



INTERNATIONAL UNION
OF RAILWAYS

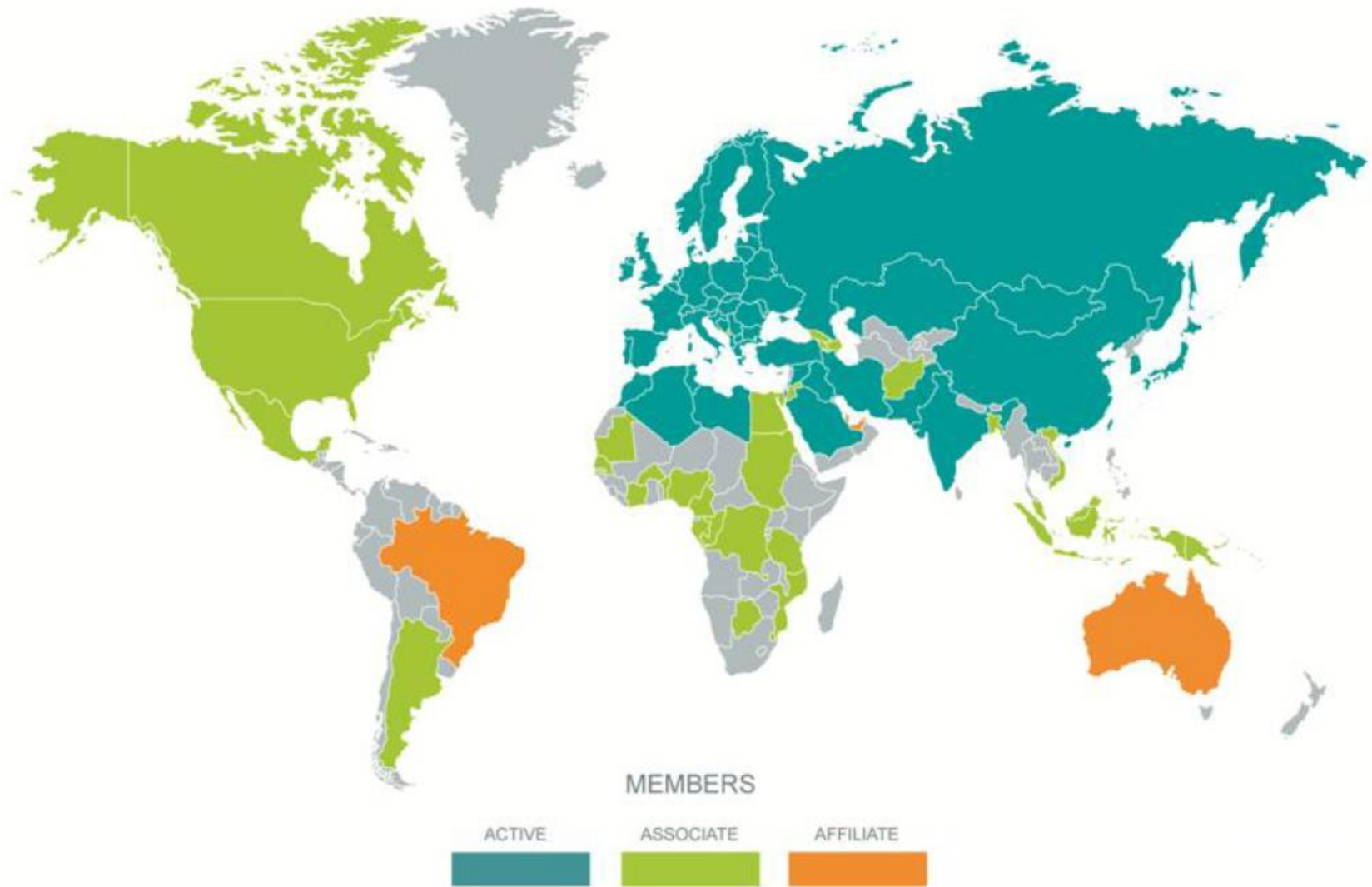
unity, solidarity, universality

Adapting Rail Infrastructure to Climate Change

Group of Experts on Climate Change Impacts and Adaptation for
transport networks and nodes – UNECE

Andrea Braschi, 11 April 2016

UIC in 2015



CLIMATE SUMMIT 2014

CATALYZING ACTION

UN HEADQUARTERS · NEW YORK
23 SEPTEMBER 2014



“I call on the International Union of Railways and their members to set ambitious goals for reducing carbon emissions supported by robust monitoring, verification and reporting.”

