



IceLossForecast: What it is, how it works, and what's next

Mona Kurppa

Many wind turbines do not have a blade heating system, which is why the winter surprised electricity production again

Wind power production is at a low level because the weather is not windy. The blades of the turbines are also frozen by the icing problem.



Icing impairs the aerodynamics of the blades and can even bring the turbine to a complete standstill. Illustration. Video: Pasi Takkunen / Yle.

Freezing temperatures are already taking a toll on offshore wind turbines

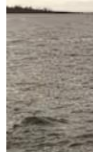
Production has suffered at the Tahkoluoto offshore wind farm in Pori.



Electricity is now very expensive and the culprit is freezing

Electricity | On Sunday evening, the freezing of wind turbine blades ate up more than half of the predicted electricity production. The conditions for freezing have been exceptionally favourable in January.

For subscribers



The warm
Photo: Esa



Freezing the blades of wind turbines was also a problem in 2022, when HS visited Ilmatar's wind

Ice layers are now punishing wind power production – an expert does not remember such a bad situation

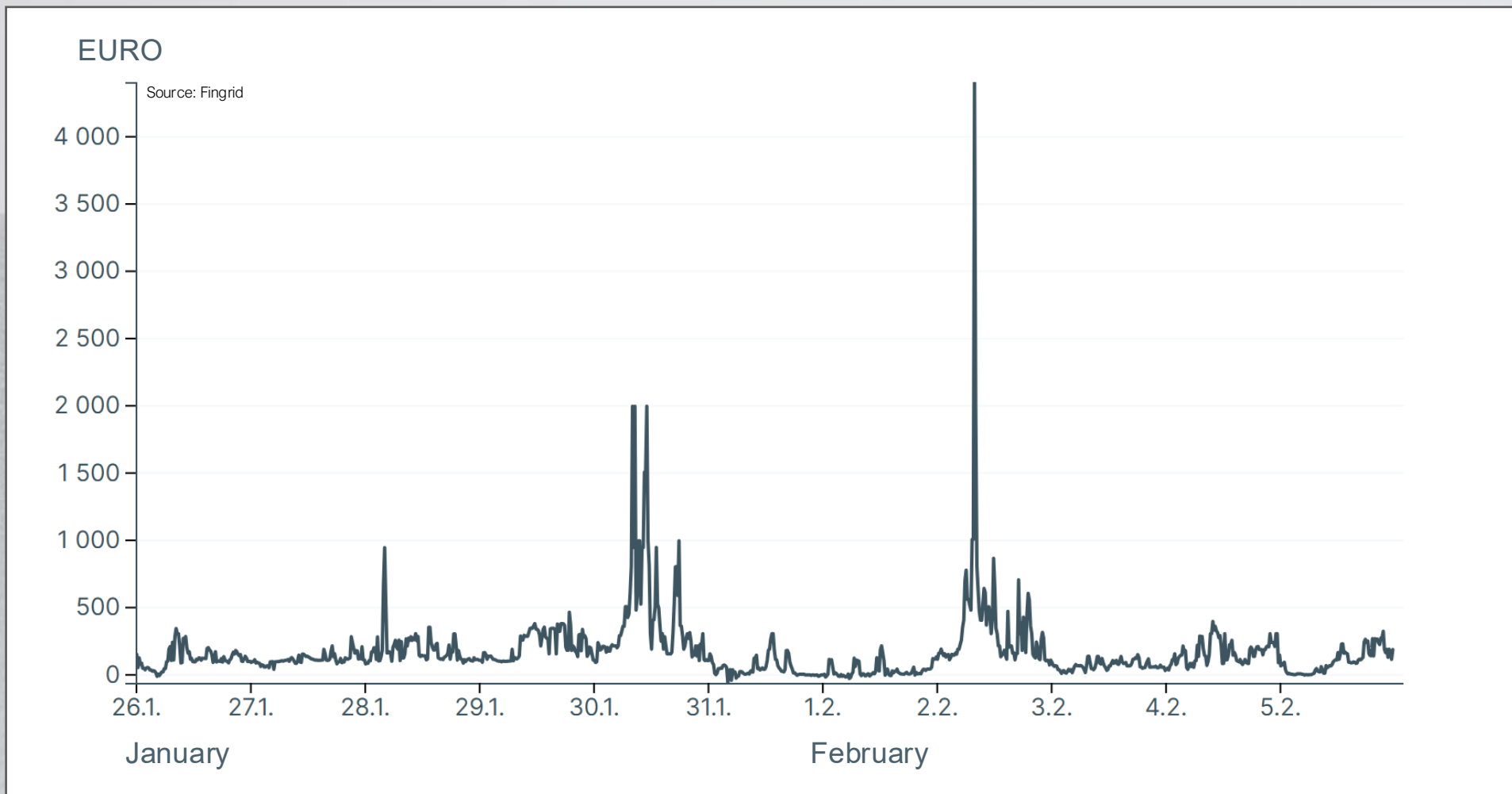
Wind power cannot be produced normally at the moment, because ice has accumulated on the blades of wind turbines in a large area in Finland.



