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Wind Energy in Germany

Policy, Status and Research Activities

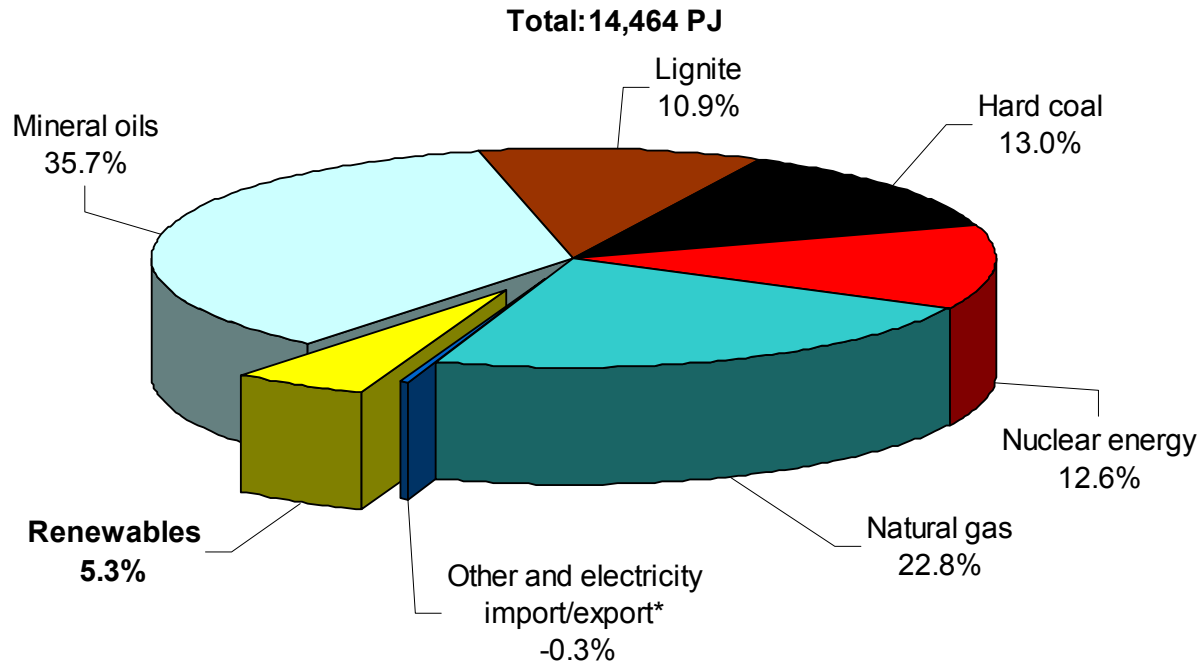
Ralf Christmann

Division Research and Development
in the Field of Renewable Energies



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Structure of Primary Energy Consumption in Germany





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Supportive Factors for Renewables

- Economic development requires energy
- Rising energy demand and limited resources
- Increasing prices
- Conflicts about energy access
- Climate change



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Energy Policy in Germany

- Phasing out Nuclear Energy
- Energy Efficiency and Energy Savings
- Renewable Energies



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Germany's Renewable Energy Strategy

- National targets
- Market Deployment
- Research and Development



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Renewable Energy in Germany Targets and Achievements

Year in %	2006	Targets		
		2010	2020	2050
Primary Energy	5.3	4.2	10	50
Electricity	11.8	12.5	20	
Biofuels	4.7	5.75		



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Germany's Renewable Energy Strategy

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Market Deployment Instruments

- Electricity: Renewable Energy Sources Act
→ *Feed-in guarantee*
 - Heat: Market Incentive Programme
→ *Grants and Loans*
(→ "Renewable Heat Source Act" planned)
 - Biofuels: → *Tax Reduction/
Blending Obligation*
-



