PowerWind

The German Renewable Energy Law 2009

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Agenda

- Short introduction of PowerWind
- Dependents from non-renewable resources
- The German Renewable Energy Law

Who is PowerWind ?

PowerWind is an upcoming German wind turbine manufacturer and service provider, offering the complete array of

- Design
- Production
- Project management
- Installation
- commissioning to
- maintenance and unscheduled maintenance

- State-of-the-art 900 kW turbine for the sub-megawatt-class
- 2.5 MW turbine under development: installation of prototypes planned for end 2009

- Over 100 employees with more than 400 years of wind experience

PowerWind 56

The PowerWind 56 is a variable-speed, pitch-controlled wind turbine, certified as a IEC type class IIA. It has 59m or 71m hub height and a rotor diameter of 56 m.

- Full scale converter ensures that the system is suitable even for weaker grids

- The three active cooling system enables the turbine to be installed and operated also in regions with extreme climatic conditions

- Compact design allows inexpensive transportation and installation even in locations with weak infrastructure

- Development is based on the industry's experiences of the last 20 years. The machine type was already built 20.000 times

PowerWind 90

The PowerWind 90 is a variable-speed, pitch-controlled wind turbine, certified as a IEC type class IIA

- Rated Power: 2500 kW
- Rotor diameter: 90 m
- Hub height 98m

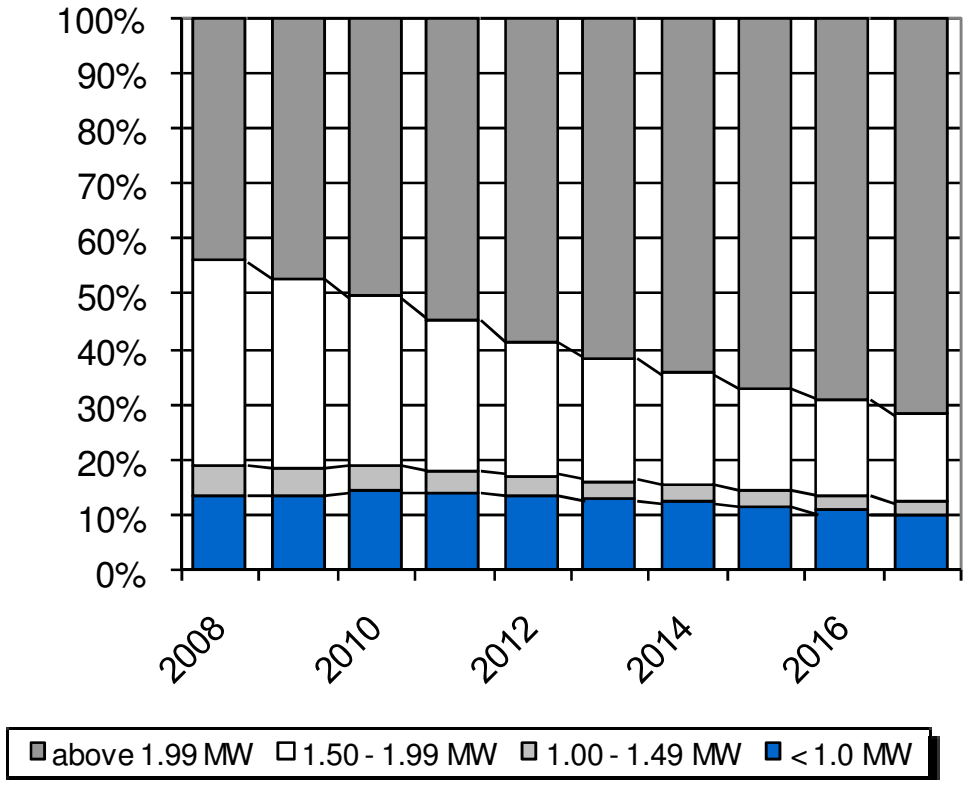
- Full scale converter allows the compliance with most demanding grid requirements

