

Institute for Transport Studies

FACULTY OF ENVIRONMENT



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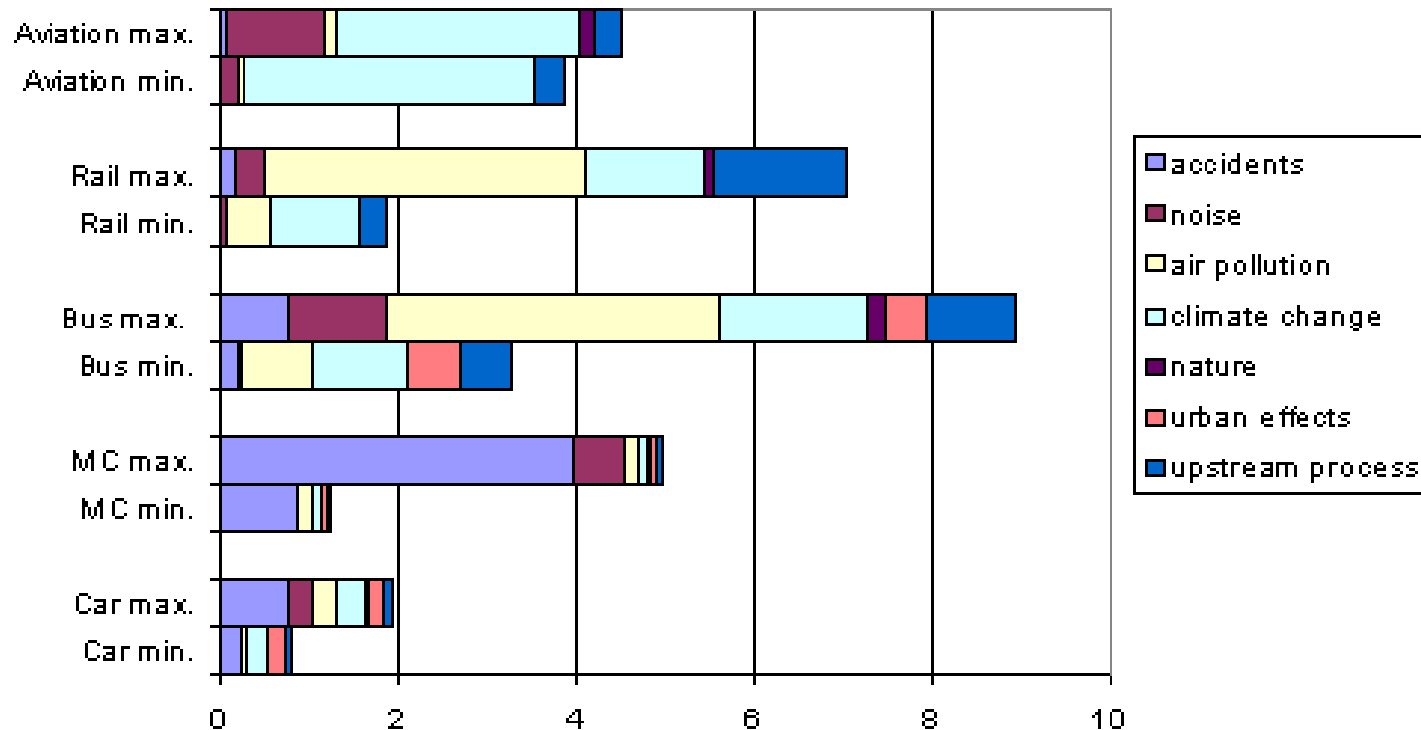
Road Pricing: environmental motives and implications

