![Labkotec INDUTRADE GROUP]

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How to improve area safety at wind farms during icing conditions

Winterwind 2023 International Wind Energy Conference Åre, Sweden

Ice doesn't have any night shifts!

Face the facts!

Scandinavia at ice class 3

Selite

Low_temperature_sites

Low temperature

Value

　　no

　　yes

IEA_ice_class

IEA ice class

Value

　　No data

　　1

　　2

　　≥ 3
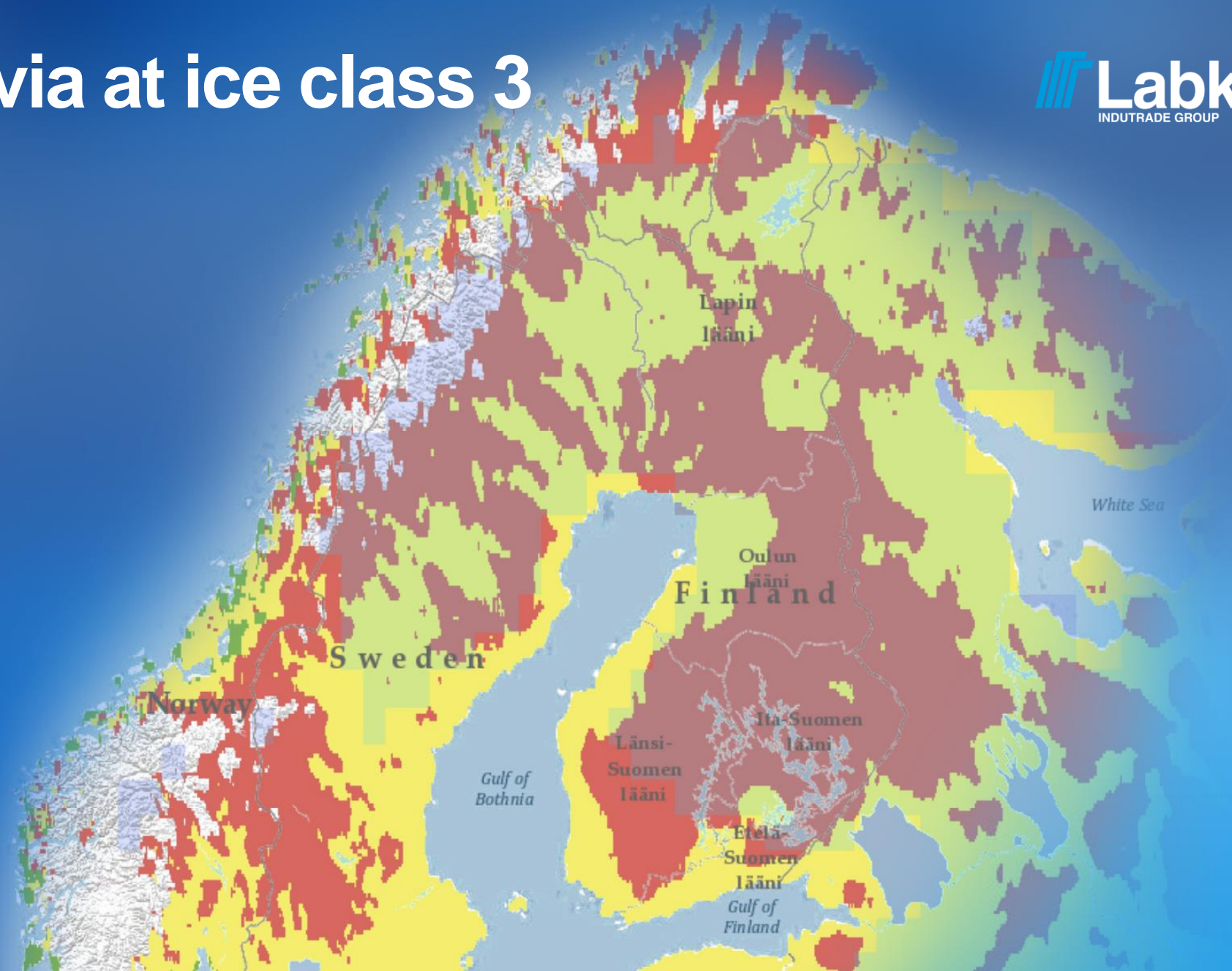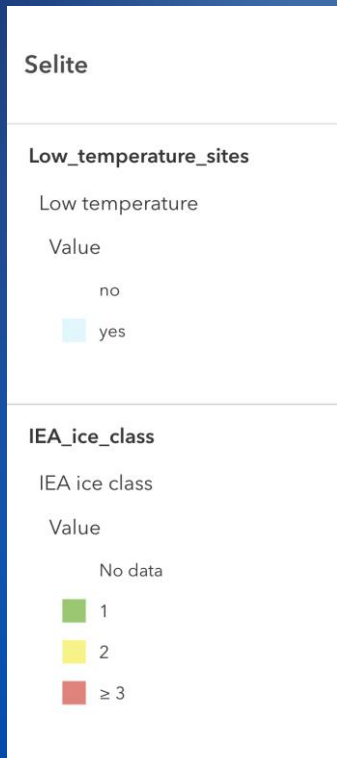
Source: WIce Atlas

