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Learning from STOA-scenarios on eco-efficient transport for Europe

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Scenarios – a hype or a “real need”?

- Observation: the number of scenarios in transport (and other sectors) increased heavily over the last two decades
- Scenarios differ heavily in terms of purpose, scope, methodological approach, assumptions, results etc.
- There must be (different?) expectations towards scenarios
- How and to what extent can scenarios meet these expectation?
- Are all these scenarios “helpful” policy making?

What are scenarios?

- Transport systems are characterised by a mutual relationship between technical, societal, economical, political, and environmental factors
- The term co-evolution is used to describe these interdependencies which are in-deterministic in principle and, thus, hardly predictable
- Scenario: used to cope with this high degree in complexity/uncertainty
- Scenarios are no predictions - they explicitly assume that different possibilities for future developments exist
- Scenarios are defined as a coherent illustration of possible future situations together with pathways that might lead to these situations
- They are able to take into account different measures or variables and to explore the mutual interrelations between these variables

Categorising scenarios

Explorative / normative

- Explorative scenarios: not focussed on a desired result
- Normative scenarios: explicitly focussed on a desired result

Quantitative / qualitative :

- Quantitative scenarios
 - a limited set of variables and their interrelations is analysed
 - are able to quantify the impact of policy interventions according to the variables considered
 - show the potential magnitude of impacts/effects
 - results depend on the underlying assumption and, thus, are not more or less “true” or objective than results of qualitative approaches.
- Qualitative (narrative) scenarios: more open regarding the number and type of variables included; the system delimitations are less fixed

Why using scenarios? Looking into theory

Scenarios can have different functions. At least in theory, the following two can be distinguished:

- Output oriented: They can help to **improve the understanding of possible cause-effect relations in a system**. Thus, they help to get a better understanding on the intended and unintended effects of policy intervention and other developments onto the transport system (and beyond). In these cases, it is mainly the **output** of the scenarios that aims at giving orientation to decision makers.
- Process-oriented: Secondly, scenarios can be used to **trigger or structure a debate on certain issues**. In these cases, it is rather the **process** of working with the scenarios that gives support to policy making.



Example: the STOA project on Eco-Efficient transport

- **STOA: Science and Technology Option Assessment Panel of the European Parliament**
- The STOA-project aims at achieving a better understanding on how eco-efficient transport can be achieved
- The idea is to conduct technology assessment supported by a consultation of stakeholders with scenario building as an integrative element
- Scenarios are not used for predicting the future but to learn about differing views on the pros and cons of potentially eco-efficient approaches

Differentiation between desirability and feasibility

- Scenarios are not used for predicting the future but to learn about differing views on the pros and cons of potentially eco-efficient approaches
- Qualitative scenarios were developed and quantified with the transport model ASTRA
- Feasibility and the desirability of elements of the scenarios was assessed by stakeholders
 - with a survey on elements of the scenarios (thesis)
 - the results of the survey were discussed in a workshop
- Scenarios were refined on basis of these assessments

