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Advanced Cost Benefit Analysis: methodology and benefits for SMEs

Jens Rockel
Dominik Palsa

Bologna, 18 September 2014

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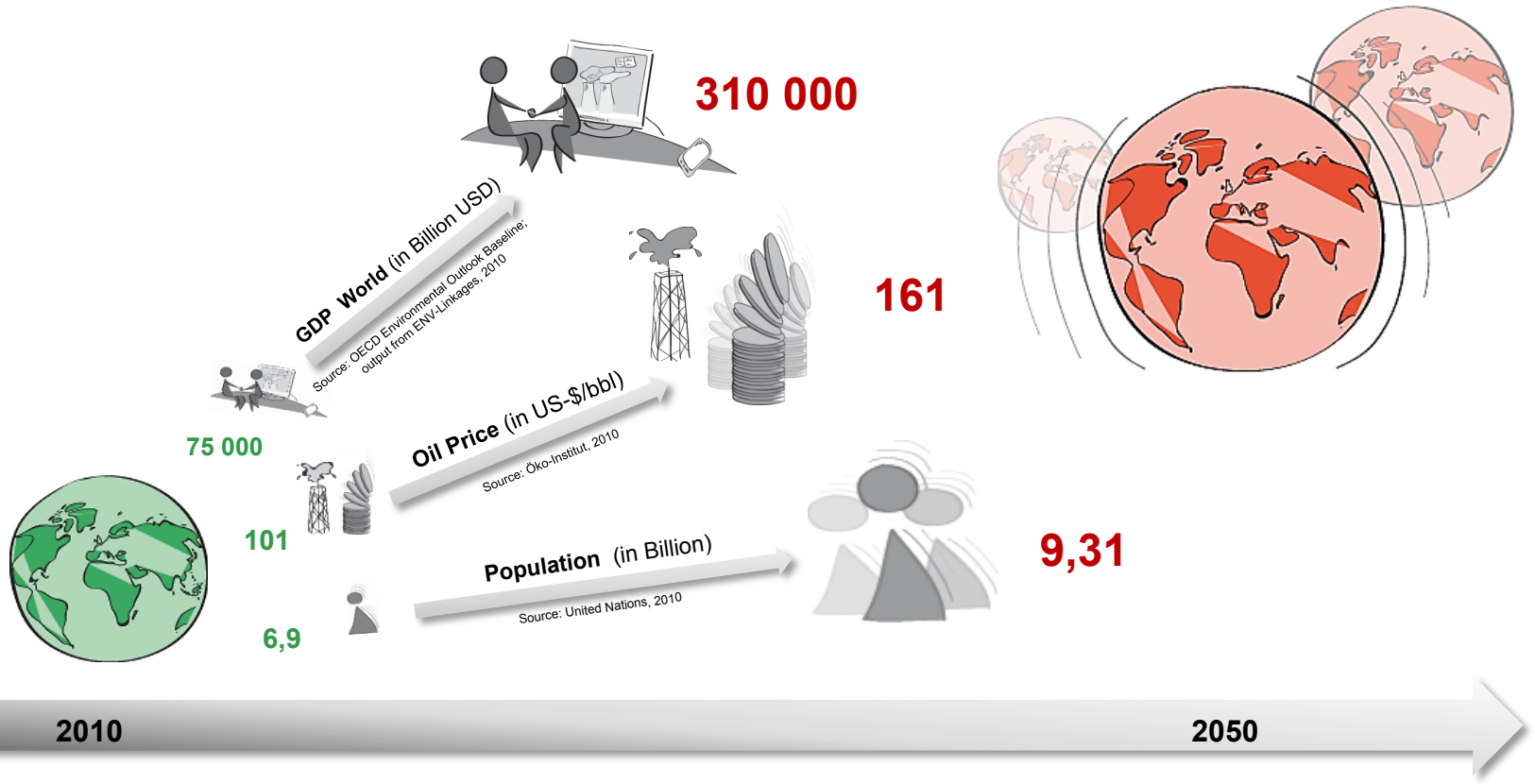
PRESOURCE – Promotion of Resource Efficiency in SMEs in Central Europe



