RED3 transposition in Germany

Modelling energy demand in transport for 2026-2030

V1 - December 2025

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About SQUARECO

Based on the Leman Lake shores in Switzerland, SquareCo develops market intelligence solutions designed to help players active in renewable fuels markets to gain a deeper understanding of regulatory frameworks, market dynamics and industry developments.

SquareCo delivers high-quality expertise through the publication of articles, market reports and thematic studies displayed on our Web Platform. Our strong emphasis on data monitoring allows us to supply our clients with access to a comprehensively organized database.

We help energy suppliers to the road, maritime and aviation sectors to navigate serenely the complexity of regulations applying to low carbon fuels markets. Relying on 30 years of experience and an extensive network of contacts at ministries and companies around the world, we keep our clients constantly updated about the current and coming rules.

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Summary

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Abbreviations

BEV Battery Electric Vehicle

DOM Domestic

F Forecast

ERE Emission Reduction Unit

Elec RE Renewable Electricity

EV Electric Vehicle

FEUM Fuel EU Maritime

HEV Hybrid Electric Vehicle

PHEV Plug-in Hybrid Electric Vehicle

INL SHIP Inland Shipping

OPS Onshore Power Supply

RCF Recycled Carbon Fuels

RFNBO Renewable Fuels from Non Biomass Origin

AF C1, C2, C3 Animal Fats category 1, 2, 3

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Objectives of the study

▶ To interpret the draft laws designed to transpose the RED3 Directive (2023/2413) based on SquareCo's expertise

▶ To propose a transparent and credible forecast for the amounts of renewable energy required in the German transport sector from 2026 to 2030.

Two interconnected models

▶ Projecting the **evolution of the various pools** of transport fuels

▶ Resolving the **compliance targets** under the THG quota

The present document compiles the main outcomes of our modelling work in a visual and minimalist way. The methodology and assumptions used in our models are detailed in two separate documents (PDF + XLS).

Primary topics addressed by the study are the following:

- The **evolution of energy pools** included in both the national mandates and the RED3 2030 obligation, including a rigorous forecast of road electrification.
- A thorough analysis of all the elements of drafted **regulations**.
- The **forecasted demand** for low-carbon fuels, split by category (9A, 9B, crop, uncategorized)
- The forecasted contribution of renewable electricity to savings generation
- The forecasted amounts of RFNBOs required to meet the sub-targets
- The **modality and impacts** of compliance flexibility between the three mandates
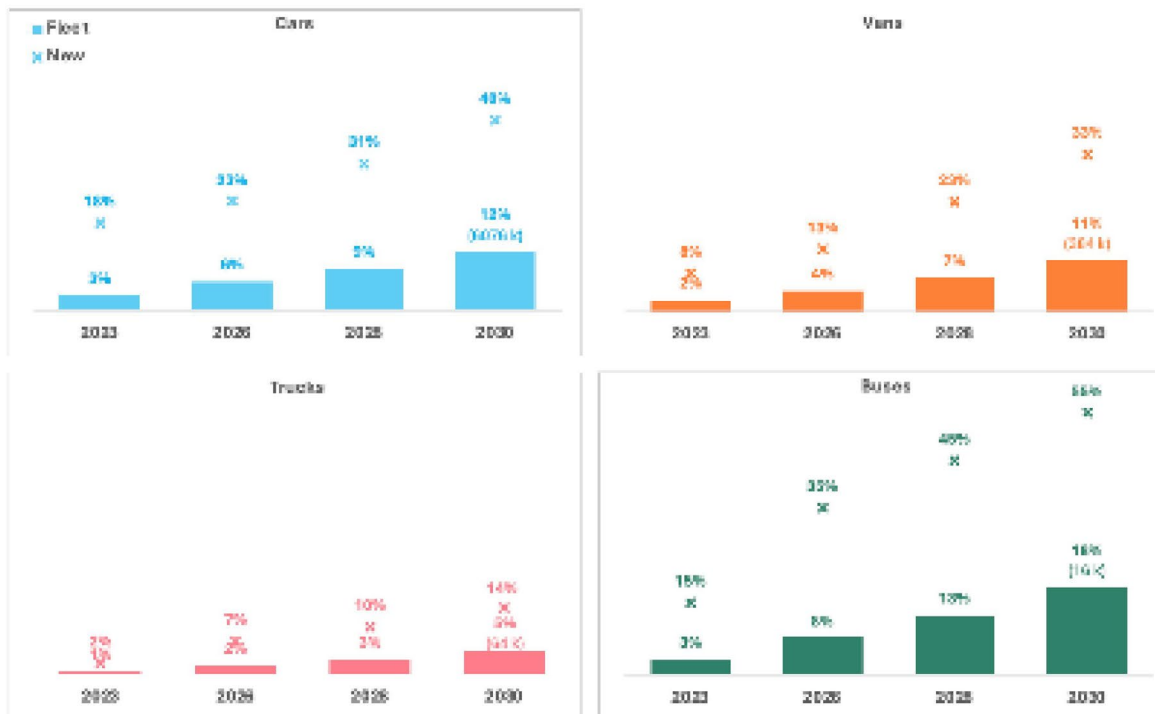
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Road

Fig.1 EV fleets and new sales evolution

German vehicle fleet electrification has regained momentum following the 2024 sales downturn. Our baseline scenario assumes a steady increase in BEV sales across all vehicle categorie.
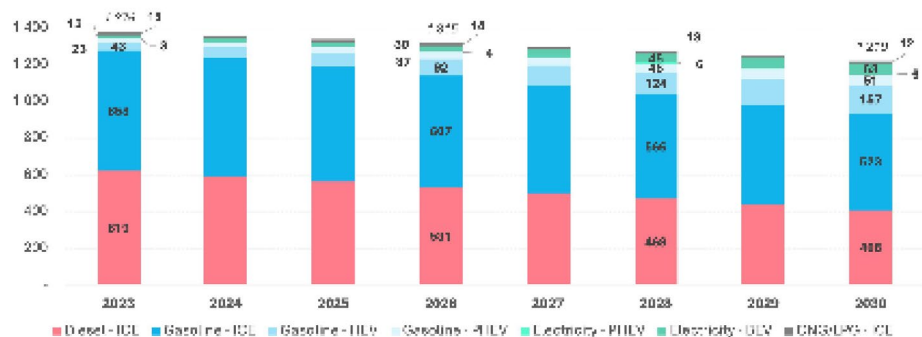
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Fig.2 Car fuel demand by powertrain (PJ)

