Introduction of GHG calculation and ISCC Certification System

Andreas Feige, Managing Director, ISCC System GmbH
ISCC is a leading certification system for all types of agricultural, forestry and alternative raw materials and products
ISCC is an widely accepted certification system in the market, as these numbers confirm

250 organisations have been involved in the development of ISCC. Today it is the leading certification system with 15,500 certificates issued. We are a trusted solution for more than 3,000 companies in more than 100 countries. More than 30 certification bodies are cooperating with us. Their 670 auditors are trained in 60 trainings conducted by ISCC all over the world. Our association aims at continuous improvement and counts 90 members. As the leader in innovation, we are the 1st system globally using systematically remote sensing services to verify that supply chains are deforestation free and that biodiverse grassland is protected.

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ISCC puts major emphasis on global and regional stakeholder dialogue

Global Events
- Seven ISCC Global Sustainability Conferences
- Eight annual General Assemblies for ISCC Association

TC Europe
Eight meetings since 2010

TC Southeast Asia
Since 2013
Next date: 25 Oct 2017
Working groups:
- Land use change
- Smallholders
- Social issues
- Methane reduction/avoidance
- Australia/Canola

TC Solid Biomass
Seven meetings since 2011
Next date: 28 Nov 2017

TC North America
Since 2012
Next date: 5 Dec 2017
Working groups:
- National adaptations
- ISCC PLUS

TC South America
Since 2010
Next date: 1st quarter 2018
Working groups:
- National and biomass specific adaptations
- Biodiverse grassland
- ISCC PLUS
ISCC is a multi-stakeholder initiative. It is governed by an association with 90 members. New members are welcome.
ISCC cooperates with 32 certification bodies from 16 countries to conduct the audits for ISCC certification.
363 of the currently valid 3,100 ISCC certificates have been issued for Indonesia and Malaysia.

Numbers as of 19 October 2017. Numbers based on currently valid certificates.
ISCC is a one stop shop for all crops and markets, and is compliant with many important platforms and industry standards.

With ISCC, only one audit is required to cover all markets!
Example of on-product label for final products (II) – ISCC certified vegetable oil

“This bottle of Venusz edible oil has ISSC PLUS certification. The required quantity of sustainable sunflower seed is certified according to the ISCC PLUS International Sustainability Standards. We are tracking the certified supply chain, and are monitoring the emission of greenhouse gases.”
Example of on-product labels for Drop-In solutions for partly biobased products

Arla: ISCC Logo on milk cartons

Arla is using PurePak® from Elopak. Milk cartons with ISCC logo available in Denmark
The RED and FQD set the framework for the implementation of the renewable energy regulations for the transport sector in the EU


- 10% mandatory target (2020) for the use of renewable energy in transport
- Obligatory sustainability requirements
- Minimum GHG savings
- Use of voluntary certification schemes
- Double-counting options for biofuels produced from waste and residues, including UCOME


- Fossil fuel suppliers are obligated to gradually reduce life cycle greenhouse gas emissions by a minimum of 6% by 2020 (decarbonization strategy)
- Obligatory sustainability requirements
- Minimum GHG savings

Both Directives have a strong impact on fuel markets and the share and type of renewables used in the fuel market
From January 1\textsuperscript{st} 2018 onwards biofuel producers need to achieve GHG saving requirements of at least 50%.

**Renewable Energy Directive (RED)**

- 2015/1513/EC from 2015

**Fuel Quality Directive (FQD)**

- 2015/1513/EC from 2015

GHG saving requirements for biofuels:

- 35 % for existing installation until Dec 2017
- 50 % from 1 Jan 2018\(^*\)
- 60% for new installations directly
- New installation: Physical production of biofuels/-liquids started after October 2015

\(^*\) was amended from 50% from 1 Jan 2017.
Emissions for a simplified supply chain including cultivation ($e_{ec}$), processing ($e_p$) and transport & distribution ($e_{td}$)
According to the EC GHG Note*, each calculation formula element must be separately reported

\[ E = e_{ec} + e_I + e_p + e_{td} + e_u - e_{sca} - e_{CCS} - e_{CCr} - e_{ee} \]

- **E**: Total GHG emissions from supply and use of the fuel (in g CO\textsubscript{2}eq/MJ)
- **e\textsubscript{ec}**: GHG emissions from the extraction or cultivation of raw materials
- **e_I**: Annualized (over 20 years) GHG emissions from carbon stock change due to land use change
- **e_p**: GHG emissions from processing
- **e_{td}**: GHG emissions from transport and distribution
- **e_u**: GHG emissions from the fuel in use (shall be taken to be zero)
- **e_{sca}**: GHG emissions savings from soil carbon accumulation via improved agricultural management
- **e_{ccs}**: GHG emissions savings from carbon capture and geological storage
- **e_{ccr}**: GHG emissions savings from carbon capture and replacement
- **e_{ee}**: GHG emissions savings from excess electricity from cogeneration

Source of formula: EU RED

* EC “Note on conducting and verifying actual calculations on GHG emission savings”.
All supply chain elements must report the respective components of the GHG calculation formula. Calculation and values must be audited.

\[ E = e_{ec} + e_{l} + e_{p} + e_{td} + e_{u} - e_{sca} - e_{CCS} - e_{CCR} - e_{ee} \]
Relevant inputs and outputs for GHG calculation in the supply chain of palm oil/biodiesel

- **Inputs**
  - Seed
  - Energy
  - Fertilizers (e.g. EFBs), Pesticides
  - ...

