OUTLINE

1. GENERAL OVERVIEW of HIGHWAY NETWORK
2. ROAD FINANCING IN TURKEY
3. HIGHWAY INVESTMENTS
4. MOTORWAYS AND PPP MOTORWAY PROJECTS
5. CONCLUSIONS
GENERAL OVERVIEW of HIGHWAY NETWORK
The lands of Turkey are located at a point where the three continents; Asia, Africa and Europe are closest to each other. Turkey has 13000 km of international road network. Within 4 hours flying time, about 1.5 billion people from 56 countries can reach Turkey.
The road network excluding urban roads is about 385,000 km in length.
GENERAL DIRECTORATE OF TURKISH HIGHWAYS

- GDH is responsible for planning, design, construction, maintenance, repair and operation of roads, bridges and structures within the network of motorways, state and provincial roads and keep all the network safely in operation in all weather conditions.

- GDH was established on March 1, 1950

- GDH is an affiliated institution of the Ministry of Transport, Maritime Affairs and Communications.
REGIONAL DIVISIONS OF GDH

- 18 Regional Divisions
- 118 Subdivisions
- 281 Maintenance Houses

- 25 Motorway Maintenance and Operation Offices
- 2 Equipment and Supply Directories
NATIONAL HIGHWAY NETWORK

- Total road network is 66.801 km.
- 36.5% of total road network (24.369 km) is dual carriageway

- Total Replacement Value: 67 Billion $
- Road Density: 50 km / 100 km² (Excl. Urban Roads)
- Motorway Density: 2.86/1000 km²
ROAD STRUCTURES – TUNNELS, BRIDGES & VIADUCTS

**2003**
- Number of Tunnels: 83
- Length of Tunnels: 50 km
- Number of Bridges & Viaducts: 5.967
- Length of Bridges & Viaducts: 311 km

**2016**
- Number of Tunnels: 272
- Length of Tunnels: 271 km
- Number of Bridges & Viaducts: 7.898
- Length of Bridges & Viaducts: 469 km

**Under Construction**
- Number of Tunnels: 85
- Length of Tunnels: 266 km
- Number of Bridges & Viaducts: 431
- Length of Bridges & Viaducts: 65 km
NATIONAL HIGHWAY NETWORK (66.801 km)

- Turkish Road Network under General Directorate of Turkish Highways’ responsibility.
By the end of March 2016
- Number of Vehicles: 20,252,146
- Number of Passenger Cars: 10,752,863 (53% of Vehicle Fleet)
VEHICLE & CAR OWNERSHIP

- Car ownership 137 cars per 1000 people is much lower than the EU and other developed countries.
- High potential for an increase in the number of vehicles per capita (compared to developed countries)

*IRF WORLD ROAD STATISTICS 50 TH YEAR ANNIVERSARY VOLUME 1 DATA 2000-2011
DOMESTIC PASSENGER & FREIGHT TRANSPORT 2015

**PASSENGER TRANSPORT**
- Railways, 1.1%
- Airlines, 9.1%
- Highways, 89.2%

**FREIGHT TRANSPORT**
- Railways, 3.9%
- Sea Routes, 6.3%
- Highways, 89.8%

**Passenger Transport**
Highways: 89.8%

**Freight Transport**
Highways: 89.5%
116% increase in vehicle-km, 61% increase in ton-km, 77% increase in passenger-km in the period of 2003 & 2015.

Despite only accounting for 3.4% of the road network as a whole, our motorway network is carrying 23% of all freight.
TRAFFIC VOLUME
Million Km (2003)

52,349
Total Vehicle-Km

TRAFFIC VOLUME
Million Km (2015)

113,274
Total Vehicle-Km

116% increase in vehicle-km
Between 2003 & 2014, we achieved 62% reduction in fatality rate per 100 Million Vehicle x Km.

**TARGET 2023**
Reduce Fatality Rate below 1 for 100 Million Vehicle x Km
ROAD FINANCING IN TURKEY
**National Budget**
- financing approximately 95% of road investment budget
- Road used related taxes and excise taxes on vehicle purchasing taxes directly go to the consolidated budget. Ministry of Finance collects all taxes and allocates those taxes to all public expenditures.

