

# Conference on Rail Resilience to Climate Change

## ERA Rail Resilience Study – preliminary results

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16 June 2025 – Warsaw, Poland



- First [Rail Environmental Report](#) (2024), identification of data gaps on rail resilience to extreme weather events
- TSIs revision request of the European Commission (2024) includes the task to perform a study on rail resilience to climate change with the following objectives:
  - Collecting data to build an overview at European scale of the frequency and consequences of extreme weather events (1<sup>st</sup> phase)
  - Assessing and if relevant, proposing changes to the technical European legal framework that could contribute to increase resilience of the railway system (2<sup>nd</sup> phase)
- No definition *stricto sensu* of ‘extreme weather event’ so elements from Railway Safety Directive have been used i.e. angle of consequences taken:
  - ‘Extensive damage’: at least **EUR 2 million** in total; and/or
  - ‘Extensive disruption to traffic’: train services on a railway line are **interrupted for 6h** or more.
- Geographical scope and time span covered:
  - European Union + Norway, Switzerland and United Kingdom
  - 2005-2024 (last 20 years)

**30+ documents**  
reviewed  
7 organisations  
consulted

<b>Scope</b> of the study Desk research Targeted bilateral interviews	<b>Data collection</b> from main IMs in each European country
Bilateral interviews on more <b>qualitative inputs</b> with main IMs in each European country	Survey to the <b>NSAs on their role in supervision, SSC/SA, APS</b>

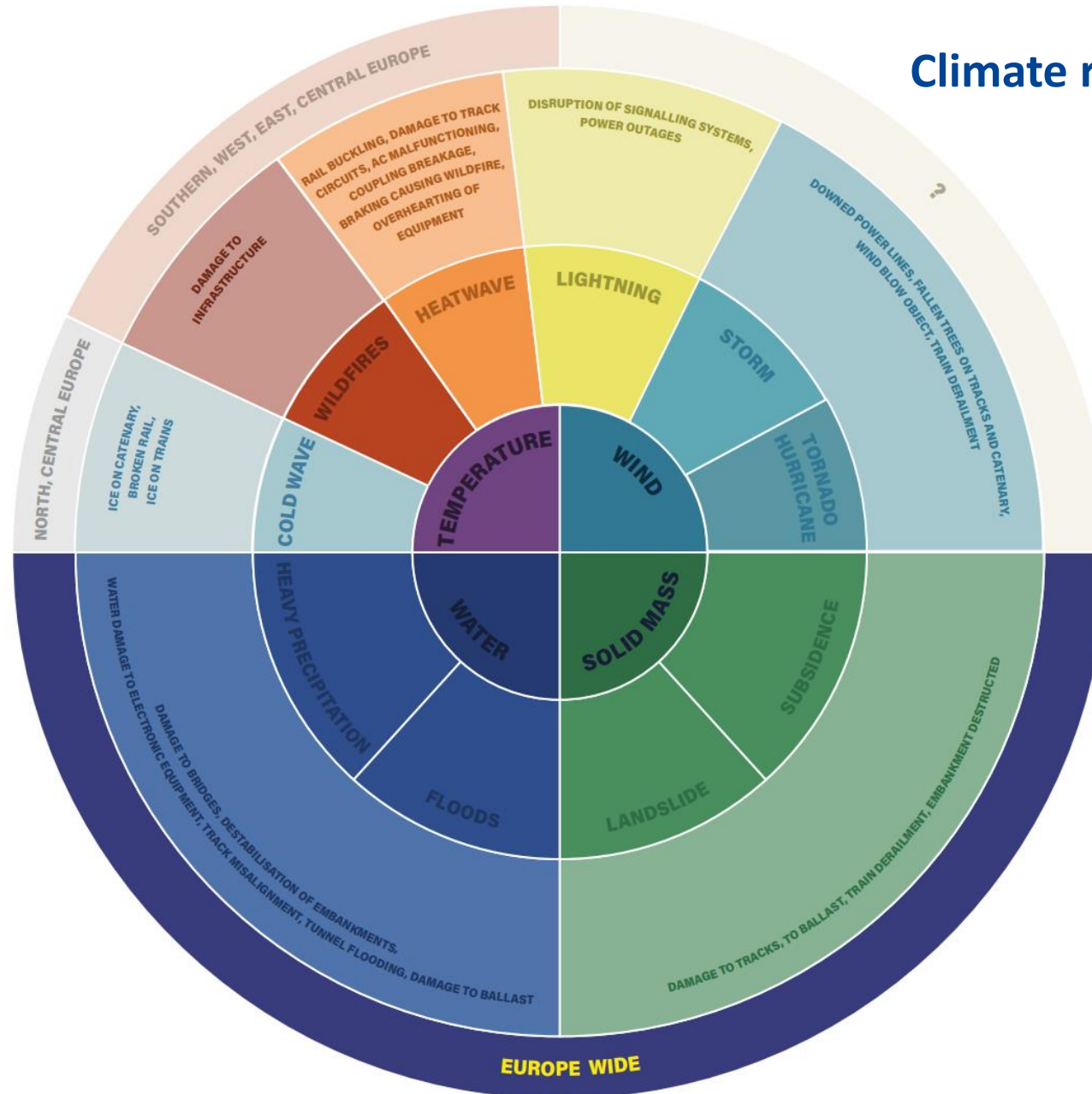
**22/28 respondents**  
(about 80% response  
rate) – 20/22 with  
data (77% of the  
network covered)

