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Low ILUC-risk certification

Update and learnings from low ILUC pilots
https://iluc.guidehouse.com/

Stakeholder webinar

19 May 2021

From Glenn Carstens-Peters on Unsplash

Housekeeping

- Please post questions in the **Chat/Questions box**. At the end of each section, the presenter will answer questions as posted in the chat box.
- We will be using PollEV to ask questions using the following link: www.pollEV.com/lowiluc
- The slides and a summary of the Q&A will be distributed after the workshop.
- We welcome any remarks or feedback after the meeting by email to ILUCpilots@Guidehouse.com
- **Please note this webinar will be recorded.**

Agenda

01 European Commission policy context

02 Low ILUC Pilot Project

03 Low ILUC certification guidance

04 Main lessons from first round pilot audits

05 Q&A and next steps

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Webinar aims

Update on low ILUC-risk pilot project and share findings from the first round of pilot audits

Invite feedback and comments from stakeholders

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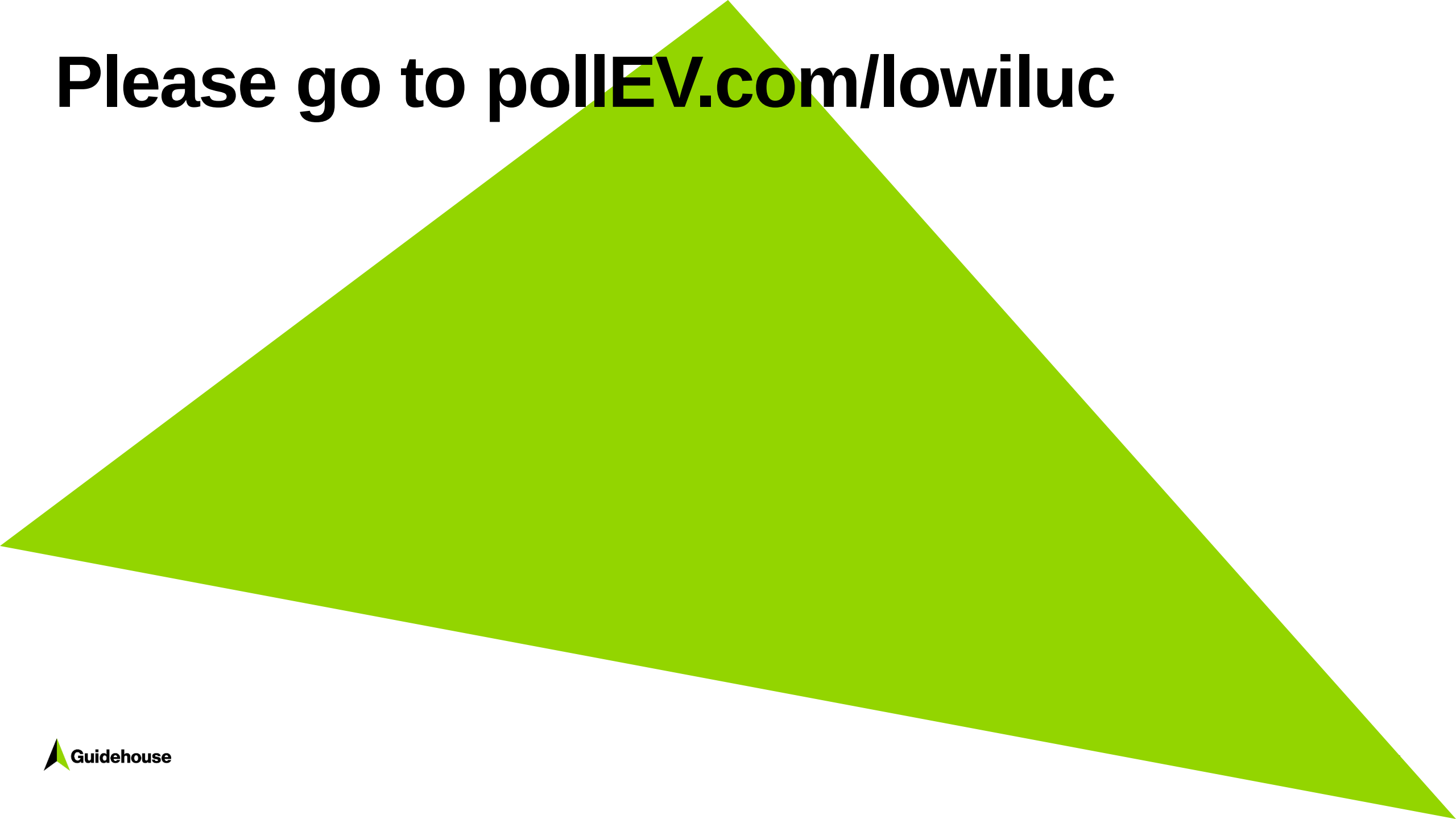
Please go to pollEV.com/lowiluc



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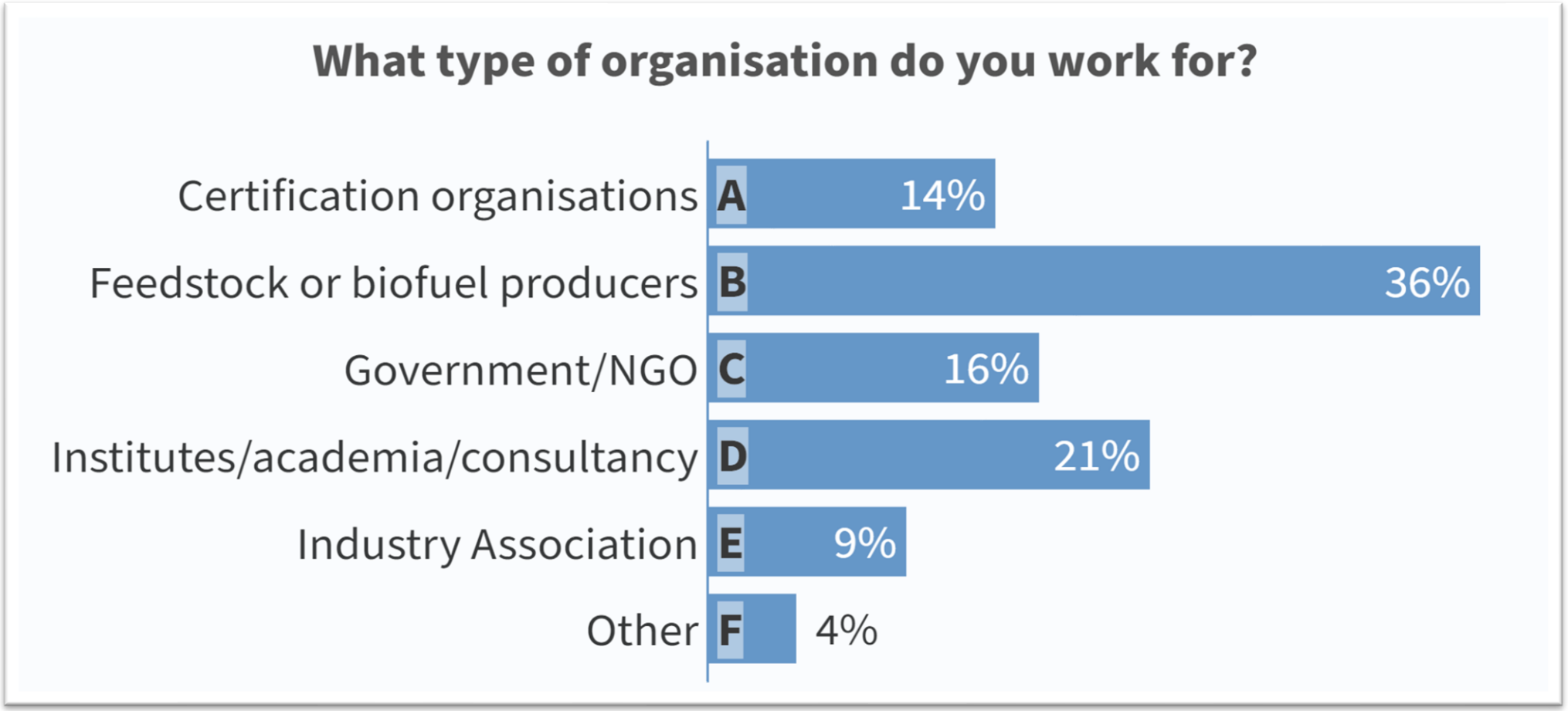
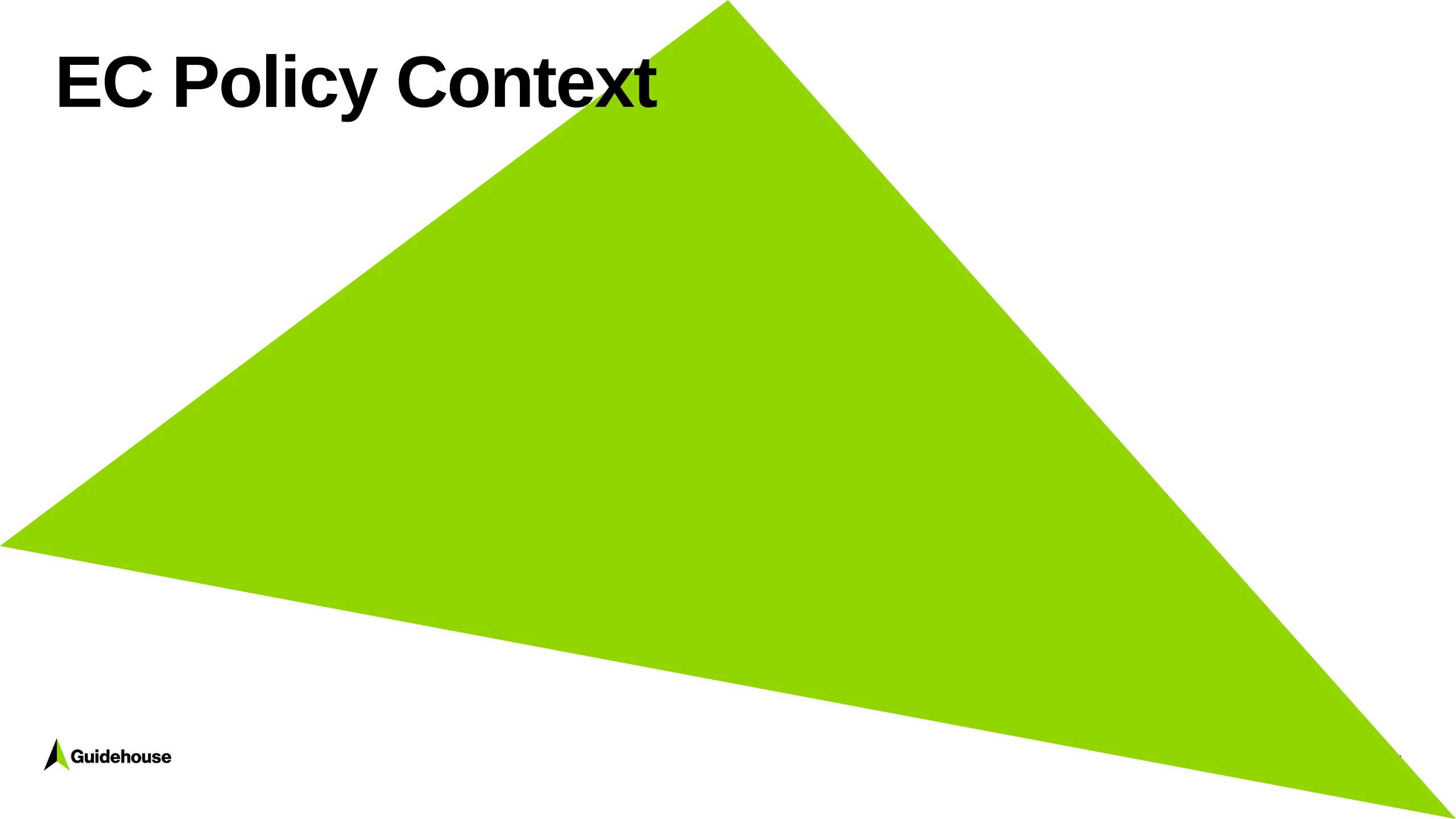
What country are you from?



Please note: The PollEV survey is for information purposes only

EC Policy Context



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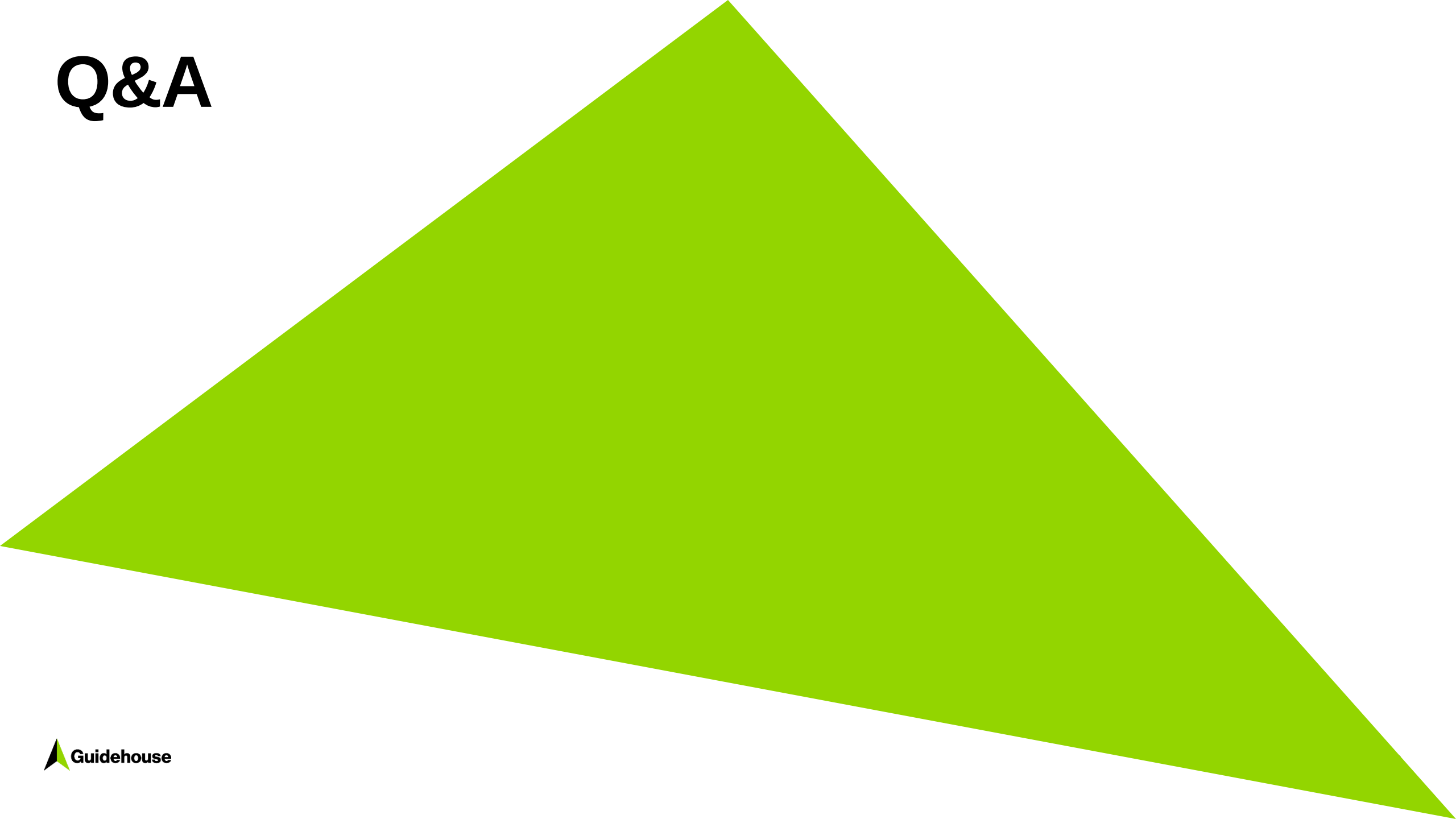
Legislative and institutional framework on High/ Low ILUC

Legal path to implement/ enforce the High/ Low ILUC concepts

- The Renewable Energy Directive recast (REDII) introduces the High ILUC concept and the option of Low ILUC-risk certification (December 2018);
- Delegated Regulation 2019/807 determines High ILUC-risk feedstock for which a significant expansion of the production area into high carbon stock land is observed, and the criteria for Low ILUC-risk certification of biofuels, bioliquids and biomass fuels (March 2019);
- Upcoming Commission Implementing Regulation on Implementing rules for voluntary schemes under REDII (to be adopted 2021) will include a module on Low ILUC-risk certification. The guidance being developed on Low ILUC-risk certification and the Low ILUC-risk pilots are a major contribution for its preparation;
- Once finalised, the Implementing Regulation can be used by voluntary schemes to develop an (optional) Low ILUC-risk certification module for their participants, subject to recognition by the Commission.

Q&A



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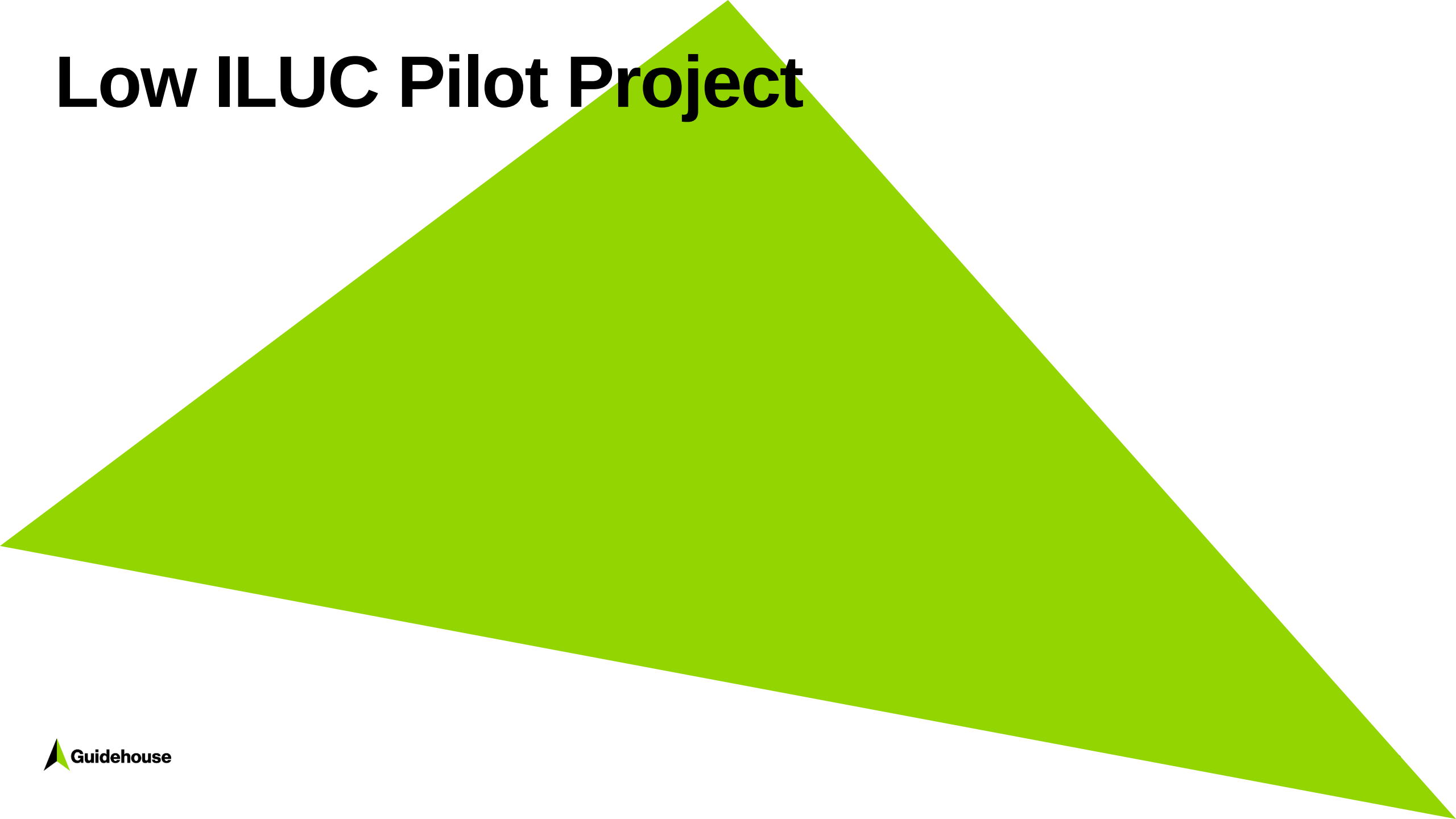
Low ILUC Pilot Project



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Low ILUC-risk Pilot project (Lot 2 ENER/C2/2018-462)

Testing the approach to low ILUC-risk certification

Objective

Support the European Commission to:

- Test certification guidance for low ILUC-risk biofuels as specified in the Delegated Regulation 2019/807
- Review the certification approach set out in the feedstock expansion report

Pilot Design

The pilots have been designed to cover a broad range of:

- Crops - palm, soy, crops for biogas
- Geographies - SE Asia, Latin America, Europe
- ILUC solutions - yield increase, abandoned land

