Indirect GHG emissions from waste and by-product feedstocks

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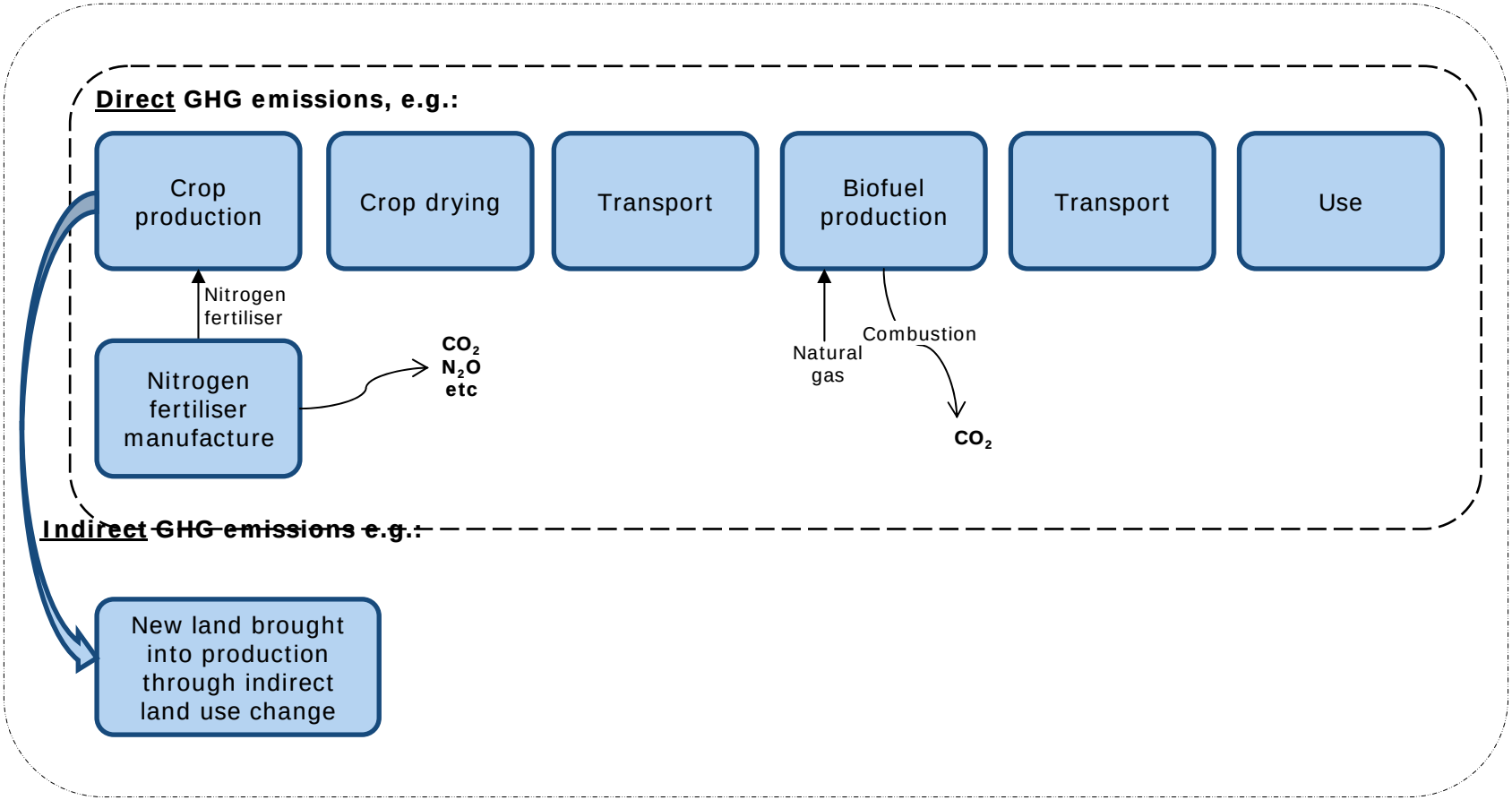
What are “indirect effects”?



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Definitions (for the purposes of this discussion)

