



(How to solve) Indirect Land Use Change from biofuels

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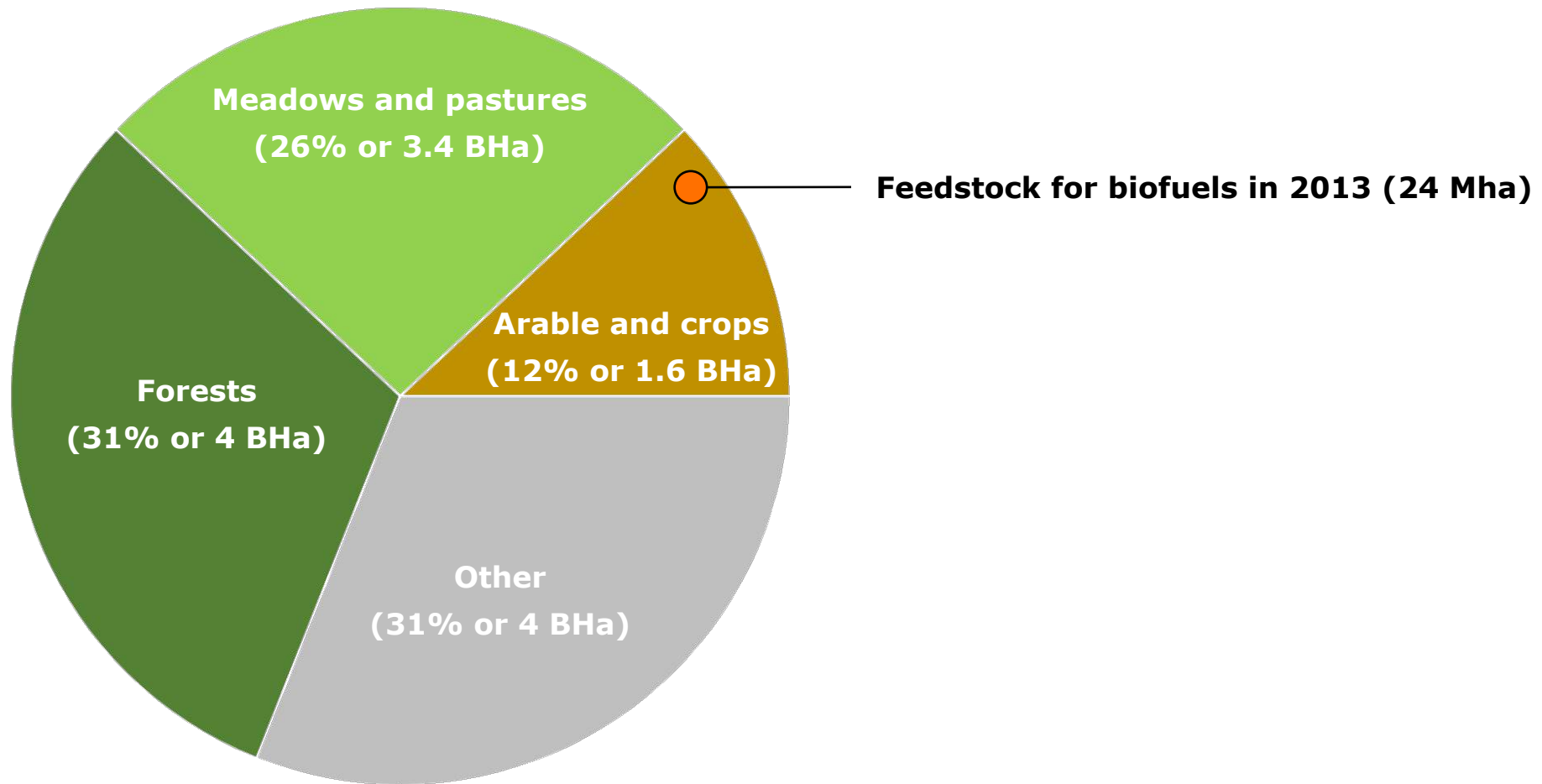
Platform Duurzame Biobrandstoffen - Utrecht



Indirect Land Use Change

Global agricultural land use

- > World land area: 13 billion hectare
- > Agricultural land: 5 billion hectare



ILUC concept: indirect land use change (simplistic explanation)

