

Environmental modeling of physical flows

IVL applied life cycle assessment, carbon footprinting, and material pinch analysis to estimate the potential or expected resource and environmental benefits of specific elements of the DYNAMIX policy mixes:

- Information campaigns to change diets and food-waste management
- Redistribution and donation of food to reduce food waste
- A feebate system on cars (combines subsidies on the best products and fees on the worst products)

- Research and development to improve copper removal in car dismantling
- Product standards that specify material choice in water piping
- A tax on all materials used in the EU
- Etc.

This poster presents three examples from the forthcoming report "Physical and environmental assessment".

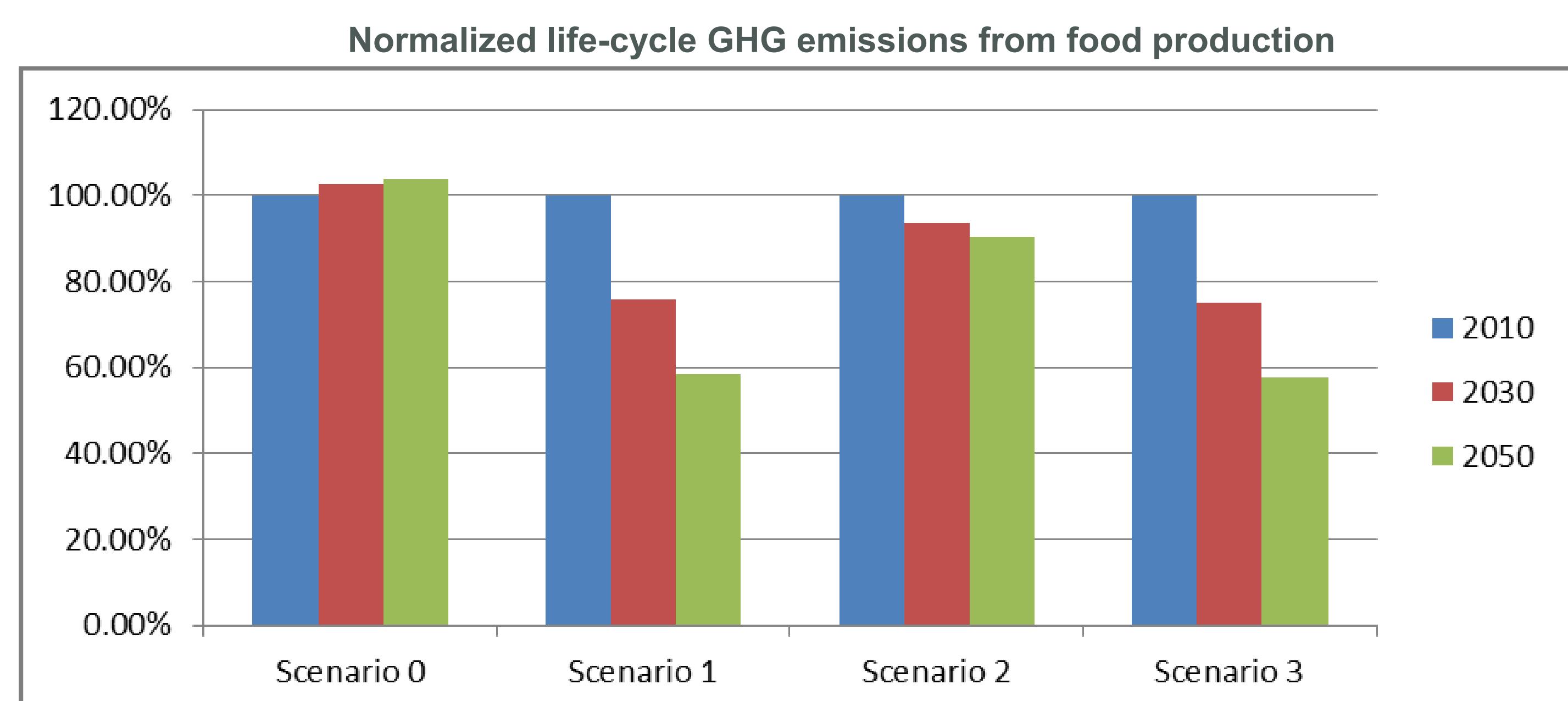
Dietary changes: reducing the overconsumption of protein is important for the climate

