



Instituut voor  
Sportaccommodaties

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Partner for progress

# Life Cycle Assessment of Sports Surfaces

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# Contents

- Sustainability
- Purpose of environmental labelling
- Life Cycle Assessment
- Aggregation using shadow prices method
- Results of varying scenario's
- Conclusions and recommendations

# Sustainability

Cradle to Cradle

Eco Efficiency

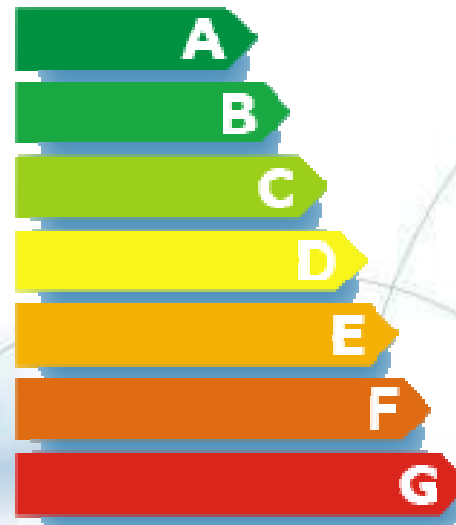
People Planet Profit

CO<sub>2</sub> reduction



**GOAL: one standard for assessment of  
sustainability!**

# Eco label



Comparison / certification of (artificial) turf systems  
and other sports surfaces

- ▶ tool for ***product improvements*** and ***tenders***



# Project approach

## Standards:

EN ISO 14001: Environmental Management Systems

EN ISO 14025: Environmental Labels and Declarations

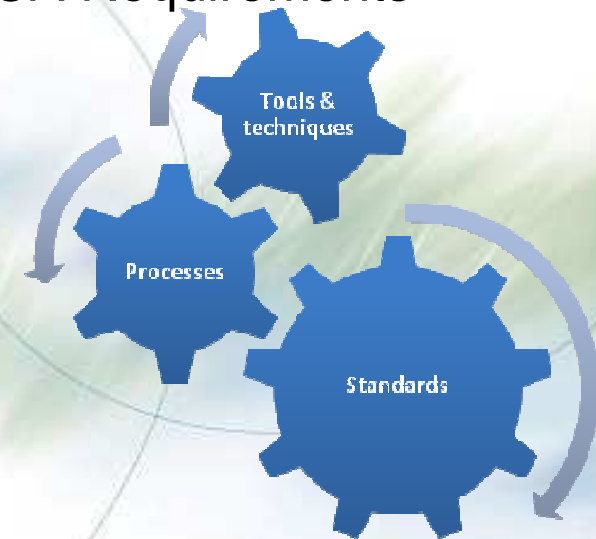
EN 15804: Environmental Product Declarations

ISO 14040: Environmental Management: LCA Principles

ISO 14044: Environmental Management: LCA Requirements

## Life cycle methodology tools:

- CML-LCA2 calculation model
- SimaPro 7.3
- Ecoinvent database
- CE Shadow pricing



# Life cycle methodology

## Life cycle phases

Raw materials extraction + production  
- Yarn, carpet, infill, subbase



# Life cycle methodology

## Life cycle phases

Installation + usage and maintenance

- Transport, machines
- Material and transport for maintenance





# Life cycle methodology

## Life cycle phases

### Disposal activities and transport





## Life cycle methodology

# Life cycle phases

### Waste treatment and/or recycling

- separate and re-use for same use
- separate and down-grade
- incineration (burn)
- landfill





# Recycling





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## Life cycle methodology Monetary Values

Environmental Impact Category	Equivalent unit	Shadow price [€/eq. unit]
Abiotic Depletion (ADP)	kg Sb eq	0
Acidification (AP)	kg SO <sub>2</sub> eq	4
Eutrophication (EP)	kg PO <sub>4</sub> <sup>3-</sup> eq	9
Fresh water aquatic ecotoxicity (FAETP)	kg 1,4-DCB eq	0.03
Global Warming (GWP)	kg CO <sub>2</sub> eq	0.05
Human toxicity (HTP)	kg 1,4-DCB eq	0.09
Marine aquatic ecotoxiciteit (MAETP)	kg 1,4-DCB eq	0.0001
Ozone layer depletion (ODP)	kg CFC11 eq	30
Fotochemical oxidation (POCP)	kg C <sub>2</sub> H <sub>2</sub> eq	2
Terrestrial ecotoxicity (TETP)	kg 1,4-DCB eq	0.06
Land Use (LC)	m <sup>2</sup> .year	0.201

