IEA participation
MexNext, WakeBench, Forcasting

Associate Professor Stefan Ivanell
Head of Section, Wind Energy UU Campus Gotland
and
Director STandUP for Wind
Research focus; from fundamental understanding to applied methods.

- Wake vortices interact and roll up during breakdown process
- Break down to large-scale turbulence and mixing
- Interaction in large wind farms
- Farm-farm interaction
- Resource mapping
- Basic research - Meteorology

[Montgomerie & Dahlberg 2003]
Research focus; from fundamental understanding to applied methods, from mm to 10’s km’s.

NexNext  WakeBench  (Forecasting)
WAKEBENCH Benchmarking of Wind Farm Flow Models

Participants for 14 IEA Countries

- Canada, China, Denmark, Germany, Greece, Italy, Japan, Netherlands (to sign), Norway, Spain, Sweden, Switzerland, U.K., U.S.

Task Organization

- 2 Operating Agents: CENER (2/3) and NREL (1/3)
- 10 Working Groups
- Advisory and Scientific Committees
- 80+ organizations have expressed interest
- 200+ people in the mail list
Phase II:
Emphasis on setting a framework for quantification of uncertainties
Participants

Academic and industrial partners from:
Description of tasks, WakeBench

- Wake benchmarks

- **Horns Rev (4)**
  - Offshore, 7D, stability

- **Lillgrund (3)**
  - Offshore, 3.3D, gap

- **Sexbierum (2)**
  - Single/Double wake

- **UMN/EPFL (TBD)**
  - Wind tunnel arrays

- **Infinite Wind Farm (1)**
  - Asymptotic wake

- **RisoWakeLidar (1)**
  - Single wake, stability

- **Norrkaer Enge (3)**
  - Wake data analysis

- **San Gregorio (2)**
  - Steep terrain + wakes

- **Axisymmetric Wake (1)**
  - 1D neutral ABL

Legend:
- **Theory / Idealized**
- **Wind Tunnel**
- **Field**
Timeline, MexNext

- Phase I: June 08 – June 11
- Phase II: Jan 12 – Jan 15
- Phase III: Jan 15 – Jan 18
Participants, MexNext

Academic and industrial partners from:

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Description of tasks, MexNext

Task leaders assigned for every task

- Comparison between calculations and measurements for axial inflow and yawed inflow
- Standstill
- Influence of rotational speed and Reynolds number
- Angle of attack
- Near wake aerodynamics
- Flow non uniformities in the rotor plane
- 3D rotational effects
- Yawed conditions and instationary airfoil aerodynamics
- Dynamic inflow
- Boundary layer transition
Thank you for your attention!

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