**Unused
High carbon land**



Unsustainable
Direct land use change

Existing farms & plantations



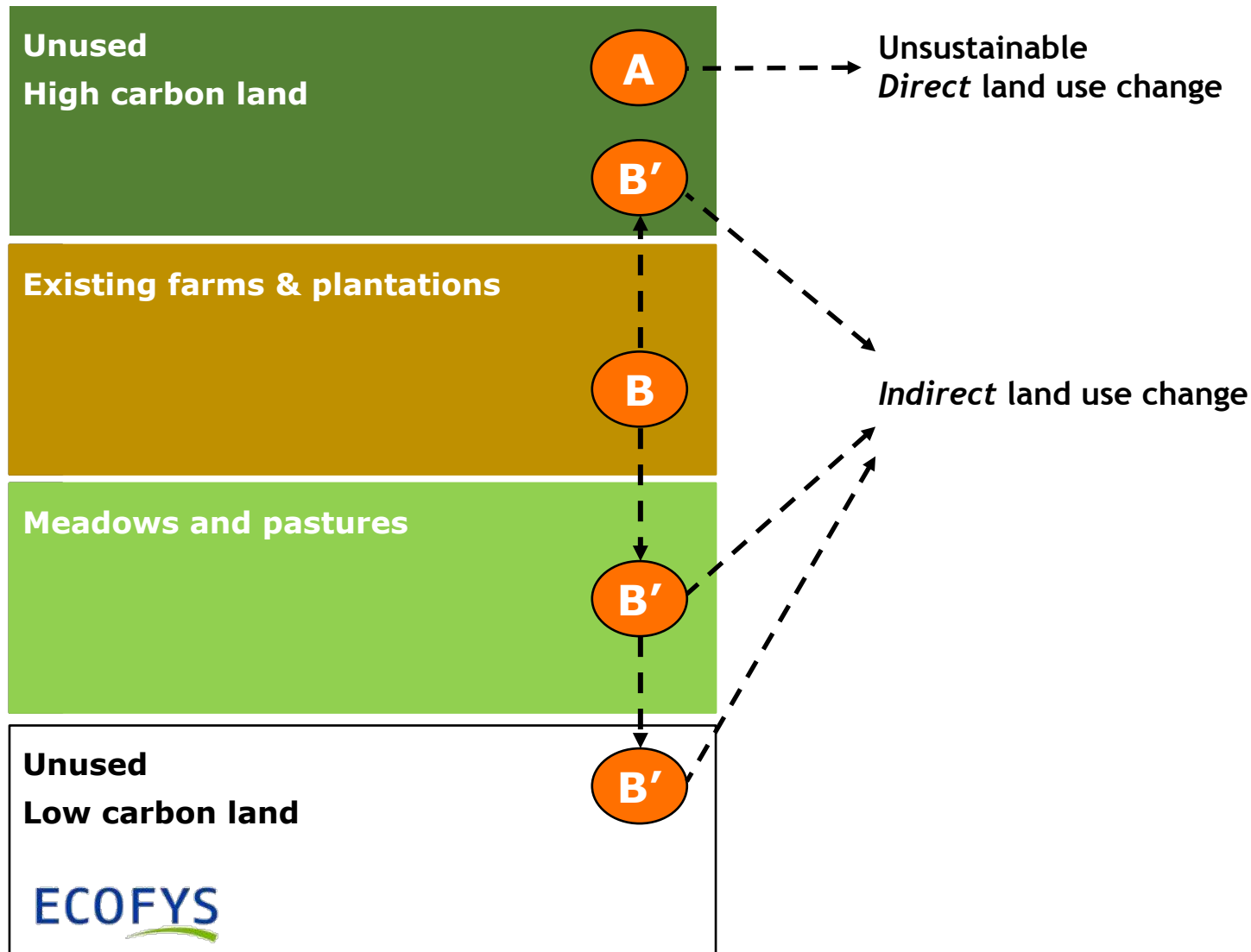
Using existing crops or land?

