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## Key findings of Tetra Pak® LCA study for Nordic countries focussing on the Swedish market

**Study title:** Comparative Life Cycle Assessment of Tetra Pak® carton packages and alternative packaging systems for liquid food on the Nordic market



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# Who is ifeu?



## ifeu – Institute for Energy and Environmental Reserach ...

...founded in 1978 by a group of scientists from the University of Heidelberg.

### Today...

...ifeu is an independent non-profit ecological research institute without any party political and economical influence. Financing **solely project-bounded** means orders 2/3 from public sector 1/3 from private enterprises.

### An important part of the institute...

... is the commitment of its employees to a sustainable society.

### Clients...

... .. include international institutions, federal and state ministries and agencies, governments, well-known companies, business associations, NGOs, public utilities, transport and logistics service providers.



# Research and consulting for a sustainable society



**70 Scientists working on**



**Resource protection and waste**

Development of policies for a circular economy and assessment of practical recycling solutions and its ecological benefits.



**Energy**

Evaluation of technologies, development of strategies and policies for a sustainable and efficient energy system, development of climate action plans



**Food and Biomass**

Environmental assessment and sustainability analyses of foodstuffs, animal feed, bioenergy and all aspects of renewable raw materials from different biomass sources



**Industry and Products**

Environmental impact assessment, resource and risk analysis of products, processes, technologies, sustainable urban development



**Mobility**

Analysis of energy consumption and emissions from all motorised transport systems, evaluation of strategies designed to reduce the environmental impact of transport.





## Longstanding experience in

- Life Cycle Assessment (LCA) and GHG emission calculation
- development of methodologies and standards, e.g. German Federal Environment Agency (UBA) and ISO Standards for LCA

## In recent years

- LCA of packaging systems and cooperation with packaging producers worldwide
- special focus on beverage packaging systems including many LCA studies
- general environmental consultancy for Tetra Pak and ACE

## Neutral and independent

- Commissioned also by competitors like bottle or can producers
- Consultancy also for European Commission, ministries and agencies

# LCA for Nordic countries



## Comparative Life Cycle Assessment of Tetra Pak® carton packages and alternative packaging systems for liquid food on the Nordic market

Final report

commissioned by Tetra Pak International SA

Heidelberg, April 2017

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## Main objectives

- Assessment of environmental performance of Tetra Pak carton packaging portfolio on the Nordic market
- Comparison with plant based plastics & alternative packaging systems
- Special focus on higher share of renewable material in beverage cartons and their impact on environmental profile

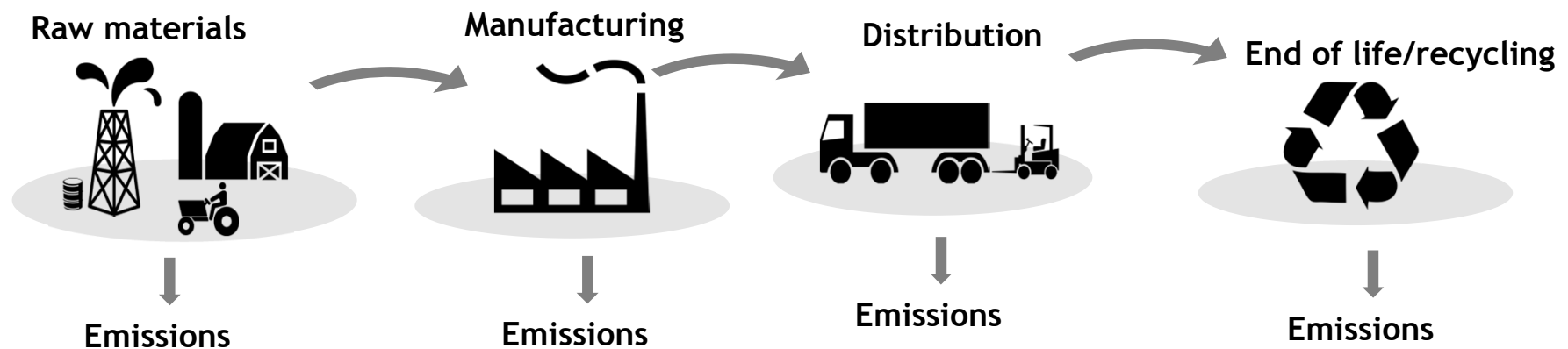


# What is LCA

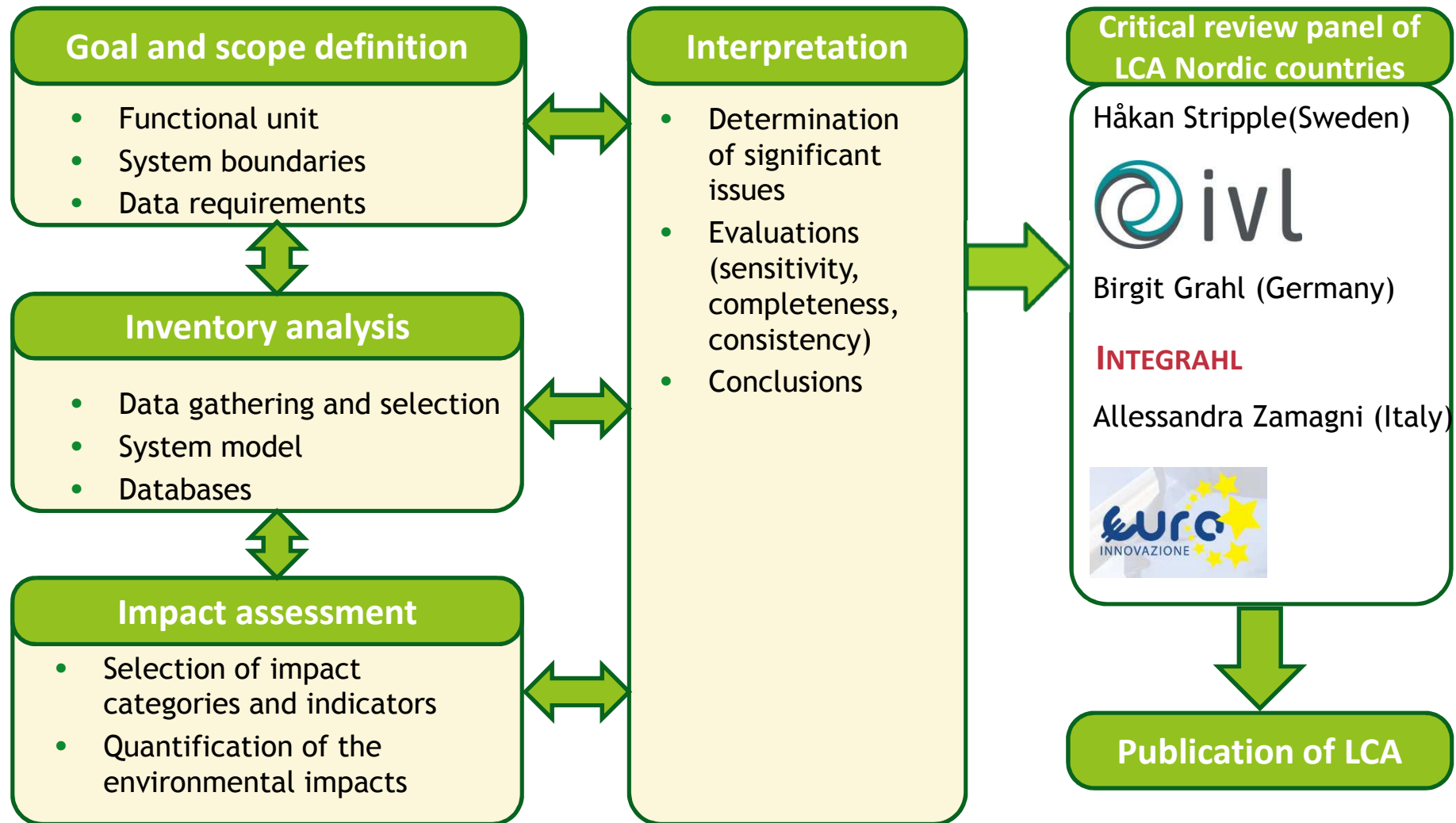


Life Cycle Assessment is a compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

