



Workshop

'External Costs of Energy and Transport'

Research Results

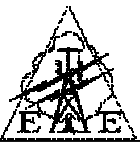
Advances of the ExternE methodology

Rainer Friedrich

University of Stuttgart

Reason for estimating external costs

New Developments



External Costs Definition

An external cost arises, when the social or economic activities of one group of persons have an impact on another group and when that impact is not fully accounted, or compensated for, by the first group.



For what purpose are estimates of external costs needed?

Technology assessment: comparison of techniques, identification of weak points

Internalising external costs – ‚getting the prices right‘

Cost-Benefit-Analyses, e. g. for measures and directives to protect the environment and human health

Sustainability and welfare indicator; assessment of impacts/ damage categories; priority setting for environmental policy



Features of Estimates of External Costs

1) External costs depend on

- site
- technology
- time

-> Bottom-up approach needed: the 'extended impact pathway approach' -> next presentation

2) For assessment (weighting) of risks and damage the preference structure of the population is measured

e.g. contingent valuation -> presentation on monetary valuation



”History“ of ExternE

***Project ExternE = Externalities of Energy* launched in 1991, financed by DG Research within the Joule programme**

scope: airborne pollutants from power plants, development of the Impact Pathway Approach

- **Follow-up projects**
 - **improving and extending the methodology, incorporating new knowledge**
 - **extending the field of applications: heat production, transport , industrial activities**



Impacts included (I)

Impact Category	Pollutant / Burden	Effects
Human Health – mortality	PM ₁₀	Reduction in life expectancy due to short and long time exposure
	SO ₂ , O ₃	Reduction in life expectancy due to short time exposure
	Benzene, BaP, 1,3-butad., Diesel part.	Reduction in life expectancy due to long time exposure
	Noise	Reduction in life expectancy due to long time exposure
	Accident risk	Fatality risk from traffic and workplace accidents
Human Health – morbidity	PM ₁₀ , O ₃ , SO ₂	Respiratory hospital admissions
	PM ₁₀ , O ₃	Restricted activity days
	PM ₁₀ , CO	Congestive heart failure
	Benzene, BaP, 1,3-butad., Diesel part.	Cancer risk (non-fatal)
	PM ₁₀	Cerebrovascular hospital admissions, cases of chronic bronchitis, cases of chronic cough in children, cough in asthmatics, lower respiratory symptoms
	O ₃	Asthma attacks, symptom days
	Noise	Myocardial infarction, angina pectoris, hypertension, sleep disturbance
Accident risk	Risk of injuries from traffic and workplace accidents	





Impacts included (II)

Impact Category	Pollutant / Burden	Effects
Building Material	SO ₂ , Acid deposition	Ageing of galvanised steel, limestone, mortar, sand-stone, paint, rendering, and zinc for utilitarian buildings
	Combustion particles	Soiling of buildings
Crops	SO ₂	Yield change for wheat, barley, rye, oats, potato, sugar beet
	O ₃	Yield change for wheat, barley, rye, oats, potato, rice, tobacco, sunflower seed
	Acid deposition	Increased need for liming
	N, S	Fertilising effects
Global Warming	CO ₂ , CH ₄ , N ₂ O, N, S	World-wide effects on mortality, morbidity, coastal impacts, agriculture, energy demand, and economic impacts due to temperature change and sea level rise
Amenity losses	Noise	Amenity losses due to noise exposure
Ecosystems	Acid deposition, nitrogen deposition	Acidity and eutrophication (avoidance costs for reducing areas where critical loads are exceeded)

