Impact assessments of cycle schemes

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Agenda

● Introduction
● Impact assessments in Norway
● CBA of cycle schemes
● Challenges and coming work
The Norwegian Public Roads Administration

Key figures

Impact assessments of cycle schemes, 29. sept 2015 Stockholm
We are where the people are
Organised by region

- The Directorate of Public Roads
- Five Regions
- 72 Driver and Vehicle Licensing Offices
- 7,100 employees
How we travel in Norway

Modal split of all travels

On foot: 21%
Bicycle: 5%
Car driver: 55%
Car passenger: 9%
Public Transport: 10%
Other: 1%

Source: Norwegian Travel Survey 2013/14 – TØI report 1383/2014
The growth in passenger transport in the main urban areas must be absorbed by public transport, cycling and walking.™
Impact assessment of road transport projects

Revision of handbook for impact assessments

Main goal:

Improve the assessment methodology for cycling and public transport

Due to be finished in 2017

http://www.vegvesen.no/Fag/Publikasjoner/Handboker
Procedure on Impact Assessment

Monetised impacts (calculated)

Non-monetised impacts (assessment)

Summary of the socioeconomic analysis

NPV + NMI > 0

Spatial and social development, when required
Distribution
Attainment of objectives

Recommendation

Socio-Economic analysis

Statens vegvesen
Norwegian Public Roads Administration
Monetised impacts (1)

- **Road- and transport users**
  - Vehicle costs (distance-related)
  - Time costs
  - Direct costs (e.g. tickets)
  - Inconvenience costs in ferry connections
  - Benefits for «new» traffic
  - Health effects for pedestrians and cyclists
  - Unsafe conditions for pedestrians and cyclists

- **Operators** (public transport, ferry, toll road companies, P companies)
  - Costs
  - Income
  - Transfers

\[\text{All types of projects}\]

\[\text{«Special» projects}\]
Monetised impacts (2)

- Government budget
  - Investment costs
  - Management and maintenance
  - Transfers (subsidies) between government and operators
  - Taxes

- Third parties
  - Accidents
  - Noise and air pollution
  - Residual value (infrastructure)
  - Tax costs (loss of efficiency by tax funding)
Unit values for pedestrians/cyclists

- **Time**: 170 kr/h cycling and 152 kr/h walking (TØI 2010/1053b)

- **Insecurity** (TØI 2010/1053 g)

<table>
<thead>
<tr>
<th></th>
<th>Insecurity walking</th>
<th>Insecurity cycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossings</td>
<td>1,2 kr/crossing</td>
<td>2,8 kr/crossing</td>
</tr>
<tr>
<td>Road side</td>
<td>33,9 kr/km</td>
<td>15,2 kr/km</td>
</tr>
<tr>
<td>walking/cycling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Health:**

<table>
<thead>
<tr>
<th>Costs</th>
<th>Cycling (Kr/km)</th>
<th>Walking (kr/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced costs of short spells of illness</td>
<td>1,8</td>
<td>3,4</td>
</tr>
<tr>
<td>Reduced costs of serious illness</td>
<td>24,6</td>
<td>49</td>
</tr>
</tbody>
</table>

Insecurity walking

Insecurity cycling

Crossings

Road side walking/cycling

Costs

Cycling (Kr/km)

Walking (kr/km)
<table>
<thead>
<tr>
<th>Benefactors</th>
<th>Impacts</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport users</td>
<td>Benefit for transport users (travel time, travel cost, health for w/c, insecurity)</td>
<td>Monetized</td>
</tr>
<tr>
<td>Operators</td>
<td>Operator benefit</td>
<td></td>
</tr>
<tr>
<td>The government</td>
<td>Budget effects</td>
<td></td>
</tr>
<tr>
<td>Third parties</td>
<td>Traffic accidents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noise and air pollution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residual value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of government funds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Landscape</td>
<td>Non-monetized</td>
</tr>
<tr>
<td></td>
<td>Community life and outdoor life</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural heritage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural resources</td>
<td></td>
</tr>
</tbody>
</table>
Project types and data flow

- Transport models
- Separate modules
- EFFEKT
Project types:

1. Without data from transport model (*all in EFFEKT*)
2. With data from transport model
3. With data from transport model, transport user benefit module and public transport module
4. Pedestrian / Bicycle project
Software for calculation CBA.

Transport model → Transport user benefit module → Public Transportation module → EFFEKT
CBA for cycle schemes: Two methods

1. Cycle module in EFFEKT; fixed demand

2. Flexible demand: transport models, transport user benefit module, EFFEKT
Walking and cycling-module in EFFEKT - fixed demand!

Speed:
- Walking: 5 km/h
- Cycling: 15 km/h
## Impacts included at link levels

<table>
<thead>
<tr>
<th>Link type</th>
<th>Time</th>
<th>Accidents</th>
<th>Health</th>
<th>Insecurity</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At the link</td>
<td>Delay w/c + cars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road side cycling/walking</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking /cycling path</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossings</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Impact assessments of cycle schemes, 29. sept 2015 Stockholm
Walking and cycling; flexible demand

Transport model:
- Calculation of mode choice; also changes from walking and cycling to public transport and car
- Calculates changes in destinations

Transport user benefit module and EFFEKT
- Calculates benefits related to time costs and changes in health costs
Challenges

- Little knowledge on the amount of walking and cycling and changes in this caused by changes in the road network

- The transport models:
  - Too large zones for estimation of changes in walking and cycling? ....internal trips
  - Don’t consider topography and climate
  - Network:
    • cycling and walking follow the main road; no shortcuts
    • Don’t consider the quality of the cycle/walking network when estimating demand.
Challenges

- CBA:
  - The most important impacts are monetized, but the quality of infrastructure should maybe be better included?
  - Discussions about the size of the health impacts
Work ahead/ongoing work

- Before – /after studies of cycle scheme
  - traffic
  - changes in activity levels

- Reestimation of transport demand model. Goal: to be better also on cycling and walking.

- Include induced cycle traffic in the cycle module in EFFEKT
  - Elasticities and rules of thumb (coming literature survey)
Assessing non-monetised impacts

Value of Asset + Magnitude of Impact → Significance of the Impact
Assessing non-monetised impacts

<table>
<thead>
<tr>
<th>Value Magnitude</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large positive</td>
<td>Large positive significance (+++++)</td>
<td>Large positive significance (+++)</td>
<td>Large positive significance (+)</td>
</tr>
<tr>
<td>Medium positive</td>
<td>Medium positive significance (+)</td>
<td>Medium positive significance (+)</td>
<td>Medium positive significance (+)</td>
</tr>
<tr>
<td>Small positive</td>
<td>Small positive significance (+)</td>
<td>Small positive significance (+)</td>
<td>Small positive significance (+)</td>
</tr>
<tr>
<td>None</td>
<td>No significance (0)</td>
<td>No significance (0)</td>
<td>No significance (0)</td>
</tr>
<tr>
<td>Small negative</td>
<td>Small negative significance (-)</td>
<td>Small negative significance (-)</td>
<td>Small negative significance (-)</td>
</tr>
<tr>
<td>Medium negative</td>
<td>Medium negative significance (-)</td>
<td>Medium negative significance (-)</td>
<td>Medium negative significance (-)</td>
</tr>
<tr>
<td>Large negative</td>
<td>Large negative significance (-)</td>
<td>Large negative significance (-)</td>
<td>Large negative significance (-)</td>
</tr>
</tbody>
</table>

The significance of the various impacts is to be assessed by combining the value and the magnitude of impact.