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Sustainability of pet food and rendered pet food ingredients.

The growth of biodiesel, the challenge with fertilizers and potential impact on animal feed ingredients used in pet food

US PFI Meeting
17th August 2022

Lucas Cypriano
President

WRO

ABOUT THE WRO

SUSTAINABILITY

FEED INGREDIENT AVAILABILITY

- Renewable Fuels
- Fertilizers

CONCLUSIONS

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ABOUT THE WRO

Structure and decision process

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About WRO

Founded in 1999, due to the BSE crisis in Europe in the 1990's

Represents the international rendering community at international forums with one voice

WRO members are the national renderers association

The strategies of WRO are decided at the Annual Assembly, and the Officers are responsible to make the strategies operational

About WRO

Officers from June 2021 to 2023

President

Lucas Cypriano
Brazil

1st VP

Doyle Leefers
USA

2nd VP

Damian Evans
Australia

2nd VP

Lars Krause-Kjaer
Denmark

Coordinator

Kent Swisher
USA

Scientific Advisory Painel

David Meeker
EUA

Martin Alm
Germany

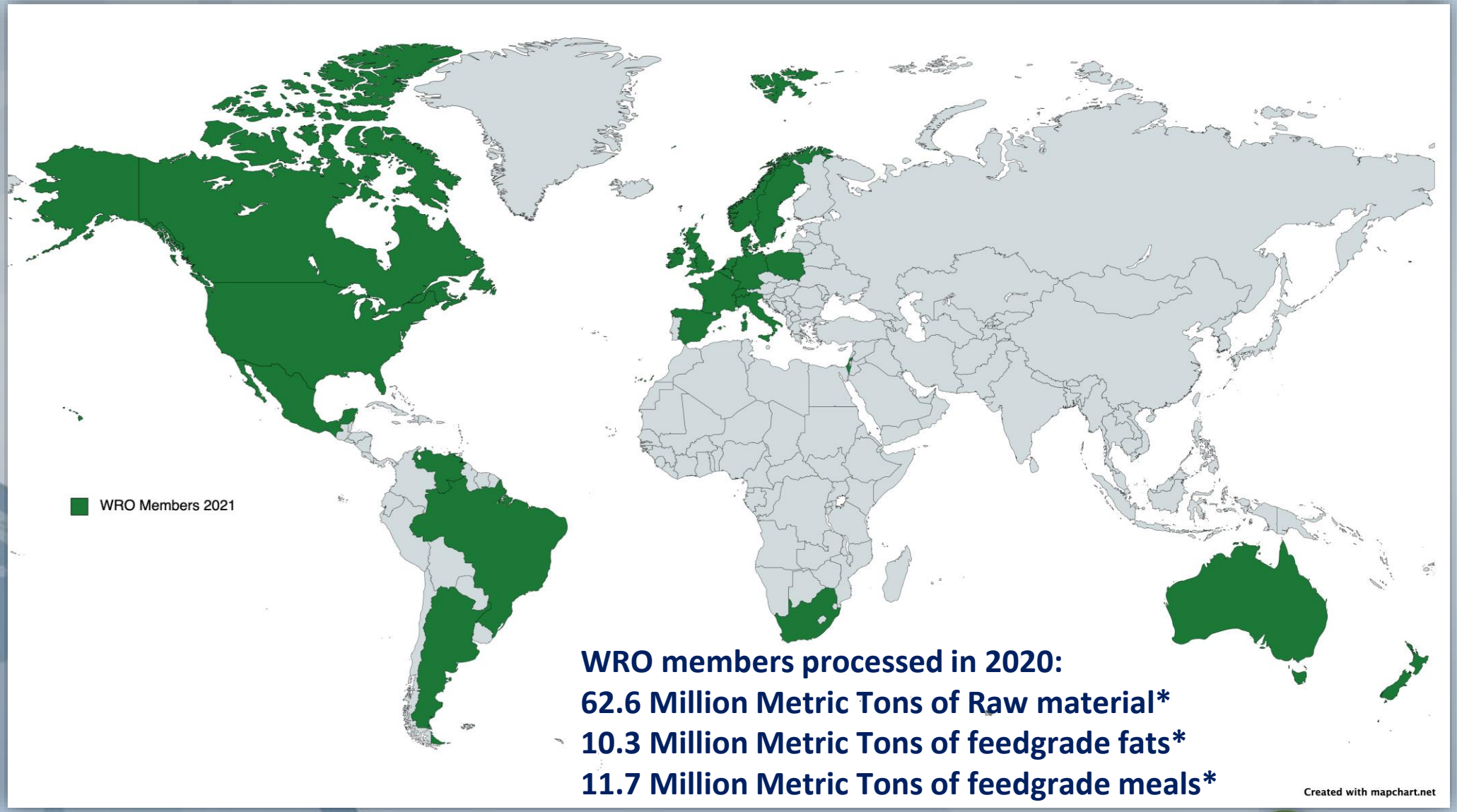
Lucas Cypriano
Brazil

Shane Leath
New Zealand

About WRO

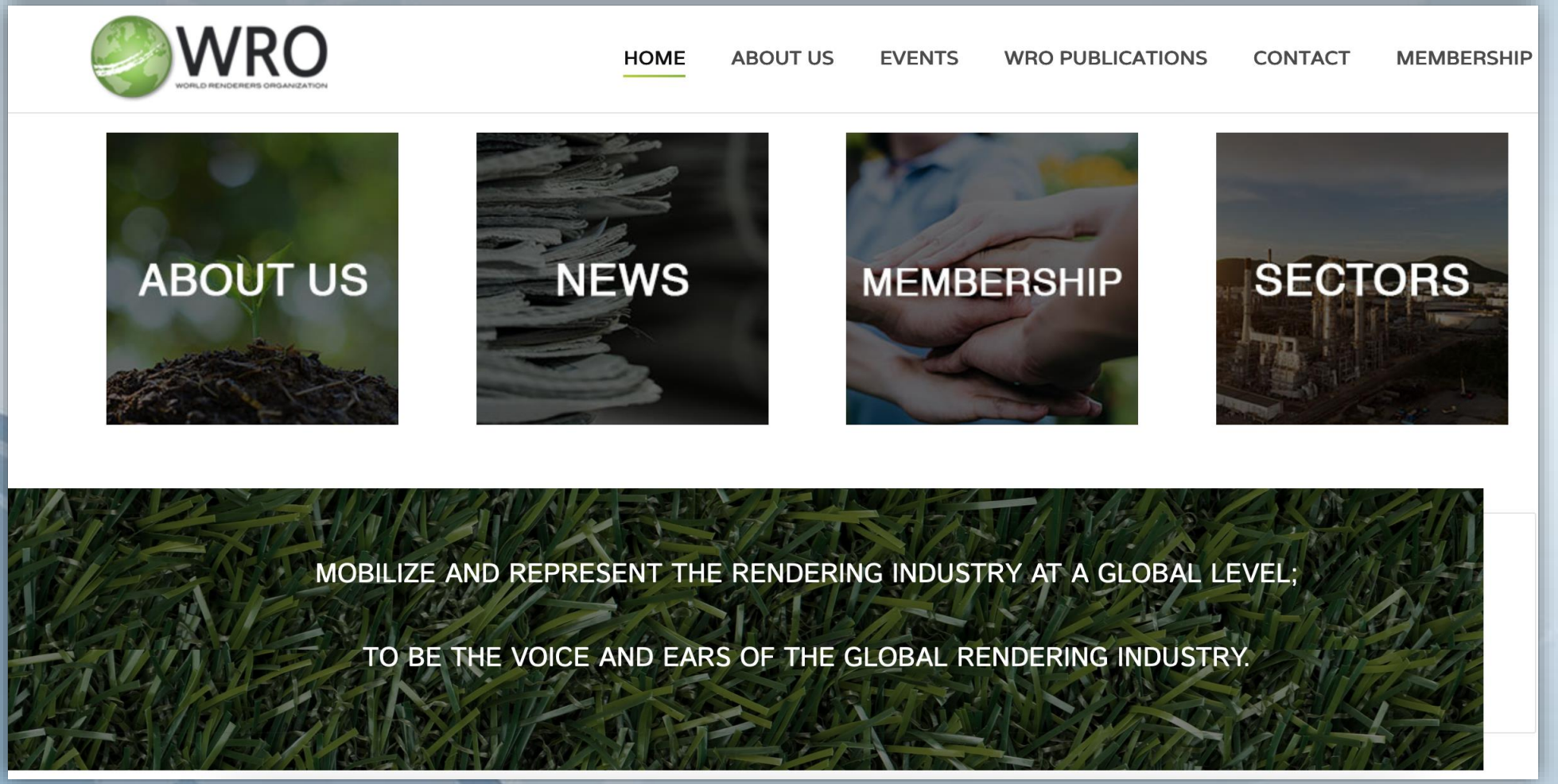
21 Countries with 22 Members

2 Allied Supporting Members



**WRO estimative accordingly with member's reports*

About WRO



www.worldrenderers.net

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About WRO

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d as “safe

SUSTAINABILITY

How rendered products contributes to the petfood industries sustainability

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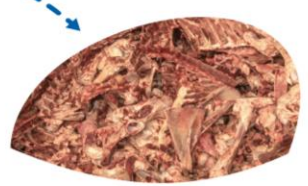
FARMS

