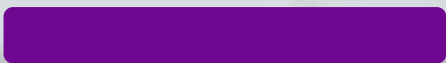




Securing the supply chain: The 2026 animal feed and pet food playbook



March 2026

Chloe Krimmel, Veronika Prykhodko, Sarah Schneider

US meat and bone meal trends

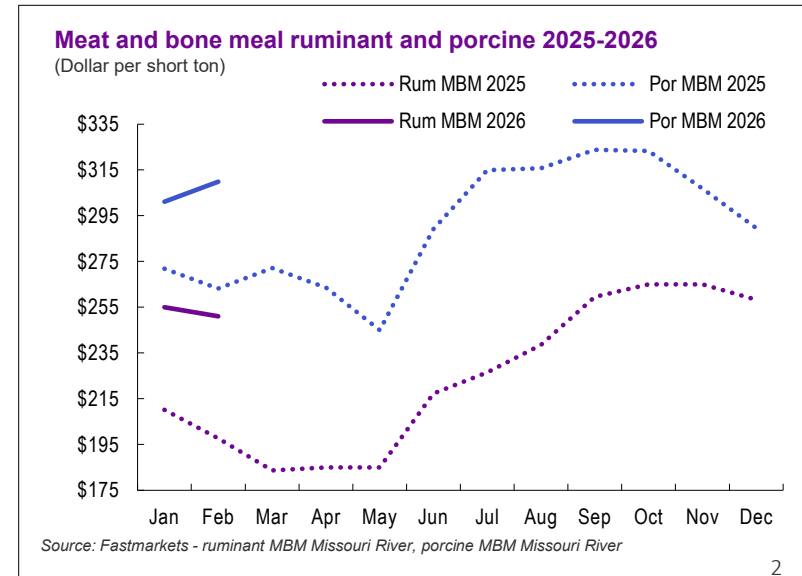
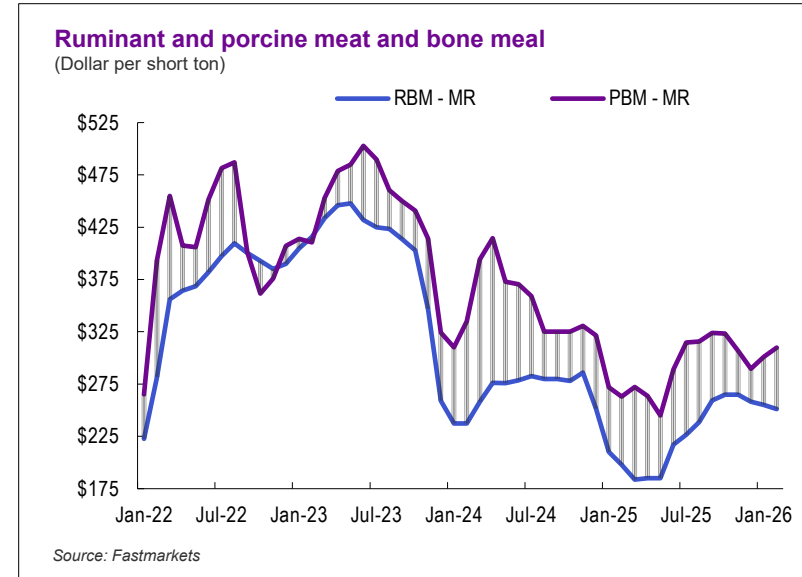
- Prices at the end of 2024 and into 2025 were under negative pressure; even with decreased production, depressed soybean meal prices capped gains
- 2025 prices traded below 2024 due to formulation changes – higher focus on dollar per protein
- Lower production has kept a floor under the market in 2024 and 2025
- Prices at the end of 2025 and into 2026 higher - diminished production, supportive soybean meal prices

Ruminant meat and bone meal

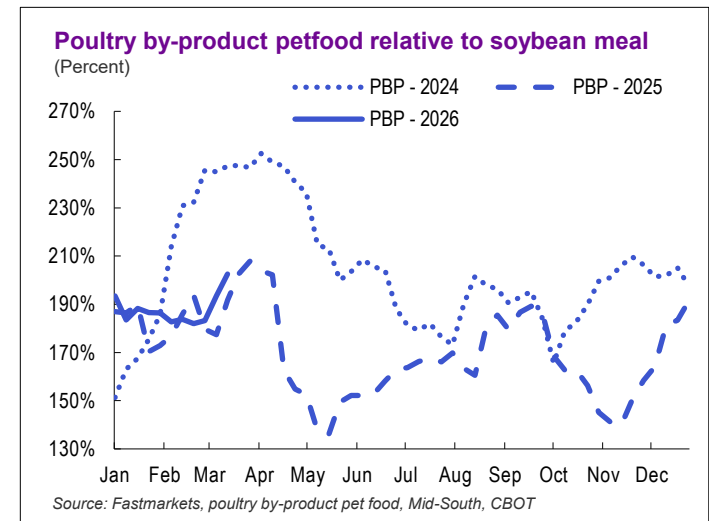
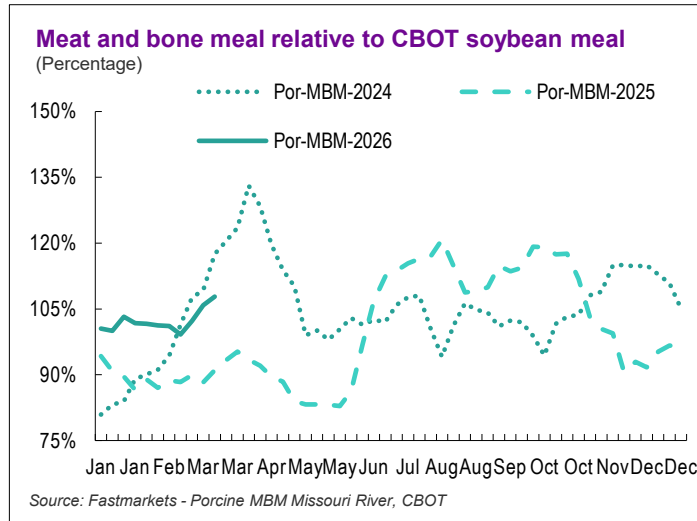
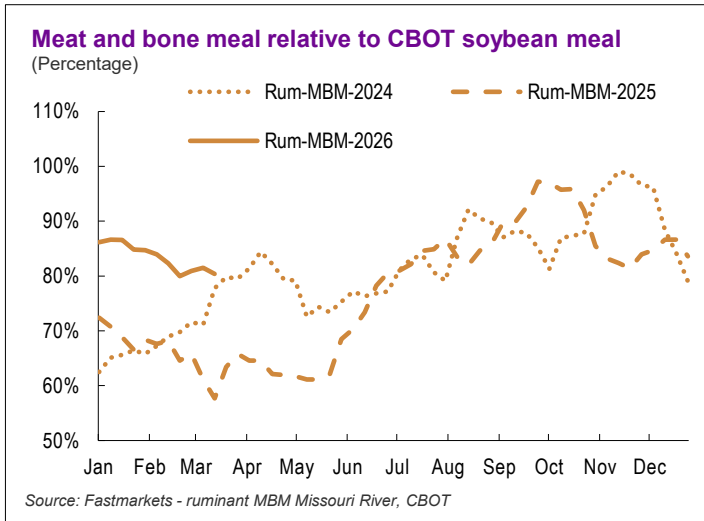
- Higher cattle weights are not expected to offset production from low head counts
- Price ranges remain wide on ruminant MBM due to mixed to pure beef spread
 - Mixed species meat and bone meal has higher supply to demand ratio
 - Pure beef meat and bone meal spot supplies have been tight

Porcine meat and bone meal

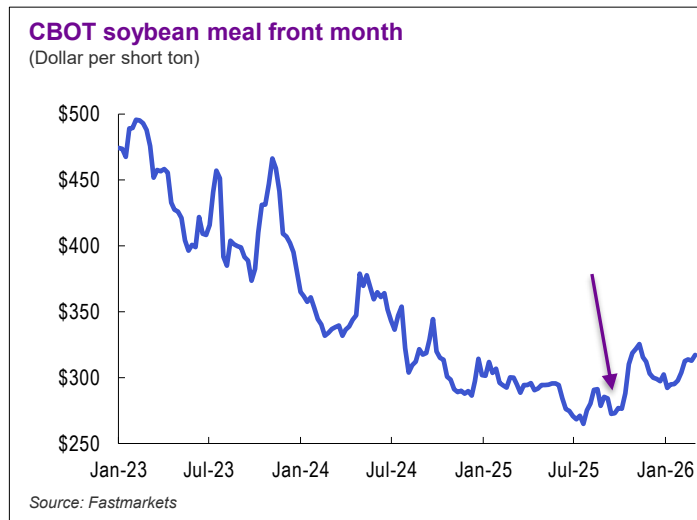
- Price trends comparable to ruminant meat and bonemeal; ranges tighter



Soybean meal relative price to US animal proteins

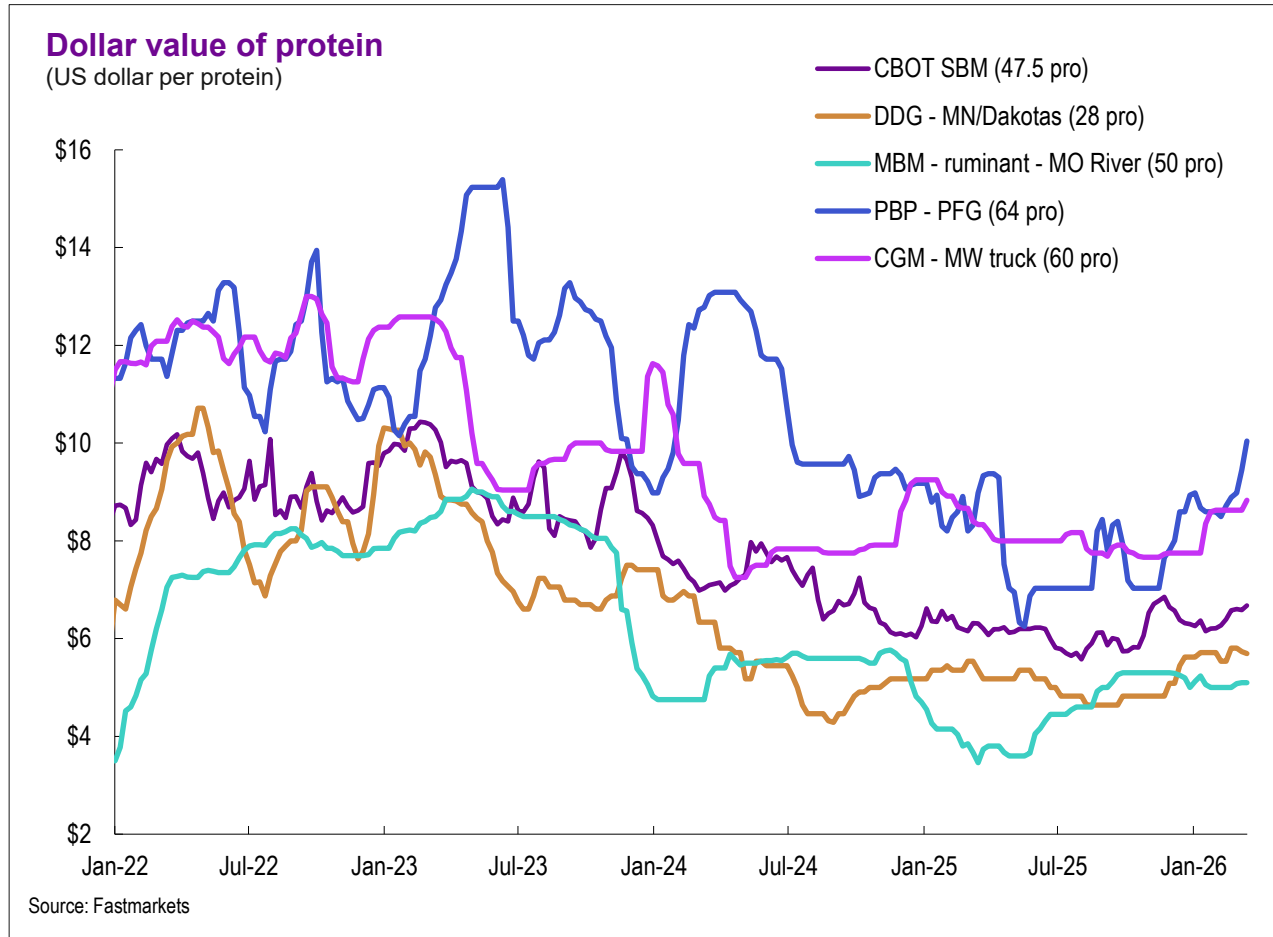


- Porcine and ruminant MBM relative to SBM trending higher than 2025 and 2024
- Poultry by-product pet grade is in-line with other years but less volatile
- Export demand has smoothed out – fewer tariff adjustments, active demand overseas



- Soybean meal relative to SBM is used due to the reliability, digestibility, liquidity, and transparent pricing
- In 2025 it changed: increased soybean crush, biofuel policies, and access to new trade regions.
- Soybean meal dominates protein meal volumes in the market

Shift to dollar per protein



Variability

Protein sources no longer move in lockstep

Processing, origin, and supply differences widened price dispersion

Soybean meal prices increasingly reflect oil and crush economics, not protein alone

Digestibility

Growing spread between crude protein and digestible amino acid value

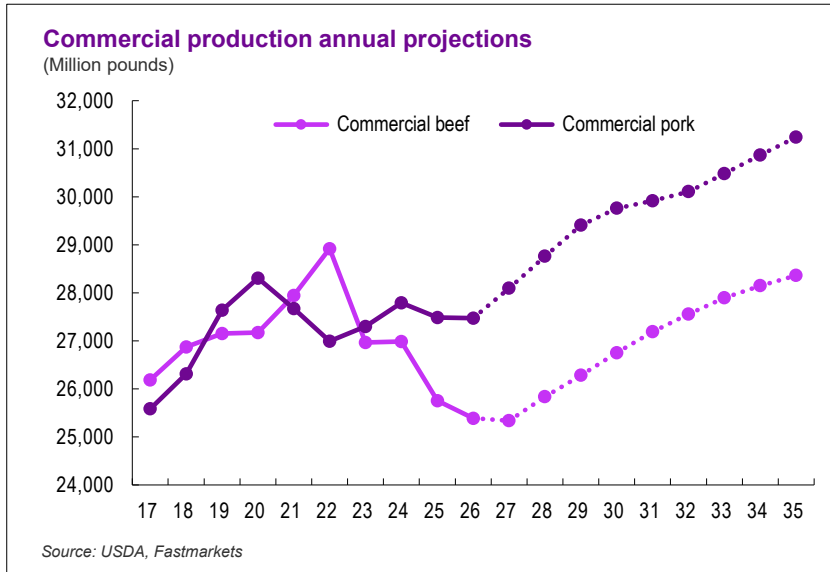
New and alternative proteins require pricing on usable nutrition, not inclusion rate

