Future Funding
Review of international transport planning and funding frameworks
November 2014
The Future Funding project is one of three Strategic Projects that the Ministry of Transport undertook in 2014. The other two projects are Future Demand and Economic Development and Transport. These projects consider the changing world and how our transport systems, including funding, can be ‘future proofed’ while adapting to known and uncertain economic, environmental and social changes.

Future Funding addresses land transport funding. The project aims to promote informed and critical thinking among Ministry staff and external stakeholders regarding how much we should invest in the land transport system and how we should raise that money.

The key questions considered in this project are set out in the quadrants of the circle in the diagram below with key reports produced for each question outlined in the adjacent boxes. This report outlines the transport planning process of different countries in response to question one and two.

Figure 1: Key questions of Future Funding and its associated reports

This paper is presented not as policy, but with a view to inform and stimulate wider debate.
Introduction

This paper examines the transport planning process of a few selected countries (The United States of America, Germany, France, Sweden and the Republic of Ireland). The aim of this paper is to provide the Ministry with a better understanding of overseas jurisdictions with regards to how transport policies and levels of funding are set. In doing so, the Ministry hopes to capture any lessons it could learn from these jurisdictions and apply them in the New Zealand context.

The main findings from each country are as follows:

► In the USA, multi-year federal legislation and state appropriations determine investment levels, with decisions being significantly influenced by political considerations supported by varying economic analysis by state and federal government.

► In Germany, consistent methods of economic evaluation play a significant role in aiding decision making across levels of government, however, political negotiation between the federal and state governments is also important.

► The French assessment process is primarily based around a combination of benefit cost analysis and multi-criteria assessment, although much weight is still placed on benefit cost analysis. Following adoption of the Grenelle laws, French transport planning looks across all modes of transport and the factors included in their assessment are always evolving. Lastly, there is a high expectation of public participation in the project selection process.

► Transport planning in Sweden is separated into three different levels: national, regional, and municipal. Sweden has a National Transport Plan which sets out the government’s objectives for transport. The National Transport Plan acts as a steering document for the regional counties and local municipalities. Most of the planning is decentralised with the municipalities having the ‘monopoly’ on developing a plan for land and water use which forms the basic conditions for future infrastructure planning. Although an assessment of non-monetised impacts is required for each project, a lot of weight is still placed on the result of the cost-benefit analysis.

► In the Republic of Ireland, planning and investment decisions are dominated by central government with a strong focus on investment efficiency and monitoring outcomes as a result of considerable fiscal pressure arising from the Global Financial Crisis’s impact on the country.

While this is a small sample of countries, the review has highlighted four issues which warrant further consideration:

► All 5 countries in the sample use discount rates lower than the rate used in New Zealand. There may be good reasons for this but it does suggest the level of discount rates would be a useful area to explore further.

► All countries bar the United States have their transport policy in a Ministry with wider responsibilities. The link with another area suggesting the priority for transport outcomes. Two countries link their transport work with energy and environment, one with digital communication and another with tourism. This highlights the importance of transport to many and varied other government objectives. It also suggests the value of having a separate Ministry to allow the government of the day to decide the priority focus for transport outside institutional constraints.
Cost benefit analysis is central to the decision making process in all the countries examined however, they have also adopted an approach which balances this analysis with a process which allows investment to align with social values. This approach ranges from multi criteria assessment with a strategic test aligned to political goals, to more direct political or social input (France) for decisions on which projects to invest in.

Two countries set plans of five years or more, the longest for 15 years. This compares to New Zealand’s three year update of the Government Policy Statement on Land Transport. The longer plans of these countries is probably necessary to provide the long term certainty needed for major infrastructure programmes outside of a hypothecated system.
United States of America

Introduction

In 2011, the latest year for which comprehensive data are available for federal, state, and local governments, the United States spent more than $215 billion on surface transportation. Taken together, total spending as a share of GDP has been falling, from about 3 percent of GDP in 1962 to 1.4 percent today.

Highway facilities, public transportation systems, airports, seaports and rail stations are almost always planned, built, owned and operated by state and local governments. In general, the federal government does not own or operate transportation facilities, but rather serves to distribute funds to the state and local governments. The main exceptions are inland waterways across the country, which are controlled by the federal government, along with infrastructure serving Washington D.C.

Transport Planning and Funding

In the United States, there is a central Department of Transportation as well as separate Departments of Transportation for each state. Metropolitan Planning Organisations are federally mandated and funded transport policy making organisations for urban areas with a population greater than 50,000.

The overall amount of funding for transport in the United States is determined by both the federal government and state governments. Federal funding is predominantly used for capital expenditure while state funds are used for both capital and operational expenditure. On average, 44% of state transport capital expenditure is provided by the federal government; however substantial variation exists between states, with less populous states typically relying more heavily on federal investment. Federal funding for surface transportation is determined by Congress through legislation. Typically, transport funding legislation is active for between two and five years at a time. The size and form of transport funding legislation is set through a political process in Congress with advice from the United States Department of Transportation.

The most recent large piece of transport funding legislation passed was the Moving Ahead for Progress in the 21st Century Act (MAP-21). MAP 21 governed federal spending on surface transport from July 2012 to September 2014. The Act set the federal government’s framework on transport investment. It allocated funding to programmes addressing different modes and set the federal government transport policy direction. It allocated $105 billion to programmes for fiscal years (FY) 2013 and 2014.

To replace MAP 21, the President and the Secretary of Transportation have introduced the GROW AMERICA Act to Congress through the fiscal year 2015 President’s Budget Request. The Generating Renewal, Opportunity, and Work with Accelerated Mobility, Efficiency, and Rebuilding of Infrastructure and Communities throughout America Act, or GROW AMERICA Act, is a $302 billion, four year transportation reauthorisation proposal that provides increased and stable funding for the country’s highways, bridges, public transport and rail systems. The Act is proposed to be funded by supplementing current revenues with $150 billion gained through pro-growth business tax reform. The GROW AMERICA Act will also address funding shortfalls in the Highway Trust Fund.
Since the 1950s, the Highway Trust Fund has been the primary federal source of funding for state and local surface transportation projects (equivalent to the National Land Transport Fund in New Zealand). Every five to ten years, Congress authorised predictable levels of funding to states and later local transit agencies for road, bridge, and transit projects. Over the last quarter-century, Congress has customarily taken stock of the nation’s needs for transportation investment and authorised multi-year funding increases of roughly 40 percent over the prior authorisation to better meet the needs of communities and the economy. Over the past few years, revenues that go into the Fund have not kept pace with the federal funding levels promised to states by Congress. As a result, the Department of Transportation projects the Highway Trust Fund to be insolvent towards the end of 2014. Soon afterwards, the Congressional authorities that establish surface transportation programs will expire. Congress refusing to increase fuel excise duty since the 1990s, increasing fuel efficiency and decreasing vehicle kilometres travelled have also contributed to the fund drying up. States wishing to expand or even maintain existing transport investment programmes in the future will likely have to develop new sources of revenue. The GROW AMERICA Act will prevent the Highway Trust Fund’s insolvency for four years and increase investments to help meet national economic goals.

The United States Department of Transportation and its divisions provide policy development, regulation, supervision, and federal funding for all areas of transportation. Several divisions sit within the United States Department of Transportation, each with different functions. Following a transport funding Act being passed by Congress, these divisions provide federal funds to state Departments of Transportation and Metropolitan Planning Organisations in line with ‘activity class’ allocations determined by the legislation. Earmarks for specific projects are also occasionally made under the legislation.

Divisions of the United States Department of Transportation include:

**Policy Divisions**
- Office of the Secretary of Transportation (provides policy development and oversight of the department)
- Office of Inspector General (provides independent and objective oversight of the department’s activities)
- Surface Transportation Board (undertakes regulatory reform, resolution of disputes and facilitation of business transactions)

**Operational Divisions**
- Federal Highway Administration
- Federal Motor Carrier Safety Administration
- National Highway Traffic Safety Administration
- Federal Transit Administration
- Federal Railroad Administration
- Maritime Administration
- Federal Aviation Administration
Pipeline and Hazardous Materials Safety Administration
Saint Lawrence Seaway Development Corporation (operates the US part of the St. Lawrence Seaway)

Table 1: The proposed allocations for the Fiscal Year 2015 President’s Budget request (to be authorised by Congress through passing the GROW AMERICA Act).

