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Effective sustainability criteria for advanced biofuels in the context of converging biobased economy sectors

Workshop: Optimising value chains and ensuring the sustainability of advanced lignocellulosic biofuels with effective sustainability criteria and verification

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WP4 ADVANCEFUEL: Towards sustainable biomass production, harmonized sustainability standards and certification

Main objective:

Assess sustainable production of RESfuels and test its performance against sustainability criteria and certification schemes and standards

- **Provide spatially explicit and quantitative insights regarding environmental impacts of lignocellulosic biomass feedstock production**
 - **Assess GHG footprints and socio-economic performance of RESfuel supply chains and further tailor and refine tools to harmonise GHG calculations of RESfuels for road, marine and aviation.**
 - **Provide a set of sustainability criteria and indicators relevant to demonstrate the sustainability performance of RESfuels**
- **Provide recommendations on the options for harmonization of national and voluntary sustainability criteria and certification at the EU level**
Partly based on the outcome of this workshop.



Sustainability concerns of bioenergy

- Poor greenhouse gas performance of certain bioenergy pathways, due to:
 - Supply chain greenhouse gas emissions, including emissions related to direct land use change, biomass cultivation, transport and processing;
 - Biogenic emissions related to changes in carbon stock, particularly in forest and soils;
 - Indirect emissions related to displacement effects.
- ILUC impacts of biofuels from food and feed crops
- Impacts of biomass production on biodiversity, soil and water;
- Impacts of biomass combustion on air quality;
- Low conversion efficiency of biomass to electricity;
- Competition with non-energy end-use markets;
- Distortion of biomass trade due to diverging national sustainability schemes.

Advanced biofuels have the potential to provide **high GHG savings** with **low ILUC** risks and competition with food and feed.

Nevertheless, **ensuring sustainability** along the supply chain is a key prerequisite in fostering the market uptake.



