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EXPERTS IN SUSTAINABILITY

Impact of the renewable Energy Directive (RED) on GHG emission reduction

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1. PE INTERNATIONAL
2. EU directive RED
3. Examples

Impact of the renewable Energy Directive (RED) on GHG emission reduction

PE International
Worldwide

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PE-Sites ★ Software Sales Partner

PE INTERNATIONAL
established 1991
Employees: 58
Offices: Stuttgart

PE Asia established 1998
Employees : 4
Offices: Tokyo, Taipei

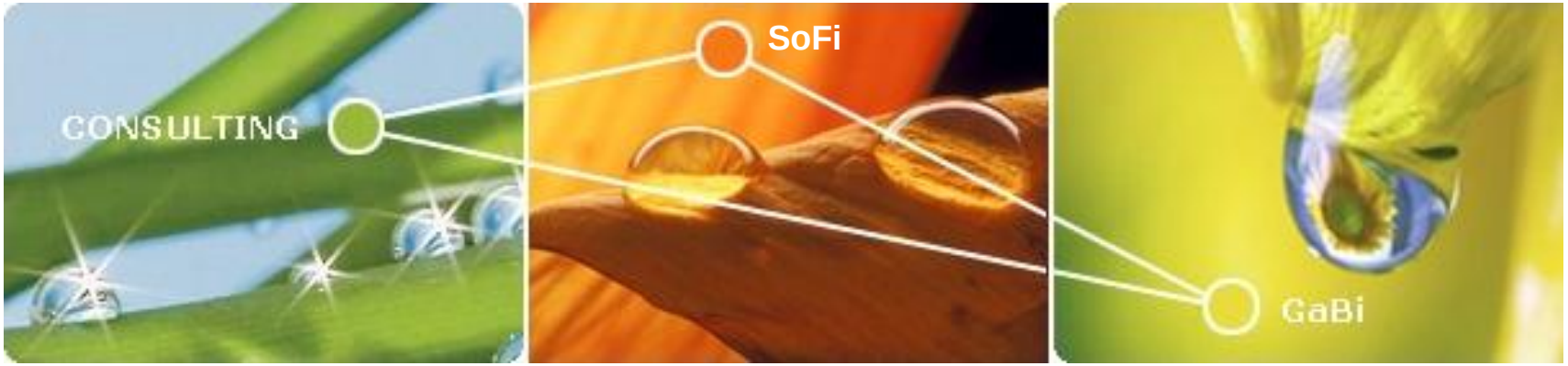
PE Americas established 1998
Employees : 11
Office: Boston

PE CEE (Central Eastern Europe)
established 2006, Employees : 6
Office: Vienna

PE Australia established 2006
Employees : 3
Offices: Perth

PE I Malaysia Sdn. Bhd.
established 2008, Employees : 3
Offices: Kuala Lumpur

Sustainability is a long-term issue – and has been a business model for PE INTERNATIONAL for 20 years.



- Life Cycle Assessment (LCA)
- Energy efficiency studies
- Strategy development
- Monitoring and Reporting Systems
- Carbon Footprints
- CDM and carbon offsetting
- Compliance and risk management
- Renewable energy
- Communication

- **Corporate Sustainability**
- Sustainability information management and reporting (e.g., GRI, ISO 14001, OHSAS 18000)
- Key Performance Indicator (KPI) systems
- Corporate Carbon Footprint
- Supply Chain Management

- **Product Sustainability**
- Life Cycle Assessment
- Design for Environment
- Product Carbon Footprint

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- **Automotive** — Audi, BMW, DaimlerChrysler, GM, Porsche, Renault, Toyota, VW,..
- **Automotive suppliers** — Autoliv, Behr, Bosch, Continental, Delphi, Mann+Hummel,...
- **Electronics** — Bosch, LG Electronics, Motorola, Nokia, Siemens, Sony,...
- **Materials** — Alcan, Alcoa, Arcelor-Mittal, ThyssenKrupp, Baosteel, WISCO, Samancor, Bayer, Solvay,...
- **Surface treatment** — ABB, BASF, Ciba, DuPont, Dürr, Eisenmann, PPG, Wörwag,...
- **Construction** — BV Baustoffe, Steine und Erden, HeidelbergCement, Sto,…
- **Heating** — Junkers, Vaillant, Viessmann, Wilo, Grundfos, ...

