Tool for Sustainability Impact Assessment (ToSIA)
Introducing the Concept

Marcus Lindner
European Forest Institute

Industrial activities and new policies are evaluated against their impact on Sustainable Development

What means Sustainable Development in our context???

Environmentally friendly resource management

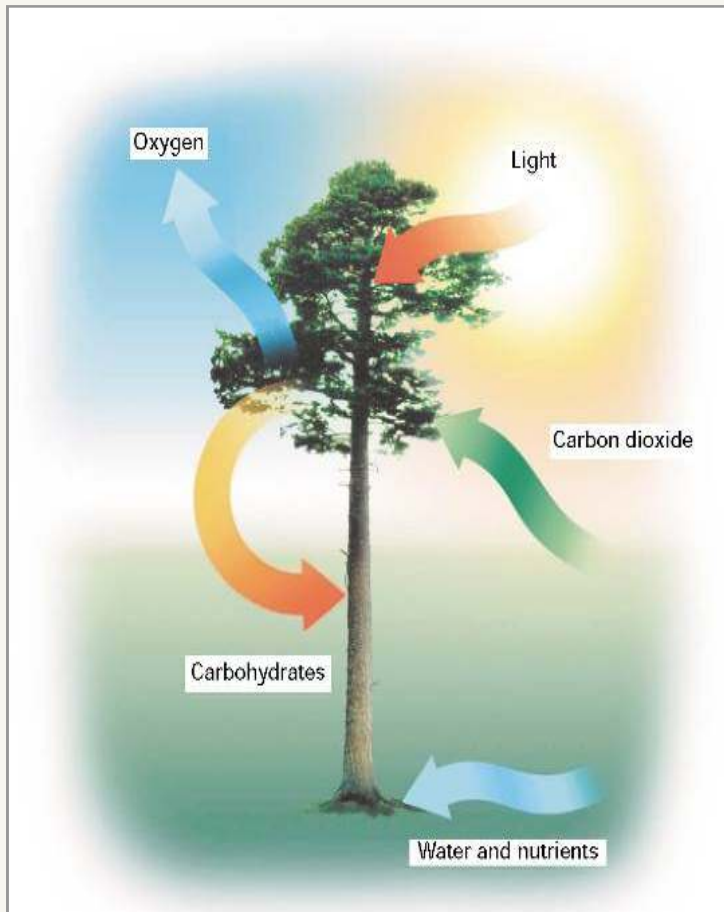Securing social wellbeing in the region

Economically viable resource utilization
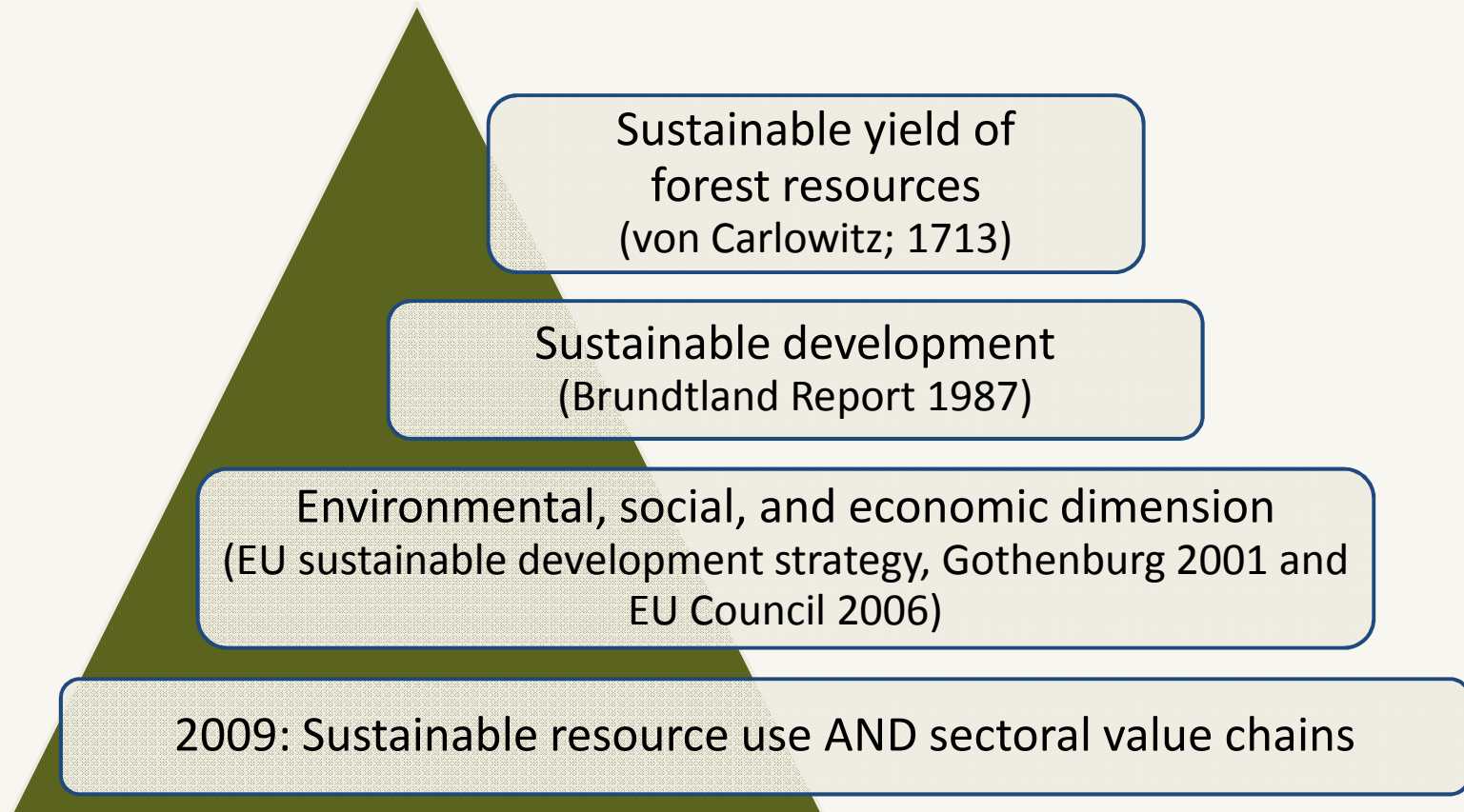
Gällö in Jämtland, Sweden

The Forest-based Sector has the potential to play a key-role in the development of a sustainable society!

The sustainability concept evolved over the centuries

Sustainable yield of
forest resources
(von Carlowitz; 1713)

Sustainable development
(Brundtland Report 1987)

Environmental, social, and economic dimension
(EU sustainable development strategy, Gothenburg 2001 and
EU Council 2006)

2009: Sustainable resource use AND sectoral value chains

ToSIA is suitable for:

identifying hot-spots in value chains that can contribute to improved sustainability
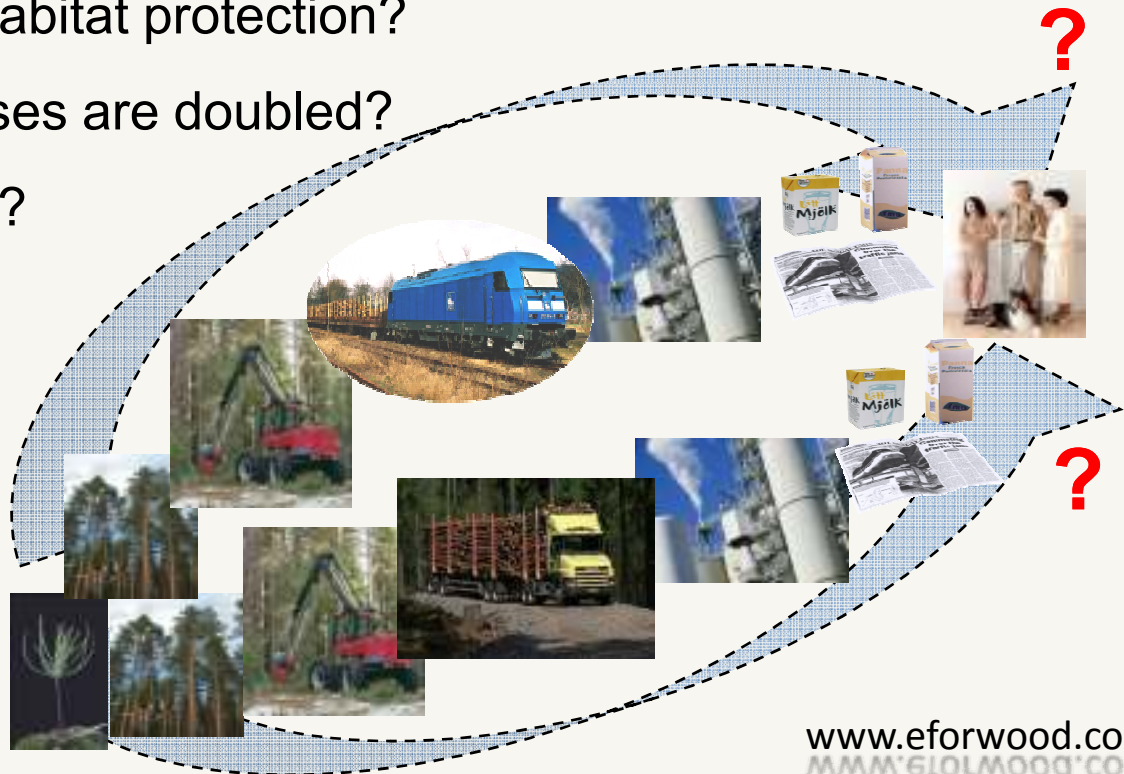
ToSIA is primarely designed to give answers to **WHAT IF? - questions**.

What if:

❖ new policies are introduced on e.g. energy / transport / recycling / habitat protection?

❖ wooden frames in houses are doubled?

❖ global market changes?

❖ oil prices doubles?

