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External costs of cars in EU-27

- overview on existing studies and methods
- sums of uncovered externalized costs

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Transport is important!

- for industry and commerce
- for the economy and jobs (manufacturers!)
- for the population: Access to goods and services:
to the shop, to the job, to the doctor, to the
pharmacy, to the restaurant, to relatives,...
- transport affects „freedom and quality of live“
- ...

There is scientific and popular consensus on that:

The benefits of transport are very large!



How much – and which – transport?

This question

- can only be answered by transport users

There is scientific and popular consensus on that:

Demand is determined individually.

Society determines infrastructures, laws, taxes, prices:

Supply is determined by society.

supply & demand, individuals & society: two perspectives.



Individual perspective:

Large transport benefits, **Access** to goods & services:

- Access to spare parts, products, workers, ...
- Access to shops, jobs, doctors, restaurants, relatives ...

1) Each transport user knows his/her benefits

2) Each transport user knows his/her costs: ticket prices, trip times, fuel prices, highway charges, parking fees, congestion charges, vehicle taxes, VAT,

Users do get a service in exchange (or pay a tax)

Efficient allocations: Trips are made if benefits $>$ costs.



Perspective of society:

In individual decisions, **external effects** are not included.

External costs are significant:

- part of infrastructure costs are paid by society
- noise costs are carried by residents/society
- some accident costs are covered by society
- pollution costs are carried by residents/society
- costs of climate change are not paid by today's users
- up- and downstream effects are not covered by users
- other costs (soil, water, habitat losses ...) exist
- ...



Perspective of society:

Significant parts of total costs are externalized
- onto other people, regions, generations

There are trips where total costs for society exceed benefits:
Inefficient allocations are generated

As long as external costs are not included, we generate
inefficiencies, wasted resources, misleading price signals

There is scientific and growing popular consensus on that:
The prices have to give the right signals

Arthur Cecil Pigou: *Wealth and Welfare (1912), Economics of Welfare (1920)*



EU White Paper 2011 (p. 29):

3.3. Getting prices right and avoiding distortions

Phase I (up to 2016)

Transport charges and taxes should be restructured. They should underpin transport's role in promoting European competitiveness, while the overall burden for the sector should reflect the total costs of transport in terms of infrastructure and external costs.

...

Proceed with the internalisation of external costs for all modes of transport applying common principles while taking into account the specificity of each mode.

Phase II (2016 to 2020)

Building on Phase I, proceed to the full and mandatory internalisation of external costs



EU Handbook on estimation of external costs

M. Maibach, C. Schreyer, D. Sutter (INFRAS)

H.P. van Essen, B.H. Boon, R. Smokers, A. Schroten (CE Delft)

C. Doll (Fraunhofer Gesellschaft – ISI)

B. Pawlowska, M. Bak (University of Gdansk)

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Handbook on estimation of external costs in the transport sector

Produced within the study
Internalisation Measures and Policies
for All external Cost of Transport
(IMPACT)

Wide scientific consensus on the order of magnitude!

http://ec.europa.eu/transport/themes/sustainable/doc/2008_costs_handbook.pdf

Recently updated (CE Delft, Sept. 2011):



Huib van Essen, Arno Schroten, Matthijs Otten (CE Delft)
Daniel Sutter, Christoph Schreyer, Remo Zandonella,
Markus Maibach (INFRAS Zürich)
Claus Doll (Fraunhofer ISI Karlsruhe)

External Costs of Transport in Europe
Update Study for 2008

results: 514 billion € (transport), 314 billion € (cars)

http://www.cedelft.eu/publicatie/external_costs_of_transport_in_europe/1258



Methodology for this project

- Methodology based on „handbook“ and „update study“
- „Cars“ only, 2008 prices
- Scope: EU-27: CE Delft –(NO/CH) + (Malta+Cyprus)
- No new data basis, only using available figures

Included external effects:

- Accidents
- Air pollution
- Noise
- Climate Change (high/low estimate)
- Upstream and downstream effects (high/low estimates)
- Other effects (land use, separational effects, etc.)