The electrification of the car fleet, compounded with lower overall vehicles sales since the pandemic, lead to a decreasing primary energy demand from the fleet.
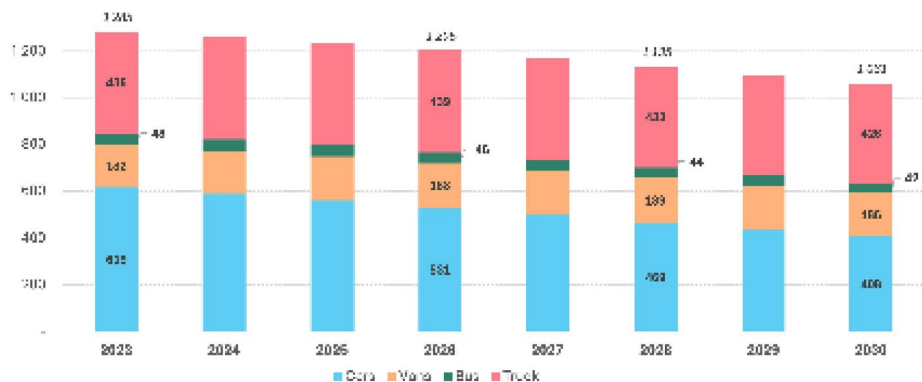
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Fig.3 Road diesel demand per vehicle type (PJ)

International shipping
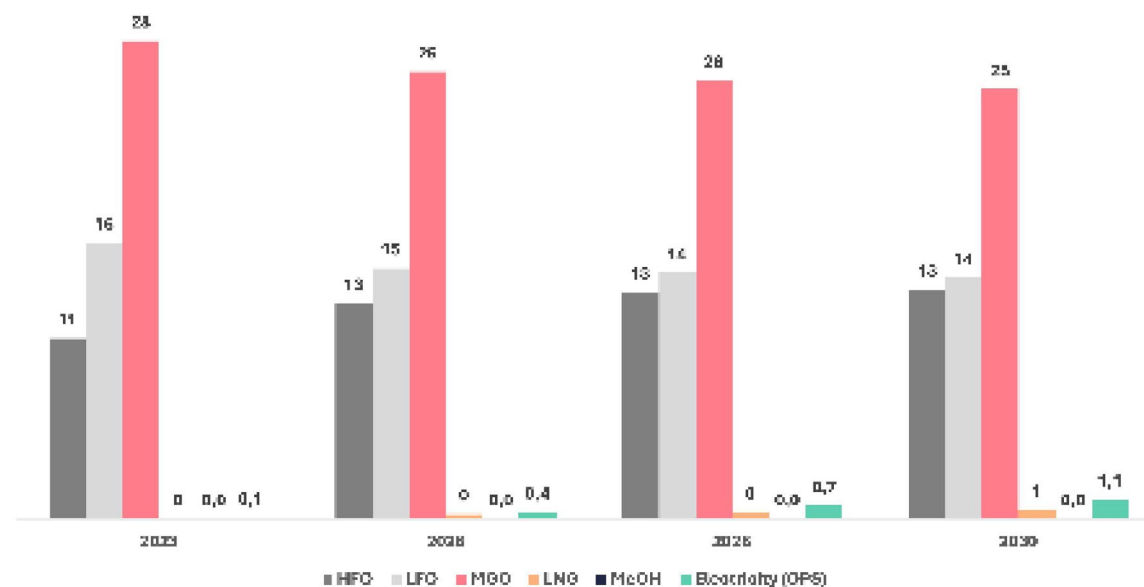
Fig.4 German international shipping bunker fuel demand (PJ)

- Our model results in a stable energy demand from the maritime sector.
- OPS volumes increase throughout the outlook given the regulatory requirements on passenger ships and container vessels.

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Aviation:
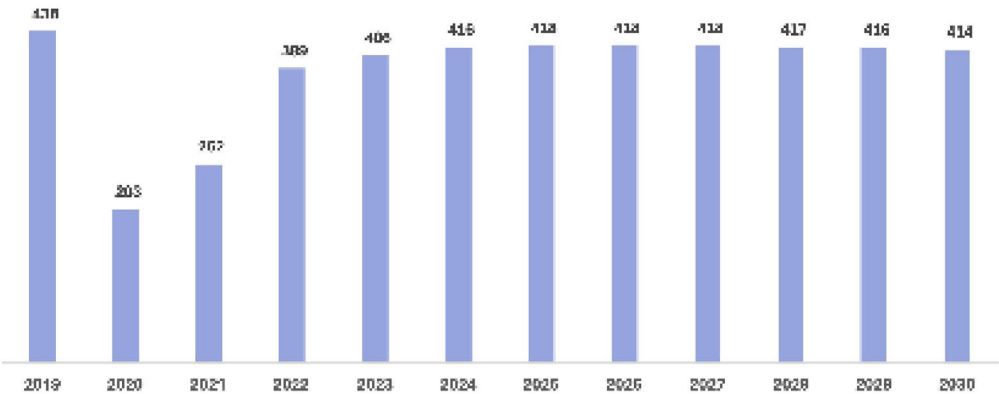
Fig.5 Jet fuel pool 2019-2030 projection (PJ)
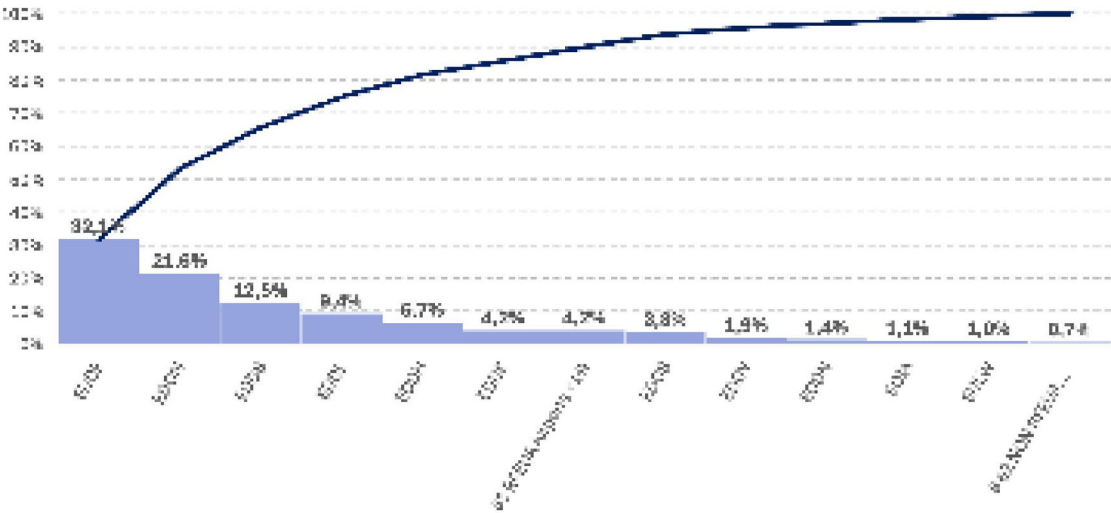
Fig.6 German airports share of fuel pool (estimated)