www.eforwood.com

ToSIA approach to Sustainability Impact Assessment of Forest-Wood Chains

ToSIA measures volume flows and sustainability indicators
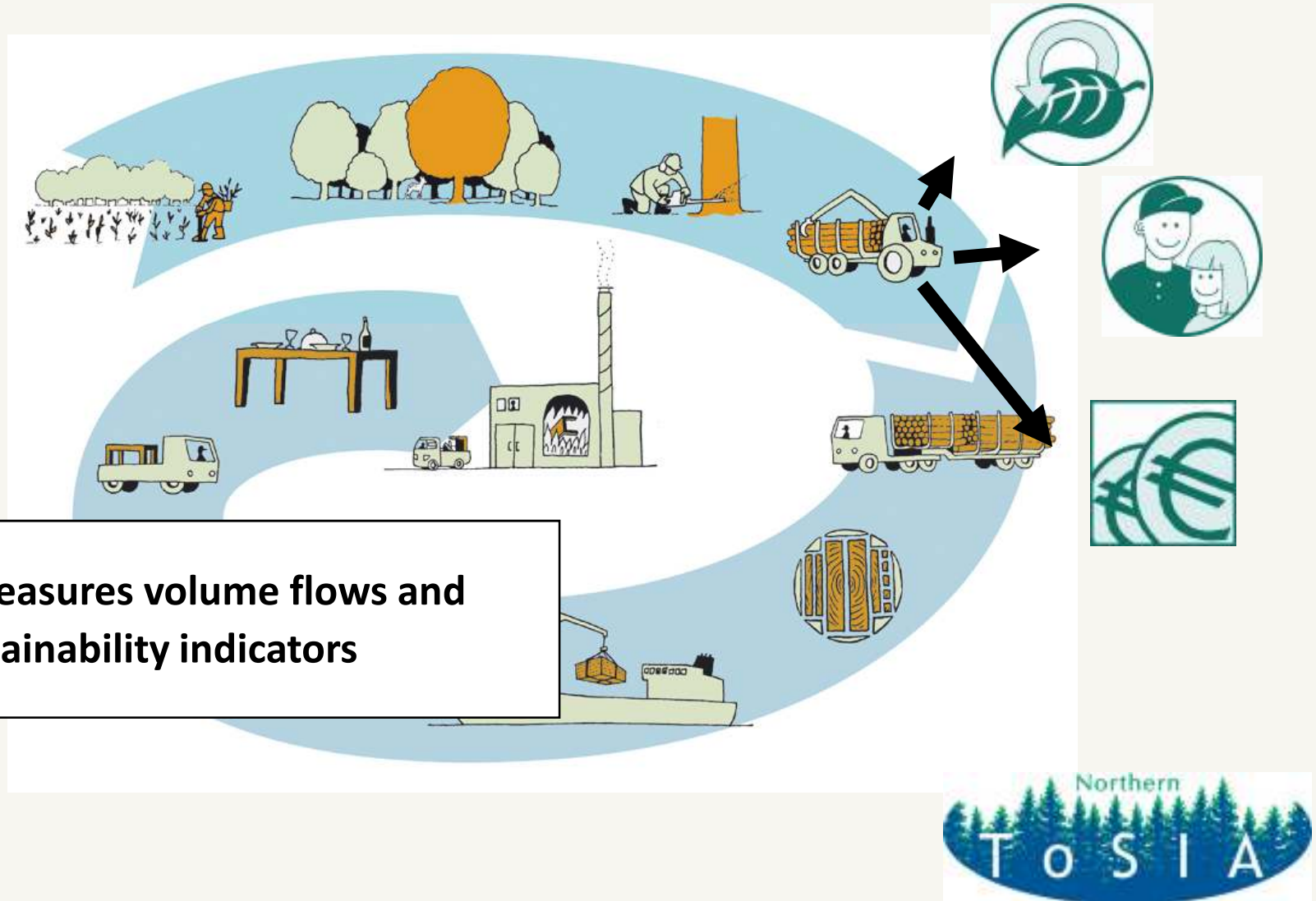
Sustainability Indicators

Economic	Environmental	Social
Gross value added	Energy generation and use	**Employment**
Production costs	**GHG emissions** & carbon stocks	Wages and salaries
Trade balance	Transport distance and freight	**Occupational safety and health**
Resource use	Water use	Quality of employment
Total production	Emissions to water and air	Provision of public forest services
Investment and R&D	Generation of waste	
Productivity	**Biodiversity**	
	Forest resources	
	Soil condition	
	Forest damage	