LCA of four scenarios for changes in diets in a slowly increasing EU population

- Scenario 0: No change in diets
- Scenario 1: overconsumption of protein is eliminated through reduced consumption of meat
- Scenario 2: meat consumption shifts from bovine and pork to poultry
- Scenario 3: reduced meat consumption plus greater share of poultry

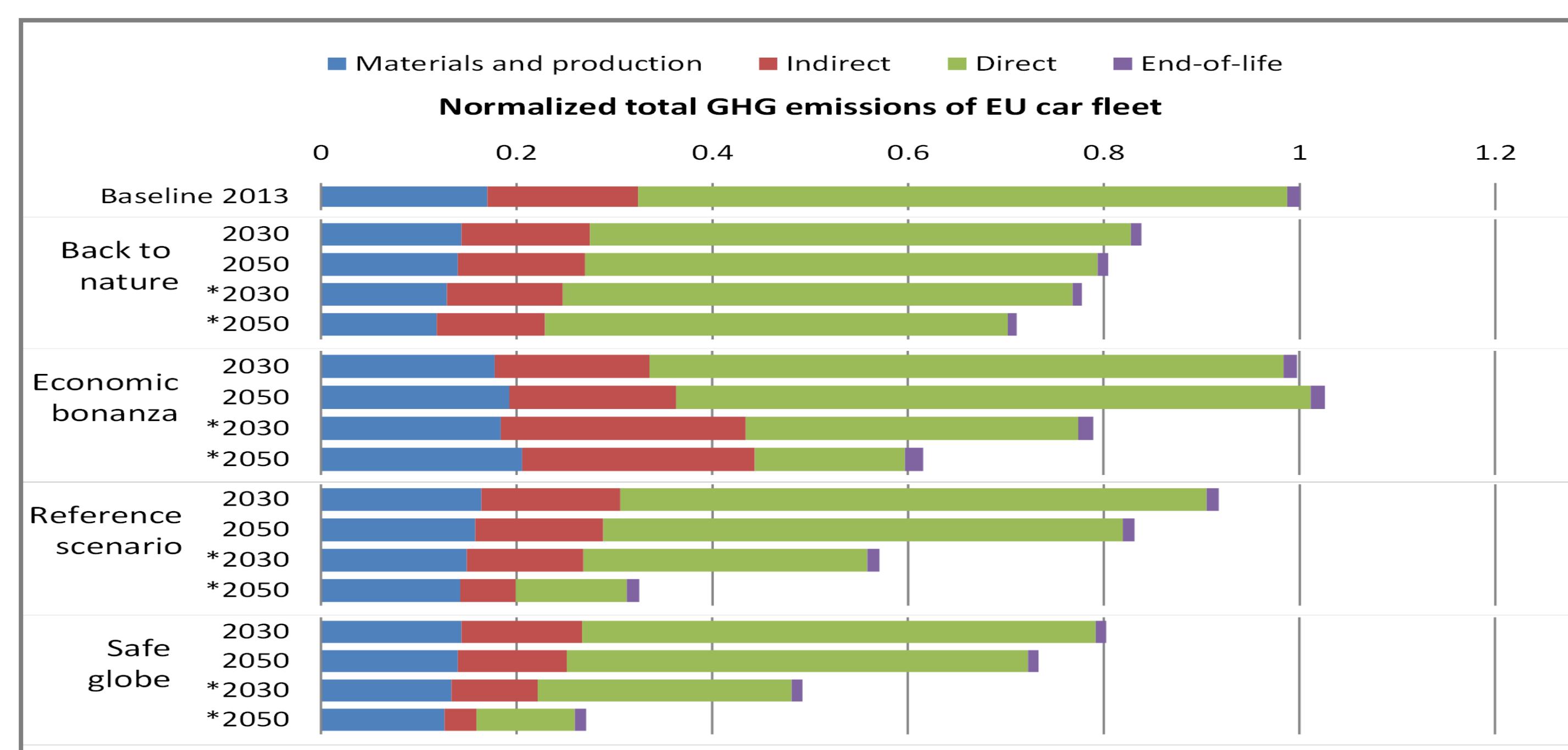
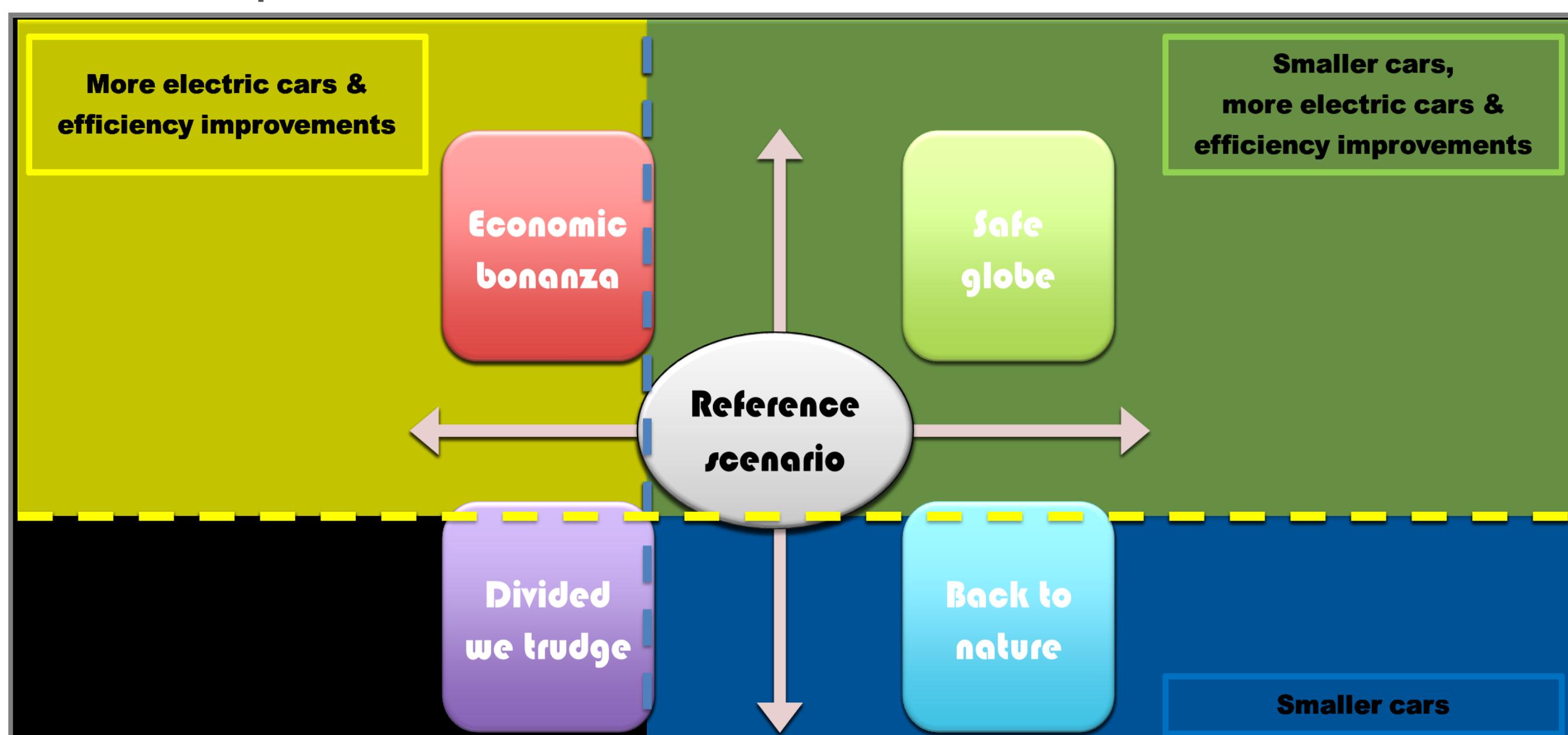
Conclusions from the dietary change scenarios

