

European Workshop Europe's Rail – Rail4EARTH

ERA study on rail resilience to climate change – Extreme weather events

Idriss Pagand, Eva Valeri

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The **objective of the Agency** is to contribute to making **Single European Railway Area** functioning, while improving the competitive position of the railway sector by:

- Enhancing the level of **interoperability**;
- Developing a **common approach to safety**;
- Issuing **authorisations** for the placing on the market of railway vehicles and vehicle types;
- Issuing **single safety certificates** for railway undertakings;
- Acting as System authority for **ERTMS**.

Link to the report: [Rail & Environment | European Union Agency for Railways](#)

- 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 (1st phase)
 - Assessing and if relevant, proposing changes to the technical European legal framework that could contribute to increase resilience of the railway system (2nd 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)

Study Methodology

30+ documents
reviewed
7 organisations
consulted

Scope of the study
Desk research
Targeted bilateral interviews

Data collection from main IMs
in each European country

24/28 respondents
(about 90% response
rate) – 20/24 with
data (75% of the
network covered)

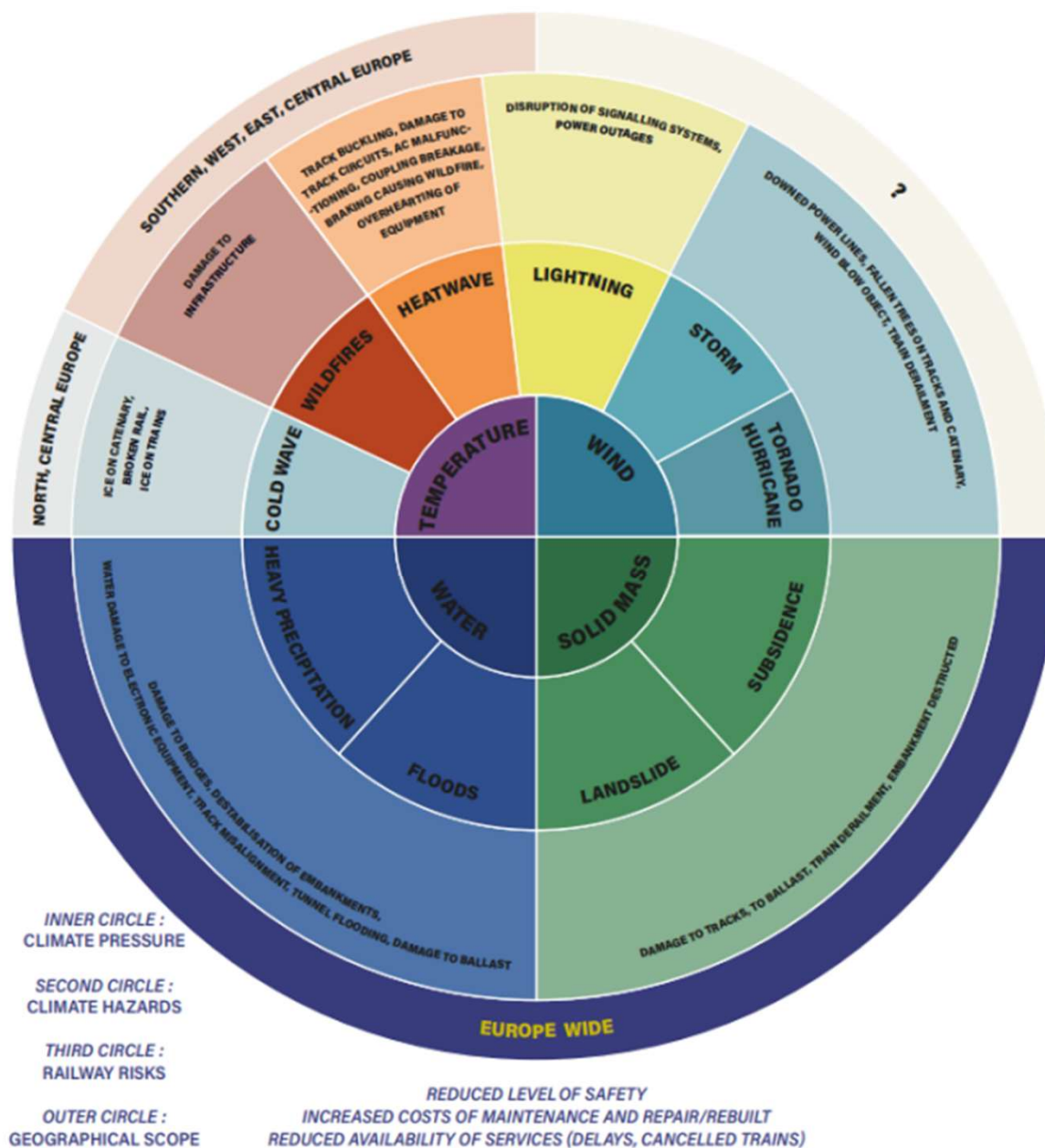
Bilateral interviews on more
qualitative inputs with main
IMs in each European
country