Meadows and pastures

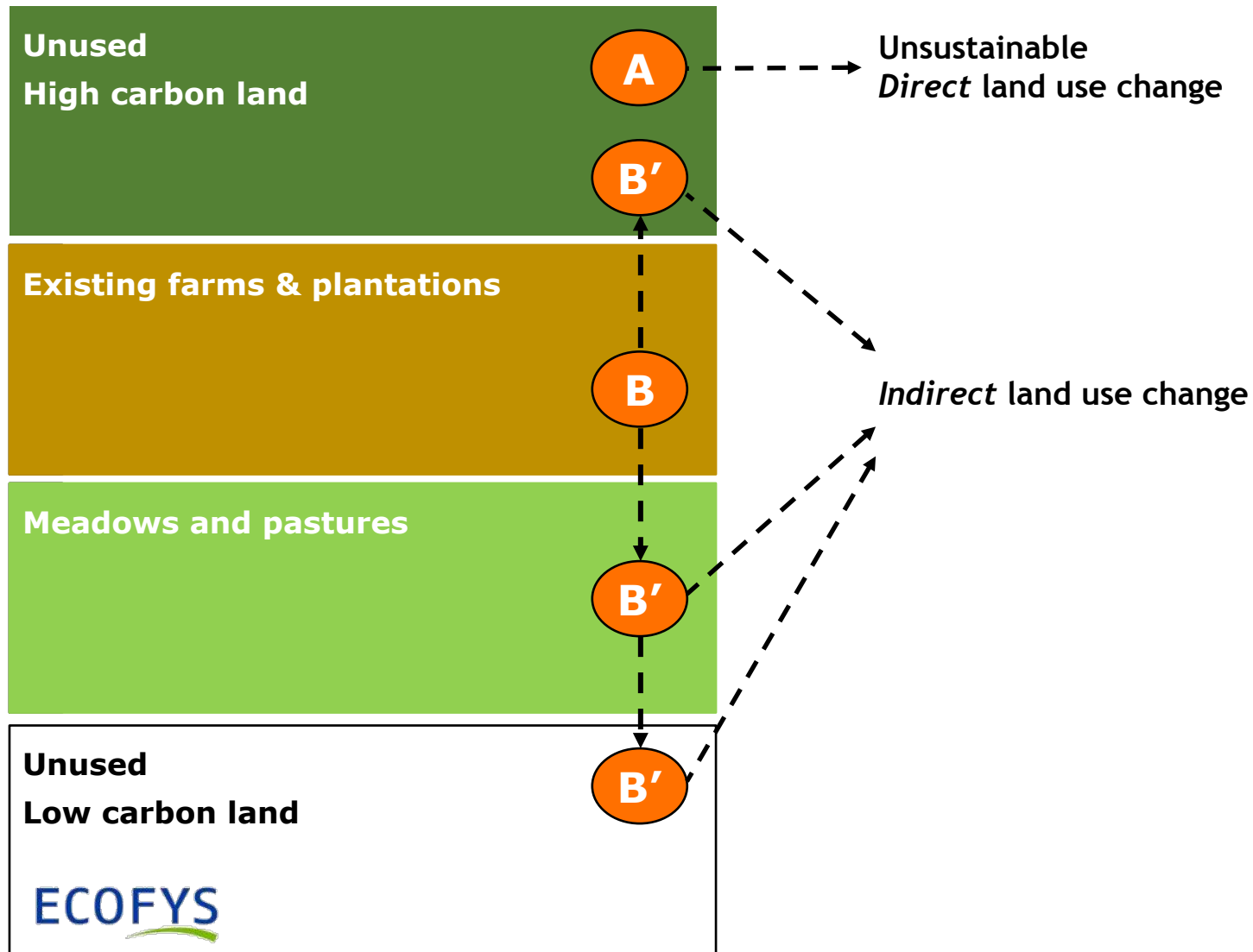
**Unused
Low carbon land**

ECOFYS