- Sophisticated gearbox protection concept stands for highest reliability

- Prototype to be installed 12/ 2009

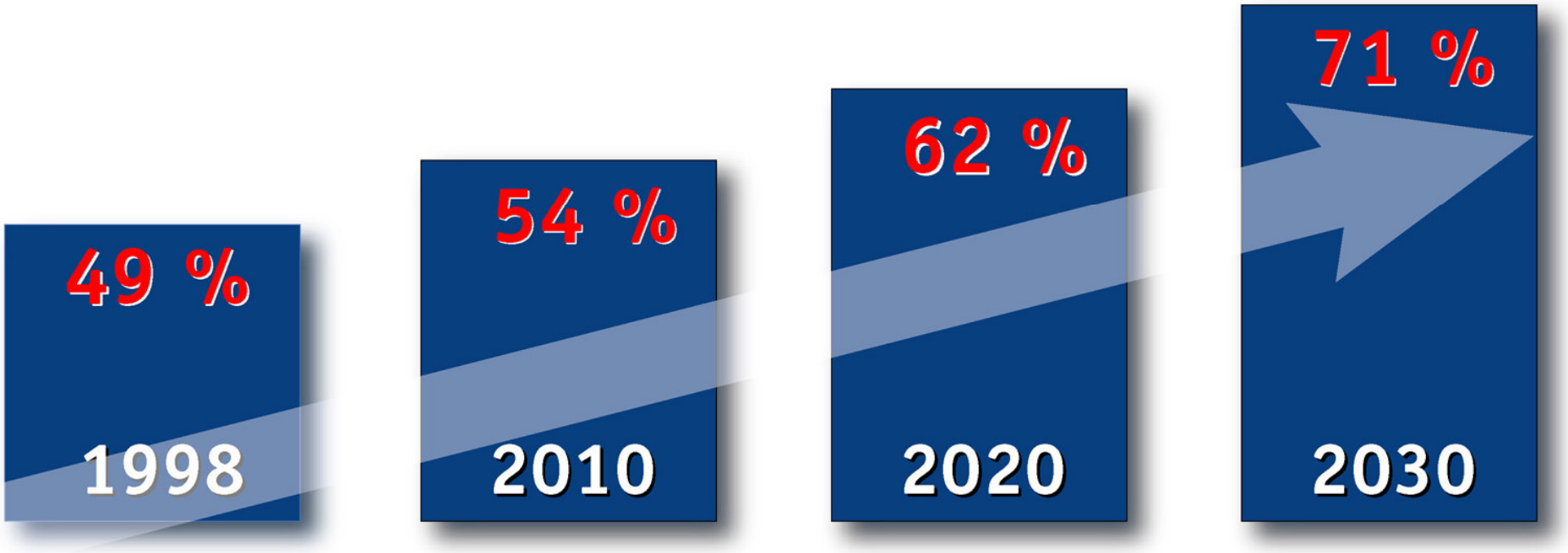
The 2.5 MW-turbine dominates the market, but the sub-MW range remains with substantial market volumes

Development of market shares for different power ranges (Shares of installed MW)



