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REG:

Some guiding principles on designing renewable aviation mandates – Highest carbon reduction per feedstock molecule

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Discussion Points

- REG products reduce carbon at scale
- Cumulative carbon impact requires GHG reduction sooner than later
- Smart fuels choices based on cost and GHG reduction
- Guiding principles for aviation mandates

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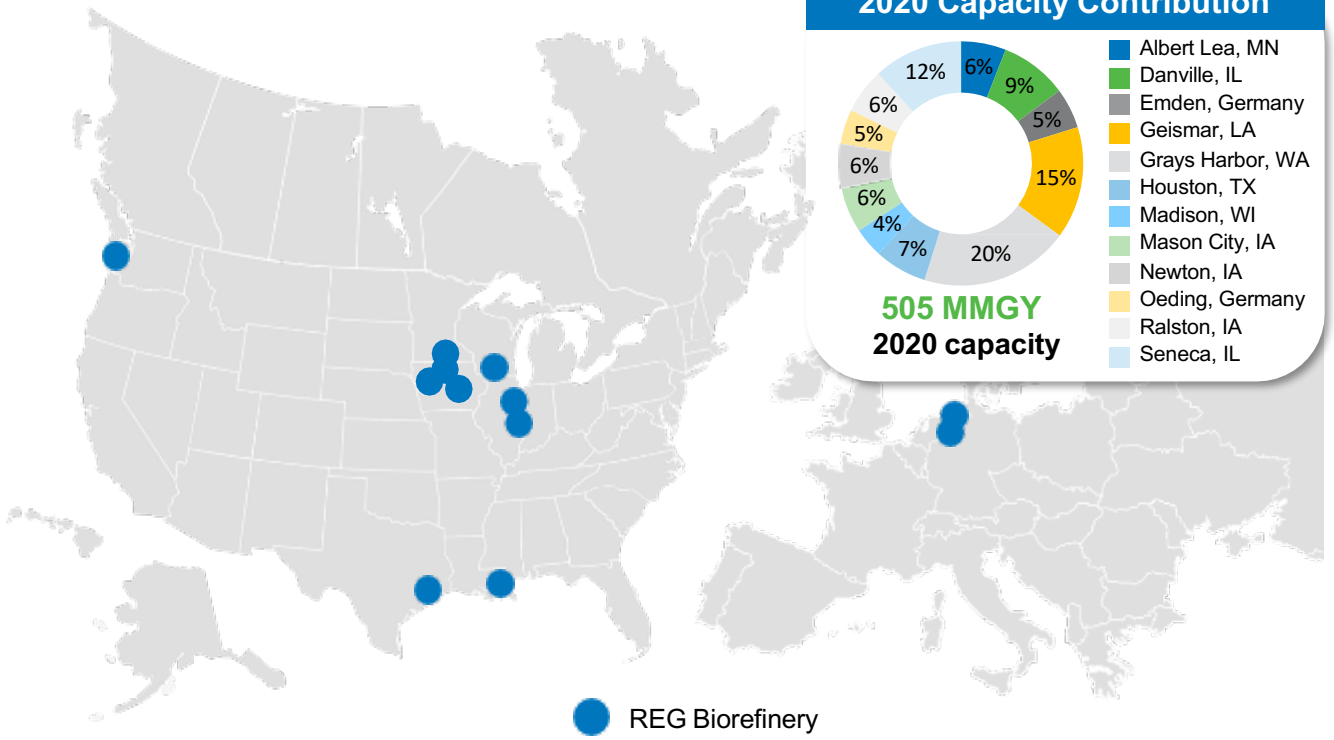
Diversified footprint of biorefineries enables optimization

12 Bio-Based Diesel Plants | **651**[(1)] Million Gallons Sold in 2020 | REG 2020 Sales were made in: **41** U.S. States, **7** Canadian Provinces, **14** Countries

- **Global reach with diversified end-market exposure**
- **Integrated model with optimized feedstock and distribution networks**
- **Flexibility and sales optimization to incentivized markets**
- **Proven access to diversified feedstocks**



2020 Capacity Contribution

505 MMGY
2020 capacity

Source: Company
(1) Includes self-produced and third-party bio-based diesel and petroleum-based diesel.