Margins

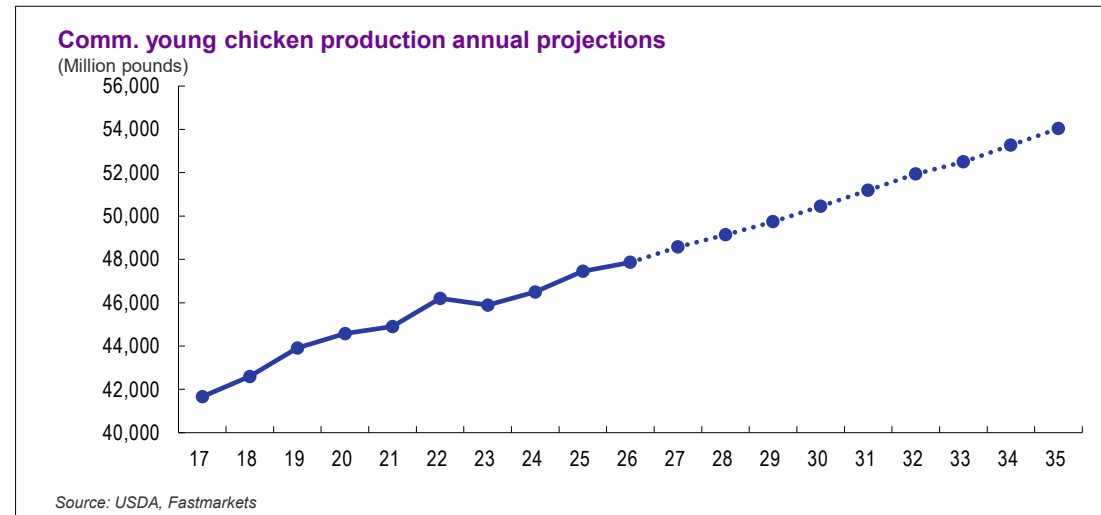
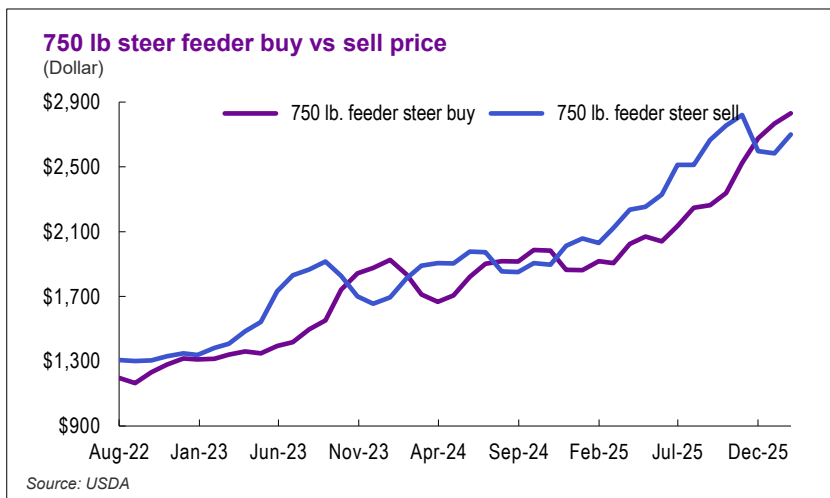
Tighter feed margins exposed formulation shortcuts

\$/protein improved cost control and formulation accuracy

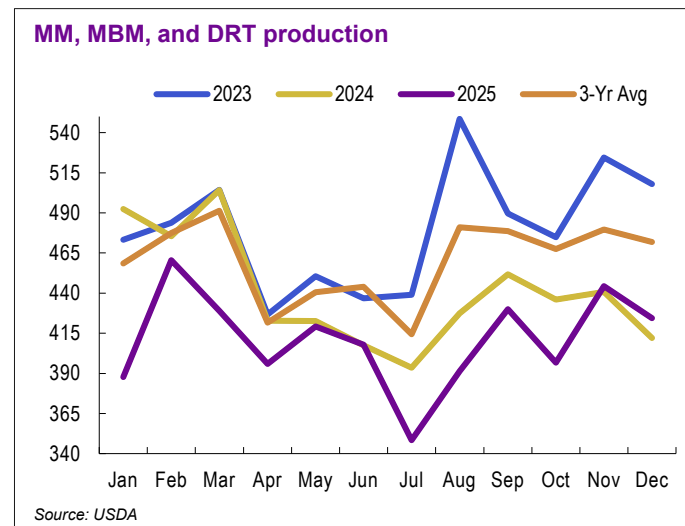
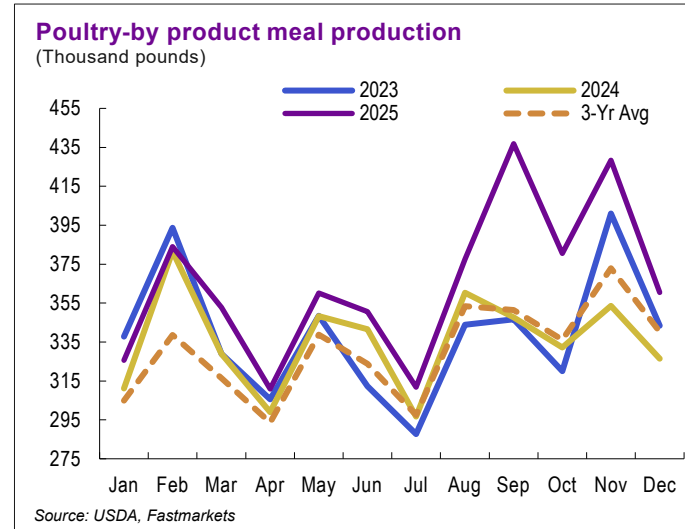
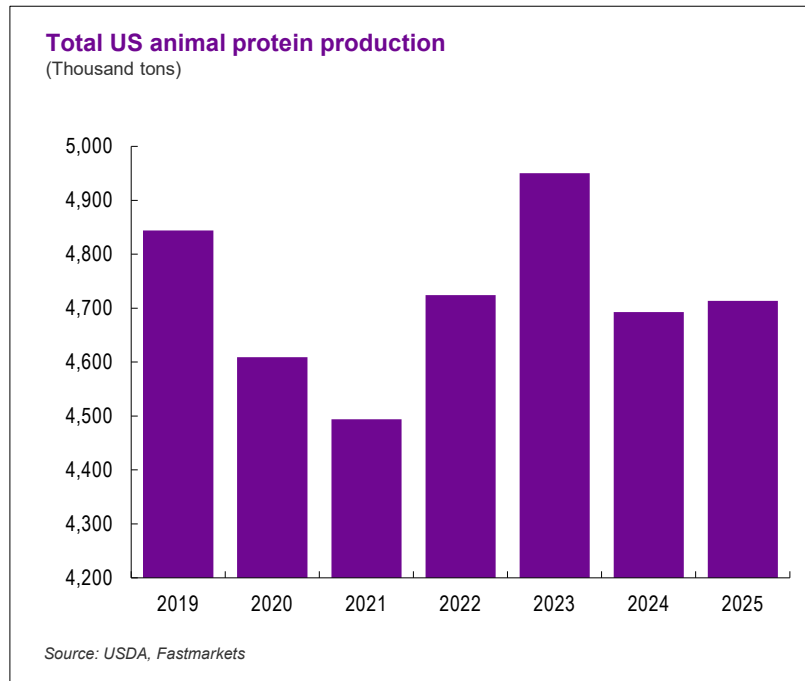
US livestock projections



- Commercial young chickens projected higher year on year for next 10 years
 - Very active buyer interest on poultry meats
 - Short flock regrowth after disease or disappearances (5-7 weeks)
- Commercial pork projected higher following slight drop in 2026
 - 5-7 months to market ready
 - Building new structures
 - Proposition 12 in California and other states
- Commercial beef projected lower until a bottom in 2027
 - Slow herd rebuilding (18-22 months)
 - Producer margins started 2026 at \$(35)



Total US animal protein production



9%

Total poultry by-product production for 2025 is 8.7% above 2024.

42%

Poultry meal made up 42.1% of total production. Up from 38.9% in 2024.

47%

Meat meal made up 47.5% of total production. Down from 51.1% in 2024

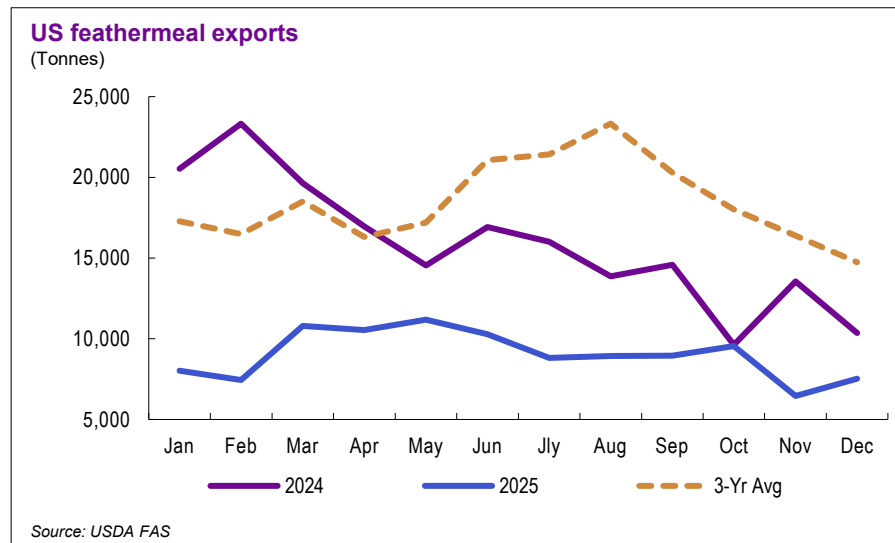
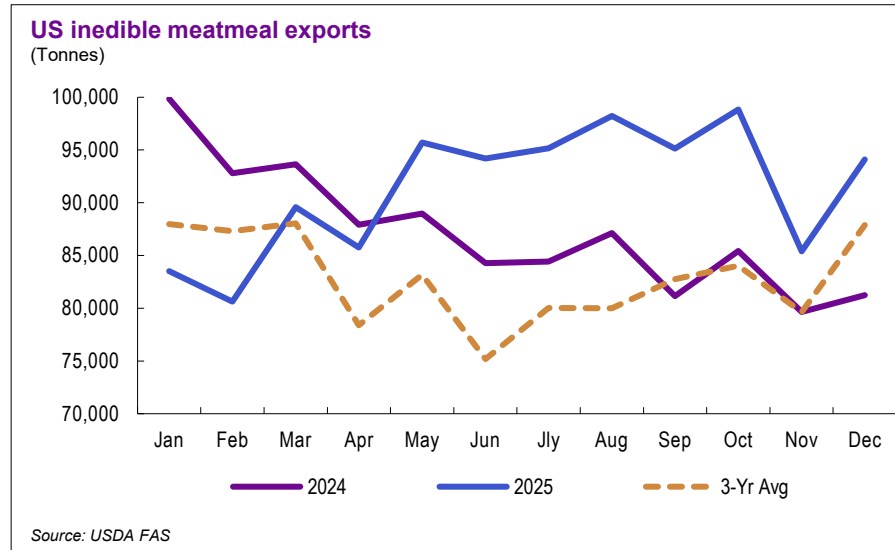
US export: IE MM and FM

Meat meal, meat and bonemeal, and DRT: 2025 volume (tonne)

| 2025 total | Change from 2024 |
|---------------------|------------------|
| China – 180,485 | -6.1% |
| Indonesia – 209,737 | +13.4% |
| Mexico – 148,086 | +15.8% |
| Vietnam – 331,123 | +37.9% |
| Ecuador – 80,531 | +44.3% |

Feathermeal: 2025 YTD volume (tonne)

| 2025 total | Change from 2024 |
|--------------------|------------------|
| Indonesia – 40,913 | -34.5% |
| Vietnam – 22,538 | -56.6% |
| Chile – 33,613 | -34.9% |
| China – 6,523 | +12.2% |



Demand shift

China lower due to tariffs

Indonesia, Mexico, Vietnam absorbing displaced volumes

New feed

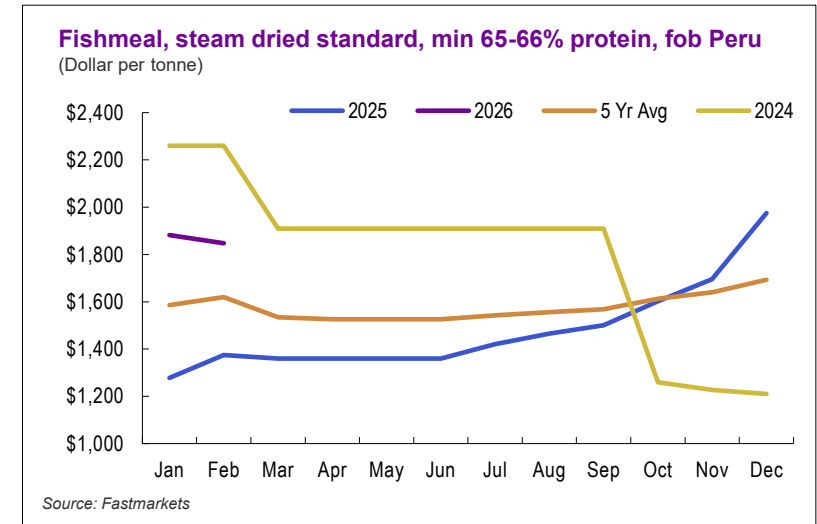
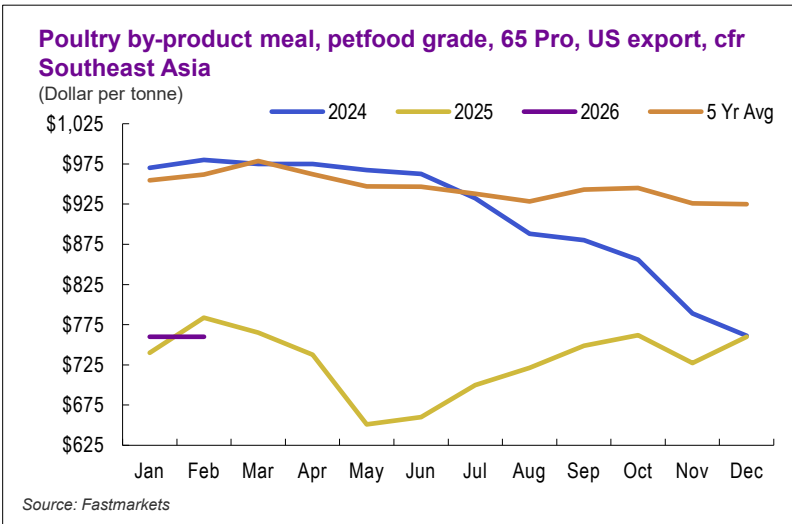
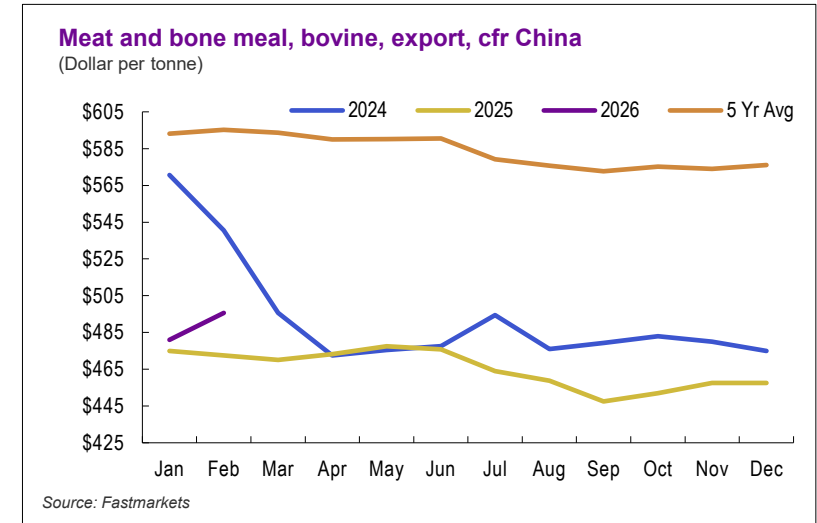
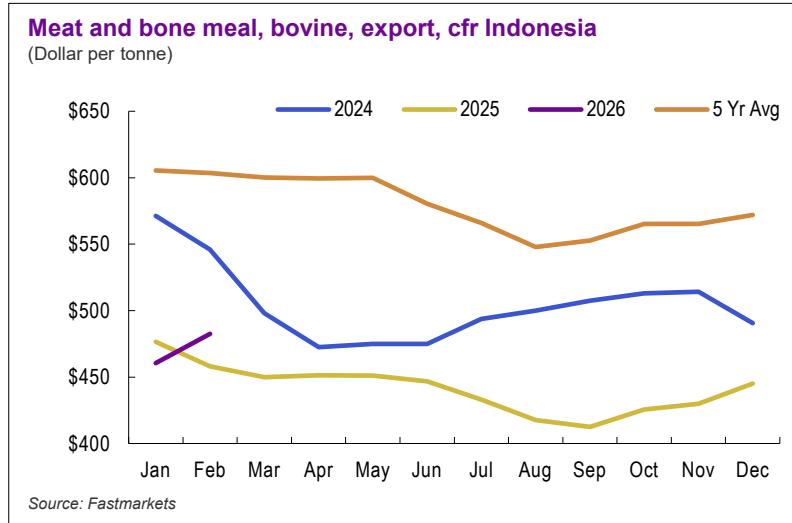
Meat and bone meal increasingly used as a cost-effective protein substitute in aqua and poultry feed