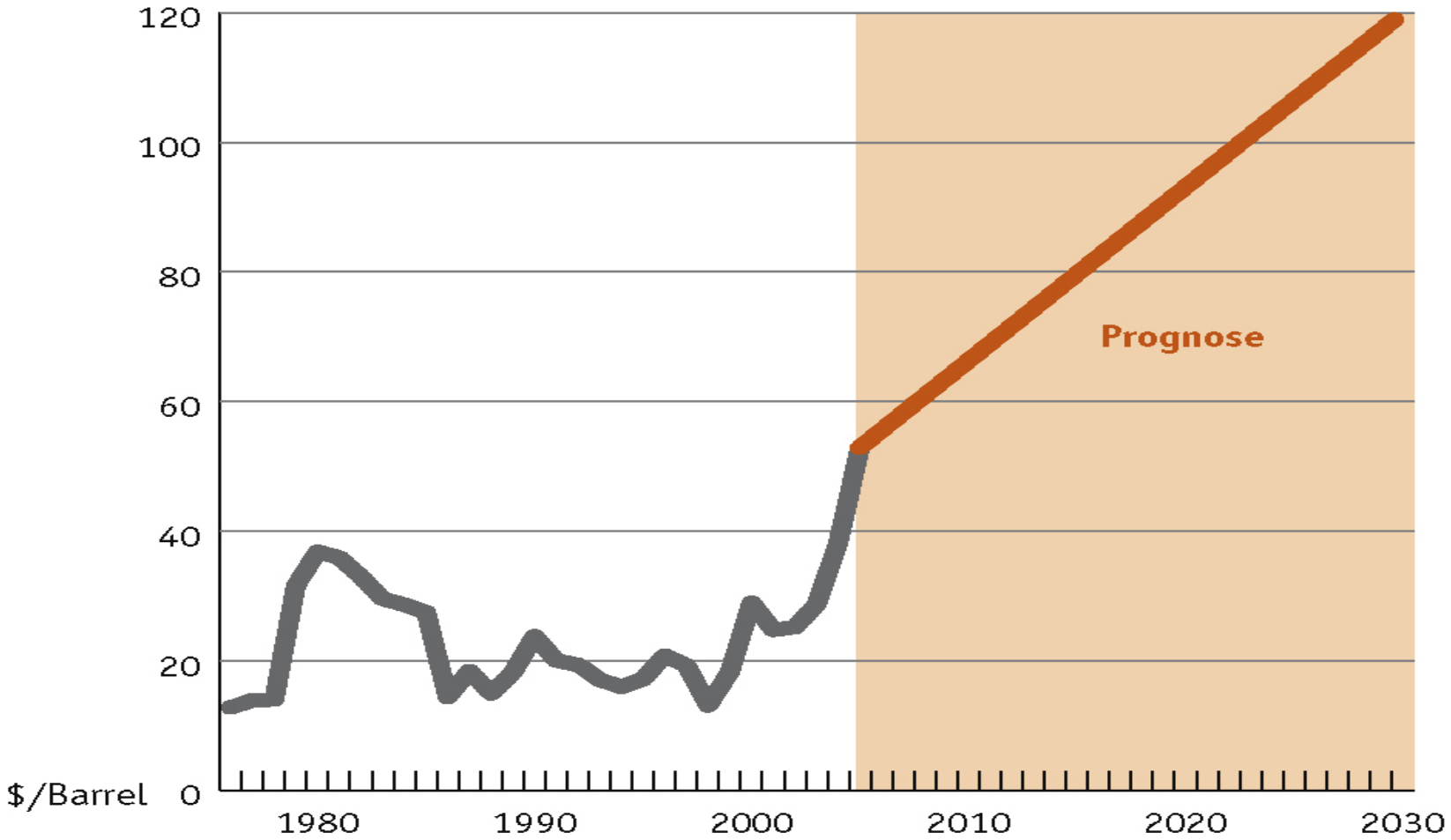
Source: EER: Global Forecast 2009 – 2020 ; June 2008