Reducing carbon at scale

4.2 MILLION METRIC TONS

OF CARBON REDUCTION[1]

FROM 519 MILLION GALLONS OF BIOFUELS PRODUCED IN 2020

EQUIVALENT TO

GHG EMISSIONS FROM
10.4 BILLION MILES
DRIVEN BY AN AVERAGE PASSENGER VEHICLE[2]

CO_2 EMISSIONS FROM
4.6 BILLION POUNDS
OF COAL BURNED[2]

CO_2 SEQUESTERED BY
5.5 MILLION ACRES
OF U.S. FORESTS IN ONE YEAR[2]

CO_2 EMISSION REDUCTION FROM
1.7 MILLION
PASSENGER ELECTRIC VEHICLES ON THE ROAD IN ONE YEAR[3]

(1) Carbon reduction based on life cycle analysis of REG-produced fuels versus petroleum diesel.
(2) epa.gov/energy/greenhouse-gas-equivalencies-calculator
(3) Assuming annual travel of 11,484 miles/year and national grid average electricity versus gasoline using CA-GREET

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The urgency of reducing GHG emissions ASAP

- Scientists warned that there would be more frequent severe weather events and that they would increase in intensity
  - Unfortunately we are seeing that manifest with tragic consequences
- Many environmental scientists consider this decade to be a critical for climate change mitigation
  - Many entities treat “2030” as a target date by which to achieve an annual GHG reduction target
  - Yet in setting these targets, they have frequently failed to appreciate or prioritize the importance of reducing GHG emissions sooner rather than later

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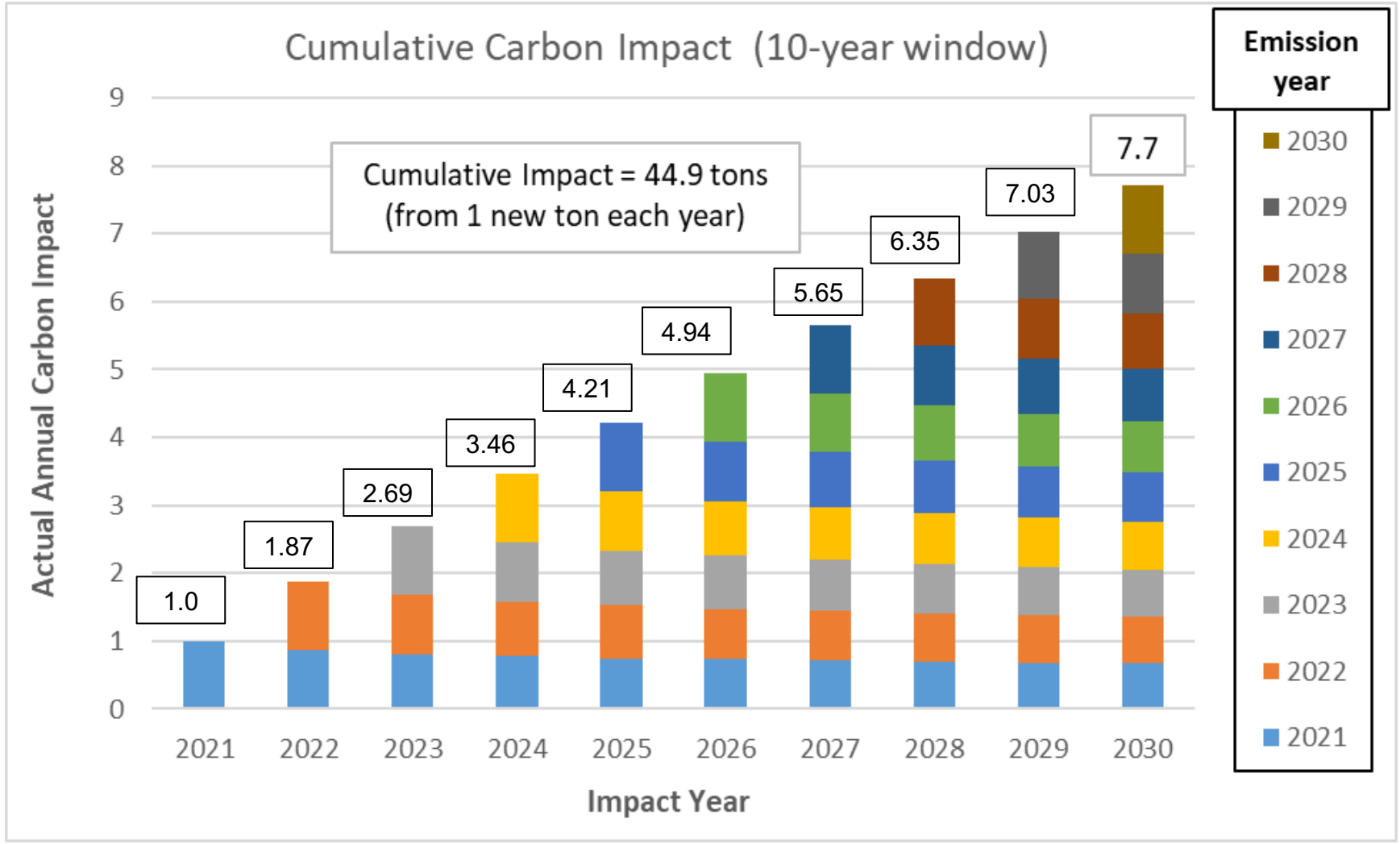
Accounting for Cumulative Carbon Impact is more accurate