US supply disruptions

HPAI disrupted poultry by-product supply

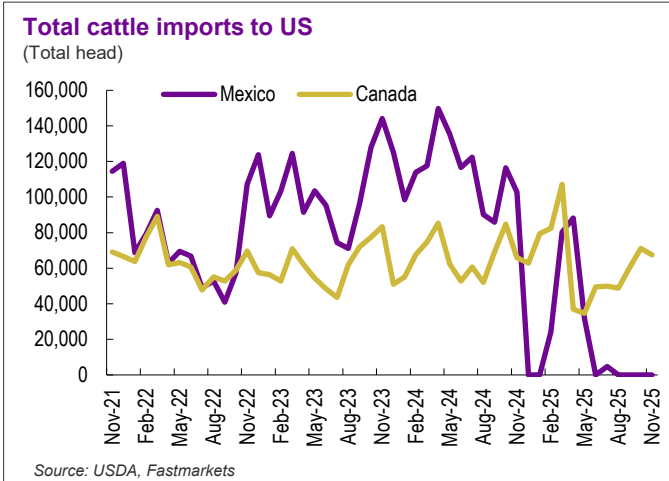
Lower feathermeal inclusion

International and US export price overview



- Most international prices flat or under previous years
- Increased production from both Australia and Brazil
- Relative soybean meal price pressure
- Increased cost of freight
- Fishmeal demand is active and fishing has been limited in some regions

Factors impacting US animal proteins



Cattle imports:

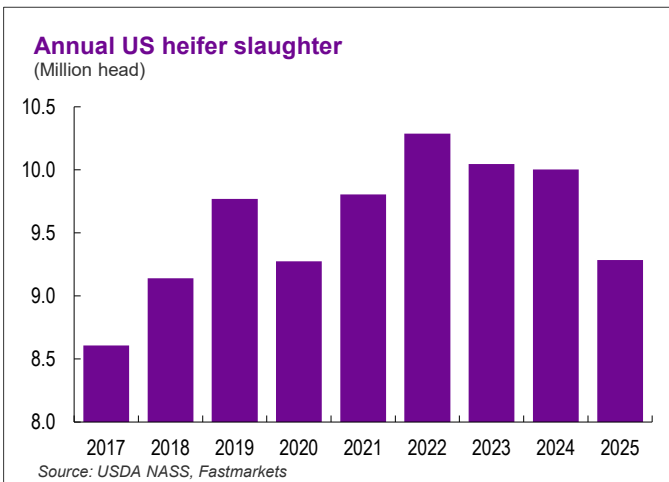
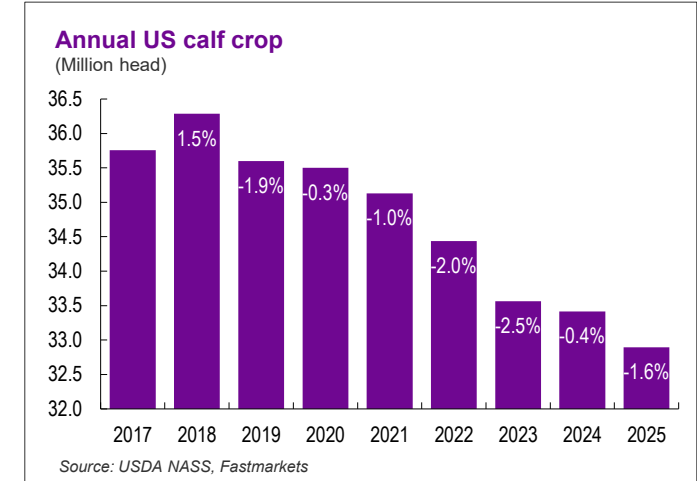
- New World Screwworm in Mexico diminishing US imports of cattle

Calf headcounts:

- US calf headcounts have continued to drop since the peak in 2018

Heifer slaughter:

- Though decreased in 2025; kept heifers will not calf until early 2027.

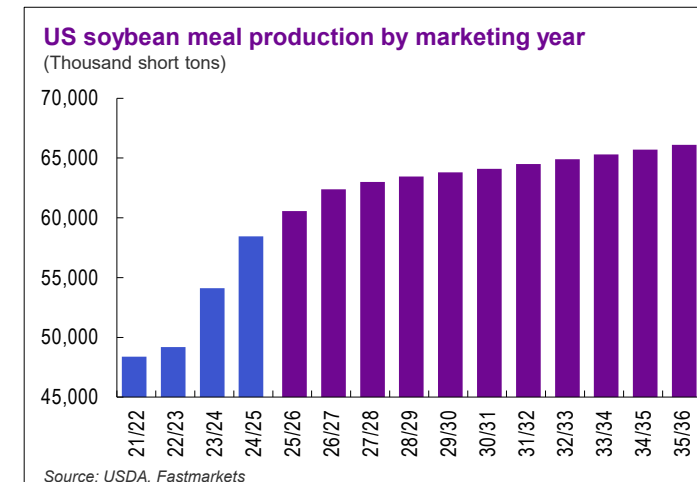


Animal viruses/diseases:

- Avian flu
- Swine flu
- PRRS
- Screw worm

Soybean meal production:

- Soybean meal production expected to move higher year-on-year for the next 5 years, minimum



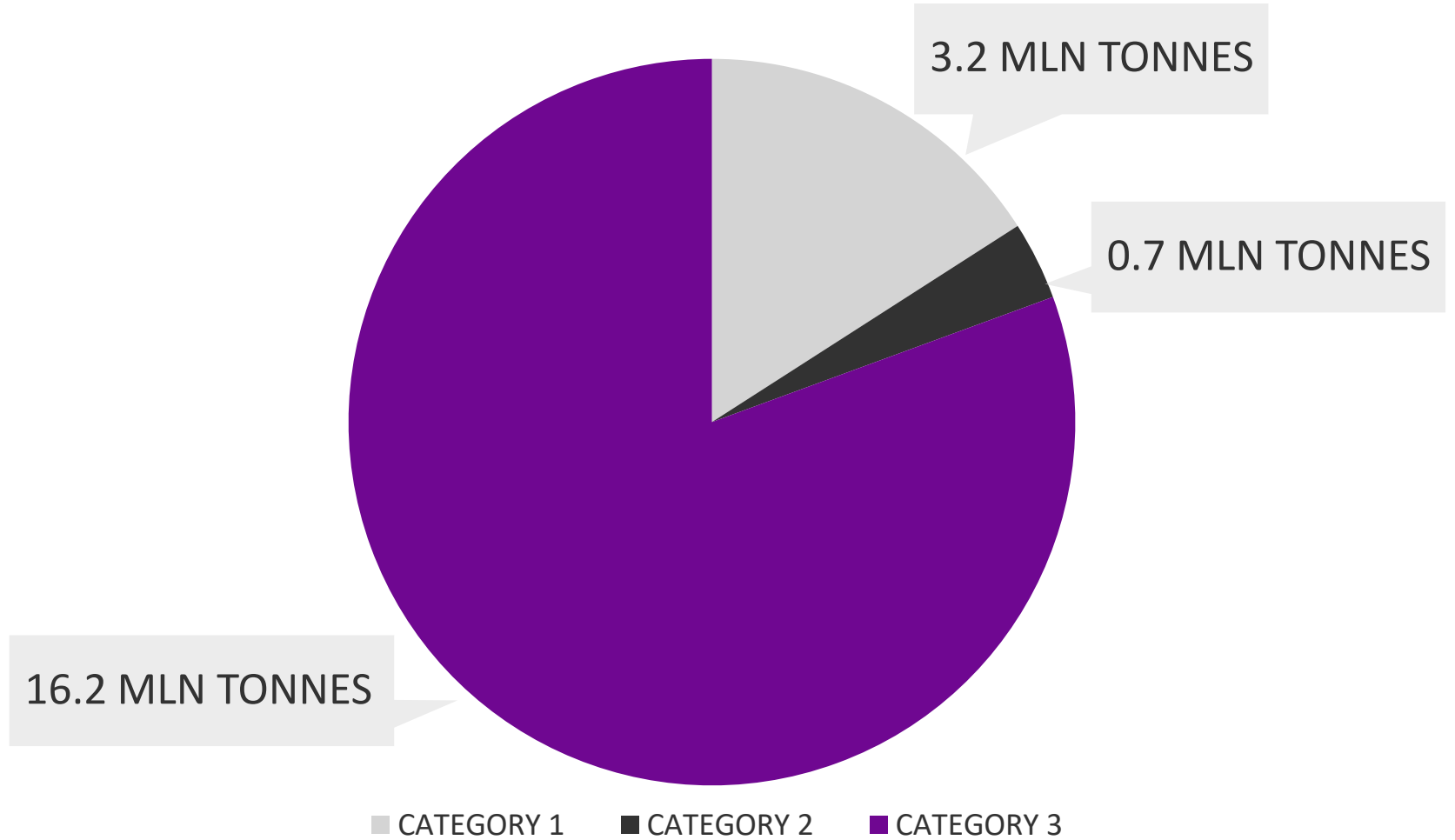
EUROPEAN CATEGORIZATION

Cat 1 (High Risk)

Cat 2 (Medium Risk)

Cat 3 (Low Risk) – derived
from healthy animals

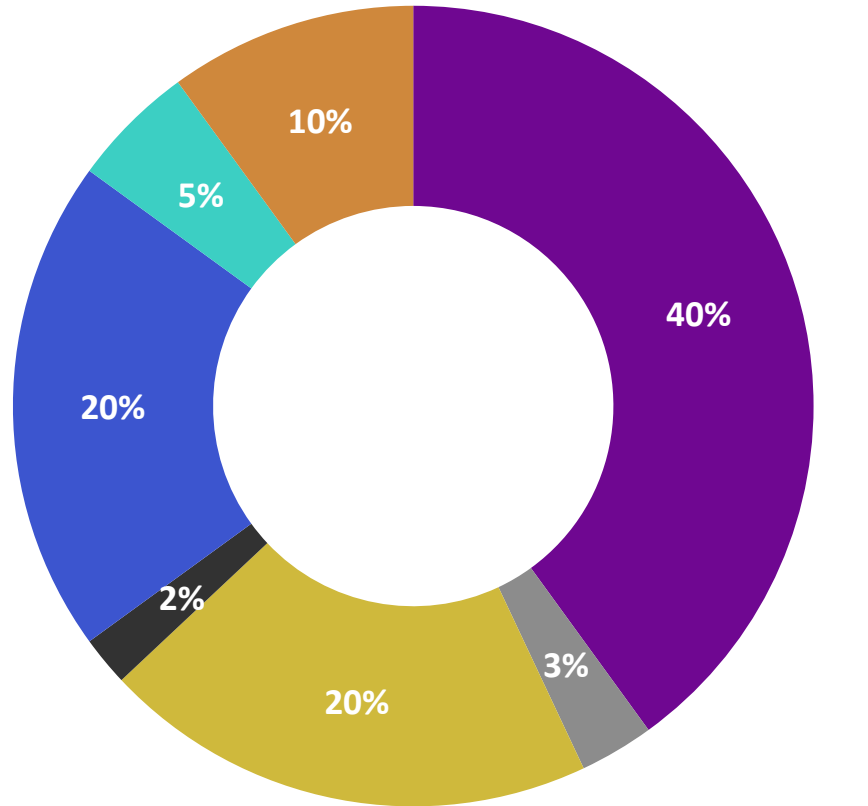
Over 80% of European fat and proteins are
Category 3 certified



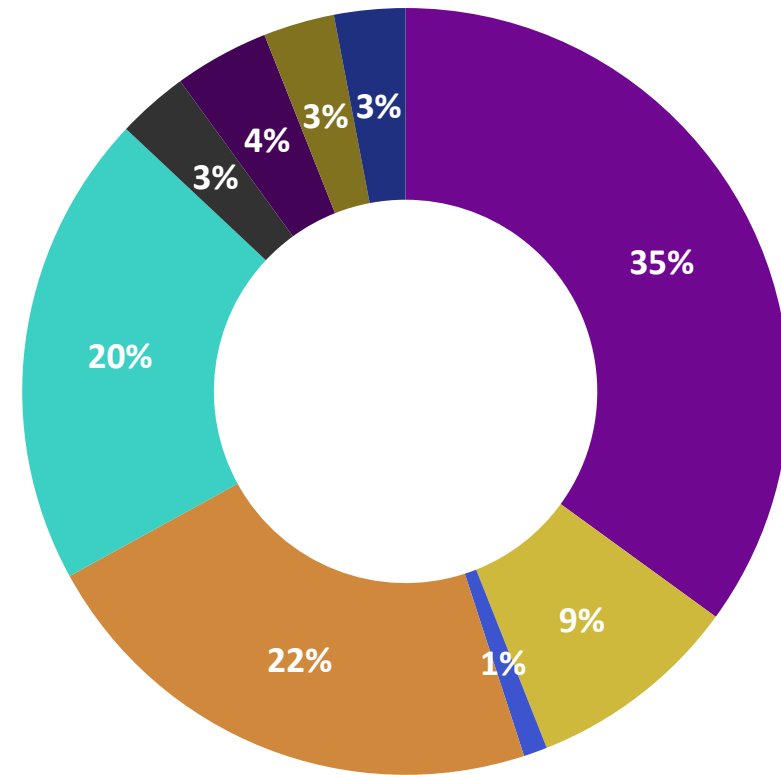
Porcine and avian fats and proteins dominate the European supply



