TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)

COMPLETING NETWORK – IMPROVING MANAGEMENT – RESPONDING TO TRENDS

UNIQUE PLATFORM FOR ROAD INFRASTRUCTURE PROVIDERS, MANAGERS AND OPERATORS

DECEMBER 2018
Who we are

TEMSTAT map

UNECE TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)
Why we were established

1. NO POVERTY
2. ZERO HUNGER
3. GOOD HEALTH AND WELL-BEING
4. QUALITY EDUCATION
5. GENDER EQUALITY
6. CLEAN WATER AND SANITATION
7. AFFORDABLE AND CLEAN ENERGY
8. DECENT WORK AND ECONOMIC GROWTH
9. INDUSTRY INNOVATION AND INFRASTRUCTURE
10. REDUCED INEQUALITIES
11. SUSTAINABLE CITIES AND COMMUNITIES
12. RESPONSIBLE CONSUMPTION AND PRODUCTION
13. CLIMATE ACTION
14. LIFE BELOW WATER
15. LIFE ON LAND
16. PEACE AND JUSTICE, STRONG INSTITUTIONS
17. PARTNERSHIPS FOR THE GOALS

UNECE TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)
## How we do so

### PROJECTS and ACTIVITIES UP TO 2021

### Standards:
- Safety standards in work zones
- Development of a standard catalogue of public services in terms of road infrastructure
- Standards for road equipment for the protection of the environment

### Cooperation with partners:
- UN Regional Commissions, Specialized Agencies, Programs and Funds, Departments and Offices
- Highways Engineering Exchange Program, IRF, OECD ITF, PIARC, CEDR
- UNECE (i.e.: WP.5, SC.1, WP.1, WP.29, WP.6)

### Evaluation of effectiveness and efficiency:
- Road safety infrastructural means
- Solutions for the protection of the environment
- Tolling systems

### Internal business processes:
- Data collection, measurement and dissemination processes for road operators
- Alternative methods of energy production in the management of road infrastructure
- Building Information Modeling for road operators
Areas of interest

TEM Project
Strategic Objectives

✓ Facilitating road traffic in Europe

✓ Improving the quality and efficiency of transport operations in UN ECE region

✓ Balancing existing gaps and disparities between motorway networks in Western, Eastern, Central and South-Eastern Europe

✓ Assisting the integration process of European transport infrastructure systems

NETWORK
ANALYSIS AND PROJECTS COORDINATION

OPERATIONAL PROFICIENCY
BUSINESS PROCESSES IMPROVEMENT

TRENDS
UNDERSTANDING AND RESPONSE
NETWORK
ANALYSIS AND PROJECTS COORDINATION

OPERATIONAL PROFICIENCY
BUSINESS PROCESSES IMPROVEMENT

TRENDS
UNDERSTANDING AND RESPONSE
Network

**LEGACY:**
- TEM Master Plan has been prepared in 2006 and revised in 2011;
- It contains revised list of priority projects of TEM backbone network;
- The expected status of the network in 2020 is also projected.

**CURRENT PROJECT:**
- **TEM Network Report** has been scheduled to be prepared in 2018;
- It will examine progress of network development;
- Transport growth and transport needs in terms of road infrastructure will be presented;
- Road safety has been taken into consideration, as well as Border crossings as probable bottle necks on the network.
Network

TEM Network Report – objectives of the report

• Presentation of TEM Network in one coherent document
• TEM Network Report is a continuation of TEMSTAT activities of TEM Project
• TEM Network Report constitute continual monitoring system
• Report presents data in terms of network readiness, plans for development, road safety, border crossings and general transport information. This document can be treated as an attempt of revision of TEM Masterplan from 2011
• Report will establish a stable set of data allowing to monitor trends and identify changes in development and future of TEM road network
• Excellent source of data and information for governments, National Road Administrations and any interested parties in road and infrastructure sector which can be used for network planning
• 2018 edition comprise also wider range of data - whole road network of TEM member countries to have clear view regarding development of road networks in last years
Network
TEM Network Report