UNECE, 11 April 2016



Climate responsibility pledge

The rail sectors needs to maintain visibility and demonstrate a scaling up of action

The Train to Paris steering committee is developing a climate responsibility pledge – to be signed by UIC member CEOs

Four qualitative goals, achievable by all UIC members;

- 1. reduce carbon intensity**
- 2. stimulate market shift**
- 3. actively communicate your actions**
- 4. report performance**

Adaptating Rail Infrastructure to Climate Change

What? Possible consequences and events caused by extreme weather



dry and hot summer



extreme storm events

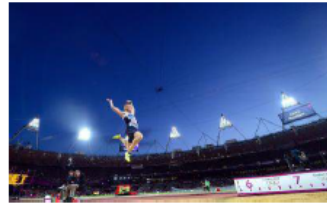


high and low water periods



freeze spell with increasing wet snow

Network Rail budget 2014-2019



One Olympic Games

£9bn



Man Utd, Barcelona and Real Madrid

£5.5bn



One aircraft carrier

£6bn

What could you buy for £29.8bn?



20 hospitals

£2bn



20 Superjumbos £4bn



100 schools

£1.5bn

Source Andy Kirwan Andy Kirwan – Chair, UIC Asset Management Working Group

Impact of adverse weather to Network Rail 2006-2015:

- > 1.6 Million minutes lost per year
- > 12% per of all delays
- > 50£m compensation to train and freight operating companies



Tomorrow's Railway and Climate Change Adaptation (TRACCA)

- > A Railway Safety Standard Board (RSSB) funded research study
- > Explores the need to increase the resilience of the GB railway in response to anticipated changes in key climate variables.
- > Phase 1 (delivered autumn 2015): Comprehensive knowledge review and knowledge gap analysis
- > Phase 2 (out in spring 2016) Improve knowledge of climate change vulnerabilities and develop support tools to increase resilience of the GB railway.

Key questions the research addresses

- **Projected climatic change** in the UK over the next 50 years
- **Impacts** of climate change and extreme weather on the railway
- **Actions taken** by GB rail industry in response to these potential impacts
- **Proposed future actions**, including 'quick wins' which can be implemented over the next few years
- Requirements for **additional decision support frameworks**, processes, and tools, to permit cost-effective action to be taken

Phase 1 recommendations

- Develop existing **infrastructure design and maintenance** approaches, especially for earthworks.
- Implement lifecycle costing and **adaptive pathways approaches**, including consideration of re-routing key routes
- Increase and **integrate good quality data** about assets, weather events and operations to inform predictive modelling and response
- Enhance the industry's ability to model and **predict the impacts** of combined and successive weather events.
- Improve **communications** about weather events and climate change
- Review all relevant design and **operational standards** and guidance (ie ISO, BS, UIC).



CONCLUSION:

Adapting Rail Infrastructure to Climate Change

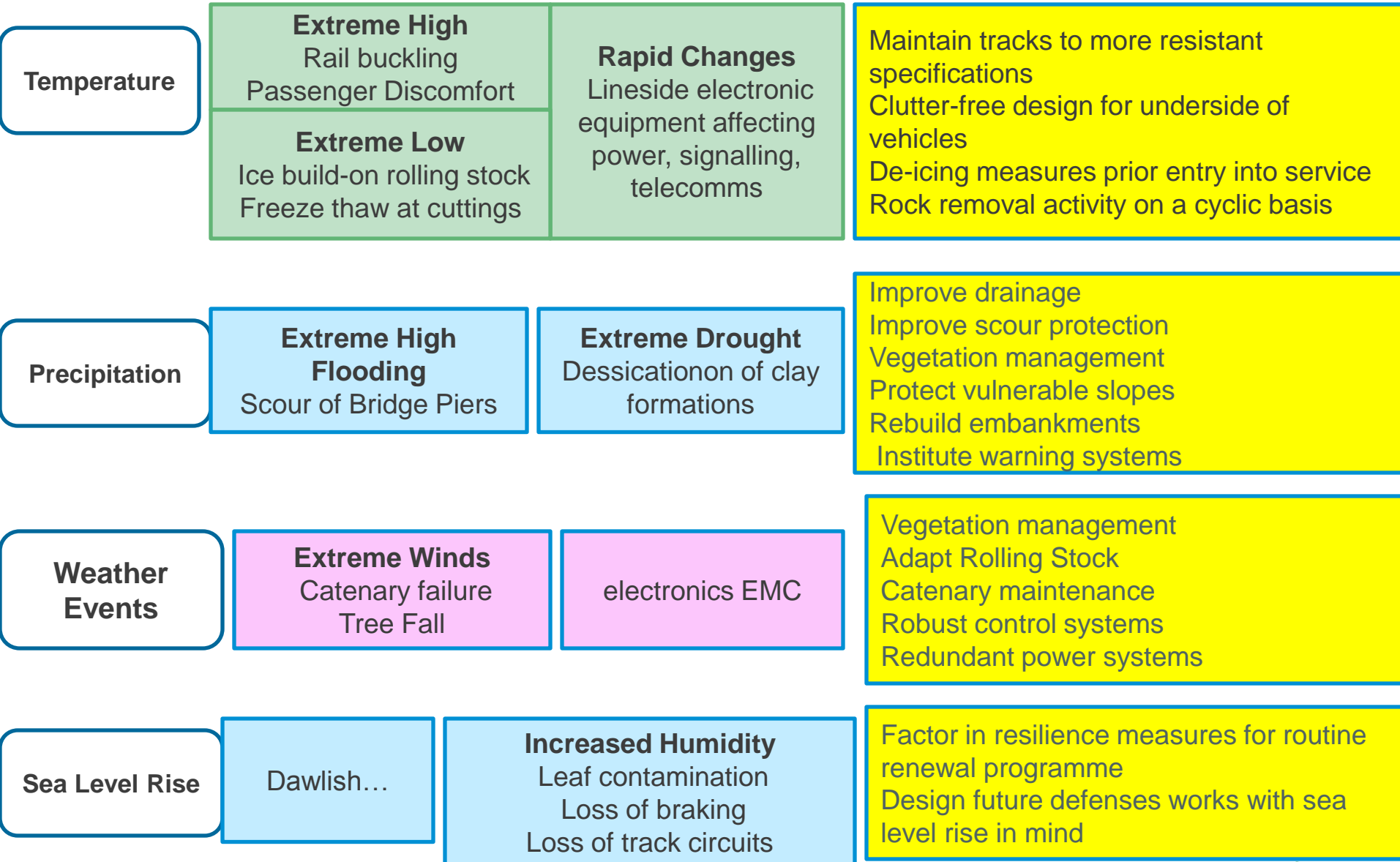
- Railways have an **extremely long life time** and are constructed to withstand natural hazards, such as i.e. the 50 years flood.
- However, as number and intensity of incidents will arise, also the **pressure on the capacity** of the rail system will rise together with the costs of the sector in the future.
- If the right measures are taken at the right time, the **risk will be bearable**
- **International cooperation** and coordination are needed for example when impacts that might be new for one region, already are well handled in other regions.
- **UIC is developing a common framework for Weather Resilience and Climate Change Adaptation**



■ ■ ■ Thank you for your kind attention

Andrea Braschi, braschi@uic.org

Impacts and potential resilience measures



| Climate change related risk for GB railway system | Theme of recommendations | Specific key recommendations (with relevant climate variables in brackets) | Time scale for action | System |
|--|---|---|-----------------------|------------|
| Increased risk of flooding from heavy rainfall events, high sea levels and storm surges with consequences for resilience of infrastructure and assets. | Adaptive pathways and lifecycle cost analysis for reducing vulnerability of infrastructure, assets and operations | Take an adaptive pathways approach, such as that developed by the Thames Estuary 2100 project to the long term management of the GB railway to improve the resilience of infrastructure to flood risk and storm damage (High precipitation, High winds, High sea levels and storm surge). | Long Term | Infra |
| Potential increase in impacts of adverse, extreme or critical weather events on resilience and performance of assets and operations. | Communications and information before, during and after adverse, extreme or critical weather events. | Undertake research to identify and develop ways of improving the cascade of communication from a given meteorological forecast provider to Network Rail to TOCs to passengers before and during hot weather, snow, rain, wind and storm surge events (High temperatures, Low temperatures, High precipitation, High winds, High sea levels and storm surges). | Short Term | Operations |
| | | | | |

Conclusions – Public Private Partnership

- The modern rail sector is a varied mix of private operators, public service franchise contracts, and nationally owned companies
- A key requirement is strong cooperation on climate forecasting :
 - Adaptation of infrastructure needs detailed information about impacts at the local level
 - Rolling stock has a long lifetime, so manufacturers need to know the operating conditions for 30, 40 even 50 years ahead
- The broader issue is making the railways resilient to climate change
 - Updated standards may be needed for new infrastructure. A greater challenge is existing infrastructure which may be over 100 years old!
 - Railways are now working on detailed, costs and plans for adaptation, and additional investment may be required

Adaptating Rail Infrastructure to Climate Change

Why?

Adapting to the growing risks that the increasingly higher frequency of extreme weather events (with increasing higher intensity) is a newer challenge for society and for the rail sector.

ARISCC is about preparing rail infrastructure for when 'today's extreme weather becomes tomorrow's normal weather' !

The results are needed by:

- Governments for long term planning and financing infrastructure projects,
- Infrastructure managers for planning and managing the risks,
- Companies within the risk assurance and construction business.