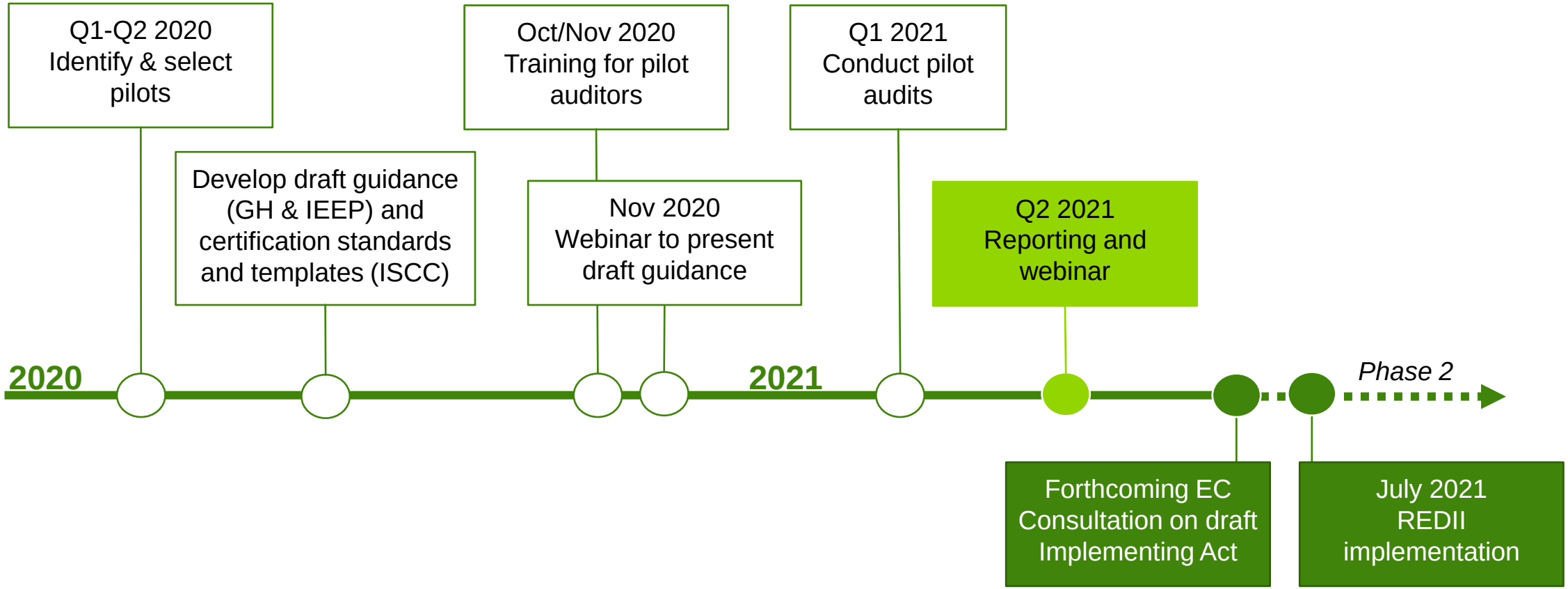
Timeline

2020-2022 in two phases

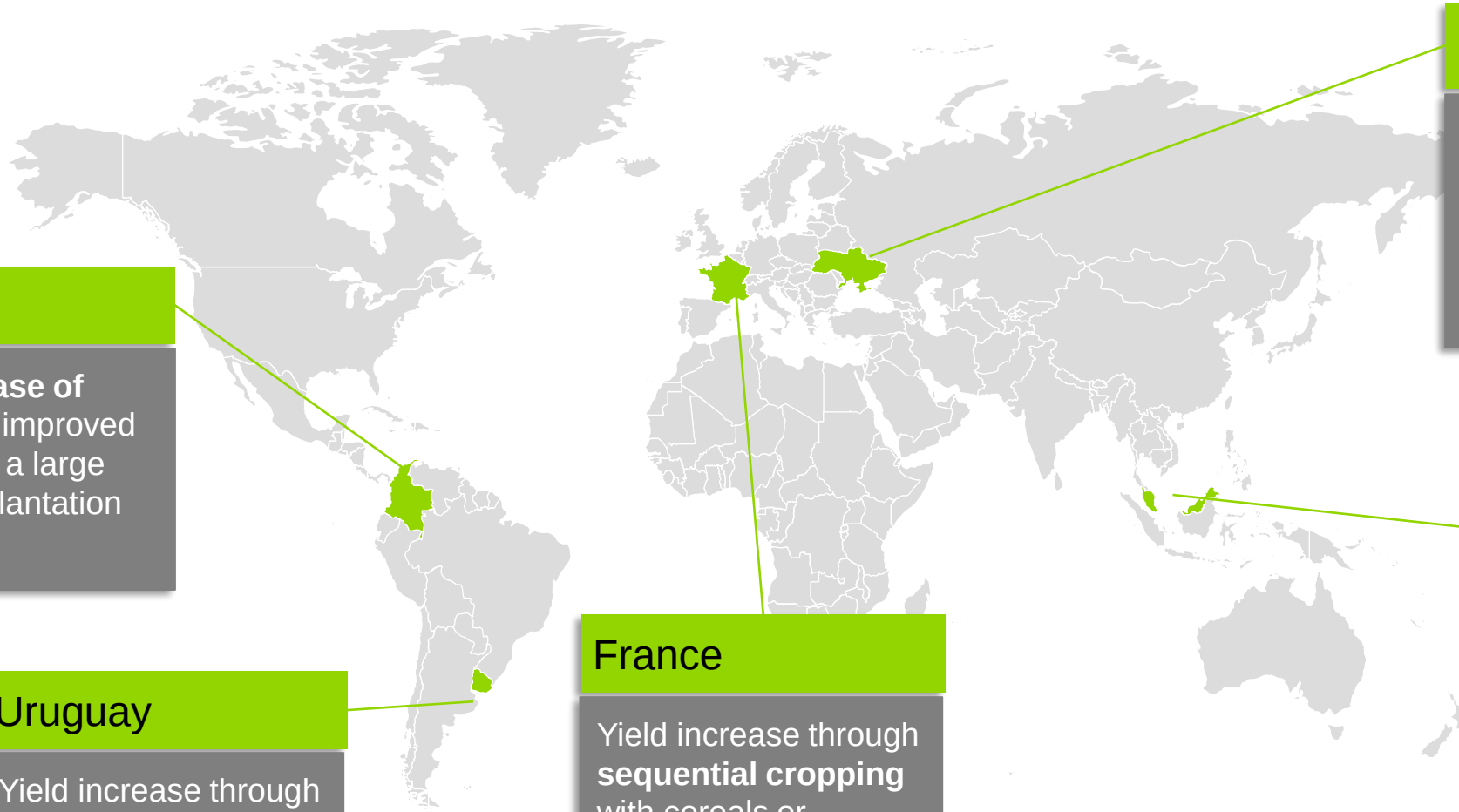
Website

https://iluc.guidehouse.com/

Timeline Low ILUC-risk Pilot project (Phase 1)



Overview of pilots



Ukraine

Cultivation on **abandoned land** for a 10ha plot that has been abandoned since the 1990's

Colombia

Yield increase of palm oil by improved irrigation on a large integrated plantation and mill

Malaysia

Yield increase of palm oil by thinning and replanting of high yielding seedlings on different parts of a large plantation

France

Yield increase through **sequential cropping** with cereals or oilseeds on an arable farm with biogas

Uruguay

Yield increase through **sequential cropping** of soy bean and Brassica carinata

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Low ILUC-risk certification guidance

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Legal framework: REDII and ILUC Delegated Regulation

- The Delegated Regulation (EU) 2019/807 of March 2019 defines high ILUC-risk feedstocks and low ILUC-risk biofuels
- The REDII (EU) 2018/2001 explains the concepts of high ILUC-risk feedstock and **low ILUC-risk certification**
- Forthcoming **Implementing Act on voluntary schemes** will set out more detailed guidance for low ILUC certification

Fuels produced from feedstocks considered high ILUC-risk will be subject to a cap set at the 2019 consumption level and will be phased out by 2030, unless they can be certified as low ILUC-risk

High ILUC-risk feedstocks are determined by a formula combining crop expansion values with productivity factors and energy yield – currently only palm oil is labeled as high ILUC-risk feedstock

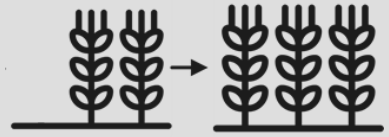
Low ILUC-risk fuels are those that can demonstrate:

- Produced from '**Additional feedstock**' **(e.g. through yield increase or unused/abandoned/severely degraded land)**
- Meets one of the following **'Additionality'** tests:
  - Financial attractiveness or non-financial barrier analysis
  - Production on abandoned or severely degraded land
  - Applied by smallholders < 2 ha

Two options for Low ILUC-risk biofuels

Low ILUC-risk biofuels

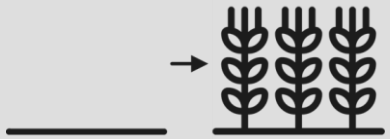
Yield Increase



- Existing crop systems
- Production of additional crop yields above a dynamic yield baseline

OR

Unused, Abandoned or Severely Degraded Land

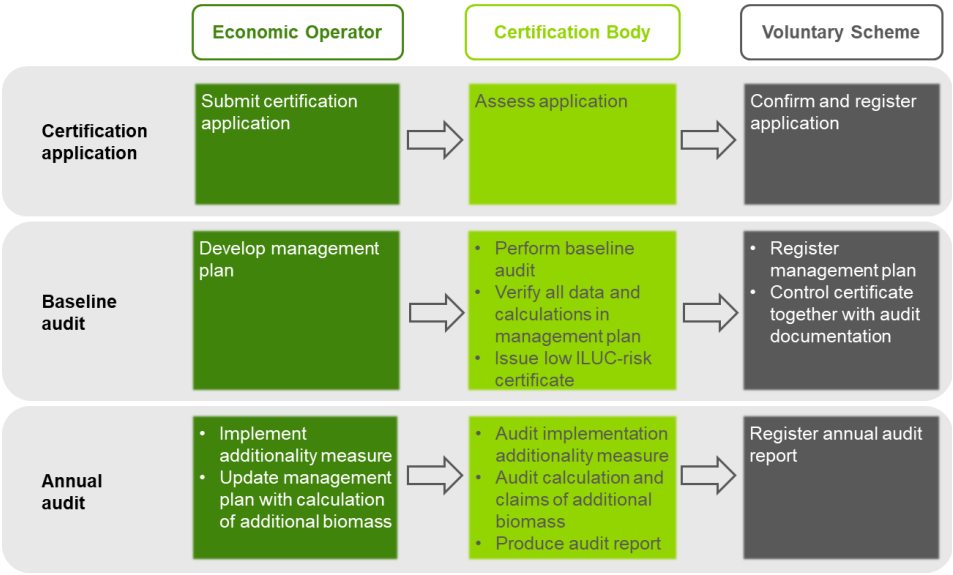


- New crop system
- Production on unused, abandoned or severely degraded land

Audit process

Optional “add-on” to existing EC-recognised voluntary schemes

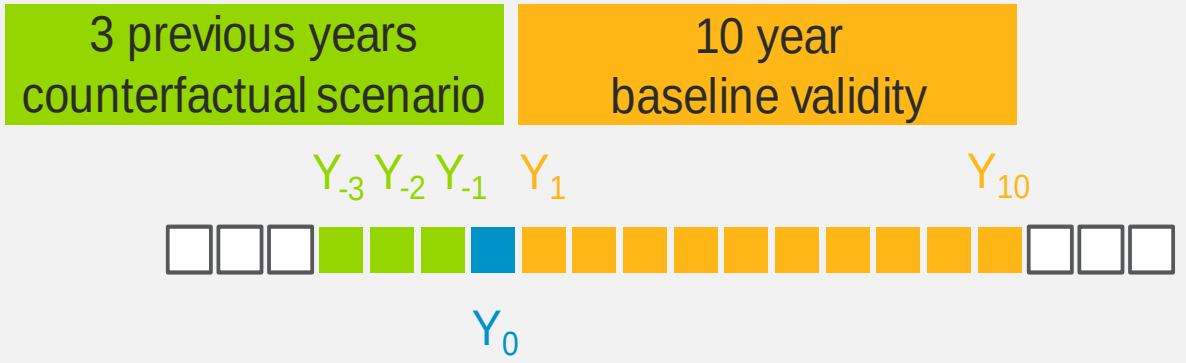
- EC-recognised voluntary schemes ensure compliance with “core” REDII sustainability criteria
- Low ILUC-risk certification requires: onsite **baseline audit** followed by **annual audits** aligned with main voluntary scheme
  - Baseline audit checks content of **management plan**, including **dynamic yield baseline** and results of the **additionality test**
  - Annually auditor confirms implementation and sustainability of additionality measure and volume of **additional biomass**
  - **Baseline validity** of 10 years from implementation of additionality measure



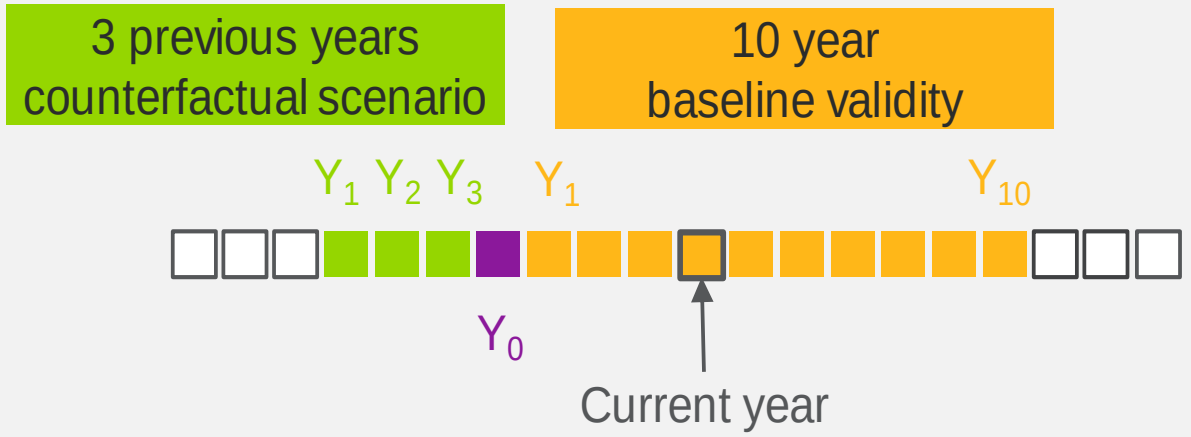
- Per consignment, economic operator declares low ILUC-risk claim as part of the sustainability characteristics
- Note the low ILUC-risk claim **can only be applied to the additional biomass**. Therefore, a single farm will produce **both** additional and non-additional biomass

“Baseline validity” of 10 years

Additionality measure taken in the present day

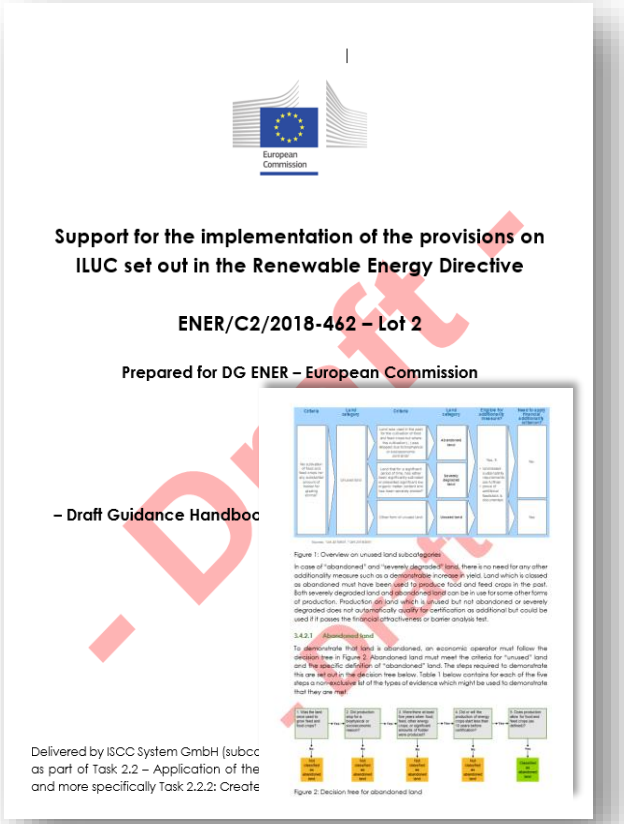


Additionality measure taken in the past



Pilot project developed draft certification documentation

Certification Standard (“Handbook”)



European Commission

Support for the implementation of the provisions on ILUC set out in the Renewable Energy Directive

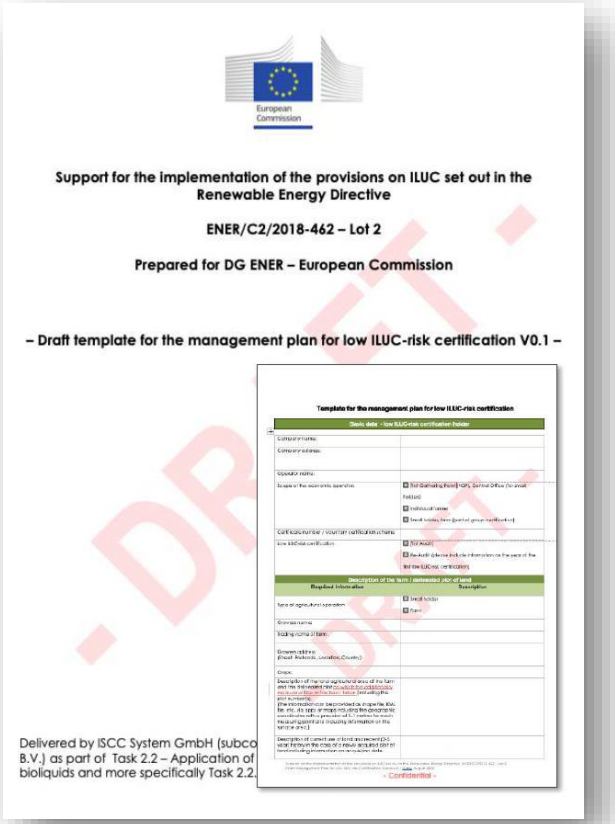
ENER/C2/2018-462 – Lot 2

Prepared for DG ENER – European Commission

– Draft Guidance Handboc

Delivered by ISCC System GmbH (subcc
as part of Task 2.2 – Application of the
and more specifically Task 2.2.2: Create

Management Plan template



European Commission

Support for the implementation of the provisions on ILUC set out in the Renewable Energy Directive

ENER/C2/2018-462 – Lot 2

Prepared for DG ENER – European Commission

– Draft template for the management plan for low ILUC-risk certification V0.1 –

Delivered by ISCC System GmbH (subco
B.V.) as part of Task 2.2 – Application of
bioliquids and more specifically Task 2.2.

Audit Checklist

European Commission

Support for the implementation of the provisions on ILUC set out in the Renewable Energy Directive

ENER/C2/2018-462 – Lot 2

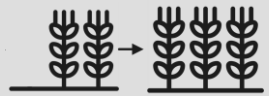
Prepared for DG ENER – European Commission

– Draft Audit Checklist for low ILUC-risk Certification V0.6 –

Delivered by ISCC System GmbH (subcontractor under the lead of Navigant Netherlands B.V.) as part of Task 2.2 – Application of the methodology in low ILUC-risk biofuels and bioliquids and more specifically Task 2.2.2: Create guidance for auditors

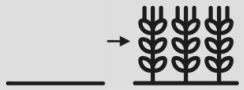
Guidance sets out steps to build management plan

Yield Increase



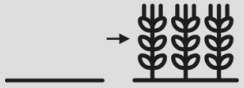
1. Describe plot and additionality measure
2. Check sustainability of measure
3. Demonstrate additionality
4. Determine dynamic yield baseline
5. Estimate additional biomass yield

Abandoned or Severely Degraded Land



1. Describe plot and additionality measure
2. Check sustainability of measure
3. Demonstrate additionality not needed
4. Demonstrate land status, baseline yield is zero
5. Estimate additional biomass yield

Other unused land



1. Describe plot and additionality measure
2. Check sustainability of measure
3. Demonstrate additionality
4. Demonstrate land status, baseline yield is zero
5. Estimate additional biomass yield

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Describe delineated plot of land

1 Describe plot and additionality measure

Description for each plot of land upon which an additionality measure is applied

Land tenure and existing certification:

- Current land use and recent (3-5 yr) history
- Any existing sustainability certification
- Acquisition dates if newly acquired

Description of delineated plot:

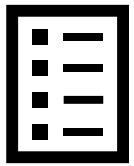
- Location (geographic coordinates)
- Surface area
- Crop rotation system if applicable

Describe additionality measure

Delegated Regulation 2019/807, Article 2(5)

> (5) 'additionality measure' means any improvement of agricultural practices leading, in a sustainable manner, to an increase in yields of food and feed crops on land that is already used for the cultivation of food and feed crops; and any action that enables the cultivation of food and feed crops on unused land, including abandoned land, for the production of biofuels, bioliquids and biomass fuels;

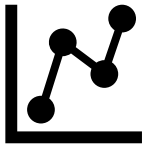
Description of the additionality measure(s)



Qualitative situation of the farm/plantation/plot before the additionality measure

Description of the additionality measure

Timeline over which it was or will be applied



Explanation of the expected future yield growth

Check sustainability of Additionality Measure

2 Check sustainability of measure

The additionality measure should lead, **in a sustainable manner**, to an increase in yields (DR Article 2(5)).

As a baseline, **the REDII sustainability criteria** will be used to demonstrate that the additionality measure is sustainable.

- The certification status of the economic operator will be checked as part of the baseline audit and on an on-going basis as part of the annual audits, which should be conducted in line with the existing voluntary scheme audits
- Some EC-recognised voluntary schemes go beyond the REDII sustainability criteria

We propose that in addition:

- **Auditor should flag any potential sustainability risks** from the implementation of the additionality measure that they come across during the baseline audit.
  These risks would then be checked as part of the additionality audit.
- **Economic operators should show that they have measures to identify and mitigate any risks** in the management plan and implementation of this should be checked as part of the additionality audit.

Demonstrate Additionality

3 Demonstrate additionality

Two options to prove additionality:

- **Financial attractiveness** or
- **Non-financial barrier** analysis.

The Additionality test is valid for the 10-year baseline validity.

No additionality test required for measures on abandoned or severely degraded land or land managed by small holders (< 2ha). NB. It is a requirement for measures on 'other unused land'.

Article 5

Additionality measures

1. Biofuels, bioliquids and biomass fuels may only be certified as low indirect land-use change-risk fuels if:

(a) the additionality measures to produce the additional feedstock meet at least one of the following conditions:

(i) they become financially attractive or face no barrier preventing their implementation only because the biofuels, bioliquids and biomass fuels produced from the additional feedstock can be counted towards the targets for renewable energy under Directive 2009/28/EC or Directive (EU) 2018/2001;

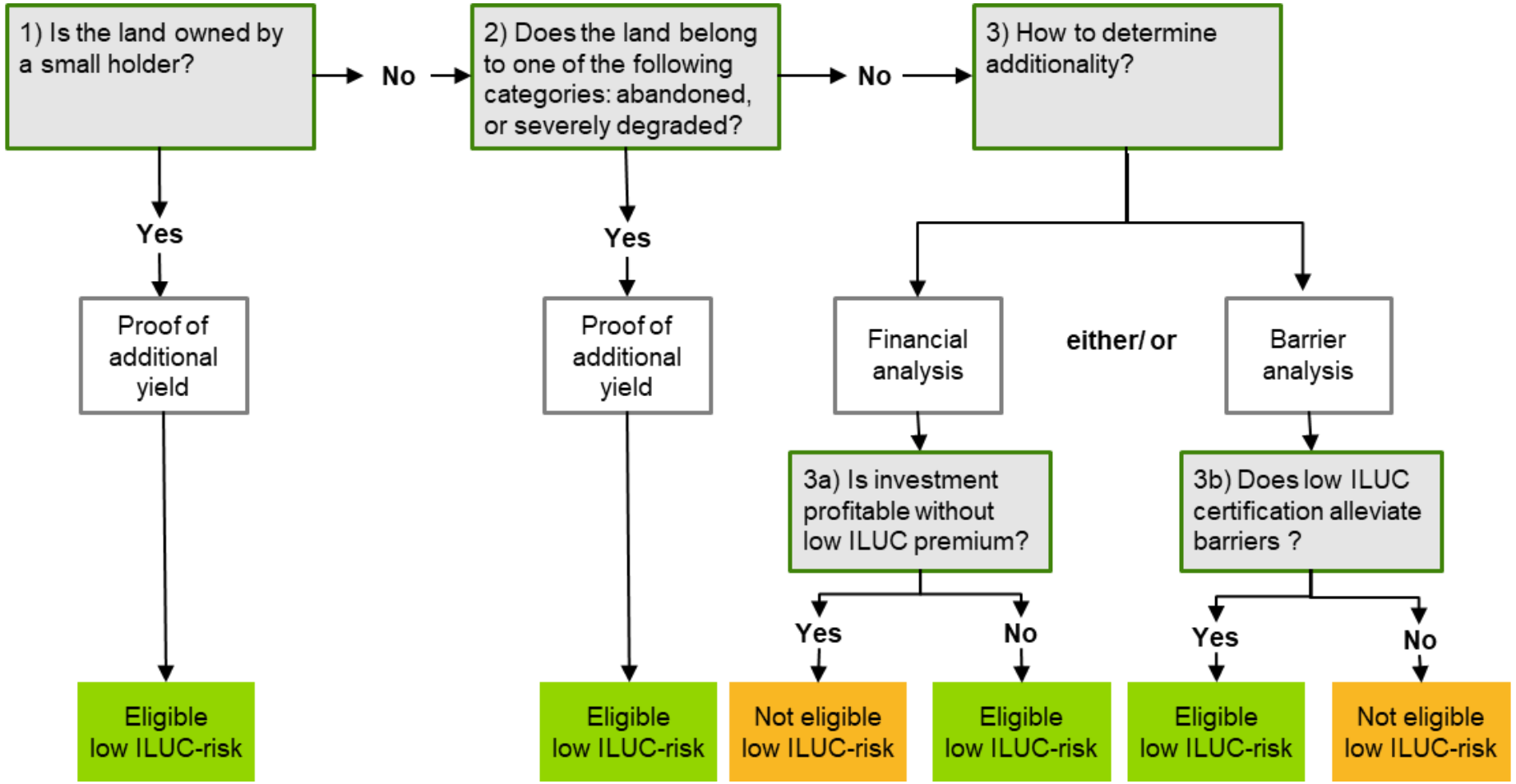
(ii) they allow for cultivation of food and feed crops on abandoned land or severely degraded land;

(iii) they are applied by small holders;

(b) the additionality measures are taken no longer than 10 years before the certification of the biofuels, bioliquids and biomass fuels as low indirect land-use change-risk fuels.

