ISCC for Low Carbon Fuels

Dr Jan Henke, ISCC System GmbH
Technical Committee “Waste, Residues and Advances Low Carbon Fuels”, Shanghai, 02 July 2019
Biodiesel in the UK is dominated by UCO, ethanol by crops

Volume of sustainable renewable fuels 2017/2018

- Biodiesel 49%
- Bioethanol 46%
- Others 0.53%
- Biomethanol 4%

Sustainable renewable fuels 1,6 billion litres

Source: RTFO
The share of biofuels based on waste/residues supplied to the UK increased.
Biodiesel in the **UK** is dominated by **UCO**, ethanol by crops

**Biodiesel supply by feedstock**
- UCO: 84%
- Tallow Cat. 1: 3%
- Other: 11%
- POME: 0.5%

**Bioethanol supply by feedstock**
- Wheat: 26%
- Corn: 28%
- Sugar beet: 17%
- Sugarcane: 3%
- Waste feedstock (starch slurry & food waste): 25%
- Other: 0.1%

*Source: RTFO*
The share of biodiesel based on waste/residues has doubled in Germany between 2012 and 2017.

Amounts of biofuels supplied in 2017

- Biodiesel: 66%
- Bioethanol: 27%
- Other: 8%

Total amount: 113,029 TJ

Source: BLE
Almost one third of biofuels on German market are waste/residue based.

<table>
<thead>
<tr>
<th>Year</th>
<th>Non w/r</th>
<th>w/r</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>85%</td>
<td>15%</td>
</tr>
<tr>
<td>2014</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>2015</td>
<td>81%</td>
<td>20%</td>
</tr>
<tr>
<td>2016</td>
<td>69%</td>
<td>31%</td>
</tr>
<tr>
<td>2017</td>
<td>71%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Source: BLE

© ISCC System GmbH: For personal use only. Reproduction and distribution is prohibited.
The **largest raw material** contribution for biofuels in the Netherlands in 2016 has been **UCO**

Distribution of the main raw materials for biofuels in 2016

- UCO: 61%
- Wheat: 14%
- Corn: 10%
- Animal fat (cat1&2): 7%
- Sugar cane: 3%
- Sugar beet: 3%
- Others: 2%

Source: Nea
RED II introduced new fuel categories – ISCC is prepared to cover these new categories

### Advanced biofuels
- Annex IX of RED II (Part A)
- Sub-quota of 3.5% (Part A)
- 1.7% (Part B) but exemptions possible

### Renewable fuels of non-biological origin (RFNBO)
- Fuels other than biofuels or biogas, the energy content of which is derived from renewable sources other than biomass, E.g. hydrogen
- Directly 70% GHG savings required
- GHG calculation methodology not defined yet

### Recycled carbon fuels (RCFs)
- Fuels produced from e.g. waste plastics, exhaust gases
- Counted only for 14% transport target, not for overall renewable energy target
- Min. GHG saving and calculation methodology not defined yet
Under ISCC all types of bio-based waste and residues as well as non-bio feedstocks of low carbon fuels can be covered

<table>
<thead>
<tr>
<th>Waste and processing residues</th>
<th>Renewable non-bio feedstocks</th>
<th>Forestry / agricultural crop residue</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCO</td>
<td>Power-to-Gas</td>
<td>Forestry residue</td>
</tr>
<tr>
<td>Landfill gas</td>
<td>Power-to-Liquid</td>
<td></td>
</tr>
<tr>
<td>Tall oil</td>
<td></td>
<td>Husks</td>
</tr>
<tr>
<td>End-of-life tires</td>
<td></td>
<td>Straw</td>
</tr>
<tr>
<td>MSW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed plastic waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude glycerine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MSW: Mixed plastic waste

CO2: Carbon dioxide

Forestry residue: Includes forestry residue and agricultural crop residue.
Many materials from Annex IX (part A)* are already covered by ISCC

<table>
<thead>
<tr>
<th>Materials Annex IX, Part A (selection)</th>
<th>No. of ISCC certificate holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass fraction of industrial waste not fit for use in the food or feed chain**</td>
<td>546</td>
</tr>
<tr>
<td>Palm oil mill effluent and empty palm fruit bunches</td>
<td>163</td>
</tr>
<tr>
<td>Crude glycerine</td>
<td>61</td>
</tr>
<tr>
<td>Animal manure and sewage sludge</td>
<td>59</td>
</tr>
<tr>
<td>Grape marc and wine lees</td>
<td>39</td>
</tr>
<tr>
<td>Straw</td>
<td>18</td>
</tr>
<tr>
<td>Biomass fraction of mixed municipal waste</td>
<td>13</td>
</tr>
<tr>
<td>Tall oil and tall oil pitch</td>
<td>11</td>
</tr>
<tr>
<td>Biomass fraction of wastes and residues from forestry and forest-based industries</td>
<td>4</td>
</tr>
<tr>
<td>Husks</td>
<td>6</td>
</tr>
<tr>
<td>Bagasse</td>
<td>1</td>
</tr>
<tr>
<td>Nut shells</td>
<td>1</td>
</tr>
</tbody>
</table>

*Includes e.g. FFA, food waste, grape marc, starch slurry, sugar beet residues and others

Note: Numbers as of June 2019

* Amended RED
GHG calculation of waste and residues starts at the Collecting Point of the raw material

Simplified supply chain of waste and residues (e.g. Palm Oil Mill Effluent)

No upstream:
- certification
- sustainability requirements for cultivation
- GHG emissions
- traceability

Sampling for points of origin possible
No GHG at point of origin. First GHG with transport
ISCC certifies already several companies using Annex IX A feedstock for the production of low carbon fuels

**Raizen** produces bioethanol from *bagasse*.

**Enerkem** is producing methanol and ethanol from *municipal solid waste*.

**UPM** is producing renewable diesel and bionaphtha from *tall oil pitch and crude tall oil*.

**BioMCN** is converting *waste-based biogas* into biomethanol.

**Examples**

*Companies producing biofuels out of Palm Oil Mill Effluent (POME)*.
ISCC system users and members are already entering markets for RFNBO and recycled carbon fuels
The UK already developed own regulations for RFNBOs and introduced the new category “development fuels”

- The UK is the first “Member State” including RFNBOs in existing national legislation in April 2018 already (and also jet fuels)

- Definition of “Development fuels”
  - At fuel level
  - At feedstock level

- ISCC submitted a draft ISCC PLUS guidance document for the certification of RFNBOs to be recognized by the UK

Certification of low carbon fuels with ISCC

- Biofuel mandates around the globe increasingly require **verification of sustainable supply chains** and 
**CI**

- **Increase in advanced biofuels** expected; already several companies using ISCC for this

- **New feedstocks** and **new technologies** require **secure verification** of sustainability parameters

- ISCC offers **solutions for the certification of different feedstocks of low carbon fuels**

- Established **TC on “Waste, Residues and Advanced Low Carbon Fuels”** with regular meetings. **Working group** on “further strengthening ISCC for waste and residues”

- Further **guidance from EC needed** for RFNBO´s and RCF´s via delegated acts

- ISCC develops happy to support pilot projects for **new fuel categories**
Many thanks for your attention!

Dr Jan Henke, ISCC System GmbH
Hohenzollernring 72, 50672 Cologne, Germany
Email: henke@iscc-system.org