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Fields of Activity II

- **Associations** — Eurofer, IISI, ICDA, VEC, ECVM, Jeita, GRI
- **Finance** — Allianz, ABN AMRO, BBVA, WestLB, LBBW, SNB, …
- **Public bodies** — Europäische Kommission, UBA, Bundesministerien (BMVBW, BMVEL, BMBF), Wirtschaftsministerium Baden-Württemberg,…
- **Energy** — Esti, EnBW, Iberdrola, ….

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Impact of the renewable Energy Directive (RED) on GHG emission reduction

Binding Targets of the EU Directive till 2020

- 10% share of renewable energy in transport
- 6% reduction in unit greenhouse gas emissions from road transport fuels (Fuel Quality Directive)

Minimum rate of GHG savings

- 35% immediately
- 50% in 2017
- 60% in 2018 (new installations only)
- Calculation methodology => Default Values given

Sustainability criterion

- Avoid conversion for greenhouse gas reasons (land use changes)
- Avoid taking of biomass for biodiversity reasons
- Reporting every two years of sustainability certificate (to EU commission; trader import)

Default and Typical values are given for the Life Cycle Steps

- Cultivation
- Processing
- Transport

in gCO2-eq/MJ

Default values OR Actual values can be used for the actual calculation

Default values (40% higher than typical values for processing only)

- Used for the **actual calculation** of the GHG emissions

Typical Values

- Used for **forcast purposes** of the biofuel target

The Default values (gCO2-eq/MJ) are higher than the typical values. (for forecast purposes)