Wind power production will remain at about 0–5 per cent of the total capacity over the next five days, the Finnish Meteorological Institute estimates. Photo: Timo Valtteri Sihvonen / Yle

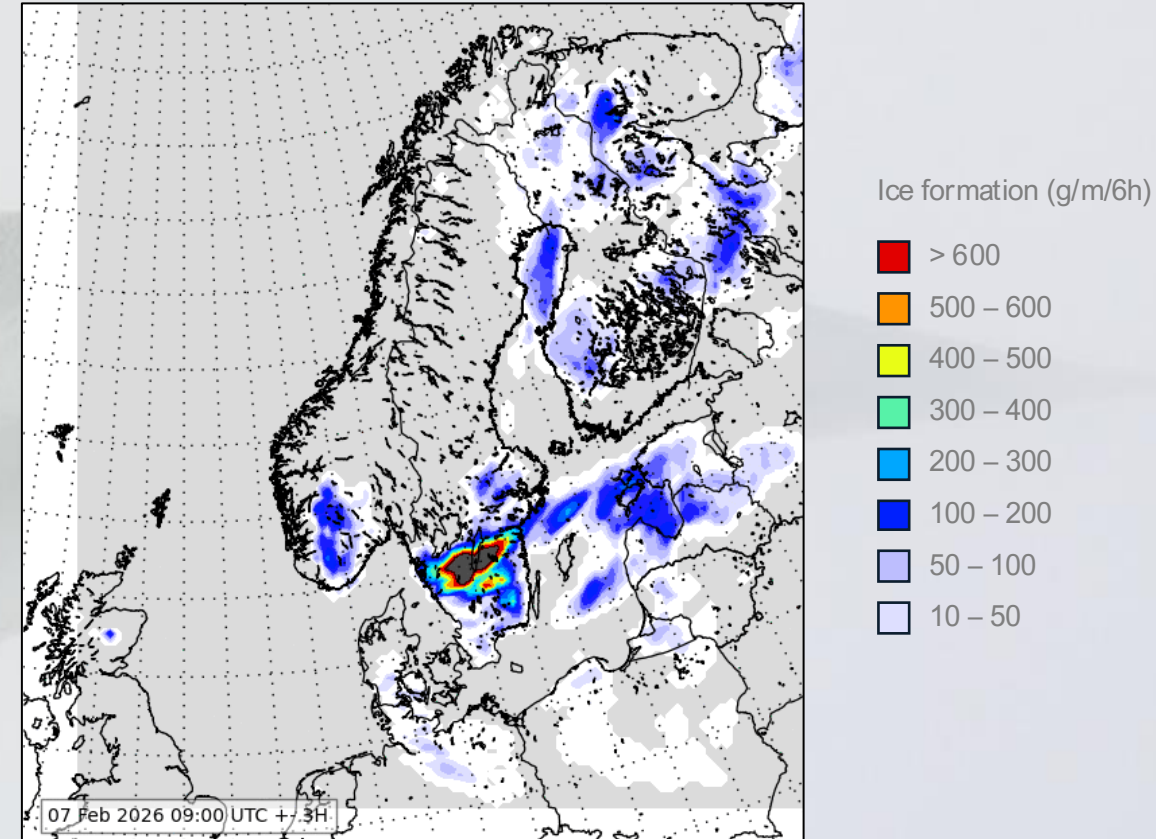
Sources: yle.fi, hs.fi

Imbalance prices in Finland



Turbine icing is important but so challenging to forecast

- ▶ Icing: **Second largest** source of production loss
- ▶ Forecasting
 - ▶ **Where** are the **clouds**?
 - ▶ What do the clouds contain? (**water** as liquid or ice)
 - ▶ What is the **wind speed** at hub height?
 - ▶ How warm are the **blades**?
 - ▶ When will the ice **fall off**?
- ▶ How much does icing reduce **power production**?



Our IceLossForecast

- ▶ Today: operational forecasts for 35% installed capacity in Finland
- ▶ Icing forecasting experience across the Nordics, Baltics, Central Europe & Turkey

