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Inland Transport Committee

Working Party on Road Transport

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Item 2 (d) of the provisional agenda

Activities of interest to the Working Party

Digital/smart road infrastructure

Digital/smart road infrastructure

Submitted by the Secretariat

During its last session, SC.1 stated that it would “endeavour to organize events related to digital/smart infrastructure so that it may be better informed of emerging issues and consider how it may incorporate these developments into its work programme” (para. 49, ECE/TRANS/SC.1/408). Accordingly, the secretariat organised a special session of SC.1 on 4-6 April 2018, with the second day – 5 April 2018 – as a dedicated workshop on this topic. The outcomes of the meeting are reflected in the report (ECE/TRANS/SC.1/S/398). SC.1 also requested the secretariat to create a compilation of case studies or project excerpts based on the voluntary contributions of the workshop’s speakers. The following pages contain the voluntary contributions received from TMaaS, FIA and UNECE.

SC.1 Special Session Workshop on Smart / Digital Road Infrastructure

5 April 2018

Compilation of articles and case studies received from workshop speakers

**TMaaS,
a leap towards the mobility of the future**

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TMaaS, a leap towards the mobility of the future

The future of traffic monitoring has gone digital: The Belgian city of Ghent is working together with industrial partners and universities on the innovative traffic platform TMaaS (Traffic Management as a Service). The aim of this platform is to provide governments and citizens with a wealth of traffic information in real time. It combines mobility information from data and transport companies and other players and communicates them automatically to end users. The cloud-based TMaaS solution is futuristic, efficient and inexpensive. Moreover, it can be used in any urban context. The European Commission is providing financial support for the development of this initiative for a period of three years.

The classic control room versus a revolutionary digital platform

An increasing number of cities are looking for ways to unravel knotty mobility problems. After all, urban mobility is becoming increasingly complex because of the many different means of transport, the changing urban logistics, environmental factors, the energy issue, etc. The city of Ghent, a medium-sized city in Belgium with approximately 250,000 inhabitants, wants to focus on a more efficient and less expensive (resource-wise) control room. After all, control rooms are not efficient and require a huge investment of time and resources (cameras, screens, locations, staff to man the screens, etc.). The classic system also concentrates a lot on motorised vehicles. Virtually everyone today has a smartphone in their pocket or in their handbag so the solution has to be about developing the technology to interlink data that is already out there and to process it automatically.

TMaaS has set itself the goal of bringing relevant mobility data that is available to a whole series of players together in one digital platform. At the current point in time traffic information in Ghent is fragmented and it is not so easy to ensure that different means of transport are connected

to each other, or for people to find out which is the best way to get from door-to-door in a seamless way. Therefore, TMaaS is working on a tool that will be accessible for local authorities and citizens. This tool's objective is to make information available about traffic situations for all transport modes in real time and steer users to the best mobility solution. This cloud-based concept places the users at the heart of the system both when collecting and using the data.

Unique collaboration

The city of Ghent has brought data and IT companies, universities, NGO's and citizens together around the table, which makes this project quite unique. The willingness to cooperate in developing this system has been impressive. The European Commission also believes in it and decided to support the project financially for a period of three years via Urban Innovative Actions (UIA), an initiative that supports urban areas in testing new answers to urban challenges. It got off the ground in February 2018 with a leading team of researchers, developers and innovators. The project is broken up into three phases: research, implementation and evaluation. During the first phase, which is currently taking place, research is being carried out into what is required in order to develop the platform for traffic operators and end-users, the residents of the City of Ghent. What information do people find useful? How do they want to view it? What information do the traffic operators want? During this research phase, there is a close collaboration between the universities of Ghent and Leuven.

A system by people for people

The city is currently collecting as much data as possible. Once the new digital platform has been implemented, the city's traffic operators will be able to monitor and use that data to inform residents and take mobility measures if necessary. Residents will be able to view up-to-date information on the TMaaS platform about the traffic situation in their neighbourhood and will get notified about any irregularities in their daily journeys (traffic jams, delays, the availability of cars via car-sharing platforms, train timetables, the space available in bike shelters or car parks, weather reports,

etc.). Moreover, the information they request is personalised. Moving around the city will become a lot more efficient. The system wants to be very flexible so it can include new ways of mobility in the future. The city will promote the platform via social media, newsletters, lectures, presentations, etc.

