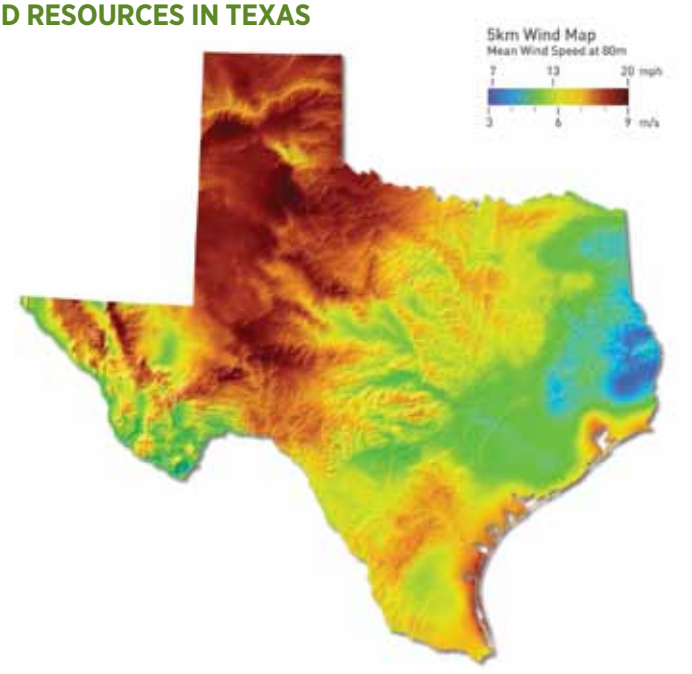
- Renewable portfolio standards or goals
- Federal financial incentives such as the Production Tax Credit (PTC), the Investment Tax Credit (ITC), Department of Energy (DOE) loan guarantees, and accelerated depreciation rules.
- The fuel price volatility of Texas' natural gas-heavy generation fleet
- Customer demand for renewable energy

Drivers of wind energy development, as compared to other renewable energy resources include:

- Lower levelized cost of energy (LCOE) for wind as compared to solar
- High capacity factors due to strong winds in Texas
- Easier permitting for wind in Texas as compared to other states
- Scalability of wind farms as compared to solar
- Less land use per megawatt as compared to ground-mount solar
- Relatively close proximity to load as compared to other states

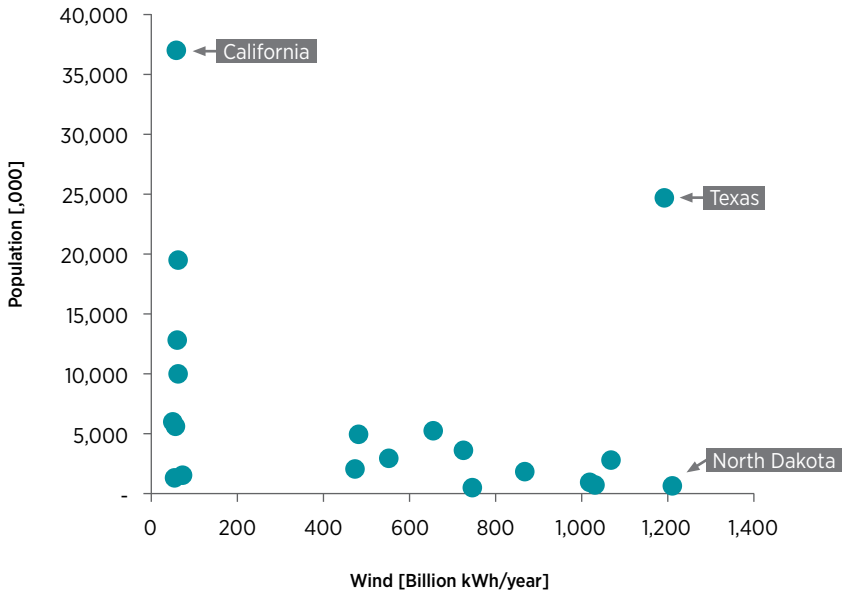
Texas' abundant wind resources are among the best in the country, leading to high potential capacity factors. As seen in Figure 2, the most favorable sites for wind power are located in the panhandle, in the west, and along the Gulf Coast. However, only a limited amount of

Figure 2: WIND RESOURCES IN TEXAS



Source: 3TIER

Figure 3: TOP 20 STATES IN WIND POTENTIAL (BY POPULATION)



Source: Pacific Northwest Laboratory, U.S. Census Bureau

the prime resources are located near electricity loads. As a result, significant transmission investment is needed to interconnect the favorable wind resources.

As shown in Figure 3, Texas is unique among states in that it is both windy and populous, making it a prime market for wind power. In the U.S., people have generally chosen to live where the wind does not blow. This holds true for Texas. However, among the windiest states in the U.S., Texas has the highest population by far. Similarly, among the most populous states, Texas is the windiest.

BARRIERS TO WIND DEVELOPMENT

Barriers—primarily transmission-related—could limit wind installations in Texas if not effectively resolved. Barriers to renewable energy development, as compared to conventional energy resources include:

- Typically higher LCOE (for wind and particularly for solar) than conventional sources; natural gas prices in 2009 and the first half of 2010 were lower than in previous years
- Higher up-front capital costs (per kW) as compared to coal and natural gas
- Variability of both wind and solar power; lack of dispatchability
- Lack of economies of scale; projects are smaller than those for coal, natural gas, and nuclear

Barriers to wind energy development, as compared to other renewable energy resources include:

- Transmission constraints, as compared to distributed renewables, including access to sufficient transmission, delays and uncertainties with interconnection queues, and complexity of wind integration into grid operations
- Significant permitting and community acceptance thresholds for wind and transmission
- Mismatch of wind output with load: wind is most abundant at night when load is low while solar is better matched to load

Transmission, interconnection, and integration are key barriers in incorporating more wind power in Texas' energy mix:

- Transmission Planning: How to build the transmission lines needed to connect wind projects and transfer power between regions.
- Wind Interconnection: Codes and standards governing the performance of wind plants, particularly during grid disturbances.
- Wind Integration: How to operate the power system with variability and uncertainty.

While lack of transmission has caused numerous problems for wind in Texas, CREZ-related transmission additions (to be discussed below) should enable growth.

TRANSMISSION PLANNING CONSTRAINTS

There has historically been a "chicken and egg" dilemma for transmission development. Wind developers have been reluctant to construct wind farms without the needed transmission lines in place or planned. Similarly, transmission operators have been reluctant to build transmission lines without the assurance that wind farms will be built and interconnected. Ineffective cost allocation methodologies for transmission upgrades have limited both wind and transmission development.

COMPETITIVE RENEWABLE ENERGY ZONES (CREZ)

The state of Texas appears to have solved the "chicken and egg" dilemma through the establishment of CREZs. In 2005, the Texas legislature passed a law that enabled the Texas Public Utilities Commission (PUC) to create CREZs and develop plans to build the transmission infrastructure necessary to deliver wind energy from the CREZs to electricity customers. The Texas PUC will allow utilities to recover the approximately $5 billion in capital costs through rates. Additionally, wind developers will provide transmission service providers with assurance of commitment by posting collateral. The resulting transmission upgrades are expected to enable 18,000+ MW of wind generation in Texas.

The CREZ plan will not provide an immediate solution, however. Curtailment is likely to continue for the next few years until much of CREZ transmission is complete. In addition, there are an increasing number of delays in the construction of the transmission lines due to landowner opposition to the visual impacts of such construction.

TRANSMISSION INTERCONNECTION CONSTRAINTS

The Electric Reliability Council of Texas (ERCOT), as well as most other markets, suffers from a lengthy interconnection backlog which delays wind development. As of Q1 2010, there was about 300,000 MW of wind in interconnection queues in the U.S. About 50,000 MW of this queue backlog was in Texas. Factors contributing to long interconnection queues include: fast growth of wind markets, low interconnection queue entry and exit requirements, queue positions in suspension, and re-studies.

WIND INTEGRATION CONSTRAINTS

While integrating wind into the grid is challenging given its variability, there are proven ways to accommodate the integration of wind.

Wind Integration Issues:

- Wind output cannot be controlled with much accuracy
- Variability can affect system operation and cost
- There are more high-ramp requirements with wind than without wind[1]
- A system with wind generation needs more active load-following generation capability[2]
- Electricity markets were not designed with significant amounts of wind power in mind

1 A high-ramp event occurs when variable winds cause large increases or decreases in wind output in a short amount of time.
2 Load-following generation is generally between base load power and peaking power in terms of efficiency and the speed of startup. Power output from load-following generation is adjusted in accordance with demand and typically runs during the day.

Accommodating Wind:

- Wind output forecasting is critical to reducing uncertainty; ERCOT began using forecasting tools from AWS Truewind in 2008
- Geographically diverse wind resources and larger balancing areas reduce operational impacts
- Adequate dispatchable resources can be maintained to account for any variance in wind generation; Texas has significant natural gas generation
- ERCOT's move from a zonal market to a nodal market will potentially alleviate limitations of the current dispatch procedures and provide for rapid system responsiveness. In the old zonal market, congestion was managed and electricity was priced across only four zones. In the new nodal system, electricity will be priced at 8,000 nodes, improving price signals and alleviating congestion.