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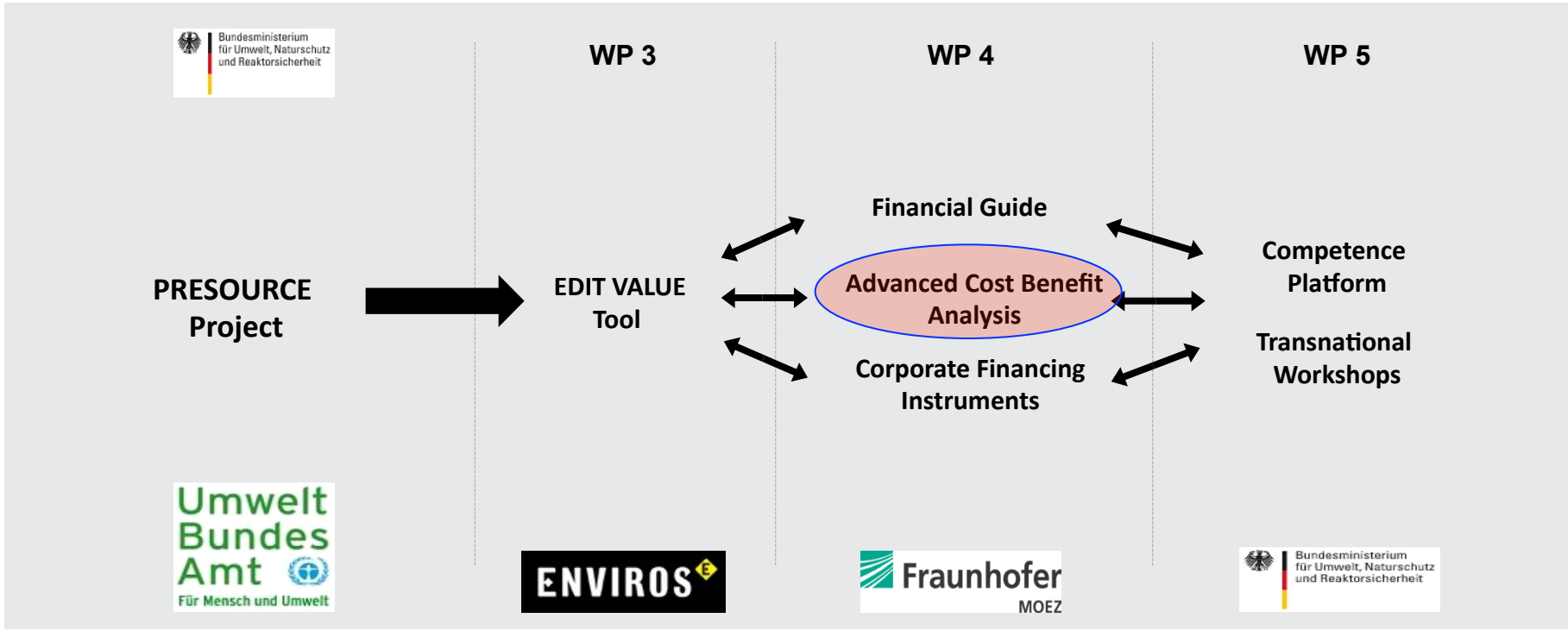