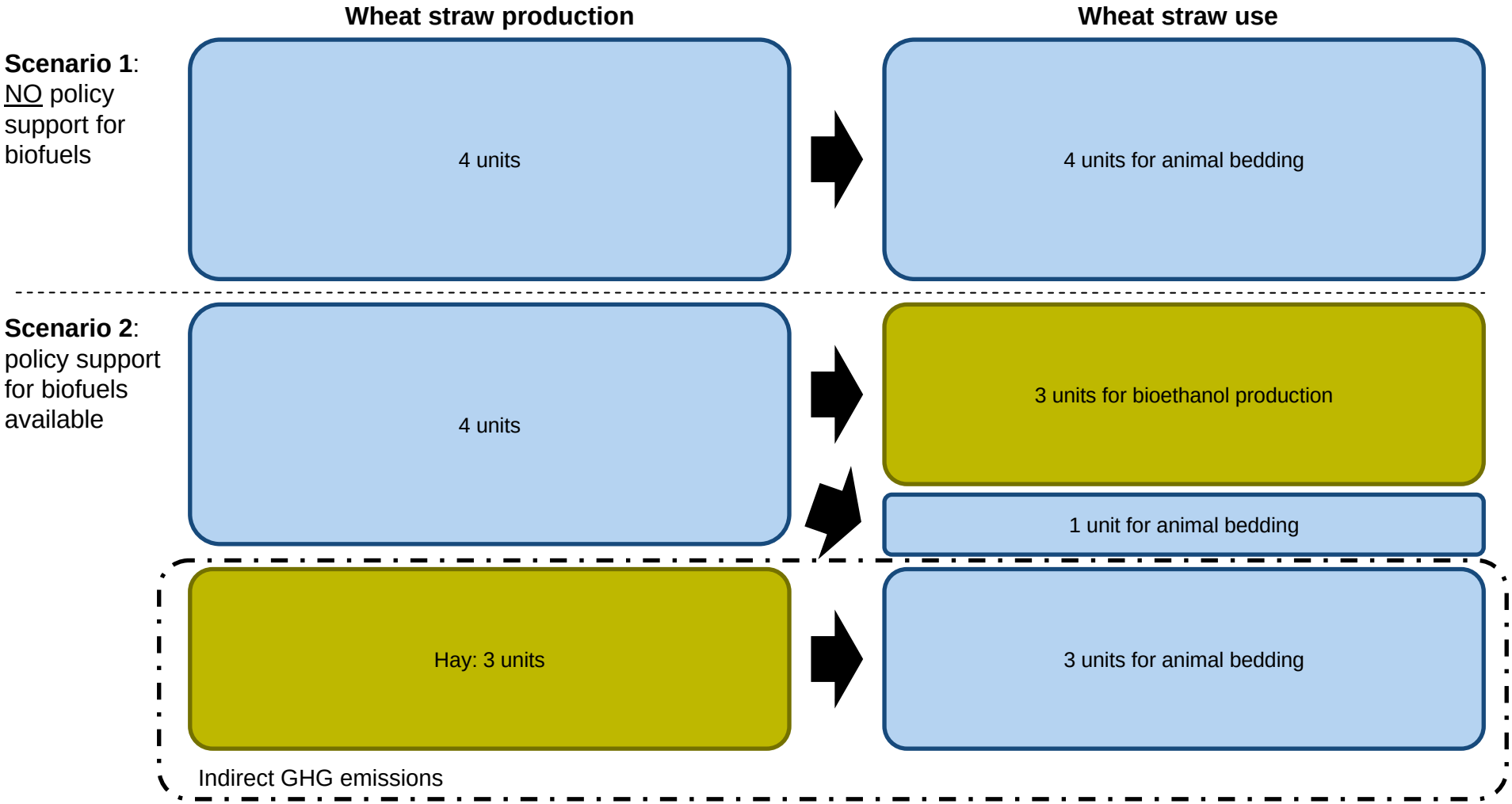
Inelastic supply

- *Wastes* and *by-products* are products whose supply is inelastic to an increase in demand.
- That is, the quantity produced is determined by other factors, such as demand for the main product (e.g. meat in the case of tallow) or for the initial product (e.g. food in the case of organic MSW)