CAT 3 FATS



CAT 3 PROTEINS



- MIXED FAT
- BONE FAT
- POULTRY FAT
- PIG SKIN FAT
- PIG FAT
- TALLOW
- LARD

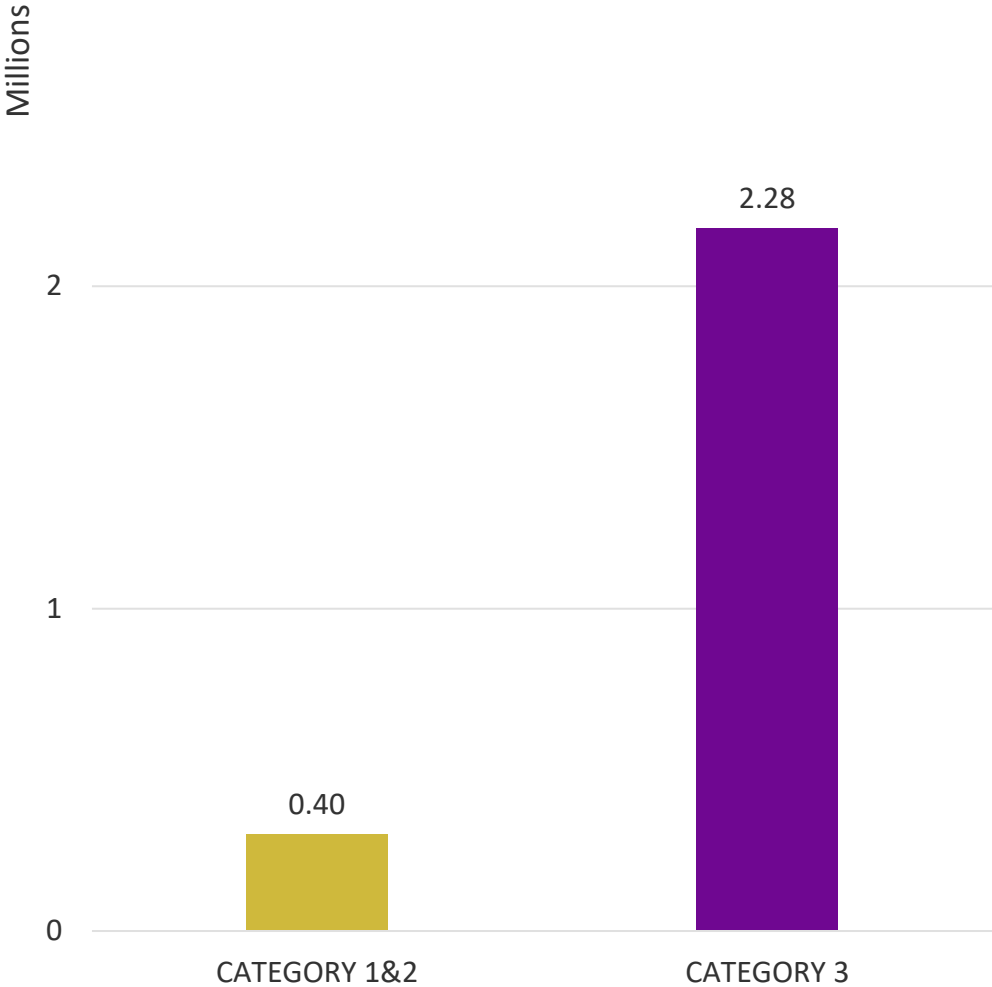
- MIXED SPECIES
- POULTRY MEAL
- BLOOD PRODUCTS
- FEATHER MEAL
- PORK MEAL
- GREAVERS MEAL
- PIG HAIR MEAL
- BLOOD MEAL
- GELATINE BY-PRODUCTS

Source: European Fat Processors and Renderers Association (EFPRA), 2024 data

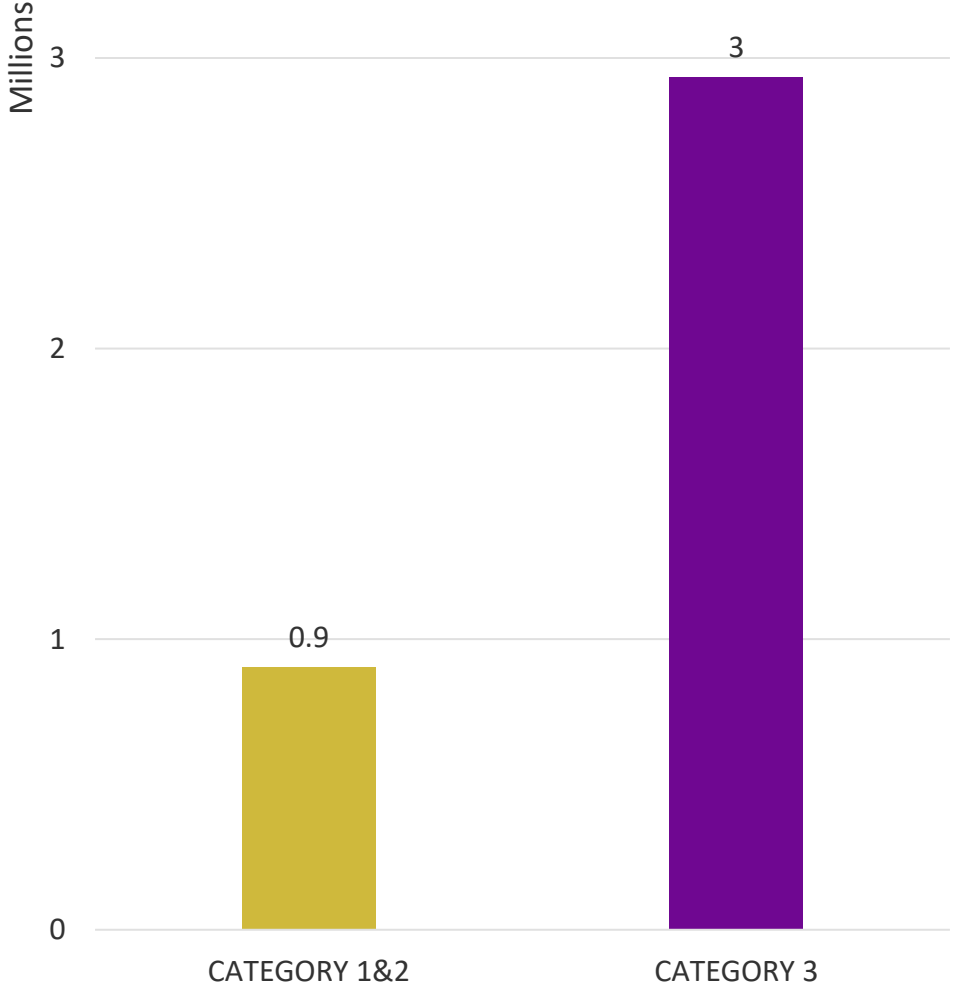
6.33 million tonnes of animal fats and proteins are produced annually



ANIMAL FATS



ANIMAL PROTEINS



Source: European Fat Processors and Renderers Association (EFPRA), 2024 data



ANIMAL FATS AND PROTEINS USE



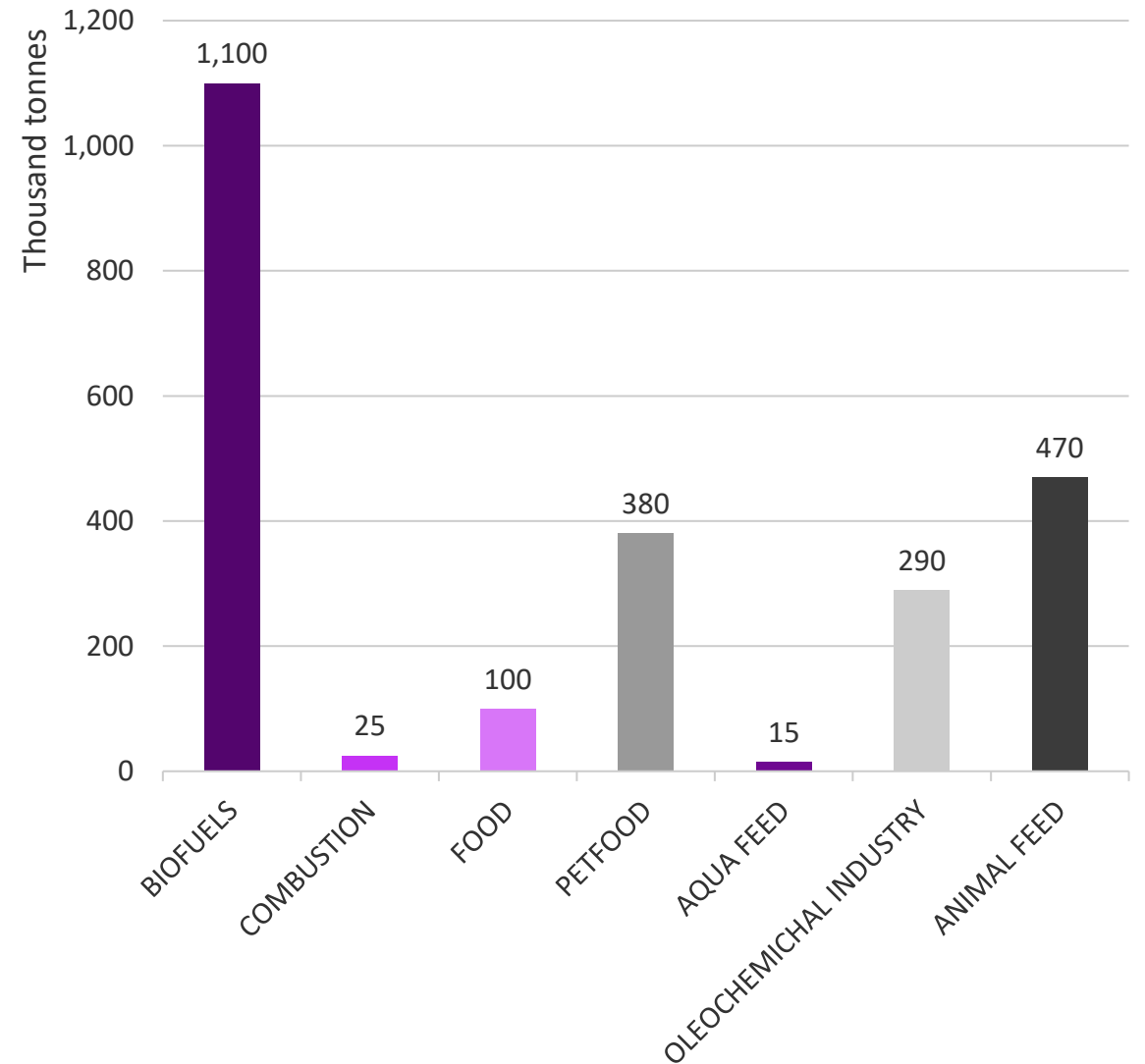
391,000 tonnes

of category 1 and 2 animal fats used to produce biofuels annually

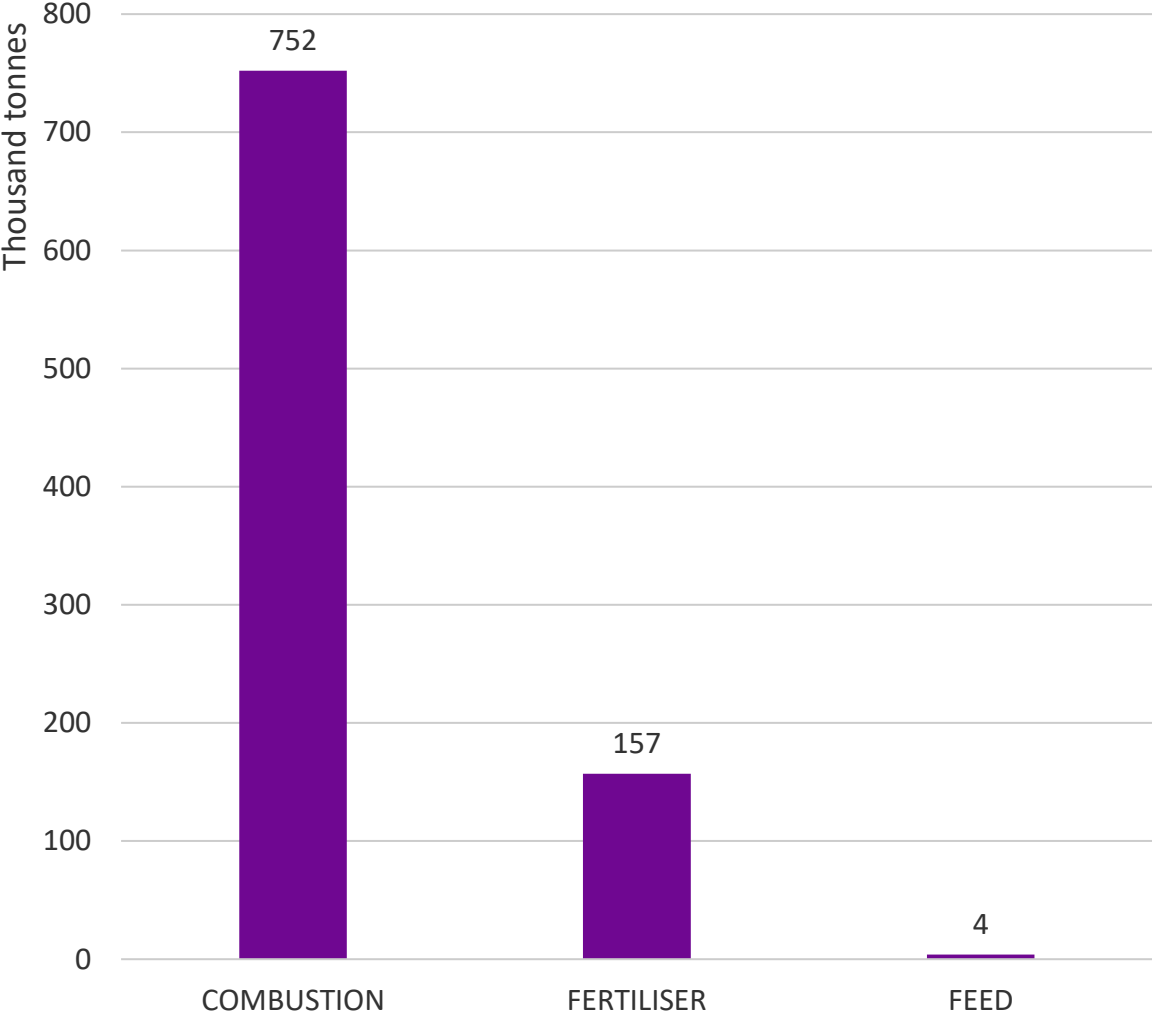
as part of the Annex IX B list feedstocks according to RED III, alongside used cooking oil around **10,000** tonnes - burned as a combustion fuel



