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US-CHINA
QUARTERLY MARKET REVIEW

SPRING 2011

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A COLLABORATIVE REPORT BY:

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US-CHINA PROGRAM

The US-China Program (USCP) of the American Council On Renewable Energy (ACORE) is dedicated to increasing understanding of the U.S. and Chinese renewable energy markets and fostering public and private sector partnerships between our two countries.

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 Spring 2011 US-China Quarterly Market Review (QMR).

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Dear Participants in the US-China Program:

The American Council On Renewable Energy (ACORE) and the Chinese Renewable Energy Industries Association (CREIA) are pleased to present the third US-China Quarterly Market Review, a product of ACORE's US-China Program.

The US-China Quarterly Market Review presents executive-level information on the U.S. and Chinese renewable energy markets in the areas of policy, market development, and finance.

This Spring 2011 Review features expert contributions on:

- China's 12th Five-Year Plan
- Foreign Investment in the U.S. Renewable Energy Sector
- China's Solar Market Development and Grid Capacity
- Siting & Permitting Challenges in the U.S.
- Private Equity in China's Renewable Energy Sector
- The Emerging Electric Storage Market in the U.S.

By reading this report—with its excellent contributions from ACORE members—we hope you will increase your understanding of the U.S. and Chinese renewable energy markets, while also identifying potential areas for collaboration.

As the US-China Collaboration Update section of this Review demonstrates, the opportunities in the U.S. and Chinese renewable energy markets are vast, and the benefits of partnering to advance technologies, raise capital, and develop renewable energy projects are clear.

Sincerely,

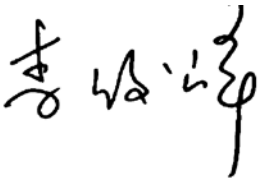

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TABLE OF CONTENTS

U.S. REVIEW

■ U.S. FINANCE: RECENT TRENDS IN INBOUND INVESTMENT

The U.S. renewable energy market has proven to be dynamic and rapidly evolving over the last few years. The market for cross-border mergers and acquisitions (M&A) has regained vitality, and activity has increased substantially over the past year. Foreign investors with strong balance sheets are finding increased opportunities for U.S. investment.

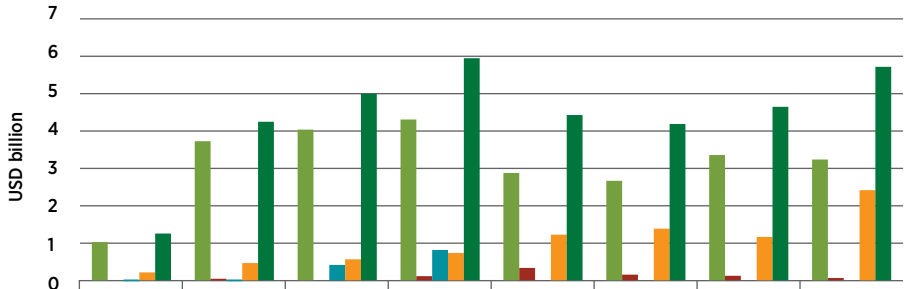
MARKET ACTIVITY: TRENDS & ANALYSIS

In the M&A area, renewable energy activity increased last year due to a renewed confidence in the market following the financial crisis of 2008 and 2009. Globally, deal volume increased by almost 66% in 2010, as compared to 2009, while total deal value declined slightly.[1]

Figures 1–3 present data from the past several quarters for the U.S. renewable energy M&A market, displaying acquisition data for all renewables, then for wind and solar individually.

1 Bloomberg New Energy Finance. "Renewable Energy Deals Increase as Confidence Returns." March 2011.

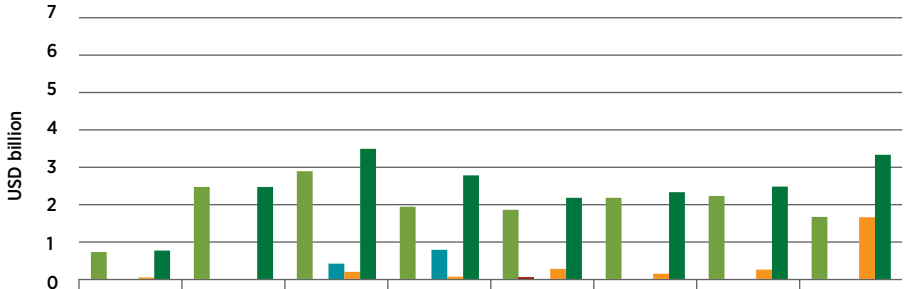
Figure 1: OVERALL ACQUISITION TRANSACTIONS IN RENEWABLE ENERGY, Q1 2009 – Q4 2010



	Q1 09	Q2 09	Q3 09	Q4 09	Q1 10	Q2 10	Q3 10	Q4 10
Asset finance refinancing & acquisitions	1.02	3.72	4.03	4.30	2.87	2.66	3.35	3.23
Public market: investor exits	0.00	0.04	0.00	0.11	0.33	0.15	0.12	0.06
PE buy-outs	0.02	0.02	0.41	0.81	0.00	0.00	0.00	0.00
Corporate M&A	0.21	0.46	0.56	0.73	1.22	1.38	1.16	2.41
Grand Total	1.25	4.24	4.99	5.94	4.42	4.18	4.64	5.71

Source: Bloomberg New Energy Finance. Data represents renewable energy acquisition transactions only. Energy efficiency, smart grid, carbon capture and storage, clean energy vehicles, and support transactions are not included.

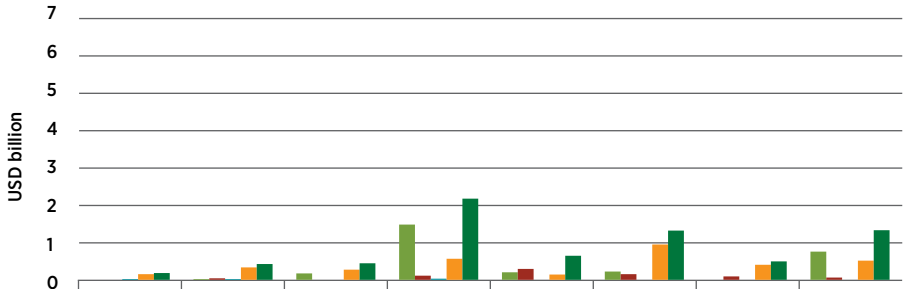
Figure 2: WIND ACQUISITION TRANSACTIONS, Q1 2009 – Q4 2010



	Q1 09	Q2 09	Q3 09	Q4 09	Q1 10	Q2 10	Q3 10	Q4 10
Asset finance refinancing & acquisitions	0.72	2.46	2.88	1.93	1.85	2.17	2.22	1.66
Public market: investor exits	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
PE buy-outs	0.00	0.00	0.41	0.78	0.00	0.00	0.00	0.00
Corporate M&A	0.04	0.00	0.19	0.06	0.27	0.14	0.25	1.65
Grand Total	0.76	2.46	3.48	2.77	2.17	2.32	2.47	3.32

Source: Bloomberg New Energy Finance

Figure 3: SOLAR ACQUISITION TRANSACTIONS, Q1 2009 – Q4 2010



	Q1 09	Q2 09	Q3 09	Q4 09	Q1 10	Q2 10	Q3 10	Q4 10
Asset finance refinancing & acquisitions	0.00	0.02	0.17	1.47	0.20	0.22	0.00	0.75
Public market: investor exits	0.00	0.04	0.00	0.11	0.29	0.15	0.09	0.06
PE buy-outs	0.02	0.02	0.00	0.03	0.00	0.00	0.00	0.00
Corporate M&A	0.15	0.33	0.27	0.56	0.14	0.94	0.40	0.51
Grand Total	0.18	0.42	0.44	2.16	0.64	1.31	0.49	1.32

Source: Bloomberg New Energy Finance

A significant trend in renewables M&A activity over the past few years has been foreign acquisition of renewable development companies and development projects. In many cases, the acquisition strategy of these purchasers has been to acquire projects and development pipelines that will use the technology or equipment of the acquirer. The trend has accelerated recently in part due to the expected expiration of the U.S. Treasury Department's Section 1603 Cash Grant Program ("Section 1603" or "Cash Grant") and the 100% bonus depreciation incentive at the end of 2011.[2] The availability of foreign investment in the U.S. is also increasing as a result of renewables investors based in Europe more frequently looking beyond the European markets for opportunities.

Foreign investors often want to make investments in development companies or in individual projects where a majority of the permitting work for the project or projects is completed, site control has been achieved, and an off-taker has been secured. This strategy enables investors to capitalize on attractive acquisition opportunities without having to devote significant time and resources to early development work which may prove to be unsuccessful and poses risks of delays and cost increases. However, recent trends suggest that, as the inventory of construction-ready development projects shrinks, interest in acquiring earlier-stage projects or development pipelines may be increasing, except in areas of the country where heavy market constraints exist.

