



26th Annual Clinical Trial Supply Europe 2025

Balancing GDP Compliance with Environmental Responsibility: The IPEL Approach to Green Clinical Logistics



JOINING UP THE SAFE AND **SUSTAINABLE** DISTRIBUTION OF MEDICINES FROM PRODUCER TO PATIENT



The Sustainability Challenge in Clinical Trial Logistics

- Pharma logistics contributes significantly to global GHG emissions.
- Clinical trial supply chains require precise temperature control and compliance.
- Clinical trials are complex in execution: communications and data-intensive, involve inbound and outbound, and usually very time-sensitive.
- Clinical trial shipments are smaller in scale compared to commercial shipments and involve last-mile delivery, sometimes in very remote locations.
- Balancing sustainability with GDP compliance is key.

GDP Compliance and Sustainability – A Complementary Approach

- GDP ensures product integrity; sustainability focuses on reducing emissions.
- Strategies include optimised routing, reusable packaging, and green transport modes.
- GDP compliance can be enhanced by sustainable practices.

The Impact of Green Logistics on Operational Costs

- Sustainable solutions reduce fuel consumption and packaging waste.
- Improved efficiency leads to lower costs.
- Carbon tax implications and long-term savings.

Carbon Accounting in Clinical Trial Supply Chains

- **Measuring and tracking emissions is critical for sustainability.**
- **Use of carbon accounting platforms for emissions benchmarking.**
- **Data-driven strategies for continual improvement.**

COP 29: UN Climate Talks, Azerbaijan

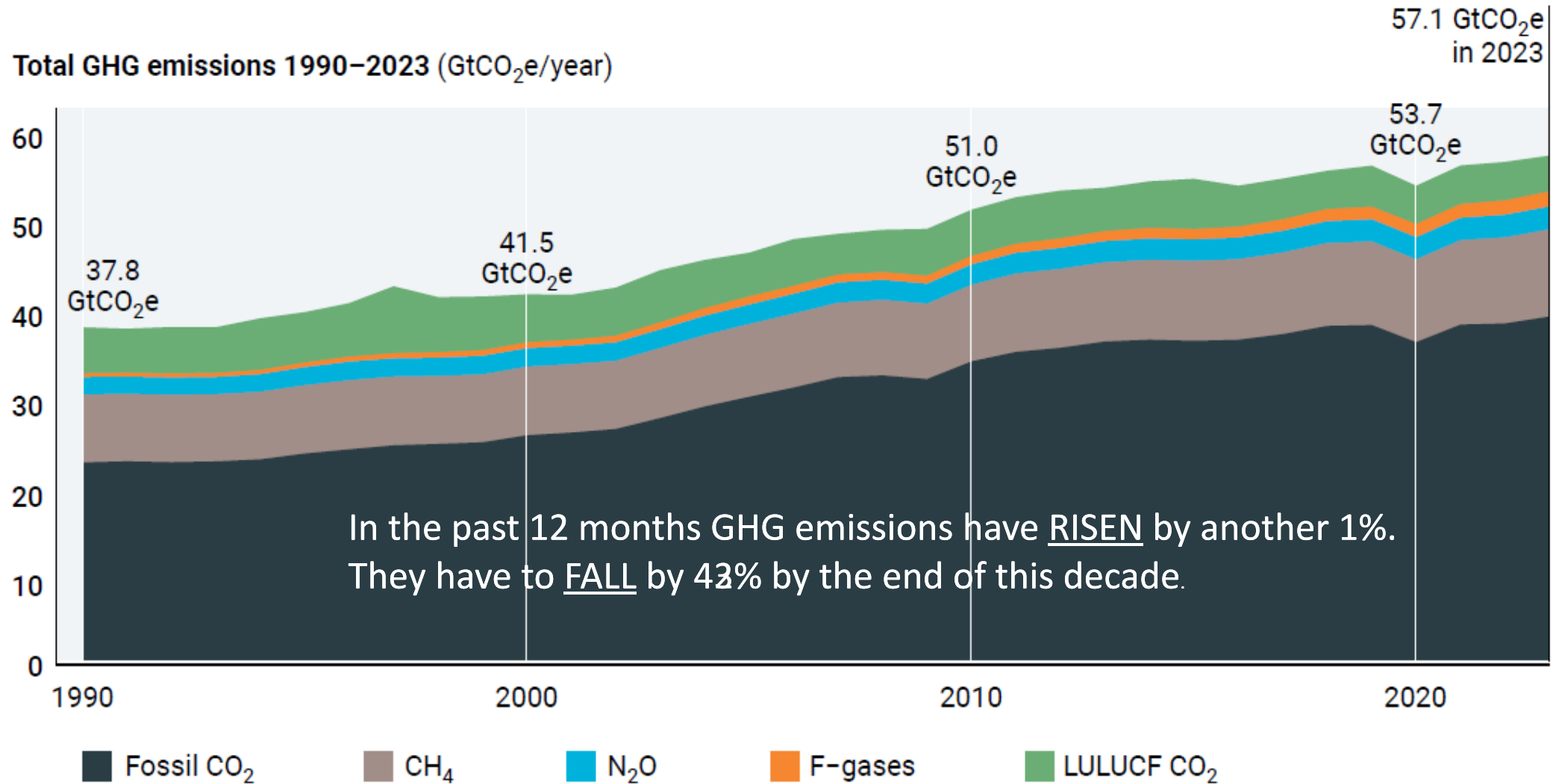
"Planet Earth is in critical condition"
with change needed at
"exponential speed and scale"



Source: Open letter to UN from leading climate scientists November 2024

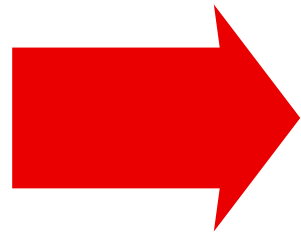
Total GHG Emissions 1990 -2023

Total GHG emissions 1990–2023 (GtCO₂e/year)



