VALUATION OF TRANSPORT EXTERNALITIES
-THE GRACE SOFTWARE-

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ISIS

General objectives

- Introdution to the GRACE software
- Data input
- The output of the software

Introduction to the software

- Targeted users: non experts
- User friendliness
  - Guided, interactive
  - No display of mathematical formulas (cost functions)
  - Basic inputs required
    - ✓ *Select network section*
    - ✓ *Select cost category(ies)*
    - ✓ *Provide values of cost drivers*
  - Fall back options (reference values, statistical estimates)

Introduction to the GRACE software

- The software GRACE was set up as result of the EU funded project GRACE "Generalisation of Research on Accounts and Cost Estimation" (2005-2007)
- The software aims to estimate the transport external costs in presence of lack of information through two options:

1. The identification of cost functions (CF) depending on the analysis of key drivers: (e.g. type of vehicles, population density, etc)
2. The set up of a database of reference external costs (RC)

GLOBAL-IQ

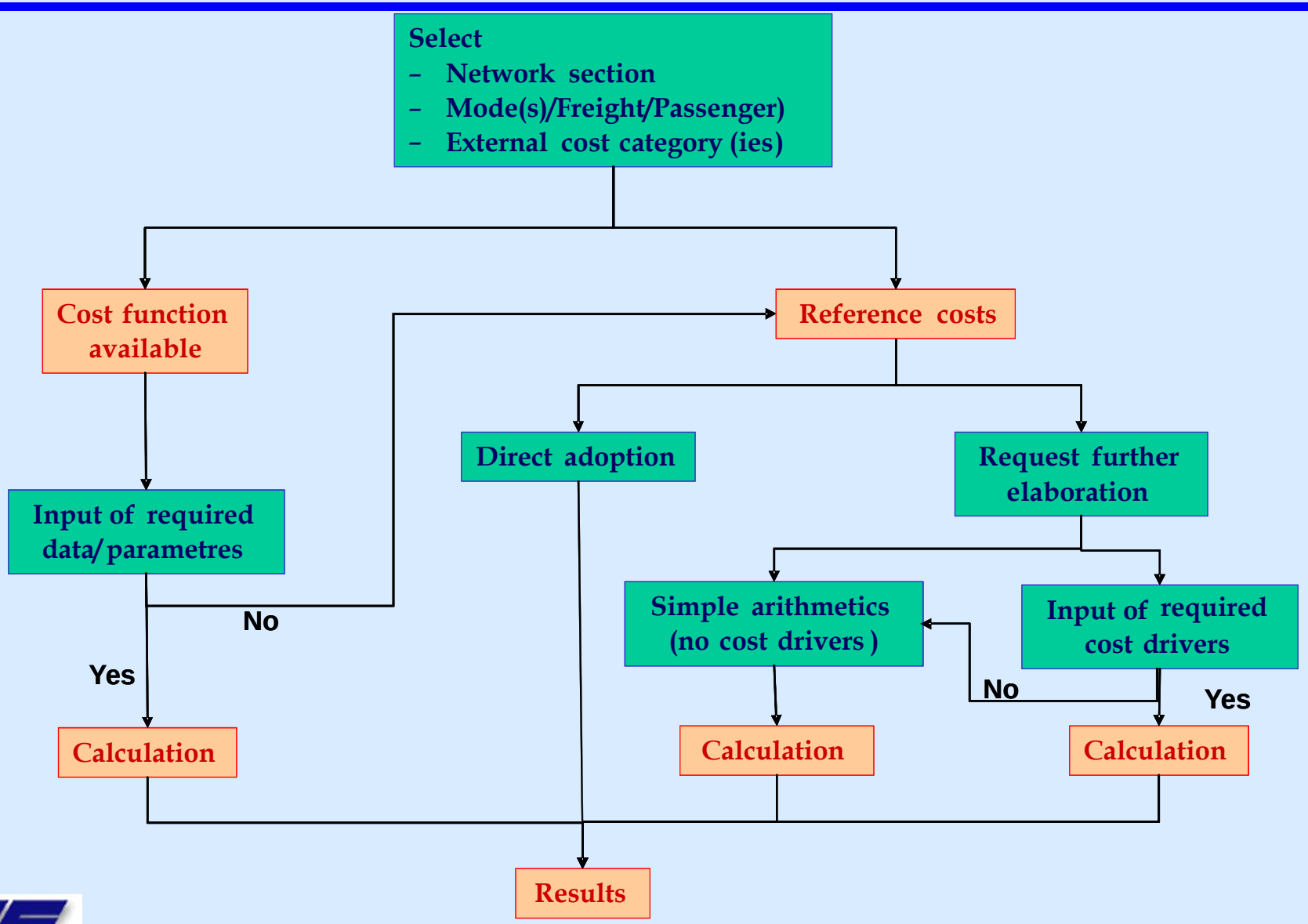
Possible approaches: cost functions (CF) and reference costs (RC)