<table>
<thead>
<tr>
<th>Division</th>
<th>Funding (in $US billions, rounded to 2 d.p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy Divisions</strong></td>
<td></td>
</tr>
<tr>
<td>Office of the Secretary</td>
<td>$1.5 (including $1.25 for TIGER grants programme)</td>
</tr>
<tr>
<td>Office of the Inspector General</td>
<td>$0.09</td>
</tr>
<tr>
<td>Surface Transportation Board</td>
<td>$0.03</td>
</tr>
<tr>
<td><strong>Operating Divisions</strong></td>
<td></td>
</tr>
<tr>
<td>Federal Aviation Administration</td>
<td>$15.4</td>
</tr>
<tr>
<td>Federal Highway Administration</td>
<td>$49</td>
</tr>
<tr>
<td>Federal Motor Carrier Safety Administration</td>
<td>$0.67</td>
</tr>
<tr>
<td>National Highway Traffic Safety Administration</td>
<td>$0.85</td>
</tr>
<tr>
<td>Federal Transit Administration</td>
<td>$17.6</td>
</tr>
<tr>
<td>Federal Railroad Administration</td>
<td>$5</td>
</tr>
<tr>
<td>Pipelines and Hazardous Materials Safety Administration</td>
<td>$0.26</td>
</tr>
<tr>
<td>Maritime Administration</td>
<td>$0.67</td>
</tr>
<tr>
<td>Saint Lawrence Seaway Development Corporation</td>
<td>$0.03</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$90.9</td>
</tr>
</tbody>
</table>

Table 1 above shows provisional federal funding allocations for fiscal year 2015 between different divisions of the federal Department of Transportation. The operational divisions allocate their funds to federally funded initiatives and/or to State Departments of Transportation and Metropolitan Planning Organisations for spending on relevant transport investments.

Most of the federal funds are distributed to state Departments of Transportation and Metropolitan Planning Organisations by formulas set by Congress to reflect perceived needs and priorities. The funding formulas are based on factors which include population and traffic volumes.
For instance, rural states that have significant traffic passing through them get more federal highway funds per capita than other states to make up for the added burden of providing for trips generated elsewhere. The federal formula funds are also segregated into different program areas, such as metropolitan planning, state highway projects, urban congestion mitigation and air quality improvement projects, safety projects, highway/rail crossings, rural transit, transportation alternatives and mobility for seniors and individuals with disabilities. Federal formula grants can be used for subsidizing operating expenses only for rural and small transit systems; all others are subsidized by state and local funds.

State Departments of Transportation and Metropolitan Planning Organisations allocate federal funds to specific projects. States also use their own funds to match federal grants and fund their chosen projects.

State governments use their powers of taxation both to match federal grants (which is usually required), and independently fund local transportation needs. Different states have different systems for dividing responsibility for funding and maintaining road and transit networks between the state department of transportation, counties, municipalities, and other entities. Generally, cities or counties are responsible for local roads, financed by state or federal grants and local property taxes. States are responsible for major roads that receive state and federal allocations. Many mass transit agencies are quasi-independent, subsidised branches of a state, county, or city government.

State Departments of Transportation and Metropolitan Planning Organisations are funders and providers. Metropolitan Planning Organisations typically cooperate closely with the state Departments of Transportation when deciding what projects to fund. A combination of tools is typically used to make the decision, some of which include economic modelling and public consultation. More detail on project appraisal is outlined in the next section of this paper.

Other significant funding initiatives which are separate to the general appropriations under the central transport funding legislation include the following:

**Transport Infrastructure Finance and Innovation Act (TIFIA)**
The TIFIA Program offers low-cost, long-term, flexible financing that can make large, complex transportation projects more attractive to both the public and private sector. The TIFIA program allows the Department of Transportation to lend at the 30-year Treasury rate (currently around 3.3 percent) for up to 35 years following substantial completion of an eligible transportation project. It also allows the Department to enter into a subordinate lien position and postpone repayment for up to 5 years after substantial project completion. This flexibility provides significant cost savings to borrowers and, in some cases, is the catalyst that ensures that a project will be undertaken.

**Transport Investment Generating Economic Recovery (TIGER) grant programme**
The TIGER program enables the Department of Transportation to examine a broad array of projects on their merits, to help ensure that taxpayers are getting the highest value for every dollar invested. In each round of TIGER, the Department of Transportation receives many applications from state governments and Metropolitan Planning Organizations to build and repair critical pieces of the freight and passenger transportation networks. Applicants must detail the benefits their project would deliver for five long-term outcomes: safety, economic competitiveness, state of good repair, liveability and
environmental sustainability. Benefit-cost analysis is used extensively to evaluate project applications. Since 2009, Congress has dedicated more than $4.1 billion for six rounds to fund projects that have a significant impact on the nation, a region or a metropolitan area. In total the program has financed over 230 capital projects and 33 planning projects, leveraging local, state and private funding to build multimodal projects across the country.

**Project Appraisal and Assessment**

The US, as a country with a federal government, has adopted processes for making project investment decisions which differ according to whether the source of funding is through a discretionary federal grant or through state funding, supplemented by a formula-based federal contribution. The US Department of Transportation requires projects it funds to be appraised using a traditional cost benefit analysis, with most environmental and social impacts valued in monetary terms. The federal government uses a discount rate of 7% with sensitivity for 3% when undertaking a cost benefit analysis. Interestingly, there is no guidance about those environmental capital impacts that European countries tend to measure on a qualitative scale, since, under US law, heritage is protected against any incursions. GDP related objectives have recently been taken into account in the guidelines for applications for funding under the TIGER (Transport Investment Generating Economic Recovery) programme.

There is no mandatory appraisal method required for projects funded by individual states. All use an appraisal process but the information provided to decision-makers differs between states. Some states use multi criteria analysis, identifying factors of particular importance to that state and its transport users, effects on productivity, and the degree of public support and then weight these criteria to provide a summary table and score. Others use cost benefit analysis supplemented by an analysis of the impact on the local economy, while other states focus more on the impact on the local economy. Estimation of local economic impacts is facilitated in the US by the existence of regional economic models, such as REMI and TREDIS. As freight is considered the major beneficiary of many state highway schemes, these generally only look at benefits to freight movements. Changes to the cost of freight transportation are more easily modelled than in the case of business time savings, since regional or national accounts do not generally include business travel time as an explicit cost to the provision of business services. For cost benefit analysis, states use discount rates which vary from 3-7%.

**Conclusion**

The United States’ transport funding system is complicated by the federal structure of the country. Recently, a little under half of transport funding has been determined by Congress through legislation. Transport funding legislation can be strongly influenced by political considerations. Political considerations also play a significant part at the state level. While political negotiation plays an important role in transport planning and funding, project appraisal also strongly influences decision making, however this varies by state.
Germany

Introduction
As a federally organised nation of sixteen states, Germany has a vertically tiered system of responsibilities. The legislative, executive and jurisdictional powers are separated between the federal level (Bund), the federal states (Bundesländer), and communities (Gemeinden), following two principles. The first is the principle of subsidiarity, meaning that decisions are generally taken on a decentralised basis, with federal competences defined in the constitution. The second important principle is that of a cooperative federalism or division of power in contrast to a separation of powers (as in the USA for example). In the cooperative system, a major part of legislation is decided on the federal level, while the states are responsible for the implementation. The reduced self-determination of states in the cooperative system is compensated by strong participatory rights in federal decision-making.

In 2011, the most recent year for which data are available, Germany spent 0.6% of its GDP on inland transport infrastructure. Rates had been closer to 1% in the period to 2005, after which it has fluctuated between 0.6% and 0.7%. Prioritisation of fiscal restraint to improve the government’s financial position and a preference to allocate funds to areas more likely to win votes are speculated by German political commentators to be possible explanations for this reduction in spending.1

Transport Planning and Funding
Transport policy and operations are split between three levels of government in Germany; federal, state and local. Different levels of government have different jurisdiction over transport decisions (both policy and operations) depending on the area of transport in question.