–ISO 14040



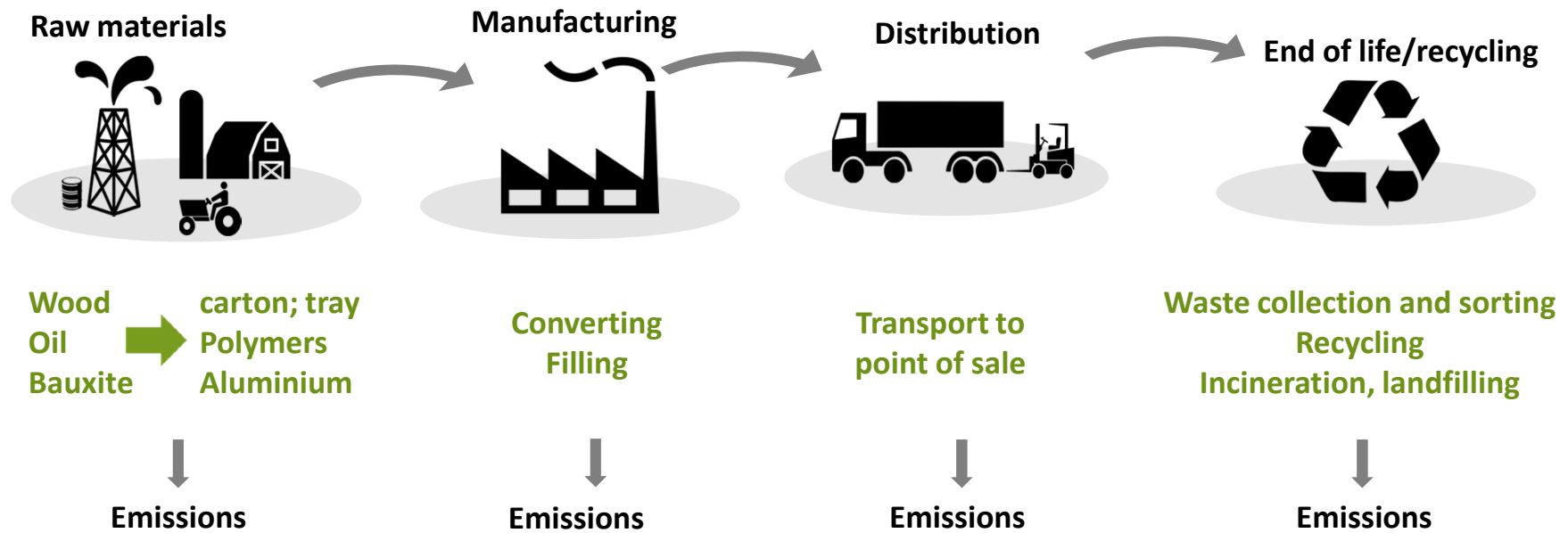
# LCA framework according to ISO 14040/44



# System boundaries



## 'Cradle-to-grave' LCA





# System allocation approach

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**How are the impacts and benefits of recycling and recovery processes considered in the system model?**

## System allocation approach

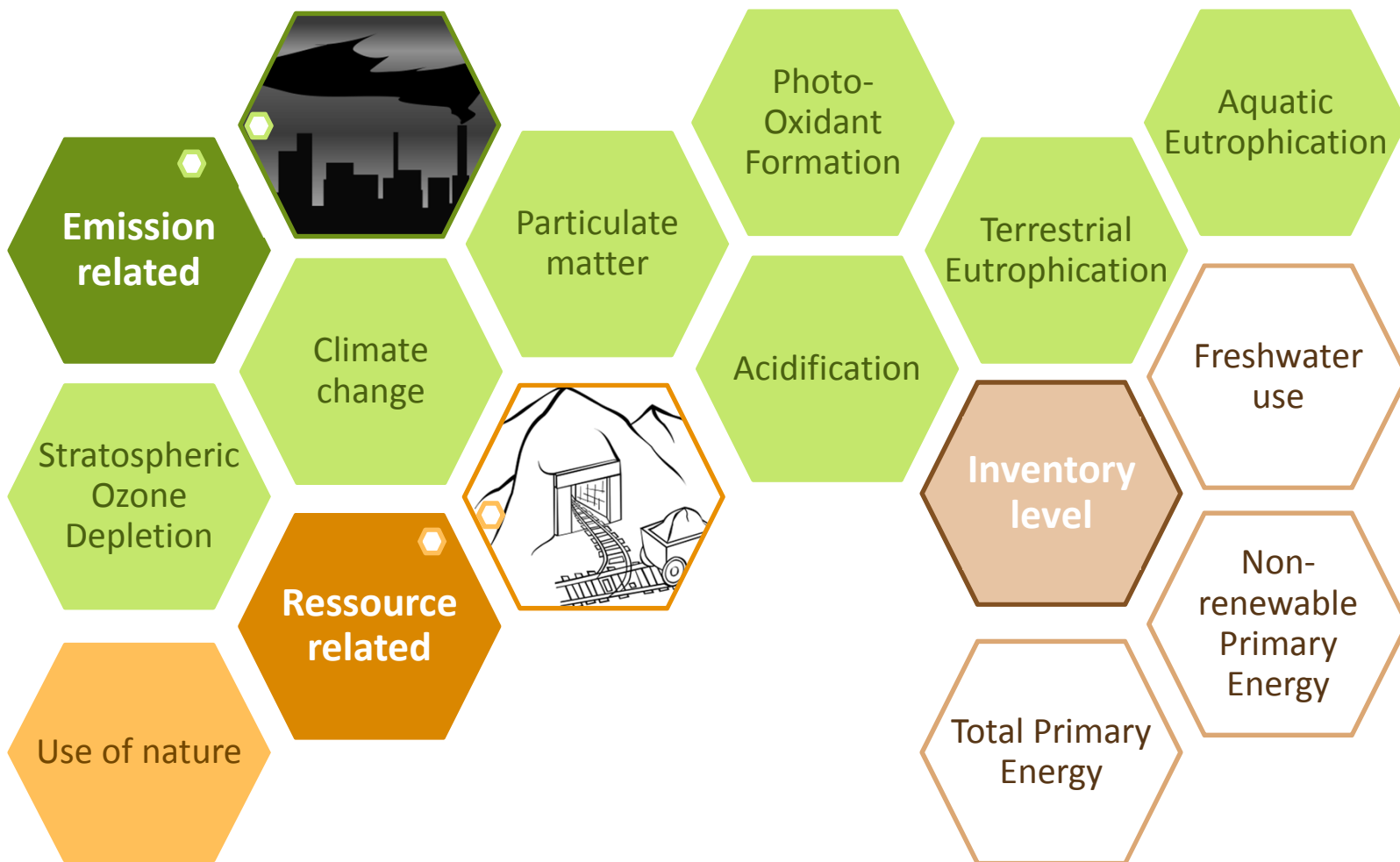
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**How are the impacts and benefits of recycling and recovery processes considered in the system model?**