SLAUGHTERHOUSE

Byproduct

BUTCHER SHOP



Byproduct

ANIMAL RENDERING INDUSTRY

FEEDSTUFF

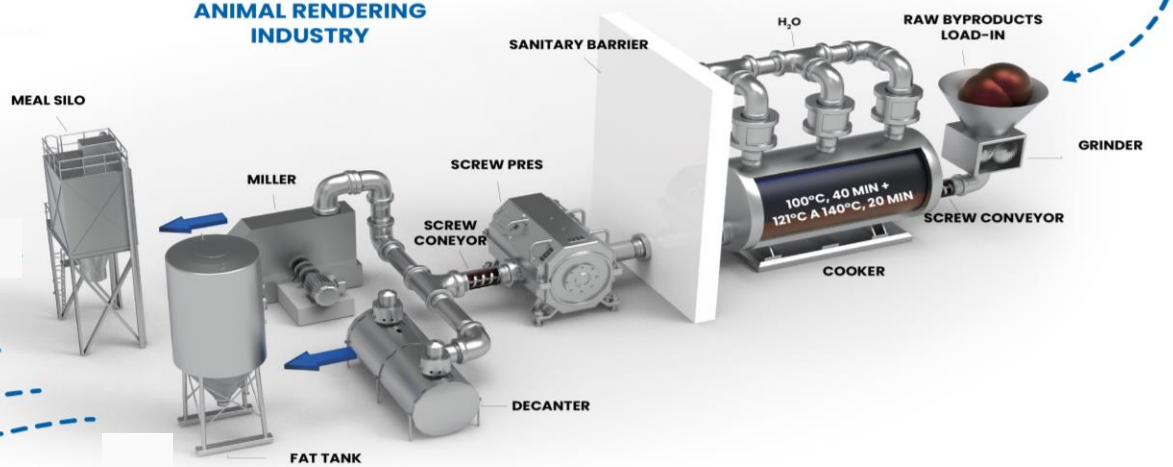
PET FOOD

COSMETICS, SOAP, HYGIENE AND CLEANING

OTHER INDUSTRIES

Paints, dyes and resins
Fertilizers

BIODIESEL



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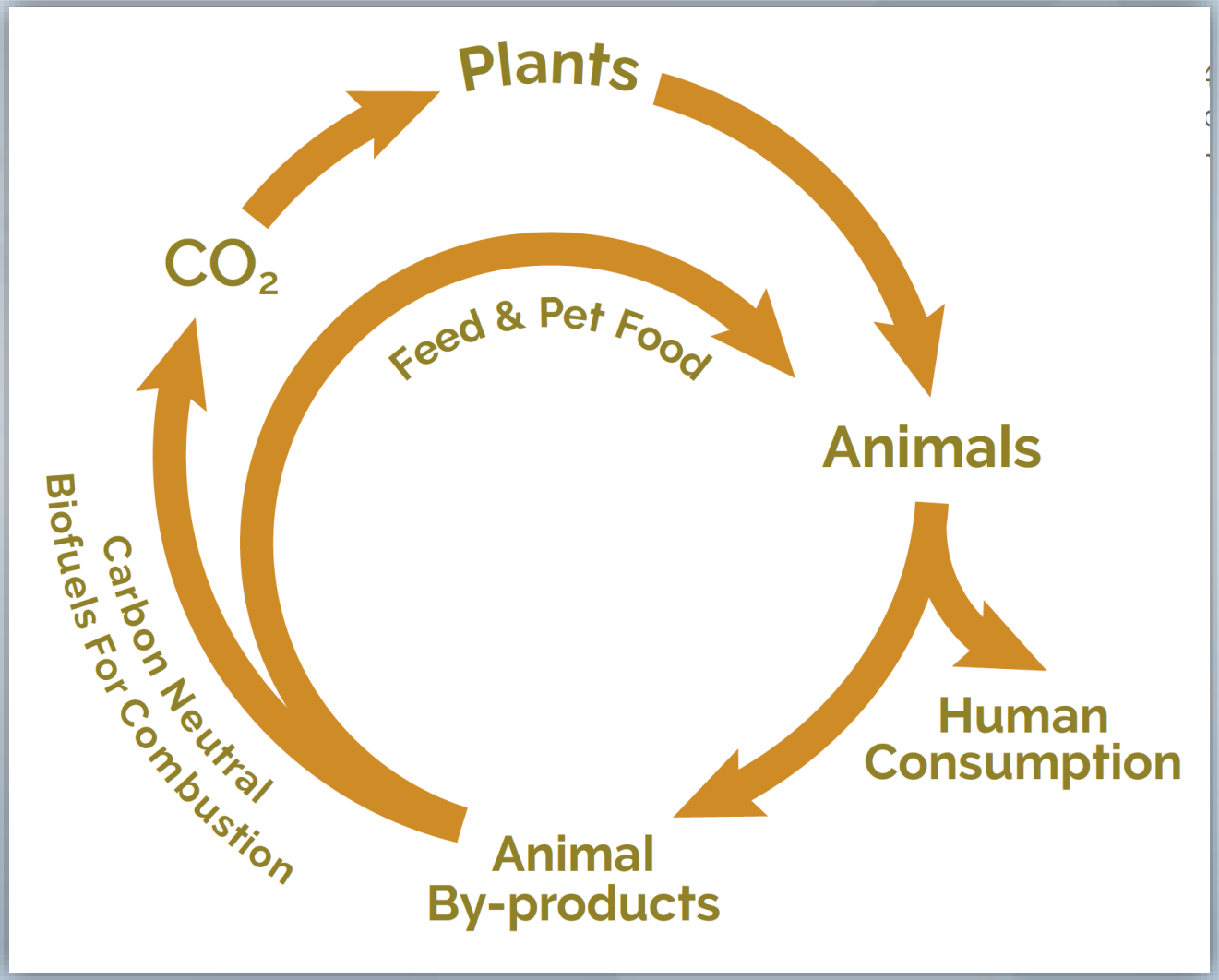
Rendered products: CIRCULAR BIOECONOMY

Rendered products do not allows the waste of precious resources used in raising livestock, helps our customers to ethically maximise value from the animal

Rendered products contributes to the sustainability of agriculture and food production, reducing the overall carbon footprint of the animal-based food value chain