CONCLUSIONS

Texas is the leading U.S. state in wind development. This is primarily driven by the state's very strong wind resources, significant loads, and favorable permitting conditions. Transmission-related barriers have caused significant wind curtailment and are likely to slow wind development until they are addressed. Implementation of CREZ will enable substantially greater volumes of wind energy to be transferred from strong resource areas to load centers with less congestion. Until CREZ is fully implemented, however, issues will remain. Finally, ERCOT's nodal market, launched in December 2010, will likely better accommodate wind's variability by alleviating limitations of the current dispatch procedures and by providing for rapid system responsiveness.

U.S. RENEWABLE ENERGY POLICY: IMPACT OF THE 2010 ELECTIONS

Smart policy at both the state and federal level has continued to foster renewable energy markets across the U.S. The 2010 midterm election results underscore the need for a continued focus on job creation and economic innovation, both of which are central to renewable energy deployment, making it an issue ripe for bipartisanship during the 112th Congress.

This section provides updates on U.S. elections and renewable energy policy tools. These include an overview of the midterm elections and federal policy, such as tax benefits and loan guarantees, as well as state policy, including net metering and transmission reform.

ELECTION OUTCOMES

The results of the 2010 national midterm elections represent a historic shift in political power for Republicans, with Democrats losing 65 seats in the House of Representatives and six seats in the Senate. Republican leadership has claimed it represents a mandate to curtail government, which will have broad implications for the renewable energy industry. The election represents huge change in Washington and creates uncertainty for renewable energy policy.

A notable state election outcome occurred in California where over 60% of voters rejected Proposition 23. The proposition would have suspended California's 2006 carbon reduction law, known as AB 32, until the state's unemployment rate (12.4% at the time of voting) reached 5.5%. Following the resounding defeat of Proposition 23, the California Air Resources Board voted to approve regulations that will establish a cap-and-trade program for greenhouse gas emissions, scheduled to launch in 2012. The decision will drive the development of renewable energy jobs and projects throughout the state.

COMMITTEE ASSIGNMENTS

The new Republican majority in the House of Representatives will result in changes in congressional committee assignments that may impact legislation for renewable energy programs. Rep. Fred Upton (R-MI) will succeed Rep. Henry Waxman (D-CA) as Chairman of the House Energy & Commerce Committee. Rep. Upton will split the current Energy and Environment Subcommittee into two separate subcommittees: Energy and Power, which will have jurisdiction over energy and Clean Air Act issues, and Environment and Economy, which will focus on other environmental regulations and their economic impact. Rep. Upton has previously sponsored legislation to promote renewable energy sources; however, during his campaign for Chairman he reversed his positions in an effort to bolster conservative credentials.

EXPECTATIONS FOR CONGRESS IN 2011

In recent history, there remained an opportunity to pass energy legislation during times of political division. In 2005, with power divided between Democrats and Republicans in Congress, a Republican president signed into law the Energy Policy Act. In 2007, a Democrat-controlled Congress passed the Energy Independence and Security Act, which was signed into law by a Republican president. Renewable energy has bipartisan appeal given its importance to national security, reducing reliance on oil imports, and fostering innovation in the private sector.

Despite historical precedent, progress for renewable energy policy under the 112th Congress with strengthened Republican caucuses is uncertain. A recent poll from *The Washington Post*, found that 49% of Republican voters prefer to work with Democrats on energy, while 46% prefer to try to stop changes to energy policy.[3] Actions

3 http://www.washingtonpost.com/wp-srv/politics/polls/postpoll_113009.html?hpid=topnews

during the second half of 2010 reflected this divide in attitudes toward renewable energy. Republicans have voted to extend the Section 1603 Treasury Cash Grant Program during the recent lame-duck session of Congress (to be discussed below), but also authored the Pledge to America, which among other things would scrap remaining incentives for clean energy projects under the American Recovery and Reinvestment Act (ARRA).[4] The approach that prevails within the Republican Party in the coming two years will greatly affect renewable energy policy outcomes.

Republicans have continued to raise the possibility of enacting a national Clean Energy Standard (CES) as one potential area for progress in 2011. Slightly different from the Renewable Electricity Standard (RES) introduced by the Senate Energy and Natural Resources Committee in 2010, a CES would include nuclear energy and possibly other alternative energy generation technologies. According to *The Hill*, the top Republican on the Committee, Senator Lisa Murkowski (R-Alaska) expects the idea will gain traction among Republicans in the next Congress. Some, such as Senator Lindsey Graham (R-SC), have echoed this sentiment. [5]

FEDERAL POLICIES

FEDERAL TAX BENEFITS

During the recent lame-duck session in Congress, Republicans and Democrats brokered a compromise over the Bush-era tax cuts, adopting an $858 billion legislative package signed by President Obama on December 17.[6] The tax package contains a one-year extension of the Section 1603 Treasury Cash Grant Program, allowing new renewable energy projects to receive a 30% cash payment from the U.S. Treasury Department in lieu of the Investment Tax Credit (ITC) or Production Tax Credit (PTC). The bill also extends a number of other provisions including ethanol and energy efficiency incentives.[7] The US Partnership for Renewable Energy Finance (US-PREF) analyzed the benefits of 1603 and found that the program has already created 104,068 jobs in the renewable energy sector. Now that it has been extended, it has the potential to create an additional 201,379 jobs in 2011. US-PREF estimates that if allowed to lapse it would have resulted in $24 billion in canceled investment in renewable energy projects.[8]

Key provisions, such as renewing the 48(c) Advanced Manufacturing Tax Credit, were not included in the tax package, despite efforts by Senate Democrats. Under ARRA, 48(c) authorized the Department of Treasury to award $2.3 billion in tax credits for qualified investments in renewable energy projects to support new, expanded, or re-equipped domestic manufacturing facilities. Senators Bingaman (D-NM) and Snowe (R-ME) called for an additional $2.5 billion of credit to the 48(c) program, which would have been enough to leverage $8.3 billion in new capital investments in renewable energy.[9]

LOAN GUARANTEES

The Department of Energy (DOE) recently awarded Caithness Energy a $1.3 billion loan guarantee to build the world's largest wind farm in eastern Oregon. This wind farm will produce 845 MW (compared to now second-largest 735.5 MW wind project Horse Hollow Wind Energy Center in Texas) with a generating capacity of 2.5 MW per wind turbine. In addition to the DOE loan guarantee, the project received strong financial backing on account of a power purchase agreement (PPA) with Southern California Edison (SCE) that guaranteed fixed prices on wind turbines for 20 years.[10] Despite this recent announcement, both Republicans and Democrats have called for an "overhaul" of the DOE loan guarantee program, including Senator Jeff Bingaman (D-NM), Chairman of the Senate Energy and Natural Resources Committee.

4 http://climateprogress.org/2010/09/23/gop-pledge-to-america-big-oil-exxon-lobbyist-brian-wild/
5 http://thehill.com/blogs/e2-wire/677-e2-wire/134389-murkowski-sees-gop-traction-for-clean-energy-standard.
6 http://topics.nytimes.com/top/reference/timestopics/organizations/c/congress/lameduck_session/index.html
7 http://www.acore.org/about/2010/12/17/acore_and_us_pref_salute_house_and_senate_passage_1603_treasury_grant_program_tgp_e
8 http://www.uspref.org/white-papers/A_US%20PREF%20Jobs%20Analysis%201603%20v2.2.pdf
9 http://bingaman.senate.gov/policy/aetia_summ.pdf
10 http://apps1.eere.energy.gov/news/progress_alerts.cfm/pa_id=453

SOLAR ENERGY ZONES

In December 2010, Secretary of the Interior Ken Salazar and Secretary of Energy Steven Chu announced an environmental analysis that establishes "solar energy zones" on public lands in six western states qualified for solar energy production: California, Colorado, Nevada, New Mexico, and Utah. These areas have been identified as possessing the highest solar energy potential with the least impact on the environment. The draft plan is open to public comment through March 17, 2011. Under this plan, about 22 million acres of land would be eligible to apply for solar development. The "solar energy zones" will standardize the authorization process and create mandatory design features for solar panels on public land managed by the Bureau of Land Management, an agency within the Interior Department.

STATE POLICIES

NET METERING

Failure to pass a national RES has encouraged states to pave the way for renewable energy deployment. In 2010, 20 U.S. states were recognized by the Network for New Energy Choices for improving their interconnection programs to link renewable energy systems to the electric distribution grid. In addition, 43 states now have statewide net metering programs that credit owners of renewable energy facilities through market-based incentives.[12]

TRANSMISSION REFORM

The Federal Energy Regulatory Commission (FERC) recently approved two forward-looking proposals to broadly share the costs of high-voltage transmission lines that will connect consumers to renewable resources across the Midwest and South.