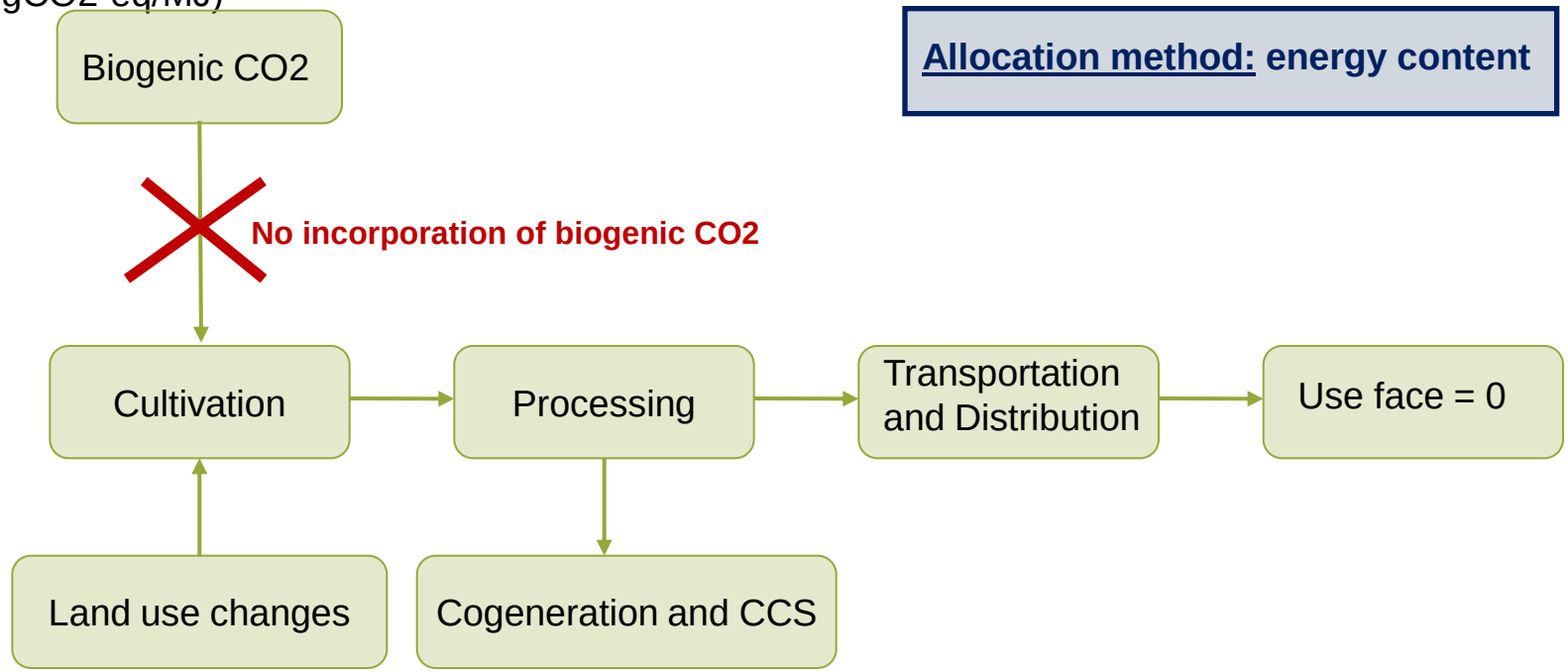
stimulation is created

for the biofuels producer to use his actual values, but still the forecast values can be more exact (assumption of improved processing technologies)

Calculation methodology

- Total GHG-Emissions = Emissions from Cultivation + LUC (land use changes) + Processing + Transport + Fuel in use + Cogeneration + CCS (carbon capture and Storage)

  → **CO2 - Savings** (Fuel benchmark: Average CO2 from diesel and petrol of the country or 83,8 gCO2-eq/MJ)