Costs per turf system [€ / m<sup>2</sup> / year] (= value to compensate ecological impact)



# Example soccer fields

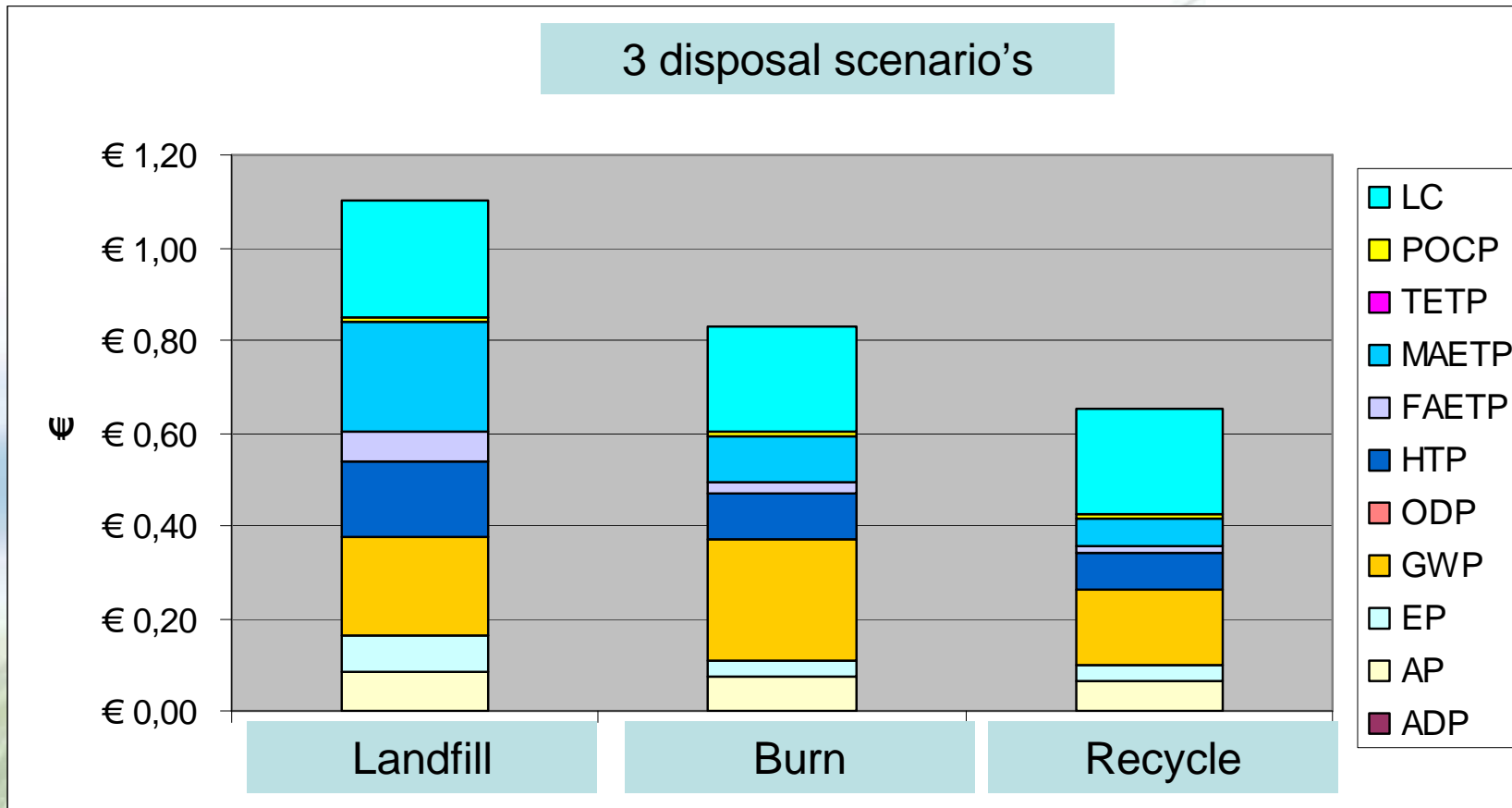
- Natural turf
- Artificial turf:



	<u>System 1</u>	<u>System 2</u>
– Pile:	60 mm	40 mm
– Infill:	10 mm sand	15 mm sand
	30 mm SBR	10 mm TPE
– Shockpad	-	10 mm foam
– Sub base (lava)	100 mm	100 mm
– Sand base (M3C)	360 mm	365 mm

- Disposal and transport scenario's

# Project results

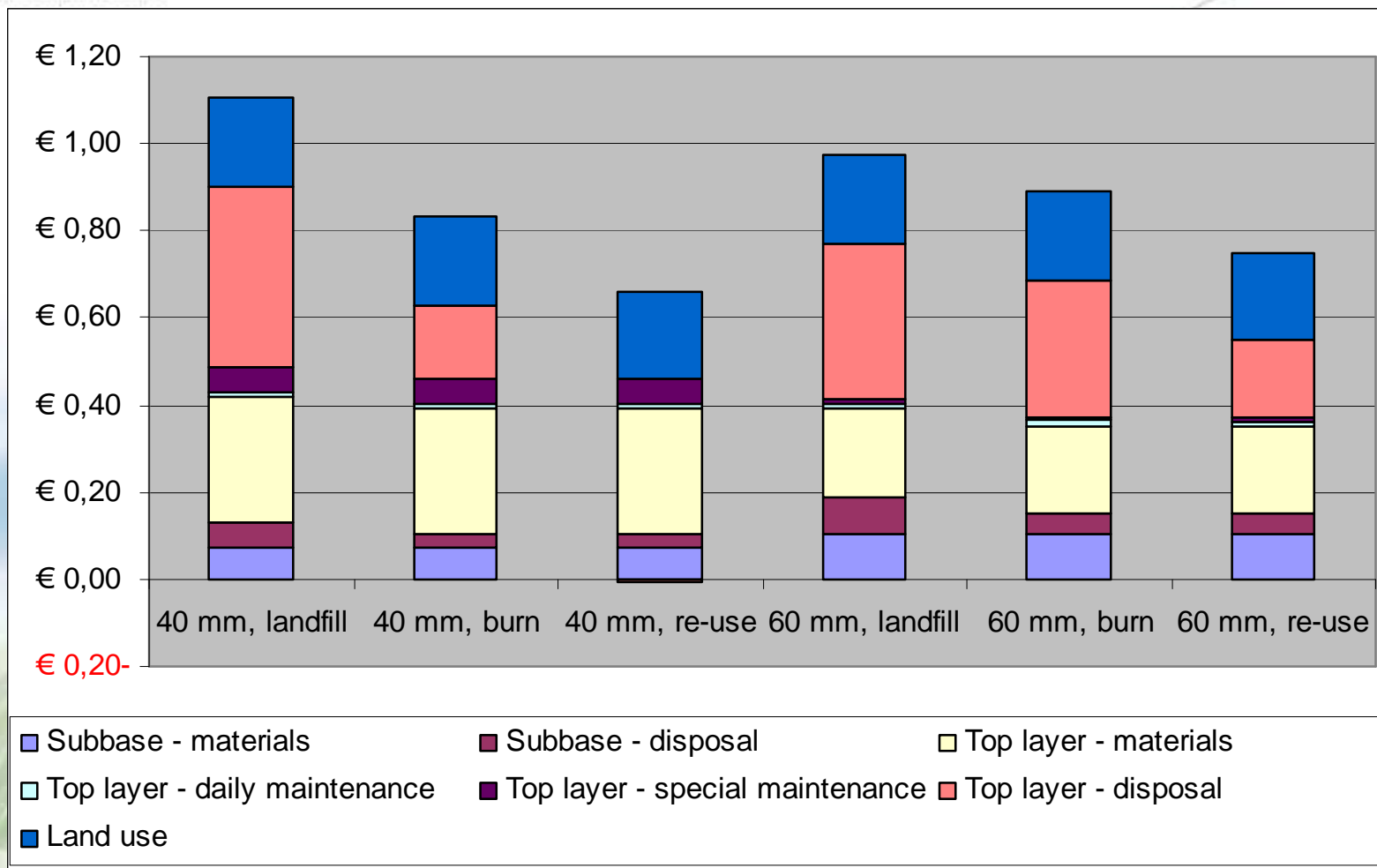




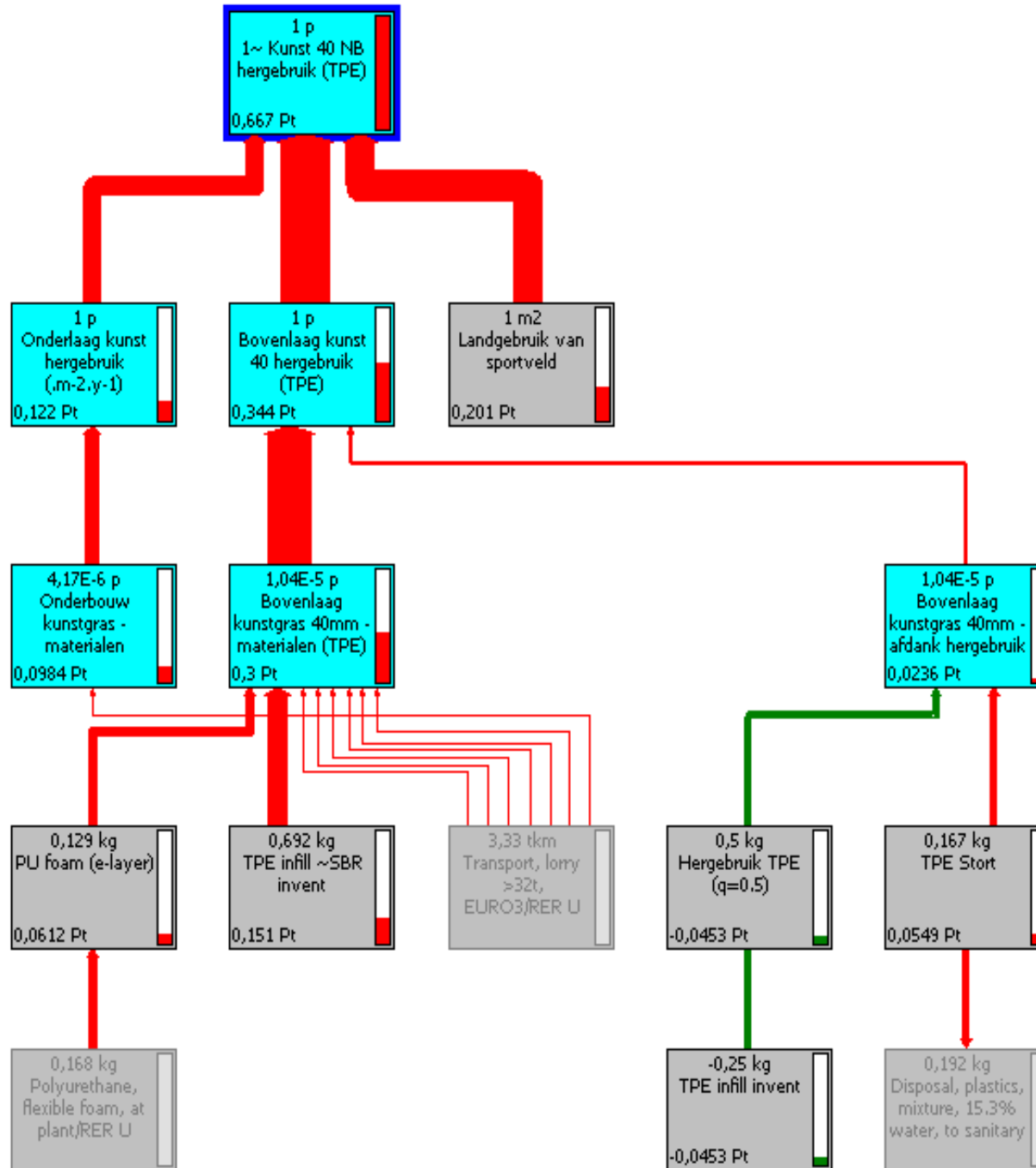
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## Life cycle assessment of sports surfaces

