

## Minutes of meetings

**Title:** Webinar on Climate Change Impacts and Adaptation of Transport Infrastructure

**Moderator:** Maja Kurtagić-Hadžić (CENER21) and Selma Totić (Congress Service Center – service provider)

**MoM prepared by:** Sanita Džino and Maja Kurtagić-Hadžić, CENER21

**Date:** December 02, 2021

**Time:** 09:30 – 12:00, on-line via the Zoom app

### **Aim of the Webinar:**

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- Transfer of knowledge, expertise and experience of expert consultants from Deltares in the field of construction of climate resilient road infrastructure, thus offering an opportunity for stakeholders from public and private companies involved in the design and construction of infrastructure, civil society and national governmental institutions to reflect on progress made in the world in relation to assessing and adapting to climate impacts and challenges

### **Participants response:**

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The meeting was attended by a total of 67 participants. The list of participants is given in Annex 1 of these minutes.

## Agenda:

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Theme	Panellist	Time
<b>Formal introduction to the Webinar</b>		09:30 – 09:45
<i>Welcome and opening remarks</i>	Maja Kurtagić-Hadžić, CENER21	09:30 – 09:35
<i>Introduction to webinar and quiz</i>	Maja Kurtagić-Hadžić, CENER21	09:35 – 09:45
<b>Climate proofing standards for transport network design, construction and maintenance</b>		09:45 – 11:00
<i>Frameworks for Climate Change Risks, Impacts and Adaptation for Transport Infrastructure</i>	Thomas Bles, Deltares	09:45 – 09:55
<i>Methods for assessing the climate resilience of transport infrastructure</i>	Thomas Bles, Deltares	09:55 – 10:05
<i>Case study: Enhancing the climate resilience of Albanian transport infrastructure</i>	Mike Woning, Deltares	10:05 – 10:25
<i>Dealing with uncertainties – importance of integrating climate risk assessment into infrastructure design process</i>	Thomas Bles, Deltares	10:25 – 10:40
<i>Case study: Enhancing the climate resilience of Dominican Republic transport infrastructure</i>	Margreet van Marle, Deltares	10:40 – 11:00
<b>Discussion</b>		11:00 – 11:15
<b>Lessons learned and quiz</b>	Maja Kurtagić-Hadžić, CENER21	11:15 – 11:30

## Course of the Webinar:

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Ms. Selma Totić, on behalf of the Congress Service Center – service provider, welcomed all participants to the Webinar and introduced them to the basic functions and technical characteristics of the Zoom platform.

The ClimaProof Project Manager on behalf of CENER21, Ms. Maja Kurtagić-Hadžić, in her introductory speech presented general information about the Webinar, its goals and the main topics of discussion. Also, the participants were welcomed by Ms. Sonja Gebert, Associate Programme Manager within the UNEP Office Vienna. Ms. Gebert thanked all participants for their response and participation and emphasized the importance of the topic of the Webinar. Prior to the panellists' presentations, participants were asked to complete a short questionnaire in order to assess the initial level of knowledge of the participants on the subject topic. The results will later enable the assessment of the level of efficiency of the webinars held in terms of knowledge transfer.

The main session of the *Webinar: Climate proofing standards for transport network design, construction and maintenance* was opened by Thomas Bles, Senior Consultant at Deltares, with presentations on frameworks for climate change risks, impacts and adaptation of transport infrastructure and methods of assessing climate resilience of transport infrastructure. Mr. Bles spoke about the basic quantitative and qualitative data needed to assess the risks and impacts of climate change on road infrastructure, tools that can be used for these purposes, and their function. Mr. Bles emphasized that once the risk has been identified, a vulnerability assessment of the road infrastructure must be carried out, as well as socio-economic analysis, followed by appropriate measures identified. After that, a climate change adaptation strategy should be developed. Mr. Bles presented the key steps of the so-called *QuickStep steps*: (i) determining scope, (ii) determining consequences and probabilities, (iii) determining locations and risk maps and (iv) determining actions. During his presentation, Mr. Bles also referred to climate change hazard maps for different return periods, flood hazard map, flood exposure map, aggregated damage map to RBIS road and total flood losses map.