Base scenarios: Allocation factor 50%

Sensitivity analysis: Allocation factor 100%

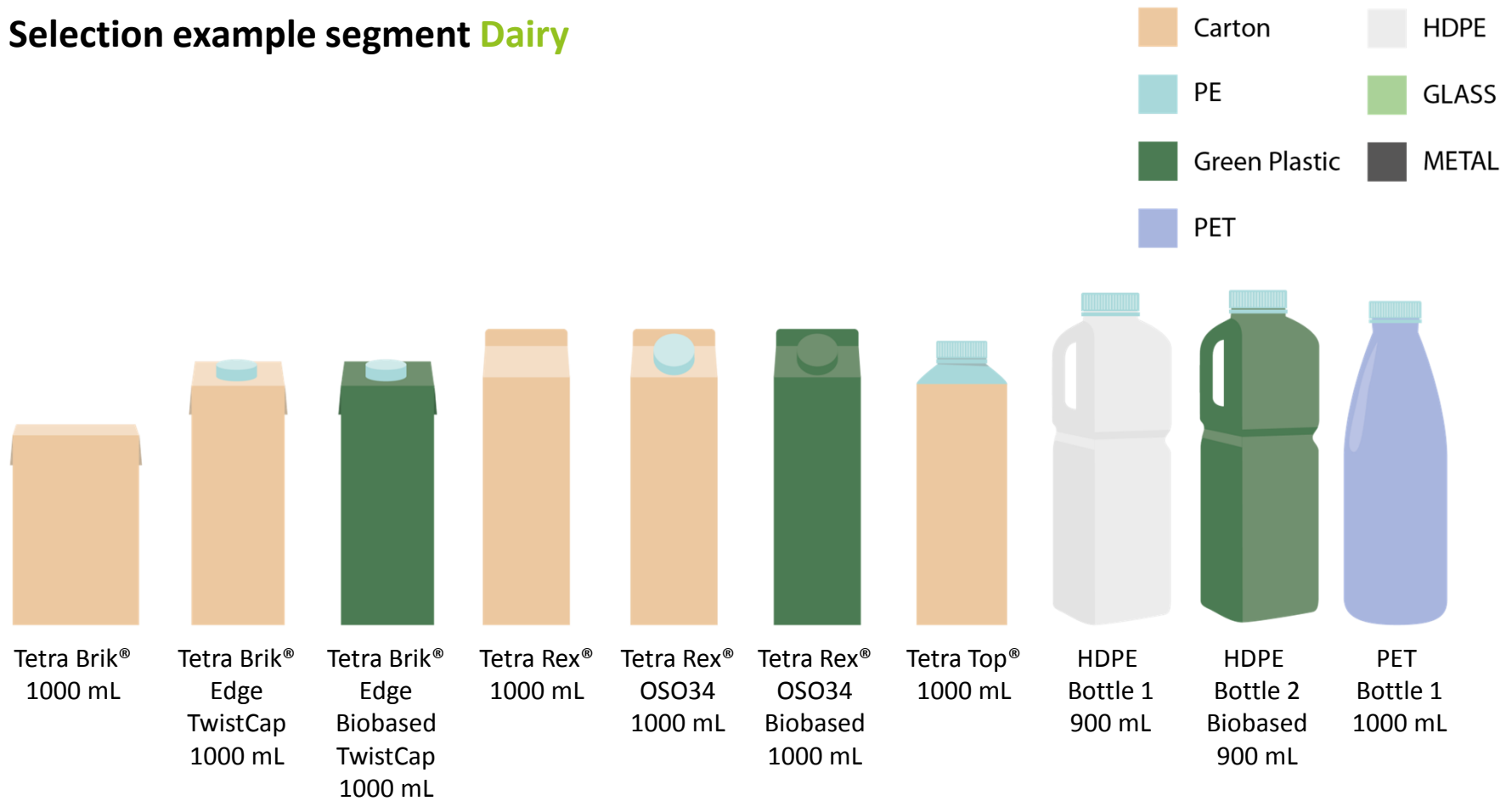
# Environmental categories



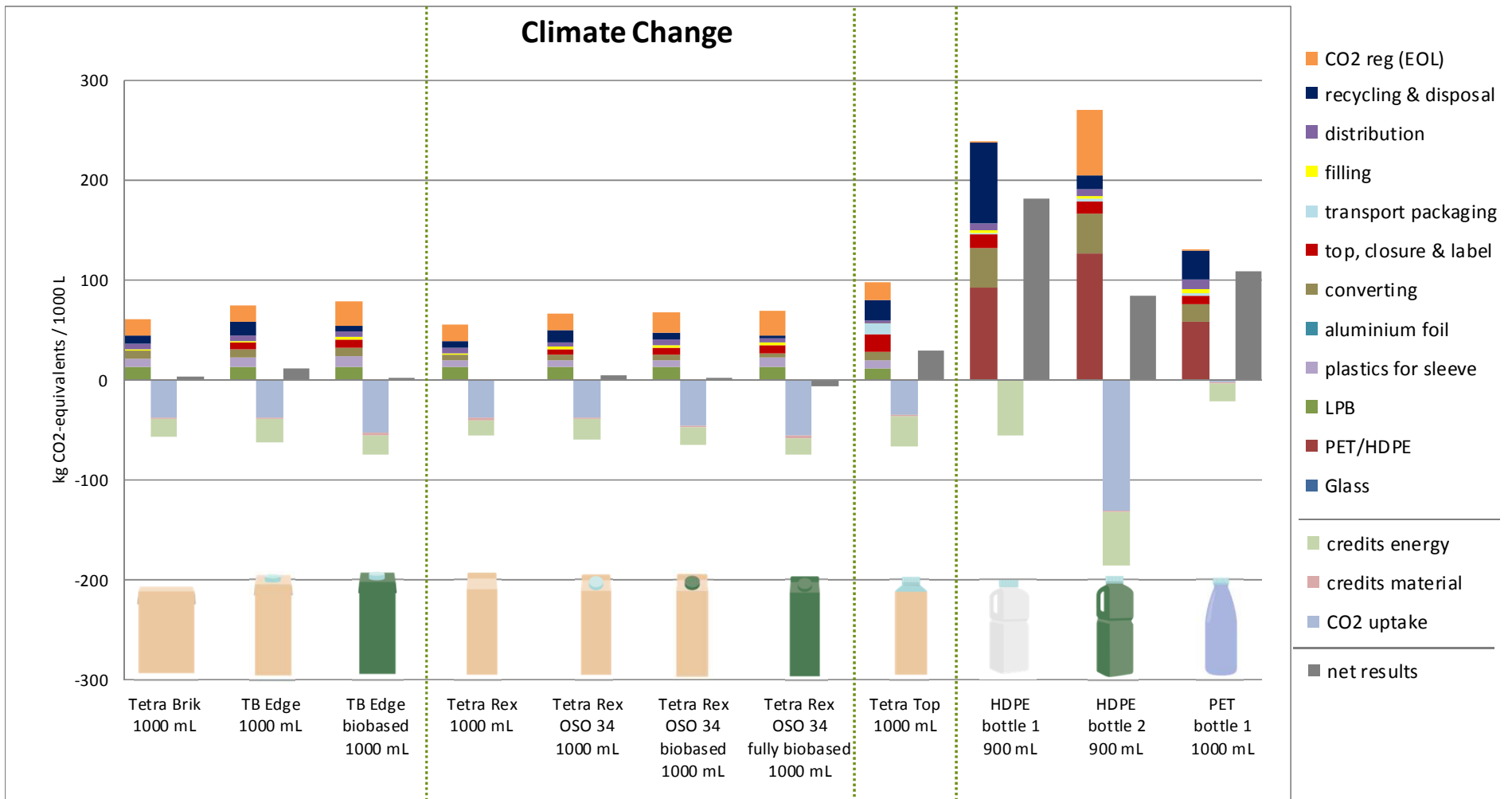
# Selection of segments & systems **Sweden**



