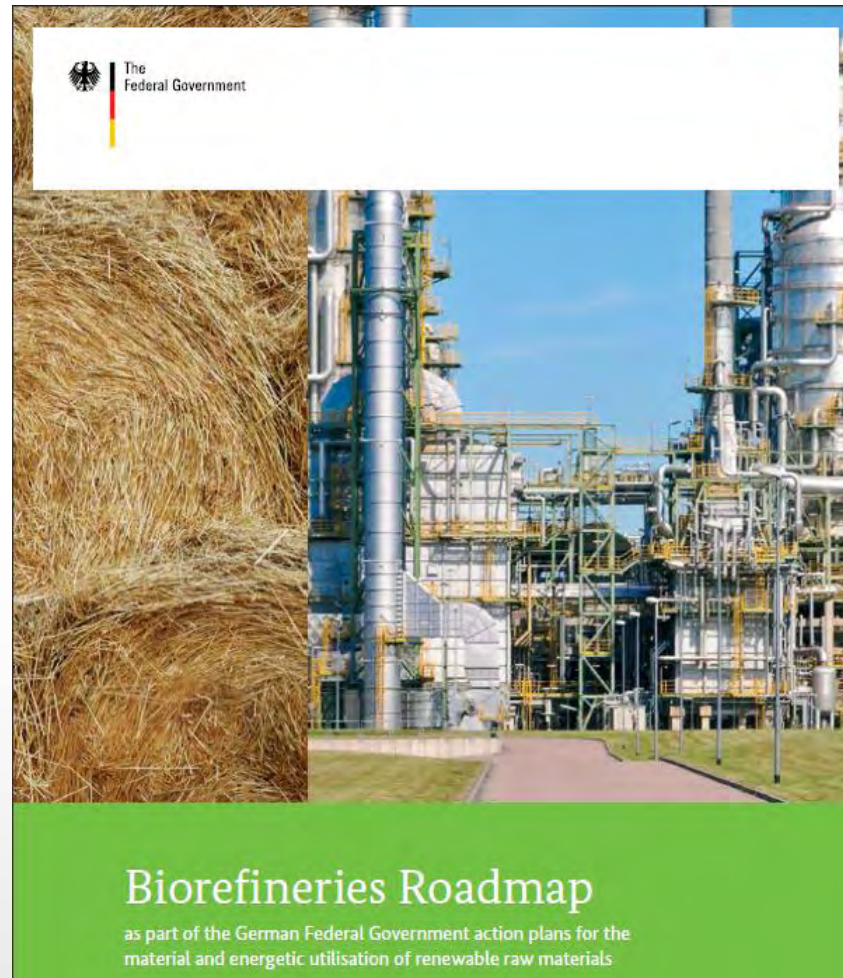


# Update on the German Biorefinery Road Map



# Four important activities

VEREIN  
DEUTSCHER  
INGENIEURE

Klassifikation und Gütekriterien von Bioraffinerien  
Titelement 2  
Titelement 3  
Internes Arbeitspapier

VDI 6310

Zur weiteren Bearbeitung zum Gründruck  
(09/2013)

## PROGRAMM

9. – 12. Juni 2013  
Evangelische Akademie Schloss Tutzing  
am Starnberger See

## 52. Tutzing-Symposium

Ein Jahr Bioraffinerie-Roadmap:  
Wo steht Deutschland im  
internationalen Vergleich?

