

Climate Change Adaptation in the Transport Sector

Experience from Project Preparation and Network
Management

JASPERS Networking Platform Event, 6 December 2017, Brussels



Summary Report and Key Messages



Index

Overview

Session 1: Analysis of Climate Vulnerabilities on Transport Networks

Session 1: Lessons Learnt and Discussion Outcomes

Session 2: Assessment of Climate Risks for New Projects

Session 2 : Lessons Learnt and Discussion Outcomes

Session 3: Awareness Raising and Information Sharing
Within and Between Countries

Session 3: Discussion outcomes

Overview

Following up on previous Networking Platform events on the topic of climate change adaptation, this interactive event focused more specifically on experience from the transport sector, to share best practice examples between experts working in transport authorities and related stakeholders.

The workshop was designed as a combination of presentations and case studies that facilitated a discussion forum in which national authorities from thirteen countries: Croatia, Hungary, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, and Spain; exchanged experience and thoughts on relevant topics related to climate change adaptation, in three main areas:

- Experiences in the analysis of climate vulnerabilities on existing transport networks, identifying hotspots, managing risks and adaptation plans;
- Experiences in the assessment of climate risks for new transport projects, looking at the methodologies implemented and practical project examples;
- Best practices for disseminating information, raising awareness and sharing experiences within and between countries.

The detailed agenda of the event, along with the presentations given, are available on the JASPERS Networking Platform Website: [Event Page](#).

Session 1:

Analysis of Climate Vulnerabilities on Transport Networks



The first session included presentations of best practice examples from Spain, Poland, Portugal and the Netherlands, on how they analyse the climate vulnerabilities of their transport networks. This was followed by group discussions on the topic.

Alberto Compte Anguela from CEDEX, Spain (a public organisation providing technical assistance and developing research for the ministries of environment and transport) started the session with a presentation on [“Identifying the climate change hotspots in the Spanish State-owned inland transport network”](#) . He explained how CEDEX coordinated a working group on the adaptation needs of the core transport infrastructure network in Spain between 2012 and 2013, which resulted in a [report providing a qualitative analysis](#). In 2016 this work was further developed and an analysis is now underway to identify the hotspots. This analysis is based on GIS and looks at the criticality, exposure and sensitivity of the network sections. The work has so far determined that the most critical areas of the network are around the main cities in Spain, along the coast and the main north-south axis. The main climatic stressors, that the networks are and will be exposed to, have been identified, whilst work on analysing sensitivity is ongoing.

Grzegorz Łutczyk from GDDKiA (the Polish National Road Authority) provided a presentation on their work [mapping climate vulnerabilities on the existing national road network in Poland](#) . He explained that in 2016 GDDKiA initiated the work on a climate change adaptation strategy for the national road network. As a first step, in order to identify the main hazards affecting the road network, a survey was conducted with the regional branches of GDDKiA, to gather data on extreme weather events that caused the intervention of the maintenance services over the past 10 years. Certain conclusions could already be made at this stage about the main hazards and the main seasons when they occur. Further work is planned to verify these results against meteorological data and further integrate climate change projections to provide proposals on climate change adaptation measures and actions for the existing network and future developments. This work is undertaken with the support of JASPERS.

Rui Velasco Martins from the Instituto de Movilidade e dos Transportes (IMT) of Portugal gave a presentation on Portugal's experience in [Adapting Transport Authorities to Climate Change Adaptation](#). Portugal has a transport working group for Climate Change Adaptation, which was recently established as part of the 2nd version of the National Strategy for Climate Change Adaptation (ENAAAC 2020). Analysis of climate change scenarios has been carried out for Portugal and the easily accessible information can be found on the [national climate portal](#). In order to analyse the climate vulnerabilities of the transport network, the working group carried out a survey of the relevant transport entities, regarding their assessment of climate change impacts and adaptation of their respective transport infrastructure. Next steps include cross checking the results of the survey with extreme weather events, potential amendments to transport policies following examples from other countries, and preparing an action plan for transport adaptation.