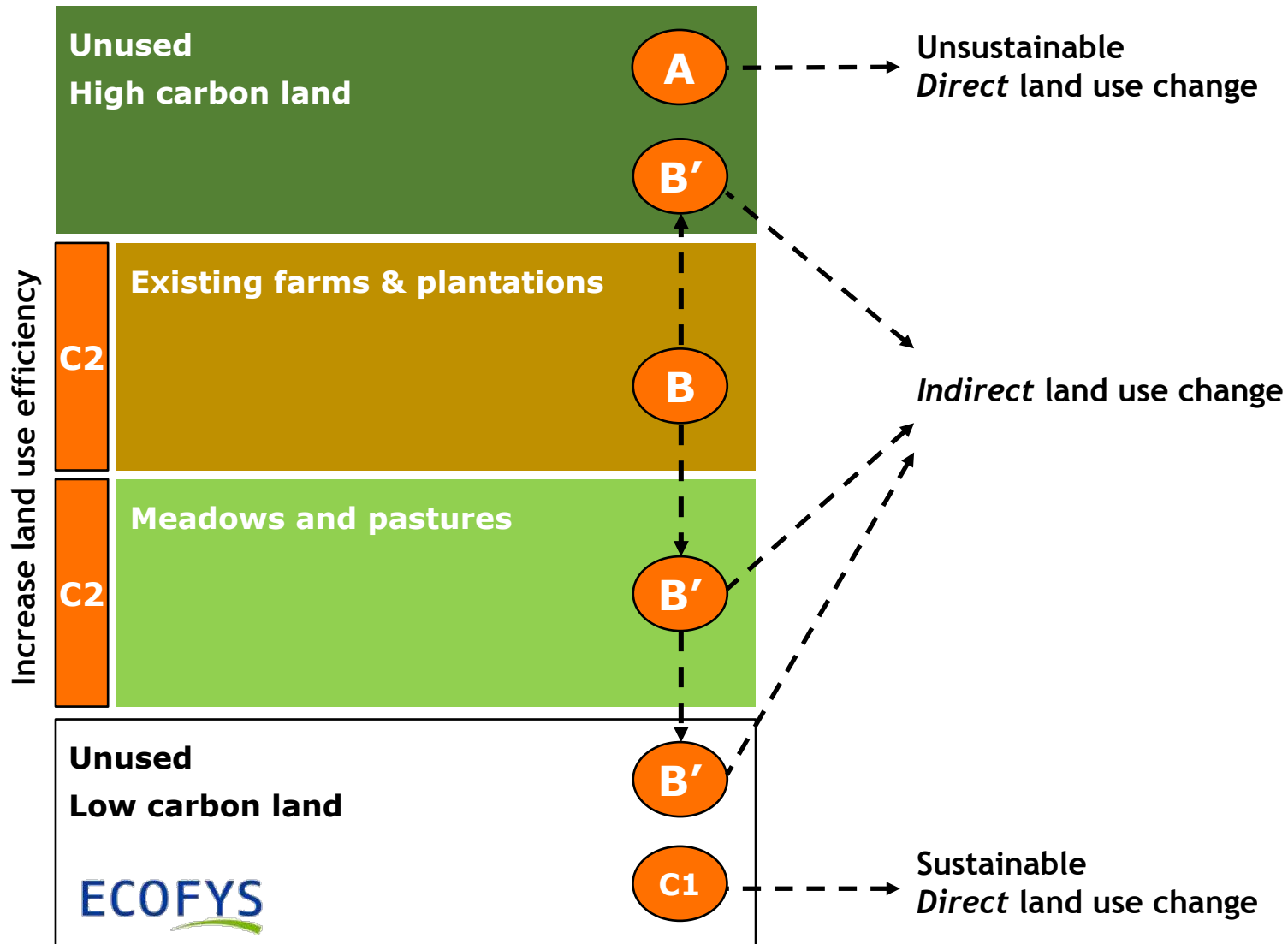
ILUC concept: indirect land use change (simplistic explanation)