Dependents from imports of non-renewable resource to the EU

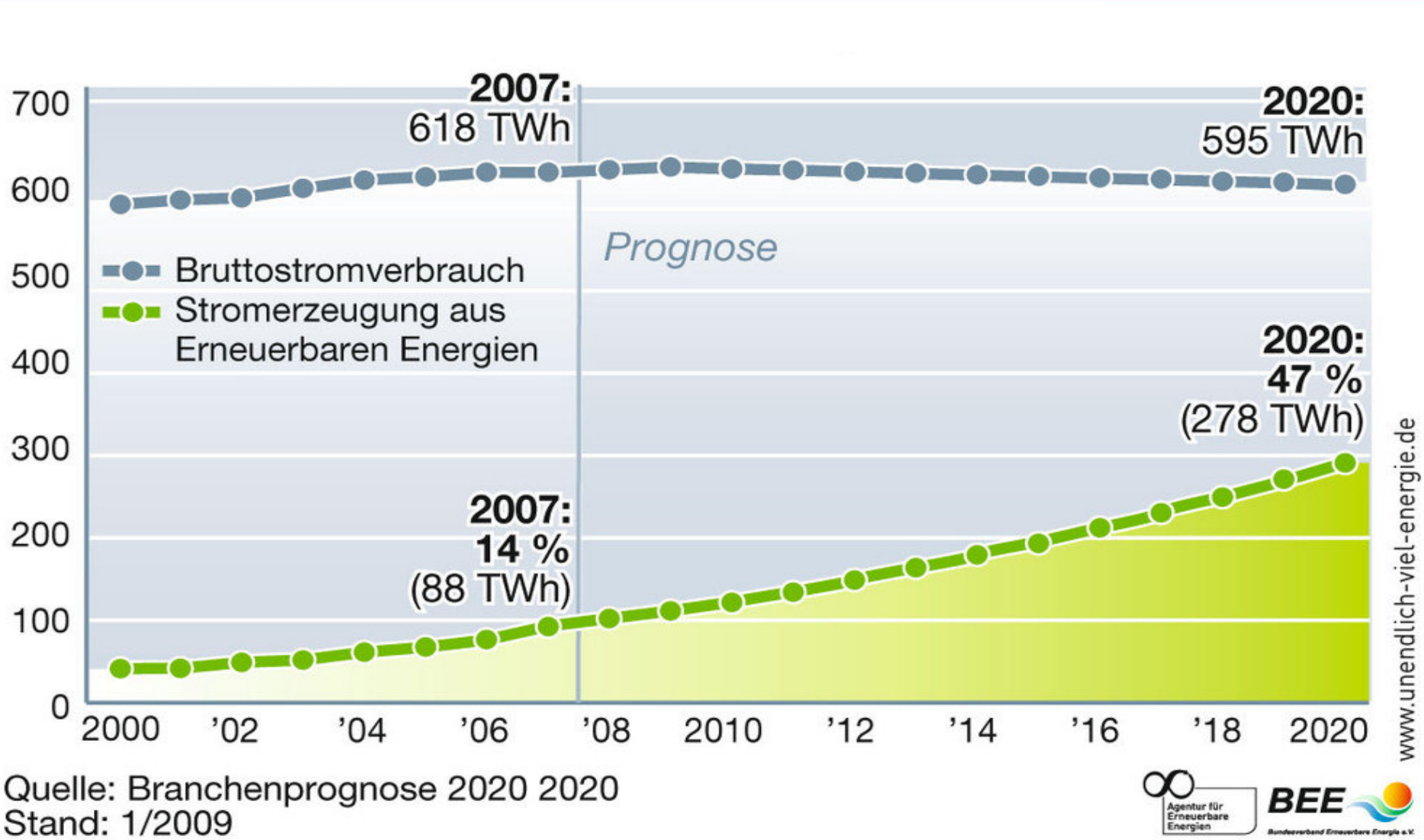


Quelle: Europäische Kommission

Expensive mineral oil: Growing demand and shorter resources cause extreme growth of prices



Electric consumption covered by renewable energy by 2020



Quelle: Branchenprognose 2020 2020
Stand: 1/2009

Agentur für Erneuerbare Energien

BEE Bundesverband Erneuerbare Energie e.V.

Law for the support of clean energy

The **Renewable Energy Law**, Germany

The Aim

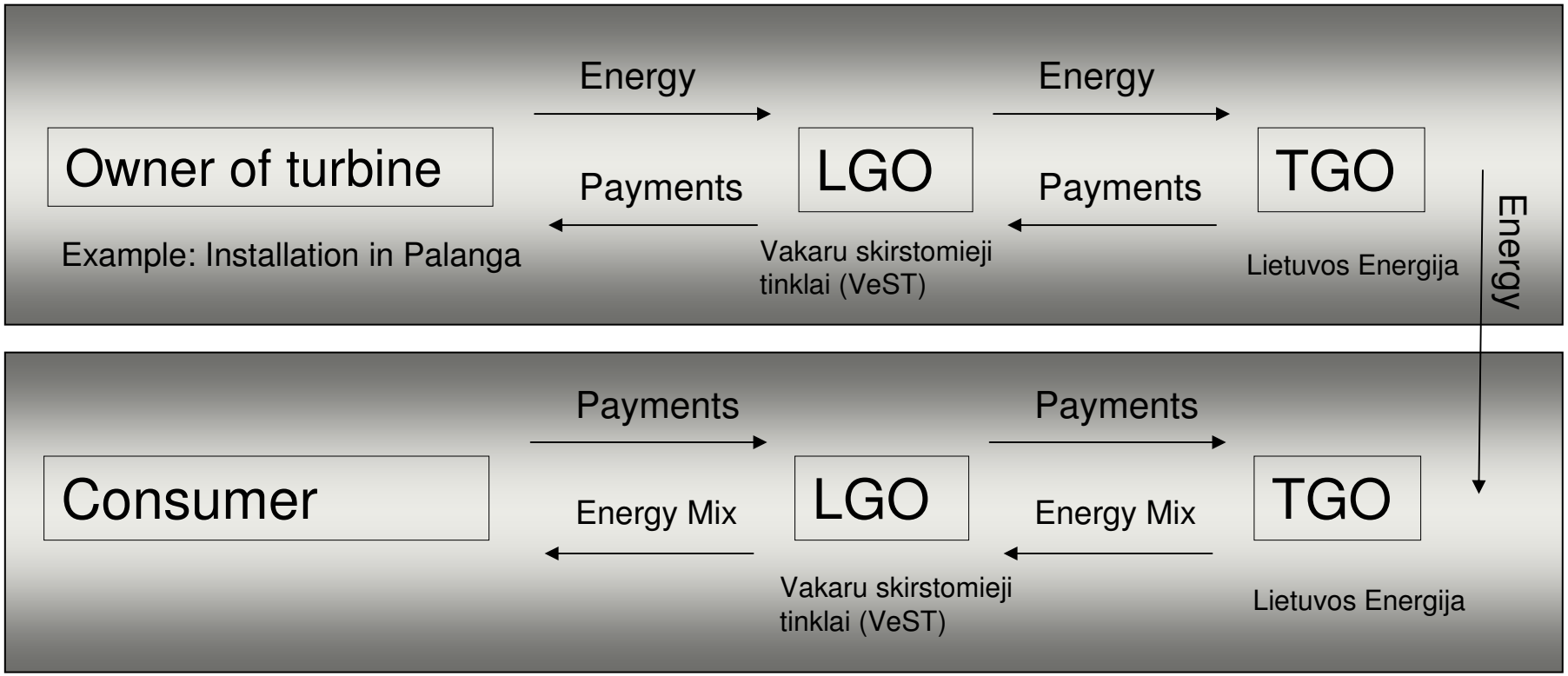
In order to protect the worlds climate and the environment, the **Renewable Energy Law** shall help to increase the share of the renewables on the total energy consumption