In general, the federal government is responsible for planning, construction, maintenance and operation of federal roads and trunk roads (Bundesfernstraßen: Autobahnen and Bundesstraßen), federal railways (Deutsche Bahn Netz AG as part of Deutsche Bahn AG), and inland waterways. The federal government is also involved in urban transport to an extent.

Airports and sea ports fall under the responsibility of the states, with their connection to the surface transport modes covered by the federal government. Urban transport (both public transport and local roads) are generally the responsibility of states and local authorities.

The federal Ministry of Transport and Digital Infrastructure (formally known as the Federal Ministry of Transport, Building and Urban Development) is the central agency advising the federal government.

Each of the 16 state governments in Germany also have a Ministry of Transport which is the central agency providing their transport advice. Local authorities, like municipal authorities, are involved with regards to some projects in their jurisdiction. Local authorities’ jurisdiction is determined by legislation

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and the principle of subsidiarity. As an example, Table 2 below outlines the roles of different levels of government in urban transport.

Table 2: The decision making responsibilities for different areas of urban transport

<table>
<thead>
<tr>
<th>Source</th>
<th>Type of policy supported</th>
<th>Administrative Level</th>
<th>Flexibility</th>
<th>Planning instrument</th>
<th>Eligibility assessment</th>
<th>Source of funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal infrastructure in urban areas</td>
<td>Road and heavy rail investments, traffic management, maintenance</td>
<td>federal</td>
<td>federal</td>
<td>state / governmental districts</td>
<td>low</td>
<td>National transport master plan</td>
</tr>
<tr>
<td>State infrastructure in urban areas</td>
<td>Road investments, traffic management, maintenance</td>
<td>state</td>
<td>state</td>
<td>state / governmental districts</td>
<td>low</td>
<td>State general / integrated transport plans or programmes</td>
</tr>
<tr>
<td>Regionalisation funds for local rail services</td>
<td>Regional and local heavy rail services, rolling stock, general public transport</td>
<td>federal state / Executive authorities</td>
<td>Executive authorities</td>
<td>low</td>
<td>Federal state shares; tendering of services</td>
<td>federal taxes transferred en bloc to states, partly complemented by state budgets</td>
</tr>
<tr>
<td>Grants for (large) municipal transport investments (federal programmes)</td>
<td>Large public transport investments (mainly light rail)</td>
<td>federal federal / state</td>
<td>federal</td>
<td>medium</td>
<td>Standardised economic appraisal method</td>
<td>national budget, co-funded by state / local budgets, some private involvement in planning costs</td>
</tr>
<tr>
<td>Grants for municipal transport investments (state programmes)</td>
<td>Road investments, walking and cycling facilities, traffic management, public transport facilities, parking facilities</td>
<td>federal state</td>
<td>state</td>
<td>high</td>
<td>Local public transport plans</td>
<td>individual by state; standardised economic appraisal for public transport investments; municipalities apply for grants and have to report on use of funds</td>
</tr>
<tr>
<td>Municipal budget funding</td>
<td>Local road investments and maintenance, public transport operations, walking and cycling facilities</td>
<td>local</td>
<td>local</td>
<td>local</td>
<td>Local integrated plans, Local public transport plans</td>
<td>individual by municipality</td>
</tr>
<tr>
<td>Compensatory payments</td>
<td>Reduced pt fares for people in education and the disabled</td>
<td>depends on uptake</td>
<td>operators</td>
<td>states</td>
<td>low</td>
<td>-</td>
</tr>
<tr>
<td>Passenger revenues</td>
<td>Pt operations</td>
<td>depends on uptake</td>
<td>operators</td>
<td>operators</td>
<td>low</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2 also shows the various funding sources available for urban transport, highlighting the type of transport these sources support, alignment to planning instruments, appraisal methods and revenue generation activities.

In practice, the federal government has significant influence on funding levels for transport in states, as state budgets are substantially derived from taxes collected at the federal level. The federal government can also influence the direction of state transport through the processes it uses when allocating funds for particular projects through the federal infrastructure master plans.

Negotiation between political representatives of different levels of government occurs in two main ways. The first is through the process of setting federal infrastructure master plans. The second is during the process of co-ordinating decisions at the state level. This is achieved through committees attended by state representatives (typically Ministers of Transport) and the Federal Ministry of Transport and Digital Infrastructure, and joint working groups for more operational matters.

An interesting point to note is that according to some research, transport policy objectives are quite consistent regardless of which main political party is in power in the Bundestag.²

Transport infrastructure investment is not always well synchronised across Germany and particular problems arise in cross-national planning when a similar number of actors can be involved from a secondary country, leading to lengthy planning processes.

A central framework exists for making federal funding decisions. The main instrument of federal infrastructure planning is the federal infrastructure (master) plan. The latest plan was released in 2003 and runs for 15 years. The federal infrastructure master planning process can cover all federal investment in federal roads and trunk roads, federal railways, inland waterways and some areas of urban transport.

The simplified outline for how the master plans are made is the following:

- States and local government submit a list of desired projects to the Federal Ministry of Transport and Digital Infrastructure.
- A project appraisal methodology (typically comprising a monetised cost-benefit analysis, an environmental risk assessment and a spatial development assessment plus some additional political criteria such as European interconnectivity or intermodal integration) is applied to the lists of desired projects to provide an initial priority ranking of only economically viable projects. The federal Ministry of Transport and Digital Infrastructure compiles this first draft ranking of projects.
- The federal states then have the option to re-arrange those priorities within their lists based on their preferences through hearings and coordination meetings with other stakeholders.
- Funding allocations between states are primarily determined based on proportional population size. A proportional financial participation of the federal government, the state and the local authorities is then agreed on, following the 1971 Municipal Transport Financing Law (GVFG).
- A Cabinet decision is then made and the final list of projects is presented to parliament by the federal government.
- A parliamentary decision is then made by the Bundesrat (federal council) and the Bundestag (national parliament) on infrastructure development acts which give effect to federal infrastructure plans.
- The projects listed in the federal infrastructure plan then enter into a legal planning process at state and community level.

By participating in a wide variety of transport projects with this mixed financing approach, the Federal Government is able to exert influence on the transport policy of the states.
Figure 2: Overview of the political process and the role of the planning bodies in this process

A criticised inefficiency with this framework is that states have increasingly concentrated their efforts on obtaining funding from the federal government, regardless of whether they reasonably require the transport infrastructure in question. A frequently cited example of this is underground railway construction in relatively small urban centres where, through the above framework, states have been able to acquire federal funding when more reasonably priced alternatives, like trams, would have sufficed.³

Project Appraisal and Assessment⁴

Appraisal of (transport) infrastructure projects plays an important role in the decision-making-process regarding infrastructure investments in Germany.

The national appraisal framework is a fairly holistic approach, integrating transport policy with regional planning objectives, and considering distributional and environmental effects. The framework requires significant preparation of technical work for the evaluation of projects and decision making.

Because infrastructure planning and funding in Germany is shared across the different levels of government: federal, state and local, variations in the appraisal approach exist. These are described in Table 3.