Demonstrate Additionality

Additionality test



Financial Attractiveness Analysis

Negative NPV required to pass additionality test

3 Demonstrate additionality

Net Present Value analysis of
additionality measure:

- Additional revenue based on expected additional volume and averaged historic feedstock prices
- Investment cost, discounted over the lifetime of the investment

Negative NPV passes additionality test.
A feedstock producer would only invest in a project with a prospected negative NPV if it can be counted towards the REDII.

$$NPV = \sum \frac{P - L}{(1+i)^t}$$

Where:

P = profits from feedstock revenue
L = losses from CAPEX and OPEX
i = discount rate
t = time period

Financial Attractiveness Analysis

Additional volume		2.2	tonne/ha	Note: expected additional production volume after implementing additionality measure
Feedstock sales value		250	USD/tonne	Note: option for EO to use FAOSTAT national data or offtaker contracts
Discount rate	5%			Note: to be further specified according to region
NPV		$ -1,125.22		

		Year										
		0	1	2	3	4	5	6	7	8	9	10
Profits												
	Value											
Sales value	USD/tonne	0	550	550	550	550	550	550	550	550	550	550
Total	***USD/tonn***	***0***	***550***	***550***	***550***	***55***	***550***	***550***	***550***	***550***	***550***	***550***
NPV		0.0	523.8	498.9	[illegible]	[illegible]	430.9	410.4	390.9	372.3	354.5	337.7
Losses												
	Value											
additional CAPEX	USD/ha	4500										
additional OPEX	USD/ha	100	100	100	100	100	100	100	100	100	100	100
Total	***USD/ha***	***4600***	***100***	***100***	***100***	***100***	***100***	***100***	***100***	***100***	***100***	***100***
NPV		4600.0	95.2	90.7	86.4	82.3	78.4	74.6	71.1	67.7	64.5	61.4

EXAMPLE

Barrier analysis

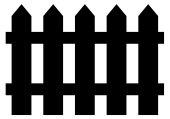
Written analysis of how the barrier will be overcome

3 Demonstrate additionality

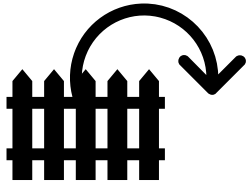
Economic operator should describe:

The envisaged additionality measure

The barrier and how it inhibits the uptake of the additionality measure



How low ILUC-risk certification overcomes the barrier



- **If something can be quantified, then it should be considered in the financial attractiveness analysis**
- **Key challenge for barrier analysis is to make it as objective as possible**
- Possible examples that could be considered as non-financial barriers:
  - First-of-a-kind / common practice
  - Training that has not been offered previously in the region/country
  - Export / barriers to trade

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Measures on unused, abandoned or severely degraded land

4 Demonstrate land status, baseline yield is zero

Article 2

Definitions

For the purposes of this Regulation, the following definitions apply:

(1) 'oil crops' means food and feed crops such as rapeseed, palm, soybeans and sunflower, that are not starch rich crops and sugar crops that are commonly used as feedstock for the production of biofuels, bioliquids and biomass fuels;

(2) 'unused land' means areas which, for a consecutive period of at least 5 years before the start of cultivation of the feedstock used for the production of biofuels, bioliquids and biomass fuels, were neither used for the cultivation of food and feed crops, other energy crops nor any substantial amount of fodder for grazing animals;

(3) 'abandoned land' means unused land, which was used in the past for the cultivation of food and feed crops but where the cultivation of food and feed crops was stopped due to biophysical or socioeconomic constraints;

(4) 'severely degraded land' means land as defined in point 9 of Annex V, part C to Directive (EU) 2018/2001;

(5) 'additionality measure' means any improvement of agricultural practices leading, in a sustainable manner, to an increase in yields of food and feed crops on land that is already used for the cultivation of food and feed crops; and any action that enables the cultivation of food and feed crops on unused land, including abandoned land, for the production of biofuels, bioliquids and biomass fuels;

(6) 'additional feedstock' means the additional amount of a food and feed crop produced in a clearly delineated area compared to the dynamic yield baseline and that is the direct result of applying an additionality measure;

(7) 'dynamic yield baseline' means the average yield from the delineated area where an additionality measure has been taken, calculated over the 3-year period immediately preceding the year of the application of such measure, taking into account the average yield increase observed for that feedstock over the previous decade and the yield curves over the life time in case of permanent crops, excluding yield fluctuations;

Production on unused, abandoned or severely degraded land, baseline is zero

4 Demonstrate land status, baseline yield is zero

Unused Land

No cultivation of food, feed, other energy crops, or significant amounts of fodder produced on the land

Abandoned land	Severely degraded land	Other unused land
Land was used in the past for the cultivation of food and feed crops but where the cultivation (…) was stopped due to biophysical or socioeconomic constraints	Land that for a significant period of time, has either been significantly salinated or presented significant low organic matter content and has been severely eroded.	Other form of unused land

Requirements for eligibility of additionality measure

• Land based sustainability requirements • Documentation additional biomass	• Land based sustainability requirements • Documentation additional biomass	• Land based sustainability requirements • Documentation additional biomass • **Additionality (financial or barrier analysis)**

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Steps to demonstrate abandoned land status, baseline is zero

4 Demonstrate land status, baseline yield is zero

1 Food and Feed Previously Grown

- Show that food and feed crops (as defined in the legislation) were once grown.
- Show that this predates the beginning of the period of at least five years following abandonment

2 Production Ceased

- Show that production of food and feed crops ceased
- Show that this was for a biophysical or socioeconomic reason

3 5 Years Elapsed

- Show that at least five years elapsed when neither food nor feed crops, other energy crops nor significant amounts of fodder were produced

4 10 Years Before Certification

- Show that activity needed to bring the land into production took place no earlier than 10 years before certification

5 Able for Cultivation Food and Feed

- Show that the crops to be certified as additional are food or feed crops, rather than other energy crops.

Yield increase: determine dynamic yield baseline

Definition and elements to be taken into account

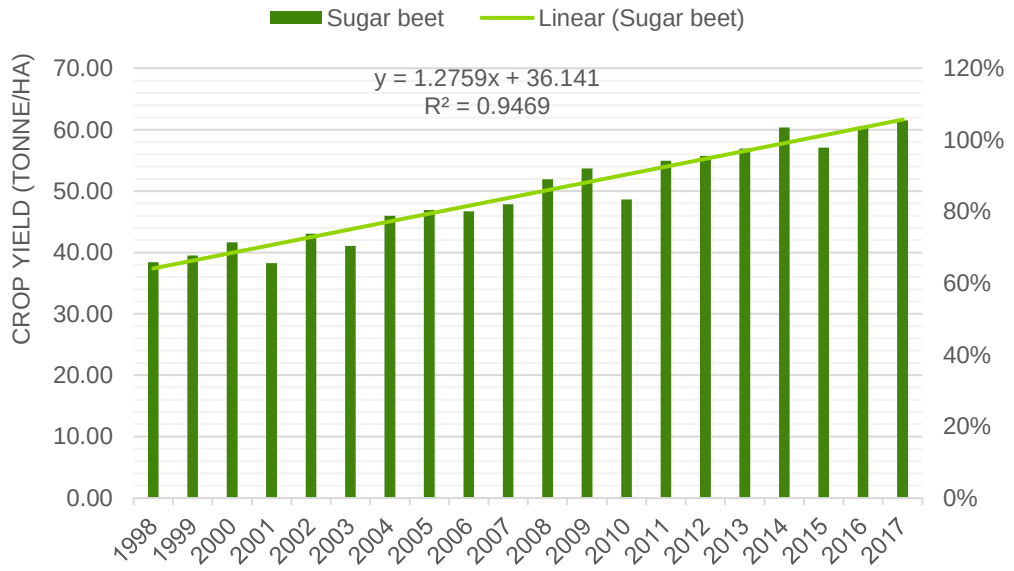
4 Determine dynamic yield baseline

Delegated Regulation 2019/807, Article 2(7)

> (7) 'dynamic yield baseline' means the average yield from the delineated area where an additionality measure has been taken, calculated over the 3-year period immediately preceding the year of the application of such measure, taking into account the average yield increase observed for that feedstock over the previous decade and the yield curves over the life time in case of permanent crops, excluding yield fluctuations;

Dynamic yield baseline is based on two elements:

1. **Starting point** average of historical crop yields on the delineated plot
2. **Slope** based on trendline fitted through global FAOSTAT crop yield data for previous 20 years

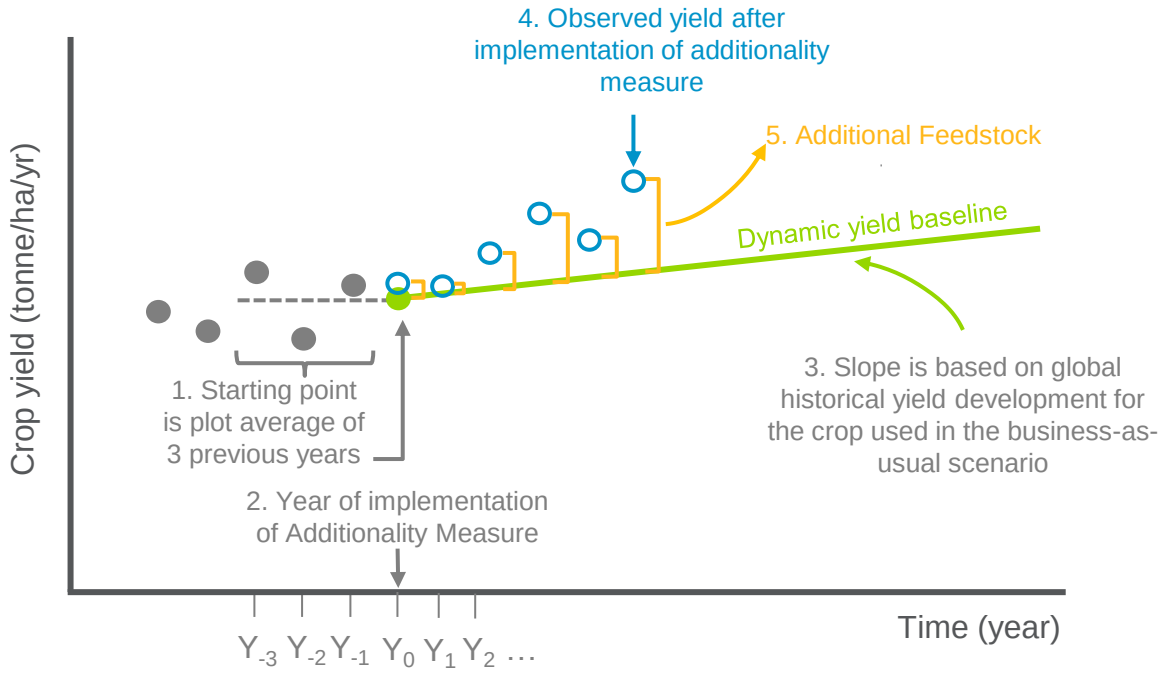


Yield increase: determine dynamic yield baseline

How to determine dynamic yield baseline (annual crop)

4 Determine dynamic yield baseline

- Most straightforward case is for an annual crop
- Approach for **perennial crops** (e.g. palm) and **sequential cropping** or **crops in rotation** is more complex
- Guidance sets out an approach to address **outlier crop yields** to “exclude yield fluctuations”



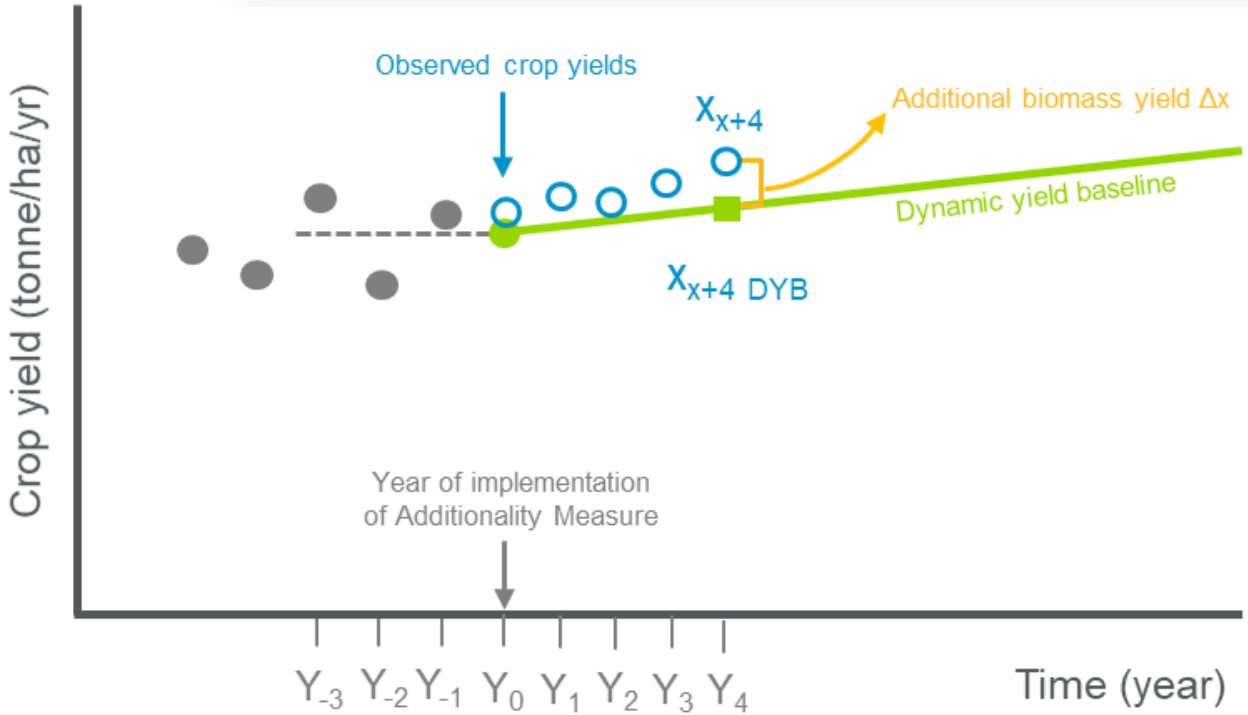
Estimate additional biomass yield

Difference between observed yield & dynamic yield baseline

5 Estimate additional biomass yield

Delegated Regulation 2019/807, Article 2(6)

(6) 'additional feedstock' means the additional amount of a food and feed crop produced in a clearly delineated area compared to the dynamic yield baseline and that is the direct result of applying an additionality measure;



$$\Delta x = (x_{x+4} - x_{x+4\ DYB}) \times A\ (\text{in tonne/yr})$$

- *Estimate* of additional biomass required for the NPV calculation
- The amount of low ILUC-risk biomass claimed is the actual difference between the observed yield and the dynamic yield baseline

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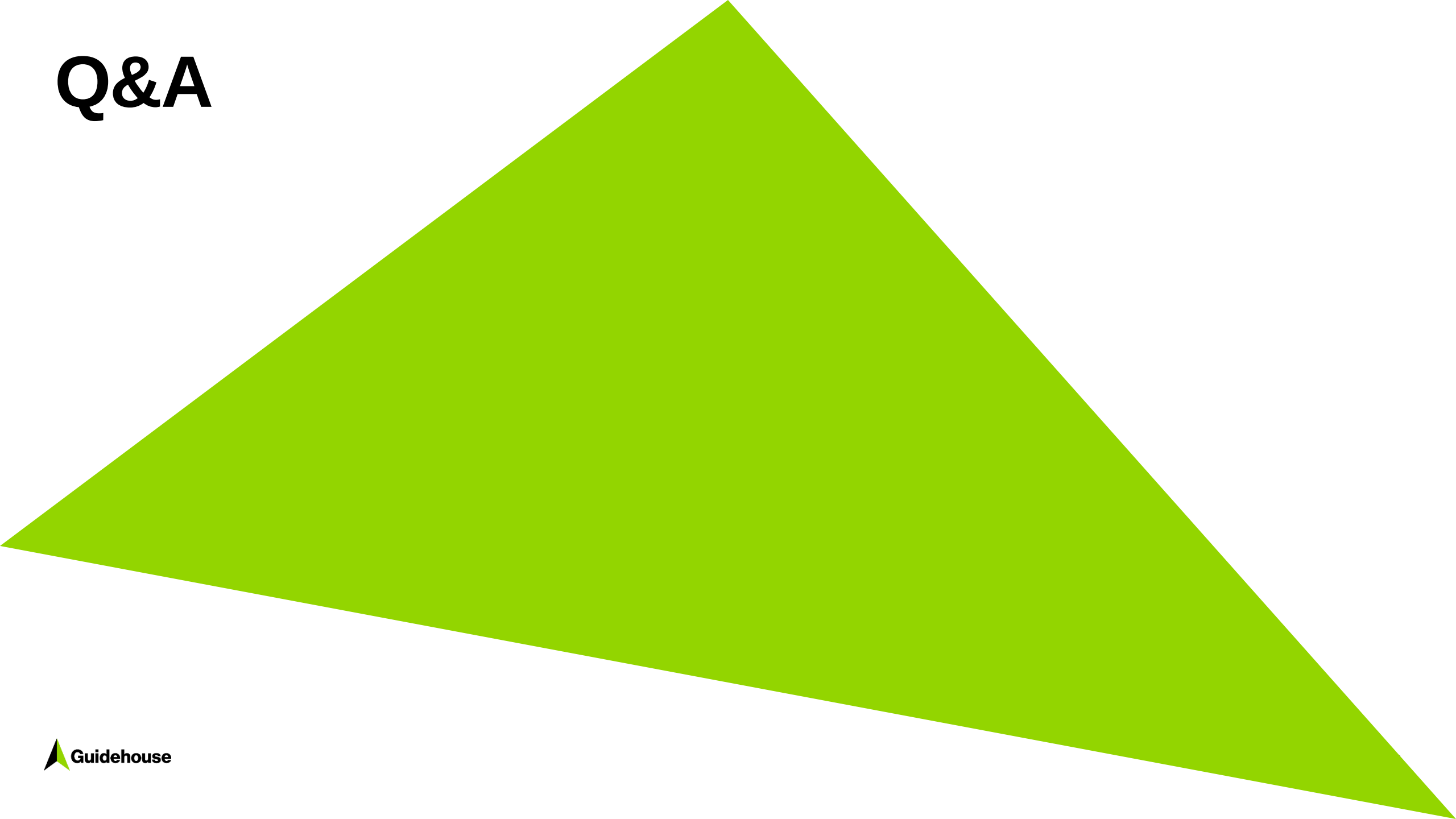
Q&A



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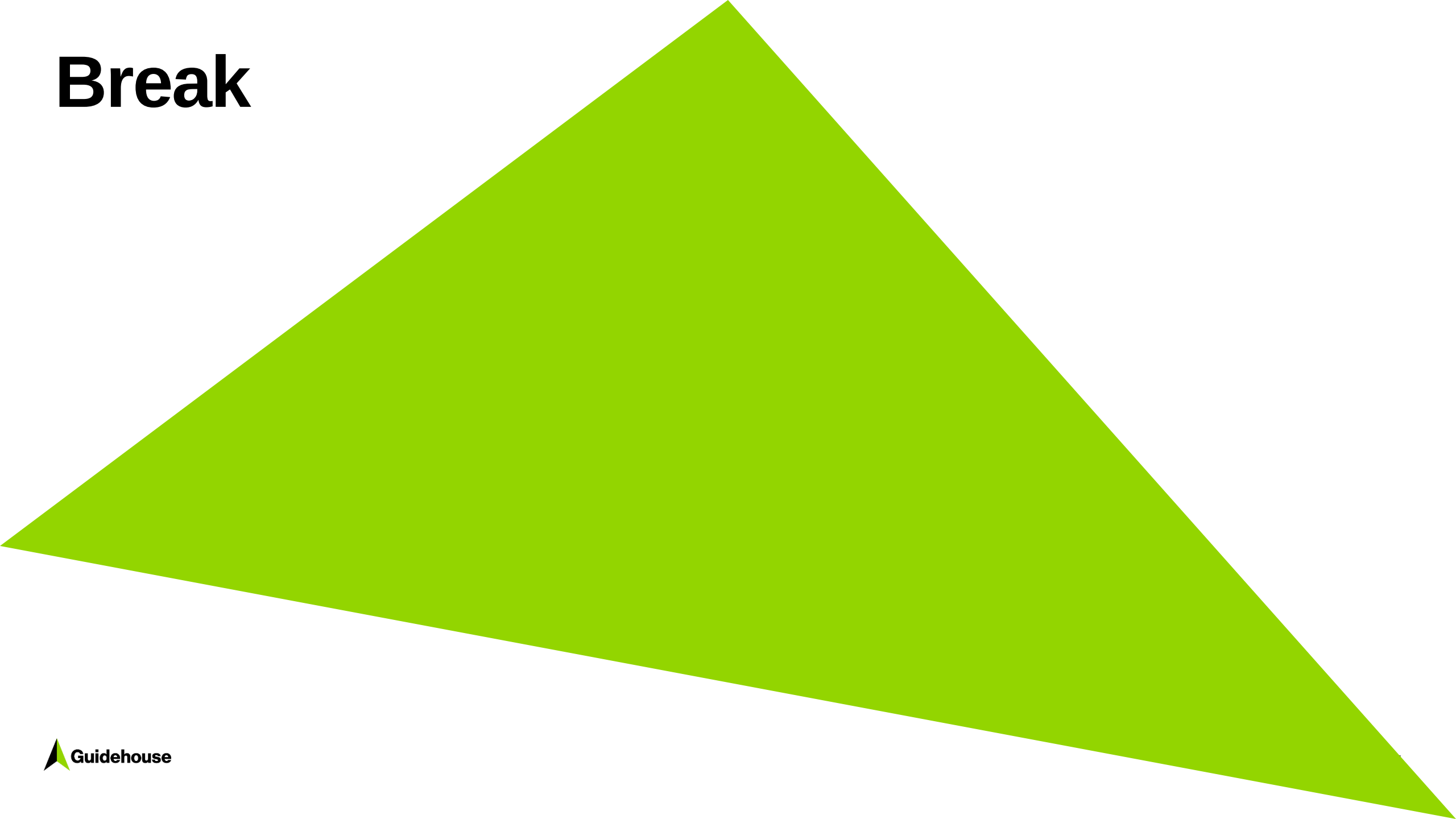
Break



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Main lessons from first round pilot audits

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Overall practicality of low ILUC-risk certification

Verifiable data was available to do all required calculations

- Data was available and auditable. The approach in general fits well alongside existing voluntary scheme and audit practices, noting that the pilot companies were mostly already certified to a voluntary scheme.
- Whilst the pilot companies all had the required data, some expressed doubt whether all farms/plantations would have such data, especially if they are not already certified.