**27/28 respondents**  
(about 95% of  
response rate and  
99% of the network  
covered)

Deadline to  
answer: today!

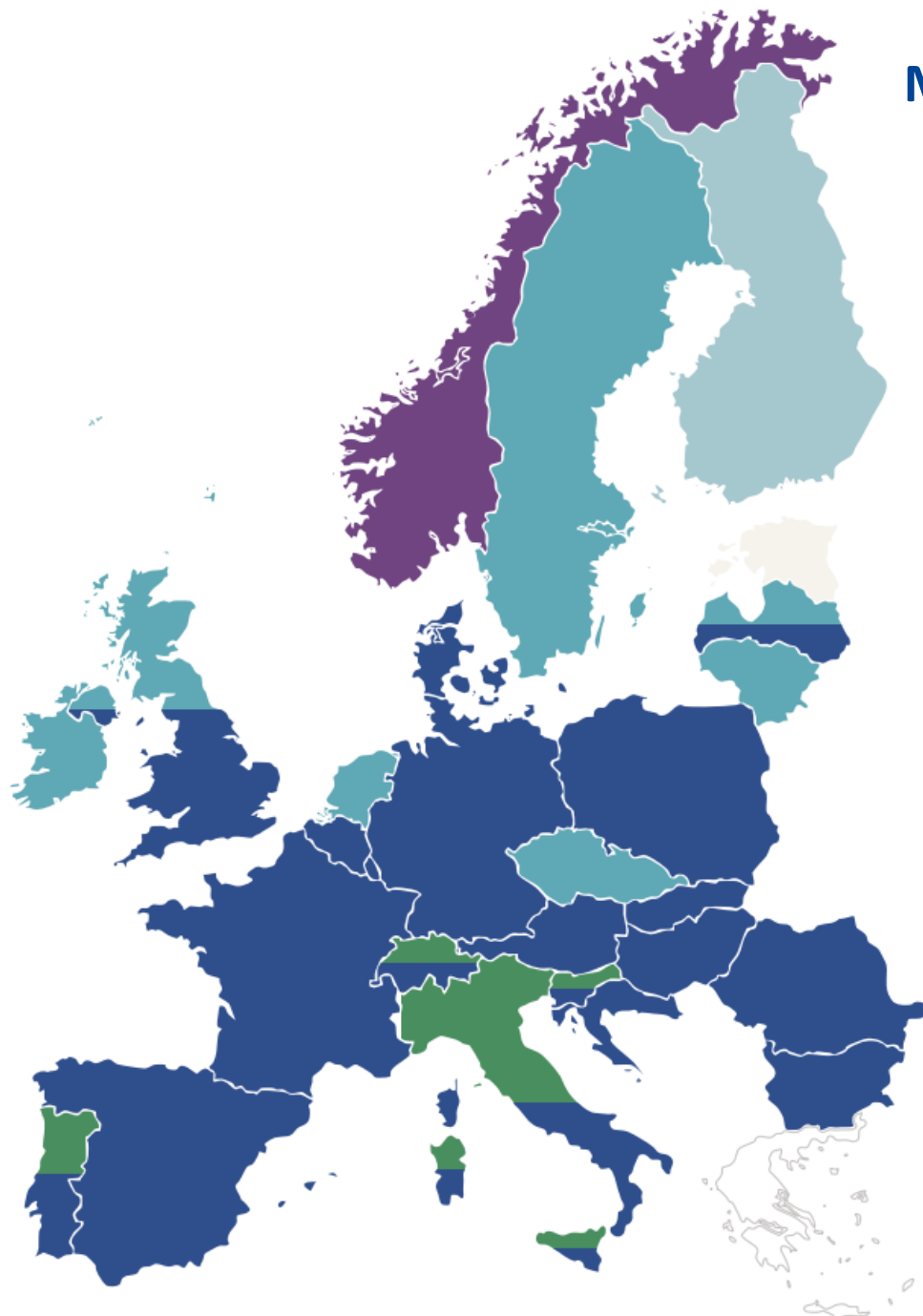
# Climate railway risks wheel

- INNER CIRCLE :**  
CLIMATE PRESSURE
- SECOND CIRCLE :**  
CLIMATE HAZARDS
- THIRD CIRCLE :**  
RAILWAY RISKS
- OUTER CIRCLE :**  
GEOGRAPHICAL SCOPE



REDUCED LEVEL OF SAFETY  
 INCREASED COSTS OF MAINTENANCE AND REPAIR/REBUILT  
 REDUCED AVAILABILITY OF SERVICES (DELAYS, CANCELLED TRAINS)

## Main climate hazard(s) identified per country



**74% of the IMs (20/27)**  
representing 84% of the network covered  
**perceived an increase of the weather events'  
impact on rail operation and infrastructure.**

Different indicators used such as  
delayed/cancelled trains due to  
meteorological conditions, increase in  
exceptional maintenance costs.