First best: Damage Costs

Accidents: traffic data, accident rates per country (CE Delft), value of statistical life (VSL) = 1,67 M€, country adjusted

Air pollution: PM₁₀, PM_{2.5}, NO_x, SO₂, VOC, O₃ : tons emitted from cars, times damage estimates [€/t] (CE Delft)

Noise: Number people affected (acc. to 2002/49/EC) times annoyance and health costs (CE Delft):

32% of total costs for cars, 68% for all other vehicles

Upstream and downstream effects: Including energy production, vehicle production, infrastructure: 14,3 billion € for pollution plus ca. 16,7% of climate costs added

Other effects (land use, separation, etc.): +3,4%



Climate costs

A) Damage costs for climate change are not really feasible

B) Avoidance costs: Depending on assumptions:

- Target? Time to reach the target?
- total of emissions up to base year?
- only technical improvements? Self supporting?
- changes in land use and individual behaviour?
- measures in all sectors/only transport specific?

Meta-Study by Kuik, Brander, Tol: Energy policy 37 (2009):

- 450 ppm CO₂-eq
- Marginal Avoidance Costs for 2025: 69 €₂₀₀₅ (low)
241 €₂₀₀₅ (high)
- our discount rate 2005 to 2008: 1,5% p.a.
- values used in this study: 72 €₂₀₀₅ (low)
252 €₂₀₀₅ (high)



Total costs of cars by country and category

	Accidents	Air Pollution	Noise	Climate (low)	Climate (high)	Up + Down (high)	Up + Down (low)	Other	Total
	Mio €a	Mio €a	Mio €a	Mio €a	Mio €a	Mio €a	Mio €a	Mio €a	Mio €a
Austria	5,811	0,674	0,177	0,683	2,384	0,646	0,362	0,296	9,988
Belgium	4,790	0,851	0,174	0,928	3,240	0,877	0,492	0,290	10,222
Bulgaria	1,647	0,078	0,085	0,224	0,782	0,212	0,119	0,084	2,888
Cyprus	0,185	0,032	0,010	0,017	0,101	0,027	0,009	0,012	0,368
Czech Republic	2,416	0,394	0,174	0,446	1,559	0,422	0,237	0,146	5,112
Denmark	1,504	0,250	0,073	0,510	1,780	0,482	0,270	0,112	4,200
Estonia	0,191	0,019	0,004	0,052	0,183	0,049	0,028	0,012	0,459
Finland	1,331	0,347	0,037	0,704	2,460	0,666	0,373	0,126	4,968
France	16,756	5,402	1,093	5,832	20,369	5,516	3,091	1,362	50,498
Germany	38,366	6,351	0,621	9,121	31,856	8,628	4,834	2,442	88,263
Greece	2,234	0,111	0,239	0,388	1,354	0,367	0,206	0,127	4,432
Hungary	2,128	0,345	0,122	0,366	1,280	0,347	0,194	0,125	4,346
Ireland	1,221	0,142	0,148	0,300	1,050	0,284	0,159	0,045	2,890
Italy	19,977	2,578	0,685	3,634	12,694	3,438	1,926	1,153	40,525
Latvia	0,392	0,038	0,041	0,103	0,360	0,098	0,055	0,026	0,955
Lithuania	0,679	0,055	0,022	0,106	0,372	0,101	0,056	0,036	1,265
Luxembourg	0,447	0,098	0,006	0,070	0,245	0,066	0,037	0,026	0,889
Malta	0,069	0,012	0,004	0,006	0,038	0,010	0,003	0,005	0,137
Netherlands	4,620	1,038	0,220	1,613	5,634	1,526	0,855	0,357	13,396
Poland	7,180	0,775	0,259	1,405	4,908	1,329	0,745	0,419	14,870
Portugal	1,828	0,192	0,125	0,597	2,085	0,565	0,316	0,131	4,925
Romania	2,766	0,171	0,189	0,389	1,360	0,368	0,206	0,146	5,000
Slovakia	0,857	0,174	0,092	0,180	0,628	0,170	0,095	0,056	1,978
Slovenia	0,943	0,106	0,017	0,146	0,508	0,138	0,077	0,051	1,764
Spain	10,695	2,035	0,987	3,868	13,509	3,659	2,050	0,844	31,728
Sweden	2,610	0,320	0,080	1,085	3,789	1,026	0,575	0,208	8,032
United Kingdom	22,396	3,174	2,222	6,712	23,443	6,349	3,558	1,603	59,188
Total EU-27	153,003	25,762	7,905	39,486	137,969	37,366	20,930	10,240	373,284