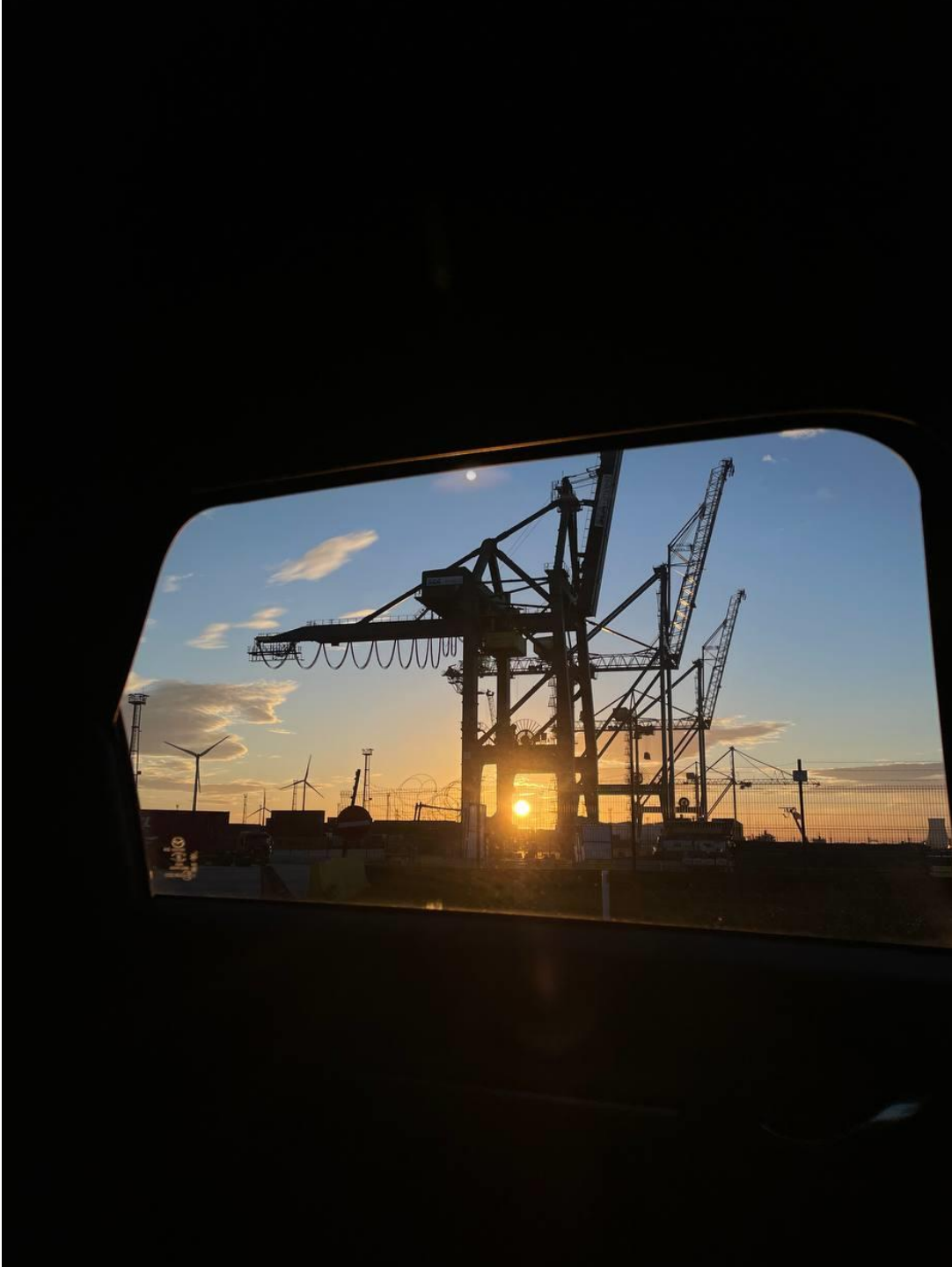
Category 3 fats use per industry



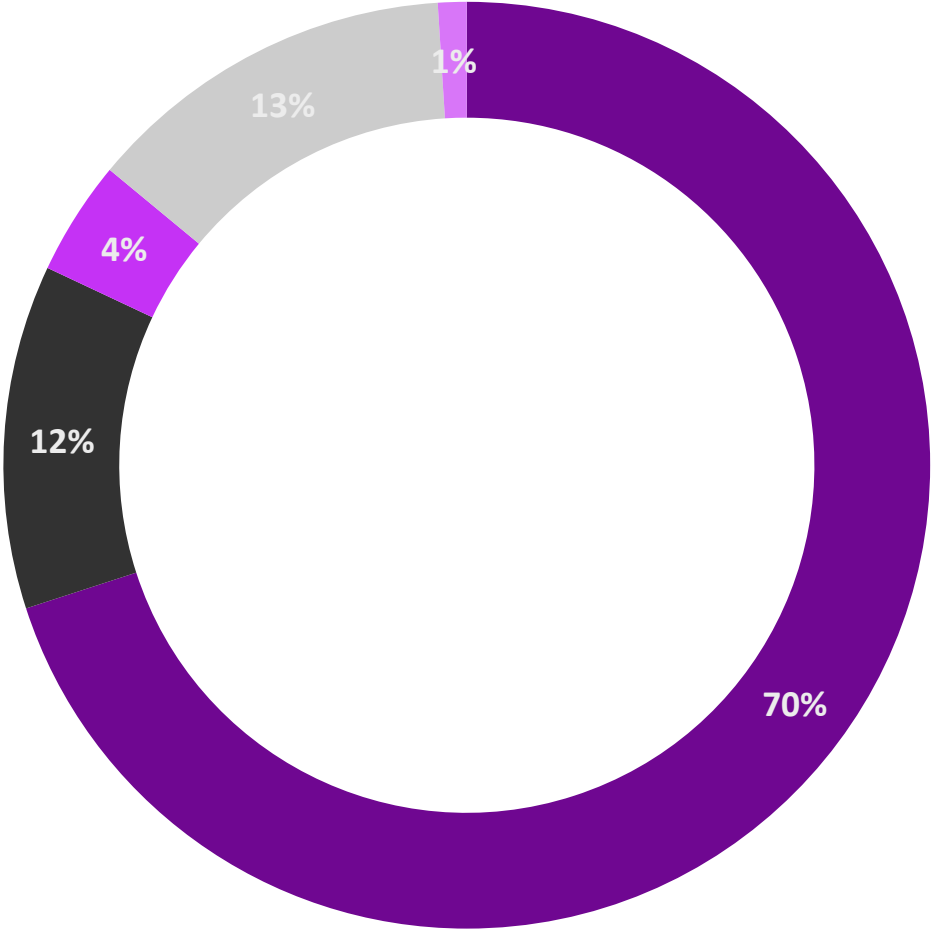
Category 1&2 proteins use per industry



Source: European Fat Processors and Renderers Association (EFPRA), 2024 data



Category 3 proteins use per industry



■ PET FOOD ■ FERTILIZERS ■ ANIMAL FEED ■ AQUA FEED ■ COMBUSTION

Source: European Fat Processors and Renderers Association (EFPRA), 2024 data





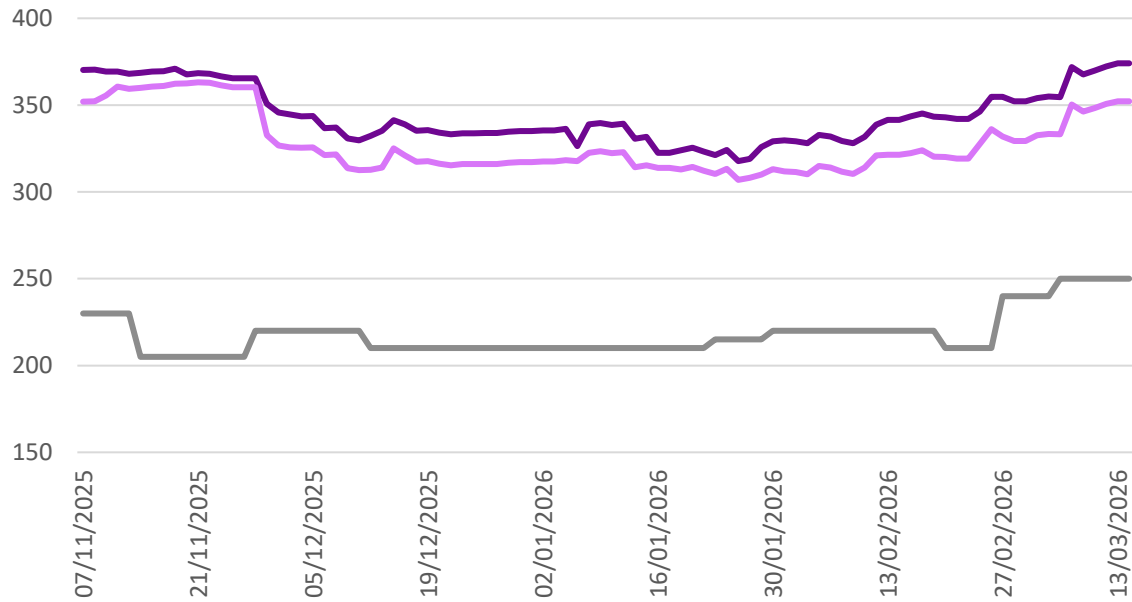
PROCESSED ANIMAL PROTEINS MARKET

Soybean meal priced €102.18/t higher in Europe compared to MBM

End-of-season supply shortages and futures volatility keep Argentinian meal prices high

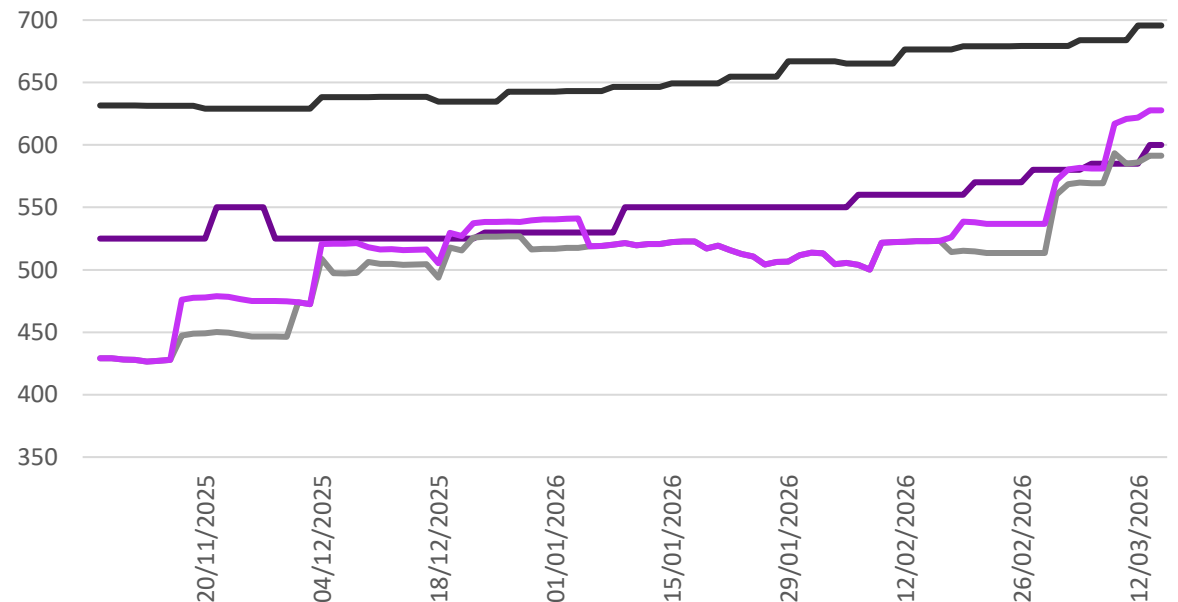


European meat and bone meal vs Argentinian, Brazilian soymeal, €/tonne



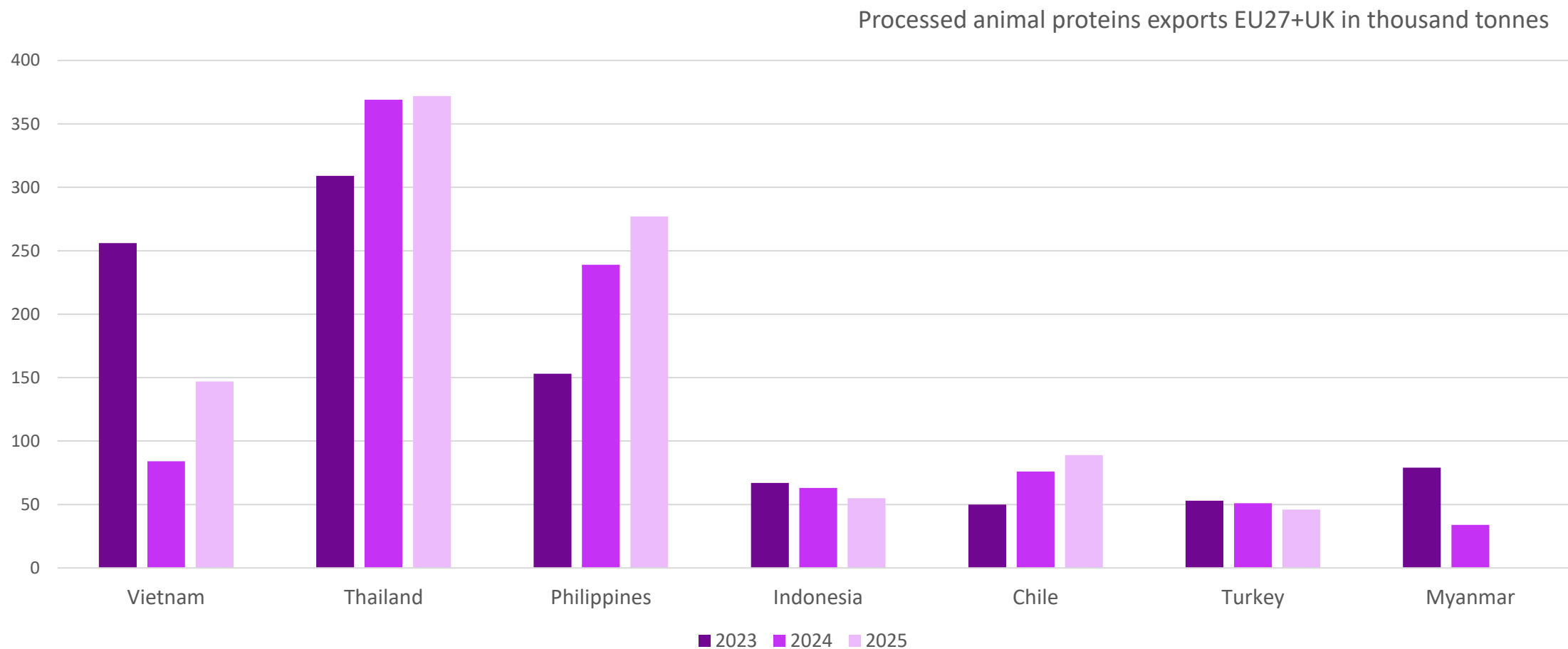
- Category 3 mixed meat and bone meal, 50% pro, exw Eastern Europe, €/tonne
- Soymeal (Brazil), Hi Pro, 48%, cif Rotterdam, \$/tonne
- Soymeal (Argentina), Hi Pro, 49%, cif Rotterdam, \$/tonne