The solar sector has been particularly active, and a number of solar startups are now seeking either strategic partners or sales of their development pipeline. Both strategies may appear to be more desirable than attempting to access the IPO markets, which can be difficult for a development company without a mature balance sheet. A few concentrated solar power (CSP) developers have sold projects to traditional solar PV players or converted CSP projects to PV projects,

2 Section 1603 provides a cash payment equal to 30% of a project's qualifying costs once the project is completed. Projects may qualify for the cash grant only if construction starts by the end of 2011. Current law also allows projects placed in service before the end of 2011 to qualify for 100% bonus depreciation. Projects placed in service in 2012 will be eligible for 50% bonus depreciation.

creating acquisition opportunities. There has also been a recent trend of traditional wind developers expanding into the solar sector through acquisitions. This trend is expected to continue, creating further M&A opportunity and competition.

Vertical integration is also a key trend as the solar industry matures. Between 2008 and 2010, a number of large solar project portfolios were sold to solar module manufacturers and other strategic buyers both within and outside the solar industry. One major benefit for the purchaser in a number of these transactions was to generate sales of their modules and engineering, procurement, and construction (EPC) services. Where long-term ownership has not been integral to the acquisition strategy, some purchasers have gone on to sell their previously acquired renewable energy assets. For instance, in December 2010, First Solar sold to NRG the 290 MW Agua Caliente solar project that First Solar acquired from NextLight in June 2010. This trend of vertically integrated project purchasers later selling development stage projects creates opportunities for inbound investors to acquire solar projects with relatively low development risk.

Over the last year, M&A activity in the wind sector has been somewhat less active than solar in terms of volume, due mainly to the mature nature of the wind industry. The wind power purchase agreement (PPA) market is now more constrained in some areas of the country, which will have a direct negative impact on the number of available projects coming online in the near future and will factor into the analysis of potential investors when considering project-specific opportunities. Consolidation is continuing, however, as large conglomerates and turbine manufacturers are acquiring IT systems providers, O&M service companies, sub-component makers, and project companies that will use the acquiror's products and equipment. The fledgling U.S. offshore wind market is also beginning to attract foreign investment, although it is not yet clear how significant the market will become.

REGULATORY & POLICY CONSIDERATIONS OF FOREIGN INVESTORS

The U.S. maintains an official policy of welcoming foreign investment and remains one of the most competitive and attractive renewable energy investment destinations. Nonetheless, inbound investors in renewable energy find the need to take into consideration numerous political and regulatory considerations when evaluating potential U.S. investment opportunities.

AVAILABILITY OF TAX INCENTIVES

As with all participants in the U.S. renewable energy sector, foreign investors are confronted with an uncertain energy policy landscape, and, therefore, must assess whether current federal incentives for renewable energy projects will remain available.

Although the Obama Administration and Congress cooperated in December 2010 to extend expiring tax incentives for renewable energy projects and recently left renewable energy programs largely unscathed in a budget battle over funding for the remainder of fiscal year 2011, the future of these incentives remains highly uncertain.

CFIUS REVIEW

A second significant consideration for inbound investors is whether to make a voluntary filing with the interagency Committee on Foreign Investment in the United States (CFIUS) for review and approval of a contemplated acquisition. CFIUS is authorized to review transactions where a foreign entity acquires control of a U.S. company. CFIUS can investigate any transaction that threatens to impair national security or would result in control by a foreign government. Following a 30-day preliminary review period, if there is credible evidence that the transaction threatens national security, CFIUS may initiate further review or propose a mitigation plan, and may ultimately recommend that the President block the transaction. Although filing for CFIUS review is voluntary, CFIUS can initiate a review unilaterally, even after a transaction is completed.

Chinese investors need to be especially mindful of the concern over "foreign control" of U.S. entities. Given the landscape of the Chinese economy and the strong history of Chinese companies being at least partly owned by the government, Chinese companies can face increased scrutiny from CFIUS. In February of this year, CFIUS recommended that Huawei Technologies divest its interest in the cloud-computing technology company 3Leaf Systems. This was the third acquisition by a Chinese buyer that CFIUS declined to approve since late 2009. Two of the three failed transactions involved significant intellectual property (IP) acquisitions, and the third was based on the target's proximity to a naval air station.

Although transactions involving U.S. businesses in the energy sector may generally invite some scrutiny, most renewable investments should pose less risk because there is less potential for renewable investments to be perceived as critical infrastructure. Also, CFIUS precedent suggests that even large energy deals will be viewed as acceptable. In early 2010, CFIUS approved the sale of a 15% stake in AES Corporation, a U.S. power generation company, to the China Investment Corporation (CIC). In general, inbound investors need to evaluate the size and scope of a potential transaction and whether there is significant IP at issue to determine whether to voluntarily file with CFIUS.

ADDITIONAL CONSIDERATIONS

EXPERIENCE, PARTNERSHIPS & PUBLIC RELATIONS

In addition to the political and regulatory considerations outlined above, inbound investors to the U.S. are making forthright assessments of their previous experience in the U.S. when evaluating a particular investment. Given the complexities and level of competition in the U.S., many foreign investors have found the need to hire a management team with a history of successful U.S. renewable energy development and operational experience.

Facing potential regulatory risk and a dynamic U.S. renewable market, many new inbound investors have shown increased interest in partnerships or joint venture arrangements, and are often looking to find established U.S. partners or to invest in consortiums with other seasoned investors. This joint development strategy is an often-recommended strategic first step towards more substantial inbound investments, since a strong U.S. business partner can provide experience, opportunities, and capital, and often can serve as a strong advocate when faced with regulatory scrutiny.

Lastly, the politically-charged nature of foreign investment in infrastructure has prompted some investors to develop government and public relations strategies for any potentially controversial investment. Some firms have conducted successful campaigns involving exchanges with state and local officials whose constituents would benefit from the potential investment; outreach to trade and policy groups; and a coordinated media and public relations effort.

U.S. MARKET FOCUS: THE EMERGING MARKET FOR ELECTRIC STORAGE

Beacon Power Corporation builds the world's first grid-scale, flywheel-based energy storage plant in Stephentown, New York.

The recent emergence of advanced storage technologies is changing how electricity storage can be implemented. Traditional storage devices, such as pumped hydro and lead-acid batteries, have been in the marketplace for many years, but they have been limited in their applications. The advancements seen today in the number of cycles, ability to locate, efficiency, and speed of new storage devices are creating the potential for storage to be utilized throughout the grid. These developments bring to the electricity industry an ability that most other industries already have—the ability to store their product.

This potential to make storage ubiquitous throughout the grid can bring benefits to the integration of renewable technologies, service reliability, and transportation. Advanced storage can even serve as a tool to ensure that the electricity grid can continue to maintain operations as more types of generation are added to the grid.

The advancements are not limited to battery technologies. Other technologies are also being utilized, including flywheels and above-ground compressed air energy storage systems. These technologies will complement traditional storage systems and will serve as important components to future utility and smart grid networks.

In the U.S., federal regulators are now moving to accommodate the generation, transmission, and "hybrid" applications of electricity storage. Regulators recognize that these applications are rapidly becoming important to the realization of the broader smart grid, energy efficiency, and renewable energy programs. Several landmark regulatory orders and decisions regarding energy storage devices have been issued. All of these developments, taken together, will likely expand the viability of larger-scale storage financing and of smaller, distributed community applications.

ADVANCING STORAGE MARKETS

As in the rest of the world, the absence of the capability to store electricity in the U.S. has made our electricity grid the ultimate "just in time" delivery system, with operators constantly balancing supply and demand. Typically, this balance involved a variable demand and an essentially controllable supply (i.e., coal, nuclear, or natural gas generation). As the U.S. generation profile transitions to renewable energy sources, variability will be introduced to the supply side as well. This variability in supply could potentially lead to difficulties in maintaining operations and create the need for mechanisms such as ancillary services in order to assure the reliability of the grid.

Recently, the need for storage has been further emphasized by the extensive development of intermittent renewable generation in the U.S., often in locations remote from load centers. There has been increasing concern expressed over the ability of utility grids to reliably integrate large amounts of wind and solar into their operation. Some consensus is now starting to form that, when there is approximately 20% penetration of renewables into the generation mix, maintaining reliable grid operations will become a challenge for operators.

Although pumped storage has been utilized to support grid operations, particularly in favorable geographic settings, there are challenges to expanding the use of this technology. These challenges include:

- the length of time to permit and install the systems (often 10 years or more);
- limited geographic sites; and
- difficulties in predicting water availability year over year.

Coupled with the increasing need of the capabilities offered by existing storage, new attention has come to be focused on three other technical storage application areas:

- chemical battery technologies;
- compressed air systems (below ground where appropriate geological formations exist and above ground where they do not);
- kinetic energy storage devices; and
- thermal storage devices.

The technical characteristics of these technologies (e.g., storage capacity, storage life, storage cost per unit, ability to locate, and scalability) create the potential to meet the several challenges outlined above. Each of the advanced technologies being introduced has characteristics that allow them to excel in specific applications. In addition, as the technologies begin to commercialize, end-users will find more and more uses for the technologies, such as for back-up power, peak-load reduction, and serving their own end-use optimization of power-use applications.

