

# IEA RD&D Wind Task 11

## Base Technology Information Exchange

GWEC '06  
Adelaide, September 19, 2006

Sven-Erik Thor  
Operating Agent



# Objective

Promote wind turbine technology through:

1. cooperative activities and
2. information exchange

on RD&D topics of common interest.



# How do we achieve this?

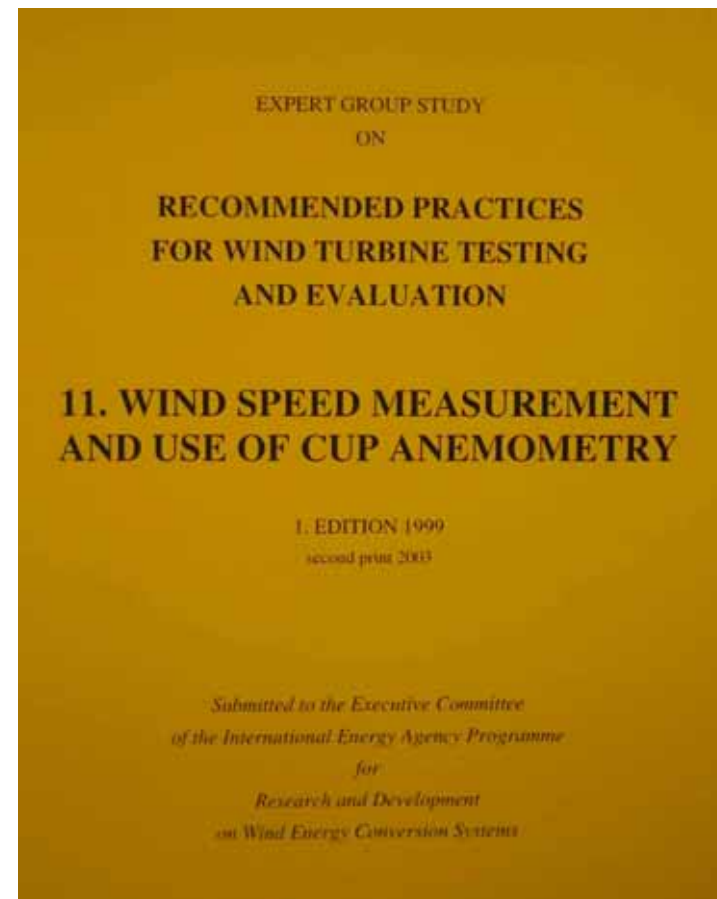
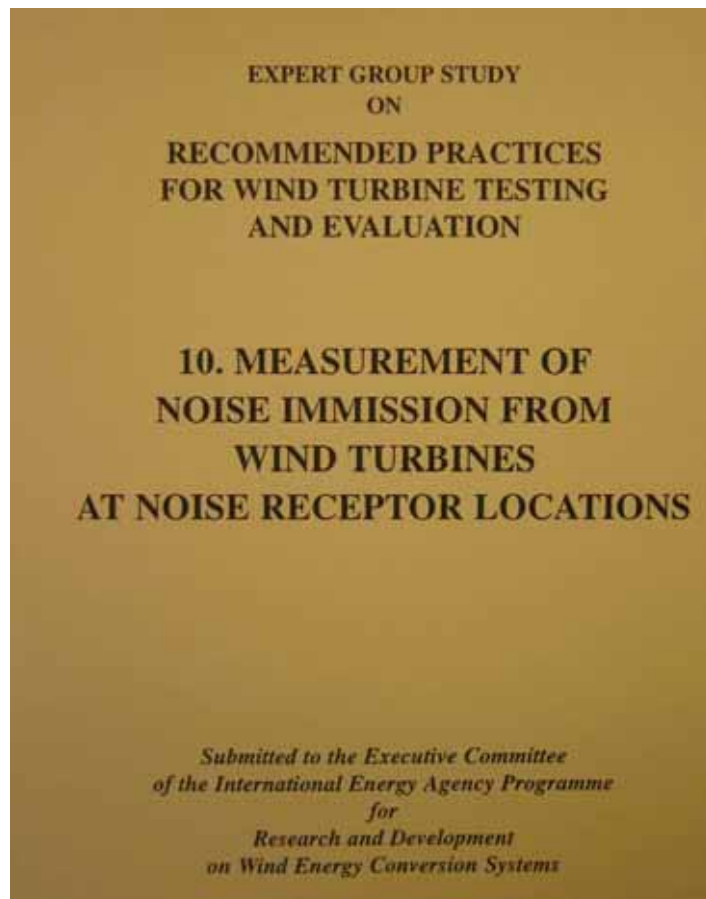
- Develop Recommended Practices for Testing and Evaluation
- Arrange Expert Meetings  
4 per year



