

Applying distance-to-target weighing methodology to evaluate the environmental performance of bio-based products

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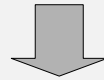
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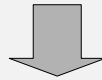


Problem: How to evaluate the environmental performance of biomass use, if LCA results indicate both positive and negative environmental effects?

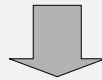


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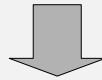


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 - **Stakeholder dialogue driven by interests**
- **There is need for a rationale in the decision finding process**

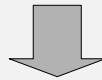


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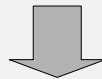
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Distance-to-target weighing methodology



Objective

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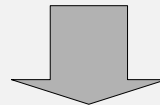
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- **Identifying environmentally favorable utilization routes for biomass (production of energy, fuels, materials)**



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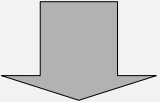
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 - **We analyze the results given for 4 environmental impact categories: (i) non-renewable energy consumption, (ii) global warming potential, (iii) eutrophication potential, and (iv) acidification potential**



Methodology

Input of energy
and materials



Bio-based product
alternative



Emissions, Consumption
of non-renewable energy

1 ha



Methodology

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**Bio-based product
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**Conventional
product alternative**

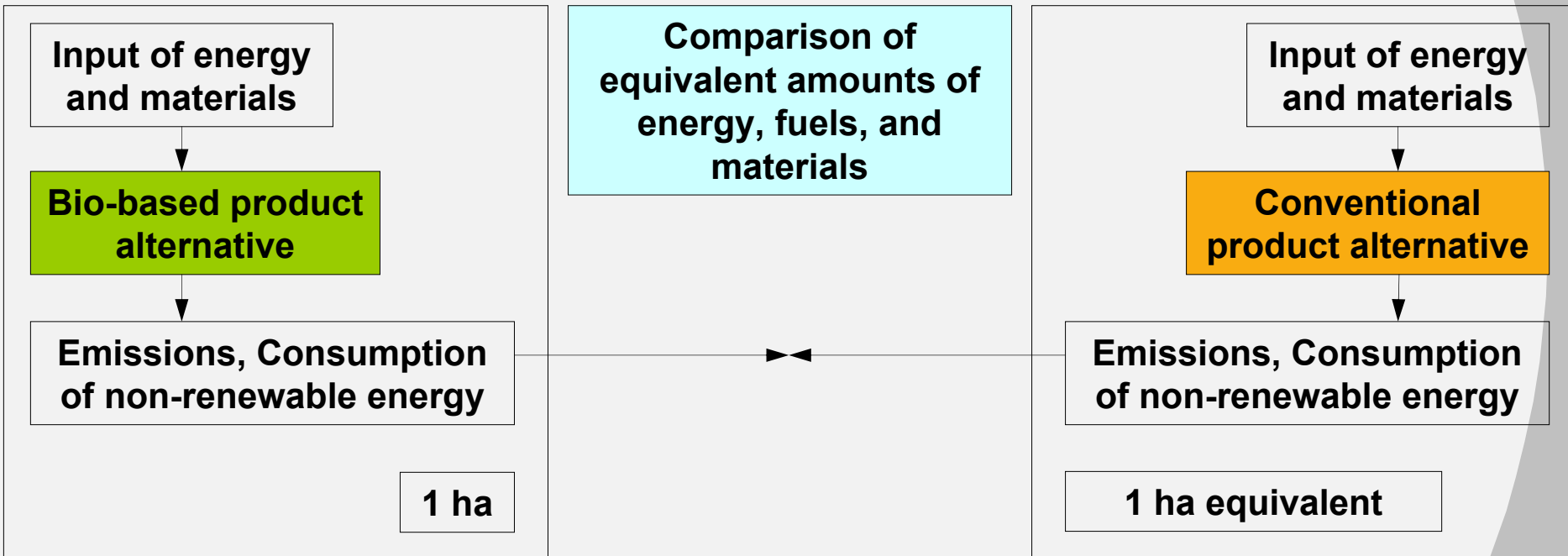


Emissions, Consumption
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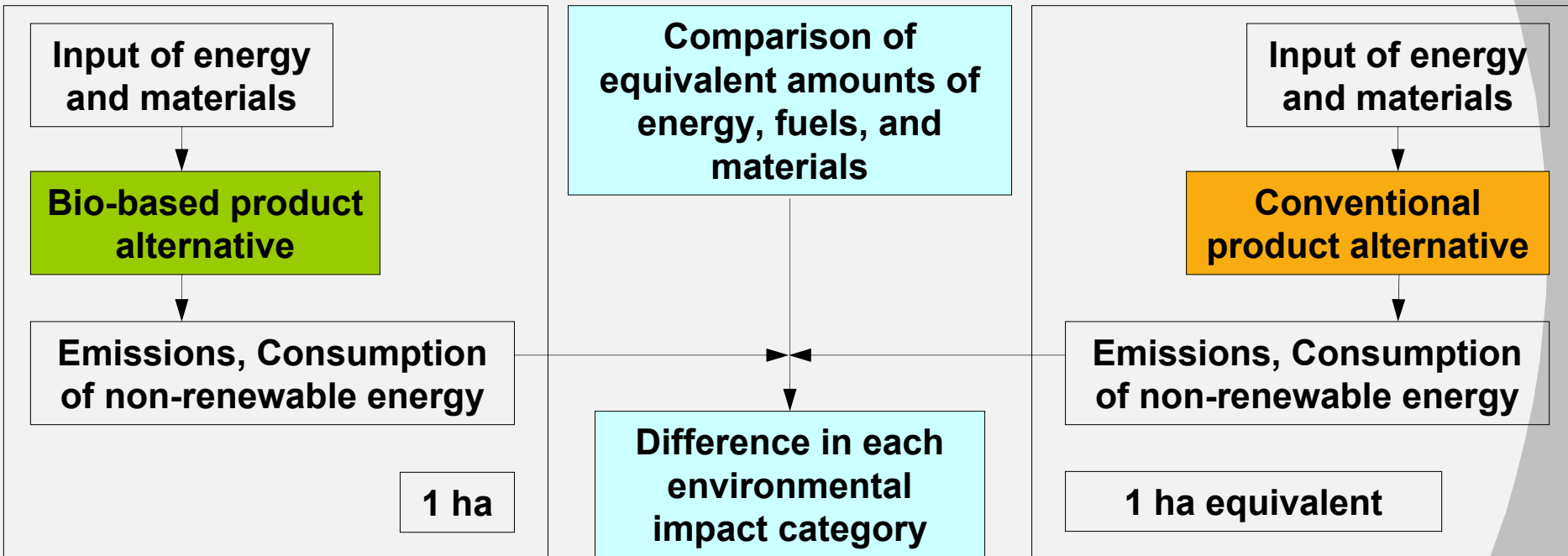
1 ha equivalent