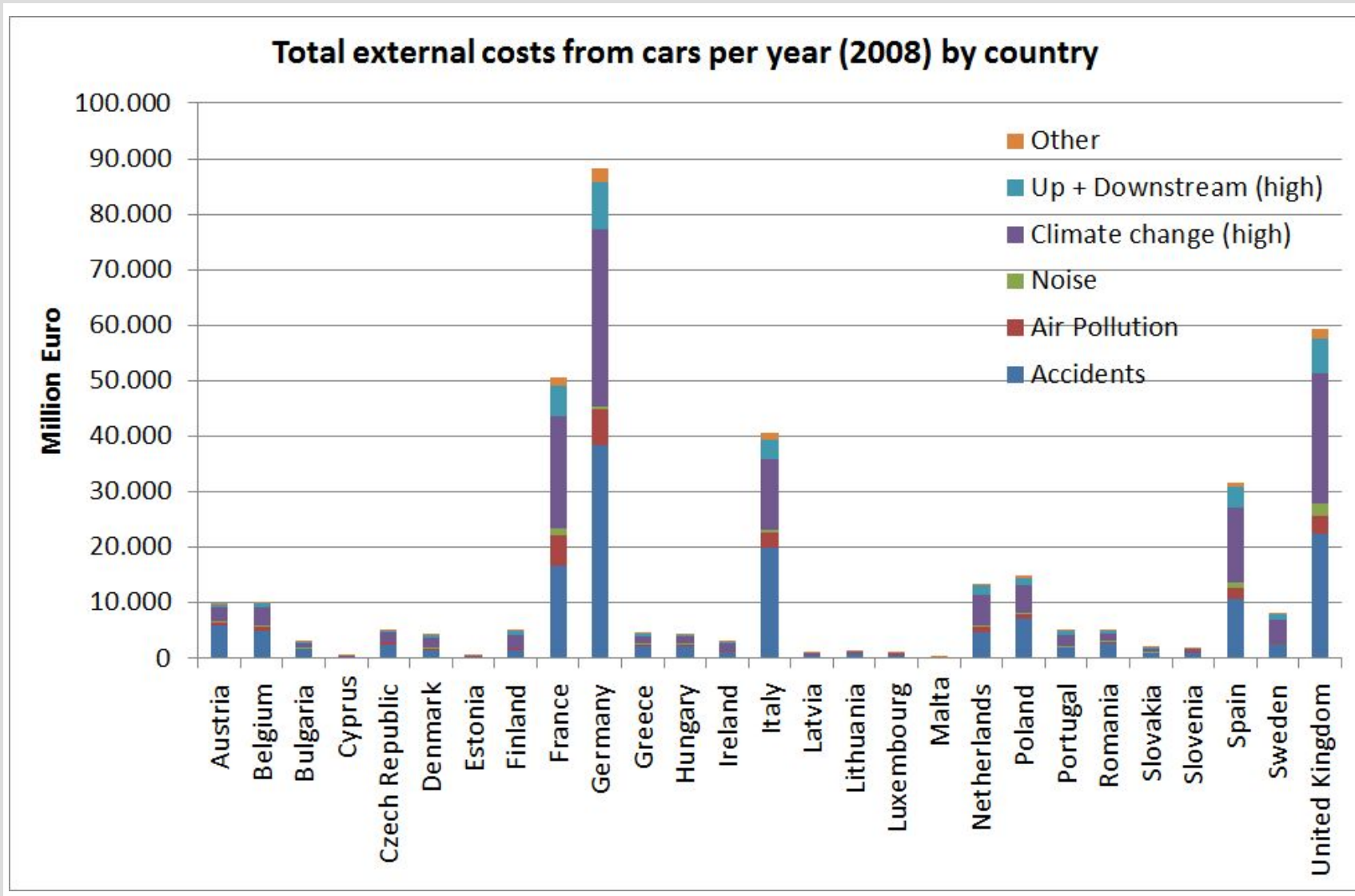


Results for EU-27 (high estimates)

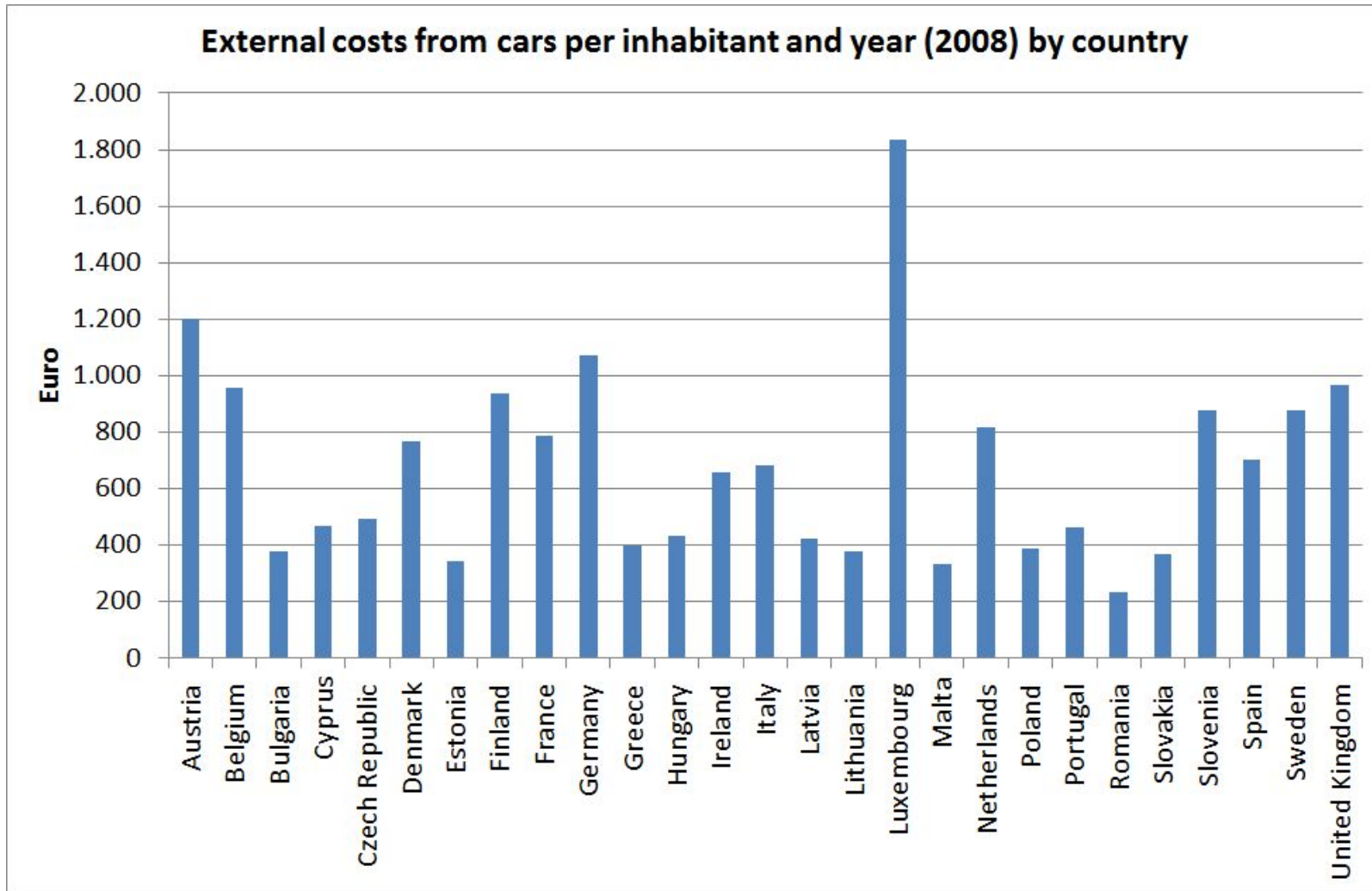
- 1) Uncovered external costs of cars per year in EU-27: 350 to 400 billion € (i.e. 3732840000000 €)
- 2) That corresponds with ca. 750 € per person (EU 27)
- 3) Size of external costs depend on country size (in billion €/year): e.g. DE 88.2; UK 59.2, FR 50.5, LUX 0.9
- 4) 234 million cars in EU-27 (2008): Uncovered external costs per [car*year] ca. 1600 €/year (high: 1596.24)
- 5) Country differences: e.g. DE 2140€, LT 760€ per year
- 6) "Low estimate": 258.4 billion €, i. e. 1100 €/car*year
- 7) Please note: Chapter 5.5(5) states 1300 €/car*year: This is for Slovakia only (which is not mentioned!)
- 8) Do not compare figures among countries: different purchasing parities, transit vehicles, urban/regional



