



IEA Wind Task 19

Guarantee guidelines for wind turbines in icing conditions

WinterWind conference

6-7th February 2018, Åre – Sweden

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IEA WIND TASK 19

WIND ENERGY IN COLD CLIMATES

- TASK 19 – WIND ENERGY IN COLD CLIMATES – EXPERT GROUP
- MISSION: *ENABLE LARGE SCALE DEPLOYMENT OF COLD CLIMATE WIND POWER IN A SAFE AND ECONOMICALLY FEASIBLE MANNER*
- WORKING GROUP FOR
 - INTERNATIONAL RESEARCH COLLABORATION
 - ACQUARING INFORMATION ON THE COLD CLIMATE WIND ENERGY TOPIC
 - WRITING RECOMMENDATIONS
 - DISSEMINATING INFORMATION
- TASK WORKED SINCE 2002
- CURRENT TERM 2016-2018





IEA WIND TASK 19 TOPICS FOR 2016-2018

Topic	Content	2016	2017	2018
Deployment	Market study update for 2015-2020	Done!		
Standardization	International standard IEC 61400-15 “Site energy yield assessment” CC aspects			Ongoing
	T19IceLossMethod valid. & development			Ongoing
	Laboratory and <u>full scale testing</u>			Ongoing
	<u>Guarantee guidelines for wind turbines in icing conditions</u>			Q1
Ice meas. & mapping	Ice mapping		Done!	
	Ice sensor classification			Ongoing
Safety	International ice throw guidelines			Q3

NEW WEBSITE!



iea wind

IEA Wind Home **Task 19** Work Plan Participants Publications T19IceLossMethod Ice Throw



Task 19

Wind Energy in Cold Climates

About Task 19

The international expert group IEA Wind TCP Task 19 Wind Energy in Cold Climates gathers and provides information about wind energy in cold climates. Cold Climate areas are regions where icing events or periods with temperatures below the operational limits of standard wind turbines occur, which may impact project implementation, economics and safety. The group studies a variety of topics, including: project development; operation and maintenance (O&M); health, safety and environment (HSE); operational experiences; and recent research.



The current Task 19 working period runs between 2016-2018 and covers the following themes:

Task 19 Publications

-  IEA Wind TCP Task 19 Work Plan 2016-2018
Posted in: [Task19](#)
-  IEA Wind TCP Task 19 Work Plan 2013-2015
Posted in: [Task19](#)
-  IEA Wind TCP Task 19 Recommended Practice 13 Ed 2: ...
Posted in: [Task19](#)

[HTTPS://COMMUNITY.IEAWIND.ORG/TASK19/HOME](https://community.ieawind.org/task19/home)

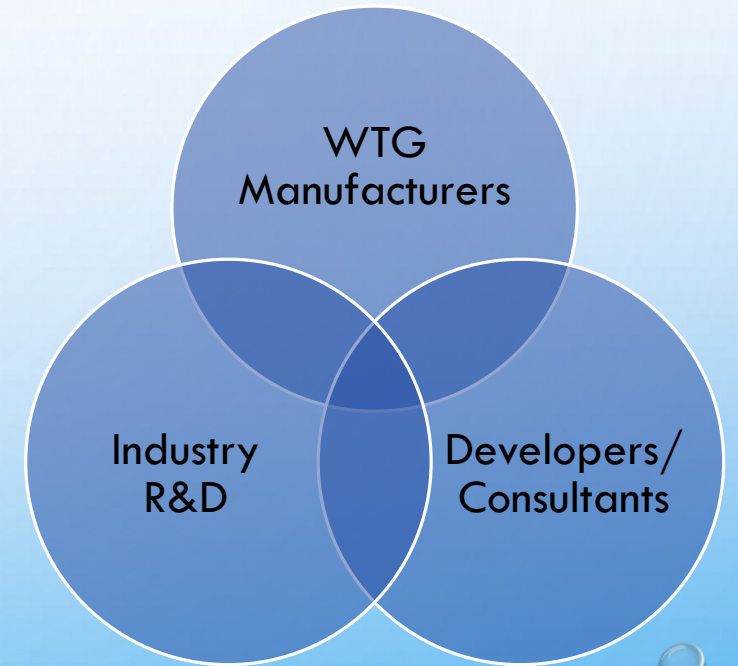
Guarantee Guidelines for Wind Turbines in Icing Conditions

- WHY GUARANTEES?
- STRATEGIES AND TECHNOLOGIES
- TYPES OF WARRANTIES AVAILABLE
- TEST METHODOLOGIES
- RISK SHARING
- FUTURE



Why Warranties?