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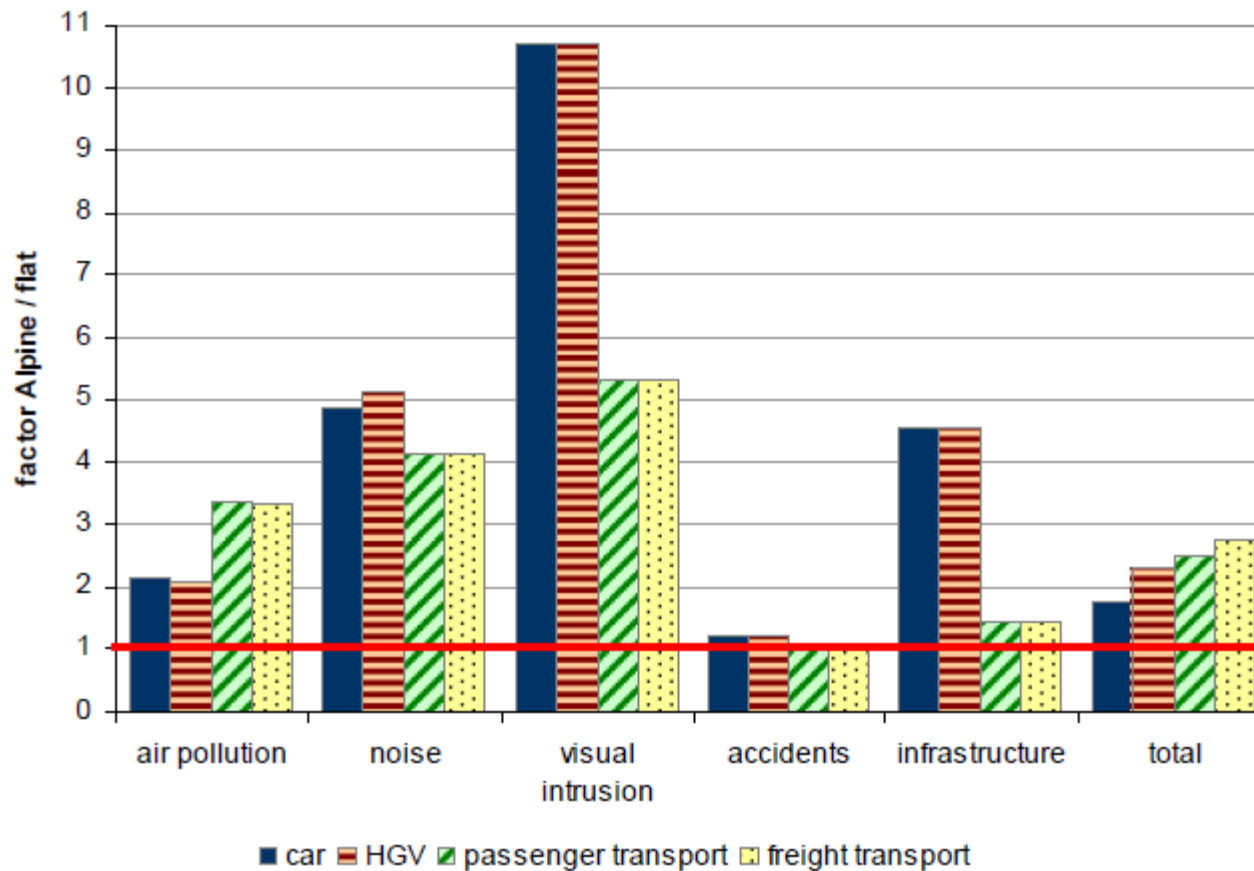
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Road Pricing as Environmental Policy Instrument

- Internalisation of external costs of transport



Increased Costs for Sensitive Areas (Alps)



First Best Road User Charging

Theoretically ideally charges would vary according to:

- Vehicle characteristics
- Road type (Capacity)
- Time
- Location: Sensitivity of area travelled

The price would be continually adjusted during a journey.