The Midwest Independent Transmission System Operator (MISO) — the manager of the electric grid in all or parts of 13 states from North Dakota to Ohio to Missouri — may now spread the costs of certain new interstate transmission lines evenly among all electric customers in the region. The so-called "Multi Value Projects (MVPs)" are transmission lines identified through a collaborative regional planning process that provide broad benefits to all customers such as greater reliability and access to low-cost renewable energy.

FERC also approved the Southwest Power Pool's (SPP) "Highway/Byway" proposal to broadly share the costs of high-voltage transmission upgrades to the electric grid it operates in all or parts of Kansas, Oklahoma, Missouri, Arkansas, Texas, Louisiana and Nebraska.[13] The new lines will improve system reliability and reduce congestion costs while connecting renewable resource-rich western regions with population centers in the east.

Both proposals aim to overcome a critical barrier to renewable energy development: the insufficient transmission capacity to move electricity from remote, resource-rich regions to population centers. By broadly sharing costs of this essential infrastructure, FERC and the grid operators will open markets to renewable energy and dramatically accelerate renewable resource development in these regions.

CONCLUSION

Recent renewable energy policy victories at the state and national level, including the defeat of Proposition 23 in California, the one-year extension of the Section 1603 Treasury Cash Grant Program, and recent FERC transmission decisions, will continue to boost the sector in 2011 and beyond. While the prospects for progress on renewable energy policy in the 112th Congress remain uncertain, opportunities certainly exist to advance bipartisan renewable energy policies that create jobs and increase U.S. competitiveness. Furthermore, strong support for renewable energy among the public, the states, and the Obama Administration, allow for a hedging of bets on federal renewable energy legislation, with significant prospects for administrative and state-level victories.

11 http://www.blm.gov/wo/st/en/info/newsroom/2010/december/NR_12162010.html
12 http://www.newenergychoices.org/uploads/FreeingTheGrid2010.pdf (1-110).
13 http://blog.climateandenergy.org/2010/06/17/ferc-approves-spp-highway-byway-cost-allocation-plan/

U.S. RENEWABLE ENERGY FINANCE: TRENDS IN PROJECT FINANCING

This section analyzes recent trends in the U.S. for financing renewable energy projects, especially wind and solar projects. The section first presents some current market data concerning dollar amounts and types of investments that have been made in the renewable project space in the last several quarters. Then, the section discusses recent market observations in both the tax equity markets and project finance debt, and concludes with a discussion of structuring considerations for a developer or sponsor.

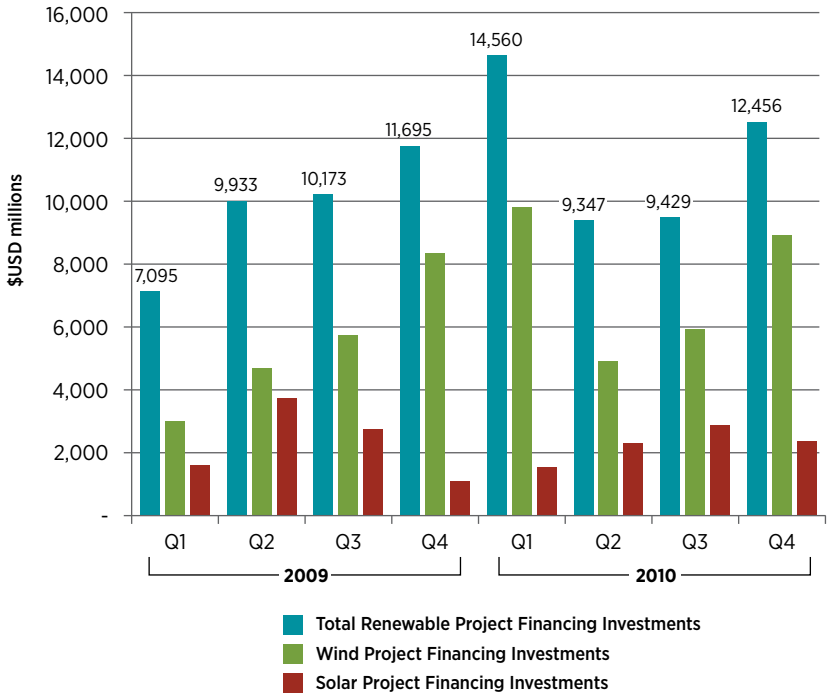
MARKET ACTIVITY

As Figure 4 demonstrates, all renewable energy market activity increased dramatically following the Q1 2009 slowdown, primarily as a result of the 2009 American Recovery and Reinvestment Act (Recovery Act) and the Section 1603 Treasury Cash Grant Program. Of this activity, approximately 54.6%, or $25.8 billion represents new build project loans, where 18.2% or $8.6 billion represents debt refinancing.

TRENDS & ANALYSIS

Typically, renewable energy projects are "project financed": the money used to build the project is advanced not to the sponsor of the project, but to a special purpose entity (SPE) whose sole business is building, owning and operating the project. The SPE structure is important, as repayment of the project debt or equity investment is non-recourse to the sponsor and the funding party looks solely to the project assets being financed and the revenue and tax benefits associated

Figure 4: RENEWABLE PROJECT FINANCING INVESTMENTS



Source: Bloomberg New Energy Finance

The following types of investments are considered: project construction debt, project term or refinancing debt, and tax equity investments.

with those assets for repayment. This underscores the importance of the project developer entering into strong off-take arrangements in the form of a power purchase agreement (PPA) with a utility or other power purchaser in order to successfully obtain financing for the project.

TAX EQUITY MARKET

Through 2007, the large majority of renewable project financings relied primarily on tax equity investors and sponsors with fairly large balance sheets. Historically, tax equity was provided by large institutional parties with dependable tax appetites, such as banks and insurance companies, who invested equity into projects and received the bulk of tax benefits and some cash flow. The major driver of this market was PTC investment, together with the Modified Accelerated Cost Recovery System (MACRS) depreciation. Most of these renewable financings had no project-level debt, and the tax equity investor would generally invest 65–70% of the project cost, with the sponsor (or a cash-return investor) investing 30-35%. To fund construction, in some cases, bank lenders advanced project construction debt that would be repaid by the SPE through a tax equity financing when the project reached commercial operation.

As discussed in the Fall 2010 market review, many large tax-equity investors disappeared altogether when the financial crisis hit, and the remaining investors had a greatly reduced tax-appetite. The abrupt loss of tax equity investors was devastating to the renewable energy sector, and the Section 1603 Treasury Cash Grant Program was critical to the recovery of renewable energy finance. The large majority of renewable energy financings in 2009 and 2010 relied on the cash grant.

DEBT MARKET

At the same time that the tax equity market contracted sharply, the financial crisis caused many of the most active debt lenders, including several European banks, to withdraw substantially from the U.S. renewable energy markets. Project finance loans became more expensive relative to central bank interest rates, tenors were shortened, and deals took much longer to arrange and close.

Project debt financing has recovered significantly from the late-2008, early-2009 market. In the first two quarters of 2010, project debt financing in the U.S. rose to $8.4 billion, compared to $5.9 billion for the same period in 2009. Although lending requirements remain generally conservative, with limited risk appetite for unproven technology or inexperienced developers, the markets have opened, and experienced sponsors with strong financial backing and solid power purchase agreements have been able to finance their projects on favorable terms and conditions. While in 2009 “mini-perm” loans were the rule, in 2010, fifteen-year, fully amortizing loans again became available.[14] At the same time, interest rates are near historical lows, making it possible to lock in very favorable interest rates for projects. The market has also benefited from the increased competition arising from additional lenders either entering or re-entering the market.

Lenders also quickly adapted to the Section 1603 Treasury Cash Grant Program, and typically include in the construction financing arrangements a bridge loan for 90–95% of the expected cash grant.

SPONSOR CHOICES

Sponsors must consider a variety of factors when considering how to finance a U.S. renewable project. For ease of execution, the cash grant combined with project debt may be the favored choice. However, with this structure the sponsor may not be able to use the bonus or MACRS depreciation, reducing economic efficiency. This can be overcome by including a tax investor in the financing, complicating the transaction. In addition, there are some potential pitfalls to the cash grant, including a claw back possibility if the project is taken out of service

14 “Mini-perm” loans have up to 15-year amortization schedules but typically mature with a balloon payment after 5 to 7 years.

or if an impermissible person takes an ownership interest in the project, such as an upstream parent transfer. For some wind projects, the best economic returns are achieved using a PTC financing, and the PTC tax equity market is more robust today than it was a year ago.

STRUCTURAL CONSIDERATIONS

Tax equity investments typically come in two main forms, a partnership flip structure or a sale-leaseback structure.

In a partnership flip, the tax-equity investor will usually purchase an interest in a project company from the developer. Pre-flip, the investor will then be allocated 99% of the taxable income and tax benefits and losses and a specified percentage of cash until the investor receives its agreed upon rate of return for the project. The structure then "flips," and the investor's share of income, losses and cash goes down to 5%. The sponsor will then have the option to buy out the tax-equity investor at fair market value when the tax equity investor has only a 5% interest in the project.

