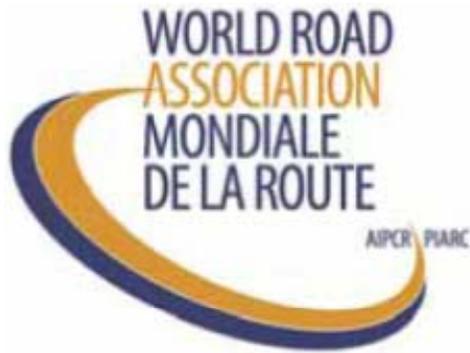


World Road Association (UK) 2012 Congress Maximising growth through transport

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Dr Andrew Murray

Road maintenance funding and delivery - the Northern Ireland perspective

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Road Maintenance Funding and Delivery The Northern Ireland Perspective

Presentation to
World Road Association - 2012 Congress

Dr Andrew Murray
Director of Network Services
31 October 2012

The Road Network – a vital asset

- 2½ times more roads per head than England
- NI: 99% of freight moves by road GB: 64%
- asset worth around £30bn
- almost everyone uses roads & footways every day



An integrated road authority

- Sole roads authority in Northern Ireland
- Responsible for entire road network;
- 25,800 km of road
- 9,900 km of footway
- 5,800 bridges
- 265,000 street lights
- 360 car parks



Roads Service Divisional Boundaries and main office locations

Cost of Maintaining the Network

Structural Maintenance Budget 12/13*

- resurfacing / strengthening £38.6m
- surface dressing £ 11.5m
- patching £23.3m
- structural drainage £ 5.0m
- footway maintenance £ 2.5m
- **Total Structural Maintenance £80.9m**

* Figures as at end August 2012

What is needed?

- Funding need based on Structural Maintenance Funding Plan (SMFP).
- An independent assessment of the funding required for the structural maintenance of the Northern Ireland's 26,000 km road network
- Updated annually it provides a comprehensive assessment of the level of investment required by Roads Service

Funding Shortfall

- Budget 2010, i.e. 2011/12 to 2014/15
- Funding £120/£81/£65/£65 million
- Around £330million over 4 year budget period
- Around £170million less than levels recommended in the SMFP



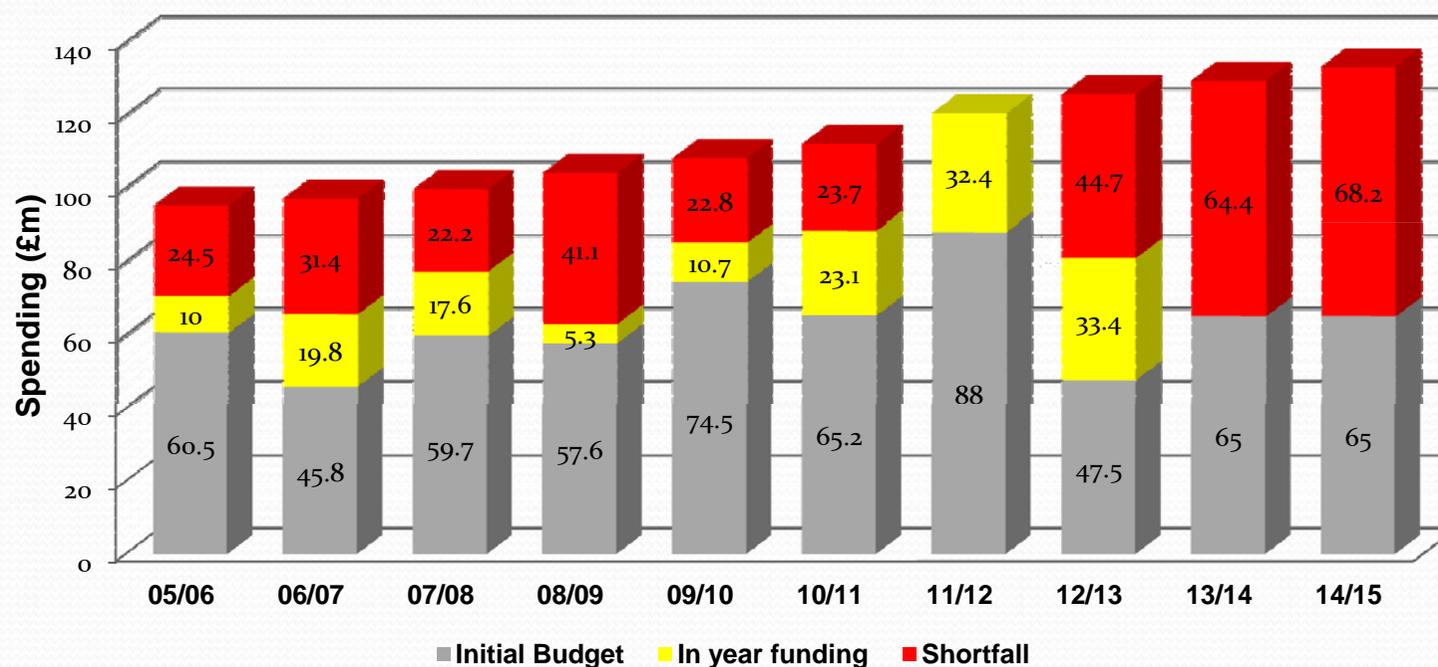
Managing Shortfall

Sub-optimal budget strategy developed

- Resurface motorways & trunk roads once ever 20 years. (a Roads Service key performance objective)
- Patching only where necessary for safety
- Minimum footway expenditure compatible with public liability claims
- Maximise surface dressing

Structural Maintenance

Historically dependent on additional in year funding.



