



International Association for the  
Study of Insurance Economics

# Études et Dossiers

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Extract from

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The Geneva Association - General Secretariat - 53, route de Malagnou - CH-1208 Geneva  
Tel.: +41-22-707 66 00 - Fax: +41-22-736 75 36 - [secretariat@genevaassociation.org](mailto:secretariat@genevaassociation.org) - [www.genevaassociation.org](http://www.genevaassociation.org)

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Layout & Distribution: Valéria Kozakova

# Infrastructure Needs, Options, Economic Models and Policy Issues: The Case of Transport



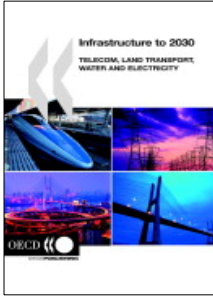
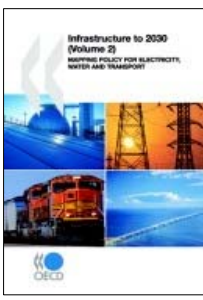

Pierre-Alain Schieb

Who are we?

Advisory Unit to the Secretary-General (SGE/AU)  
*International Futures Programme (IFP)*

- **Multidisciplinary team**, created in 1990, reporting directly to the Secretary-General of the OECD
- **Mission** = Identify and explore emerging policy issues to 2030 (management of new emerging risks, the security economy, bioeconomy, migrations...)
- **Participation / Project Funding** = Involvement of governmental bodies and private sector actors in each (self-financed) project


## Examples of OECD/IFP projects

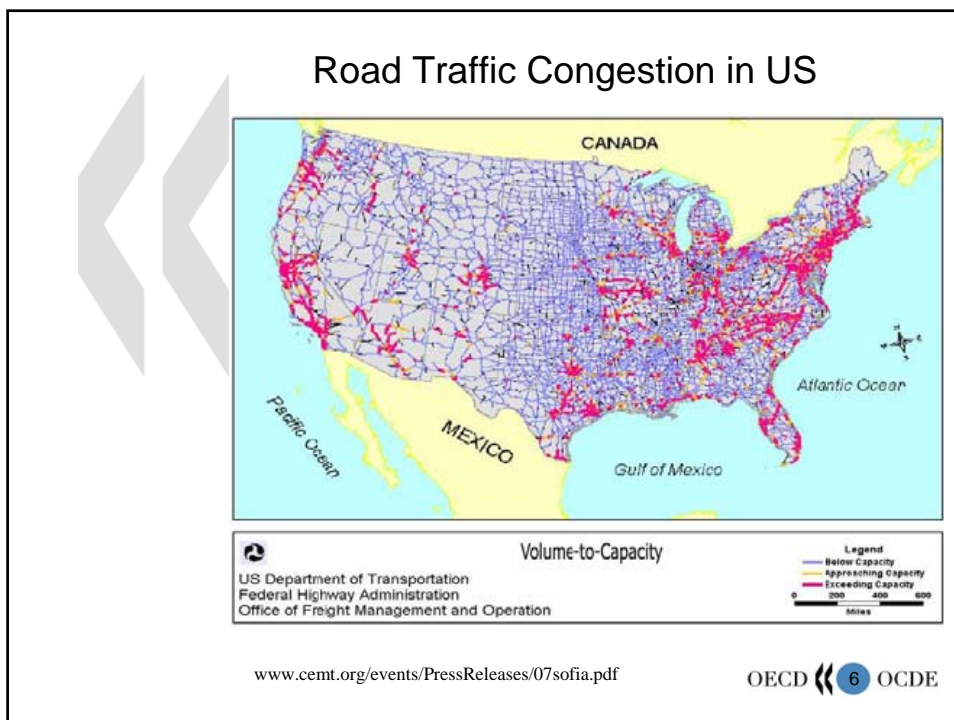
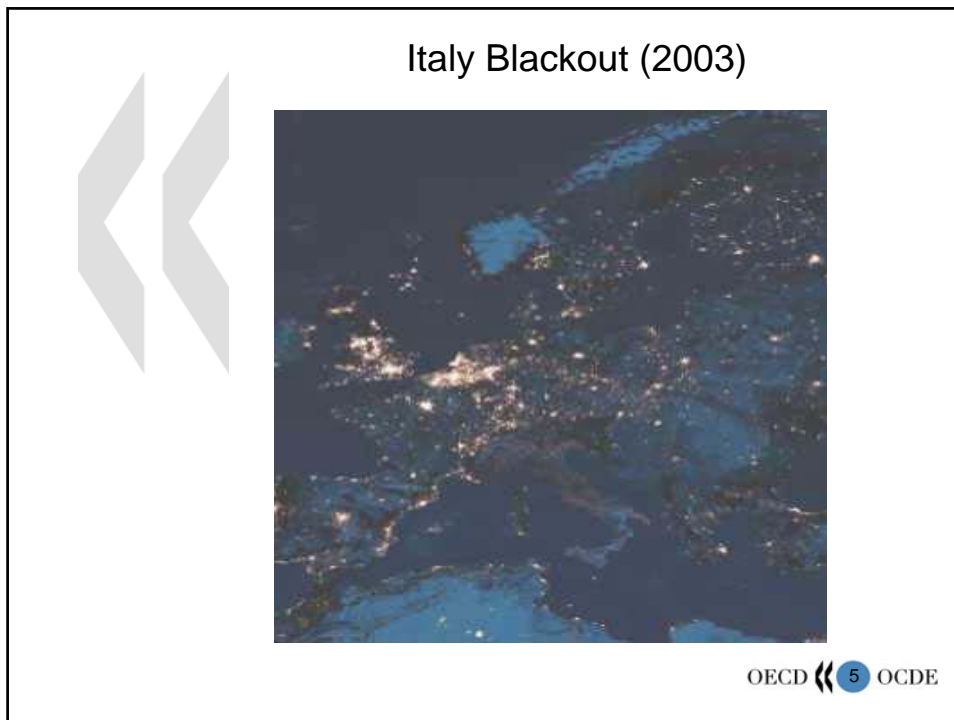
			