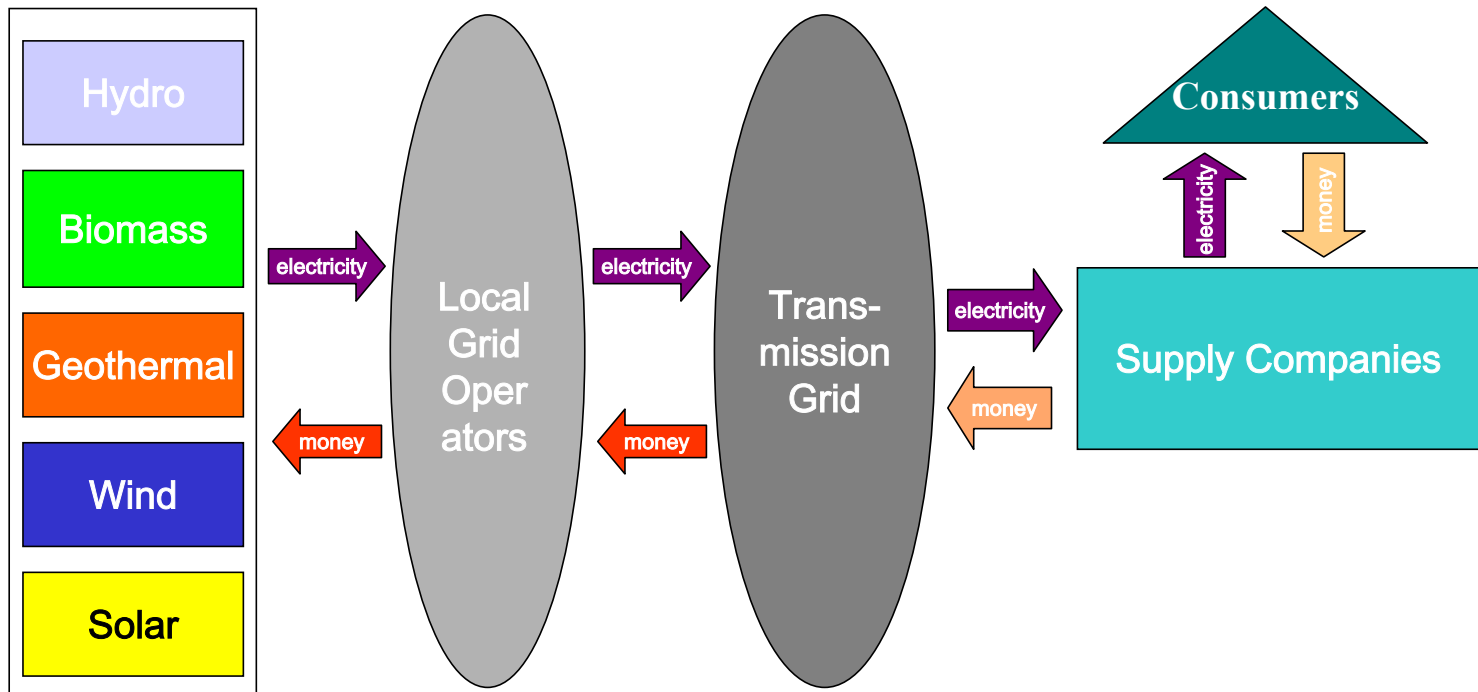
Market Deployment Instruments

- Priority access for RE to the power grid
- Priority transmission and distribution
- Obligation of grid operators to purchase the electricity produced from RE at fixed price ("tariff") for in general 20 years
- Tariffs are degressive and depend on technology and size of the plant



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How does the RE Resources Act work?