In a sale-leaseback transaction, the tax equity investor acts as lessor, and purchases the project and (generally) takes 100% of the tax benefits, funded in part by a loan from the project lender. The lessor simultaneously leases the project back to the project company. The project company, as lessee, then is entitled to the operating cash flow of the project, net of rent payments.

The core advantage of the sale-leaseback structure is the ability of a non-owner to claim the ITC with the cash grant option. The old owner can claim the ITC prior to the sale-leaseback or the new owner can apply for the grant after the sale-leaseback has occurred. Sponsors have until three months after a project enters service to close a sale-leaseback transaction and monetize these benefits for the benefit of the investor, after which the tax basis becomes lower and the benefits become less attractive. In addition, lease tax-equity may have the advantage of attracting more investors that are comfortable with the lease structure in the marketplace.

Key disadvantages of the leasing structure include the sponsor's inability to buy out the tax equity investor at a lower price (as is the case in the partnership flip), because the sponsor must pay the entire fair market value for the project. In addition, the lease structure requires generally greater discipline on the part of the developers. That is, the lease must be structured such that the equity investors receive their rent on time and in full, which may create structuring issues to account for the variability of intermittent resources. To provide more comfort to the lease tax-equity investor, the sponsor may have to provide several reserve accounts, much like a project lender would request.

CONCLUSION

The U.S. renewable energy project finance market is recovering. The tax equity market has not regained its former strength, but is improving with tax equity investors using investment structures compatible with the Section 1603 Treasury Cash Grant Program. As U.S. and international financial institutions recover, debt terms have improved and more lenders are participating. The extension of the Section 1603 Treasury Cash Grant Program through the end of 2011 will provide a significant near-term boost in activity.

CHINA MARKET REVIEW

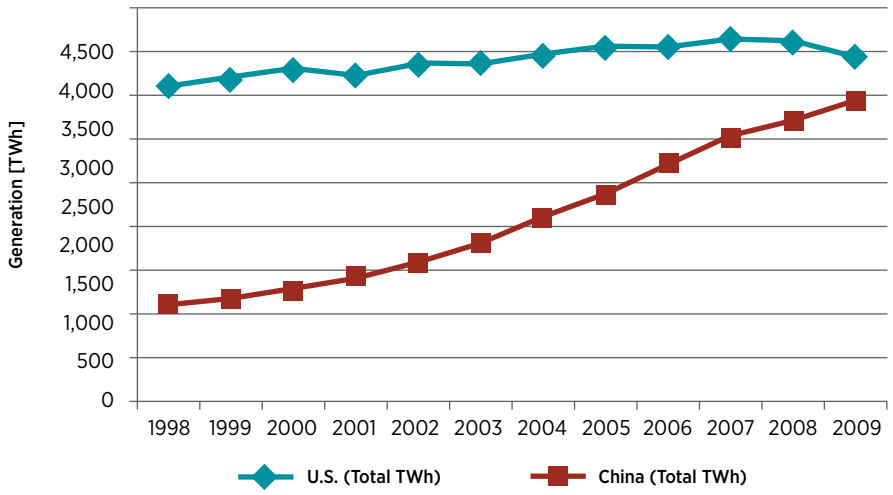
CHINA RENEWABLE ENERGY MARKETS: FOCUS ON THE WIND MARKET

OVERVIEW

Two trends are observed in China's electricity market. First, China's tremendous economic growth over the past two decades has led to a sharp rise in annual electricity demand, exceeding 10% on average. Second, while this growth continues to be strong, the growth rate has not been as strong over the past two years. Figure 5 below shows electricity generation levels for China and the U.S. from the past 12 years. Both trends noted above are expected to continue through the coming decades, as the projected growth in electricity consumption in China and the generation required to meet it remain huge.

The other principal feature of China's electricity generation and consumption pattern is the regional disparity between the main areas of primary resource and regions of greatest demand. The densely populated eastern seaboard has the strongest levels of economic activity, and thus demand. However, China's vast coal reserves are mainly found in

Figure 5: TOTAL NET ELECTRICTY GENERATION IN CHINA AND THE U.S.



Source: U.S. Energy Information Administration

15 http://tonto.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=2&pid=2&aid=12

the west and northwest of the country, hydropower is located principally in the southwest, and onshore wind resources are greatest in the north.

POWER GENERATION MIX

The National Development and Reform Commission (NDRC) reported China's cumulative installed generating capacity at the end of 2009 to be 874 GW.[16] As shown in Figure 6, thermal generation—overwhelmingly made up of coal-fired plants—accounts for almost three quarters of this capacity with the remainder largely consisting of hydropower.

Figure 7 shows the breakdown for new installations during 2009. Again, thermal generation (94% of which is coal-fired) accounts for the greatest contribution; however, the most notable aspect is that over 10% of all new installations during 2009 were wind generation plants reflecting the massive growth rate seen in this sector in China over the last few years.

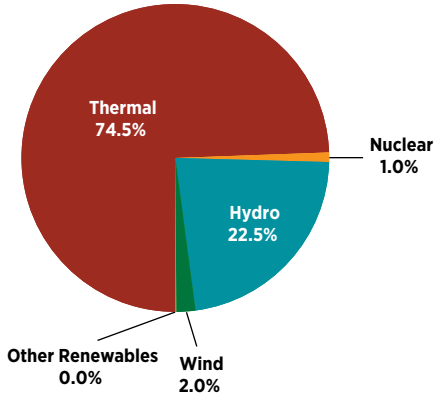
MARKET UPDATES

SOLAR

As discussed in the Fall 2010 market review, China is a global leader in the production of photovoltaic (PV) cells, however, the domestic market for PV is considered underdeveloped. In 2009, China held 40% of the global market share for PV cell production, while containing just over 1% of the 22.9 GW worldwide installed PV generating capacity.[17]

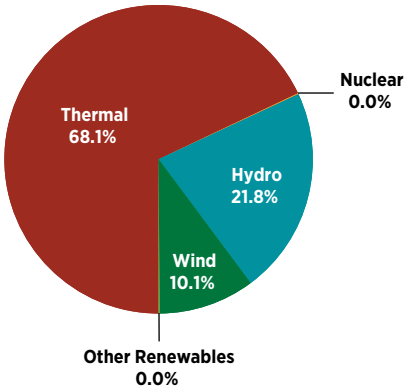
In an effort to match its PV manufacturing leadership position with national generation capacity, China has established significant goals for PV installation in the coming years. The National Energy Administration has called for 5 GW of PV capacity to be online by 2016,[18] and a further target of up to 20 GW by 2020 has also been discussed.[19] These longer-term goals are considered optimistic, however, and their success will greatly depend

Figure 6: TOTAL INSTALLED GENERATING CAPACITY IN CHINA



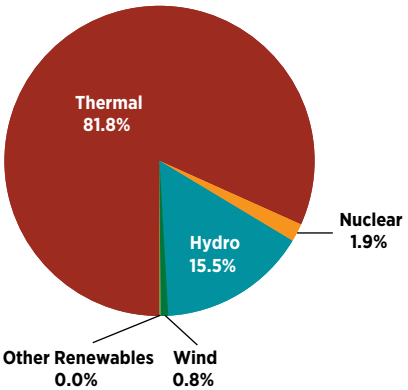
Source: NDRC

Figure 7: 2009 INSTALLATIONS OF GENERATING CAPACITY



Source: NDRC

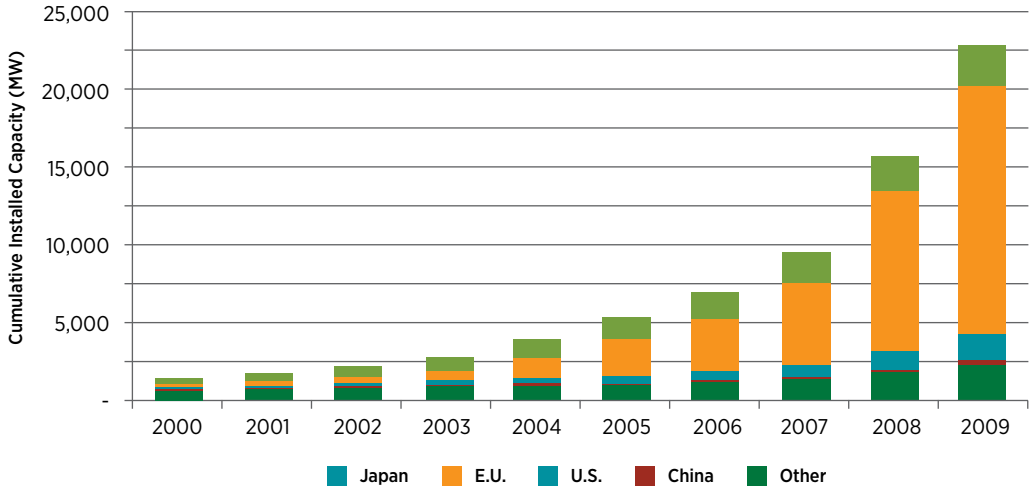
Figure 8: SOURCE OF ELECTRICITY GENERATION IN CHINA FOR 2009



Source: NDRC

16 http://nyj.ndrc.gov.cn/ggtz/W020100713803369945820.pdf
17 http://www.epia.org/fileadmin/EPIA_docs/public/Global_Market_Outlook_for_Photovoltaics_until_2014.pdf
18 http://www.reuters.com/article/idUSTOE6A904820101110
19 http://www.pv-power-plants.com/fileadmin/user_upload/PVPP_2010_web.pdf

Figure 9: CUMULATIVE GLOBAL PV INSTALLATION HISTORY



Source: EPIA

on the strength of support policy mechanisms that are yet to be enacted. The projected cumulative installations by the end of 2010 total account for approximately 1 GW towards these goals.[20]

The message from Beijing is that there is an upswing in momentum towards domestic PV utilization and that this market will grow considerably in the coming years.[21] In the absence of a national feed-in-tariff, the Chinese government has announced a plan to create 13 demonstration zones designated for PV installations, each zone capable of supporting hundreds if not thousands of megawatts of PV installations.