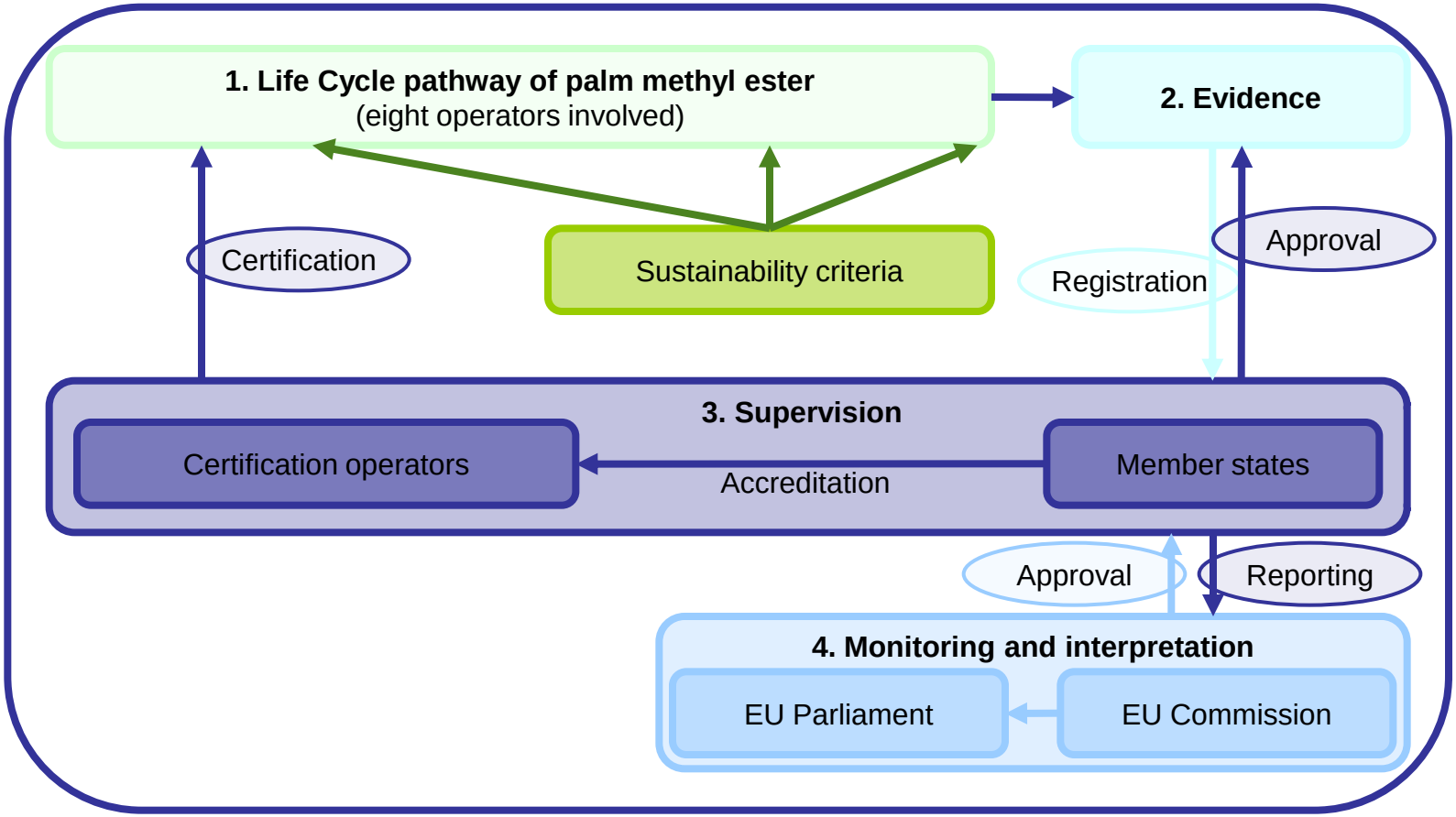
Direct Land Use Changes

- Calculation Methodology given
- Methodology after IPCC
  - 20 years, not discounted
  - Fixed reference land use (2008)
  - Guideline till the end of 2009

Indirect Land Use Changes

- Shall be included in the future

Sustainability certificate needs to be added at point of sale



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Experience in the biofuel sector and the RED EU Directive

Comparison of LCA studies

	EU Directive	Concawe	RFA	UFOP	Others EMPA, FNR, etc.
Scope	WtW	WtW	WtW	WtW	WtW or CO2e-Savings
Goal	Calculation method for estimating the GHG (EU)	Transparent and scientific survey for reference	Calculation method for estimating the GHG (UK)	Calculation method for estimating the GHG (DE)	Calculation of GHG Savings for specific pathways
Allocation	Energy content	Substitution	Substitution or market value	Energy content	Different approaches

- RFA Renewable Fuels Agency
- UFOP (Union für Förderung von Öl und Proteinpflanzen e.V.)
- WtW Well to Wheel