1. Economic data:
   - Transport growth evolution in TEM countries
   - Trade exchange flows by transport mode (% by tkm) in TEM countries
   - Employment by transport mode in TEM countries
   - Gross investments spending in road infrastructure in TEM countries
   - Maintenance expenditures in road infrastructure in TEM countries
   - Registered vehicles by type of vehicles in TEM countries

2. Structure of the national TEM Members network
   - Road Network data
     - Total road network (KM) and High Speed Roads (KM)
     - Dual and single carriage roads (toll and not tollled) (KM)
     - Road network density by country (km roads/km2 land area)
     - Traffic density by country AADT
   - General Transport Data
     - Road passenger and goods transport (pkm+tkm)
   - Road Safety

3. Structure of TEM Network
   - Road type present and planned
   - Number of lanes present and planned
   - Sections:
     - In operation, under construction, planned/programmed
     - Years of construction
     - Estimated costs
   - AADT volume
   - Accidents and fatalities

4. Border Crossings of TEM Network
   - Roads
   - Average Time
   - Services
   - Number of HGV
   - AADT
Sources of data

- Eurostat
- UNECE Statistical Database
- OECD Stat
- World Bank
- WP6 UNECE
- OECD ITF
Employment by mode of transport

- Road Freight transport
- Road passenger transport
- Railways
- Pipelines
- Inland water transport
- Sea Transport
- Air transport
- Warehousing and support activities
- Postal and courier activities

TRANS-EUROPEAN NORTH-SOUTH MOTORWAY (TEM)
NETWORK
ANALYSIS AND PROJECTS COORDINATION

OPERATIONAL PROFICIENCY
BUSINESS PROCESSES IMPROVEMENT

TRENDS
UNDERSTANDING AND RESPONSE
Operational proficiency

PROJECTS DELIVERED:
- RSA and RSI on the TEM Network

CURRENT PROJECTS:
- Maintenance standards for roads and highways
- Governing and funding of road infrastructure
- Benchmarking of Transport Infrastructure Construction Costs

LEGACY:
- TEM Standards and Recommended Practice (design, construction, maintenance)
Operational proficiency
REPORT: Governing and funding of road infrastructure

1. Road sub-sector’s goals and public services
   - Governance and public services according to the UN System understanding
   - the goals and services for road authorities, taking into consideration literature review and international best practice
   - Generic Balanced Scorecard for road authority

2. Governance and organization of the road sub-sector:
   - Roles and responsibilities of ministries, agencies and organizations
   - Legal forms of these organizations
   - Supply chain organization
   - Private Sector involvement

3. Capabilities of the road sub-sector:
   - Asset management maturity and strategy
   - Data collection and management
   - Planning and programming processes
   - Performance measurement

4. Funding strategies and PPP Projects:
   - Funding sources
   - Governance of funding
   - Debt financing
   - Road expenditures
   - Preparation and management of PPP projects

Permanent workgroup with iHEEP on Asset Management

UNECE TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)
Business Model approach
Common denominator

- Key partners
- Key activities
- Key resources
- Value proposition
- Customer relationships
- Channels
- Customer segments
- Costs structure
- Revenue streams
Chapter A
Road sub-sector’s goals and public services

- Customer expectations:
  - Customer orientation as a primary driver of organizational performance
  - The value creation process which support customer orientation
  - Reliable and safe infrastructure for mobility operations

- Road infrastructure value proposition:
  - Asset management
  - Traffic management

- Requirements for governance:
  - Responsive
  - Accountable
  - Understanding the customer
  - Building capacity
  - Service delivery
  - Continual improvement
# Chapter A