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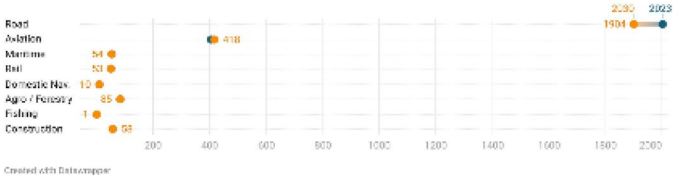
Overview

Fig.7 Sector pool under compliance evolution 2023-2030
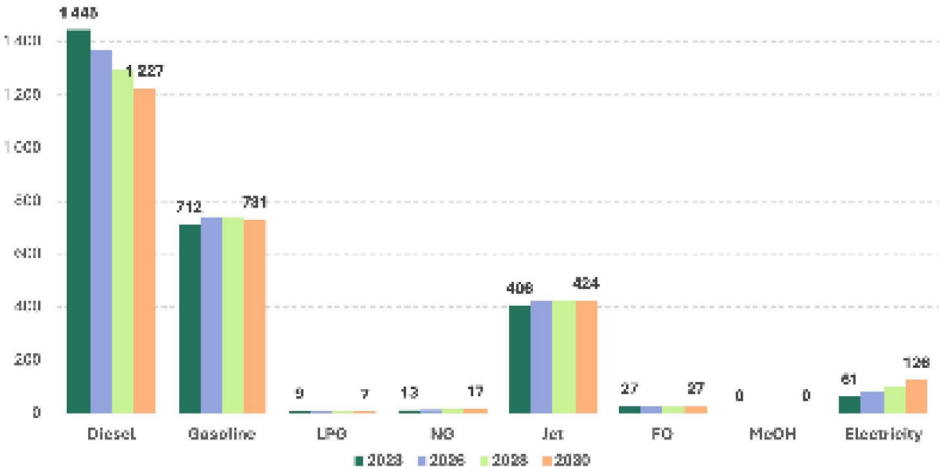
Fig.8 Fuel pools all sectors (PJ)

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The drafted rules are based on the same model of the GHG reduction obligation enforced since 2015, applied to all taxed gasoline, diesel and their substitutes (i.e B100, HVO100) supplied to road and non-road (i.e agriculture, construction, rail) outlets.

Fuels used by the German armed forces and the Petroleum Stockholding Association will remain exempted. From 2026, fuels used by the state police forces, the Federal Police, the Customs Service, the Federal Agency for Technical Relief, the Federal Criminal Police Office, the fire brigades, and the units and facilities of civil protection and disaster relief will also be exempted.

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THG quota

- Electricity accountable, FAME coverage of the blend wall, B100, HVO100, ethanol coverage of the blend wall and biomethane are set per our assumptions (see XLS).
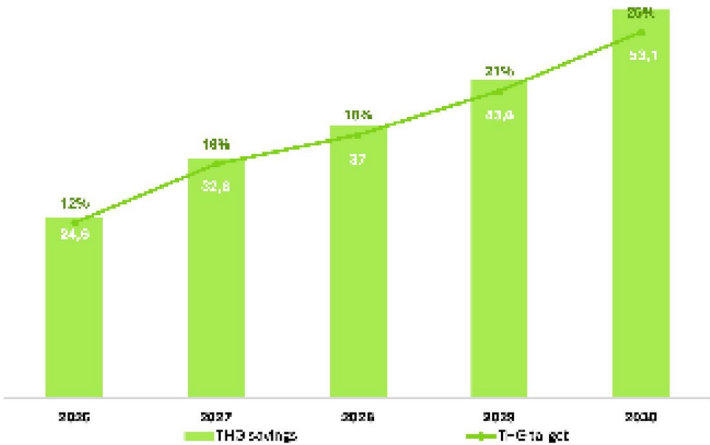
Fig.9 Targets trajectory and required savings (% GHG)

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				2026	2027	2028	2029	2030
Targets	Overall	min	% GHG	12%	16%	19%	21%	26%
	QA	min	% o.o	2%	8%	5%	8%	26%
	RFNBO	min	% o.o	0.1%	0.1%	0.5%	0.8%	1.2%
Caps	Crop	max	% a.r.	4.6%	4.6%	4.4%	4.6%	4.6%
	SB	max	% a.r.	1.9%	1.9%	1.9%	1.9%	1.9%
Reference	Energy	[T]Phy	TJ	2114022	2082000	2007000	2023771	2044002
Reference	Emissions	[T]TC	tCO2	205150044	204002700	207000050	207070100	212520202
Required	Savings	min [T]	tCO2	24010700	32740041	37024050	40012002	55100070
Surplus	Savings	2024+2027(H)	tCO2	0	6002000	0	0	0
Required	SA	min [T]	TJ	42200	62704	55050	01010	71547
	RFNBO	min [T]	TJ	2115	2000	10050	10200	24500
Capped savings	Crop	max [T]	TJ	95045	92004	91415	97000	95045
	SB	max [T]	TJ	40170	37700	55475	47022	35000