- Largest potential reductions in GHG emissions come from significantly reducing meat consumption (in particular bovine and pork) with nearly 40% GHG emissions reductions.
- Shift to more poultry does not lead to large emissions reductions
- Food consumption accounts for roughly 30% of current per capita emissions in Europe
- In the future improvements to agricultural processes may be needed to further decrease emissions although reducing protein intake is an important contribution to the DYNAMIX targets



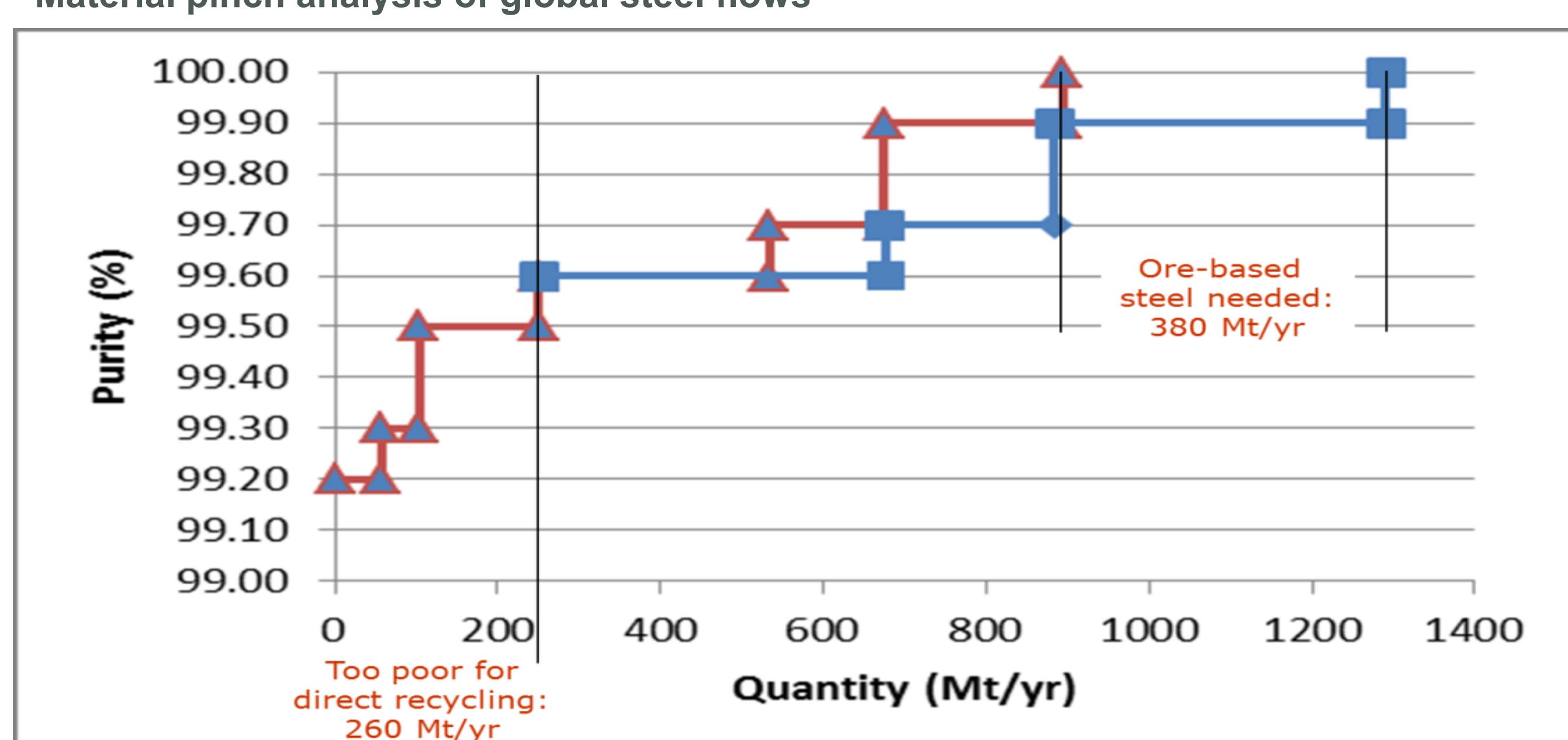
Feebate on cars: technological shifts bring greater potential benefits than reduced car size

Assumed impact of feebate in different future scenarios



R&D for recycling: improved dismantling processes increase long-term recyclability of steel

Material pinch analysis of global steel flows



Conclusions from the material pinch analysis

- Ore-based steel is in the long term required to substitute for material losses in the steel flows.
- In the very long term ore-based steel is needed to replace scrap discarded due to copper contamination.
- Extracting 75% of the copper currently in the steel scrap from cars and light trucks globally increase maximum long-term steel recycling by 20 Mtonne/year.
- Copper recycling increases immediately by nearly 250 ktonne/year.

Literature

- Ekvall T, Fråne A, Hallgren F, Holmgren K. 2014. Material pinch analysis: a pilot study on global steel flows. Metallurgical Research & Technology 111(6): 359-367.
 Ekvall T, Martin M, Palm D, Danielsson L, Fråne A, Laurenti R, Oliveira F. Forthcoming. Physical and environmental assessment. DYNAMIX Deliverable D6.1. IVL Swedish Environmental Research Institute.
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 Martin M, Danielsson L, Ekvall T. 2015. Environmental Implications of Dynamic Policies on Food Consumption and Waste Handling in the European Union. EXPO 2015 conference: LCA for feeding the planet and energy for life. Stresa, Italy.

