

# Financing Renewable Energy Projects in China



Internationale Weiterbildung  
und Entwicklung gGmbH

**Capacity Building  
supports cooperations  
of industries in the  
renewable energy sector**

# Financing Renewable Energy Projects in China



## German - Chinese Cooperation

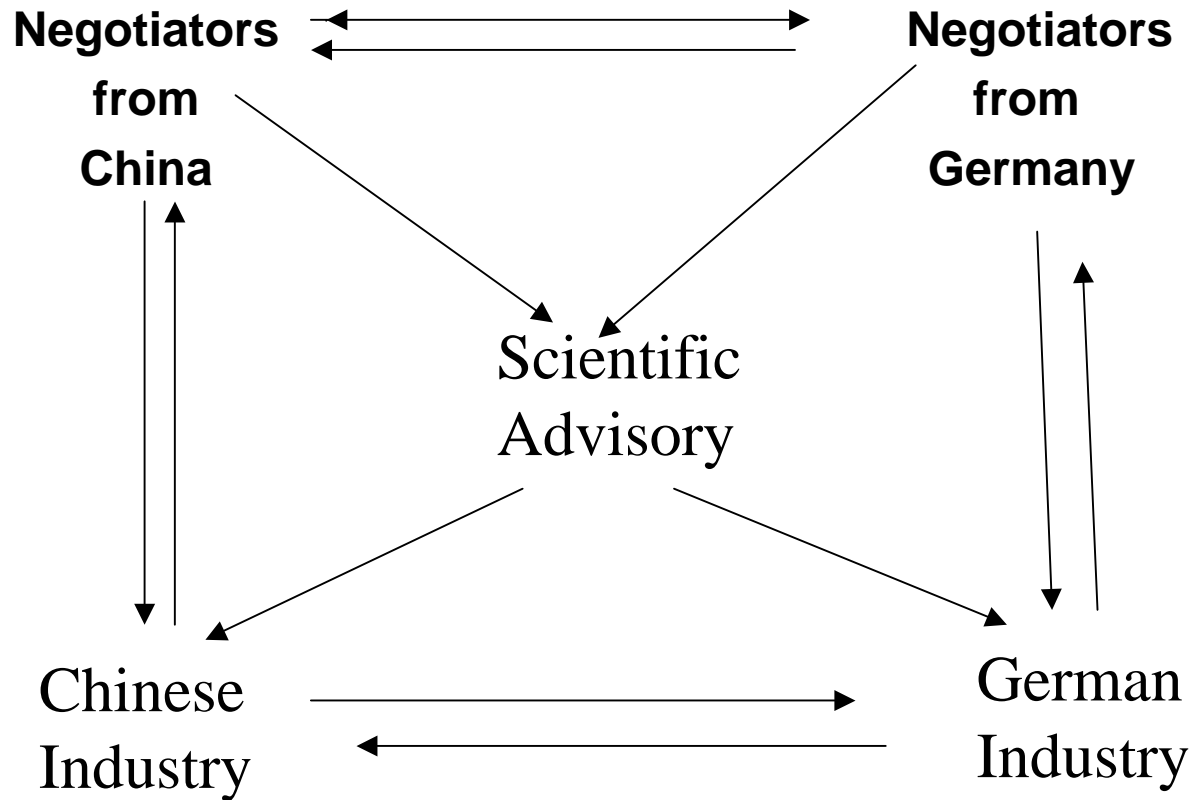


- Northwestern Polytechnic University (NPU)  
Xi'an, VR China
- Yunnan Normal University, Kunming
- InWEnt – Capacity Building International, Germany  
Dept. “Environment, Energy and Water” Berlin
- GTZ, China
- Tsinghua University
- MOST

# Financing Renewable Energy Projects in China



## Workshops on the Design of CDM-projects



## Financing Renewable Energy Projects in China



### Questions

- Why there are only a few cdm - projects in wind energy, micro hydro, pv, biomass?
- Do joint ventures still need to have a Chinese share of at least 51 % ?
- Is technology transfer in the field of sustainable energy technologies still an important target of the Chinese government?
- How shall the CERs be distributed among the investors?
- Relating to cdm: Do Chinese partners wish further dialog/capacity building measures and in which fields?
- Will China support any Kyoto II-process (and accept to have some emission reduction obligations)?

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### Feed in Law and Kyoto Mechanism

**How can a feed in law be designed to enable cdm-projects?**

**As we learned that electricity generated by renewable energy systems at current market prices will not become economically feasible if we only can use the CERs – therefore renewable energy cdm-projects need guaranteed feed in prices to have a chance to be realized to a greater extend!**

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## Further projects

Further development of curricula and modules for the basic course at the NPU (Prof. Dr.-Ing. MingFu Liao)

Advanced courses (praxis oriented) in Germany through InWEnt gGmbH together with German/European research and training institutes, industry, utilities, planning and financing institutes and energy authorities

InWEnt and NPU support the new Wind Energy Center in Beijing

- a) through training of Chinese trainers and
- b) through training of Chinese wind energy experts (together with Chinese trainers)

# Financing Renewable Energy Projects in China



## Content of the basic cours

### “Technology of Wind Power Plants - Introduction”

- Introduction to RE, environmental impacts on energy use
- Structure of the Chinese energy sector
- RE sector analysis
- Wind energy physics (maximal power coefficient; Betz maximum; wind potential)
- Wind measurement and evaluation (anemometer calibration; Weibull parameters, power curve of wind turbines; energy output of a turbine)
- Wind turbine technology

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## Content basic course (contin.)