Tab.1 Targets and required savings for the THG quota

Savings required

Since the THG quota will finally not include multiple sectors, we stick to one base scenario.
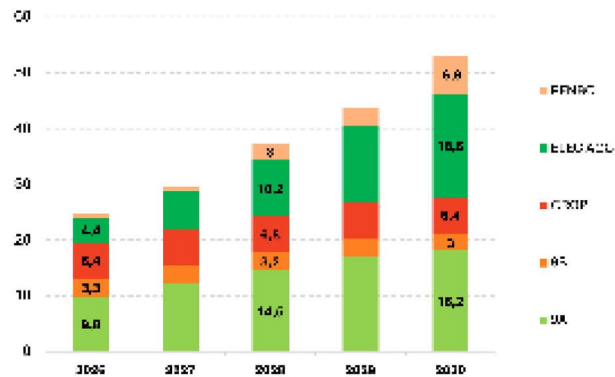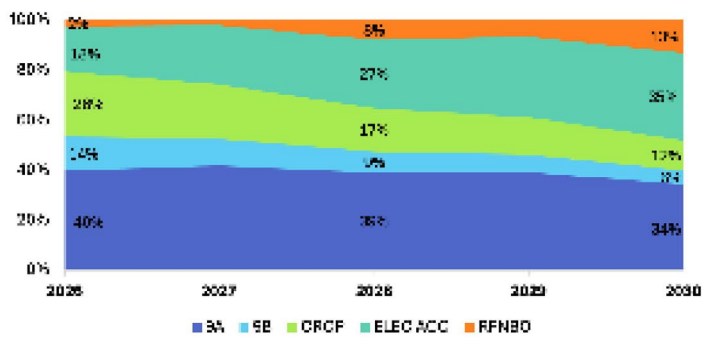

Fig.10 Projected savings per category (t CO2)

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Fig.11 Shares of savings per category (%)
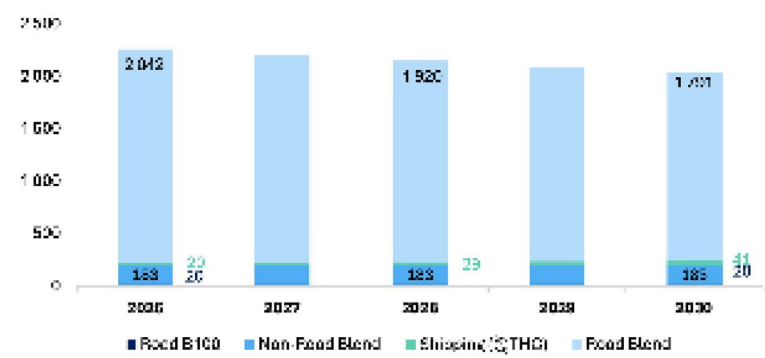
Products demand - FAME
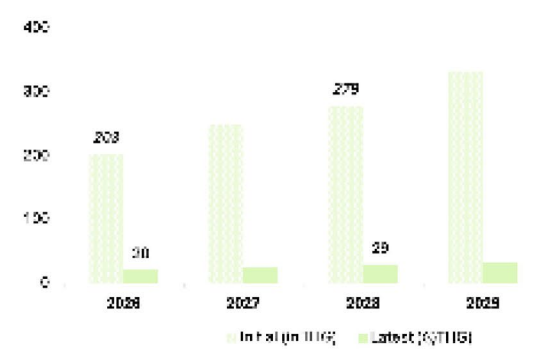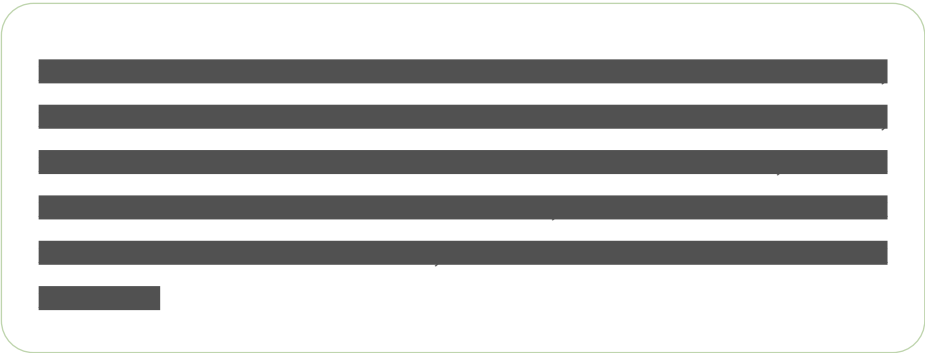

Fig.12 Fame demand forecasted per outlet (kt)

Fig.13 FAME demand in shipping according to initial vs latest drafts (kt)
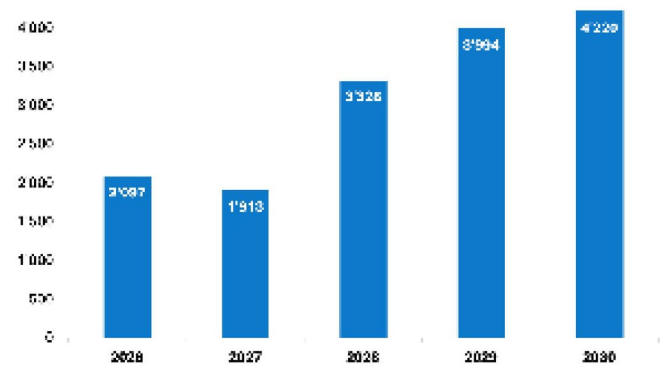
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Products demand - HVO
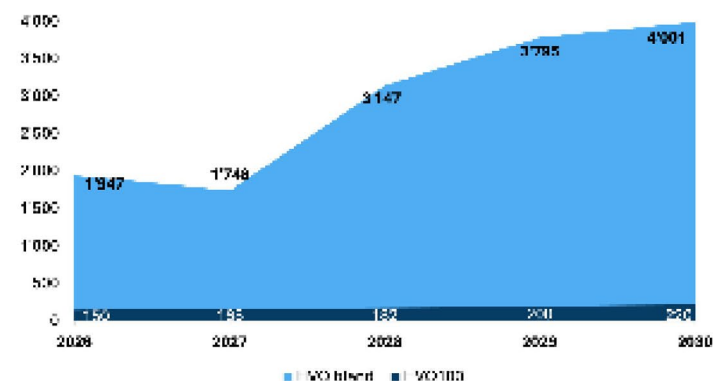

Fig.14 Total HVO demand forecasted under the THG quota (kt)

Fig.15 HVO demand forecasted under the THG quota, per outlet (kt)

Forecasting the evolution of the HVO100 outlet is challenging. At this stage, we choose to remain on the conservative side of the spectrum, working with a 10% yearly growth rate making the outlet hit 220 kt by 2030.