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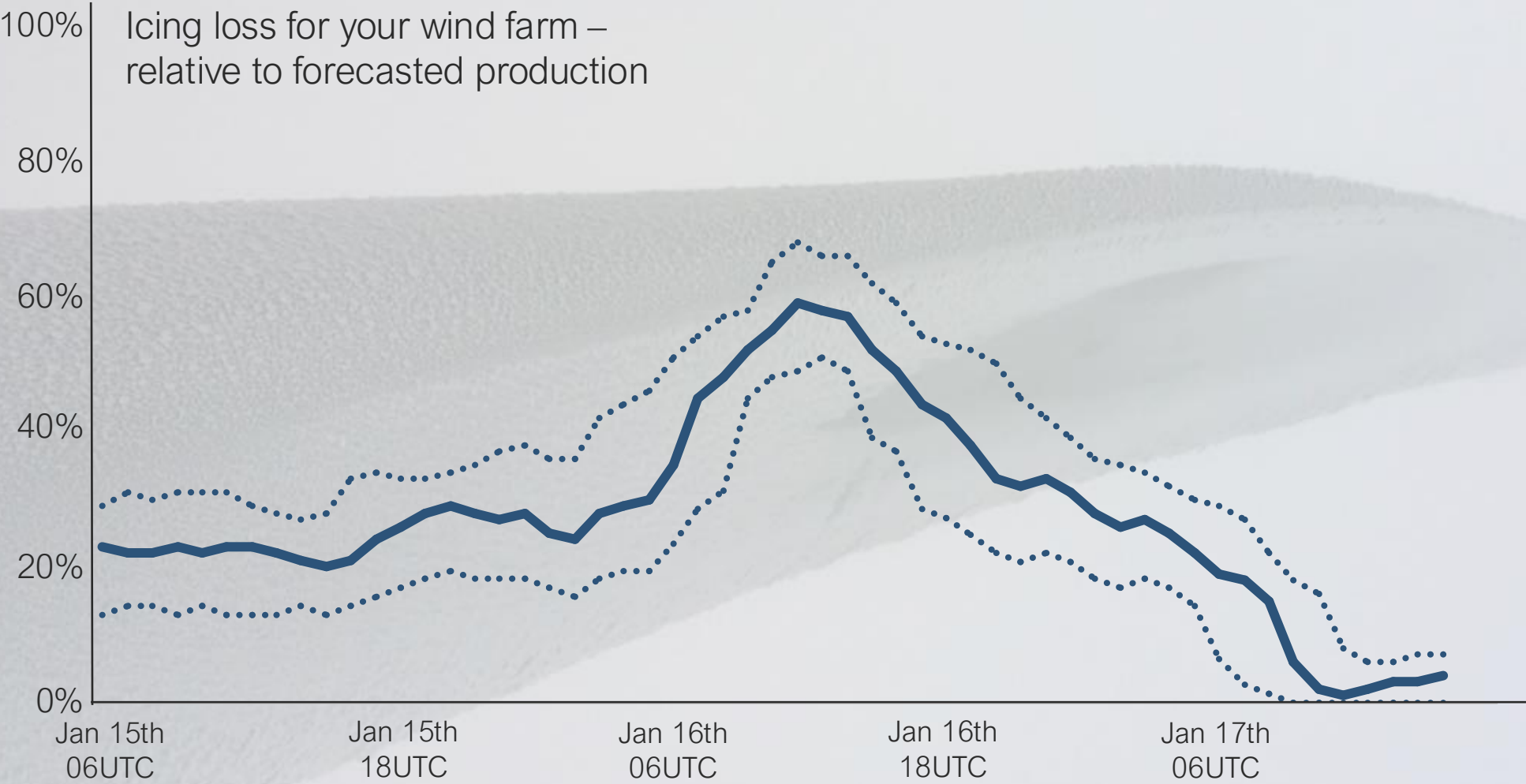
Fred. Olsen Ltd.