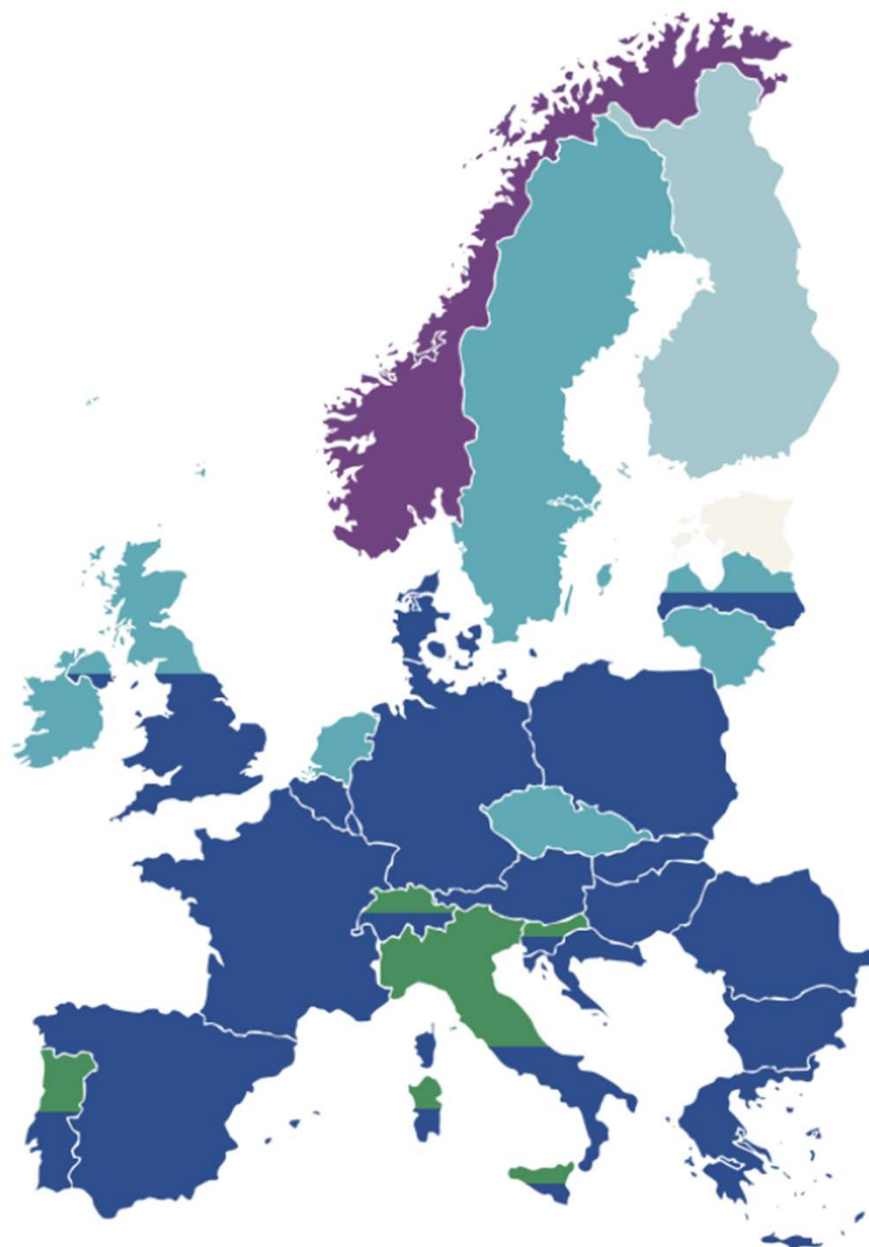
Survey to the **NSAs on their
role in supervision,**
SSC/SA, APS

28/28 respondents
(100% of response
rate and network
covered)

14 out 27 NSAs
replied
(about 50%
response rate)