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Products demand - FAME/HVO
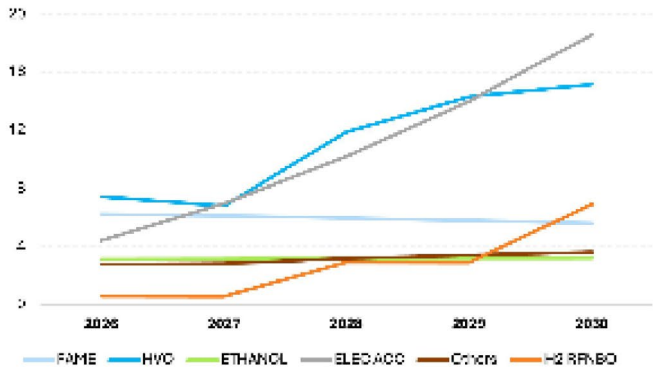
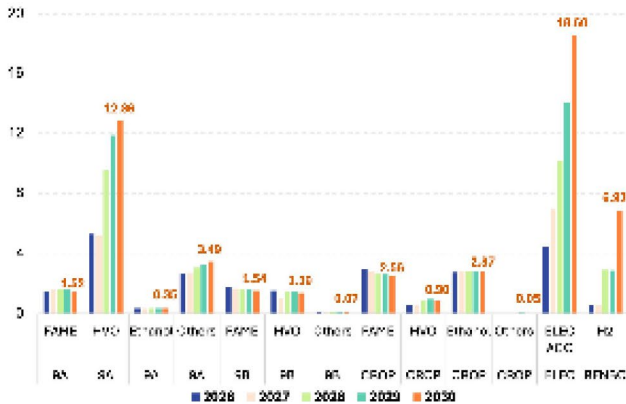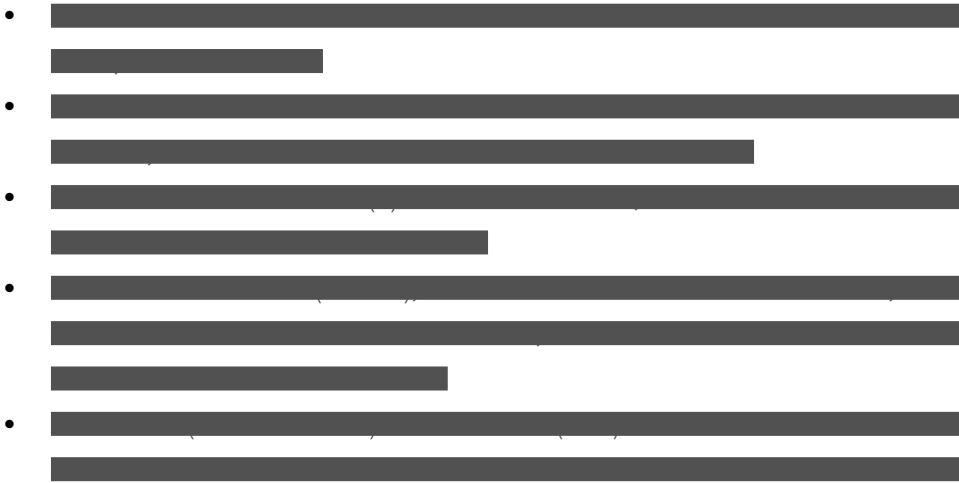Fig.16 Savings generated per product under THG quota compliance (t CO2)

Fig.17 Savings generated per product and category under THG compliance (t CO2)
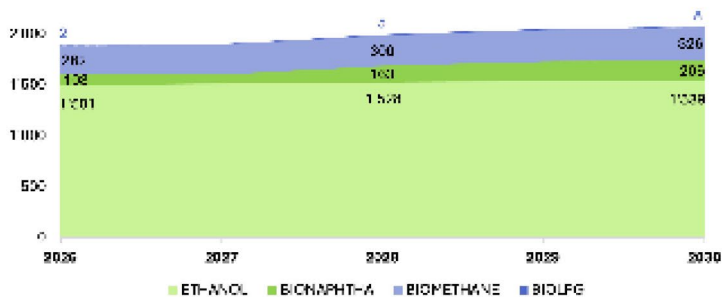
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Products demand - Ethanol & others

Fig.18 Other biofuels demand forecast under THG quota (kt)

Fig.19 Savings contribution of other biofuels (% of the total)

The bionaphtha outlet, which we assumed will be correlated to 5% of the HVO consumption, would progress from 103 kt in 2026 to 206 kt in 2030. Without any additional incentive, bioLPG should remain very small.
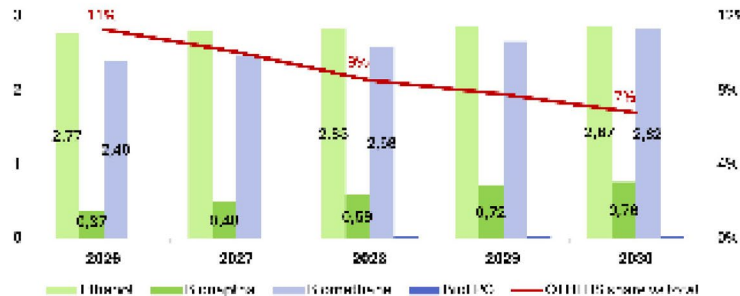
Thanks to its ultra low- GHG CI, biomethane should generate by 2030 more savings than ethanol. Bionaphtha's contribution will be in line with HVO expansion (see sensitivity in section 6).