OX2

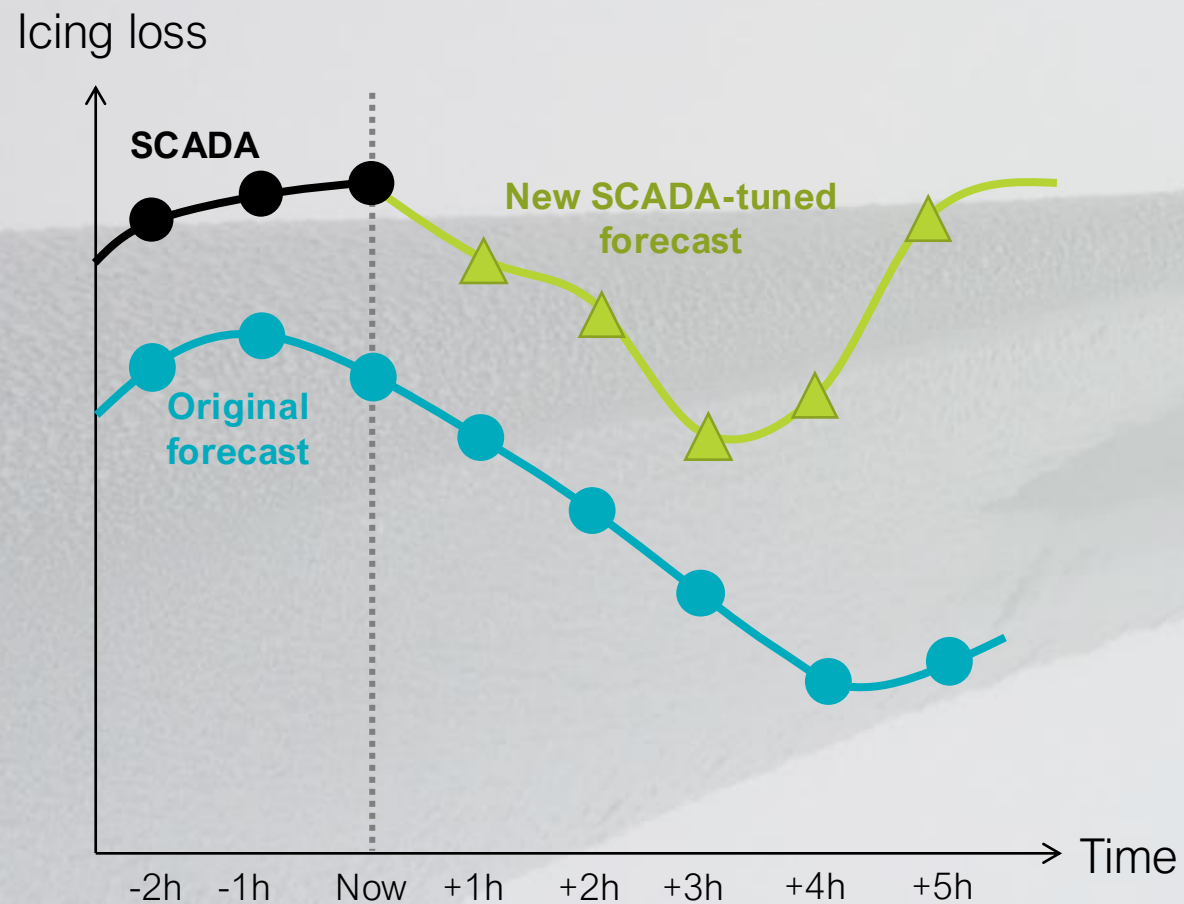
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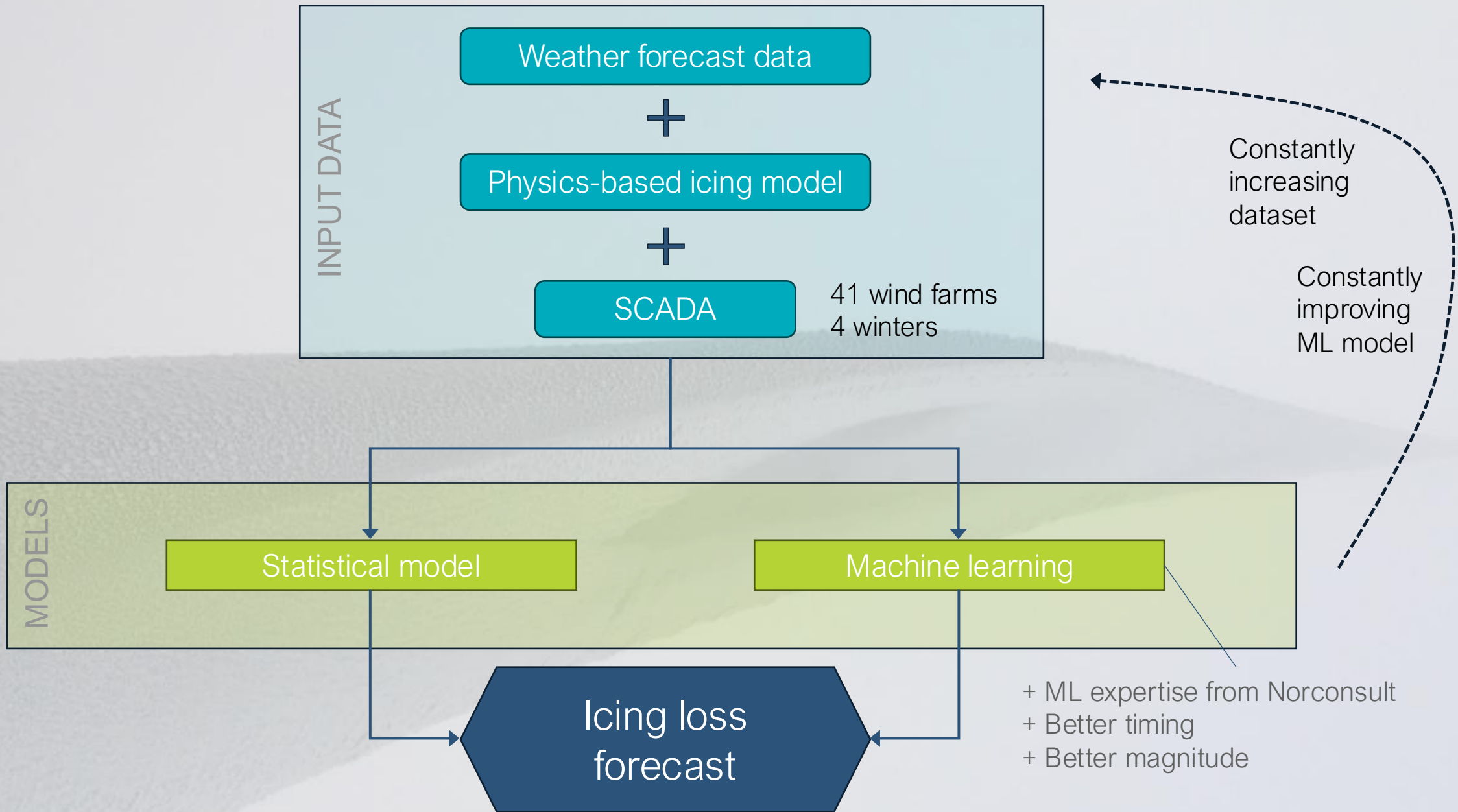
KJELLER
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Our IceLossForecast