Methodology complex and administrative burden relatively high compared to volume of additional biomass

- The methodology was judged to be complex and some methodological questions remain which would benefit from further refinement, guidance or tools.
- The volumes of low ILUC biomass to be claimed were often quite low, e.g. <1 tonne crude palm oil/ha in the Malaysia pilot, which may not justify the administrative burden for some economic operators, especially amidst uncertainty.

Uncertainty in Additional Biomass volume

- Yield variations mean that the volume of low ILUC biomass an economic operator can claim in a certain year, or even whether or not they will be able to claim, is highly uncertain. The volume varies year to year or even subplot to subplot.
- The uncertainty is commercially unattractive for economic operators and would complicate the logistics of selling product.

Uncertainty on low ILUC premium

- The logic of the financial attractiveness test relies on a premium for low ILUC biomass.
- There is little incentive to become low ILUC certified without a guarantee of a premium. Any premium is likely to be for the biofuel and might not translate to an upstream commodity price for a farmer, even more so given the uncertainty in volumes and the fact that a farmer can only claim their additional biomass as low iLUC (not the whole harvest).

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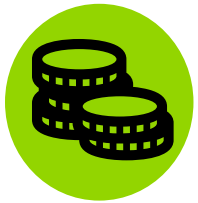
Financial attractiveness test



No negative NPV projects among pilots

- The financial attractiveness test resulted in a positive NPV for most situations within the pilots
- Non-profitable investments are unlikely to be made if there is no certain low ILUC premium. A premium is tricky for any commodity at the farm/plantation level and there is no policy mechanism for this for feedstocks that are not high ILUC
- Some participants said we should not create a mechanism to incentivise just the most expensive or unprofitable measures

Variations in feedstock volume and prices make NPV analysis challenging

- Feedstock prices were available and verifiable, but highly variable over the course of a year. This makes it difficult to select a single price to use in the NPV analysis. The methodology should define which price should be used (e.g. avg annual price)
- The feedstock also differs per economic operator, e.g. fresh fruit bunches for a palm plantation and crude palm oil for an integrated mill

Discount rates higher in reality

- Higher discount rates were suggested by pilot companies than stated in the guidance. Malaysia suggested 7-12% and Colombia 16%
- Using the lower discount rates in the guidance would make the NPV more positive

Difficulty forecasting cost of an additionality measure

- Costs of certain additionality measures can be difficult to forecast, e.g. the actual cost of the thinning on the Malaysia palm plantation varied >10x for the different subplots on a EUR/ha basis

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Non-financial barrier test

Lack of clarity for auditors and economic operators

- The auditors felt there was limited guidance to judge whether the non-financial barriers claimed in some of the pilots were legitimate enough to pass the non-financial barrier test.
- Economic operators also felt there was a lack of clarity on the type of non-financial barriers that could be stated. For example, if an additionality is not common practice, common practice as compared to what? Regional practices, practices of similar sized economic operators, etc.

More focus needed to develop the non-financial barrier test

- The pilots focused on testing the financial attractiveness test (given also the focus of the draft Implementing Act) but some pilots attempted the non-financial barrier analysis.
- These large companies have already taken steps to increase their yield. But some commented that in reality where yields are not already optimised that is more usually because of “other barriers” rather than because a yield increase measure would not make financial sense.

Abandoned land as an additionality measure

Direct Land Use Change Emissions

- Any conversion of land needs to meet the core REDII sustainability criteria, but some land use changes are permitted. It is unclear whether GHG emissions associated with permitted direct land use change need to be taken into account when converting abandoned land to agricultural land.
- If dLUC needs to be taken into consideration, the GHG savings requirement will likely not be met.

Biodiversity

- Biomass needs to meet the core REDII sustainability criteria. There may be biodiversity concerns if land is abandoned for a long period and biodiversity has increased.
- This increase in biodiversity is regionally and climate dependent. This was not an issue in the Ukraine pilot.

Methods Available for Demonstrating Abandoned Land

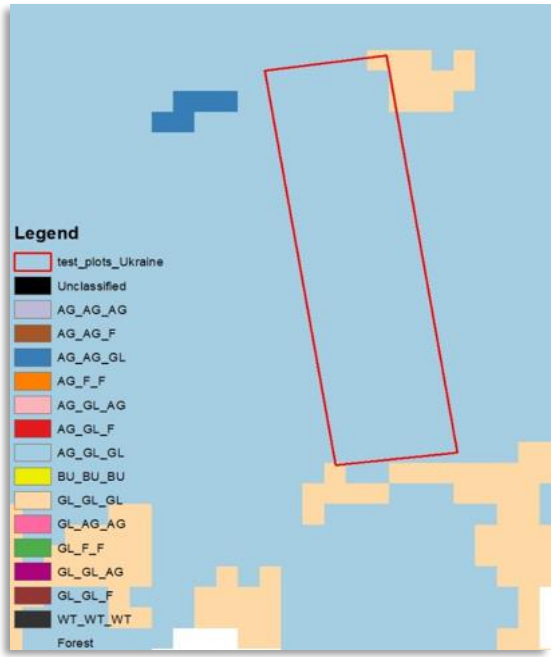
- Satellite imaging can be used to demonstrate the required >5 years of abandonment or intensive/extensive grazing. It is more challenging and requires more data to demonstrate that a food or feed crop was previously grown or small-scale grazing and would need to be complemented with other methods.
- Local interviews were used in the pilots to complement satellite imaging analysis.
- Local archives were not available as they are only kept for 25 years and the period of abandonment was longer than this. They will likely be available for shorter periods of abandonment.
- Soil sampling and environmental DNA sequencing is not adapted to demonstrate that land was agricultural during a certain period of time. It can be demonstrated that a certain crop species was grown, but not the distinct timeline.

Abandoned land and direct land use change

Direct Land Use Change Emissions

- Any conversion of land needs to meet the core REDII sustainability criteria, but some land use changes are permitted. It is unclear whether GHG emissions associated with permitted direct land use change need to be taken into account when converting abandoned land to agricultural land.
- If dLUC needs to be taken into consideration, the GHG savings requirement will likely not be met.

Land status from time series
(1986, 1998, 2010)



Direct Land Use Change

The plot was abandoned for ~30 years, so over time, the agricultural land turned into grassland

Direct land use change (dLUC) GHG emissions associated with conversion from grassland to agricultural land may need to be considered
(depending if managed or unmanaged grassland)

If dLUC emissions are to be considered, the GHG savings criteria for biofuels would not be met

Findings

Conclusion

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Abandoned land and biodiversity

Biodiversity

- Biomass needs to meet the core REDII sustainability criteria. There may be biodiversity concerns if land is abandoned for a long period and biodiversity has increased.
- This increase in biodiversity is regionally and climate dependent. This was not an issue in the Ukraine pilot.

Plot of land during audit

Biodiversity

Findings

The plot was abandoned for ~30 years, so biodiversity could have increased in that period. Some regrowth of trees was observed.

The audit concluded through field maps, satellite imaging, land-lease agreements and interviews with locals that the plot was not classified as a highly biodiverse grassland.

Conclusion

Biodiversity was not a sustainability concern in this pilot

Abandoned land and methods for demonstration

Methods Available for Demonstrating Abandoned Land

- Satellite imaging can be used to demonstrate the required >5 years of abandonment or intensive/extensive grazing. It is more challenging and requires more data to demonstrate that a food or feed crop was previously grown or small-scale grazing and would need to be complemented with other methods.
- Soil sampling and environmental DNA sequencing is not adapted to demonstrate that land was agricultural during a certain period of time. It can be demonstrated that a certain crop species was grown, but not the distinct timeline.

Methods for Demonstration				
✓ Satellite imaging ✓ Local interviews x Local archives not available from >25 years ago x Soil sampling with eDNA sequencing	✓ Satellite imaging (no food/feed crops) x Satellite imaging not sufficient to identify small-scale grazing ✓ Local interviews	✓ Satellite imaging ✓ Local interviews ✓ Land lease contracts	✓ Satellite imaging ✓ Local interviews x Local archives not available from >25 years ago	• Not applicable as land was not yet cultivating new crops

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Calculation of dynamic yield baseline for palm

Different growth curve options result in different low ILUC volumes

- Different volumes of low ILUC biomass can be claimed for the same additionality measure depending on the option selected. It is not clear whether one option is “better” as yields vary so in some years Option 1A allows to claim more additional biomass and in some years Option 1B.
- The methodology was complex. Any simplification would be beneficial.

Weather effects significant

- Weather events such as droughts can have a significant effect on yield in comparison to the effect of an additionality measure. Weather events that occur in the years that are used to set the dynamic yield baseline can influence whether low ILUC biomass can or cannot be claimed.
- This is especially true for plantations that already have good yields and additionality measures only provide marginal yield increases.

Subplot level or plantation level certification

- The Malaysia pilot was performed at a subplot level and Colombia pilot at a whole plantation level (because of the type of additionality measure). The level selected can influence the volumes, and whether or not an economic operator can claim low ILUC biomass.
- Subplot level is more accurate in some cases, however requires more granular data, is a greater administrative burden, and is more complicated for auditors to audit.

Delay in observed yield increase

- The effects of an additionality measure for oil palm are observed only 2-3 years after the measure is taken because it is perennial. The Malaysia pilot company suggested to start the year that they can start claiming low ILUC biomass from the year of the observed effect rather than year of implementing the measure.

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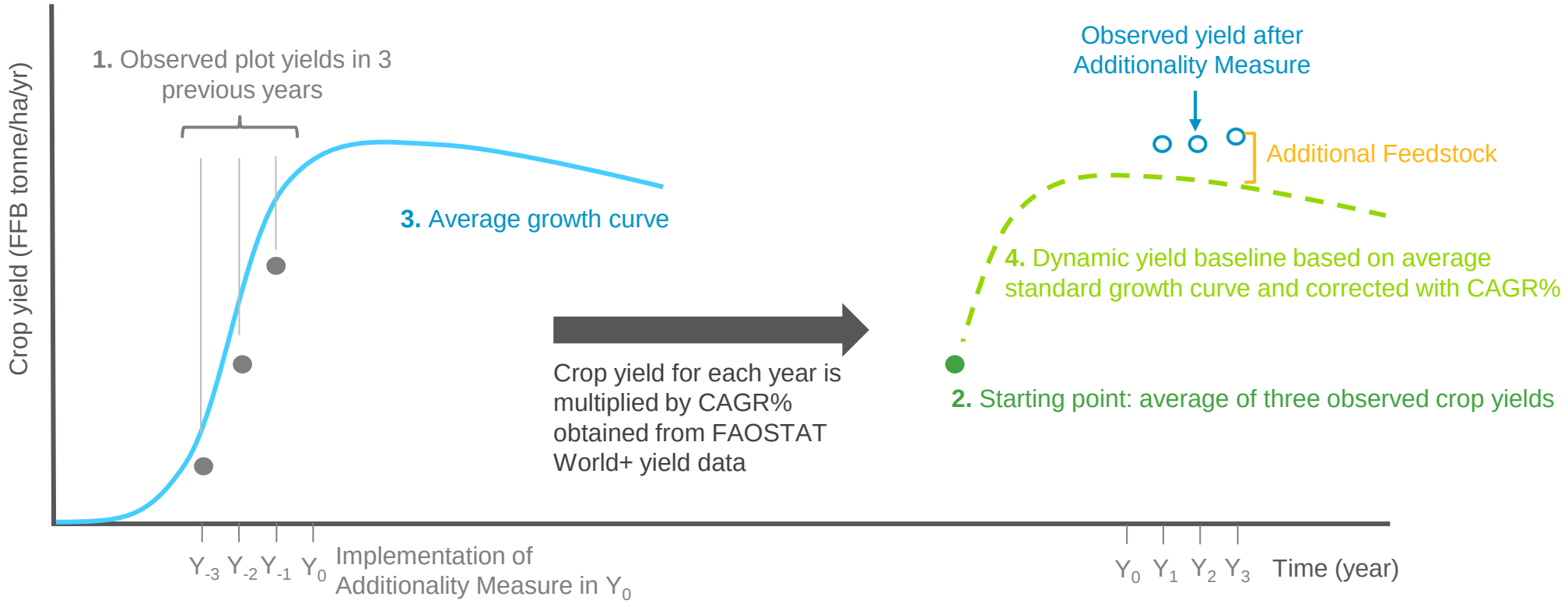
How to determine dynamic yield baseline

Perennial crop

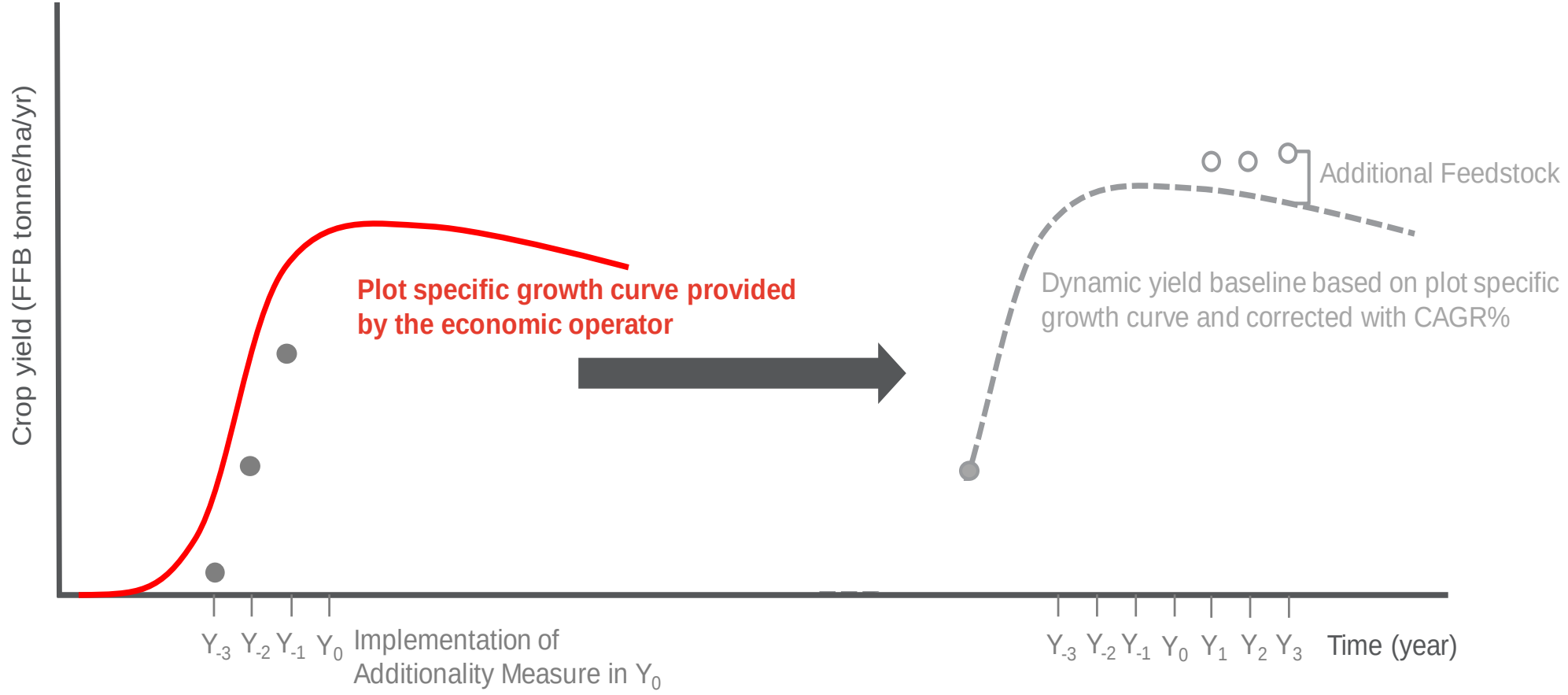
Palm- Option 1a: average growth curve



How to determine dynamic yield baseline

Perennial crop

Palm- Option 1b: growth curve provided by economic operator



Dynamic growth curve options result in different low ILUC volumes

Differences between Option 1A and 1B

- Different volumes of low ILUC biomass can be claimed for the same additionality measure depending on the option selected. It is not clear whether one option is “better” as yields vary so in some years Option 1A allows to claim more additional biomass and in some years Option 1B.
- The methodology was complex. Any simplification would be beneficial.

Yield of Option 1A and 1B from 2020-2030

Dynamic yield baseline options

The pilot company used both Option 1A (average growth rate) and 1B (own growth curve)

Findings

Both options resulted in similar results, although yield difference over the next ten years was higher for option 1B compared to option 1A

Conclusion

Slightly different volumes of biomass can be claimed depending on the option chosen

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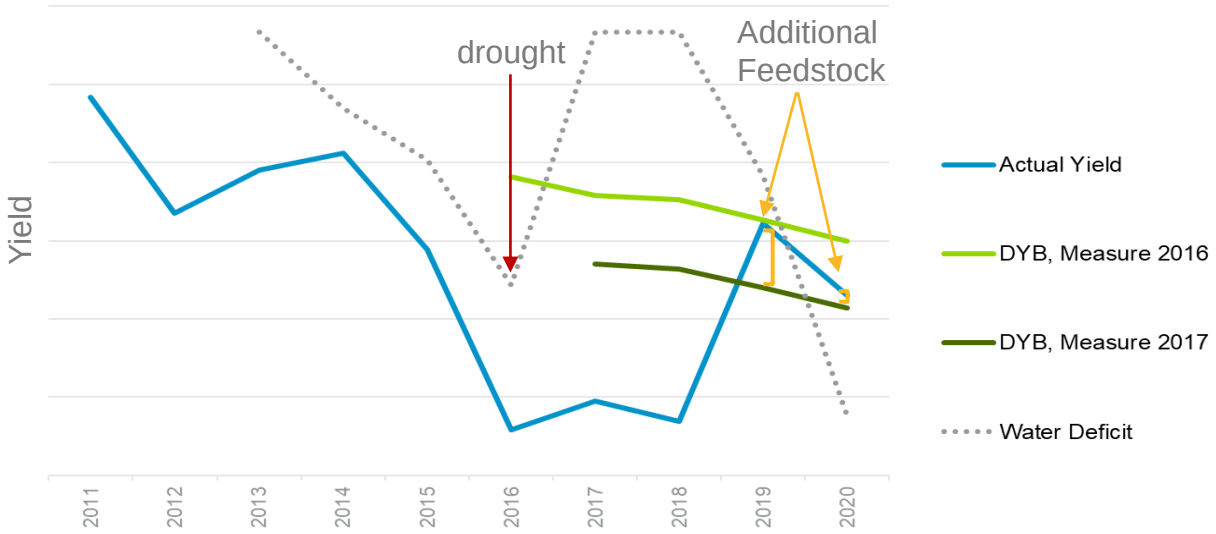
Dynamic yield baseline and weather effects

Weather effects significant

- Weather events such as droughts can have a significant effect on yield in comparison to the effect of an additionality measure. Weather events that occur in the years that are used to set the dynamic yield baseline can influence whether low ILUC biomass can or cannot be claimed.
- This is especially true for plantations that already have good yields and additionality measures only provide marginal yield increases.

Fresh fruit bunch yield of pilot plot 2011-2020



Cause → Effect

Y_0 = 2016
Bad yield in 2016 due to water deficit ***is not included*** in 3-year previous yield data

Additional biomass is not claimed in 2019 or 2020

Y_0 = 2017
Bad yield in 2016 due to water deficit ***is included*** in 3-year previous yield data

Additional biomass is claimed in 2019 and 2020

Findings

Conclusion

In cases where yields are already high and additional yields are relatively small, the effect on yields from weather events is greater than the effect of an additionality measure

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Level of certification

Subplot level or plantation level certification

- The Malaysia pilot was performed at a subplot level and Colombia pilot at plantation-mill level (because of the type of additionality measure and company structure.
- Subplot level can be more accurate in some cases, however requires more granular data, is a greater administrative burden, and is more complicated for auditors to audit.

Analysis of advantages and disadvantages of analysis at subplot level

PROS

- Yield is assessed at a very granular level and is most representative as compared to assessing an entire plantation as a whole
- Decreases the uncertainty of volume of feedstock to be low ILUC certified (rather than whole plantation "failing", only certain subplots may fail)

CONS

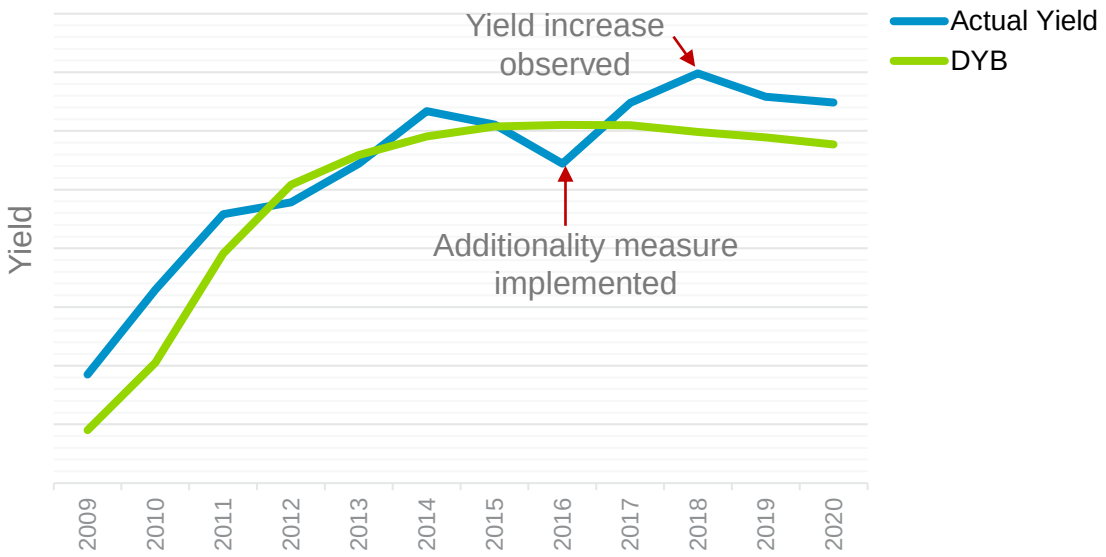
- Overall increases the administrative burden since each subplot needs to be individually certified
- Same additionality measure on different subplots will "pass" on some subplots but "fail" on others
- Unnecessary complexity for some additionality measures
- More difficult to audit as the dynamic yield baselines become more complex to verify
- The economic operator needs very granular yield data
- Moving to disaggregated baseline creates more opportunities to claim additional biomass purely based on variability in yield

Starting year of claim period

Delay in observed yield increase

- The effects of an additionality measure for oil palm are observed only 2-3 years after the measure is taken because it is perennial.
- Palm pilot companies suggested to start the year that they can start claiming low ILUC biomass from the year of the observed effect rather than year of implementing the measure.