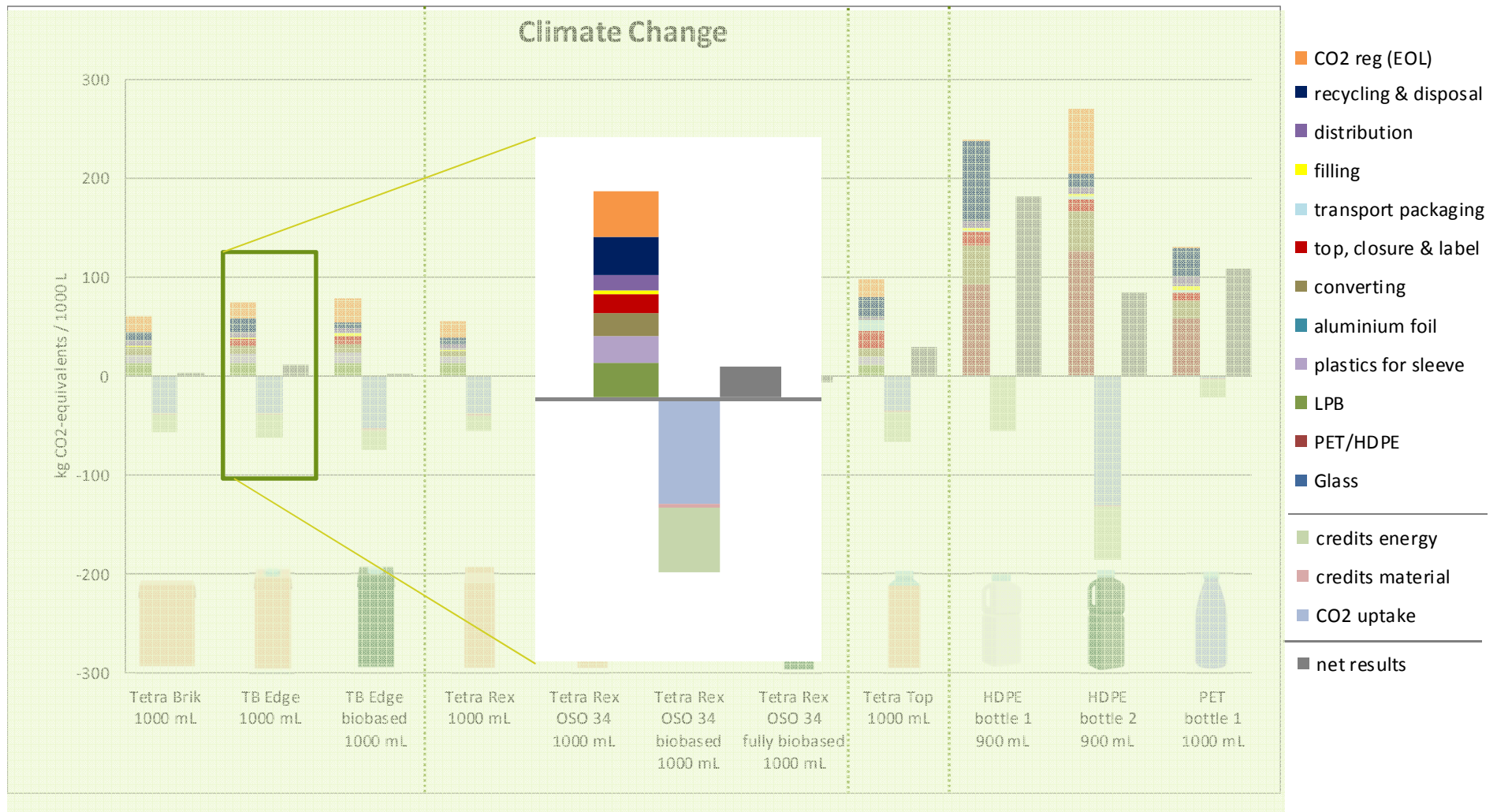
## Selection example segment **Dairy**



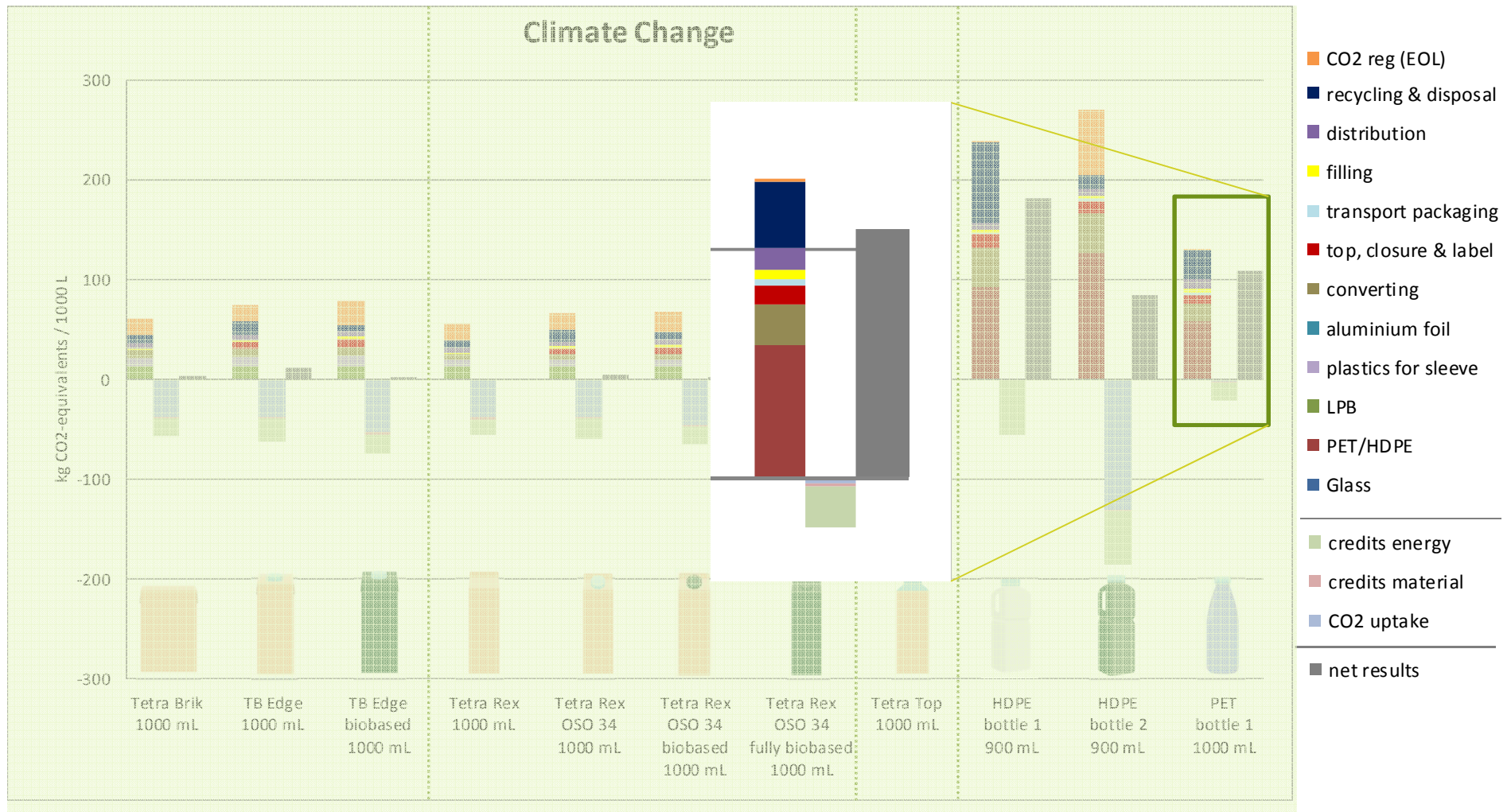
# Results Segment Dairy Sweden – Base scenario