Ms. Gebert asked Mr. Bles how often do climate models used to assess the risks, hazards, and exposures change, given the increasing frequency of large-scale climate change? Mr. Bles replied that certainly risk, hazard and impact assessment models should be adapted to the new data related to more frequent exposure and the consequences of climate change in road infrastructure. For example, more than 12 years ago, climate change risk assessment projects did not include flood or landslide hazard maps. Therefore, the maps themselves can stay the same, but they can be updated with better and more comprehensive data.

The session continued with the presentation held by Mr. Mike Woning, a transport infrastructure geo-engineer at Deltares, who presented a case study of road climate resilience analysis in Albania. The main goal of this assessment was to provide adequate information on the prioritisation of future climate and seismic resilient investments in road assets in Albania. The hazards taken into account were related to earthquakes, landslides and floods (coastal and fluvial). Mr. Woning explained that for each hazard, an assessment of risks and economic losses, i.e., repair costs, was performed, emphasizing that this enabled an insight into the prioritization of locations with the highest risks. At the end of his presentation, Mr. Woning pointed out that desk studies based on global or regional input data with coarse traffic data (corridor level) can produce useful and objective (strategic) results at a network level.

Mr. Bakir Krajinović, on behalf of the Federal Hydrometeorological Institute (Bosnia and Herzegovina), was interested in how many climatologists or meteorologists were involved in the road infrastructure risk assessment team in Albania and what type of information was needed from them. Mr. Woning replied that the team involved several climatologists who worked together with climate experts in Albania. Their main task was to bring climate information from the regional level to a lower one, which is often a great challenge. Ms. Margreet van Marle, an expert in wildfires and climate resilience at Deltares, added that the impact of climate

change with an aspect on floods was especially considered, and for that purpose, the team devised a model and entered data for extreme climate change.

Continuing with the topics of case studies relevant to increasing resilience of road network, Ms. van Marle, presented a project in which she participated in Dominican Republic. Ms. van Marle commented on the challenges they faced, emphasizing that Dominican Republic is exposed to many natural hazards, including tropical storms, floods, earthquakes, tsunamis, and landslides. In order to prioritize sites exposed to natural hazards, the following steps have been conducted: inventory of all the assets in the network, risk analysis for natural hazards, analysis of network criticality and, at the end, prioritisation of interventions. Hazard maps (e.g. floods, earthquakes) and road network assets (road, bridges, tunnels, culverts) were used to develop exposure maps for every scenario and assets. Ms. van Marle pointed out that it is important to determine expected disruption of each road stretch and economic impact resulting from each type of hazard per road stretch.

The session ended with a presentation held by Mr. Thomas Bles, Senior Consultant at Deltares, focused on importance of integrating climate risk assessment into infrastructure design process. Mr. Bles presented the method of including climate change in the resilience assessment, which is based on climate hazards maps and change in likelihood/ return period. Mr. Bles pointed out that hazard maps provide best results, but the data are often not available.

In the part provided for discussion, Mr. Marko Ilić, an Environmental Specialist at E3 Consulting (Montenegro), had a question for Mr. Bles. He was interested in how to estimate the economic losses due to transport interruptions, emphasizing the lack of database within Montenegrin institutions. Mr. Bles emphasized that it is first important to prioritise road infrastructure and analyse the consequences that could be caused by traffic disruptions. To analyse the costs caused by traffic disruptions, it is necessary to determine the most critical points, the duration of traffic interruptions as well as traffic density. This can be done manually, based on estimates and empirical data, but there are also certain tools for this purpose. Ms. van Marle added that *OpenStreetMap tool* can also be used to determine network criticality.

Mr. Nikola Arnaut, a Project Manager within Transport Administration of Montenegro, was interested in whether the budget for resilience to climate change, within the project implemented in Albania, had already been planned or adopted. Ms. van Marle replied that the project was implemented as part of a World Bank project, aimed to support the Albanian government.