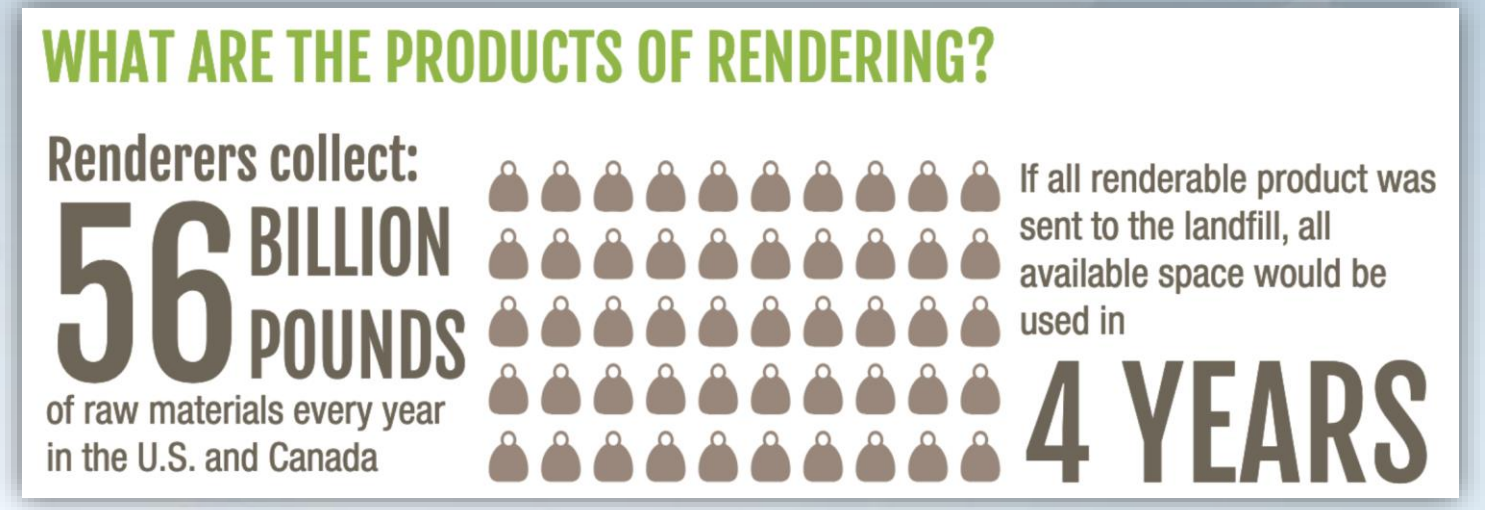


https://efpra.eu/wp-content/uploads/2022/05/EFPRA-SUSTAINABILITY-CHARTER-V1a.pdf

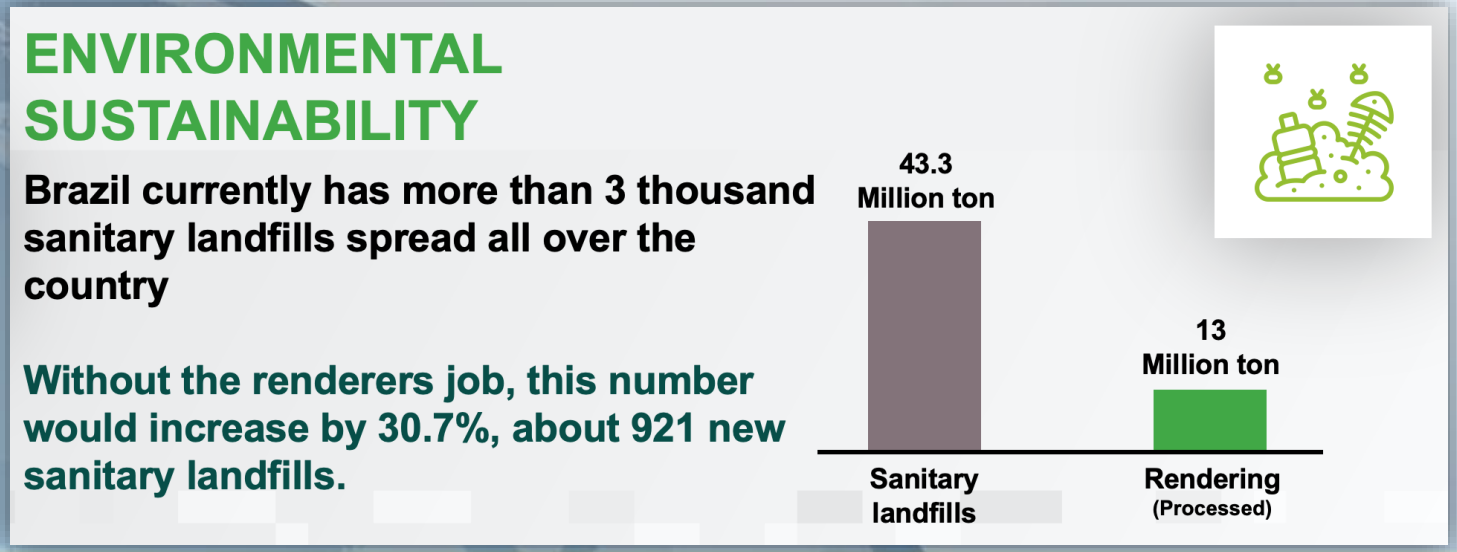
Rendered products: IS RECYCLING

Avoid waste

Lower landfills outputs



https://nara.org/wp-content/uploads/2019/12/Rendering-is-Recycling-Update.pdf

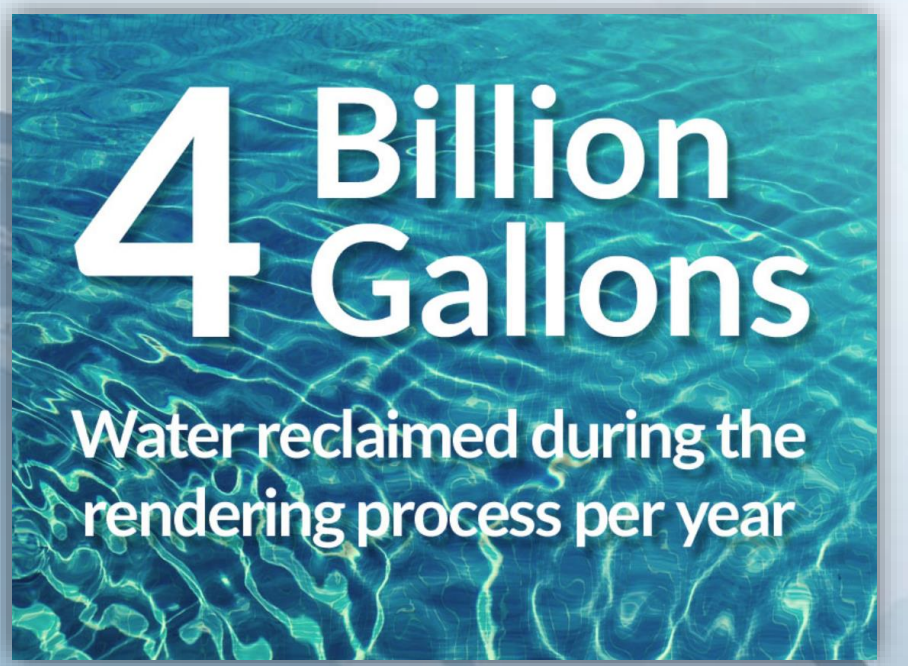


https://abra.ind.br/conheca-o-setor/?lang=en

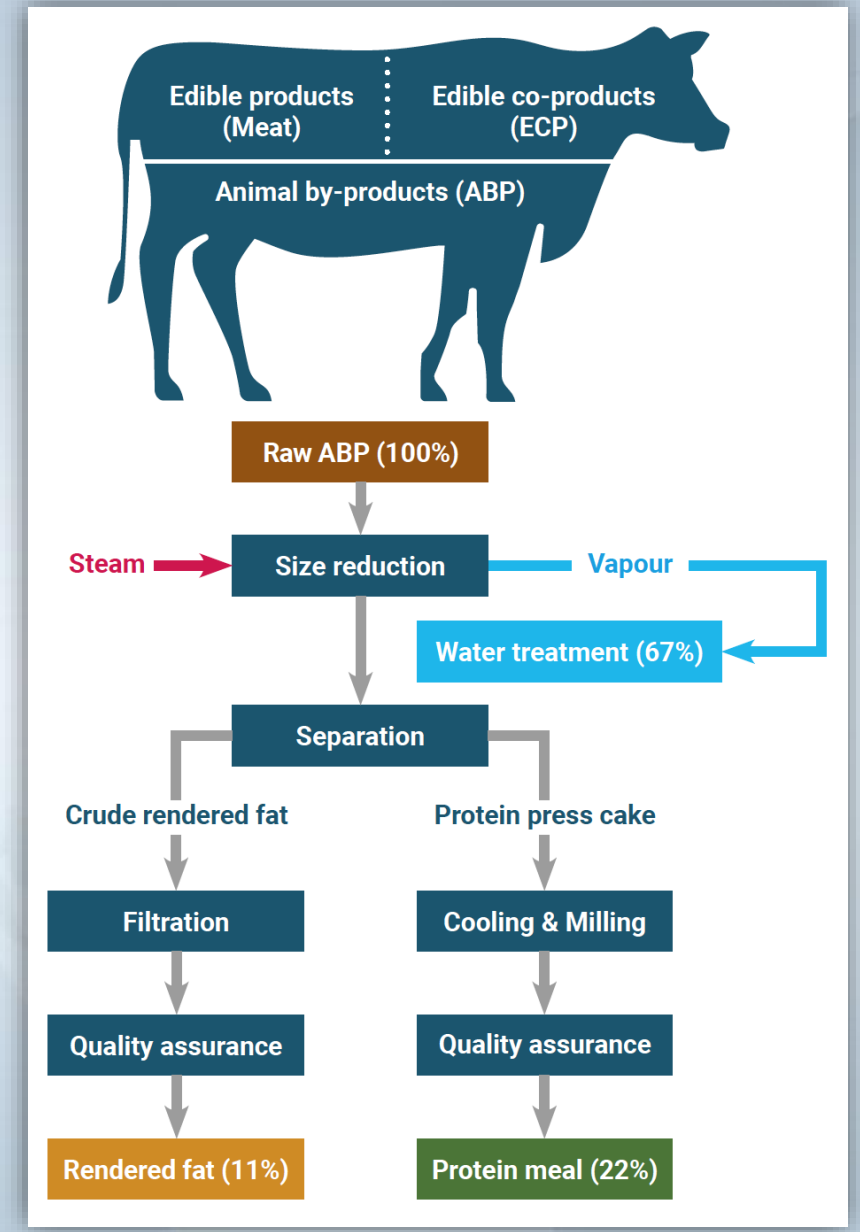
Rendered products: WATER RECOVERY

Water: from ½ to ¾ is water reclaimed and treated before released

Yearly in USA & Canada:



https://nara.org/sustainability/water-recovery/



https://efpra.eu/wp-content/uploads/2022/05/EFPRA-SUSTAINABILITY-CHARTER-V1a.pdf

Rendered products: NUTRIENT AND LAND-SAVING

Valuables nutrients are saved / upcycled

The demand for arable land and fertilizers is lowered

For example in 2017 Brazilian renderers:

- *recycled 1.9 million tons of pure protein and 32.4 billions kcal (5.3 million tons of fats and meals)*. The phosphorous recycled were equivalent to 650 thousand tons in dicalcium phosphate***
- *To replace the rendered products by corn/soybean, 2.1 millions hectares of arable land and 910 thousand tons of NKP would be needed*.*

*: L. Cypriano, Revista Reciclagem Animal, Jan/Feb 2018, pp. 60 a 63 - http://www.mflip.com.br/pub/stilo/?numero=61&edicao=10598#page/61
**: L. Cypriano, Revista Reciclagem Animal, Dec/Nov 2017, pp. 50 a 55 - http://www.mflip.com.br/pub/stilo/?numero=60&edicao=10538#page/51

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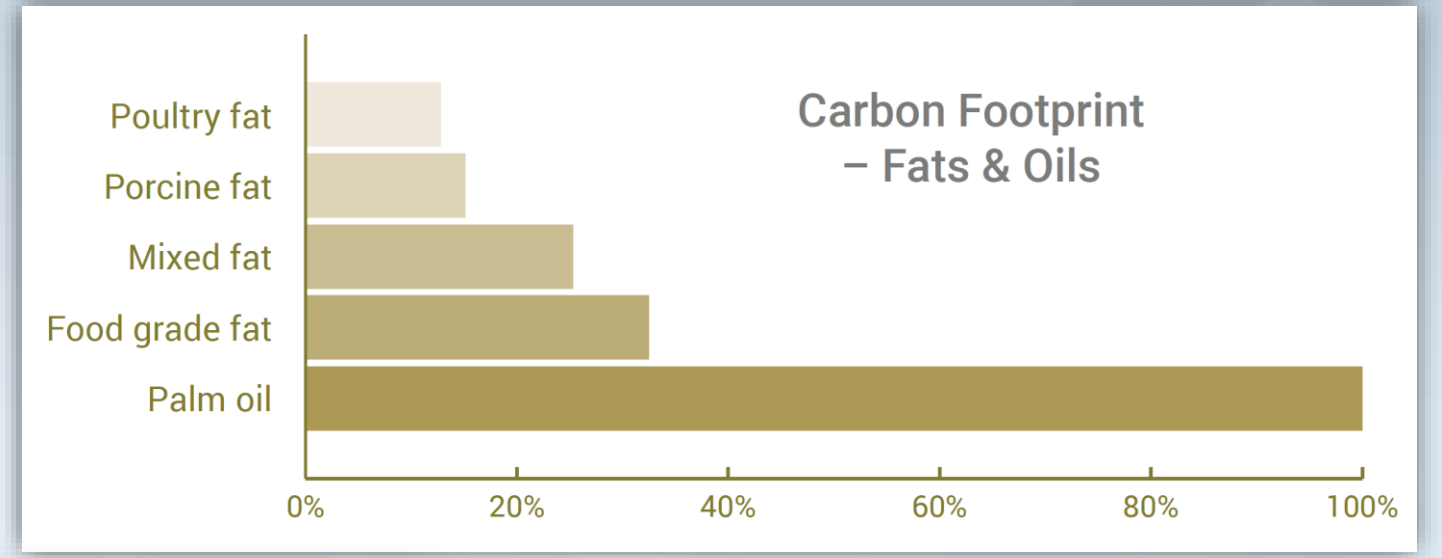
Rendered products: ESSENTIAL PUBLIC SERVICE

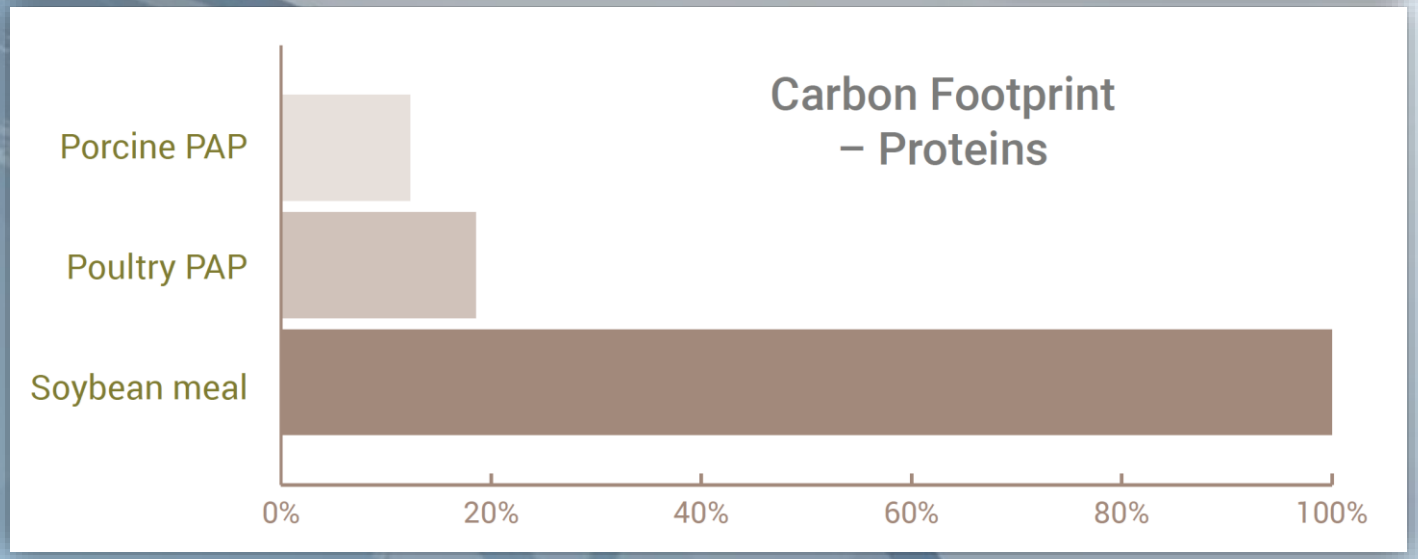
Rendering: an essential public service – Rendering is a centuries-old practice that manages, economically and efficiently, an important environmental problem: the safe disposal of large quantities of animal by-products and wastes. In the rendering process, animal wastes, largely in the form of fat, bone, hide, and offal, are ground and melted down at high temperatures for a fixed time. Protein settles under a layer of fat. These products are then recovered for use as ingredients in numerous commercial products. Fat, tallow, and grease are siphoned off for use in products ranging from lubricants and lipstick to soap, candles, pharmaceuticals, ink, and cement. The heavier protein at the bottom is further processed and recycled, largely for use as a high-energy supplement in the feed rations of domestic animals.

