



Market Potential and Transfer of
Technology –
Experience and Conditions of the
German Wind Industry

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License Implementation
REpower Systems AG



REpower Portfolio



Historical Background



Two Sides of Know-how Transfer



Character of REpower Know-how Transfer



Criteria for Countries and Companies



REpower Experience with Know-how Transfer



Résumé

Product Portfolio.



	Turbine type	Rated Power (MW)	Prototype Installation	REpower Turbine Characteristics
Offshore Turbines	6M	6.15	2009	<ul style="list-style-type: none"> ▪ Premium quality ▪ High performance ▪ Excellent reliability ▪ Solid design ▪ Service friendliness ▪ Smart in detail ▪ Low sound emission
	5M	5.00	2004	
Onshore Turbines	3M	3.30	2009	
	MM92	2.05	2005	
	MM82	2.05	2003	
Sold in License	MM70	2.00	2002	
	MD7	1.50	2000	
	MD70	1.50	1998	

REpower 6M




- Rated power: 6.15 MW
- Rotor Ø: 126 m
- Hub height: offshore around 80-95 m
onshore around 100 m
- Rated wind speed: 14.0 m/sec
- Certification: IEC 1b, GL Offshore TK1

REpower 3.XM



- Rated power : 3.30 MW
- Rotor Ø : 104 m
- Hub height: 78-80 / 98-100 m
- Rated wind speed: 12.5 m/sec
- Certification: up to IEC 2a

Historical Background

Since 1992	<ul style="list-style-type: none">▪ Predecessor companies HSW and Jacobs Energie sold 30, 250 and 500KW turbines to China, Korea and India 
1996	<ul style="list-style-type: none">▪ Founding of BWU Brandenburgische Wind- und Umwelttechnologien GmbH. License agreement with Jacobs Energie for WEC type 43/600
1997	<ul style="list-style-type: none">▪ Founding of Wind-Engineering-Office pro + pro Energiesysteme GmbH & Co. KG, Rendsburg
1998	<ul style="list-style-type: none">▪ Development of MD 70 – biggest WEC worldwide
1999	<ul style="list-style-type: none">▪ License agreements with BWU, Jacobs Energie, Fuhrländer and Nordex for WEC type MD

Historical Background

2001

- **License agreements** with Goldwind (China) und Windey (China) – for WEC type 48/750



2001

- Consolidation of Jacobs Energie, BWU und pro + pro Energiesysteme to **REpower Systems AG**

2002

- Initial **Public Offering** of REpower Systems AG

2004

- **License agreement** with Dongfang in China for WEC type MD70 / MD77

Historical Background

2005	<ul style="list-style-type: none">▪ Foundation of a joint venture with Martifer Energia in Portugal
2006	<ul style="list-style-type: none">▪ Foundation of a joint venture with North Heavy Industry Corporation (NHIC) and Honiton Energy Ltd. in China (Inner Mongolia) license agreement for WEC type MM70 / MM82
2007	<ul style="list-style-type: none">▪ License agreement signed with the Indian Essar group for WEC type MD70 / MD77
2007	<ul style="list-style-type: none">▪ License agreement with Ventipower (Portugal) – MM82 / MM92

Example Projects from Licensees



Urumqi Mixed Park



Windey (CN) 48/750



RE North (CN): 75 x MM82



Two Sides of Technology Transfer / Licenses

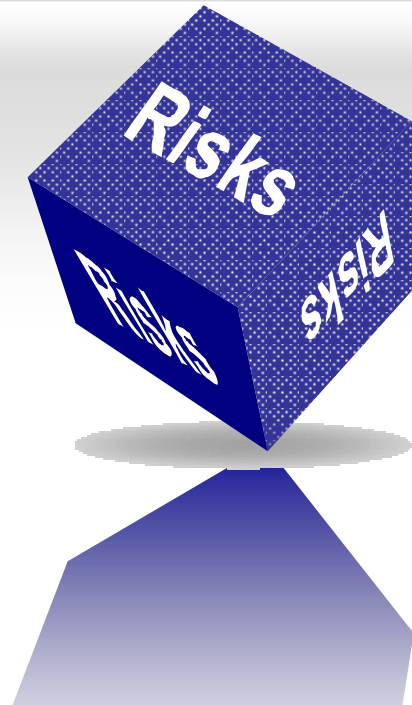


Chances

- Additional earnings for R&D and further developments
- Chances in countries without own activities
- Market preparation for later market entries
- Buildup of supplier chain
- Support for renewable energy in emerging countries