TAKEAWAYS

- New carbon impacts the atmosphere each year for many years (new carbon = fossil carbon)
- 7.7 tons of new (fossil) carbon in the atmosphere in 2030 (as CO_2)

* Using the Bern Carbon Cycle model provided in Ch. 10 of the 4th Assessment Report of the IPCC (2007) from Joos et al., 2001.

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Biodiesel and Renewable Diesel (HVO): REG produces both

BIODIESEL and **RENEWABLE DIESEL**
use similar feedstocks (FOGs) to make low-carbon, clean burning fuels

BIODIESEL

- Mild process conditions
- Low capital intensity
- Plants can be small and close to feedstock source and markets
- Mono-alkyl ester - blend limitations in most applications
- High lubricity

RENEWABLE DIESEL

- Severe process conditions
- High capital intensity
- Economies of scale important
- Hydrocarbon - no blend limitations
- High cetane
- Can be cracked and distilled to make sustainable aviation fuel (SAF); SAF blend limit is 50%

REG Ultra Clean®: A biodiesel/renewable diesel blend with specific advantages derived from the positive properties of each fuel.

REDII, annex V: waste **BIODIESEL** reduces more GHG emissions

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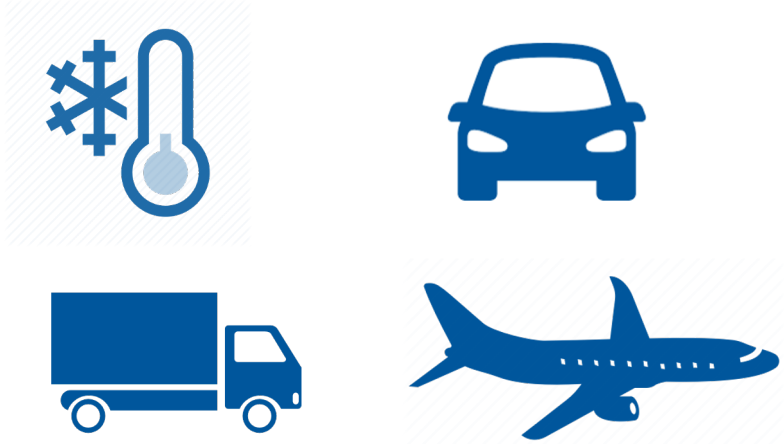
Future fuel choices must be smarter

Economics, market needs and benefits of different solutions could influence biofuel choices and destination of waste feedstocks such as UCO

BIODIESEL

RENEWABLE DIESEL



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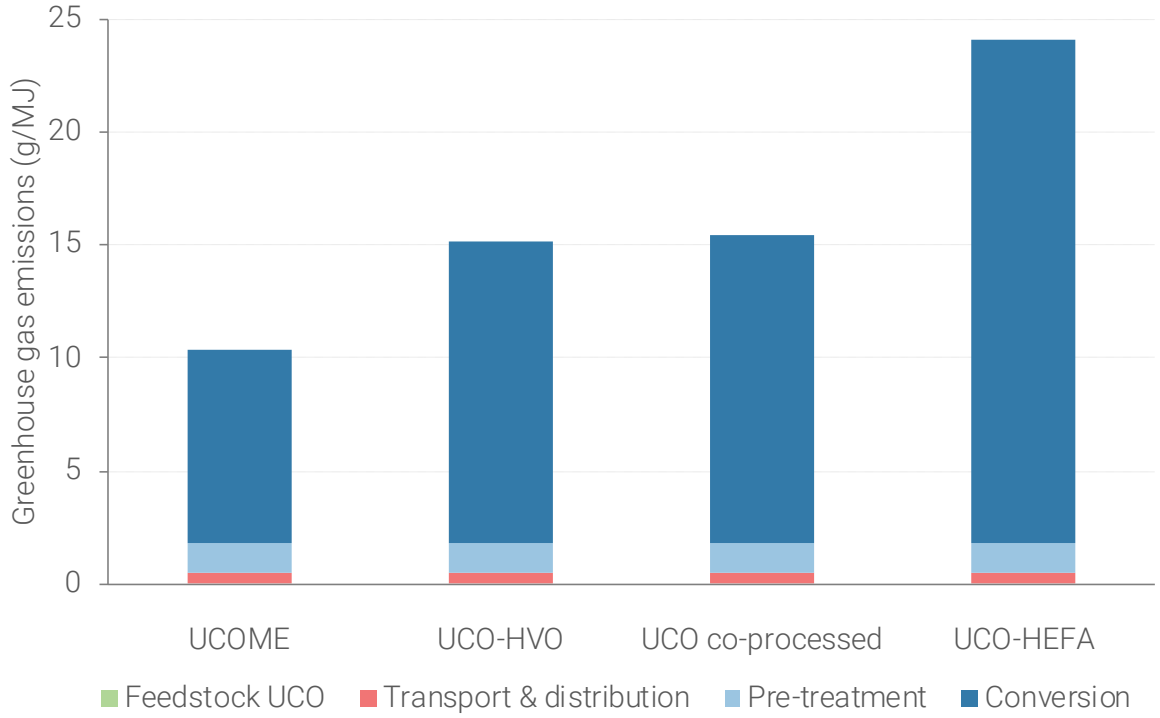
Which UCO pathway delivers the highest environmental benefits? Independent analysis

