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**Economic Commission for Europe****Inland Transport Committee****Working Party on Transport Trends and Economics****Group of Experts on Benchmarking Transport Infrastructure Construction Costs****Fourteenth session**

Geneva, 23–24 May 2022

Item 5 of the provisional agenda

**Discussion on the structure of the final report of the Group of Experts****Rationale for the establishment of the Group of Experts on Benchmarking of Transport Infrastructure Construction Costs, its added value, current achievements and way ahead****Note by the secretariat****I. Background**

1. During the twenty-seventh session of the Working Party on Transport Trends and Economics (WP.5) (Geneva, 8–10 September 2014) a workshop was organized on “Good practices and new tools for Financing Transport Infrastructure”. During the workshop it was agreed by the participants that the benchmarking of transport infrastructure construction costs is significant for having realistic construction costs and a stable investment program with no unforeseen costs. The Working Party requested the secretariat to draft a formal document based on inputs received by the experts on benchmarking of transport infrastructure construction costs where proposals for possible further actions to be taken by the Working Party on this issue were to be included. (ECE/TRANS/WP.5/56, paras. 10 and 12).
2. During its twenty-eighth session (Geneva, 7–9 September 2015) the Working Party considered and adopted the Terms of Reference (ToR) of the Group of Experts on Benchmarking of Transport Infrastructure Construction Costs (ECE/TRANS/WP.5/58, para 40).
3. These Terms of Reference (ECE/TRANS/2016/4) were subsequently adopted by the Inland Transport Committee at its seventy-eighth session (Geneva, 23–26 February 2016) (ECE/TRANS/254, para. 21) and by the Executive Committee during its May 2016 session.



## Box 1

At a joint, Euro-Asian Transport Links (EATL) project - Trans-European Motorways (TEM) and Trans-European Railway (TER) projects – and Working Party on Transport Trends and Economics, workshop on “Financing Transport Infrastructure”, Geneva, September 2013

## Participants:

- Recalled that financing of transport infrastructure includes the planning for and building of new infrastructure, as well as the planning for and realization of rehabilitation and/or maintenance of existing one.
- Agreed on the need to prepare feasibility studies where the economic viability will be analysed by taking into consideration the social aspects of such investments such as road safety and environmental costs.
- Agreed on the need to identify and harmonize, if possible, the cost per unit of investment, i.e. cost of constructing 1 kilometre of road or the cost of constructing 1 kilometre of railroad or high-speed railroad.
- Observed the need to harmonize the technical standards of transport infrastructure and referred to the technical standards included in international agreements serviced by ECE e.g. AGR<sup>1</sup>, AGC<sup>2</sup>, AGTC<sup>3</sup> and AGN<sup>4</sup> as best practices to be followed.
- Noted that an observatory for exchange of information and lessons learned from implementing public private partnership (PPP) schemes as a transport infrastructure financing tool could be beneficial.
- Observed that the development of investment plans and especially their harmonization is an efficient step forward to finance transport infrastructure. Also noted the work developing investment plans during the EATL phase II and agreed on the need to focus on funding these projects.
- Observed that improvements should also take place on non-physical obstacles – border crossings facilitation, etc. — in parallel with the physical ones such as transport infrastructure.

## II. Scope of issues and achievements expected:

4. Based on its ToRs it was agreed that the Group of Experts should focus its work on the following issues:
  - Identify models, methodologies, tools and good practices for evaluating, calculating and analysing inland transport infrastructure construction costs.
  - Identify and list terminologies used in the ECE region for construction costs of inland transport infrastructure; if possible, create a glossary of agreed terminologies and related explanations.
  - Collect and analyse data in order to prepare a benchmarking of transport infrastructure construction costs along the ECE region for each inland transport mode – road, rail, inland waterways – including intermodal terminals, freight/logistics centres and ports; Analyse and describe the conditions / parameters under which these costs have been calculated on.