Risks

- Lost of know-how
- Build-up of competitors
- Additional resources needed
- Copy of license products
- Quality problems



Every know-how transfer is regulated in **know-how license agreements** - also the know-how transfer to joint venture partners

The intension is always the implementation of all required know-how.

Included Know-how

- Purchase of components
- Production of turbines
- Erection and commissioning
- Maintain and operate wind parks
- Trouble shooting

Not Included Know-how

- Calculation of loadings
- Competence for further developments
- Ability to make changes at certification relevant components

The know-how-transfer is divided in to two main parts:

	Tasks
Technical Documentation	<ul style="list-style-type: none">▪ Definition of valuable documents → know-how protection▪ Check for certification relevant components and its documentation▪ Compilation of all necessary documents▪ Regular distribution of documents to licensees
Training	<ul style="list-style-type: none">▪ Target is the implementation of necessary know-how▪ Standard training packages for all relevant fields as: Sales, procurement, production, project management, operation and maintenance▪ Individual training based on licensees request▪ Trainings at REpower or licensee side

Criteria for the Selection of **Countries** to Establish Technology Transfer



General Conditions



Commercial Conditions



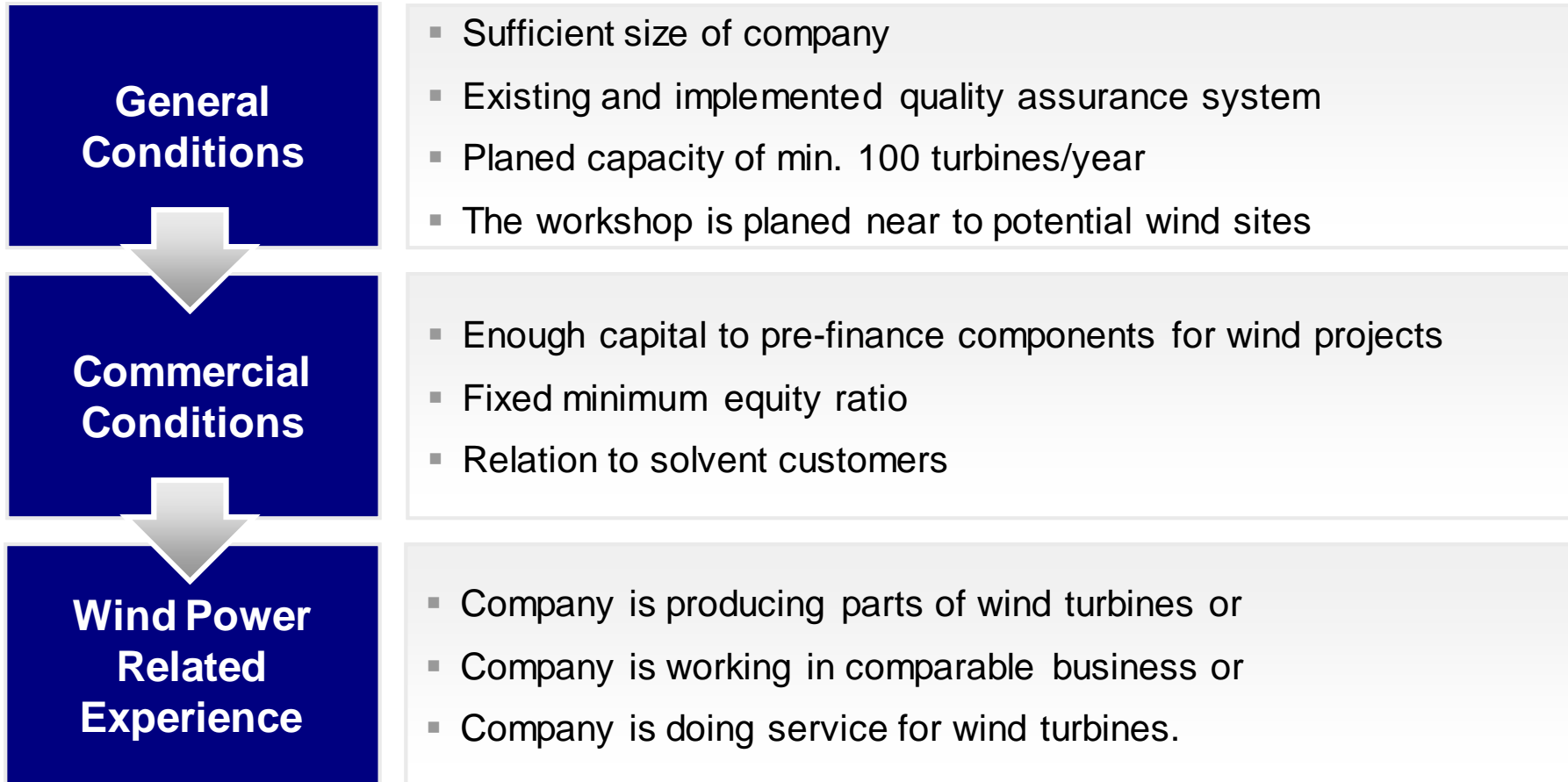
Chances for Wind Projects

- No other REpower activities planned
- Clear political circumstances
- Legal security
- Public acceptance of wind projects