Freight Logistics

responsible for over

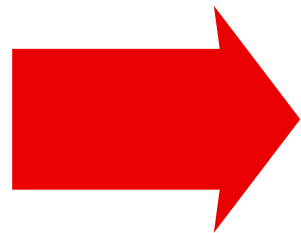


13%

of total global CO₂ emissions



& around



10%

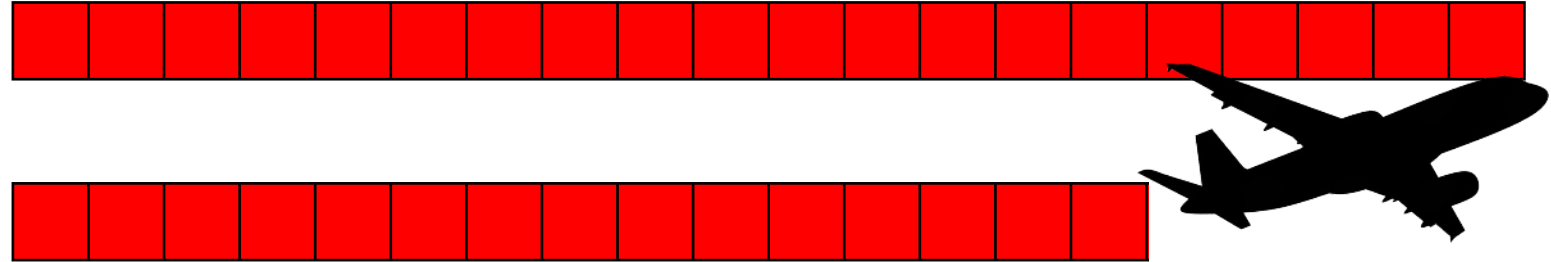
of total global GHG emissions



COMPARISON OF CO₂ EMISSIONS BETWEEN MODES OF TRANSPORT

CO₂ Efficiency Comparison: Grams of CO₂ emitted per ton-kilometer (gCO₂/ton-km):

Short-haul Flights (under ~1,500 km):
1,500-2,000 gCO₂/ton-km



Long-haul Flights (over ~1,500 km):
1,000-1,500 gCO₂/ton-km

Road Freight: 60-150 gCO₂/ton-km



Inland Waterways: 30-50 gCO₂/ton-km



Sea Freight: 7-40 gCO₂/ton-km



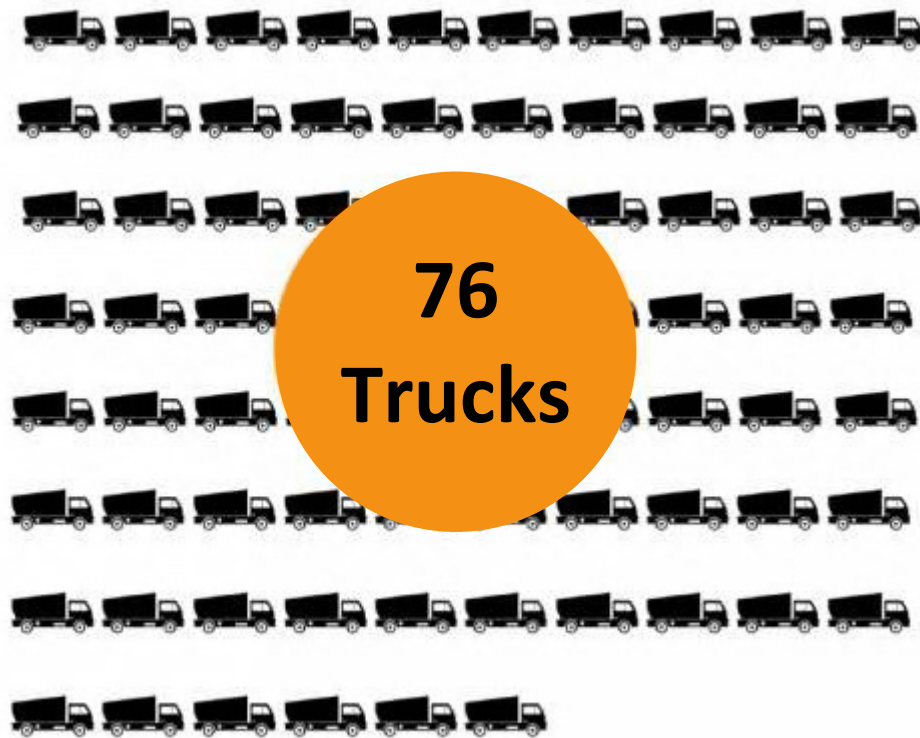
Rail Freight: 15-30 gCO₂/ton-km



**NOTE: ADDITIONAL IMPACT
OF AIR FREIGHT:**

+ a radiative forcing multiplier
(1.9 to 2.0 times the CO₂ emissions)
applies to both short- and long-haul
flights