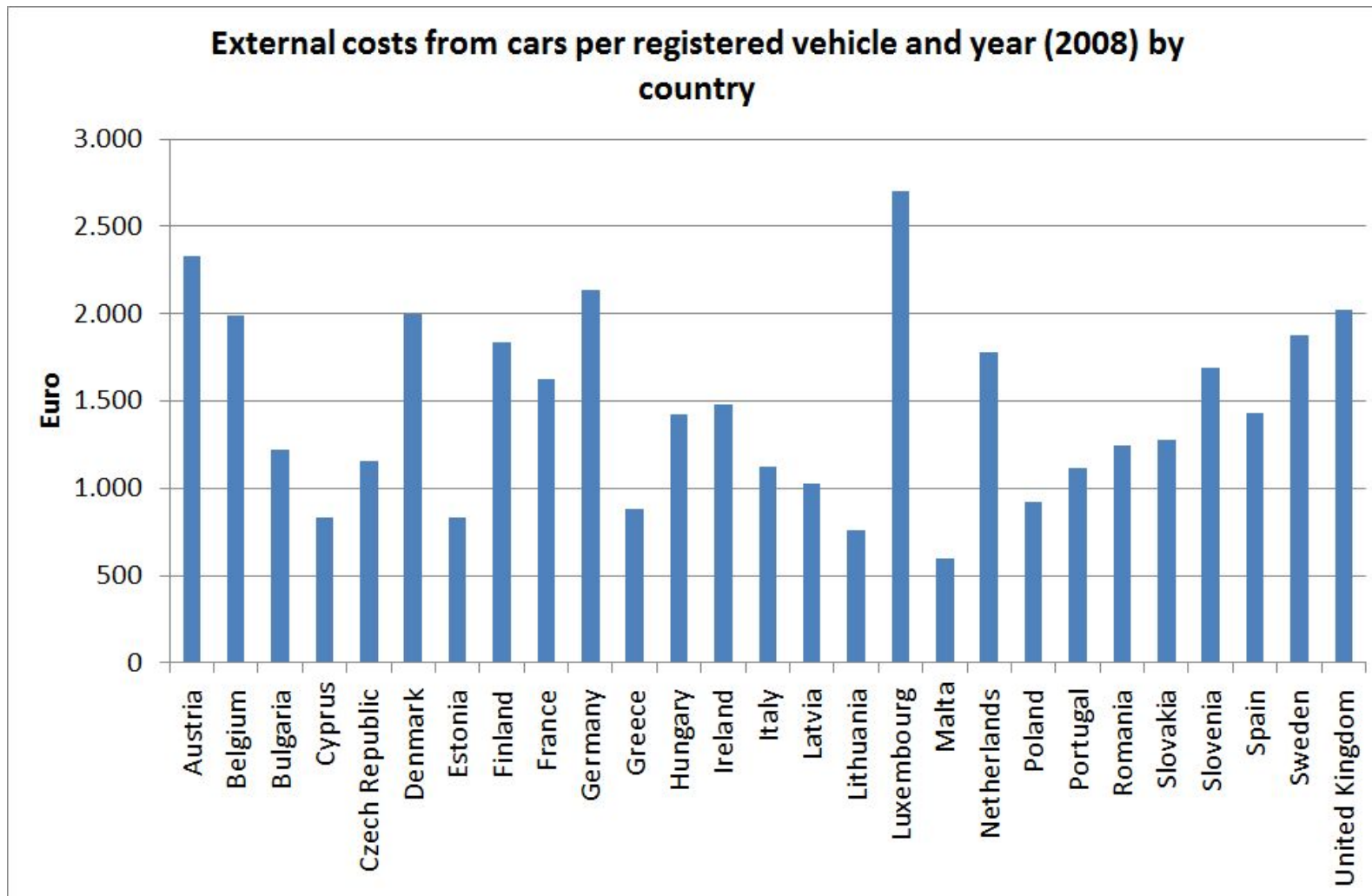
Results - Total costs of cars per year by country