# Project results



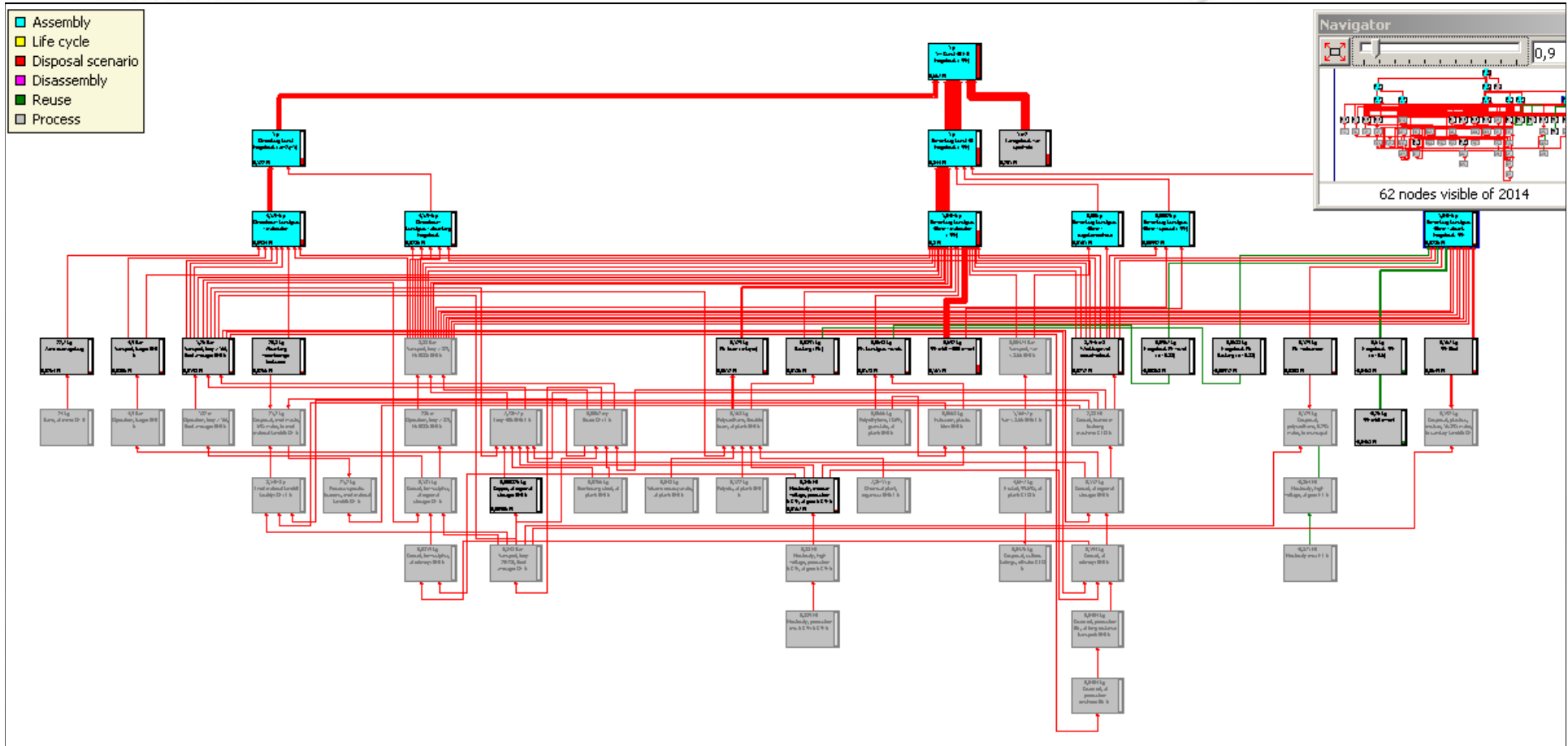






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# Activities with effect > 1%