Space 2004	Space 2005	Infrastructure 2006	Infrastructure 2007
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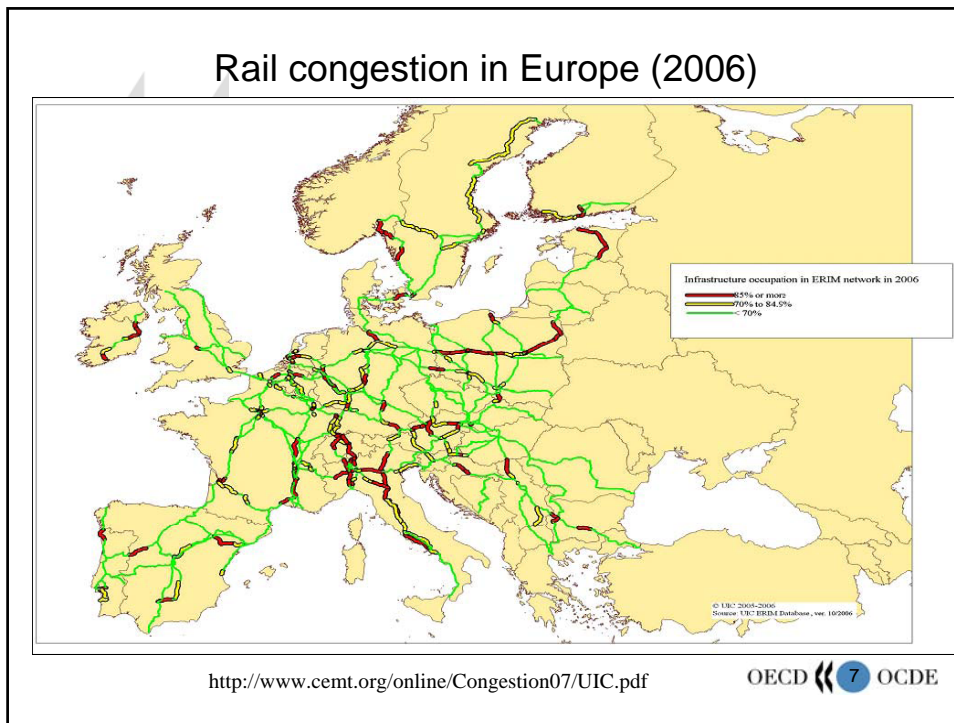
## Why infrastructure in OECD countries?

