ENOUGH

EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Is decarbonisation a technical or a political issue?

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Tech-Policy

Tools to reduce GHG emissions: increase energy efficiency, phase out fossil fuels, increase transparency

Direction and ambition: biding targets, driving investments, coordination, infrastructure and research

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Technological innovation

Essential for GHG emissions mitigation across all sectors but must be paired with institutional, behavioral, and infrastructural change

The path to net zero in food systems is technologically feasible but must be politically orchestrated and socially inclusive
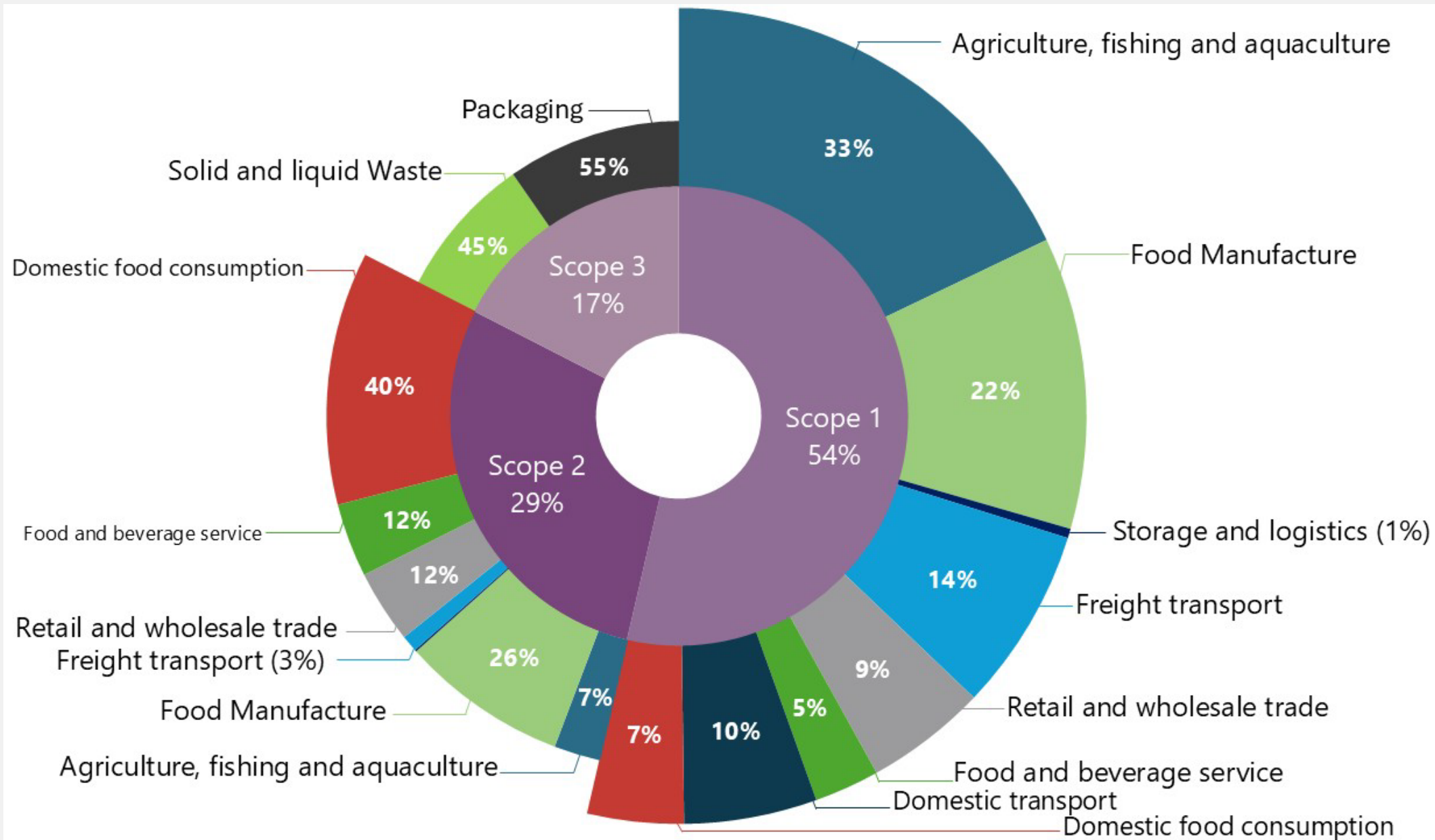
Breakdown of Scope 1,2, and 3 GHG emissions by sectors of the food supply chain in ten European countries
(Norway, Germany, United Kingdom, Italy, France, Belgium, Lithuania, Austria, Poland, Hungary) for the base year 2019. Based on ENOUGH emissions inventory

Domains

1
Technology

2
Policies

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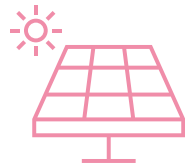
Technology across the food supply chain stages

1. Packaging

Scope 1 and 2 emissions through energy use in production and lifecycle emissions from waste

Impact

Up to 40% reduction in GHG emissions is achievable in packaging via material substitution and improved design (World Bank, 2023)

Food waste reduction through packaging innovation could reduce global emissions by up to 8–10% (FAO, 2023)

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Technology across the food supply chain stages II

2. Food Manufacturing

Food processing is energy and water-intensive often dependent on fossil fuels, especially in thermal operations like drying, sterilizing, and pasteurization

Impact

EU food processing industry could reduce emissions by 50–60% by 2040 through electrification and energy efficiency (European Commission, 2023)

Process improvements can reduce Scope 1 and 2 emissions significantly in dairy, meat, and bakery subsectors (WRI, 2022)

Technology across the food supply chain stages III

3. Cold-chain logistics

Cold storage and refrigerated transport are essential for perishable foods but highly energy-intensive and HFC-dependent

Impact

Transitioning to low-emission cold chains could cut GHG emissions from refrigerated transport by up to 70% by 2050 (WRI, 2022)

Reduced food loss through efficient cold chains can address ~10% of global emissions (FAO, 2023)

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Technology across the food supply chain stages IV

4. Transport and distribution

Transport accounts for 6–10% of total food-related GHG emissions especially animal products, frozen goods, and globally traded commodities

Impact

Electrifying light-duty food transport fleets in Europe could cut transport emissions by up to 70% by 2040 (EC, 2023)

Combining smart routing and vehicle electrification could save 35 $MtCO_2$ equivalent annually in the EU (WRI, 2022)

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Clean Industrial Deal

1. Scaling Strategic Net-Zero Technologies

2. Removing Bottlenecks in Deployment

3. Boosting Demand via Procurement and Market Access

4. Financing and Investment Frameworks

5. Building Workforce and Skill Capacity

Establish Net-Zero Industry Academies to train 100,000 workers in clean-tech manufacturing over three years, and promote cross-border qualification recognition
Equip industrial ecosystems with skilled labor aligned to net-zero projects, workforce mobility, and vocational continuity

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Policy to enable net-zero

Policy is central to both enabling innovation and scaling its adoption across society (IPCC AR6 2023)

1

Set target: Define legally binding climate objectives

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Address externalities: Internalize carbon costs and env degradation

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Ensure equity: Compensate or support vulnerable groups

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Policy and technology

Achieving net-zero emissions is not merely a question of having the right technologies or the right policies

Technology is the "How" — Policy Is the "Why" and "When"

Policy enables technology at scale

Technology informs and limits policy ambition

Jointly, they enable systemic transformation

Neither technology nor policy can drive net-zero transitions in isolation

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Thank you

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