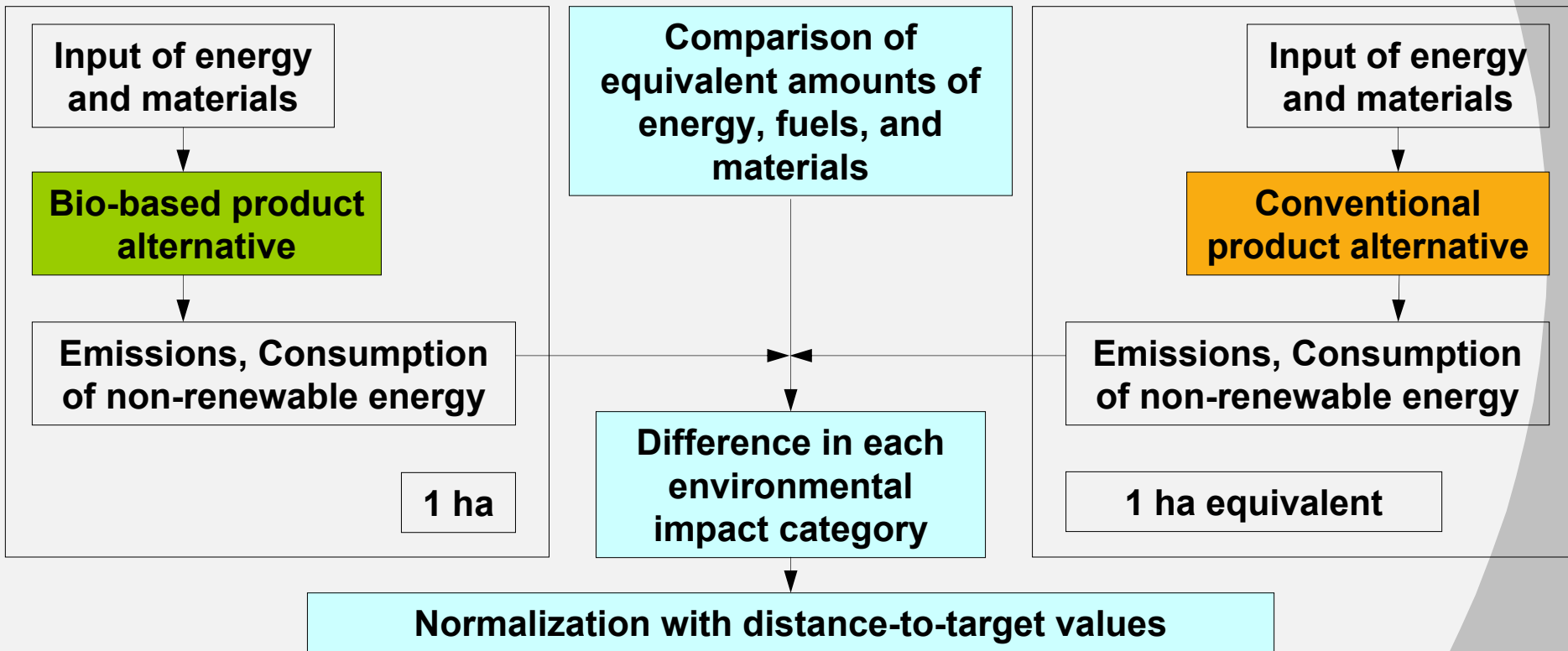
Methodology



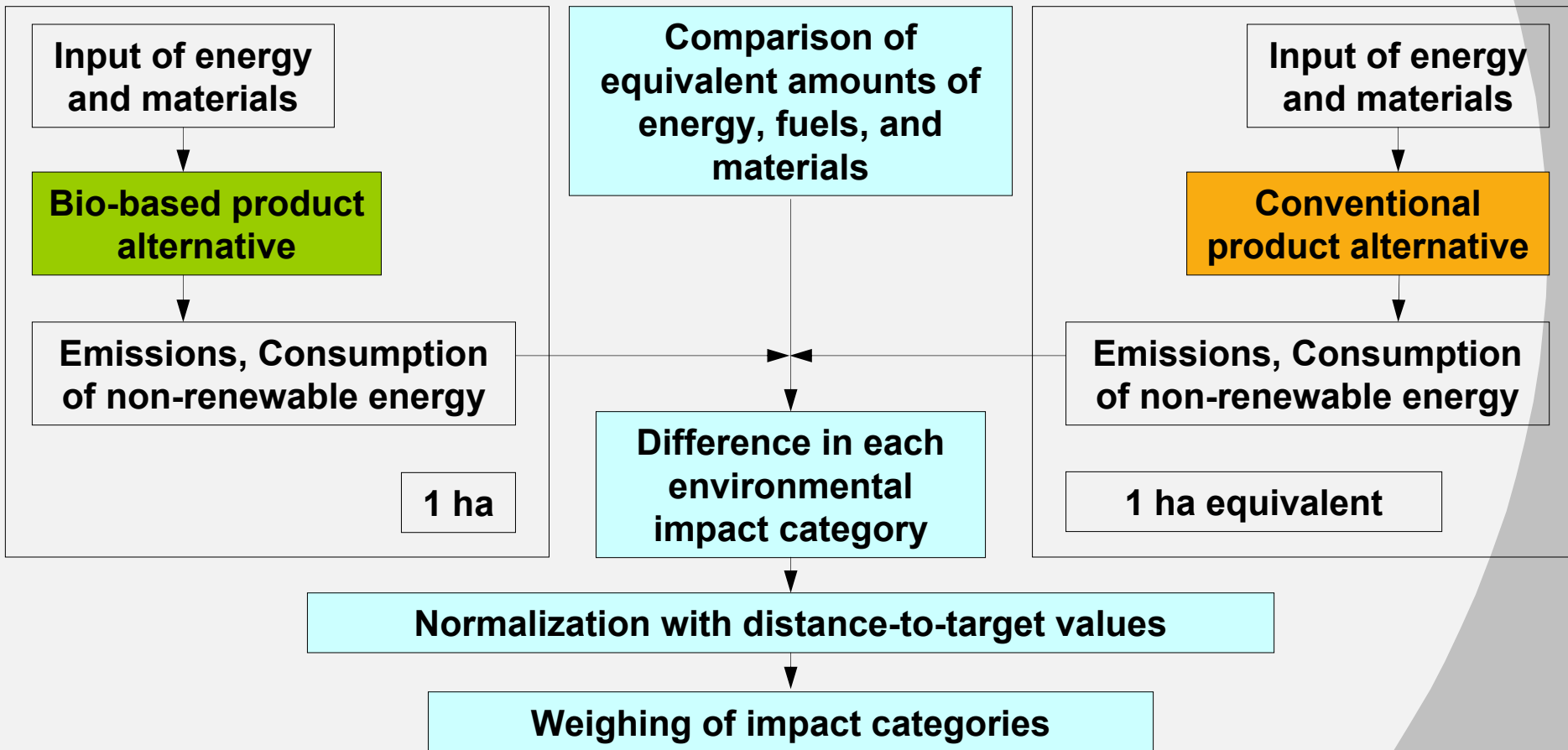
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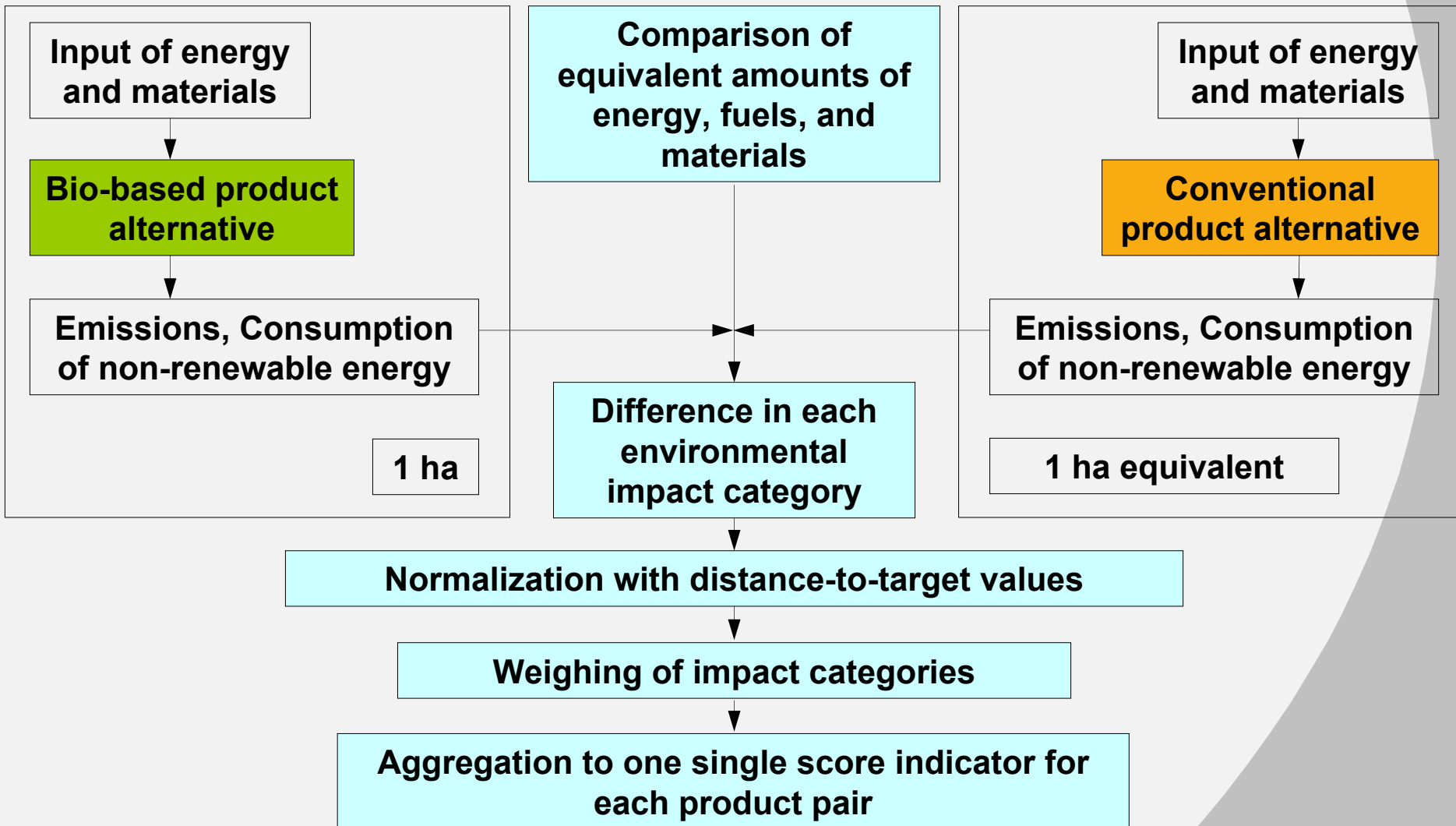
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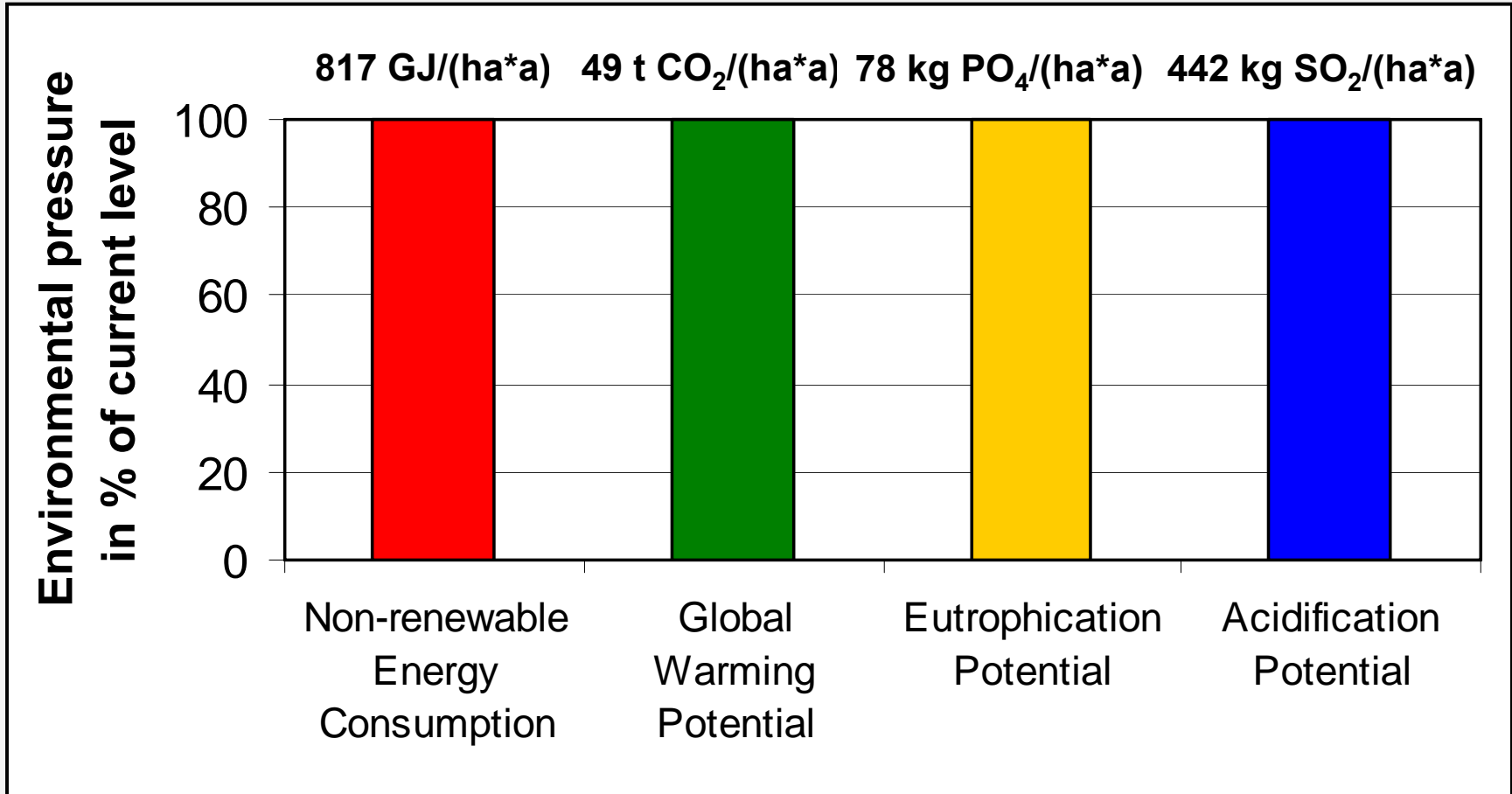