- Economic benefits in OECD countries were « inconclusive » in the 80's (Aschauer, 1989, A. Munnell..)
- Cost of opportunity in 2000s: shortages, market failures, ageing infrastructure..
- Attractiveness (Krugman): what if you have science parks and universities but no power, clean water, public transportation?
- Many kinds of social benefits (Lewis Mumford etc)

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## Main Features of the Project

- Long-term view of infrastructure development and investment
- 2 year duration (2005-2007)
- OECD countries + BRICs
- Telecoms, electricity, road, rail, water
- Time horizon 2030
- Project team – OECD IFP
- Steering Group (government, business, research)
- Collaboration across Organisation

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## 1: Assessment of needs, potential demand and the future evolution of the sector

- Critical assessments of existing reports
- What are the key factors driving the future evolution of the sector?
- Longer term prospects for needs and potential demand
- Cross sectoral interdependencies/synergies



## Drivers and key trends

Covering long term trends in 8 areas:

1. Geo-political developments
2. Macro-economy
3. Public Finance/financial markets
4. Population
5. Mobility
6. Environment
7. Technology
8. Governance

## Transport Investment to 2030 (David Stambrook, Canada)

- Road transport: 220 to 290 billion \$ a year  
(2/3 in OECD countries)
- Rail transport: 50 to 60 billion \$ a year  
(2/3 in OECD countries)
- *Policy matters: potential shift of 10% from road to rail*

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## Estimated average annual world infrastructure investment requirements 2003-2030 (additions and renewal)

In USD Bn and as a percentage of world GDP

Type of infrastructure	2000-10	Approx. % of world GDP	2010-20	Approx. % of world GDP	2020-30	Approx. % of world GDP
Road	220	0.38	245	0.32	292	0.29
Rail	49	0.09	54	0.07	58	0.06
Telecoms <sup>1</sup>	654	1.14	646	0.85	171	0.17
Electricity <sup>2</sup>	127	0.22	180	0.24	241	0.24
Water <sup>1,3</sup>	576	1.01	772	1.01	1 037	1.03

1. Estimates apply to the years 2005, 2015 and 2025.
2. Transmission and distribution only.
3. Only OECD countries, Russia, China, India and Brazil are considered here.

Table 1 p 29 - Infrastructure to 2030: Telecom, Land Transport, Water and Electricity (2006)

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## II- The Infrastructure gap: challenges and options for project design and business models?

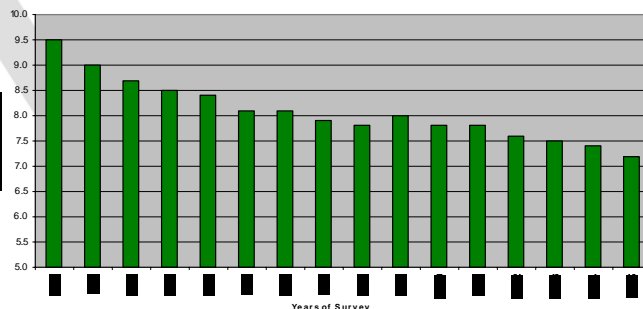
- Huge opportunities but a financial gap
- From centralised to decentralised, smaller scale?
- From large equipment to small equipment and perhaps different suppliers
- From ground to mobile/on board networked systems
- From « conventional » to new policy challenges (funding, back up systems, safety, liabilities..)
- Shortage of human capital (quantitative and qualitative basis)

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## In OECD countries, public capital investment as a share of total government expenditure is declining