- Secured finance of wind project
- Solid grid feed-in tariffs

- Sufficient wind sites
- Infrastructure
- Potential for at least 1GW wind power

Criteria for the Selection of **Companies** to Establish Technology Transfer



Short overview to the experience of REpower

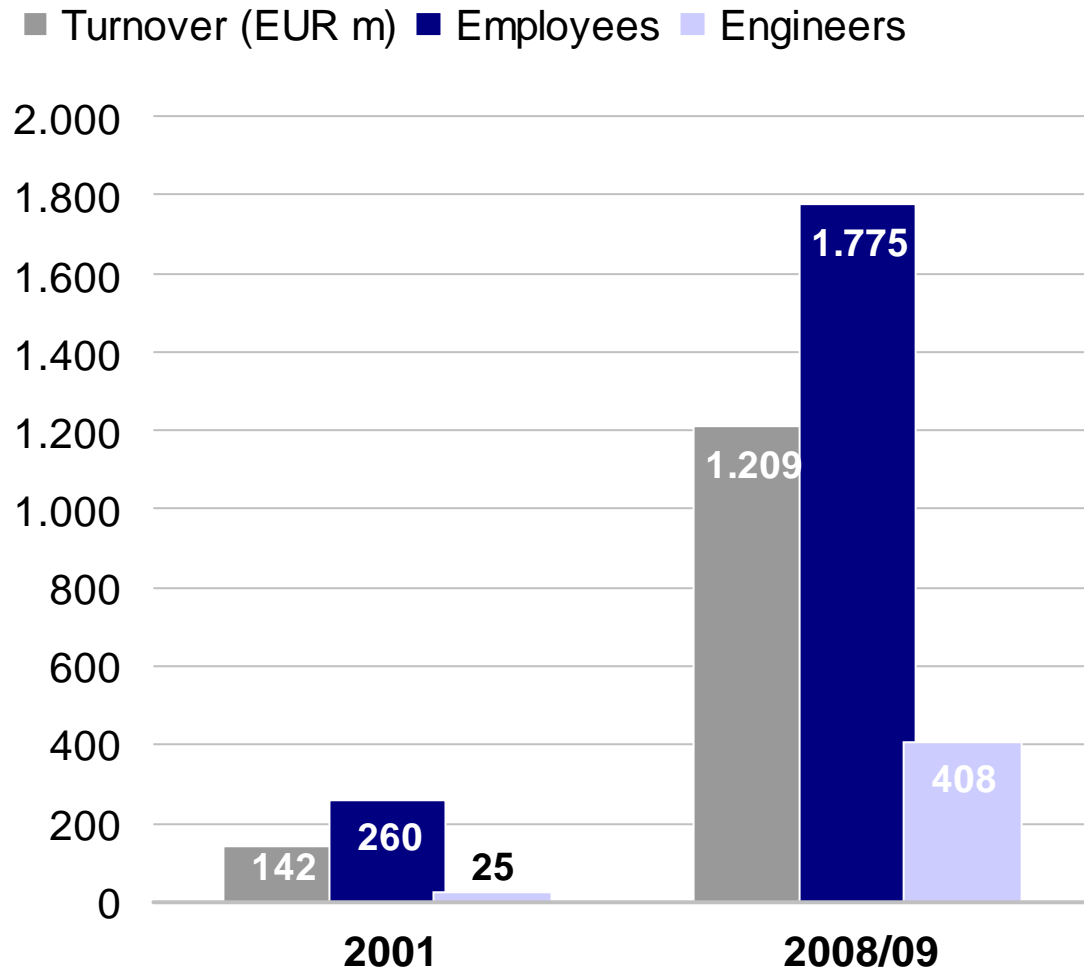
Positive

- Additional income
- Protection of jobs and further development in Germany due to additional income from license fee. (bigger impact to smaller companies)
- Build-up of Supply chain
- Preparation for the market
- Substantial contribution to the development of the renewable energy in emerging markets
- Information about markets
