

**13:00**
**OPENING SESSION (1)**
**Moderators: Jeanette Lindeblad & Stefan Gsänger**
**13:05** Wind Power Around the World, Stefan Gsänger, World Wind Energy Association WWEA (45)

**13:15** Record 2020 masks mounting onshore wind challenges, **Isabelle Edwards**, Bloomberg, GB (12)

**13:35** Climate resilience vs. low cost renewables, **Rosemary Barnes**, Pardalote, AU (43)

**13:55** Announcements

**14:00**
**Exhibition break**
**14:30**
**IMPROVEMENTS (2)**
**Chairs: Tove Hamberg & Stefan Bill**
**14:35** Wear resistane multi-composite coating for wind power blades, JUN CHEN, Lulea University of Technology, SE (34)

**14:50** Yaw optimisation, Thomas van Delft, DNV, UK (17)

**15:05** Q&A

**14:15 - 15:30**
**STANDARDS & WARRANTIES (3)**
**Chairs: Jenny Longworth & Anders Björck**

- IEA Wind Task 19: Standardization of pre-construction icing loss assessment in upcoming IEC 61400-15 standard, Ville Lehtomäki, Kjeller Vindteknikk, FI (23)

- Performance warranty guidelines for wind turbines in icing climates, Helena Wickman, Vattenfall, SE (29)

**5 minute break**
**Panel discussion - Standards & warranties**
**Panel Moderator: Jenny Longworth, KVT AB**
*Panelists:*

 Ville Lehtomäki (KVT Oy), Helena Wickman (Vattenfall)  
 Anders Björck (OX2), Stefan Söderberg (DNV GL)

**Conclusions**
**15:15**
**Exhibition break**
**15:45**
**MODELLING ICE (4)**
**Chairs: Luca Durstewitz & Enrico Sindici**
**15:50** On-site estimation of effective liquid water content, Patrice Roberge, Université Laval, CA (35)

**16:05** Operational icing forecast with a probabilistic approach, Jesper Thiesen, ConWx, DK (20)

**16:20** Q&A

**ICE PROTECTION SYSTEMS (5)**
**Chairs: Johanna Bohn & Bastian Ritter**
**15:50** The evaluation of state-of-the-art anti-icing surface solutions using a large scale icing test set-up, Joey Bosmans, Sarris, BE (24)

**16:05** Assessment of ENERCON blade heating performance in various conditions, Gilles Boesch, ENERCON Canada, CA (27)

**16:20** Q&A

**16:30**
**Exhibition break**
**17:00**
**MODELLING ICE ON WT (6)**
**Chairs: Jennie Molinder & Alexander Stoekl**
**17:05** Icing impact on trailing edge noise in wind turbines, **Timo Karlsson**, VTT Technical Research Centre of Finland, FI (28)

**17:20** A complete model chain for icing of wind turbines, Johan Revstedt, Lunds Universitet, SE (8)

**17:35** Q&A

**ICING AND ITS CONSEQUENCES (7)**
**Chairs: Carla Ribeiro & Paul Froidevaux**
**17:05** Development and calibration of state-of-the-art icing loss estimates using a new meteorological dataset, Øyvind Byrkjedal, Kjeller Vindteknikk, Norconsult, NO (33)

**17:20** Towards improving wind energy in cold climate: how to quantify the use of alternative operational strategies, André Bégin-Drolet, Université Laval, CA (32)

**17:35** Q&A

**17:45**
**Exhibition break/Mingle 45 min**
**18:30**
**End of day**

## TUESDAY APRIL 20

13:00

### SESSION (8) - LOAD CONTROL

**Chairs:** Rosemary Barnes & Richard Sahlberg

**13:05** 6D inertial sensing on the blade surface - know the moves of your blade's surface, Michael Moser, eologix sensor technology, AT (10)

**13:15** Improving turbine annual energy production (AEP) and reducing O&M costs with real-time blade airflow quality monitoring and quantification under all environmental conditions and levels of blade contamination, John Maris, Marinvent, CA (13)

**13:35** Blade intelligence - Combined ice measurement and load monitoring, Nils Lesmann, Pheonix Contact, DE (2)

**13:55** Q&A

12:15 - 14:15

### WORKSHOP: RISK OF ICE FALL (9)

**Chairs:** Åsa Elmqvist & Michael Durstewitz

- TRiceR, a cloud-based web application for supporting risk-based decisions associated with ice falling from windturbine blades, Xavier Vanwijck/Bossuyt Ottelien, Tractebel, BE (3)

- Timeseries-based approach for volume risk assessment, Enrico Sindici, Natural Power, GB (4)

- Challenges and opportunities in the communication of risk from Ice Throw, Karl Ove Ingebrigtsen, Norconsult, NO (15)

**Break, 10 minutes**

**Workshop**

**Conclusions**

14:00

**Exhibition break**

14:30

### DETECTING ICE - SENSORS (10)

**Chairs:** Marianne Rodgers & André Bégin-Drolet

**14:35** From turbines to farms: Using distributed ice detection to increase safety and accessibility, Theresa Loss, eologix sensor technology, AT (9)