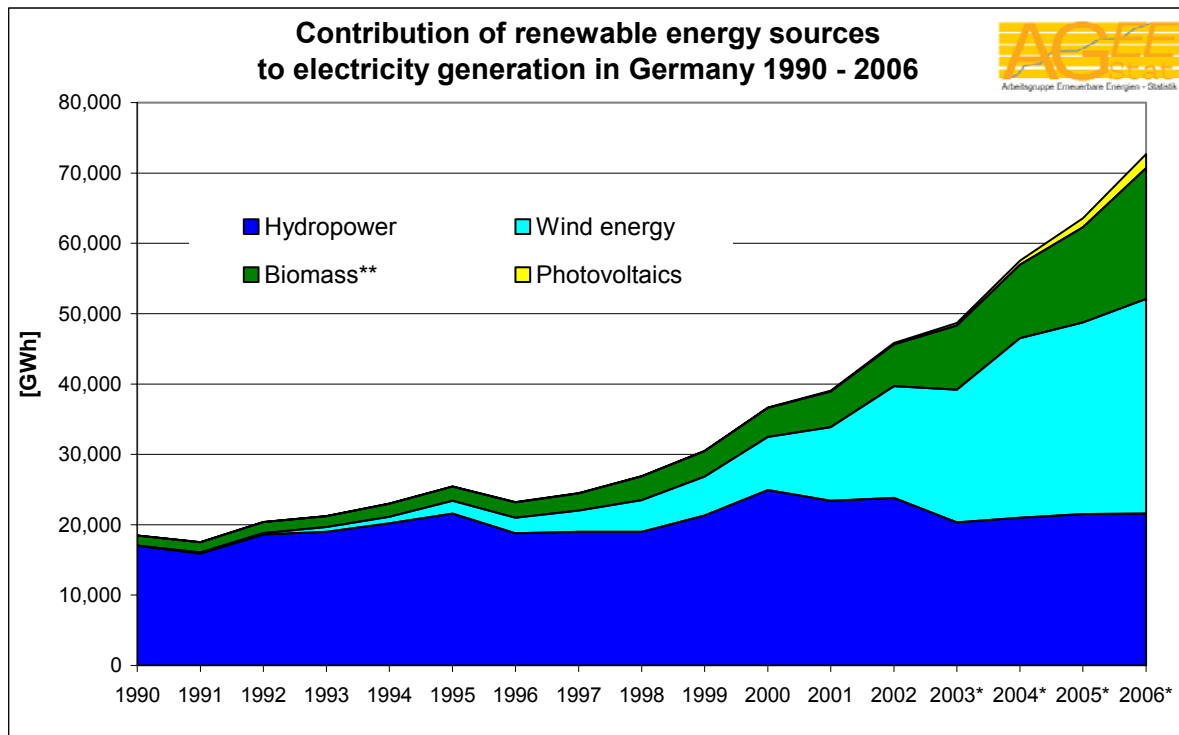
Jeju-Do, Korea
April 20, 2007

Wind Energy in Germany
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KWEA/IEA Workshop
on Wind Energy



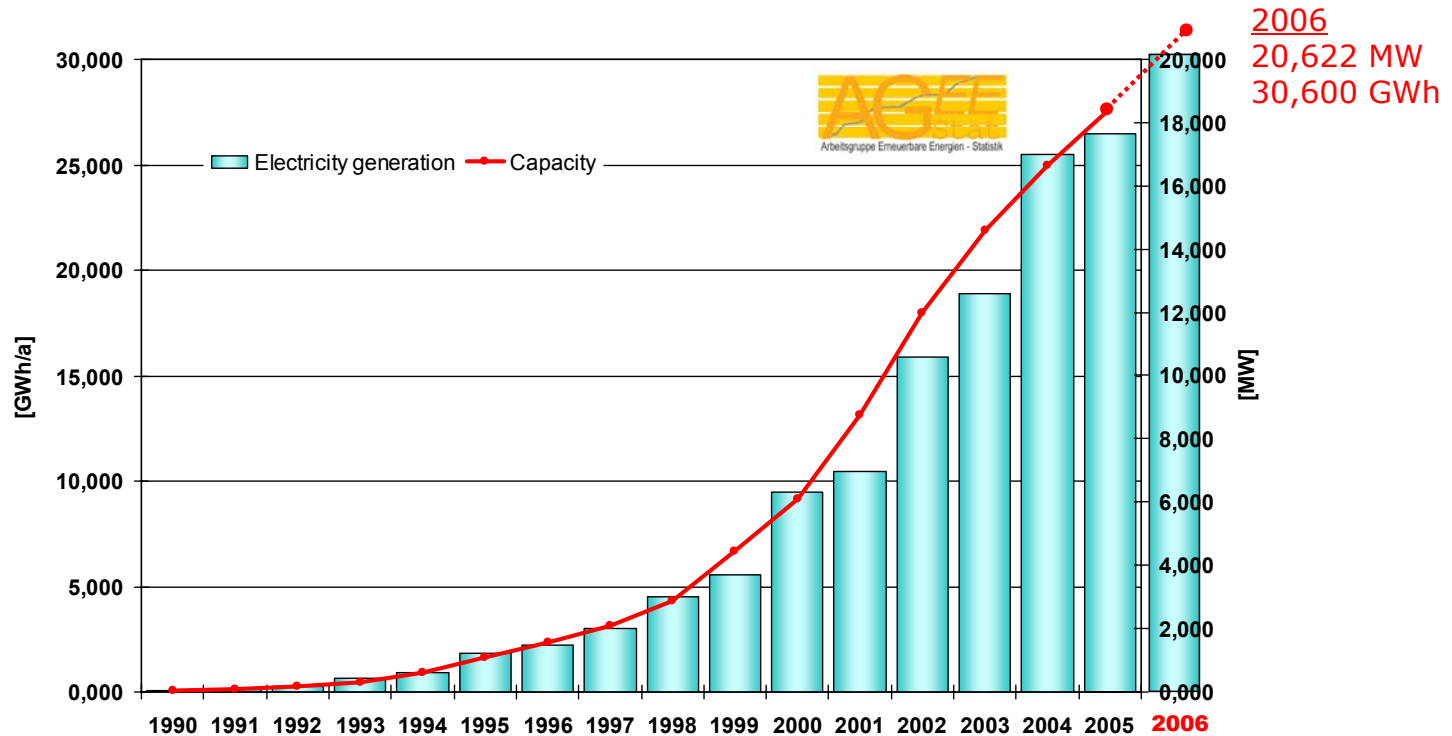
Development of Renewables in the Electricity Sector