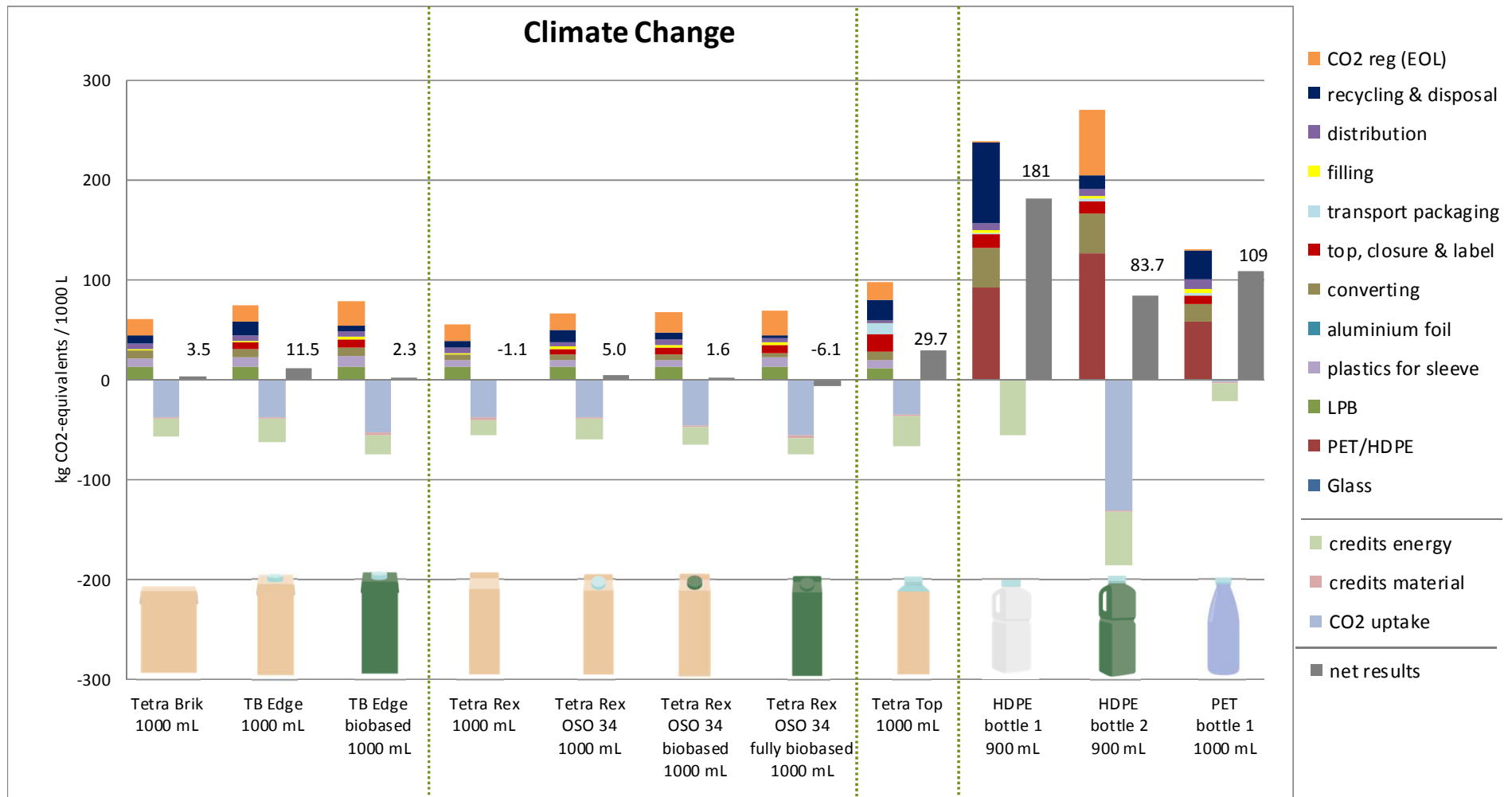
# Results Segment Dairy Sweden – Base scenario



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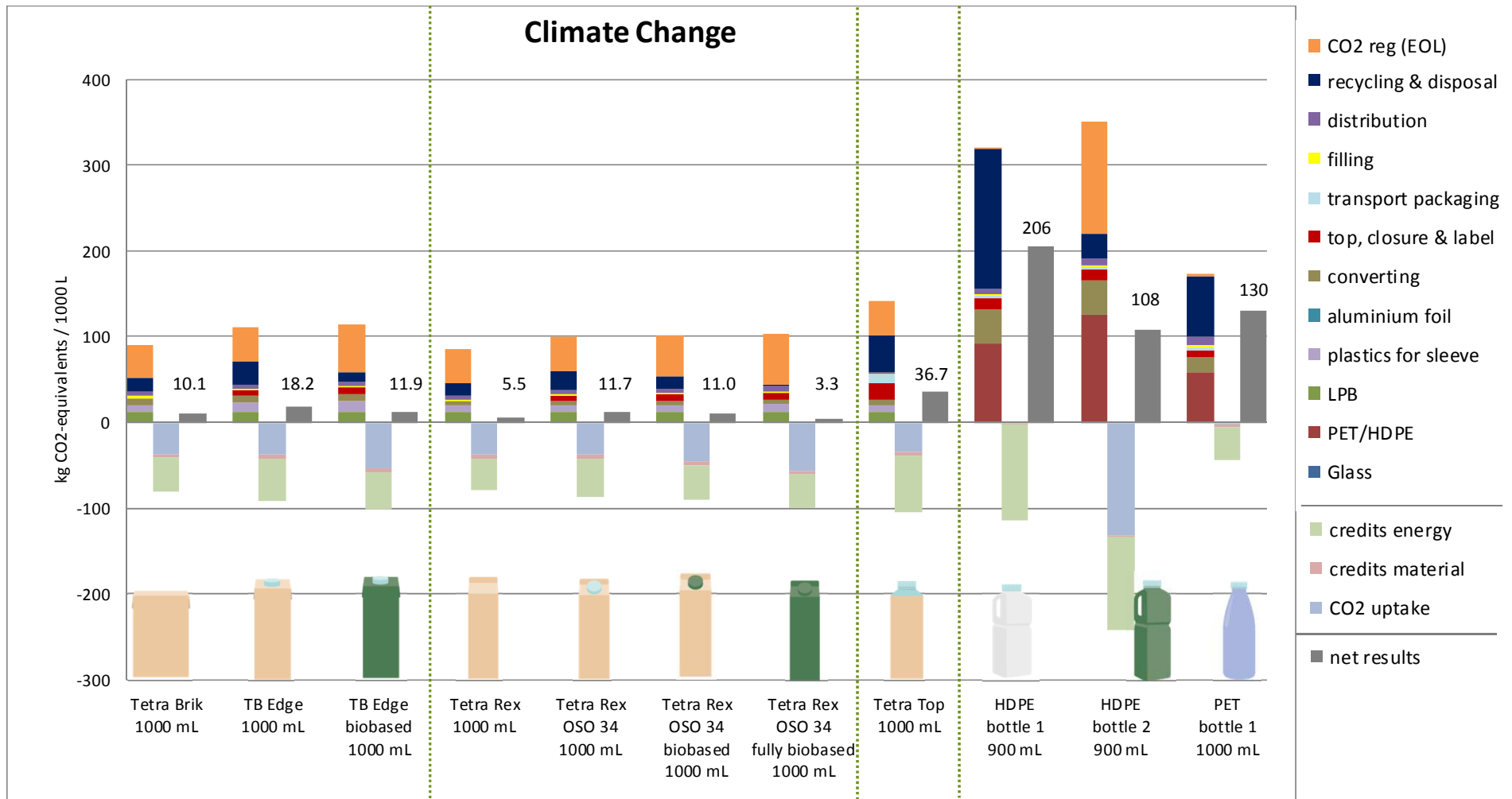