Fresh fruit bunch yield of pilot plot 2009-2020



Delay in observed yield increase

Findings

The additionality measure was taken in 2016

The yield increase was only observed starting in 2018

Conclusion

Perennial crops such as palm only observe yield increases 2-3 years after a measure is taken

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Calculation of additional biomass for sequential cropping

Units for Additional Biomass

- Different units were tested to compare yields of different crops
- Most simple unit (weight) works when comparing similar crops (e.g. different soy varieties), but not for rotations that include various types of crops (e.g. cereals and oilseeds)

Different crop rotations in practice make it hard to determine baseline

- Crop rotations vary considerably - the variety of combinations of crops falling in the baseline period is a real challenge in establishing a robust DYB, and a methodology that would be appropriate for all crop rotations
- The chosen baseline, rotation period, and the type of crops it includes, has a big impact on how much additional biomass can be claimed

Status of sequential cropping under REDII

- Sequential cropping can be **outside food or feed cap**, even without being low ILUC-risk certified because it is not the "main crop"
- If this is the case, **sequential cropping would not need to pass Additionality test**
- But **would need a robust mechanism within a voluntary scheme** to show that the sequential crop "does not trigger demand for additional land", i.e. question of which units to compare different crops is still relevant

Main crop definition

- A solid definition of "main crop" is needed to implement this in practice
- With a solid definition of main crop, the baseline for sequential cropping can be "zero" (on the basis that it is not the main crop) with a compensation mechanism to account for any impact on the yield of the main crop

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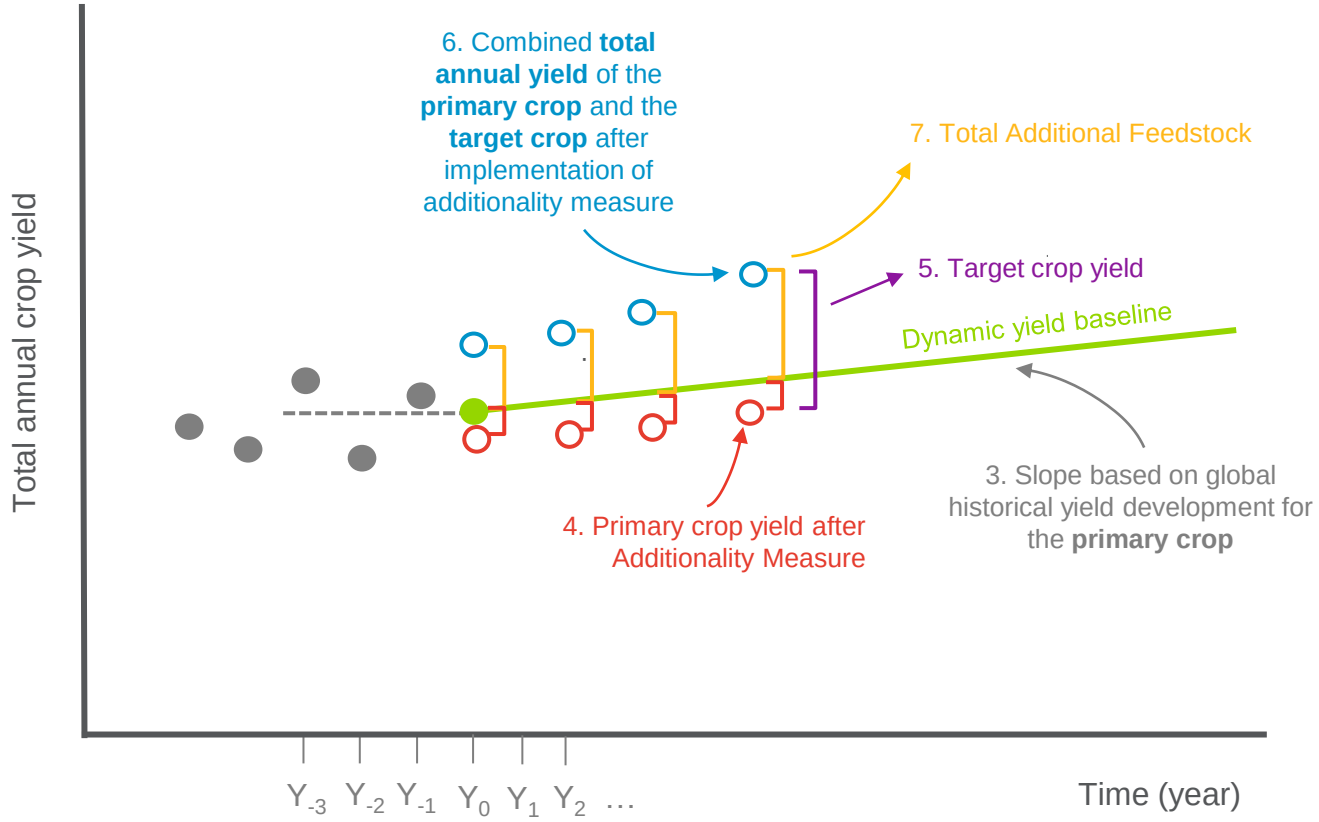
Dynamic yield baseline for Sequential cropping
(Second crop on same land)



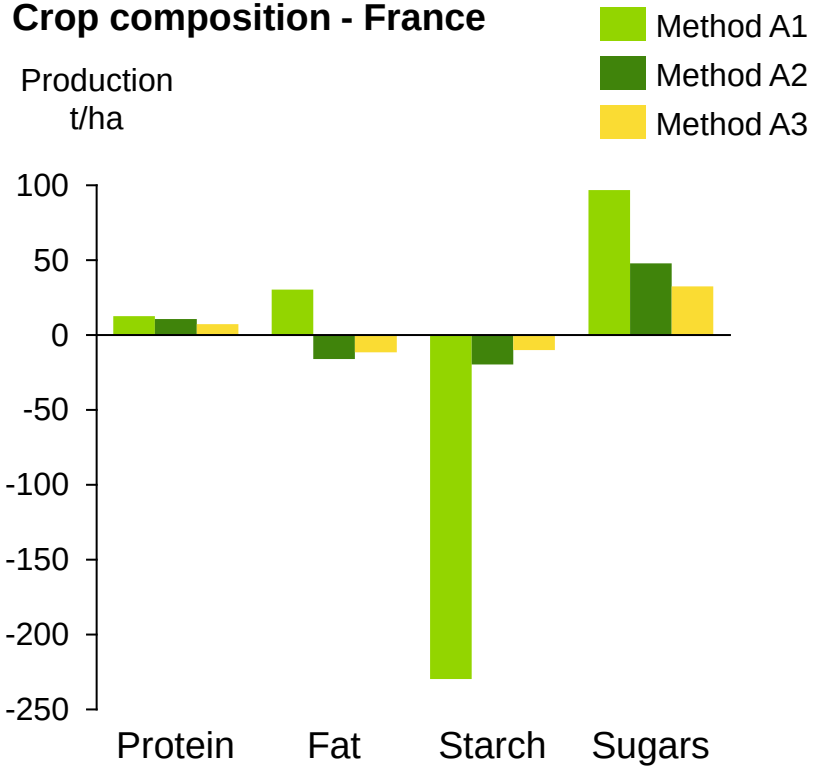
- Business-as-usual is the primary crop
- Secondary (target) crop is added on top
- Options included in guidance for the UNITS to be used
- Weight, calorific value or combination of key components and weight, e.g. sum of weight of oil and protein meal

Sequential cropping: units

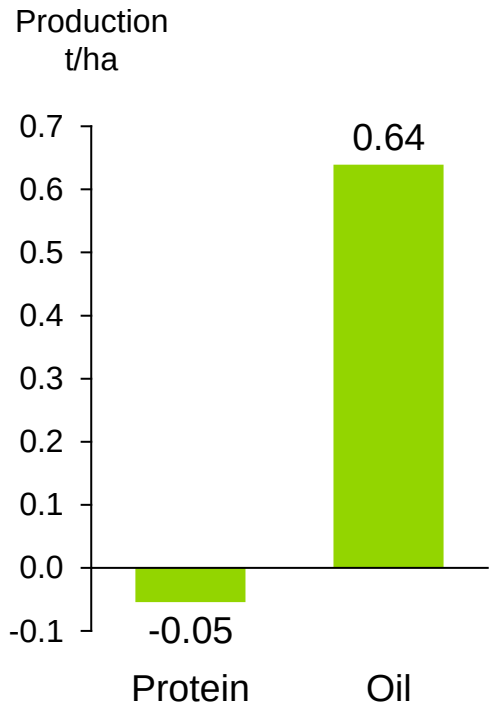
Units for Additional Biomass

- Calculating the amount of additional biomass produced requires the use of a common unit for different crops.
- Different units were tested to compare yields of different crops

Crop composition - France



Crop composition - Uruguay



Additional biomass options

Three units tested:

1. Weight (t/ha)
2. Crop composition approach (protein, fat, starch and sugar/ ha)
3. Energy content (in MJ/ha)

Different units led to different results.

It is not clear which unit is the "best“ and will likely depend on context.

Findings

Conclusion

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Sequential cropping: Units

	Uruguay	France	pros	cons
Weight: tonnes	X	X	Standard yield data, readily available	Weight of biomass produced is highly variable between crops
Crop component: tonnes of proteins, oil, sugar, starch	X	X	More precise measure of additionality than weight	• Amounts of proteins, oil, sugar or starch go up or down depending on crops' characteristics • No distinction between edible and non-edible oil • Quantity of respective nutrients should be translated back into a quantity of low ILUC biomass
Crop component split by end use: protein and oil destined to food/feed vs. biofuel	X		Allows a distinction between edible and non-edible oil (Uruguay)	• Only applicable for biofuel biomass • End use must be known
Energy content: MegaJoules (MJ)		X	More precise measure of additionality than weight	Amount of additional energy (MJ) should be translated back into a quantity of low ILUC biomass

Different crop rotations in practice make it hard to determine baseline

The guidance requires the baseline to be based on the last 3 years of yield data

- Crop rotations vary considerably - the variety of combinations of crops falling in the baseline period is a real challenge in establishing a robust DYB, and a methodology that would be appropriate for all crop rotations
- The chosen baseline, rotation period, and the type of crops it includes, has a big impact on how much additional biomass can be claimed

Crop rotation in Uruguay (above) and France (below), t/ha

2015		2016		2017		2018		Implementation (2019)	
Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Wheat	Soy 2	Cover Crop	Soy 1	Cover crop	Soy 1	Barley	Soy 2	Carinata	Soy 2
3.7	3.6	-	4.4	-	3.7	3.4	2.2	2.0	2.7

2015		2016		2017		2018		Implementation (2019)	
Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Barley	Barley	-	Rapeseed	Wheat	Wheat	Barley	Barley	Triticale	Sunflower
7.8		-	2.4	-	7.6	7.1	-	7.3	1.3

Recommendation for sequential cropping under REDII

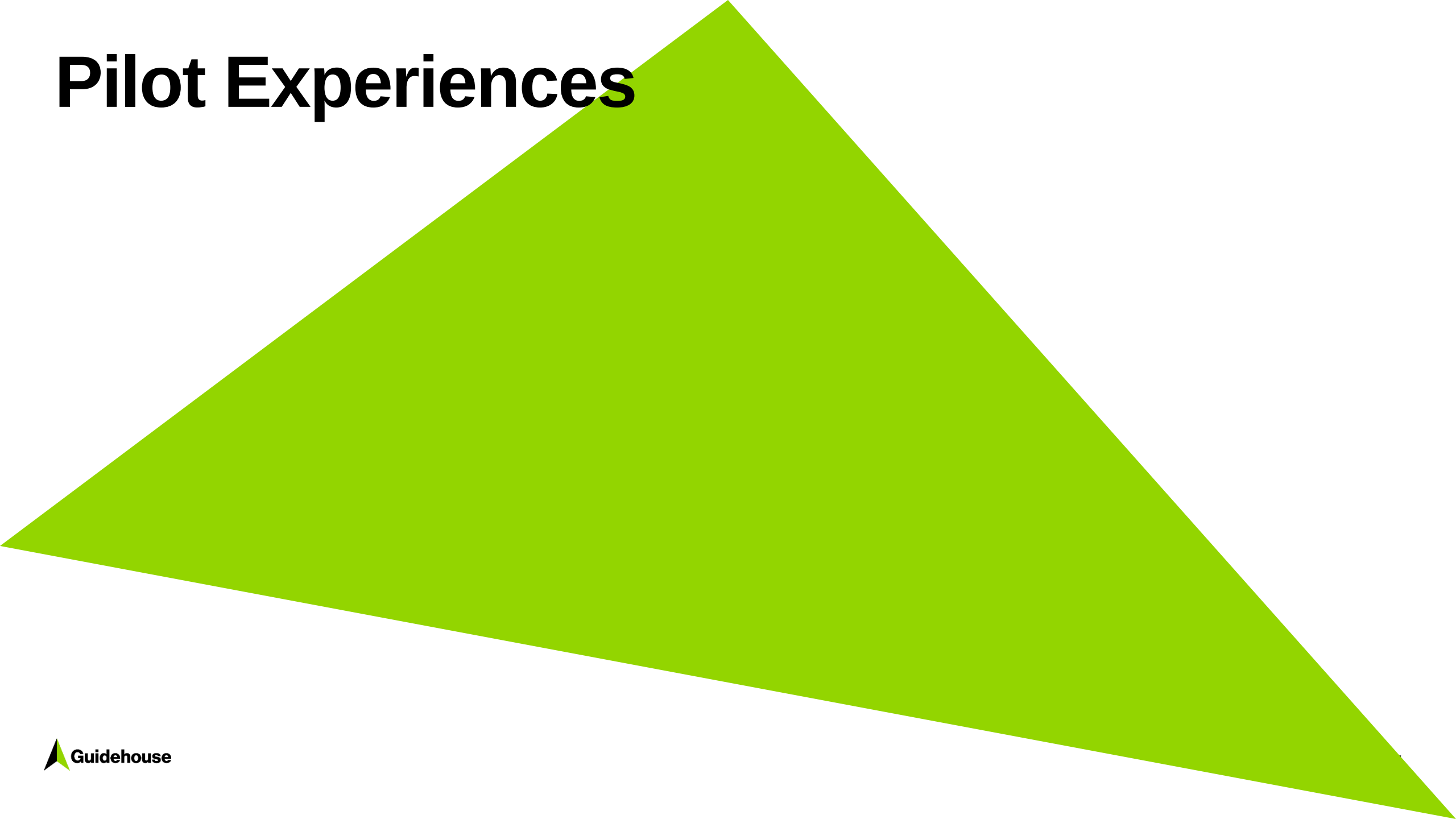
Status of sequential cropping under REDII

- Sequential cropping can be **outside food or feed cap**, even without being low ILUC-risk certified because it is not the “main crop”
- If this is the case, **sequential cropping would not need to pass Additionality test**
- But **would need a robust mechanism within a voluntary scheme** to show that the sequential crop “does not trigger demand for additional land”, i.e. question of which units to compare different crops is still relevant

Main crop definition

- A solid definition of “main crop” is needed to implement this in practice
- With a solid definition of main crop, the baseline for sequential cropping can be “zero” (on the basis that it is not the main crop) with a compensation mechanism to account for any impact on the yield of the main crop

Pilot Experiences



UPM Climate positive farming concept

Low ILUC risk pilots webinar

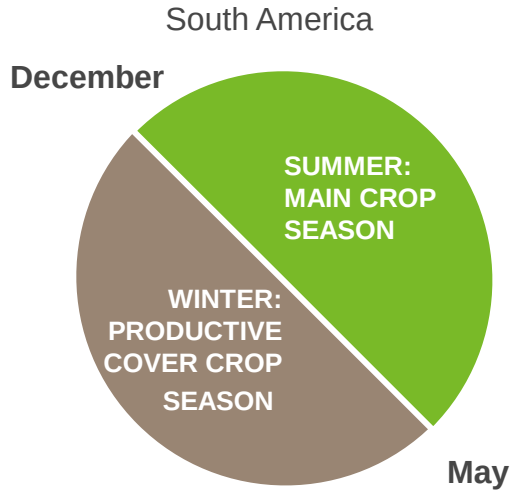
19.05.2021

Liisa Ranta, UPM Biofuels

UPM Climate positive farming

TARGETS

- Additional biomass outside main cultivation season -
  No impacts on land-use
- Higher rates of carbon sequestration to soil and improved soil productivity
- High GHG-reduction from sustainable way of farming
- Sustainable additional raw material for producing biofuels



Experience from the pilot audit

- Current low ILUC risk methodology not readily suitable for sequential cropping
- Audit experience
  - Smooth process, similar to regular sustainability audits
  - Challenges in getting data and evidence from past, e.g rotation history, historical yields etc.
  - How to e.g proof a certain rotation history?
- New production systems are complex – practical experience and applicability needs to be taken into account when developing new requirements and criteria

Key takeaways

There is a growing demand for development of new sustainable feedstock solutions

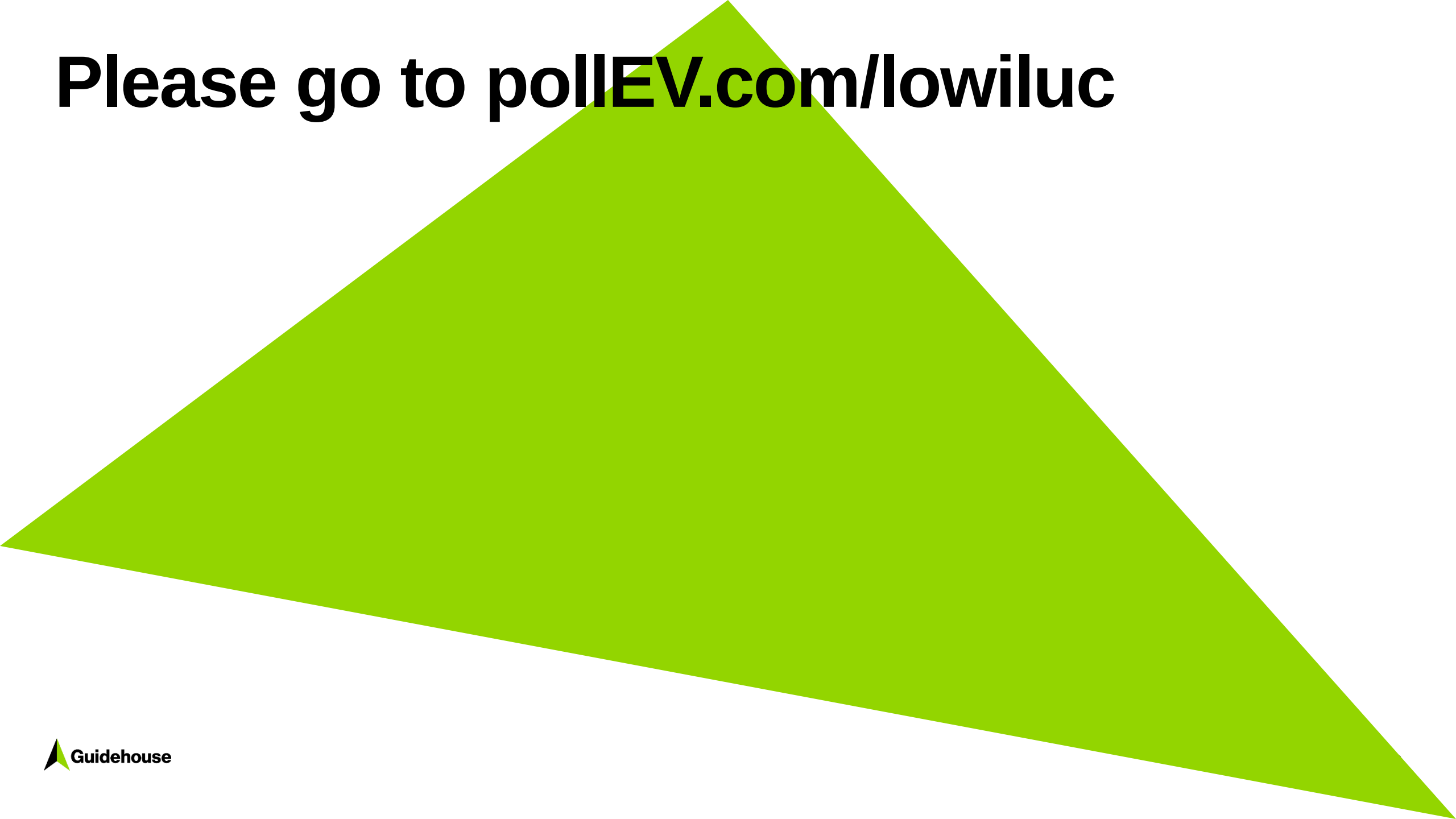
Incentives for transforming agricultural practices into more climate and soil friendly are needed – sustainably produced biomass is needed in different sectors

Position for sequential cropping should be clarified within the current regulatory framework

- Low ILUC risk criteria – development would be needed for sequential cropping
- Sequential cropping should be outside of food cap – main crop definition to be clarified
- Review of Annex IX A list – position for sequential cropping with suitable criteria could be developed