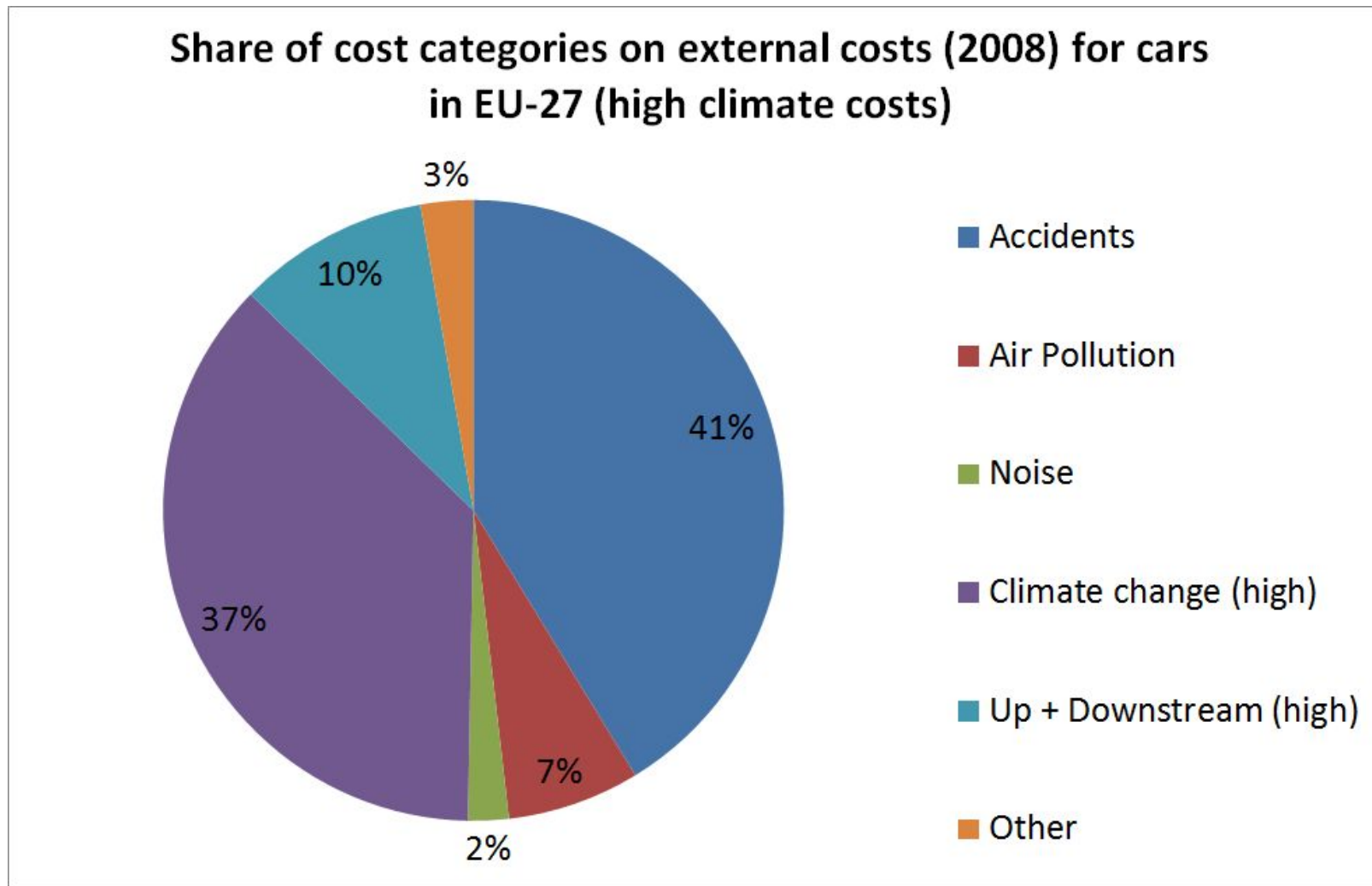
Results - External costs from cars per person



