Innovating for Growth through Transport Infrastructure

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Secretary General

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MISSION:
“To foster a deeper understanding of the role of transport as a key to economic growth and of its impact on the environmental and social dimensions of sustainability.”
Intergovernmental Organisation

54 member countries of which 21 non-OECD

Housed by OECD

Council of Ministers of Transport, rotating annual presidency

Legal instruments: European Multilateral Quota System (Road Freight)
Think Tank

Evidence-based research and analysis

Data and statistics

Identification of best-practice policies

Institutionalised in OECD/ITF Joint Transport Research Centre (JTRC)
Key Infrastructure Challenges Ahead:

• Major **growth in mobility** – especially outside of OECD.

• **Uncertainty**: climate, financing, technology portfolios.

• Focus on **new infrastructure and connectivity**. Need to minimise lifecycle infrastructure costs under uncertainty.

• **Ageing asset base** in OECD countries – maintenance and refurbishment under limited budgets, increased construction costs.

• Pressure to **optimise use** of existing assets and design infrastructure for **lower lifecycle costs**.

• Mobilising resources for infrastructure – **competition for private sector funds** within and outside of transport sector.
ITF Outlook Work

- Mobility to **triple** by 2050
- Context defined by **constraints**
  - Resource costs
  - Income distribution
- Subject to **variable cycles**
  - Boom and bust
  - Peak oil
- Driven by **agglomeration**
  - Major feature of growth
  - Transport driver/driven
  - The world is less and less flat
- **Responses:** combination of
  - Higher Efficiency
  - Technology
  - Planning

*Source: ITF Transport Outlook 2011*

*Source: EU ESPON 2013 Programme*
Asset Management under Climate Uncertainty

• Changes in **prevailing climate patterns** over the lifetime of existing and new infrastructure assets – no guarantee that the past will reliably serve as a basis for the future.

• **Service disruptions**, premature **asset failures** and **network breakdowns** under extreme conditions are material risks under changing climate regimes.

• **Strategic asset management** plans help address uncertainty, but these are lacking. Need for comprehensive and comparable national asset inventories and “balance sheets” to inform choices.

• Network **resilience** is built on **robustness, redundancy** and **recovery** – but strategic **retreat** may avoid some future problems.

• Carrying out full and regular **asset maintenance** is a critical first line of defense against uncertainty – but this has proven to be one area where cuts in budgets are first made.
Minimising Lifecycle Costs

$24 trillion global transport investment needs 2013-2030\(^1\) (~1/2 of all global infrastructure needs – mostly road).

- Mostly non-OECD countries but replacing old and building new infrastructure to meet heavy demand will be necessary in OECD.
- Overall aim: optimise service level delivered over the asset lifecycle.
- Primary focus on value to users – need appropriate performance measures.
- Long-term financial planning - sustainability of funding sources key. Important to balance revenues with total lifetime cost of ownership
- Infrastructure construction productivity flat/falling – potential for gains here (contracting, modularity, etc)

\(^1\) Source: McKInsey Global Institute, ITF data
Minimising Lifecycle Costs: Long life pavement

• ITF looking at lifecycle costs of long life wearing courses (up to 30 years instead of 7 to 10 years).

• More expensive wearing courses but important savings can be made:
  - Reduced maintenance costs.
  - Reduced user costs through less delays and congestion during maintenance.

• Long-life pavement surfacing costing around three times that of traditional wearing courses would be economically feasible for a range of high-traffic roads.

• Field tests currently being undertaken in France, the UK and New Zealand.
Infrastructure and the economic downturn

• In a financial crisis, always tempting to **forgo transport infrastructure investments**, mainly in new construction and upgrading, but often also in maintenance.
  
  - **Quality decay** visible in many places, increased risk of service degradation and disruption.
  
  - Deferred maintenance is a form of **borrowing from future revenues** – is it cheaper to borrow now to prolong asset life?

• Financial **constraints** totally dominating the discussion, but what about **opportunities**?:
  
  - Has the transport community been competent enough in presenting the likely **benefits of investing in smarter infrastructure** (new or retrofitted)?
  
  - Are incentives, regulatory framework in place to **guide investment** in infrastructure efficiency?
Transport Infrastructure: slow decay or rejuvenation?

• Under the current economic climate, dominant picture is:
  - **Slow decay** of (most) existing infrastructure.
  - Some construction under the **traditional design guidelines** (improvements only on environmental front).