UPM BIOFORE
BEYOND FOSSILS

Please go to pollEV.com/lowiluc



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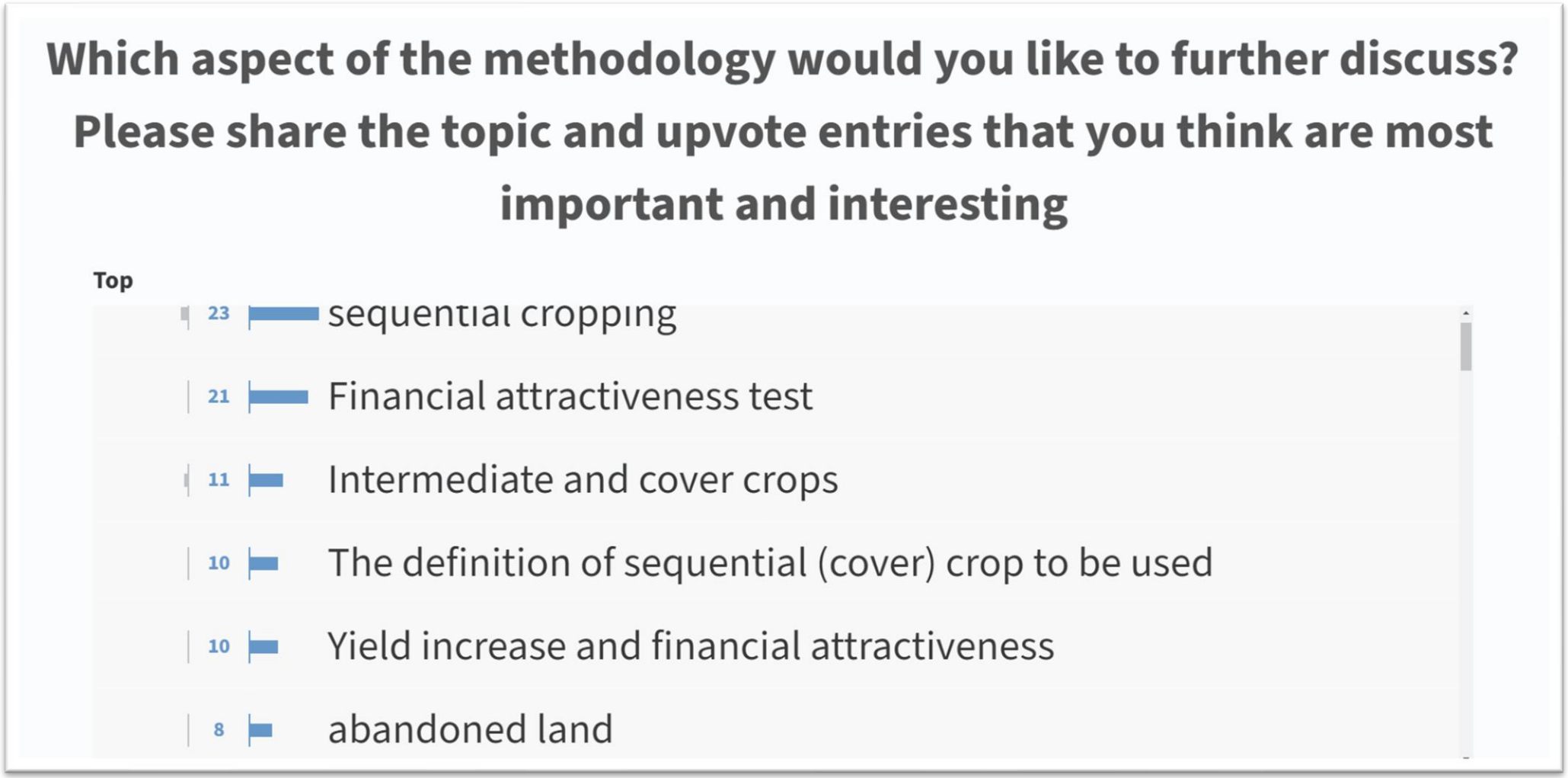
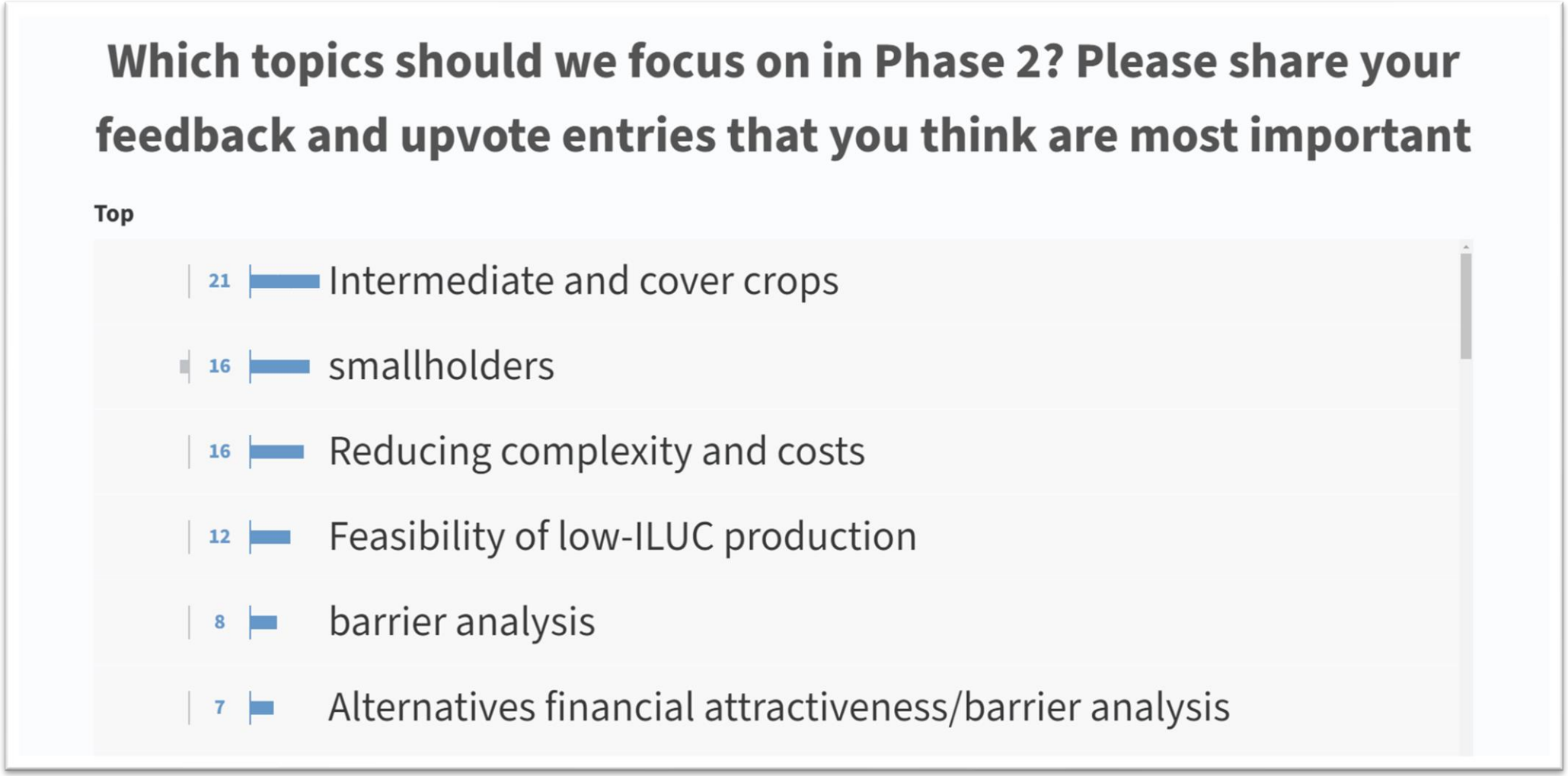
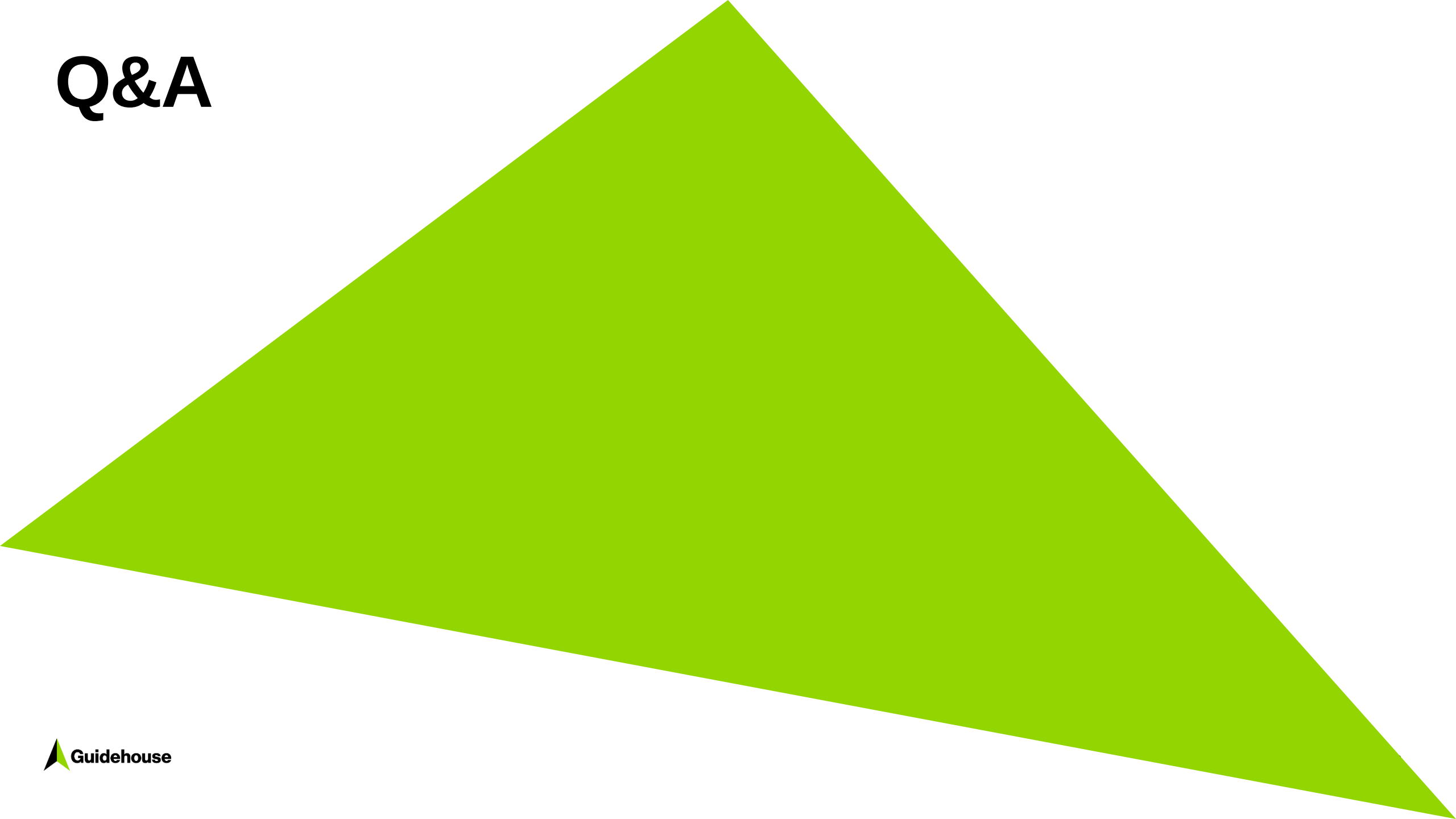


The figure shows the top-6 results from the PollEV survey
Please note: The PollEV survey is for information purposes only



The figure shows the top-6 results from the PollEV survey
Please note: The PollEV survey is for information purposes only

Q&A



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A summary of the questions and answers from the webinar will be prepared and circulated

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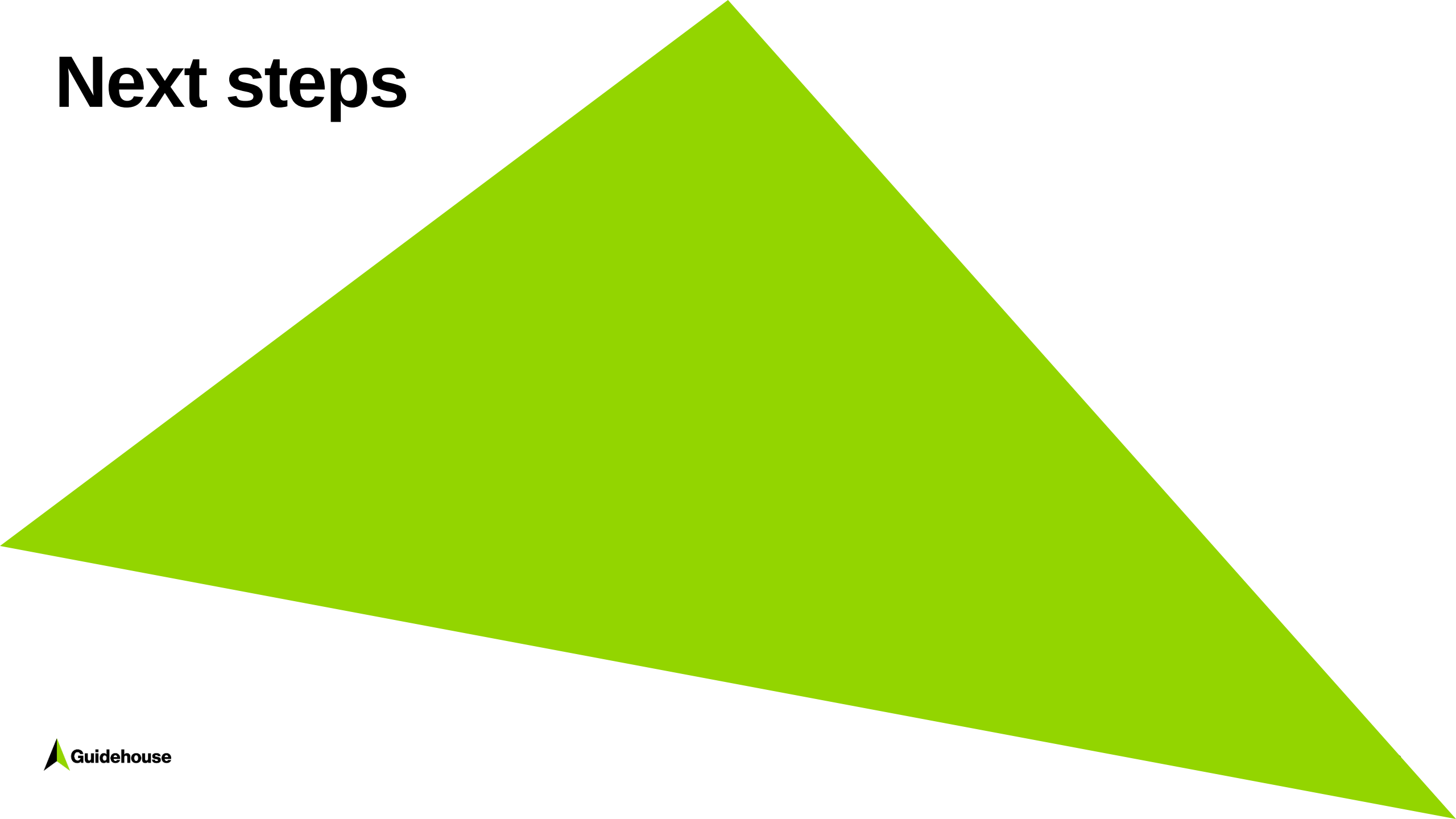
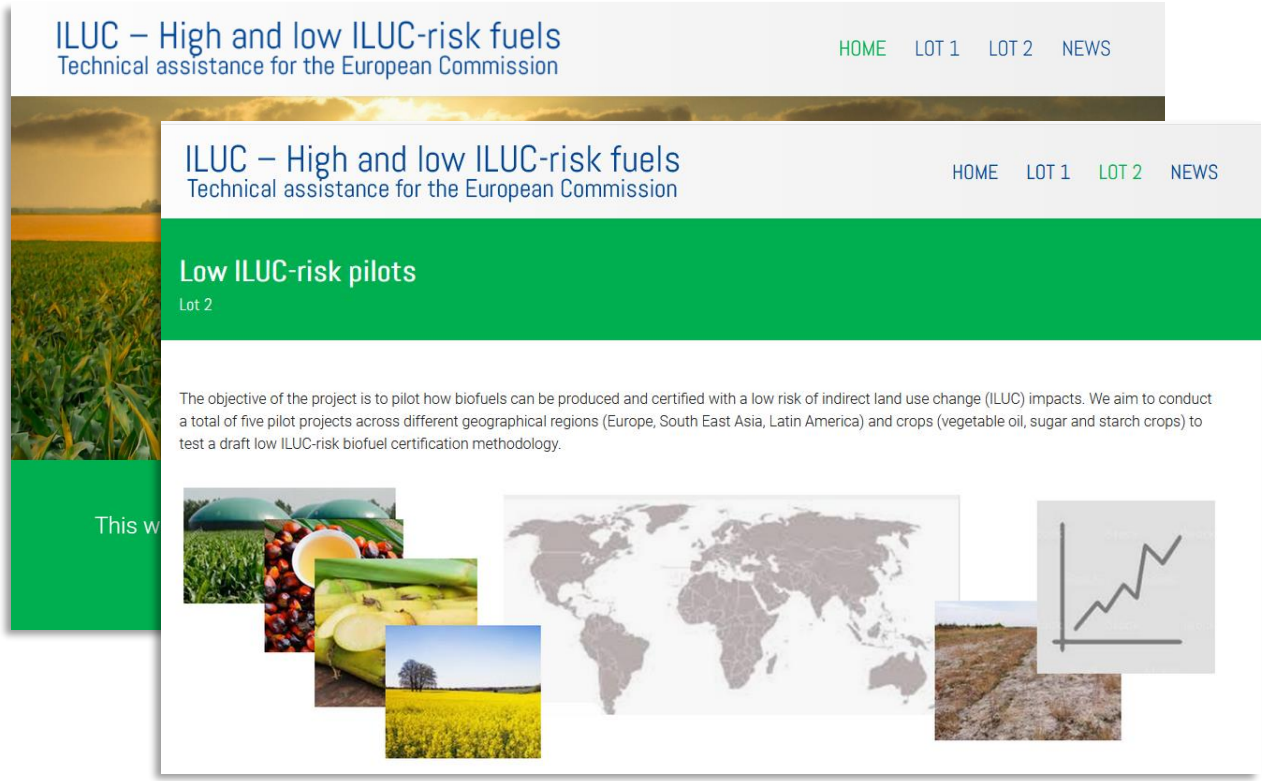
Next steps



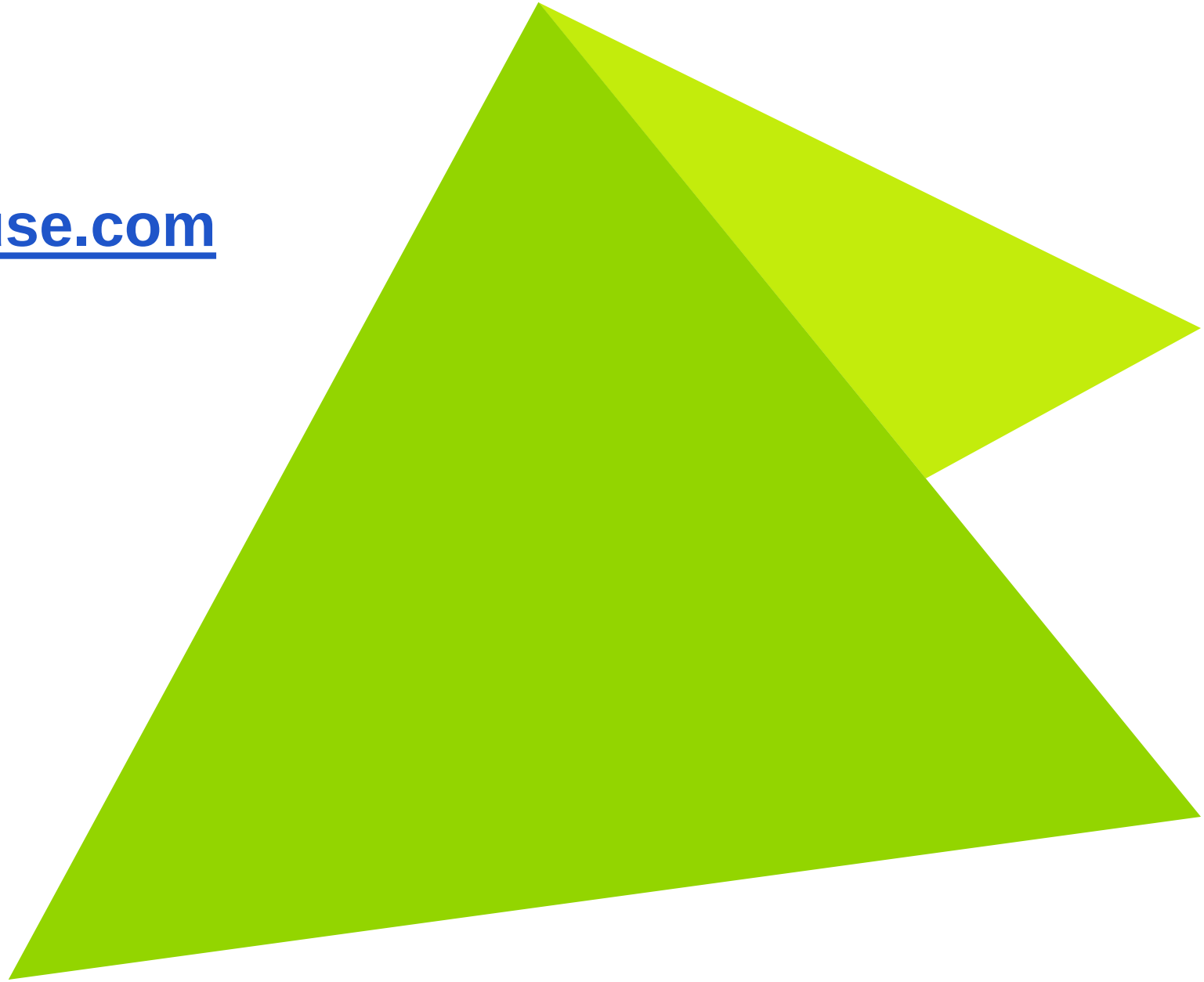
Next steps

- Webinar slides – including Annex with detailed findings per pilot – and summary of Q&A will be circulated and published on project website: https://iluc.guidehouse.com/lot-2
- Further project results will be published on the project website at the end of Phase 1
- Scoping underway for Phase 2
- Planning in-depth stakeholder sessions on key topics, including:
  - Additionality
  - Dynamic yield baseline for palm
  - Sequential cropping
- **Upcoming EC public consultation on draft Implementing Act on voluntary schemes**



Contact

ILUCpilots@guidehouse.com



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Annex: First Pilot Audit Findings

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Ukraine
Abandoned land

Additionality Measure

Cultivation on abandoned land

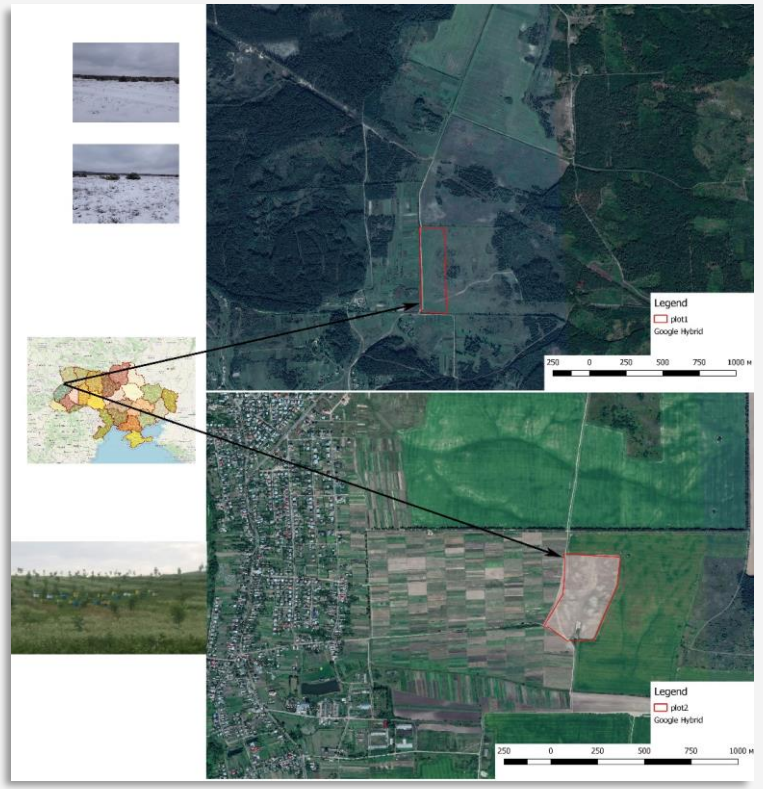
Land History

- Used to be part of a state-owned farm, or “kolkhoz” that grew rye
- Abandoned after collapse of Soviet Union
- Had some grazing during period of abandonment

Pilot Partner

Agribusiness ‘Dolyna Agro’ LLC

Ukrainian National Forestry University



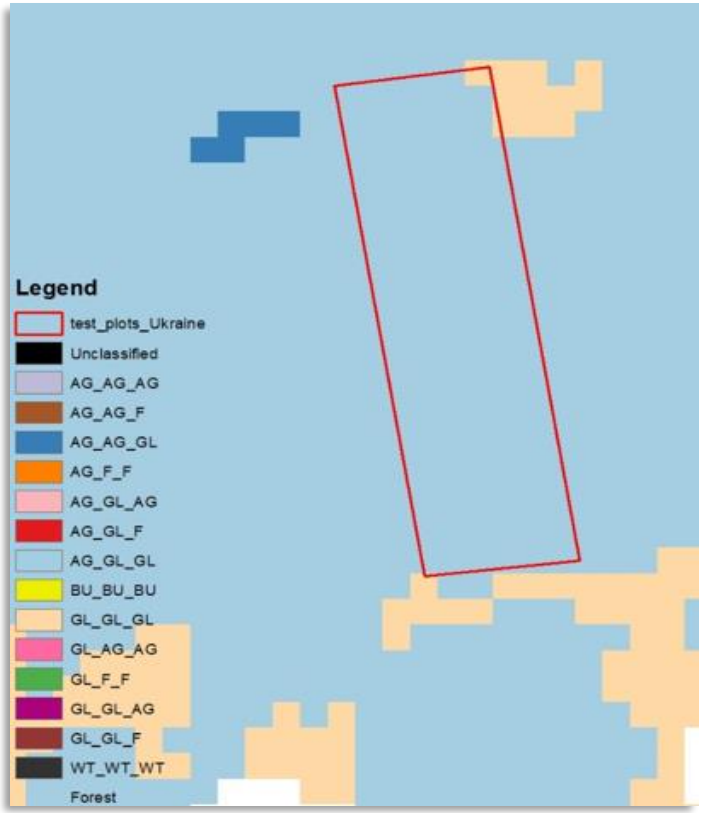
- ✓ Located in Reklynec village in the west of Ukraine
- ✓ 10 ha

Guidehouse

Ukraine

Direct land use change GHG emissions

Analysis from time series
(1986, 1998, 2010)



Land Use Change

The plot was abandoned for ~30 years, so over time, the agricultural land turned into grassland. Any conversion of land needs to meet the core REDII sustainability criteria

Direct land use change (dLUC) GHG emissions associated with *permitted* conversion from grassland to agricultural land may need to be considered (depending if grassland is managed or unmanaged)

Findings

If dLUC emissions are considered, the GHG savings criteria for biofuels is unlikely to be met.