Climate railway risks wheel

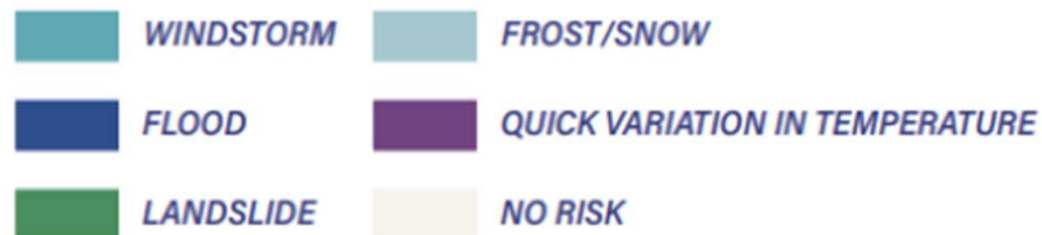




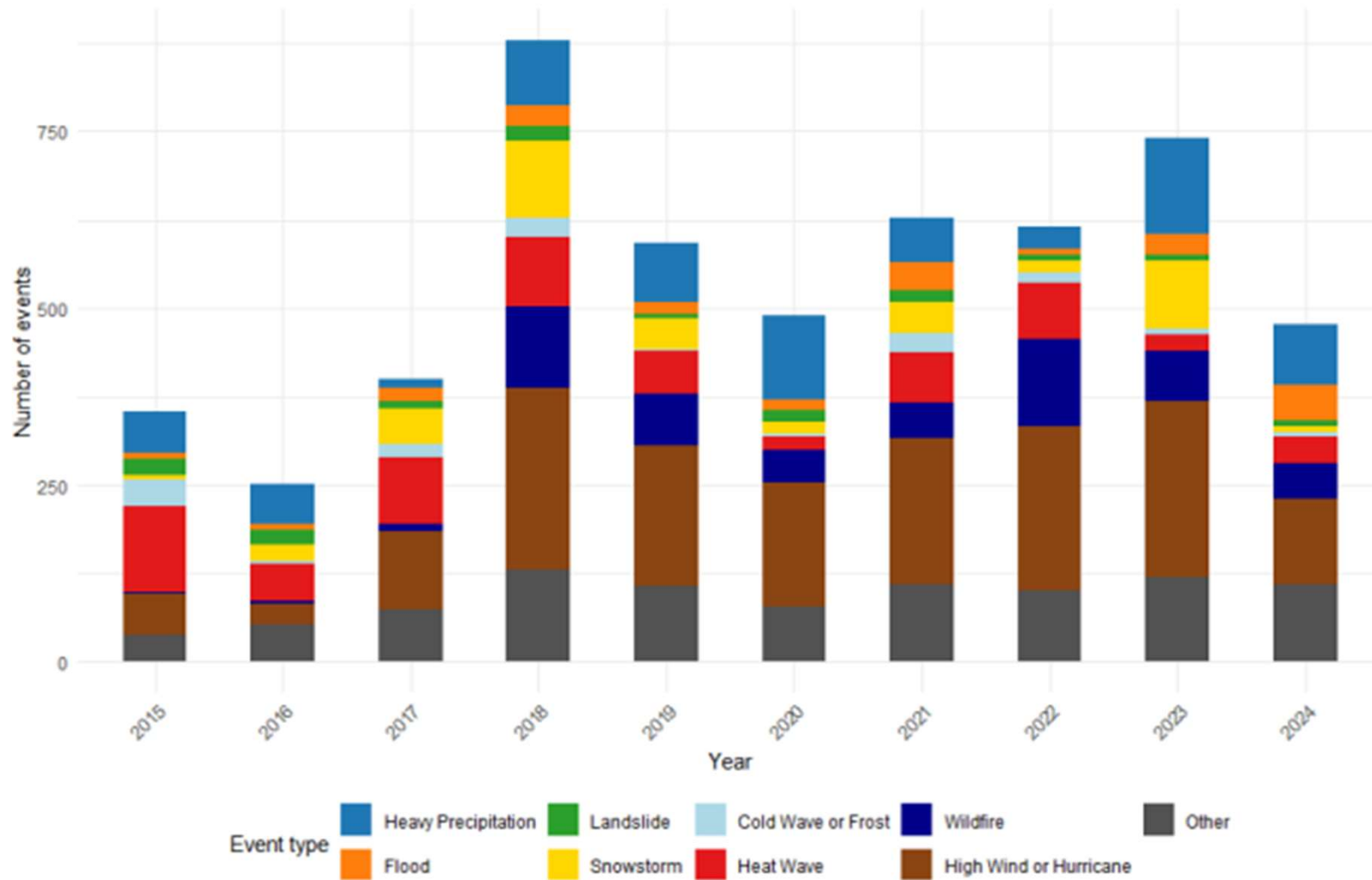
Main climate hazard(s) identified per country

70% of the IMs (19/27)
representing 79% of the network covered
and Network Rail **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 or increase in
exceptional maintenance costs.