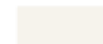
 *STORM*

 *FROST/SNOW*

 *FLOOD*

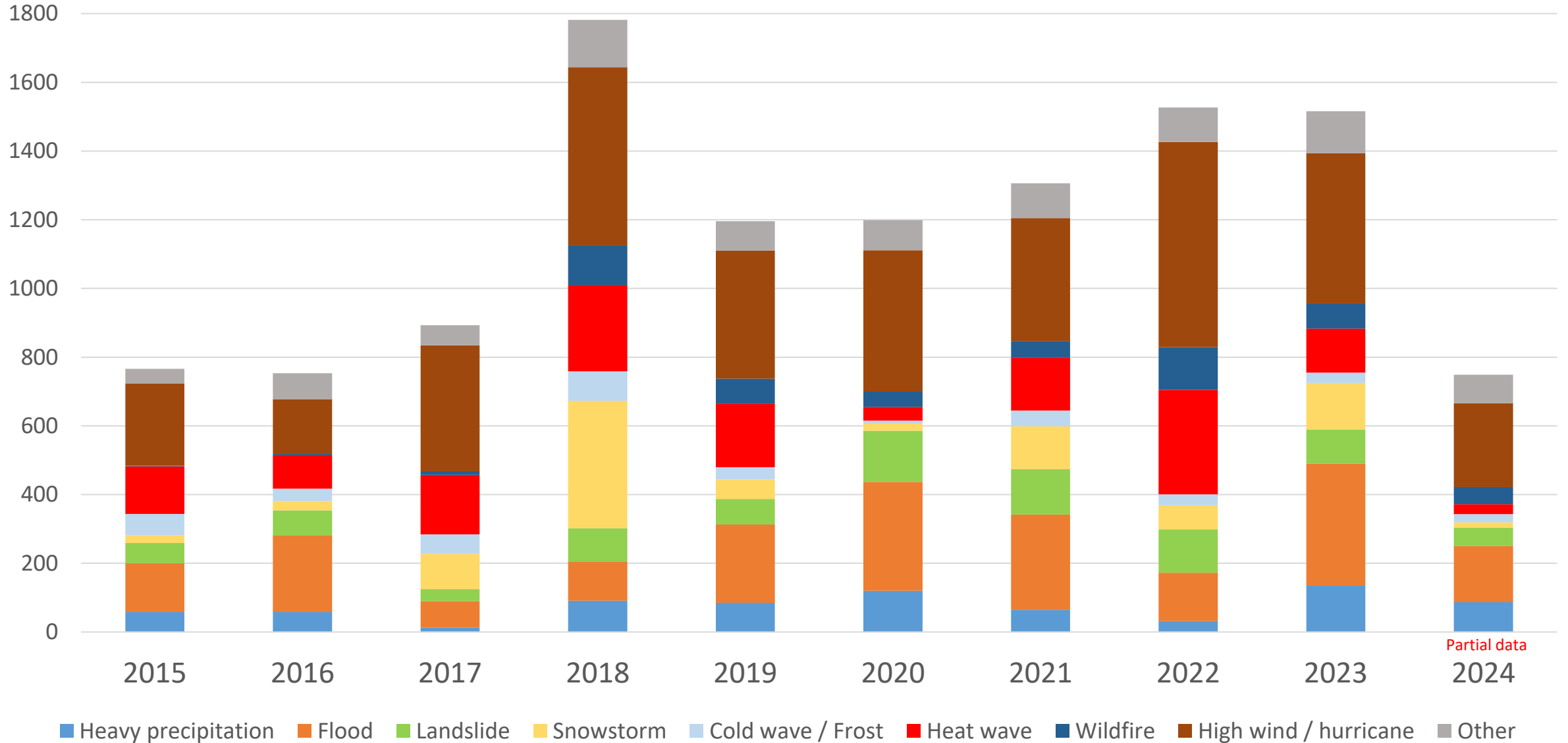
 *QUICK VARIATION IN TEMPERATURE*