World Health Organization – Understanding the BSE Threat – 2002 - https://apps.who.int/iris/handle/10665/67749

Rendered products: LOW CARBON FOOTPRINT

Rendered products do not compete with food!





Renderers have been Petfood's partners from the start!

https://efpra.eu/wp-content/uploads/2022/05/EFPRA-SUSTAINABILITY-CHARTER-V1a.pdf

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The use of rendered protein meals and fats have been supporting the sustainability of the petfood industry

In addition to the already known nutritional benefits for our pets

SUSTAINABLE DEVELOPMENT GOALS

FEED INGREDIENT AVAILABILITY

How rendered products availability are been affected by biodiesel policy and cold be affected by the organic agriculture

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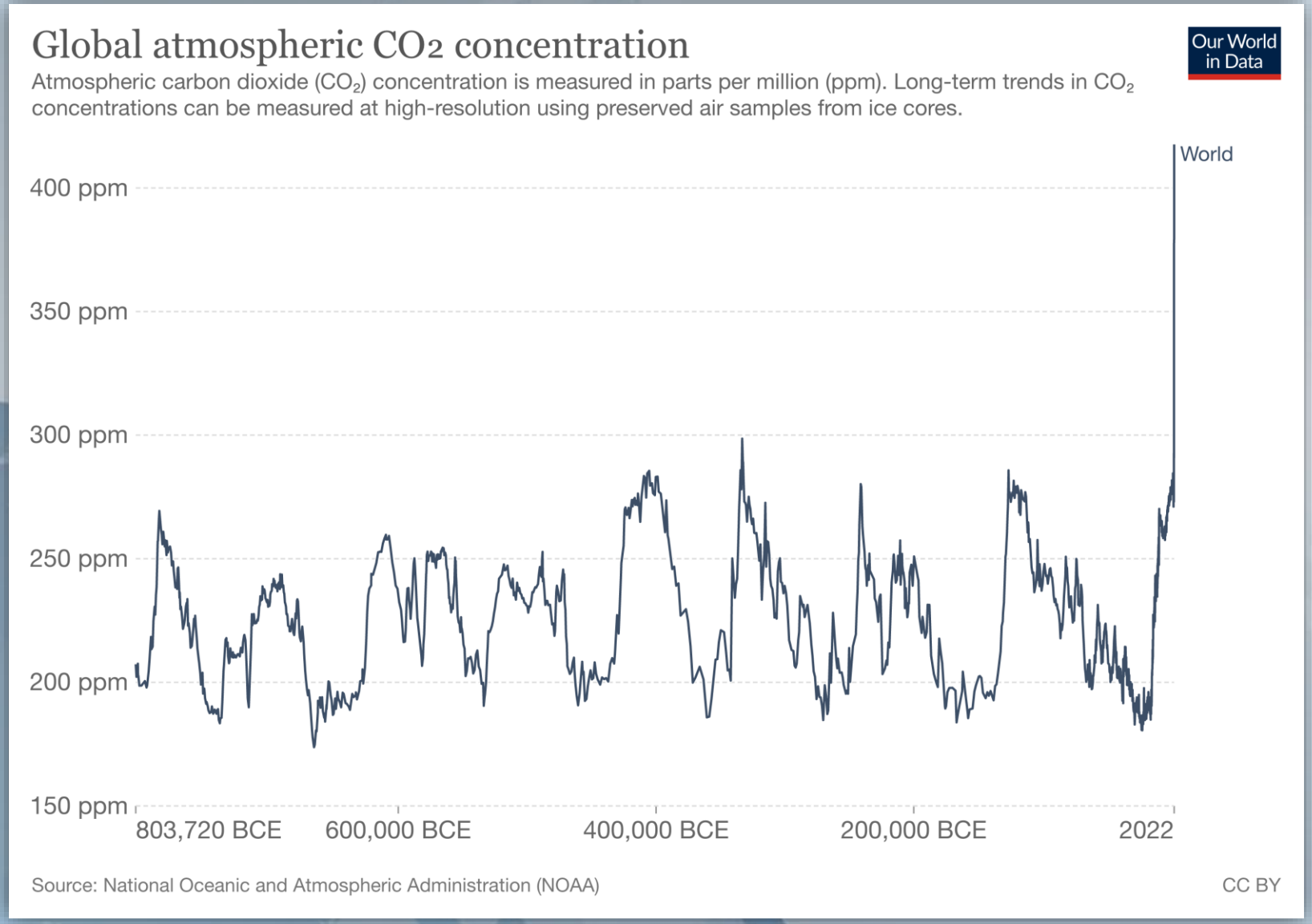
CO_2 levels are rising as never observed!

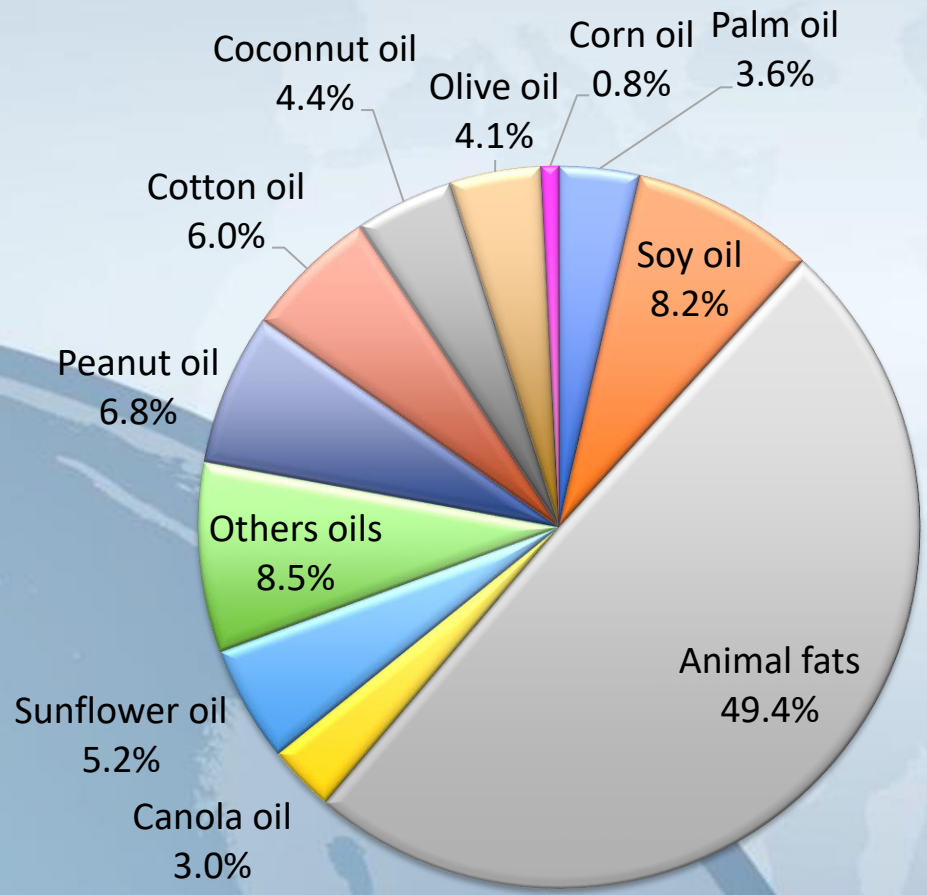


119ppm (40%) above the highest level ever “recorded” by the least 800,000 years

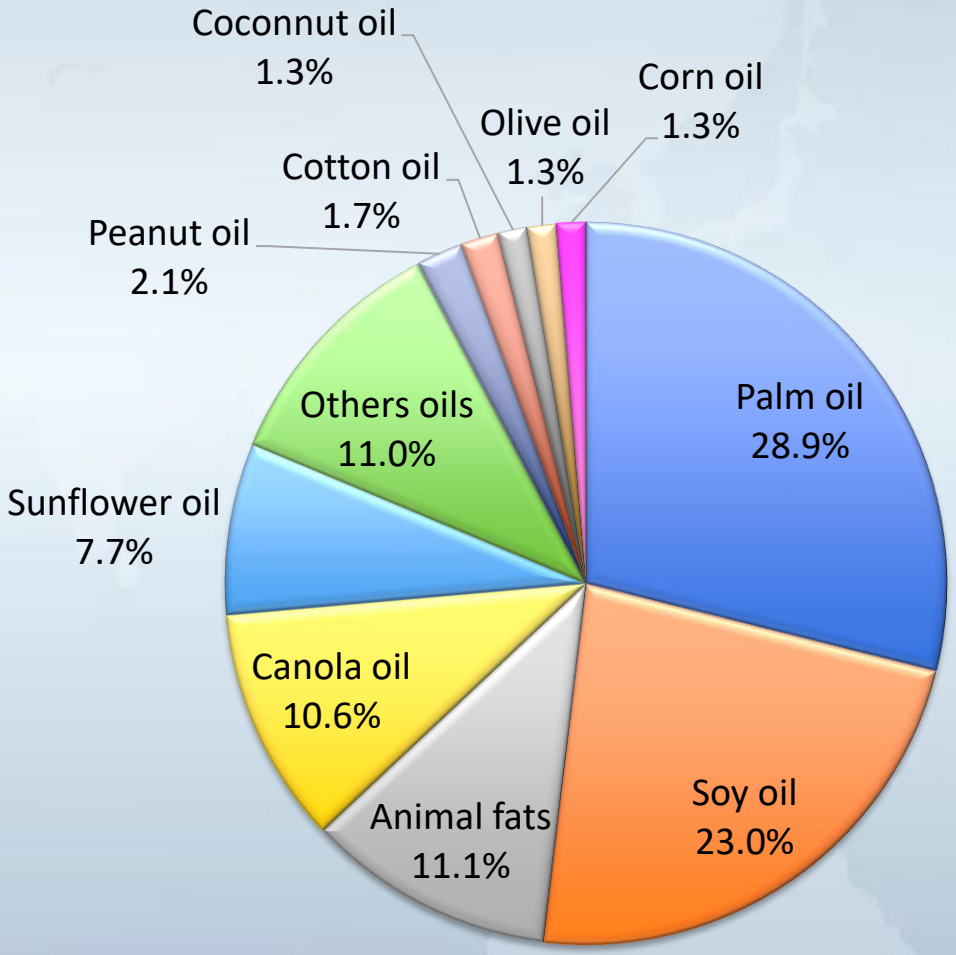
Decarbonization is mandatory!