Another key factor affecting storage market penetration is the increasing diversity of firms seeking to enter the market, and the strategic business alliances which they have struck. While there are some analogies in this regard to the renewable energy market, there are certain differences that will need to be taken into account as well.

Several of the first movers in the market have been independent power companies, which have built small installations (e.g., 2–5 MW) in different U.S. locations. The State of Hawaii's requirements regarding interconnection by large renewables systems have motivated independent power developers to incorporate battery technologies into their projects.[3] Some utilities have entered into larger-scale storage to assure power reliability, by using conventional sodium-sulfur (NaS) battery technology, flywheel technology, or compressed air storage. Listed in Table 1 is a summary of certain key U.S. projects.

In addition to those projects listed in Table 1, there are approximately 30 MW of demonstration projects planned for the U.S. in 2011–2012 utilizing technologies such as lithium-ion, flow batteries (zinc and vanadium redox), as well as sodium-sulfur (NaS) and advanced lead acid systems.

3 Hawaiian Electric Company. "Model Power Purchase Agreement for Renewable Energy Projects: Appendix C." http://www.heco.com/vcmcontent/GenerationBid/HECO/FinalRenewableModelPPA.pdf

Table 1: INDICATIVE U.S. ELECTRIC STORAGE PROJECTS

ANCILLARY SERVICES				
Capacity	**Technology**	**Technology Provider**	**Location**	**User**
8 MW (to be expanded to 0 MW)	Lithium-ion	A123 Systems	New York	AES Energy Storage
32 MW	Lithium	Lithium manufacturer	West Virginia	AES Energy Storage
20 MW	Flywheel	Beacon Power Corporation	New York	Beacon Power Corporation
RENEWABLES INTEGRATION				
Capacity	**Technology**	**Technology Provider**	**Location**	**Project**
1.5 MW	Advanced dry cell battery	Xtreme Power	Hawaii	30 MW wind farm
15 MW / 10 MWh	Advanced dry cell battery	Xtreme Power	Hawaii	30 MW wind farm
10 MW / 20 MWh	Advanced dry cell battery	Xtreme Power	Hawaii	1 MW wind farm
36 MW (in-process) [4]	*Advanced dry cell battery*	*Xtreme Power*	*Texas*	*153 MW wind farm*
TRANSMISSION SYSTEM RELIABILITY SUPPORT				
Capacity	**Technology**	**Technology Provider**	**Location**	**User**
4 MW	Sodium-sulfur (NaS)	NGK Insulators	Texas	American Electric Power

Note: Information in the table above is derived exclusively from generally available public information and does not represent a comprehensive listing of electric storage projects in the U.S.

4 Announced, but not yet constructed. Greentech Media. "Xtreme Power Builds on Storage Momentum with Duke Deal." 14 April 2011. http://www.greentechmedia.com/articles/read/who-rules-energy-storage-right-now-xtreme-power-does/

There have been some initial efforts at private equity sponsorship of battery storage projects as investments in conjunction with utilities, either through tolling arrangements or through transactions with the regional transmission organizations (RTOs) which oversee the reliability of their transmission arrangements. However, as these single application systems are introduced, there is the potential for the devices to be used across additional application classifications. As the technology is adopted, stakeholders are realizing that the devices can serve as both a transmission and a merchant power asset. The best way to handle the regulatory questions raised by these developments is still being debated.

SUPPORTIVE REGULATORY DEVELOPMENTS

Regulators are attempting to accommodate the diverse technical and project sponsorship potential of storage. They are doing so within the constraints of separate national and state regulatory commissions, whose jurisdiction is exercised over different storage applications depending on the function being performed.

Companies seeking to develop energy storage projects must overlay the terminology used by regulators over what is technically possible through storage use. Generally, storage has been categorized by many regulators as (1) "generation," i.e., either "arbitrage" (buying power at a low price off peak, and discharging power at peak times when prices are higher), or "ancillary services"; or (2) "transmission," i.e., providing regulated power transmission and distribution service into the grid in order to preserve system reliability.

It is now being recognized that the same facility may serve both generation and transmission functions at different times, i.e., a "hybrid," whose rates are set differently for different purposes.

Historically, storage has been treated as a generation function, subject to applicable ratemaking, and transmission has been treated exclusively as a regulated service function, provided by and controlled by utilities (with federal/state oversight). No standard formulation for regulation of hybrid storage devices has yet emerged. A key issue which has not yet been fully resolved is how storage utilized in the integration of renewables (such as wind generation) will be regulated. If utilities provide storage services to renewables, the storage facilities could be treated as just another transmission-related asset on which a regulated rate of return can be earned. If non-utilities purchase, aggregate, and store renewable power, when they sell that power, they could be entitled to the then-current power price, even in the absence of firm power purchase off-take agreements. The new revenue sources which would be available to them might even be a basis for new financing models which they could utilize.

The Federal Electricity Regulatory Commission (FERC) has now found that certain very specialized types of storage—which provide reliability assurance to constitute transmission services—may be performed by independent non-utilities. FERC has also proposed that the provision of ancillary services by storage facilities, e.g., facilitating the ramp-up or ramp-down of generation, be recognized as potentially more efficient than the utilization of standby generation held in reserve for that purpose, as utilities have done historically.

Regulators have not yet determined what types of entities may legally provide storage services and on what ratemaking basis. They are, however, moving in that direction. Some states, like California, have begun to enact legislation supportive of storage utilization.

With the advent of these new storage technologies, an important market for utilizing improved technology and offering additional forms of service delivery and/or renewables system integration is now emerging. While utilities will be a natural customer for such technology breakthroughs, other independent service providers, such as RTOs are emerging as potential customers, as well. The role for non-utility players is still being delineated. While the U.S. market for storage is at a relatively early stage, (2.3% of total installed U.S. generating capacity) and currently is not the subject

of the type of special incentives that are available to certain types of renewables generation, the inherent value of storage to the electricity generation and distribution process suggests that its market growth will not necessarily be limited by the absence of these incentives. As more uniform technology performance standards emerge in the market, more options for financing electricity storage will emerge as well. While complexities remain to be worked out, the prospects for meeting the requirements for successful storage finance and deployment to accommodate renewables integration appear bright.

U.S. POLICY: SITING PROJECTS IN THE U.S.

Siting and permitting of renewable energy projects in the U.S. involves federal, state, and local requirements. On private lands, aside from state and local zoning regulations and building permit requirements, federal environmental regulations are typically the chief concern. A few states consider siting of projects at a state agency level. More states, however, rely on a patchwork of local regulations, and the resultant focus tends to emphasize local issues and create inconsistent outcomes.

On federal lands, such as increasingly important sites in the western U. S. and the Outer Continental Shelf (OCS), siting is generally focused on environmental issues. Additional project development considerations arise in certain states that regulate direct and indirect foreign ownership of land, and, if a project is to be located on tribal lands, consideration of sovereign immunity issues is warranted.

Renewable energy generally requires that the facility be developed at the location of the renewable resource, which may be near an area of environmental, recreational, or historic significance, as opposed to coal or natural gas which can be delivered to a facility at a less sensitive site. With the increase in the number and scale of renewable facilities, and their locations impinging on denser population areas, it is becoming as difficult to construct a utility-scale renewable energy project as a coal-fired facility.

Notwithstanding the federal and state encouragement of renewable energy projects, increased local challenges are mounting to siting and permitting requests and decisions. These challenges are often referred to as NIMBY ("not in my back yard"). NIMBY challenges tend to focus on the local impacts of a project, such as the perceived adverse impacts on surrounding property values; claimed adverse health impacts; and, importantly, the aesthetics of a project.

FEDERAL SITING CHALLENGES

The federal government is encouraging the development of renewable energy as exemplified by the tax benefits accorded these projects by legislation, such as the American Recovery and Reinvestment Act of 2009 (ARRA). Many states have provided legislation mandating renewable energy development through renewable portfolio standards (RPS).[5] Such benefits and mandates notwithstanding, citizen group challenges are becoming prolific. Approximately 45% of recent challenges to U.S. power projects involved renewable energy projects.[6]

Projects located on federal land must secure a review under the National Energy Policy Act (NEPA), in which the government considers the environmental impacts of the proposed project. Agencies such as the U.S. Forest Service, the Bureau of Land Management (BLM), the U.S. Army Corps of Engineers, and the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) are involved as required by specific project circumstances. The major federal statutes involved are the Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act, and NEPA.