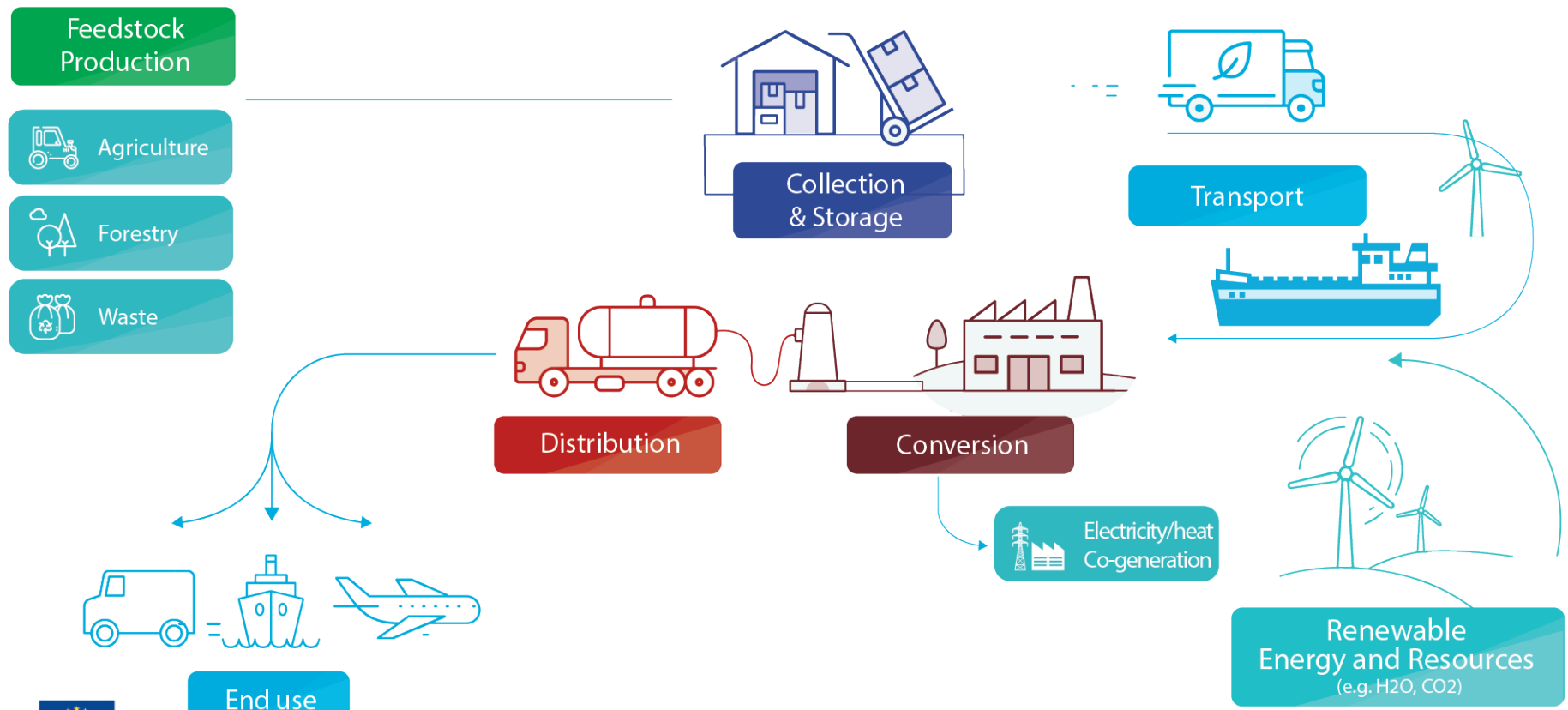
The relevance of harmonisation



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Prominent barriers to advanced biofuels (stakeholder consultation):

- Lack of harmonised regulations on sustainable farming practices for residual biomass and energy crops.
- Lack of harmonised regulations on sustainable forest management.
- Poor harmonisation of global rules for RESfuels in maritime and aviation sectors.



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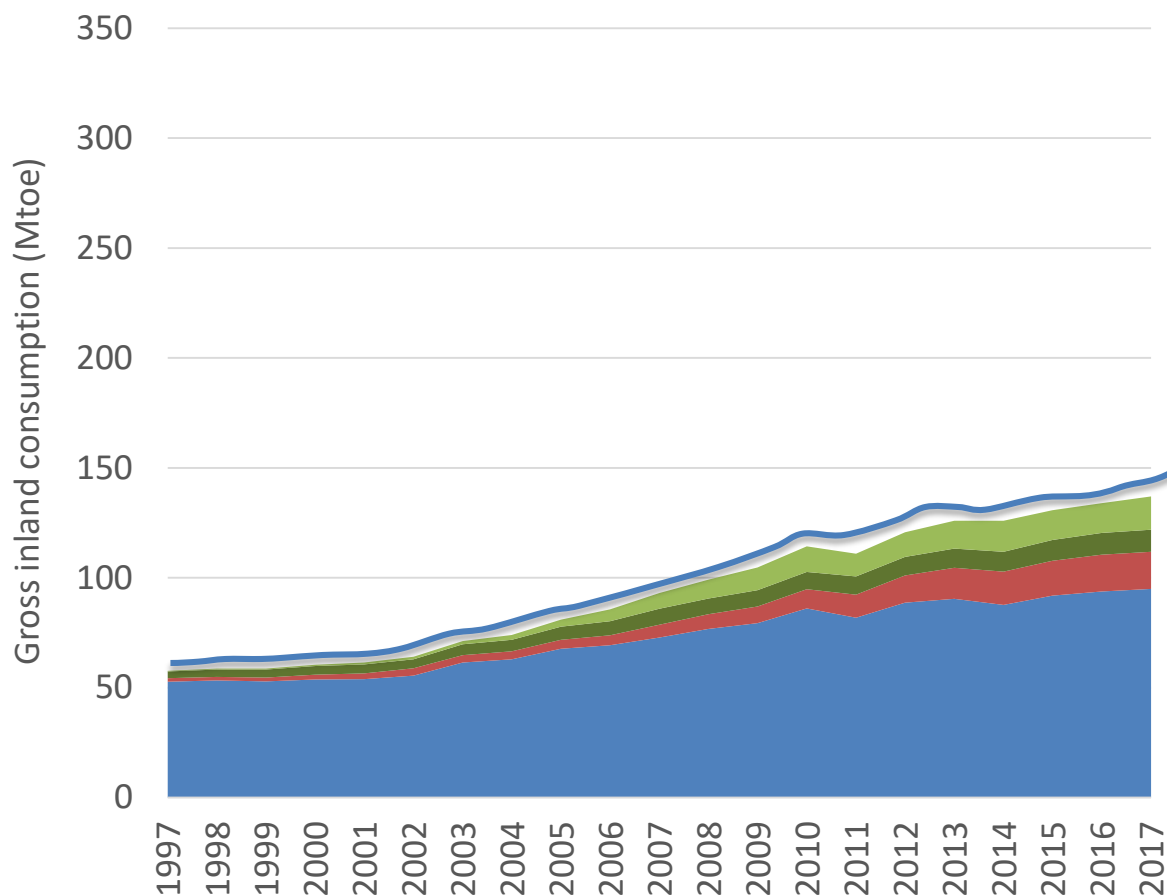
Options for harmonisation