A system that can be rolled out in other cities

The new system has another great advantage: it is scalable and can be translated and rolled out in other urban contexts using the data that is available from anywhere and everywhere. Major cities such as Barcelona, Copenhagen and New York have already shown an interest in the system. The price tag is also an advantage of course. The completely virtual platform requires much less input than the classic approach via control rooms. Although the TMaaS cloud-based traffic system originated in a European context, the team is also investigating whether it can be useful in a radically different context, for example in developing countries in Africa or Asia. After all, all around the world today people have access to smartphones and are therefore in a position to use the concept. The system could be a major leap forward for mobility in cities with little or no infrastructure, and could minimise the differences between developed and non-developed areas.

Ghent, the trial ground for the mobility of the future

A smart traffic policy does not just focus on cars, but on the most efficient and sustainable mobility solutions. This could involve transport by bike, on foot, the tram or bus, or a combination of different means of transport. Up-to-date information about traffic situations guides users to the right choice. Although the new service primarily monitors traffic, it can also lead to an increasing number of people choosing to take other modes of transport. The researchers emphasize that the system should act as a link within a broader mobility policy. It requires local authorities and government bodies to have a vision. And this is indeed the case in Ghent, where a traffic circulation plan implemented in 2017 eliminated motorised vehicles from the historic city centre as much as possible and steered them out of the city via loops. Right from the start of the TMaaS project an

important role was reserved for the residents of the city, who received an online inquiry to participate in the research phase. Citizens will be involved in all phases of the project. Participants also kept a mobility journal of traffic tracking and interviews. The objective of this approach is to ensure a system on a human scale.

Partners

TMaas's success and expansion would not be possible without the collaboration of a whole series of partners, including Ghent University and KU Leuven; TomTom, Waylay, Be-Mobile, De Staatse Ruiter and The European Passengers' Federation. An advisory board with international experts evaluates the evolution of the project every six months.

Follow Traffic Management as a Service on www.tmaas.eu.







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IF Sustainability Case Study
FIA SMART CITIES





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IF SUSTAINABILITY CASE STUDIES

The world faces significant challenges across a wide spectrum of economic, social and environmental matters. The Olympic Movement has both an opportunity and a duty to actively contribute to the global sustainability debate in line with its vision of “Building a better world through sport”.

With this in mind, and in response to recommendation 5 of Olympic Agenda 2020 (“Include sustainability within the Olympic Movement’s daily operations”), the IOC

conducted the International Federations (IF) Sustainability Project in 2016. This allowed the IOC to obtain an overview of IFs’ sustainability initiatives; identify

common topics, good practices and mutual challenges; and share information. One of the Project’s outcomes was a series of case studies, illustrating how IFs are actively contributing towards a more sustainable world.

As part of the IOC’s objective to profile the role of the Olympic Movement in sustainability through the aggregation of information and collective reporting, it was agreed that the identification and

sharing of IF sustainability case studies should be continued. These case studies form part of the enhanced support system provided to the Olympic Movement through the [IOC Sustainability Strategy](#).

Each case study is aligned with one or more of the IOC’s five sustainability focus areas: infrastructure & natural sites; sourcing & resource management; mobility; workforce; and climate. The studies are also aligned with one or more of the United Nations’ (UN) framework of 17 Sustainable Development Goals (SDGs).

This framework is pivotal for the Olympic Movement since in September 2015, the UN General Assembly confirmed the important role that

sport can play in supporting the UN’s 2030 Agenda for Sustainable Development and its SDGs.

The UN’s 17 SDGs provide a common framework for organisations to explain how they plan to contribute to sustainable development and tackle the key global sustainability challenges. The IF case studies attest to the fact that the Olympic Movement contributes to the achievement of many of these.



“Sport is also an important enabler of sustainable development. We recognise the growing contribution of sport to the realisation of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives.”