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Products demand - Electricity RE

The German electric mix is underway a massive transition, with the share of renewable increasing quickly despite the remaining heavy use of coal and natural gas to fil the gap left by the nuclear exit. In the latest version of the National Energy and Climate Plan (NECP), the BKMW revised steeply down the projected figure for the 2030 grid carbon intensity (CI) compared to the previous version.
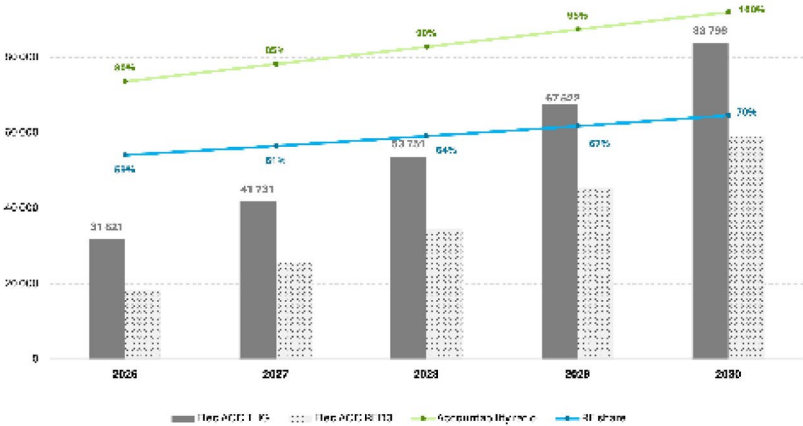
Fig.20 Accountable electricity under THG quota and RED3 (TJ)

In our model, all electricity supplied to the German road sector in 2030 will be accountable (ACC) under the THG quota (23.3 TWh). Only the renewable share of it (70%) will be accountable under RED3, implying a lower amount (16.3 TWh) eligible for reporting to the EC, with different calculation rules (no multiplier, and FFC at 183 gCO2e/MJ).
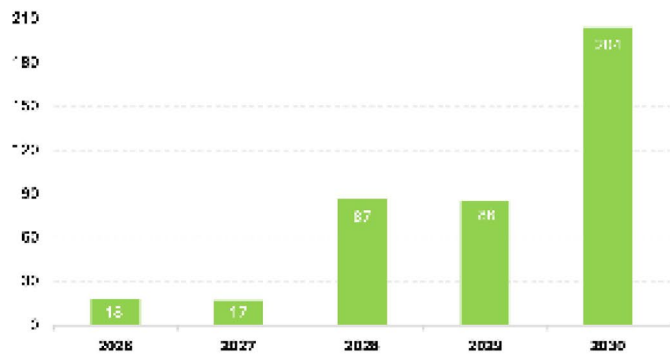
Products demand - Green H2

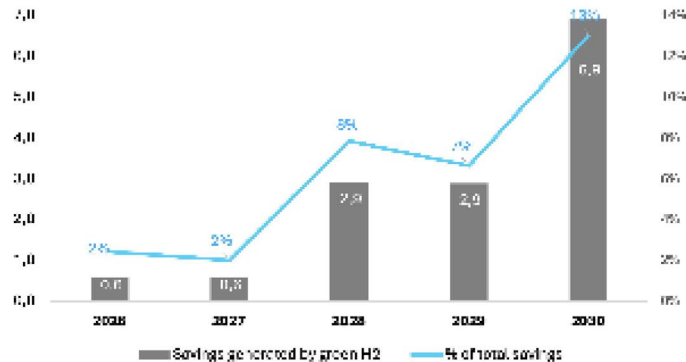Fig.21 Green H2 required to meet the THG quota sub-target (kt)

Fig.22 Savings generated by green H2 at refineries (t CO2) & share in total savings (%GHG)

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RED3 compliance

The fulfilment of the national mandates does not exactly match the German compliance under the RED3 targets, for the following reasons:

- Diesel, gasoline and fuel oil supplied to the non-road sector (i.e construction, agriculture, etc) are obliged under national mandates but not falling under RED3 compliance.

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	INCLUDED IN THG QUOTA	EXCLUDED FROM NATIONAL SCHEME	
ROAD	Diesel + Gasoline fossil FAME, HVO, Ethanol, Bionaptha BioLPG, Biomethane All Elec 1 877 842	LPG + NG fossil 6 639	
REFINERY	Green H2 24 530		R E D 3 → 2 454 401 TJ
RAIL	Diesel fossil FAME, HVO 12 434	All Elec 41 404	
SHIPPING		All fossil, renewable, elec 77 392	
AVIATION		Jet fuels fossil SAF HEFA 414 160	
NON-ROAD	Diesel + fuel oil fossil FAME, HVO 94 046		
TOTAL (TJ)	2 008 852	539 595	

Fig.23 Comparison of THG quota and RED3 scopes (TJ)

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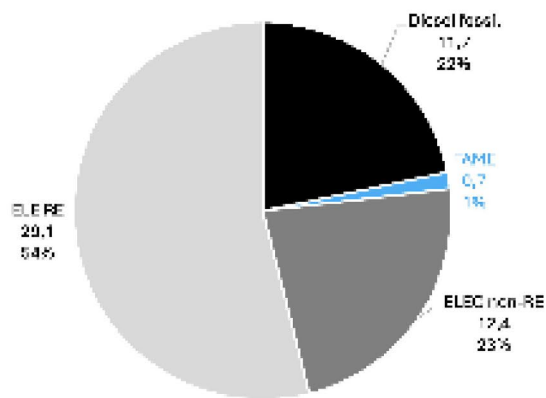
Rail, shipping & aviation