# Results Segment Dairy Sweden – Base scenario





# Results Segment Dairy Sweden - Allocation factor 100%

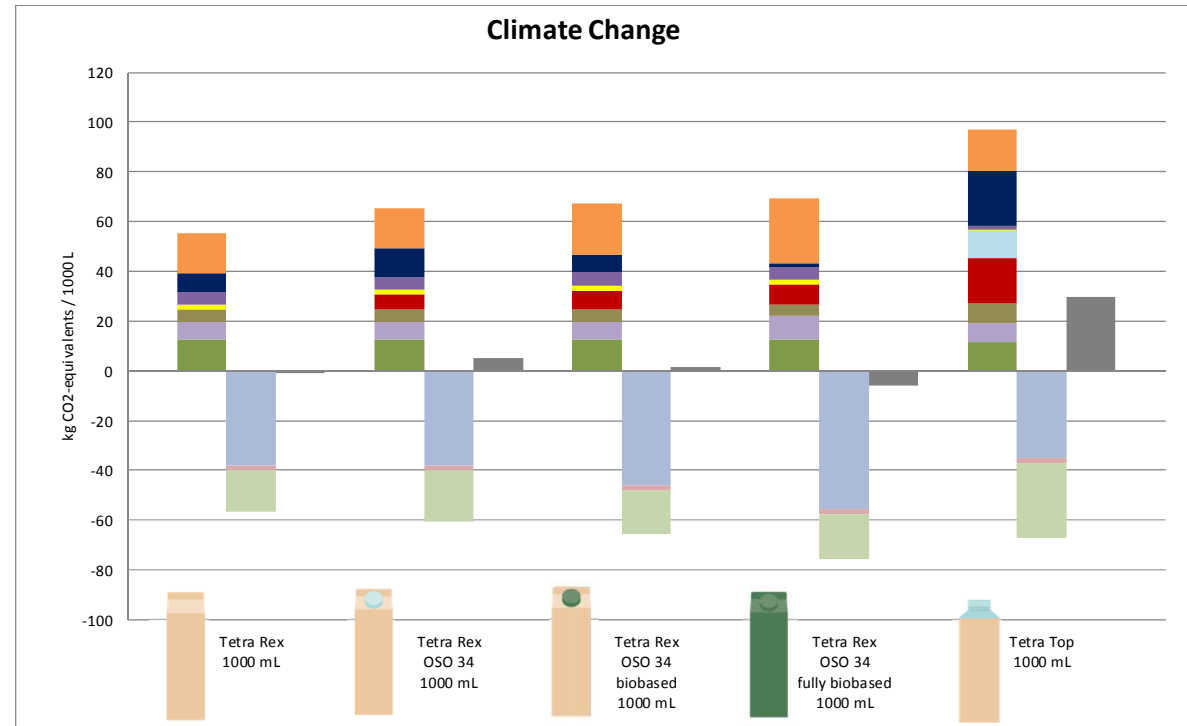


# Results Segment Dairy Sweden – Key findings



## Lower results for beverage cartons in Climate Change

- No closure
- Biobased closure
- Fully biobased carton
- No transport packaging



# Results Segment Dairy Sweden – Key findings

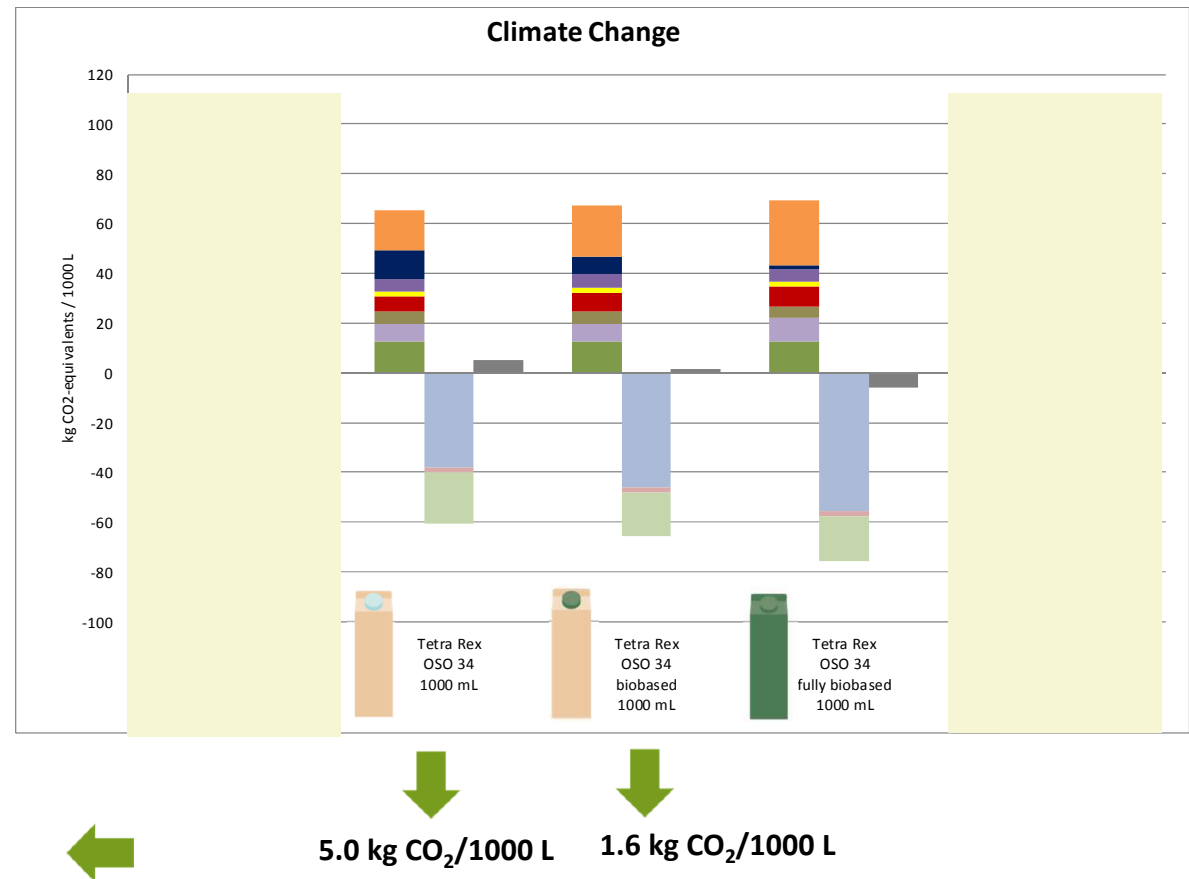