Paragraph 37, UN 2030 Agenda for Sustainable Development

Each IF sustainability project contributes to one or more of the IOC's sustainability focus areas and one or more of the UN's Sustainable Development Goals (SDGs)



THE FIA FORMULA E CHAMPIONSHIP SHOWCASES INNOVATION AND SUSTAINABLE MOBILITY

The number of people living in urban areas around the world is expected to grow by around 2.5 billion by 2050. With transport and mobility being two core elements of a liveable city environment, the world urgently needs plans and policies that tackle pollution, congestion and road safety hazards.

Supporting the United Nations' New Urban Agenda, the Fédération Internationale de l'Automobile (FIA) has taken a proactive role in shaping the future of our cities by creating the "FIA Smart Cities" initiative.

Launched in March 2017 as a platform for knowledge generation and information exchange in the field of sustainable urban

mobility, "FIA Smart Cities" is centred on three key initiatives (see next page) that take place during the FIA Formula E Championship, a series of street races featuring electric-powered cars.

The "FIA Smart Cities" programme is the first time that the two realms of the FIA, sport and mobility, have united to provide a platform to showcase technological progress in motorsport, and its potential application to public transport and private vehicles. Participants and spectators at the FIA Formula E Championship have a unique opportunity to observe how these innovations might shape our cities in the future.

OBJECTIVES

The FIA promotes safe and sustainable urban mobility. Through the "FIA Smart Cities" initiatives, it:

- Raises awareness about key issues in urban mobility and enhances collaboration across key stakeholders in the urban mobility ecosystem.
- Redefines sustainability in urban areas by unlocking the potential of innovations piloted in motor sports.
- Identifies, supports and invests in the most successful start-ups empowering smart cities.
- Equips city authorities with tools and knowledge derived by stakeholders within the mobility ecosystem.



"THE INITIATIVE ALIGNS MOTOR SPORT AND USER MOBILITY UNDER A FRAMEWORK OF INNOVATION AND SUSTAINABILITY, ENABLING FORMULA E TECHNOLOGY TO BE SEEN IN PRACTICE, AND CITY AUTHORITIES TO SHARE THEIR VIEWS ON URBAN TRANSPORTATION." JEAN TODT, FIA PRESIDENT



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FIA SMART CITIES: THREE KEY INITIATIVES

FIA SMART CITIES FORUM

High-level discussions and practical sessions focusing on the future of sustainable urban mobility.

FIA SMART CITIES START-UP

Support and investment for innovative start-up services or technologies designed to find new mobility solutions for cities.

FIA SMART CITIES AWARDS

Presented to the most innovative projects in sustainable urban mobility, it is announced at the last FIA Smart Cities Forum.



LESSONS LEARNED

- To find your path to sustainability, consider what makes your actions stand out from similar initiatives, and differentiate them by finding a competitive advantage.
- To reach the right audience, it helps to keep your message clear and appealing.
- Your network of National Federations can help to improve your dialogue with local authorities and raise awareness of your event.



EVALUATION

By creating “FIA Smart Cities”, the FIA has positioned itself at the centre of the sustainable mobility movement, and contributes to creating a smart and sustainable urban future. The “FIA Smart Cities” platform has shown the FIA’s National Federations and Member Clubs the relevance and importance of finding solutions for urban mobility.

The next phase of “FIA Smart Cities” will be rolled out during the FIA Formula E Championship Season IV in 2017/18, and will reach cities as far afield as Rome and Santiago de Chile. Thanks to the support and commitment of founding partners Enel, Julius Bär and Michelin, “FIA Smart Cities” is set to grow within the smart city ecosystem.

International Transport Infrastructure Observatory

Inland Transport Committee
UNECE

The following information was taken from the document ECE/TRANS/2018/4 dated 7 December 2017 of the Inland Transport Committee.

Services to be provided

The main objectives of this observatory are:

- a) to enhance cooperation among the different transport infrastructure initiatives in Europe and Asia;*
- b) to create economies of scale and maximize efficiency by helping governments and organizations to achieve more by spending less;*
- c) to provide concrete and tangible inputs to governments by hosting data and findings of different topical studies;*
- d) to facilitate communication among the focal points of the initiatives in order to exchange basic information (meeting dates, agendas, reports, workshop programmes, etc.);*
- e) to disseminate ad hoc knowledge, and best or good practices including information about vendors, consultants, etc.;*
- f) to exchange information about projects and other initiatives/proposals;*
- g) to seek cooperation on specific transport infrastructure projects/tasks/studies and researches decided during their secretariat sessions.*