## Recommended Practices for Testing and Evaluation

No	Title	Valid	Status
1	Power Performance Testing		Superseded by IEC 61400-12, Wind Power Performance
2	Estimation of Cost of Energy from WECS	yes	
3	Fatigue Load Characteristics	yes	Part of IEC 61400-13 TS, Measurement of mechanical loads
4	Measurement of Noise Emission	no	Superseded by IEC 61400-11, Acoustic noise measurement techniques
5	Electromagnetic Interference	yes	See also CENELEC Draft prEN50373, Wind Turbines - Electromagnetic compatibility
6	Structural Safety	no	See also IEC 614000-1, ed 2
7	Quality of Power		Superseded by IEC 614000-21, Measurement and assessment of power quality of grid connected wind turbines
8	Glossary of Terms		See also IEC 60050-415 International Electrotechnical vocabulary: Wind turbine generator systems
9	Lightning Protection	yes	See also IEC TR61400-24, Lightning protection for wind turbines
10	Noise Immission Measurement	yes	
11	Wind Speed Measurement and use of Cup Anemometers	yes	Document will be used by IEC 61400 MT 13, updating power performance measurement standard

# The most popular ones

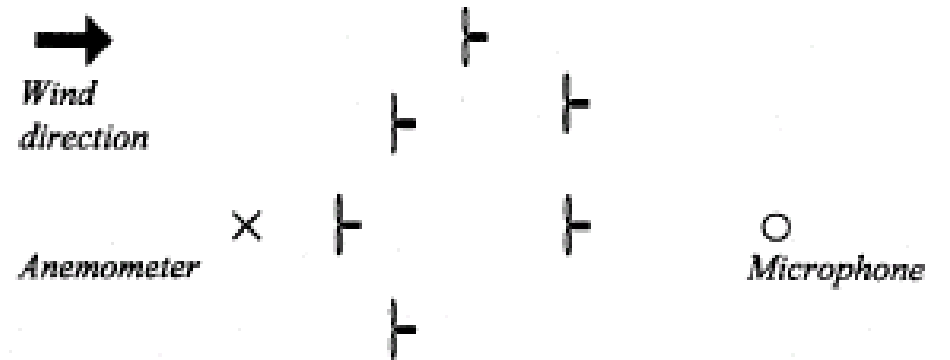
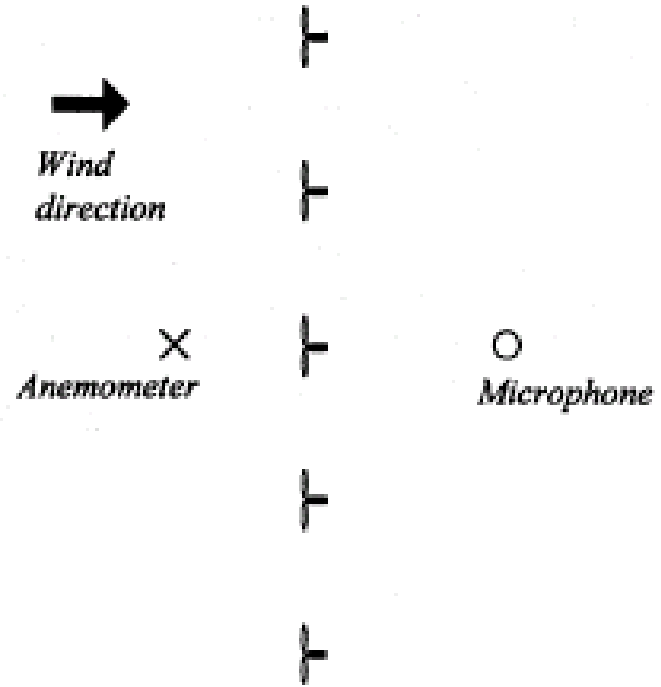