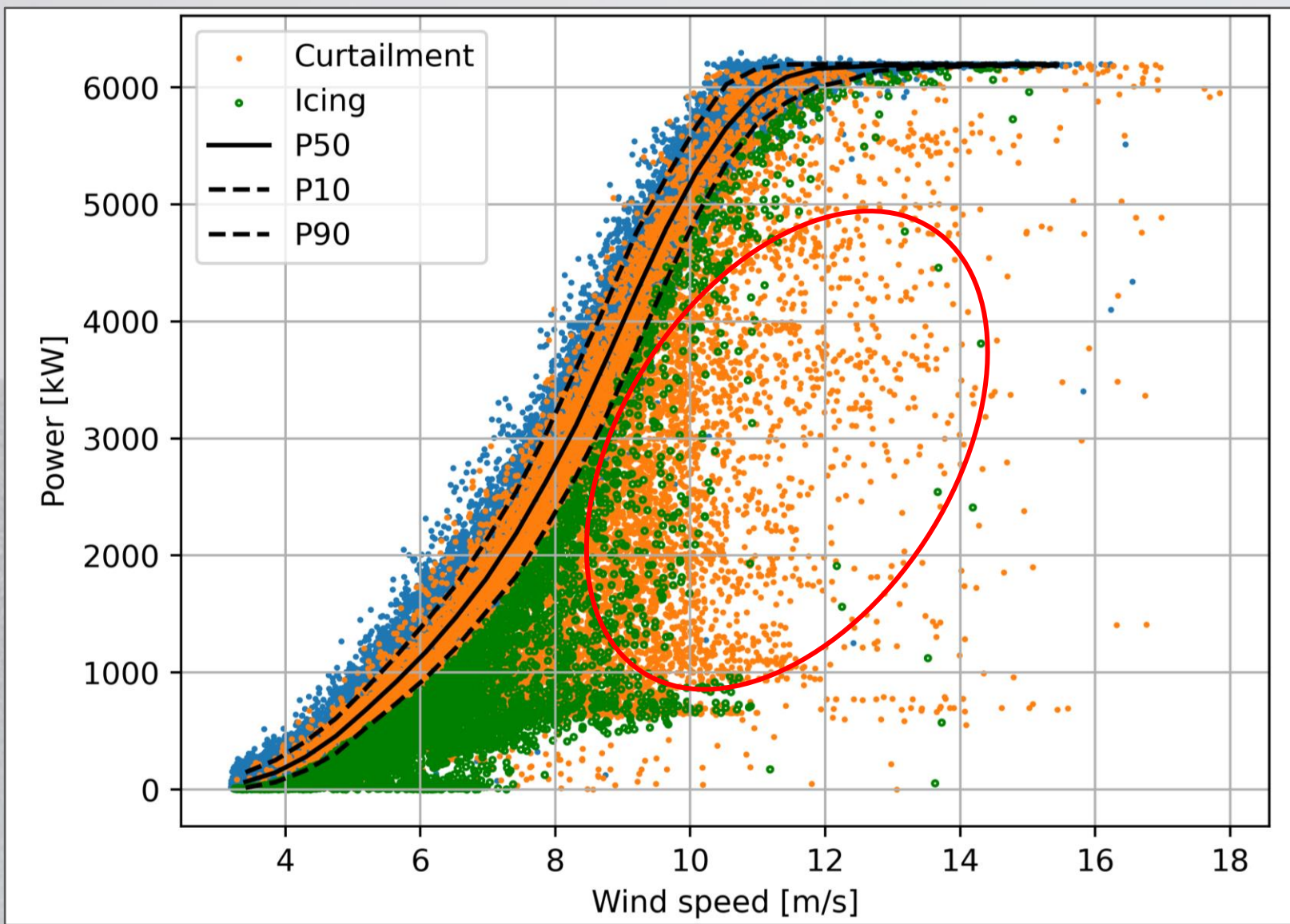


Real-time SCADA-tuned forecasts





Icing or curtailment?