Kees van Muiswinkel from Rijkswaterstaat, the Ministry of Infrastructure and Water Management of the Netherlands provided a presentation on [the assessment of risks for highways in the Netherlands due to Climate Change](#). He highlighted that 60% of the Netherlands is under flood risk, meaning that climate change considerations have been present there for a long time already. There are different levels of adaptation, including the durability of materials, the adaptation of infrastructure objects and the functioning of the networks. We need to be considering all of these levels when designing resilient transport. Several methods and tools were presented including a 2012 analysis of the blue spots (e.g. areas vulnerable to flooding) which has helped decision making regarding future investments. There are various tools and examples available but there is still more work to be done to integrate the topic fully into the normal processes and policy. This is potentially due to the fact that the topic really needs long term thinking and strong visionary leadership, as adaptation requires short term costs and results in long term benefits.

Session 1:

Lessons Learnt and Discussion Outcomes



Elisabet Vila Jordà from JASPERS summarised some of the key considerations and lessons learnt:

- Weather and climate change is impacting transport infrastructure and we need to improve our understanding of how to deal with this impact.
- It is useful and recommended to identify relevant climate hazards and existing networks vulnerabilities (e.g. hotspots) in a GIS system.
- It is recommended to set up monitoring and data collection systems for weather related events (if such systems are not yet established), surveys with transport operators and maintenance authorities may be useful as well..
- Climate projections are needed to ensure that the analysis looks at climate change and not just current or historic climate. This needs to include trends analysis and projections and account for the levels of uncertainty with scenarios.
- On the basis of those analyses, it is necessary to establish action plans, identifying actions, measures, milestones and responsible parties.
- The experiences presented shows that there are good examples of such analyses being undertaken in practice.

The following can be summarised from the discussions, both after each of the presentations as well as during the group break-out discussions:

1. There are **broad differences between countries** in terms of the availability of national adaptation strategies and nationally developed data including climate projections. Most EU Member States have National Adaptation Strategies in place, or at least have studies undertaken at various levels, either nationally, regionally or locally. However, the level of detail of these strategies, and the applicability to the transport sector, varies greatly.
2. The examples of network analysis provided in this session were found by the participants to be useful and potentially **replicable in other member states**. Given the relative simplicity of the analysis undertaken and the great benefits that such studies could bring, it was considered that mapping vulnerable hotspots on networks is a practice which should be further developed. JASPERS support in this area was considered to be beneficial, for example, the support to Poland described above. This is an example of where JASPERS could provide further **technical advisory support** to member states on the development of network analysis.
3. The importance of **climate change projections and adaptation scenarios** was stressed. Guidance on a national or even EU level would be useful to define the projection scenarios to be used. This would result in a more consistent approach

and give us more clarity on what to plan for whilst also ensuring that the uncertainty of future climates is accounted for.

4. **Involving the right people** in the analysis is key. Inter-ministerial cooperation is often very difficult, but the nature of climate change means that it is not the responsibility of one organisation alone and needs improved cooperation between the various actors. Additionally in identifying climate hotspots it is important to understand the local knowledge and involve the relevant people who are working with this infrastructure on a daily basis, the operational and maintenance experts.
5. It should be stressed that this **network based approach** is different and provides a more comprehensive overview than the project based approach. Going beyond the minimum EU requirements for financing infrastructure, into managing climate adaptation risks for the operation and management of transport networks.



Session 2:

Assessment of Climate Risks for New Projects



The second session included presentations of best practice examples from Norway, the Netherlands and Croatia, on how they assess climate risks in new projects and how they manage climate hazards during operations. This was again followed by group discussions on the topic.

The first example was provided by **Martine Holm Frekhaug** from NPRA, the Norwegian Public Roads Administration, who gave a presentation on [Climate Change and the Norwegian Road Network](#). She highlighted that their work on climate change adaptation is underpinned by the report: [Climate in Norway 2100](#), a webportal on climate, and collaborations with other agencies. Norway is expecting to see an increase in precipitation, a shorter snow season and more flooding, resulting in a greater risk of landslides and avalanches. The management of these hazards is considered at planning, construction, operation and maintenance. NPRA is analysing the events that lead to road closures, including weather related risks and in particular how to improve forecasting avalanche and landslide risks using new technologies and real time information from contractors operating on the roads.