[www.processnet.org/tusy52](http://www.processnet.org/tusy52)



Initiative Nachhaltige Rohstoffbereitstellung  
für die stoffliche Biomassenutzung



Roadmap Bioraffinerien

11. Edition der Bioraffinerie-Roadmap der  
VDF-Industrie-Union, 2013

# The Association of German Engineers (VDI) Guideline VDI 6310 (Green-print in preparation)

ICS 13.###.##

VDI-RICHTLINIEN

VEREIN DEUTSCHER INGENIEURE	Klassifikation und Gütekriterien von Bioraffinerien Titелеlement 2 Titелеlement 3 <b>Internes Arbeitspapier</b>	VDI 6310 <i>Zur weiteren Bearbeitung zum Gründruck (09/2013)</i>
<p>First title element – Second title element – Third title element</p> <p><b>Inhalt</b></p> <p><b>Vorbemerkung</b>..... 2</p> <p><b>Einleitung</b>..... 2</p> <p><b>1 Anwendungsbereich</b>..... 4</p> <p><b>2 Normative Verweise</b>..... 4</p> <p><b>3 Begriffe</b>..... 4</p> <p><b>4 Technologie der Bioraffinerie</b>..... 7</p> <p>4.1 Klassifizierung von Bioraffinerieanlagen..... 7</p> <p>4.2 Technologische Konzepte..... 11</p> <p><b>5 Definition von Bewertungsmethoden und zugehöriger Kenngrößen</b> 16</p> <p>5.1 Allgemeine Standortfaktoren..... 16</p> <p>5.2 Integrationsniveau und Standorte für Bioraffinerien..... 17</p> <p>5.3 Biomassebereitstellung..... 19</p> <p>5.4 Marktstrategische Ausblicke..... 25</p> <p>5.5 Methodischer Rahmen zur Ermittlung von Kenngrößen..... 27</p> <p>5.6 Definition von Bewertungsgrößen/Bewertung..... 28</p> <p>5.7 Wahrnehmung gesellschaftlicher Verantwortung..... 39</p>		<p><i>Einsprüche bis 200#-##-##</i></p> <ul style="list-style-type: none"> <li>• <i>vorzugsweise in Tabellenform als Datei per E-Mail an <a href="mailto:tls@vdi.de">tls@vdi.de</a></i> <i>Die Vorlage dieser Tabelle kann abgerufen werden unter <a href="http://www.vdi-richtlinien.de/einsprueche">http://www.vdi-richtlinien.de/einsprueche</a></i></li> <li>• <i>in Papierform an</i> <i>Gesellschaft Technologies of Life-Sciences</i> <i>Fachbereich Biotechnologie</i> <i>Postfach 10 11 39 Seite</i> <i>40002 Düsseldorf</i></li> </ul>

<b>6 Anwendung ausgewählter Methoden auf das Praxisbeispiel „Grüne Bioraffinerie“</b> .....	<b>41</b>
6.1 Einführung.....	41
6.2 Beschreibung der Anlage: Die Biowert-Bioraffinerie, Brensbach.....	42
6.3 Ökonomische Bewertung.....	45
6.4 Ökologische Bewertung.....	50
6.5 Soziale Bewertung.....	56
6.6 Wahrnehmung gesellschaftlicher Verantwortung.....	56
6.7 Fazit aus der Anwendung der Gütekriterien.....	57
<b>7 Schlussfolgerung</b> .....	<b>57</b>
<b>Schrifttum</b> .....	<b>59</b>

VDI Gesellschaft Technologies of Life Sciences  
Fachbeirat Biotechnologie

# Exchange of experience



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# Outcome

- Market pull is missing (green procurement)
- Uncertain political conditions – hampers investments
- Missing supporting schemes for demonstration plants
- Reality more complex than biorefinery definition
- Feedstock availability and constant quality
- Communication/cooperation „gaps“ between sectors
- Data gaps for economic and ecological assesment of BR data for fossil counterparts frequently missing

# Example – tar sand



# INRO-Biomasse - Background

## Problems:

- Food versus fuel debate
- Public and NGOs → requirements/standards



## (Possible) solution:

- International standard for the certification of sustainable biomass production
- Broad consensus between different actors in the field at an European/international level



The screenshot shows the homepage of the INRO website. At the top is a green navigation bar with links: Home, about INRO, Participants, Events, Documents, Moderation, Schedule, and Contact. The main content area features a central heading: "Renewable resources for material use: social und ecological!". Below this is a paragraph explaining that regrowable raw materials are increasingly used in industrial production and need sustainable certification. A list of participants follows, including companies from chemicals, automobiles, packing, consumer goods, materials, hydraulic lubricants, varnishes/paints industries, industrial federations, German ministries, scientists, and environmental organizations. On the right side, there are two featured articles. The first is titled "Sustainability Criteria" and includes a photo of sunflowers and a "read >" link. The second is titled "Criteria for good Certification Systems" and includes a photo of a red industrial valve and another "read >" link.

