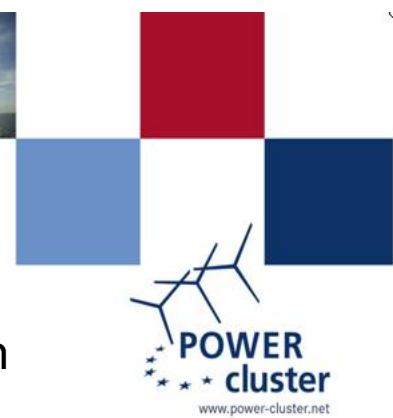
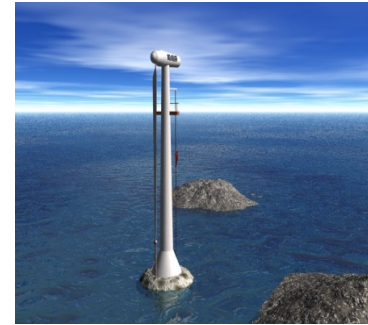


# Life long learning in off-shore wind



Gerard van Bussel, Stefan Jung, Kersti Karltorp, Moses Kärn and many others

## Training of technicians



Needs of personnel and education

## Life long learning in off-shore wind

Age 10 16 18 20 25 30 50



Inspiring the youth



University education

Recommendations

# Rationale: urgent need for qualified workforce!



EWEA "Wind at Work" 2009

Some 400,000 jobs in 2030

~ 200,000 **new jobs** in offshore wind!!

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# Need for competences



## ➤ Large demand for engineers (all levels):

- Turbines
- Foundations
- Meteorology
- Grid
- O&M

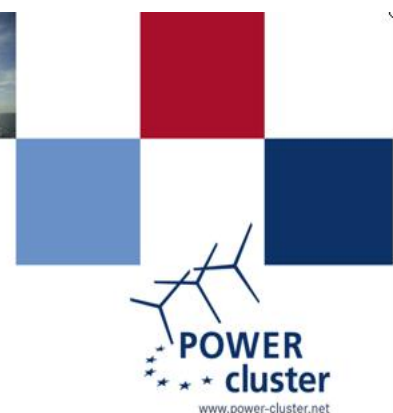
## ➤ Competences:

- Disciplinary: mechanical, electrical, civil, physics etc
- Integrated: project management, group work etc
- Health and Safety

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Age    10            16            18            20            30            50

# Elements in life long learning



## ➤ Training of Technicians

- Skills qualification
- Short training modules
- Safety centre

Co-presenter: Stephan Jung

## ➤ University education

- Bachelor and Master modules

Co-presenter: Kersti Karltorp

## ➤ Inspiring the youth

- Rise awareness among teachers and pupils

Co-presenter: Moses Kärn

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Age    10            16            18            20            30            50

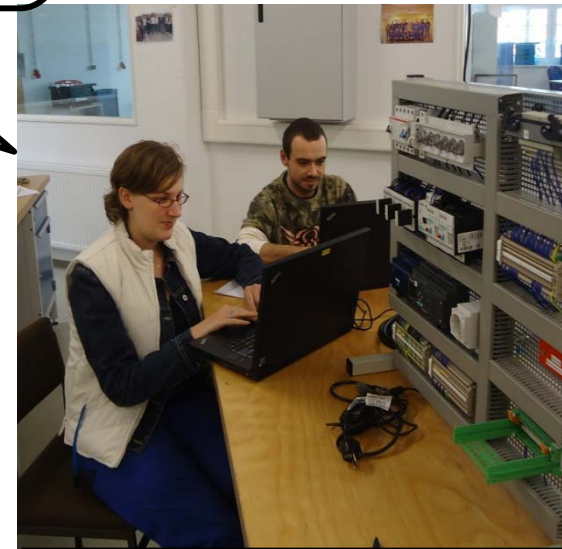
# Training of technicians

" We are apprentices of electronics technician for industrial engineering"

- What are the opportunities?
- Where and what can I study?

## At start of the Power projects:

- There are no initial vocational training programmes
- There are not enough apprentice positions in wind industry
- Not enough teaching workshops in wind industry

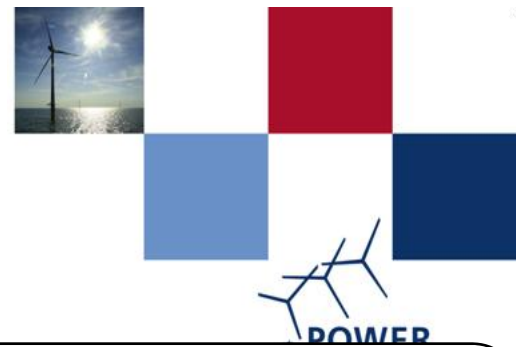


Sarah Schwarting (21)  
Tino Reinhardt (24)

## Life long learning in off-shore wind

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# Training of technicians: Three entries to industry



## Initial training

- entry level: high school
- recognized standard profession
- specialization in wind energy
- Berufliche Bildung Bremerhaven (BBB)

## Certified further training

- entry level: mechanic or electrician
- BZEE-standard
- for service and manufacturing
- WAK Husum
- bfw, Bremen
- Northumberland Coll.
- Chalmers University

## Certified Engineer for Renewable Energy

- entry level: 2 years of professional experience
- introduction to scientific engineering
- BST, Bremerhaven  
→ national approach: curriculum ready but not in operation

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# Training of technicians: Recommendations

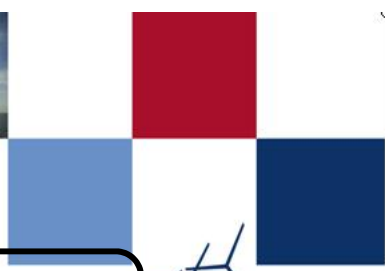
- Industry should increase training capacities
- Education centres and industry should agree on standards
- Industry: share more technologies to optimize education
- Development of "dual education system": combined apprenticeship and university education
- Development part-time education



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# University education



POWER  
cluster  
www.power-cluster.net

" I want to become an offshore wind energy engineer"

- What are the demands for engineering competences?
- What are the opportunities?
- Where and what can I study?