www.eforwood.com

ToSIA approach to Sustainability Impact Assessment of Forest-Wood Chains

Sustainability indicators are linked to all production processes
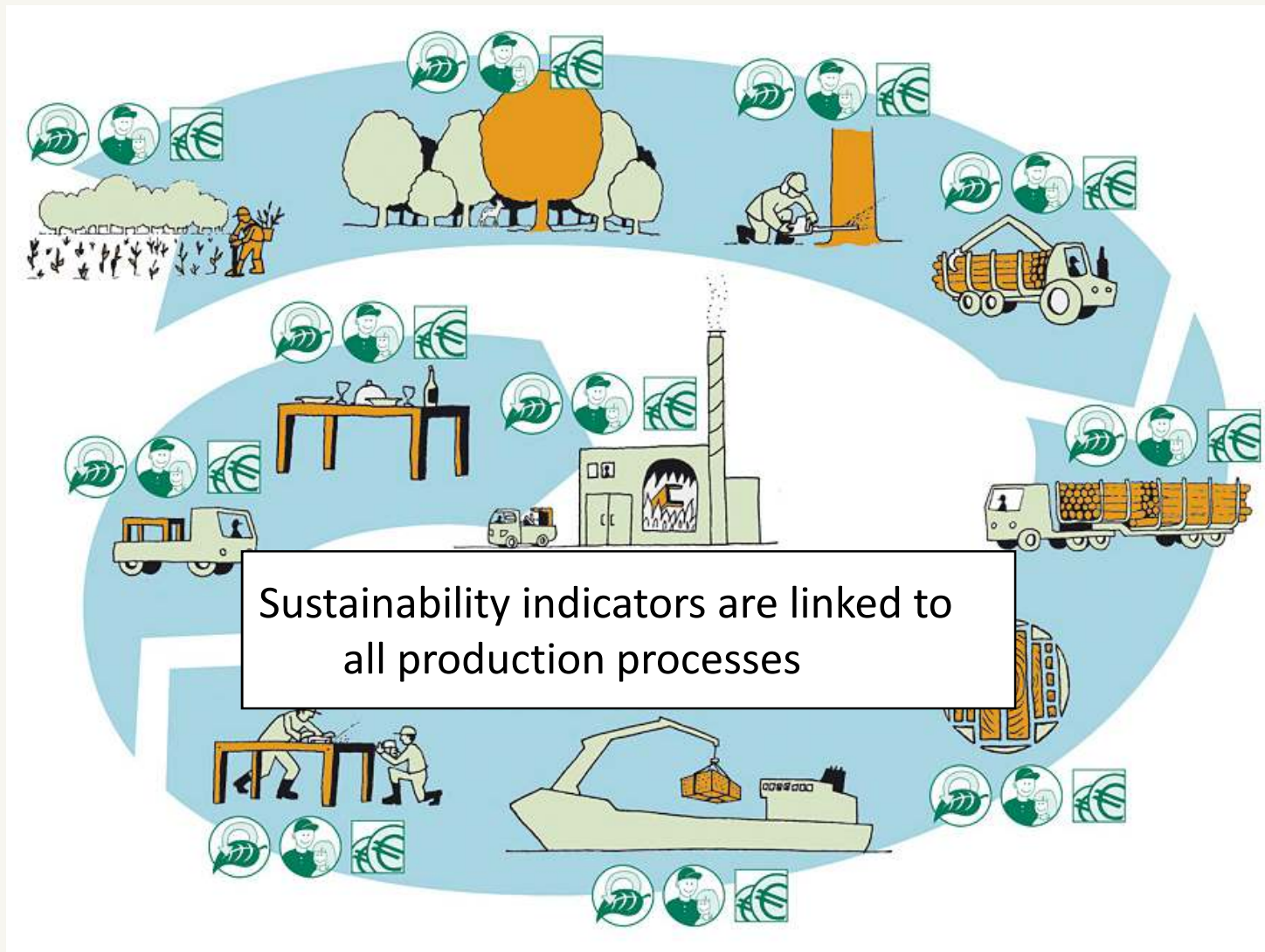
ToSIA approach... (basic principles)
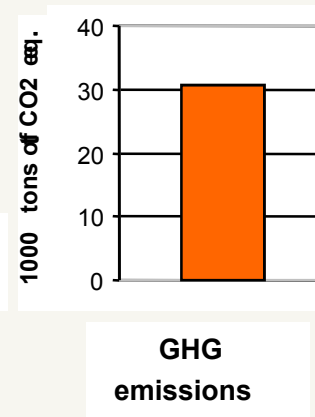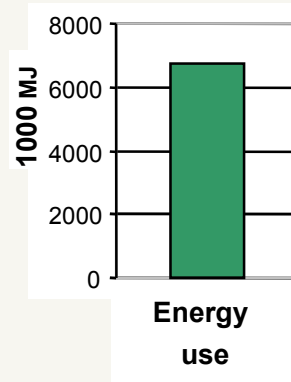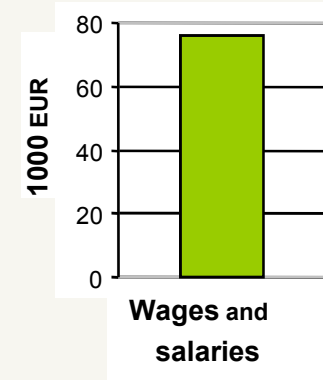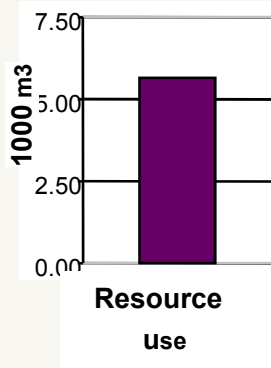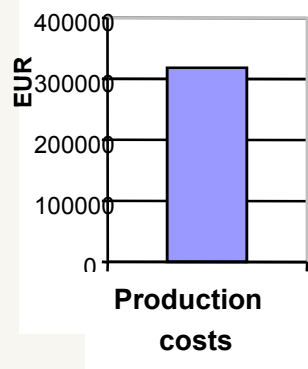
ToSIA aggregates indicator results along the FWC