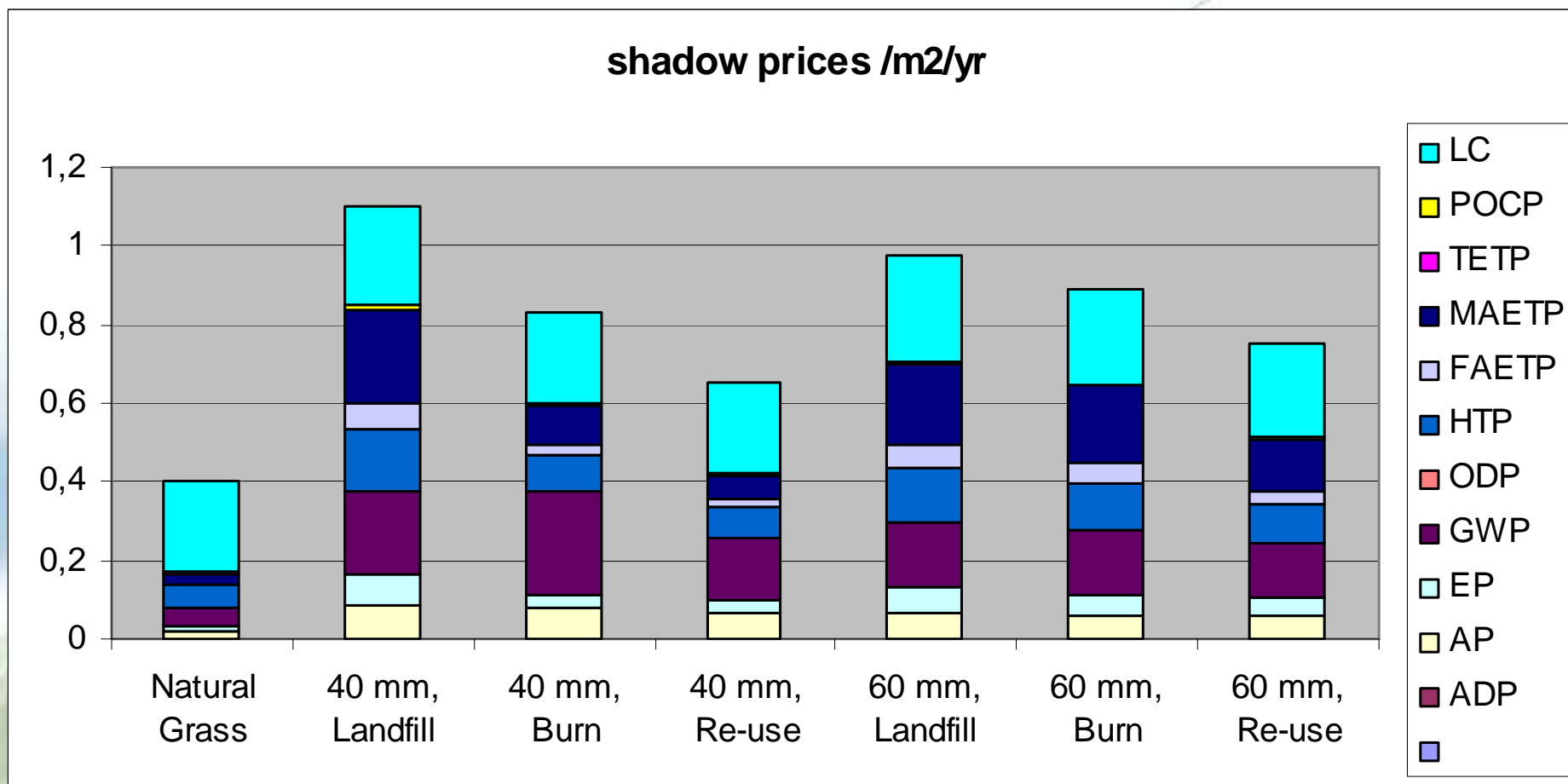




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