Mike Woning from Deltares, an independent research institute in the Netherlands, provided a presentation on [Increasing Transport Resilience: The ROADADAPT framework in practice](#). More extreme weather events are affecting transport infrastructure, therefore efficient asset management is an increasing challenge together with higher demands from society. Mike presented a number of different methods for risk assessment and asset management. The ROADADAPT method is based on the basic steps of defining hazards, assessing impacts to evaluate risks and prioritising actions to ensure resilience, using interactive workshops this method gives semi-quantitative results. WATCH is an ongoing research project which provides recommendations for water management in road systems. An example from Paraguay demonstrated how mapping vulnerability can allow road operators to priorities monitoring requirements. The use of adaptation pathways was also presented as a method of assessing different adaptation options.

The final presentation was provided by **Boris Majić** from Hrvatske Ceste (Croatian Roads), who presented the [Climate change vulnerability and risk assessment that has been undertaken for the Gradiška Bridge project](#). The project is a bridge crossing the Sava River and is developed jointly between Croatia and Bosnia Herzegovina. The assessment methodology was based on the “Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient”, together with their experience of undertaking similar assessments in recent years. Croatia does not have a National Adaptation Strategy in place yet, therefore climate data and forecasts to feed into the assessments are obtained on a project-by-project basis. Following the assessment, adaptation measures were fully integrated into the design, with no need for significant additional costs. Adequate monitoring was also proposed for the operational phase to ensure the implementation of additional measures when needed, for example in the case of water evacuation.

Session 2:

Lessons Learnt and Discussion Outcomes



Elisabet Vila Jordà from JASPERS summarised some of the key considerations and lessons learnt:

- It is important to take climate change impacts into account as early as possible in the project development, though it is not always easy to integrate it into normal processes, particularly for more mature projects at an advanced stage of preparation.
- With that in mind, it is relevant to stress that the climate change adaptation vulnerability and risk assessment principles can be followed at any project stage and the process should be iterative.
- Adaptation measures can be integrated into projects from the design stage through into the operation stage.
- Options for measures can be assessed based on their cost effectiveness and considering asset management and defined performance levels for different project sections (for example the acceptance of road closures).
- Increased awareness and cooperation between stakeholders is key for successful adaptation action.

The following can be summarised from the discussions, both after each of the presentations as well as during the group break-out discussions:

1. Again there are **broad differences** between countries in how they integrate climate change adaptation considerations into planning and developing projects. Whilst the EU requirements are useful for motivating beneficiaries to integrate adaptation considerations into the feasibility and design stages, in many cases this may be at a superficial level. More needs to be done to make sure it is truly integrated throughout all stages, including the early stages of strategic planning through to the post implementation stages of operation and maintenance. It was recognised that very often climate considerations are being factored in to the design of projects but it may not necessarily be identified as such, and it may not be truly covering the climate change element in terms of future projections. Additionally there are issues in terms of communication. Project developers are often doing a lot but are not able to communicate this effectively using the right terminology.
2. **The availability of adequate input data** is crucial. In the countries which have good quality adaptation strategies in place or who have undertaken more detailed network analysis, this high level information and data provides a robust basis for project level assessments. In countries where this national level data is lacking it is harder, although not impossible, to defend projects on a case-by-case basis with less confidence that the input data used is relevant and accurate. New information is available from DG CLIMA which outlines the climate change adaptation preparedness of each EU Member State in the form of [draft country](#)

[fiches](#). Such information together with the country information on [Climate ADAPT](#) may be useful in finding more relevant national data.

3. The issue of **uncertainty** can be difficult to deal with in the design stage. This should be duly recognised that the future is uncertain and even more so with climate change. However, solutions can be found through the implementation of **"no-regret" adaptation measures**, particularly operation and maintenance measures. Or through analysis of **adaptation pathways** where various adaptation options are assessed, including options with a combination of monitoring and later implementation of measures to find the most cost-effective solutions for now and the future.

