



PIX02130, Credit: Simon Tsuo

Tibetan home with 20-watt PV panel and 500-watt wind turbine.

Renewable Energy in China

Township Electrification Program

China's renewable energy industry has grown steadily over the last decade, and a principal target of technological advancement has been rural village- and household-scale power systems. Nationally, almost 97% of Chinese households have access to electricity and yet there are still 30 million people without it; they live primarily in isolated rural areas away from the power grid. To address this need, village systems based on photovoltaic (PV) and wind power provide a cost-effective alternative to grid extension to these areas, and have been the focus of Chinese rural electrification initiatives in recent years.

In late 2001, China's State Development and Planning Commission (renamed the National Development and Reform Commission [NDRC] in 2003) launched an ambitious renewable energy-based rural electrification program known as Song Dian Dao Xiang, literally "Sending Electricity to Townships." In just 20 months, the program electrified more than 1000 townships in

nine western provinces—Xinjiang, Qinghai, Gansu, Inner Mongolia, Shaanxi, Sichuan, Hunan, Yunnan, and Tibet—bringing power to nearly one million people and providing the basis for rural economic development. Installation was completed in June 2003 and consisted of 20 MW from PV, 840 kW from wind, and 200 MW from small hydropower (in Hunan and Yunnan provinces). The government provided 240 million U.S. dollars (USD), or 2 billion Chinese yuan (CNY), to subsidize the capital costs of equipment, and is now drafting guidelines for tariffs and system ownership.

The next phase of this initiative will be the Village Electrification Program, which is targeted for 2005-2010 and will electrify another 20,000 villages in China's off-grid western region. Capacity building will be an important component of this phase, and NDRC will work with Jikedian Renewable Energy Development Center, National Renewable Energy Laboratory, Institute for Sustainable Power, and international and local agencies to develop and implement a training program for national- and local-level engineers and technicians. The training certification system has been an integral part of China's 1998 Brightness Program, and indeed human

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Preliminary Installation Information by Province

Province	Number of Townships	Installed Capacity (kW)	Total Investment (CNY million)	NDRC grant (%)	Provincial grant (%)	System integrators
Xinjiang	48	1,932.45	177	50	50	Xinjiang New Energy Co. Ltd.
Qinghai	86	2,600	266	80	20	Qinghai New Energy Research Institute
Gansu	12	1,230	113	50	50	Gansu Huineng Co. Ltd.
Inner Mongolia	39	1,362	68	50	50	I.M. Huade New Tech. Co.
Shaanxi	10	70	8	50	50	Shaanxi Electrical Power Consultant Co.
Sichuan	51	1,600	180	50	50	Baoding Yingli New Energy Co. Xinjiang New Energy Co. Ltd. Beijing Sangpu Solar Energy Co.
Tibet	350	6,700	800	100	0	Beijing Kenuoweiyi Co. Ltd. Beijing Jike Co. Ltd. Tibet Huaguan PV Tech. Co. Ltd. Yunnan Semi-Conductor Plant Shanghai 811 Institute Changzhou Tianhe Co. Ltd.
Total	596	15,494.45	1,612			

Township Electrification Program

capital is key to the sustainability of rural electrification initiatives. Other inputs that will be critical to overall program sustainability include system design, productive use components, load management, system monitoring, reliable batteries, and appropriate tariffs.

The Township Electrification Program is one of the largest renewable energy-based rural

electrification programs in the world, and it has enough critical mass to create a truly robust and sustainable renewable energy infrastructure in China, especially for PV. The program represents an important launch point, as the lessons learned will have an immediate impact not only on future objectives of rural electrification, but also ostensibly on renewable energy programs worldwide. As commercialization of renewable energy technologies advances in China, market opportunities will be considerable for joint ventures between Chinese and international companies. Such ventures provide a powerful tool for meeting China's environmental challenges.

Bidding

In 2001, the central government assigned programs to regional governments, and Guoxin Tendering Corporation Ltd. was appointed the tendering agency. Five nationwide public tenders were conducted in 2002 to select system integrators to design, procure and install PV and PV/wind systems. Fifteen companies were selected, and have issued international tenders for PV, wind turbines, batteries and electronics. There are ample opportunities for U.S. equipment manufacturers to participate. The bidding price for Tibet is 105,000-115,000 (CNY)/kW (12,685-13,890 USD), and the price for other regions is 90,000-100,000 CNY/kW (10,873-12,081 USD). Detailed information on installation capacity, investment, and grant allocation of each province, as well as system integrator name and contact information, is available in the accompanying charts.

System Integrators	Province	Contact	Tel	E-mail
Baoding Yingli New Energy Co.	Hebei	Miao Liansheng	+86 (312) 313-1800	ylxny@bdinfo.net
Beijing Jike Co. Ltd.	Beijing	Wang Sicheng	+86 (10) 6234-7144	jike@public.bta.net.cn
Beijing Sangpu Solar Energy Co.	Beijing	Wang Guohua	+86 (10) 6200-1062	btssolar@263.net
Gansu Huineng Co.Ltd	Gansu	Gui Junxiang	+86 1390-949-2388	
I.M. Huade New Tech. Co.	Inner Mongolia	Zhao Yongtong	+86 (471) 496-8471	huadecom@public.hh.nm.cn
Qinghai New Energy Research Institute	Qinghai	Zhang Zhimin	+86 (971) 630-4742	qhneri@public.xn.qh.cn
Shaanxi Electrical Power Consultant Co.	Shaanxi		+86 (29) 824-3176	
Tibet Huaguan PV Tech. Co. Ltd.	Sichuan	Zhang Yan	+86 (28) 736-0978	hggd@163.com
Xinjiang New Energy Co. Ltd.	Xinjiang	Hou Weidong	+86 (991) 367-2533	
Yunnan Semi-Conductor Plant	Yunnan	Zhu Xiaomin	+86 (871) 533-7279	greenstar@km169.net
Beijing Kenuoweiyi Co. Ltd	Beijing	Xu Honghua	+86 1370-102-1351	hxy@mail.iee.ac.cn
Chanzhou Tianhe Co. Ltd	Jiangsu	Qiu Diming	+86 1360-871-1446	manage@trina.com.cn
Shanghai 811 Plant	Shanghai	Yuan Xiao	+86 (21) 6408-2388 6495-0932	

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 Web site (in Chinese): www.crein.org.cn/sub-pages/windpower/windpower.htm

The National Renewable Energy Laboratory
 China Web site: www.nrel.gov/china

The National Development & Reform Commission
 Web site: www.sdpc.gov.cn

The following fact sheets on renewable energy in China are available on the National Renewable Energy Laboratory's China Web site (www.nrel.gov/china).

- WB/GEF Renewable Energy Development Project
- Grid Connected Wind Power in China
- Renewable Energy Policy in China: Overview
- Renewable Energy Policy in China: Financial Incentives
- Township Electrification Program
- China's Plan for Renewable Energy
- Brightness Rural Electrification Program
- Renewable Energy Business Partnerships in China

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PIX01874, Credit: Roger Taylor/NREL



A PV module in a rural area in China.

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