Mr. Vasko Popovski, National Consultant for North Macedonia, asked if there were any technical checklist developed as a guidance when it comes to the resilience of road infrastructure. Ms. Gebert replied that such a list shall be developed as part of the Regional Strategy, envisaged under Component 3 of the ClimaProof project. She also pointed out that in July 2021, the European Union has published a new Technical guidance on climate-proofing of infrastructure projects for the period 2021-2027. Mr. Bles added that some similar checklists already exist, but was very happy that a tailor made one for the region of the Western Balkans shall be developed within ClimaProof,

Upon completion of the discussion session, the panellists briefly reviewed the lessons learned at the Webinar.

The Webinar was closed by Ms. Gebert and Ms. Kurtagić-Hadžić who greeted all participants and panellists thanking them for their active participation in the Webinar and inviting them to join the upcoming Webinar on Green Infrastructure.

## Lessons learned:

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- Quantitative and/or qualitative climate data can be used to analyse the climate resilience of road infrastructure.
- When assessing the impact of climate change and the resilience of road infrastructure, it is better to use a smaller amount of verified data than a large amount of data from unverified sources.
- Desktop studies based on global/regional input data with coarse traffic data (corridor level) can produce useful and objective (strategic) results at a network level.
- Field validation is required for execution of an action plan.
- Interactions with stakeholders are very important for local input data.
- Strengthening the capacity of institutions that analyze and interpret climate data is of great importance.