Germany 2000

Supported Energy Sources

- Hydro power
- **Wind energy**
- Solar thermal power
- Geo thermal
- Deposit gas
- Sewage gas
- Mining gas
- Biomass

The compensation principle



The Lithuanian names are given in order to understand how the system in Germany is working

Remuneration based on the regulations of the Renewable Energy Law

Example: Reference WEC , defined to produce within 12 month 1.000.000 kWh, wind speed 5,5 m/s in 30 m.

1. Real installed WEC produces **1.440.000 kWh,** equal to **144 %** energy yield compared with a defined reference turbine.
2. This value is 6 % smaller than a defined benchmark value of 150 %.
3. 6 % / 0,75 % = 8 → 8 * 2 month = **16 month**
4. 16 month + 5 years = 6 years and 4 month the owner receives the higher **initial tariff (9,2 Euro Cents/ kWh)**, after this, the price will be decreased to the lower **basic tariff 5,02 Euro Cents /kWh**.

EEG 2009: Higher price for energy and smaller digression

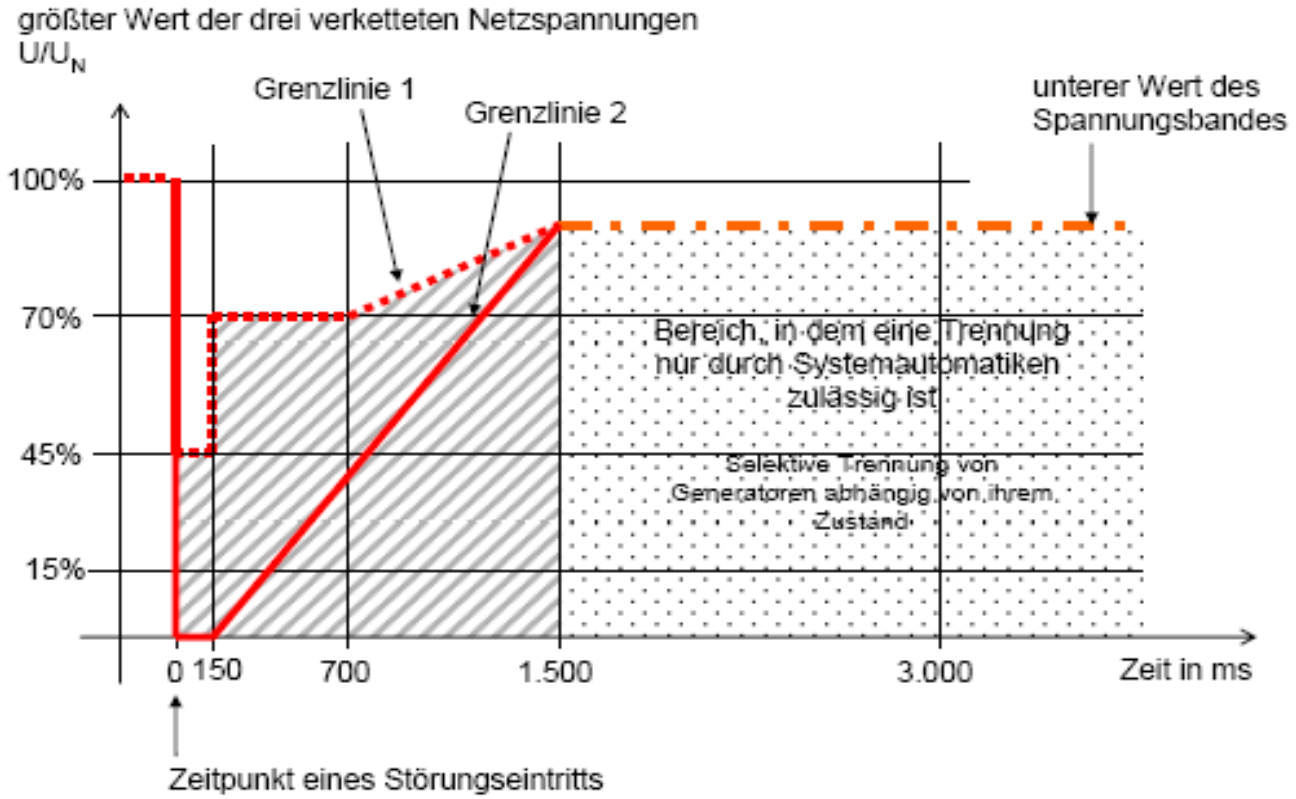
Remuneration for WECs installed on-shore