COMPARISON OF CO₂ EMISSIONS BETWEEN MODES OF TRANSPORT

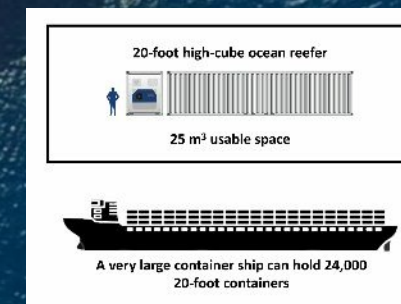
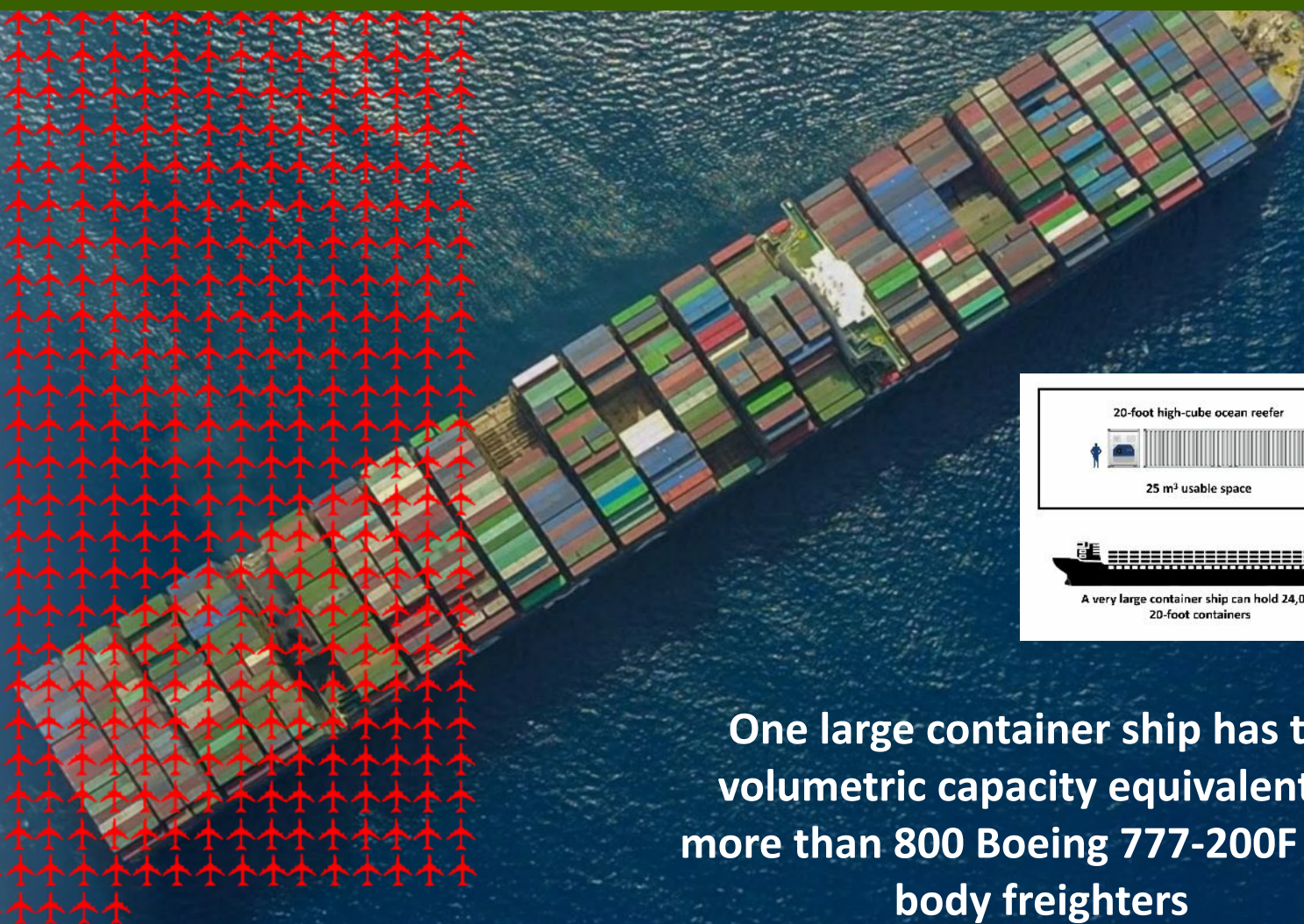
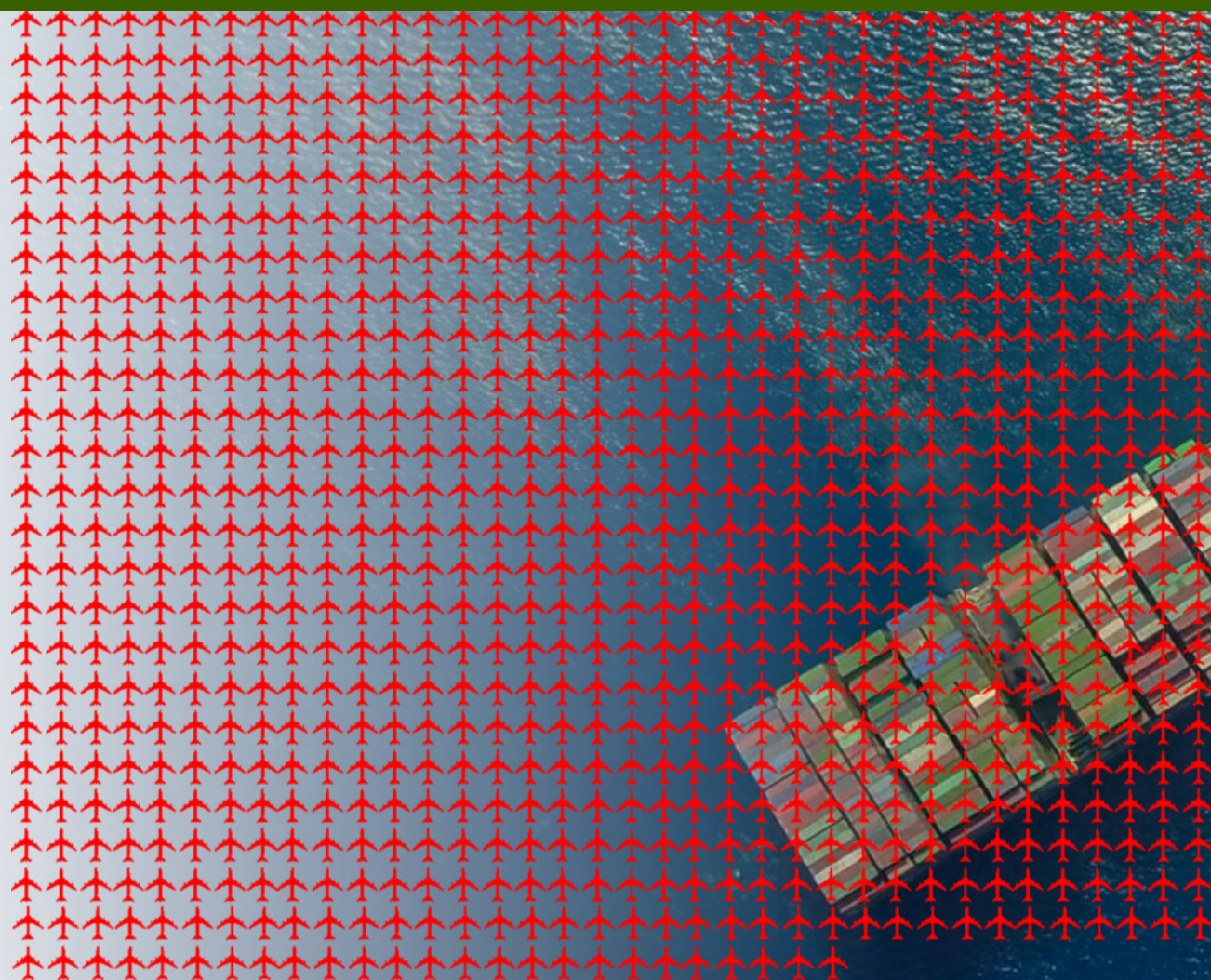


