

TECHNICAL REVIEW
CHINA
RENEWABLE ENERGY DEVELOPMENT PROJECT

STAP Review of China Renewables Energy Project

January 28, 1998

Thank you for the opportunity to review *The China Renewable Energy Development Project*. In general I find this to be a well developed, clearly articulated project plan with the potential to significantly advance the dissemination, use, and commercialization of solar and wind energy systems in China and ideally the region as a whole. The focus on building institutional and commercial capacity over time is particularly important, and should take place at several levels: commercial and manufacturing; training of local vendors and assemblers; and education and information programs among potential end-users.

The project should go forward, and the World Bank/GEF partnership as well as the budget levels appear appropriate.

I have a several comments and concerns, particularly focusing on the mechanisms to support after-sales service for manufacturers/vendors as well as consumers. In particular:

- Technological diversity: This project focuses exclusively on solar home systems, larger wind farms and PV-wind hybrid systems. There are a number of advantages to including hybrid systems in the project, particularly in that in many of these rural areas, especially Inner Mongolia, per capita incomes are high enough that households and some businesses could add solar to their wind systems. The household sector loan only addresses SHS. A number of project areas (Inner Mongolia, Gansu, Xinjiang, Qinghai) all have a good wind resource base, which is generally cheaper than PV. Many areas already have wind turbines (100 - 300W). These families could look to adding PV to give them power in the low-wind summer months. Technological diversity and flexibility is a critical component of the project which makes the China program more attractive to consumer and vendor needs.
- Commercial capacity building? Critical to the sustained success of this renewable energy dissemination effort is the development of a profitable private sector that can withstand short-term market fluctuations, and has the technical and service expertise to support the customer base. While the proposal discusses these features in institutional terms (e.g. Annex 2), the addition of a number of very mundane market development and evaluation parameters would provide significant guidance to the local monitoring, assessment, and evaluation teams. This need not be material placed in the Proposal itself, but could be a project task to take place in the initial year(s) of work. In particular, the Concept Document could call for:

1. The development and dissemination of training and technical manuals for PV system vendors and maintenance companies. Several particularly good models for this are:
 - Cabraal, A., Cosgrove-Davies, M. and Schaeffer, L. (1995) *Best Practices for Photovoltaic Household Electrification Programs* (World Bank Technical Paper Number 324: Asia Technical Department Series, Washington, DC).
 - EDRC (1992) *Remote Area Power Supply Design Manual* (Energy for Development Research Centre: Cape Town, South Africa).
 - Inversin, A. R. (1996) *New Designs for Rural Electrification: Private Sector Experiences in Nepal*, NRECA, International Programs Division.
 - Hankins, M. (1991) *Small Solar Electric Systems for Africa: A Guide for Planning and Installing Solar Electric Systems in Rural Africa* (Motif Creative Arts, Ltd., Nairobi).
 2. Solar (and wind) engineering as well as economics training at local technical schools. These courses could produce a group of trained renewable energy students who would be appropriate to be hired as technicians, retailers and providers of after-sales service for both PV and wind systems.
- Cooperation or competition with extant rural energy offices? In many of the project areas highly trained and reasonably equipped rural energy offices already exist. These offices have been instrumental in the dissemination of a number of renewable energy systems. The Project Concept Document could be clarified as to the degree of cooperation that will take place with these offices, as opposed to establishing a parallel and therefore competitive infrastructure.
 - Policy leverage of the wind farm project? Perhaps the most critical aspect of the windfarm initiative is to create and operate a policy dialog (via this demonstration project) that will open the door for private investment in wind power in China. This is certainly the goal of the project, but to a large extent the success or failure of this initiative depends on the willingness of the Chinese government to create an attractive business environment (the wind resource has already been demonstrated to be significant). Without active support of private investment, this project could end as a 'one-off' initiative. The two critical steps of the project plan are to:
 1. work with the Chinese government to finalize and support a financial incentive program for investors; and
 2. permit development of the wind resource that spurs rural development without forcing technology transfer agreements that limits private sector interest.These activities are clearly part of the project plan, but will require particular vigilance and attention. Once private sector activities in wind development accelerate (i.e. establishing local manufacturing facilities), then partnership and technology transfer could then become a central focus (although I would argue that once the market accelerates, this process will happen more naturally and more

Overall, this is a solid proposal that is feasible, important, and economically sound. The potential exists to not only impact a major renewables market (China), but also to generate spill-overs to other nations that purchase equipment from China and/or compete with China in this emerging market.