NORTHERN CORRIDORS UNDER PRESSURE

FinMobility

SKAL RT INFRA

LINJA-AUTOLIITTO

MTK

NORDIC CONDITIONS AND EU REGULATION

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About SKAL's AdBlue survey

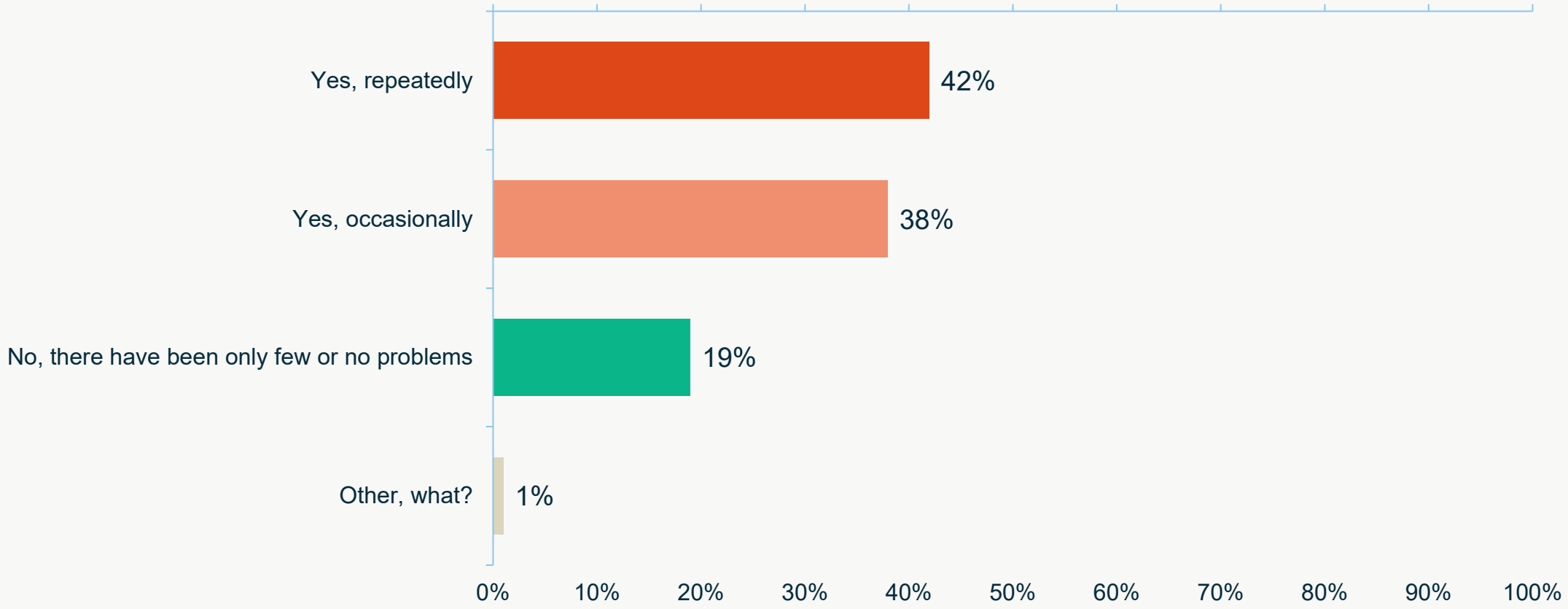
- **Why survey?** – Finnish Transport and Logistics SKAL had received a lot of **negative reports** from its member companies regarding poor functionality and problems related to the emissions control systems (AdBlue)
- All SKAL's members of were invited to respond to the survey, conducted **28.2.–17.3.2024**
- Over a fifth (22 %) **854 member companies** responded to the survey
- The survey results proved that problems with the emissions control systems were extensive and economically significant particularly in wintertime

Finnish Transport and Logistics SKAL represents Finnish transport sector with 3 600 member companies, operating with 21 000 vehicles. **skal.fi**

Survey question 1

N=847

Have your company's vehicles experienced abnormal problems related to the operation of emissions control systems (AdBlue)?