Production share of vegetable oil / animal fat

1961 – 37 million tons



2019 – 235 million tons



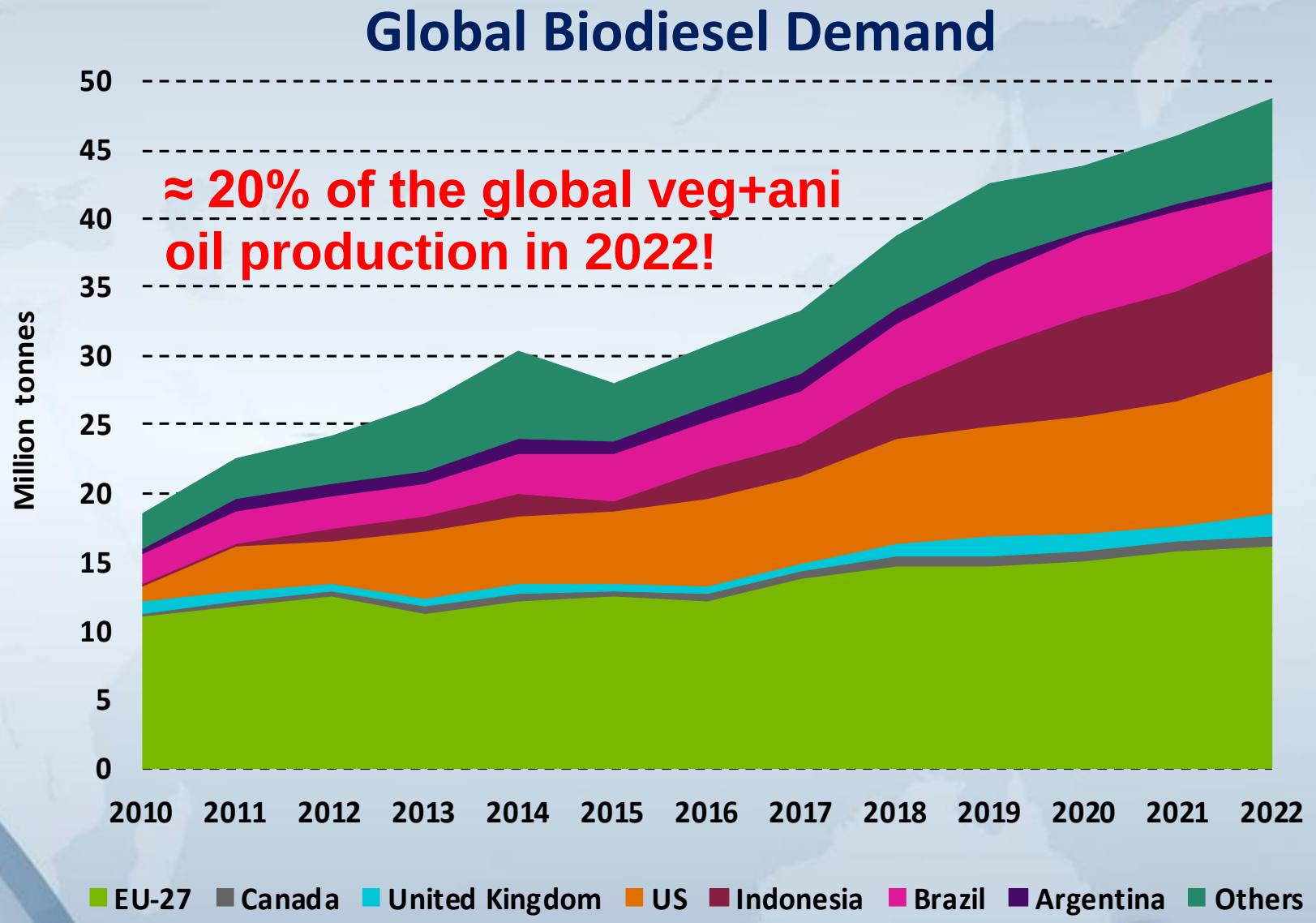
E. Dubinski, El futuro de las grasas y aceites, A&G Magazine, Vol. 4, pp 568-582, 2020

Biodiesel

Lowering of CO_2 emissions is needed

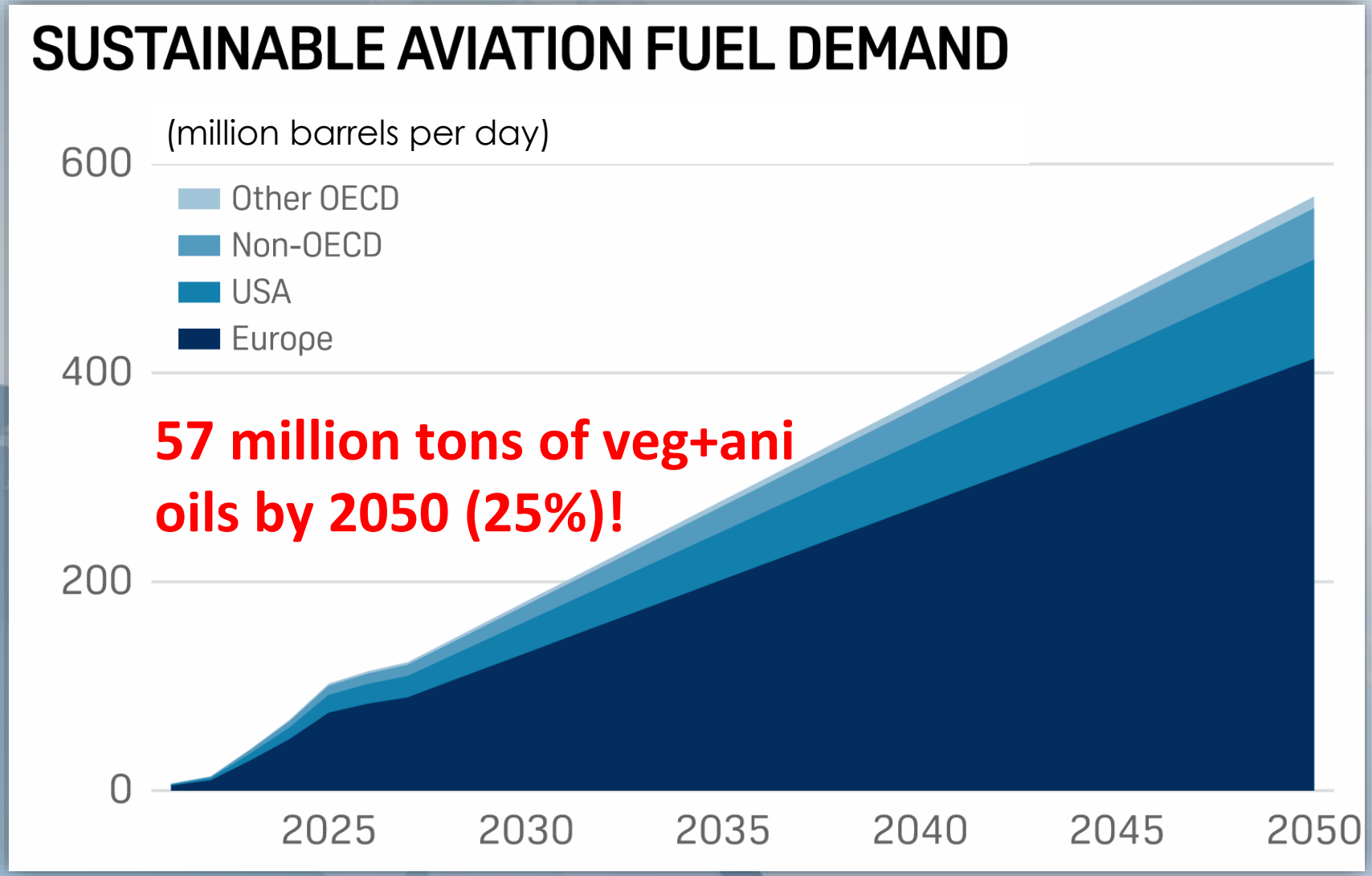
Countries are increasing the use of renewable diesel/biodiesel, by increasing their addition to the mineral diesel

Globally (2010 → 22):
↑2.5 million ton per year



R. Low, Biofuels and their Feedstock, EFPRA Congress, May 2022

New factor: SAF



"EU's yet-to-be-finalized "Fit for 55" package that proposes a 2% SAF blending mandate by 2025, which goes up to 5% by 2030, and 63% by 2050"

E. Dimitriadou and C. Lavinsky, Long-term demand for SAF could run into supply constraints, 22/mar/2022
https://www.spglobal.com/commodityinsights/en/market-insights/blogs/oil/032222-sustainable-aviation-fuel-saf-2050

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New factor: SAF

Legislation may not be “the sole driver” at SAF:

Act for Sky → 16 Asian corporates → No target yet

https://www.anahd.co.jp/group/en/pr/pdf/20220302.pdf

Clean Skies for Tomorrow → 60 corporates → 10% of SAF by 2030

https://www3.weforum.org/docs/WEF_Clean_Skies_Tomorrow_SAF_Analytics_2020.pdf

> *“It finds that sufficient **sustainable feedstocks** are available to meet the projected jet fuel demand for global aviation in 2030”*