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R&D Competence for RE (BMU)

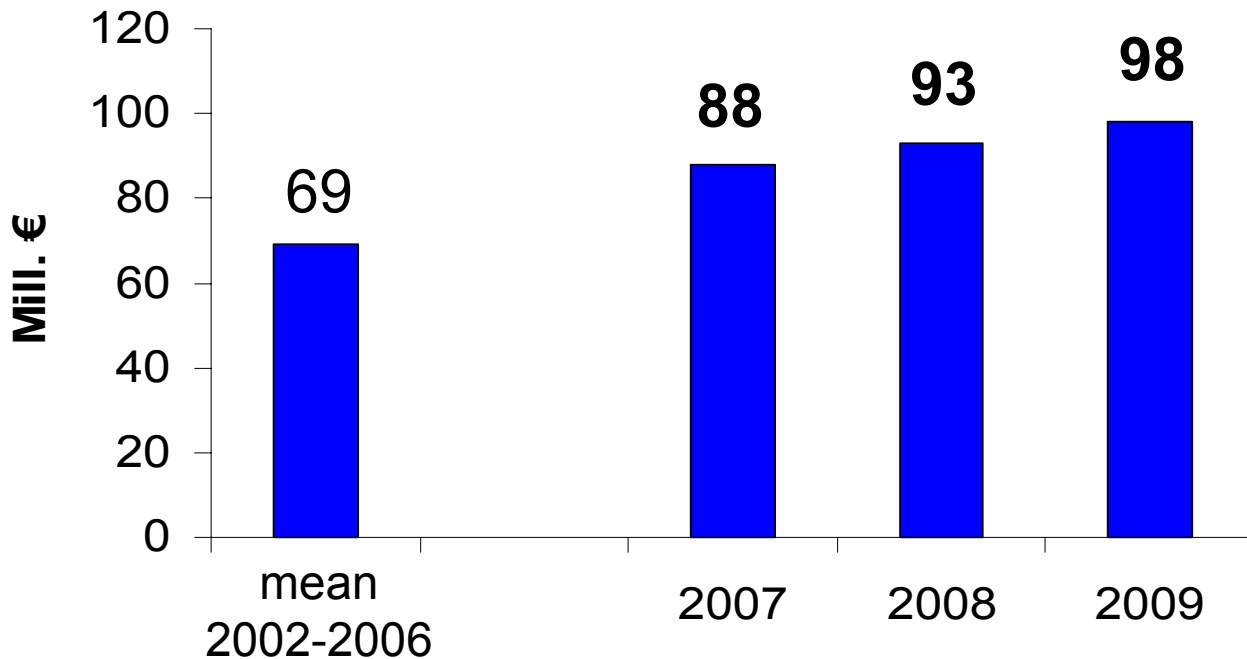
Applied research in the fields of RE

- Photovoltaics
- Wind Power
- Solarthermal Energy
- Geothermal Energy
- Concentrating Solar Power
- Hydro and Ocean Energy