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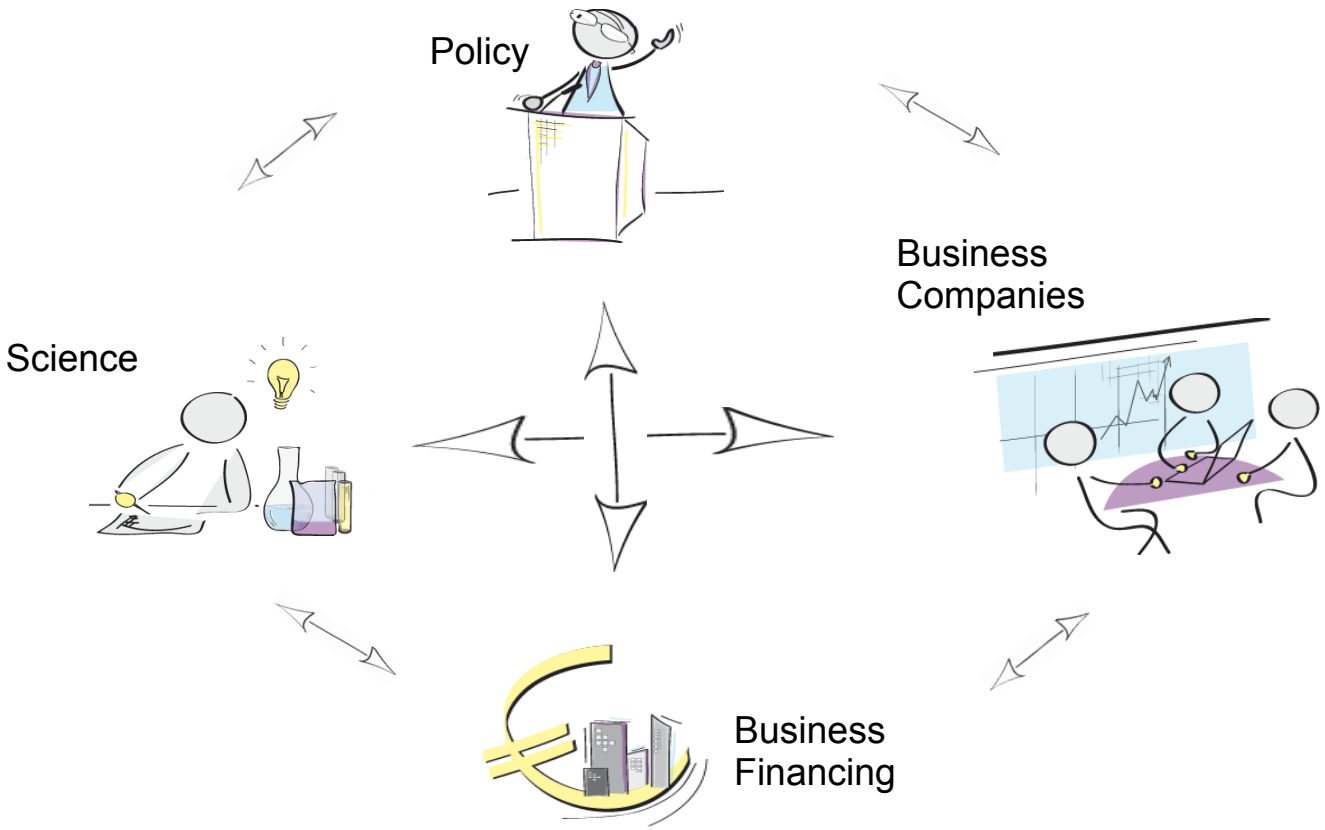
Stakeholder interplay



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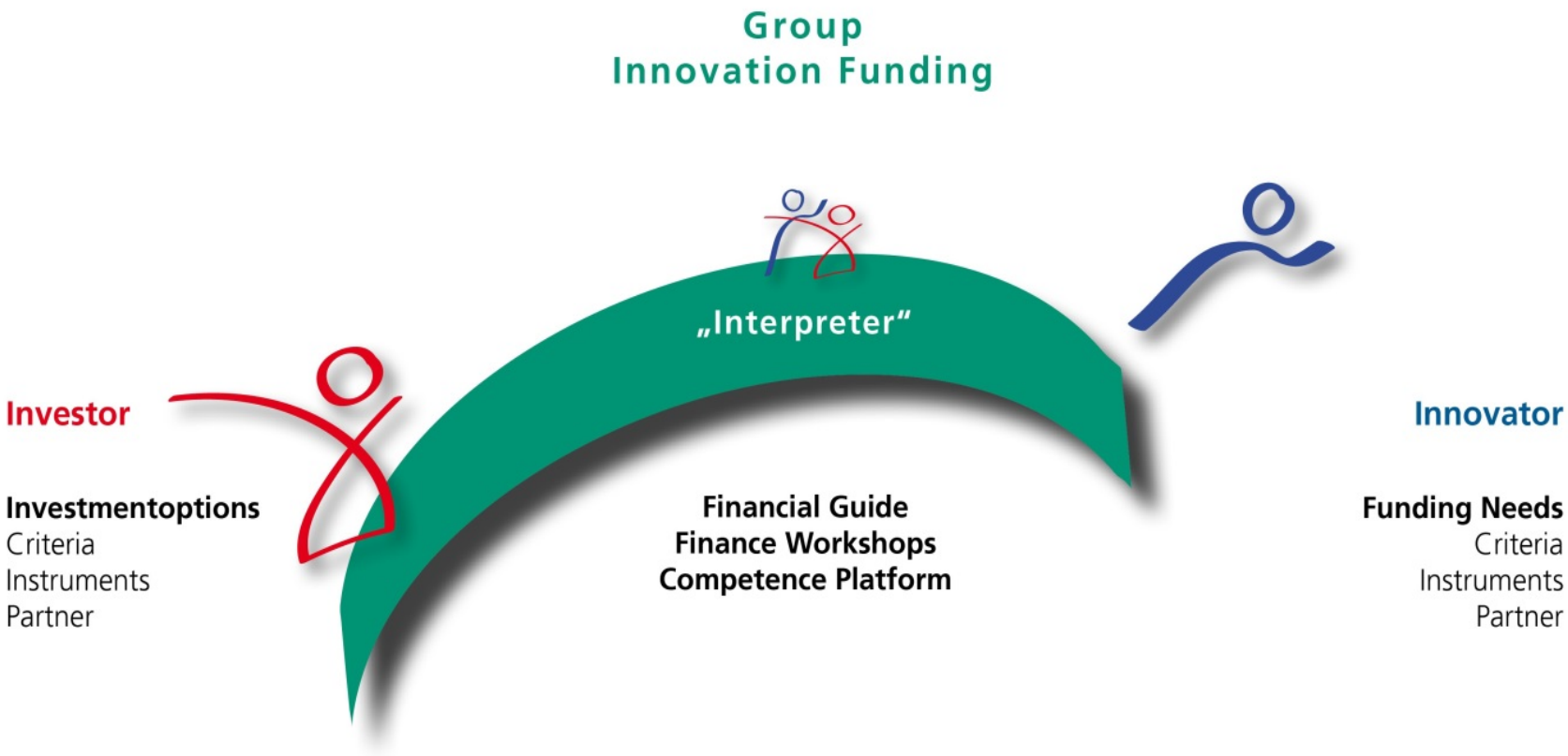
Fraunhofer – Group Innovation Funding



