

**Germans future in Renewable  
Energy Solutions (RES):  
'Big time' for RES after  
Fukushima!**

Dr. Ludger Deitmer  
ITB, University of Bremen

# What is my focus here?

- Policy change
- Details of the plan
- Wind energy as key
- Greening of VET occupations
- Off shore
- Qualifications
- Blades making
- Service maintenance
- conclusions

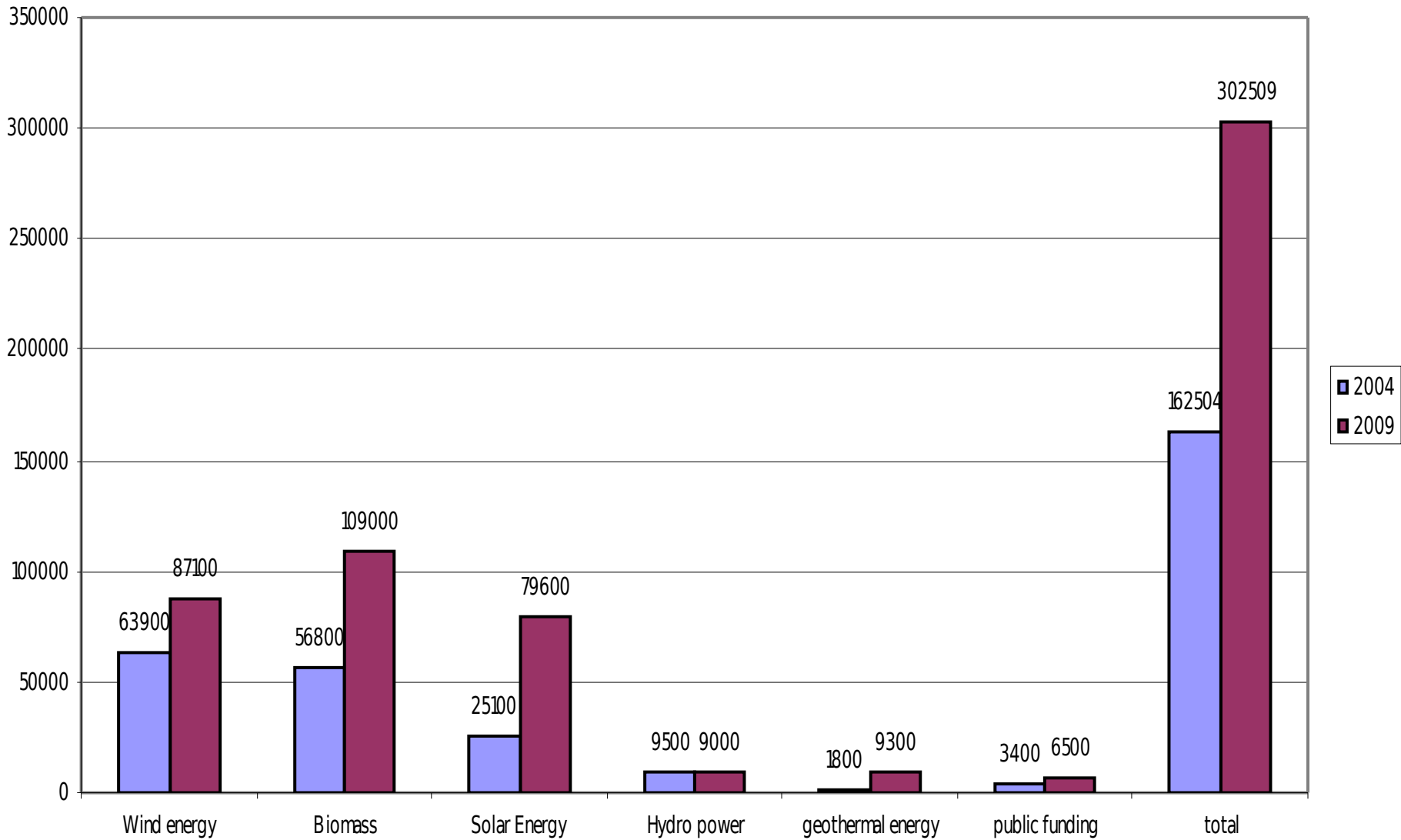
# Radical environmental policy change

- Electrical power from offshore wind energy farms will make an important contribution to energy and climate policies in Germany.
- More urgent after the atomic power station disaster after the Fukushima crash!!
- By beginning of 2022 in Germany all atomic power stations have to be reconstituted by other energy generating forms and by RES and by offshore wind farms.
- About one-third of German electricity is currently produced in nuclear power plants. This will need to be replaced by environmentally friendly alternatives over the coming years.