UCOME achieves highest savings per tonne of feedstock

compared with other UCO pathways



Studio Gear Up (Amsterdam) study, 2021: Results

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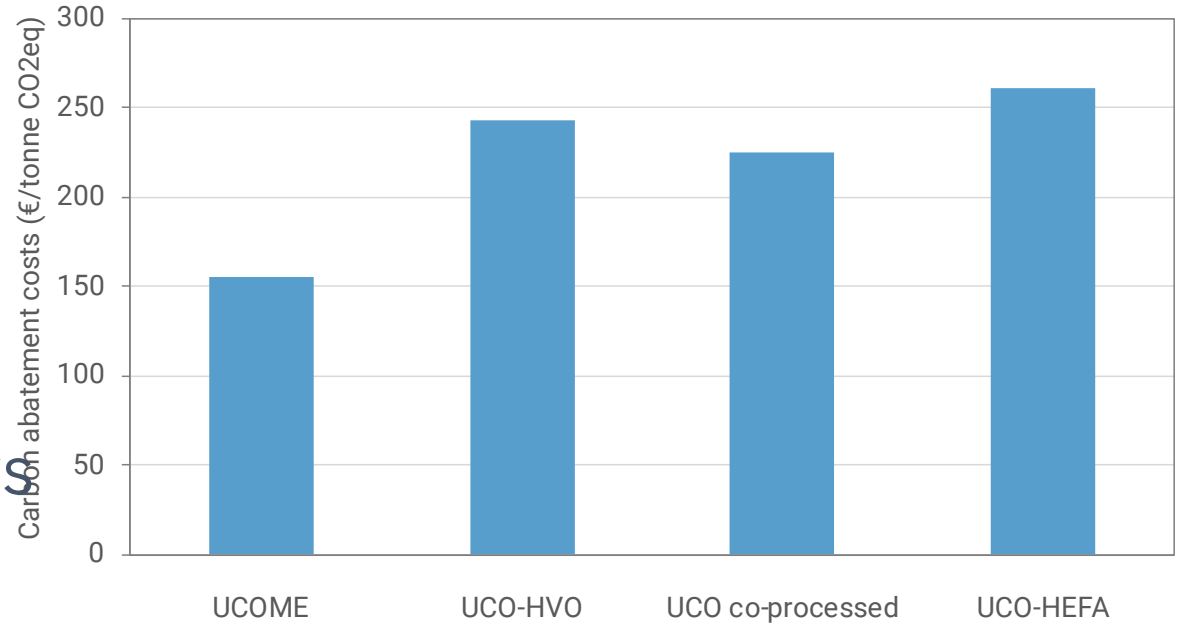
Which UCO pathway requires the lowest carbon abatement costs? Independent analysis

UCOME achieves has lowest cost per tonne of saved CO2 compared with other UCO pathways