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Budget for Applied Research on Renewable Energies (BMU)

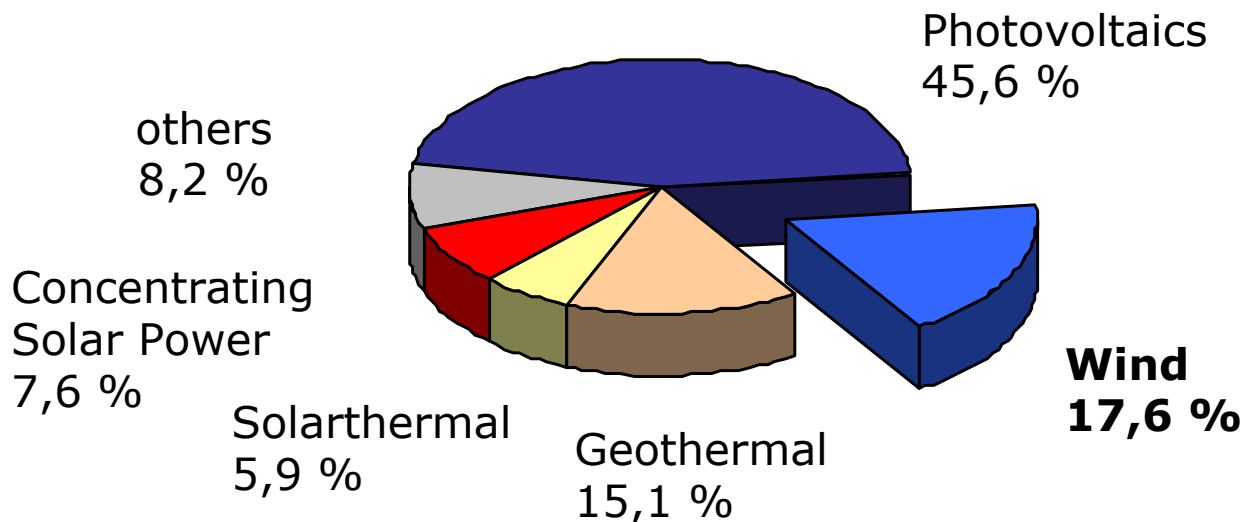




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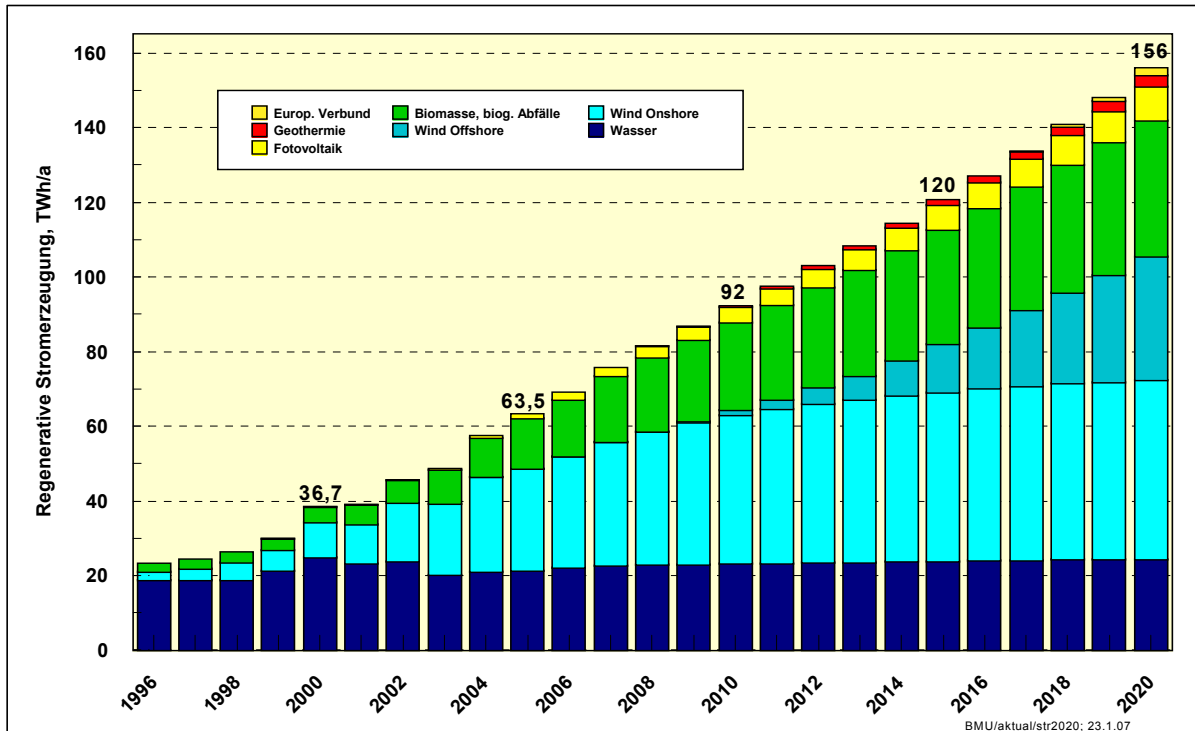
BMU R&D Budget for RE Shares 2002-2006

Annual budget (mean 2002-2006)
69 Mill. Euro





Renewables Scenario in the Electricity Sector





Governmental Support of Offshore Wind Energy

- National targets