1
Freight Train



Source: HS2.org.uk 2024

COMPARISON OF CO₂ EMISSIONS BETWEEN MODES OF TRANSPORT



One large container ship has the volumetric capacity equivalent to more than 800 Boeing 777-200F wide body freighters

IPEL

Overview

Overview

INTEGRATED PHARMA ECO-LANE

“An ‘Integrated Pharma Eco-lane’ (IPEL) in pharmaceutical logistics refers to a specialized supply chain route optimised to transport pharmaceutical products in an environmentally and sustainable manner while ensuring the integrity and safety of the pharmaceuticals through compliance with regulatory standards and other GDP guidelines”



JOINING UP THE SAFE AND **SUSTAINABLE** DISTRIBUTION OF MEDICINES FROM PRODUCER TO PATIENT



IPEL: A Sustainable Framework for Pharma Logistics

- IPEL is a framework for compliance and sustainability.
- Integrated Pharmaceutical Eco-Lanes bring a structured approach to green logistics.
- Integration of GDP standards into intermodal Eco-Lanes.
- Collaborative approach with pharma shippers, carriers, freight hubs, logistics providers & regulators.

The Role of Cross-Industry Collaboration in Sustainable Logistics

- Success in sustainability requires multi-stakeholder engagement.
- Collaboration between manufacturers, distributors, 3PLs, and regulators.
- Shared responsibility for sustainability goals.
- Co-ordinated logistics planning.

The Need for Advance Planning

- Multi-modal transport requires careful planning.
- Transit times are often longer than direct shipments.
- Logistics planning should begin at trial inception stage.

Challenges in Rail & Sea Transport for Temperature-Sensitive Shipments

- Longer transit times increase exposure to temperature variations.
- Rail freight: high-temperature fluctuations in summer/winter.
- Sea freight: crossing multiple climate zones with slow transit times.
- Multiple handling points create additional risks.

IPEL

TWO PHASES:

1. PILOT STAGE

2. COMMERCIALISATION STAGE

**Reefers with on-board
gen-sets and/or dual refrigeration
units provide security of power,
automatic emergency back-up and
minimal reefer power-off times**

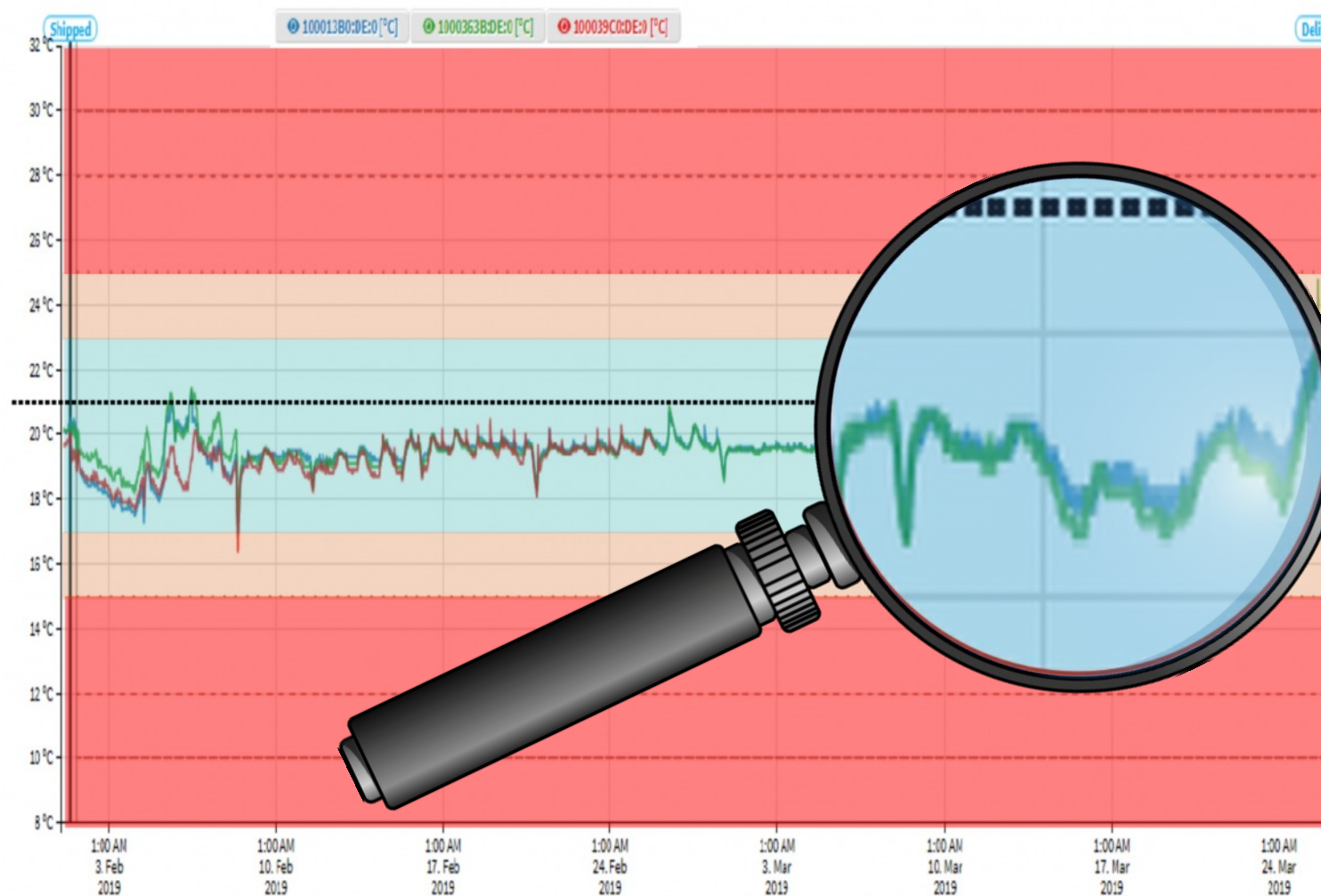
Klinge Model PFP-572

The dual refrigeration system automatically switches to its back-up in an emergency to provide the ultimate peace of mind when shipping valuable high value pharmaceuticals.