LCA Comparison using the example of palm oil

WtW – CO2-eq/MJ for the Life Cycle Stages

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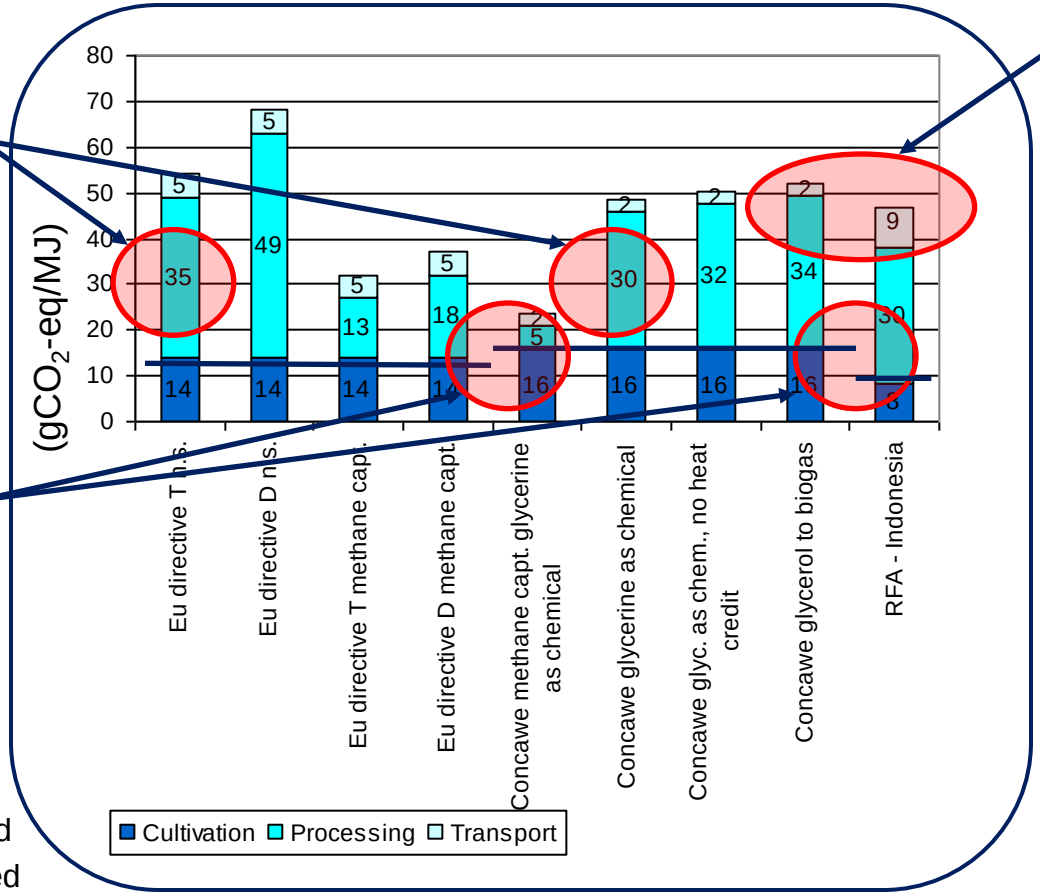
- **„Red circle“** Differences: Allocation decisions, Assumptions, Scope

EU: Allocation via energy content

EU: Allocation via energy content



Different transport distance e.g. Tanker transport

EU: 10.186 km (5)
Concawe: “ km (2)
RFA: 15.500km(9)