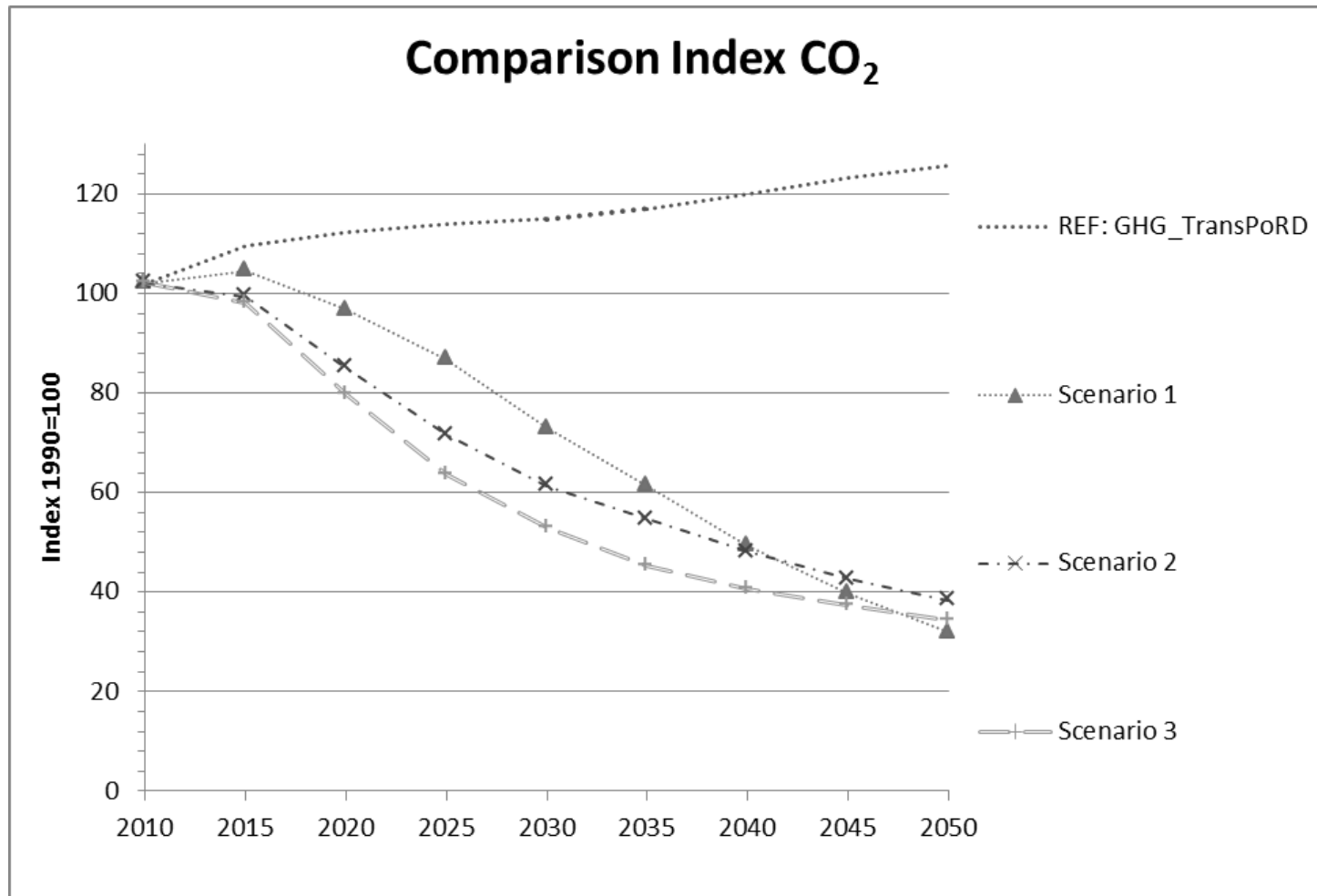
Designing scenarios along three basic strategies

1. Scenario 1: ***Making transport modes cleaner*** (users/goods use the same modes)
2. Scenario 2: ***Changing the modal split*** (users/goods use different modes)
3. Scenario 3: ***Reducing growth rates in transport demand*** (users/goods have different origins/destinations)