ILUC can be avoided

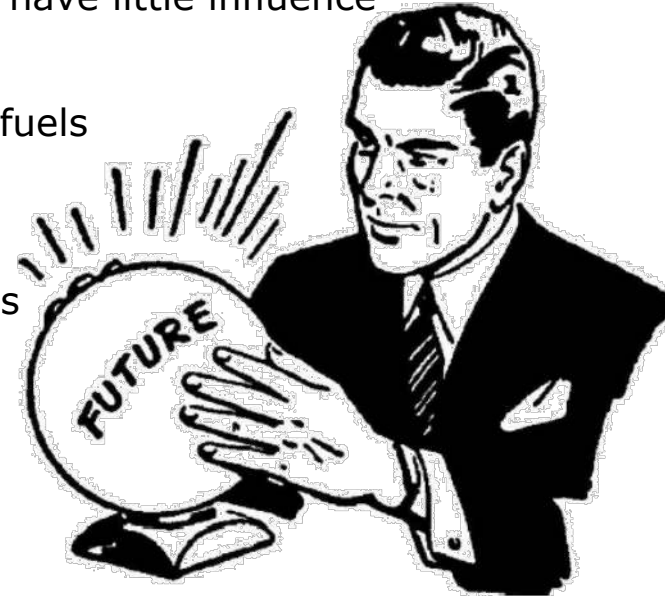


ILUC can be avoided



ILUC concept

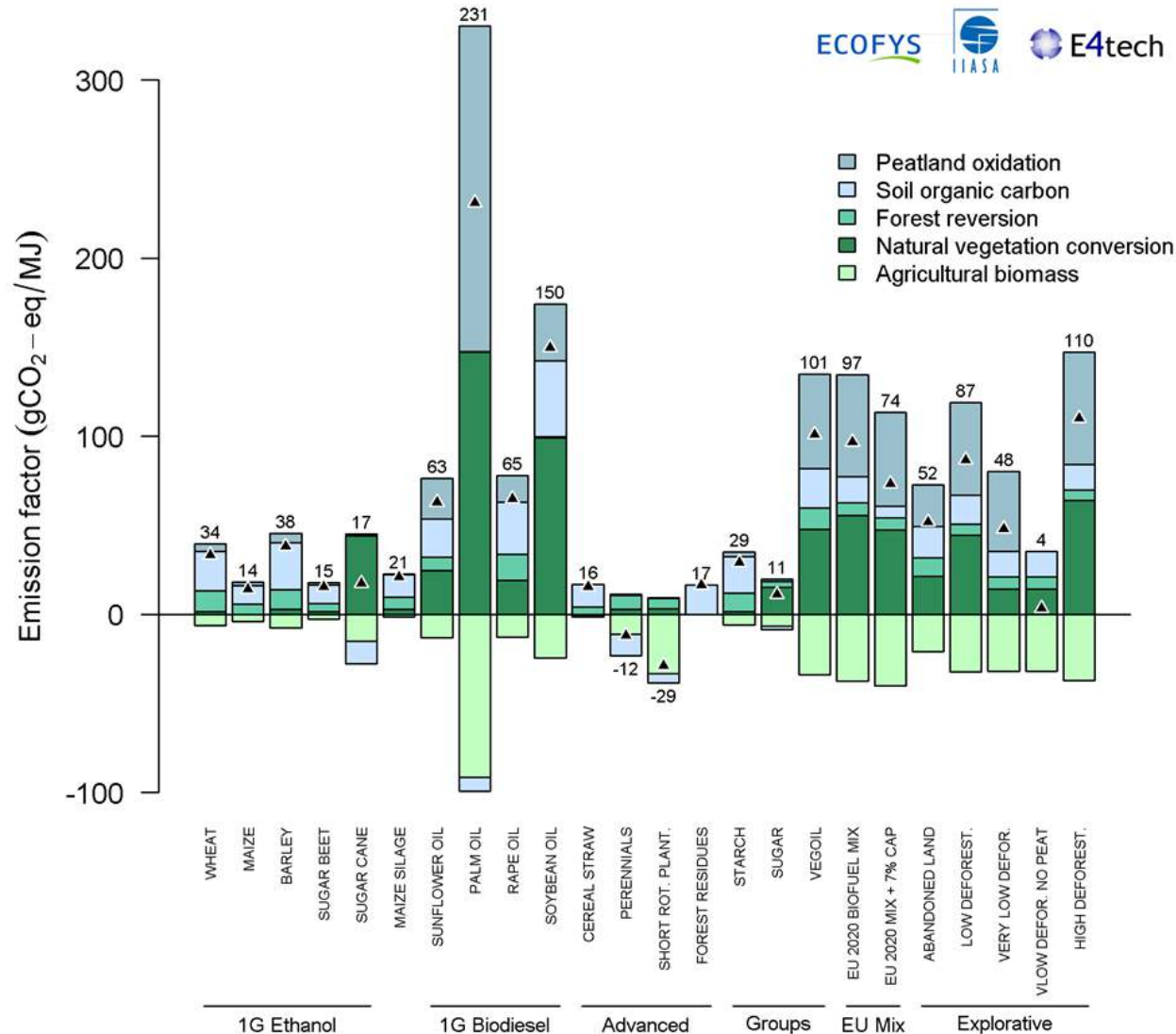
- > Political concern:
 - Increased consumption of biofuels require agricultural expansion at a global scale
 - Marginal land use change causes high carbon emissions
 - This limits greenhouse gas savings from biofuels application
- > Policy makers want to understand the larger consequences of their decisions
- > Biofuels industry feels unfair treatment – are not cause – have little influence
- > Models can shed some light on the land use impact of biofuels
- > ILUC quantification:
For a certain biofuels development, the land use change is quantified worldwide, and compared to counterfactual, i.e. the world without that development