Federal litigation is routinely utilized by citizen groups challenging the siting of a project. An example of a successful federal citizen's suit is *Animal Welfare Institute v. Beech Ridge Energy LLC*, where the court that found the developer of a wind project failed to obtain an "incidental take permit" from the U.S. Fish and Wildlife Service relating to the harming of an endangered bat species in violation of the Endangered Species Act. As

5 DSIRE. "Quantitative RPS Data Project." http://www.dsireusa.org/rpsdata/index.cfm

6 U.S. Chamber of Commerce. "Project No Project." www.projectnoproject.com Also: U.S. Chamber of Commerce. "Progress Denied: A Study on the Potential Economic Impact of Permitting Challenges Facing Proposed Energy Projects."

a result, the court limited the project's operations to the months when the bat species hibernated.

Even if a permit has been obtained, a citizens group may challenge the decision of the agency as inconsistent with the law, outside the agency's jurisdiction, an abuse of discretion, or an arbitrary and capricious agency action in violation of the Administrative Procedure Act (APA). The adequacy of the project's environmental impact statement (EIS) may also be challenged.

Examples of such challenges include *Clark County Nevada v. Federal Aviation Administration*, where the court agreed that the Federal Aviation Administration in permitting a wind farm within ten miles of an airport was arbitrary and capricious. In *Quechan Tribe of Fort Yuma Indian Reservation v. United States Department of the Interior*, the court granted a preliminary injunction halting the development of a 709 MW solar project on 6,144 acres of public land in California. The plaintiff alleged that the Department of Interior failed to evaluate cultural resource sites important to the tribe in its evaluation of the project's impact on certain biological species. The court ruled that the government had, at a minimum, failed to adequately consult with the tribe over historic sites.

STATE & LOCAL SITING CHALLENGES

Projects on non-federal lands are subject to siting processes that vary from state to state.[7] Many states provide a county and municipal process for siting review. While this approach may be more abbreviated, it also lends itself to a focus on local issues rather than statewide goals and benefits flowing from the proposed project. A renewable energy project is readily challengeable in this type of process by citizen activists. Such local processes are prone to lack of uniformity in their results, creating an uncertain environment for project development. Uncertainty typically increases project costs and even affects project viability if investors and lenders are not convinced of the duration and extent of the approval process.[8]

Some states, such as Minnesota, have a statewide siting authority. Developers tend to favor a statewide siting authority because decisions are generally uniform, and results are thus more certain. In a sign of the current tension present in the development climate, however, Wisconsin's statewide siting regulations—enacted in December 2010—were suspended in March 2011 due to public concerns raised with the Wisconsin Joint Committee for the Review of Administrative Rules.[9]

Typical components of a potential state or local NIMBY challenge include: (1) aesthetics; (2) noise (which may include a health component over claimed infrasound—low frequency sound—generated by wind turbines); (3) ice throw; (4) shadow flicker; (5) electromagnetic interference; (6) wind tower lights; (7) loss of property value; (8) private nuisance claims; (9) rural road damage from transportation of heavy equipment during project construction; and (10) violation of federal law, such as the Endangered Species Act.[10]

ADDITIONAL CHALLENGES

In addition to the restrictions placed on foreign investments in the U.S. by the federal government, a number of states limit the ability of foreign entities or persons to acquire an ownership interest in real estate

7 DSIRE. "Rules, Regulations & Policies For Renewable Energy." http://www.dsireusa.org/summarytables/rrpre.cfm

8 Renew Wisconsin. "Midwest Wind Suspends Project Development in Wisconsin." 30 March 2011. http://renewwisconsinblog.org/2011/03/30/5008

9 DSIRE. "Wisconsin Incentives: Policies for Renewables & Efficiency." http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WI16R&re=1&ee=1; Wisconsin Public Service Commission. "Wind Siting Frequently Asked Questions." http://psc.wi.gov/renewables/documents/WindSitingFAQs.pdf; and Joint Committee for the Review of Administrative Rules. "Report to the Legislature Administrative Code PSC 128." http://legis.wisconsin.gov/2011/data/fe/SB-50ar.pdf

10 Minneapolis Star Tribune. "Birds Ground Xcel Wind Deal." 5 April 2011. http://wwwstartribune.com/business/119252484.html

either directly or indirectly.[11] The restrictions vary from state to state and include prohibitions on ownership of agricultural land by foreign entities;[12] "friend" (e.g., not an enemy of the U.S.) requirements;[13] disclosure requirements;[14] and a variety of other restrictions that limit a foreign entity's ability to own or lease real estate.

The lack of uniformity between the states' restrictions results in the possibility of multiple sets of restrictions for a project that crosses state lines. For these reasons, obtaining financing (equity or debt) can be more difficult if the project will be owned by a foreign entity either directly or indirectly in a state (or states) that has restrictions on foreign ownership. Accordingly, the ownership structure of the project must be carefully considered in such states.

Developers of projects on tribal lands must also take into account that Native American tribes recognized by the federal government have sovereign immunity and cannot be sued without their consent.[15]

CONCLUSION

Federal permitting requirements provide activists with options for challenging projects. State permitting requirements continue to largely remain focused on local procedures with limited statewide processes. Public opposition to the siting of renewable energy projects is on the rise. If, however, project developers include the local community in the siting process as a valued stakeholder, and minimize potentially adverse environmental impacts, public opposition can be meaningfully reduced and managed.[16]

11 National Association of Realtors. *Alien Land Ownership Guide: State Laws Relating to Ownership of U.S. Land by Aliens and Business Entities*. November 2006. http://www.realtor.org/NCommSrc.nsf/files/Alien%20Land%20Ownership%20Guide%20(November%202006).pdf/$FILE/Alien%20Land%20Ownership%20Guide%20(November%202006).pdf.

12 Ibid 6.

13 Ibid 8.

14 Ibid 12.

15 *Native American Distr. v. Seneca-Cayuga Tobacco Co.*, 546 F.3d 1288, 1295 (10th Cir. 2008). *Warburton/Buttner LLP v. Superior Court*, 127 Ca. Rptr.2d 706 (Ct. App. Cal. 2002).

16 Lorde Martin, Susan. "Wind Farms and NIMBYs: Generating Conflict, Reducing Litigation." http://alsb.roundtablelive.org/resources/documents/np%202009%20martin,%20s.pdf.

CHINA MARKET REVIEW

■ CHINA MARKET FOCUS: SOLAR PV AND GRID CAPACITY

China invested $54.4 billion in renewable energy in 2010, far surpassing second- and third-place Germany and the U.S. at $41.2 billion and $34 billion, respectively, according to a March 2011 report published by the Pew Charitable Trusts.[17] This represents a 39% increase over China's 2009 investment in the sector and echoes the results of a similar 2009 study which reported China had, for the first time, led the world in annual renewables investment.

Despite the progress China has made in the renewable sector in the past several years, it is clear from the continued development of the market during the past quarter that Chinese policymakers and market players do not intend to rest on their laurels. The long-awaited adoption in March 2011 of China's 12th Five Year Plan, discussed in detail in the following section, is perhaps the most significant policy development in the Chinese renewables industry since the introduction of the Renewable Energy Law in 2006. The plan will be supported by an estimated RMB 5 trillion (about $763 billion) in domestic clean energy (including nuclear) investment in the next decade under a related national energy plan.

In addition to these major headlines, a number of market developments affecting a range of renewable energy sectors occurred during the quarter. In this section of the US-China Quarterly Market Review, we focus on two of those areas: solar PV and grid infrastructure.

SOLAR PV

BACKGROUND

In contrast to China's leading position in the wind power sector, which was discussed in detail in the Winter 2011 US-China Quarterly Market Review,[18] the development of its solar PV generating capacity has lagged significantly, accounting for only about 3% of the global total in 2010. This is despite China producing more than half of all solar PV equipment installed worldwide last year.

The initial focus of China's market development strategy was to promote the growth of its domestic solar PV equipment manufacturing industry, with the vast majority of its production capacity being slated for export. Low-cost financing from state-owned banks and export incentive policies that apply to all manufacturing, including the PV industry, aided this strategy. The domestic manufacturing industry was also given a boost

17 Pew Charitable Trusts. "Who's Winning the Clean Energy Race? 2010 Edition." 29 March 2011. http://www.pewenvironment.org/news-room/reports/whos-winning-the-clean-energy-race-2010-edition-329291

18 ACORE, CREIA. "Winter 2011 US-China Quarterly Market Review." January 2011. http://www.acore.org/wp-content/uploads/2011/02/US-China_QMR_11Q111.pdf

by strong demand in the principal export markets of the U.S. and Germany. These factors have helped domestic producers dramatically increase market share and reduce prices in recent years, with the long-term goal of providing a more competitive alternative to conventional energy sources.

Following years of remarkable growth in domestic PV manufacturing and a corresponding dependence on overseas markets, China's policymakers have adopted a cautious, yet deliberate, approach to the development of its solar PV power generation sector. Energy policymakers continue to study the issue of a feed-in-tariff for solar, but are reportedly not close to adopting one on a national basis, despite reports in the summer of 2010 that such an announcement was imminent. Similarly, China has taken only preliminary steps to adapt to the solar market its long-running national concession program for awarding wind project tenders. In the second such tender process, 13 solar project concessions were allocated in 2010, with the "Big 5" state-owned generating firms dominating with bids of less than RMB 1 per kilowatt hour, which observers say is destined to result in money-losing projects.