Home   about INRO   Participants   Events   Documents   Moderation   Schedule   Contact

## Renewable resources for material use: social und ecological!

Regrowable raw materials are increasingly used in industrial production. They are to be produced sustainably and given credible certification. The aim of the INRO 'Initiative for the Sustainable Provision of Raw Materials for the Material Use of Biomass' is to reach an agreement with industrial companies on the voluntary certification of renewable raw materials to the point of their first processing.

The participants at INRO are:

- Companies from the chemicals, automobile, packing, consumer goods, materials, hydraulic lubricants and lubricants, varnishes/paints industries;
- Industrial federations and associations
- German ministries and authorities
- Scientists
- Environmental and development organisations and
- German certification systems

[Sustainability Criteria](#)



[read >](#)

[Criteria for good Certification Systems](#)



[read >](#)



# Some participants from industry

**ANIMOX**



BDF ●●●●●  
**Beiersdorf**



Excellence is our Passion



Linde Engineering  
Dresden GmbH



**Nordzucker**



**Tetra Pak**  
PROTECTS WHAT'S GOOD™

# Associations, NGO's, goverment bodies



Bundesministerium für  
Ernährung, Landwirtschaft  
und Verbraucherschutz



Bundesanstalt für  
Landwirtschaft und Ernährung



# What are the goals of INRO-Biomasse?

- Definition of sustainability criteria for biomass provision for industrial processes
- Acceptance and voluntary commitment of the companies for the purchase of certified biomass
- Identical criteria for all sectors in order to avoid distortions of competition
- Comparable criteria for agricultural production
- Strengthening of the advantage for the customer
- Protection of the companies against allegations by the press, media, NGOs
- As a "first mover", opportunity to influence the embodiment of international and national rules