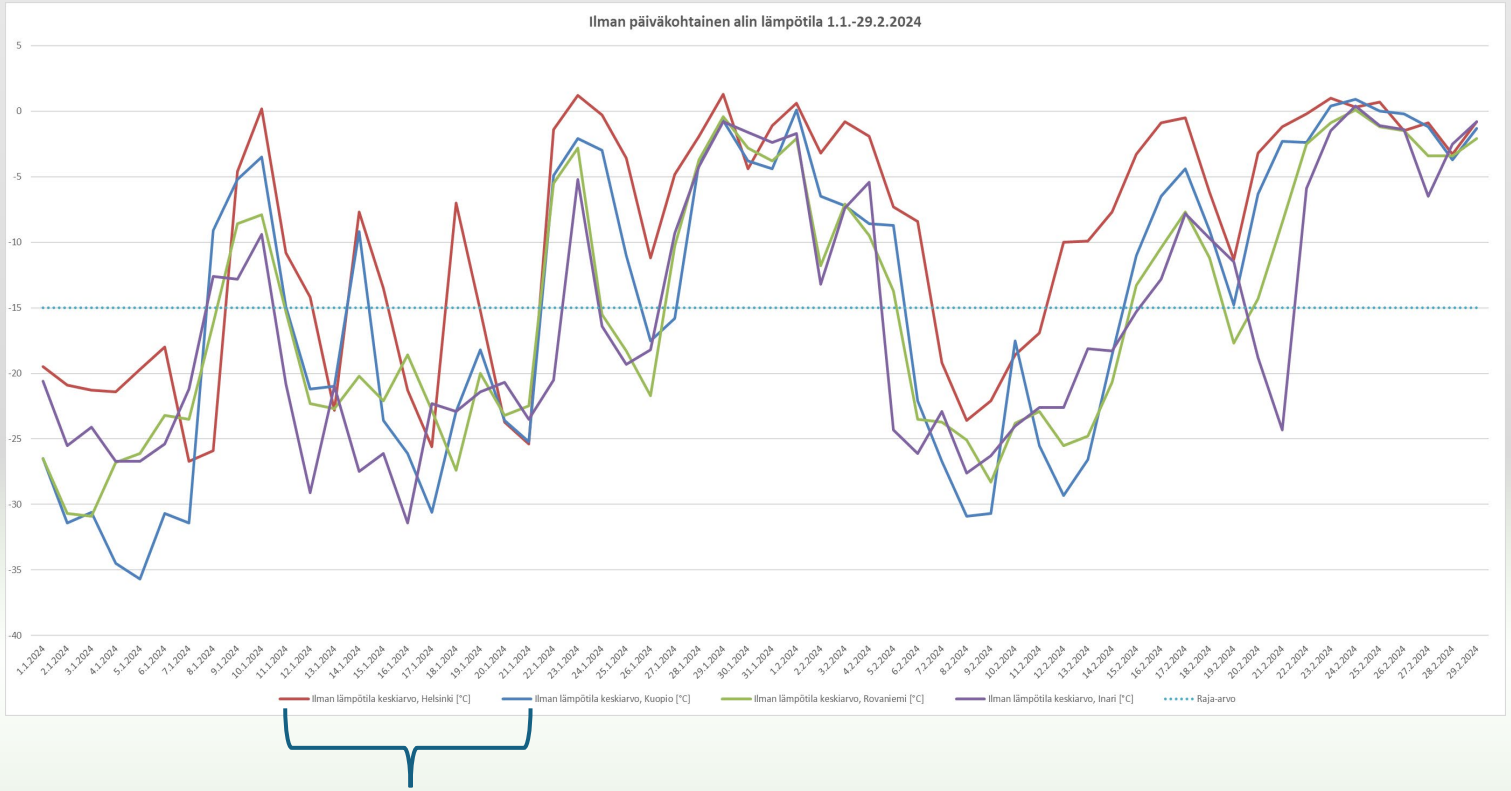


Highlights from the 227 open-ended responses

- “The operation of the equipment is **very unstable**, and problems usually start when the weather warms up after cold periods.”
- “During the past winter we have had many **AdBlue failures and extremely expensive repairs**. A single truck can get a bill of several thousand euros at once. It’s frustrating.”
- “The power and especially the **speed reduction** completely prevent us from working in situations where, for example, **spare parts are not available** at all.”
- “Of the repair shop visits related to vehicle faults (excluding regular maintenance), **4 out of 5 vehicle faults are related to emission reduction systems**.”
- “The **immobilisation and power-reduction functions** activate far too quickly.”
- “So, in the worst-case scenario, **driving tasks get interrupted** simply because we are waiting for that particular sensor.”
- “AdBlue **systems do not withstand winter conditions**, which results in significant additional repair costs.”
- “In almost every case, the cost of **repairing one AdBlue-related fault is € 2,000–4,000 excluding VAT**.”
- “In both trucks, the AdBlue **pressure sensors failed** in January during the severe cold, costing € 1,200 each.”
- “The AdBlue system is so prone to failures that it is **not suitable for Finnish conditions** in any way; warning lights come on weekly in several truck brands.”
- “This winter I have spent **over € 7,000** (excluding VAT) repairing AdBlue equipment **across three trucks**, and one of them still does not function properly.”
- "The truck is a 2017, and the AdBlue-related faults have cost an estimated average of € 2,500 per year.“
- “Sometimes we had **two Euro 6 trucks standing idle in the workshop** because **no spare parts** for that system were available due to high demand.”
- “A very **large amount of money is spent** on these devices.”

-15 °C as a requirement for truck manufacturer

Daily lowest temperature 1st Jan – 29th Feb 2024, 4 Finnish cities



The daily lowest temperature in Rovaniemi has been below -15 for 11 consecutive days, the average of the lowest temperatures during this period was -21,6.

Problems are real, solutions are needed

1. Problems with the winter operation of emission control system are a real concern.
2. Wintertime operational problems with emission control system cause intolerable costs for companies in the North.
3. Northern conditions need to be better taken into account in EU regulations.
4. Vehicles, both new and old ones, should be allowed to use reagents that better withstand freezing temperatures.
5. In Euro 7 regulation, the operation of vehicles in extremely cold conditions must be taken into account better than at present.

BREAKDOWNS COST EUROPE — AdBlue RELIABILITY IS CRITICAL FOR THE EU'S NORTHERN SUPPLY CHAINS

RT INFRA

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2.2.2026

We Ensure the Functioning of Everyday Life in the Arctic

- Northern Finland holds significant reserves of critical minerals essential for global industry.
- These minerals — and the refined products made from them, from metals to machinery and defense components — are exported worldwide.
- INFRA member companies keep mines operating and build and maintain infrastructure vital to society’s functioning.
- All this requires machinery that must perform reliably in extremely demanding Arctic conditions.
- When AdBlue fails in cold conditions, it jeopardizes industrial operations and the security of supply across the EU’s northern regions.

2.2.2026

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A Single Breakdown Can Cost Over €10,000

- Direct costs (€2,300–5,500)
  - New components and equipment (€1,000–4,000)
  - Transport of the broken machine to repair (€1,000)
  - Installation work (€300–500)
- Indirect costs (€2,800–5,800)
  - Operator downtime (one day's wage, €300)
  - Transport of a replacement machine (€1,000)
  - Replacement machine rental (€300–500/day)
  - Lost production revenue (€1,200–4,000/day per machine)
- Additional impact
  - Possible contractual penalties
  - Reputational damage and other non-quantifiable losses

Machine under repair, total cost ~€10,000

Crack at the mounting nipple caused by AdBlue freezing

RT INFRA

When a Critical Machine Breaks Down, Costs Escalate Quickly

- Breakdowns of essential production machinery can multiply costs, especially in ton-based contract work.
- For example, if an excavator loading ore stops, an entire fleet of heavy haul trucks may be forced to wait.
- For companies operating dozens of machines, AdBlue-related failures can occur several times each winter — each causing delays, extra work and significant financial losses.
- INFRA brings together 1,400 member companies that collectively operate more than 17,000 work machines, all of which are exposed to operational risks arising from AdBlue freezing.