According to the Chinese Renewable Energy Industries Association, PV cell production in China is projected to reach 15 GW by the end of 2010, which is more than double the 7.2 GW produced in 2009. During the next 2 to 3 years, Chinese PV manufacturers are expected to continue to increase their market share to the point where they collectively bring in more revenue from PV cell production than their combined competition across the rest of the world.[22]

BIOMASS

The biomass market is growing and maturing rapidly mainly due to lucrative government incentives. The availability of these incentives and the concurrent effort to ensure balanced development of the industry are admirable given the speed of the expansion.

Ethanol continues to be a growing source of energy. As of 2008, China supplied 2,050 metric tonnes of ethanol for domestic use with no exports. In 2009, China was the third largest producer of ethanol worldwide.[23]

China's biomass power generation capacity rose 14 percent in 2009 to 3.2 GW with plans to install 30 GW by 2020. Currently, there are 54 GW of biomass power installed worldwide as of 2009. As of the end of 2009, China had installed a reported 835 MW of solid biomass capacity based on agricultural residues — an increase of 130 MW from 2008 levels — and more than 1.5 GW of bagasse cogeneration plants (up 300 MW in 2009) with a goal of 1.7 GW by 2012. Combined solid biomass in 2008 supplied 2,359 GWh of energy.[24]

20 Ibid.
21 http://solarhbj.com/news/china-looking-to-ramp-up-domestic-solar-pv-installations-ministry-says-01179
22 http://www.epia.org/fileadmin/EPIA_docs/public/Global_Market_Outlook_for_Photovoltaics_until_2014.pdf
23 http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR_2010_full_revised%20Sept2010.pdf
24 Ibid.

Although biomass power generation technologies, such as woody biomass power, urban waste power, and solid biomass fuel have been developed, their deployment remains immature. Aggressive incentives to encourage development have caused the industry to expand rapidly. Continued expansion will likely require continued political and economic support in the short term.

WIND

Wind development in China continues at a blistering pace. By the end of 2010, 17 GW of additional capacity are expected to be installed,[25] up from 13.8 GW in 2009. With 25.8 GW installed as of the end of 2009, China has now surpassed the U.S. to become the global leader in installed wind generating capacity. It is important, however, to distinguish between installations and operational capacity. China's 13.8 GW of installations in 2009, for example, included almost 5 GW of installations that were yet to be connected to the grid by the year end.

The Chinese offshore wind market is also growing rapidly. Bidding for the first 1 GW of offshore wind development rights concluded in October 2010. The projects consist of two 300 MW offshore projects in Binhai and Sheyang, and two 200 MW near-shore projects in Dongtai and Dafeng. The winning bids offered prices ranging from RMB 0.6235/kWh to RMB 0.7370/kWh (approximately 9.3 to 11.0¢/kWh USD). At these prices, which are close to onshore prices, there is concern that the projects will lose money, or not have sufficient income to properly fund operations and maintenance activities, and this may be counterproductive to the development of the offshore wind industry in China.[26, 27]

There is significant interest in bringing the successes in China to overseas markets, and turbine suppliers are specifically eyeing the U.S. onshore and U.K. offshore markets — the European onshore market is seen as difficult to enter. In 2010, three turbines from Goldwind Science & Technology became the first MW-class Chinese turbines installed in the U.S. This is seen as just the start, however, with an ultimate goal of project development, turbine supply, operations and maintenance, and financing all provided by Chinese companies.[28]

WIND ENERGY MARKET FOCUS

TARGETS, DRIVERS & FORECASTS

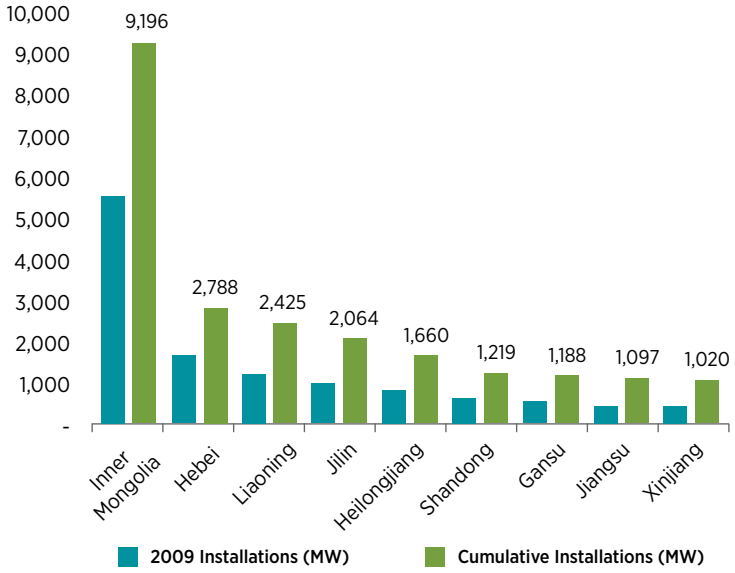
While a relatively late entrant into the wind industry, China has seen outstanding growth both in terms of installation rates and the domestic wind turbine equipment manufacturing sector since the implementation of the Renewable Energy Law in January 2006. The law outlined a framework of policy direction covering aspects such as pricing, development planning, and technical support within which renewable energy in China has been able to develop.

The *Medium and Long-term Development Plan for Renewable Energy in China* constructed by the National Development & Reform Commission (NDRC) and published in September 2007, set out targets of 5 GW of installed wind capacity by 2010 and 30 GW by 2020. With over 20 GW installed as of the start of 2010 and a series of huge developments proposed in China's "Wind Base" development strategy, state media has reported that the 2020 target could be revised upward to 150 GW. Whatever the exact target becomes, the next decade will see China play a central role in the growth of the wind sector on a global scale.

Perhaps the most significant driver for the state-owned developers who dominate wind turbine installation in China is a requirement introduced by the Chinese government that large utilities must have at least 3% of their installed capacity accounted for by renewable energy plants (excluding large-scale hydropower) by 2010

25 http://www.businessgreen.com/bg/news/1930730/china-inks-round-wind-farm-mega-deals
26 http://www.windpowermonthly.com/news/1027644/State-owned-firms-bid-low-Chinese-offshore-tender/?DCMP=ILC-SEARCH
27 http://www.windpowermonthly.com/news/1035303/No-money-O-M-Chinas-1GW-offshore-plans/?DCMP=ILC-SEARCH
28 Prideaux, E. "China Wind Power 2010 Conference Report – Chinese wind sector takes on the world", Wind Power Monthly, December 1, 2010.

Figure 10: CHINA ANNUAL AND CUMULATIVE INSTALLED CAPACITY BY PROVINCE



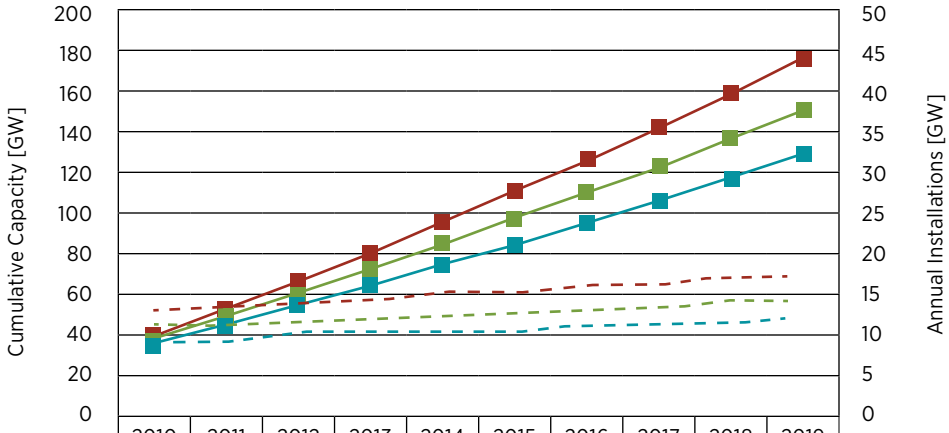
Source: Chinese Wind Energy Association

WIND BASES

"Wind Bases" refer to areas of centrally planned high development activity located across six provinces and totaling over 120 GW of proposed capacity. These projects are located in the following provinces:

- *Hami, Xinjiang province (10.8 GW)*
- *Inner Mongolia (20 GW for eastern Inner Mongolia and 37 GW for western Inner Mongolia)*
- *Jiuquan, Gansu province (12.7 GW)*
- *Hebei province (14 GW)*
- *Jilin province (23 GW)*
- *Jiangsu province (3 GW onshore and 7 GW offshore)*

Figure 11: CHINA WIND INSTALLATION PROJECTIONS TO 2019



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cumulative, Low	35	44	54	64	74	84	95	106	117	129
Cumulative, Medium	37	48	60	72	84	97	110	123	137	151
Cumulative, High	39	52	66	80	95	110	126	142	159	176
Annual, Low	9	9	10	10	10	10	11	11	11	12
Annual, Medium	11	11	12	12	12	13	13	13	14	14
Annual, High	13	13	14	14	15	15	161	16	17	17

Source: GL Garrad Hassan

and 8% by 2020. The details and implications of recent amendments to this requirement are discussed in the China Policy section.