## 10. Measurement of Noise Immission at Noise Receptor Locations

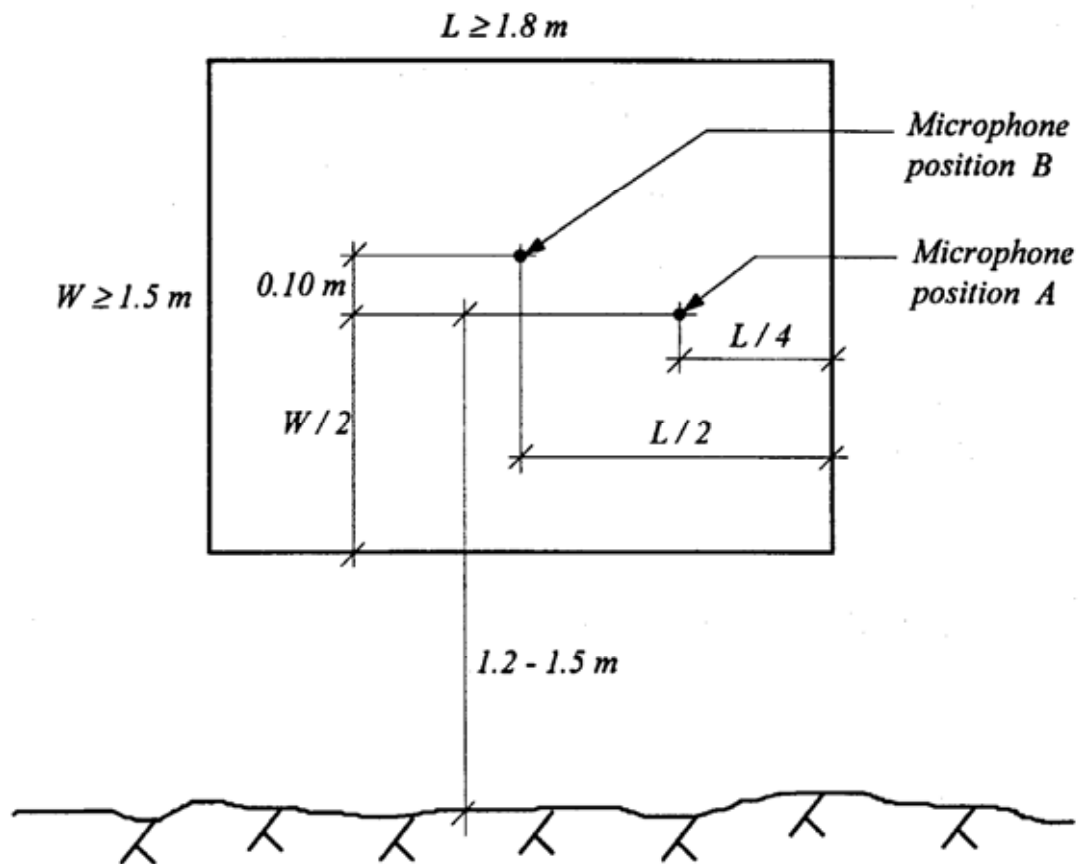
- techniques and methods for the measurement
- description of wind turbine noise immission at noise receptor locations