Methodology



Methodology

Current environmental pressure and long term policy goals: The case of Germany

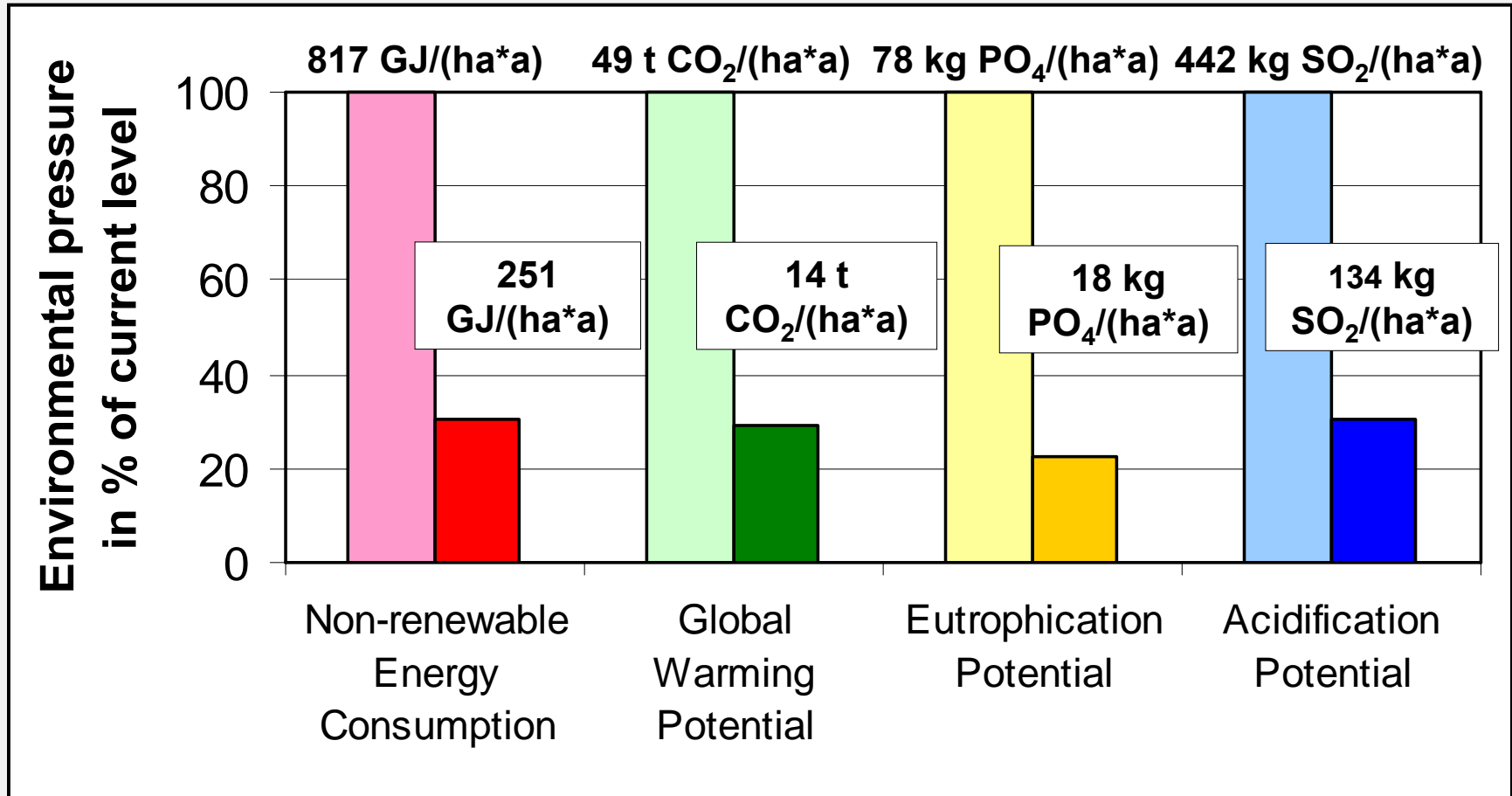


Source: Federal Environmental Agency of Germany (2002, 2005); Federal Environmental Ministry of Germany (2002)



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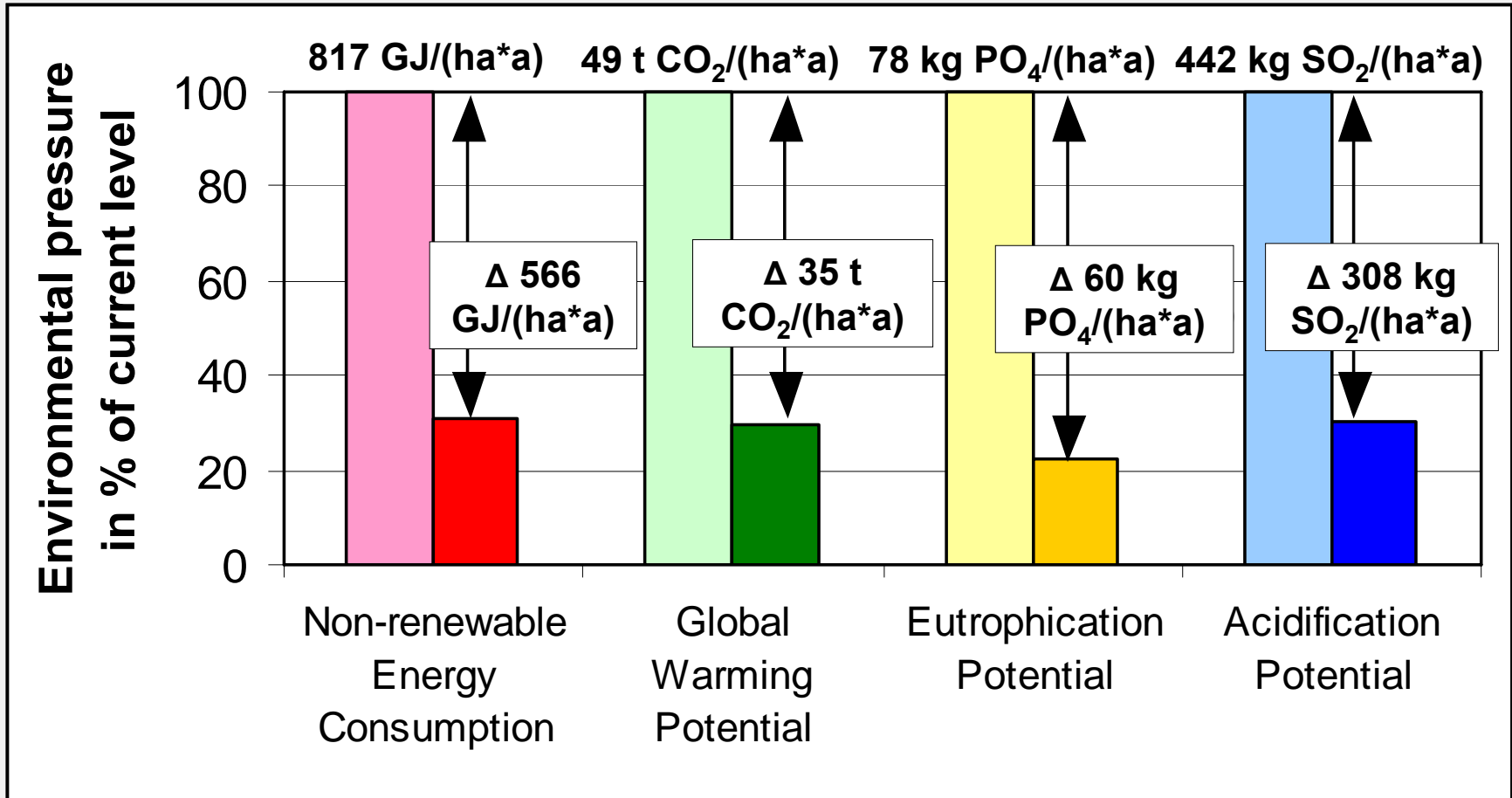