In terms of future projected growth, GL Garrad Hassan expects around 150 GW of installation (including both onshore and offshore) by 2019. Figure 11 above presents GL Garrad Hassan's low, medium and high growth scenarios for future installation in China. The actual speed of much of the growth will depend upon the ongoing work being conducted to enhance China's grid system and the ramping up of turbine supply chains. Around half of the development may come in the form of the giant Wind Base projects.

CHINA RENEWABLE ENERGY POLICY: DEVELOPMENTS IN THE RENEWABLE ENERGY LAW

REGULATORY FRAMEWORK

China's first renewable energy law, The Law of the People's Republic of China on Renewable Energy (the "Law") was introduced in 2006. The Law drew upon experiences from developed countries in promoting renewables by including a "mandatory purchase and connection" clause. The Law was backed by a general regulatory and policy framework that was renewable energy-friendly by introducing favorable tariffs for wind, biomass and solar power and easy access to cheap credit for renewable energy developers. For example, under the Law, Chinese financial institutions were permitted to "offer a favorable loan with a financial discount" to certain qualified renewable energy projects.

In theory, the Law appeared to have laid out a solid base to promote renewable energy. Since its introduction, the Law, together with other policy guidance and practical mandates, has indeed brought about success to the exploration, development, and application of renewable energy. However, fundamental flaws in the Law became more salient as China's renewable energy sector continued to grow and expand.

As an illustration of the legal defects in the Law, a wind power project located in Qijiashan of Hebei province, with a capacity of 100 MW, was completed in 2008 but has not been used to generate electricity because it is not connected to the grid. This is not an isolated case. Varying reports estimate that 10–33% of China's wind power cannot be used to generate electricity because it is not grid-connected.[29] Furthermore, grid companies in some parts of the country are not accepting dispatch during certain periods. Grid companies' reasons for not accepting renewable energy dispatch vary, but include:

- The background of a grid that is perpetually lagging behind rapid capacity growth
- A lack of effective compensation for grid companies' higher costs associated with the mandated purchase of renewable energy, including the ability to charge new generators or their customers for the cost of new transmission assets
- Undeveloped technical standards applicable to renewable energy imposed on renewable generators
- A lack of meaningful governmental coordination between the rapid development of renewable energy sources and the development of power grid companies.

The legal framework imposed the core burden for the promotion of renewable energy upon the grid for free connection and mandatory purchase, and whose implementation relied upon project companies' enforcement of the rights against the grid. Few breaches, however, were actually settled on a legal ground, because project companies were reluctant to bring an action against grid companies for fear that they would be shut out of future projects. China's grid is owned by two powerful companies, both of whom operate the grid through local subsidiaries in each province. Project companies are reluctant to confront or criticize either one of the grid companies.

AMENDMENTS TO THE LAW

The Standing Committee of the People's Congress amended the Law in order to resolve the above problems. The amendments (the "Amendments", the Law as amended, the "Amended Law") also aimed to further promote the growth of renewable energy in China, to

29 The method for calculating the percentage of wind power not connected to the grid varies by organization in China. The Chinese government is studying the issue to establish a standard reporting method.

encourage the construction of power grids and to support power grid companies in purchasing renewable energy despite its higher costs. The amendments took effect on April 1, 2010. Implementation rules of these Amendments are yet to be promulgated by the State Council.

ADMINISTRATIVE COORDINATION

The new Article 8 of the Amended Law adds a paragraph, which reads: "Relevant departments under the State Council shall formulate plans that are favorable to the realization of national long- and medium-term goals on the total amounts of renewable energy to be developed and utilized." This Article now requires governments at the provincial level to "formulate a plan on the development for the development and utilization of renewable energy for their respective administrative regions" in accordance with the national plans and targets established by the State Council. The new Article 9 adopts a renewable energy policy, which requires project developers and government offices to "act according to local circumstances, take overall circumstances into account, allocate on a reasonable basis, and develop in an orderly fashion."

MANDATORY CONNECTION AND PURCHASE

The old Article 14 simply required that a relevant electricity grid enterprise "purchase the full amount of the electricity generated" by a licensed renewable energy enterprise that had signed a synchronization agreement with such electricity grid enterprise. Under the new Article 14, an electricity grid enterprise still has an obligation to purchase the full amount of the synchronized electricity, but requires that such electricity must first have met pre-established technical requirements. This quality requirement helps to alleviate the unreasonable burden for a grid company to purchase electricity from a renewable energy project company regardless of the quality of the electricity it generates.

In addition, the new Article 14 requires the government to "establish the proportion of electricity to be generated by renewable energies in accordance with the national plan on renewable energy development and utilization, formulate specific measures on priority scheduling and full purchases of electricity generated by renewable energy among electricity grid enterprises." This amendment aims to better coordinate the generation capacity and the capacity for grid connection.

COMPENSATION AND RENEWABLE ENERGY DEVELOPMENT FUND

Under the Amended Law, the State Council still has the authority to assign an agency to set the price of on-grid electricity generated by renewable energy. According to the Amended Law, if this price is higher than the average price of electricity generated by conventional energy, "the balance thereof shall be compensated by charging renewable energy fees throughout the nation on the sale of electricity" (Article 20). This is different from the old Article 20, which proscribed that "the balance shall be apportioned by adjusting the selling price of the electricity." The new Article 24 requires the financial authorities of the State set up a renewable energy development fund, the sources of which shall include lawfully collected renewable energy fees from the nation and special funds allocated by the national annual financial budget. Such a fund will be used to compensate the Article 20 price discrepancy, subsidize renewable energy development, and support various renewable infrastructure installations.

According to CREIA, money has successfully been collected for the renewable energy development fund since the implementation of the Law. However, the rate of the surcharge is not ample to cover the cost of the rapid expansion of renewable energy development in China. The government is currently considering raising the surcharge to meet the pace of development.

PRACTICAL IMPLICATIONS

Amendments to Article 8 and Article 9 aim to promote better governmental coordination between the rapid development of renewable energy sources and the development of transmission infrastructure (among

other objectives). The newly established renewable energy development fund aims to, among other things, address the financing of transmission assets. If implemented properly, this would bridge the gap between the generation capacity and the connection to a grid. Caution should be taken, however, because this governmental coordination is a new bureaucratic layer of administrative burden. Without the implementation rules announced, it is difficult to judge whether the changes will resolve more issues or create more hurdles.

The Amended Law now requires the electricity dispatched by renewable energy companies to meet pre-established technical standards. It also requires the State Council to set renewable energy quotas for an energy company, i.e., the proportion of the amount of electricity to be generated by using renewable energy out of the total amount of electricity to be generated by such company, similar to renewable energy portfolio standards in the U.S. In adding these standards, China hopes to relieve the burden the grid companies bear under the mandatory purchase and connection clause.

Instead of putting the financial burden on the grid companies, the Amended Law requires the government to compensate the grid companies for the surplus costs they spent in purchasing electricity generated by renewable energy over electricity generated by conventional means. For that purpose, the renewable energy development fund will also be used to subsidize the installation and improvement of the grid infrastructure and other projects in promoting renewable energy. This is good news for the often under-resourced grid companies.

REMEDIES AND IMPLEMENTATION

The remedy in the Amended Law is substantively the same as in the Law, according to which "[a]ny electricity grid enterprise which fails to purchase the full amount of electricity in accordance with the Amended Law and thus causes economic losses to relevant power enterprise shall be liable for such losses and be ordered by state power regulatory authorities to make corrections within a specified time limit and, if such electricity grid enterprise refuses to make corrections as required, be given a fine not exceeding the double amount of the losses suffered by relevant power enterprise."

In theory, this remedy provides a sound mechanism for renewable energy companies to protect their interest. Unfortunately, the implementation difficulty created by the reluctance of renewable energy companies to enforce their rights still persists. The Amended Law did not provide any solution to this problem, which is rooted in the imbalance of power between the generators and the grid companies, who are all ultimately owned by one of the two powerful state-owned grid giants against which generating companies are reluctant to pursue legal action for fear of commercial retaliation.