ToSIA is very scalable and can operate at different levels, within defined system boundaries:

(1) Single FWCs

(3) European FWC

(2) Case study FWCs

- "Production driven" (N. Scandinavia)
- "Products driven" (Iberia)
- "Regional" (Baden Württemberg)

Northern ToSIA
case studies will be presented tomorrow!

Interpretation of results

- No absolute answer to the question: Is this FWC sustainable?

- Comparing FWC alternatives shows impacts of external drivers on sustainability

- Are the trends in line with existing policies?

- Impacts may differ between indicators

- MCA/CBA evaluation modules are needed to rank FWC alternatives

Two Evaluation Methods

Cost-Benefit Analysis (CBA)

= Economic assessment tool to analyse projects or public policies, that allows to determine their merits and acceptance, according to an **efficiency goal**: maximize net benefits

All benefits and all costs of a project or a public policy are quantified in monetary terms (money)

Multi-Criteria Analysis (MCA)

= Socio-Economic assessment tool to analyse strategies, projects or public policies by multiple criteria based on expert estimations and/or stakeholder preferences. Criteria and indicators are aggregated at a dimensionless scale to rank alternatives according to their preferentiality.

Value judgments are used to evaluate strategies, projects or public policies in terms of a preference measure

15

Evaluation Method: <u>CBA</u>

➕ Benefits (€) {

Economic Benefit = any gain in the welfare of the society caused by an actual change, e.g. new choice of technology or land use. Revealed by individuals' **willingness to pay** for such gains

▭ Costs (€) {

Economic Cost = any loss in welfare of the society, by a change in the use of a resource in the project being analysed, instead of using it in its best alternative (opportunity cost). Revealed by individuals' **willingness to accept a compensation** for such losses

▬ Net Benefits (€)