Pharma by Rail

Montreal to Chicago 1650 km (1025 miles)



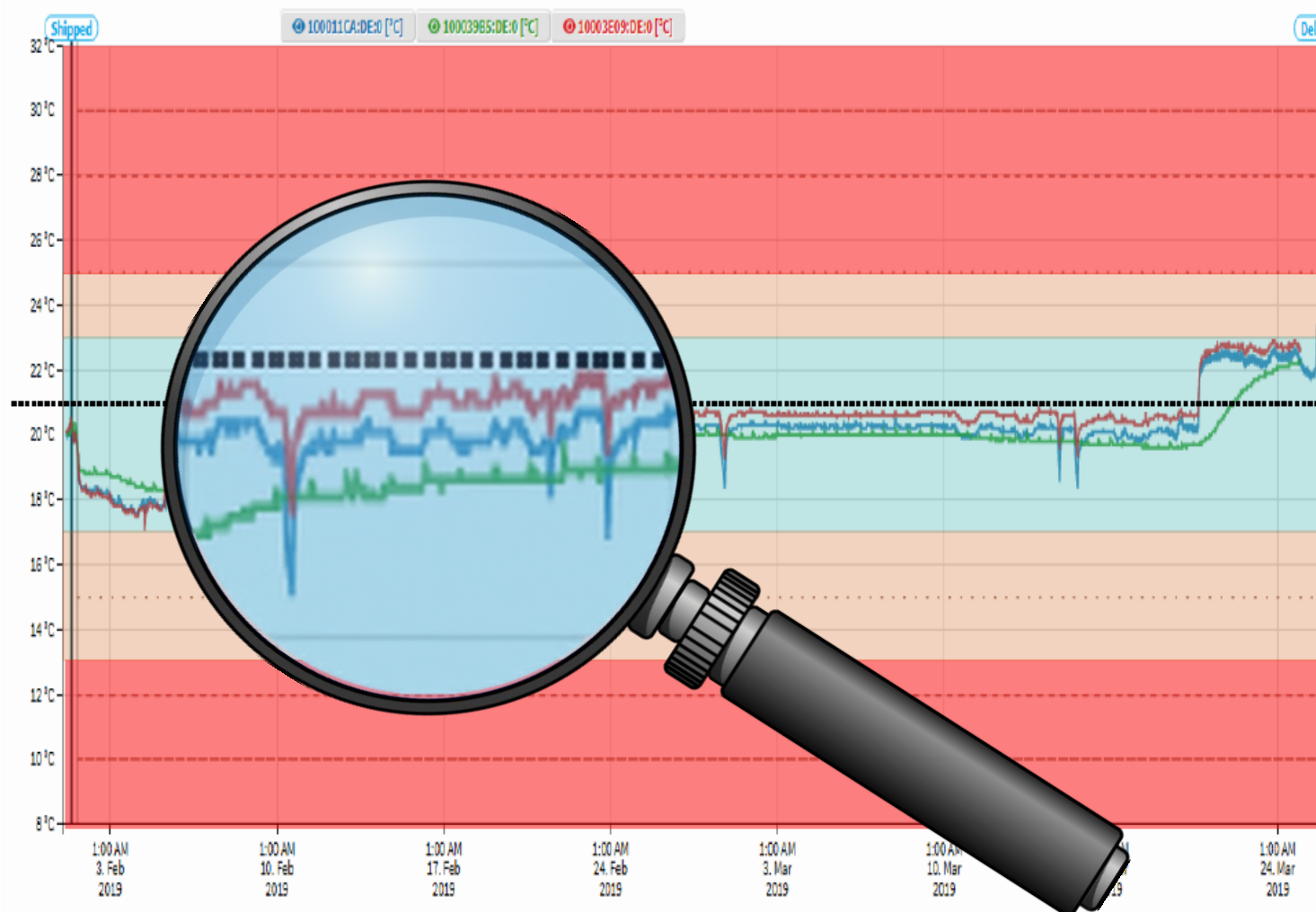
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LOW:	8/2	11:00	17.0
PACKING:	4/2	18:00	18.8
SHIPMENT DATE:	8/2	14:30	18.8
DELIVERY DATE:	21/3	11:40	22.6
UNPACK DATE:	25/3	15:00	-
(recording stopped	25/3	12:00	22.5)

1000363B	Date	Time	°C
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LOW:	8/2	11:10	16.9
PACKING DATE:	4/2	18:00	19.6
SHIPMENT DATE:	8/2	14:30	19.0
DELIVERY DATE:	21/3	11:40	22.8
UNPACK DATE:	25/3	15:00	22.9

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LOW:	8/2	11:10	16.4
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SHIPMENT DATE:	8/2	14:30	18.8
DELIVERY DATE:	21/3	11:40	-
UNPACK DATE:	25/3	15:00	-
(recording stopped	26/2	00:00	19.6)

Pharma by Waterway (Rhine)

Mainz to Antwerp 550 km (340 miles)