³ Tohru Watanabe, An Overview of the Outlook and Analysis of Problems regarding the Federal Financial Aid System for Local Transport in Germany – with a main focus on the Disentanglement Law and the Regionalization Law.
⁴ Ernst & Young. (Draft) International Guidelines and Practice on Transport Project Appraisal (2014)
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empfehlungen für Wirtschaftlichkeitsuntersuchungen an Straßen (EWS)</td>
<td>The EWS is the economic appraisal for state and local roads. The development of the EWS is driven by the FSGV (not-for-profit transport research association), but is partly funded by the local transport research program of the Federal Ministry of Transport and Digital Infrastructure.</td>
<td>CBA MCA Other assessments for non-monetised effects</td>
</tr>
<tr>
<td>Standardisierte Bewertung (SB)</td>
<td>The standardised appraisal method for regional and local public transport investments. This is the appraisal tool for transport infrastructure projects funded by the Local Authority Traffic Financing Act (GFVG). Federal states can apply for co-funding from the GFVG for projects over €50 million (for road and public transport investments). The law requires rail projects to be subject to CBA.</td>
<td>CBA MCA Qualitative assessments</td>
</tr>
</tbody>
</table>

Airport, seaport and inland ports planning do not have standardised appraisal guidelines. For projects co-funded by the European Regional Development Fund, the appraisal framework agreed by the European Union is used.
Role of Cost Benefit Analysis
The German appraisal approach is based on ranking schemes based on their benefit cost ratios after fully accounting for non-quantifiable impacts on habitats and the environment. A discount rate of 3% is used. The appraisal of non-quantifiable impacts is used to identify mitigation measures or alternatives that could be implemented to protect natural resources and whether this is feasible and affordable. As a result, appraisal of infrastructure projects includes a mix of monetised and non-monetised methods that vary depending on the level of government. Overall, the different appraisal frameworks follow similar principles aligned to the national approach:

Bundesverkehrswegeplan (BVWP)
The core appraisal method is Cost Benefit Analysis (CBA), which is complemented by non-monetised methods such as Spatial Impact Assessment (SIA) and Environmental Risk Assessment (ERA) with Habitats Directive Assessment. The standard CBA approach was established in 1985, updated over the years, with the latest version being 2003 and a 2015 version underway. The 2015 BVWP will have stricter information requirements for project registrations, including design, costs, expected effects and what options were evaluated before the submission.

As one of the first steps in the appraisal process, alternative scenarios are created based on different socio-economic assumptions and expectations for future transport policy. The 2015 BVWP will include two standard scenarios:

Core – including assumptions on economic development and policy development influencing user costs
Corridor change – including a change of + or – 3% in traffic volumes while user costs are kept constant

Only one forecast year is expected to be used for the 2015 BVWP: 2030 (under a Base Case and alternative scenario), with traffic forecasting following the standard four-stage modelling. Traffic forecasting can be undertaken at a multi-modal level and across a variety of regions.

The CBA includes the following items (in terms of savings or increased costs):

► Vehicle operating and standby costs
► Transport infrastructure preservation (Maintenance costs)
► Improved accessibility to destinations (Travel Time)
► Spatial advantages (Employment during construction and operation, with regional differentiation based on regional unemployment rates)
► Noise exposure
► Exhaust emissions
► Economic lives: Standard economic lives are used for the various infrastructure components

Estimation of regional benefits for investments that enhance the links to and from seaports and airports include a particular evaluation of the project contribution in improving the competitiveness of German ports at an international level. Furthermore, there are rare occasions where transport projects result in fulfilling a non-transport function which deliver additional savings under a CBA.
Empfehlungen für Wirtschaftlichkeitsuntersuchungen an Straßen (EWS)

First published in 1997, the EWS provides recommendations for CBA for road investments at state and local level, although it is not mandatory. In general states apply EWS or they can choose to apply the BVWP approach for road projects, complementing either of these approaches by:

- Non-monetary assessments - following a similar approach to SIA and ERA within the BVWP, albeit with synthesis of results not following a formal procedure
- Multi-criteria assessment - using 3 main impact areas: society, economy and environment and 35 qualitative and quantitative indicators reflecting sub-objectives, where the indicators include those of the CBA. All indicators are converted into scores (utility values) using linear value function or qualitative classifications and aggregated using the linear summation approach. The resulting value is then used for project rankings.

Note however that the non-monetised methods are not compulsory and can vary by state jurisdiction.

Standardisierte Bewertung (SB)

SB is a formal appraisal tool for public transport projects developed in the 1970s. The approach combines cost benefit analysis, multi criteria analysis and qualitative assessment elements. The most recent version of this tool was developed in 2006, and is currently being updated through ongoing research projects which are expected to be completed in 2014. States can apply for co-funding through the GFVG with a funding volume over €50m.

Table 4: Summary of the key features for the various German appraisal frameworks

<table>
<thead>
<tr>
<th>Scope</th>
<th>BVWP - Federal roads, railways, inland waterways</th>
<th>EWS - State and local roads</th>
<th>Standardisierte Bewertung - Public transport investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost elements</td>
<td>▪ Investment costs including all expenditures for e.g. compensation payments or measures to mitigate adverse environmental impacts ▪ Node specific price indices series</td>
<td>▪ Investment costs including all expenditures for e.g. compensation payments or measures to mitigate adverse environmental impacts</td>
<td>▪ Public transport capital costs ▪ Costs for investments and provision of fixed infrastructure ▪ Investment, depreciation and time dependent operating costs of public transport vehicles</td>
</tr>
<tr>
<td>Monetised benefit elements</td>
<td>▪ Reduction in transport costs ▪ Vehicle operating cost ▪ Intermodal changes in transport costs ▪ Reduction of costs for infrastructure preservation ▪ Infrastructure maintenance ▪ Infrastructure renewal ▪ Increased traffic safety ▪ Improved accessibility of destinations ▪ Spatial advantages ▪ Employment effects from construction and operation of infrastructure ▪ Promotion of international relationships ▪ Reduction of environmental impacts ▪ Noise exposure ▪ Exhaust emissions ▪ Community severance ▪ Impacts from induced traffic ▪ Improved links to and from seaports and airports ▪ Sufficiency of non-transport functions</td>
<td>▪ Vehicle operating costs ▪ Traffic safety ▪ Travel time savings ▪ Noise exposure ▪ Air pollution ▪ Impacts on climate ▪ Community severance ▪ Land availability in built-up areas ▪ Further components</td>
<td>▪ Travel time savings in public transport, including access, transfer and waiting times ▪ Car operating cost savings ▪ Public transport operating costs ▪ Personnel costs ▪ Energy and performance dependent operating costs of trains ▪ Route and performance dependent operating costs for rail vehicles ▪ Energy costs dependent on stops ▪ Traffic safety ▪ Exhaust emissions ▪ Noise exposure</td>
</tr>
<tr>
<td>Non monetised elements</td>
<td>▪ Spatial Impact Assessment ▪ Environmental Risk Assessment with Habitats Directive Assessment</td>
<td>no guidelines</td>
<td>▪ Quantitative as part of SEA: Monetised benefits in their original measurements plus accessibility, energy consumption, land use ▪ Qualitative: Functionality, comfort, impacts on protected areas (water, nature, landscape), contribution to regional development aims, impacts on landscape and recreational sites, community severance, impacts on regional economic and social structures and on freeways</td>
</tr>
</tbody>
</table>

Role of Multi-Criteria Assessment

The German infrastructure planning process uses a variety of non-monetised tools such as multi criteria analysis, that are used to account for spatial and environmental objectives. These are described in the sections below.
Bundesverkehrswegeplan (BVWP)- SIA (non-monetised)

SIA aims to evaluate the contribution of transport infrastructure investments to the achievement of spatial goals that cannot be included within a CBA. The SIA is a multi-attribute utility theory based on Multi Criteria Analysis. This system awards “regional planning points” based on which spatial objectives the project is regarded to satisfy. Spatial objectives include:

► Distribution and development objectives – points are awarded based on the initiative’s contribution to enhance links to regions deemed as disadvantaged and with poor accessibility.

► Relief and modal shift objectives - points are awarded based on the initiative’s ability to influence modal shift in high density areas to more environmentally friendly modes.

► Effects on the urban environment are also captured at the local level, with road projects being classified according to the potential change of the urban environment due to the project (based on changes in traffic volumes and quality of existing facilities).

Results are then integrated into one score based on the highest score achieved, with scores going from 1 (not very significant) to 5 (outstanding significance). The SIA process is illustrated in Figures 3 and 4.