2.2.2026

ADBLUE CHALLENGES IN ARCTIC CONDITIONS: TECHNICAL AND REGULATORY NEEDS

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LINJA-AUTOLIITTO

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The Finnish Bus and Coach Association

The Finnish Bus and Coach Association (Linja-autoliitto ry) is the professional cooperation and advocacy organization for all companies in Finland engaged in bus and coach transport as well as other passenger transport services, operating in market-based, contracted, and tourism-related transport.

The Association promotes the consistent and harmonized development of the sector through proactive advocacy.
It supports a positive public image of the industry and shares its expertise with member companies through its member services.

As a societal stakeholder **the Association aims to** secure fair, sustainable, and well-functioning business conditions for its member companies in urban and intercity passenger transport, and to ensure high-quality and comprehensive transport services for customers.

The Association has

130

member companies, mostly small and medium-sized enterprises, with extensive coverage in Northern Finland.

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AdBlue-related challenges in public transport

Nature of Technical Problems

In extreme cold conditions AdBlue causes physical damage for the vehicles and leads to system malfunctions.

Although the malfunction may not stop the engine, software-imposed limitations restrict vehicle functionality and, for example, reduce driving speed.

Entrepreneur Perspective

Cold temperatures cause mechanical damage and connector failures, leading to additional costs and operational disruptions when vehicles must be taken out of service for repairs.

Resilience and Continuity Management

The circumstances in which these issues arise are precisely those, where becoming stranded can pose significant safety risks.

Due to the long distances, obtaining assistance may require a considerable amount of time.

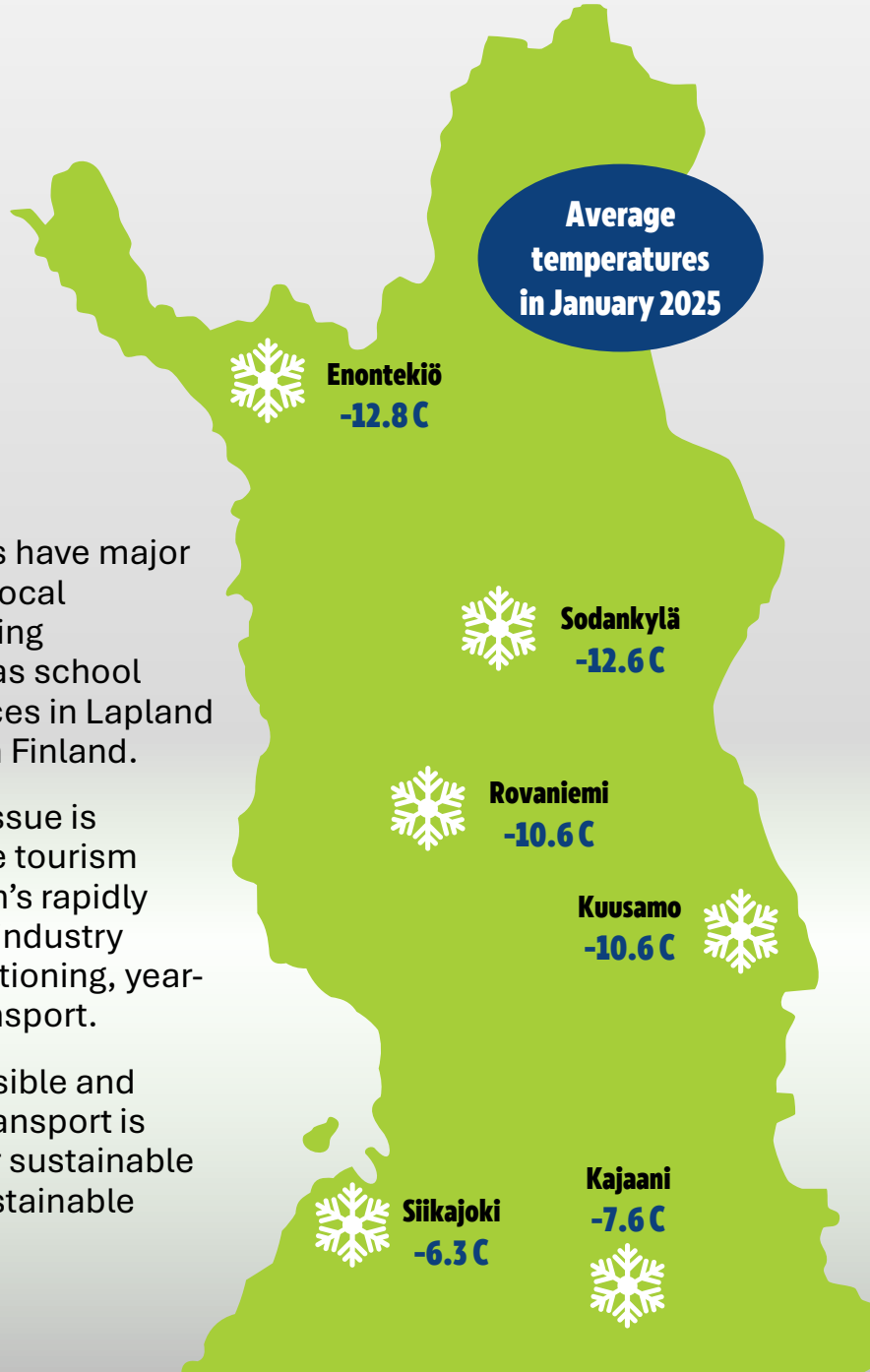
Likewise, if the vehicle's speed decreases, reaching the designated assistance point will also take longer.

Regional Impacts

These challenges have major implications for local residents, including schoolchildren, as school transport distances in Lapland are the longest in Finland.

In addition, the issue is significant for the tourism sector: the region's rapidly growing tourism industry depends on functioning, year-round public transport.

Moreover, accessible and reliable public transport is a prerequisite for sustainable lifestyles and sustainable tourism.