**Toll Motorway Revenues**
- 400 Million USD, covering 5% of total road investment budget
- Istanbul-Ankara toll rate is about 6 USD for 380 km (0.015 USD/km, 1.5 US Cents/km)
- Two intercontinental suspended bridges over Istanbul Strait 1.5 US$ for two way

**PPP concessions for the construction of BOT motorways**
- İstanbul-İzmir Motorway (Inc. İzmit Bay Crossing)
- Northern Marmara Motorway, Odayeri-Paşaköy Section (Inc. Yavuz Sultan Selim Cable Stayed Suspension Bridge) Project
PERCENTAGE OF GDP USED FOR HIGHWAY INFRASTRUCTURE INVESTMENT

INVESTMENT 2016 Fixed Price (Billion $)  
Perc. Of GDP (%)

2003: 1.70 0.42%  
2004: 2.30 0.46%  
2005: 3.15 0.52%  
2006: 3.80 0.60%  
2007: 4.14 0.53%  
2008: 6.30 0.74%  
2009: 5.93 0.87%  
2010: 8.52 1.05%  
2011: 8.88 1.06%  
2012: 7.54 0.91%  
2013: 7.62 0.90%  
2014: 7.24 0.89%  
2015: 7.79 1.08%  
2016: 1.08%  

TEM / IHEEP MEETING ON ROAD FINANCING
HIGHWAY INFRASTRUCTURE INVESTMENT

vs.

VEHICLE-KM

INVESTMENT 2016 Fixed Price (Billion $)

VEH-KM (Billion)
64% of Gasoline price and 59% of diesel price is tax. Tax rates of diesel is lower.

Vehicle purchase taxes and annual motor vehicle taxes are determined according to engine size, age and type of vehicle.

The revenues from the road related taxes, taxes on gasoline and diesel, vehicle purchase taxes, annual motor vehicle taxes are not tied to highway construction and maintenance.
FUEL TAXES IN SELECTED COUNTRIES

- Belgium: Gasoline 1.07, Diesel 0.80
- France: Gasoline 1.06, Diesel 0.80
- Germany: Gasoline 1.11, Diesel 0.84
- Italy: Gasoline 1.27, Diesel 1.12
- Japan: Gasoline 0.59, Diesel 0.38
- Netherlands: Gasoline 1.31, Diesel 0.89
- UK: Gasoline 1.23, Diesel 1.24
- USA: Gasoline 0.11, Diesel 0.13
- Turkey: Gasoline 1.01, Diesel 0.75

USD per Liter
THE BREAKDOWN OF GDH’s TOTAL BUDGET

In 2015, Total budget of Turkish Highway amounted to **8.5 Billion US $**.

Out of total budget,

- 68% on state and provincial road construction & upgrading
- 6% on motorway rehabilitation and operation,
- 6% on routine maintenance,
- 2% on routine road safety works,
- 6% on personnel expenditure,
- 10% on expropriation
- the remaining 2% on other current expenditures.

The share of road transport investments in the Gross Domestic Product (GDP) is about 1%.
HIGHWAY INVESTMENTS
ACCORDING TO OUR NATIONAL ROAD PROGRAM:
The road infrastructure investments are planned to ensure;

1. Staying competitive by reducing travel times and transport costs

2. Providing uninterrupted and safe road transportation

3. The improvement of mobility and road user comfort

4. Facilitating the distribution of economic prosperity to all regions of the country
General Directorate of Highways started the implementation of a highway upgrading program in 2003 involving the upgrading of existing single carriageway into dual carriageway.

The primary objectives of dual carriageway road construction:
- to reduce traffic accident fatalities and serious injuries due to head-on collision,
- to improve the level of service affected by inadequate capacity.

The length of dual carriageway roads opened to traffic has reached to 18.268 km including motorways since 2003.
### EAST-WEST CORRIDORS (8.126 KM)

<table>
<thead>
<tr>
<th>Corridor</th>
<th>LENGTH (KM)</th>
<th>In Operation</th>
<th>Under Construction</th>
<th>Will be Tendered</th>
</tr>
</thead>
<tbody>
<tr>
<td>D010</td>
<td>1.152</td>
<td>867</td>
<td>27</td>
<td>258</td>
</tr>
<tr>
<td>D100</td>
<td>1.852</td>
<td>1.851</td>
<td>1</td>
<td>0</td>
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<tr>
<td>D200</td>
<td>1.235</td>
<td>1.222</td>
<td>2</td>
<td>11</td>
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<tr>
<td>D300</td>
<td>1.926</td>
<td>1.897</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>D400</td>
<td>1.961</td>
<td>1.385</td>
<td>56</td>
<td>519</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8.126</strong></td>
<td><strong>7.222 (% 89)</strong></td>
<td><strong>89(%1)</strong></td>
<td><strong>815 (%10)</strong></td>
</tr>
</tbody>
</table>
**NORTH-SOUTH CORRIDORS (12.146 KM)**