EEG 2004: §10	**EEG 2009:** §29
• Initial remuneration (2009): **7,87 ct/kWh** • Basic remuneration (2009): **4,97 ct/kWh** • Digression: **2% p.a**. • **Not** depending on development of general generating costs	• Initial remuneration (2009): **9,20 ct/kWh** • Basic remuneration (2009): **5,02 ct/kWh** • Digression: **1% p.a.** • **Not** depending on development of general generating costs

Bonus for Ancillary Service

- Undervoltage Fault Ride Through

E.ON Netz GmbH Grid Code



EEG 2009: Bonus payment for electric equipment supporting the grid quality

Bonus for Ancillary Service

EEG 2004	**EEG 2009:** (§29 Abs. 2 Satz 4; §66 Abs. 1 Nr. 6 i.V.m.; §64 Abs. 1 Nr 1)
No regulation	• **New:** Bonus for Ancillary Service for new installations. Initial remuneration + **0,5 ct/kWh** • **New: Installed WECs** (Commissioning later than 1.1.2002) receive an Bonus for Ancillary Service of 0,7 ct/kWh in the first 5 years if the grid supporting components are installed before 31.12.2010.

EEG 2009: Remuneration for on-shore installations

Year of commissioning	Initial remuniration	Repowering bonus	Bonus for Ancillary Service	Basic remuneration
2009	9,20 €/Cent	0,50 €/Cent	0,50 €/Cent	5,02 €/Cent
2010	9,11 €/Cent	0,50 €/Cent	0,50 €/Cent	4,97 €/Cent
2011	9,02 €/Cent	0,50 €/Cent	0,50 €/Cent	4,92 €/Cent
2012	8,93 €/Cent	0,50 €/Cent	0,50 €/Cent	4,87 €/Cent
2013	8,84 €/Cent	0,50 €/Cent	0,50 €/Cent	4,82 €/Cent
2014	8,75 €/Cent	0,50 €/Cent		4,77 €/Cent
2015	8,66 €/Cent	0,50 €/Cent		4,72 €/Cent

EEG 2009: Improved conditions for WEC owners regarding generation management

Feed in management

EEG 2004:	**EEG 2009:** (§6, 11, 12 i.V.m; §66 Abs. 1)
• No right on financial compensation • Privileged feed in of renewable energy instead of fossil energy • All renewable energy sources have got the same priority	• **New:** WECs > 100 kW need a remote control device to reduce generation. The 15 minute data have to be recorded in log files. • Existing WECs (Commissioning before 1.1.2009) have to fulfill this obligation until 1.1.2011. • **New:** Grid operator has to optimize the generation management. • **New:** Conventional power stations have to reduce generation • **New:** Renewable energy sources have to be reduced only as second counter measure.

EEG 2009: The utilities do have the duty to reinforce and to optimize the grids. If they don‘t do so, they can be hold liable by WEC owners!