Road sub-sector’s goals and public services

## Implementation strategies

<table>
<thead>
<tr>
<th>Increase utility</th>
<th>Maximize asset utilization</th>
<th>Enhance peak capacity and effective throughput</th>
<th>Apply demand management</th>
<th>Optimize availability/reduce downtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance quality for users</td>
<td>Adopt customer-centric operating model</td>
<td>Enhance the end-to-end user experience</td>
<td></td>
<td>Use smart technologies to refine user performance</td>
</tr>
<tr>
<td>Decrease total cost</td>
<td>Implement lean and automated processes</td>
<td>Optimize procurement costs and outsourcing</td>
<td></td>
<td>Right size management and support functions</td>
</tr>
<tr>
<td>Mitigate externalities</td>
<td>Arrange comprehensive sustainability: Health, Safety, Environment</td>
<td>Embed sustainability: Health, Safety, Environment routine</td>
<td></td>
<td>Cooperate with relevant stakeholders</td>
</tr>
<tr>
<td>Increase lifetime value</td>
<td>Extend asset life</td>
<td>Invest in preventive maintenance</td>
<td>Control excessive asset consumption and stress</td>
<td>Enhance resilience</td>
</tr>
<tr>
<td>Reinvest with a life cycle view</td>
<td>Prioritize project options with whole life cycle CBA</td>
<td>Select contracting mode for best value for money</td>
<td></td>
<td>Prepare for efficient project delivery</td>
</tr>
<tr>
<td>Enable O&amp;M best practice</td>
<td>Ensure funding</td>
<td>Dedicate user taxes via maintenance funds</td>
<td>Apply inclusive user charges</td>
<td>Capture ancillary business</td>
</tr>
<tr>
<td></td>
<td>Build capabilities</td>
<td>Introduce asset management planning</td>
<td>Apply data benchmarks and tools</td>
<td>Conduct training and develop talents</td>
</tr>
<tr>
<td></td>
<td>Reform governance</td>
<td>Corporatize and professionalize public agencies</td>
<td>Foster cooperation between agencies</td>
<td>Consider private Sector participation and competition</td>
</tr>
</tbody>
</table>

Source: WEF
# Chapter B

## Governance within the road sub-sector

<table>
<thead>
<tr>
<th>Stage of development</th>
<th>Birth</th>
<th>Growth</th>
<th>Upgrading</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
<td>Large public works department</td>
<td>Separation of client and service deliverer</td>
<td>Road agency/administration/board</td>
<td>“Commercial” roads</td>
</tr>
<tr>
<td><strong>Management systems</strong></td>
<td>Maintenance management</td>
<td>Accounting, road inventory, traffic, and road condition</td>
<td>Financial management, information management, road asset, and performance management (road smoothness, capacity, safety)</td>
<td>Financial management, transportation modeling</td>
</tr>
<tr>
<td><strong>Management skills</strong></td>
<td>Resource mobilization</td>
<td>Management of contractual relationships and relationships with state level issues</td>
<td>“Commercial” management, reorganization management and management of relationships with community issues</td>
<td>Management of modal integration and wider issues, management of consultation and probity</td>
</tr>
<tr>
<td><strong>Technical skills</strong></td>
<td>Basic engineering, maintenance workforce management</td>
<td>Highway engineering; road asset management; planning, programming, and prioritization of road activities; contract management</td>
<td>Use of performance indicators, economic analysis, environmental/social analysis</td>
<td>Transport system performance, planning, financial analysis, information technology, traffic demand management</td>
</tr>
<tr>
<td><strong>Private sector involvement</strong></td>
<td>Low</td>
<td>Some consulting/contracting</td>
<td>Design, construction, maintenance, road management, and financing</td>
<td>Long-term performance specified maintenance and public-private partnerships</td>
</tr>
</tbody>
</table>

Source: ADB
Chapter B
Governance within the road sub-sector

**PHASE I**
- Road administration is relatively simple with thousands of employees
- All works are done in-house
- The governance structure is centralized and the Ministry micromanages and selects projects

**PHASE II**
- Identification of roles of customer and contractor begins
- The Ministry passes some management functions to the road administration, however still has the right to point specific project
- Merging of goals and objectives for infrastructure and transport