- LOWER UNCERTAINTIES
 - INCREASE KNOWLEDGE ABOUT FUNCTION
 - INCREASE KNOWLEDGE ABOUT LIMITATIONS
 - UNDERSTAND SYSTEM EFFICIENCY
 - (- INCREASE KNOWLEDGE ABOUT SITE CONDITIONS)
- INCREASE INCENTIVE TO "OPTIMISE" SYSTEM OPERATIONS
- OVERALL CC INDUSTRY BENEFITS



Operational strategies & IPS technology

Hybrid

De-icing

- Heating mats
- Hot air
- Combination

Anti-icing

- Heating mats
- Hot air
- Combination

Basic Performance Warranty

- CLEAR REQUIREMENTS/CRITERIA
- TEST METHOD FOR FOLLOWING UP IF THE REQUIREMENTS/CRITERIA ARE MET
- CONSEQUENCES BASED ON THE RESULTS OF THE TESTS

IPS Warranty

➤ IPS PERFORMANCE WARRANTY

- IPS TURBINE PERFORMANCE
 - PPT COLD CLIMATE
 - WTG TO WTG COMPARISON
 - WTG SELF COMPARISON
- IPS SYSTEM PERFORMANCE
 - TIME TO DEICE

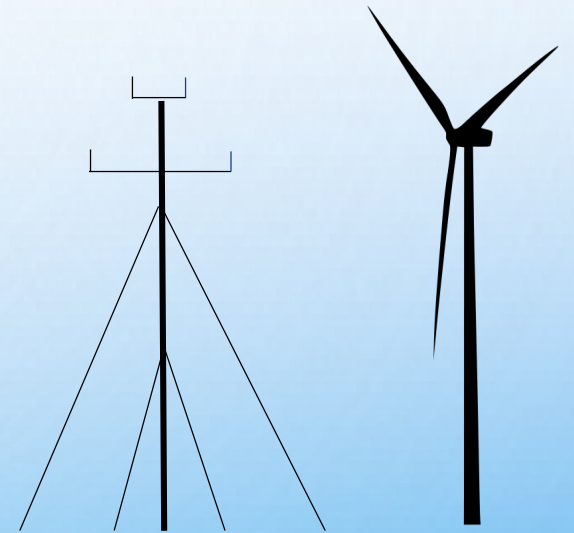
➤ IPS PRODUCT WARRANTY

➤ AVAILABILITY WARRANTY

IPS Turbine Performance, PPT

POWER PERFORMANCE TEST, PPT

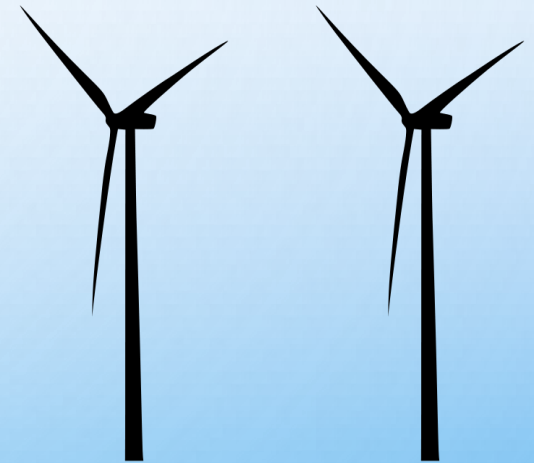
- USE OF POWER PERFORMANCE MAST AND TEST TURBINE TO IDENTIFY LOSS OF PRODUCTION DUE TO ICE.
- PROS: IEC STANDARDS BASE. REMOTE SENSING COULD BE USED?
- CONS: HIGH COST FOR MASTS. ANEMOMETERS ARE NOT 100% FUNCTIONING AND ICE FREE