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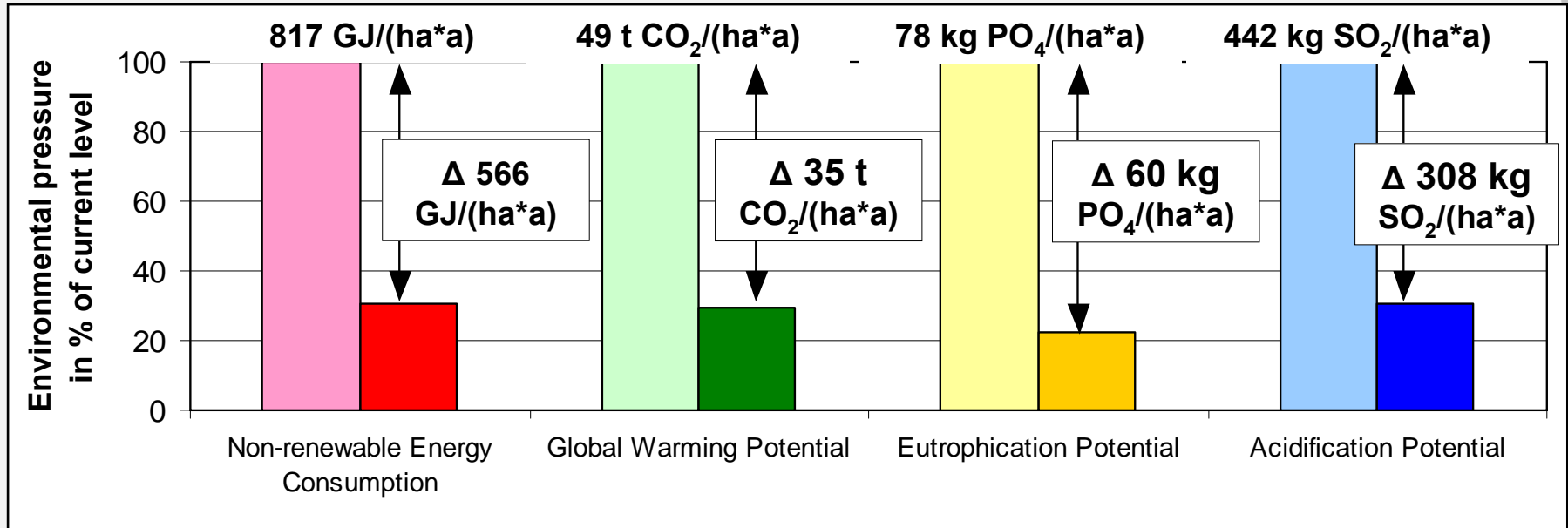


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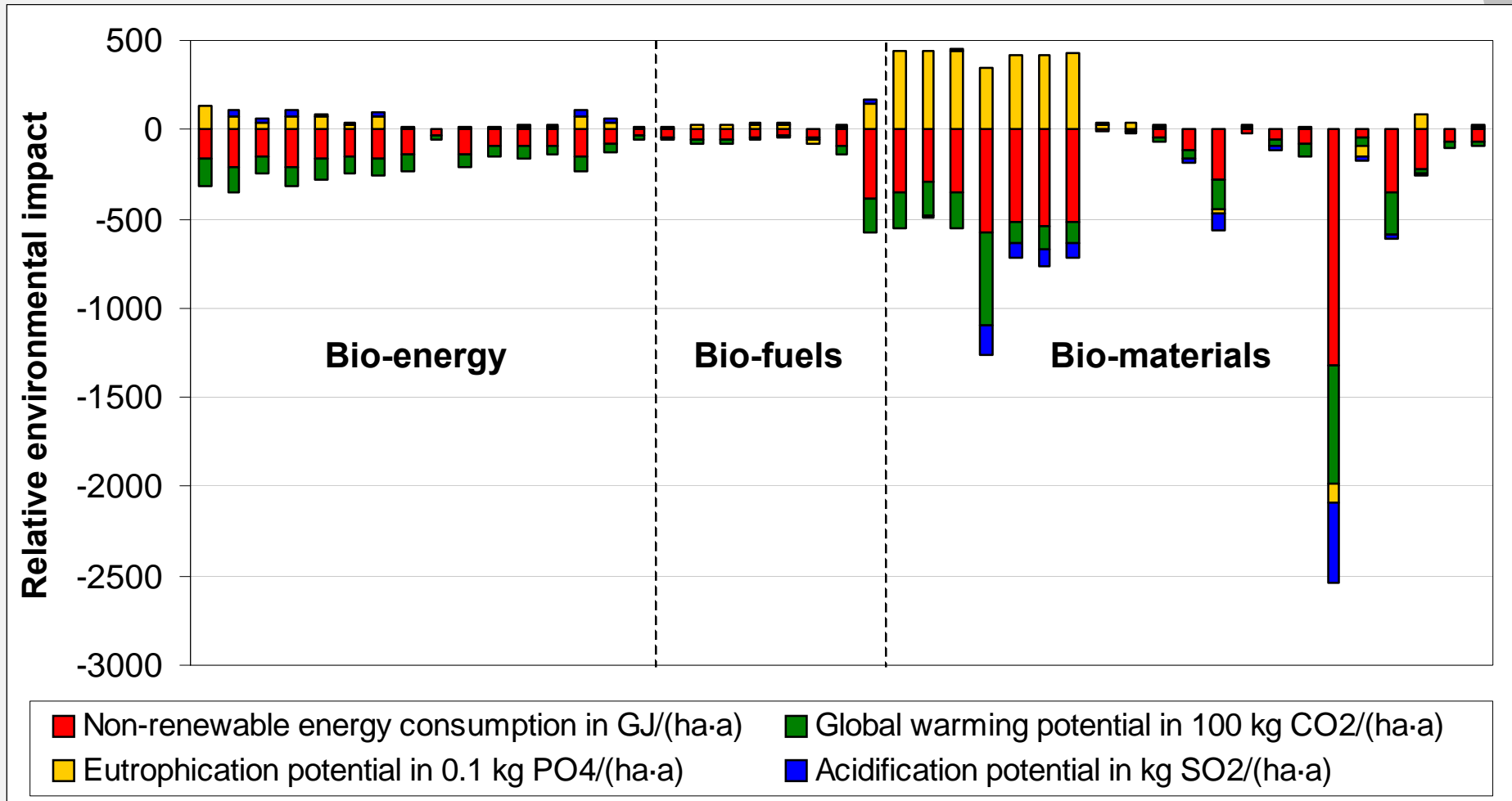


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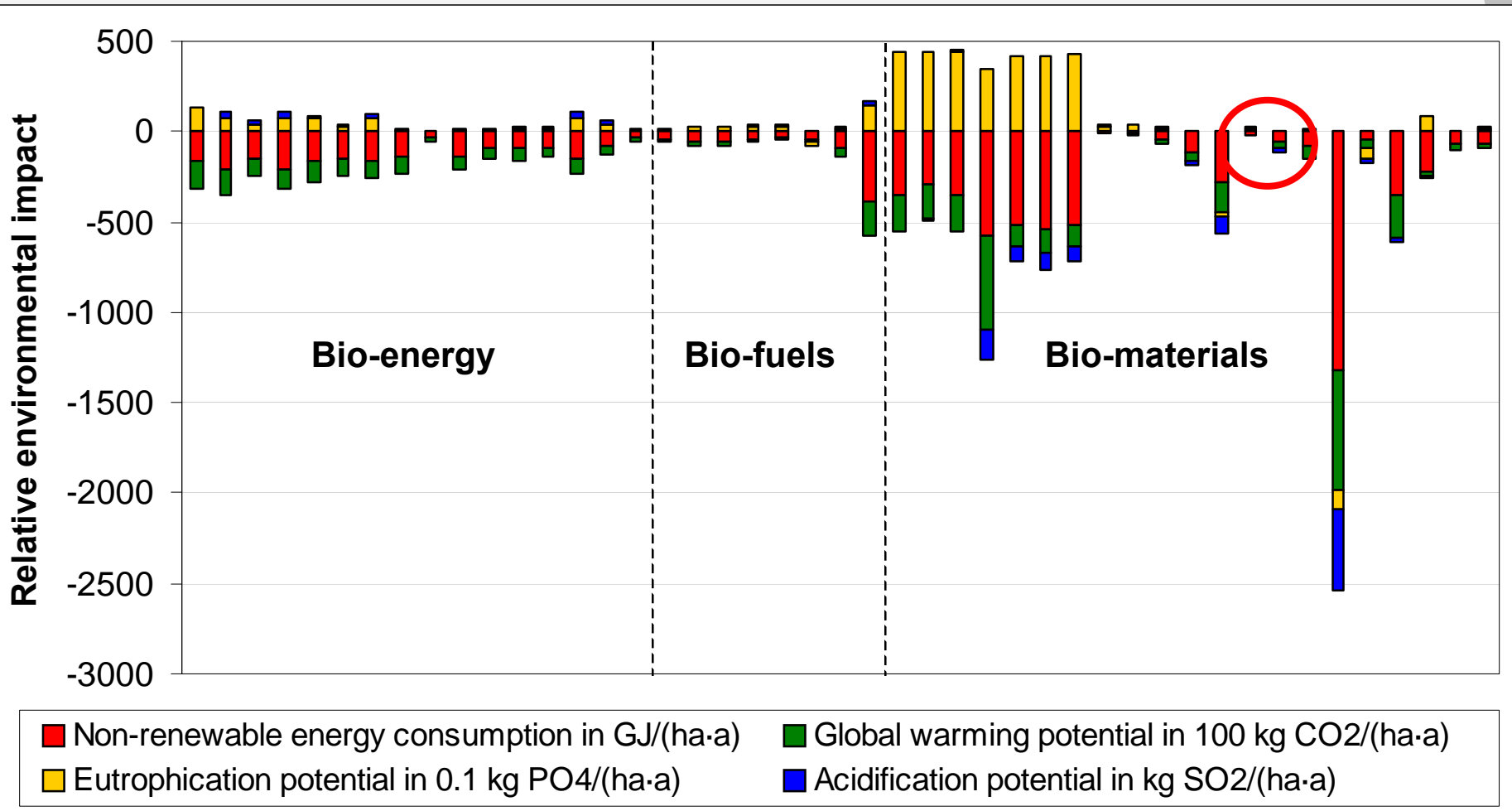
Results