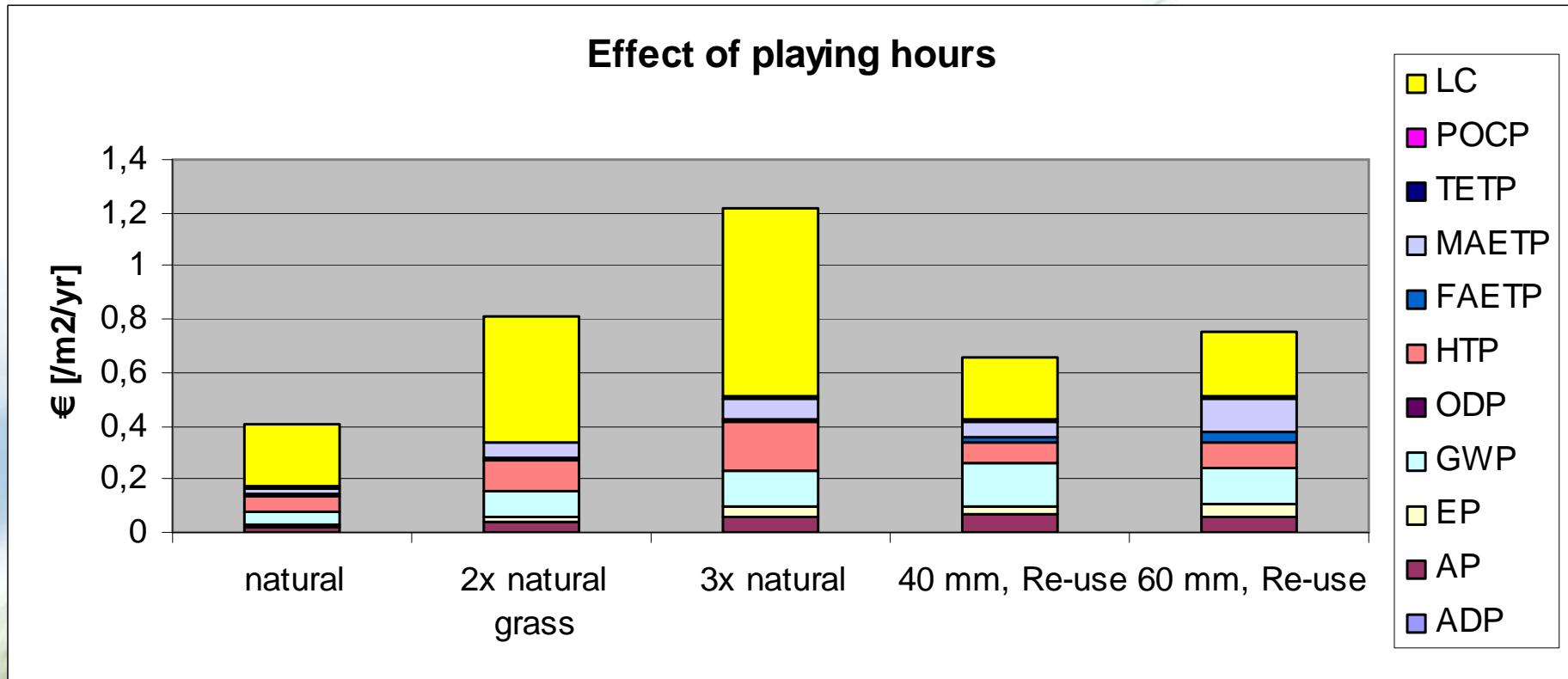
## Life cycle assessment of sports surfaces