However, since the observatory will be developed on a sophisticated Geographical Information System (GIS) platform the services that will be provided to users and especially to governments and the international financial institutions are beyond those mentioned above. It would permit all users to find and analyse:

- a) data about all transport networks and nodes (road, rail, inland waterways, ports, airports, intermodal terminals, logistics centres and border crossing points). This data will include any kind of information from technical specifications such as number of lanes, electrified lines, etc. to operational details such as opening hours, number of lanes for TIR trucks, etc.*
- b) data on transport corridors (length, services, missing links, time schedules, tariffs). This data will include information about block trains*

for instance that operate on specific corridors, number of border crossings and waiting times, real time monitoring of services (time schedules, stops, etc.), and intermodal tariffs calculations (door to door delivery). In a later stage, and in cooperation with the railway undertaking, the block trains can be equipped with GPS providing to their users, through the observatory, an online realtime track and trace of train trips, and therefore of their cargoes;

- c) data about new transport infrastructure projects. Government focal points will have the possibility if they wish to provide information on new transport infrastructure projects either with secured or not secured funding to be evaluated for funding by the International Financial Institutions (IFIs) and other donors. The real value for the governments and especially the IFIs while evaluating these new projects will be that they would have the opportunity to see and analyse the projects in a broader geographical and socioeconomic context by adding or reducing GIS layers. For instance, there is critical information that a bank should know before deciding to finance a new project. For example this information for a new project that is part of a transport corridor includes the number of border crossing points and their waiting times until cargo will reach the first port, as well as the existing and forecasted trade flows along the corridor.
- d) data about traffic and cargo / goods flows; the traffic and goods flows indicate the level of criticality of an artery compared to the whole network. It is the parameter that could characterize a new transport infrastructure project as viable and sustainable or not;
- e) data about international conventions / agreements ratification and implementation: at a glance, and by adding a GIS layer, users could see which countries have signed and ratified which international conventions and agreements and the level of their implementation. This information is critical indicator for the conditions of transport and trade facilitation that exist in a region and therefore for the viability and sustainability of a future transport infrastructure project;
- f) results of different regional studies such as:
 - i. Benchmarking transport infrastructure construction costs: A group of experts already exists with this mandate. If the findings of this group are incorporated in the observatory, then governments and banks will know by adding a GIS layer how much other governments in the region pay to construct a similar, for instance, bridge, road, etc. and is valuable input to prepare 'bankable' project proposals and to evaluate the actual cost of a new project;

- ii.* Climate Change impacts and adaptation for transport networks and nodes: A group of experts already exists with this mandate. If the findings of this group are incorporated in the observatory, then governments and banks will have by adding a GIS layer a full climate change impacts hot spots map for the region. The hot spots map would be the result of matching together the forecasts provided by IPCC on different climatic factors (precipitation, temperature, etc.) with the critical transport infrastructure. For instance, if based on this hot spots map the suggested construction area risks to be flooded, then either the governments/banks should suggest additional technical measures to adapt to this climate change impacts or maybe they could reconsider building in the area;
- iii.* Good practices and innovative solutions in financing transport infrastructure: the observatory will work as an ‘electronic library’ that will incorporate all good and best practices, tools and methodologies to finance transport infrastructure.

International financial institutions need to have access to reliable data and to analytical tools to ensure the financing of transport infrastructure projects that efficiently improve regional and international connectivity. The international transport infrastructure observatory would be an innovative example of how government data on new transport infrastructure projects is presented to financial institutions and other donors in a transparent, comprehensive and bankable way. The observatory is devised as an online platform where (a) governments find the data to prepare, benchmark and present their transport infrastructure projects and (b) financial institutions can consider, analyse and compare projects from a regional/international perspective and identify projects to finance.

Figure 10

International Transport Infrastructure Observatory Components



The following are some illustrations from the observatory.