- Knowledge about intercultural properties

Negative

- Blocking of shared supplier
- Difficult control of licensees in case of technical changes in the license product
- Quality problems
- Possibly bad reputation in case of problems with products from licensees
- Unwished further development through the licensees
- Changes in political circumstances

From Regional Master to International Champion.



REpower Systems AG came out of a merger of the companies **Jacobs Energie, BWU und pro + pro Energiesysteme** in 2001.

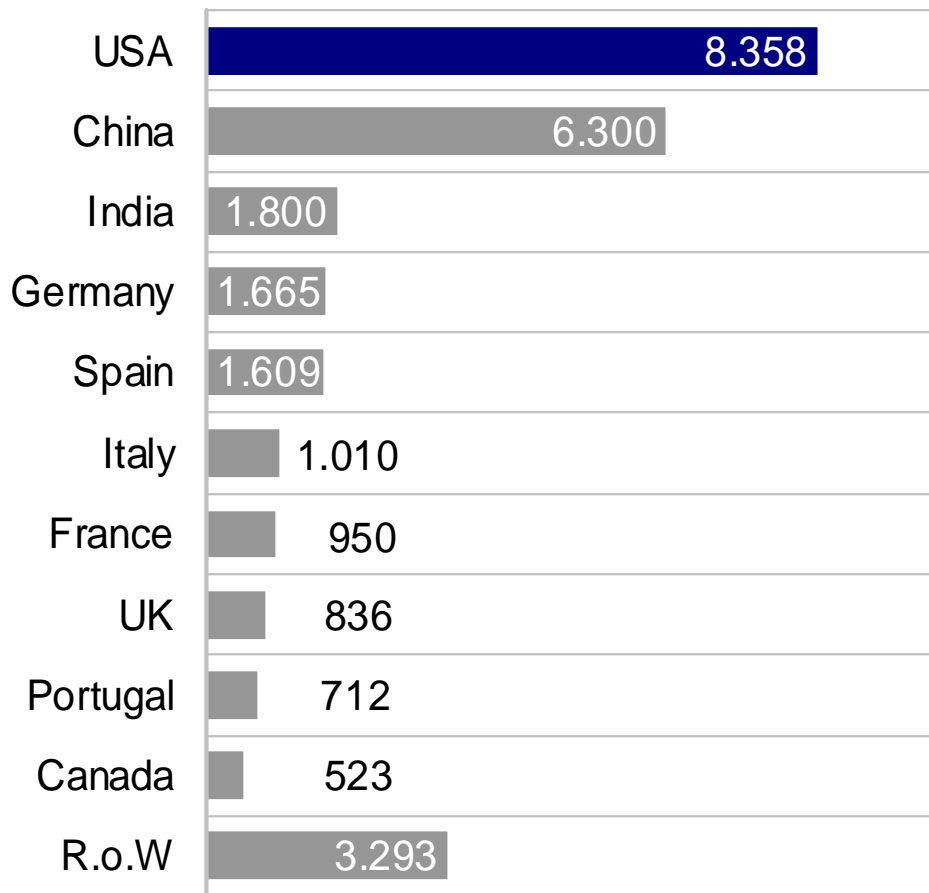
Since **2002** REpower Systems AG is listed at the German Stock Exchange in the **Prime Standard Segment**.