Figure 3: SIA process for distribution and development objectives
Figure 4: FSIA process for relief and modal shift objectives

**Environmental Risk Assessment (ERA) and Habitats Directive Assessment (HDA) (non-monetised)**

Projects are evaluated to determine if an ERA or HDA are necessary. Classification of project impacts are based on project type (upgrade or new build), size of project, traffic volume, environmental risks and the whether natural conservation areas would be affected. The final stage of the evaluation includes verbal descriptions of key issues and planning instructions. Projects are then assigned one of four risk categories, going from “low” to “very high”, and then ranked for each federal state.

The detailed ERA is a spatial assessment aimed at determining:

- The sensitivity of sites
- The expected impact from the project
- A classification of environmental risks

Criteria for the spatial analysis are:

- Protection status of sites
- Land use type
- Whether sites are of national or international significance
- Regional planning objectives
HDA assesses the potential impacts on Natura 2000 areas, without replacing detailed Habitats Directive compatibility assessment of projects at later stages. The HDA is a qualitative assessment which classifies projects in one of three categories depending on whether negative impacts on Natura 2000 objectives are “probable”, “cannot be ruled out” or “can be ruled out”.

Figure 5: Integration of ERA and HDA results

As Figure 5 shows, projects with the highest environmental risks (ERA=5) and unavoidable negative impacts on Natura 2000 objectives (HAD=3) are considered for further analysis to investigate if those risks can be mitigated. If risks cannot be mitigated, then these projects carry a special planning requirement and cannot be included in investment plans until these requirements are met. For projects with less critical environmental scores, it is assumed that risks can be mitigated and addressed in more detailed planning stages, particularly in the environmental impact assessment stage.

The updated version of the BVWP (BVWP 2015) further develops non-monetary elements, including a strategic environmental assessment which incorporates ERA and HDA and recommends procedural aspects such as consultation and involvement of relevant stakeholders, and an updated evaluation process for urban effects of projects.

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5 European Union legislation designed to protect the most seriously threatened habitats and species across Europe.
Integration of monetised and non-monetised results

Based on the results from the monetised (CBA) and non-monetised appraisal methods (SIA/ERA/HDA), projects are classified as either:

► Urgent Need – projects are classified under this category based on the ranking of their BCR as long as they are within the funding envelope by mode plus a planning reserve
► Further Need – all other projects that have a BCR above 1

Projects with the highest BCR and highest regional planning points from SIA are labelled as “flagship” projects (up to a funding pool of €6.5 billion), meaning that the federal states are recommended to give a higher priority to the realisation of these projects and include them in future investment plans. There is an additional funding pool of up to around €1.5 billion for road infrastructure projects with the highest spatial benefits but whose BCR alone is not high enough to be included in the Urgent Need category.

Summary of project appraisal

► The 15 year national infrastructure plan is at the centre of project evaluation.
► BVWP appraisal approaches is standardised but is itself not prescriptive, rather it serves as a decision-making tool in political discussions at the various government levels and across a variety of stakeholders.
► There is an economic appraisal approach specific to the different levels of government and funding arrangements.
► CBA is used widely in a more standardised fashion, albeit with parameters differing depending on whether a BVWP, EWS or SB is undertaken since manuals have been prepared by different levels of government at different times and using varying approaches.
► There are a variety of non-monetised tools such as MCA that are used to account for spatial and environmental objectives.
► Use of a mix of methods within the appraisal process leads to some inconsistencies but also to cross fertilisation of results.
► In most appraisal processes, results for CBA and non-monetised approaches are used to form a view about the desirability of a project, and with the SB approach combining results for CBA and MCA to form a single result for project prioritisation using a formal mathematical approach.

The Transport Infrastructure Financing Agency

The Transport Infrastructure Agency is owned by the federal government and managed by civil servants from the federal Ministry of Transport. The major motivation for founding the Agency was to create the institutional structure to enable and support transport infrastructure investments outside the general public budget and public accounting system. The Agency is mainly tasked with the preparation and carrying out of public-private partnership projects and bringing financing forward for desired federal projects.
Evidence used in setting transport spend

Indicator data
► Allocation of federal transport funding is broadly determined by the proportional share of population each state has.
► It is also determined by the proportional share of registered vehicles in each state, with adjustments for city states (Berlin etc.) and newer federal states (East German states).
► Public transport expenditure is determined in part with regard to the state of the existing public transport system. Federal subsidies are also calculated according to population demographics.

Market Research
► Market research is used to inform transport planning however the research is limited.
► Information about a recent research project can be found here.

Conclusion
Economic evaluation of projects plays a central role in the German system to aid decision makers in determining optimal transport investment. While economic evaluation is important, political negotiation between levels of government is also a significant factor in transport planning and funding decisions.
France

Introduction
Transport policy setting in France falls under the responsibility of the Ministry of Ecology, Energy, and Sustainable Development (MEESD). The MEESD sets out the national objectives for transport in the National Transport Infrastructure Plan (SNIT). Planning in France has progressed from the use of national infrastructure plans drawn up by mode of transport to a new concept of national multimodal transport service plans in which infrastructure planning is based on the services expected by users.

Following the adoption of the ‘Grenelle Environment Roundtable’ commitments by the French government, the latest SNIT sets out four goals:

► Optimising the existing transportation system to limit the creation of new infrastructure
► Improving the performance of the system in serving areas far from major metropolitan areas
► Improving the energy efficiency of the system
► Reducing the environmental impact of the network.

Transport planning and funding

Planning
Infrastructure planning in France has changed from a system of successive pluriannual plans to one based on planning contracts between central government and the regions. Regional dimension and territorial development are progressively taken into account at both the national and regional level of planning.

The development of major national transport infrastructure has been a core component of planning contracts, although from 2000 onwards, the share of funding for roads has been significantly reduced in favour of rail and public transport.

The use of these contractual procedures has ensured that local authorities are closely involved in the choice of operations. As co-financers, they are directly involved in optimising each government project from both an economic and environmental standpoint.

Transport infrastructures that are not within the contractual framework are the very large infrastructure projects which have the greatest structural impact, such as toll motorways, major interregional road corridors that are deemed to be national priority, or new TGV lines (rail).

Since 1995, the public debating procedure, according to which a project is submitted to all stakeholders for review, is mandatory for any transport infrastructure project with a budget exceeding €300 M or a length of over 40 km. This process extends completion periods by about a year but it makes the project more acceptable and sometimes improves their quality.6

6OECD, 2005
Funding
In 2011, the French government spent approximately €21 billion on transport investment and maintenance. The state’s financial contribution to any infrastructure project is undertaken through the Agence de financement des infrastructure de transport de France (AFITF). It was established based on a decision by decree of the council of ministers in 2004, and is multimodal covering road, rail, coast and inland waterway shipping, seaport, and local transport infrastructure projects. The AFITF’s financial resources are principally made up of the following elements:\(^7\):

► contribution from the state
► fees paid by highway concessionaires
► a special tax paid by highway concessionaires
► 40% of fines resulting from automatic control and penalty systems
► income from investments
► loans

The agency is not involved in either the selection or planning process of projects to be financed, these are determined by three major initiatives which work within the framework set by the SNIT. The major initiatives are:

► Selection of large projects by the Comité interministériel d’aménagement et de développement du territoire (CIADT) based on strategic fit
► Regional infrastructure projects according to the Contrat de Projets État-Région (CPER) and the special investment programme for Corsica; these are agreements negotiated between the government and each regional authority setting out a multi-annual programme to be financed on a 50:50 basis.
► Local transport infrastructures projects according to the decision of the Comité Interministériel d’Aménagement et de Compétitivité des Territoires (CIACT)

Project appraisal and assessment
The development of major transport infrastructure now consists of, firstly, an analysis of the utility of new projects and, secondly, a process of project assessment. The project assessment combines economic calculation with a multi-criteria approach in accordance with an ever more stringent methodology, in order to better inform the political decision.

France is currently experiencing a movement from a strict application of traditional economic calculation and the pre-eminence of a single criterion predicated on surplus theory\(^8\), to a multi-criteria analysis in which traditional cost benefit analysis is only one of the assessment factors. However, the movement is in its early stages, and a lot of weight is still being placed on traditional cost benefit analysis.