 *LANDSLIDE*

 *NO RISK*

# Trend of extreme weather events affecting EU railway system (EU, CH, UK)

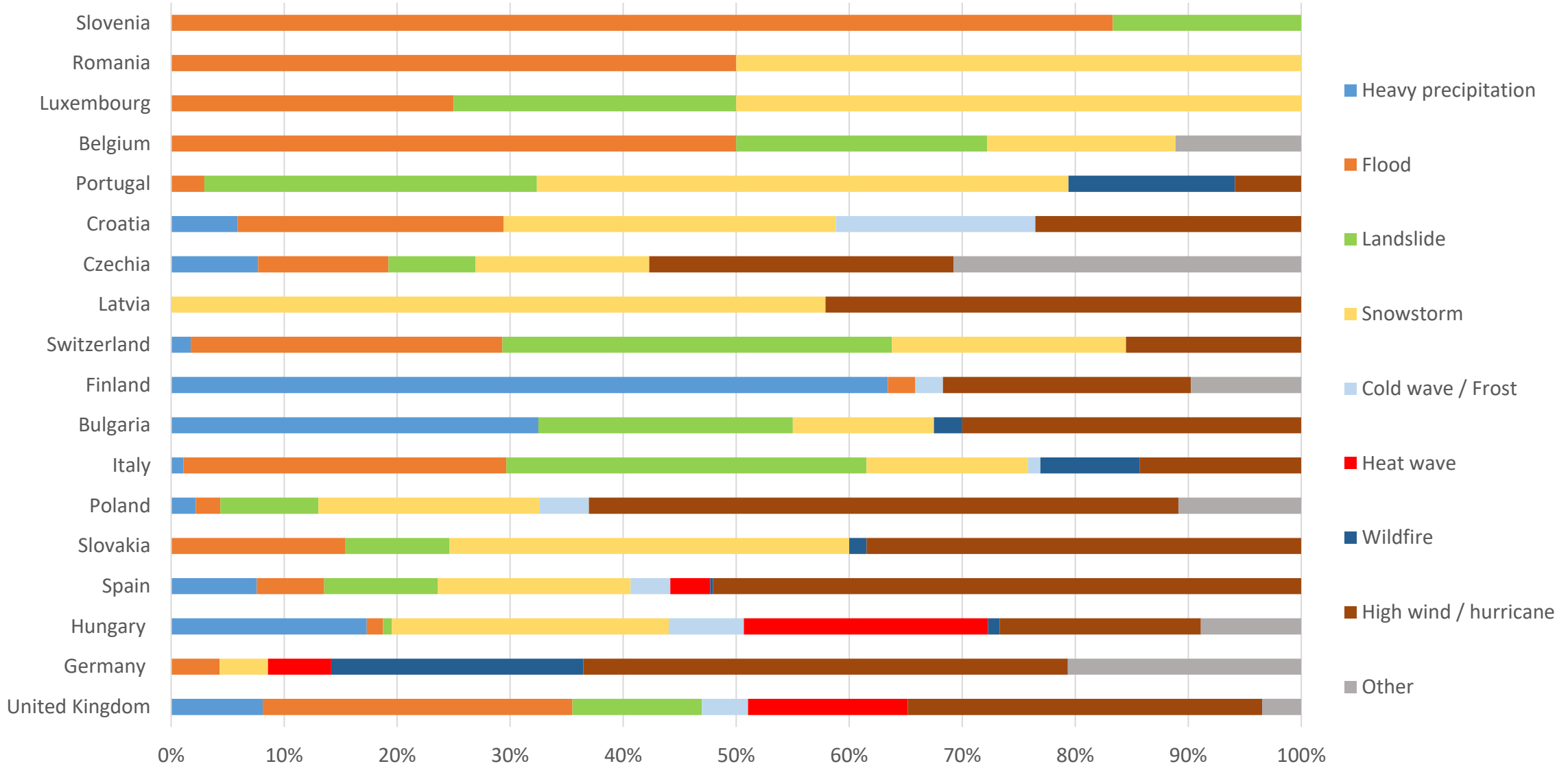