12/13 figures as at end August 2012

Consequences of Underfunding

- More patching – poor value for money
- Increase in public liability claims
- Maintenance backlog increases - more expensive reconstruction in later years
- Accelerated deterioration
- Increased accidents and transport costs
- Criticism from public, elected representatives and local construction industry

Current Procurement Methods

- Use of in house contactor – Roads Service Direct (RSD)
- Term Contracts
- One off competitive tenders
- Currently two DBFO contracts in place for maintenance of the majority of the motorway network along with a small percentage of the trunk road network
- Around 90% of structural maintenance delivered by external contractors.

Alternative Procurement Methods

- Managing Agent Contracts (MAC's)
- Managing Agent / Term Maintenance Contracts
- Construction Management Contracts
- Highways Maintenance Private Finance

Comparison of costs

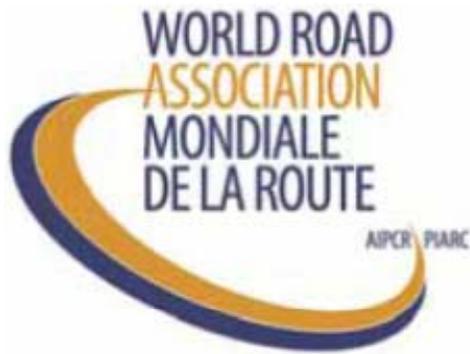
- Managing Agent Contracts – Scotland
Wales
- PFI / PPP – Birmingham
Portsmouth
Existing Roads Service PPP
contracts
- Comparison of in house (RSD vs. Term Contracts)
- Winter Service

Outcome of Review

- Current arrangements provide maintenance considerably cheaper than other parts of the UK
- No financial basis for a move from public to private sector model
- Possible need for internal workforce to focus on a reduced range of activities to drive down unit costs and improve competitiveness with private sector

Status Quo should largely be maintained

QUESTIONS?



Karl Johnson & Chris Parkman
Economic, Environmental and Social
Impacts of Road Maintenance

WITH THANKS TO THE CONGRESS SPONSORS:





Economic, Environmental and Social Impacts of Road Maintenance

Experience on Scottish trunk and local roads

Karl Johnston

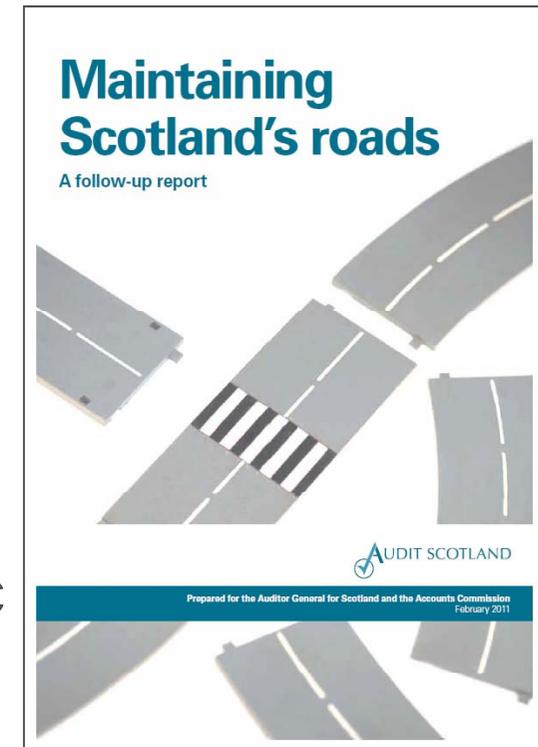
Head of Road and Rail Economics
Transport Scotland

Chris Parkman

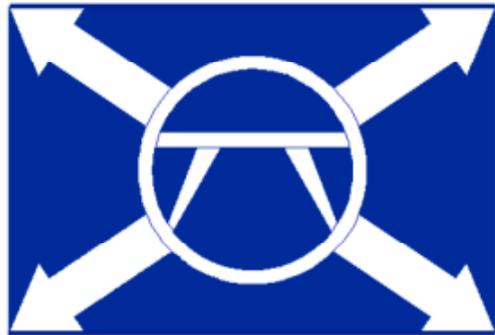
Technical Director
Transport Research Laboratory

Introduction

- 2011 Government National Road Maintenance review following Audit Scotland report
- How is the road network in Scotland managed and maintained?
- Steering group and four Working groups
- A workstream to look at: **Wider Economic Issues, Costs and Benefits**



Steering Group



S C O T S

— THE OFFICE OF —
**THE SCOTTISH
ROAD WORKS
COMMISSIONER**



**TRANSPORT
SCOTLAND**

An agency of  The Scottish Government



COSLA



solace
Scotland



Working Group



- **Membership**

Transport Scotland, SCOTS, COSLA, Institute of Advanced Motoring, RAC, Guide Dogs for the Blind (representing Mobility and Access Committee), Living Streets, Sustrans, Road Haulage Association Ltd, Confederation of Passenger Transport and Freight Transport Association

- **Terms of Reference**

Estimate the economic and social impacts of changes (focussing mostly on reductions) in trunk and local road maintenance expenditure over a ten and twenty year time period



How did we go about this?