\(^7\) The AFITF also benefited from a one-time allocation of €4 billion, which came from the proceeds of the privatisation of highway concessionary companies in 2006.

\(^8\) OECD, 2011
adopts a relatively low discount rate with a decrease beyond a certain number of years. The discount rate is set at 4% until 2035, then 3.5% until 2054 and 3% thereafter.

The SNIT provides for a list of criteria and indicators for assessing transport infrastructure. An examination of the criteria and indicators reveals that they consist of project impact assessments, in particular on the local economy and the environment.

Table 5: Criteria and indicators for assessing the development of rail transport objectives

<table>
<thead>
<tr>
<th>Detailed objective</th>
<th>Criteria</th>
<th>Indicators</th>
<th>What is to be assessed?</th>
<th>Infrastructure at stake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase the access of large regional agglomerations to high-speed rail. Develop a rail alternative to air and road transport.</td>
<td>Ability of the project to provide an alternative to air transport for areas with an airport that serves short-haul destinations</td>
<td>Amount of traffic shifted to rail</td>
<td>Estimate the modal shift to rail and the consequences in terms of CO₂ emissions</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td>Ability of the project to contribute to network effects.</td>
<td>Number of links between regional metropolises with travel times</td>
<td>Assess the time savings between the main hubs of the high-speed rail network</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td>Ability of the project to increase access to high-speed rail travel</td>
<td>Number of cities of more than 100,000 inhabitants that become a “TGV city”</td>
<td>Assess the improvement in access of urban agglomerations to the TGV network</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agglomerations with a population of more than 100,000 with access to high-speed service within less than 70 minutes</td>
<td></td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cities with more than 100,000 inhabitants saving travel time of more than ½ hour</td>
<td></td>
<td>Rail</td>
</tr>
<tr>
<td>Cope with the increase in traffic with a sufficient quality of service by means of upgrading lines, improving operations or building new tracks when necessary.</td>
<td>Ability of the project to act as a substitute for non-collective transport</td>
<td>Amount of traffic shifted from road transport by transfer from road to rail</td>
<td>Estimate the modal shift from road to rail and the consequences in terms of CO₂ emissions</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td>Ability of the project to reduce congestion</td>
<td>Number of nodes and length of links where congestion has been reduced</td>
<td>Assess the consequences of the project in terms of network congestion</td>
<td>Rail</td>
</tr>
<tr>
<td>Improve the interchanges between modes for passengers and freight.</td>
<td>Possible market for rail in the framework of an interconnection between rail and road</td>
<td>Amount of traffic possibly transferred from air to rail in the case of an air-rail interconnection</td>
<td>Assess the benefits of an air-rail interconnection</td>
<td>Airports, Rail</td>
</tr>
<tr>
<td></td>
<td>Quality of public transport from TGV stations</td>
<td>Amount of CO₂ emitted in tonnes saved in this area</td>
<td></td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td>Impact of the project on the number of new stations in the Île-de-France</td>
<td>Number of passengers and amount of freight using rail to and from the airport terminal</td>
<td></td>
<td>Rail</td>
</tr>
<tr>
<td>Establish a plan for railway stations in Paris in order to cope with the growth in traffic, taking into account the increase in traffic owing to the improvement of intercity routes.</td>
<td>Ability of the project to improve the services between the areas of TGV services</td>
<td>Amount of traffic diverted from Paris stations to new stations on outskirts.</td>
<td>Assess the ability of the project to relieve congestion in Paris stations and to improve the direct services from provinces to provinces.</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Share and volume of long-distance road freight traffic (more than 50 km)</td>
<td></td>
<td>Rail</td>
</tr>
<tr>
<td>Improve the quality of intermodal transport logistics through road motorways, combined transport and ordinary rail services</td>
<td>Size and type of market possibly concerned by rail/road/airway and sea transport</td>
<td>Amount of freight traffic which can be diverted towards other modes.</td>
<td>Determine where part of the transport demand can be served by rail, inland waterway or sea transport</td>
<td>Rail, sea ports, inland waterways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amount of CO₂ tons avoided</td>
<td>Assess the impact of the project on climate change</td>
<td>Rail, inland waterways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic of sea ports in the area of the project</td>
<td>Assess the impact of the project vis-à-vis the accessibility of sea ports</td>
<td>Rail, road, inland waterways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of ports benefiting from an improvement in reliability</td>
<td></td>
<td>Rail, inland waterways</td>
</tr>
<tr>
<td></td>
<td>Ability of the project to develop the hinterland of sea ports</td>
<td>Travel time savings stemming from the project on a representative O&amp;D</td>
<td>Assess the performance of the project on sea port reliability</td>
<td>Rail, inland waterways, sea ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Share of logistic sector employment in the area under consideration</td>
<td>Assess the ability of the project to improve sea port accessibility</td>
<td>Rail, inland waterways, sea ports</td>
</tr>
<tr>
<td></td>
<td>Presence of traffic generation sources in the area</td>
<td>Number of combined transport terminals and multimodal platforms in the area of the project</td>
<td>Assess the ability of the project to improve sea port accessibility</td>
<td>Rail, road, inland waterways, sea ports, airports</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Find areas where interconnections between modes could be improved and estimate the contribution of the project to this improvement</td>
<td>Rail, road, inland waterways, sea ports, airports</td>
</tr>
</tbody>
</table>

23
In addition to the assessment of the projects, French law regulates the participation of the general public in all stages of major infrastructure project planning. Provision must be made for the public to participate in all stages of project development, from the initiation of the preliminary design studies until completion of the public enquiry. The public must also be kept informed during the construction stage until the final entry into service of the infrastructure.

An independent administrative authority, the National Commission for Public Debate (CNDP) is charged with the task of ensuring that these principles are respected and of organising the relevant procedures. According to the scale of the project and its overall impacts, the Commission determines whether the public debate should be organised by the Commission itself, a special commission, or by the owner of the project under the supervision of the commission.

The entire system is a clear advance towards ‘participatory’ democracy. However, it does pose an additional challenge to the owners of works who must be open to, available and prepared for this additional debate. A sufficiently detailed project assessment would improve the debate process as it can then be informed with the costs and benefits in full knowledge of the relevant facts.

**Conclusion**

The French assessment process is primarily based around a combination of benefit cost analysis and multi-criteria assessment, although much weight is still placed on benefit cost analysis. Following adoption of the Grenelle laws, French transport planning looks across all modes of transport and the factors included in their assessment are always evolving. Lastly, there is a high expectation of public participation in the project selection process.
Sweden

Introduction

The Ministry of Enterprise, Energy, and Communications (the Ministry) has responsibility over transport matters in Sweden. The Ministry, together with the Swedish Parliament (Riksdag) sets the overall direction for transport policies through the National Transport Plan. The Swedish Transport Administration (Trafikverket) operates under the authority of the Ministry to plan and manage both national and regional infrastructure with the National Transport Plan as the reference document.

Transport Planning and Funding

The planning process starts with the Ministry presenting its Infrastructure Bill to the Riksdag for approval. The Bill sets out the framework and the basis for action planning. Once approved, the government will then direct the Swedish Transport Administration to initiate the action plans. The directive will set out the government’s conditions that apply to planning.

The Swedish Transport Administration will then submit a proposal for long-term planning. This proposal will be sent out for broad consultation with stakeholders before coming to a final decision. After the consultation process, the government will reach a final decision on the National Transport Plan. The latest National Transport Plan 2014-2025 was released in April 2014.

At the national, the Transport Administration participates in the overall planning of transport infrastructure through the development of the national transport plan. The planning process is carried out through targeting planning and action planning. The process takes about four years to complete and is restarted once every four years. Targeted planning involves strategic analysis of transport and transport development on different goals. Analyses are produced mainly by transport authorities and counties as well as committees and government commissions.

Sweden’s regional level is divided into 21 counties. The county administrative board has the responsibility for seeing that national interests are taken into account, and that governmental directives are followed. The Swedish regional strategy is based on direct input from counties. The regional planners are more measure-oriented than strategy-oriented. They are primarily interested in solving concrete problems, for instance infrastructure bottlenecks and less interested in the more theoretical planning approach as applied for the national planning process.