## Annex 1: Attendee Report

No.	Name and surname	Institution	Job title	Country	Gender	Contact
1.	Nikola Arnaut	Transport Administration of Montenegro	Project manager	Montenegro	Male	nikola.arnaut@uzs.gov.me
2.	Sara Vujanovic	Ministry of Construction, Transport and Infrastructure	Assistant	Serbia	Female	sara.vujanovic@mgsi.gov.rs
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7.	Bakir Krajinović	Hydrometeorological Institute of Federation of Bosnia and Herzegovina	Senior advisor	Bosnia and Herzegovina	Male	bakir.krajinovic@fhmzbih.gov.ba
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15.	Tamara Krvavac	Epa	Adviser	Montenegro	Female	tamara.krvavac@epa.org.me
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17.	Mirjana Kos	Ministarstvo za prostorno uređenje, građevinarstvo i ekologiju Reoublike Srpske	Senior expert for air protection	Bosnia and Herzegovina	Female	m.kos@mgr.vladars.net
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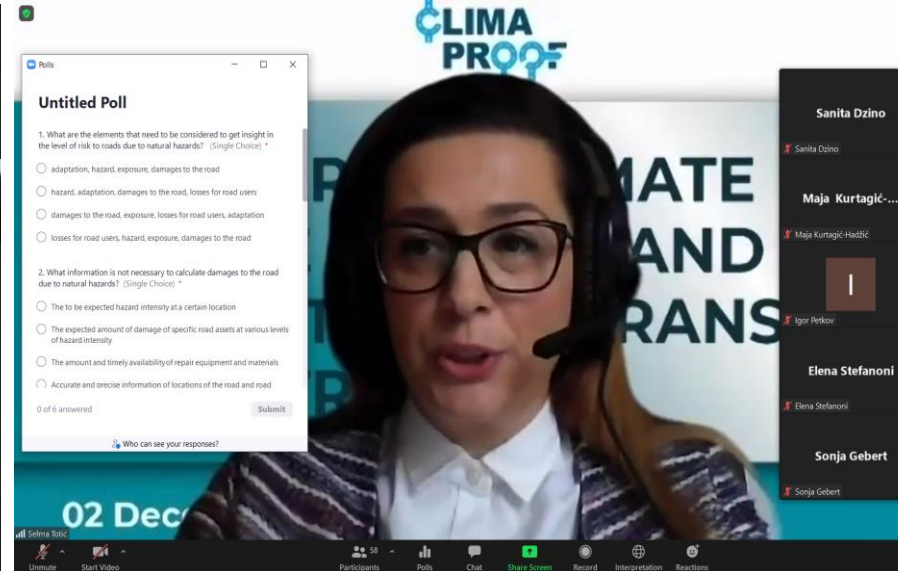
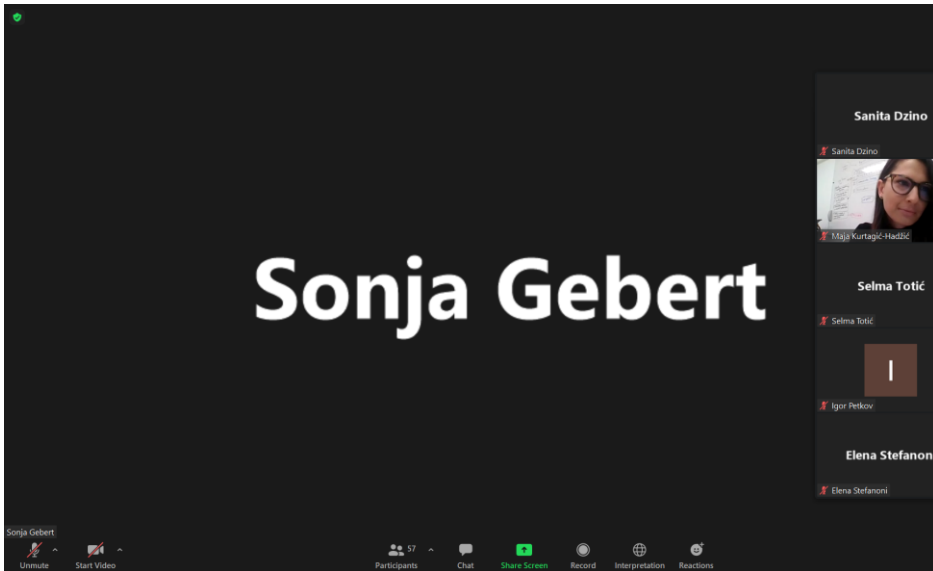
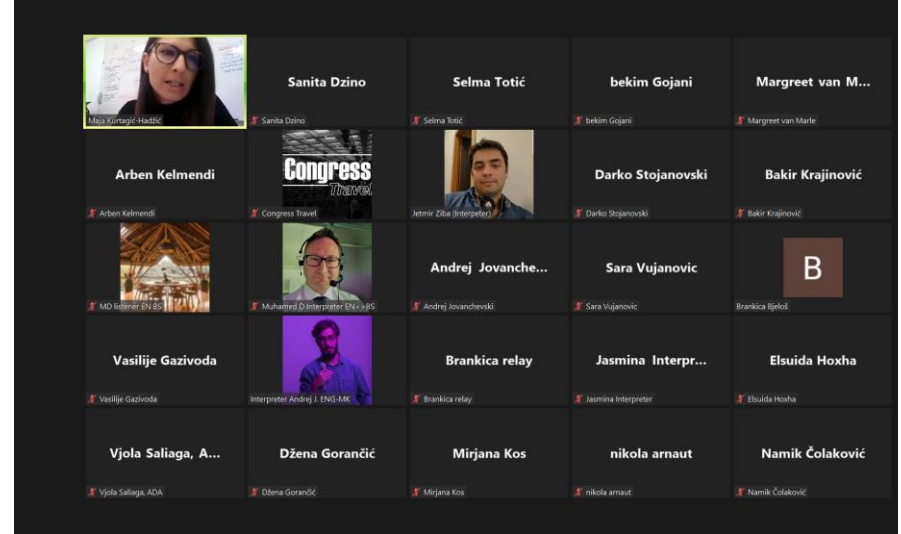
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50.	Lumnie Berisha	Ministry of Environment, Spatial Planning and Infrastructure	Official in the Department of Road Infrastructure	Kosovo*	Female	lberisha575@gmail.com
51.	Hysejn Dobërqani	Ministry of Environment, Spatial Planning and Infrastructure	Civil Road Infrastructure	Kosovo*	Male	hysejn.doberqani@rks-gov.net
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65.	Sonja Gebert	UNEP	Project Manager	Austria	Female	gebertsonja@gmail.com
66.	Maja Kurtagić-Hadžić	CENER21	Project Manager	Bosnia and Herzegovina	Female	maja.kurtagic@cener21.ba
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\* The designation is without prejudice to positions on status and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of Independence.