 - Governmental offshore strategy: 20-25 GW until 2030
 - BMU Roadmap: 1 GW until 2010, 15 GW until 2020
- Optimised Framework Conditions
 - Feed-In-Law with increased tariffs for offshore wind
 - Infrastructure Acceleration Act:
Obligation for TSOs to ensure grid access at sea
- Research and Development
 - Focus on Offshore Wind Power



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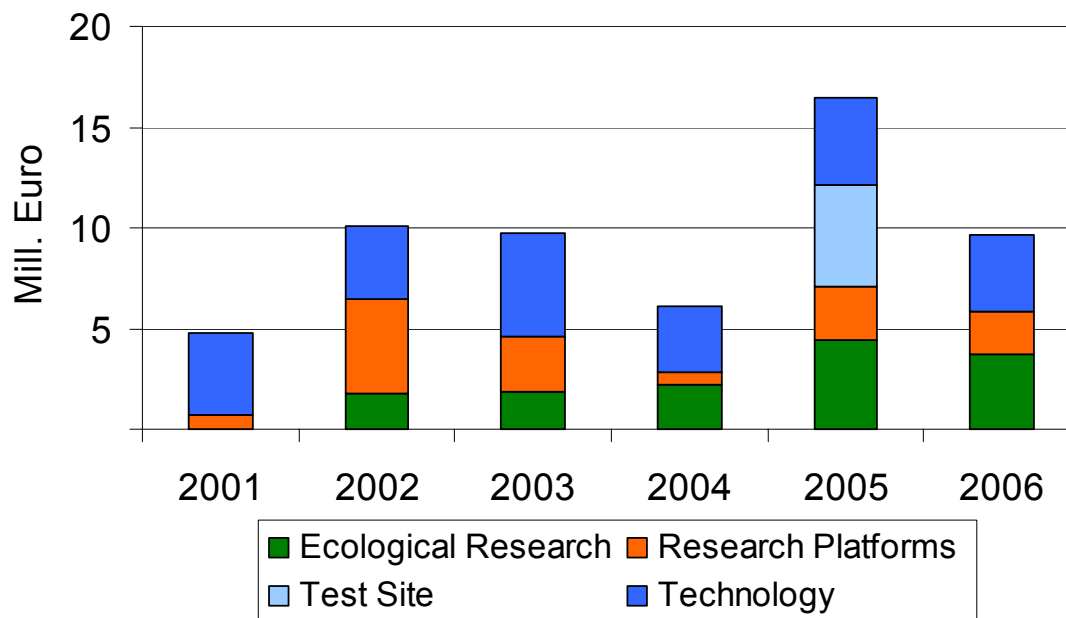
R&D Priorities Wind Energy