- **GHG emissions saving (calculation method, threshold and implementation)**
- **SFM: forest productivity & functioning, biodiversity conservation**
- **Socio-economic criteria: labour rights, land right**
- **Chain management (verification): Chain of custody**
- **Requirements for auditing and verification**



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Development of bioenergy in the European Union



- To meet the 2050 objective (80% GHG reduction), biomass demand could more than double by 2050 compared to 2017 (110 – 130% increase)*.
- Advanced biofuels used in transport sectors is one of the main drivers for the increased use of biomass in the EU.

2050

■ Wood & other solid biofuels ■ Biogas
■ Renewable wastes ■ Liquid biofuels

EUROSTAT 2019

*) EU Energy Roadmap 2050 (2011)

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The development of bioenergy in the EU is largely stimulated and shaped by targets set in the 2009 Renewable Energy Directive

- **The Renewable Energy Directive (RED) (2009/28/EC) and Fuel Quality Directive (FQD) introduced binding sustainability criteria at the EU level for liquid biofuels by excluding:**
 - Biofuels produced from high nature value or high carbon stock land
 - Recently deforested land or drained peatland
 - Biofuels with less than 35 % GHG savings compared to their fossil reference
- **Indirect land use change (ILUC) was addressed in 2015 with the “ILUC Directive” that caps the contribution of food and feed based biofuels to 7%**
- **Solid and gaseous biomass used in electricity, heating and cooling were exempted from EU wide binding sustainability criteria**

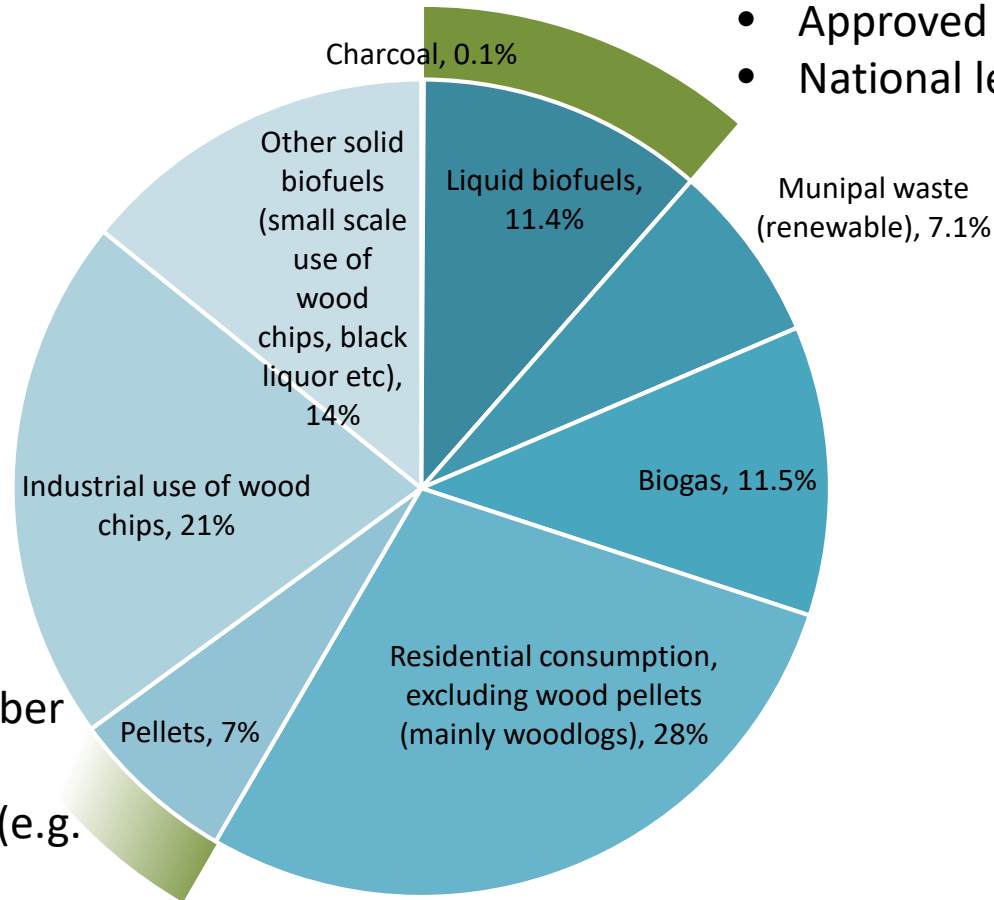
Biomass consumption in the EU28 (2015) and coverage by current (binding) sustainability criteria in the 2009 RED