Problems:

- No clear price signal
- Safety
- Technologically difficult
- No full cost recovery (e.g. for private operators)
- Non-human impacts / intangibles undervalued

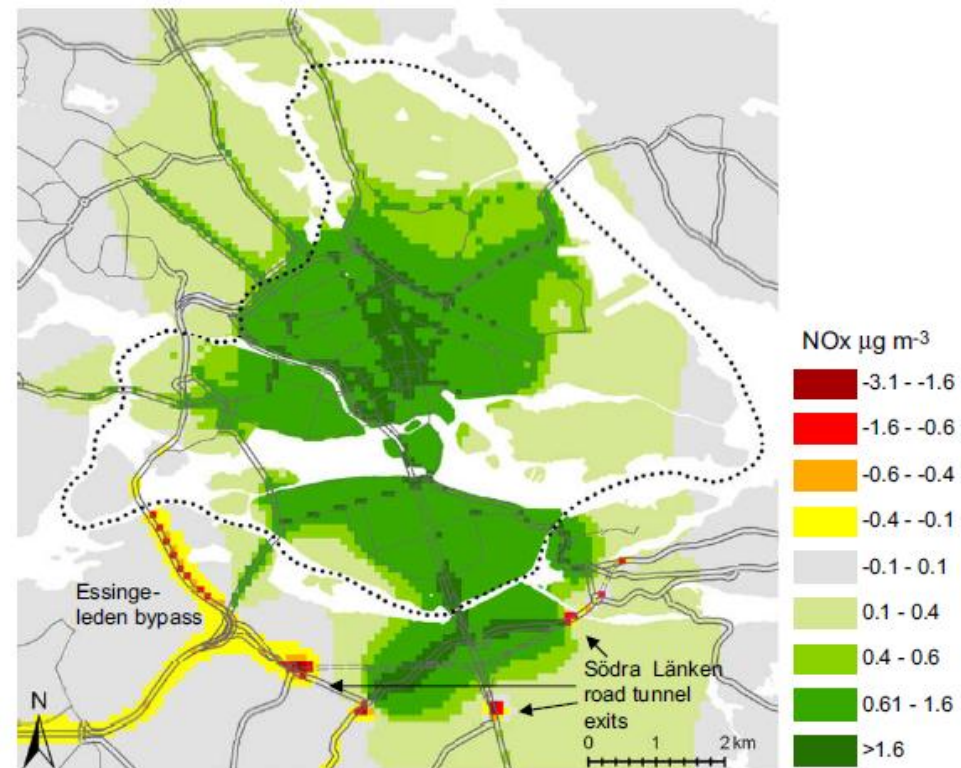
Motorway Tolls / Interurban Roads

- Legal background: EU Directive
 - Differentiation by emission classes
 - Mark-ups for mountainous areas
 - New: Air pollution + noise can be excluded (no climate impacts)
 - Freight only (lorries above 3.5 t)
 - Revenue earmarked for sustainable transport
- Existing distance-based tolls:
 - Small environmental benefits in line with traffic reductions

Urban Charging

- Congestion charging schemes with discounts / differentiation
 - London
 - Stockholm
- Air pollution motivated: Example Milan Ecopass
- Moderate overall environmental benefits, local differences