CONCLUSION

The Amendments mostly favor the grid companies, and make the "mandatory purchase and connection" more practical. If implemented properly, the Amendments are expected to further promote the growth of renewable energy in China and to cultivate a friendlier legal environment for domestic and international investors and developers in the renewable energy sector. The implementation rules to these Amendments, however, are yet to be promulgated. It thus remains to be seen how the Amended Law will operate in practice and whether it can resolve or alleviate the difficulties in the development of renewable energy.

CHINA RENEWABLE ENERGY INVESTMENT: POLICIES CONCERNING FOREIGN INVESTMENT

China's policies regarding foreign investment in the clean technology and renewable energy sectors reflect the country's high prioritization of these sectors in its national development plans. China has adopted a variety of rules and funding mechanisms to support indigenous companies while also encouraging foreign investment in these sectors, both through joint ventures with indigenous companies and direct investment in foreign-owned subsidiaries. These policies have led to many examples of foreign investment in China's renewables industry by a broad range of U.S. companies.

At the same time China has faced criticism that certain policies promote indigenous firms in these sectors at the expense of foreign firms. Tension between local industrial development and foreign investments is a common theme among many G-20 nations as they seek to promote renewable energy development. We expect that China's policies regarding foreign investment will continue to evolve as it seeks to balance the inherent tension between promoting indigenous industries and participating in a free and vibrant global market for renewable energy technologies.

CURRENT POLICY ENVIRONMENT AND SUPPORT FOR FOREIGN INVESTMENT

POLICY ENVIRONMENT FOR THE RENEWABLE ENERGY SECTOR

While China's *12th Five-Year Plan* will not be revealed until March 2011, in general it is expected to continue Beijing's broad focus on the enhancement of critical domestic industries, including renewable energy. Early comments about its contents suggest that, as part of this broad effort, the government will establish ambitious clean technology and renewable energy goals and begin experimenting with policies that will have a significant impact on these sectors.

According to both official and unofficial statements, low carbon emissions energy technologies will be a priority in the *Five-Year Plan*, with "energy savings and environmental protection" considered as a "pillar industry" for state planning, while advanced automobiles, new energy and new materials are identified as "leading industries." Government officials have suggested that under the *Five-Year Plan*, China will expand its energy intensity goals and begin utilizing market-based mechanisms to control emissions, possibly including carbon taxes and carbon markets. Interviews with officials from NDRC reveal that by 2015, they expect installed wind and solar electricity generation capacity to reach 90 GW and 5 GW, respectively. Li Junfeng, Deputy Director-General of NDRC's Energy Research Institute, has expressed that the renewable energy policies in the *12th Five Year Plan* will focus more on the utilization of renewable energy and less on manufacturing.

OFFICIAL TREATMENT OF INVESTMENT IN THE RENEWABLE ENERGY SECTOR

One result of the ongoing focus on the renewable energy industry in China's economic planning is the continuing need for capital investment. Foreign investment, in particular, has long been seen as an important part of China's development policy in these sectors because of its potential to support the development of critical domestic industries.

Under the updated *Industry Catalogue for Guiding Foreign Investment* from 2007 — which remains the authoritative guidance document on foreign investment in China — investments in a number of clean technology and renewable energy areas are classified as "encouraged."[30] Specifically, automobile engine and battery manufacturing; construction and operation of

30 The *Industry Catalog* affects what types of foreign investments can be approved by China's regulators at the central, provincial, and local levels. An "encouraged" categorization means that foreign investment can be made in the form of a wholly-owned venture (WFOE) or in a joint venture (JV) with a foreign firm holding the majority share. Authorities will often give favorable attention to projects in "encouraged" categories.

Table 1: INDUSTRY CATALOGUE FOR GUIDING FOREIGN INVESTMENT (2007)

MANUFACTURING – ENCOURAGED ITEMS (All Forms of Foreign Investment Allowed)

Special Equipment

- Equipment for producing solar cells.
- Equipment for the manufacture of hydrogen energy systems.

Transportation

- Manufacture and research & development of automobile electronic devices including fuel cell stacks and their parts and components and automobile hydrogen storage systems.

Electric Machinery and Equipment Manufacturing Industry

- Solar air conditioning and heating systems and solar drying devices.
- Biomass drying pyrolysis systems and biomass gasification devices.

Other Electronic Equipment Manufacturing Industries

- Batteries including Ni-MH, nickel-zinc, silver-zinc, lithium-ion, high-capacity, completely-sealed and maintenance-free lead-acid accumulators, solar, fuel and column zinc-air batteries.

POWER PRODUCTION & SUPPLY — ENCOURAGED ITEMS (All Forms of Foreign Investment Allowed)

- Construction and operation of hydroelectric power stations with the main purpose of power generation.
- Construction and operation of renewable energy power stations (including solar energy, wind energy, magnetic energy, geothermal energy, tidal energy, wave energy, and biomass energy).

SCIENTIFIC RESEARCH, TECHNOLOGICAL SERVICES & GEOLOGICAL EXPLORATION — ENCOURAGED ITEMS (All Forms of Foreign Investment Allowed)

- Biomass energy development technology
- Marine energy exploration technology
- Energy-saving development technology
- Development and application of technologies for recycling emissions and discharges from enterprise productions

MANUFACTURING — ENCOURAGED ITEMS (Limited to Joint Ventures)

Transportation

- Automobile electronic bus network technologies; (nickel-metal hydride and lithium-ion) batteries and control systems; integrated electric motor and control systems

Electric Machinery and Equipment Manufacturing Industry

- Manufacture of complete sets of equipment or key equipment for power generation with new energy resources including equipment for photovoltaic power generation, geothermal power generation, tidal power generation, wave power generation, garbage power generation, biogas power generation, and wind power generation with the capacity of 1.5 MW or more.

hydropower stations; and, most notably, construction and management of wind, solar, geothermal, tidal, and biomass energy plants are actively encouraged, with limited stated prohibitions on the establishment of wholly foreign-owned entities to conduct business in those sectors. Additionally, the *Catalogue of Priority Industries for Foreign Investment in Central and Western China* specifies that wind generation equipment manufacturing and biomass power generation equipment manufacturing are priority industries for foreign investment in the provinces and municipalities in the southwestern and northwestern areas of China.

In April 2010, the government released the *Certain Opinions of the State Council on Further Facilitating the Utilization of Foreign Capital*, in which the State Council urged revisions of the *Industry Catalog for Guiding Foreign Investment* to further prioritize investments in clean technology and renewable energy industries, and restricting investments in projects that are "high-polluting, high-energy-consuming and resource-dependent." Observers believe the 2010 release was largely aimed at countering claims that the environment for foreign investment in China had worsened in recent years. China insists that the investments of foreign and domestic companies are increasingly being treated similarly in the renewable energy sector, with the government equally encouraging investment and offering preferential tax levels to foreign and domestic firms.

CHALLENGES FOR FOREIGN INVESTMENT IN THE RENEWABLE ENERGY SECTOR

Recent developments have tempered the foreign business community's initial appreciation of China's favorable treatment of foreign investors in the clean technology and renewable energy sectors. Wariness surrounding China's support for its domestic firms has resulted in growing complaints about Chinese policy in this sector.

Throughout 2010, there has been a noticeable trend of news reports and statements highlighting the difficulties faced by foreign firms in China. News reports have focused on the long-term impact that a now revoked local content requirement for renewable energy projects has had on the wind industry, pointing to anecdotal evidence of how technology transfer to China has enhanced local capabilities and created a flow of lower cost components out of China. Leaders of some major global manufacturing and export-oriented firms have also made critical statements about China's support of indigenous companies to the detriment of foreign competitors.

Complaints were also officially laid out in a petition filed by the United Steelworkers Union ("USW") with the United States Trade Representative under Section 301 of the Trade Act of 1974. The USW's petition has refined these broad sentiments with a number of specific allegations about China's trade practices in the clean technology and renewable energy sectors For example, the petition alleges that a number of funding programs including China's Ride the Wind Program, Special Fund for Wind Power Manufacturing, and Export Product Research and Development Fund, as well as export support available through China's Export-Import Bank and through the China Export and Credit Insurance Corporation, are all prohibited subsidies under the Agreement on Subsidies and Countervailing Measures ("SCM Agreement"). The petition also alleges that the bidding process for wind and solar power projects, the Clean Development Mechanism application process, the localization requirements in supplier and joint venture agreements, and price controls on rare earth materials discriminate against foreign investors.

On December 22, 2010, in response to the USW Petition, the U.S. government requested consultations with China regarding the Special Fund for Wind Power Manufacturing through the World Trade Organization (WTO), taking the first step in officially raising a trade complaint. China's response to the U.S. complaint and to the USW petition, in which it is denying any violation of its WTO obligations, is ongoing. China initially asserted that the subsidies are "speculative," or were offered prior to its joining the WTO, or are not currently being offered. China also stated that its domestic subsidies, if any, "cannot cause any prejudice

to the interests of the United States." More recently, China has also participated in a high-level dialogue in which it has agreed to limit its local content requirements and affirmed that certain important technological areas, including development of smart grids, will remain open to foreign firms. Covington & Burling expects China's defense of its policies to continue as the WTO process and the U.S. government's investigation of allegations raised by the USW's petition unfolds.