**PHASE III**
- Separation of customer and contractor roles
- NRA becomes the customer
- Process of decentralization begins
- Headquarters is responsible for overall management and regional branches are responsible for projects' implementation according to established performance indicators and targets
- The Ministry defines goals for the NRA

**PHASE IV**
- The contractor side is completely privatized
- The road funds starts to finance road activities
- Budget is prepared by the road administration
- NRA's HQ uses IT systems to support planning and programming
- Regional branches are responsible for plans and programs execution
- IT systems support performance measurement based on the adopted KPIs

**PHASE V**
- Road administration becomes to official owner of the assets
- NRA is corporatized
- Its activities are based on the assets value
- It may generate profit

Source: WB

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Chapter C
Capabilities of the road authorities

- AMP as business process
# Chapter C

## Capabilities of the road authorities

<table>
<thead>
<tr>
<th>Three main outcomes</th>
<th>AMP business process</th>
<th>Five core questions</th>
<th>AASHTO areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-assessment &amp; gap analysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PERFORMANCE ASSESSMENT</strong></td>
<td>Develop asset inventory</td>
<td>What is the current state of my assets?</td>
<td>SERVICE PLANNING</td>
</tr>
<tr>
<td></td>
<td>Establish levels of service, performance measures and targets</td>
<td>What is my required level of service?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assess condition and performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPTIMIZATION OF DECISION MAKING</strong></td>
<td>Determine future demand</td>
<td></td>
<td>LIFE CYCLE MANAGEMENT AND ASSET PRESERVATION</td>
</tr>
<tr>
<td></td>
<td>Determine residual life</td>
<td>Which assets are critical?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine life cycle costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine risk treatment and management</td>
<td>What is my best O&amp;M and CIP investment strategy?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimize operations and maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimize capital investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FUNDING STRATEGY</strong></td>
<td>Determine funding strategy</td>
<td>What is my best long term funding strategy?</td>
<td>PROGRAM PLANNING AND TAMP</td>
</tr>
<tr>
<td></td>
<td>Build TAMP with financial plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UNECE**  
TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)
Chapter D
Financing and public-private partnership

- Financing sources and instruments

Source: UNECE
## Chapter D
Financing

<table>
<thead>
<tr>
<th>Category</th>
<th>Funding mechanism</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>All purpose taxes</td>
<td>General taxes</td>
<td>Charges applied to salaries, goods and services purchase, companies’ incomes etc. Sometimes earmarked to specific road funds</td>
</tr>
<tr>
<td>Special purpose road user taxes and fines</td>
<td>Vehicle taxes</td>
<td>Payments per vehicle depending on vehicle characteristics on a one-off and on an annual basis</td>
</tr>
<tr>
<td></td>
<td>Fuel taxes</td>
<td>Payments applied to the oil and diesel products that are consumed by the vehicle</td>
</tr>
<tr>
<td></td>
<td>Green taxes</td>
<td>The charge depends on the distance driven and/or the pollutant emissions features of the vehicle</td>
</tr>
<tr>
<td></td>
<td>Fines</td>
<td>Charges from law violations</td>
</tr>
<tr>
<td>Road user charges</td>
<td>Distance based</td>
<td>Payments are applied strictly to the distance travelled</td>
</tr>
<tr>
<td></td>
<td>Time based</td>
<td>Payments based on the amount of time that the infrastructure is available</td>
</tr>
<tr>
<td></td>
<td>Road pricing</td>
<td>Charges applied to users within a certain area (for i.e. demand management)</td>
</tr>
<tr>
<td></td>
<td>International transit fees</td>
<td>Transit charges (i.e. taking into account distance, quantity of goods)</td>
</tr>
<tr>
<td>Development cost charges</td>
<td>Commercial areas access contribution</td>
<td>Payments imposed to new commercial areas where the infrastructure has been developed</td>
</tr>
<tr>
<td></td>
<td>Urban development contribution</td>
<td>Payments imposed to municipalities where the infrastructure has been developed</td>
</tr>
<tr>
<td>Grants</td>
<td></td>
<td>Non-repayable funds disbursed by one party.</td>
</tr>
<tr>
<td>Private financing</td>
<td>PPP</td>
<td>Obtaining financing by private organizations from commercial financing institutions to be invested in public infrastructure</td>
</tr>
<tr>
<td></td>
<td>Donations</td>
<td>Individuals or organization who help to maintain roads</td>
</tr>
</tbody>
</table>

