China Renewable Energy Program Strategy

Overarching goal: To encourage bulk purchases of renewable energy by China's electric utilities and independent power producers in order to drive down costs and speed adoption of renewable technologies.

Goal: Encourage the development and implementation of new renewable energy policies that establish aggressive targets for national and provincial renewable energy deployment, including renewable portfolio standards, public benefits charges, incentives for distributed generation technologies, and renewable energy pricing regulations.

Means:

1. Encourage China to adopt and implement a national renewable portfolio standard (RPS), as stated in the State Development Planning Commission's Tenth Five-Year Plan.
2. Work with at least two provinces to pilot an RPS, in cooperation with the World Bank and Global Environment Facility.
3. Encourage a wind concession model for attracting foreign investment in large-scale wind energy development.
4. Encourage investment in distributed generation technologies and the development of renewable energy microgrids.
5. Encourage "green pricing" policy pilot projects so that population centers serve as the market for renewable energy facilities.

Evaluation Criteria (Key Performance Indicators):

We support and evaluate projects based on the ability to deliver measurable progress in the form of key performance indicators. Overall progress include these metrics.

1. The extent to which a national RPS gets implemented in China. (Target: 2020, at least 10% of all electricity to come from renewable energy, particularly wind energy.)
2. The extent to which provincial renewable energy policies, such as an RPS or system benefits charges, get implemented, as measured by actual megawatts of new renewable energy installed.
3. Whether a wind energy concession policy is adopted and investment is attracted to large-scale wind development within the concession zone.
4. Whether rural microgrids become established that augment volume purchases of renewable energy.
5. Whether major utilities adopt green pricing programs such that slightly higher electricity rates serve to pay for new renewable energy development.

China Sustainable Energy Program
PROJECT UPDATES
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Renewable Energy

Goal: The Renewable Energy Program encourages policies that catalyze bulk purchases of renewable energy by China's electric utilities and independent power producers in order to drive down costs and speed commercialization of renewable energy technologies.

Mandatory Market Share (MMS) and Provincial Policy Pilots

The Center for Renewable Energy Development (CRED) and international consultants from the Center for Resource Solutions (CRS) continue to work with central and provincial policymakers to develop a comprehensive MMS policy and implementation strategy for China. An MMS would require a specific percentage of all kilowatt-hours of electricity to come from renewable energy; those utilities that do not generate renewable kilowatt-hours would be required to purchase credits from those that do, via a secondary market in "green electricity credits."

The Renewable Energy Law (no Energy Foundation funds were used for lobbying) requires China to develop a total volume target for renewable energy. At the national level, the National Development and Reform Commission (NDRC) has completed the formulation of the *2020 Renewable Energy Development Plan*. The Plan has both a national renewable energy development target—ten percent of all electricity is to come from renewable energy by 2020—and targets for key individual renewable energy technologies such as wind and biomass.

At the local level, CRED has convinced local authorities to adopt a 14 percent MMS in Fujian Province, and a 10 percent MMS in Sichuan Province by 2015. CRED is currently assisting NDRC to allocate the national "10 percent by 2020" target to individual provinces, and is developing mechanisms and incentive policies to put the MMS into implementation. CRED is also working with the Fujian Energy Research Society and Sichuan University to design and implement local MMS pilots, including coordination of both grantees' and the World Bank/Global Environment Facility (WB/GEF) CRESP program's outreach and international best practice input for those pilots.

Recommendation: NDRC should require ten percent all primary energy consumption to come from renewable energy by 2020 and use mandatory market share as the implementation mechanism for delivering the national renewable energy target.

Wind Concession Project

China seeks policy mechanisms that can attract investors into state-of-the-art utility-scale wind turbine technologies. CRED worked to develop a "wind concession" approach, which auctions wind rights to private developers such that the lowest bid (per kilowatt-hour) wins a geographic concession.

With international assistance from CRS, CRED drafted a wind concession policy framework and implementation methods, including a standard wind concession agreement and power purchase agreement (PPA). CRED also developed a power tariff structure and evaluated various factors that could affect wind power prices. To date, NDRC has approved four batches of wind concession projects totaling 1,100 megawatts (MW) of capacity (an investment of approximately US $1.1 billion). The winning bids have a tariff range of US 4.8-6.8 cents/kWh, which is a significant reduction compared with previous wind farms. One concern is that some of the initial winning tariffs may be too low if to encourage profitable wind energy development. CRED is looking into the impacts of these low tariffs and making recommendations to NDRC for mitigating risks.

CRED drafted technical regulations and management stipulations for wind concession projects, which will be issued by NDRC. CRED also completed a guidebook for wind concession projects and will publish it soon.

Recommendation: Speed up implementation of wind concession programs in all wind-rich areas. Allow the additional up-front costs of renewable energy to be spread nationally so that they do not fall only on locals.