# Details of the plan

- In 10 Years the proportion of RES generated electricity shall increase by 130 %: from currently 17 % at the moment up to 40 %
- Electricity out of Wind, Sun and Biomass should compensate the decline of atomic energy!
- The entry compensation guarantee will increase for the above discussed offshore energy from 13 up to 15 cent per Kilo Watt per hour
- This programme shall run for eight years and should make it for energy producing investors to expand in this kind of energy production market
- But on the country side for wind power generators new cost reduction was formulated.
- Efficiency should come from a much quicker process to get the agreement by the public and local bodies!
- The general intention is that in the long run the RES technology should be able to be implemented without any subsidies from the state.
- Whether this kind of modification on a subvention free RES future in Germany will work there are also some skeptical remarks to be noted from the national wind support and development association “Bundesverband Windenergie” (see Weser Newspaper from 6.5.2011).

## Employment in renewable energy sector in Germany



# Wind energy as the key thing!!

- crucial role to redefine the German energy policy for the near future.
- Enormous wind forces at north and baltic sea offer an huge potential.
- Modern wind power technology can enable to exploit this potential: re powering; south of Germany; new grid and off shore.
- Catalyst: enough highly skilled work force on all levels; on the making as well as on the installation and servicing of wind mills!
- My argument: topic of RES needs to be integrated into the curriculum of general as well as of VET schools
- My estimation: existing VET occupations get “greener” and generations of new occupations within dual apprenticeship, see the example of the “Solateur”!
- Investments into RES will support employment growth and lead to 500 000 additional jobs in environmental protection by 2020 and 800 000 by 2030.

# The greening of occupations

- RES companies more often recruit qualified workers rather than offering new dual training opportunities.
- This implies a tendency towards “pull” from other sectors.
- As studies in the regional wind power sector in Bremerhaven show, there is a lack of proactive engagement of the wind power companies in dual vocational training (compared to other German industries).
- At the level of training of skilled workers, environmental protection has been integrated into all initial vocational training regulations.
- Between 1996 and 2009, 82 occupations were created and 219 occupations modernised under the greening skill dimensions.
- A good example of greening of an existing occupation (as a result of technological change) is the training of solar installation technicians

## What are the new skill requirements in Germany which will emerge out of the use RES and in specific out of offshore wind power investment?

- 1. Planning/Development/Finance/Insurance
- 2. Foundation technology and tower construction
- 3. Mechanical engineering and plant construction (e.g. gears)
- 4. Plastics and fibre composite technology (e.g. rotor blades, nacelle cladding)
- 5. Electrical engineering (e.g. construction of generators)
- 6. Assembly and logistics
- 7. Service, maintenance, repairs

# Qualification research: What will be needed?

- 1. What is the current qualification profile of your employees?
- 2. What new qualification requirements arise from use of offshore wind energy?
- 3. How are company personnel expected to develop further in the face of the offshore expansion?
- 4. What concrete further education requirements can the company express?
- 5. From the point of view of the companies, is it necessary to make changes to professional education?

# Plastics and fibre composite technology (e.g. rotor blades, nacelle cladding)

- One is manual laminating of glass fibre textiles in built up fashion and coating them with polyester resin.
- Second variation is the so called vacuum infusion method which inserts the fibers stored in the build up pattern into a vacuum through film coverings.
- Third process uses pre impregnated glass fibre textiles which are tailored by machines and are delivered frozen. By warming up the material is adapted to the shape of the blade.
- Because of the high cost of the last type of blade production most manufactures use the vacuum infusion method.
- For the workers producing the blades there is knowledge needed about the plastic and fibre composite technology.
- Also safety instructions are important as well as all information out of which components such a blade exist

# Service, Maintenance and Repair

- The service people must have a good understanding of the functions of all the wind plant and mill components.
- The function of the service technicians is for example to test the brakes; they have to change the gear oil.
- In regular intervals they have to check the condition of the wind mill plant.
- The service company are often in charge of the monitoring of the condition of the plant.
- The companies manage this service by hosting measurement data, like the vibrations of the plant, checking electrical functions, temperature, noise conditions as well as much more other data.
- Target values exist for parameters and are compared with actual data so that in case of deviations the plant can be stopped immediately and service can take place.
- There are new qualification requirements for the service technicians:
  - offshore security training which is obligatory;
  - vocational skill and knowledge on servicing the plant like the mechanical and electrical components,
  - as well hydraulic systems and a good understanding of the conditions needed for the fibre technology of the plant.
- Also they must be able to interpret the data they receive from the monitoring systems either on the control room on land but also be able to measure at the plant itself.

# Final prospect:

- In the past decade, wind energy showed the highest capacity growth of all renewable energy forms.
- For the future wind energy, whether on or off-shore, will play an key role (stronger than bio mass and solar energy) in the change of course in power production.
- The growth potential for wind energy in the coming decade is also very promising but it is very much depending on engineering and skilled technicians and workers availability whether the ambitious plans can be realised.