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Proposed solutions

The European Commission has proposed allowing the temporary deactivation of emission-control systems in extreme cold conditions. However, this is not a viable long-term solution. Such deactivation would create unclear liability questions onto transport operators and could even expose them to allegations of emission manipulation.

Moreover, temporary deactivation would not address the underlying technical problem. Given the current stage of technological development, the systems in question are relatively new and insufficiently adapted to Arctic conditions.

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Instead of allowing the temporary deactivation, the EU should initiate a process to address the issue structurally by:

- Allowing the use of alternative, cold-resistant solutions.
- Expanding approval procedures to cover a broader range of urea solution compositions.
- Establishing clear and robust test criteria for cold-climate performance and raising the minimum required cold-resilience threshold.
- Mandating manufacturers to test systems in realistically cold, northern operating conditions.
- Creating an accelerated approval pathway for solutions designed for cold climates.
- Allowing alternative technical solutions without requiring the entire vehicle model to undergo full re-type approval.
- Supporting the development of new technologies through dedicated research funding.

DEMONSTRATION: ALTERNATIVE ARCTIC UREA SOLUTION FOR SCR SYSTEMS

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WE HAVE OPTIONS!
UREA
ALTERNATIVE SOLUTION -30°C
ICE
SNOW HOW

Backround information, timeline

Target to be compatible and interchangeable with existing urea-systems:

- same amount of active ammonia as with standarized urea solution.
- same distribution chain as with urea can be used
- to follow the urea standard, DIN 70070 / ISO 22241 impurity requirements

Early 2000s

First idea for solving urea freezing point issue arised

2006

First engine tests at VTT Finland (EURO 4)

In 2023 after heavy winter season in Finland, new development phase started

2023

Laboratory tests (freezing&stability) were carried out

winter 2024–2025

A small test batch was produced to verify production and real-world performance.

spring 2025

new engine test runs were conducted at Proventia's engine laboratory (Stage 5)

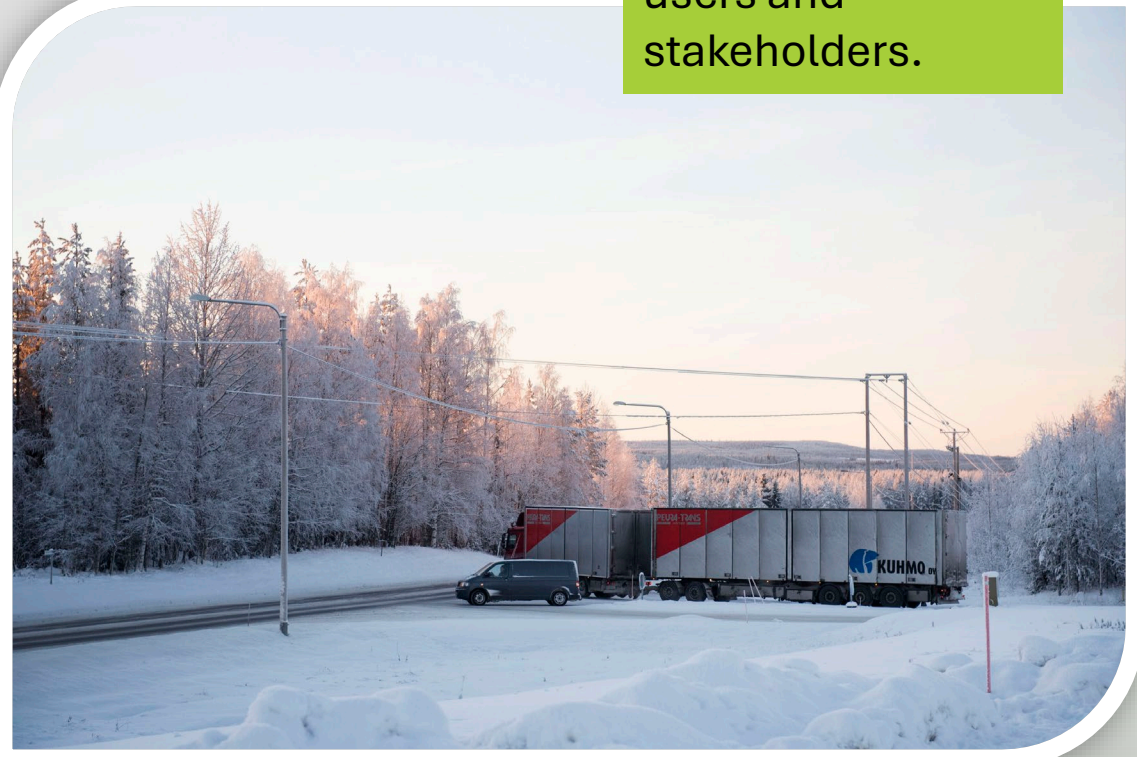
autumn 2025

the first limited production batch of new alternative solution was manufactured

winter 2025–2026

the product has been tested in various types of vehicles

Discussions with authorities are held throughout the project, with a shared objective of enabling the use of the product for all users and stakeholders.