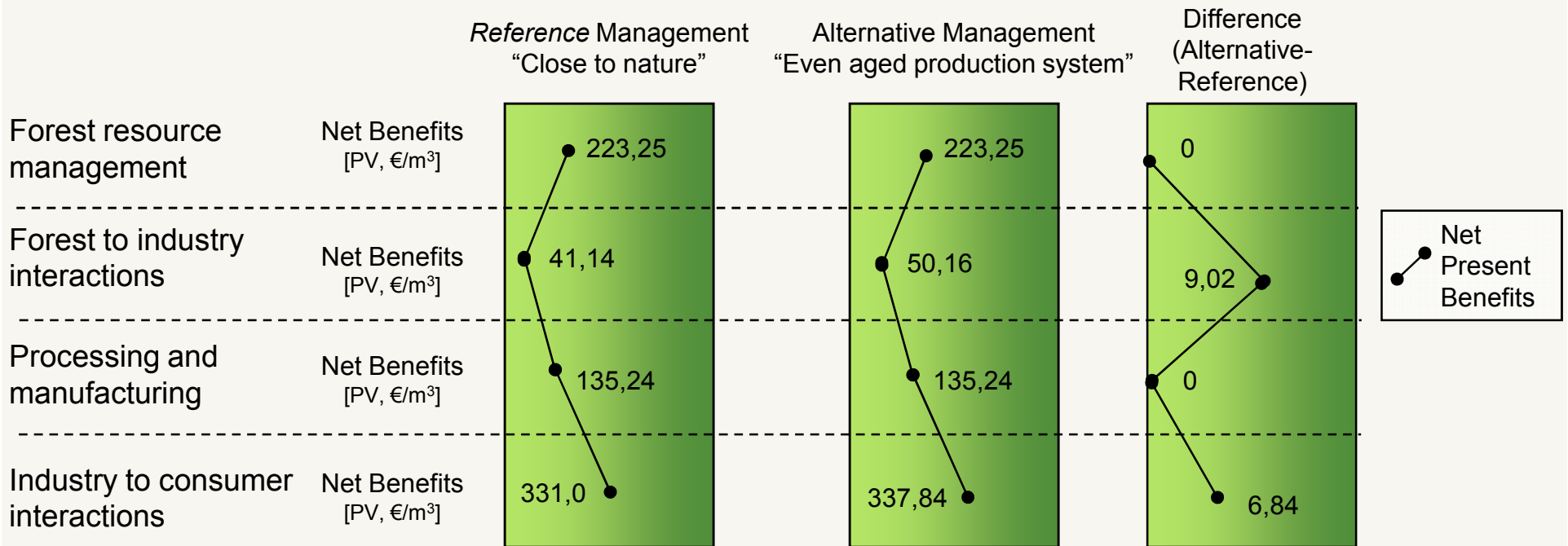⟹ **All members** of society affected by the project

⟹ **Time Discounting** of Benefits and Costs

⟹ **Selection** Rules

CBA: Compare sustainability profiles (by modules/ phases on the FWC)

Forest wood chain : | Pulp-log (pine) | ▼ | i | Compare : **Technologies** | Policies |

		Reference Management "Close to nature"	Alternative Management "Even aged production system"	Difference (Alternative-Reference)
Forest resource management	Net Benefits [PV, €/m³]	223,25	223,25	0
Forest to industry interactions	Net Benefits [PV, €/m³]	41,14	50,16	9,02
Processing and manufacturing	Net Benefits [PV, €/m³]	135,24	135,24	0
Industry to consumer interactions	Net Benefits [PV, €/m³]	331,0	337,84	6,84