Figure 11

Rail Networks and Investment Projects

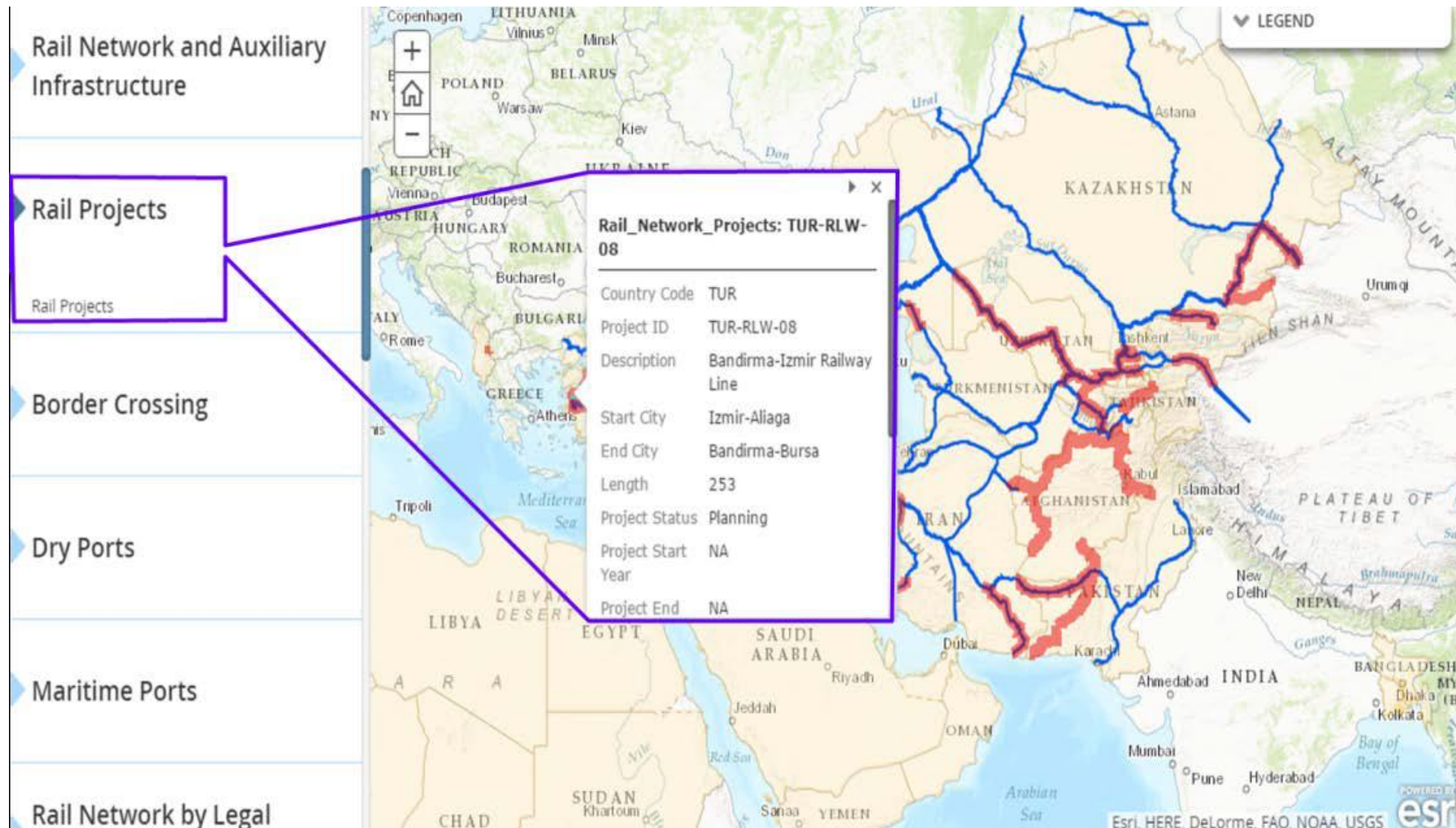


Figure 12

Intermodal Transport Network

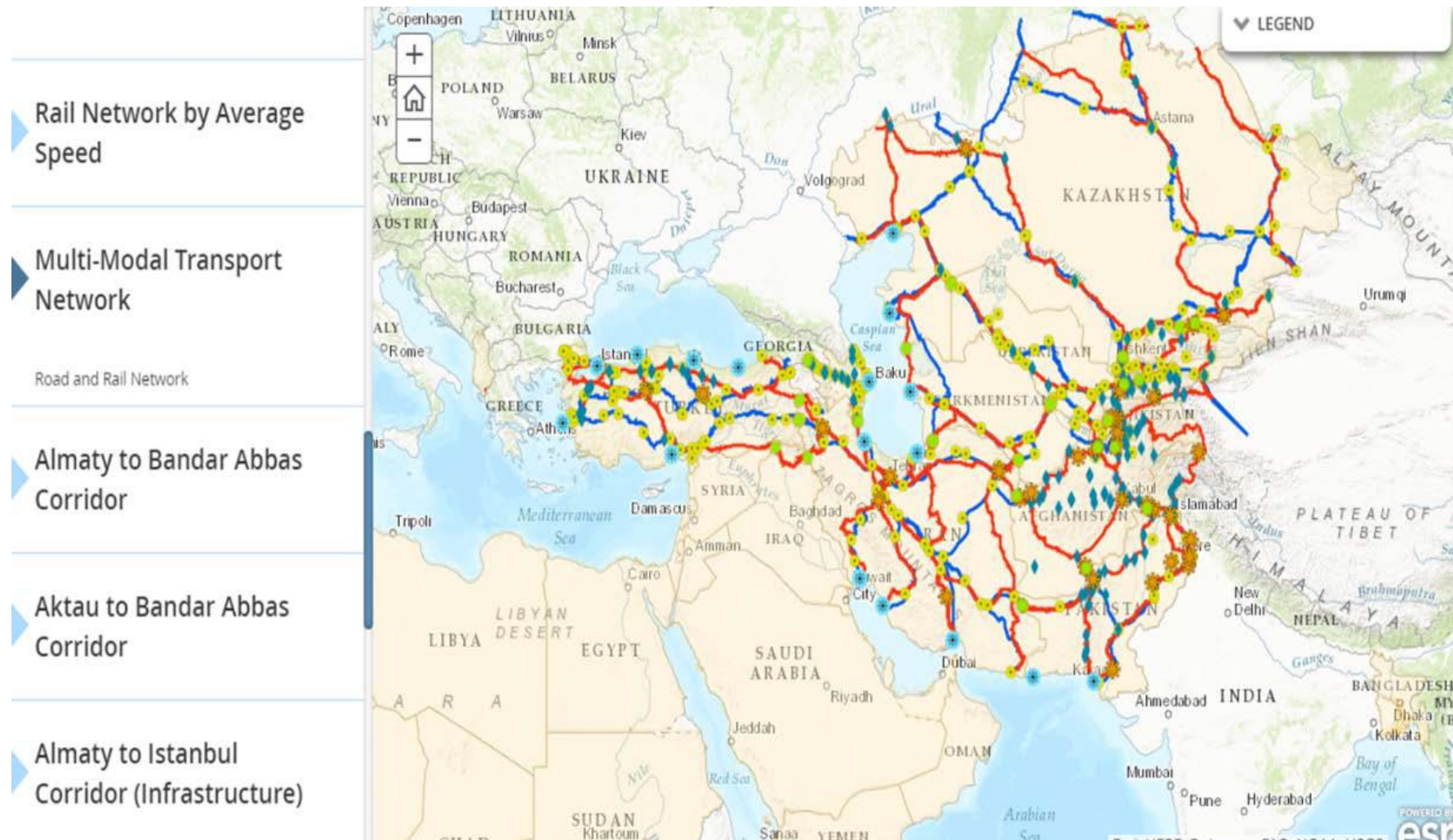
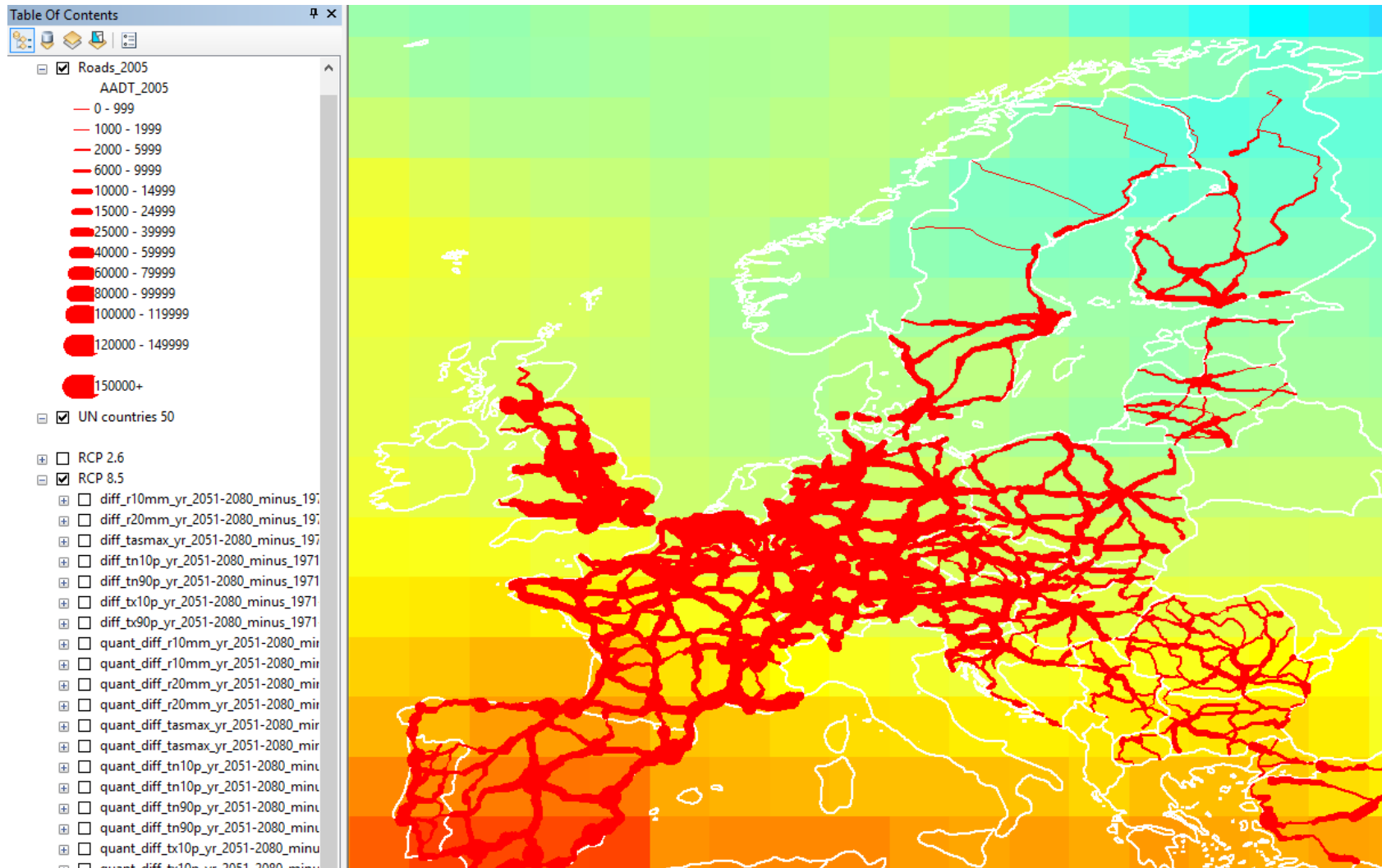


Figure 13

Hotspots Map: Critical transport infrastructure and projections for temperature



Funding

In 2011, a memorandum of understanding (MOU) between IsDB, ECO and ECE was signed. The main objective of the MOU was to promote the development of an international intermodal transport and logistics system for ECO member countries, which will contribute to the promotion of economic development and social progress in the ECO region as a cross road for corridors connecting Asia and Europe.

As a follow-up to the MOU, a project was agreed on in 2016 between the Sustainable Transport Division and IsDB to enhance regional connectivity through GIS. The bank provides the funds to ECE to procure the GIS software needed for the development of the transport infrastructure observatory and to hire the consultants to customize the software based on the needs of ECE/bank and to collect the relevant data.

The project has already started. The secretariat has already bought the software and has hired the consultants to collect the relevant data. Based on the initial project plan, the first phase of the observatory will be ready and operational in September 2018.

Other development banks and United Nations regional commissions and agencies have already shown interest in participating in this observatory.