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PRESOURCE Expert Interviews

> 100 interviews with financial stakeholders in AT, CZ, HU, IT, PL and GER

- *Information asymmetry between innovators and capital providers*
- *Intransparency regarding relevant actors and tailored instruments*
- *Economic valuation problem of resource efficiency potential*
- *Lack of measurable indicators (resource efficiency vs. eco-innovation)*
- *Good-practice examples and transnational success stories are missing*

Common understanding of measurable indicators is needed

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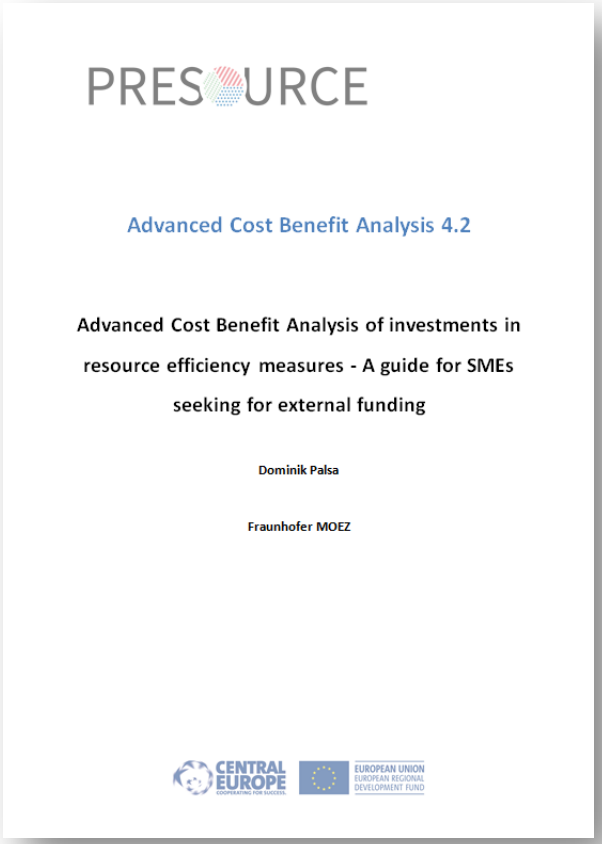
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Advanced Cost Benefit Analysis 4.2

Advanced Cost Benefit Analysis of investments in resource efficiency measures - A guide for SMEs seeking for external funding

Dominik Palsa

Fraunhofer MOEZ

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Problem

- Measures for eco-innovation/RE face a high level uncertainty about their economic feasibility
- Lack of valuation criteria for RE investments

= imperfect market conditions

Necessity for a comprehensive tool to optimize the decision-making processes of RE-investments