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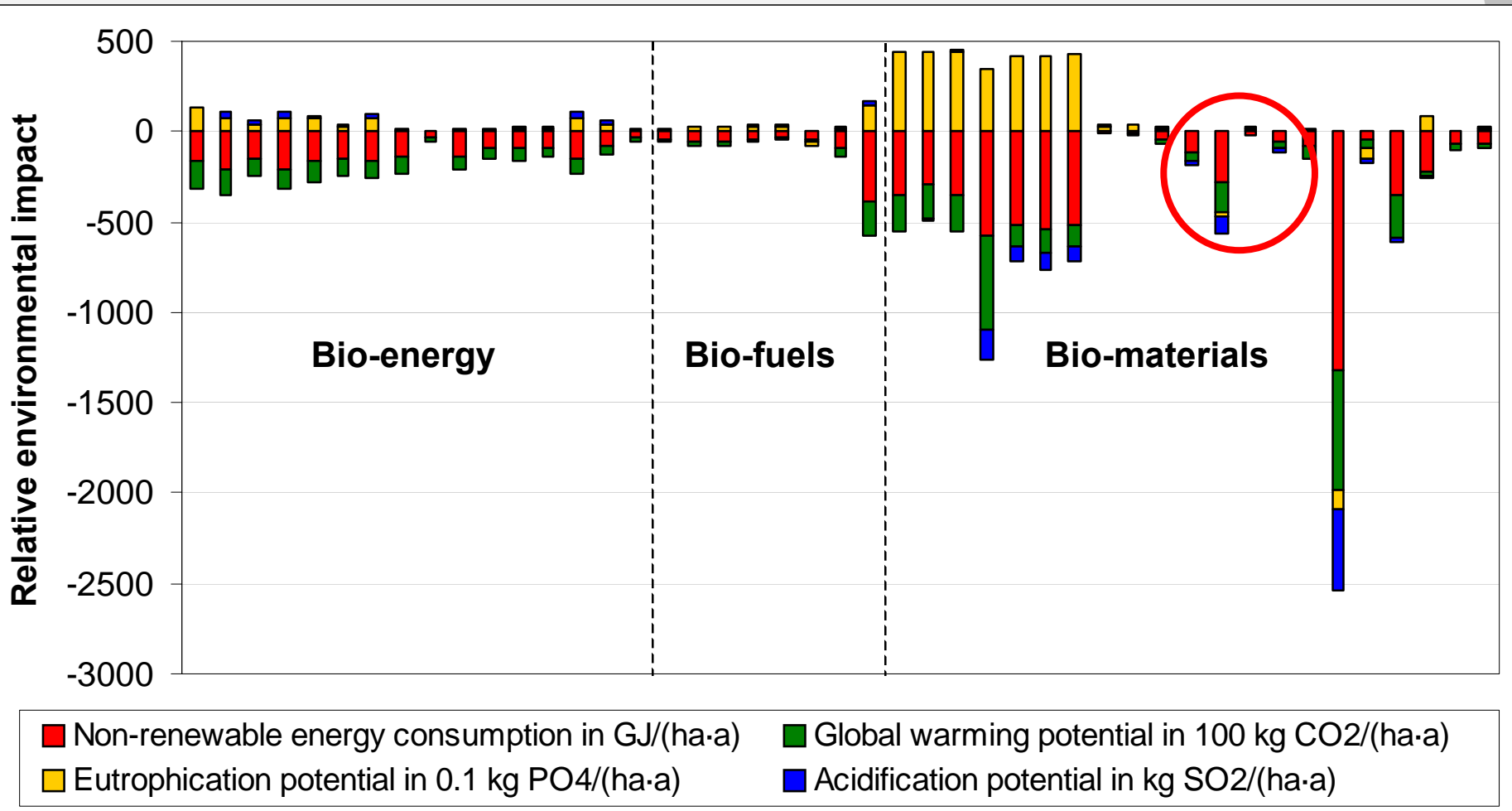
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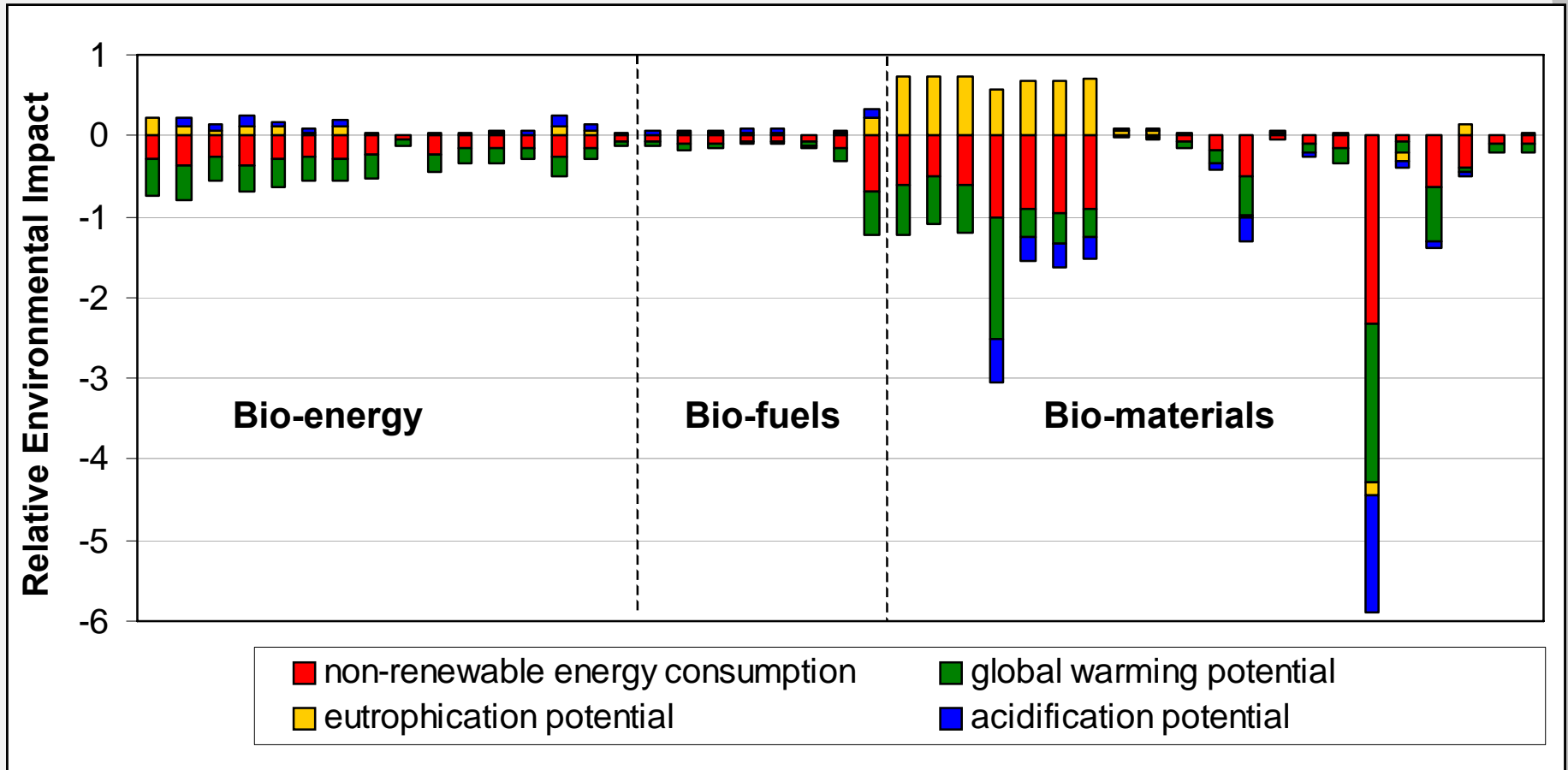
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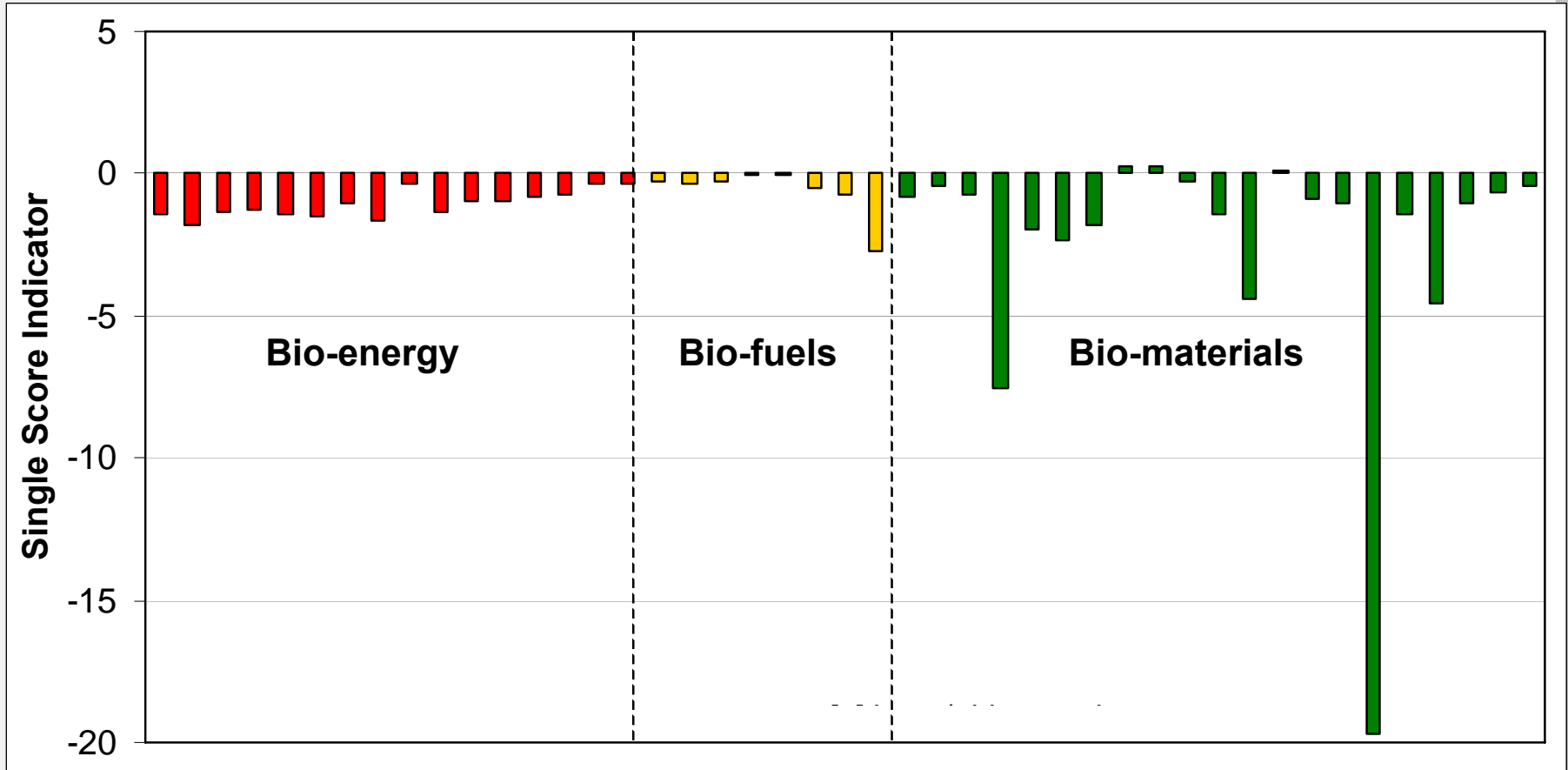
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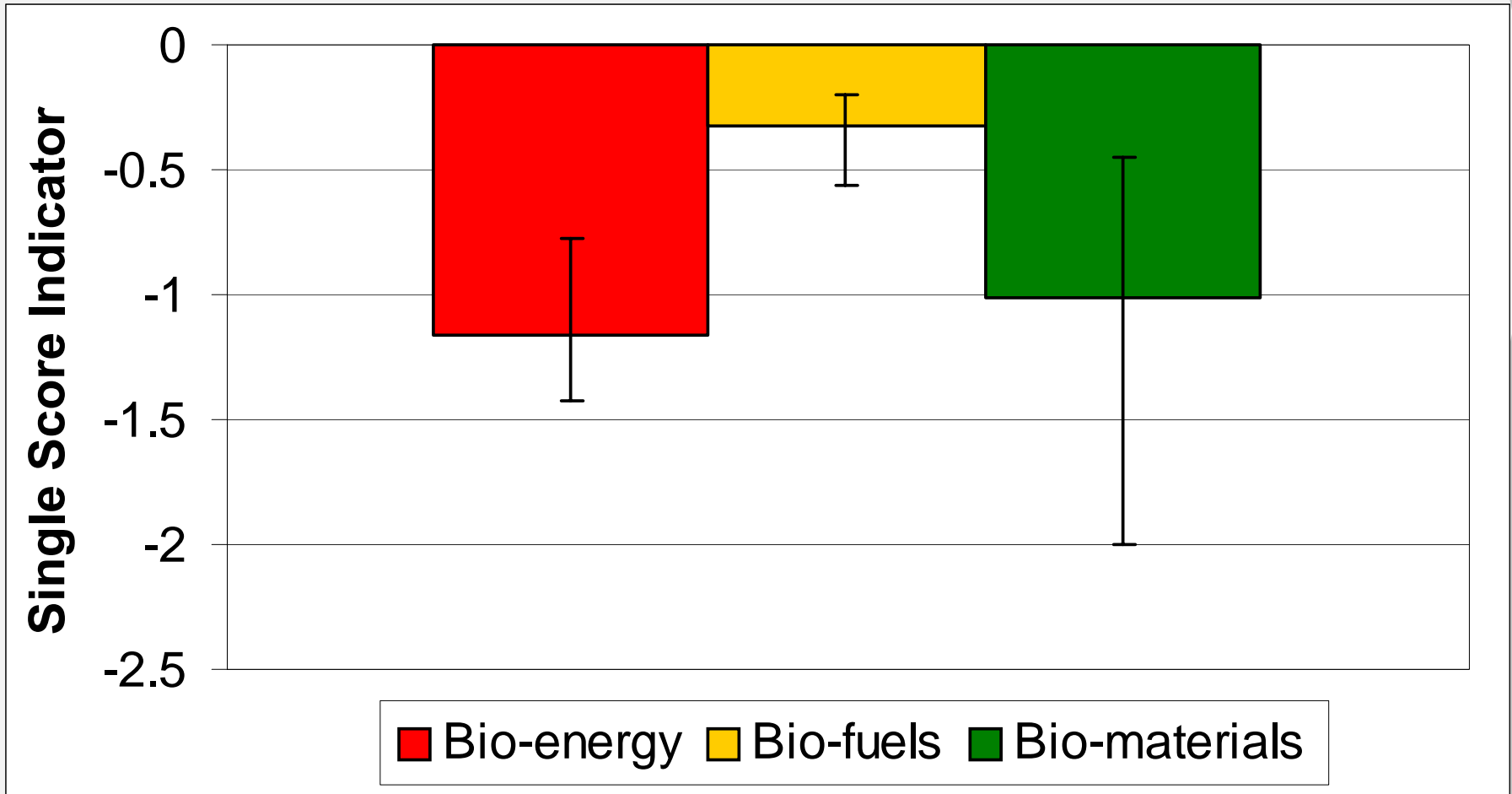