<sup>1</sup> European Agreement on Main International Traffic Arteries

<sup>2</sup> European Agreement on Main International Railway Lines

<sup>3</sup> European Agreement on Important International Combined Transport Lines and Related Installations

<sup>4</sup> European Agreement on Main Inland Waterways of International Importance

5. It was also decided that the Group of Experts should base its considerations on previous work of ECE in this field, in particular the work on:

- Cost benefit analysis of transport infrastructure projects, 2003.<sup>5</sup>
- A methodological basis for the definition of common criteria regarding the identification of bottlenecks, missing links and quality of service in infrastructure networks, 2009.<sup>6</sup>
- The Trans-European North-South Motorway (TEM) Project standards and Recommended Practice, 2002.<sup>7</sup>
- The TEM and TER revised Master Plan – Final Report, 2012.<sup>8</sup>
- The Euro Asian Transport Linkages Project studies, 2008/2012.<sup>9, 10</sup>

### III. Methods of work

6. Participation in the Group of Experts was opened to all concerned United Nations member countries and experts. Concerned intergovernmental and non-governmental organizations, as well as concerned road, railway and inland waterways administration authorities and companies, freight and forwarding industries, intermodal terminals, freight and logistics centres as well as ports authorities are invited to participate and provide expert advice in compliance with United Nations rules and practices.

7. It was agreed that translation of documents and simultaneous interpretation of its sessions in English, French, and Russian shall be provided by ECE for all sessions held at the Palais des Nations in Geneva.

8. Representatives of the following ECE Member States participated in the first session and to varying degrees remained involved in the subsequent sessions: Austria, Croatia, Cyprus, Czechia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Slovakia, Sweden and Turkey.

9. At a later stage representative of the Russian Federation engaged in the work of the Group as well.

### IV. Time frame

10. The initial mandate of the Group of Experts was for two years but it has been extended twice, most recently on the occasion of the eighty-third session of the Inland Transport Committee (February 2021) until 2022, with the aim to hold at least two sessions annually in 2021 and 2022 with interpretation in the three ECE official languages and to continue and revamp its data collection efforts across all modes resulting in a more data rich final report.

11. In the course of these six years the Group of Experts met on the following occasions:

- First session: 31 October 2016 – 1 November 2016
- Second session: 10–11 April 2016
- Third session: 10–11 July 2016
- Fourth session: 16–17 October 2017
- Fifth session: 30–31 January 2018
- Sixth session: 1–2 May 2018

<sup>5</sup> [www.unece.org/fileadmin/DAM/trans/doc/2008/wp5/CBAe.pdf](http://www.unece.org/fileadmin/DAM/trans/doc/2008/wp5/CBAe.pdf)

<sup>6</sup> [www.unece.org/fileadmin/DAM/trans/doc/2009/wp5/ECE-TRANS-205e.pdf](http://www.unece.org/fileadmin/DAM/trans/doc/2009/wp5/ECE-TRANS-205e.pdf)

<sup>7</sup> [www.unece.org/fileadmin/DAM/trans/main/tem/temdocs/TEM-Std-Ed3.pdf](http://www.unece.org/fileadmin/DAM/trans/main/tem/temdocs/TEM-Std-Ed3.pdf)

<sup>8</sup> [www.unece.org/fileadmin/DAM/trans/main/temterm/temterm/docs/TEM\\_and\\_TER\\_Vol\\_I.pdf](http://www.unece.org/fileadmin/DAM/trans/main/temterm/temterm/docs/TEM_and_TER_Vol_I.pdf)

<sup>9</sup> [www.unece.org/fileadmin/DAM/trans/main/eatl/in\\_house\\_study.pdf](http://www.unece.org/fileadmin/DAM/trans/main/eatl/in_house_study.pdf)

<sup>10</sup> [www.unece.org/fileadmin/DAM/trans/main/eatl/docs/EATL\\_Report\\_Phase\\_II.pdf](http://www.unece.org/fileadmin/DAM/trans/main/eatl/docs/EATL_Report_Phase_II.pdf)

- Seventh session: 28 June 2018
  - Eighth session: 15–16 July 2019
  - Ninth session: 29 September – 1 October 2019
  - Tenth session: 30–31 January 2020
  - Eleventh session: May 2020 cancelled due to COVID-19 (replaced by shorter virtual sessions on 14 May 2020 and 18 June 2020 respectively)
  - Eleventh session: 8-9 April 2021
  - Twelfth session: 22-23 November 2021
  - Thirteenth session: 10-11 February 2022
12. The final, fourteenth session of the Group will be held on 23-24 May 2022.