- Assessment of impact of reduction in maintenance spend
- Uses Scottish Transport Appraisal Guidance
- Environment, Safety, Economy, Integration, Accessibility and Social Inclusion
- Quantitative and Qualitative assessments
- Presentation focuses on the overall impact
- Undertaken by TRL



Approach

Scenario 1

- Maintain current (2010/11) funding levels for 20 years

Scenario 2

- 20% reduction over first 10 years, Scenario 1 spending levels over next 5 years and annual increase of 2.5% over final 5 years

Scenario 3

- 40% reduction over first 10 years, Scenario 1 spending levels over next 5 years and annual increase of 2.5% over final 5 years

Approach

- **Qualitative**
 - Against each of the STAG criteria
 - Sub-criteria assessed
 - Comprehensive literature review
- **Quantitative including sensitivity testing**
 - Vehicle operating costs
 - Travel time costs
 - Accident costs
 - CO₂ emissions
- **Assumptions**
 - How reductions are allocated across maintenance activities
 - Sample approach for the Local Roads analysis

Environmental impact

Safety impact

Economic impact

Integration impact

Accessibility and Social
Inclusion impact

Results - Qualitative

- Noise and vibration, global and local air quality, water quality and drainage, geology, biodiversity and habitats, landscape, visual amenity and cultural heritage, agriculture and soils
- Air quality benefit from less planned maintenance activity, but worsen by more unplanned interventions
- Landscape, visual amenity and cultural effects significantly affected by poorly maintained streets and public spaces
- Poor walking environments and transport links leave areas isolated and damage community cohesion
- Noise and vibration effects will worsen

- Accidents and security
- Deterioration in footways and cycle-tracks
- Lower spending on key structures, increased frequency of emergency incidents with local disruptions

Environmental impact

Safety impact

Economic impact

Integration impact

Accessibility and Social
Inclusion impact

Results - Qualitative

- Transport economic efficiency
- Journey reliability and quality deteriorate
- Road condition deteriorates due to delays in maintenance and a rise in temporary repairs
- Increased risk of emergency incidents on strategic infrastructure will divert resources from maintenance budgets
- Wider economic disbenefits - reduced tourism and local economic activity

- Policy integration
- Numerous Scottish Government cross-cutting strategies
- Lower quality footways and cycleways mean disincentives to physical fitness

Environmental impact

Safety impact

Economic impact

Integration impact

Accessibility and Social Inclusion impact

Results - Qualitative

- Community accessibility and comparative accessibility
- Remote communities likely to suffer - reduced budgets focus on most significant risks and traffic
- Community accessibility suffers if emergency closures needed
- Vulnerable pedestrians (visual or mobility impaired) are most affected by increased defects on footpaths
- Customer satisfaction decreases

Environmental impact

Safety impact

Economic impact

Integration impact

Accessibility and Social
Inclusion impact

Results - Quantitative



- Carriageway condition deterioration means increased vehicle operating costs (fuel consumption and wear and tear)
- Analysis based on HDM-4
- Scenario 3 (40% reduction) - increased cost* of £3.59b

Vehicle operating costs

Travel time costs

- As carriageway condition deteriorates, journey times increase
- Analysis only applicable to trunk roads and A class local roads (based on earlier work done in the UK)
- Scenario 3 (40% reduction) - increased cost* of £0.25b

Accident costs

CO₂ emissions

* Discounted cost over 20 years



Results - Quantitative



- Skidding accidents - on trunk roads, negative effect only for Scenario 3 (40% reduction)
- Lighting - In 2010/11, around 2000 night-time accidents, increase by 50 for Scenario 3 (40% reduction)
- Scenario 3 (40% reduction) - increased cost* of £0.06b

- Reduce maintenance - less work - lower emissions from maintenance work
- Scenario 3 (40% reduction) - decreased cost* of £0.07b

Vehicle operating costs

Travel time costs

Accident costs

CO₂ emissions

* Discounted cost over 20 years



Results – Quantitative Summary

Cumulative discounted costs (£m 2002 Prices)	Trunk Roads			Local Roads			All Roads	
	Scenario 1 (Base Case)	Scenario 2	Scenario 3	Scenario 1 (Base Case)	Scenario 2	Scenario 3	Scenario 2	Scenario 3
Financial Costs to Government								
Maintenance works	2,152	-266	-568	5,677	-688	-1,459	-954	-2,027
Impacts on Society								
Vehicle operating costs	73,223	+376	+625	274,246	+1,485	+2,966	+1,861	+3,591
Travel time (surface condition related)	362	+57	+94	1,572	+77	+158	+134	+252
Accidents (skid related)	345	0	+21	N/A	N/A	N/A	0	+21
Delays (through roadworks)	119	-25	-38	1,480	-354	-712	-379	-750
Lighting (accidents)	128	+1	+2	2,155	+18	+37	+19	+39
CO ₂ Emissions	5,765	-36	-58	14,971	-14	-16	-50	-74
Overall impact on society	79,942	373	646	294,424	1,212	2,433	1,585	3,079
Economic analysis								
Works costs reduction	Base Case	266	568	Base Case	688	1,459	954	2,027
Increase in user costs	Base Case	373	647	Base Case	1,212	2,433	1,585	3,080
Net Present Value	Base Case	-107	-79	Base Case	-524	-974	-631	-1,053

Results - Quantitative



Sensitivity tests	Trunk roads		Local roads	
	Scenario 2 (20% cut)	Scenario 3 (40% cut)	Scenario 2 (20% cut)	Scenario 3 (40% cut)
Base analysis (20 years, standard growth and indexing assumptions)	-107	-79	-524	-974
Reduced (10 year) time period analysis	112	263	-	-
Higher inflation rates on works costs	-62	44	-	-
Vehicle operating costs: No traffic growth or fuel price increases	307	983	332	743
Scaling up methodology for local road sample to network effects	-	-	-447	-806