DEVELOPMENTS

Despite the relatively slow pace of development of domestic solar PV generating capacity, the market is by no means stagnant. One of the most significant developments this quarter was the extension of the "Golden Sun" program of subsidies covering 50–70% of the costs of qualifying utility-scale solar projects, plus related grid connection and transmission costs. Originally announced in 2009, the program was intended to have a limited lifespan and a target of 500 MW in subsidized capacity. However, it will now be extended beyond its original 2012 expiry date and will be used to subsidize at least another 1,000 MW of solar projects. Although it is encouraging to industry participants that additional subsidies will be available, the program extension may be intended more as a stop-gap measure covering the period prior to the adoption of a comprehensive national approach to solar PV power generation.

Also this quarter, as a reaction to the Fukushima Dai-Ichi nuclear crisis in Japan, a representative of the National Reform and Development Commission (NDRC) has reportedly indicated that it is considering a reduction in the amount of targeted nuclear power capacity and a corresponding increase in solar for the period covered by the 12th Five-Year Plan.[19] This followed an earlier announcement that China was imposing a moratorium on approvals of any new nuclear facilities while it updates safety standards.[20] Reports have indicated that the national solar PV generating target may be increased to 10 GW by 2015 from the current 5 GW goal. Such a change could result in 1–2 GW of installations every year from 2011–2015. Nevertheless, observers appear skeptical about whether solar could reliably serve as a substitute for nuclear.

On the equipment manufacturing side, industry watchers in the recent quarter have expressed increased concern about possible overcapacity as a number of major Chinese manufacturers have recently announced significant capacity increases. Some believe that the increases are ill-timed as many European markets, such as Germany, which absorbs a large proportion of Chinese exports, have initiated plans to scale back solar subsidies. As discussed above, it is unlikely that suppliers will be able to rely on a major expansion of the domestic market as an alternative outlet in the near-term.

In another development this quarter affecting equipment manufacturers, a wave of consolidation among Chinese polysilicon producers is being predicted, along with a reduction in overall capacity, as a result of new scale and efficiency standards published by several Chinese ministries and the NDRC.

19 CRI. "China May Double Solar goal after Japan Leak." 30 March 2011. http://english.cri.cn/6909/2011/03/30/2741s629576.htm

20 McClatchy. "Japan nuclear crisis prompts China to halt plans for new plants." 16 March 2011. http://www.mcclatchydc.com/2011/03/16/110547/japan-crisis-prompts-china-to.html

Under the new measures, approvals for new polysilicon manufacturing facilities have been halted, and those facilities with less than 3,000 metric tons (tonnes) of annual capacity are being threatened with closure. Among other requirements, eligible producers in the energy-intensive industry must also eventually meet increased efficiency standards of 60 kilowatt hours per kilogram, down from 80 at the beginning of the year.

It is expected that the vast majority of China's producers will be affected by these measures as regulators push production toward high levels of sustainability and international competitiveness. However, the larger, more developed producers will likely have less difficulty meeting the standards and may, in fact, benefit from the ability to increase market share.

WIND SLOWDOWN & GRID CAPACITY

Since China became a major player in the wind power sector in recent years, issues related to the capacity of its grid system to handle newly developed projects have been cited as a major impediment to the industry's development. Estimates produced at various times have stated that anywhere from 20–50% of the country's wind power projects remain unconnected to the grid. These figures have been widely cited in the press as evidence of the inefficiency of Chinese investment in the sector. However, a large proportion of the unconnected capacity is the result of the unavoidable lag of several months between installing a wind power project, testing it for grid compatibility, and actually physically connecting it to the grid. Given the pace of development of the wind sector in China, a large portion of unconnected capacity should therefore be expected.

Nonetheless, real issues with grid capacity do exist, and they have led a representative of the Chinese Wind Energy Association (CWEA) to predict a slowdown in investment in the sector in 2011 and coming years if the issues are not addressed. The problem is reflected in a finding published by State Energy Regulatory Commission (SERC) in February 2011 that a total of 2.8 billion kilowatt hours of wind energy was wasted during the first six months of 2010 due to insufficient grid connections and transmission issues. As discussed in the Winter 2011 US-China Quarterly Market Review, most issues relate to the distance of China's wind resources in the north from its population and industrial centers in the east.[21] An estimated 75% of unconnected wind power capacity is located in remote northern regions.

Grid companies must be properly incentivized to connect wind projects to the grid by using cost recovery programs and by working to ensure technical compatibility. The Renewable Energy Law was amended in late 2009 in an attempt to address some of these issues, but implementing rules are still in the process of being developed, and the market will need some time to assess whether the impact of the amendments is adequate.[22]

As a partial response to grid capacity issues, State Grid, China's largest power distribution firm, has announced planned investment of RMB 322 billion (about $49 billion) this year, principally on grid upgrades, with the focus on the development of its ultra high voltage (UHV) network. Early investments include a RMB 4.3 billion (about $657 million) investment in 2011 to extend its UHV transmission system that runs from northern Shanxi Province to power grids in central China. Similarly, State Grid announced earlier in the quarter the completion of the world's first 660 kilovolt DC power transmission line running from northeast China's Ningxia Hui Autonomous Region to heavily industrialized Shandong Province on China's east coast. Wind projects will not be the only beneficiaries of these investments, since these regions are also home to a large amount of hydro and thermal generating capacity.

21 ACORE, CREIA. "Winter 2011 US-China Quarterly Market Review." January 2011. http://www.acore.org/wp-content/uploads/2011/02/US-China_QMR_11Q111.pdf

22 Ibid.

CHINA POLICY: THE 12th FIVE YEAR PLAN

LEADERSHIP TOWARD A LOW CARBON ECONOMY

China has previously shown its ability to successfully implement mandates, standards, and incentives for a low-carbon economy. The 12th Five-Year Plan ("the Plan" or "12th FYP") further demonstrates global leadership for development of an environmentally sound, low-carbon economy.[23] For the first time, the 12th FYP identifies multiple "green" industries as Strategic Emerging Industries (at least three of the seven SEIs identified in the Plan are explicitly environment-oriented). In addition, the Plan creates an entire section setting forth goals for "energy conservation and environmental protection in responding to climate change."

The policies of the Plan further accelerate China's low-carbon development with aggregate funding of RMB 3 trillion (approximately $460 billion) supporting many new initiatives, including:

- targets of 235 GW for renewable and low-carbon energy (incremental renewable capacity of 70 GW, 5 GW and 120 GW for wind, solar, and hydro, respectively, by 2015);[24]
- plans for market mechanisms including pilot cap-and-trade programs for carbon and other pollutants;
- environmental taxes and resource use fees;
- RMB 500 billion (approximately $77 billion) for grid transmission expansion;
- a target of 4,700 kilometers of new high-speed rail; and
- a target of 12.5 million hectares of new forest cover.

There are also many additional positive mandates and new policies in the 12th FYP discussed later in this report.

The 12th FYP appears to create a broad range of climate change-related investment opportunities for: (1) equipment and service companies in the wind, solar, and hydro power sectors; (2) equipment and technology companies in the low-carbon transportation sector; (3) hardware, software and services for energy management; and (4) renewable energy project finance activity. The nuclear disaster in Japan, as well as unrest in the Middle East, may further amplify these trends while also increasing opportunities for cleaner natural gas electricity generation.

12th FIVE-YEAR PLAN: BROAD & AMBITIOUS

With the introduction of the 12th FYP on March 5, 2011, the Chinese leadership presented several new and expanded energy and environmental policy initiatives and targets as evidence that China is serious about transitioning to a low-carbon economy. This is borne out in the summary Draft 12th Five-Year Plan which contains a new section on "…energy conservation and environmental protection in responding to climate change."[25] The Draft 12th FYP also lays out significant progress in key areas, describing the high-level objectives of China's National Climate Change Program. The Draft Plan states that pilot cap-and-trade systems for carbon and other criteria pollutants will be undertaken. This strong demonstration of central government leadership contrasts with the stalled efforts at the U.S. federal level. Contrary to previous commentators' expectations that U.S. carbon policy would lead the way for China to join a decarbonizing world, it is now China that is preparing for carbon markets by 2013.

23 The summary details of the 12th Five-Year Plan are in no single publicly available document and have been obtained from official sources including the NDRC, Premier Wen Jiabao's remarks before the National People's Congress, press releases from Xinhua, the state news agency, and various press releases from State Grid Corporation of China, China Electricity Council, among others. Collectively, these sources are referred to as "the summary Draft 12th Five-Year Plan."