Cost Category	ROAD		RAIL	IWW	AIR	SSS
	Urban	Interurban				
Air Pollution	CF	CF	CF	CF	CF Airport	CF (Port)
Noise	CF	CF	CF	-	CF Airport	-
Accidents	CF	CF	-	-	-	-
Congestion/scarcity	CF*	CF	N.A.	CF	CF Airport	-
Global Warming	CF	CF	CF	CF	CF Airport	CF (Port)
Wear and tear	RC*	RC*	RC	CF	CF Airport	CF (Port)

Introduction to the GRACE software: summing up

- The software in based on a review of methodological approaches to calculate transport external costs
- Comparative analysis of available external costs values
- Preconditions for transferability and generalisation (for each cost category):
  - Existence of a mainstream (preferred) method for external costs valuation
  - Existence of cost drivers (cost functions)
  - Availability and quality of reference datasets

Possible software configuration: an overview



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Data input: Accident costs (Cost Function)

THE USER SHOULD BE ABLE TO :

1. SELECT COUNTRY AND MODE:

-Network section----------→ COUNTRY (REGION or LINK)

-Mode ----------→ ROAD or RAIL

2. MODIFY THE COST FUNCTION PARAMETERS:

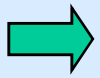
Ext. Costs = Accident risk * Accident valuation * km

[Euro/v]

[Number of fatality, Injury (severe, slight) /vkm]

[Euro/Number of fatality, Injury (severe, slight)]

[km]

INPUT 

- **URBAN**
- **NOT URBAN**
- **Or other road types…**

- **VEHICLE TYPE (less the proportion of internal costs Car, HGV, buses)**

Link length

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Data input Air pollution (Cost functions)

THE USER SHOULD BE ABLE TO :

1. SELECT COUNTRY AND MODE:

-Network section----------→ COUNTRY (REGION, LINK)

-Mode ----------→ ROAD, RAIL, AIR AND INLAND

2. MODIFY THE COST FUNCTION PARAMETERS:

Ext. Costs =Emission factor * Energy cons. * Geographical location* Vkm (Euro)

INPUT

- **•Emission factor *lt/kWh**
  - **•SPEED**
  - **•FUEL TYPE**
  - **•EMISSION STANDARD**
- **•Ton o kWh * vkm**
- **•URBAN**
  - **•NON URBAN**
- **•Number of kilometer**

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Data input: Global warming (Cost function)

THE USER SHOULD BE ABLE TO :

1. SELECT COUNTRY AND MODE:

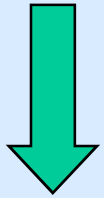
-Network section----------→ COUNTRY, (REGION OR LINK)

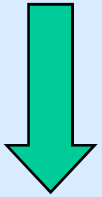
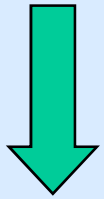
-Mode ----------→ ROAD, RAIL, AIR AND INLAND

2. MODIFY THE COST FUNCTION PARAMETERS:

Ext. Costs = Emission factor * Energy cons. * Monetary valuation * Vkm

(Euro)



INPUT 

•Emission factor (direct emission) * lt/kWh

•Ton o kWh * vkm

•Euro * ton emitted (damage or abatement)

•Number of kilometer

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Infrastructure costs (Reference costs)

THE USER SHOULD BE ABLE TO :

1. SELECT COUNTRY AND MODE:

-Network section----------→ COUNTRY

-Mode ----------→ ROAD, RAIL

2. SELECT REFERENCE VALUES (BY COUNTRY) OF AC AND COST ELASTICITY BY:

-Operation

-Maintenance

-Renewal

Data output

- Main output
  - Unitary values of transport external costs (e.g. in €/veh.km, €/pass.km, €/ton.km)
  - Total trip external costs (€: unitary value multiplied by the overall traffic flows)
  - Data produced at link level or at regional/country level

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The Software

FIRST STEP: SET UP THE CORRIDOR/AREA

SECOND STEP: CALCULATION