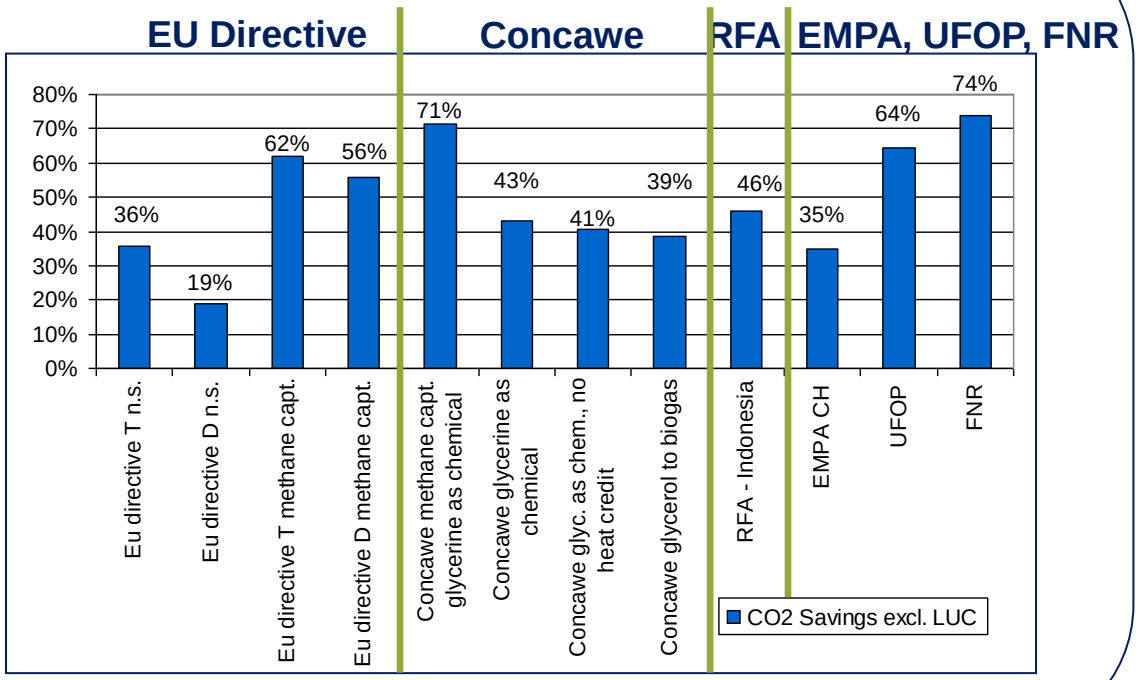
Google-Maps check was positive

(gCO_2-eq/MJ)

- T. n. s. typical not specified
- D. n. s. default not specified

LCA Comparison using the example of palm oil

WtW – CO2-Savings excl. LUC in %

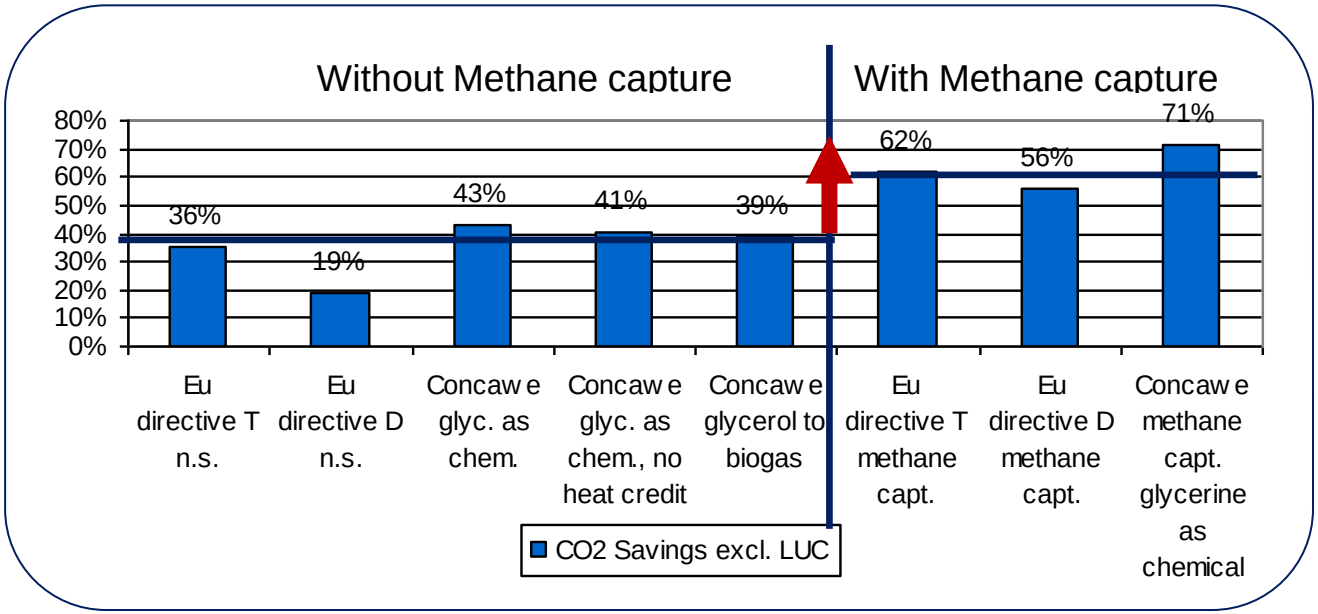


Comparison

- Similar Values of Concawe and EU, but still differences up to 10 percent)
- EMPA, nearly the same value as Typical n.s. (small amount of LUC incl.)
  vs. 58% savings compared to gasoline
- UFOP, nearly the same value as Typical value with methane capture
- FNR has the highest value, similar to Concawe with methane capture
- RFA: Savings are higher than other values without methane capture