Fig.24 Rail energy consumption in 2030 (PJ)
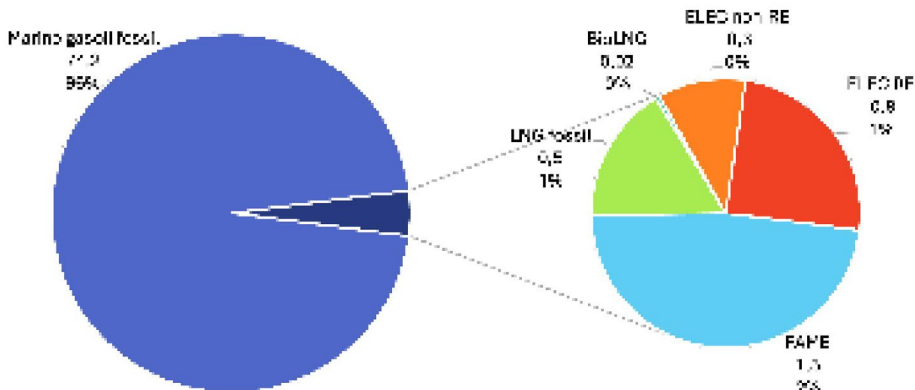
Fig.25 Shipping energy consumption in 2030 (PJ)
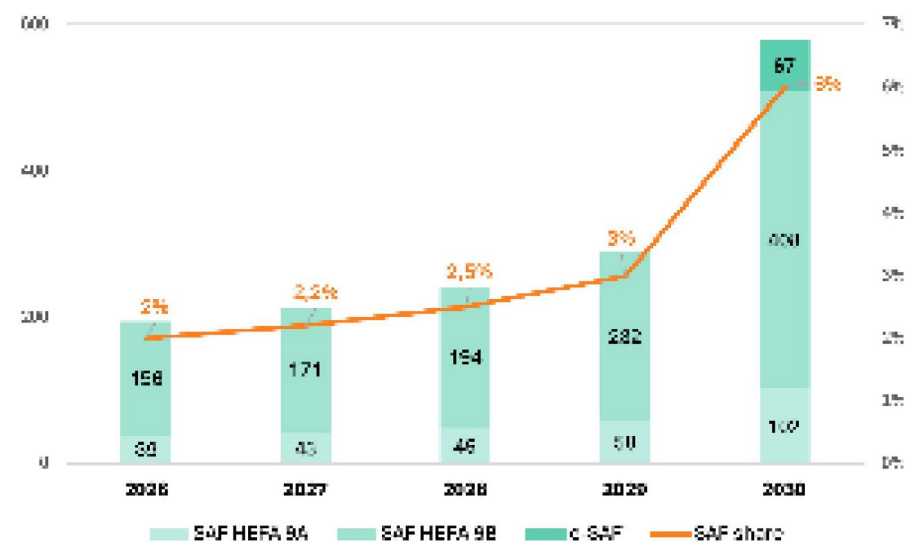
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Aviation

Fig.26 SAF requirements in 2060-2030 (kt)

- Our energy modelling suggests the jet fuel pool will remain stable during the 2026-2030 period, close to 9.6 Mt.
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Our simulation of the German RED3 compliance puts the total GHG reduction in transport at 20.8%. There is no excess energy in maritime to be considered, contrary to the Dutch compliance.

Fig.28 Surplus and Deficits generated in 2030 under RED3 rules (t CO2)

Fig.27 Projected compliance under RED3 GHG target (% GHG)

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We ran a sensitivity analysis to test how shifts in electrification, fuel performance, activity, and other key variables could reshape low-carbon fuel demand. All results are shown relative to the baseline case explored in the previous sections of this study.

Road electrification pace

The ELEC scenario assumes a faster roll-out of electric vehicles, reducing liquid fuel demand. The RENF scenario reflects a plateau in electrification, increasing the need for low-carbon fuels to meet mandates.
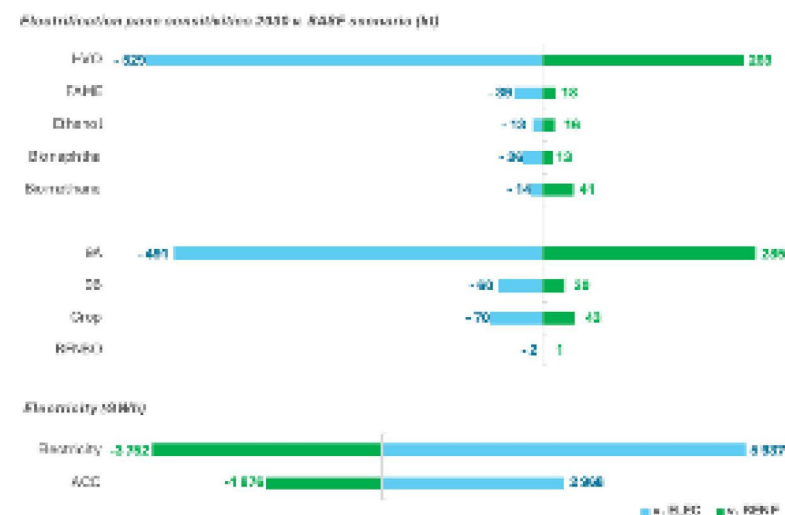
Fig.29 Electrification pace sensitivities 2030 vs BASE scenario (kt)