## V. Work plan/ Sequence of work

13. The Group conducted its activities based on a prepared work plan in order to ensure its smooth implementation.
14. The following work phases are to be distinguished:
- Development of specific questionnaires:
    - Questionnaire on Benchmarking Road Transport Infrastructure Construction Costs
    - Questionnaire on Benchmarking Rail Transport Infrastructure Construction Costs
    - Questionnaire on Benchmarking Intermodal Terminal Infrastructure Construction Costs
    - Questionnaire on Benchmarking Inland Waterway Infrastructure Construction, Upgrading and Maintenance Costs
    - Questionnaire on Benchmarking Inland Waterway Port Construction, Upgrading and Maintenance Costs
    - The development of a set of 4 open questions on different national benchmarking models and approaches in use across the ECE region
    - Upon its last extension and as suggested by the Government of Turkey, the Group has developed two additional questionnaires with a focus on transport infrastructure maintenance and operation costs.
  - Development of a consolidated list of terminologies on benchmarking of road, rail, inland waterway and intermodal terminals construction costs, including also on benchmarking of maintenance and operation costs.
  - Dissemination of these questionnaires among delegates participating in WP.5 which is the GE.4 parent body.
  - Dissemination of the questionnaires among delegates in mode-specific Working Parties including SC.1 on Road Transport, SC.2 on Rail Transport, SC.3/WP.3 Inland Water Transport and WP.25 on Intermodal Transport and Logistics.
  - In parallel, reaching out to and building partnerships with other relevant organizations in the field of benchmarking of transport infrastructure construction costs, including TEM and TER Projects, the International Union of Railways (UIC), the International Road Federation (IRF) and European Union networks of road and rail infrastructure operators.
  - The following GE.4 members acted as lead countries for the drafting process of the final report:

- Turkey: conducted a benchmarking literature review and provided substantive inputs to the road transport terminology and the analysis of data for the road sector.
- Poland: provided substantive inputs to the rail transport terminology and conducted the analysis of data for the rail sector.
- Russian Federation: provided substantive inputs to the road data analysis and contributed to the compilation of national benchmarking approaches and methodologies.
- All other members of the Group actively participated in the drafting process of the final report and contributed through the provision of national case studies and data on benchmarking.

## **VI. Challenges experienced and opportunities identified by the Group**

15. The Group faced several challenges in the conduct of its work, including during its final extension:

(a) The quantity and quality of road and railway data

The data received was often sparse and scattered. In some cases, there were misrepresentations or omissions in the datasets provided by respondents. The first challenge was to turn the data into a workable format which could later be analysed. For that purpose, all the questionnaires with missing or inaccurate data had to be removed from the final dataset.

(b) Delays in data collection for intermodal terminals, inland waterways and ports

In particular the data collection efforts for ports, intermodal terminals and inland waterways were delayed and the data received was often insufficient or inaccurate. The present study has therefor mostly focused on road and rail sectors.

16. Given however that the available analysis proves to be of great value added it is worthwhile to continue data collection efforts of the Group across all modes. In doing so, efforts need to be made to make sure that there is a better understanding among ECE member States wishing to submit additional data regarding the exact requirements. At its thirteenth session in February 2020, the Group decided that rather than asking for an additional extension of its mandate or establish a new Group to continue the work, its efforts could be continued in the framework of the TEM and TER projects.