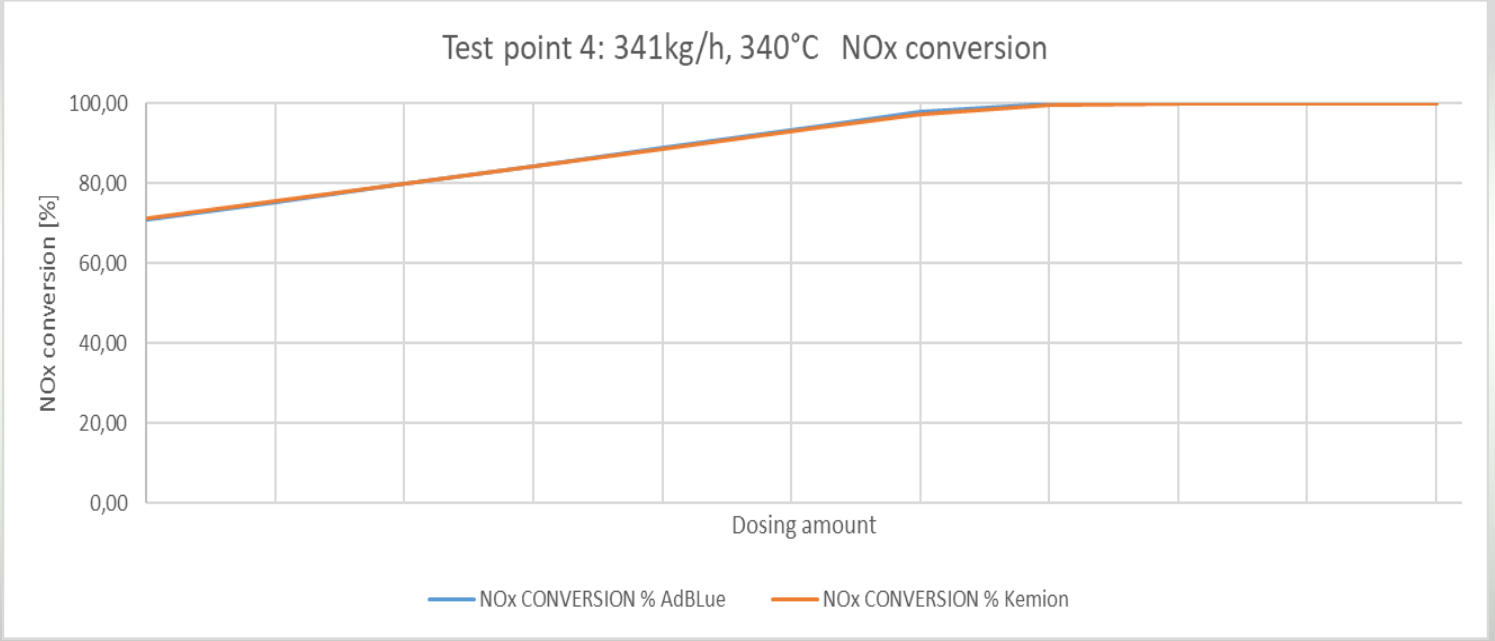
Observations of new product properties

- **Compatible and interchangeable with traditional urea/Adblue**
  - With the exception, vehicles containing a quality sensor
  - Difference in product density and electrical conductivity
- **Freezing point – 30 °C**
  - Vs. Adblue freezing point -11 °C
  - Significantly increases the usability of the SCR system and improves NOX emission control in arctic conditions
- **Better stability - less crystallization and polymerization in the exhaust gas line**
  - Lower risk for solid deposit formation
  - High temperature stability, advantage in warm weather conditions
- **Higher conversion of NOx's at low motor temperatures**
  - NOx removal more effective below 200 °C
  - Interesting especially for city buses and delivery trucks

Freezing point of alternative solution mixed with Adblue

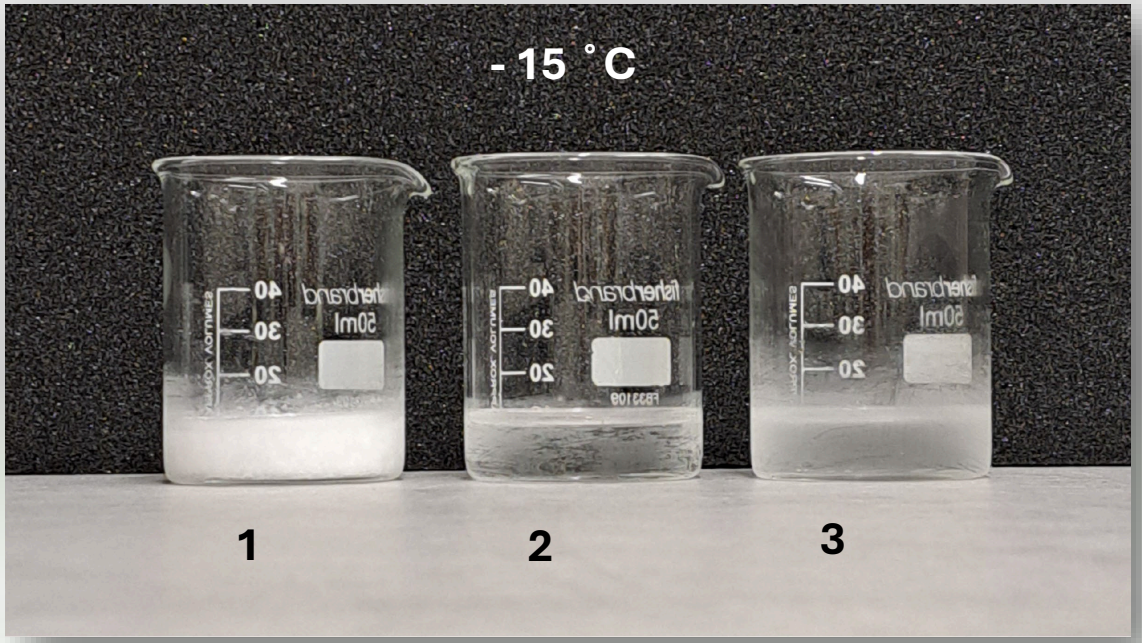
Adblue share	New solution share	Freezing point of mixture
v-%	v-%	ºC
100,00	0,00	-11
75,00	25,00	-15
50,00	50,00	-22
25,00	75,00	-25
0,00	100,00	-30