24 See footnote 19 regarding a potential doubling of China's 2015 solar target.

25 See footnote 23 regarding terminology "summary Draft 12th Five-Year Plan.

Table 2: KEY GOALS IN 12th FIVE-YEAR PLAN

NEW GREEN DEVELOPMENT ITEMS	POLICY EXTENSIONS
Carbon Intensity: approximate 4% reduction in 2011 and estimated 18% cumulative reduction by 2015	Energy-to-GDP intensity: approximate 4% reduction in 2011 and estimated cumulative reduction of 18% by 2015
NOx reduction of 1.5% year-on-year in 2011	SO_x reduction of 1.5% year-on-year
Add RMB 500 billion ($76.7 billion) to build cross-region UHV and other transmission lines to support long-distance power transmission and grid connection for renewable power	Target "new energy" (non-fossil fuel) generation as a proportion of total generation at 11.4% in 2011, rising to 15% by 2020
Plans for resource consumption fees and environmental taxes	8% growth in electricity consumption and generation capacity including a 45% increase in grid-connected wind power, a 13.1% increase in nuclear power, and a 6.1% increase in hydropower in 2011
Plans for market-centric power pricing mechanisms including demand-side management (DSM) and carbon emissions and pollutant trading mechanisms	Industrial water consumption intensity reduction of 7% year-on-year in 2011 and a 30% cumulative reduction by 2015
Establish and deploy a public system for greenhouse gas (GHG) statistics and accounting	Add 120 GW of hydro capacity by 2015
Ammoniac nitrogen reduction of 1.5% year-on-year in 2011 and cumulative 10% reduction by 2015	Add at least 70 GW of new wind capacity by 2015
Inclusion of flue gas denitrification for mandatory emissions control	Add 5 GW of solar power capacity by 2015[26]
Inclusion of heavy metal pollutants in targeted pollutant reduction schedules	Establish 6 large on-shore wind farms and 2 off-shore wind farms by 2015
Improve business conditions for energy efficiency service sector (e.g. terms comparable to those enjoyed by industrial players for financing, energy, gas, and water) and support for energy performance contracting (EPC)	Add 40 GW of low-carbon nuclear capacity
Inclusion of compliance measures in provincial and local cadre performance criteria for energy and environmental objectives	Industrial transformation in the steel, non-ferrous, petrochemical and ship-building sectors
Steer foreign direct investment (FDI) toward energy conservation and environmental protection areas among others	Continued policy support for power grid automation (smart grid) and intelligence to accommodate greater intra-regional power transfers
	Add 4,700 km of high-speed rail line
	Aquatic O_2 demand reduction of 1.5% year-on-year
	Increase the area of forest cover by 12.5 million hectares and forest stock by 600 million cubic meters by 2015
	Improve coal use efficiencies and expand natural gas production

Source: NDRC summary Draft of the 12th Five-Year Plan, 5 March 2011, and DBCCA Analysis, 2011.

26 See footnote 19 regarding a potential doubling of China's 2015 solar target.

CARBON & POLLUTION MARKET MECHANISMS

MAKING STEADY PROGRESS

China is well known as a generator of clean development mechanism (CDM) credits, particularly for the European Union Emission Trading Scheme (EU ETS), and it has taken steps to develop domestic carbon and emissions markets in recent years. In 2006, China began laying out a preliminary outline of cap-and trade-mechanisms. Exchanges were created in 2008 in Beijing, Tianjin and Shanghai with subsequent trading activity. By 2010, policymakers had come to realize that mandates, standards, and incentives alone could not ensure achievement of China's energy and carbon intensity targets. The NDRC identified 13 areas with significant industrial and commercial activity to pilot low-carbon programs, essentially creating centers with an adequate supply of and demand for carbon credits to form carbon markets.

The Draft 12th Five Year Plan demonstrates that development of domestic carbon emissions markets is of increasing national importance. The Plan's inclusion of pilot carbon (and other pollutants) market exchange systems, along with efforts to create the necessary emissions inventory, measurement, and tracking systems, are encouraging signs that China will continue to break new ground in decarbonizing its economy through 2015. The summary Draft 12th Five Year Plan has made these pilot exchange programs core elements in a strategy to foster low-carbon behavior above and beyond the mandates, standards, and incentives that have been successfully deployed to date.[27]

Using market-based mechanisms to supplement continued mandates, standards, and incentives will serve the two-fold purpose of assisting China's transition to a low-carbon economy while also building a high-value market opportunity for domestic and international investors. On a global scale, establishing a market-based price for carbon is necessary for businesses to make informed economic and planning decisions.

CHINA'S BEST-IN-CLASS LOW-CARBON POLICIES

A GLOBAL COMPARISON

A comparison by Deutsche Bank Climate Change Advisors (DBCCA), based on China's summary Draft 12th Five-Year Plan released on March 5 (which will likely be very similar to the final published plan) and subsequent incremental policy announcements, shows that China is implementing best-in-class policies and demonstrating global leadership in decarbonizing its economy.[28] Table 3, below, provides a qualitative comparison of China's low-carbon policy leadership relative to low-carbon policy approaches in other select countries.

27 See footnote 23 regarding terminology "summary Draft 12th Five-Year Plan.
28 See footnote 23 regarding terminology "summary Draft 12th Five-Year Plan.

Table 3: LOW-CARBON POLICY REGIMES AROUND THE WORLD

		GERMANY	CHINA	U.K.	U.S.	INDIA
EMISSIONS CONTROL	Binding Emissions Target	✔	✔	✔	⏳	⏳
	Renewable Electricity Standard	✔	✔	✔	⏳ *State-level*	⏳ *State-level*
	Long-term Energy Efficiency Plan	✔	✔	✔	⏳	✔
FINANCIAL SUPPORT	Feed-in-Tariff	✔	✔	⏳ *Microgen FiTs*	⏳ *State, Local*	⏳ *State, Regional*
	Long-term Gov't-based "Green Bank"	✔	✔	⏳ *Proposed*	⏳	X
	Tax Benefits	✔	✔	✔	✔	✔
	Long-term Funding Programs	✔	✔	✔	⏳	⏳
	Long-term Grid Improvement Plan	✔	✔	⏳ *Proposed*	⏳	✔
	Budget Strength (Deficit as percentage of GDP)	3.6%	1.6%	11.5%	10.0%	5.5%

Source: DBCCA Analysis, 2010. ⏳ = Policy exists at a sub-national level; ⏳ = Policy is only in tentative or planning stages.

According to DBCCA's estimation, China should remain on track with the previously articulated goal of reducing 2020 carbon intensity by 40–45% relative to 2005 levels provided that any reduction in nuclear capacity build-out (as a result of events in Japan) is met predominantly by gas and renewable energy development. By 2015, China's targeted energy intensity may decline 34% cumulatively from 2005 levels. To achieve the 40–45% reduction goal by 2020, the future 13th Five Year Plan (2016–2020) would then have to include a 13% energy intensity reduction goal in order for the cumulative reduction to reach approximately 42.5%, the middle of the target range. Given the announcements of more aggressive energy and carbon intensity reductions of 18% by 2015, compared to the prior targets of 16% and 17% reductions, respectively, DBCCA believes a portion of the more aggressive decarbonization will come from greater energy efficiency gains and a proportion of non-fossil fuels in the energy mix that is incrementally higher than the 11.4% discussed in the summary Draft 12th Five Year Plan.[29]

29 See footnote 23 regarding terminology "summary Draft 12th Five-Year Plan.

STRATEGIC EMERGING INDUSTRIES

The 12th Five Year Plan does not focus solely on climate change and environmental issues. Rather, the Plan is the proverbial master guideline for legislation and administrative policy intended to guide the continuing growth of China as an economy and as a country. As such, from both sectoral and operational perspectives, the Plan addresses a broad range of priorities including economic growth, social conditions, emerging technologies, innovation, and governmental operations. The Plan designates certain industries, depicted in Table 4, as "Strategic Emerging Industries (SEIs)," also referred to as "pillar industries."

The SEI sectors in the outgoing 11th Five Year Plan exceeded targeted growth. Given the substantial technology support prescribed in the 12th FYP, DBCCA expects growth for the new SEIs to exhibit similar achievements.

Table 4: 12th FIVE-YEAR PLAN— STRATEGIC EMERGING INDUSTRIES

STRATEGIC EMERGING INDUSTRIES
Biotechnology
Clean Energy Vehicles
Energy Conservation & Environmental Protection
High-End Manufacturing Equipment
New Energy
New Materials
Next-Generation Information Technology

INVESTMENT THEMES: THE DBCCA VIEW

Contained below in Table 5 are DBCCA's assessment of sectors that may experience growth and restructuring arising from the new SEI designations. To rapidly advance decarbonization, energy efficiency and conservation measures may have significant near-term effect while new energy systems grow to more significant scale in coming years.