Operational ice filtering using
Task19/Task54 methods(IEA)
<https://iea-wind.org/task54/>

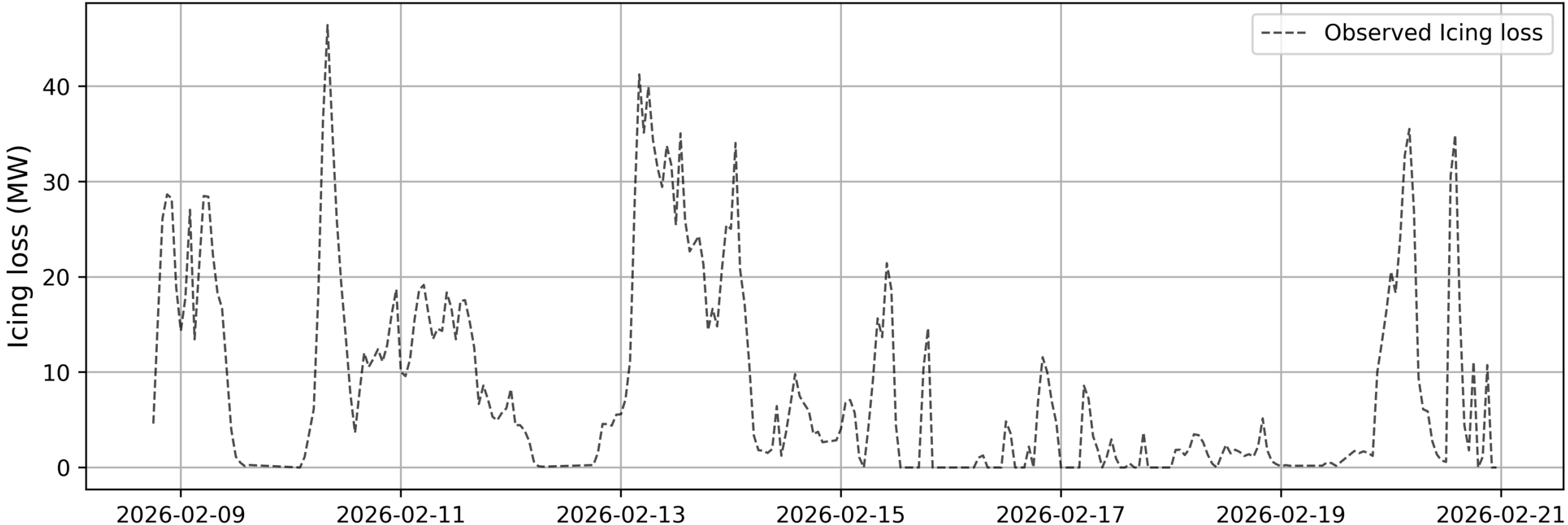
Forecast performance: winter 2025-2026

- ▶ 30 wind farms in Finland and Sweden
- ▶ Threshold: 10% icing loss

	Intraday	Day-ahead		Intraday
	Model based	Model based		Real-time SCADA-tuning
Accuracy	71 %	68 %	➔	79 %
Hit rate	53 %	54 %	➔	73 %
False alarm rate	21 %	25 %	➔	20 %

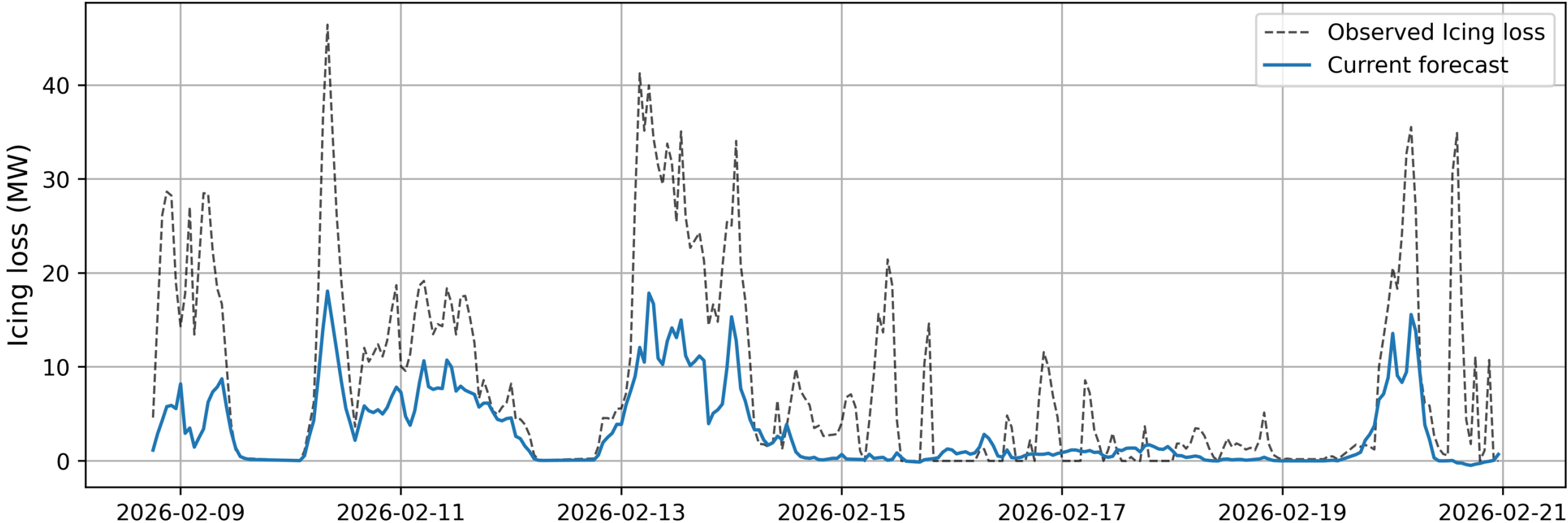
New machine learning model significantly improves performance