- Transport an erection of a wind turbine
- Rotor design
- Aerodynamic fundamentals
- Blade dimension based (Betz, Schmitz)
- Partial load performance
- Wind tunnel testing
- Structural loads
- Scaling
- Electrical connection
- Blade construction and production

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## Basic course (contin.)

- **Dynamic behaviour**
- **Controlling (different control systems; pitch; stall)**
- **Economic analysis (methods, external costs, comparison analysis, sensitivity analysis, dynamic energy production costs)**
- **Site selection**
- **Environmental impacts**
- **Social acceptance**

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### Content of the advanced course in Germany:

“Application of Wind Energy”

- **Structural loads and operational parameters**
- **Design and control concepts of wind turbines**
- **Planning wind power projects incl. electrical connection**
- **Technical concepts of German wind turbines**
- **Company presentations (AN Bonus, DeWind, Nordex, REPower, GE Wind, Enercon, Vestas)**
- **German wind energy market**
- **Policy and incentives in Germany**
- **Wind measurement and resource assessment**

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## Advanced course in Germany (contin.)

- Planning wind parks (Siting optimisation, transmission losses, wake effects)
- Wind power in complex terrain (micro-siting)
- Resource assessment (flow models, park calculations)
- Power curve measurements
- Technical requirements for data loggers
- Environmental impacts of wind power projects
- Planning permission procedures and noise measurements
- From financing to take over – practical aspects of project planning

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### Advanced course in Germany (contin.)

- Stand alone systems based on wind and hydro power
- Wind power integration into the electricity supply system and wind integration aspects in China
- Generator systems
- Grid connections and grid effects
- Results of the German „250 MW wind power programme“
- Grid-relevant wind turbine characteristics given by manufacturers
- Hybrid systems with wind power

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## Participants of the two advanced courses

40 participants in two years

**2003**

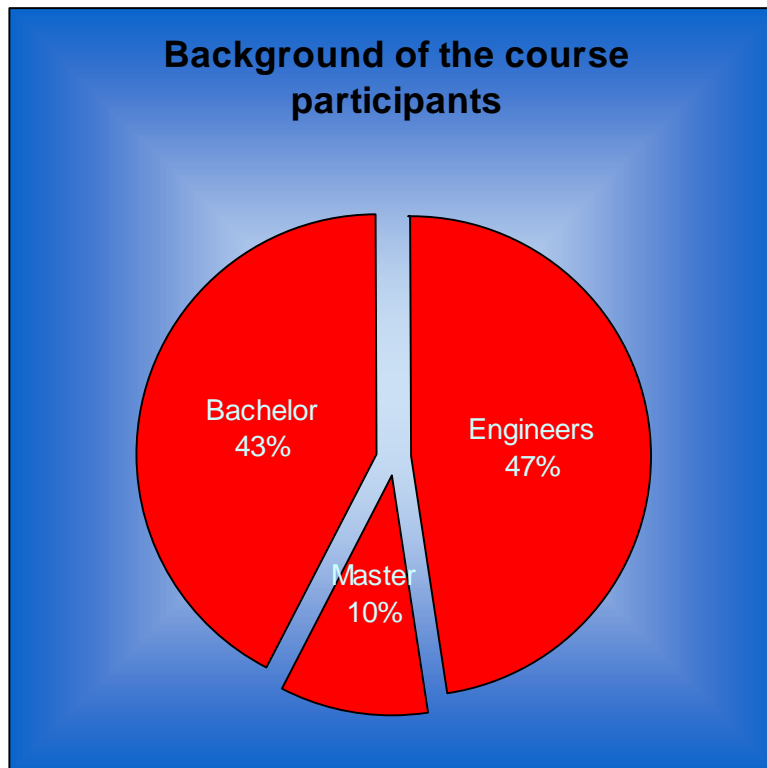


**2004**

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## Participants



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### Results

- **Both, Chinese and German side are very much interested in a continuation of this form of capacity building programme**
- **High qualified Chinese wind energy experts are available and can be employed in Chinese – German joint ventures**
- **This capacity building programme contributes to a German – Chinese technology transfer**

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## Perspectives

- **Internship should last at least three to four months**
- **Industry is invited to participate in the further design of the courses**
- **Industry should share costs of the course to a higher extend**
- **NPU shall become an integrated partner of the new Chinese wind energy centre in Beijing**

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**As a result of the discussions and the question and answer sessions it might be stated that the Chinese side is more interested in buyers of CERs than in investors or joint venture partners for cdm-projects.  
Most of the cdm-projects seem to be planned as unilateral projects.**

**Thank you for your attention!**