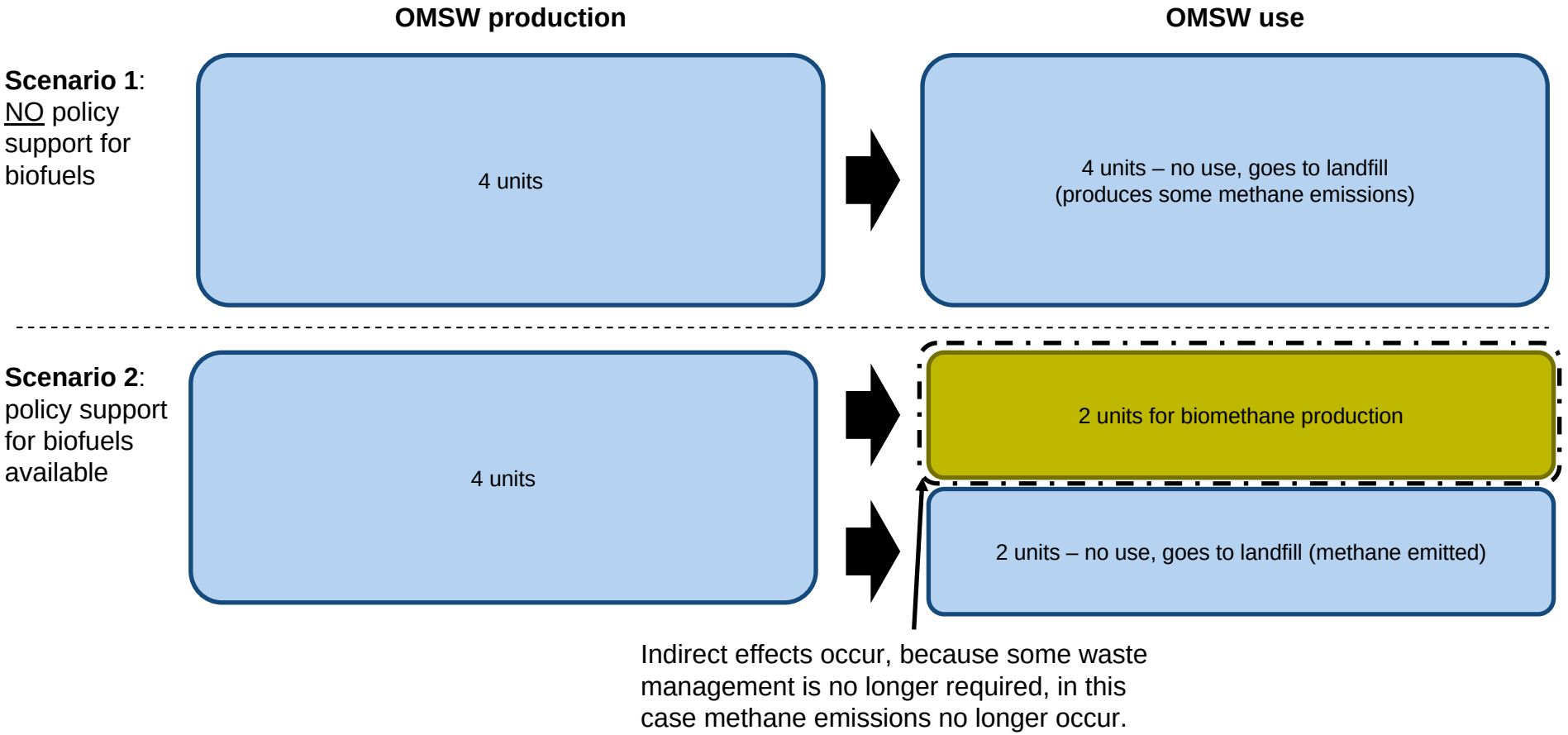
Waste vs by-product

- By-products are those products which **currently do** have a productive use (in the absence of demand for the feedstock for biofuel production).
- Wastes are those products which **currently do not** have a productive use (in the absence of demand for the feedstock for biofuel production).
- A certain product may be a waste and a by-product at the same time because only a certain amount of it may find a productive use

By-products will cause indirect effects because supply is constrained – e.g. wheat straw for bioethanol



Wastes will cause indirect effects because waste disposal is avoided – e.g. OMSW for biomethane



Indirect effects occur, because some waste management is no longer required, in this case methane emissions no longer occur.

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Methodology for assessing indirect GHG emissions from wastes and by-products

	By-products	Wastes
Step 1:	Identify existing uses of the biofuel feedstock that are likely to be sensitive to a change in demand, and, therefore most likely to switch to another feedstock.	Identify the existing or likely "*waste management*" process for the biofuel feedstock, taking into account technical, practical and legislative constraints
Step 2:	Establish GHG emissi feedstock away from t application(s): •What feedstock is / w feedstock? •What GHG emissions result of supplying and	voided by reducing tock treated using this
Step 3:	If there is more than one existing or likely alternative productive application, calculate an average impact of diverting the biofuel feedstock away from these applications	If there is more than one existing or likely waste management process, calculate an average impact of diverting the biofuel feedstock away from these processes.

What if the biofuel feedstock is partly a waste and partly a by-product?

Fuel chain default value would be set conservatively (i.e. on whichever source has the highest carbon intensity). However, if companies could prove their feedstock would otherwise have been a waste or a by-product, they would be able to claim the appropriate carbon intensity.

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It is not yet appropriate to account for indirect effects of waste and by-products with-in the UK methodology

- The indirect impact biofuels that using waste and by-product feedstocks can have on GHG emissions are clearly important, and should be taken into account when assessing a biofuel's performance for policy
- However,
  - Indirect GHG emissions are not taken into account for biofuels produced from crops.
  - All biofuels should be compared using the same boundaries of analysis; otherwise risk perverse incentives.
  - The indirect effects of waste and by-product feedstocks on GHG emissions should only be taken into account when indirect GHG emissions from crop based biofuels are also taken into account.
- In addition, the RED GHG saving methodology does not currently allow for the assessment of indirect effects caused by wastes and by-products. A change to the UK methodology now would only be valid for one year.