Source: CEDR
## Chapter D
Financing and public-private partnership

<table>
<thead>
<tr>
<th>Category</th>
<th>Work &amp; service contract (traditional procurement)</th>
<th>Public-Private Partnership</th>
<th>Privatization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Design, Build</td>
<td>Performance-Based Contracts (PBC)</td>
<td>BOT, DBFO, BOO (Greenfield)</td>
</tr>
<tr>
<td>Design</td>
<td>Private by fee contract</td>
<td>Private by fee contract</td>
<td>Private by concession contract</td>
</tr>
<tr>
<td>Build</td>
<td>Private by fee contract</td>
<td>Private by fee contract</td>
<td>Private by fee contract</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Public</td>
<td>Public</td>
<td>Private by concession contract</td>
</tr>
<tr>
<td>Finance</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Own</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Private sector revenue options</td>
<td></td>
<td></td>
<td>Public (BOT/DBFO) or Private (BOO)</td>
</tr>
</tbody>
</table>

Source: PPIAF Toolkit for PPP in Roads and Highways
NETWORK
ANALYSIS AND PROJECTS COORDINATION

OPERATIONAL PROFICIENCY
BUSINESS PROCESSES IMPROVEMENT

TRENDS
UNDERSTANDING AND RESPONSE
Trends

Trends in economy and transportation

- Alternative fuels
- Sharing-economy
- Automation

Road operators response in terms of:

- Self-explaining roads
- Well-maintained roads and signs
- Road traffic information
- Data collection and sharing
- New digital infrastructure
- Safety and security policies and procedures
Trends
Report about Mobility as a Service

MOBILITY CUSTOMERS

MOBILITY PROVIDERS

DATA PROVIDERS

TRANSPORT PROVIDERS AND OPERATORS

INFRASTRUCTURE PROVIDERS AND OPERATORS

SERVICE

INSIGHT

DATA

SERVICE

UNECE TRANS-EUROPEAN NORTH-SOUTH MOTORWAY PROJECT (TEM)
Part 1: Generic services and value proposition of infrastructure providers
   - Definition of current situation
   - Requirements for improvement concerning:
     - Customer perspective
     - Internal business perspective
     - Learn and growth perspective

Part 2: Current trends in transportation and a role of infrastructure providers and operators in mobility supply chain
   - Trends definition:
     - Electrification
     - Sharing economy
     - Automation
   - Requirements, brought by mentioned above trends in transportation, will be investigated with a special focus on the possible and/or expected roles of the infrastructure operator in the mobility supply chain

Part 3: Identification of new business processes and needs for re-engineering of existing business processes of infrastructure providers and operators
   - Impact of the mobility requirements, on the existing business processes, will be investigated
   - Possible new business processes will be suggested in line with learning and growth perspective.
Conclusions

**UNIQUE PLATFORM FOR ROAD INFRASTRUCTURE PROVIDERS AND OPERATORS**

**NETWORK IMPROVEMENT**
- WHICH SECTIONS AND SERVICES EXIST
- WHICH ARE MISSING
- WHEN EXPECTED

**OPERATIONAL PROFICIENCY**
- HOW TO ENHANCE EFFECTIVENESS AND EFFICIENCY WITHIN ROAD SUB-SECTOR

**TRENDS RESPONSE**
- CONTRIBUTION TO MOBILITY SUPPLY CHAIN
- IMPACT ON THE ROAD INFRASTRUCTURE PROVIDERS
- NEW BUSINESS PROCESSES
Thank you for your attention

Do not wait any longer. Join us!😊

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