# Starting premises

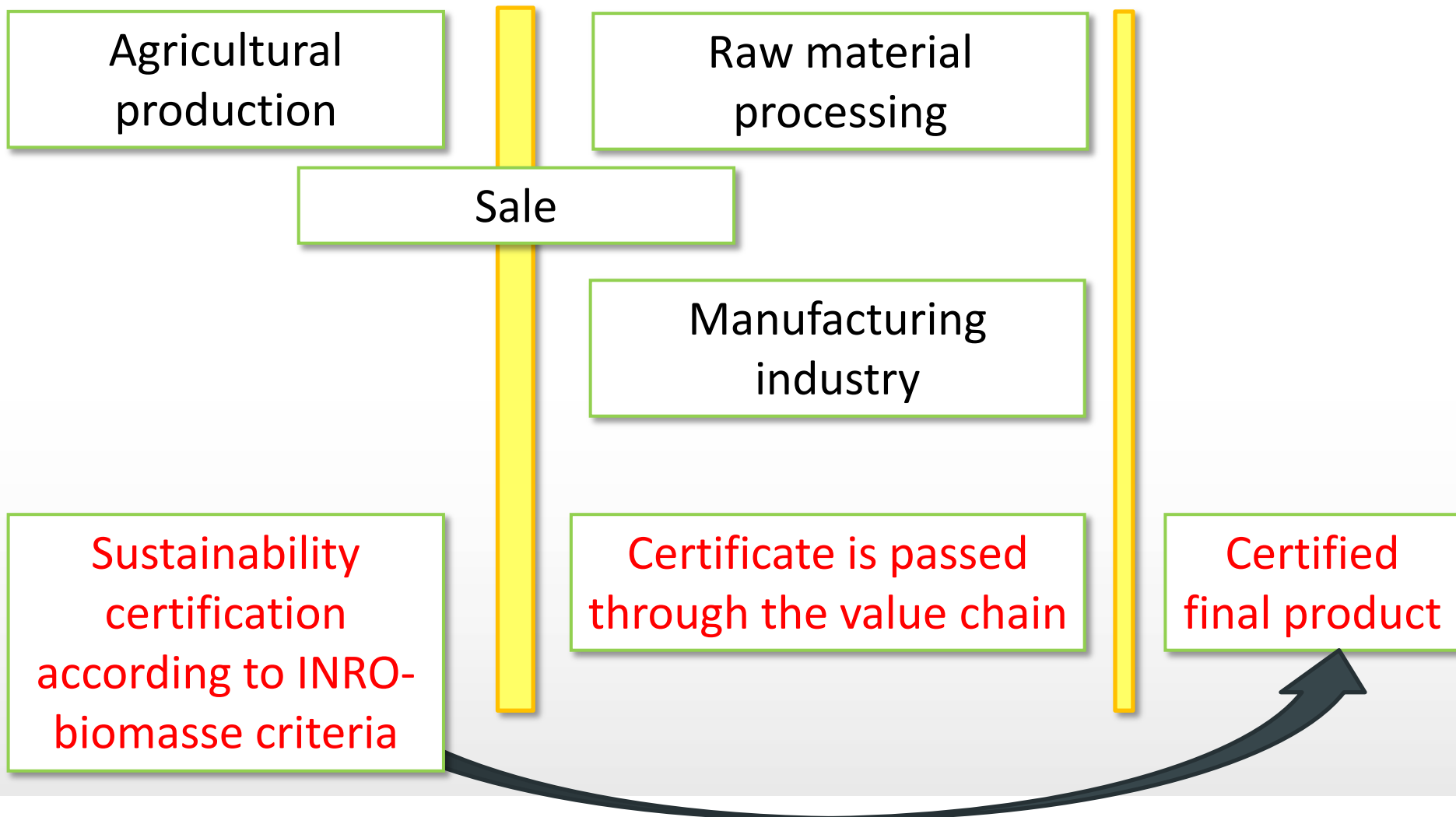
- Based on sustainability criteria for bioenergy
- No new certification standard, instead use of existing certification systems
- Currently restricted to:
  - Oilseeds
  - Starch/sugar plants
  - Fibre plants
- Later inclusion of
  - Cellulosic materials
  - Secondary materials (e.g. animal fats, waste, etc.)

# Sustainability criteria

Criteria are classified as

1. **Verifiable**
  2. **Verifiable, but**
  3. **Non-verifiable, although desirable**
- **Ecological criteria**  
Protection area (HCV, HCS, etc.), soil and water protection, GHG; use of fertiliser and pesticides, waste management...
  - **Social criteria**  
ILO compliance, safe working conditions, land use rights, stakeholder involvement, food security, etc.
  - **Economic criteria**  
Subcontractor involvement, anti-corruption and bribery measures, registration of cultivation area, etc.

# Envisaged procedure





## Initiative **N**achhaltige **R**ohstoffbereitstellung für die stoffliche Biomassenutzung

Initiative Sustainable Provision of Raw Materials for the Material Use of Biomass



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Renewable resources for material use:  
social und ecological!