Solution

Development of an easy to use indicator system and tool for SMEs seeking for external funding

- Soft indicators
- Environmental indicators
- Economic indicators

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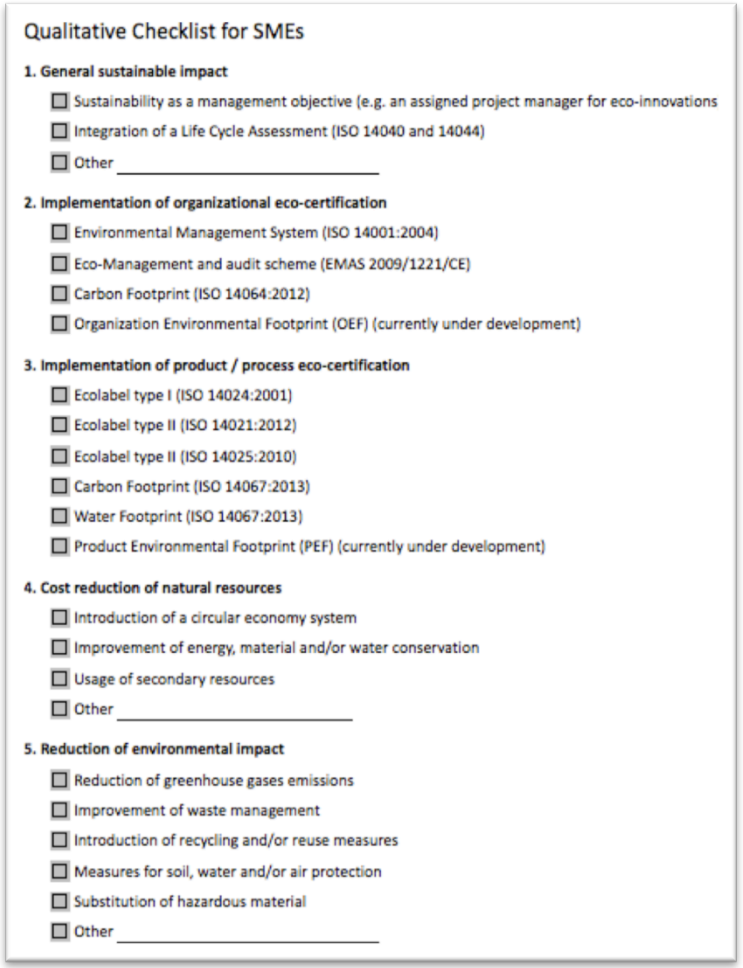
Advanced Cost Benefit Analysis

Soft Indicators

= Upfront Qualitative Checklist Scheme

- Provides a qualitative overview of the general environmental impact:
  - Managerial decisions,
  - Eco-certifications / ecolabels,
  - EMSs,
  - etc.



Qualitative Checklist for SMEs

1. General sustainable impact

- ☐ Sustainability as a management objective (e.g. an assigned project manager for eco-innovations
- ☐ Integration of a Life Cycle Assessment (ISO 14040 and 14044)
- ☐ Other _____

2. Implementation of organizational eco-certification

- ☐ Environmental Management System (ISO 14001:2004)
- ☐ Eco-Management and audit scheme (EMAS 2009/1221/CE)
- ☐ Carbon Footprint (ISO 14064:2012)
- ☐ Organization Environmental Footprint (OEF) (currently under development)

3. Implementation of product / process eco-certification

- ☐ Ecolabel type I (ISO 14024:2001)
- ☐ Ecolabel type II (ISO 14021:2012)
- ☐ Ecolabel type II (ISO 14025:2010)
- ☐ Carbon Footprint (ISO 14067:2013)
- ☐ Water Footprint (ISO 14067:2013)
- ☐ Product Environmental Footprint (PEF) (currently under development)

4. Cost reduction of natural resources

- ☐ Introduction of a circular economy system
- ☐ Improvement of energy, material and/or water conservation
- ☐ Usage of secondary resources
- ☐ Other _____

5. Reduction of environmental impact

- ☐ Reduction of greenhouse gases emissions
- ☐ Improvement of waste management
- ☐ Introduction of recycling and/or reuse measures
- ☐ Measures for soil, water and/or air protection
- ☐ Substitution of hazardous material
- ☐ Other _____

