

# **IMPACT EVALUATION OF THE CHINESE BRIGHTNESS-PROGRAMME IMPLEMENTED DURING 1996-2006**

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Frank Haugwitz



# Rural Electrification Experience

## Early Foundation Building

1970's to  
1996

- Since mid-1970's Technical Dev. & system integration for village power / remote industrial appl.
- Capacity building for domestic system integrators and component manufacturing base
- Experience with pilot projects, applications, and intl. practice through bilateral programs
- Conditioning of natl. & local govt. and business infrastructure rgds. acceptance of RE technologies
- Extensive history of national grants and subsidies for rural sector particularly in western China
- Development of SHS commercial markets



# Objectives of Brightness Programme

**Brightness  
Programme**  
(1996-2010)

## Situation Mid 90s

- Over 25,000 villages + 1000 townships not electrified, approx. 3,55% of population

## Objectives

- By 2010 approx. 23 Mio. people supplied
- Per capita 100 Wp capacity installed
- PV & PV/Wind Hybrid, Hydro

## Issues

- Financing and Affordability
- Technical Quality
- Sales- and Service Network
- User Education and Training

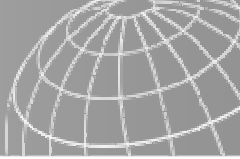


# Brightness: Pilot Phase (1999-2002)



- Total Investment: EUR 2 Mio.
- Provinces: Inner Mongolia, Gansu, Tibet
- IMAR: 5500 wind/PV hybrid home system  
1 wind/diesel/battery system
- Gansu: 10,000 SHS; 3 PV VP systems
- Tibet: 30 PV VP systems 11,000 SHS
- approx. 50,000 people supplied

**Electrification as a symbol  
of wealth in the countryside  
China 1973**

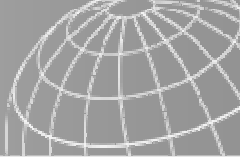


# Brightness: Pilot Phase (1999-2002)

- Govt. affiliated Executing Agencies set-up Service Points
- PV / Wind Quality Test and Evaluation Center
- Comprehensive Trainings held / Radio & TV broadcasting
- Monitoring & Evaluation Group established



**Field-Test of Wind Turbines**  
**All wind-turbines must pass a  
one year field reliability test.**



## **Pilot Phase Evaluation Oct. 2003: Inner Mongolia**

- Statistics of in total 5240 PV/Wind battery hybrid Systems
- In total 2119 Systems (40,5%) malfunctioning
- 1099 Charge Controller/Inverter (20,9%)
- 657 Batteries (12,6%)
- 363 Wind Turbines (6,9%)

### **Principal reasons for system failure**

- Copper Bearings of Wind Turbine proofed unsuitable
- Charge Controller/Inverter – poor design / material
- Reduced life time of batteries because of charge controller





# Brightness: Township Prog. (2002-2004)

## Objective

- Electrification of 1065 townships; ~ 1,3 Mio. people

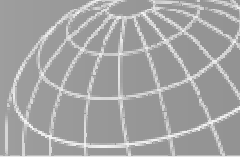
## Financing

- EUR 470 Mio. Central & Prov. Govt., Townships

## Approach

- Provincial competitive bidding
- Selection of System Integrators
- PV/Battery Village Power Systems, plus some wind & diesel back-up, small hydro