Poultry meal: Europe, Australia, United States, €/tonne



- Poultry by-product meal, petfood grade, 65 Pro, delivered Australia
- Category 3 poultry meal, 65% pro, exw Eastern Europe
- Poultry by-product meal, pet food, 14 Ash 64 Pro, fob US Southeast
- Poultry by-product meal, pet food, 14 Ash 64 Pro, fob US Mid-South

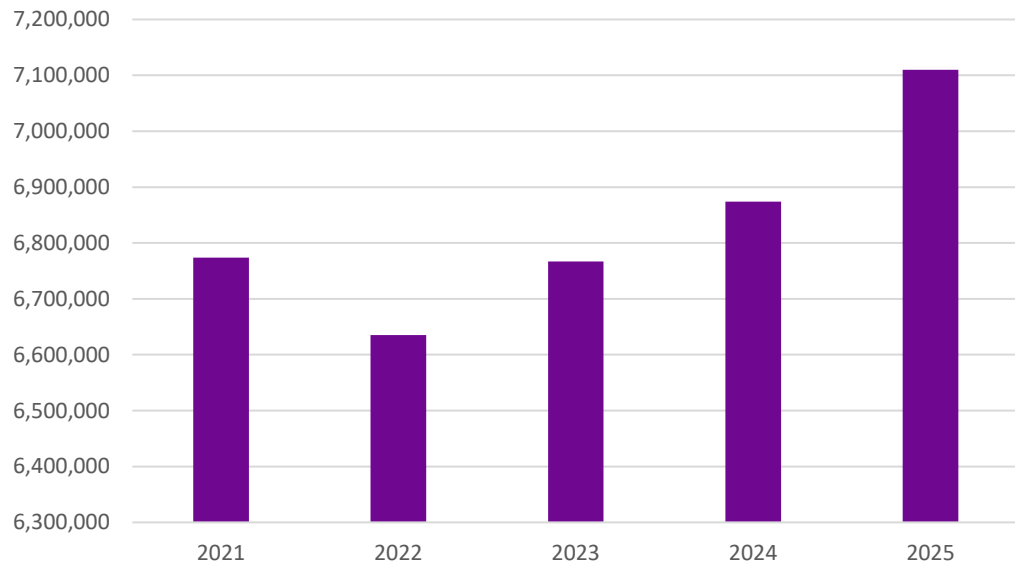
European 2025 PAPs exports up 6% y-o-y at 1.16 million tonnes



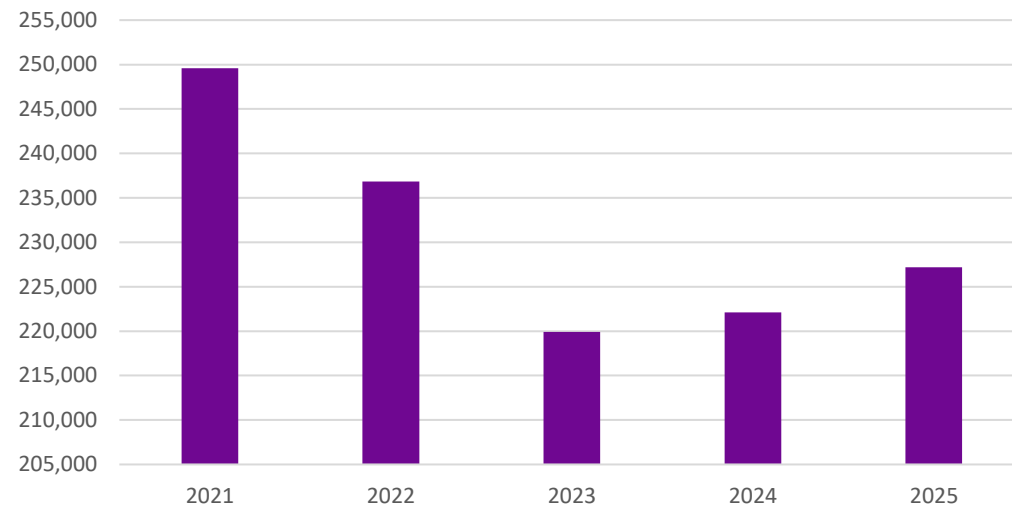
HS code 230110: flours, meals and pellets, of meat or offal, unfit for human consumption; greaves



Poultry slaughter (1,000 head)



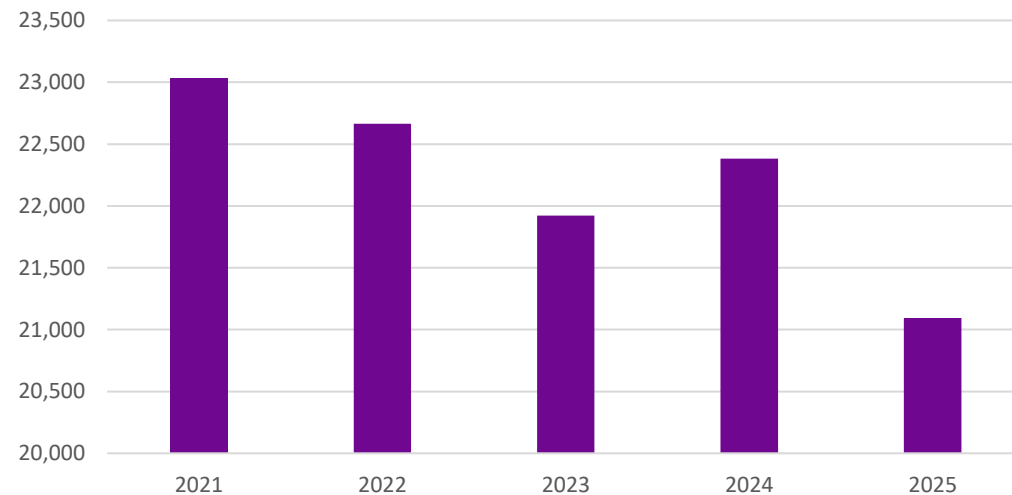
Pork slaughter rates (1,000 head)



2025:

- Total poultry slaughter 7,109,980k heads (+3.43% y-o-y)
- Total pork slaughter 227,202k heads (+2.28% y-o-y)
- Total beef slaughter 21,095k heads (-5.75% y-o-y)

Beef slaughter rates (1,000 head)



Processed animal protein use policy



Partial lifting of the feed ban – September 2021

The major change came with Commission Regulation (EU) 2021/1372, which partially lifted the PAP ban:

Allowed in the EU since 2021

Porcine PAP → poultry feed

Poultry PAP → pig feed

Insect PAP → pig & poultry feed

Ruminant collagen and gelatine → non-ruminant feed

Still prohibited

Any ruminant PAP → any farmed animal

Intra-species recycling (e.g. poultry to poultry, pig to pig)

Any PAP → ruminant feed

This framework remains in force today and applies across all EU Member States.

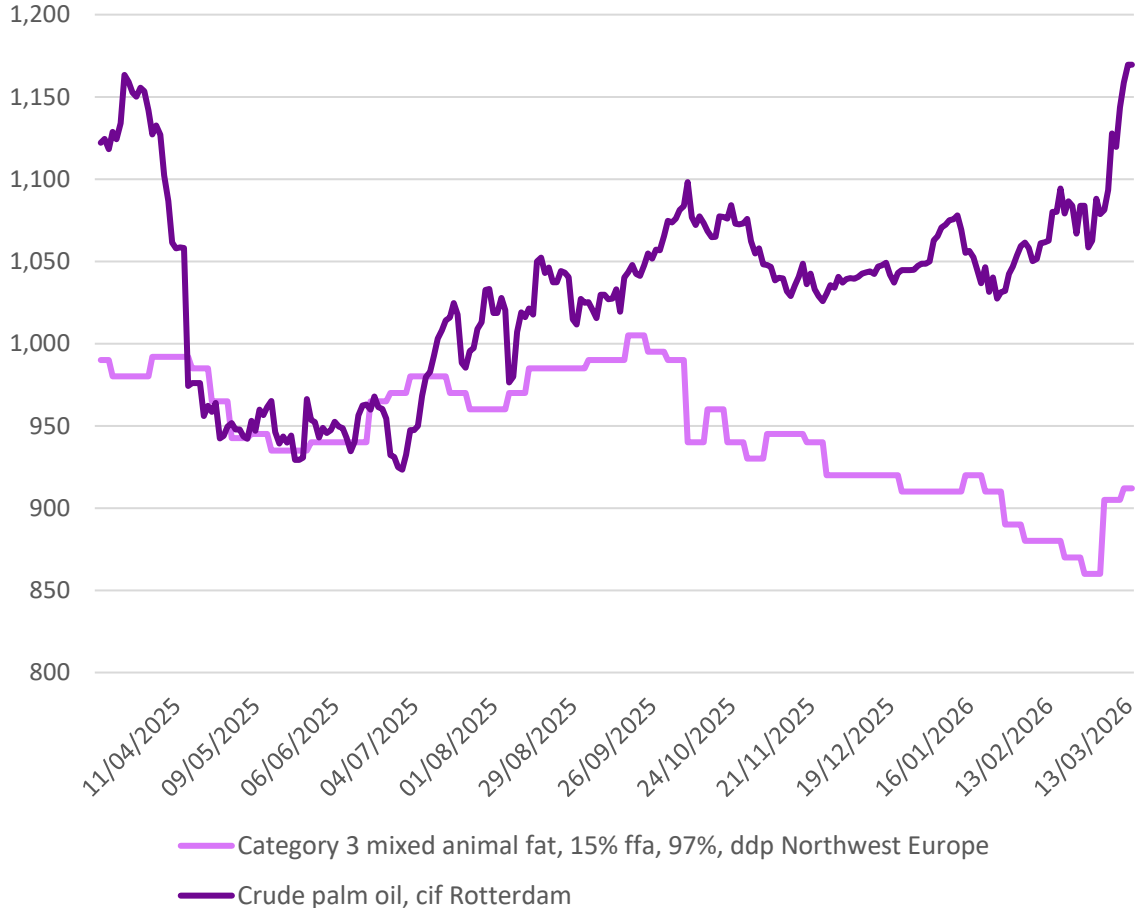


ANIMAL FATS MARKET

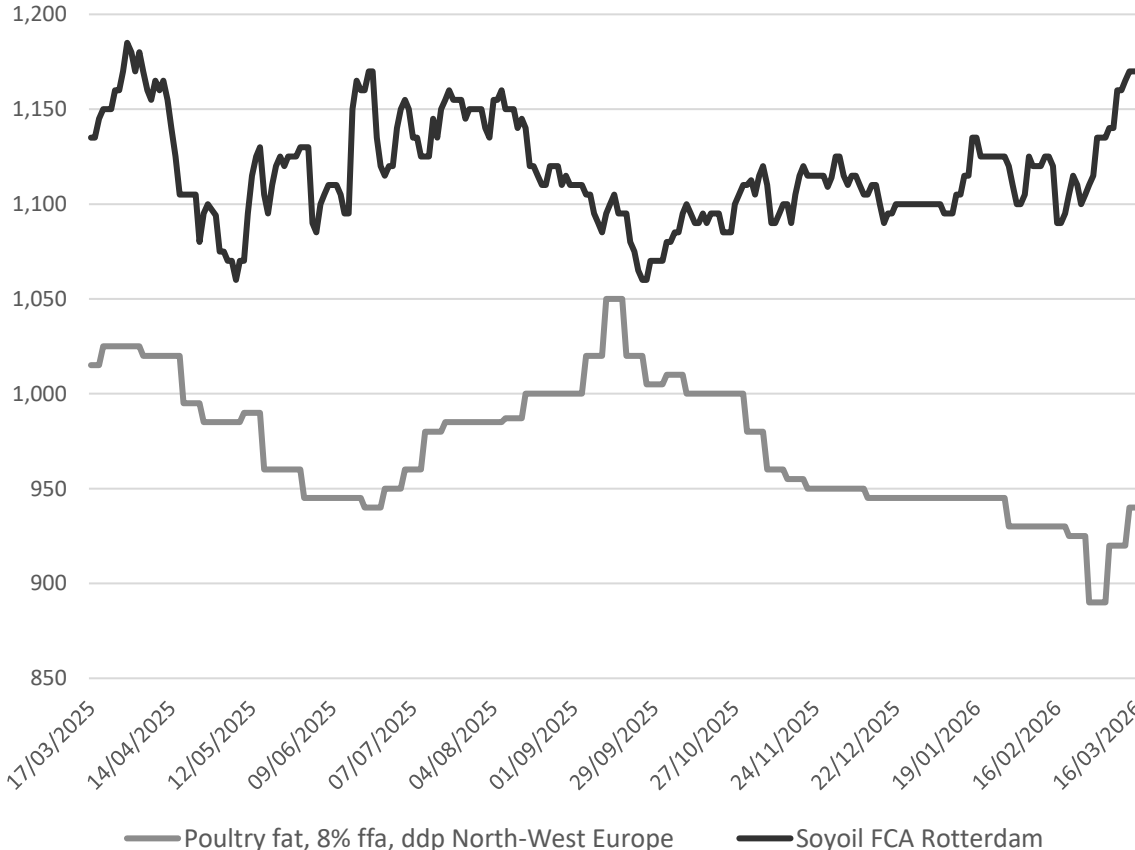
Higher vegetable oil prices increase oleochemical, animal feed and pet food demand for category 3 animal fats