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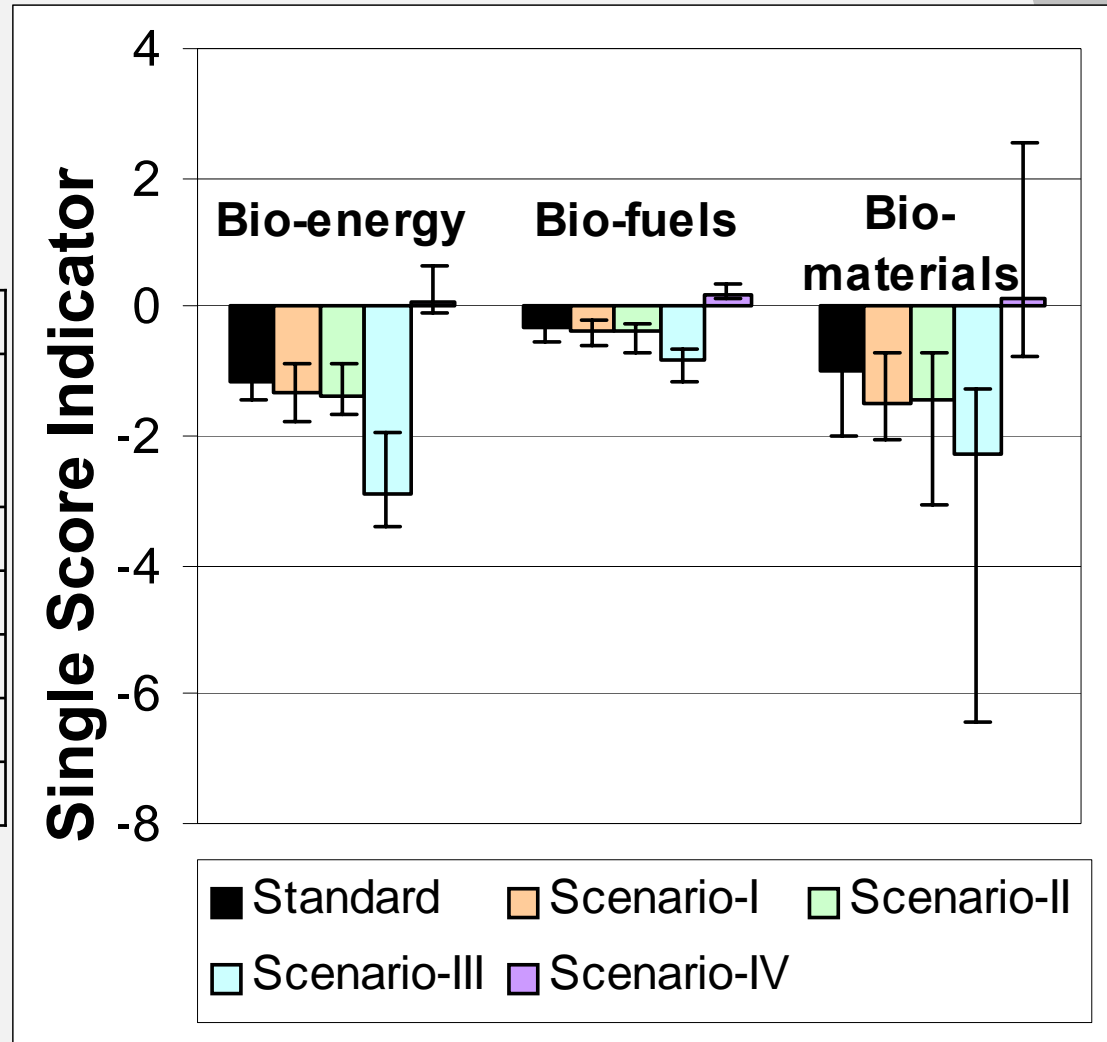