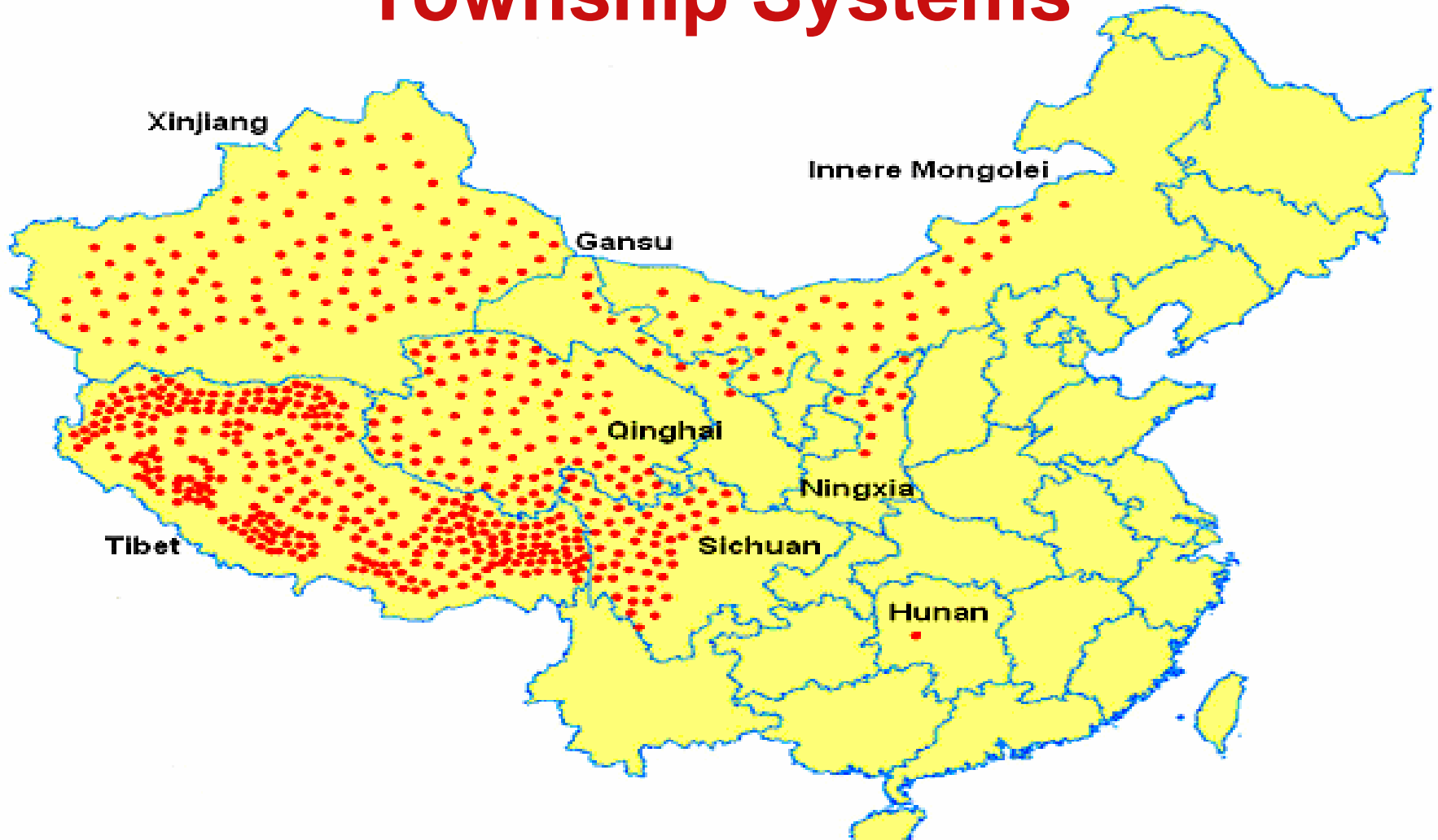
# Installed Township Systems

Province	No. of installed Systems	Installed Capacity (kWp)	Ø – installed Capacities (kWp)	No. of installed SHS	Installed Capacities (kWp)
Hunan	1	20	20	0	0
Shaanxi	9	100	11,1	0	0
Qinghai	112	2715	24,2	6800	136
Gansu	23	995	43,2	0	0
Xinjiang	159	2378	14,9	7133	356
I. Mongolei	42	752	17,9	1525	610
Sichuan	46	1817	39,5	0	0
Tibet	329	6763	20,6	0	0
<b>Total</b>	<b>721</b>	<b>15540</b>	<b>21,5</b>	<b>15458</b>	<b>1102</b>





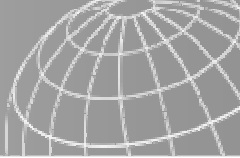
# Geographical Distribution of “Township Systems”





# Open Issues: Township Programme

<b>Ownership</b>	Accelerating transfer from natl. to local govt./township
<b>Management</b>	Four management models under investigation; Assessing financial and contractual requirements
<b>Financial Support</b>	Govt. will provide ongoing subsidies; Assessment of 15 year financial requirements discussed Two Cost Calculation Methods discussed: According to installed capacity or generated kWh
<b>Tariff</b>	Govt. will develop tariff guidelines
<b>Training</b>	Assessment of training requirements for support infrastructure on several levels for system integrators / operators / managers, manufacturers, key decision makers; a training center network & standardization of training materials to be established



# Future of Brightness Programme

## Objective

20,000-25,000 remaining unelectrified villages  
11<sup>th</sup> Five-Year Plan Target: 3,5 Mio. HH

## Commitment

EUR 2 Mio for initial pilot phase

## Implementation

Flexible multiple phases  
Mainly SHS and small wind

## Long Term Support

Renewable Energy Law  
Rural Electrification Fund

Late 2006 State Grid Corp. launched “Power to All” Programme

Aim: In 20 Prov.; 4,5 Mio. people / 1,2 Mio. HH with EUR 2,3 Bio.

Gansu: All villages with up to 5 HH will be grid-connected



# Impact Evaluation of Brightness Programme

## Financing & Affordability

Experienced Financial Institutions regarding RET, however not particularly concerning off-grid applications  
Poverty Alleviation Offices (PAO) and Rural Credit Cooperatives offer micro-credit schemes  
Intl. Cooperation favours subsidy of US 2/Wp for SHS

## Technical Quality

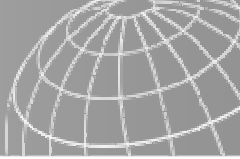
Host of technical standards/regulations elaborated  
Technical Monitoring of 14 Townships in Qinghai  
Most component manufacturer obtained ISO 9001 certif.

## Sales & Service Network

Western Prov. are home to countless SHS retailers  
Township Integrators set-up Service Points

## User Education & Training

Isolated Trainings not sustainable, therefore the Ministry of Labour & Social Security elaborates institutional scheme  
Nationwide Propaganda via print matters, TV, Radio



# Thank you for your attention !

Frank Haugwitz

GTZ German Technical Cooperation, 100004 Beijing, P.R. China,

Tel: 0086 (010) 8532 3489 / Fax: 0086 (010) 8532 3481

Mail: [Frank.Haugwitz@gtz.de](mailto:Frank.Haugwitz@gtz.de) (only valid until 30 Sept., 2007)

[Frank.Haugwitz@gmail.com](mailto:Frank.Haugwitz@gmail.com)