4. As experience on the topic develops, existing **guidance may need to be further refined**. For example the current guidance available from JASPERS ([The Basics of Climate Change Adaptation, Vulnerability and Risk Assessment](#)) allows a lot of flexibility in approaches. Depending on how it is applied, this can have both benefits, in terms of developing newer better methods, and disadvantages, in that there are no strict requirements. When more assessment examples are gathered, this guidance (and others, for example the DG CLIMA non-paper) may need to be updated.

Session 3:

Awareness Raising and Information Sharing Within and Between Countries



The concluding session focused on sharing examples for how to raise awareness of climate change adaptation, disseminate information and improve cooperation to work together more effectively on the topic, both within and between countries.

Rui Velasco Martins (Instituto de Movilidade e dos Transportes) from Portugal described the organisation of a **Transport Working Group for Climate Change** in Portugal (as set out in his earlier [presentation](#)). This technical level group includes eight different entities (transport operators and managers from all modes). They meet once every three months and are working on a commonly agreed action plan.

Kees van Muiswinkel from Rijkswaterstaat, Netherlands, explained the work of **CEDR** ([Conférence Européenne des Directeurs de Routes](#)): A platform for cooperation between National Road Authorities) on Climate Change Adaptation. CEDR has a climate change adaptation working group who have undertaken various studies and research calls resulting in several reports and tools (some of which were described in the earlier [presentation](#)). The results of the working group's research is publically available, however, membership of CEDR and participation in the research calls involves a small fee. Current climate change research calls in CEDR include the [WATCH](#) and [DeTECTOR](#) projects. CEDR will also showcase some climate change related work at the Transport Research Arena in Vienna in 2018.

Sarah Duff from JASPERS provided an overview of [JASPERS areas of activity](#) in relation to climate change adaptation, and the support provided to different EU Member States. This includes advisory support in project preparation, independent quality review for projects submitted for EU financing and knowledge sharing and capacity building. In particular, technical advice is provided on analysing climate change aspects in projects from different sectors and the organisation of relevant workshops and knowledge exchanges on climate change.

Session 3:

Discussion Outcomes



The following conclusions can be taken from the joint group discussion during this session:

1. **Multi-country sector based working groups** were considered to be very useful, for example CEDR. The discussions held in this current event were seen as a compliment to the CEDR working group and other similar groups, as a way of transferring the knowledge and research results to a greater number of people.

Further development of a platform of exchanges regarding climate change and transport would be welcomed. This may be through additional JASPERS workshops, following-up on the present one and widening the audience to reach a greater number of relevant people, or through other experience exchanges between countries. The aim of such events would be continued awareness raising for all relevant stakeholders as well as further development of specific and practical knowledge on the area.

2. Many countries have **national level working groups** on either a permanent or temporary basis. Portugal and the Netherlands have ongoing permanent working groups set up. Whilst Romania and Poland set up temporary working groups to deliver their climate strategy and guidance documents respectively. Such working groups were considered to be a useful method of communication. In some cases the discussions are more informal, such as in the case of Spain, where there is a focal point in the Ministry of Transport and an informal network exists among interested individuals. National Climate Portals can also be useful methods of disseminating information. The Spanish climate portal (similar to climate ADAPT) is used for this purpose.

3. Additional support from JASPERS, to help national authorities establish **country level training and workshops** on climate change adaptation, would be useful to disseminate the information and share experiences with a greater number of people, including transport authorities in cities and regions. This would complement the advisory support that JASPERS provides at project level, which will continue and be further enhanced through such discussions and through better access to available data at national levels and best practices.

The JASPERS Networking Platform was created to complement JASPERS project advisory operations by implementing knowledge sharing and capacity building activities, as well as fostering dissemination of good practices and exchange of experiences among all EU member states, pre-accession countries and other JASPERS Stakeholders.



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