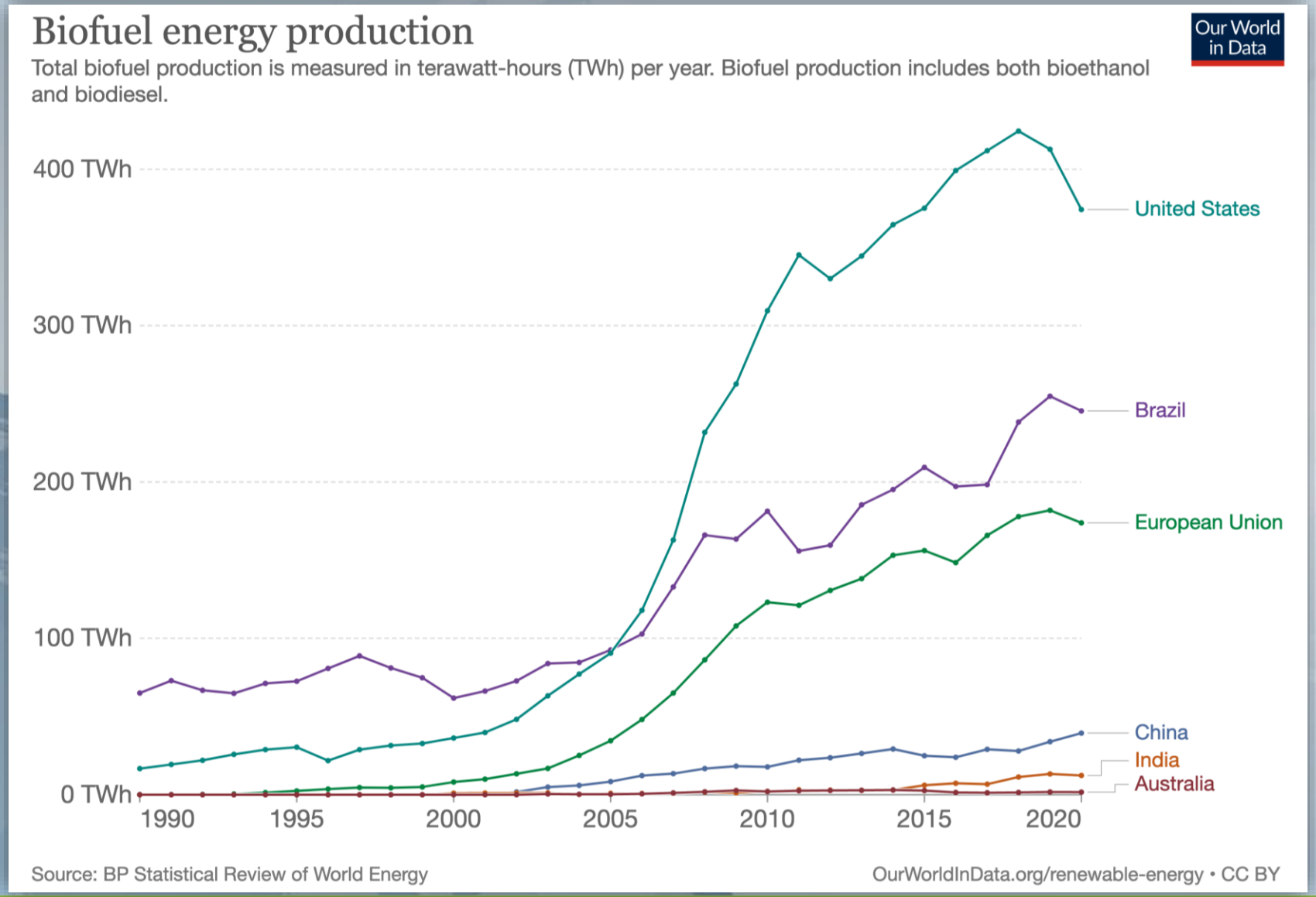
All feedstock must fulfil sustainability criteria

Feedstock type	Feedstock category			Feedstock[vi]	Substantial GHG savings potential[vii]	No fundamental sustainability concerns[viii]
1st gen / crop-based	Edible oil crops			Palm	✗	✗
				Soybean	✗	✗
				Other (incl. sunflower, rapeseed/canola)	✗	✗
	Edible sugars			Sugar cane	✓	✗
				Maize	✗	✗
				Other	✗	✗
Advanced and waste	Waste and residue lipids[ii]			Used cooking oil (industrial or private sources)	✓	✓
				Animal waste fat (tallow)	✓	✓
				Other (incl. tall oil, technical corn oil, fish oil, POME, PFAD)	✓	✓
	Purposely grown energy plants	Oil trees on degraded land		Jatropha, pongamia	✓	✓
		Rotational cover crops	Oil cover crops	Camelina, carinata, pennycress	✓	✓
			Cellulosic cover crops	Miscanthus, switchgrass, reed cannarygrass	✓	✓
	Agricultural residues			Rice straw	✓	✓
				Sugar cane bagasse	✓	✓
				Other (incl. corn stover, cereal residues)	✓	✓
	Forestry residues[iii]				✓	✓
	Wood-processing waste[iv]				✓	✓
	Municipal solid waste[v]				✓	✓
Recycled carbon	Reusable plastic waste				✗	✓
Non-biomass based[i]	Industrial waste gas	CO_2 from point source capture (CCS)			✓	✓
		Other (e.g. flue gas from steel production)			✓	✓
	CO_2 from direct air capture (DAC)				✓	✓

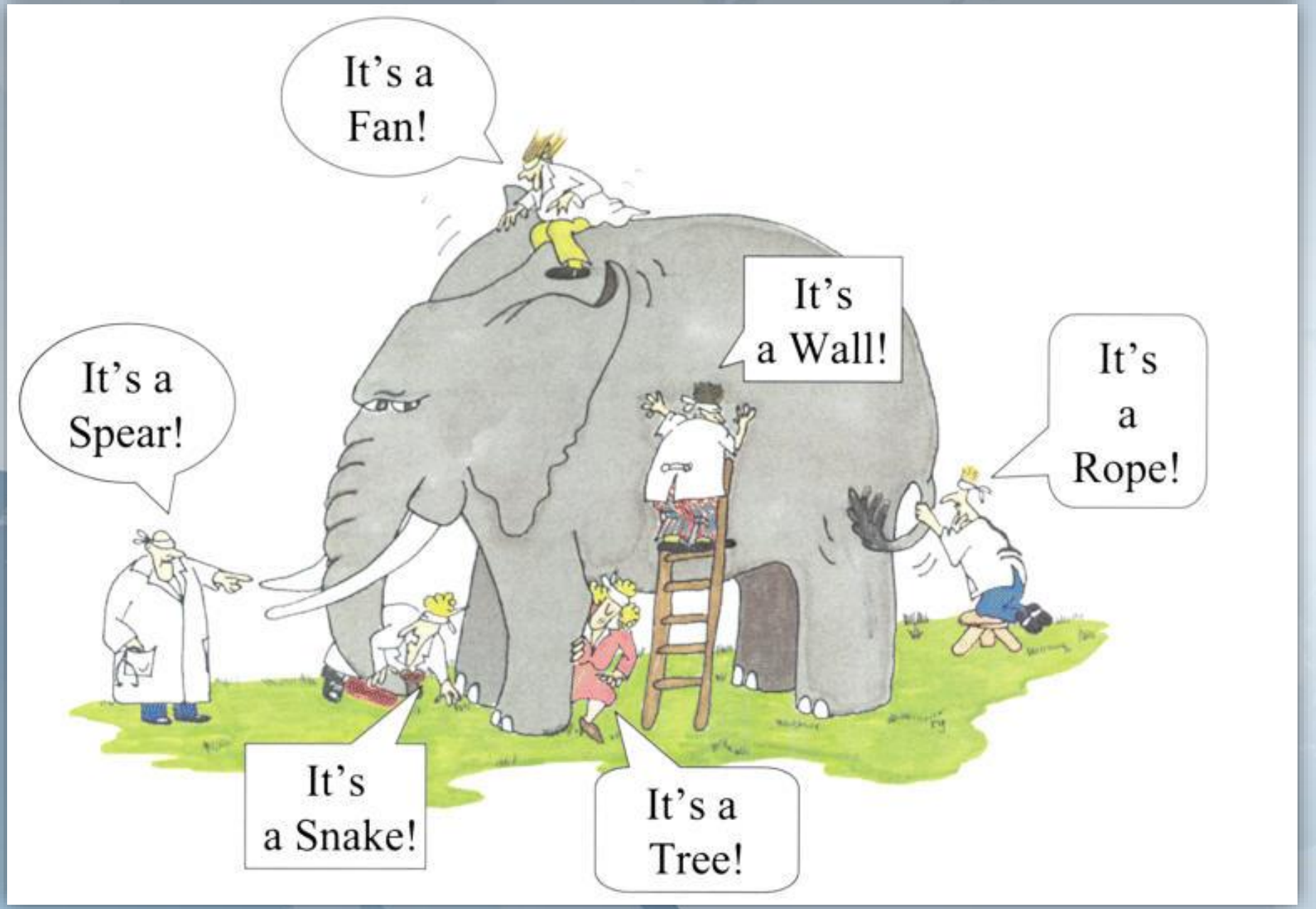
Focus of analysis ✓ Satisfied ✓ Potentially satisfied[ix] ✗ Not satisfied

Source: https://www3.weforum.org/docs/WEF_Clean_Skies_Tomorrow_SAF_Analytics_2020.pdf

Biodiesel



Strong growth tendency worldwide for all biofuels (bioethanol and biodiesel)



Been too focus may blinds you from the bigger picture…

Picture from: http://www.agilebuddha.com/agile/user-stories-lack-of-big-picture-leads-to-blind-man-product/