Conclusions

- Savings on road maintenance spend would be significantly outweighed by wider additional costs. (E.g. 40% reduction saves £2 billion, but costs Scotland's road users and communities £3 billion).
- £1 reduction in road maintenance results in a £1.50 cost to the wider Scottish economy and society
- Qualitative findings further reinforce this.
- Impact is greater for local roads (qual and quant)
- Most significant quantified impact - increase in vehicle operating costs
- Public dissatisfaction with road conditions is likely to increase
- Investing in the maintenance of this significant capital asset delivers economic and social benefits to Scotland



Questions



Thank you

Karl Johnston

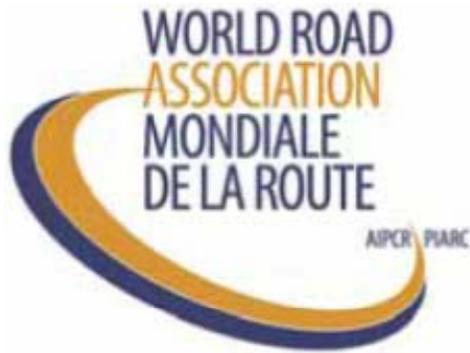
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Dr. Karl-Josef Höhnscheid
**Germany's PPP & assessment tools of
master plan**

WITH THANKS TO THE CONGRESS SPONSORS:



Germany's transport infrastructure master plan, assessment tools and PPP

When history meets future - from the Federal Transport Infrastructure Plans to PPP

Today: Tax-based financing of infrastructure investments

Project overview: Transport Infrastructure Master Plan and Framework Investment Plan

Project selection: Decisions based on the results of the application of the Transport Infrastructure Master Plan's assessment tools

Since 2003: PPP-models used for infrastructure investments

Since 2005: Motorway Toll for Heavy Commercial Trucks, revenues used for PPP-models

Federal Transport Infrastructure Plan

The current Federal Transport Infrastructure Plan 2003 represents the Federal Government's investment strategy for transport infrastructure.

Taking into account the annual appropriations of around 10 billion euros, the total level of funding available for the rail, road and waterway modes for the period from 2001 to 2015 is around 150 billion euros.



Source: Federal Government / Bienert

Draft 2011 – 2015 framework investment plan submitted

The framework investment plan is required by law and represents the guideline, on which the Federal Government will base its investments during the relevant period.



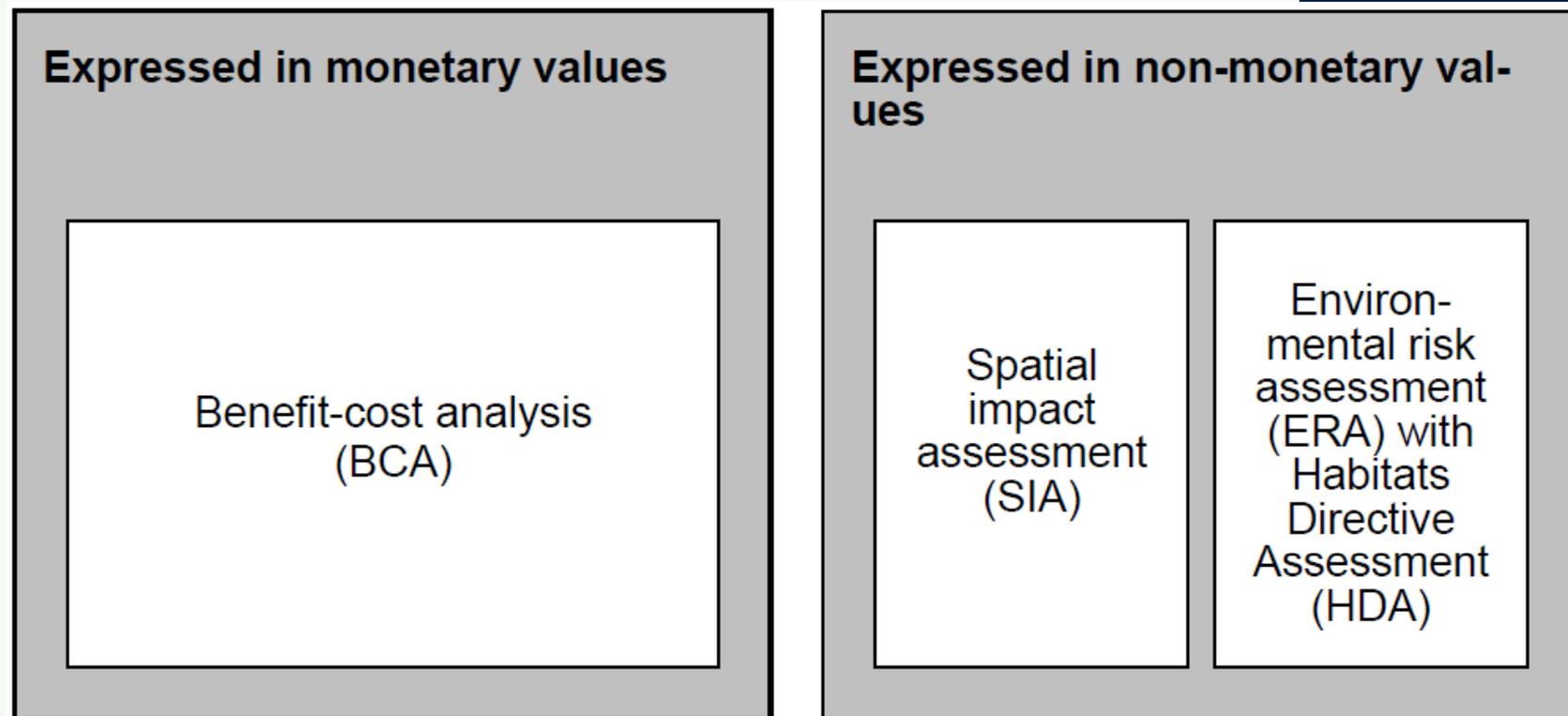
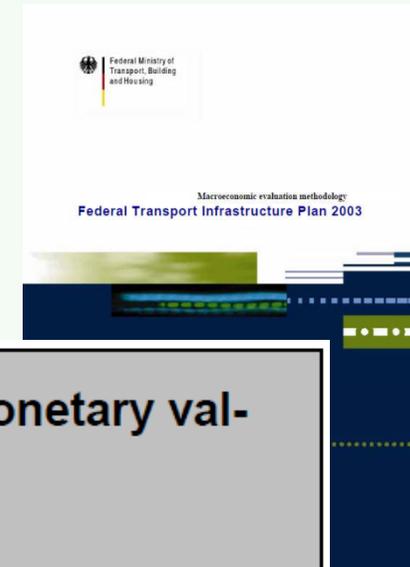
Source: Federal Government