<table>
<thead>
<tr>
<th></th>
<th>Dual Carriageway</th>
<th>Single Carriageway</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In Operation</strong></td>
<td>9,086</td>
<td>640</td>
<td>9,726 (80%)</td>
</tr>
<tr>
<td><strong>Under Construction</strong></td>
<td>973</td>
<td>218</td>
<td>1,191 (9,8%)</td>
</tr>
<tr>
<td><strong>Will be Tendered</strong></td>
<td>722</td>
<td>507</td>
<td>1,229 (10,2%)</td>
</tr>
<tr>
<td><strong>Total Length</strong></td>
<td>10.781 (88,7%)</td>
<td>1.365 (11,3%)</td>
<td>12.146</td>
</tr>
</tbody>
</table>
MULTILANE DIVIDED 
HIGHWAY NETWORK 
(2003)

1.714 Km 
MOTORWAY

4.387 Km 
MULTILANE DIVIDED 
STATE&PROVINCIAL 
ROADS

6.101 Km 
TOTAL

MULTILANE DIVIDED 
HIGHWAY NETWORK 
(May 2016)

2.329 Km 
MOTORWAY

22.040 Km 
MULTILANE DIVIDED 
STATE&PROVINCIAL 
ROADS

24.369 Km 
TOTAL

HIGHWAY NETWORK: 63.143

HIGHWAY NETWORK: 66.801
INTELLIGENT TRANSPORTATION SYSTEMS-ITS

- Nationwide integrated system
- Main Traffic Management Centre in Ankara
- 17 Regional Traffic Management Centres
- Fibre optic cable 7500 km for inter-centre communication
- Widespread implementation of traffic management & traveller information systems on state & provincial roads
- Completion of the project up to 2023
Our organization has launched a challenging and ambitious motorway construction program. With regard to this expedited motorway construction program, up to now, a motorway network with a length of 2.329 km has been opened to traffic. Up to date, the total expenditure for motorway projects has been reached to approximately 25 Billion USD.
TOLL COLLECTION

OGS (DSRC-ACTIVE)
- 1,941,210 Subscribers
- 32.98% of Payment

HGS (RFID-PASSIVE)
- 8,923,450 Subscribers
- 67.02% of Payment

TOTAL
- 10,864,660 Subscribers
- 400 Million Dollar collected
- 400 Million Vehicles Passed
TURKEY’S PPP POLICY

GENERAL FEATURES OF BOT MOTORWAY CONTRACTS:

- Design specifications and standard are determined by GDH.
  (Project start-end points, corridor, technical requirements for special structures like suspension bridges)
- Traffic Guaranty will be provided to secure the pay back of the debt and equity if the generated revenue is not enough
- Expropriation costs are partly or wholly covered by Administration
- In case of the termination of Agreement, used loans will be paid by the Treasury
- The Tolls are updated every year based on the guidelines of United Nations Statistics Office
- Financing of project will be covered by the contractor as equity (at least 20%) and loan (80% at most)
PPP PROJECT PROCESS BEFORE TENDERING

1. PROJECT DEFINITION
2. PREPARATION OF BASIC DESIGN
   (DETAILED DESIGN IF NECESSARY)
3. ECONOMICAL & FINANCIAL FEASIBILITY STUDIES & REPORT OF THE PROJECT
4. APPLICATION TO HIGH PLANNING COUNCIL TO RECEIVE AUTHORISATION
5. PREPARING TENDER DOCUMENTS FOLLOWING THE HIGH PLANNING COUNCIL AUTHORISATION
6. APPROVAL OF TENDER DOCUMENTS BY MINISTER OF TRANSPORT MARITIME AFFAIRS AND COMMUNICATIONS
7. ANNOUNCEMENT OF TENDER NOTICE
PPP PROJECT PROCESS AFTER TENDERING

1. REQUESTERS START AS A PARTY AFTER ANNOUNCEMENT OF TENDER NOTICE
2. REQUESTER WHICH PROPOSED THE BEST BID IS CHOSEN BY TENDER COMMITTEE AND APPROVED BY MINISTER
3. AFTER THIS STAGE THIS REQUESTER CALLED AS CONTRACTOR
4. SIGNING OF CONTRACT
5. ADMINISTRATION CONTROLS THE PROJECT IN BOTH CONSTRUCTION AND OPERATION PERIOD
6. FINANCING OF PROJECT WILL BE COVERED BY THE CONTRACTOR AS EQUITY (AT LEAST 20%) AND LOAN (80% AT MOST)
7. IN CASE OF CANCELLATION, USED LOANS WILL BE PAID BY TREASURY OR ADMINISTRATION
ISTANBUL-İZMİR MOTORWAY (INCLUDING İZMİT BAY CROSSING AND CONNECTING ROADS)