• An alternative approach would be possible and desirable.
  - Use existing infrastructure wisely – **optimise use**.
  - Promote research towards “**condition-aware**” infrastructure (examples emerging) -- applicable both for new works and for retrofitting. Very **significant savings** predicted over lifecycle, in maintenance as well as in operation.
Building new or using existing infrastructure wisely?

Benefit-to-cost ratio of traffic and demand management superior to provision of new roads in mature networks (e.g. OECD countries)

Benefit-to-cost ratio: Road construction vs. ITS

Building new or using existing infrastructure wisely: Role of pricing

- Optimising use of infrastructure via **pricing** remains **largely unexploited** – clear, but not insurmountable, political hurdles to be overcome.

- **Revenues generated** can help meet infrastructure needs (maintenance, investment) across modes and can help make up for eroding fuel tax revenue.

- Road pricing in **urban areas** (congestion) or **network-based** (recovering damage costs, generating revenue).

- Benefits from pricing can be great – **€1 billion** net present value of Stockholm congestion charge\(^1\) – but not applicable everywhere.

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\(^1\) Source: Jonas Eliasson, "Cost-benefit analysis of the Stockholm congestion charging system"
Condition-Aware Transport Infrastructure

- New technology allows infrastructure to **permanently monitor** its material condition.
  - Widely applied in other domains, but soil-based constructions pose additional challenges.
  - From **time-based** to **condition-based** maintenance (large savings over lifecycle).
  - Very significant improvements in contracting possible -- a new meaning for “availability contracting”.

- **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.
Condition-Aware Transport Infrastructure: Examples

- Using sensors, smart paints, energy harvesting, etc, technologies to make roads that **self-monitor, adapt** to conditions and **communicate** with users and managers – design principles to be tested in NL.

Dynamic Lanes

Weather-aware Paint

Interactive Lighting

Studio Roosegaarde, Heijmans N.V.
What role for policy? Innovation as a public concern

• Innovation traditionally interpreted as mostly profit-driven entrepreneurial activity.

• Increasingly seen as a strategic activity (serving explicit goals), involving multiple agents.

• **Stimulating policies** justified when context does not serve public goals → both policy stimulus and policy steering are needed.

• **Government intervention** can be useful to share risk and accelerate delivery, but delicate to manage.
What role for policy? Kick-starting this change

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

- **Shortening path from lab to market** requires structure process.
  - “Virtuous triangle” in research effort: Infrastructure Directorates (procurers) + Labs/Universities (research) + contractors (adaptors & deployers).
  - **Small demonstration projects** included in the research concept, with risk sharing.
  - Several **consortia in parallel**, to reduce monopoly risk.
  - Careful, independent, **assessment of lifecycle impacts** included in projects, followed by dissemination of findings.
What role for policy? Ideal policy support for innovation

- **Sufficiently stringent** to encourage an optimal level of innovation;
- **Stable** enough to give investors adequate planning horizons for risky investments;
- **Flexible** enough to encourage novel solutions;
- **Closely targeted** on the policy goal, so as to avoid misallocation of effort and provide incentives for continuous change.

Source: Fostering Innovation for Green Growth, OECD, 2011
Direct benefits to early adopters

- **High-tech layer** in transport infrastructure
  - Strong **incentive for RD&I** in Civil Engineering
  - **High quality jobs** in design, construction and maintenance
  - Much **higher productivity** and **quality of service** to users
    - Short run: timely alerts and reduction of congestion
    - Long run: lower lifecycle costs
    - Better capacity to translate production savings into procurement savings
- **Overall, strong boost to growth and employment**
Induced competitiveness of Construction Industry

- **Universal aspect** of benefits delivered by these innovations.
  - “Localisation” of technical approaches does not seem too difficult

- Competitiveness gains of industries leading this innovative path should allow them **favourable export markets**
  - Similar to road vehicles industry with tougher emission standards
Annual ITF Summit

Topics related to today’s discussion

Defining spending priorities

Making better choices (set of projects, requirements in each project)

Public consultation

Attracting private finance

Funding cross-border infrastructures

Looking to the long term, ...
Annual ITF Summit

Ministerial Meeting and Declaration from Ministers

Ministers’ Roundtables

Panel Discussions with Ministers, Industry, Research, Civil Society

Bilaterals and Networking

Exhibition

1000 participants (2012)
Thank you

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