Key results

Globiom – Summary of model results



Globiom – Summary of model results

- > Conventional biodiesel feedstocks have typically large ILUC impact
 - Loss of soil organic carbon in grass and forest land
 - Peatland drainage and oxidation
 - Direct and large impact on palm oil
 - Indirect and reduced impact on other vegetable oils via substitution
- > Both conventional ethanol and advanced fuels have lower ILUC impact
 - Higher yields give lower impacts
 - Less / no connection to palm oil
- > Remarkable that contribution of conventional ethanol is limited in RED II proposal
- > Energy crops have negative ILUC because of increased carbon stock
- > Forestry residues not better than ethanol, as soil organic carbon does not increase
- > Straw can have 0 ILUC if straw removal rate is limited to 30-50%
- > EU biofuels mix has high impact *if 1/6 of additional biofuel concerns palm oil biodiesel*
- > ILUC impact almost halved if EU abandoned land is used

Some findings are counter-intuitive

- > ILUC is very much a local problem
 - With less deforestation globally (assume carbon price of only USD 50/tCO₂) and with no peatland drainage in Indonesia, Malaysia, ILUC would almost disappear

- > Foregone sequestration:
 - Without biofuels, more EU cropland is abandoned and partially becomes forest
 - Assumes (accepts) decline of EU agricultural sector

- > Results for straw depend much on extend and location
 - Same probably holds for other waste products

- > Co-produced animal feed
 - Leads to decreased soy production in Latin America → good
 - Which in turn leads to increased palm oil in South East Asia → bad
 - (Still, overall LUC impacts decrease as result of co-products)