General Government GFCF  
As a percentage of total government outlay



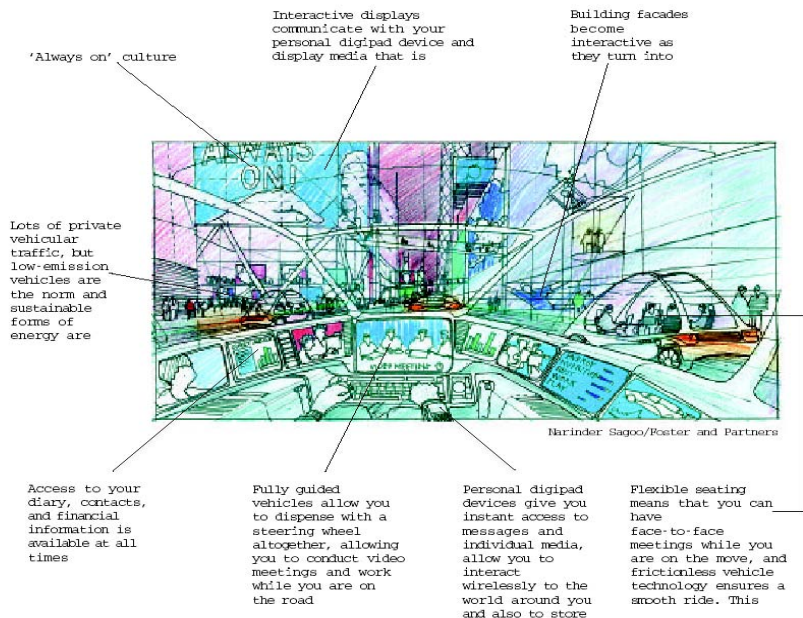
Source: OECD Economic Outlook No. 80 database, November 2006.

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### Public sector finances increasingly less able to meet future infrastructure needs from traditional sources



- Social expenditures have increased their share (from 16% of GDP in 1980 to 21% today)
- Spending on public health and long-term care likely to increase from 6.7% of GDP today to between 10.1% and 12.8% by 2050
- Pensions set to rise by 3-4 percentage points
- Lower spending on education for the young and child benefits
- But higher spending expected on secondary, tertiary and lifelong education
- Tax base may come under pressure through ageing workforce



Source : Intelligent Infrastructure Futures / The Scenarios – Towards 2055  
Office of Science and Technology, U.K

**Extremes of exchanges in infrastructure changes with telecommunications substitutions**

Infrastructure element	Investment increase or decrease	First estimate % change increase (+ve) or decrease (-ve)
Road transport infrastructure	--	-5 to -10%
Air travel (business) infrastructure	--	-5 to 10%
Fuel oil – car, air transport	-	-5%
Health care	--	-10%
Education	- or same	-5 to -10%
Justice	---	-20%
Electricity supply	+	+5%
Gas supply	+	+5%
Heating oil	+	+5%
Water supply	+	+5%
Sanitation	+	+5%

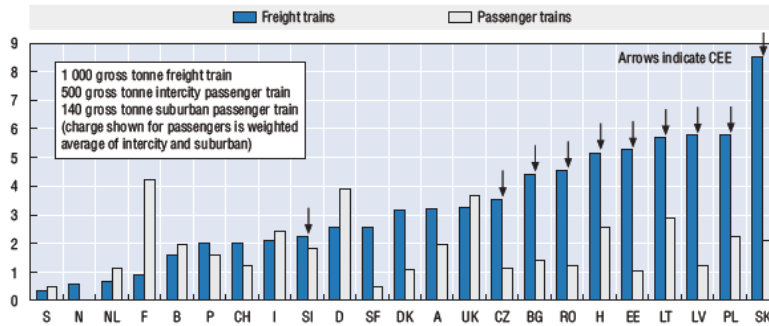


### III- Cost approaches

- Pricing: from cost recovery to life cycle cost?
- Typology of costs (example of rail)
- Impact of technology (advanced material)
- Impact of technology (transfer of investment/maintenance costs)
- Knowledge gap: the need for common indicators
- Recent progress in taking stock of infrastructure assets, including transport

### 3.1 Pricing

Figure 0.2. Average access charges in 2004  
€/train-km, excluding cost of electric traction



Note: Baltic freight trains are much larger than elsewhere. Baltic access charges are not directly comparable with those in other countries and have been adjusted here. In Estonia, for example, a typical 3 145 tonne train is charged € 11 per train-km. Data displayed for all countries for which reliable figures have been collected.

Source: European Conference of Ministers of Transport: Railway Reform & Charges for the Use of Infrastructure, ECMT 2005

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### 3.2 Typology of variable costs (rail)

#### Categories of costs included in variable charges

Maintenance			
Renewals			
Train planning and operations			
Congestion and scarcity			
Accidents			
Environment			

Source: European Conference of Ministers of Transport: Railway Reform & Charges for the Use of Infrastructure, ECMT, 2005

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### 3.3 Impact of technology (advanced material)

Table 10.1. Comparison of indicative costs between materials

Typical surfacing costs in €/m <sup>2</sup> for Western Europe			
Description	Epoxy Asphalt 30mm wearing course	HPCM 10mm wearing course	Conventional 30mm asphalt solution
Expected Lifespan	~30 years	~30 years	7-15 years
Milling 50-100mm	0.75-1.25	0.75-1.25	0.75-1.6
Binder course (50mm)	6-10	8-12	6-12
Tack/bond coat	0.25		0.1
Wearing course	18-33.5	18-22	6-12
Total costs	25-45 <sup>1</sup>	27-35	13-25 <sup>2</sup>

Notes: 1. Cost of restoration (once) of skid resistance during the service life not included.