Intraday forecast. Updated every 6 hours.



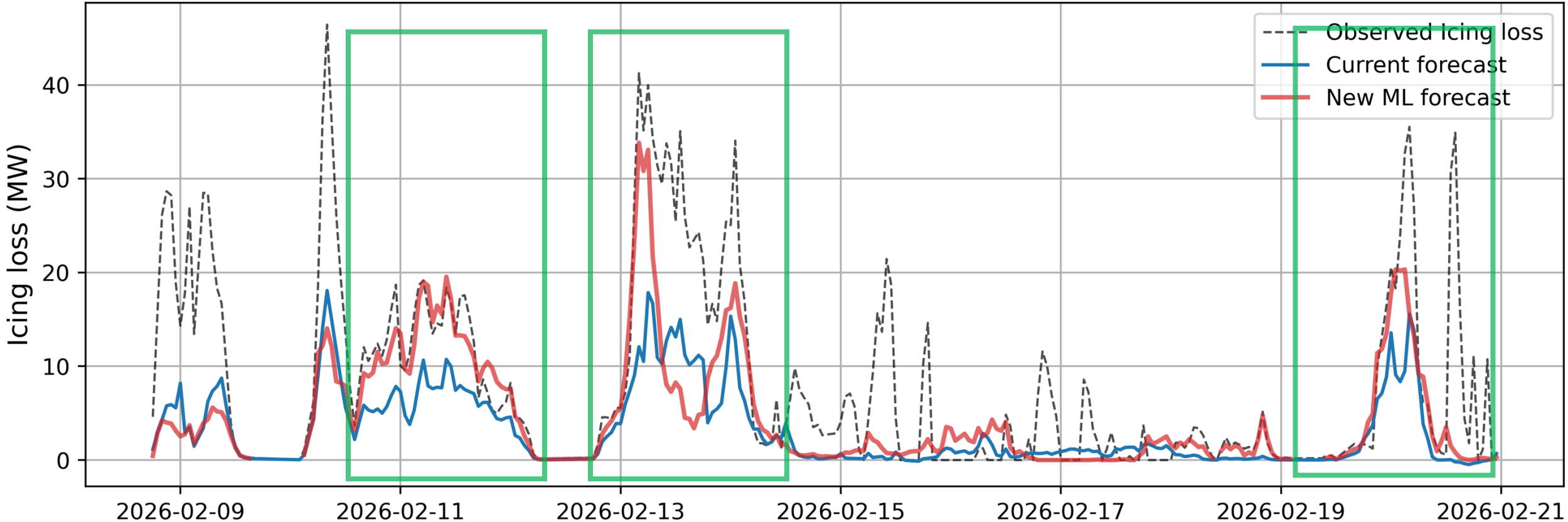
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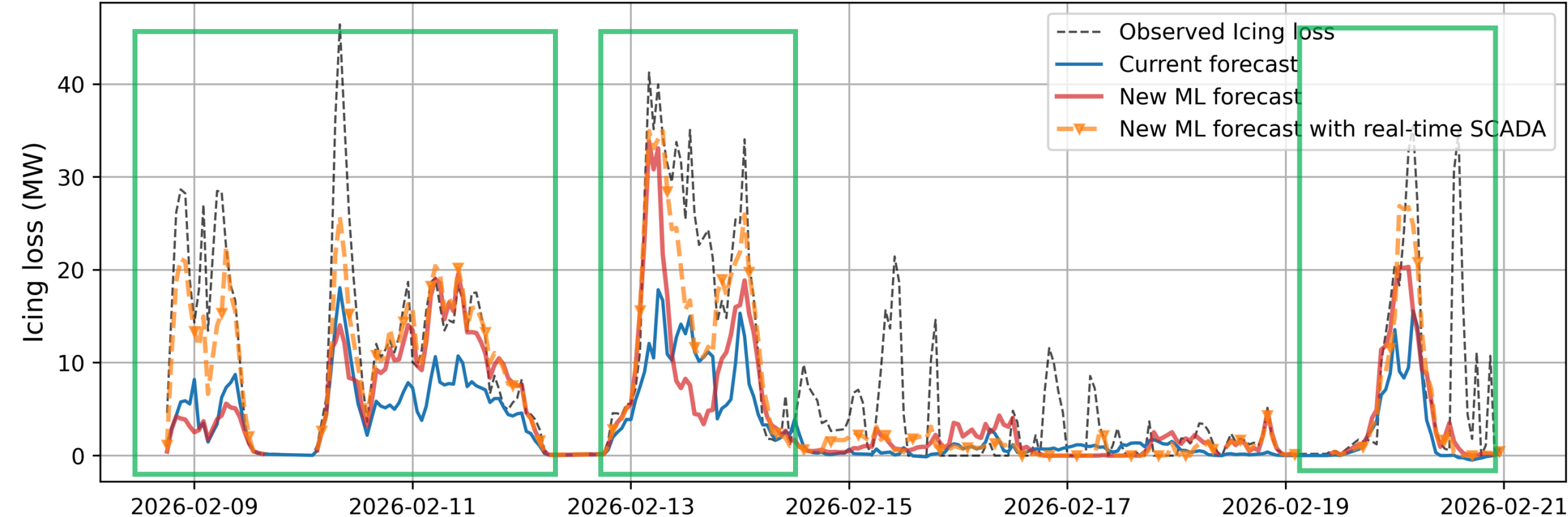
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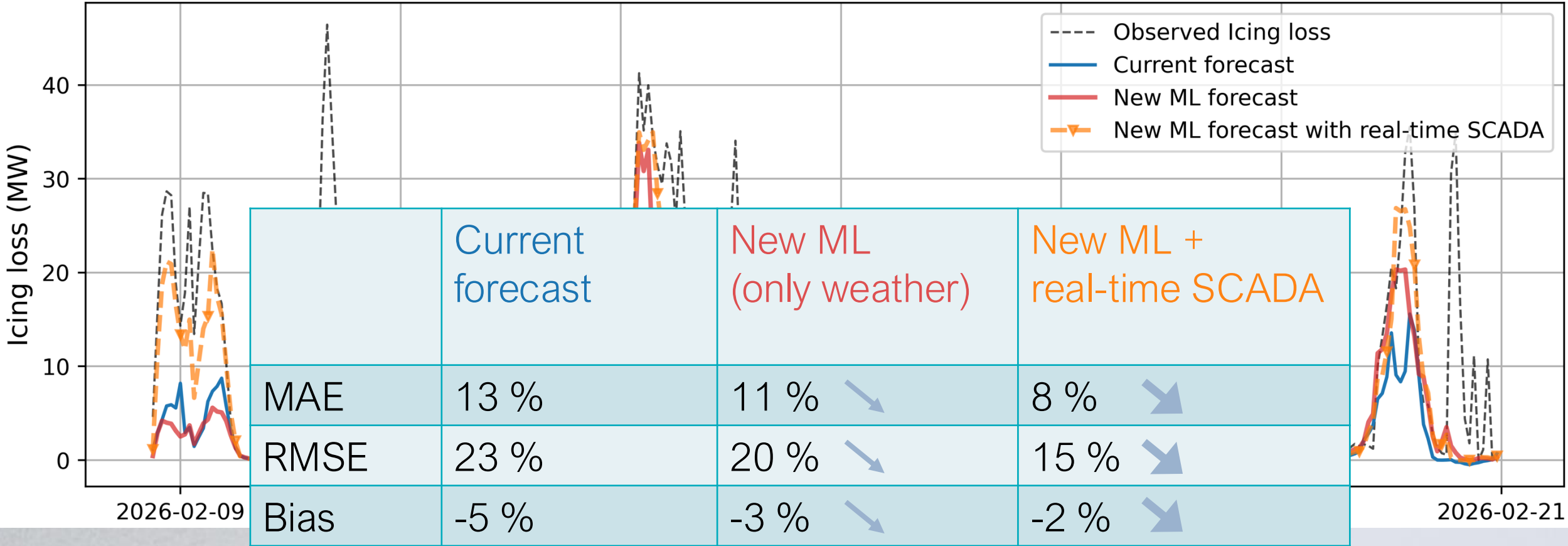
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Validation: 40 wind farms, October 2025 - April 2026.

Why IceLossForecast?



Widely used operational icing forecasting solution



Built by atmospheric scientists with extensive weather modelling experience



Enhanced by machine learning, an expanding SCADA dataset, and KVT's extensive expertise in SCADA filtering and analytics

Thank you for listening

Feel free to contact: mona.kurppa@vindteknikk.com

Read more: <https://www.vindteknikk.com/services/online-services/icelossforecast/>



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