CONCLUSIONS

China seeks to depart from fostering emerging industries and move toward being a major center for innovation and production of renewable energy technologies. Consequently, China's active support for the clean technology and renewable energy sectors, including foreign investment in these sectors, and the recent critical reaction to China's moves to advance domestic involvement in these sectors, should be understood as part of efforts to effect this evolution. China's prioritization of these sectors is similar to many of the efforts being made globally to expand clean technology and renewable energy industries and to reduce greenhouse gas emissions. Much as U.S. and European officials have cited these industries as being critical for future growth, China, too, has identified these industries as priorities for meeting domestic energy and consumer requirements and industries in which China can leverage its advantages in export markets.

The environment for foreign investment is thus best understood in light of the tension between China's desire to participate in a global market for technologies in these sectors, its domestic needs to fulfill its national plans, and its desire to promote its domestic industries. China remains a viable environment for foreign investment precisely because it seeks to be part of the global market for clean technologies. Thus, as China continues to expand its goals in these sectors in compliance with global trading obligations, there will likely be continued and increasing opportunities for foreign investment in these sectors.

US-CHINA COLLABORATION UPDATE

President Hu Jintao's visit to Washington, DC is occurring as the U.S. and Chinese renewable energy markets enjoy a period of overall success. Nevertheless, challenges remain within the individual markets and between the two countries. The continuation of US-China collaboration is necessary to overcome technological, commercial, and political hurdles.

As described in the U.S. portion of this Quarterly Market Review, project sponsors seeking financing in the U.S. face more favorable conditions than in recent years, yet policy uncertainty and transmission issues are hampering a full-swing scale-up of renewable energy. In China, the wind market continues to develop rapidly, but quality concerns are coming to light and a substantial amount of projects remain unconnected to the grid. The PV market, meanwhile, is steadily growing, but domestic demand is dwarfed by the country's equipment supply.

Amid these internal challenges, the U.S. and China are publicly airing grievances over barriers to one another's renewable energy markets. As the media has widely reported, the U.S. Trade Representative recently requested consultations with China over the *Special Fund for the Industrialization of Wind Power Equipment* through the formal World Trade Organization (WTO) process. Despite the legitimate concerns between the two countries—which are aggravated by political rhetoric and the media's focus on discord—US-China collaboration on renewable energy continues in a meaningful way, with both public and private sector actors addressing the issues described above.

The following section of this Quarterly Market Review identifies important steps that the U.S. and Chinese governments and companies are taking to increase renewable energy grid integration, policy effectiveness, project development, profitability, and project quality. These topics are generally the areas where the American Council On Renewable Energy (ACORE) is promoting collaboration through the US-China Program (USCP).

US-CHINA PROGRAM

USCP is a platform for collaboration between the U.S. and Chinese renewable energy industries. Our program components convene the industry to build partnerships and discussion, and provide industry participants with critical market and policy information from the U.S. and China.

To learn more, please visit www.acorechina.org.

EVENTS

In addition to the US-China Quarterly Market Reviews, USCP holds semiannual workshops to promote cross-Pacific industry collaboration. Please join us in 2011:

US-China Workshop at REFF-China in Beijing
May 11-12, 2011

US-China Workshop at RETECH 2011 in Washington
September 20-22, 2011

GOVERNMENT: IMPLEMENTING THE HU-OBAMA INITIATIVES

U.S. Secretary of Energy Steven Chu meets with representatives of the US-China Energy Cooperation Program (ECP) in Beijing.

Source: ECP

The renewable energy initiatives launched under President Barack Obama and President Hu Jintao in 2009 are in the implementation stage, with the U.S. Department of Energy (DOE), the U.S. Department of Commerce (DOC), the U.S. Department of Agriculture (USDA), the U.S. Trade & Development Agency (USTDA), America's National Renewable Energy Laboratory (NREL), the Chinese Ministry of Housing and Urban Rural Development (MOHURD), China's National Energy Administration (NEA), and China's Energy Research Institute (ERI) playing important roles in building a collaborative US-China energy relationship.

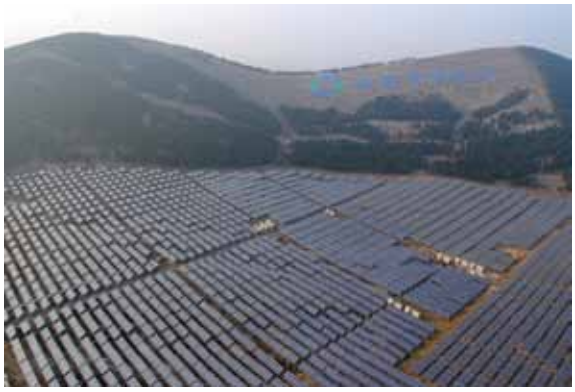
In 2010, USTDA announced multiple grants that will facilitate a transition to a renewable energy economy in China. Through the Clean Transportation and Smart Grid working groups of the US-China Energy Cooperation Program (ECP), USTDA is making hundreds of thousands of dollars available for technical assistance and standards development in the areas of aviation biofuels and smart meters. Members of the working groups like DuPont, Honeywell, GE and others, will leverage the trade assistance from USTDA while the Chinese government and industry will benefit from the U.S. private sector expertise.

USTDA and ECP also facilitated a reverse trade mission of over 20 Chinese mayors and officials from MOHURD to the U.S. to examine sustainable cities and college campuses on the West Coast. The delegation additionally met with leading U.S. companies such as Applied Materials, GE, and Honeywell to learn how U.S. technology can aid sustainable development in China. In a separate trip, NEA led a biofuels mission to the U.S. in November and December 2010, visiting feedstock sites and cellulosic conversion pilot and demonstration facilities in Iowa, Nebraska, and Tennessee. The mission concluded with a workshop convened by USDA and DOE in Washington, DC.

In December 2010, representatives from DOE and NREL met with counterparts at NEA and ERI to tackle the issue of wind energy integration with the grid and to collaboratively build industry standards for wind technology. These joint efforts are critical to increasing the quality and interconnection of wind projects in China and the U.S.

While political tensions over renewable energy have flared in recent months between the U.S. and China, the two governments continue to diligently work together to advance renewable energy technology development and deployment. These public programs—with the support and participation of the private sector—are vital to shifting to a significantly greater percentage of renewable energy generation.

PRIVATE SECTOR: FORGING LOCAL PARTNERSHIPS



GCL-Poly Energy's 20 MW solar project in Xuzhou, Jiangsu Province.

Source: GCL-Poly Energy

Local partnerships help foreign firms overcome the challenges of the U.S. and Chinese renewable energy markets. Success in the highly competitive U.S. market requires knowledge of local policies, an understanding of utility decision making, and a network of legal, financial, and consulting professionals. Such knowledge and relationships are often gained efficiently through local partnerships. In China, local partnerships can increase a firm's appeal to procurement officials who are driven by local development goals. A local partner can also improve a foreign equipment manufacturer's relationships with the market-dominating state owned project developers. Several major U.S. and Chinese firms have entered into local partnerships in recent months to become more competitive in a foreign market.

SOLARRESERVE & GCL-POLY ENERGY

In November 2010, GCL Solar Energy, subsidiary of GCL-Poly Energy, acquired 50 percent of California project developer SolarReserve. The new joint venture, GCL-SR Solar Energy, intends to take advantage of the strengths of both companies to develop projects, procure equipment, and complete the construction of multiple GW of solar energy in the U.S.

Because SolarReserve has local experience working with utilities and regulators, the firm will maintain responsibility for land acquisition, permitting, and securing PPAs. GCL, meanwhile, will procure solar equipment and manage project construction. GCL is China's largest polysilicon producer and previously constructed China's largest solar farm, a 20 MW project in Xuzhou, Jiangsu Province.

GCL-SR now has a 1.1 GW project pipeline, 400 MW of which the JV plans to begin constructing in 2011. The scale of projects that GCL-SR will develop in the near term is a testament to the benefits of US-China collaboration on renewable energy development.

GE & HARBIN ELECTRIC MACHINERY

Also in fall 2010, General Electric (GE) formed a joint venture with Harbin Electric Machinery to increase its competiveness in the world's largest wind market. In this partnership, GE is hoping to combine its strength—superior technology and experience in the energy industry—with the manufacturing might and domestic industry relationships of Harbin Electric Machinery.

The new corporate structure will give Harbin Electric Machinery 51% ownership of the new firm, while GE maintains 51% ownership of its Shenyang, Liaoning province turbine manufacturing facility, and will gain a 49% stake in a planned manufacturing facility in Jiangsu province to produce offshore wind turbines.

Further demonstrating the potential benefit of a local partner, GE hopes to utilize Harbin Electric Machinery's relationships within the domestic industry—where state-owned project developers account for roughly three-quarters of the investment in wind energy projects—to cultivate new customers and increase sales of wind turbines.

A GE engineer monitors the company's turbine performance.

Source: Wall Street Journal/Bloomberg