2. Costs of minor repairs during 15 years of service not included.

Source: Long Life Surfaces for Busy Roads, OECD/ITF, 2008

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### 3.4 Impact of technology (transfer)

- On board equipment instead of on ground/track equipment:
  - rail
  - mass transit
  - airlines
  - maritime transport
  - roads: trucks, cars ...
- Impact on who funds the investment, finance operation and maintenance, bears the risks

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### 3.5 Knowledge gap

- No international/common indicators on rail, road, ports, etc.
- No times series/comparable data on quality of service, costs, maintenance, replacement, risks, system performance
- OECD IFP to offer a platform to prepare the ground (November 18, 2008 in Paris)

### 3.6. Recent Progress in taking stock of infrastructure assets

- Canada (Federal): PSAB section 3150 (2008-9)
- USA: GSAB Statement 34 (1999, non binding)
- New Zealand: Inventory and periodic audit (2004)

## IV- Policy issues related to cost

- Role of economic/business models: impact on cost, maintenance
- Role of regulators: can provide regulations and incentives on quality standards when independent
- Role of insurers/financial institutions:
  - incentives for good performance
  - criteria for insurability
  - criteria for issuing bonds, etc.

## IV –A sample of other relevant policy recommendations

Source: Volume 2, Infrastructure to 2030 (OECD, 2007)

- 1- Innovative approaches to finance
- 2- Improving the regulatory and institutional framework conditions
- 3- Strengthening governance and strategic planning
- 4- Developing and integrating technology
- 5- Expanding and improving the toolkit

## 4.2 Improving the Regulatory and Institutional Framework

- Examine the legal and regulatory framework conditions with a view to encouraging the emergence of fresh sources of capital and new business models for the construction, maintenance and operation of infrastructures.
- Encourage the emergence of new players and new business models through the creation and promotion of frameworks that stimulate the development of effective competition either in or for the market.
- **Place greater emphasis on the issue of reliability of infrastructure functioning.**
- Strengthen the framework for standards, as a tool for encouraging new operational models and for improving interoperability.

Main findings and policy recommendations – Infrastructure to 2030 (2006)

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## 4.3 Governance and Planning

- Support the development of long-term, co-ordinated approaches to infrastructure development.
- Reduce the vulnerability of long-term infrastructure planning and implementation to short-term thinking and priority setting.
- Ensure the involvement of a broader range of stakeholders in the process of needs assessment, prioritisation, design, planning and delivery of infrastructures.
- **Strengthen international co-operation to improve the efficiency, reliability and security of flows of goods, services and information across transborder infrastructures.**

Main findings and policy recommendations - Infrastructure to 2030 (2006)

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#### 4.4 Use technologies both to improve efficiency in infrastructure and to enhance demand management

- Intelligent transport systems and capacity improvement programmes
- **New systems of road network pricing and tolling**
- Remote metering
- Further development of cross-border electrical transmission interconnection
- Microbial fuel cells for energy from wastewater
- **ICT-driven public transport management**
- **Enhanced signalling and freight rail capacity**
- **Use of GIS to facilitate life-cycle management of assets**

#### 4.5 Improving the Toolkit

- Strengthen public capacity to inform decision-making, improve analysis, monitor performance, and develop the requisite interdisciplinary skills to address infrastructure issues.
- Data collection, research and analysis, accrual accounting and asset management, wider use of cost-benefit analysis, new interdisciplinary approaches to education and training.

## Next steps with the IFP

« Kick off meeting » in Paris on November 18, 2008 to decide on the scope, coverage and format of:

- **OECD Futures Project on Transcontinental Infrastructure to 2030** – Ports, airports, rail corridors, pipelines (2009-2010)
- **OECD Future Project and Pilot Group on Taking Stock of Infrastructure Assets** (2009-2010)