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Environmental Indicators

- Overview of a SMEs environmental status and performance
- Comparison possible with estimated project targets and SME benchmarks

Environmental Indicators

Input	Indicator	Project target
Non-renewable materials intensity	..... (t / year)	..... (t / year)
Restricted substances intensity	..... (t / year)	..... (t / year)
Recycled / reused content	..... (%)	..... (%)
Operations		
Water intensity	..... (m^3 / year)	..... (m^3 / year)
Energy intensity	..... (MJ / year)	..... (MJ / year)
Renewable proportion of energy	..... (%)	..... (%)
Greenhouse gas intensity	..... (tCO_2e / year)	..... (tCO_2e / year)
Products (indicators are linked to each		
Recycled / reused content	..... (%)	..... (%)
Renewable materials content	..... (%)	..... (%)
Target value of total material input	..... (t / year)	..... (t / year)
Energy consumption intensity	..... (MJ / year)	..... (MJ / year)

1) Input — *Indicator* — *Project target*

e.g. non-renewable materials intensity (t / year) ……(t / year) …… (t / year)

Weight of non-renewable resources consumed / Normalisation factor

2) Operations — *Indicator* — *Project target*

e.g. water intensity (m^3 / year) ……(m^3/year) …… (m^3/year)

Total water intake / Normalisation factor

3) Products (indicators linked to each product) — *Indicator* — *Project target*

e.g. recycled / reused content ……(%) …… (%)

Sum for each product {(Weight of a product unit x Proportion of recycled content x Units produced) + (Weight of a product unit x Proportion of reused content x Units produced)} / Sum for each product (Weight of a product unit x Units produced) x100

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Economic Indicators

Evaluation alongside the three layers of the PRESOURCE-Definition of RE:

Energy, Water and Material

Development of an Investment Analysis Tool for RE-investments utilisable by SMEs

Financial evaluation of RE investment projects:

Net Present Value (NPV)
Pay Back Period (PBP)
Internal Rate of Return (IRR)
Return on Investment (ROI)

Scenario Analysis of Eco-Innovation Investments

	Status Quo		Scenario 1 Energy, water and process optimisation		Scenario 2 Improved energy, water and process optimisation	
Energy[17]						
of energy consumption	500,000	kWh / year	400,000	kWh / year	380,000	kWh / year
Total value of energy costs	93,950	€ / year	75,160	€ / year	71,402	€ / year
Optimisation potential			25.00	%	31.58	%
Costs of related maintenance			2,000	€ / year	2,000	€ / year
saving potential			16,790	€ / year	20,548	€ / year
Water[18]						
water consumption	50,000	m³ / year	40,000	m³ / year	40,000	m³ / year
Total value of water costs	83,500	€ / year	66,800	€ / year	66,800	€ / year
Optimisation potential			25.00	%	25.00	%
Costs of related maintenance			3,000	€ / year	3,000	€ / year
saving potential			13,700	€ / year	13,700	€ / year
Material						
tal material input	500,000	€ / year	470,000	€ / year	450,000	€ / year
Optimisation potential			6.38	%	11.11	%
Costs of related maintenance			3,500	€ / year	4,500	€ / year
Total cost saving potential			26,500	€ / year	45,500	€ / year
Additional net profits						
Through production optimisation			15,500	€ / year	21,500	€ / year
Through process optimisation			8,000	€ / year	13.000	€ / year
Through recycling/reuse measures			0	€ / year	0	€ / year
Other cost savings (e.g. cost of emissions, pollution, waste			0	€ / year	0	€ / year
Investment Summary						
Investment costs			200,000	€	350,000	€
Useful economic life			5	years	7	years
Net present value (NPV) over economic life cycle[19]			148,480	€	311,082	€
Pay Back Period (PBP)			2.48	years	3.06	years
Internal Rate of Return (IRR)			23	%	20	%
Return On Investment (ROI)			74.2	%	88.9	%

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Outlook

- Dynamic values to increase analysis depth

  -> e.g. increase of costs per year

- Validation by the market and further improvement

  of the Advanced CBA

  -> Follow-up project

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2nd Transnational Workshop on Innovative Financing Instruments

Vienna, 9 October 2014

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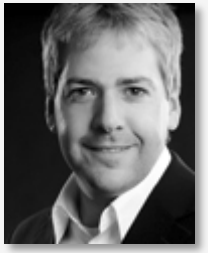
Thank you for your attention!



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