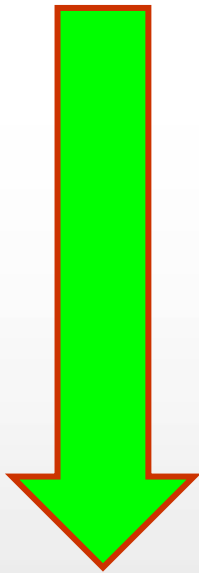


[Sustainability Criteria](#)

Public presentation Oct. 2013 in Berlin

Close cooperation with NL „Green deal“ and other European/International initiatives

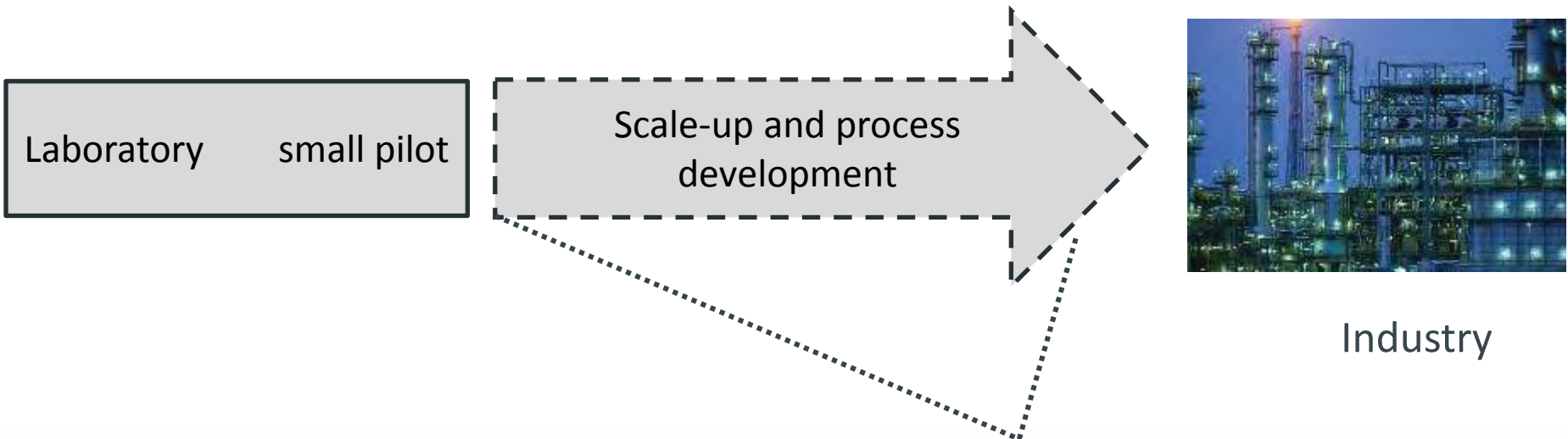
2014



- Start pilot projects
- Information event EU
- Information event German parliament
- Autumn: Final conference 1st phase
- Second phase?



# Fraunhofer Center for Chemical-Biotechnological Processes (CBP)



Opening ceremony  
Oct. 2012



# CBP – what does it contain?

In operation  
Planning/construction stage

Micro algae

Technical  
production  
(Upscaling)

Upstream  
processes 10 L  
to 10 m<sup>3</sup>  
including DSP,  
e.g. cell  
separation and  
homogenation,  
etc.

Ligno-  
cellulosic  
disintegration

Digestor 400 L,  
200C, 25 bar  
Separation  
Fractionation  
Dewatering

Fermentation

Scale up to 1m<sup>3</sup>  
Process  
monitoring unit  
Advanced  
laboratory unit

Chemical  
conversion

Gas phase  
reactions up to  
500°C  
Liquid phase  
reactions up  
500L

Extraction  
DSP

Extraction (Sc  
CO<sub>2</sub>, propane)  
Distillation  
(Ultra)filtration  
Crystallisation  
Chromatogra.  
Drying

# Conclusions

- Fuel food debate → enhanced precaution
- Investment risk considered as high due to changing political priorities and conditions
- Process development facility for scale-up is available
- Some solutions for identified problems are (shortly) available, e.g. guidance document, network/roundtable
- Voluntary certification scheme (work in progress)
- Communication still challenging
- Data and comparable assessment
- Consumer behaviour ??

# Contact

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