- **Oil palm plantation**
  - No co-products
  - Crop residues as organic fertilizer: Palm fronds*

- **Fresh fruit bunches**
  - Oil mill
    - Co-products: Palm kernels

- **Crude palm oil**
  - Biodiesel plant
    - Co-products: Refined glycerine, Palm Fatty Acid Distillate

- **Outputs**
  - Down-stream transport
  - Filling station

* No emission allocation possible to wastes and residues.
C. GHG emissions from **processing** \((e_p)\): Relevant GHG calculation formula (I)

\[
e_p \left[ \frac{kg \ CO_2 eq}{ton} \right] = \frac{(EM_{electricity} + EM_{heat} + EM_{inputs} + EM_{wastewater}) \left[ \frac{kg \ CO_2 eq}{yr} \right]}{\text{yield product} \left[ \frac{ton}{yr} \right]}
\]

**Processing**

- Emissions from electricity consumption, heat production, from waste water and from further operating supplies and inputs must be taken into account
- Calculation per ton product (dry matter). If in moist content, calculation of dry content

**Verification of**

- Consumption of electricity, process-specific inputs and heat; fuel used for heat production
- Wastewater
- Yields of main product and co-products
- Emission factors and sources

\(EM = \text{emissions}\)
C. GHG emissions from processing ($e_p$): Relevant GHG calculation formula (II)

\[
EM_{electricity} = electricity\ consumption \left[ \frac{kWh}{yr} \right] * EF_{regional\ electricity\ mix} \left[ \frac{kg\ CO_2eq}{kWh} \right]
\]

\[
EM_{inputs} = inputs\ consumption \left[ \frac{kg\ or\ l}{yr} \right] * EF_{inputs} \left[ \frac{kg\ CO_2eq}{kg\ or\ l} \right]
\]

\[
EM_{wastewater} = wastewater \left[ \frac{cbm}{yr} \right] * EF_{wastewater} \left[ \frac{kg\ CO_2eq}{cbm} \right]
\]

\[
EM_{heat} = fuel\ consumption \left[ \frac{kg\ or\ l}{yr} \right] * EF_{fuel} \left[ \frac{kg\ CO_2eq}{kg\ or\ l} \right] \text{ or }
\]

\[
EM_{heat} = heat\ produced\ from\ fuel \left[ \frac{MJ}{yr} \right] * EF_{fuel/heat\ system} \left[ \frac{kg\ CO_2eq}{MJ} \right]
\]

EM = Emission; EF = Emission factor
C. Processing: Example GHG emissions from processing at a palm oil mill (II)

- Open POME ponds and dumping of EFBs
- Ventilation of POME ponds
- Mulching of EFBs
- + Usage of algae in ponds, Composting of EFBs
- POME to biogas und co-composting EFB/pond-residues

GHG emission reduction
Many GHG reduction and avoidance options exist at POME ponds. In some cases emission measurements will be required for actual values.

Examples of floating chambers for emission measurements:

- Methane analyzer, attached to chamber.
C. Processing: Example – GHG emissions from processing at a palm oil mill (I)

Palm oil mill and POME treatment

- At a palm oil mill the most relevant emission source is methane emissions from palm oil mill effluent (POME). These can be reduced tremendously if methane capture devices are applied.
- It must be verified if the following requirements are fulfilled:
  - Absorption of total wastewater in a closed system (only short-term storage of fresh wastewater) and supply to a methane capture device.
  - Methane capture device is in good condition, leakages are non-existent.
  - Use of biogas for energy purposes or flaring of the biogas.

<table>
<thead>
<tr>
<th>Treatment Description</th>
<th>CO₂e/kg</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>POME treatment in open ponds</td>
<td>kg CO₂e/kg CPO</td>
<td>0.51</td>
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<tr>
<td>POME treatment in closed ponds and flaring of emissions</td>
<td>kg CO₂e/kg CPO</td>
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<tr>
<td>EFB burning</td>
<td>kg CO₂e/kg EFB</td>
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<tr>
<td>EFB and POME Co-composting</td>
<td>kg CO₂e/kg CPO</td>
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<tr>
<td></td>
<td>kg CO₂e/kg POME</td>
<td>0.01</td>
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</tbody>
</table>
F. The last processing unit also needs to compare emissions to fossil fuels: Relevant GHG calculation formula

GHG emission biofuel \( E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{CCS} - e_{CCr} - e_{ee} \)

GHG saving potential[\%] = \( \frac{\text{GHG emission fossil reference} - \text{GHG emission biofuel}}{\text{GHG emission fossil reference}} \) \( \times \) 100

Sum of GHG emissions (E) and Comparison to fossil reference

The final processing unit

- Calculates the overall GHG emissions \( E \) in g CO\(_2\)eq/MJ biofuel
- Compares \( E \) to the respective fossil references as provided in the EU RED (83.8 g CO\(_2\)eq/MJ)
- Calculates into which regions the biofuel can be transported without violating the minimum GHG savings potential

Verification of:

- Conversion from emissions from kg CO\(_2\)eq/t biofuel to g CO\(_2\)eq/MJ biofuel and LHV used
- Correct use of fossil references from RED
Many thanks for your attention!

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