The new framework investment plan has a project volume of around 41 billion euros. This sum covers all projects that will be launched, continued or completed between 2011 and 2015.

In the new framework investment plan, structural maintenance is clearly preferred over the construction of new infrastructure. The funds set aside for the structural maintenance of the existing infrastructure account for around two thirds of the overall sum: 28.1 billion euros have been earmarked for the structural maintenance of the federal railway infrastructure, trunk roads and waterways.

FTIP project evaluation tools

Combined approach: BCA combined with two non-monetary approaches

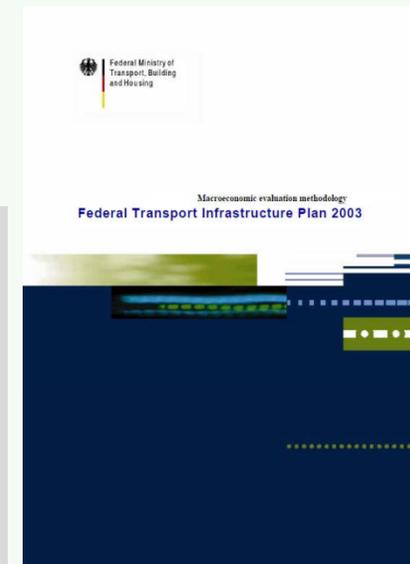


Source: Federal Transport Infrastructure Plan 2003, Federal Ministry of Transport, Building and Housing, Berlin 2003

Benefit-cost-analysis

Benefit components

- ◆ Reduction of transportation costs (NB)
 - NB1 Decreased vehicle standby costs
 - NB2 Decreased vehicle operation costs
 - NB3 Changes in transport costs due to modal shifts
- ◆ Transport infrastructure preservation (NW)
 - NW1 Transport infrastructure renewal
 - NW2 Transport infrastructure maintenance
- ◆ Increased traffic safety (NS)
- ◆ Improved accessibility of destinations (NE)
- ◆ Spatial advantages (NR)
 - NR1 Employment impacts from building transport infrastructure
 - NR2 Employment impacts from operating transport infrastructure
 - NR3 Contributions to promoting international relationships

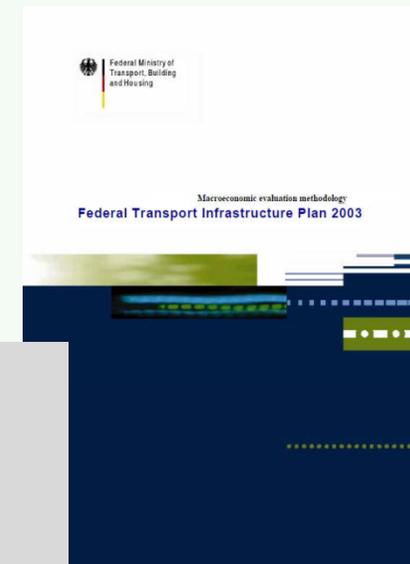


Source: Federal Transport Infrastructure Plan 2003, Macroeconomic Evaluation Methodology, Federal Ministry of Transport, Building and Housing, Berlin 2003