100039B5	Date	Time	°C
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PACKING:	4/2	18:00	18.3
SHIPMENT DATE:	8/2	14:30	18.8
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UNPACK DATE:	5/3	15:00	-
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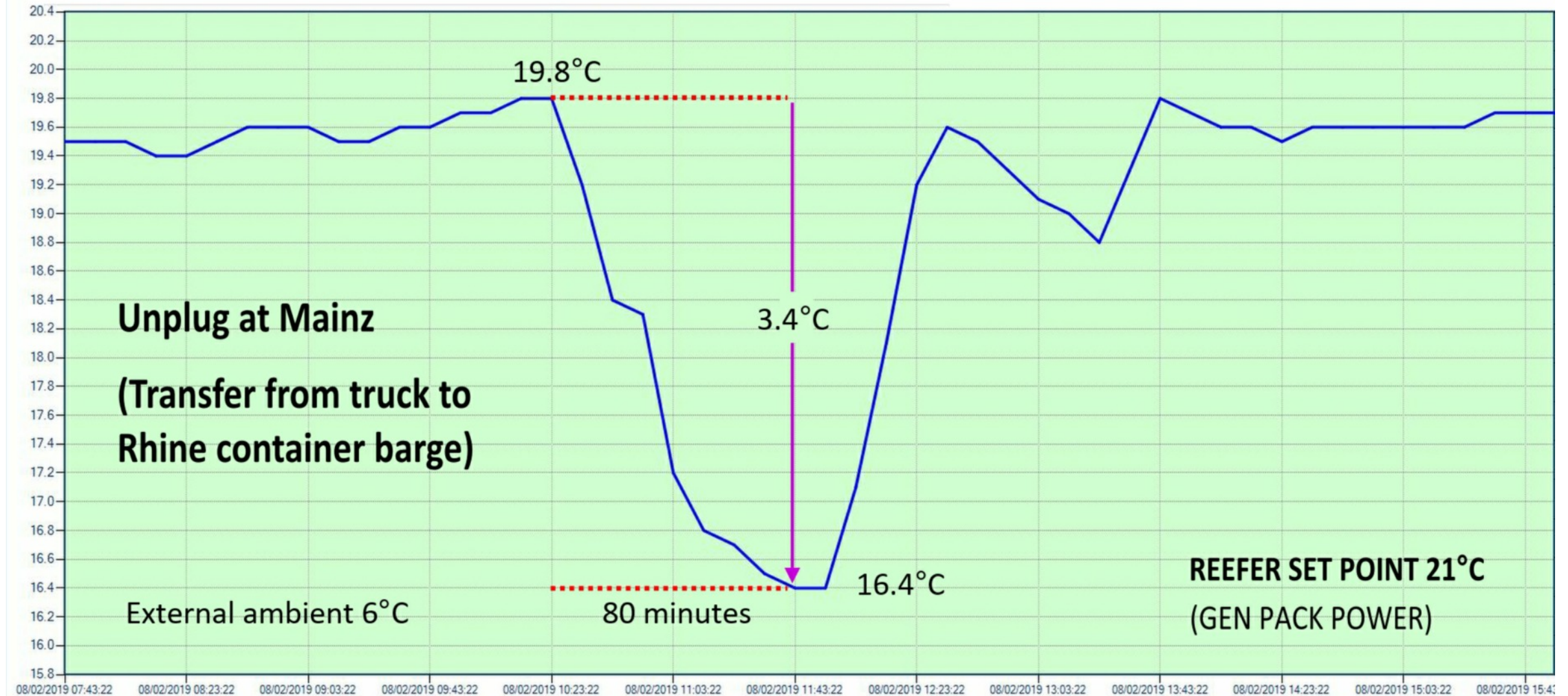
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DELIVERY DATE:	21/3	11:40	22.3
UNPACK DATE:	25/3	15:00	21.8

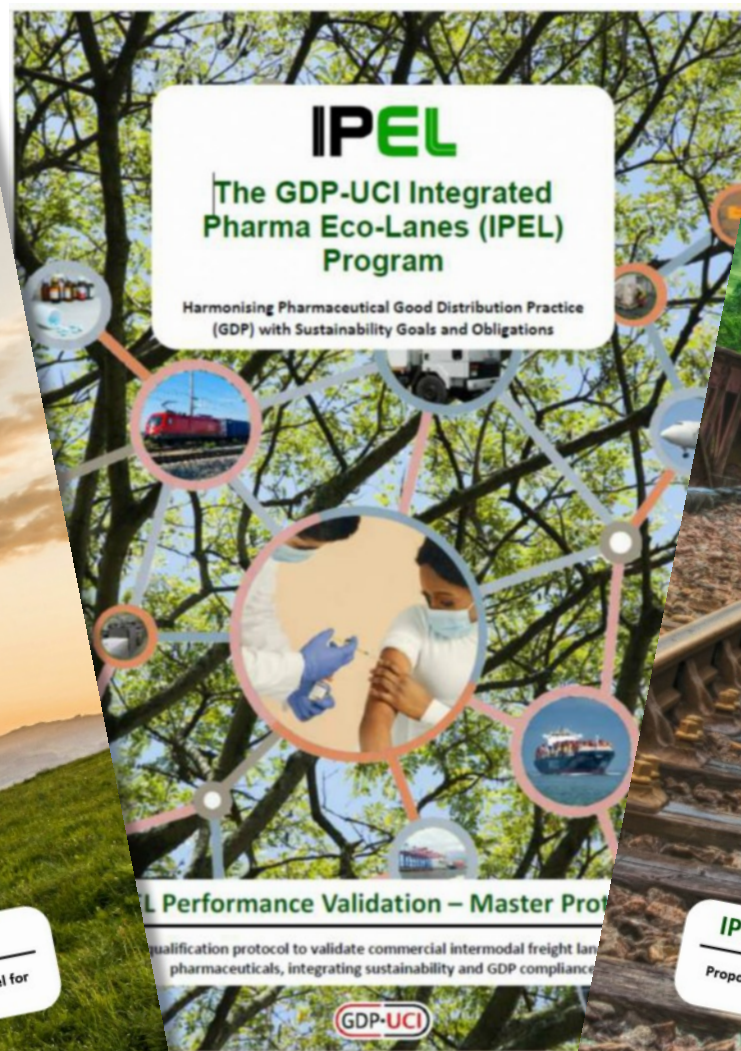
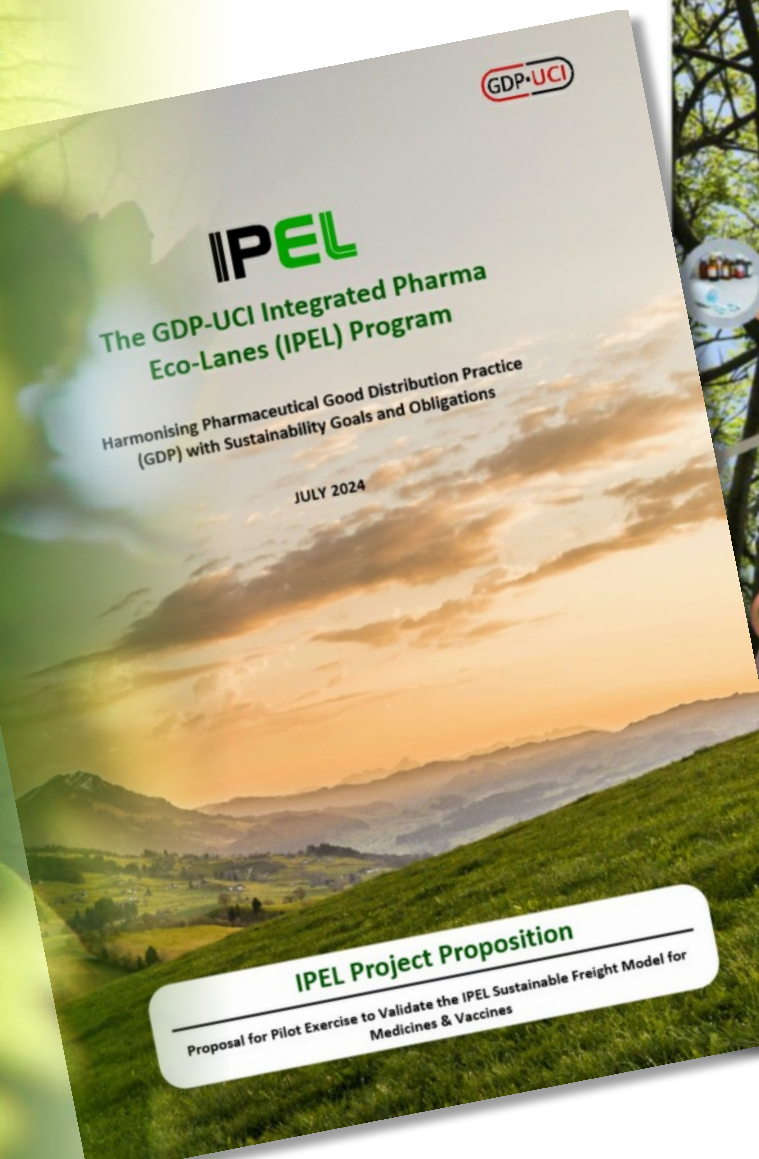
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DELIVERY DATE:	21/3	11:40	22.6
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(Last recording	25/3	00:00	22.3)