Improvement of grid capacities and liability

EEG 2004:	**EEG 2009:** §9 und §10
• Duty to improve grid capacity.	• **New:** Beside the duty to expand the grids utilities have the duty to **optimise** the existing grid and to **reinforce** it. • **New:** Failing this duty concerned WEC owners can claim the utility for financial compensation.

EEG 2009: Clear and transparent rules for the direct marketing

Direct sales of generated energy

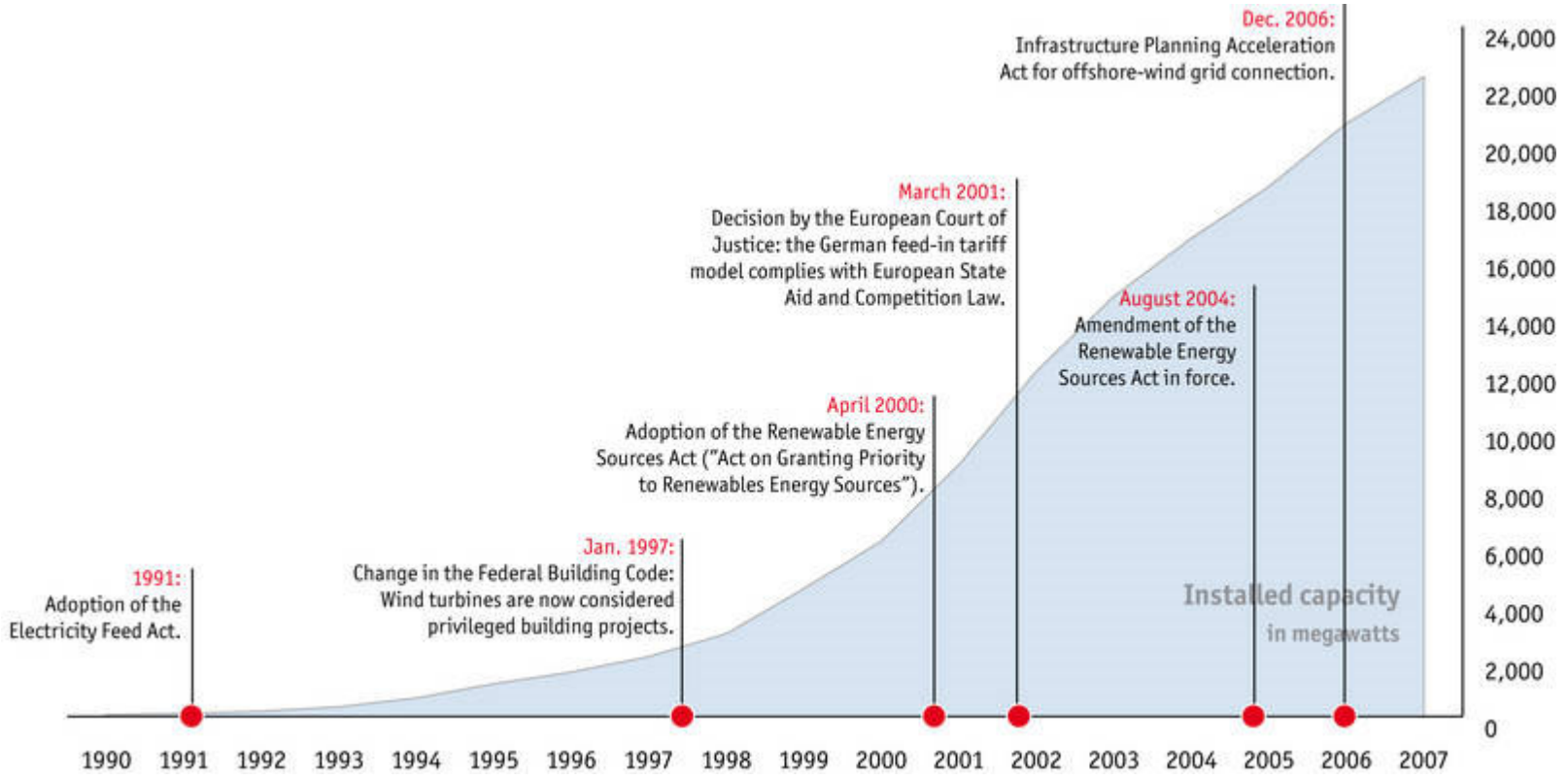
EEG 2004:	**EEG 2009:** §17
• Start and stop of direct sales of renewable energy possible but in reality not accepted by the transmission grid owners.	• **New:** Monthly change between direct sales of renewable energy and remuneration based on the minimum price system (EEG) possible • **New:** Partial direct sales is possible (fixed percentage of generation)

EEG 2009: Increased remuneration for offshore installations.