• Investment Cost is 6.3 Billion US $
• 433 Km Length
• 7 Year Construction Period
• 15 Years 4 Months Motorway Operation Period
• 22 Years 4 months Contract Period

NORTH MARMARA MOTORWAY, ODAYERİ PAŞAKÖY SECTION (INCLUDING YAVUZ SULTAN SELİM CABLE STAYED SUSPENSION BRIDGE) PROJECT

• Investment Cost is 2.5 Billion US $
• 117 Km Length
• 2 Years 6 Months Construction Period
• 7 Years 8 Months 20 Days Operation Period
• 10 Years 2 Months 20 Days Contract Period
ISTANBUL-İZMİR MOTORWAY

- Existing State Road
- Istanbul-İzmir Motorway
- Çanakkale - Balıkesir Motorway (Project)
- Existing Bursa Ring Road
- Existing State Road

North Marmara Motorway
L: 117 km. (Under Construction)
İSTANBUL-İZMİR MOTORWAY
(INCLUDING İZMİT BAY CROSSING AND CONNECTING ROADS)

TOTAL LENGTH : 433 km
(384 km motorway, 49 km connecting roads, 2.682 m suspension bridge)

NUMBER OF VIADUCTS : 40
LENGTH OF VIADUCTS : 22.3 Km

NUMBER OF TUNNELS : 3
LENGTH OF TUNNELS : 6.45 Km

NUMBER OF BRIDGES : 364
LENGTH OF BRIDGES : 20.8 Km

NUMBERS OF INTERCHANGES : 25
İZMİT BAY SUSPENSION BRIDGE

İZMİT BAY CROSSING comprise of; North Approach Viaduct, Suspension Bridge

Total: 2907m

Bridge length: 2682m

Side span: 566m

Main span: 1550m

Side span: 566m

Navigation Clearance: 64.30m x 1000m

Midspan Length (m)
İzmit Bay Bridge with a length of 2680 m and 1550 m center span (4th longest in the world)

- Altınova-Gemlik Section with 40 km length and 6.5 km of İzmir-Kemalpaşa section have been opened to traffic.
- 12 km length Gebze-Altınova Section which includes İzmit Bay Crossing Bridge will be opened to traffic in June.
At the end of 2016,

- 25 km length Gemlik-Bursa and 20 km length İzmir-Kemalpaşa will be in operation.
- Motorway section İstanbul-Bursa will have been completed.
- 103.5 km of 433 km motorway will be in operation.
NORTH MARMARA MOTORWAY
(including 3rd suspension bridge, Yavuz Sultan Selim Bridge)
NORTH MARMARA MOTORWAY
(including cable stayed suspension bridge, Yavuz Sultan Selim Bridge)

TOTAL LENGTH : 117 Km
Cable Stayed Suspension Bridge with a length of 1875 meter

NUMBER OF VIADUCTS : 35
LENGTH OF VIADUCTS : 13.5 km

NUMBER OF TUNNELS : 2+2(Railways)
LENGTH OF TUNNELS : 2389+536 m

NUMBER OF BRIDGES : 97
LENGTH OF BRIDGES : 7.6 Km

NUMBERS OF INTERCHANGES : 20
Yavuz Sultan Selim Bridge

- 1408 m main span (The Bridge will be the longest suspension bridge in the world which has a rail system on it, 2x4 lanes of motorway and 2 lanes of railway on the same deck.
- Northern part of the bridge is Black Sea, southern part of the bridge is Marmara Sea.
Yavuz Sultan Selim Bridge

• The width of the deck will be 59 meters, the largest in the world.
• Also it will have the highest tower in the world with a height of 320 meters.
WORLDWIDE RANKING OF IMPORTANT BRIDGES

- Yavuz Sultan Selim Bridge
- Akashi Kaikyo
- Russky
- Sutong
- Stonecutters
- E’dong
- Tatara
- Normandy
- Jiujiang Fuyin
- Jingyue
- Great Belt
- Yi Sun-sin
- Izmit Bay Crossing
- Nanjing 4th Yangtze
- Xihoumen
- Runyang