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100% RED compliant, through:

- Approved voluntary schemes
- National legislation



National sustainability criteria / voluntary certification in EU member states that import industrial wood pellets (e.g. UK RO, NL SDE+)

Gross inland cons: AEBIOM 2018



Biofuel targets and GHG thresholds in the RED-I and RED II



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Targets

RED-I (2009)

- 20% RES consumption by 2020
- 10% biofuels in 2020, *applying to each MS*
- 0.5% voluntary target advanced biofuels
- Double counting

RED-II (2018)

- 32% RES consumption by 2030
- 14% RES in transport by 2030, but not binding for food/feed based biofuels
- Subtarget: 0.2% 2022 → 3.5% 2030 for Part A Annex IX (advanced) biofuels) + double counting

Caps

- 7% on food-based biofuels (ILUC Directive (2015/1513))

- 7.0% for food and feed based biofuels, frozen at 2020 levels +1%
- 1.7% for Part B Annex IX biofuels + double counting
- High ILUC biofuels frozen at 2019 levels, phase out 2023-2030

Sectors

(In the nominator)

- Road and rail

- Road, rail
- Aviation and marine with a 1.2 multiplier
- EV: 4.0, RES-e in trains: 1.5%

GHG threshold

- - 50%
- - 60% post 2015 installations
- Fossil fuel: 83.8 CO_{2eq}/MJ

- -50% for pre-2015,
- -60% for post 2015
- -65% for post 2021





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Greenhouse gas thresholds in the RED II

Minimum GHG saving thresholds now apply to all RESfuels and other bioenergy sectors (electricity, heating and cooling)

Valid for plants entering into operation	Transport biofuels	Transport renewable fuels of non-biological origin	Electricity, heating and cooling
Before October 2015	50%	*	*
After October 2015	60%	*	*
After January 2021	65%	70%	70%
After January 2026	65%	70%	80%

** No mandatory GHG savings threshold until 2021*

Updated GHG calculation methodology and revised default values for biofuels

ICCT Policy Update (2018)