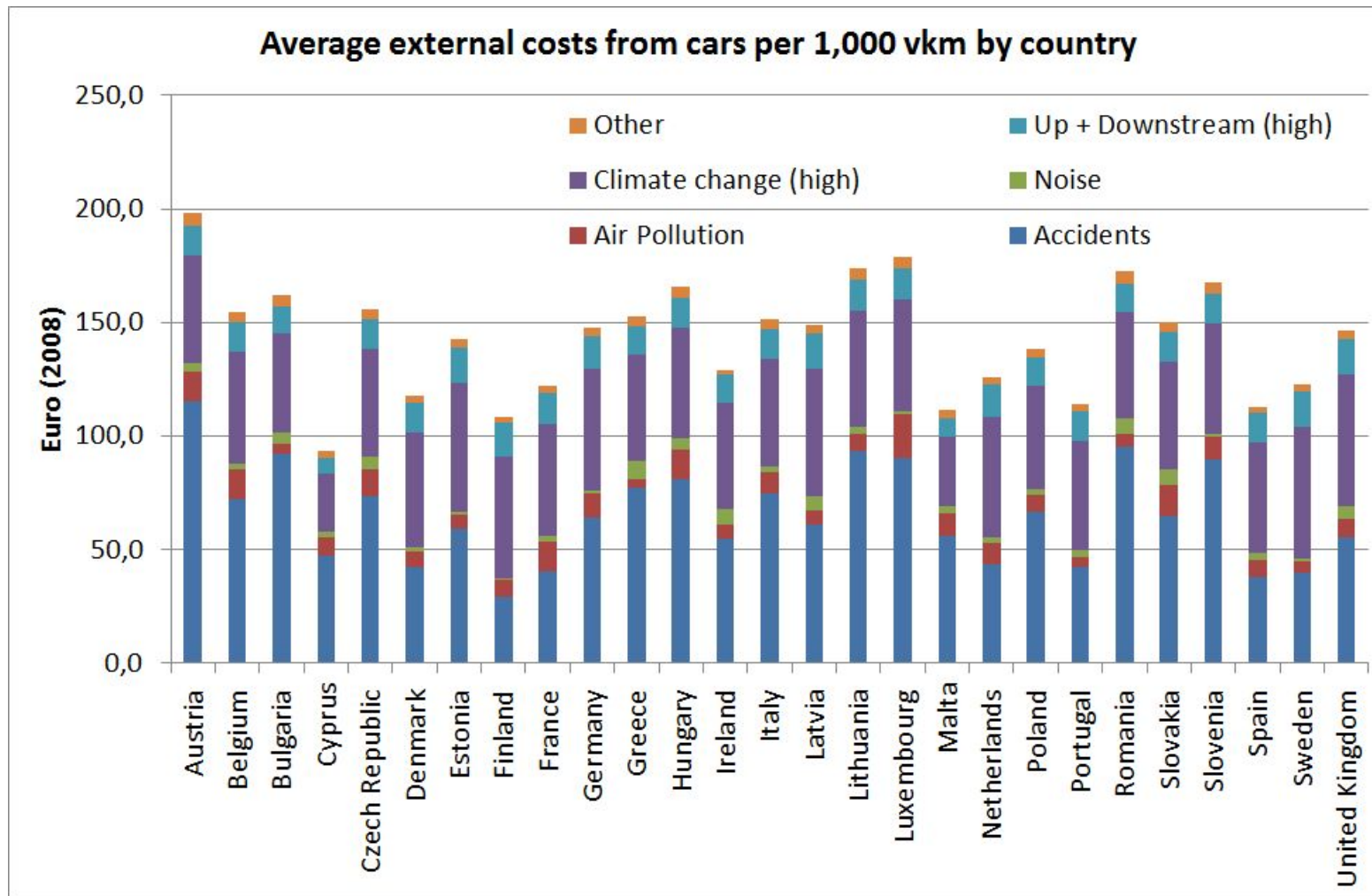
Results - External costs per vehicle



Results - Share of cost categories (high)



Results - average external costs per 1,000 vkm



Concerning these values:

External costs will never be known “by the cent”: We used “conservative estimates” (vs. reserve for impending losses!)

All cost rates are open for discussion: But they are no Zero! Somebody, somewhere, somewhen will pay these costs.

External costs can not be balanced against paid taxes: Taxes go into the general budget („Nonaffektationsprinzip“).

External costs must be balanced against special charges, fees, earmarked taxes (hypothecated, ring fenced)

EU has to embark on a process of constant monitoring and adapting the best possible estimates: Update these figures.



Internalisation:

These figures could be used as a first estimate

These figures are significant: We are wasting wealth

Ideally, for each external effect there is an instrument

On average, costs per 100 [veh*km] are 14 € /ranging from 9.40€ to 19.80€). Thus, a charge of 9-20 cts/km results.

Internalisation is extremely powerful: Everybody wants to (and should) do everything to avoid paying the costs.

All conditions change, innovation and intelligence wins

Internalisation should be smooth and everywhere: Giving planning safety, allowing for reactions

Internalisation needs continuous evaluations and adaptation



Internalising external effects

- is **not** to „punish people“ or to generate revenues
- is especially important in times of economic crises
- is setting price signals instead of prohibitive laws
- is in the long term interest of the industry
- is in the interest of the population (damage is avoided)
- is stimulating innovation and competitiveness
- is supporting the poorer parts of population (DIKE)

The earlier we start with internalization,
the more we support the economy,
the more we reduce environmental damage,
the more we help poorer parts of the society!



Thank you!