Conclusion

Guidehouse

Ukraine

Satellite imaging can be used to demonstrate abandonment

	Landsat images	Natural Vegetation Index	Food or Feed Crops	External expert needed
Findings	• Freely available Landsat images were available • Time series available from 1986-2020	• Natural Vegetation Index (NDVI) could be used to categorise land • Agricultural land has distinct NDVI patterns	• Determining the crop profile is possible (but difficult via satellite imaging) • May need to be complemented with other methods	• Satellite imaging analysis requires expertise

Conclusions

- Satellite imaging is a powerful tool that can be used to identify abandoned land and possibly identify a food or feed crop
- This analysis may require external experts since most economic operators will not have this expertise in-house
- Methods such as groundtruthing and local interviews should complement this analysis

Guidehouse

Ukraine

Demonstration of grazing during abandonment

Findings

- Grazing history was obtained from interviews with locals who had lived in the village since before the period of abandonment
- The rate of grazing varied during different periods of abandonment; it ranged from a few to 40 heads
- Small scale grazing is possible (but difficult) to determine through satellite imaging and would require a large amount of data and groundtruthing

Conclusions

Grazing history can be obtained from local interviews and potentially from satellite imaging (although difficult), but the auditor had limited guidance to determine whether 40 heads is considered ‘substantial grazing’

Guidehouse

Local archive availability

After >25 years unavailable

- The local administration only keeps documents for 25 years, thus there was no documentation to prove or disprove whether the land was agricultural and growing rye
- If the land had not been abandoned for such a long period, documentation would likely be available, such as agricultural yield data reported to the state

unplash.com from Maarten van den Heuvel

Guidehouse

Soil sampling

Unviable method for abandoned land

- A desk-based study was performed to assess the feasibility of soil sampling to demonstrate that land was formerly agricultural
- Environmental DNA sequencing is a reliable, highly developed, and economically feasible technique and can be used to determine the crop species that used to be grown in a soil sample
- However, the historical timescale of detection i.e. concluding with certainty that a crop was grown 7 years ago versus only 4 years ago cannot be determined with certainty

unplash.com from Dylan de Jonge

Guidehouse

Malaysia
Palm yield increase

Additionality Measure

Oil palm yield increase through:

- Replanting with clonal seedlings
  - Replanted 2001 onwards (different blocks each year)
  - Applied to ~2500 ha (76 blocks)
- Thinning
  - Implemented 2015 onwards
  - Applied to ~3400 ha (102 blocks)

Low ILUC certification tested at subplot level

Pilot Partner

Large plantation company

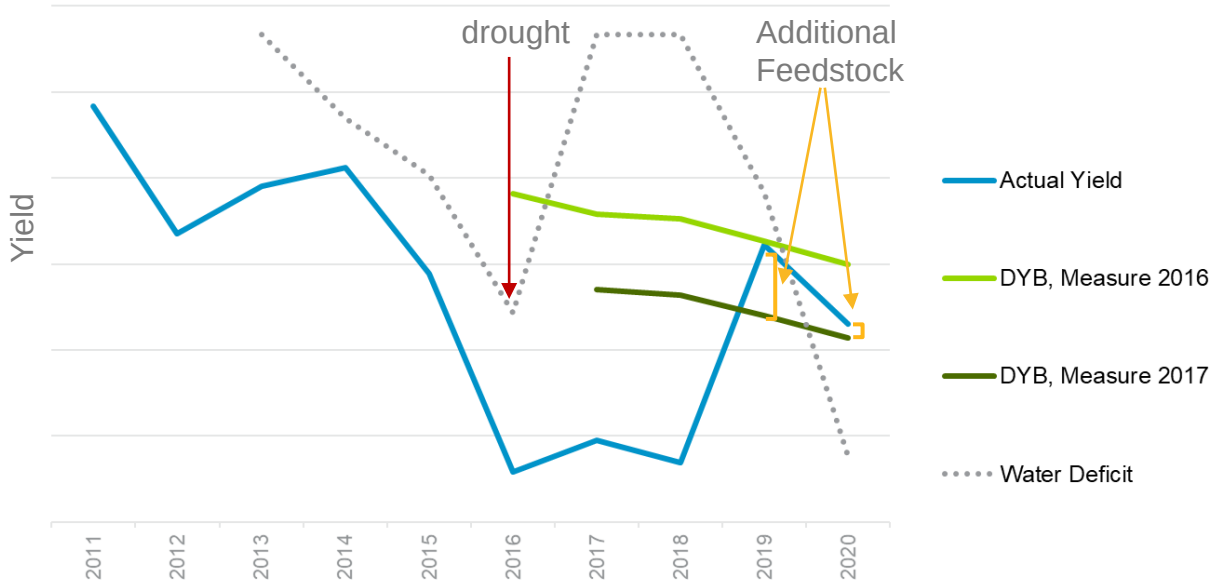
- ✓ Located in Sabah region of Malaysia
- ✓ ISCC EU, RSPO, and MSPO certified
- ✓ 3600 ha plantation

Guidehouse

Malaysia

Weather events can drastically influence historical yields

Fresh fruit bunch yield of pilot plot 2011-2020



Cause → Effect

Y_0 = 2016
Bad yield in 2016 due to water deficit ***is not included*** in 3-year previous yield data

Additional biomass is not claimed in 2019 or 2020

Y_0 = 2017
Bad yield in 2016 due to water deficit ***is included*** in 3-year previous yield data

Additional biomass is claimed in 2019 and 2020

Findings

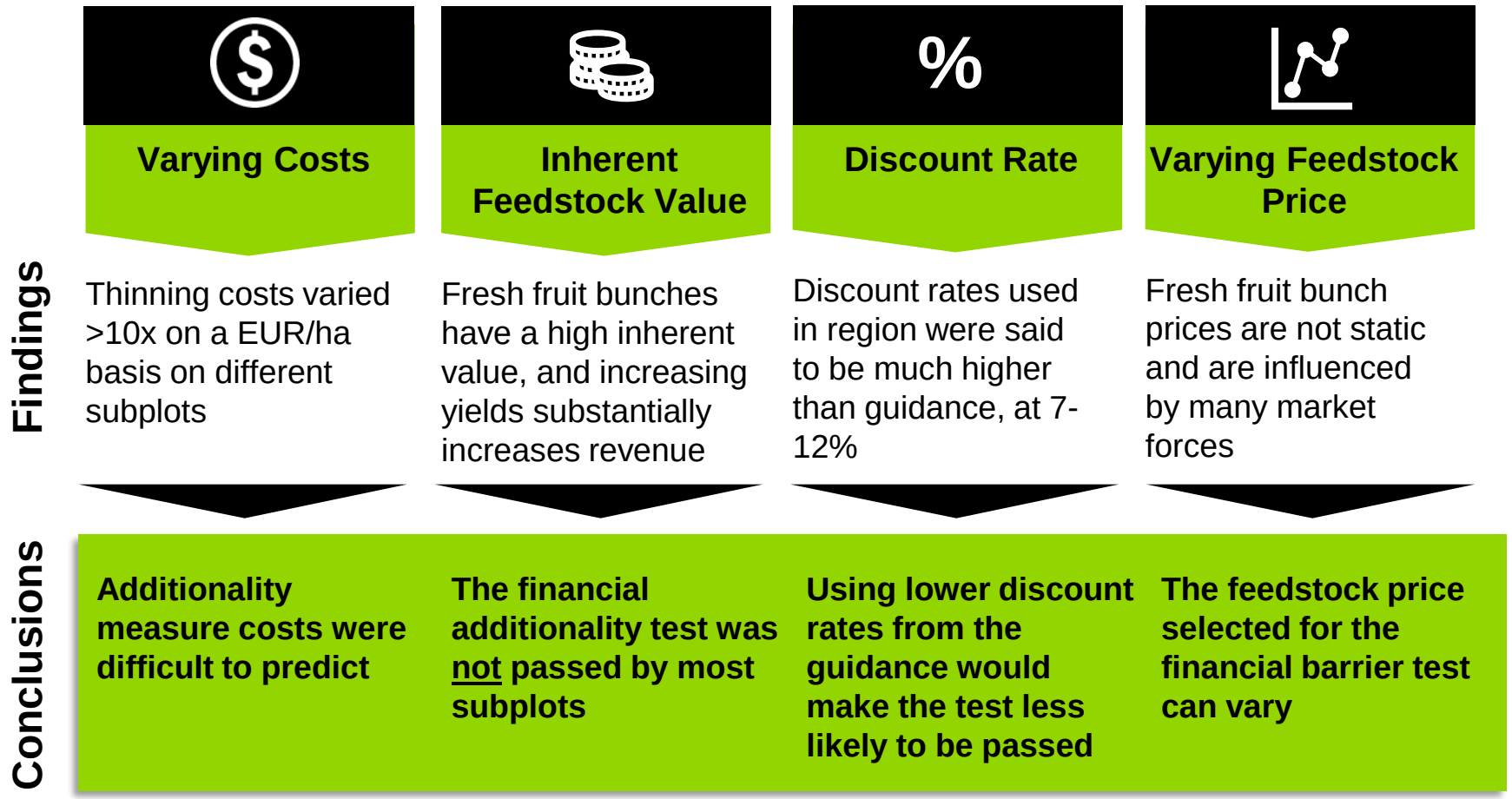
Conclusion

In cases where yields are already high and additional yields are relatively small, the effect on yields from weather events is greater than the effect of an additionality measure

Guidehouse

Malaysia

The financial barrier test faced challenges



Malaysia

The non-financial barrier analysis requires more development

Non-Financial Barriers Identified

Findings

Thinning

- It is not common practice for oil palm plantations
- Requires trained personnel to identify which trees to remove to improve overall plantation yield

Clonal seedlings

- Agronomic expertise is needed to select and prepare clonal seedlings
- Long term and quality R&D is needed to ensure the high quality of clonal material

Conclusions

- Auditors felt that there was not sufficient guidance to determine whether these arguments were legitimate enough to pass the non-financial barrier test
- The definition of common practices is not clear and whether it refers to similar regions, similar companies, etc.

Malaysia

The amount of low ILUC biomass to claim is low

For replanting clonal seedlings in a sample year

Average low ILUC biomass yield		Average conversion rate		Average low ILUC biomass
< ~3 tonne FFB/ha	x	~30% FFB to crude palm oil	=	<1 tonne crude palm oil/ha

Findings

Conclusions

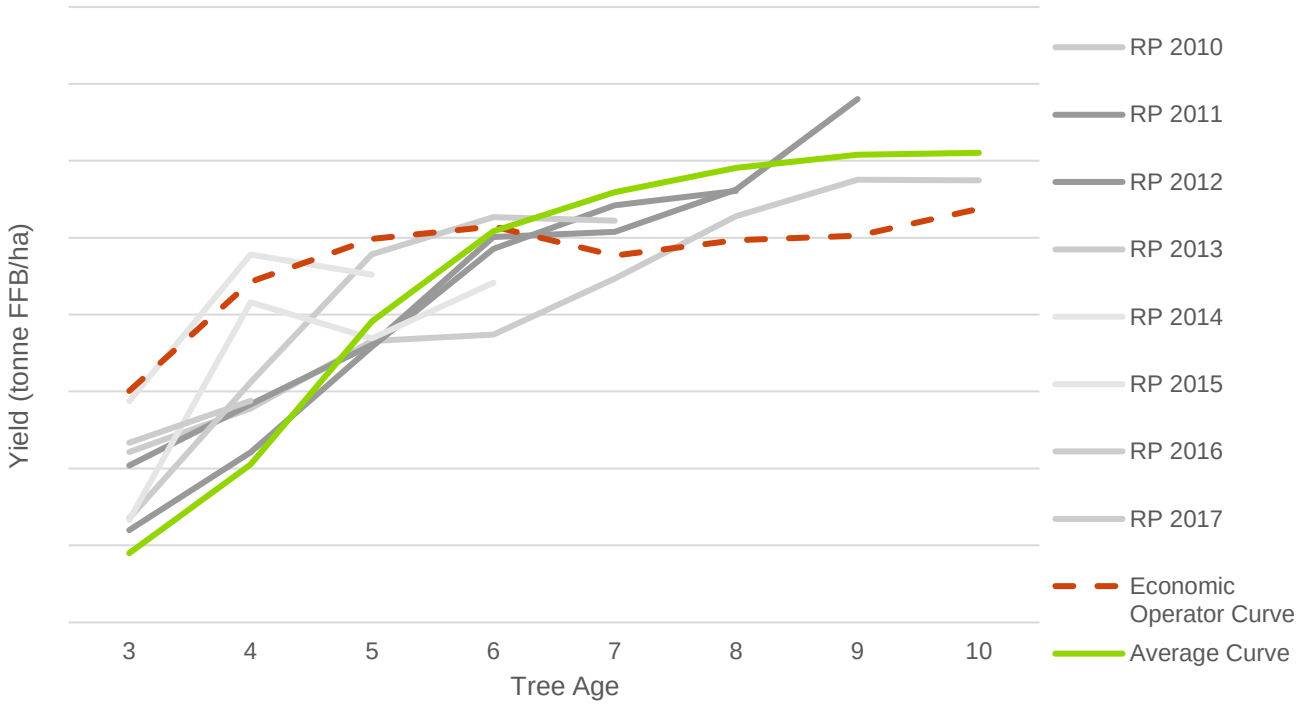
The amount of low ILUC biomass to be claimed in this case would be relatively low and would not necessarily justify the cost of becoming low ILUC certified nor of maintaining certification to an EC-recognised voluntary scheme if they can not supply the EU biofuels market). This would especially be the case for those who are not already/do not intend to already be EU REDII certified

Guidehouse

Malaysia

The options to calculate dynamic yield baseline give differing results

Yield by Tree Age



Dynamic yield baseline options

The economic operator can choose between basing the DYB on the shape of an average growth curve (Option 1A - green) or their own growth curve shape (Option 1B – dashed red)

The growth curve shapes differ, especially at a younger tree age (Year 3-6). (Note that the curves are aligned by tree age on the subplot, not by time.)

Different volumes of biomass can be claimed depending on the option chosen - and that varies per subplot

Findings

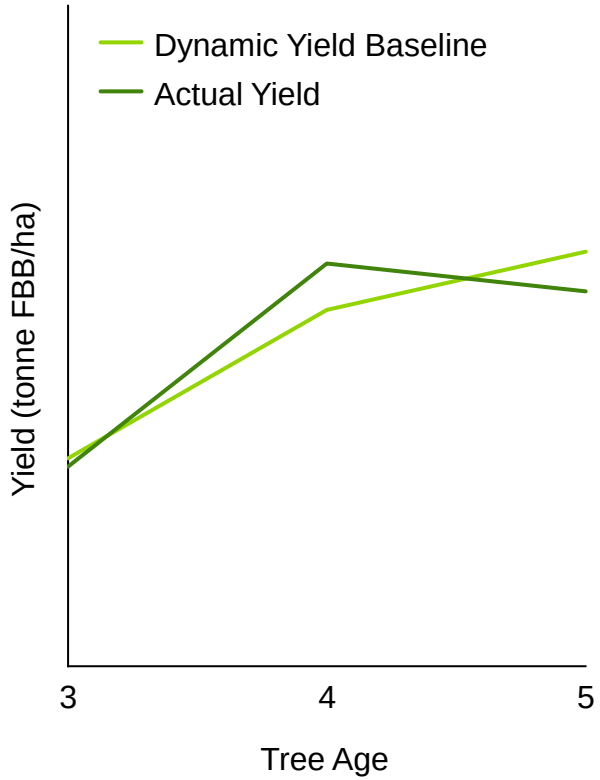
Conclusion

RP = replanting year

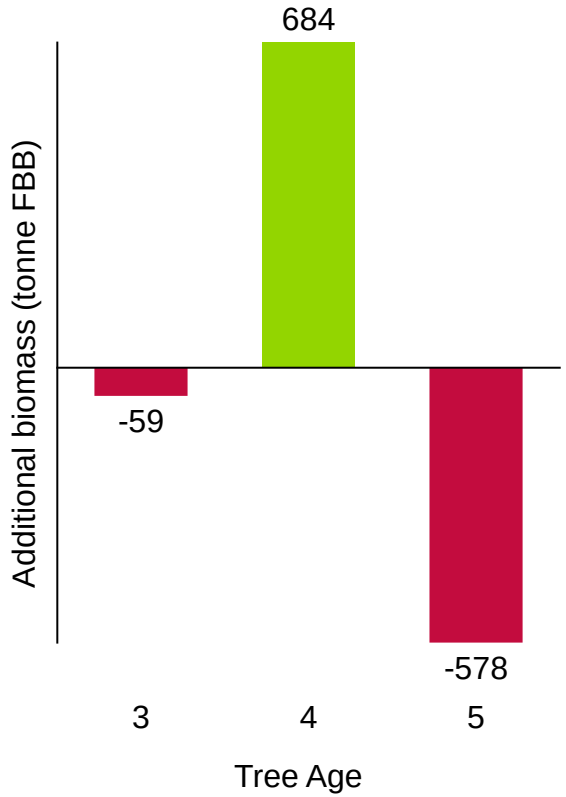
Malaysia

The low ILUC biomass to claim is uncertain for economic operators

Yield Tree Age 3-5 on Example Subplot



Low ILUC Biomass on Example Sublot



Low ILUC additional biomass

In some years, the actual yield is below the dynamic yield baseline while in other years it is above (left)

This results in some years where additional biomass could be claimed, and others in which it could not (middle)

This uncertainty in volumes makes it commercially unattractive and difficult for economic operators to coordinate the logistics of selling their feedstock on the market

Findings

Conclusion

Guidehouse

Malaysia

The low ILUC certification tests were performed at a subplot level

PROS

- Yield is assessed at a very granular level and is most representative as compared to assessing an entire plantation as a whole
- Decreases the uncertainty of volume of feedstock to be low ILUC certified (rather than whole plantation “failing”, only certain subplots may fail)

CONS

- Overall increases the administrative burden since each subplot needs to be individually certified
- Same additionality measure on different subplots will “pass” on some subplots but “fail” on others
- More difficult to audit as the dynamic yield baselines become more complex to verify
- The economic operator needs very granular yield data
- Moving to disaggregated baseline creates more opportunities to claim additional biomass purely based on variability in yield

Colombia

Palm yield increase

Additionality Measure

Oil palm yield increase through:

- Improved irrigation

Low ILUC certification tested for a whole plantation in an integrated plantation and mill

Pilot Partner

Fedepalma and Palmeras de la Costa

- ✓ 3000 ha plantation
- ✓ Located in Copey, in the Northern Oil Palm Zone
- ✓ RSPO, ISCC & Rainforest Alliance certified
- ✓ Have adopted good agricultural practices and good information system
- ✓ Synergy with ISCC-led CORSIA low ILUC project

Guidehouse

Colombia

The financial barrier test faced challenges

Positive NPV

Findings

- Positive NPV, thus did not pass test
- Question which revenues should be included – just crude palm oil (CPO), or also palm kernel oil (PKO) and cake

Calculation point of view

Findings

- Calculation done from mill perspective as Palmeras de la Costa is an integrated plantation-mill operator, but they question if this is valid

Smooth Process

Findings

- Costs easy to calculate as CAPEX and OPEX data was readily available and could be verified

Conclusions

- As an irrigation system is a significant investment, an economic driven operator would invest on one without a positive NPV
- Palmeras do not think that a potential price premium would be enough to drive other plantations into invest in irrigation if their initial NPV is negative, due to the uncertainty of the mechanism and the risk involved

Colombia

The non-financial barrier test

	Not tested in this pilot	Other economic operators
Findings	• The pilot company did not attempt to provide a non-financial barrier analysis for their project	• The pilot company suggested that other plantations might face financial constraints like lack of capital or access to debt to invest in an irrigation system
Conclusions	**N/A**	Do not expect that low ILUC-risk certification would change the situation as any potential additional revenues from accessing the European biofuels market is difficult to estimate

Colombia

Dynamic yield baseline calculation options

Dynamic yield baseline options

Findings

The pilot company used both Option 1A (average growth rate) and 1B (own growth curve)

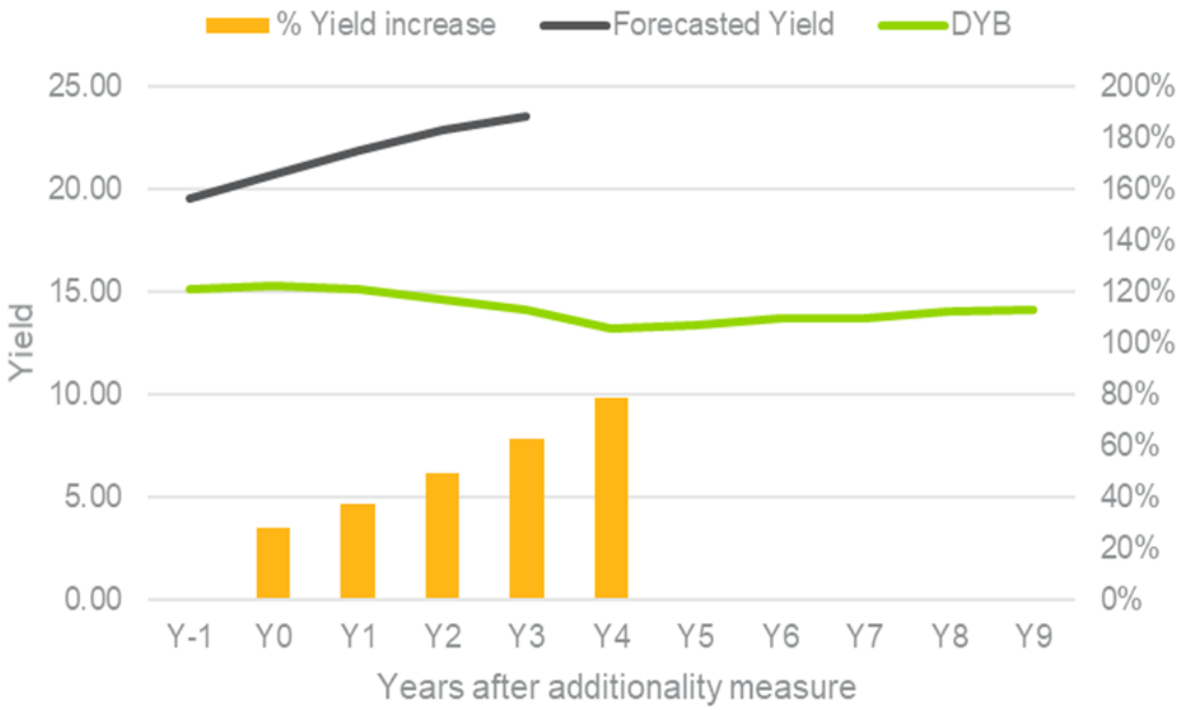
Both options resulted in similar results, although yield difference over the next ten years was higher for Option 1B compared to Option 1A