Stockholm Trial: NO_x concentrations



Johansson et al. 2009

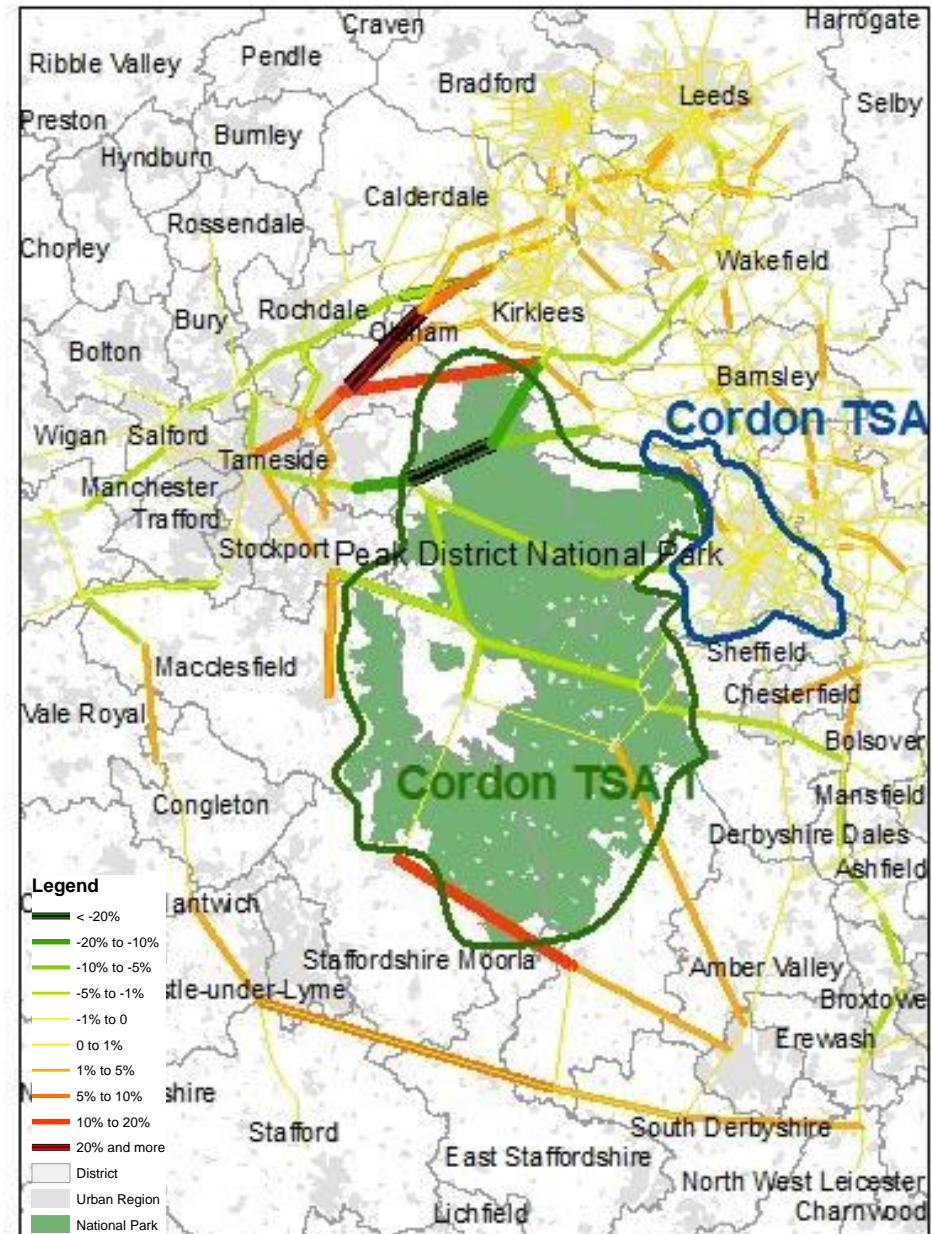
Potential Undesired Impacts

- **Traffic diversion:**
 - losses in environmental benefits and overall welfare
 - usage of unsuitable alternative routes
- **Increased emissions due to higher traffic speeds**
- **Ineffectiveness, excessive cost increases:**
 - Lack of alternatives, e.g. short haul freight
- **Multiple areas + authorities:**
 - Tax exporting behaviour

Local Optimisation

- Relocation of environmental burden due to (long distance) rerouting
- Losers are untolled links at the fringes of cordons (complementary measures)
- Significant local benefits from local optimisation on National Park roads

Change in PM₁₀ Emissions (local vs. global optimum)



Conclusions

- Environmental road user charging must be part of a **wider strategy** and **integrated policy**, e.g.
 - Public Transport Improvements (low emission vehicles)
 - Access restrictions (Low Traffic Zones , e.g. Bologna) for very sensitive areas
- **Price differentiation** according to use of road is ideal, but must be stable and readily ascertainable by road users (e.g. using multi-zones)
- Ensure **effective operation and enforcement**
- Acceptability is crucial for the effectiveness, hence implementation needs to be through a **well informed, democratic process**
- Develop a **monitoring program** in order to refine scheme when necessary
- **Co-ordination** and **harmonisation** (e.g. definitions of sensitive areas, technology) necessary between multiple authorities