



# Transport Infrastructure in

HORIZON 2020

an opportunity for innovation





## EUROPE 2020

Resource Efficient Europe

Innovation Union

Industrial Policy

2011 White Paper on transport

H2020 societal challenge transport

Smart, green and integrated transport system

**Objective**

*A European transport system that is resource-efficient, climate-and-environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society*

## Challenges create opportunities to innovate

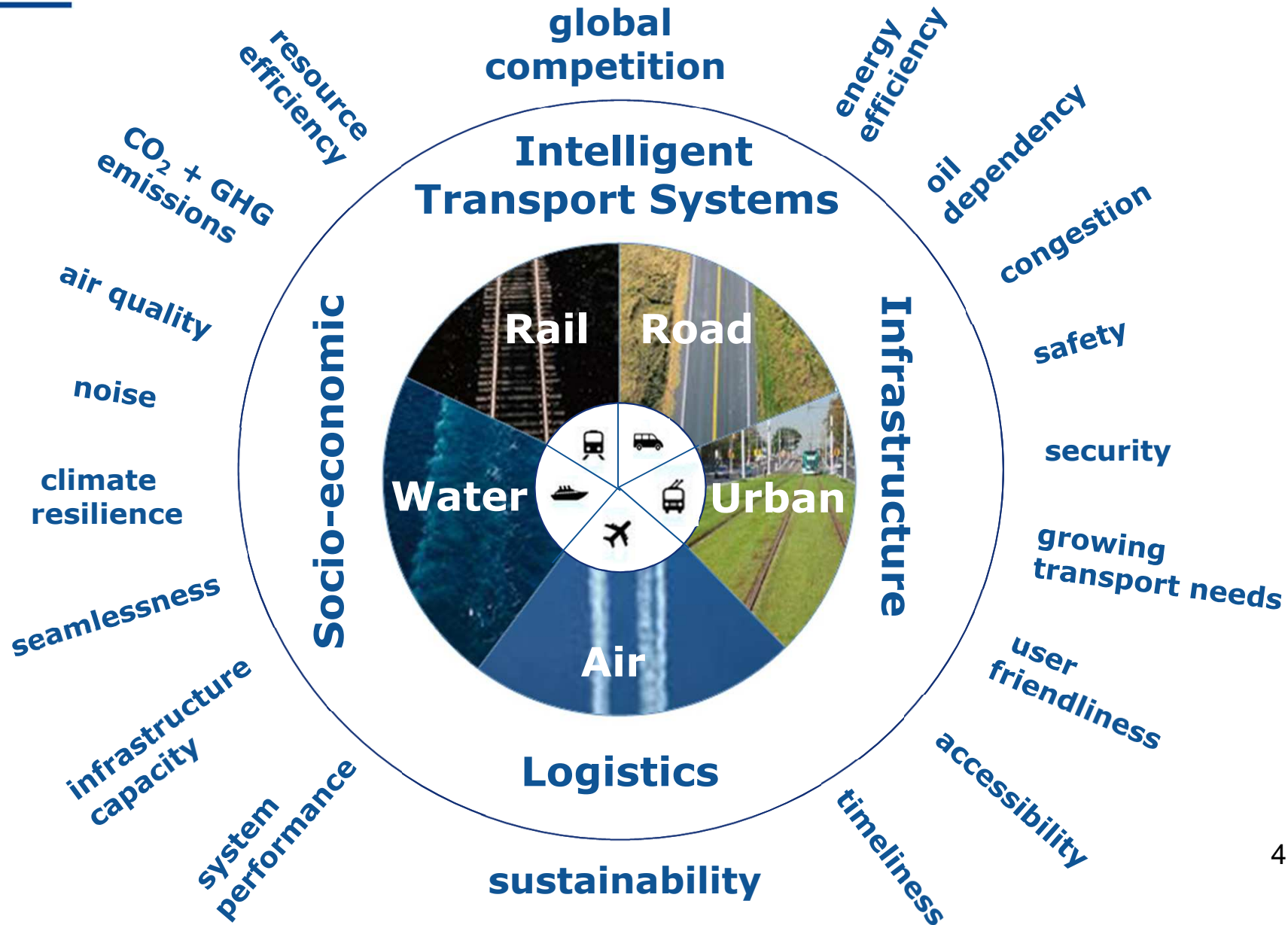
- ✓ *Climate change*
- ✓ *Health and ageing*
- ✓ *Use of natural resources*
- ✓ *Energy security*
- ✓ *Clean transport*
- ✓ *Land use*
- ✓ *....*



- ✓ *Powerful **drivers of change** in economy and society*
- ✓ *Major **global market opportunities***
- ✓ *Requiring **EU-scale approaches***
- ✓ *From **research to market***

***New needs → new ideas → new markets***

# Transport means, modes, systems, policy goals and societal challenges





**"Transport infrastructure is much more than asphalt, concrete or steel; it is the backbone of national economies, providing connections for people and goods, access to jobs and services, and enabling trade and economic growth"**

**(Declaration from Ministers at 2013 Annual ITF Summit – "Funding Transport")**



## Evolving needs

**Today's infrastructure is no longer suited to 2050 transport needs.**

**R&I needs to anticipate the change and include lifetime maintenance flow into projects and contracts.**

**New construction, retrofitting and/or maintenance works must take into consideration the evolutions brought by ITS, V2I, V2V and autonomous driving technologies, as well as by supply and recovery of energy.**



## Construction or Maintenance?

**New construction, renewal and maintenance, all improve productivity on a life cycle basis, and stimulate employment in the short term.**

It is particularly relevant in time of crisis as the present one



## The right value of the asset

**Countries are not investing enough to maintain or improve the performance of their transport infrastructure.**

**It is urgent to intervene before serious performance deficiencies or safety risks emerge.**





## Asset management and Climate Change

- Service disruptions, premature asset failures and network breakdowns under extreme conditions are material risks under **changing climate regimes**. There is no guarantee that the past will reliably serve as a basis for the future, to predict interventions.
- Carrying out full and regular asset maintenance is a critical first line of defence against uncertainty – but this has proven to be one area where **cuts in budgets** are first made.