**14:50** Tackling ice throw risks by using sophisticated algorithms of bladebased ice detection, Bastian Ritter, Wölfel Wind Systems, DE (16)

**15:05** Q&A

### REPAIRS (11)

**Chairs:** Anna Lundsgård and Sven-Erik Thor

**14:35** Structural blade repair in arctic climate, Resistive Vacuum Infusion, Greger Nilsson, Blade Solutions, SE (19)

**14:50** Cost effective de-icing blade repairs, Morten Handberg, Wind Power LAB, DK (25)

**15:05** Q&A

15:15

**Exhibition break**

15:45

### MAPPING ICE (12)

**Chairs:** Eva Sjögren & Nils Lesmann

**15:50** Atmospheric icing on offshore wind farms in Northern Europe - a risk map, Carla Ribeiro, Wood Thilsted, UK (1)

**16:05** Validation of a wind turbine icing model for site assessment, Noemi Tölg, Fraunhofer IEE (Research Institute), DE (31)

**16:20** Q&A

### ICE PROTECTION SYSTEMS (13)

**Chairs:** Mélissa Hugeux & Charles Godreau

**15:50** Linnovation concepts for operation and service in cold climates, Sven-Erik Thor, Lindskog Innovation, SE (39)

**16:05** IPS retrofit for complex blades, Daniela Roeper, Borealis Wind, CA (40)

**16:20** Q&A

16:30

**Exhibition break**

17:00

### KEYNOTE SESSION (14)

**Moderators:** Elektra Kleusberg & Stefan Gsänger

**17:05** Comparison of four blade-based ice detection systems installed on the same turbine, Paul Froidevaux, Meteotest, CH (18)

**17:20** IEA Wind Task 19: Cold climate wind market study, Timo Karlsson, VTT Technical Research Centre of Finland, FI (21)

**17:35** Q&A

17:45

**Exhibition break/Mingle 45 min**

18:30

**End of day**

**13:00**

**INTERESTING ODD TOPICS (15)**

**Chairs: Tanja Tränkle & Michael Moser**

**13:05** Protection and lifetime improvement for bearings and gears by using silicon-based additive technology, Stefan Bill, Croda, DE **(38)**

**13:15** Synergies between icing on wind turbines and UAVs, Richard Hann, Norwegian University of Science and Technology (NTNU), NO **(11)**

**13:35** Re-use of wind turbine blade for construction and infrastructure applications, Alann André, RISE Research Institutes of Sweden, SE **(37)**

**13:55** Q&A

**13:15 - 14:15  
THE SOCIAL AND ECOLOGICAL ENVIRONMENT (20)**

**Chairs: Sigrid Carstairs & Sebastian Meyer**

- A road map for the wind energy industry: taking a proactive approach to the biodiversity challenge, Tove Hägglund and Åsa Abel, Ecogain, SE **(41)**
- Digital business and collaboration platform for local anchoring and collaboration, Charlotte Larson and Oskar Ahlman, Vindkraftcentrum and Umeå University, SE **(42)**

**12:15 - 14:15**

**WORKSHOP - HSE (16)**

**Chairs: Maria Röske & Michael Henriksson**

- Safe turbine operation in icy conditions, Eva Sjögren, ENERCON GmbH, SE **(26)**
- Return on experience: Working on a wind farm in icing conditions, Charles Godreau, Nergica, CA **(14)**
- Simple rules-of-thumb for ice fall/throw safety distances, Alexander Stökl, Energiewerkstatt, AT **(5)**

**Break. 10 minutes**

**Workshop**

**Conclusions**

**14:00**

**Exhibition break**

**14:30**

**ICING LOSSES (17)**

**Chairs: Theresa Loss & Øyvind Byrkjedal**

**14:35** Modelled icing losses with WICE: A blind test in France, Stefan Söderberg, DNV, SE **(30)**

**14:50** Uncertainties of modelled production losses due to Icing, Marie Pedersen, EMD International, DK **(6)**

**15:05** Q&A

**EXPERIENCES OF ICING (18)**

**Chairs: Noemi Tölg & Matthew Wadham-Gagnon**

**14:35** Lesson in winterisation from the UK, David Armour, Natural Power, GB **(7)**

**14:50** Skellefteå Kraft:s experiences of operating wind turbines in cold climate and the need of a physical testing, Krister Efverström, Skellefteå Kraft, SE **(36)**

**15:05** Q&A

**15:15**

**Exhibition break**

**15:45**

**FINAL SESSION (19)**

**Moderators: Jeanette Lindeblad & Stefan Gsänger**

**15:50** Combining ensemble icing forecasts with real-time measurements for power line and wind turbine applications, **Bjørn Egil Nygaard**, Kjeller Vindteknikk, part of Norconsult, NO **(22)**

Wind - Breath of life or kiss of death: Analysis of wind energy fatalities, Paul Gipe, Wind-works, US **(44)**

**16:20** Q&A

**16:30**

**Exhibition break**

**17:00**

**End of conference**