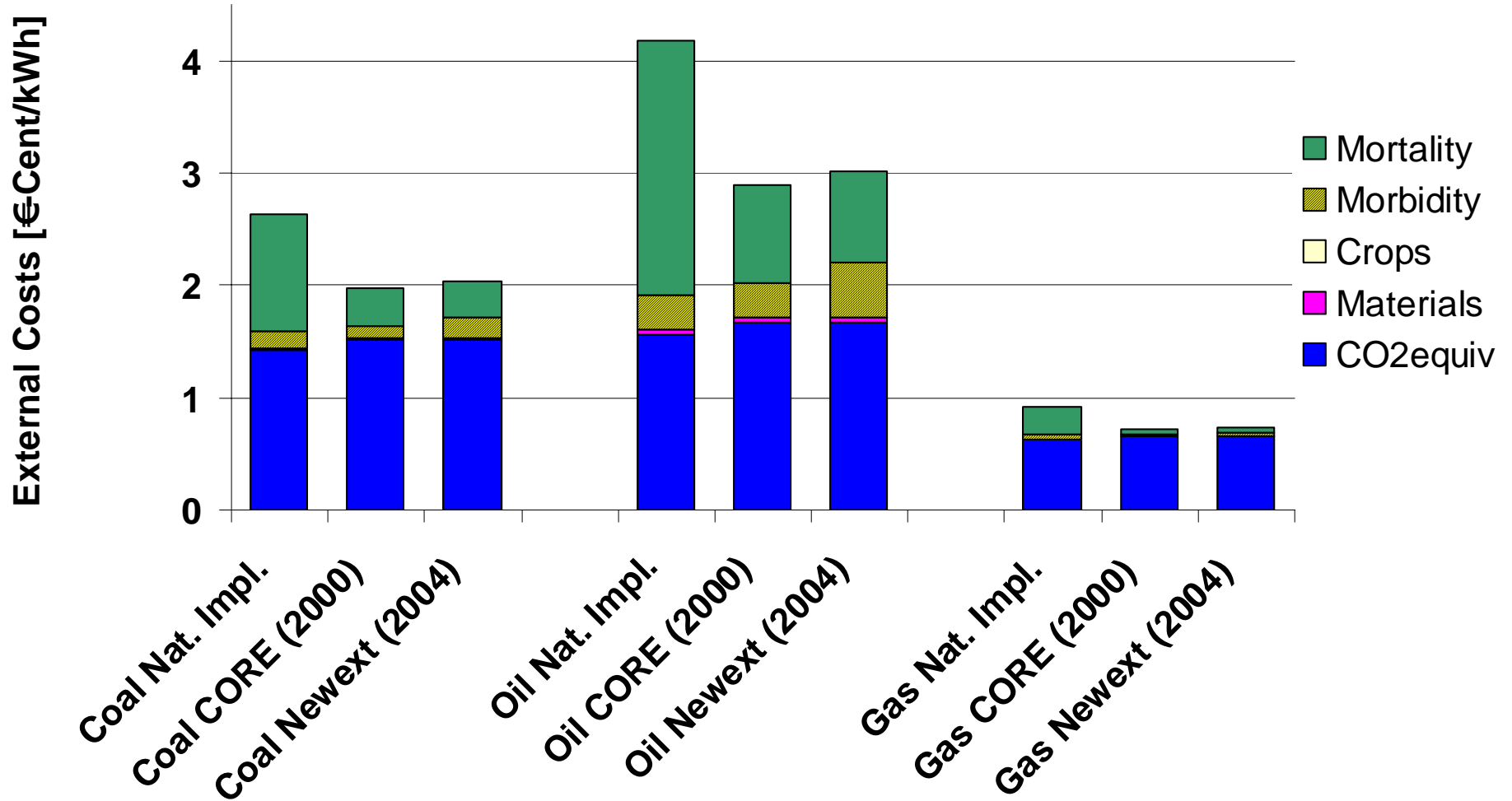


Revision of External Cost Estimates

- **Status ExternE National Implementation 95**

- **Status ExternE Core/Transport 2000**

- **Status NEWEXT/ExternE-Pol 2004/5**



External Costs





Recent Advances

Review of exposure-response-relationships for human health (DIEM)

Survey on monetary valuation of mortality risks (NEWEXT)

Assessment of eutrophication and acidification(NEWEXT)

Assessment of heavy metals (NEWEXT)

Pathways through soil and water (NEWEXT, GREENSENSE)

Valuation of transport noise (UNITE)

Valuation of traffic accidents (UNITE)

Non-nuclear accidents in the energy sector (NEWEXT)

Improved computer tools, web site-www.ExternE.info, numerous applications