## Asset management and economic downturn

In a financial crisis, it is always tempting to forgo transport infrastructure investments.

**Quality decay** is visible and leading to increased **risk of service degradation and disruption**, thus **reduced safety level**.

Long-term financial planning - sustainability of funding sources is key. It is important to **balance revenues with total lifetime cost of ownership**.

**Strategic asset management plans** help address uncertainty.

Need for comprehensive and comparable **national asset inventories** and “balance sheets” to allow **informed choices**.





# Preventive, Predictive and Corrective Maintenance

**Preventive Maintenance:** scheduled or planned maintenance actions aimed at the prevention of breakdowns and failures

**Predictive Maintenance:** techniques that help determine the conditions of in-service equipment in order to predict when maintenance should be performed. Minimize disruption of normal system operations, while allowing for budgeted, scheduled repairs.

**Corrective maintenance:** repair of equipment/structure in order to bring it back to its original operating conditions



## The importance of maintenance

- ▣ Proper maintenance programs have huge returns
- ▣ Keep asset running longer
- ▣ Allow for scheduled, budgeted repairs
- ▣ Reduce unscheduled down-time
- ▣ Make infrastructure safer and more reliable





## Needs for Innovation

Additional **research** is needed, on materials as well as on infrastructure engineering.

Promote research towards “**condition-aware**” infrastructure, applicable both for new works and for retrofitting.

Very significant **savings predicted** over lifecycle, in maintenance as well as in operation



## Condition-Aware Infrastructure

- ❄️ New technology allows infrastructure to **permanently monitor** its material condition.
- ❄️ From time-based to **condition-based maintenance** (large savings over lifecycle).
- ❄️ **Initial cost higher**, introduction easier if led by public authorities' requests.
- ❄️ Condition awareness is also efficiency-enhancing with regard to **operating conditions**:
  - ★ Automatic detection and info relay of hazards related to weather, other natural factors, traffic incidents
  - ★ Information to current users (drivers) but also more broadly to other network operators, logistics centres, etc.



# INFRASTRUCTURE

## EUROPE NEEDS

- To make infrastructure more resilient
- To keep pace with the growing mobility needs and aspirations of people and businesses
- To reduce the impact of infrastructure on the environment
- To maintain and upgrade deteriorating transport infrastructures
- To facilitate the uptake of innovation



# Call 'Mobility for Growth'



## INFRASTRUCTURE

### TOPICS:

- Smarter design, construction and maintenance  
– **MG8.1** - 2014 – *R&I: 2 stages; CSA: 1 stage*
- Next generation transport infrastructure: resource efficient, smarter and safer – **MG8.2** - 2014 – *R&I: 2 stages; CSA: 1 stage*
- Facilitating market take-up of innovative transport infrastructure solutions – **MG8.3** - 2015 – ***Public procurement of innovative solutions***
- Smart governance, network resilience and streamlined delivery of infrastructure innovation – **MG8.4** - 2015 – *R&I: 2 stages; CSA: 1 stage*

**in red: topics open in 2014**





# Public Procurement of Innovation

## A twofold objective

**Public sector** is faced with important challenges. Addressing these, often requires public sector transformation.

In many cases, solutions are near the market and would be provided if clear requirements and sufficient demand are expressed by the market (**PPI**).

In other cases R&D is still required to de-risk technology and compare competing solutions before committing to large scale deployment (**PCP**)

Demand driven innovation can open markets for **industry/researchers** creating growth & jobs in Europe.

The use of PCP/PPI contributes to the achievement of the **Internal Market** and fosters **open innovation**, mainly in SMEs often limited by a confined supply chain.



# The Transport Infrastructure Challenges

- European transport infrastructure is faced with multifaceted challenges (capacity, environment, climate change, economy). Key in the future will be to find **innovative solutions to increase the performance, robustness and efficiency of infrastructure** for all modes of transport.
- Many technological solutions are already available: the challenge consists in overcoming a **highly fragmented demand**.
- **Decision-makers are often unaware** of the availability and efficiency of high innovative solutions





## The PPI instrument is intended to facilitate

- **Public sector (\*)** to act as launching customer / early adopter / first buyer for innovative products and services that are newly arriving on the market (not widely commercially available yet) and to establish a buyers group with critical mass that triggers industry to scale up its production chain to bring products on the market with desired quality / price ratio within a specific time.
- **Buyers Groups** to share the risk linked to innovation.
- **Innovation providers** to upscale the production of their innovative products/solutions and enter a wider market and to cooperate and join forces with other suppliers to provide a complete set of products to match more complex challenges.

(\*) – infrastructure owners, operators, managers.



# WORK PROGRAMME 2016-2017 (under preparation)

## HOT TOPICS:

- Safety
- Resilience
- Optimization and adaptation
- Automation
- Electrification