Public Benefits Funds (PBF)

CRED worked with NDRC in 2002 to design a wires charge (system benefits charge, or SBC) policy—which is a small fee collected either from generators or from consumers on a per-kilowatt-hour basis that in turn funds energy efficiency, renewable energy, and energy technology R&D programs. Local government agencies in Hebei, Fujian, and Jiangsu provinces established special funds to implement demand-side management (DSM) programs. Last year, the Energy Research Institute (ERI) of NDRC led a team consisting of NDRC's Institute of Economic Research (IER), CRED, the Beijing Energy Efficiency Center (BECon), and the Ministry of Finance's (MOF) Financial Research Institute to review and evaluate domestic and international clean energy funds. The team finalized the design of a PBF scheme for China. The scheme recommends several fund-raising options for energy efficiency and renewable energy, including utility-funded wires charges, higher rates from internalized environmental costs, and pollution fees, as well as government financing. The newly approved *Renewable Energy Law* has stipulated the establishment of a renewable energy special fund. MOF is working with NDRC to determine the scale of the special fund and options for its administration.

Recommendation: Adopt a national PBF that provides matching funds to provincial PBF programs in order to speed up development of demand-side energy efficiency and renewable energy programs. A national PBF could serve as a complement to a national mandatory market share (MMS) program for renewable energy development.

Interconnection Tariffs and Cost-sharing for Grid-connected Renewable Energy

The *Renewable Energy Law* stipulates that utilities must purchase the full volume of qualified renewable energy power at a fixed power tariff. Incremental costs incurred by utilities for purchasing renewables can be recovered through retail tariffs. Appropriate interconnection tariffs and cost sharing mechanisms are the preconditions for the implementation of the *Law*.

CRED and Tsinghua University, with guidance from the Energy Bureau and the Department of Pricing of NDRC, will investigate these important incentive policies. The project team will determine the principles and economic assessment tools for determining tariff levels for various renewable energy technologies and incremental cost allocation schemes. Findings of the study together with relevant administrative arrangements will be recommended to NDRC for adoption.

Recommendation: Electricity tariffs should incorporate the higher up-front costs of renewable energy technologies. Incremental costs for purchasing renewable energy should be spread to all consumers nationwide.

Wind Power Industry Development Roadmap

China relies heavily on foreign loans and imported wind turbines to develop its abundant wind resources. The latest plan by NDRC calls for installing at least 20,000 MW of wind by 2020. A potential barrier to achieving this target is the lack of strong domestic manufacturers, service, and maintenance capacity. China has succeeded in developing a moderate market demand through a series of wind concession projects. However, local know-how and manufacturing capability remain as major challenges in China.

CRED, the China Renewable Energy Industry Association (CREIA), China Wind Energy Association, utilities, and wind manufacturers are: (1) analyzing the pros and cons of local wind turbine manufacturing; (2) identifying challenges and solutions; (3) assessing international experiences; and (4) providing policy recommendations to promote local wind industry development. The team is developing a roadmap for wind industry development in China. The Center for Resource Solutions (CRS) is providing international best practice input and training.

Recommendation: Develop and implement bulk wind energy projects to facilitate market demand and attract investment into the wind industry.

Green Electricity Pricing Regulations

The higher up-front development costs of renewable energy are a principal barrier to rapid commercialization, particularly in China where costs are only passed on to those customers living adjacent to generation facilities. The Shanghai Energy Conservation Supervision Center (SECSC) and the Shanghai Economic Commission, with international assistance from CRS, has designed a green pricing program for Shanghai. The program charges a small surcharge for green electricity to cover the additional development costs. To date, Shanghai's industrial

consumers are demanding more green electricity than the program is offering. Shanghai's municipal government is finalizing the program. The World Bank (WB) is providing co-funding.

Recommendation: Adopt the green pricing program recommended by the Shanghai Energy Conservation Supervision Center, and encourage utilities to develop new renewable energy power generation projects in order to speed the commercialization of renewable energy in East China.

Distributed Renewable Energy Development

Distributed renewable energy microgrids can provide a cost-effective alternative to utility grid (transmission line) extensions. High capital costs and a lack of clearly stated incentive policies and institutional support from the central government, however, represent major constraints. This project aims to maximize the contribution of distributed renewable energy microgrids, particularly in the western region.

The China Energy Research Society (CERS) identified barriers to the development of distributed power generation in rural areas, and analyzed potential financing mechanisms. CERS subsequently drafted the "Study of the Investment Mechanism for Off-grid Electricity Generation Systems in Rural China," and recommended that the government increase its investment in rural off-grid distributed generation systems, including a subsidy program for remote, rural households.

Tsinghua University launched a project in 2004 to develop scenarios and a rural energy consumption indicator system for 2020. The aim is to spur distributed renewables development nationally. In 2005, the Institute of Electric Engineering of the Chinese Academy of Sciences is assisting NDRC's Energy Bureau to develop the 11th Five-year Plan for Solar Photovoltaics in China.

Recommendation: Incorporate distributed renewable energy power generation and rural energy development into the State Council's Western Development Plan. Provide financial incentives to spread renewable energy microgrids in remote areas.