## Lower results for beverage cartons in Climate Change

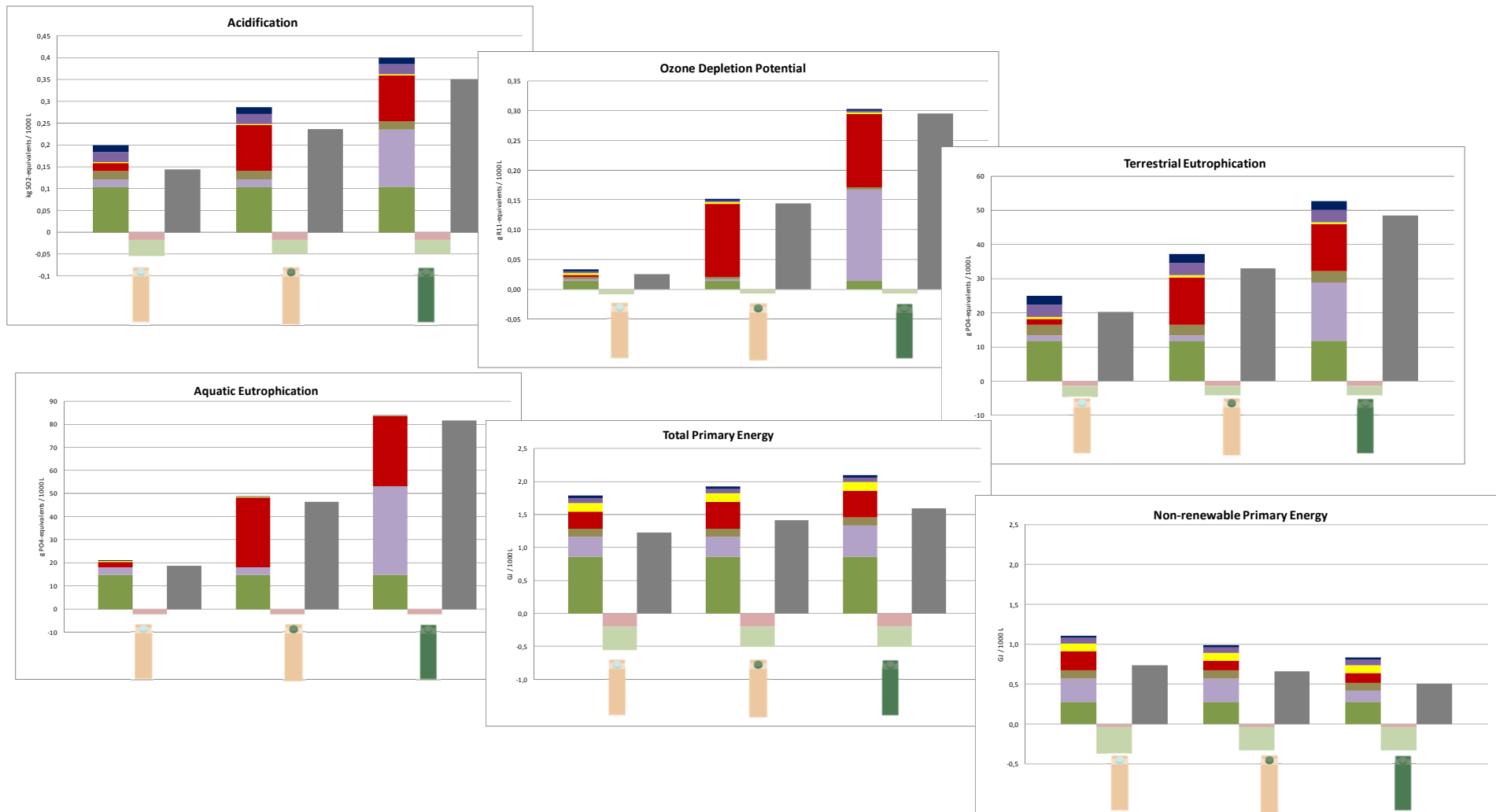
- No closure
- Biobased closure
- Fully biobased carton
- No transport packaging

### Example biobased closure:

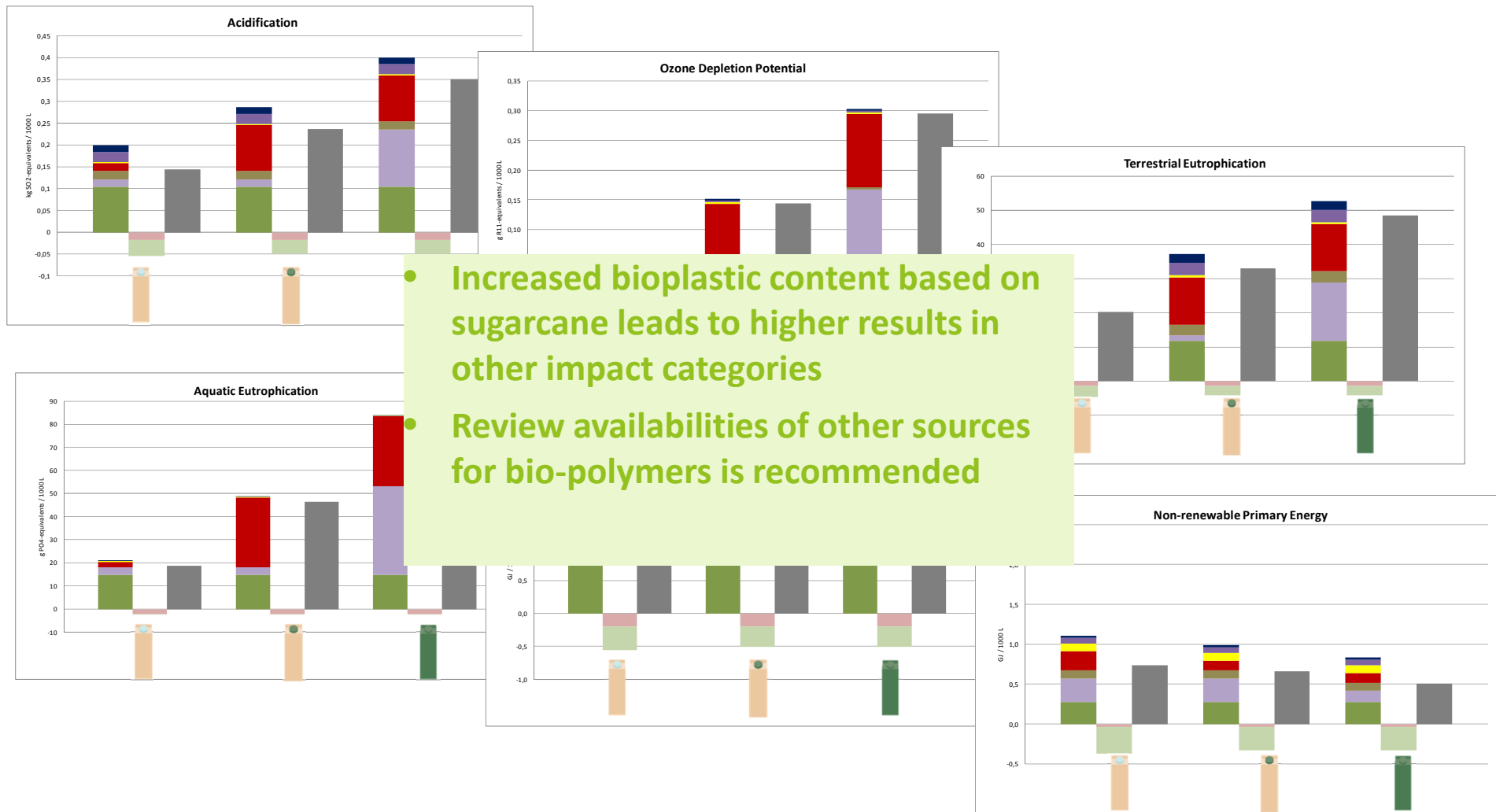
Substitution of 2.6 kg of fossil PE per 1000 packaging units by the same amount bio-based PE leads to a saving of 3.4 kg CO<sub>2</sub>-eq.