## Annex 2: Photo Material



## Webinar 1: Climate Change Impacts and Adaptation for Transport Networks

<b>Formal introduction to the Webinar</b>		09:30 – 09:45
<i>Welcome and opening remarks</i>	Maja/Sanita, CENER21	09:30 – 09:35
<i>Introduction to webinar and quiz</i>	Maja/Sanita, CENER21	09:35 – 09:45
<b>Climate proofing standards for transport network design, construction and maintenance</b>		09:45 – 11:20
<i>Frameworks for Climate Change Risks, Impacts and Adaptation for Transport Infrastructure</i>	Thomas Bles, Deltares	09:45 – 09:55
<i>Methods for assessing the climate resilience of transport infrastructure</i>	Thomas Bles, Deltares	09:55 – 10:05
<i>Case study: Enhancing the climate resilience of Albanian transport infrastructure</i>	Mike Woning, Deltares	10:05 – 10:25
<i>Dealing with uncertainties – importance of integrating climate risk assessment into infrastructure design process</i>	Thomas Bles, Deltares	10:25 – 10:40
<i>Case study: Enhancing the climate resilience of Dominican Republic transport infrastructure</i>	Margreet van Marle, Deltares	10:40 – 11:00
<b>Discussion</b>		11:00 – 11:15

**Sanita Džino**

Thomas Bles

**Selma Totić**

Maja Kurtagić...

Elena Stefanoni

Webinar 1: Climate Change Impacts and Adaptation for Transport Networks

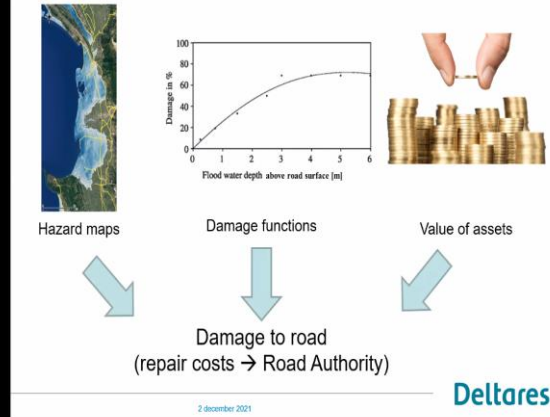
## Quantitative and qualitative, desk and collaborative



Webinar 1: Climate Change Impacts and Adaptation for Transport Networks

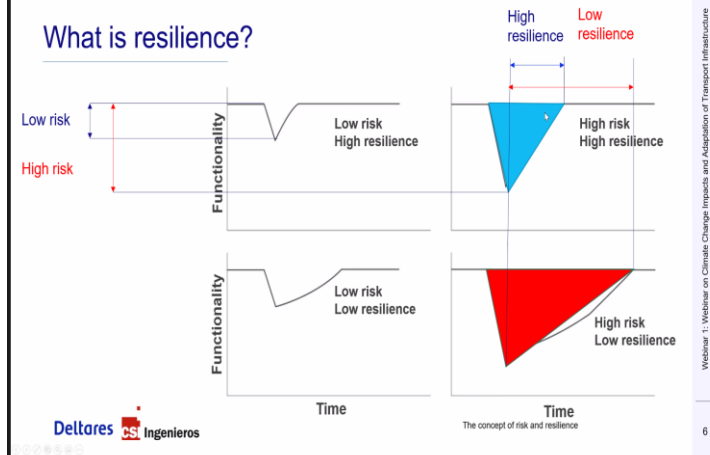
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## Approach – Repair costs (Operator costs)



Mike Woning

## What is resilience?



Margreet van Marle