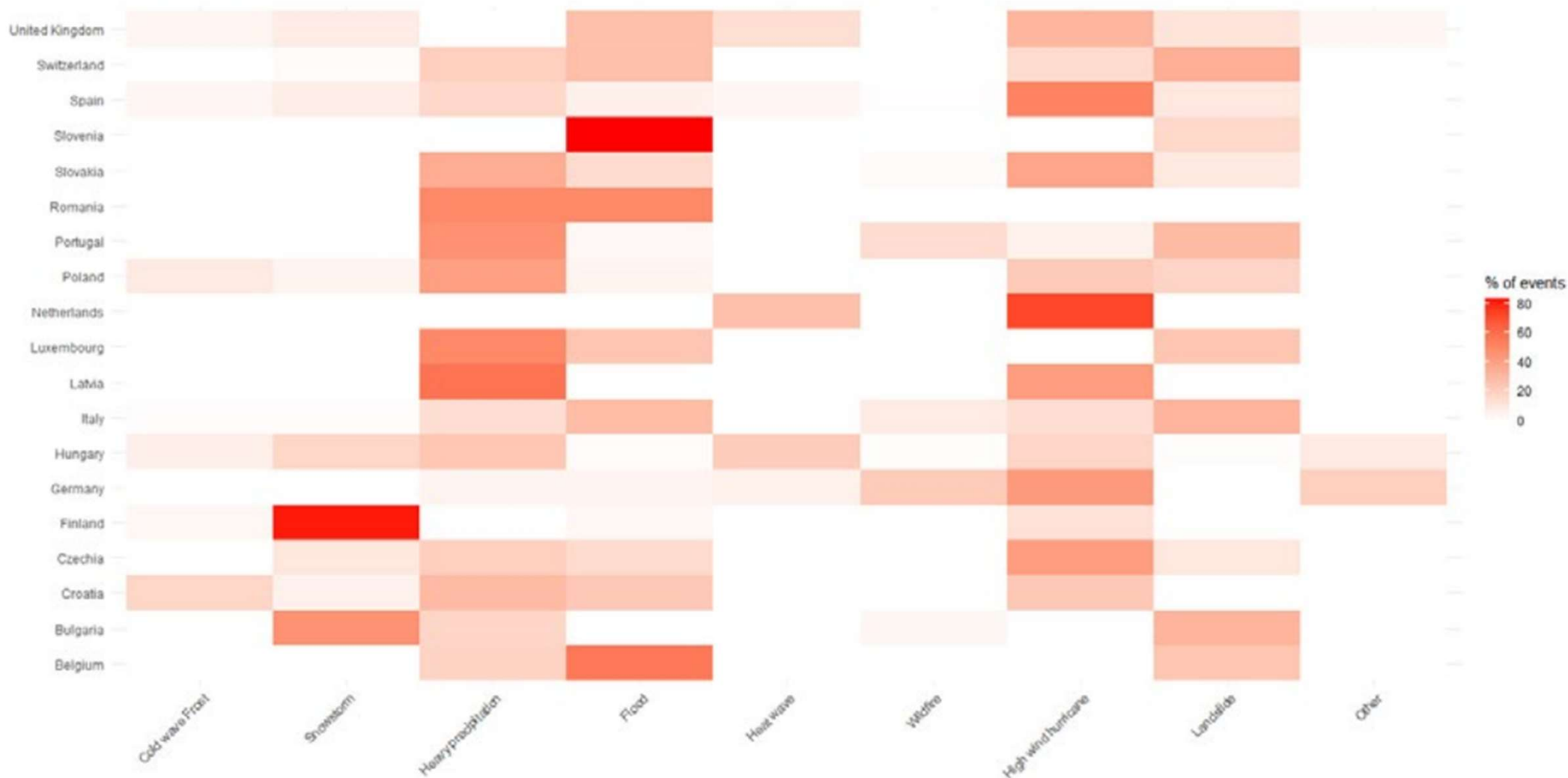


Trend of extreme weather events affecting EU railway system (EU, CH)