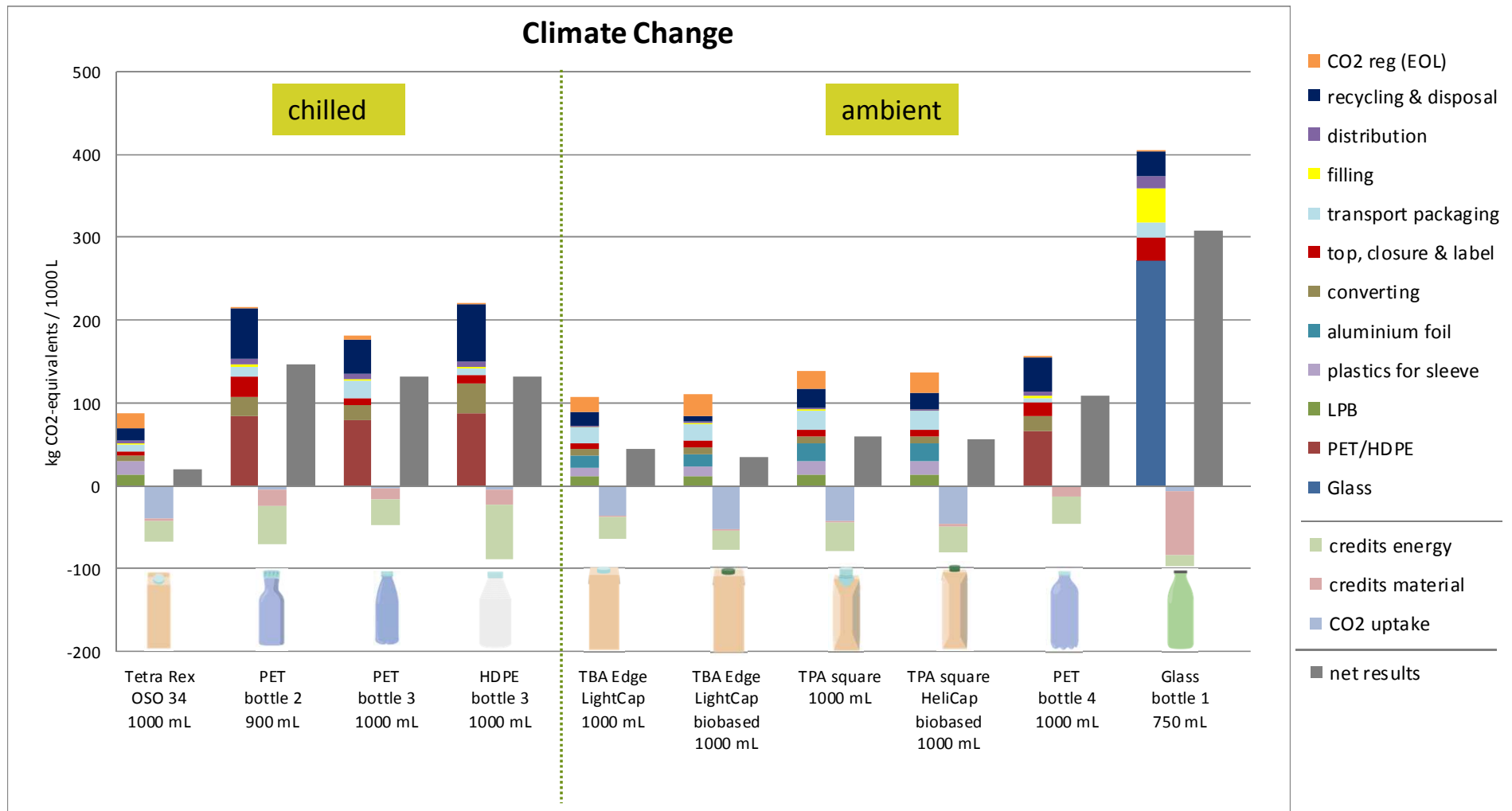
# Results Segment Dairy Sweden - Key findings



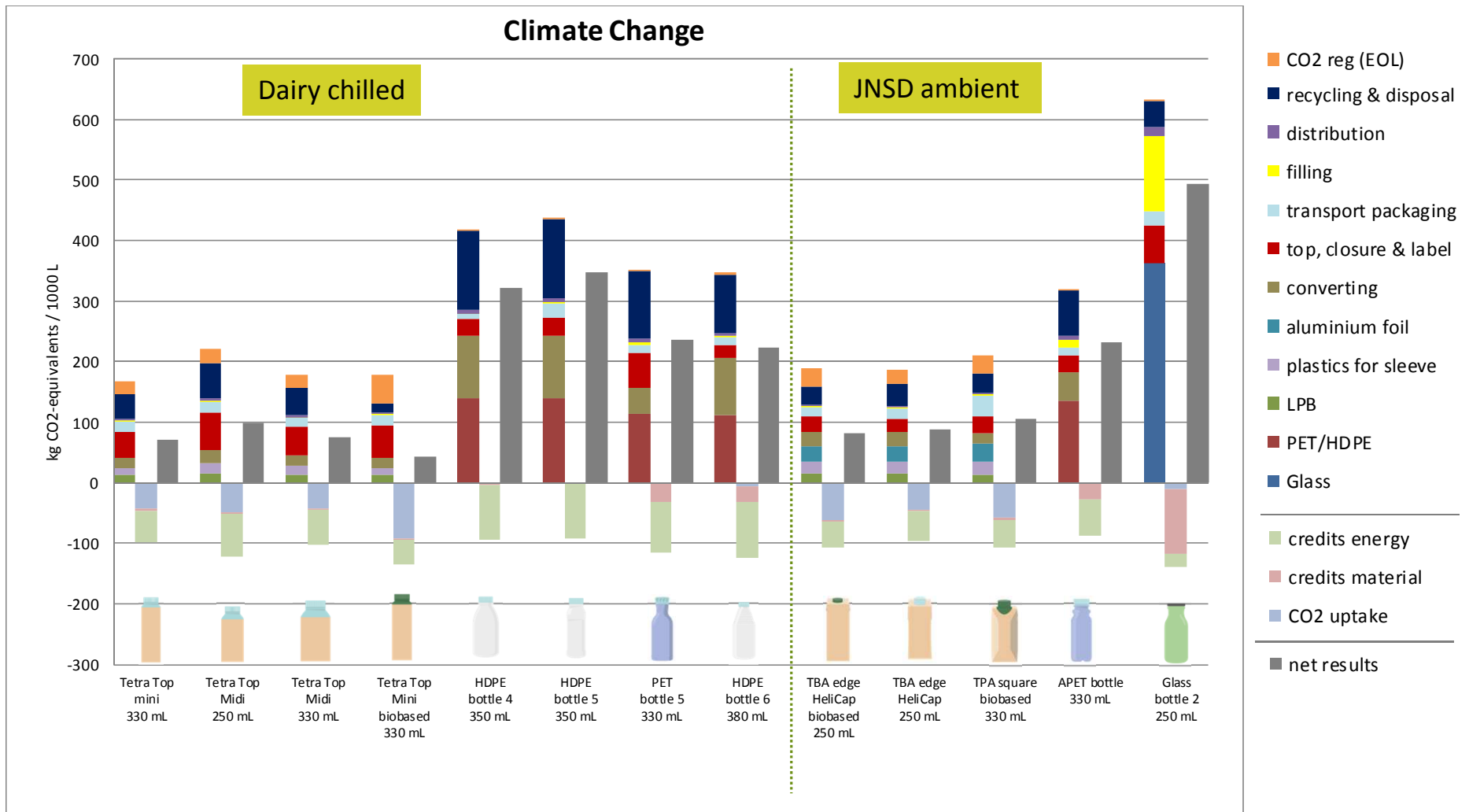
# Results Segment Dairy Sweden - Key findings



# Results Segment JNSD Sweden



# Results Segment Grab & Go Sweden



# Overarching conclusions & recommendations

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- Low LCA results for beverage cartons in most environmental impact categories compared to alternative systems in the segments Dairy, JNSD and Grab & Go in Sweden
- Benefit from use of renewable materials in production processes
- Use of biobased polyethylene instead of fossil-based material leads to lower results in 'Climate Change'
- Cultivation phase of biobased PE increases environmental impacts in other impact categories
- With strong focus on climate change mitigation in Tetra Pak's policy, utilisation of biobased PE can be an applicable path
- Review of availability of others sources for bio-polymers is recommended to examine if lower environmental impacts can be achieved







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Thank you for your attention

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