[Graph showing a scatter plot with various bridges ranked by tower height and main span deck area]
NORTH MARMARA MOTORWAY PPP PROJECT
(European & Asian Parts - Tender Phase)

KINALI-ODAYERİ (LINK HIGHWAYS INC.) SECTION
88 KM (European Side)

KURTKÖY-AKYAZI (LINK HIGHWAYS INC.) SECTION
169 KM (Asian Side)
MOTORWAYS IN OPERATION 2.329 Km

BOT PROJECTS UNDER CONSTRUCTION 550 Km
1-Gebze-Orhangazi-İzmir Motorway (44 km of 433 km is in operation) 433 Km
2-North Marmara Motorway (Yavuz Sultan Selim Cable Stayed Suspension Bridge) Odayeri-Paşaköy Section 117 Km

BOT PROJECTS IN TENDERING PROCESS 257 Km
3-a North Marmara Motorway Kınalı-Odayeri Section 88 Km
3-b North Marmara Motorway Kurtköy-Akyazı Section 169 Km
TARGET BOT PROJECTS (1. Group)

1.321 Km

4- ÇİĞLİ-ALİAĞA-ÇANDARLI MOTORWAY
76 Km

5- ANKARA-NİĞDE MOTORWAY (INCL. KIRŞEHİR CONNECTION)
330 Km

6- ANKARA-KIRIKKALE-DELİÇE MOTORWAY
119 Km

7- KINALI-TEKİRDAĞ-ÇANAKKALE-BALIKESİR MOTORWAY (INCL. ÇANAKKALE BRIDGE)
352 Km

8- MERSİN-ERDEMLİ-TAŞ_UCU MOTORWAY
92 Km

9- AYDIN-DENİZLİ-BURDUR MOTORWAY AYDIN-DENİZLİ SEC.
165 Km

10- AFYON-ANTALYA-ALANYA MOTORWAY ANTALYA-ALANYA SEC.
187 Km

MOTORWAYS IN OPERATION : 2.329 Km

TARGET BOT PROJECTS (Under Construction) : 550 Km

TARGET BOT PROJECTS (In Tendering Process): 257 Km
TARGET BOT PROJECTS (2. Group)

11- Ankara-İzmir Motorway
   - 88 km
   - 117 km
12- Aydın-Denizli-Burdur Motorway (Denizli-Burdur Sec.)
   - 433 km
   - 231 km
   - 169 km
13- Sivrihisar-Bursa Motorway
   - 352 km
14- Afyon-Antalya-Alanya Motorway (Afyon-Antalya Section)
   - 350 km
15- Gerede-Merzifon-Gürbulak Motorway (Gerede-Merzifon Section)
   - 336 km

16- Delice-Samsun Motorway
   - 572 Km
17- Gerede-Merzifon-Gürbulak Motorway (Merzifon-Gürbulak Section)
   - 950 Km
18- Şanlıurfa-Diyarbakır-Habur Motorway (Incl. Diyarbakır Connection)
   - 454 Km
19- Rize-Erzurum-Diyarbakır Motorway
   - 460 Km

TARGET BOT PROJECTS (2. GROUP) 3.786 Km
TARGET MOTORWAY NETWORK

TOTAL: 8.199 KM

MOTORWAYS IN OPERATION (2.285+44 Km BOT)
TARGET 2023 BOT PROJECTS (UNDER CONSTRUCTION)
TARGET 2023 BOT PROJECTS (IN TENDERING PROCESS)
TARGET 2023 BOT PROJECTS (1.GROUP)
TARGET 2023 BOT PROJECTS (2.GROUP)

2.329 km
550 km
257 km
1.321 km
3.786 km

5.914 KM
5 CONCLUSIONS
CONCLUSIONS

• It is important that road infrastructure investments are made on time to avoid negative effects on economy.

• In addition to the traditional direct budget allocations from general revenues, innovative financing mechanisms should be put into application for sustainable and efficient financing of road infrastructure. In this regard, Users have to pay for the quality of the service offered and collected toll revenues should be earmarked to the road infrastructure.

• Financing mechanism on the basis of PPP is one of the most effective alternative to realize large scale highway projects without causing public burden and reducing duration of the road construction works without waiting for the availability of public funding.

Successful PPP Projects needs;

• Government commitment
• Appropriate risk allocation between concession Authority and concessionaire
• Expropriation done by the Public side.
THANK YOU FOR YOUR ATTENTION!

Mücahit ARMAN
Head of Strategy Development Department
General Directorate of Turkish Highways
Ministry of Transport, Maritime Affairs and Communications