# Noise Immission Measurement



# Microphone position



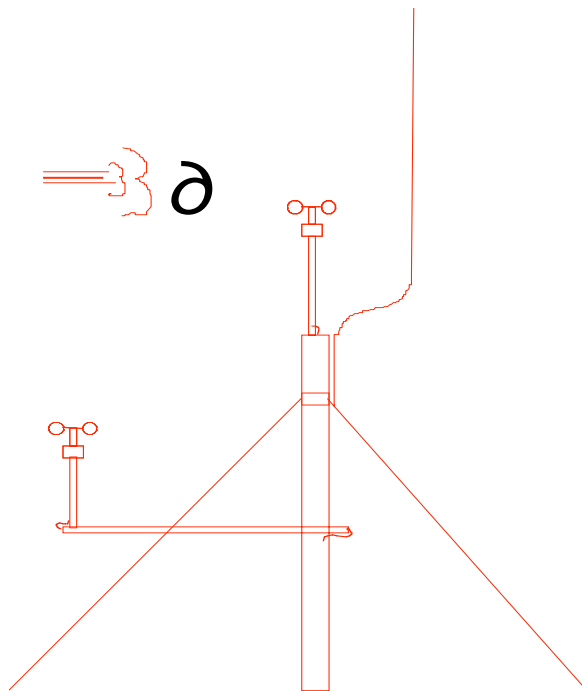
## 11. Wind Speed Measurement and use of Cup Anemometry

### **Purpose:**

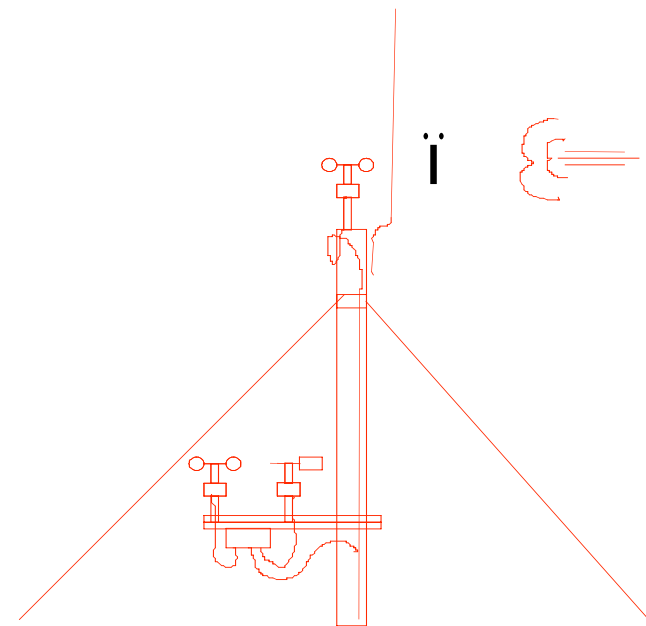
**provide guidance on best practice on the use of cup anemometers for power performance evaluation.**