Conclusion

Only slightly different volumes of biomass can be claimed depending on the option chosen

Colombia

Additional biomass



Additional biomass

The additionality measure was fully implemented in 2020. Palmeras de la Costa provided actual yield data for 2020 (Y0) and their own yield forecasts for the coming four years, based on analysis they performed before the additionality measure was implemented

Actual yields are expected to vary over the time period due to plantation partially relying on rainwater (despite irrigation system), affecting yields and therefore revenues

Volumes of additional biomass are uncertain and erratic from year to year, affecting the profitability of the operation

Findings

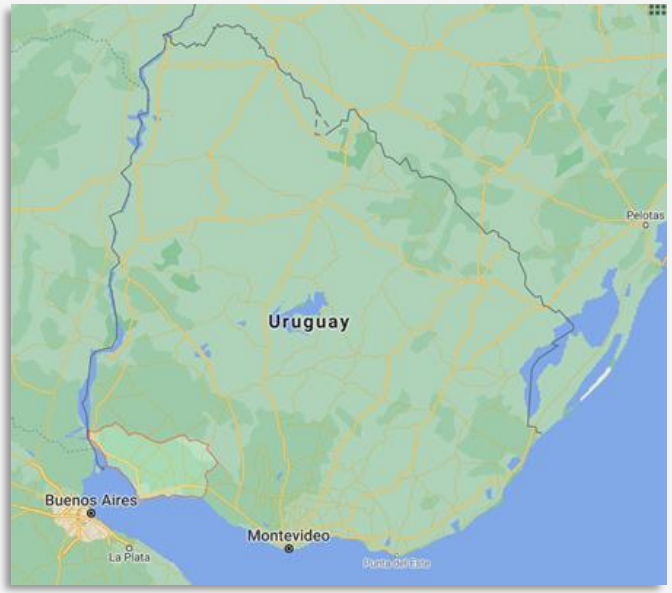
Conclusion

Uruguay
Sequential cropping

Additionality Measure

Yield increase through sequential cropping:

- Brassica carinata planted as a winter crop with soy bean as the main crop



- ✓ Located in the Colonia department of Uruguay
- ✓ RSB certified
- ✓ The farmer has 4 years of historical sequential cropping data

Pilot Partner

UPM Biofuels

Guidehouse

Uruguay

The financial barrier test faced challenges

Findings

Positive NPV

The farm had a positive NPV so would not pass the financial attractiveness test

Calculation POV

The current guidance is not clear whether the financial attractiveness assessment should be done from the perspective of the farmer or UPM

Smooth Process

The pilot company had all the necessary data for the calculations and understood the methodology behind it to calculate the results

Conclusions

UPM question the usefulness of this test, as there is no mechanism for a market premium for feedstocks that are not high ILUC, therefore negative NPV would result in abandoned projects

Guidehouse

Uruguay

The non-financial barrier test requires more development

Findings

No access to market

Claim that Brassica carinata as a sequential crop would not be financially feasible without access to the EU biodiesel market as there would not be a market for Brassica carinata

First-of-a-kind measure

- Claim that it is a first of a kind measure, as this is the first time that sequential cropping of soy and Brassica carinata done in Uruguay
- Unclear whether this would be valid after the 10yr certification

Process not objective

- Methodology is subjective and open for interpretation by auditors
- Unclear whether should be from the perspective of UPM bearing in mind that UPM's existing voluntary scheme certification scope is "UPM Biofuels" in Uruguay

Conclusions

Methodology needs to clarify the non-financial barrier test

Guidehouse

Uruguay

Crop rotation and yield (t/ha)

2015		2016		2017		2018		Implementation (2019)	
Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Wheat	Soy 2	Cover Crop	Soy 1	Cover crop	Soy 1	Barley	Soy 2	Carinata	Soy 2
3.73	3.61	-	4.38	-	3.69	3.41	2.24	2.02	2.70

The calculation of the dynamic yield baseline and additional biomass was complicated as the farm has a varying crop rotation pattern with other feedstocks occasionally sown in winter. It is not clearly defined which crops from the rotation should be included in the baseline calculation.

Uruguay

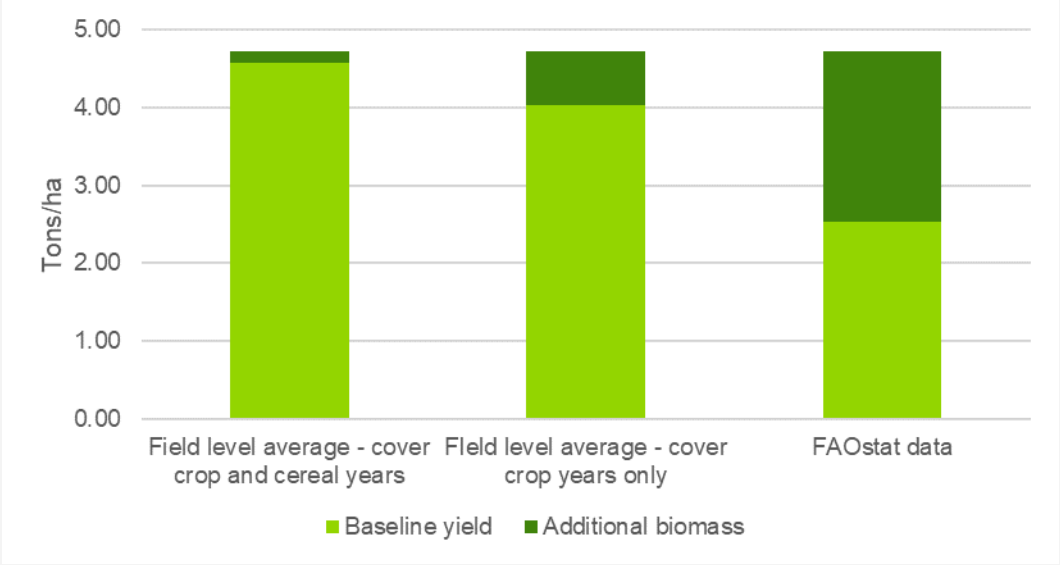
Baseline calculation

- The dynamic yield baseline calculation assumptions make a significant difference to the amount of additional biomass that a sequential cropping operation can claim
- In this specific pilot, the inclusion or not of the winter cereal crop in the baseline calculation can make a difference of up to 5x in the additional biomass claimed (dark green in figure)
- The guidance allows to use FAOSTAT average country data for operations with no available data. However, using this option would (by definition) directly qualify half the farmers in the country. In the case of this pilot, setting the baseline using FAOSTAT data would have set the baseline well below the yields obtained by the farms (right hand bar)
- **Crop aggregators**: Currently, the baseline calculation is designed to certify a specific plot (or several plots within a farm), and not the company aggregating the crop from multiple farms (the biofuel producer here contracts annually with farmers)

2015		2016		2017		2018		Implementation (2019)	
Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Wheat	Soy 2	Cover Crop	Soy 1	Cover crop	Soy 1	Barley	Soy 2	Carinata	Soy 2
3.73	3.61	-	4.38	-	3.69	3.41	2.24	2.02	2.70

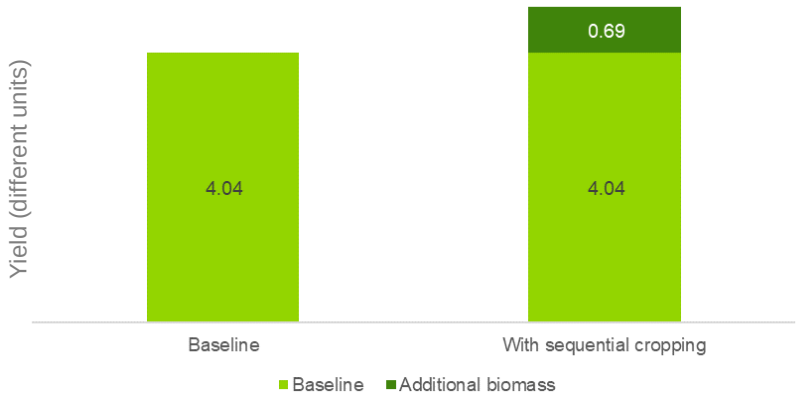
Field level average cover crop years only

Field level average cover crop and cereal years

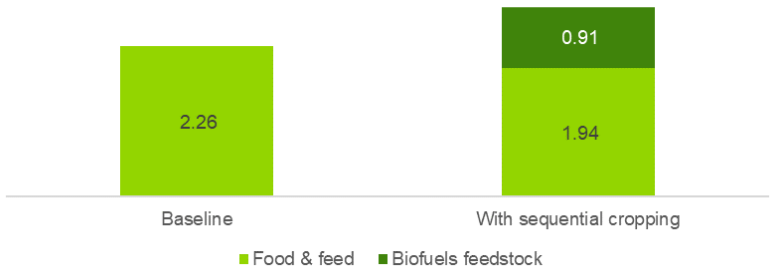


Uruguay
Additional biomass units

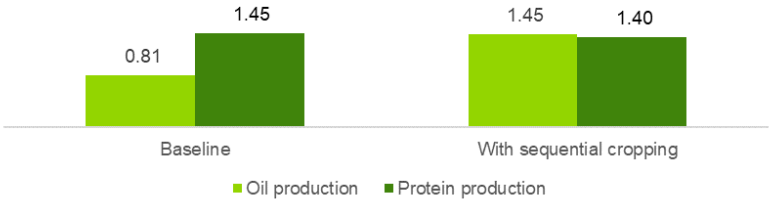
Weight approach



Food and feed approach



Crop component approach



Using different units to compare the baseline yield and the yield with sequential cropping (the additionality measure) leads to significantly different amounts of additional biomass that could be claimed, as the two crops grown in the year have different compositions. This opens the question who should select the approach used in the audit (the auditor or the party being certified). The guidance should provide a process to select the most suitable approach

Guidehouse

Uruguay

Other considerations

Weather effects

Findings

- Weather has an effect on the baseline yield and additional biomass
- This is somewhat tackled by using 3-yr historical data and using the outliers methodology

Conclusions

Weather effects should somehow be incorporated in the dynamic yield baseline

Intermediate and cover crops

Findings

- Outside the food and feed cap (even without low ILUC certification) and the value for those crops of being low ILUC certified is questionable
- Will struggle to meet the financial attractiveness test as the investment required is relatively low compared to the value of the additional biomass volume

Conclusions

Value and probability of these crops being low ILUC certified is low

Main crops

Findings

- There are questions regarding the definition for “main crop”. In this pilot, it is more or less clear that soy is the crop that repeats each year and could be considered the main crop, but sometimes farmers replace soy with corn, breaking the clear pattern

Conclusions

The definition of “main crop” needs to be clarified

Guidehouse

France
Sequential cropping

Additionality Measure

Yield increase through sequential cropping:

- Winter sequential crop (triticale) grown over winter, followed by sunflower planted in spring
- 2 crops in 1 year (test year: 2019)
- Replacing rapeseed in a 3-year crop rotation of wheat-barley-rapeseed.

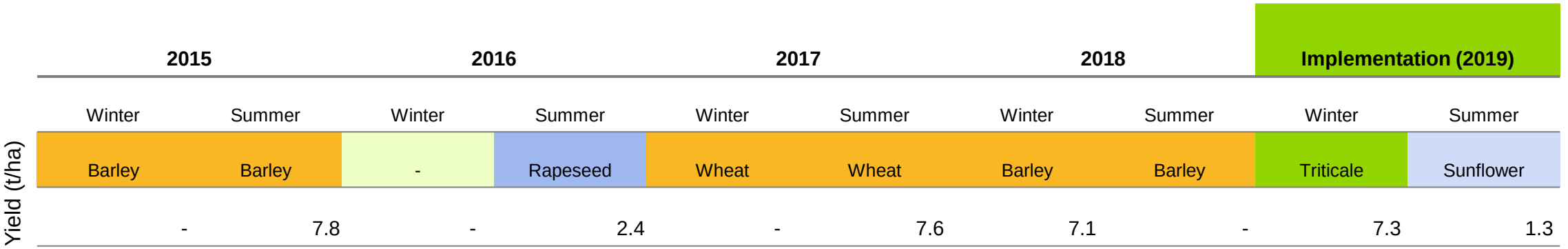
Pilot Partner

Arvalis (arable research institute)

Guidehouse

France

Crop rotation and yield



The calculation of the dynamic yield baseline and additional biomass was complicated as the farm has a varying crop rotation pattern. Note that this example is for a specific plot within the farm – different fields within the farm have different rotations. It is not clearly defined which crops from the rotation should be included in the baseline calculation.

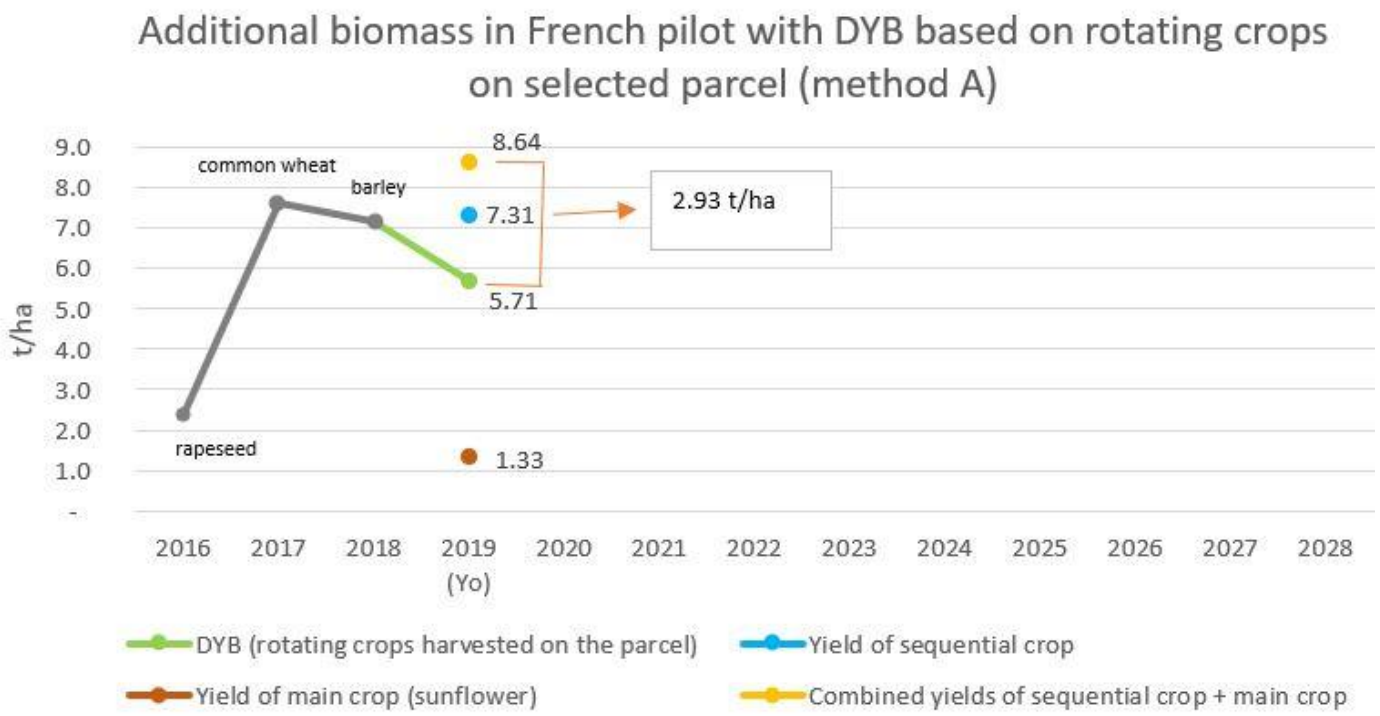
France

Financial and non-financial barrier assessments questioned

	Positive NPV	Smooth Process	Non-financial barrier
Findings	The farm did not pass the financial additionality test, as they had a positive NPV	The pilot company had all the necessary data for the calculations and understood the methodology behind it to calculate the results	• Not tested in this pilot • Feedstock is used to produce biogas and would not particularly benefit from accessing the low-ILUC risk biofuels market
Conclusions	The piloted farm questioned the usefulness of the additionality tests, especially for sequential cropping and in the French pilot context		

Dynamic yield baseline options - France

Sequential cropping – Method A



Dynamic yield baseline method A

DYB = average of yields in 3 previous years. This means combining crops with 3 very different yield volumes

This raises the question: What slope to use for 10-year DYB?

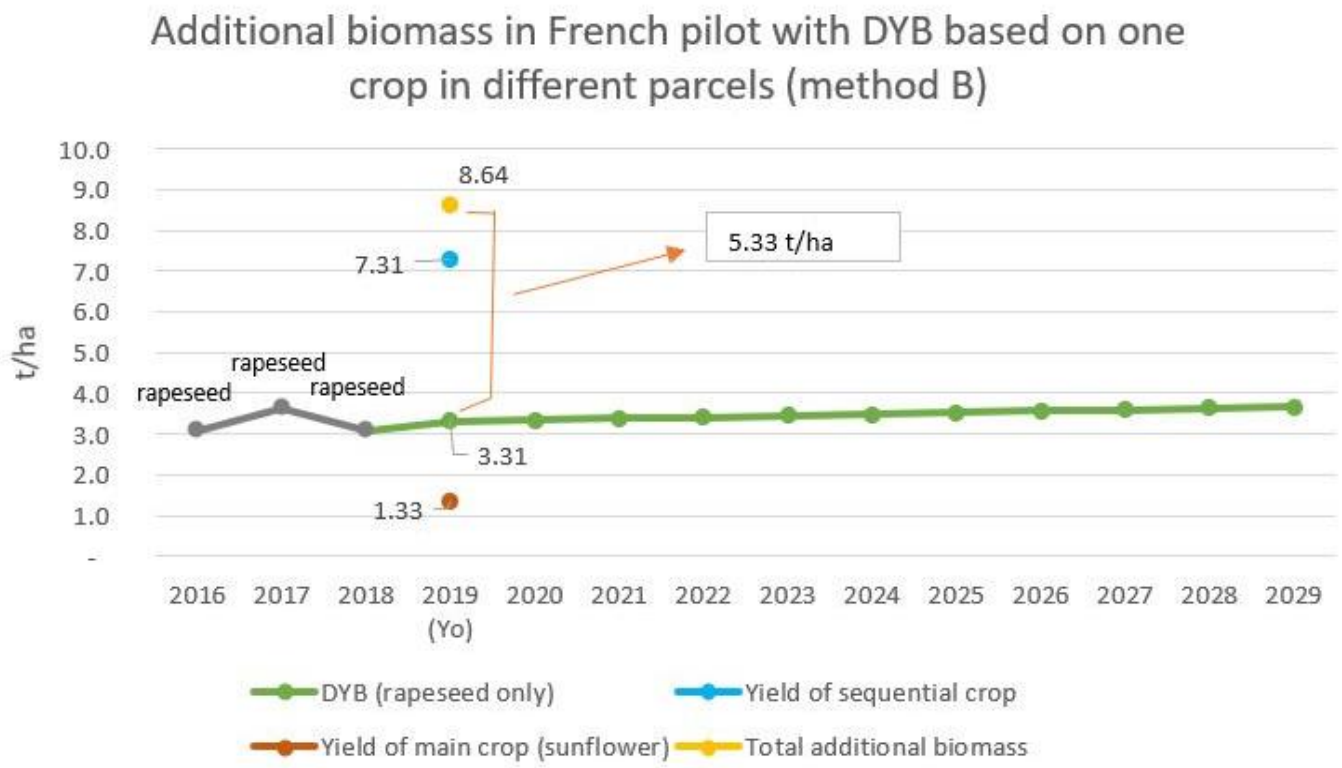
Setting the dynamic yield baseline can be challenging, depending on the chosen period and the combination of crops selected for the baseline

Findings

Conclusion

Dynamic yield baseline options - France

Sequential cropping – Method B



Dynamic yield baseline method B

DYB = average of rapeseed yields in 3 previous years. This means looking at yields of other parcels than the one selected

Slope can be applied

Setting the dynamic yield baseline for one crop over multiple parcels is possible

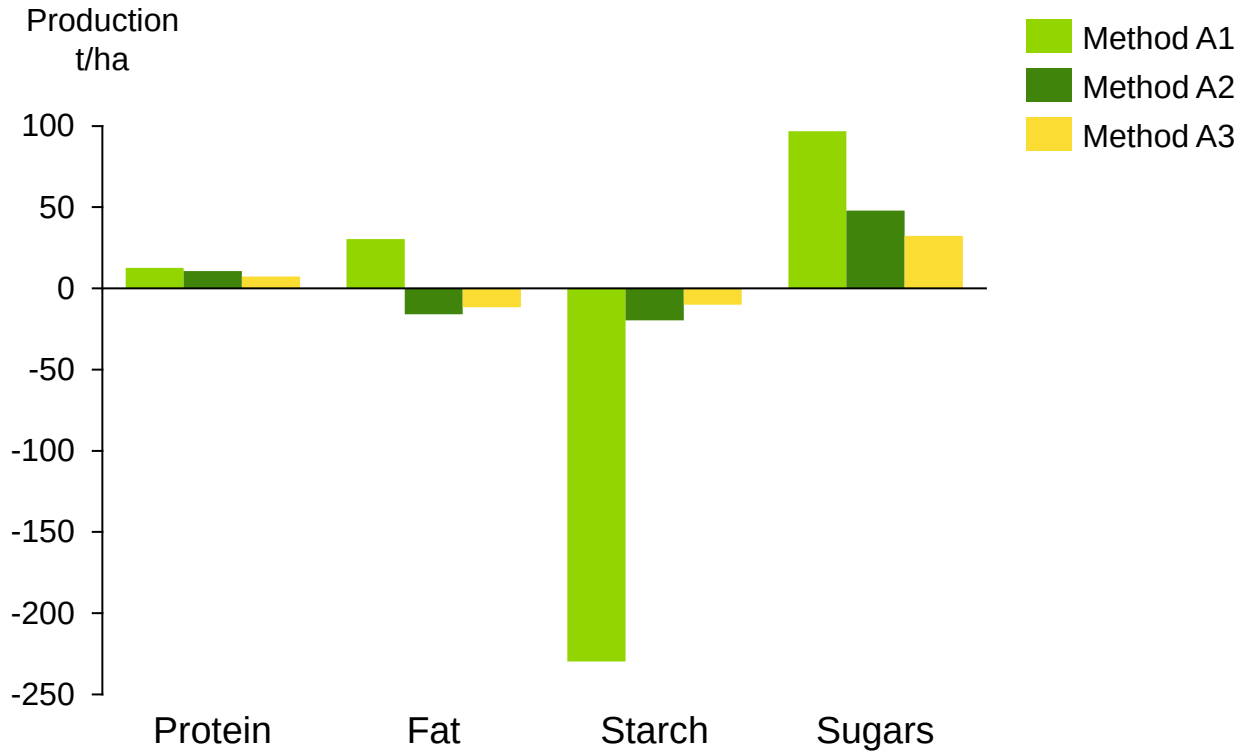
Findings

Conclusion

Additional biomass calculation options - France

Sequential cropping – units to compare different crops

Nutrient composition of crops



Additional biomass options

Three units tested:

1. Weight (tonnes and t/ha)
2. Energy content (in MJ/ha)
3. Nutrient composition of crops

% protein, fat, starch and sugar/ ha

Findings

Conclusion

Use of units other than weight may poses questions for a certification mechanism that aims to certify a quantity of additional biomass