Important notices

- > ILUC factor is only for additional biofuels compared to 2010 level

- Transport and Environment (NGO) interpretation incorrect

- ILUC factors do not add to direct emissions for all biofuels

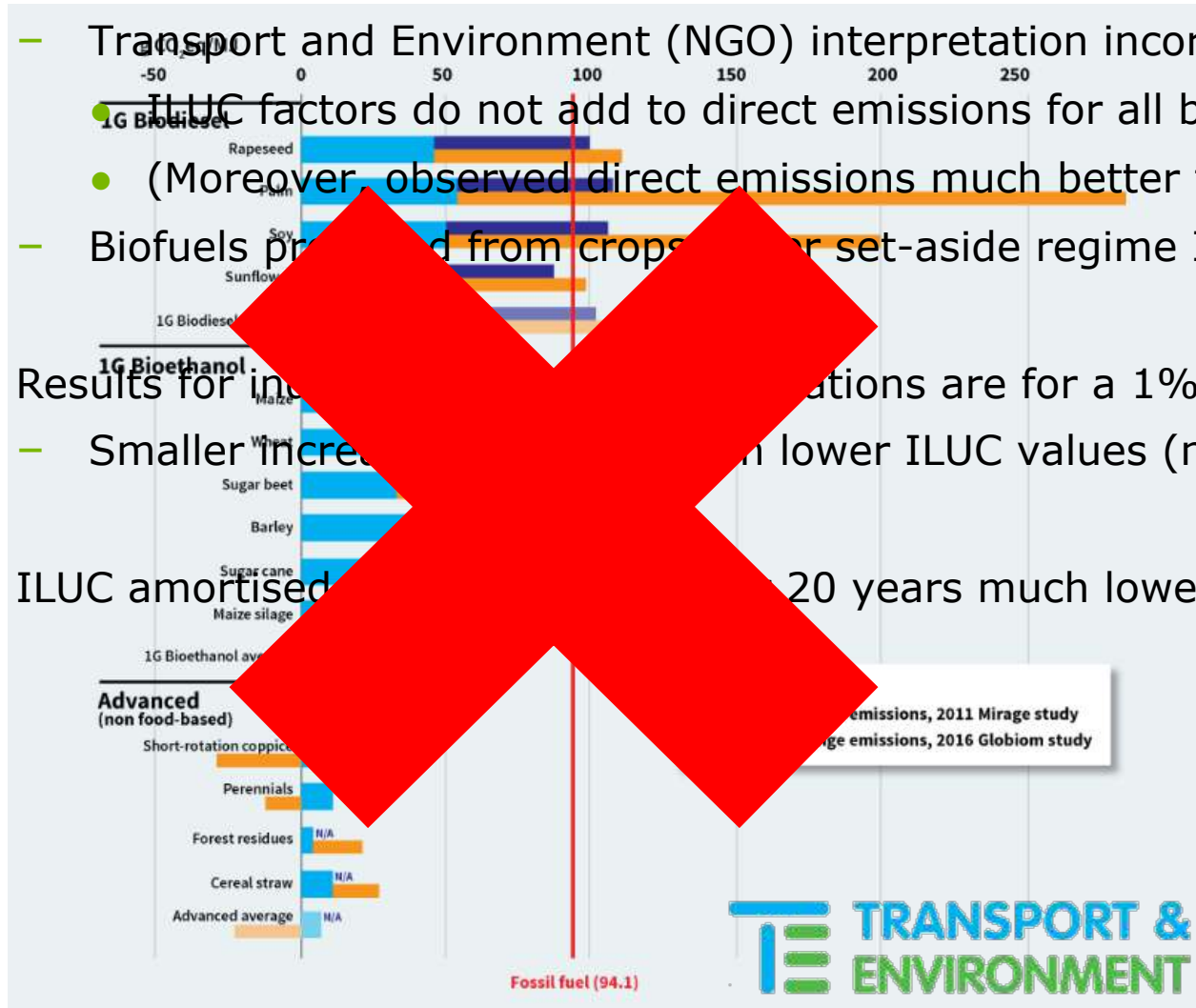
- (Moreover, observed direct emissions much better than RED typical)

- Biofuels produced from crops or set-aside regime ILUC free

- > Results for indirect emissions are for a 1% increase from 2010

- Smaller increase in lower ILUC values (non-linearity)

- > ILUC amortised over 20 years much lower value





What if higher yields?

Precision farming and smart fertilisation



Smarter use of land

> Cane – cattle integration



> Multi-cropping



Bridge yield gaps in developing countries



What if ban on palm oil in EU biofuels?