IPS Turbine Performance, WTG to WTG Comp

TURBINE TO TURBINE COMPARISON

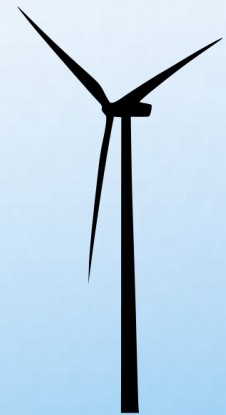
- COMPARISON OF TWO TURBINES STANDING SIDE BY SIDE, ONE WITH ACTIVE IPS AND ONE WITHOUT.
- PROS: DIRECT MEASURE OF EFFECTIVENESS
- CONS: COMPARABLE AND REPRESENTATIVE LOCATION, COST FOR LOST PRODUCTION



IPS Turbine Performance WTG Self Comparison

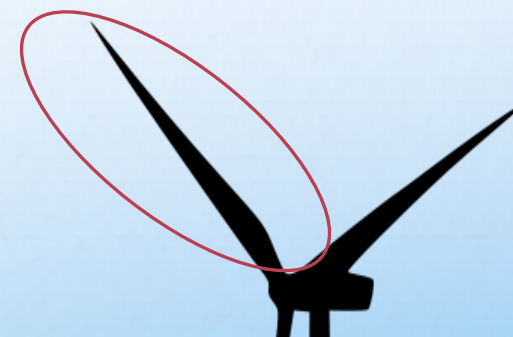
TURBINE SELF COMPARISON

- COMPARISON OF WTG SUMMER VS WINTER PC
- PROS: SIMPLE SETUP
- CONS: SEASONAL VARIATIONS MAY AFFECT RESULTS



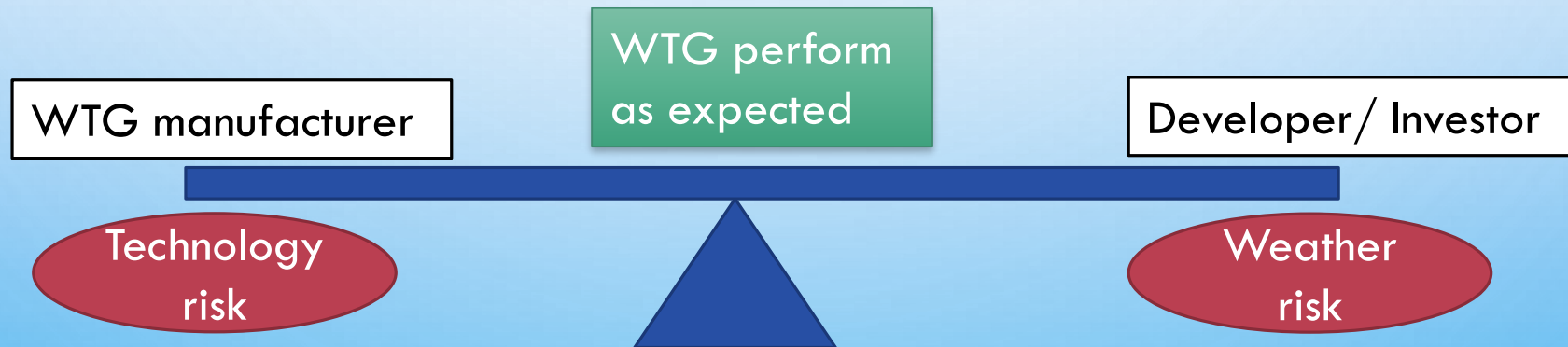
IPS System Performance, "TIME TO DE-ICE"

- REQUIREMENTS/CRITERIA & METHOD OF EVALUATION RELATED TO THE EFFICIENCY OF THE IPS SYSTEM ONLY.
- "TIME TO DE-ICE"
- PROS: SIMPLE-ISH.
- CONS: ONLY CONSIDERS IPS PERFORMANCE, MEASUREMENTS MAY BE CHALLENGING, DE-ICING..



Expertise sharing

- MANUFACTURERS HAVE MORE KNOWLEDGE OF THEIR SYSTEMS
- DEVELOPERS/CONSULTANTS HAVE MORE KNOWLEDGE OF THE SITE
- OPTIMUM IS TO WORK TOGETHER TO MINIMISE RISK AND MAXIMISE PRODUCTION



Summary...

- Need for warranties in icing conditions
- Guidelines to provide support in developing warranties
- Toolbox document, different options available

Future...

...experience from actual measurement test data...

...develop the guidelines further..

...include more details and more knowhow into guidelines v2.0

Finally..

Thanks to everyone that has provided
input to this document!