Biodiesel

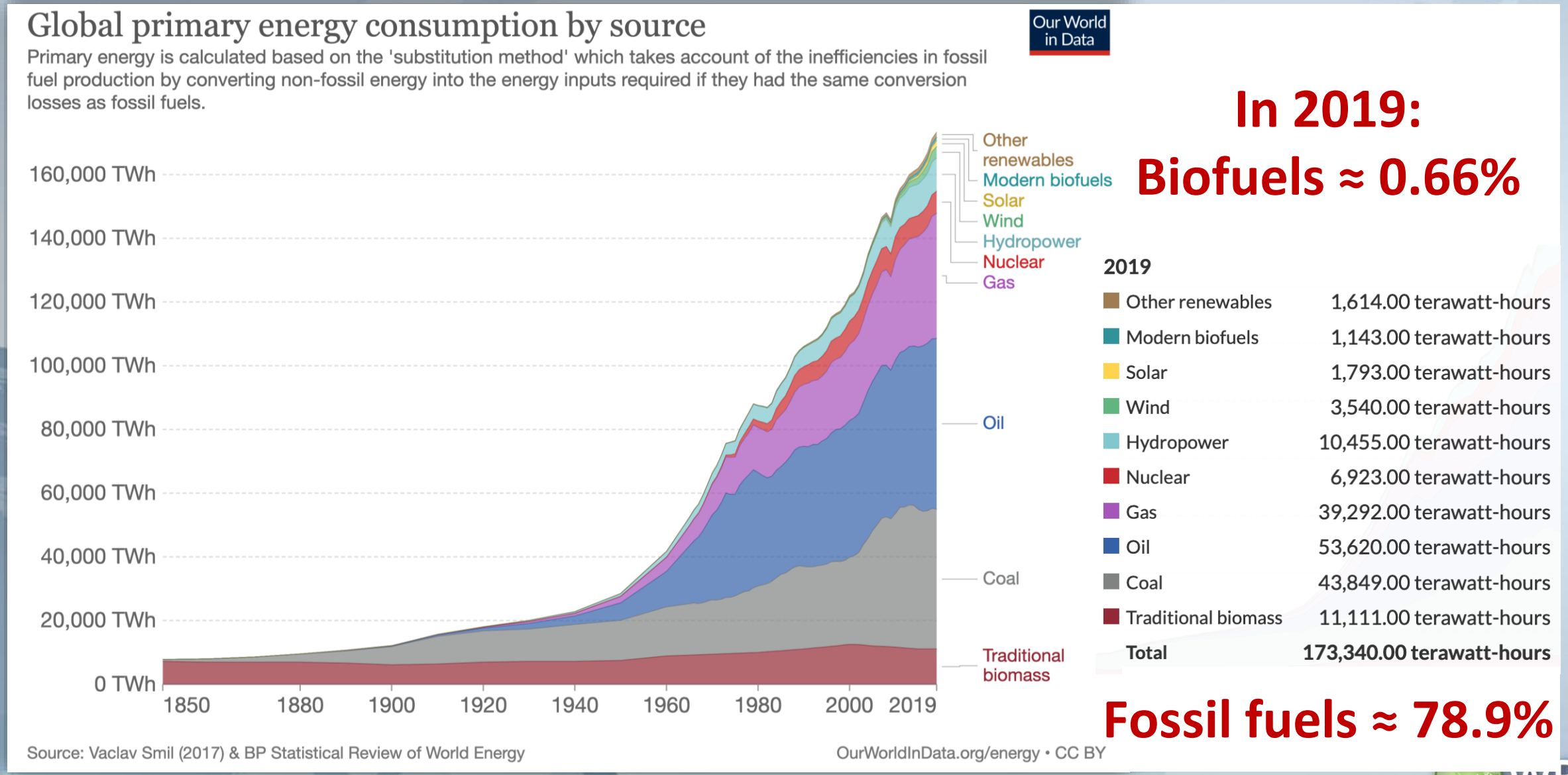
In 2020

- the biodiesel production was (litres)*: 53.000.000.000
- the oil production was (litres)**: 5.650.000.000.000

Biodiesel represented ≈0.94% of the oil production

*: WRO estimative from R. Low, Biofuels and their Feedstock, EFPRA, May 2022
**: EIA, US Energy and Information Administration, https://www.eia.gov/outlooks/steo/report/global_oil.php

Biofuels (Biodiesel + Bioethanol)

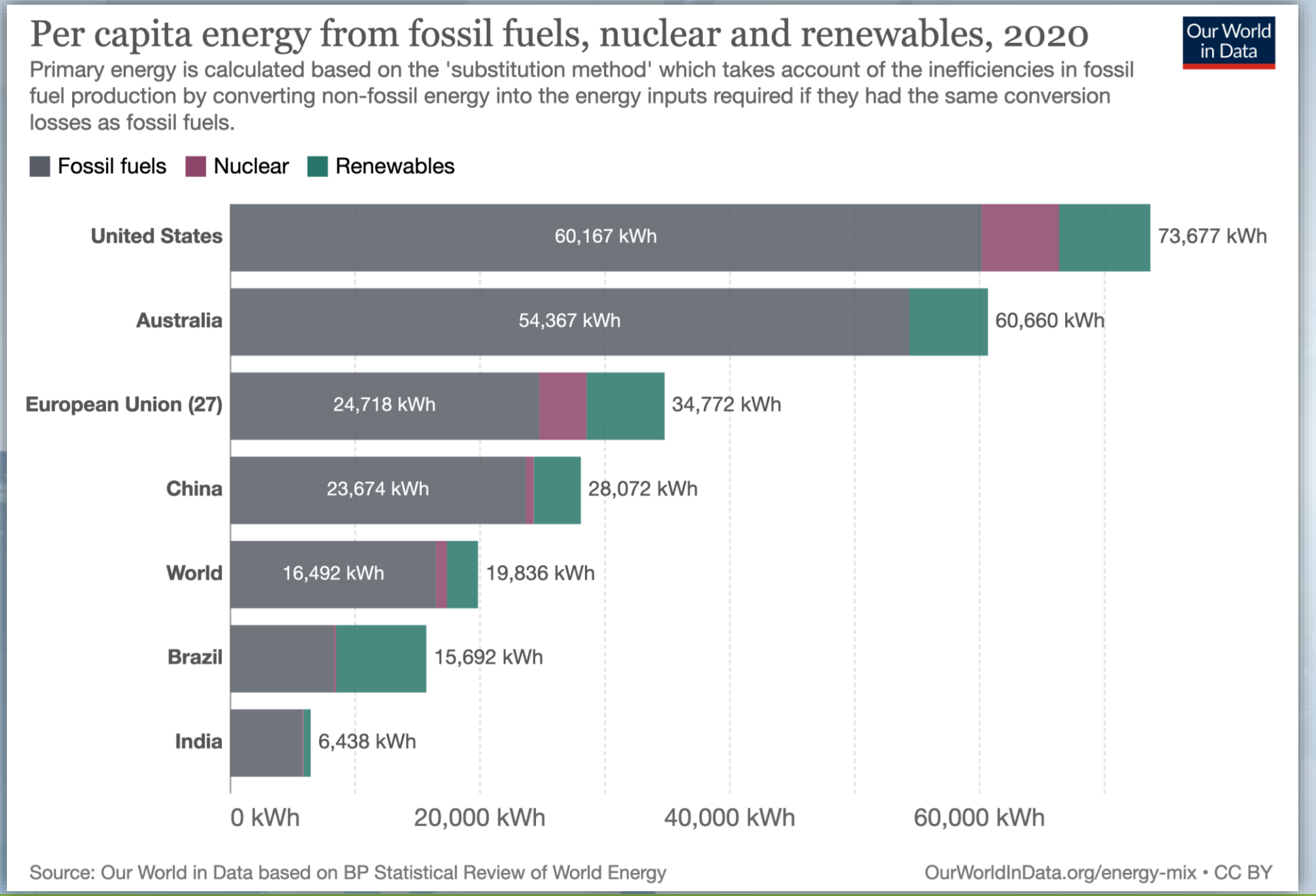


In 2019:

Biofuels ≈ 0.66%

2019	
Other renewables	1,614.00 terawatt-hours
Modern biofuels	1,143.00 terawatt-hours
Solar	1,793.00 terawatt-hours
Wind	3,540.00 terawatt-hours
Hydropower	10,455.00 terawatt-hours
Nuclear	6,923.00 terawatt-hours
Gas	39,292.00 terawatt-hours
Oil	53,620.00 terawatt-hours
Coal	43,849.00 terawatt-hours
Traditional biomass	11,111.00 terawatt-hours
Total	**173,340.00 terawatt-hours**

Fossil fuels ≈ 78.9%



And the burden must be fairly shared

Environmental policies will keeps been the main driver for animal oils and fats availability

No matter how “sustainable” the laws are, animal fats and oils will keeps been one of the “greenest” raw material for feed/biodiesel/SAF…

Fertilizers

Could it became a representative market for the rendered meals?

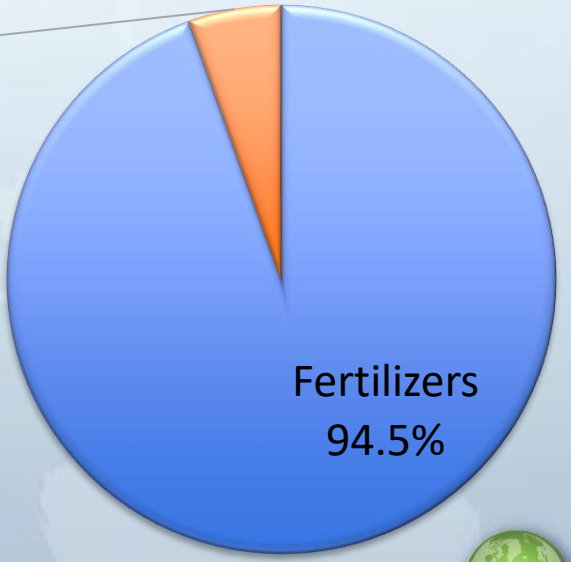
Fertilizers

- “Soil amendment” was the first use for rendered “solids”
- From 1940’s on, rendered products started been used as feed ingredients
- Until EU categorization (BSE), the vast majority of the animal rendered meals was used as feed ingredients
- Since the categorization (2002), EU have been the main supplier of animal meals for fertilizers production

C2-MBM - EU’s Category 2 Meat and Bone Meal
- BSE/SRM free, not approved for human consumption
- Fertilizers, Fur/Zoo animals

C3-PAP - EU’s Category 2 Processed Animal Protein
- Ruminant free, approved for human consumption
- Animal feeding, non-canibalistic

Cat 2-MBM*
218 th. tons



*: Dirk Dobbeloere, Statistical overview of the animal fats and animal by-products in 2021, EFPRA Congress, May 2022

Fertilizers

EU 2019/1009: Mineral fertilisers, Lime, **Organic fertilisers**, Compost and Biostimulants

- 16 July 2022 shall apply
- **Organic fertilising** products must or can be placed on the EU market as “CE” marked fertiliser (free trade)

Fertilizers

EU 2019/1009: Mineral fertilisers, Lime, **Organic fertilisers**, Compost and Biostimulants

- Components allowed to be used as **organic fertilizer**: “CMC 11: By-products within the meaning of Directive 2008/98/EC”
  - **ash of Category 2 and 3 materials**
  - **glycerine of Category 2 and 3 materials**
  - **compost and biogas digestion residues**
  - **category 3 materials other than glycerine**
  - **feathers and down**
  - **horns, horn products, hooves and hoof**
  - **processed animal protein of Category 3**
  - **meat-and-bone meal of Category 2**
  - **blood products of Category 3**
  - **hydrolysed protein**
  - **processed animal manures**