Since the formation of Hamburg based REpower Systems AG **turnover and number of employees** increased steadily.

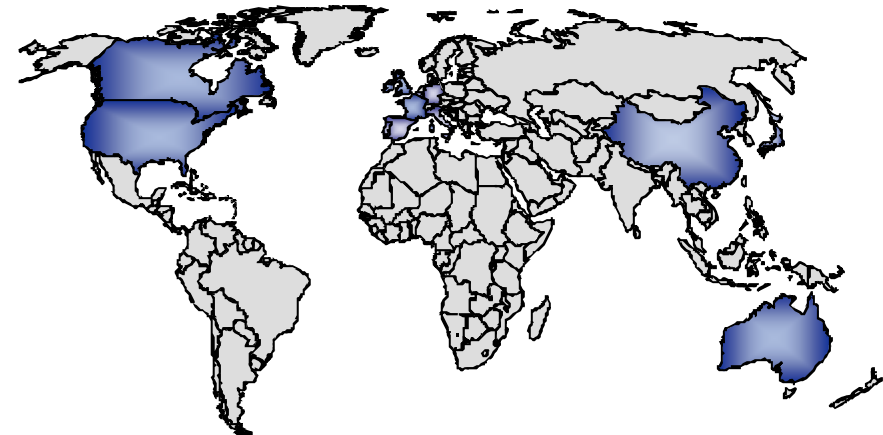
At the same time REpower keeps pace with the rapid international market growth and extends its **global activities** continuously and strategically.

The top 10 markets account for 88% of total global market volume 2008 (27,056 MW).

Top 10 Global New Installed Capacity 2008 (MW)



REpower Worldwide



REpower is present in almost all top 10 growth markets:

- Europe: Germany, Italy, Spain, France, UK, Portugal, Belgium
- Worldwide: USA, Canada, China, Japan, Australia

In retrospect to the history of the wind industry, we can see that licenses had a big influence to the development of many markets and also to many companies. Some of the big players started as licensee.

There is a big chance for emerging countries to start with renewable energy with a license of an established and experienced company. It is possible to get a real win-win situation.

In near future REpower do not plan any additional license projects

- REpower is now big enough to enter into the main markets at its own
- The additional income from the licenses is relative to the turnover not as important as in the past.
- In some markets (for example China) the circumstance changed in the last month.
- REpower is concentrating its resources to new projects as 3.x and offshore 5M and 6M.

First Fully Approved Offshore Project in Belgium.



- Phase 1: 6 x 5M at the Belgian wind farm „Thornton Bank“
- Location: North Sea, Belgium (close to Zeebrügge)
- Water depth: 12-27.5 m, distance to shore: 30 km
- Phase 2: 2010, Phase 3: 2012 (planned: 300 MW)



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