# Anemometer mounting practice



**Good practice**

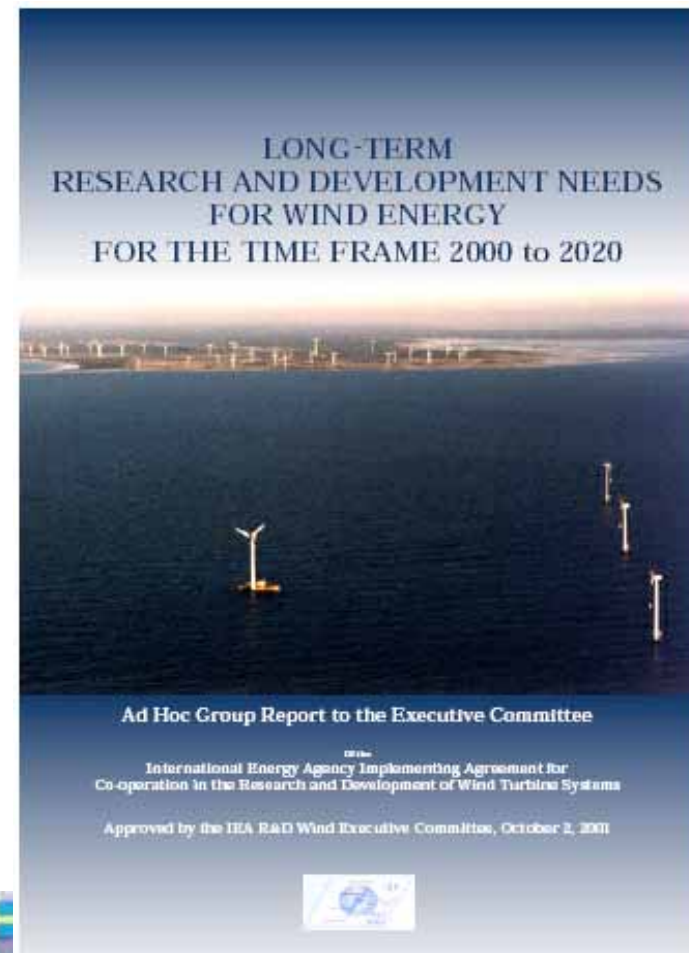


**Bad practice**



## Recent and Coming Expert Meetings

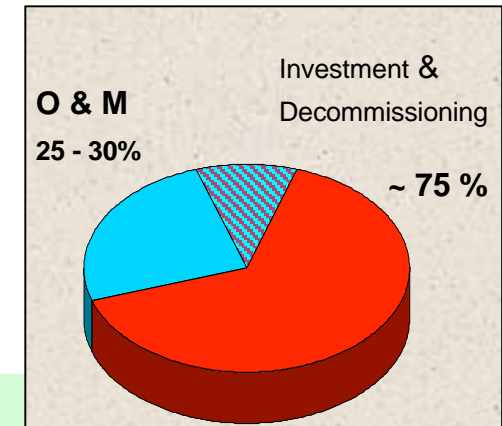
- Long Term Research Needs 2000 - 2020
- Operation and Maintenance of Wind Power Stations
- Radar, Radio, Radio Links and Wind Turbines
- Methodologies for estimation of cost of wind energy
- Challenges of Introducing Reliable Small Wind Turbines



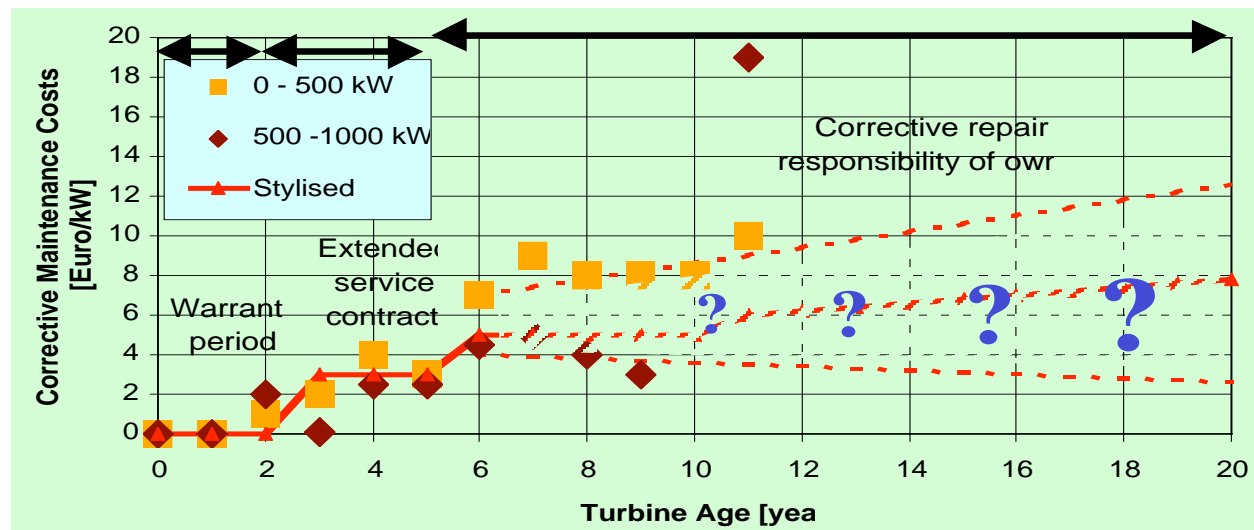
## Why O&M Offshore Research?