Fertilizers

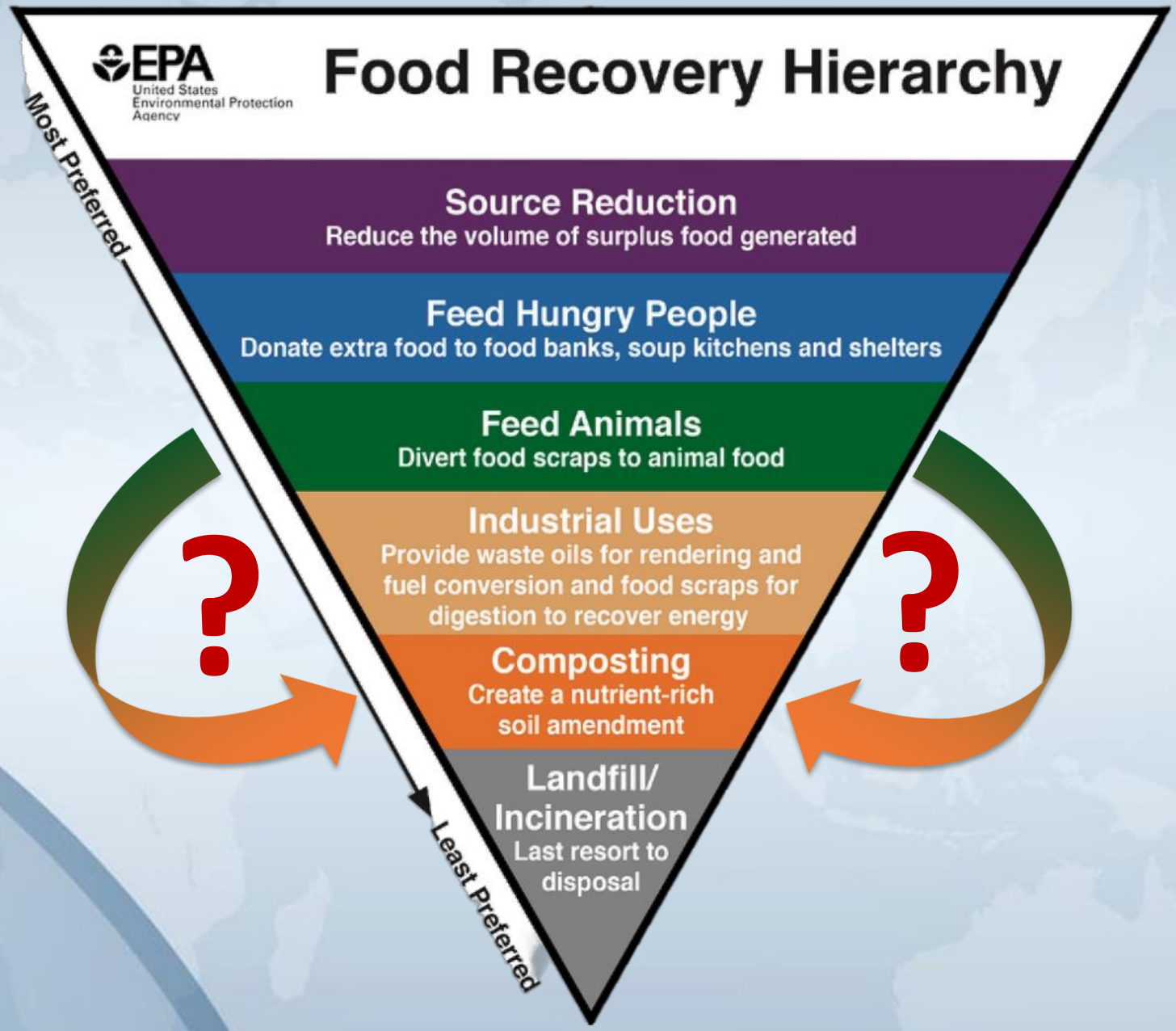
EU 2019/1009: Mineral fertilisers, Lime, **Organic fertilisers**, Compost and Biostimulants

It's been stated that:

- *"C3-PAP and C2-MBM as raw material have the highest concentration of organic nitrogen and phosphorus*
  - *C2-MBM: 9% Nitrogen + 5% Phosphorus (P_2O_5)*
  - *C3-PAP: 6-9% Nitrogen + 10-20% Phosphorus (P_2O_5)*
  - *C3 blood or feather: 13-14% nitrogen"*

"Fertilizer market is the best example of sustainable and circular economy"

Fertilizers



https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy

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Fertilizers

The EU's Farm to Fork and Biodiversity strategies include the target of reaching **25% of agricultural land under organic farming by 2030**

- was 8.5% in 2019 with 14,7 Millions ha
- will be 42.2 Million ha in 2030 (+27.5Mha)

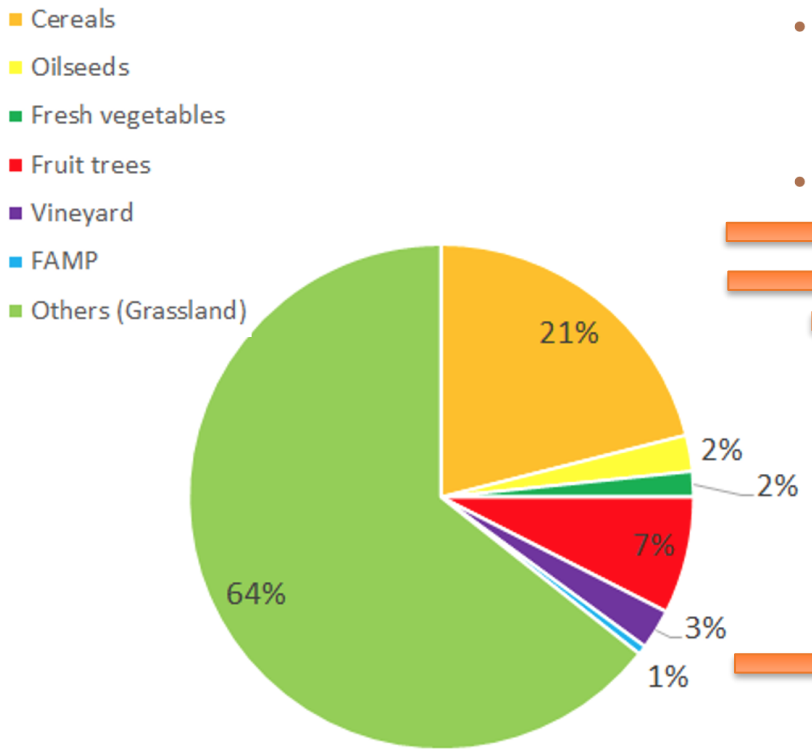
https://food.ec.europa.eu/system/files/2020-05/f2f_action-plan_2020_strategy-info_en.pdf

Fertilizers

EU 2019/1009: Mineral fertilisers, Lime, **Organic fertilisers**, Compost and Biostimulants

Market opportunities and perspectives

Need perspective in 2030 considering organic development



- 14,7 millions of ha in 2019 = 8,1%
  - 36% land covered with fertilizable crops
- Cautious approach of organic developement in 2030:
  - Only 15% of organic farming (27,3 millions ha)
  - 36% = 9 millions ha
    - 20% fertilized with animal by-products fertilizers = 1 800 000 ha
    - Volume needs [mix C2 MBM/C3 PAP*]

(Considering 30 kg/ha N and 10 kg/ha P_2O_5)

= 568 000 T to cover N

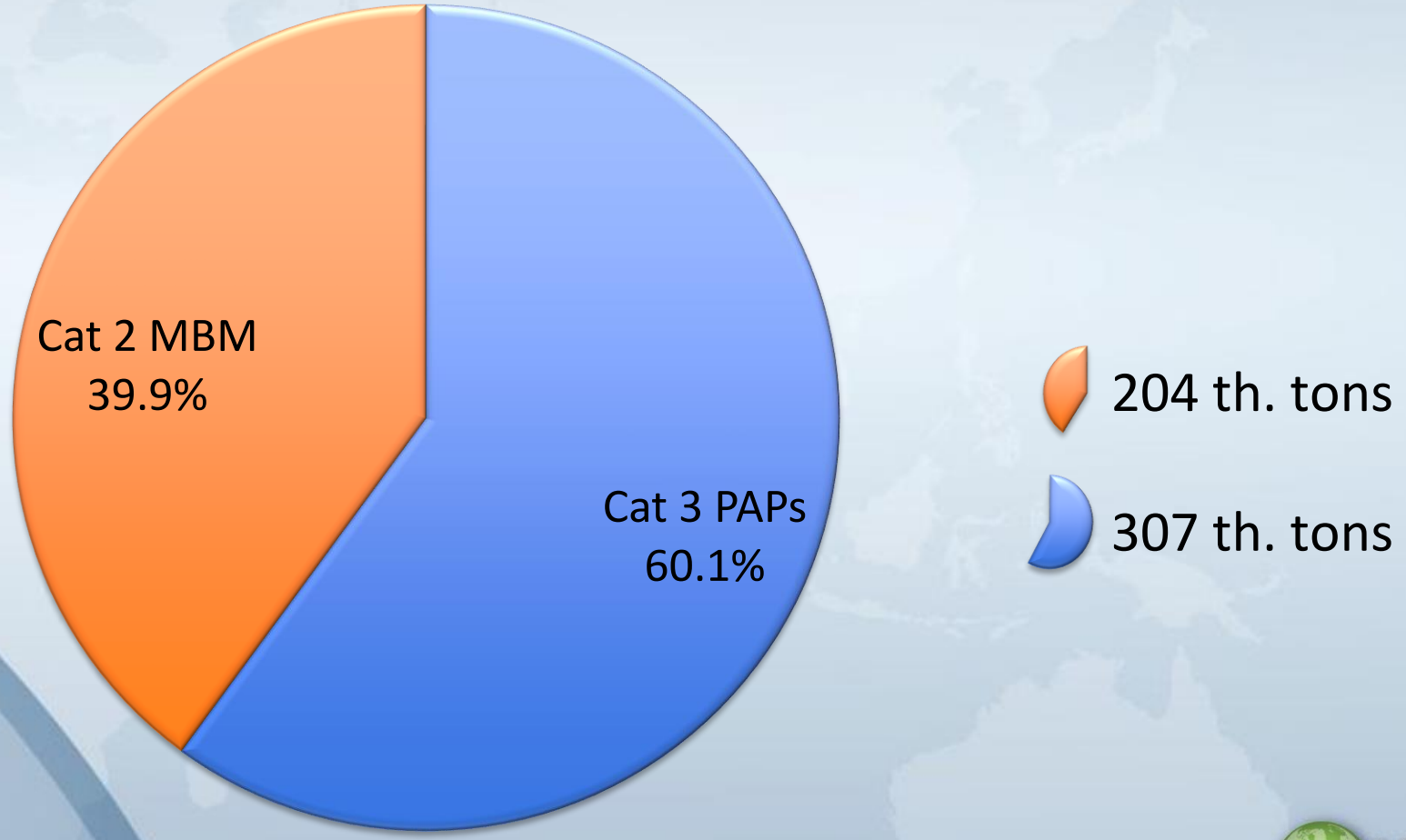
= 257 000 T to cover P_2O_5

*9,5% N -7% P_2O_5 according to EFPRA statistics 2021 Oct 7th

Demand exceeds potential supply !

Fertilizers

In 2021, European Union used 514.000 tones on fertilizers:



*: Dirk Dobbeloere, Statistical overview of the animal fats and animal by-products in 2021, EFPRA Congress, May 2022

Fertilizers

The EU targets regarding “from farm to fork” & the Organic Fertilizers Law have potential to impair the protein meal availability to animal feeding, including Petfood, Worldwide

CONCLUSIONS

What can be expected?

Picture: https://climate.nasa.gov/ask-nasa-climate/147/a-perfect-storm/

Conclusions

The animal raw by-product availability will keeps it's "dependency" to the meat production

Rendered products will remain a nutritionally rich, sustainable and safe

Environmental policies will maintain their remarkable influence over every market

Environmental friendly products will became more and more valuable Worldwide

Thanks!!!

Lucas Cypriano

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