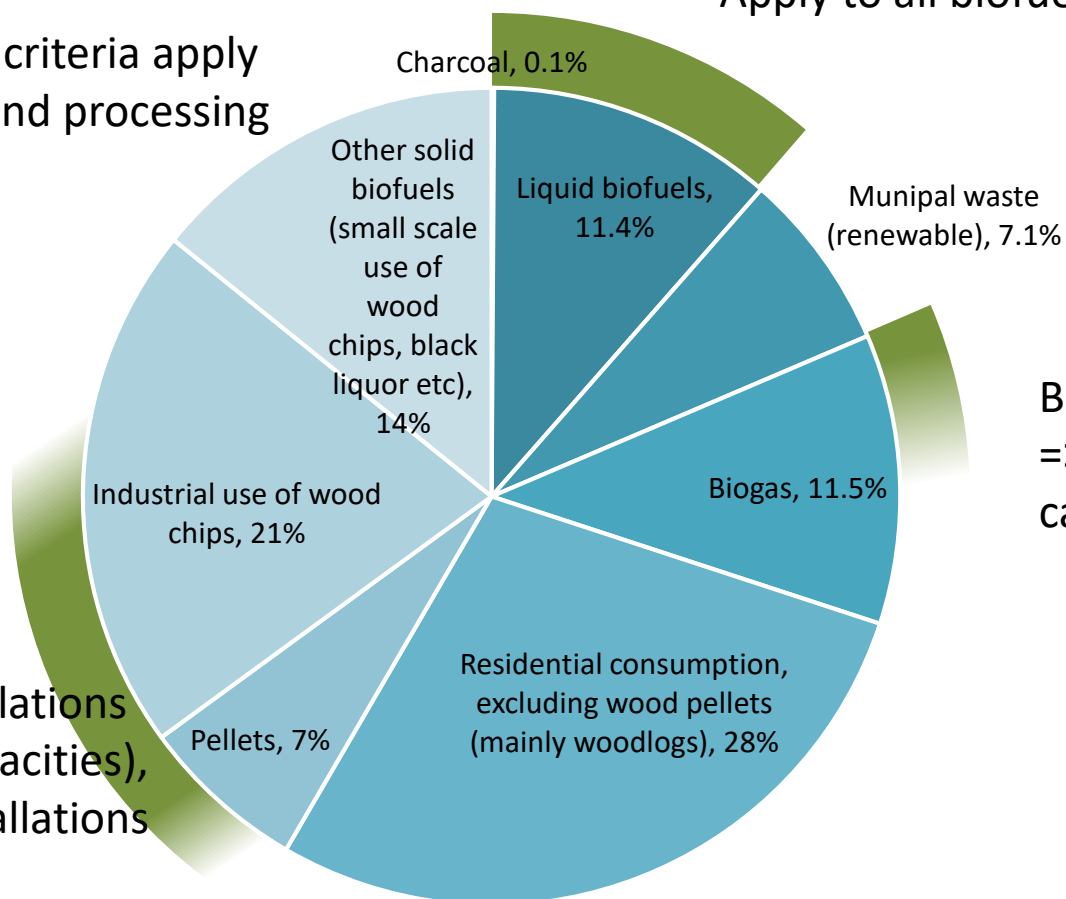


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Biomass consumption in the EU28 (2015) and coverage by sustainability criteria of the RED II

Only GHG criteria apply to waste and processing residues

Apply to all biofuels/bioliquids



Biogas installations
=> 0.5 MW (fuel capacity)

Solid biomass installations
=> 20 MW (fuel capacities),
12% of current installations
75% of chips/pellet
consumption

Gross inland cons: AEBIOM 2018



New criteria for bioenergy from forest materials: a risk based approach

- Legality of harvesting operations
- Forest regeneration of harvested areas
- Areas designated by law for nature protection purposes including wetlands/peatlands are protected
- Minimize negative impacts on soil quality and biodiversity
- Long-term production capacity of forests is maintained or improved

Option A Sustainability criteria are in place and enforced at national level

- Countries must comply/mirror EU LULUCF criteria
- Must have signed the Paris Agreement (COP21, 2015)
- Must have submitted a National Determined Contribution including LULUCF accounting and a national LULUCF accounting system in place

Option B: If not, sustainability criteria have to be ensured at sourcing / forest holding level



Critical notes from some NGOs, associations and scholars to the (revised) RED

- **Lack of guidance or too much room for interpretation** (e.g. sampling, outsourcing activities) leading to unwanted diversity among schemes - IUCN
- **Risk minimisation of unsustainable production:** biomass might still be harvested in non-primary forests of a high biodiversity – OEKO
- **Defined total rated thermal inputs** (20 MW for biomass fuels): small bioenergy plants not need to comply with sustainability criteria - OEKO
- **ILUC measurements** - exemption for additional palm oil produced in small plantations or produced on unused land: incurs risks of deforestation and land use change – T&E
- **A more comprehensive, binding set of environmental and social sustainability criteria** is needed – Various NGOs
- No mandatory requirements on soil, water and air quality
- **Social issues** such as dealing with affected communities, compliance with the ILO Conventions, and food security **are lacking** – WWF
- The use, collection and harvesting of feedstocks need to be in **compliance with international, national, regional and local environmental legislation** - IEEP

Proposed comprehensive sustainability requirements for advanced biofuels (beyond RED II)

Sustainability requirements	√					
	included			incomplete		efficient
	RED II			Proposed		
	Waste & residues	Agricultural biomass	Forest biomass	Waste & residues	Agricultural biomass	Forest biomass
Environmental:						
GHG saving	√	√	√	√	√	√
SFM			√			√
Carbon stock preservation		√	√		√	√
Biodiversity conservation		√	√		√	√
Air, water, soil protection	Only a monitoring is considered for waste & residues				√	√
ILUC measure		√	√		√	√
LULUCF measure			√			√
Social & economic						
- labour rights				√	√	√
- land rights				√	√	√
- food security					√	√

Listed criteria have been confirmed during the stakeholder consultation, but your input /feedback is welcome