### Offshore

- preventive maintenance 0,003 to 0,009 (€/kWh)
- corrective maintenance 0,005 to 0,010 (€/kWh)
- 25 to 30 % of kWh price
- revenue losses = repair costs



2001 (CA-OWEE)



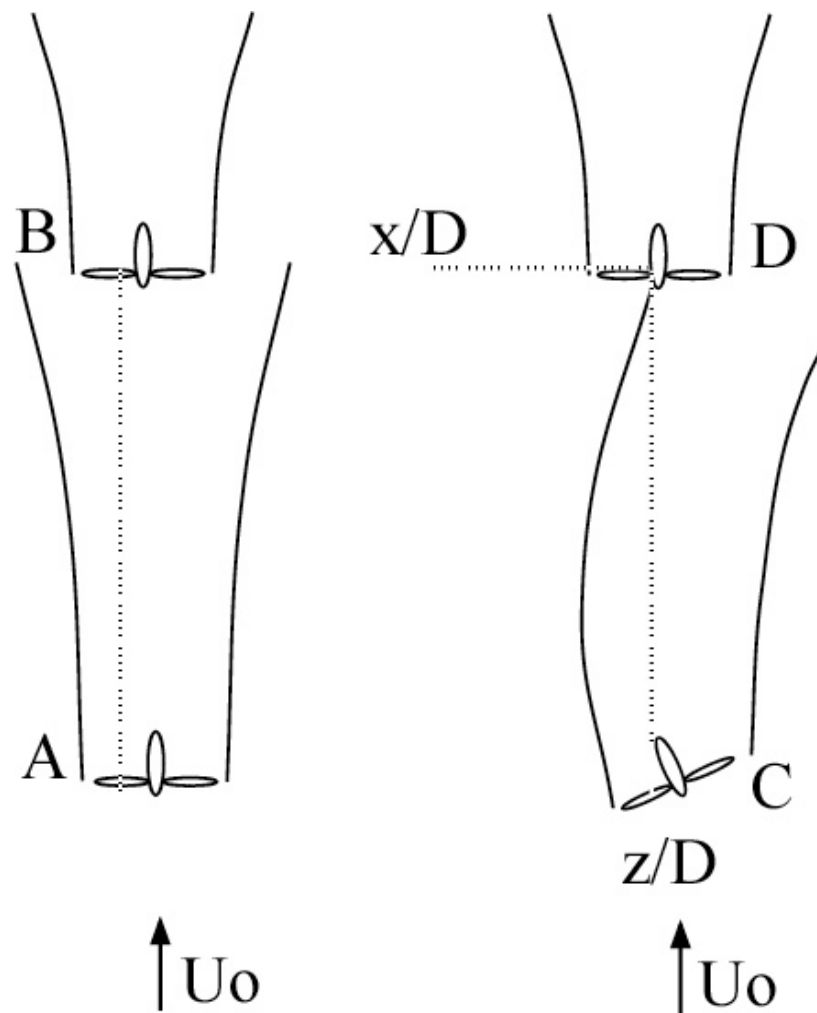