Category 3 animal fat vs crude palm oil, €/tonne



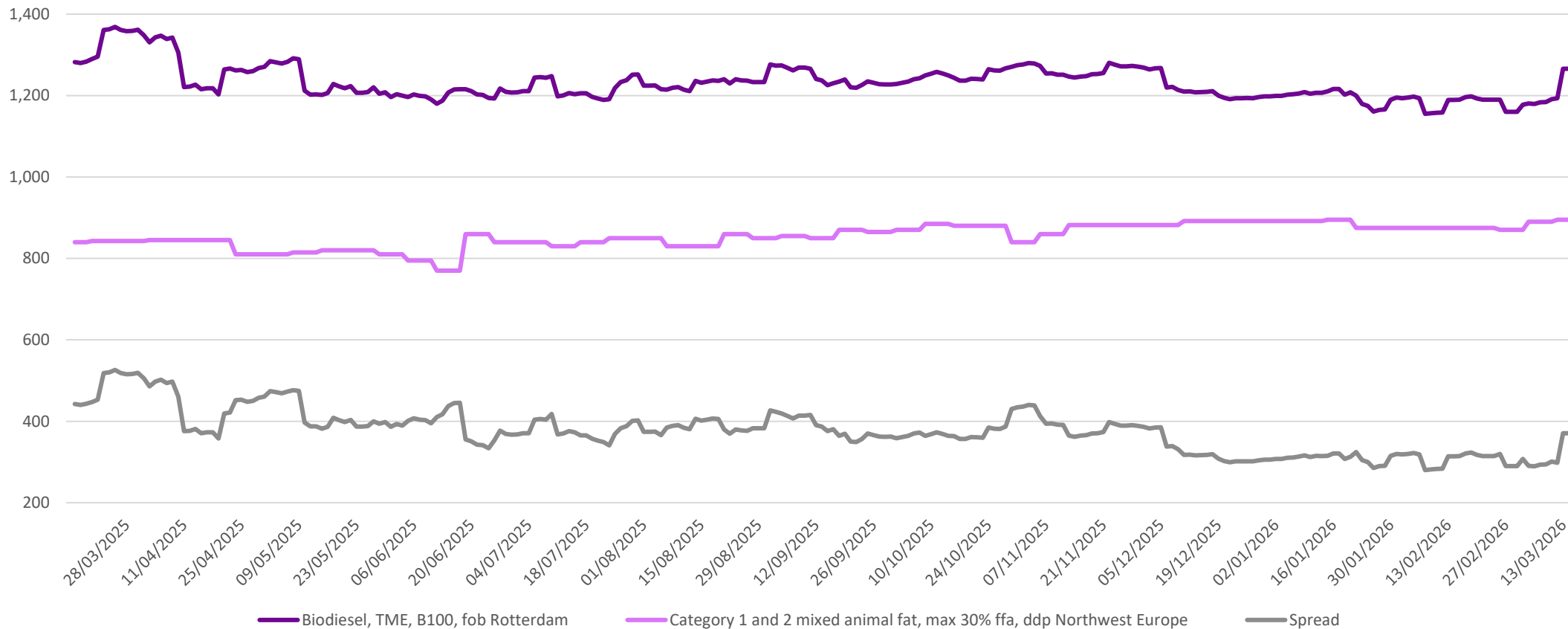
Category 3 poultry fat vs soybean oil, €/tonne



Source: Fastmarkets



Tallow methyl ester (TME) and category 1, 2 animal fat price comparison in €/tonne



Biodiesel-feedstock spreads narrow on high feedstock prices

UCOME-UCO €293.82/tonne

RME-RSO €197.90/tonne

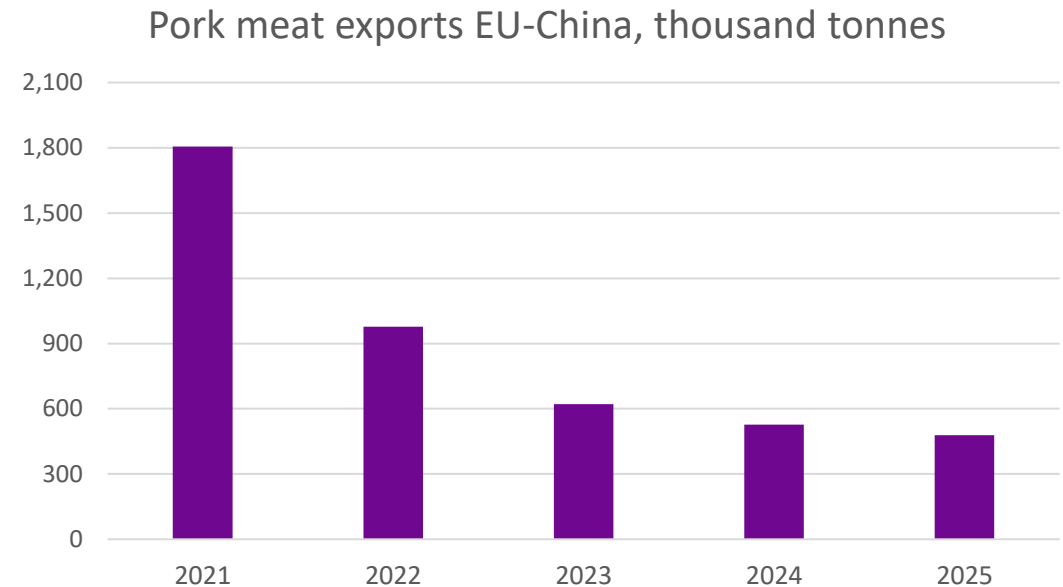
Source: Fastmarkets



Policy developments

- RED III implementation to end double-counting in the Netherlands
- Category 3 animal fat GHG savings score might be cut in half in the Netherlands (0.5 factor)
- Potential supply reductions (lower slaughter rates, meat export reductions, disease outbreaks)
- SAF demand remains minimal, voluntary market covers 2% production mandate

| GHG savings score | |
|-----------------------|----------|
| Category 3 animal fat | ≈ 80-90% |
| Category 1 animal fat | ≈ 80% |
| Rapeseed oil | ≈ 60% |



2021 vs 2025 – 73% decrease



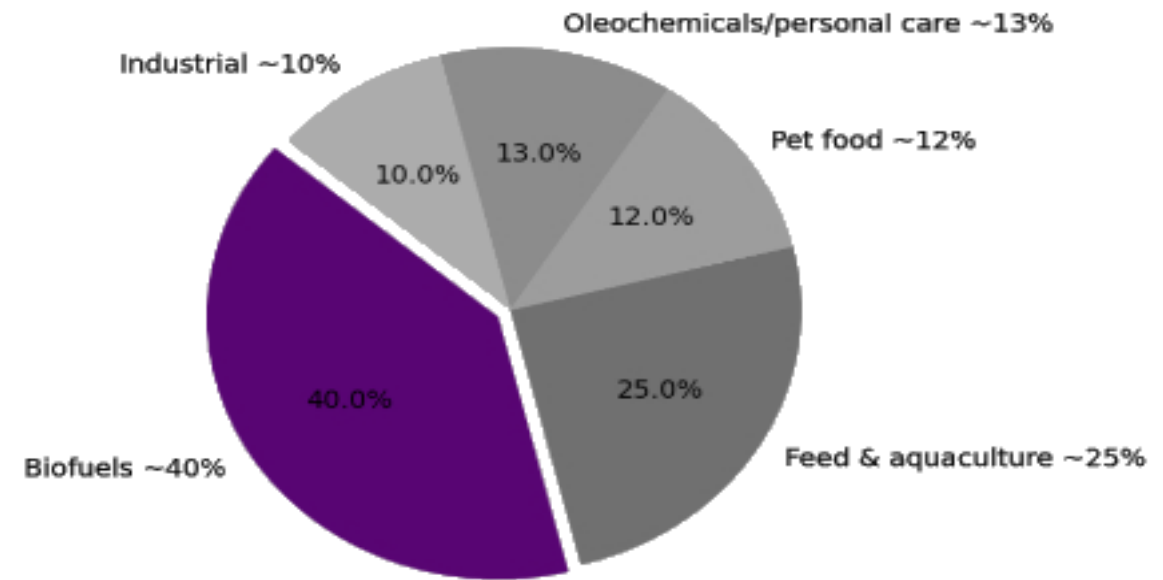
US Animal Fats Market

US animal fats markets: tightening supply and rising competition

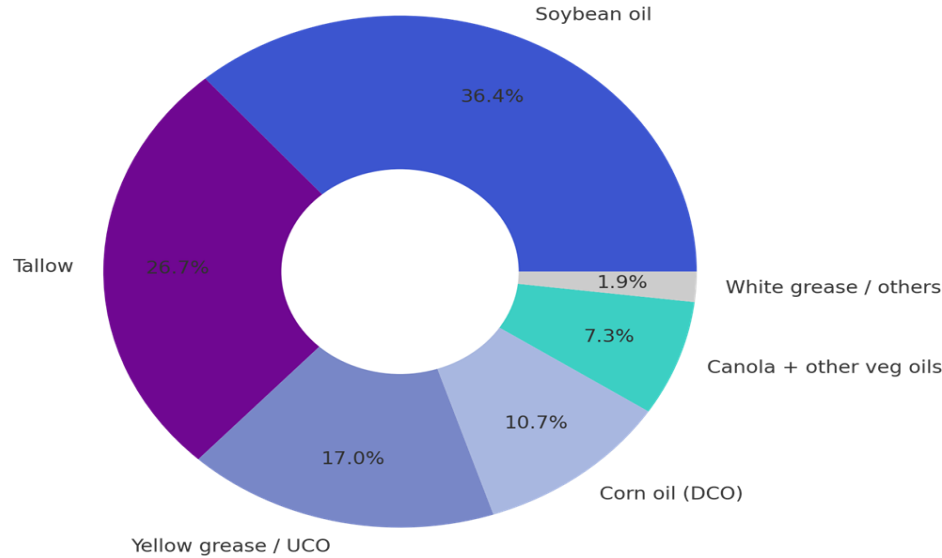


- Animal fats are used across feed, pet food, oleochemicals, food uses, and biofuels
- Feed historically represented the largest outlet for rendered fats
- Biofuels have rapidly grown to become the dominant demand segment as renewable diesel capacity expanded
- Feed and pet food buyers now compete with fuel producers for a limited supply of fats
- As a result, animal fat prices are increasingly influenced by energy markets and fuel policy

Rendered Fats End-Market Allocation



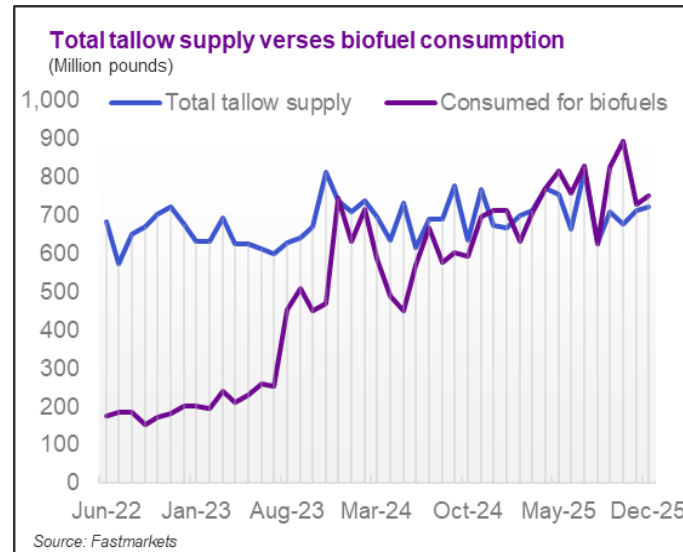
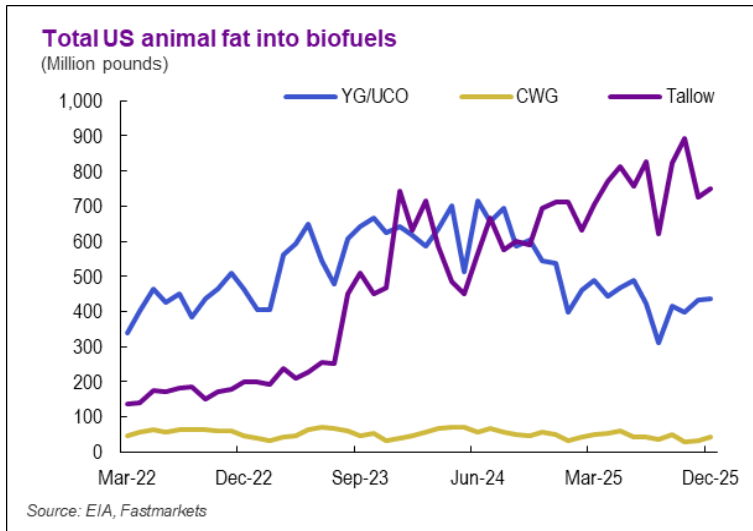
Biofuel Feedstock Share (Approx., Latest EIA Data)



Biofuels driving structural demand for fats



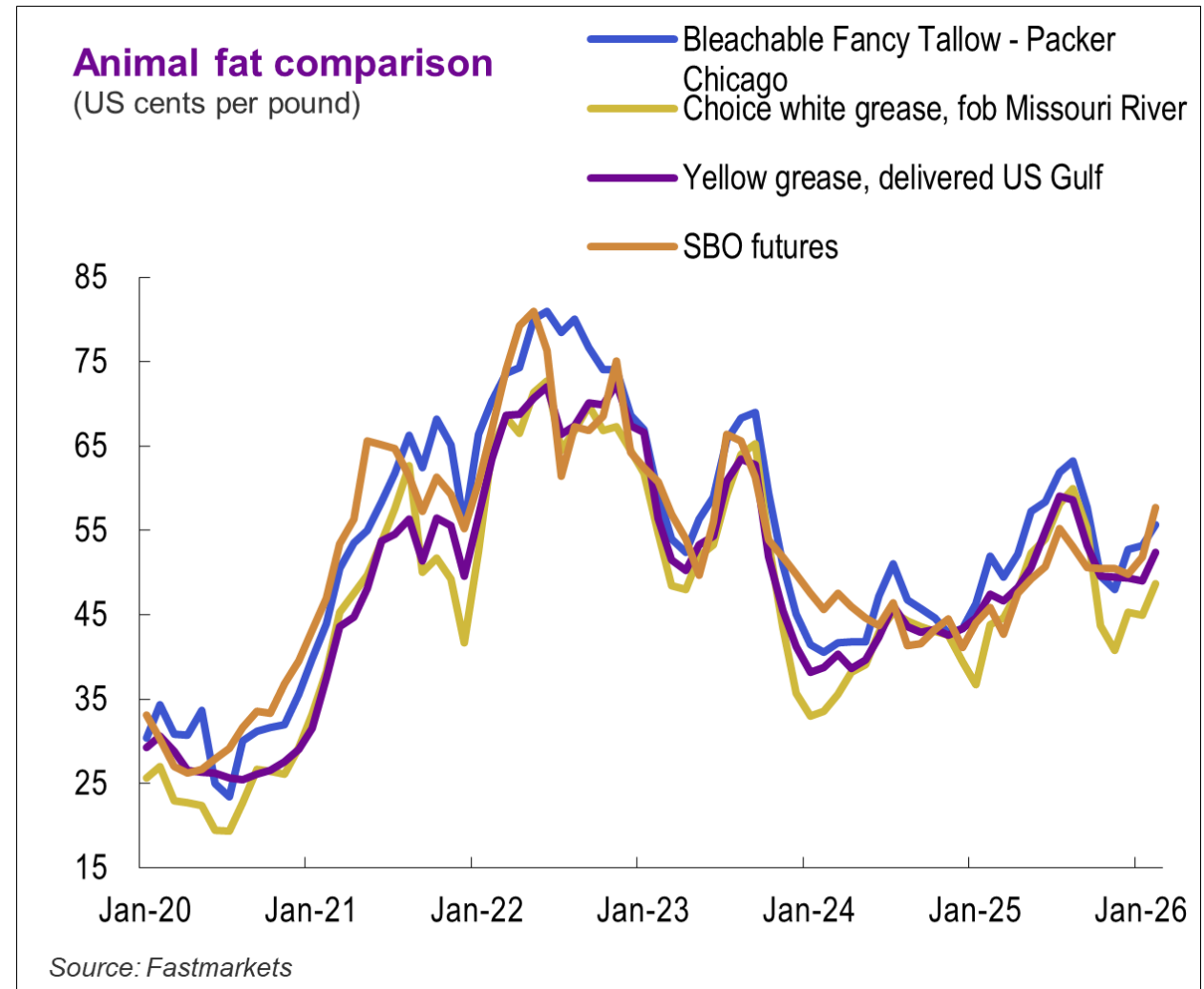
- Soybean oil remains the largest US biofuel feedstock, accounting for roughly 35-40% of inputs.
- Animal fats are gaining share as renewable diesel producers favor lower carbon intensity feedstocks.
- As by-products of meat production, animal fats often deliver lower lifecycle emissions than crop-based oils.
- Renewable diesel producers can shift between feedstocks based on carbon intensity and relative pricing.
- Higher prices for one fat — including UCO — can pull other animal fats higher across the market.
- Growing renewable diesel and emerging SAF demand are increasing competition for these feedstocks.