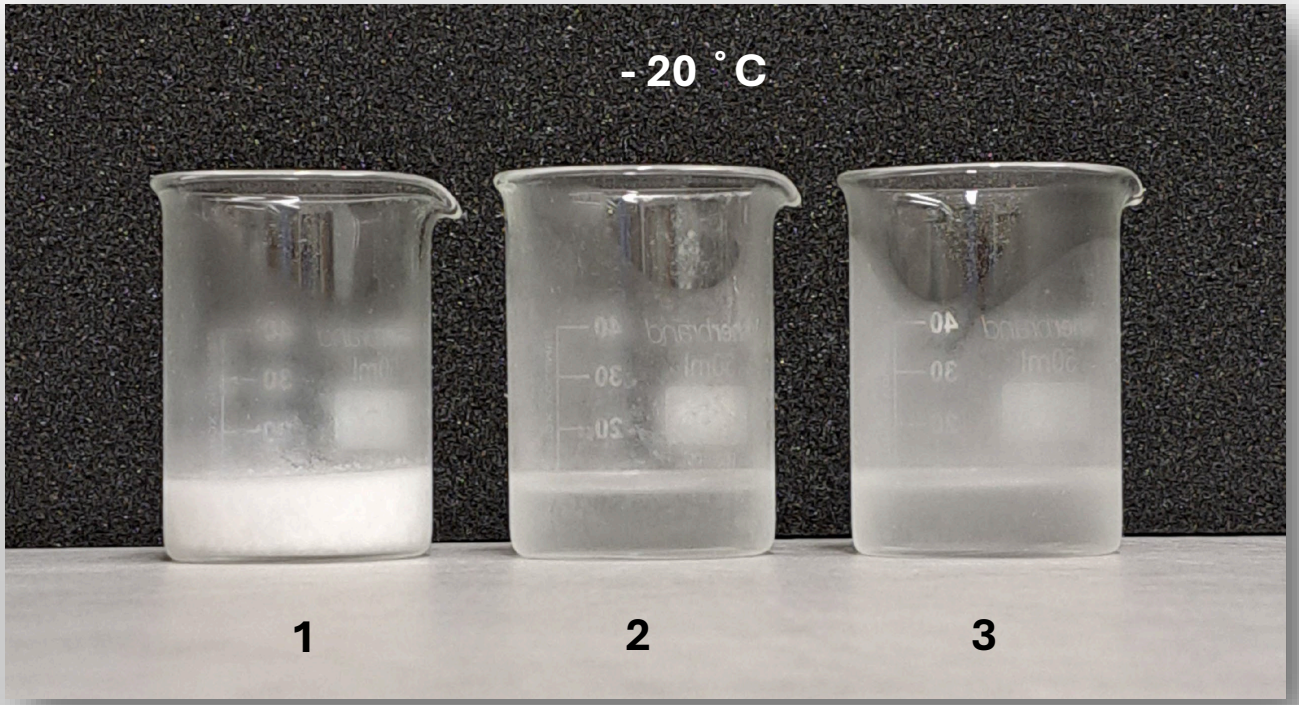
NOx reduction test 2025

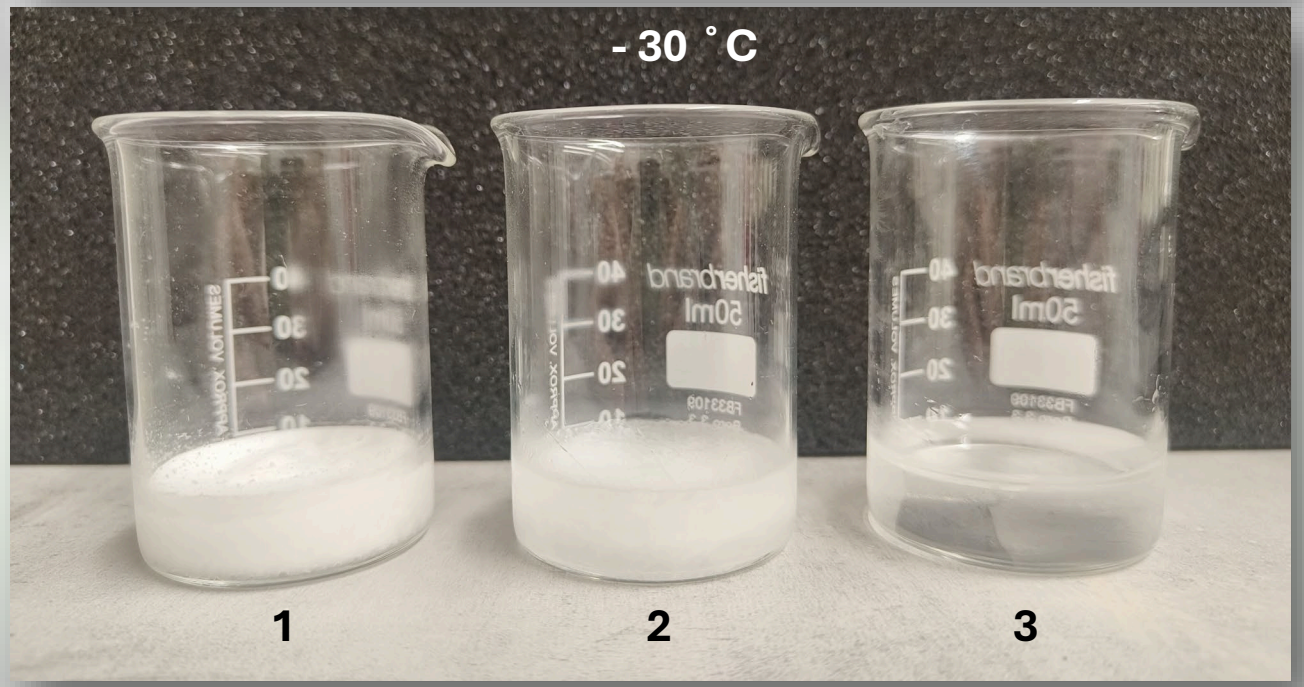


Pictures from tests

Freezing point test:
1) Adblue,
2) Alternative + Adblue 50-50%,
3) Alternative solution