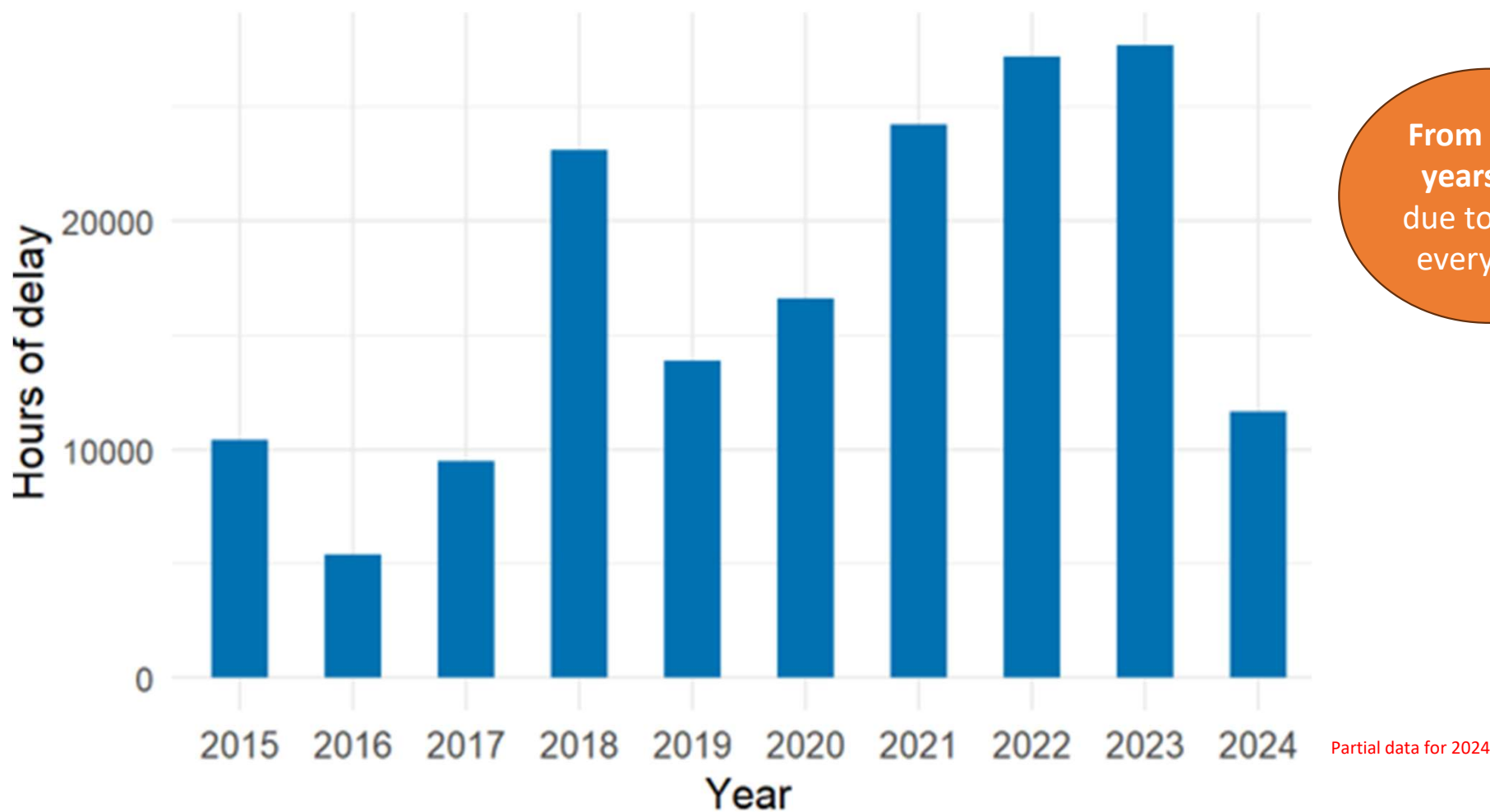


Partial data for 2024

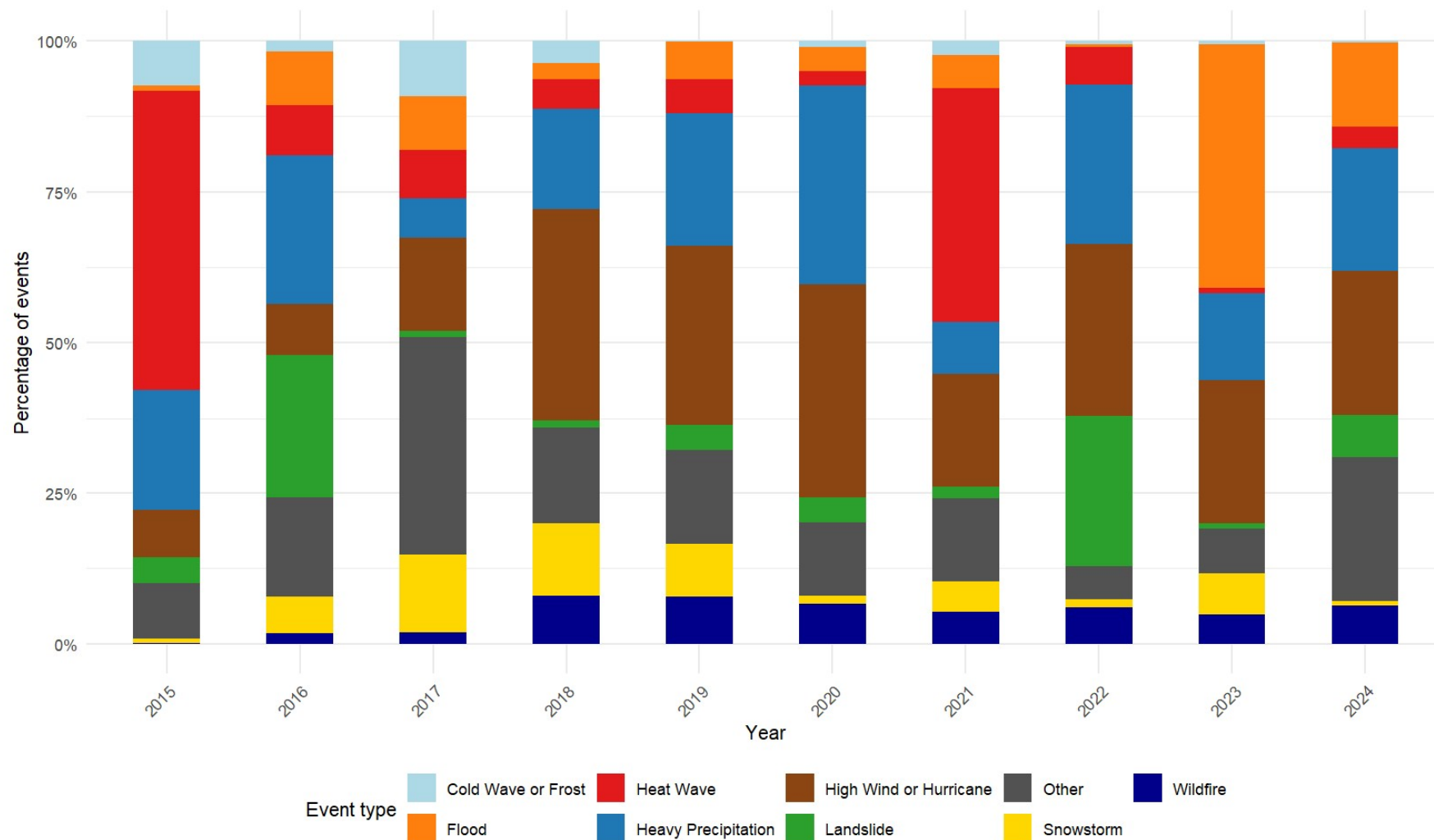
Extreme weather events by country (EU, CH, UK)



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



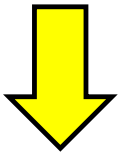
Railway delays linked to extreme weather events (EU, CH)



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

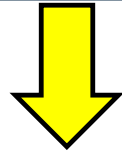
Budget constraint

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**

N°1: Ensure that the initial taxonomy of the CSM ASLP is updated and improved, where needed, to fully satisfy the reporting of weather-related accidents and incidents.

N°2: Extend the scope of CSM RA to cover additional risks (e.g. climate, cyber).

N°3: Ensure higher level of coordination between railway stakeholders in managing crisis linked to extreme weather events within the framework of TSI OPE.

N°4: Ensure that structural TSIs are adapted to face the challenge of resilience to climate change.

N°5: Enhance the capacities of the NSAs to act on the resilience of the railway system to climate change through its supervision activities and of NSAs/ERA through its certification activities.

N°6: Ensure a better coordination between the different networks and working groups on resilience to climate change to avoid duplication of efforts and stronger synergies among stakeholders

Thank you

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

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