Yearly number of ice pieces per wind turbine

IEA Icing Class	Meteorological icing (% of year)	Instrumental icing (% of year)	Production loss (% of year)	Yearly number of ice pieces per wind turbine (ice pieces /year)			
				Idling No active IPS (a)	Idling IPS de-icing (b)	Operational No active IPS (c)	Idling IPS anti-icing (d)
5	> 10	> 20	> 20	> 3200	> 8800	> 9600	> 8200
4	5 – 10	10 – 30	10 – 125	1600	4400	4800	4000
3	**3 – 5**	**6 – 15**	**3 – 12**	**800**	**2200**	**2400**	**2000**
2	0,5 – 3	1 – 9	0,5 – 5	400	1100	1200	1000
1	0 – 0,5	0 – 1,5	0 – 0,5	80	220	240	200

IEA icing class and corresponding yearly number of pieces per wind turbine, based on manual site measurements of ENERCON E-82 turbines (78 m HH) with and without active IPS, respectively in anti- or de-icing operational mode (column (a), (b) and (d)), and an extrapolation from the values of column (a) to the operational state without active IPS (column (c).

Source: IEA Wind TCP Task 19 Technical Report International Recommendations for Ice Fall and Ice Throw Risk Assessments

Situational awareness

- Verify icing by measurement
- Weather conditions vary!

Impact

Improve safety
- Accurate ice detection
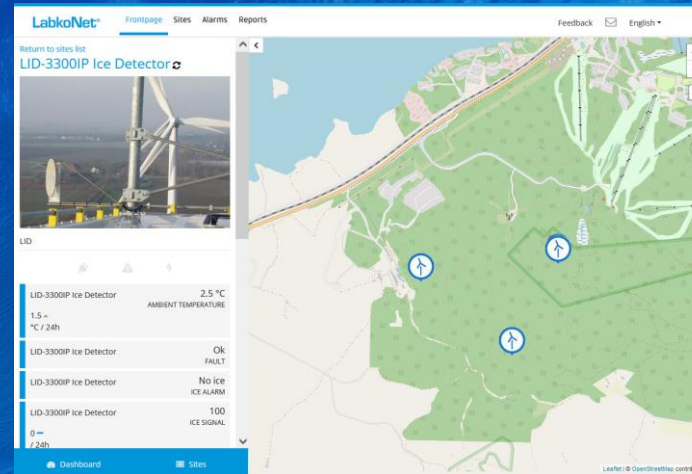- Improve area safety by using ice warning lights

Guarantee production
- Start right-time blade heating
- Enhance productivity

Facilitate decision-making
- Prevent mechanical damage
- Reduce maintenance costs
- Extend the life cycle of wind turbines

Inform

Improve safety with ice warning lights

People working and moving in the area may not be aware of the risk of ice-falling or of the risk of ice-throwing.

Inform and warn when it is needed!

CAUTION!
Falling ice when flashing

Be aware!

Three steps for better area safety

Be aware
of the beginning
of icing

Impact
on immediate
events

Inform
when
needed