**High costs, high uncertainties**

# Aerodynamics for wind turbines

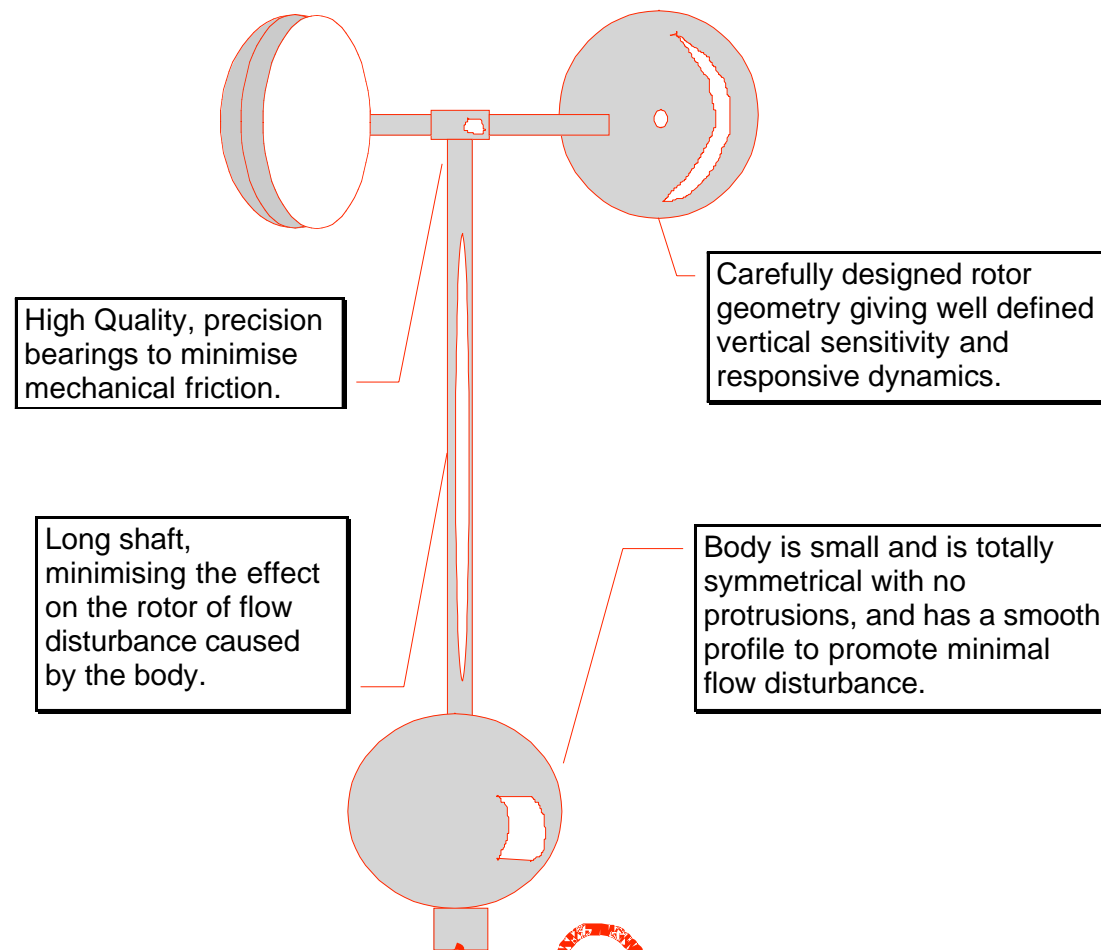
- Aerodynamics for wind turbines is special
- Wind tunnel tests
- Pushing technological frontiers further