Preliminary results



Partial data

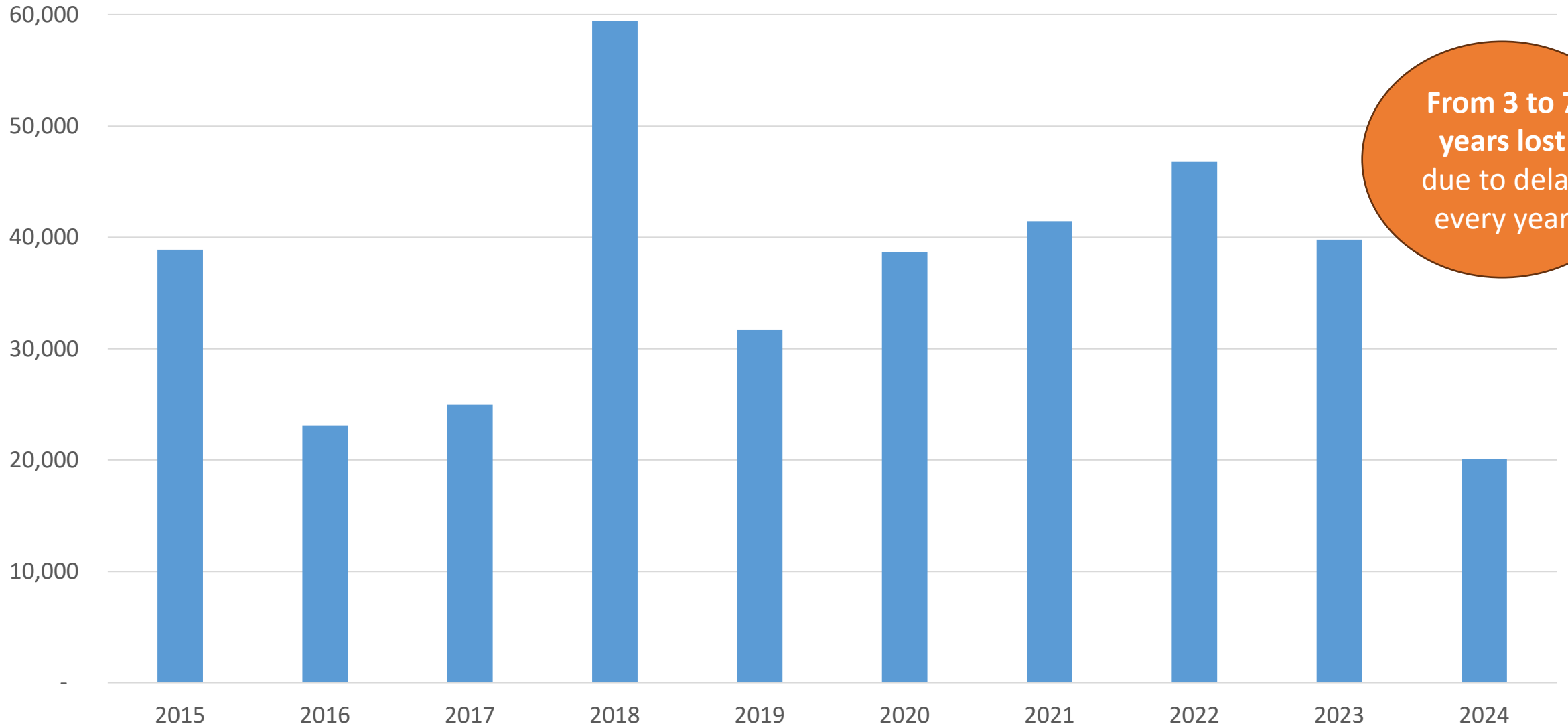
# Extreme weather events by country (EU, CH, UK)