Table 5: AREAS OF INVESTMENT & RATIONALIZATION ACTIVITY

THEMES FOR INVESTMENT	THEMES FOR RATIONALIZATION
Industrial and residential energy conservation	Older steel facilities
Emissions control systems	Inefficient or non-optimal petrochemical facilities
Environmental clean-up	Inefficient non-ferrous mills
Energy performance contracting (EPC)	Excess shipbuilding capacity
Demand-side management (DSM)	Small-scale coal mining
Smart grid and smart transmission	Inefficient coal power plants
Grid-scale energy storage	Inefficient salt operations
Emissions measurement and audit	
Green(er) transportation	
Green building materials	
Agricultural methane	
Water conservation	
High-efficiency manufacturing equipment	
On and offshore wind power	
Solar thermal and solar PV	
Natural gas power	
Nuclear power	
High-efficiency coal power	

POLICY HARMONIZATION

COORDINATING ENVIRONMENTAL GOALS IN CONJUNCTION WITH POLITICAL, ECONOMIC, AND SOCIAL GOALS

Although green development has a position of clear prominence in the 12th Five-Year Plan, the government is simultaneously addressing many other issues. Since the Plan maps out dramatic changes in the political, economic, and social realms, the execution of green objectives may occur in the midst of policy conflict. As noted in the summary Draft 12th Five-Year Plan, "...we must also be keenly aware that there are still some serious conflicts and problems facing domestic development."[30] Some of the possible cost and labor issues will require deft and nuanced management.

30 See footnote 23 regarding terminology "summary Draft 12th Five-Year Plan.

NUCLEAR ISSUES

CHINA REVIEWS ITS OPTIONS

Recent events at Tokyo Electric Power's Fukushima Dai-Ichi nuclear power station in Japan may influence the composition of the decarbonizing process in China. DBCCA expects the nuclear pause will likely serve as a catalyst to spur more rapid development of renewable energy sources, as well as to encourage greater energy conservation and efficiency.[31] China may spend 1–2 years reviewing and reconsidering plans for those nuclear plants still early in the planning process. DBCCA does not expect China to cancel plants under construction. The Chinese leadership recognizes nuclear power as a cleaner base load energy source compared to coal. DBCCA estimates, however, that delays for up to 24 GW of planned nuclear capacity could result in an increase in near-term demand for natural gas electricity generation in light of base load requirements and exigencies to help China remain on a decarbonizing path.

DBCCA estimates China can review its nuclear program and still meet its CO_2 intensity goals so long as cleaner and renewable energy sources are used to fill the gap. Facing the unrelenting need to decarbonize the economy, a possible pause in the pace of nuclear development and heightened foreign energy supply anxieties, DBCCA believes China's 12th Five Year plan will serve as a powerful springboard for substantial and sustained renewables growth.

LOOKING AHEAD

A ROAD MAP FOR RENEWABLE ENERGY

China's policymakers are currently finalizing the renewable energy development plan for 2011–2015 to accompany and further develop the overall 12th Five-Year Plan. The renewable energy plan will create a road map for renewable energy development, including more specific targets, major national policy programs, and supportive policies for priority technologies. The government is calling for comments from a broad range of stakeholders, including foreign investors, and the Chinese Renewable Energy Industries Association (CREIA) is presently organizing private sector input. With a strong foundation laid by the Draft 12th Five-Year Plan and an industry-inclusive policy process, DBCCA expects an ambitious, yet practical, renewable energy development plan to be announced soon.

31 See footnote 19 regarding China's potential doubling of its 2015 goal for solar energy capacity.

CHINA FINANCE: PRIVATE EQUITY

China's renewable energy sector is growing rapidly as a world-class leader in new technologies. As a result, private equity investors are eagerly pursuing opportunities to invest in all types of projects in China, ranging from early-stage venture capital investments in new PV technologies to project finance of wind energy plants. This section provides a brief overview of the ways in which many of these investments are structured.

Until recently, a U.S. or other foreign private equity fund typically would have invested in a Chinese company by partnering with the Chinese founder as equity investors in an offshore special purpose vehicle (SPV). Because the investment was offshore, the private equity fund could exit through an offshore transaction, such as a sale or IPO of the SPV, without the need for approval from Chinese regulators or exposure to Chinese tax. This structure is now under stress.

In 2006, the Ministry of Commerce (MOFCOM), the State Administration of Foreign Exchange (SAFE), and four other agencies issued cross-border M&A rules that had the practical effect of prohibiting many private equity investments from using the SPV structure. Then, in 2009, Chinese tax authorities began implementing measures to tax certain offshore exits. As a result, private equity investments now often are structured using complicated workarounds, such as contractual relationships designed to mimic equity ownership. Alternatively, foreign private equity funds sometimes pursue domestic exits, such as an IPO on a Chinese stock exchange. Moreover, as China progressively opens its domestic private equity industry to foreign participation, foreign fund managers have started to form Chinese private equity funds.

THE PROTOTYPICAL STRUCTURE

By contrast to private equity funds elsewhere in the world that focus on buyouts of companies, one distinctive aspect of private equity investment in China is that a private equity fund usually does not take a controlling stake in a Chinese company, but instead teams up with a Chinese founder and management team in a role more akin to a long-term passive investor. In the case of an investment by a foreign private equity fund, the Chinese founder typically forms an offshore SPV and makes a "roundtrip investment"—that is, a restructuring in which the founder's direct ownership of the Chinese company is converted into indirect ownership via the SPV—and then sells a minority stake in the SPV to the private equity fund. Although the private equity fund does not hold a controlling stake, it customarily benefits from minority investor protections, such as representation on the board of directors of both the SPV and the Chinese company, and veto rights over significant actions taken by the SPV or the Chinese company.

Examples of this prototypical structure in the renewable energy sector include the photovoltaic manufacturers Suntech Power and Yingli Solar. In each case, a Chinese founder formed an offshore SPV and made a roundtrip investment. Foreign private equity funds then took minority stakes in the SPV leading to an IPO on the New York Stock Exchange.

CIRCULAR 10 AND WORKAROUNDS

One benefit of the prototypical structure was that the approval of Chinese regulators was not required for the foreign private equity fund to exit its investment by IPO of the SPV on a U.S. or other foreign stock exchange. However, in 2006, the M&A regulations issued by MOFCOM, SAFE, and four other agencies—commonly referred to as "Circular 10"—expanded oversight of IPOs involving Chinese assets. Circular 10 requires the approval of the MOFCOM and other regulators for the IPOs of offshore SPVs that were set up by roundtrip investment after Circular 10 took effect. Because these approvals are essentially impossible to obtain, Circular 10 has had the practical effect of prohibiting many private equity investments from using the prototypical structure.

Many Chinese companies seeking foreign financing have attempted to bypass Circular 10 by setting up an offshore SPV in a way that does not involve a roundtrip investment. A typical workaround involves setting up an offshore SPV owned by the private equity fund and the Chinese founder, as in the case of the prototypical structure. However, the SPV does not make a direct investment in the Chinese company. Instead, the SPV forms a Chinese subsidiary—typically in the form of a wholly foreign-owned enterprise (WFOE)—and contributes funds to it. The WFOE then enters into contracts with the founder and the Chinese company. The WFOE transfers the funds it received from the SPV to the Chinese company in the form of, for example, loans and payments for the purchase of the Chinese company's intellectual property or other assets, and provides consulting and other services to the Chinese company. In return, the founder's economic interest and control rights in the Chinese company are transferred to the WFOE. One vexing, but unavoidable, aspect of such workarounds is that, although the underlying contractual relationships are designed to mimic equity ownership, they are merely contractual, and their enforceability in Chinese courts in case of a dispute among the parties remains uncertain. Despite the regulatory and operational risks in these workarounds, several have successfully completed U.S. public offerings, including the biodiesel manufacturer China Integrated Energy.[32]

CIRCULAR 698 AND THE JIANGSU CASE

Until recently, a foreign private equity fund using the prototypical structure could exit its investment through an offshore transaction, such as a sale or IPO of the offshore SPV, without attracting Chinese tax. In many cases, the SPV is established in a tax haven.

However, whether foreign private equity funds will be able to continue to achieve tax-free exits is uncertain. In 2009, the State Administration of Taxation (SAT) issued rules—commonly referred to as "Circular 698"—that require reporting of transfers of offshore SPVs established in tax havens, and authorize re-characterization of offshore transfers as onshore transfers if the offshore SPV does not have a reasonable commercial purpose other than tax avoidance. Circular 698 applies retroactively to all such transfers made since January 1, 2008.

At present, the reach of Circular 698 is unclear because SAT has not yet issued any interpretive guidance, but it appears to have bite. In June 2010, it was reported that The Carlyle Group paid approximately $25 million in taxes assessed by a Jiangsu tax authority on gains from the January 2010 sale of a Hong Kong SPV that was formed to hold a 49% stake in Yangzhou Chengde Steel Tube.