## **VII. Sustainability options for the work of the Group**

### **A. Synergies with the International Transport Infrastructure Observatory**

#### **1. Integrating data and analytical findings of the Group into the International Transport Infrastructure Observatory (ITIO)**

17. At its twelfth session (November 2021), the Group received more information about the recently established Geographic Information System (GIS) based International Transport Infrastructure Observatory (ITIO). The secretariat provided a detailed description of the Observatory, its purpose, functions, user groups and operational modalities. The Group requested the secretariat to prepare ahead of its next session a short note providing food-for-thought on the potential that this GIS platform offers to host and visualise benchmarking analytical data and information on national and regional benchmarking best practices. Section VII of the present document provides such an overview.

## 2. Main objectives of the International Transport Infrastructure Observatory and the services it provides

18. The Observatory offers a multi-stakeholder, web-based Geographic Information System (GIS) platform which hosts data on a large variety of transport infrastructure networks and nodes across different modes including road, rail, inland waterways, ports, airports, intermodal terminals, logistics centres and border crossing points. A geographic information system (GIS) is a system that creates, manages, analyses, and maps all types of data. GIS connects data to a map, integrating location data with all types of descriptive information. This provides a foundation for mapping and analysis that is used in science and almost every industry. GIS helps users understand patterns, relationships, and geographic context. The benefits include improved communication and efficiency as well as better management and decision making. (Esri, 2021).

19. The main objectives of the Observatory are:

(a) Support the implementation of pillars 1, 2 and 4 of the ITC Strategy until 2030, envisaging the role of the ITC as: a United Nations Platform for regional and global inland transport conventions, a United Nations Platform for supporting new technologies and innovations in inland transport and a United Nations Platform for promoting sustainable regional and interregional inland transport connectivity and mobility, respectively.

(b) Support the implementation of Sustainable Development Goal (SDG) 9 on “Building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation”; SDG 11 on “Making cities and human settlements inclusive, safe, resilient and sustainable”; SDG 13 on “Taking urgent action to combat climate change and its impacts”; and SDG 17 on “Strengthening the means of implementation and revitalizing the global partnership for sustainable development”.

(c) Offer to the United Nations system and Governments an innovative and inclusive tool that further facilitates transport infrastructure financing and enhances regional and interregional connectivity.

20. The main pillars of services that the observatory provides are being summarized below:

(a) Offering an electronic repository of ECE inland transport conventions, project outputs, and deliverables of designated Groups of Experts:

- More specifically, the observatory provides an electronic platform that will be catalytic for the ongoing digitalization of different United Nations inland transport agreements and conventions, especially those covering infrastructure (AGR<sup>11</sup>, AGC<sup>12</sup>, AGTC<sup>13</sup> and AGN<sup>14</sup>) but also border crossing facilitation instruments such as TIR<sup>15</sup>/eTIR (customs systems location).
- Furthermore, it offers a digital environment that helps visualize specific outputs and deliverables, such as the work done in the framework of the TEM<sup>16</sup>, TER<sup>17</sup> and EATL<sup>18</sup> projects but also the tangible outputs produced by the Group of Experts on Assessment of Climate Change Impacts and Adaptation for Inland (GE.3) and the Group of Experts on Benchmarking Transport Infrastructure Construction Costs (GE.4).

(b) Promoting sustainable regional and interregional connectivity: the observatory provides the possibility to all regional and interregional organizations to create their own maps illustrating their transport infrastructure initiatives, corridors, projects, reports and

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<sup>12</sup> European Agreement on Main International Railway Lines

<sup>13</sup> European Agreement on Important International Combined Transport Lines and Related Installations

<sup>14</sup> European Agreement on Main. Inland Waterways of International. Importance

<sup>15</sup> Convention on International Transport of Goods Under Cover of TIR Carnets

<sup>16</sup> Trans-European Motorways project

<sup>17</sup> Trans-European Railways project

<sup>18</sup> Euro-Asian Transport Links

studies and anything else they consider useful for the purpose of further enhancing regional connectivity. This will enhance cooperation among the different transport infrastructure initiatives in Europe, Asia, and Africa.