At the local level, the municipalities have the ‘planning monopoly’ in the Swedish planning system. They have the responsibility to establish and provide a current comprehensive plan (land development plan-LDP) that will provide guidance for decisions on use of land and water areas – this forms the basic conditions for future infrastructure planning. The LDP should include consideration of the regional development plan and the regional infrastructure plan. Consultation should be performed with the county board, regional planning agencies and affected neighbouring municipalities.
In both local and regional planning, political interests influence the suggested strategies and decisions made. Even though the guidelines for planning indicate a process where decisions should be based on descriptions of consequences due to direction taken, it is a well known fact that regional strategies and plans are governed by political agreements.\textsuperscript{9}

Figure 6 presents a picture of the overall process and the relationships involved in transport planning.

DP=Development Plant; RDP= Regional DP; LDP= Land DP

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\textsuperscript{9} Rosqvist & Wennberg, 2012
The Swedish planning process emphasised the development of methods and tools for assessing the effects of the whole range of transport interventions. New demand models for both passenger and freight transport were developed, and the outputs of these models were used for impact analysis and cost-benefit analysis of rail and road transport investment projects.

**Project Appraisal and Assessment**

**Overview of Approach**

In Sweden, the central government undertakes most regional and national transport investment. Investment appraisal is an important process in the development of the long term transport plans, which set the framework for investment decisions over the political cycle.

The government develops the Swedish transport plans by identifying and assessing proposed investments. The overall objective is to ensure the Swedish transport network is running efficiently. The main focus of the assessment process is the economic efficiency (benefit-cost ratio) of the different projects, but weight is also placed on other criteria such as impact on economic growth, contribution to regional development and alignment with urban development.

Cost-benefit analysis plays an important role in this process, with the benefit-cost ratios being the most important element of the assessment. All investments are ranked by the Transport Administration with respect to several criteria, in addition to benefit cost ratio. A proposed investment plan is then delivered to the Ministry which makes the final decision. This places policy makers in a position of influence over which projects to include in the final plan.

**Role of Cost Benefit Analysis (CBA)**

Cost benefit analysis has a long standing tradition in the Swedish transport funding decision making process. The framework includes both user and non-user impacts, in addition to a range of externality impacts. It adopts a multi-modal approach, and is applied across all types of transport infrastructure and location. A discount rate of 3.5% is adopted, which was recently changed from 4%. However, there have been concerns that modelling and methodological shortcomings might cause cost benefit analysis to be biased against certain types of projects (e.g. failure to capture the full benefits of improvement to congested areas).

**Multi Criteria Assessment**

The Swedish government adopts an ‘Overall Impact Assessment’ approach when evaluating transport projects and includes three main sections:

- Economic efficiency of the project – CBA
- The project’s contribution to policy objectives
- Distributional analysis, both spatially and across demographic groups
The overall assessment presents the wider business case for the projects and includes an assessment of non-monetised impacts. It assesses the level of development and uncertainty of the cost and benefits analysed, and provides a descriptive analysis of the overall contribution of projects to policy objectives and targets.

However, it is important to note that while the decision making process explicitly requires an assessment of non-monetised impacts and contribution to policy objectives, multi criteria assessment is not commonly applied\textsuperscript{10}. Guidance documents seem to discourage the use of multi criteria assessment, stating that it “only achieves a few of the strengths of a CBA” and that multi criteria assessment relies too heavily on subjective value judgements.

**Conclusion**

On a national level, the National Transport Plan acts as a steering document and provide guidelines for transport planning. However, planning is mainly decentralised, and decisions mainly take place on a regional/municipal level, where the municipalities have the ‘monopoly’, and develop comprehensive plans containing guidance on use of land and water areas – the basic conditions for future infrastructure planning. Although there is strong directive for multi criteria analysis, cost benefit analysis still remains as a prominent tool in the assessment process.

\textsuperscript{10} Ernst & Young, 2014
Republic of Ireland

Introduction
The global financial crisis has had a significant impact on the Republic of Ireland after a period of high economic growth following Ireland joining the EU and being provided with significant EU funding for infrastructure development. The Department of Transport, Tourism and Sport heavily emphasises the importance of ensuring that investment in the transport sector derives the greatest possible benefits to the country’s economy and society to contribute to economic recovery. This is in line with the commitments in the Programme for Government 2011-2016 and the EU-IMF Programme of Financial Support for Ireland. Rationalisation of resources is a key priority across the transport sector given severe ongoing budget constraints.

Transport planning and funding
Transport policy is set by the Minister of Transport, Tourism and Sport and the Department of Transport, Tourism and Sport in the Republic of Ireland. The Department of Transport, Tourism and Sport is the central transport agency in Ireland responsible for setting overall direction and funding across all modes.

Several transport agencies sit underneath the Department. The agencies are responsible for different operational matters including individual project selection. These agencies are split to cover aviation, public transport, roads and maritime.

Local authorities (county and city councils) have some involvement in transport planning but it is fairly limited, in part due to the relatively low proportion of public finance available to local government in Ireland.

A guiding document is issued by the Department of Transport, Tourism and Sport which sets the high-level goals and objectives for transport agreed with the Minister. The Statement is split into sections covering land, maritime and aviation modes (as well as tourism, sport and support services). The current Statement is the Statement of Strategy 2011-2014.

The Department is also able to clearly understand the objectives of the Minister of Transport, Tourism and Sport as outlined in the Minister’s priorities. The current priorities cover the period to 2016.

Individual Business Plans within each business unit of the Department are substantially more detailed and cover all of the Department’s activities.

Monitoring, reviewing and reporting
The Statement of Strategy places emphasis on the outputs and outcomes of transport objectives and the indicators by which these can be measured. The purpose of this is to provide greater public accountability for the Department’s performance. The Department reports on progress in achieving the key outcomes set out in the Statement by means of its published Annual Reports and Annual Output Statements and through its engagement with the relevant Oireachtas Committee (committees of the legislature).
The objectives in the Statement of Strategy are enacted through the more detailed annual Business Plans of each functional Division of the Department (subsidiary agencies). The Statement informs the preparation of these Business Plans over the period to 2014. The implementation of the actions in the Divisional Annual Business Plans, which also include the more detailed day-to-day activities of the Department, are monitored on a continuous basis by line management and through the Performance Management Development System. The Management Board monitors and reviews progress on the overall implementation of the objectives in the Statement of Strategy and report to the Minister on a quarterly basis. In doing so, the Management Board is conscious of the need to ensure that the strategies of the Department are sufficiently flexible and adaptable to address any emerging issues.

The interagency Transport Statistics Group is tasked with improving communications with key stakeholders, both users and data respondents. The group plays an important role in helping to set national priorities for transport statistics and facilitate the use of data for transport planning. Work is also being undertaken to create a National Transport Survey.

**Roles of agencies**

The Department of Transport, Tourism and Sport has the following responsibilities regarding roads:

- the legal framework relating to the provision and maintenance of national roads and the legal framework within which the National Roading Authority operates
- funding for the national roads programme
- monitoring National Roading Authority expenditure
- providing policy guidance to the National Roading Authority
- provision of funding and overseeing the effective implementation of the national roads element of Transport 21 investment programme
- promotion of the safer use of roads through a combination of policy, education and legislative measures
- overseeing activities of implementing agencies (The Road Safety Authority, the National Roads Authority and local authorities).

There are three agencies concerned with roads which sit under the Department of Transport, Tourism and Sport.

- National Roads Authority
- Medical Bureau of Road Safety
- Road Safety Authority

**National Roads Authority**

The National Roads Authority has statutory responsibility for the management of the national roads programme and for the allocation of grants to specific projects on the national roads network. While the Minister for Transport has responsibility for overall policy and funding in relation to the national roads programme, the implementation of individual projects is a matter for the NRA in conjunction with the relevant local authority. The NRA has overall responsibility for the planning and supervision of works for
the construction and maintenance of national roads. The responsibility for the provision of funding to carry out improvement work on individual projects also rests with the NRA.