Temp °C

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IPEL PROOF-OF-CONCEPT PILOTS

IPEL

Proof-of-Concept

Pilots



5

Main pharmaceutical sales markets (ranked)



Trans-European Transport Network (Ten-T)



Major "banana" logistics corridors



Main pharmaceutical production concentrations



Major cold-chain seaports



Major pharma airports

■■■■■ IPEL pilot routes

IPEL 1
Barcelona to Posnan
2150km



5

Main pharmaceutical sales markets (ranked)



Trans-European Transport Network (Ten-T)



Major "banana" logistics corridors



Main pharmaceutical production concentrations



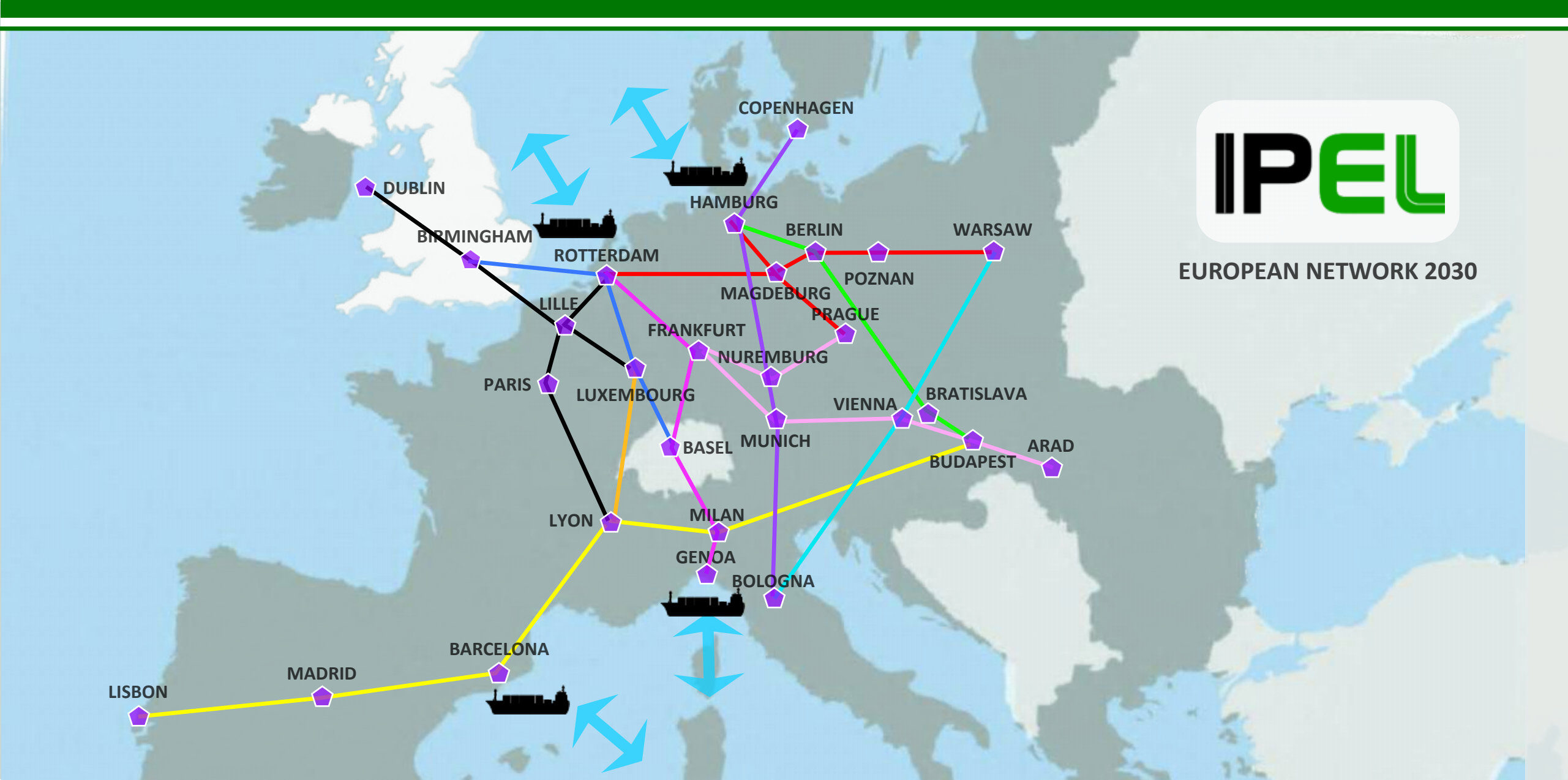
Major cold-chain seaports



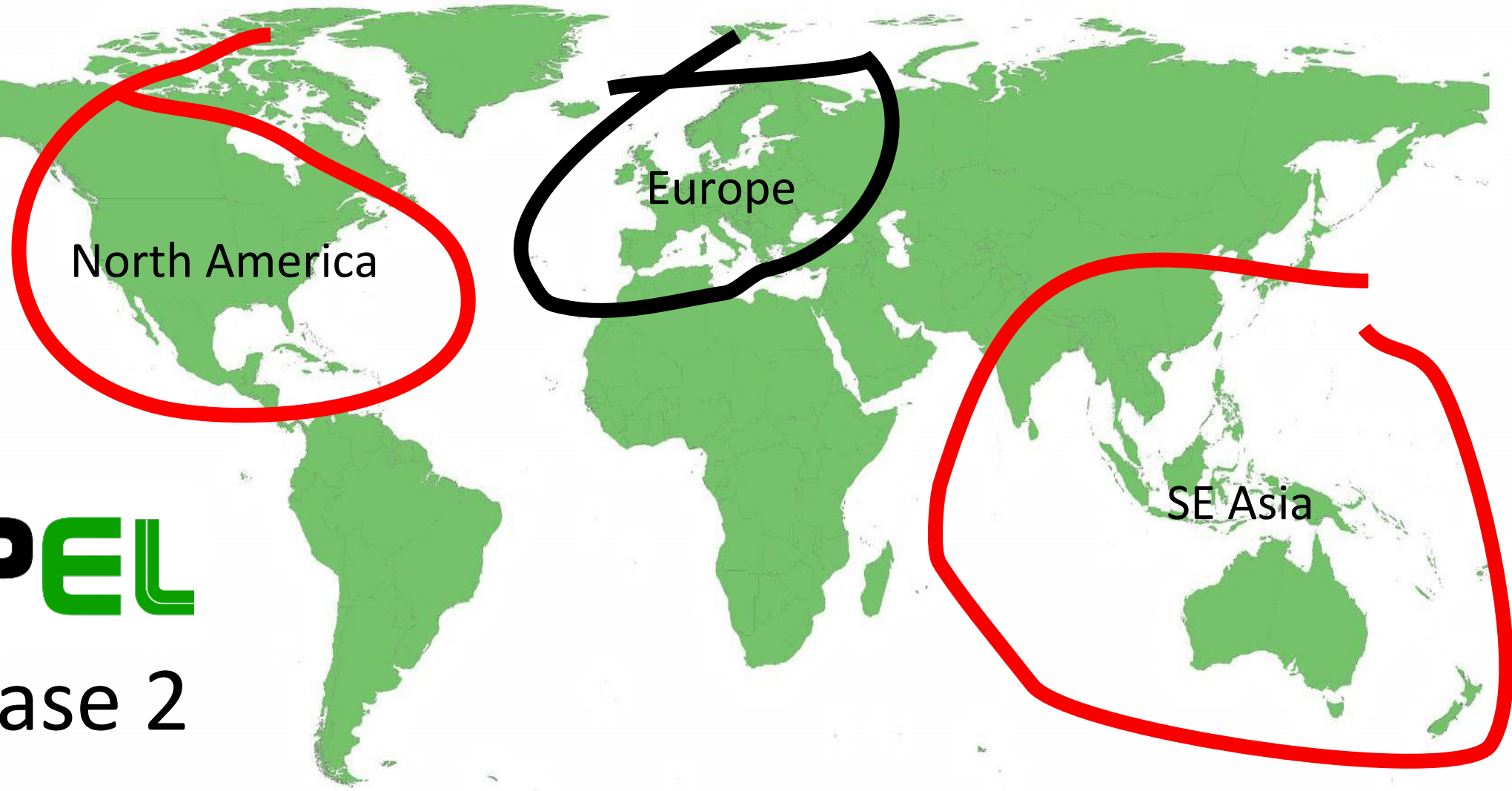
Major pharma airports

■■■■■ IPEL pilot routes

IPEL 2
Rotterdam to Budapest
1600km



EUROPEAN NETWORK 2030



IPEL

Phase 2

Key Takeaways

- Clinical trial logistics must balance GDP compliance with sustainability.
- Industry-wide collaboration is essential for real change.
- Sustainable logistics solutions can drive cost savings.
- IPEL provides a practical framework for greener clinical transport.
- Clinical trial shipments may require tailored sustainability solutions.
- Multi-modal transportation requires advance planning and takes longer transit time, making early logistics planning crucial.

Final Thoughts & Call to Action

- Start implementing sustainable logistics strategies today.
- Engage with IPEL to explore collaboration opportunities.
- Take an active role in reducing logistics-related emissions and advocate for policy changes supporting sustainable pharma logistics.



Alone we are pieces

The background of the slide is a puzzle pattern. The puzzle pieces form a landscape scene. In the center, there is a large, dark green tree with a thick trunk. The ground is covered in a field of purple flowers, possibly lavender. In the background, there are rolling hills or mountains under a sky with soft, pinkish clouds, suggesting a sunset or sunrise. The puzzle pieces are interlocking and cover the entire slide area.

Together we are the solution

IPEL

Let's do it!

Register Now

<https://team-up.glasscubes.com/form/e3bd3da4-c3eb-4a17-867d-1252866be22b>