# Project results

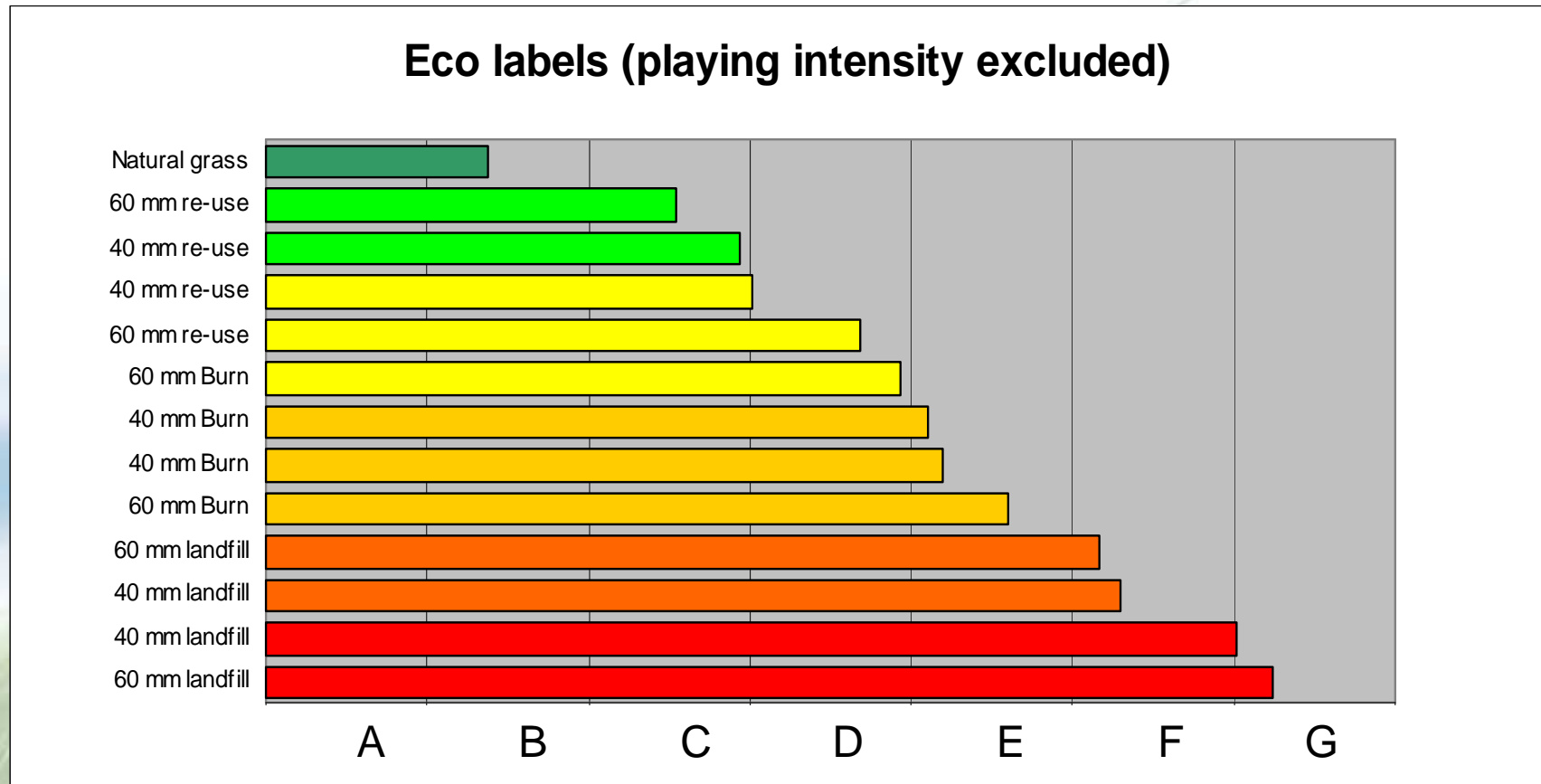




# Project results



# Eco scores /m<sup>2</sup>/yr



# Conclusions



- Clear distinction between products
- Environmental impact expressed in monetary value ( € / m<sup>2</sup>/yr )
- Different scenario's give different results
- Disposal scenario's order of eco-impact: 1 re-use, 2 incineration, 3 landfill
- Top layer has the largest contribution to total eco- burden
- It cannot generally be said that SBR infilled systems are better or worse than TPE filled systems

# Conclusions and recommendations

1. General acceptance of methodology
2. Acceptance of system boundaries and allocations
3. Rating of products / constructions
4. Sustainable turf improvements.  
stimulation by tendering
5. Introduction of a classification system

► Joint approach of the industry !





# Teaming-up towards a greener world !!



# Contact

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