● Net Present Benefits

| Total for Chain: NPV | 730,63 | 746,49 | 15,86 |

Select discount rate % | 3 | ▲▼ | Customize

View indicators : ○ Aggregated   C separated

Evaluation Method: <u>MCA</u>
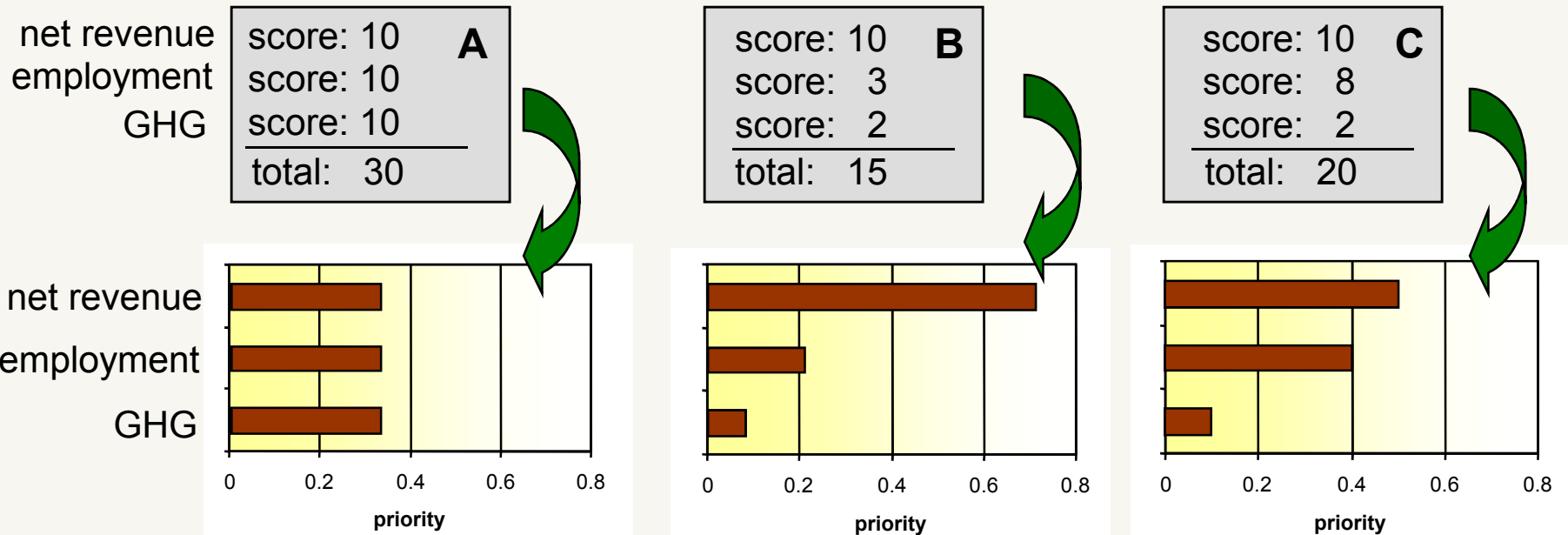
MCA - Why should we do it?

- We will see all sorts of impacts across alternatives, cf. the indicator list.

- We must be able to compare alternatives and evaluate e.g. a difference like:

  $d(a,b)$ = 10€ + 1kg CO2+ 15% weight gain

- MCA may use subjective values/judgements

- …enabling a consistent and transparent comparison among alternatives

- MCA allows the integration of expert judgements and stakeholder preferences in participative assessments

Example: Importance of indicators...

Scoring the importance of indicators   [score 10 = most important]

MCA-method: PROMETHEE

ToSIA – Current Status

- ToSIA software is operational, but under continuous development
- Intensive data quality checking ongoing for three Eforwood case studies, data collection ongoing for EU FWC analysis
- Eforwood open science conference Uppsala (23-24 September 2009) will present results
- EFORWOOD project ends late 2009

Unfortunately no time today for a ToSIA Demonstration …
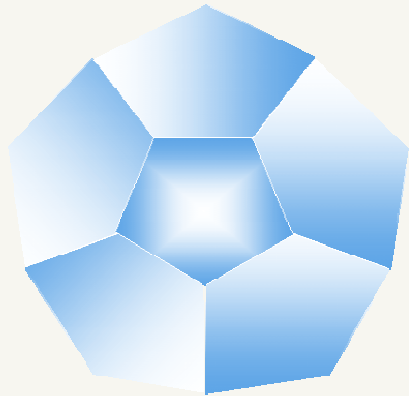
ToSIA in Summary

- Quantitative and transparent approach to sustainability assessment

- Analyses trade-offs between different aspects of sustainability

- Flexible tool - Users can select system boundaries, indicators, indicator weights ...

- Quality of assessment depends on quality of data

EFORWOOD
Sustainability Impact Assessment of the Forestry-Wood Chain

Thank you for your interest and attention!