- Offshore
- Cost reduction
- Grid integration
- Ecological impact



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R&D Budgets for Wind Energy 2001-2006





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Offshore Research Focus Test Site in the North Sea



- 12 offshore wind turbines of 5 MW-class, 60 MW total capacity
- Near platform FINO I
- Water depth 28–30 m
- Grid connection 65 km offshore 45 km onshore
- Operation planned in 2008





Offshore Test Site BMU Research Programme

R&D-Budget: 50 Mill. Euro over 5 years

Goals:

- Offshore demonstration of German high-end multi-megawatt wind turbines
- Cost reductions for future offshore wind farms by further developments on foundations, logistics and control technology
- Advanced experience on operation, costs, grid integration and ecological impact

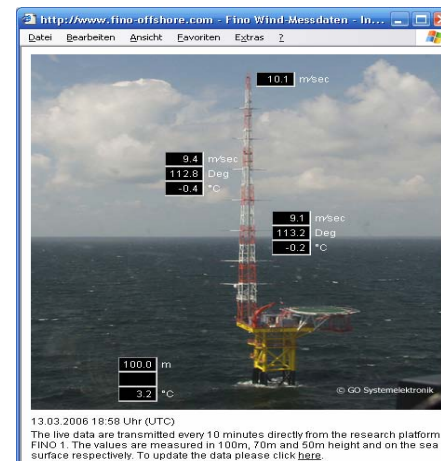
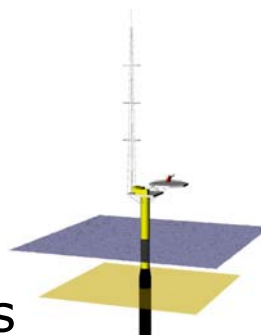


Highlights of Wind R&D Projects

- Multi-Mega-Watt turbines up to 5 MW
- Offshore Research Platforms in North and Baltic Sea



with measurements of wind and dynamic loads on structure, accompanying ecological research



www.fino-offshore.com



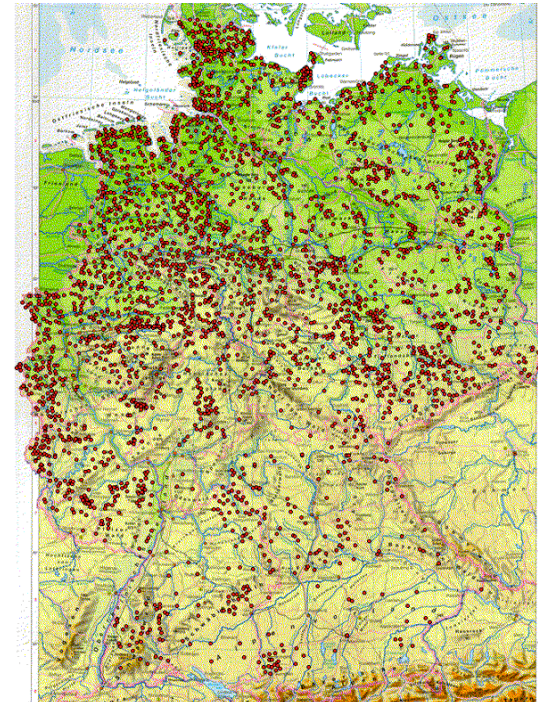
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Highlights of Wind R&D Projects

- Scientific Measurement and Evaluation Programme

with 15 years of operational experience of more than 1500 wind turbines

→ <http://reisi.uni-kassel.de>
- Joint Projects on support structures
i.e. tower and foundations





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Further information:
www.erneuerbare-energien.de



Thank you
for your attention.



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