The RFA will help inform the development of the RED methodology

- The RFA intends to build an evidence base which they will use to inform the Government on options for the development of the RED methodology
- Stakeholder input will be crucial to developing this evidence base.
- Workshops to discuss theory of the methodology and its application to specific fuel chains, e.g.:
  - Tallow
  - Molasses
  - MSW
  - Ligno-cellulosic by-product (e.g. straw, waste wood etc)

Changes to carbon reporting

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Changes to high level fuel chain default values

New fuel chains

Bio-ETBE

High level fuel chain default values are set conservatively

Fuel / feedstock / origin default values

Fuel	Feedstock	Origin	Carbon intensity
Bioethanol	Sugar cane	Brazil	25
		Pakistan	115
	Wheat	United Kingdom	61
		Ukraine	103

Fuel / feedstock default values

Fuel	Feedstock	Origin	Carbon intensity
Bioethanol	Sugar cane	Unknown	25
	Wheat	Unknown	61

Fuel default values

Fuel	Feedstock	Origin	Carbon intensity
Bioethanol	Unknown	Unknown	61

Set equal to the highest fuel / feedstock / origin default that provide this fuel, from this feedstock, provided it is likely to supply more than 5% of market.

Set equal to the highest fuel / feedstock / origin default that provide this fuel, provided it is likely to supply more than 5% of market.

RTFO volume reporting enables identification of high level default values which are not sufficiently conservative

Fuel, Feedstock, Country of Origin	Percentage of total biofuel of this type	Percentage of total biofuel of this feedstock type	Default value (grams CO_2e / MJ)
Biodiesel		*Fuel default value:*	***55***
Oilseed rape		*Fuel / feedstock default value:*	***55***
Canada	7%	22%	56
USA	2%	5%	93
Soy		*Fuel / feedstock default value:*	***78***
Brazil	2%	6%	78
USA	33%	83%	58
Tallow		*Fuel / feedstock default value:*	***13***
Denmark	1%	7%	14
USA	13%	85%	17
Bioethanol		*Fuel default value:*	***61***
Sugar cane		*Fuel / feedstock default value:*	***25***
Pakistan	2%	2%	115

- This table shows the fuel chains for which companies have reported fuel, feedstock and origin, that have a carbon intensity worse than the default value
- The circled values identify the fuel chains which would not be picked up by a 5% threshold.
- This suggests that a 5% threshold is not sufficiently conservative for the *fuel* default values
- A revised threshold of 1% is used for the fuel default values only.

The follow fuel chain default values will be revised

Fuel default values
(i.e. unknown feedstock and origin)

Fuel	Current default value (g CO_2e / MJ)	Based on the following fuel chain	Default value for 2009/10 (g CO_2e / MJ)	Based on the following fuel chain
Bioethanol (& Bio-ETBE)	61	Wheat - UK	115	Pakistan – Sugar cane
Biodiesel	55	Oilseed rape - UK	93	USA – Oilseed rape

Note: default values not shown remain unchanged

Fuel / feedstock default values
(i.e. unknown origin)

Fuel	Feedstock	Current Default Value (g CO_2e / MJ)	Assumed country of origin	Default Value for 2009/10 (g CO_2e / MJ)	Assumed country of origin
Biodiesel (ME)	Oilseed rape	55	UK	93	USA
	Tallow	13	UK	17	USA

Note: default values not shown remain unchanged

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Changes to high level fuel chain default values

New fuel chains

Bio-ETBE

Default values have been developed for the following new fuel chains

- Bioethanol from sulphite liquor
  - Hardwood and softwood
  - Canada, Sweden
- Co-processed, hydrotreated biodiesel from all vegetable oil and animal fat feedstocks
- Biodiesel (all types) from
  - Sunflower – Argentina, China, France, Russian Federation, Ukraine, United States
  - Coconut – India, Indonesia, Philippines
  - Jatropha – India
  - Soy – Spain (addition to existing countries of origin)
- Pure plant oil from
  - Oilseed rape
  - Soy

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Changes to high level fuel chain default values

New fuel chains

Bio-ETBE

The carbon intensity of bio-ETBE is now set equal to the carbon intensity of the bioethanol feedstock

- Discrepancy in current Technical Guidance
  - Default values are given in grams CO_2e / MJ of ETBE
  - Volume reporting is on renewable component i.e. volume of ethanol
  - ➢ Bio-ETBE not treated in the same way as other biofuels when calculating weighted average carbon intensities or GHG savings.

- Under the Renewable Energy Directive default values for bio-ETBE will be set equal to the carbon intensity of the bioethanol fuel chain used from which the bio-ETBE is produced.

- This approach will also be adopted for the RTFO (the revision may be retrospectively applied to all volumes of ETBE reported in 2008/09)