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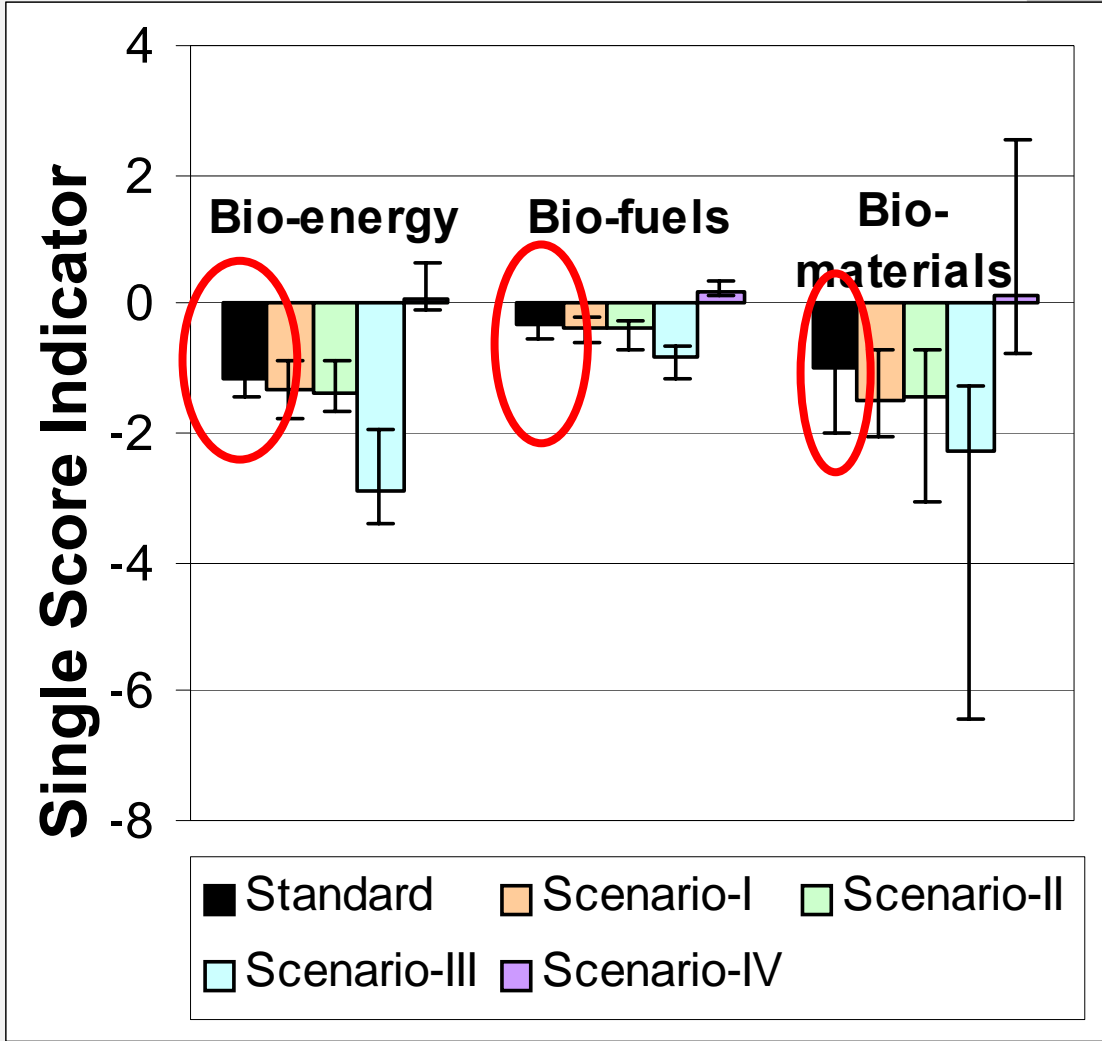
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Env. Impact Category	Scenario				
	S	I	II	III	IV
NRE	3.2	1.8	3.6	4.8	0.8
GWP	3.4	5.4	3.6	7.2	1.5
EP	4.5	3.6	3.6	1.2	7.5
AP	3.3	3.6	3.6	1.2	4.6
Total	14.4	14.4	14.4	14.4	14.4