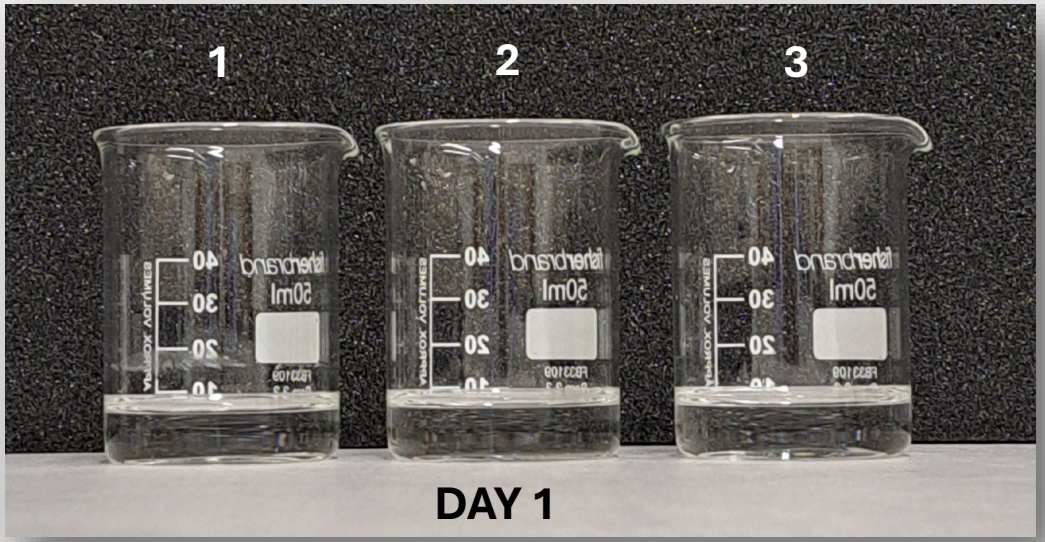


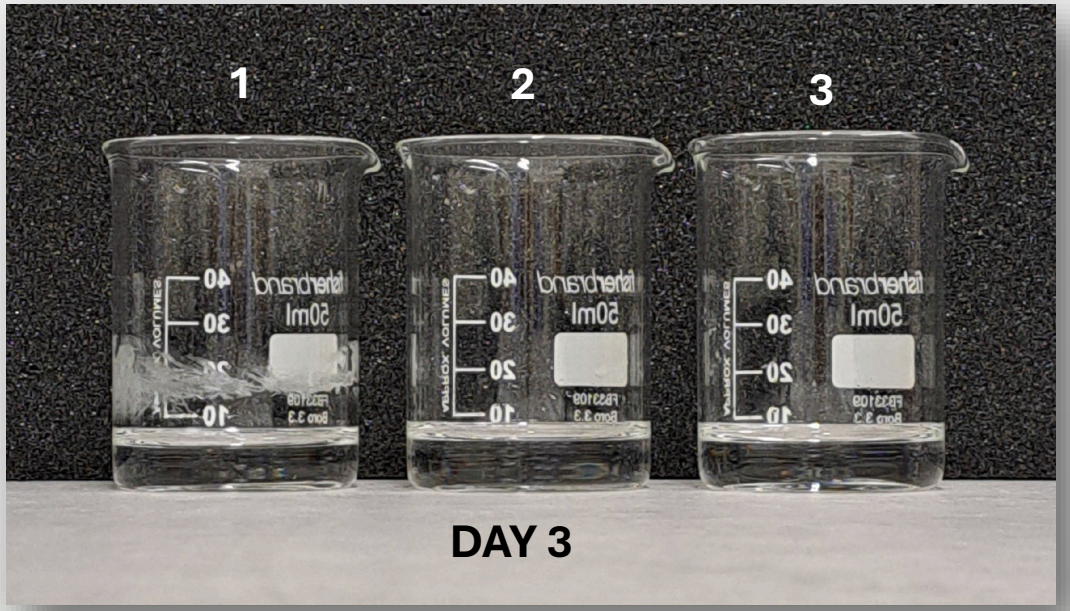


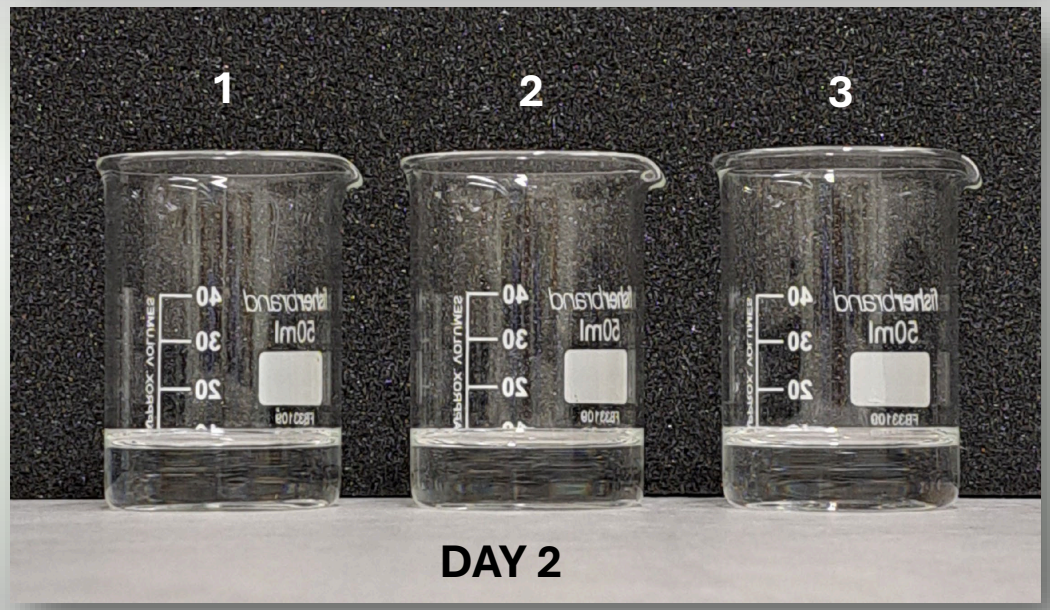


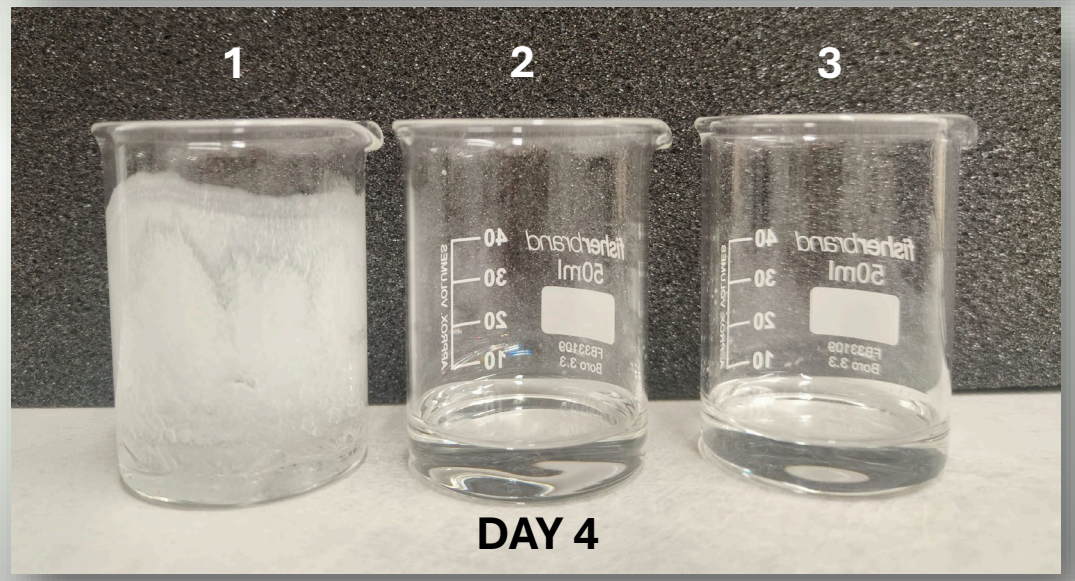
Pictures from tests

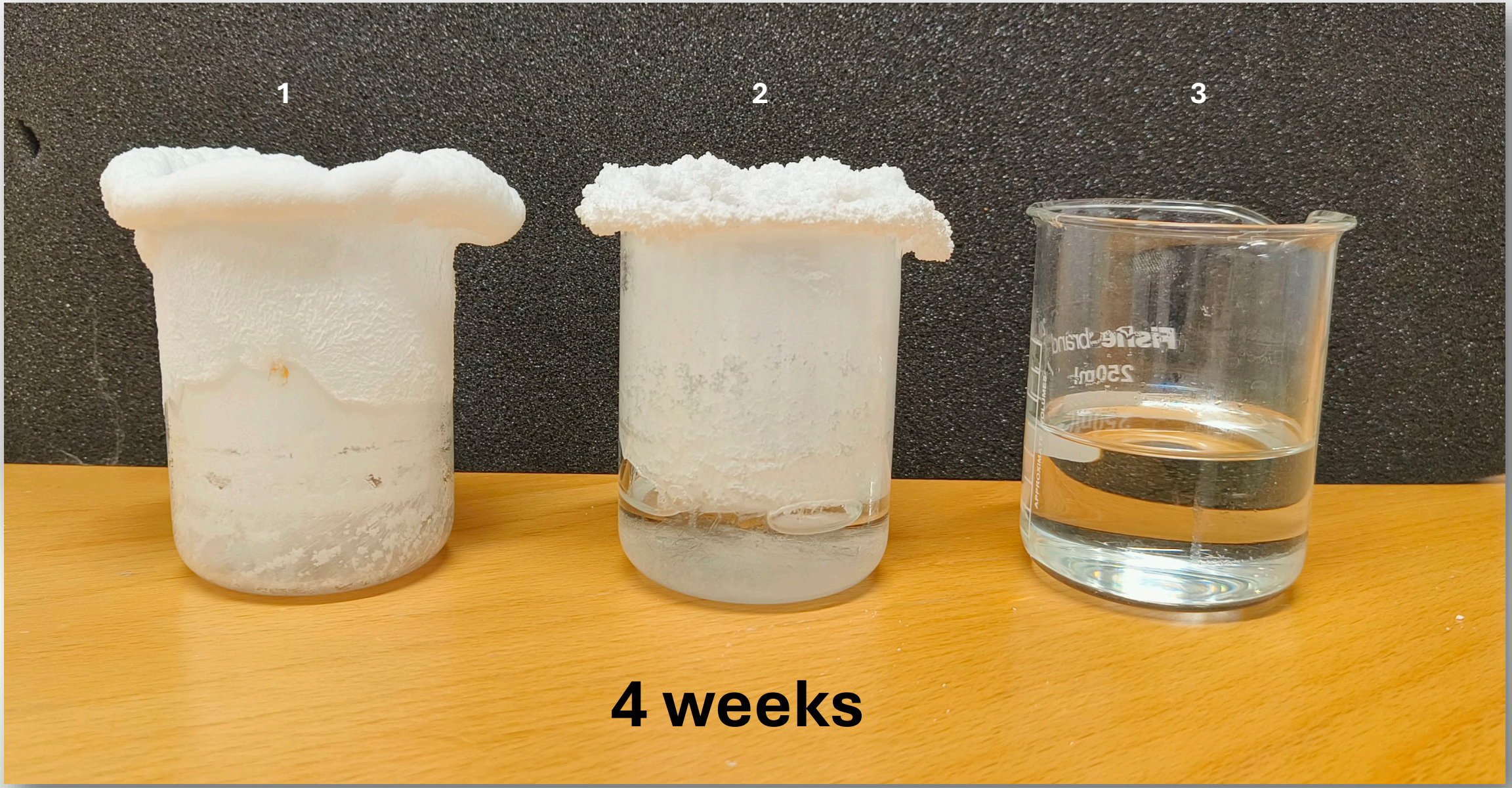
Crystallization tests (room temperature): 1) Adblue, 2) Alternative + Adblue 50-50%, 3) alternative solution







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PANEL DISCUSSION PART 1

When Cold Becomes a Competitive Disadvantage: Impacts of Arctic operating conditions on transport, supply chains and society

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Regional Manager at Central Union of Agricultural Producers and Forest Owners in Central Ostrobothnia
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Merja Kyllönen

MEP, **The Left** (Finland)

QUESTIONS?

PANEL DISCUSSION PART 2
From Problem to Policy: Delivering Solutions for Arctic Conditions

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QUESTIONS?

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