32 China Integrated Energy exemplifies the complexity in these workarounds. SEC Filing. "China Integrated Energy, Inc: Our History and Corporate Structure." 29 October 2009. Page 56. http://www.sec.gov/Archives/edgar/data/1070045/000114420409055559/v164206_424b1.htm#tOHCS

CONCLUSION

Over the past five years, Chinese regulators and tax authorities have expanded their reach to the offshore transactions pursuant to which foreign private equity funds exit from their investments in Chinese companies. As a result, investments now often use complicated workarounds. However, significant regulatory, tax, and operational risks remain. Alternatively, foreign private equity funds sometimes pursue domestic exits such as an IPO on a Chinese stock exchange. Furthermore, China is rapidly reworking the legal and regulatory framework for its domestic private equity industry in a way that encourages foreign participation. For example, regulations issued in 2010 now allow Chinese private equity funds to be structured similarly to the partnerships that are commonly used for U.S. and European private equity funds. Moreover, at the beginning of 2011, the Shanghai Municipal Government began issuing regulations aimed at attracting foreign sponsors and investors by allowing Chinese private equity funds formed by foreign fund managers to compete on a more equal footing with Chinese private equity funds formed by Chinese fund managers, and facilitating the conversion of foreign currency invested in Chinese private equity funds into RMB. In sum, the structures that foreign private equity funds use to invest in China's renewable energy and other sectors are evolving rapidly in parallel with the evolution of China's policies for foreign investment.

US-CHINA COLLABORATION UPDATE

This spring, China extended its lead in global clean energy investments, while the U.S. fell to number three in the world according to a Pew Charitable Trust study. Weeks prior to the release of Pew's rankings, China released its Draft 12th Five-Year Plan with an unprecedented role for renewable energy in China's future development strategy as detailed in the China Policy section above. Maintaining strong growth in the renewables sector and meeting the goals set forward in the 12th FYP will require increased technical expertise and further advancements in technology.

In the U.S., renewable energy project installations continue—with exceptional growth in the solar sector—despite persisting policy uncertainty in Washington. While President Barack Obama continues to push for a national energy policy that encourages cleaner energy generation, the government—particularly Congress—is largely focused on fiscal concerns. The dim prospects for bipartisan congressional action on energy policy in 2011 mean that the Obama Administration will increasingly need to look to regulatory means to achieve a renewable energy scale-up.

U.S. and Chinese government teams are collaborating to address these regulatory, technical, and technological challenges. President Hu Jintao's visit to Washington, DC in January 2011 was marked by significant collaboration announcements between the government and private sectors, and the flurry of U.S.-China energy collaboration has continued throughout the first four months of 2011.

This section of the US-China Quarterly Market Review highlights progress being made in the energy initiatives launched by President Barack Obama and President Hu Jintao and draws attention to significant collaborations between U.S. and Chinese companies that are driving forward renewable energy development.

GOVERNMENT COLLABORATION: CONTINUING PROGRESS

U.S. Secretary of Energy Steven Chu and Chinese Minister of Science & Technology Wan Gang reveal the Clean Energy Research Center logo on January 18, 2011 in Washington, DC.

Source: Ministry of Science & Technology

HU VISIT TO WASHINGTON

Renewable energy again entered the spotlight during an official US-China state visit when President Hu Jintao arrived in Washington, DC in January 2011.

Most of the renewable energy activity during President Hu's visit centered on the US-China Strategic Forum on Clean Energy Cooperation, where ACORE and the China Renewable Energy Society (CRES) chaired the renewable energy working group to address opportunities and challenges in the U.S. and Chinese renewable energy markets. During the forum, many U.S. and Chinese companies celebrated developments in new and existing partnerships (detailed information on commercial developments below).

Also at the forum, the **US-China Clean Energy Research Center (CERC)** revealed its five-year work plans for the three consortia dedicated to researching electric vehicles, energy efficiency, and advanced coal-burning technologies. The work plans, along with detailed information on the research consortia, can be found at CERC's news website: http://www.us-china-cerc.org/.

The U.S. Department of State announced two new private-public partnerships under the **US-China EcoPartnership Program**, a platform for sub-national collaboration on energy and climate goals formed by the U.S. and Chinese governments in 2008. Case Western Reserve University and the Chinese National Offshore Oil Corporation (CNOOC) will be cooperating on energy efficiency research to achieve lower greenhouse gas emissions. And in a public-private partnership, Charlotte, North Carolina and Langfang, Hebei Province will team up with local champions of industry Duke Energy and ENN Group, respectively, to share policy experiences, and to jointly develop and deploy renewable energy technologies (detailed information on Duke-ENN partnership in "Private Sector Collaboration" below).

CONTINUING PROGRESS

Implementation of US-China renewable energy cooperation initiatives did not halt with the end of President Hu's state visit. Building upon discussions during President Hu's visit and progress made at workshops in Beijing in late 2010, the U.S. National Renewable Energy Laboratory (NREL) and the Energy Research Institute (ERI) of China developed work

plans for the official **US-China Renewable Energy Partnership** this spring.

The US-China Renewable Energy Partnership was created by the Hu and Obama Administrations to develop roadmaps for widespread renewable energy deployment; share technical and analytical resources with state and local governments; and facilitate state-to-state and region-to-region partnerships.[33]

The work plans developed by NREL, under the U.S. Department of Energy (DOE), and ERI, under the Chinese National Energy Administration (NEA), represent the first phase of cooperation implementation. The U.S. and Chinese renewable energy industry have been involved in planning discussions and specific cooperation activities under the Partnership.

As specified in its five-year work plans, the Partnership will focus on the following areas:

- Policy & Planning
- Wind Technology
- Solar Technology
- Grid Integration
- Standards Development

ROAD AHEAD

Government collaboration will continue in 2011 with a series of reverse trade missions; 7–10 expected EcoPartnership announcements at the Strategic & Economic Dialogue (S&ED) in May; and further implementation of the Renewable Energy Partnership.

33 U.S. Department of Energy. "U.S.-China Clean Energy Cooperation: A Progress Report." January 2011. http://www.pi.energy.gov/documents/USChinaCleanEnergy.PDF

■ PRIVATE SECTOR: PROLIFERATING PARTNERSHIPS

More and more U.S. and Chinese renewable energy firms are forming partnerships to strengthen renewable energy development in the U.S. and China. The forms of collaboration vary from acquisition to framework agreement, with joint ventures and project-specific partnerships in between.

ACQUISITION

LDK Solar's acquisition of Solar Power Inc. (SPI) in April 2011 illustrated the M&A trend described in the U.S. Finance section above. LDK, a vertically-integrated Chinese PV firm, acquired U.S. project developer SPI in order to gain an outlet for their products and simultaneously increase their presence in the U.S. At the same time, SPI will strengthen its balance sheets and open opportunities for further pipeline expansion.

TECHNOLOGY DEPLOYMENT

U.S. and Chinese firms are also partnering to deploy advanced technologies in Chinese cities. The EcoPartnership between Duke Energy and ENN Group (discussed above) will initially involve the building of an "eco-city" in Langfang, Hebei Province. The two companies will collaborate on building a grid suitable to support electric vehicle deployment and increasing energy efficient building practices.

Honeywell is another U.S. company working to deploy grid technologies in China. Under the auspices of the US-China Energy Cooperation Program (EPC), the U.S. Trade and Development Agency is supporting Honeywell's partnership with the State Grid Electric Power Research Institute to implement a pilot project and feasibility study on demand response and advanced metering in China's commercial buildings.

HUMANITARIAN

Yingli Green Energy, commonly known as "Yingli Solar", announced a unique partnership with GRID Alternatives earlier this year that will hopefully serve as a model for future collaborations. The Chinese firm is providing solar modules to GRID Alternatives (partially on a donation-basis, partially on a cost-basis) to install solar panels on 400 low-income California homes.

FUTURE OPPORTUNTIES

Only a handful of recent announcements are listed in the table below as an illustration of increasingly abundant US-China private sector partnerships. With a bright market outlooks, top research centers, and significant sources of capital in both countries, this trend can only be expected to continue.

Table 6: RECENT US-CHINA PRIVATE SECTOR COLLABORATIONS

U.S. FIRM	CHINESE FIRM	COLLABORATION
Duke Energy	ENN Group	Duke and ENN will develop an "eco city" in Langfang, Hebei. The project will utilize renewables, energy efficiency, energy storage, and electric vehicles.
Honeywell	State Grid	Honeywell and the State Grid Electric Power Research Institute are implementing a pilot project for smart grid deployment in China's commercial buildings.
Varian Semiconductor	Over 7 Chinese PV firms	Varian is partnering with Chinese PV firms to utilize its ion-implantation technology and increase cell efficiencies.
GRID Alternatives	Yingli Green Energy	Yingli is teaming up with U.S. renewable energy system provider GRID Alternatives to install solar panels on 400 low-income homes in California.
Solar Power Inc. (SPI)	LDK Solar	LDK acquired U.S. project developer SPI to add significant PV project pipeline to its vertical integration model, while strengthening SPI's balance sheets.
MEMC	JA Solar	U.S. polysilicon producer MEMC and Chinese PV firm JA Solar are forming a 50-50 joint venture to build a 250 MW solar cell manufacturing facility in Yangzhou, Jiangsu Province.
UPC Renewables	Guodian	UPC and China Guodian Corporation are in the early stages of forming joint ventures for wind generation in China.

Note: Information in the table above is derived exclusively from generally available public information and does not purport to be a comprehensive listing of partnerships between U.S. and Chinese firms in 2011.