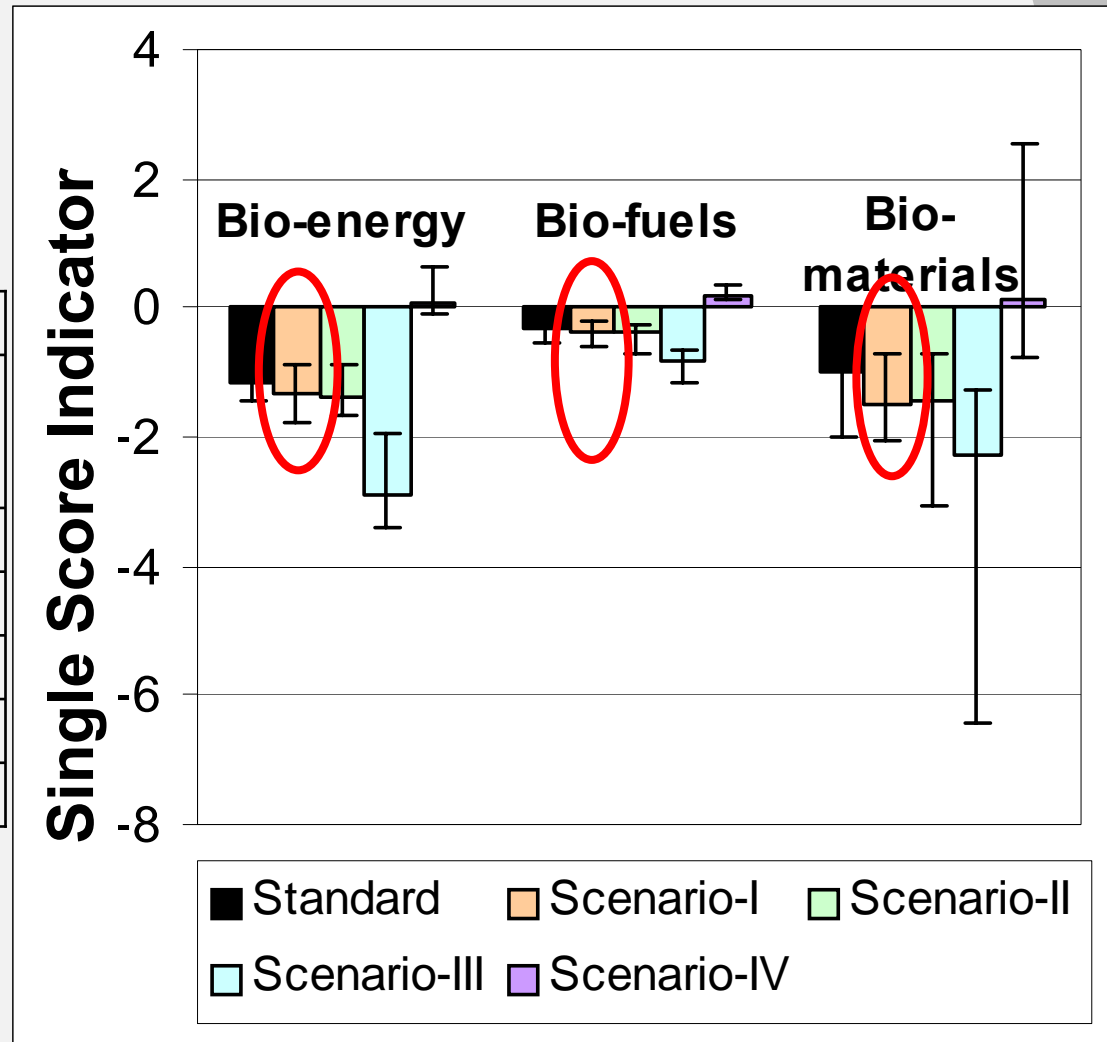
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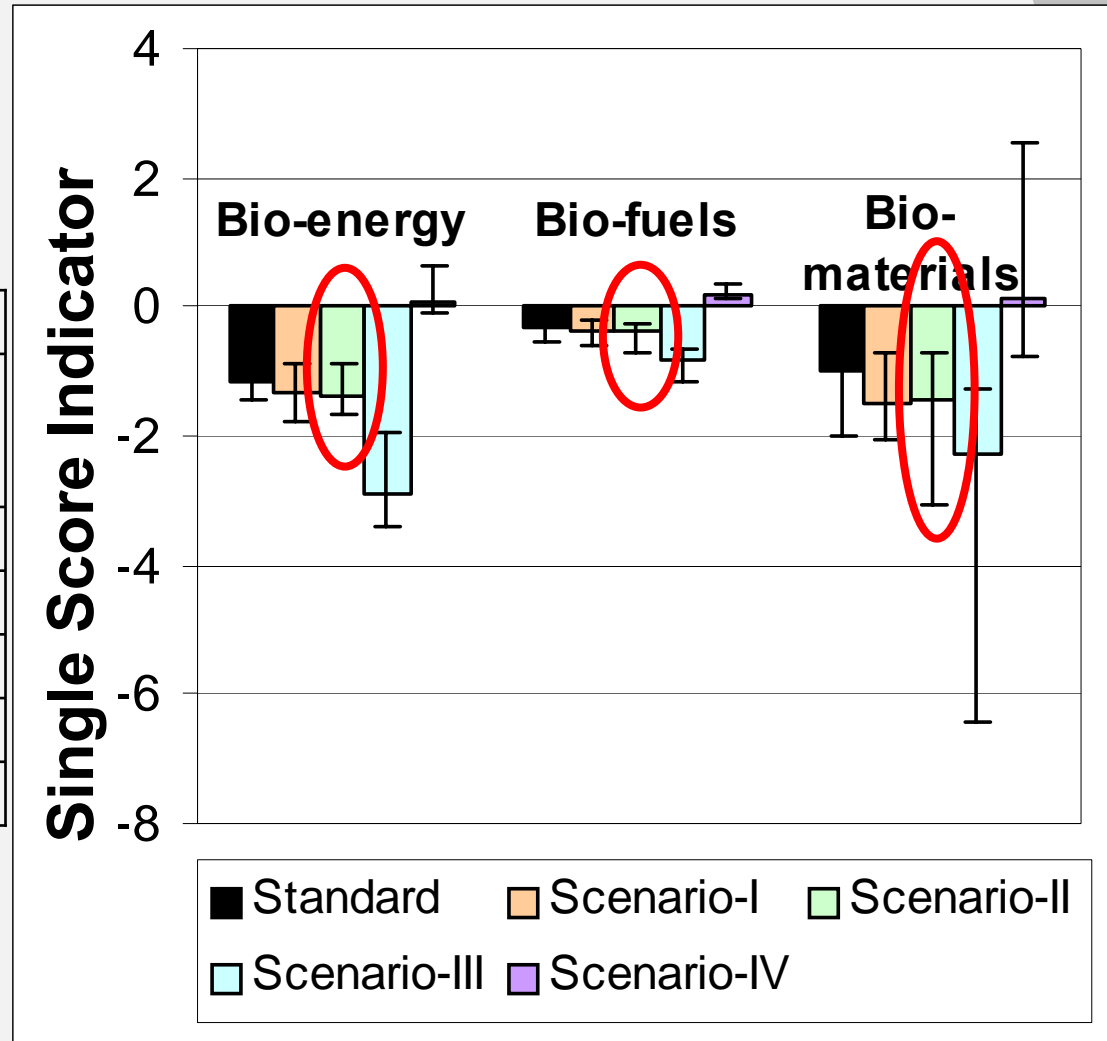
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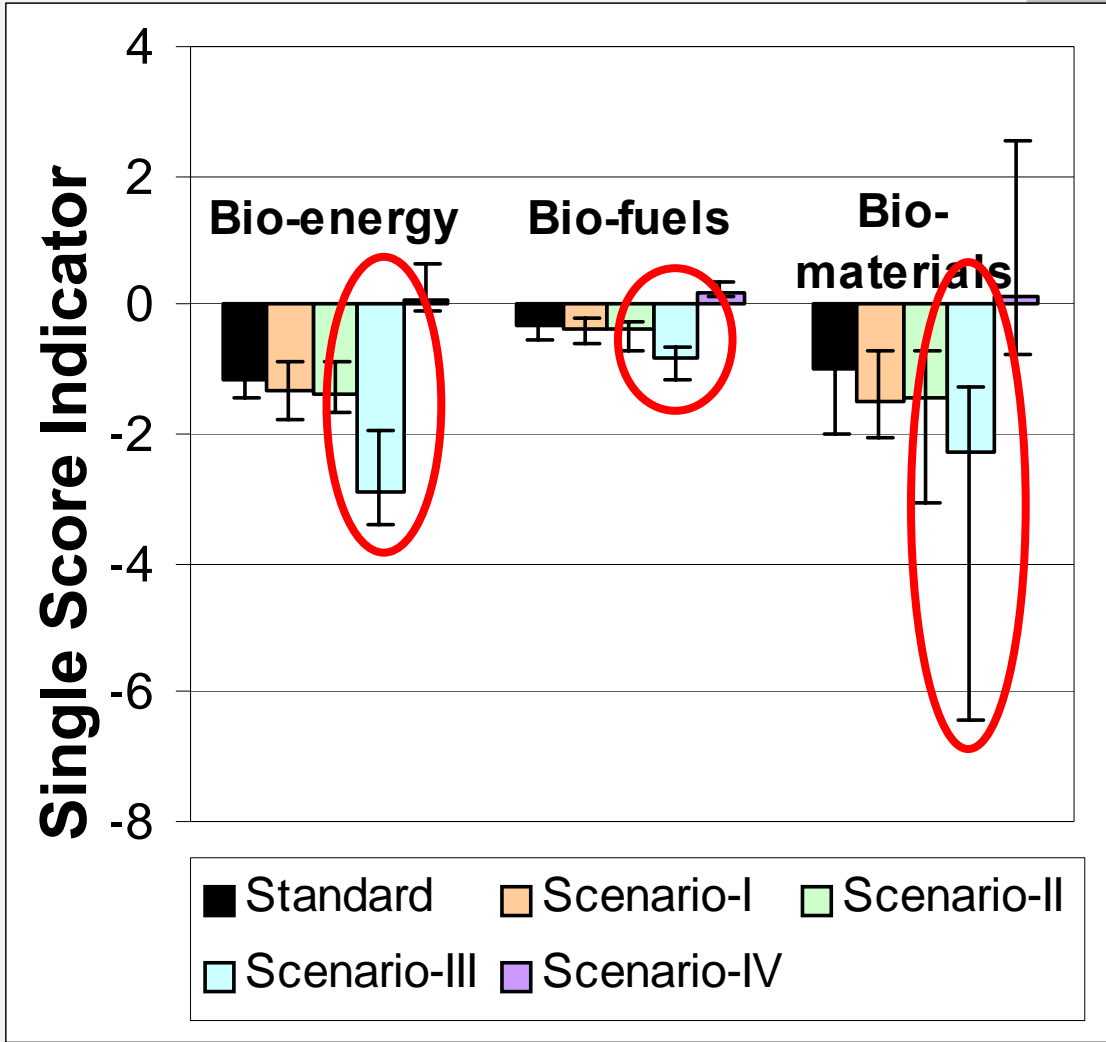
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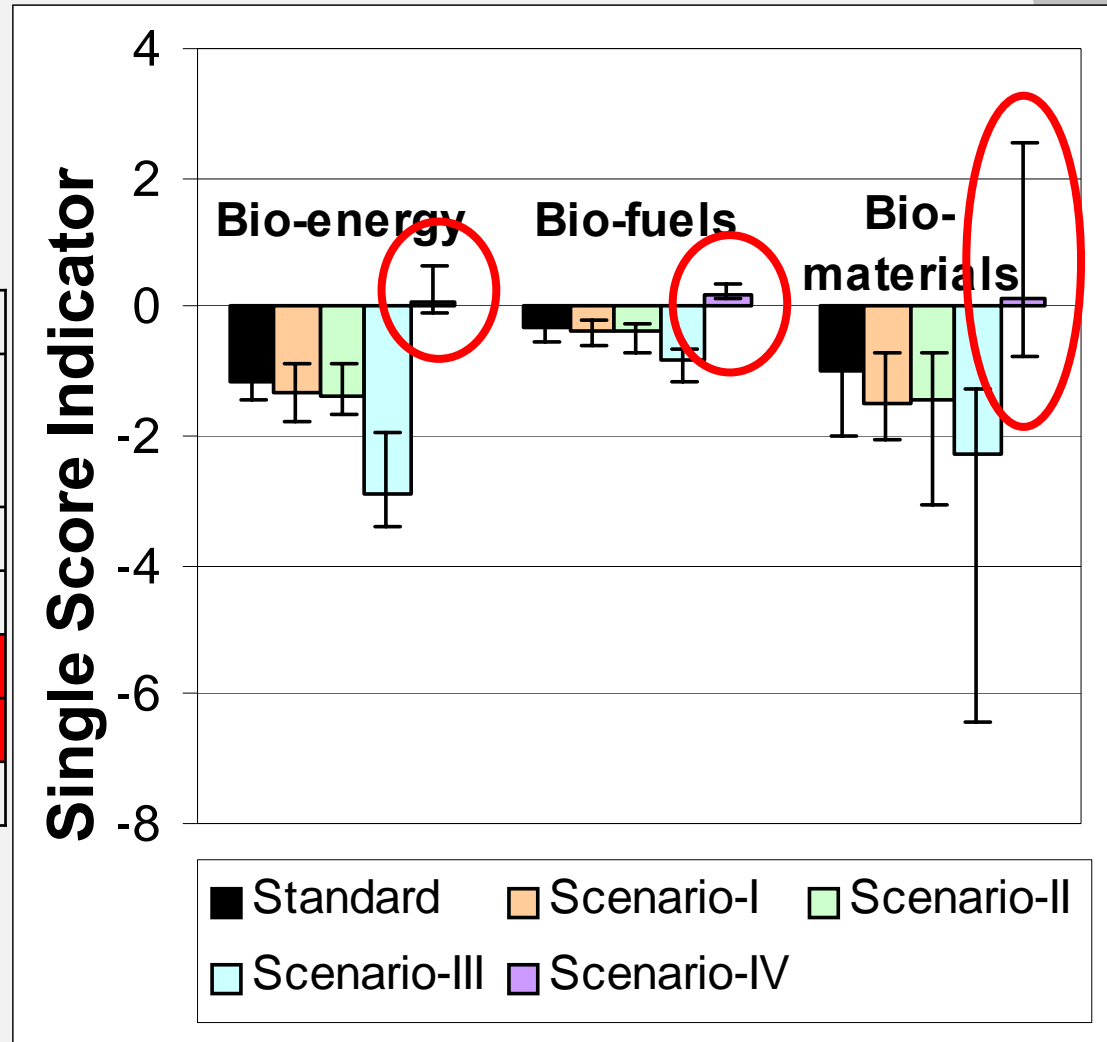
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- **Production of bio-energy and bio-materials environmentally favorable compared to bio-fuels**



Conclusions

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- **Decision making in favor or against product alternatives should also be based on economic and social criteria**



Thank you!



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