Policy and energy signals now move animal fat markets faster than traditional feed demand



- Animal fat prices are increasingly tied to energy markets and renewable diesel economics
- 2022 energy rally lifted fats prices alongside diesel and vegetable oils
- Prices weakened in 2024–2025 as renewable diesel margins declined
- Policy uncertainty — delayed RVOs and early 45Z guidance — weighed on markets
- Shift from the \$1/gal tax credit to the lower-value 45Z credit reduced fuel revenues
- Recent conflict in Iran and the Middle East has supported diesel and fats prices
- Policy shifts have also changed soybean oil's competitiveness in biofuels

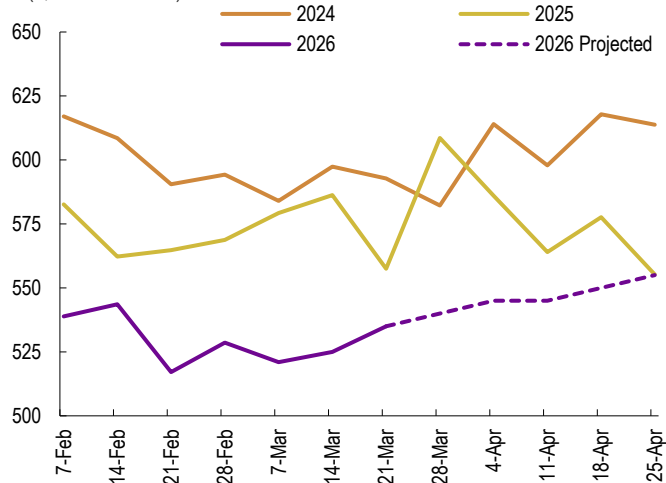


Livestock cycles limit growth in rendered fat supply



Cattle slaughter: 2024, 2025 and 2026 forecast

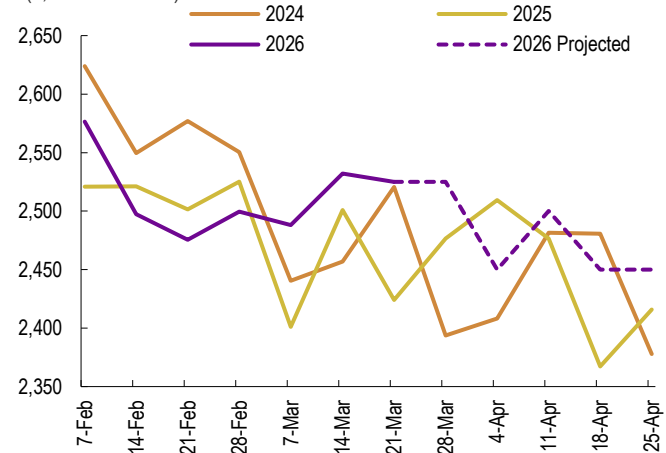
(1,000 head/week)



Source: Fastmarkets

Hog slaughter: 2024, 2025, and 2026 forecast

(1,000 head/week)

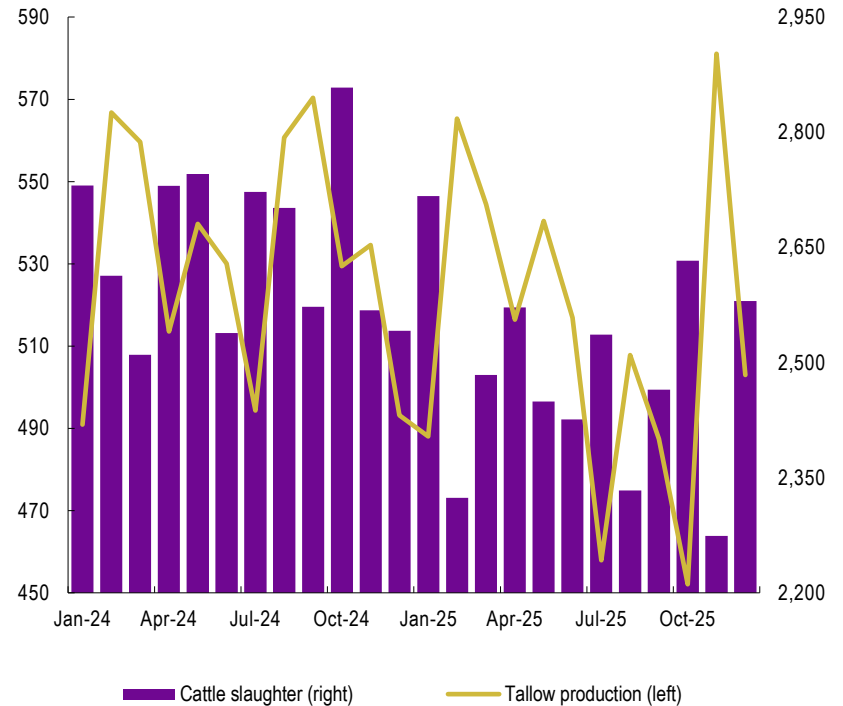


Source: Fastmarkets

- Animal fat supply is determined by livestock slaughter, not price signals
- US cattle slaughter has declined following several years of herd liquidation
- Weekly slaughter rates have remained consistently below year-ago levels
- Higher carcass weights have only partially offset lower cattle numbers
- Cattle supply responds slowly due to multi-year herd rebuilding cycles
- Limited supply growth comes as biofuel demand continues to expand

Cattle slaughter versus tallow production

(1,000 head and million lbs)



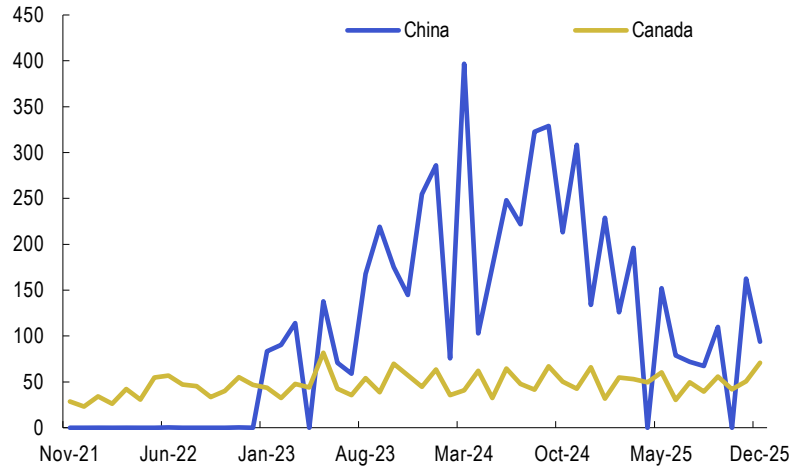
Source: USDA, Fastmarkets

Imports: Filling the supply gap



Used cooking oil, yellow grease US imports

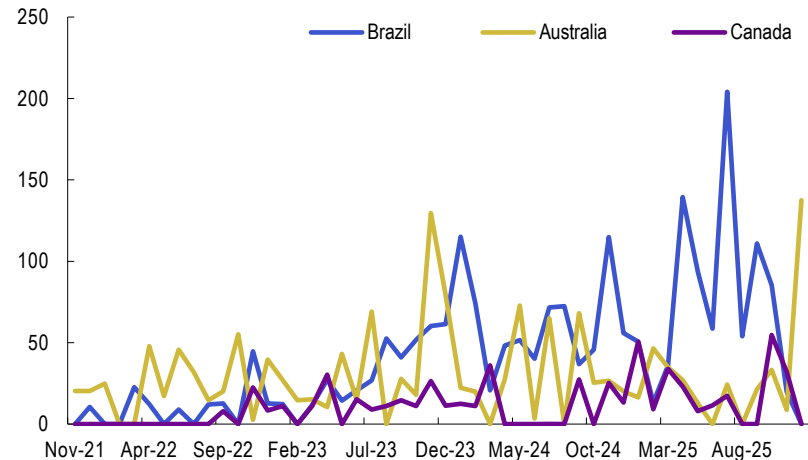
(Million pounds)



Source: USDA, Fastmarkets

Inedible tallow imports

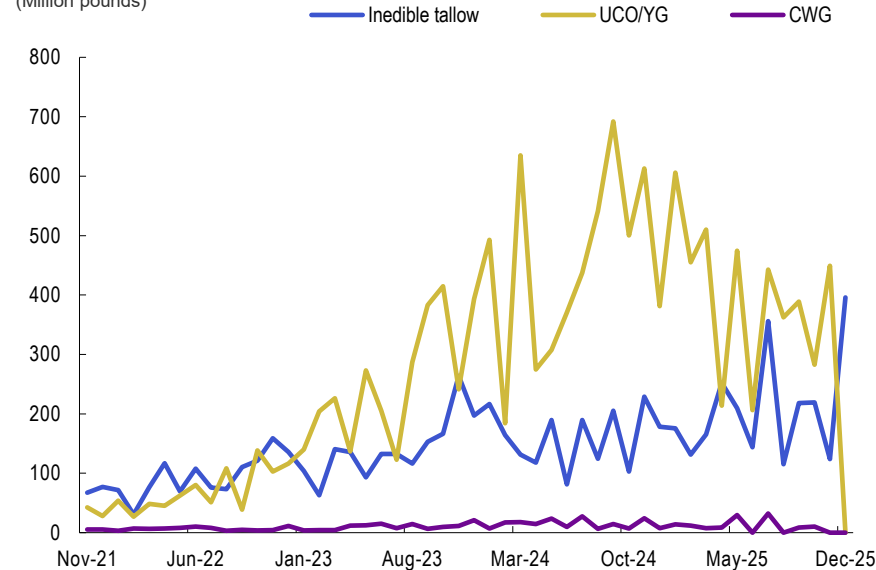
(Million pounds)



Source: USDA, Fastmarkets

US fat, oil imports

(Million pounds)



Source: USDA, Fastmarkets

- Imports became a key balancing supply source as renewable diesel demand outpaced domestic production

- US UCO imports more than doubled from ~1 MMT in 2021 to ~2.4 MMT in 2024

- Brazil emerged as the largest supplier of imported tallow to the US

- August 2025 tariffs on Brazilian tallow disrupted a major trade flow

- 45Z rules limiting foreign feedstocks create additional barriers for imports

- Despite policy headwinds, imports may persist due to RD infrastructure

- Recent tariff reductions (~10%), arbitrage opportunities have renewed interest in Latin American and Australian supply

Biofuel Policy Driving Animal Fat Demand



45Z Clean Fuel Production Credit

- Replaced the \$1/gal blender's tax credit in 2025, tying incentives to lifecycle GHG reductions
- Eligibility limited to US, Canada, and Mexico feedstocks, effectively excluding most foreign fats and oils
- Narrows the advantage of very low-CI feedstocks, bringing soybean oil closer to parity
- Acts as an effective "penalty" on imports, impacting global trade flows

Renewable Fuel Standard (RFS / RVO)

- Proposed 2026 RFS includes ~5.6B gallons of biomass-based diesel (~40–45B lbs feedstock demand)
- Establishes the baseline level of biofuel demand in the US market
- Biodiesel and renewable diesel generate D4 RINs, linking fats demand to fuel margins, and reinforces biofuels as the dominant demand driver for animal fats
- Proposed "half-RIN" treatment for foreign feedstocks discourages imports

Small Refinery Exemptions (SREs)

- Exemptions reduce individual refinery obligations under the RFS
- EPA increasingly reallocates exempted volumes back into the mandate
- ~1.3–1.4B gallons of SRE reallocation included in the 2026 proposal
- Supports overall demand by preventing mandate erosion

~45B lbs

Feedstock demand implied by RFS biomass-based diesel volumes

~15B lbs

Total US animal fat supply

30-40%

Imports' share of biofuel feedstock supply

>300%

Growth in renewable diesel capacity since 2020



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CURRENT ASSESSMENTS IN THE EUROPEAN MARKET

DDP North-West Europe

Category 1 and 2 mixed animal fat max 30% ffa

Category 3 mixed animal fat max 15% ffa

Category 3 pure beef tallow 10% ffa

Poultry fat 8% ffa

Category 3 bone fat, 5% ffa

Category 3 bone fat high grade, 5% ffa, 200 ppm polyethylene

Poultry fat 2% ffa

Edible beef tallow 2% ffa

Edible lard 1.5% ffa

EXW Eastern Europe

Category 3 mixed meat and bone meal, 50% pro

Category 3 poultry meal, 65% pro



EUROPE

AG-PF-0008 **Poultry fat, 8% ffa, ddp Northwest Europe, €/tonne**

Quality: Free fatty acids (FFA) max. 8%, moisture, impurities and unsaponifiable matter (MIU) max 1%

Quantity: Minimum 100 tonnes

Location: Northwest Europe, ddp

Timing: Delivery up to 45 days following date of sale

Unit: EUR/tonne

Publication: Weekly, Thursday, 4 pm London time

AG-PF-0009 **Poultry fat, 2% ffa, ddp Northwest Europe, €/tonne**

Quality: Free fatty acids (FFA) max. 2%, moisture, impurities and unsaponifiable matter (MIU) max 1%

Quantity: Minimum 100 tonnes

Location: Northwest Europe, ddp

Timing: Delivery up to 45 days following date of sale

Unit: EUR/tonne

Publication: Weekly, Thursday, 4 pm London time

AG-TLW-0026 **Category 3 mixed animal fat, 15% ffa, 97%, ddp Northwest Europe, €/tonne**

Quality: Free fatty acids (FFA) max. 15%, moisture, impurities and unsaponifiable matter (MIU) max 3%, purity min 97%

Quantity: Minimum 100 tonnes

Location: Northwest Europe, ddp

Timing: Delivery up to 45 days following date of sale

Unit: EUR/tonne

Publication: Weekly, Thursday, 4 pm London time

AG-TLW-0027 **Category 3 bone fat, low grade, 5% ffa, 98%, ddp Northwest Europe, €/tonne**

Quality: Free fatty acids (FFA) max. 5%, moisture, impurities and unsaponifiable matter (MIU) max 2%, purity min 98%

Quantity: Minimum 100 tonnes

Location: Northwest Europe, ddp

Timing: Delivery up to 45 days following date of sale

Unit: EUR/tonne

Publication: Weekly, Thursday, 4 pm London time