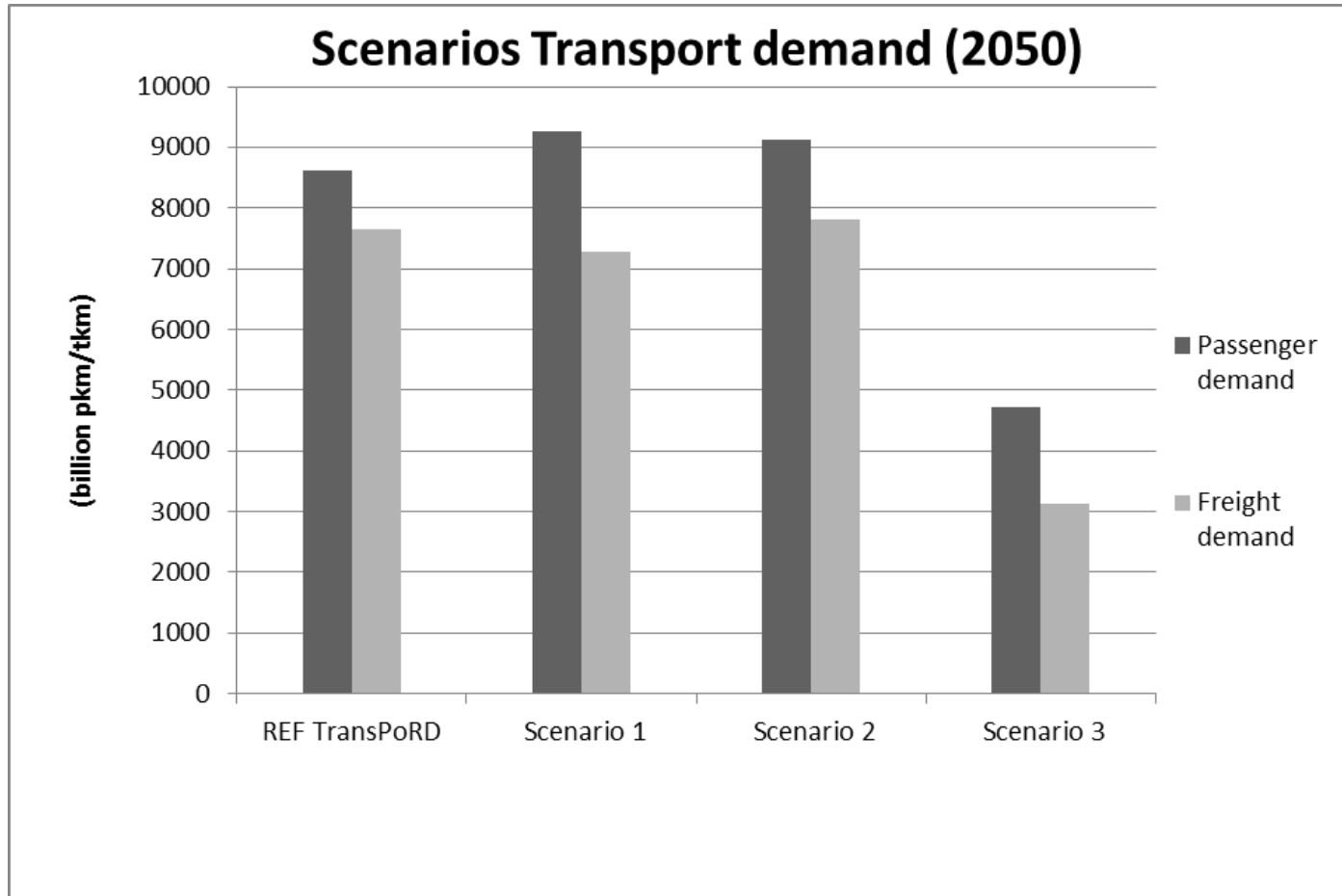
Main settings of the three scenarios

	Scenario 1	Scenario 2	Scenario 3
Main focus on	Cleaner technologies	Shift to more eco-efficient modes	Avoid and reduce physical transport
Policies orientation towards	R&D, regulations and incentives	Financing of Infrastructures	Virtual mobility and eco-efficient land-use planning
Main technological changes is related to	Fuels & propulsions + vehicles / vessels	Infrastructures	ICT
Consequences for the users	Users/goods use the same modes and do not change travel patterns	Users/goods are change modes but origin and destination are basically the same	Origins and/or destinations are changed and passenger trips are shifted to virtual mobility