Benefit-cost-analysis

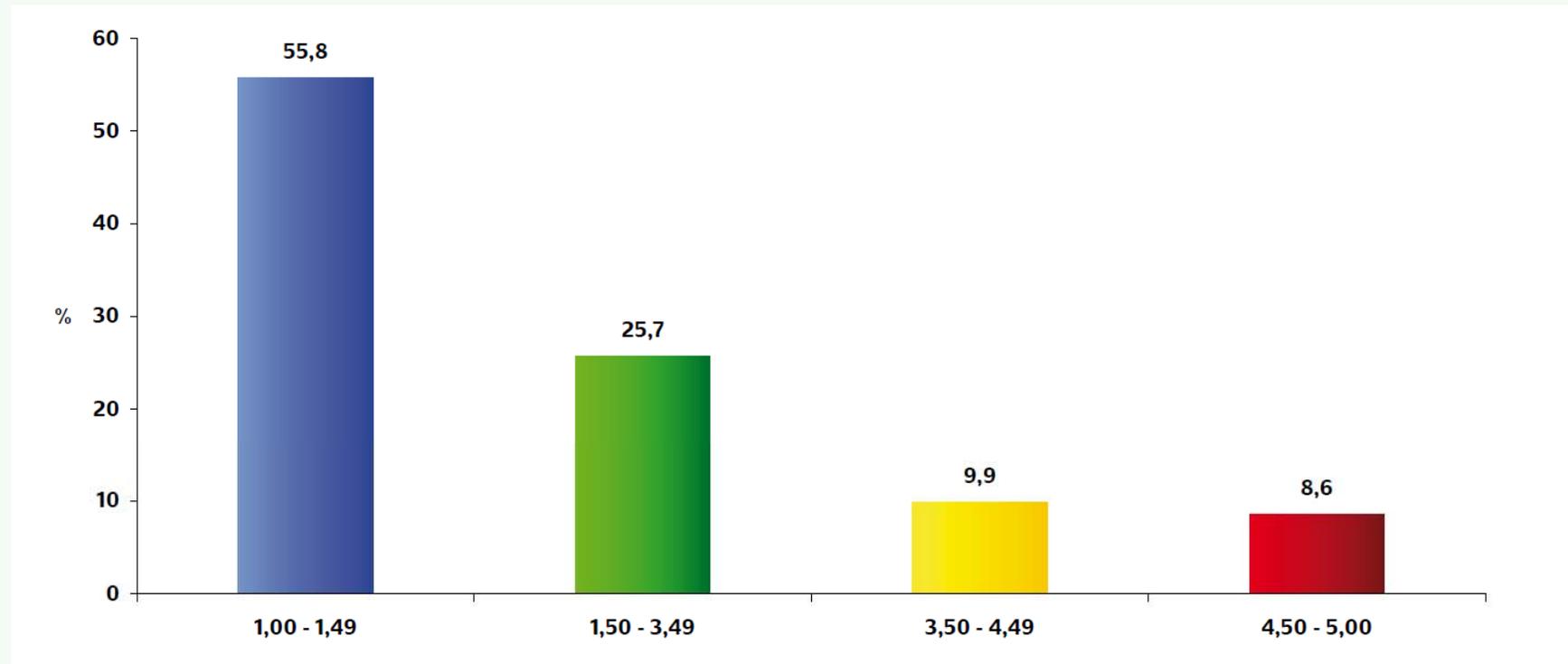
More benefit & cost components

- ◆ Environmental relief (NU)
 - NU1 Reduction in noise exposure
 - NU2 Reduction in exhaust emissions
 - NU3 Reduction of community severance
- ◆ Impacts from induced traffic (NI)
- ◆ Improved links to and from seaports and airports (NH)
- ◆ Fulfilment of non-transport functions (NF)
- ◆ Investment costs (K)



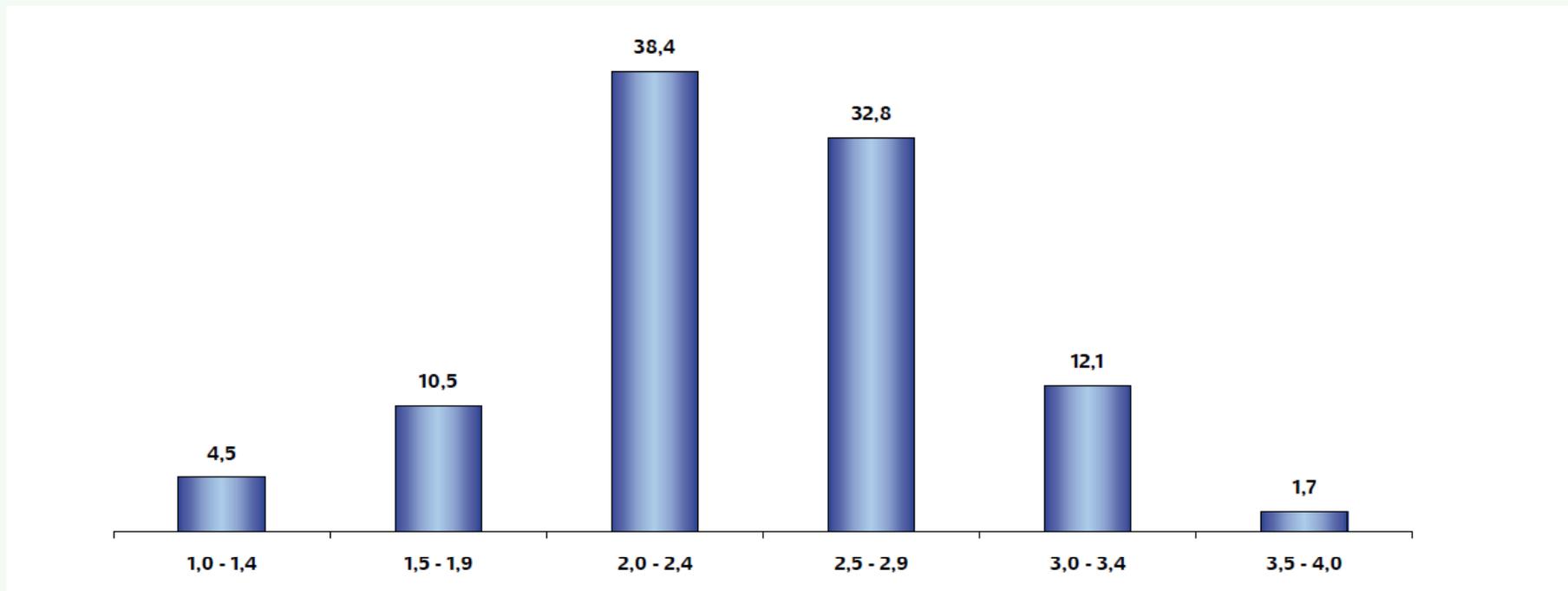
Source: Federal Transport Infrastructure Plan 2003, Macroeconomic Evaluation Methodology, Federal Ministry of Transport, Building and Housing, Berlin 2003