**Medical Bureau of Road Safety**

Its principal function is to carry out analyses of blood and urine specimens taken from people suspected of drink driving offences.

**Road Safety Authority**

The RSA has responsibility for driver testing and training, driver licensing, road safety research, driver education, vehicle standards, road safety information and awareness and road transport enforcement functions.

The Department of Transport, Tourism and Sport’s strategic objectives in relation to public transport are:

- the provision of a well functioning, integrated public transport system, which enhances competitiveness, sustains economic progress, promotes balanced regional development and contributes to social cohesion
- the provision of a defined standard of public transport, at reasonable cost to the customer and the taxpayer
- to ensure the timely and cost effective delivery of the Public Transport investment programme in line with the policy set down in the Infrastructure & Capital Investment 2012-2016: Medium Term Exchequer Framework published in November 2011.

The State Agencies under the Department's aegis in relation to public transport are:

- C.I.E. (holding company)
- Bus Éireann
- Bus Atha Cliath
- Irish Rail/Iarnród Éireann
- Railway Procurement Agency
- National Transport Authority
- Railway Safety Commission

**C.I.E.**

Córas Iompair Éireann is the main provider of land public transport services within the Republic of Ireland. C.I.E. provides rail and road freight services within the state and some ancillary services such as catering and the operation of Rosslare Harbour. In addition to the Dart rail service in Dublin city, the company also provides services to parts of Dublin County, including the EU-financed Arrow rail service to Kildare. Córas Iompair Éireann functions as a holding company with three subsidiary operational companies - Bus Éireann, Dublin Bus and Iarnród Éireann.
Bus Éireann

Bus Éireann operates a wide range of bus and coach services throughout the country including: expressway coach services linking major cities and towns; local bus services in rural areas; city bus services in Cork, Galway, Limerick and Waterford. They are also responsible for the operation of the national school transport scheme on behalf of the Department of Education.

Bus Átha Cliath

The Transport (Reorganisation of C.I.E.) Act 1986 sets out the principal objectives for Bus Átha Cliath to provide passenger services by road for the city and county of Dublin. Bus Átha Cliath is also required to operate commercially to the maximum extent possible taking account of the public service obligations of the company.

Iarnród Éireann/ Irish Rail

The Transport (Reorganisation of C.I.E.) Act 1986 sets out the principal objects of Iarnród Éireann as to provide a railway service and a road freight service. It is the general mandate of the company to operate commercially to the maximum extent possible, taking account of the public service obligations of the company and to manage, maintain and develop the rail network infrastructure.

Railway Procurement Agency

The Railway Procurement Agency (RPA) is responsible for the procurement of new light rail and metro infrastructure projects through a number of means including Public Private Partnership (PPP).

National Transport Authority

At a national level, the National Transport Authority has responsibility for securing the provision of public passenger land transport services. This includes the provision of financial support for bus and rail services provided by Bus Éireann, Dublin Bus and Irish Rail. The Authority also licences public bus passenger services. On January 1, 2011, the National Transport Authority assumed responsibility for the regulation of the small public service vehicle sector (i.e. taxis, hackneys and limousines). The Authority also has responsibility for the development of an integrated transport system within the Greater Dublin Area.

Railway Safety Commission

The Railway Safety Commission (RSC) was established under the Railway Safety Act 2005. It has responsibility for matters of railway and cableway safety on passenger carrying systems, freight carrying systems and industrial railways where they interface with public roads.
Project Appraisal and Assessment

The Department of Transport, Tourism and Sport project appraisal guidelines indicate that the appraisal process should be commensurate with the costs of proposed projects and the degree of complexity of the issues involved. The thresholds and methodologies set out are as follows.

► A simple assessment should be carried out for minor projects with an estimated cost below €0.5 million, such as projects involving minor refurbishment works or fit outs etc.
► Projects costing between €0.5 million and €5 million should be subject to a single appraisal incorporating elements of a preliminary and detailed appraisal.
► A Multi-Criteria Analysis (MCA) should be carried out at minimum for projects between €5 million and €50 million.
► Projects over €50 million should have a Cost Benefit Analysis (CBA) carried out.
► A CBA would also be appropriate for innovative projects costing above €5 million which:
  ► Involve complex or specialised issues or untried technology
  ► Involve issues which have not been previously investigated in-depth
  ► Are regarded as pilot projects on which larger programmes may be modelled
  ► Would generate additional substantial ongoing operating or maintenance costs.

Post project reviews are also carried out for all projects costing in excess of €50m and a representative 5 per cent sample of all completed projects.

The guidelines for appraisal are that for any project, three types of appraisal could be potentially carried out. These are:

► Economic appraisal
► Exchequer flows appraisal
► Financial appraisal

An economic appraisal assesses the project from the point of view of its impact on the economy as a whole. The appraisal is not confined to purely commercial or monetisable impacts of the project, but also looks at its broader economic, social and environmental impacts. Multi-criteria analysis, cost-benefit analysis and cost effectiveness analysis may be used.

The Exchequer flows appraisal is concerned with the financial impact of the project on the Exchequer. It is thus concerned with the implications of the project for capital and maintenance spending, public transport subsidies and taxation.

A financial appraisal is concerned with the financial impact of the project on the finances of the sponsoring agency.

In principle, projects should be subject to all three types of appraisal. In practice, however, a financial appraisal is sometimes omitted if financial impacts on the sponsoring agency are small.
Figure 7: Shows the three types of appraisal approaches and inputs for each

**Multi-criteria analysis**

With regard to economic appraisal, an objectives-led approach is used. This embraces the policy goals and objectives set by the political and administrative processes. Accordingly, the economic impacts of a project are appraised using the following criteria.

- Economy
- Safety
- Environment
- Accessibility and Social Inclusion
- Integration

The impacts of a transport investment on economic growth and competitiveness are assessed under the economic impact and economic efficiency criteria. Safety is concerned with the impact of the investment on the number of transport related accidents. Environment embraces a range of impacts, such as emissions, noise, and ecological and architectural impacts. Accessibility and social inclusion uses the notion that some priority should be given to benefits that accrue to those suffering from social deprivation, geographic isolation and mobility and sensory deprivation. Finally, integration considers the extent to which the project being evaluated promotes integration of transport networks and is compatible with a range of government policies, including the National Spatial Strategy.
Cost-benefit analysis
A standard Cost-benefit analysis is used with benefits including the following elements:

► Net transport user benefits
► Net transport operator benefits
► Safety benefits
► Air quality benefits
► Noise benefits.

A discount rate of 5% is used for cost benefit analysis.

Conclusion
The Republic of Ireland focuses on closely monitoring the outcomes of transport investment in an attempt to direct it optimally. Severe ongoing budget constraints as a result of the global financial crisis’s impact on the country encourage efforts to ensure returns from transport investment are optimised. Local government in the Republic of Ireland has less influence on transport planning and funding than in many other jurisdictions with the direction of transport planning being largely set by central government.
Overall conclusions
While this paper succeeded in further understanding transport planning and funding frameworks in the selected countries, it was not able to uncover significant information about how these countries determine the share of their national wealth to invest in transport. This information will likely not come from a more extensive literature review but require detailed discussions at the Ministerial and policy analyst level for the countries examined.

With regards to decisions about how much to invest in different areas of transport, all of the countries examined use a combination of politically informed strategy and economic analysis to determine investment. The relative weight that these factors have on decision making varies by jurisdiction.

All of the countries examined use similar methods for project appraisal and assessment which typically involves a multi-criteria analysis which includes a cost benefit analysis. Some of the countries examined have more uniform frameworks for conducting project appraisal than others.

The literature review has revealed that, in comparison to the countries examined, New Zealand has a reasonable mix of inputs for determining transport planning and funding decisions. In comparison to the countries with federal systems, political negotiation predictably plays a less pronounced role in New Zealand decision making. The mixed experience of other countries reinforces the importance of robust economic analysis informing elected representatives when making transport funding and investment decisions.
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**Republic of Ireland**