Preliminary results



# Railway delays in hours due to extreme weather events (EU, CH, UK)

Preliminary results

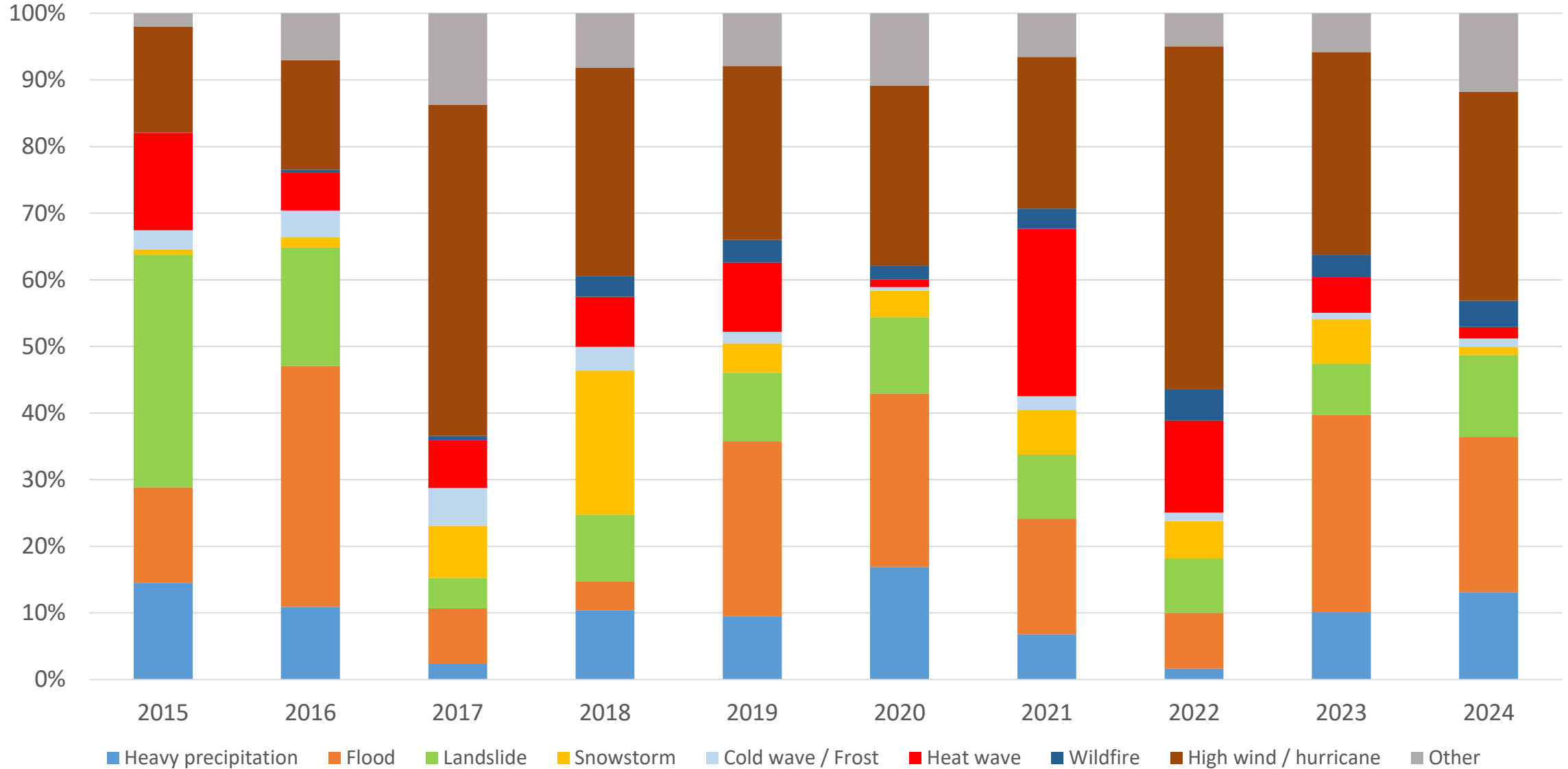


From 3 to 7  
years lost  
due to delay  
every year



# Railway delays linked to extreme weather events (EU, CH, UK)

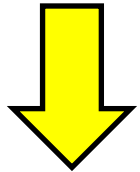
Preliminary results



## Main challenges expressed by IMs

1

Data collection and IT management of big data



37% of the IMs systematically collect data and analyse them.

33% have different databases not interconnected or collect data but without linking them to the cause.

30% have limited data collection

2

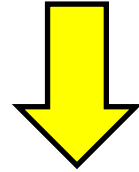
Budget constraint

3

Internal change management and decision making process

4

No common methodology (e.g. risk assessment, climate projection)



26% no climate projection / 37% no adaptation plan

33% climate projection on certain locations / 11% in the process of doing an adaptation plan

41% uses climate projection / 52% have an adaptation plan or a national plan with railway infrastructure covered

**Final goal**

**Building well  
prioritised  
investment plans**

## Some proposals expressed

Common rules/guidelines on:

- Climate risk assessment
- Climate projections' scenarios
- Cost of inaction VS cost of adaptation
- When to suspend operation
- Vegetation/tree management

More financial support

More coordination  
between IMs during  
crisis

Building a resilience metrics  
i.e. define level of  
robustness expected

Better coordination  
between funding  
calls and resilience  
requirements

Develop catalogue  
of best practices

Develop a Landslide  
Directive following  
the model of the  
Floods Directive

### Planned activities:

- Collect inputs during this Conference (thank you)!
- Drafting report – June-September 2025
- Comments from sector – October 2025
- Workshop to exchange on report and potential proposals – 13<sup>th</sup> of November 2025

### Timeline and deliverables:

- Draft report (available to consulted organisations) – end of September 2025
- Final report sent to European Commission – end of 2025
- Final report publicly available – first quarter 2026

# Thank you

Moving Europe towards a sustainable and safe railway system without frontiers.

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