Off-shore

EEG 2004: §10 Abs.3	**EEG 2009:** §31
• Initial remuneration (2009): **8,74 ct/kWh** • Basic remuneration (2009): **5,95 ct/kWh** • Digression: **2% p.a.**	• Initial remuneration (2009): **13 ct/kWh** • **New: Sprinter-Bonus** on initial remuneration: **2 ct/kWh** for commissioned WECs before 31.12.2015 • Basic remuneration (2009): **3,50 ct/kWh** • Digression: **5% p.a.** from 2015

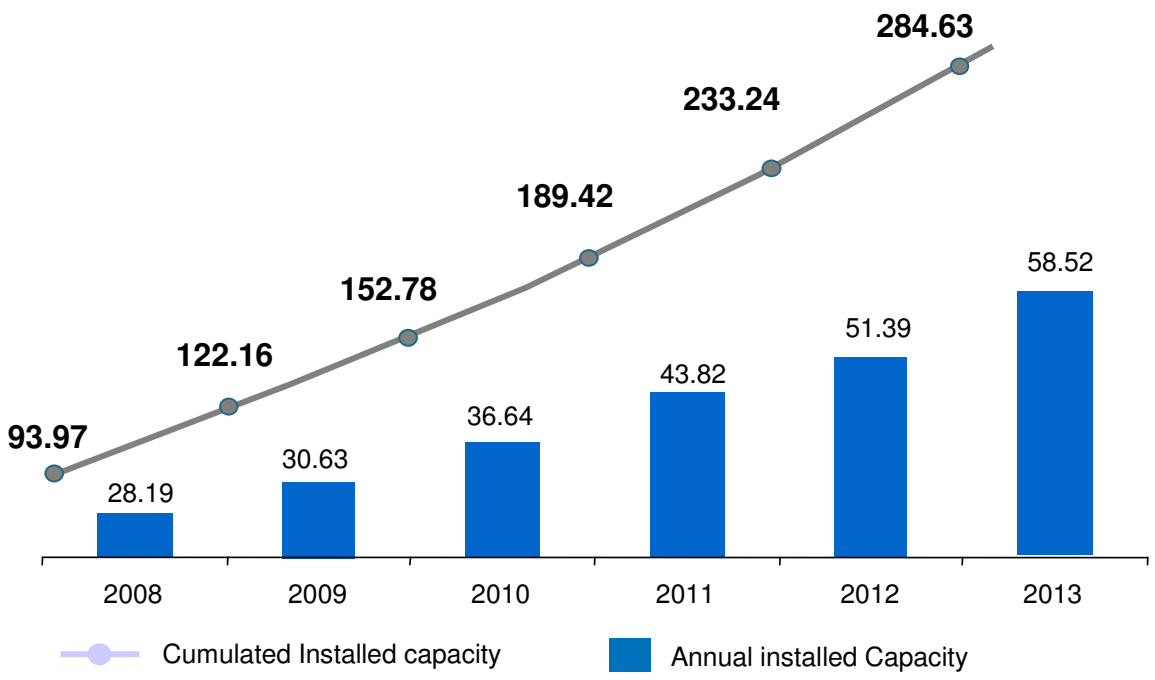
Milestones on the way to the Renewable Energy Law 2009



The Renewable Energy Law is a living tool which shall give a fair basis for all participants in the wind market.

The wind power market shows continuous strong growth of 15% to 20% on the mid- and long-term view

World market development 2008-2013 [MW installed]



Key trends

- Traditionally high growth rates of 15% to 20%
- Short-term dip to 9% due to financial crisis
- Rebound expected from 2010 on
- Strong trend to multi-MW-turbines

Source: BTM World Market Update: March 2009

What changed during the last two years in the Lithuanian wind markt ?

- The tender system is under discussion and will be changed. How it will look like in the future is still open.
- The remuneration for wind energy has been changed from 6,24 Euro Cent to 8,7 Euro Cent.
- The total installed capacity changed from 51 MW to 67 MW.

Thank you for your attention.

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The world energy consumption is growing

Example on Three gorges project on Jangtsekiang

•Start of construction 1992: coverage of 10% of Chinese energy consumption

•Start of full generation 2008: 3% of Chinese energy consumption