## At start of the Power projects:

- Some programmes in "wind" or "offshore wind energy"
- Difficulties in identifying and understanding different character

## Life long learning in off-shore wind

Age    10            16            18            20            30            50



# University education

## Needed BSc and MSc engineering competences

- Disciplinary: mechanical, electrical, civil, physics
- Integrated: electrical and mechanical engineering, project management, health and safety, maintenance

## Number of engineers needed until 2020

- 7 000 additional engineers at turbine manufacturers
- 2 000 additional engineers at utilities
- ~ 10 000 in other areas



## Life long learning in off-shore wind

Age	10	16	18	20	30	50
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# University education

## Three career paths:



### Dedicated programme

- Many disciplines integrated
- Broad scope of knowledge and methods
- Target: "systems engineer"
- University of Applied Science Bremerhaven

### Specialisation in a „classical“ programme

- Focused; deep scope of knowledge and methods
- Specialisation in one discipline
- Target: specialist for R&D
- Chalmers University
- TU Delft, DTU
- Aalborg University
- Univ. of Oldenburg

### Continuing studies programme

- part-time
- interdisciplinary
- Target: systematic know-how for professionals
- Univ. of Oldenburg

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# University education Recommendations:



- Ramp up MSc programmes in Wind Energy
  - Number of researchers/teachers has to expand
- Initiate international and cooperative programmes
  - Join forces to cover multi-disciplinary field of offshore wind energy
- Wind Energy Modules in established MSc programmes
- Expand courses for professionals
  - Organise opportunities to develop both deep and integrative competences by offering programmes for professionals

Life long learning in off-shore wind

Age    10            16            18            20            30            50

# Inspiring the youth

"Wow, wind energy is cool!"

- I like to know more about it."

## At start of the Power projects:

- "Energy" is often not a subject in school
- Teachers don't know enough to develop lessons
- No standard textbooks about wind energy
- Pupils have biased or fragmented knowledge of wind energy
- Lack of interest from young students



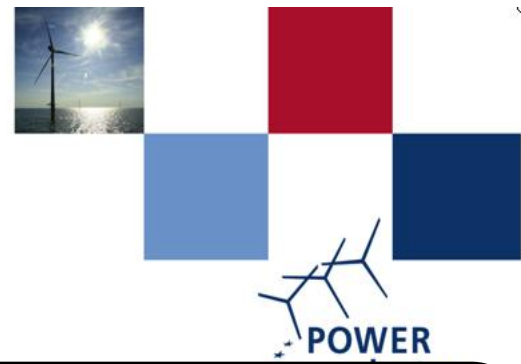
Hannah (13)

## Life long learning in off-shore wind

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# Inspiring the Youth

## Three steps:



### Research and interviews

- pupils' and teachers' views on wind energy
  - identify topics for curriculae
  - need for teacher training
- Univ. of Appl. Sc. BHV
  - Univ. of Oldenburg
  - WAK, Husum

### Teacher trainings

- teacher sets
  - teaching material
  - projects with schools
- Univ. of Appl. Sc. BHV
  - Univ. of Oldenburg
  - Chalmers University

### Activities with pupils

- construction of wind energy turbine and anemometer
  - internships
  - information days
- Univ. of Appl. Sc. BHV
  - Univ. of Oldenburg
  - Chalmers University

Life long learning in off-shore wind

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# Inspiring the youth

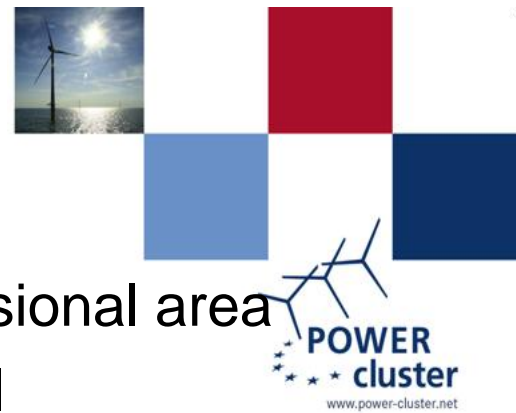
## Recommendations:

- Rise the awareness of renewable energies
- Establish “energy education” in schools
- Increase teacher trainings in the field of on- and offshore wind energy
- Extend the cooperation between schools, universities and companies
  - provide more internship places for students
- Promote on/offshore wind energy as attractive profession



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Age 10 16 18 20 30 50



# Conclusions

- Wind energy needs promotion as attractive professional area
- More and more intensive Wind Energy educational programmes/courses needed on all levels

# Recommendations

- Increase training capacities
- Agree upon one common education standard
- Industry: share more technologies to optimize education
- Development of part-time education and dual education
- Expand courses for professionals
- Ramp up MSc programmes in Wind Energy
- Initiate international and cooperative programmes

Life long learning in off-shore wind

Age      10                  16                  18                  20                  30                  50