- T. n. s. typical not specified
- D. n. s. default not specified

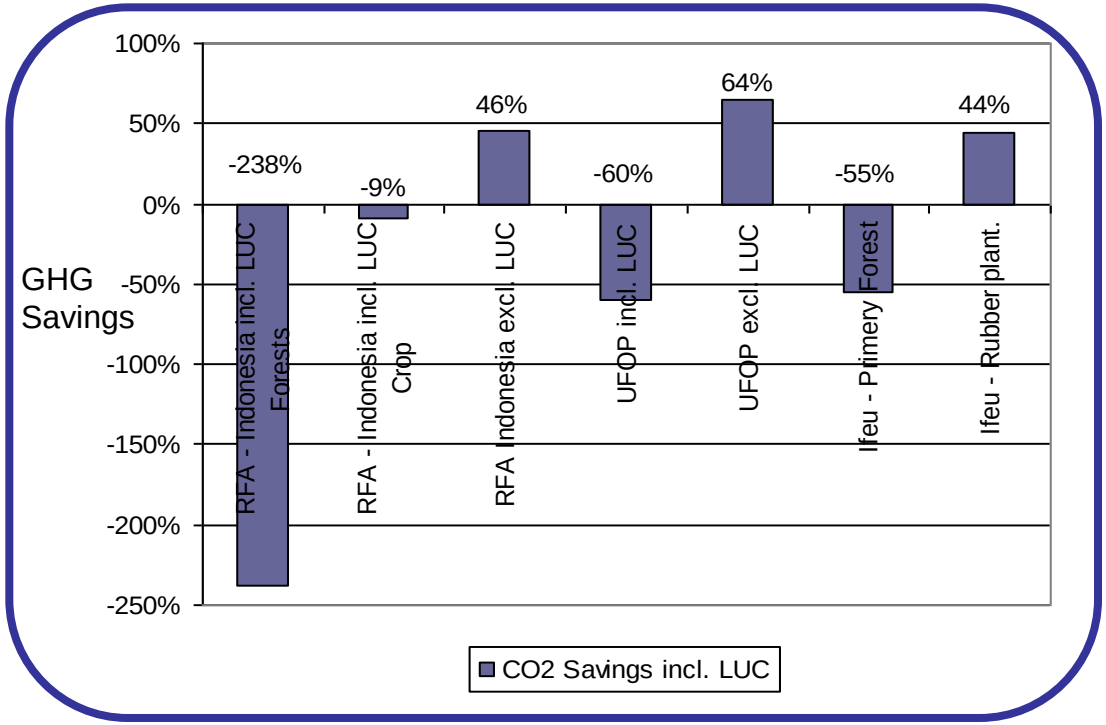
Differences between the values using the example palm oil with and without methane capture



- Average of 35 % without methane capture vs. 63 % with methane capture
- **Have to be proven by supplier of palm oil that CH4 capture is used**

LCA Comparison using the example of palm oil

WtW – CO2-Savings incl. LUC in %



Existing Plantation – Conversion from Forest

Has to be proven that plantation was already existing in 2008

=> no LUC factor necessary

- **Default Values nearly the same as CONCAWE STUDY**

  Confirmed by the EU Commission!

- Difference of both studies towards CONCAWE:
  - allocation decisions
  - Incorporation of biogenic CO_2

  CONCAWE: SUM GHG emissions in gCO_2-eq/MJ
  - Renewable Credit
  + Use Phase

  EU: SUM GHG emissions in gCO_2-eq/MJ

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Thank You
for your attention

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