Pavement condition values for German highways 2010



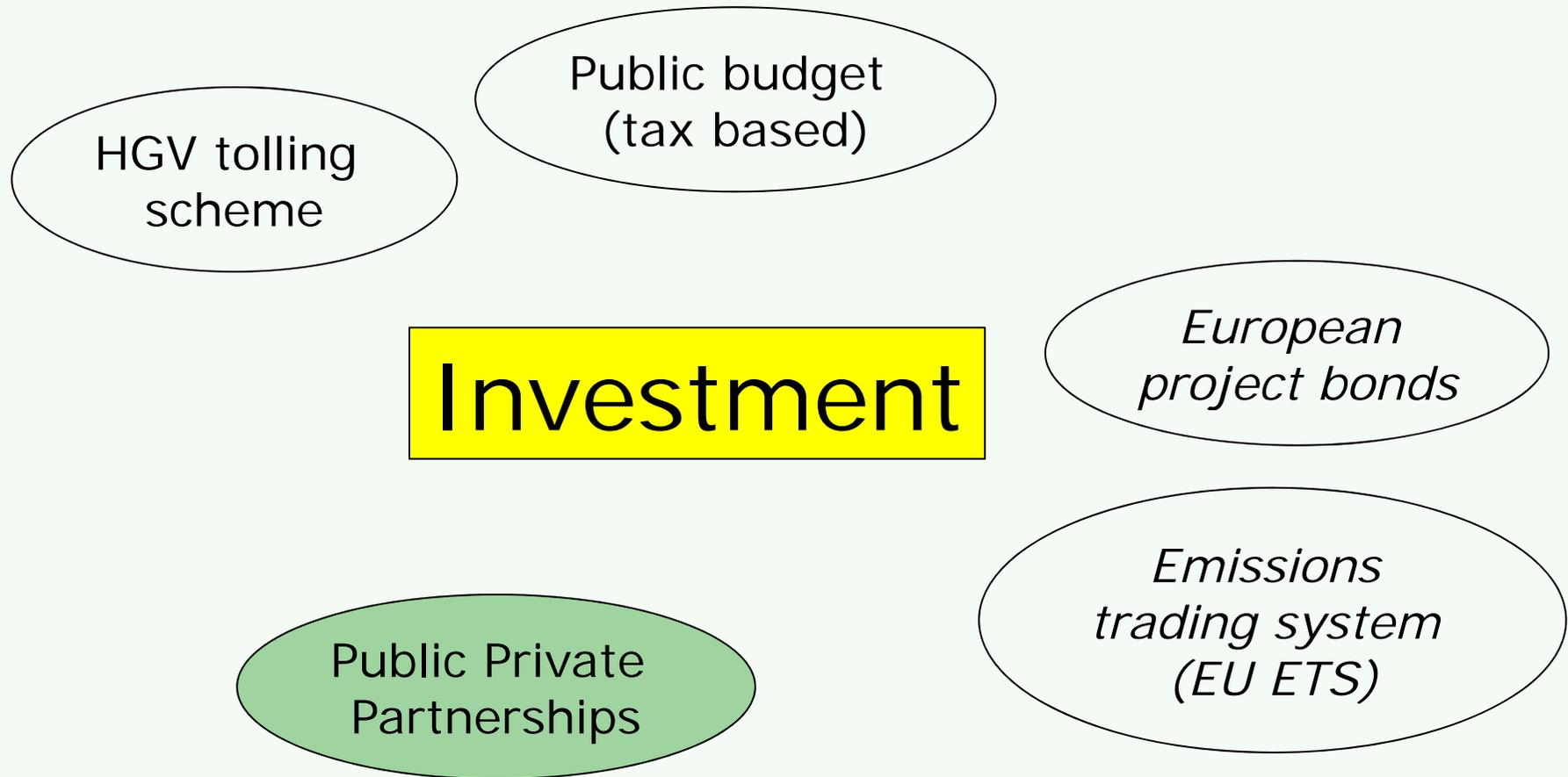
Source: Verkehrsinvestitionsbericht für das Berichtsjahr 2010, Deutscher Bundestag Drucksache 17/8700, Berlin 2012