Studio Gear Up (Amsterdam) study, 2021: Results

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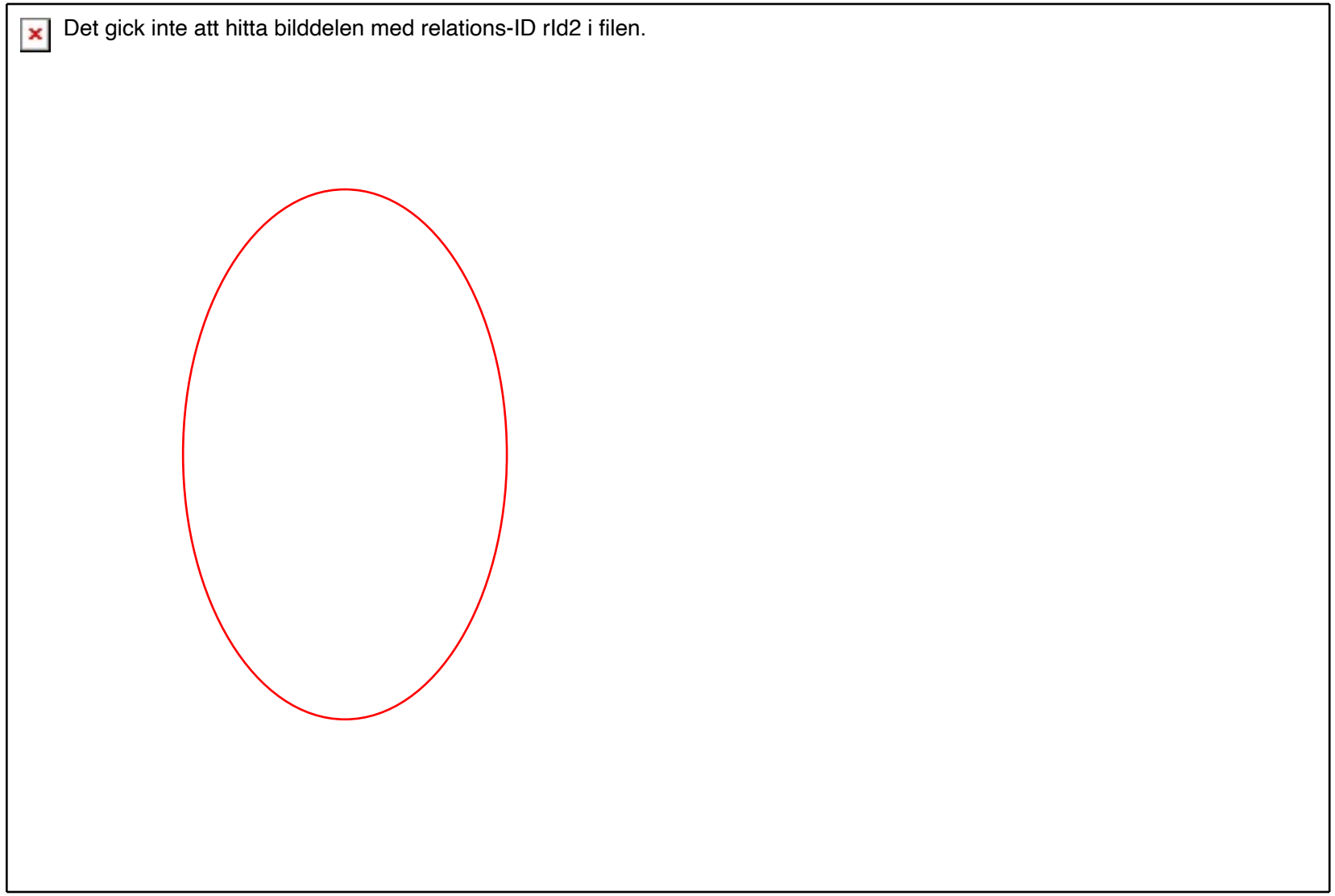
EU SAF mandate will lead to increase in GHGs by millions of tons



Impact on feedstock use according to EWABA, European Waste-based & Advanced Biofuels Association

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Principles for sustainable aviation mandates

- Include SAF in policies which are available for other biofuels and vice-versa

- For example, SAF is eligible for
  - (i) U.S. RFS RIN generation;
  - (ii) U.S. Blenders Tax Credit (BTC);
  - (iii) CA, OR, WA LCFS;
  - (iv) Bio-tickets in the Netherlands under RED

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Principles for renewable aviation mandates

- Policies should be performance-based and should increase overall decarbonization
- As a result of different lifecycle GHG reduction efficiencies (per unit feedstock or per unit energy or per unit overall cost), generic SAF policies that treat all SAF equally should be carefully evaluated and considered
- SAF policies, especially large incentives which apply equally to “all types” of SAF, irrespective of different pathways and benefits, may result in inefficient use of resources

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Principles for renewable aviation mandates

- Incentivize SAF in relation to the benefit provided
- SAF policies should not result in the displacement of other more beneficial biofuels
- Given different technology pathways and different feedstock carbon intensities, an overarching policy/incentive for “all SAF” is questionable

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Thank you.

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