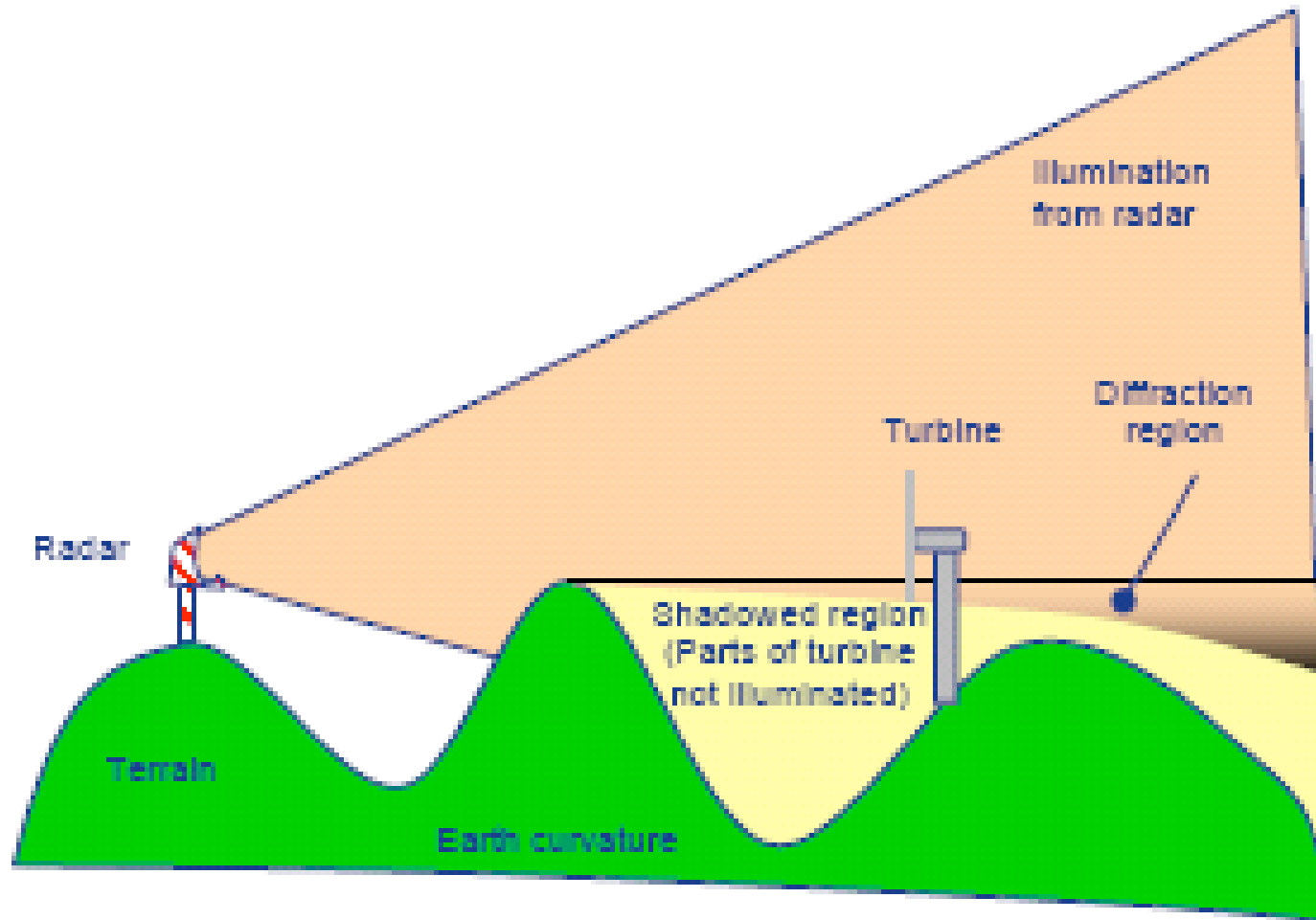
## Wake Deflection



# Schematic of a well designed anemometer



## Radar, Radio, Radio Links and Wind Turbines



## Obstacle marking

1. International Civil Aviation Organization, (ICAO), have issued rules for large buildings.

Can be problematic!!!

Contact your national representative for more information!

2. The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

Usually no problem!



# Catalyse New Tasks

## COST OF WIND ENERGY

- analysis of the cost of energy from wind systems
- methodologies to assess cost
- impact of research programs on these costs



# The proposed Task will focus on issues regarding the cost of wind energy

- **Share research and understanding of the cost of wind energy**  
Quantifying and documenting O&M costs etc
- **Develop an internationally accepted method for calculating cost of wind energy**  
Can be used by IEA, internally and externally, and other organizations
- **Identify the major cost drivers and performance opportunities for wind energy**  
Identify research topics to address these issues
- **Describe methods for evaluating the cost benefits of RD&D activities**  
Allow assessment of technology improvements and the cost benefits thereof



# More information

- IEA RD&D Wind - Home page  
<http://www.ieawind.org/>
- IEA R&D Wind – Task 11  
[http://www.ieawind.org/summary\\_page\\_xi.html](http://www.ieawind.org/summary_page_xi.html)



# Operating Agent - Contact Information

Vattenfall, Windenergy

Sven-Erik Thor

162 87 Stockholm

Sweden

[Sven-erik.thor@vattenfall.com](mailto:Sven-erik.thor@vattenfall.com)



# Thank you!