Coverage in voluntary schemes and national legislation

Scheme	Feedstock types	GHG emissions saving	Environmental criteria					Verification (CoC)	Risk Based Approach	Socio & economic criteria		
			SFM	Carbon stock	Biodiversity conservation	Monitoring water, air, soil	ILUC			Worker rights	Land right	Food price & security
UK RTFO	All	Y		Y	Y	Y		Y	Y	Y	Y	
UK RO	F & W	Y	Y	Y	Y			Y	Y			
SDE+	F & W	Y	Y	Y	Y	Y	Y	Y	Y			
ISCC	All	Y	Y	Y	Y	Y		Y		Y	Y	Y
Bonsucro	E	Y		Y	Y	Y		Y		Y	Y	
RTRS	E	Y		Y	Y	Y		Y		Y	Y	
RSB	All	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y
2BSvs	E & W	Y		Y	Y	Y		Y		Y		
Red tractor	E			Y	Y			Y				
SQC	E			Y	Y			Y				
REDcert	All	Y		Y		Y		Y		Y		Y
Better Biomass	All	Y		Y	Y	Y	Y	Y		Y	Y	Y
RSPO	E	Y		Y	Y			Y				
Biograce I	All	Y										
HVO	E & W	Y		Y	Y			Y				
Gafta	E			Y	Y			Y				
UFAS	E	Y		Y	Y			Y				
FSC	F		Y	Y	Y	Y		Y	Y	Y	Y	Y
PEFC	F		Y		Y	Y		Y	Y	Y	Y	Y

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ISCC	All	Y	Y	Y	Y	Y		Y		Y	Y	Y
Bonsucro	E	Y		Y	Y	Y		Y		Y	Y	
RTRS	E	Y		Y	Y	Y		Y		Y	Y	
RSB	All	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y
2BSvs	E & W	Y		Y	Y	Y		Y		Y		
Red tractor	E			Y	Y			Y				
SQC	E			Y	Y			Y				
REDcert	All	Y		Y		Y		Y		Y		Y
Better Biomass	All	Y		Y	Y	Y	Y	Y		Y	Y	Y
RSPO	E	Y		Y	Y			Y				
Biograce I	All											
HVO	E & W											
Gafta	E											
UFAS	E											
FSC	F										Y	Y
PEFC	F		Y		Y	Y		Y	Y	Y	Y	Y

UK legislation; ISCC, Better Biomass, RSB are advanced than RED requirements: forest sustainability; add. chains and socio/ economic included

Coverage in voluntary schemes and national legislation

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FSC	F		Y	Y	Y	Y		Y	Y	Y	Y	Y
PEFC	F		Y		Y	Y		Y	Y	Y	Y	Y

- ISCC is most popular but SFM schemes may be in demand once RED II applied
- Sectors collaboration: discussion on sustainability compliance for biofuels and heat/ electricity

Stakeholder consultation

- May 18 – Mar 19
- 14 stakeholders
- Interviews/ online survey/ meetings

3 policy makers
(DK, IT, NL)

10 industry representatives, scheme owners, consultants, NGO
(AT, CH, BE, DE, IE, NL)

Insights from stakeholder consultation:

- The proposed sustainability criteria are validated by the 14 stakeholders
- MSs still working on implementation of RED I sustainability criteria for biofuels; some for heat/ electricity
- More transparency needed in **market & sustainability reporting**
- **Inclusive sustainability criteria** (env., social & economic) desired; **Harmonised criteria beyond RED I & II, definition (e.g. feedstocks), measurements (SFM, iLUC) at EU level preferred**
- General EU guidance sufficient but **more improvements in national regulation and accompanying measurements in MSs required still**

Conclusions (1)

- **Sustainability criteria and verification through certification systems** are an effective tool to safeguard sustainable advanced biofuels/ bioenergy
- **Sustainability criteria in RED II are not sufficiently broad and in some cases not sufficiently stringent** to address certain sustainability concerns of bioenergy (mainly SFM, socio-economic criteria)
- **RED II imposes new challenges to:** extend scope to new end-use sectors (H&E), expand scope to advanced biofuels, and impose updated criteria to agriculture and forest biomass
- We propose a list of **efficient sustainability criteria for advanced biofuels/ bioenergy** that address those sustainability concerns and strengthen sustainability performance of bioenergy

Conclusions (2)

Sustainability criteria and verification through certification systems are an effective tool to safeguard sustainable advanced biofuels/ bioenergy

UK legislation; ISCC, Better Biomass, RSB are more advanced than RED II requirements: forest sustainability; add. chains and socio/ economic included

ISCC is most popular but SFM schemes may be required to incorporate once RED II applied

Sectors collaboration: discussion on sustainability compliance for biofuels and heat/ electricity

Thank you for your attention!

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Liquid biofuels the EU28 in 2015 (RED compliant)



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III. Results: *sustainability proofs of imported solid biomass* (2/3 of total trade)

