



IEA Wind Task 50

Hybrid Wind Power Plants

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WP4: Electrical Design, Control, and Market/Grid Services

- **Goal:** determine capabilities of hybrid power plants to provide grid services both traditional and futuristic
- **Activities:**
 - Review and identify different market opportunities
 - Grid services and flexibility
 - Grid codes, tests, and standardization
- **Milestone:** Workshop on design specifications of dynamic modeling, control, and grid services
 - Open-source model of control architecture
 - Two papers on recommendations on 1) grid services and 2) grid codes, test, and standardization

Task4.1: Review

- Grid/Market participation for different ancillary services
 - Traditional services like frequency, voltage, ramping
 - Forthcoming services like blackstart, capacity firming
- Different connection concepts
 - Grid connection
 - Balance of plants
- Control architecture and philosophies
- Deliverable: Open-source model of control architecture of Hybrid Power Plants

Task4.2: Grid services and flexibility

- Modelling and control for different services
- Coordination of different assets and auxiliary devices
- Stacking of different services at different control layers
- Deliverable: Recommendation on grid service provision capability and flexibility from Hybrid Power Plants

Task4.3: Grid Codes, Tests and standardization

- Needs for update of grid code requirements
- Test and validation methods
- Needs for standardization
- Deliverable: Paper on recommendation on grid codes, tests and standardization requirements to facilitate larger and faster integration of hybrid power plants

WP5: Outreach and Collaboration with TCPs, Tasks, and R&D

IEA Wind TCP

- Task 25 – Grid Integration
- Task 37 – System Engineering
- Task 41 – Distributed Wind
- Task 43 - Digitalization
- Task 44 – Farm flow control
- Task 48 – Airborne wind
- Task 51 – Forecasting
- Task 53 – Wind Energy Economics

Other IEA TCPs

- IEA TCP ECES
- IEA TCP Hydro
- IEA TCP Hydrogen
- IEA TCP PVPS

Other organisations/projects

- Wind Europe
- ENTSO-E and other grid operators
- Multiple research projects around the world

Format

- Joint meetings together with task/WP meetings
- Invitation to present in task meetings
- Joint workshops in conferences/events
- Joint publications

WP5: Outreach and Collaboration with TCPs, Tasks, and R&D

- This is a unique task and will *require close collaboration* with other TCPs and IEA wind tasks
- **Tasks include:**
 - Task 25: grid integration
 - Task 37: Systems engineering
 - Task 36: Forecasting
 - Task 41: Distributed wind
 - Task 43: Digitalization
 - Task 44: Farm Flow Control
- **TCPs:** Solar TCP and Hydrogen TCP
- Some of these connections have already been established.