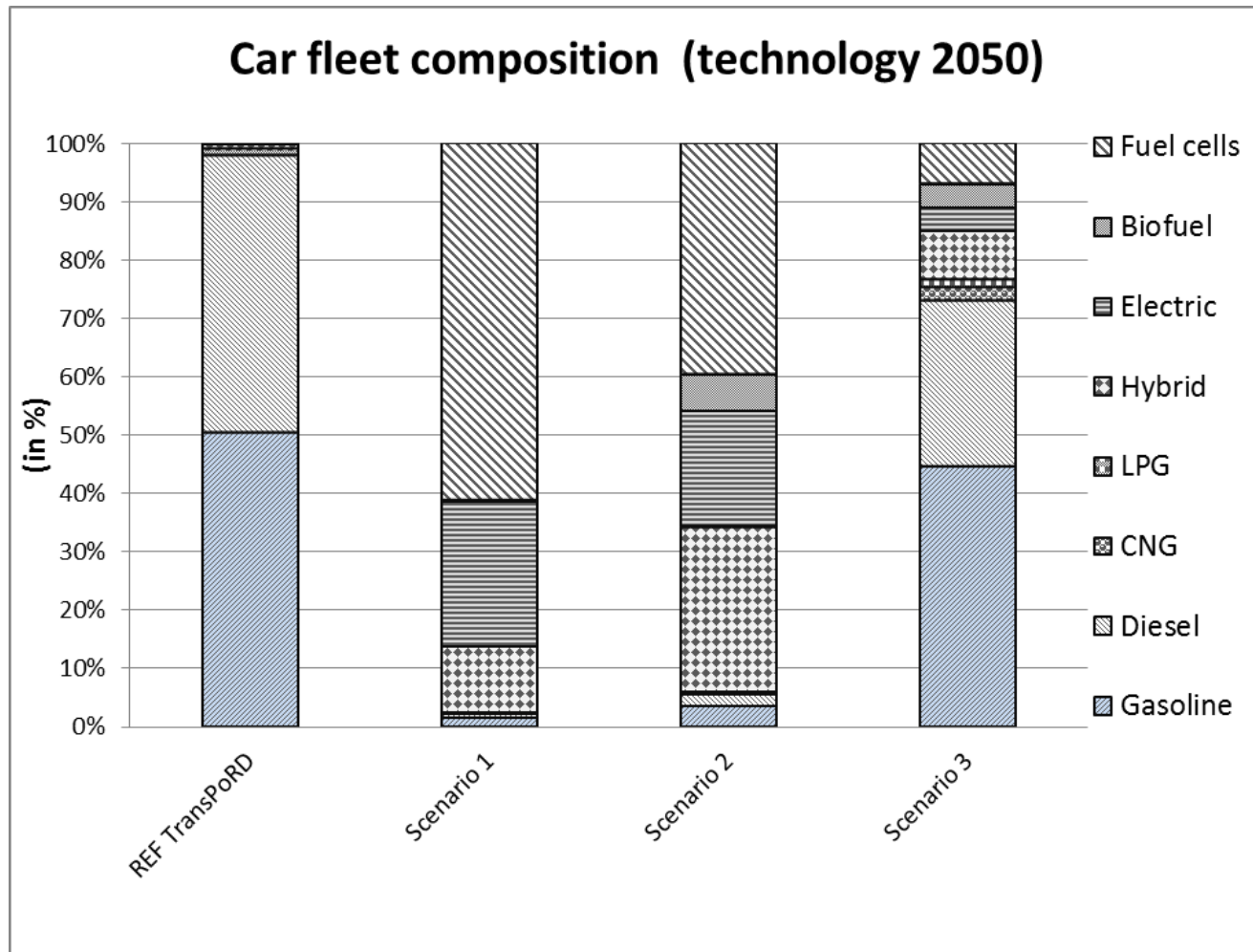
STOA-scenarios: CO₂-reductions



STOA scenarios: transport demand



STOA scenarios: car fleet composition



14 Thesis (1-7) – extracted from the scenarios

1. Half of the road based freight transport (tkm) in the EU will be carried out by alternative propulsion technology (e.g. by hydrogen, gas, or biofuels).
2. More than half of the passenger cars sold per year will be battery electric vehicles with driving ranges of 400–500 km.
3. Only local zero emission (tank-to-wheel) passenger vehicles will be allowed in European cities of more than 100.000 inhabitants.
4. In Europe, half of the passenger kilometres travelled by car will be made using full autonomous driving systems. This allows driving without human assistance as the car keeps the road and navigates on its own.
5. An interoperable electronic ticketing application for public transport will be available all over Europe. This will enable users to use the same means of payment for different modes and services (including conventional public transport and e.g. bike-sharing, car-sharing).
6. In Europe, public transport, cycling (including e-bikes) and walking will have a modal share of 75 % in urban areas of more than 100.000 inhabitants.
7. An interoperable road charging system on the trans-European road network will be implemented in all EU states, taking account of the external costs of air pollution, noise pollution and congestion.

Questionnaire and workshop on thesis/ assumptions

a) How would you assess your own expertise concerning this thesis?

I do research and publish in this field I have only focal or generalized knowledge in this field

I am working in this field / following the professional discourse I have no knowledge in this field

b) In which period would you expect this development to become true?

2012-2015 2021-2030 Later than 2050 I don't know

2016-2020 2031-2050 Not realistic at all

c) Which of the following factors could impede this development? (multiple answers possible)

Financial barriers Lack of societal acceptance

Capacity limit of infrastructures Uncoordinated institutional actions/responsibilities

Ongoing technical problems that need to be solved Differing interests of involved stakeholders (e.g. politicians, industry, NGOs)

Lack of government-funded research and development

Lack of entrepreneurial vision European and/or national legislation/regulation

Lack of political vision I don't know

d) Is this development desirable?

Very undesirable Undesirable Desirable Very desirable I don't know

e) Reaching this development would have the following impacts: (each row requires an answer)

	negative impact	positive impact	both positive and negative impact	no impact	I don't know.
Growth of European economies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Labour and employment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessibility of the transport system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduction of congestion levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modal shift towards more resource-efficient transport modes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduction of transport volumes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improvement of human health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biodiversity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced use of fossil fuels (oil/gas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced use of other non-renewable resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduction of greenhouse gas emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
other/comments:					

> your own expertise

> in which period would you expect this development to become true

> Which of the following factors could impede this development

> Is this development desirable

> Reaching this developments would have the following impacts

First draft results:

Scenario I was considered as likely

Scenario II was considered as most desirable

Conclusive thesis

- Thesis I: Complexity and uncertainty lead to a “real need” for working with scenarios

- Thesis II: It is not always clear what the scenarios should be used for
 - > a lack in skills/experience with scenarios work can be stated
 - > there is a need to make the objectives of scenarios clearer

- Thesis III: Quite often there is too much focus on figures and not enough attention paid to assumptions and arguments
 - > It's the assumptions, stupid!

- Thesis IV: To differentiate between feasibility and desirability of scenarios already helps a lot in terms of transparency