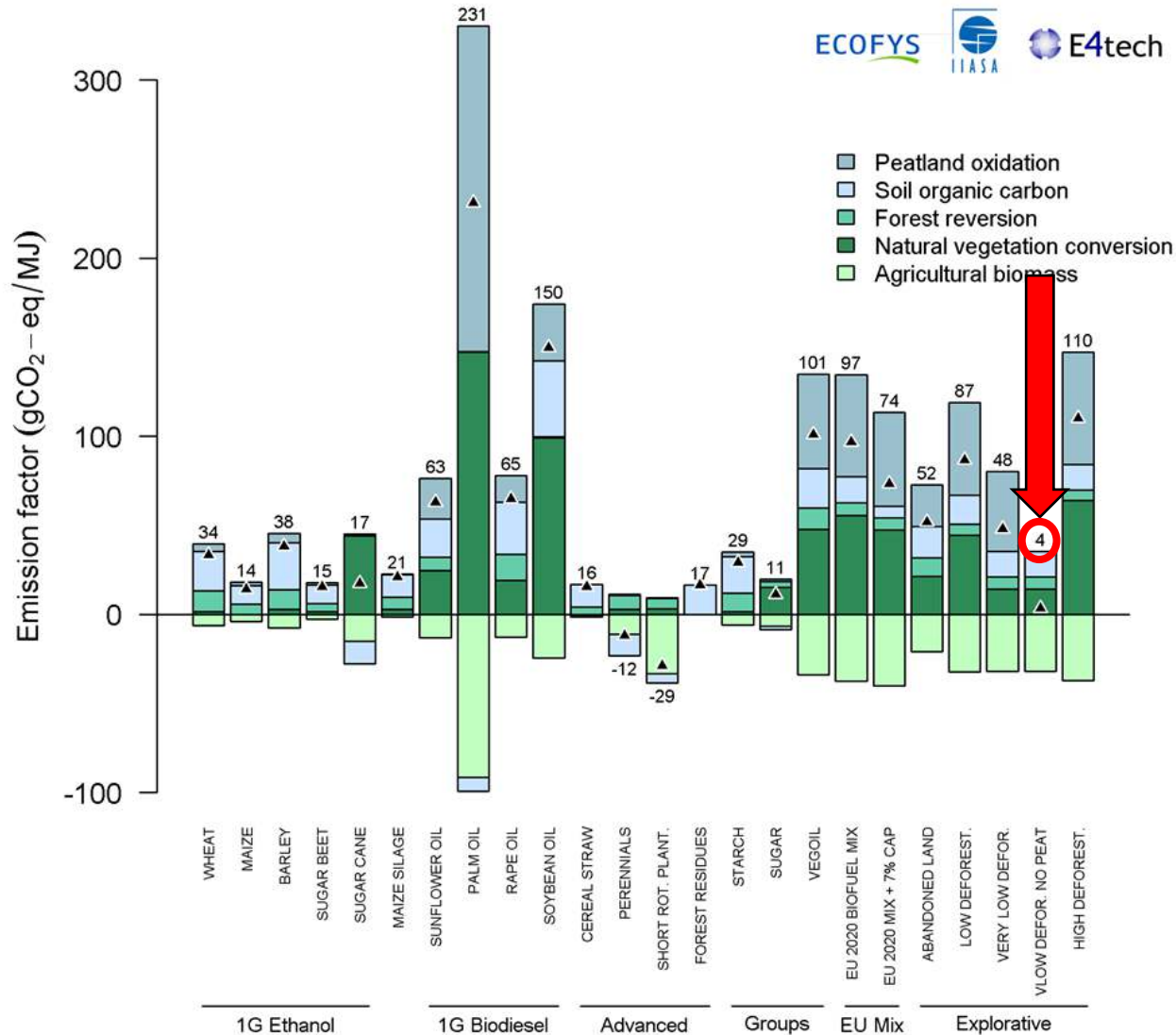
Palm oil ban from EU biofuels

- > Palm oil is feedstock with largest concerns
- > RSPO RED forbids dLUC, but cannot address ILUC
- > Phase out of palm oil from EU biofuels
 - Delays palm oil expansion for other uses for a certain time
 - This delivers an ILUC advantage compared to keeping palm oil
 - Replacing palm oil with other vegoil in EU biofuels probably beneficial for ILUC impact
 - Does not avoid palm oil expansion in long-run
- > Complementary measures?
 - Set stricter requirements to palm oil in EU food?
 - Assist Indonesia in stopping unsustainable expansion?



Achieving COP21 targets?

Globiom – Summary of model results



The image features a minimalist design. A horizontal grey band spans the width of the image, positioned in the upper half. Overlaid on this band and extending slightly above and below it are several thin, white, curved lines that intersect to form a subtle, abstract pattern. The text "Way forward" is written in a green, sans-serif font, centered horizontally within the grey band.

Way forward

Way forward

- > Sustainable biofuels are essential for sustainable transport (next to other solutions)
- > Biofuels are not automatically good or bad
- > The potential for sustainable biofuels can be very large
 - This requires improvements in agricultural practice and system
- > In long run, bioenergy and -materials have low greenhouse gas emissions
 - ILUC pays back: much smaller or even zero after 20 years
 - Fossil fuels never pay back – instead, emissions increase
- > Deforestation & peatland drainage will not stop in absence of biofuels
 - Under global 1.5C scenario these practices will stop → ILUC disappears
- > Produce biofuels feedstock without ILUC
 - Increase yields above baseline (especially relevant for “food crops”)
 - Developed countries: innovations: precision farming, multi-cropping
 - Developing countries: bridge yield gaps: access to means, know-how & market
 - Production on unused / abandoned land (direct & good Land Use Change)
 - Cellulose feedstocks, sustainable fraction of residues, and true wastes
- > Any ILUC mitigation measure should be credible and verifiable



**sustainable energy
for everyone**