Low-carbon fuel CI

We modelled a ±3 gCO2e/MJ variation in the average carbon intensity of ethanol, FAME and HVO to assess its impact on compliance and overall emissions.
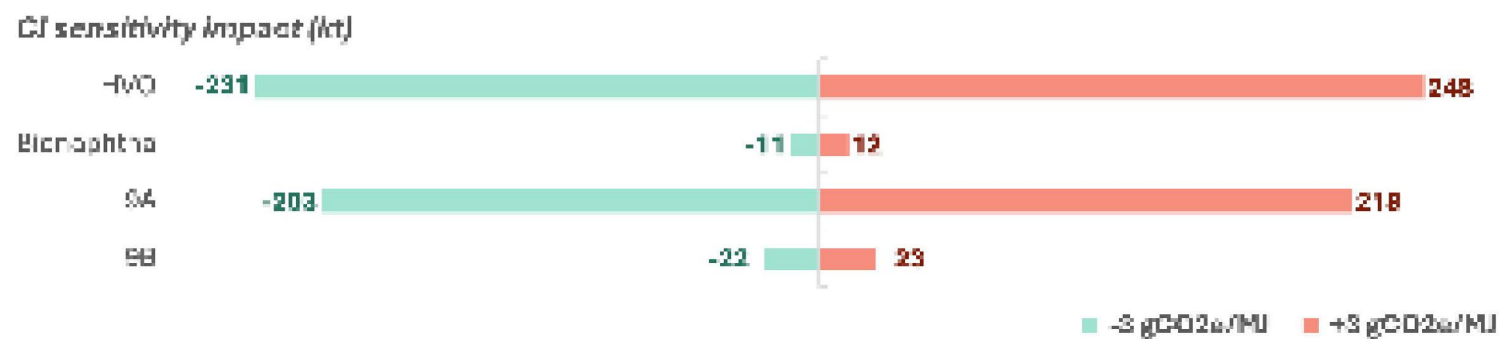
Fig.30 CI sensitivity impact (kt)
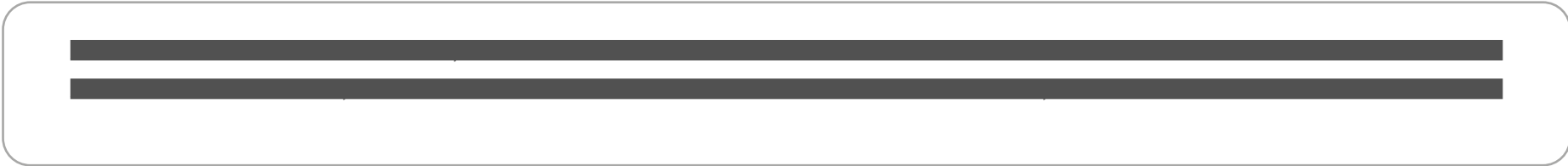
Low-carbon electricity:
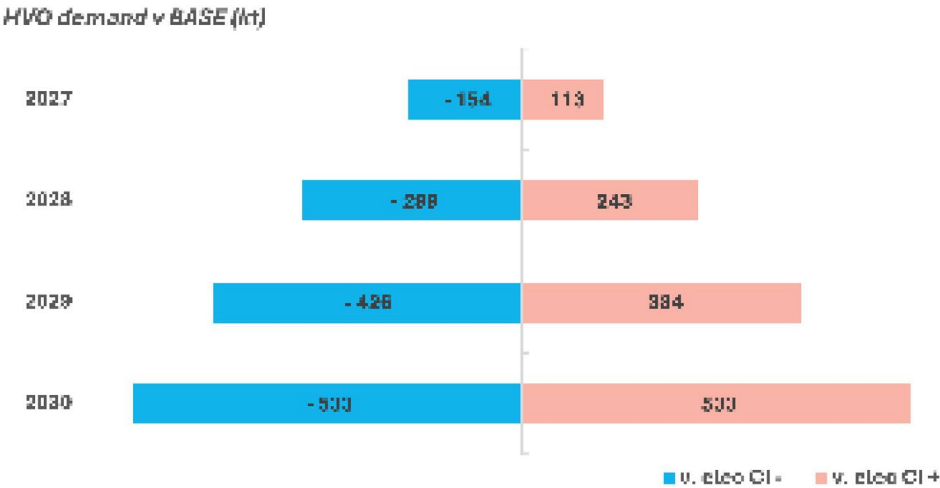
Fig.31 HVO demand vs BASE with low and high elec accountability rates (kt)

Aviation sector activity:
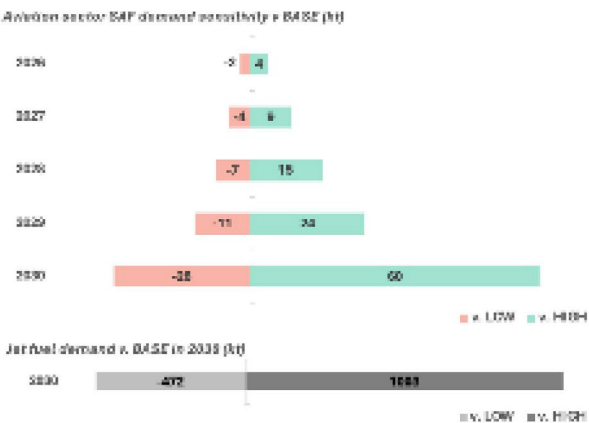
Fig.32 Aviation sector SAF demand sensitivity v BASE (kt)
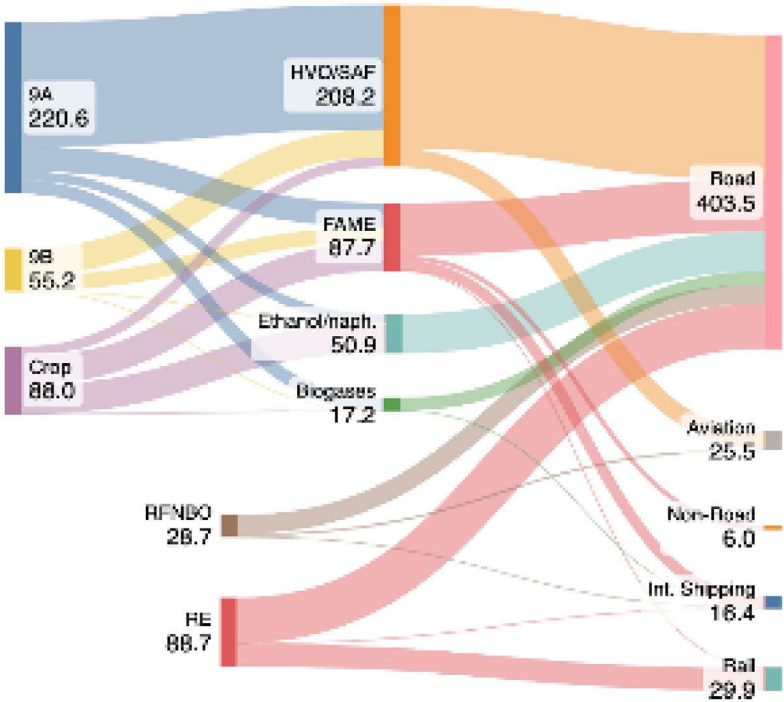
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Fig.33 Feedstocks, products, sectors compliance in 2030 (PJ)

Contact us

Square Commodities SARL
admin@squarecommodities.com

Editor in Chief
Olivier Pellegrinelli
olivier@squarecommodities.com
Tel: +41 79 676 88 87

Visit us on
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