(c) Financing transport infrastructure: the observatory operates as a marketplace for financing transport infrastructure by providing an electronic interface between Multilateral Development Banks and Governments. Governments can upload their transport infrastructure projects in need of funding as well as select which MDBs they wish to reach out to. By adding or removing GIS layers, data on transport infrastructure networks can be combined with data about the national and/or regional ratification and implementation rate of specific transport legal instruments or with the impact that climate change may have on planned infrastructure projects. For MDBs, the observatory functions as a clearing house granting them direct access to a centralized information platform assisting them to decide which projects to consider for funding. A secured electronic communication platform will be provided enabling all users to reach out to each other and exchange information.

### 3. User categories, profiles, and functionalities

21. Four user groups are foreseen in the observatory:

- (a) Governments
- (b) Multilateral Development Banks
- (c) Regional Cooperation Organizations
- (d) The wider public

22. Each of these user groups have access to a distinct set of functionalities, services, and possibilities. For Governments, MDBs and Regional Cooperation Organizations (RCOs) access will be granted to officially nominated/ accredited representatives only. A username and password will be provided only after receipt of nominations by the secretariat. The public, academia, private sector, independent experts, and others will not have to register but will only have access to high-level data and information. Upon entering the observatory, they may be invited through an optional online survey to provide some background and profile information for statistical purposes (reasons for using the observatory, their location, professional affiliation etc.).

### 4. Next steps

23. Develop additional functionalities for the ITIO, including related to visualising the benchmarking data and analysis prepared by the Group of Experts on Benchmarking of Transport Infrastructure Construction Costs (GE.4/WP.5).

24. Benefits to the ITIO include:

- Transport infrastructure construction cost data either at national/country level (i.e. average for a 10-year period) or at specific project level are of high interest both to Government users as they can compare and evaluate the costs of their own infrastructure projects with the associated costs in countries in their immediate (sub-)region as well as to International Financial Institutions (IFIs) and Multilateral Development Banks (MDBs) who may be interested in funding national and or (sub-)regional projects and want to understand how a given project proposal compares to project proposals from other countries.
- Adding a GIS layer to the ITIO that would provide such information would increase the attractiveness and usability of the platform and would also add value to Governments and MDBs since the benchmarking of transport infrastructure construction costs is a critical step for having realistic construction costs and a stable investment program without unexpected cost increases. The use of benchmarking of construction costs could also be useful for cost estimates as well as for control of projects' costs.

## 25. Benefits to GE.4:

- As the Group by May 2022 will have concluded its mandate, uploading its analysis and data findings onto the ITIO may be the best way to ensure that the work of the Group becomes sustainable and would in addition to resulting in a written report also live on in a virtual/ GIS based environment.
- Moreover, the ITIO could offer an automated user dashboard function that would allow Governments, in a secured IT environment, to continue sharing transport infrastructure construction cost information with one another.

## 26. Short overview of benchmarking visualisation options:

- GE.4 has gathered and analysed two types of transport infrastructure construction cost datasets: i) Multiple year country averages and ii) Specific project data (including information on a geographical start and end point of a specific infrastructure project). The latter option provides better options for visualisation in a GIS environment as the infrastructure segment that is subject of a planned or ongoing construction project could be shown on a map. The former could be illustrated at national/ country level through a pop-up window which would illustrate average cost data.

**B. Continuation of benchmarking of transport infrastructure construction cost efforts in the framework of the Trans-European Motorways and Trans-European Railway projects**

27. At its thirteenth session in February 2020, the Group decided that rather than asking for an additional extension of its mandate or establish a new Group to continue the work, its efforts could be continued in the framework of the TEM and TER projects.

28. The TEM and TER Master Plans, reflecting the priority transport infrastructure needs of 21 Central, Eastern, and South-Eastern European countries identify the backbone road and rail networks in those countries and present a realistic investment strategy to gradually develop these networks. As many as 491 projects with an aggregate estimated cost of EUR 102 billion have been evaluated and prioritized so far. The Group deems TEM and TER projects as very well-placed framework to continue and further extent its benchmarking efforts.

**VIII. Guidance by the Group**

29. At its forthcoming final session, GE.4 is invited to consider, discuss, amend and possibly endorse this document for submission to the thirty-fifth session of the Working Party on Transport Trends and Economics (WP.5) and for inclusion in its final report.

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