Condition values for German trunk road bridges 2010



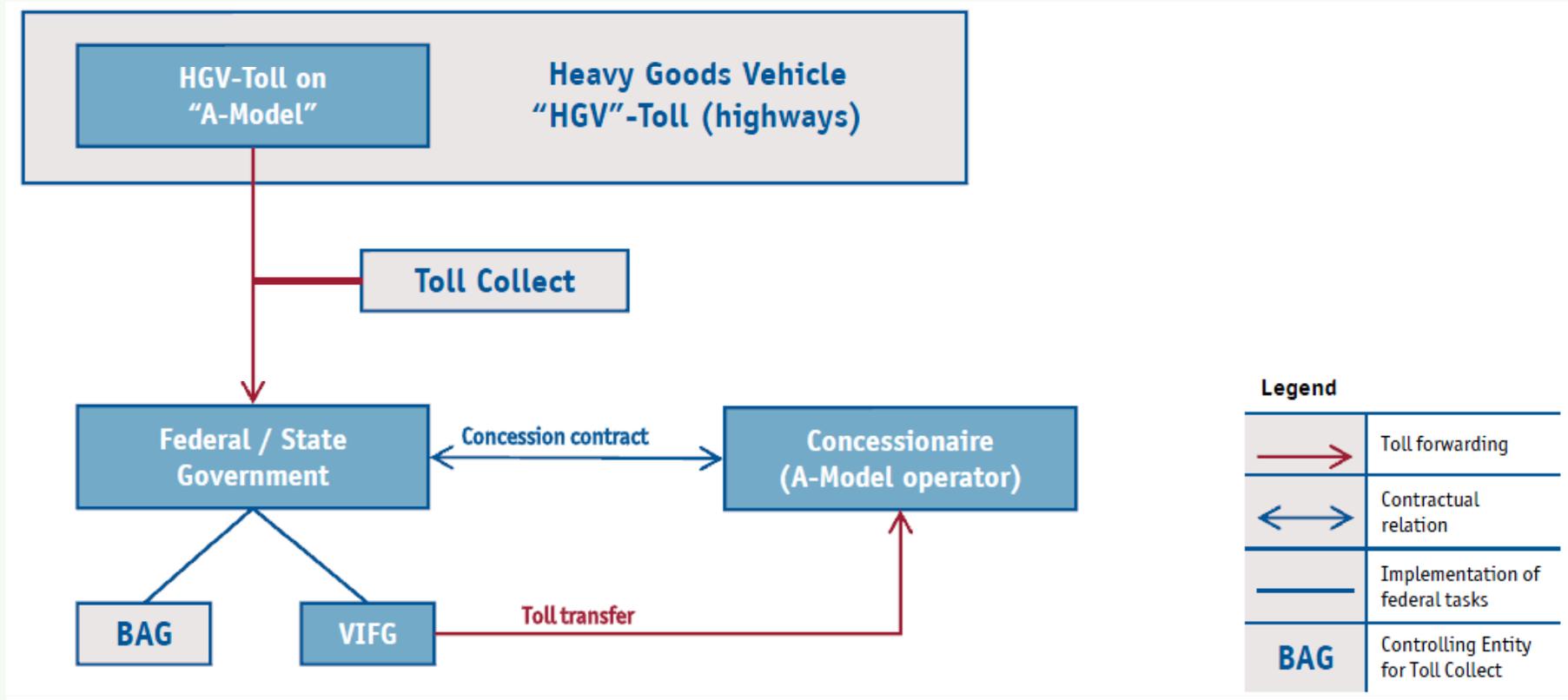
Source: Verkehrsinvestitionsbericht für das Berichtsjahr 2010, Deutscher Bundestag Drucksache 17/8700, Berlin 2012

Funding road infrastructure investments



From HGV tolling on German highways to PPP

- Earmarking of toll revenues for system operation and enhancement of transport infrastructure
- Toll revenues are entitled to the federal government, revenues and expenses are displayed in federal budget



A-Model: General specifications

- Concession to private
- Enhancement from 4 to 6 lanes
- Operating and maintenance
- Start-up financing and compensation through toll revenues of the section
- Modified model with transport and revenue risks, but without risks in changing toll charges (A8)
- Modified model with availability risks (A9)

Risks and responsibilities

- Technology risk for toll collection is not borne by the concessionaire (done by Toll Collect)
- Traffic risk

In the first A-model the traffic risk was borne by the concessionaire and he had to accept the development of the toll revenues

The risk to the concessionaire in the latest A-model is depending on the availability of the road

- Finance, construction and management risks remain with the concessionaire

F-Model: General specifications

- Legally limited to passes, bridges and tunnels of federal trunk roads
- Concession to private for construction, operation and maintenance
- Tolling scheme established by the concessionaire
- Two projects realized:
 - Warnowquerung, Rostock (opened 2003)
 - Travequerung/Herrentunnel, Lübeck (opened 2005)

Benefits from PPP – Experiences so far

Early and efficient realization of important projects

Shortening of traffic-disturbance with the aid of building measures

Efficient preparation of the roadways

Benchmarks for conventional procurement

New impulses for public administration

⇒ Increase in efficiency and user orientation

But: The impact of the financial crisis has influenced the European PPP-market

New threats???

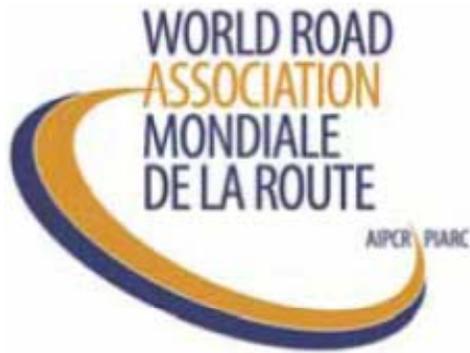
The impact of the financial crisis on the European PPP market has reduced the funding volume due to a change in risk perception.

Contract durations decreased, credit margins increased, higher cover and equity ratios are required.

Solutions:

- availability models?

- state guarantees or state bank involvement to attract private banks participation?



Break

Tea & Coffee

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