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EUROPEAN CSOS RATE SEVEN DECARBONIZATION LEVERS

Survey insights on industry decarbonization

EXECUTIVE SUMMARY

Sustainability has risen over the past decade to become one of the top priorities for major corporations. The Paris Agreement in 2015 committed signatory nations to trying to limit global temperatures to 1.5 degrees Celsius. As part of the European Green Deal initiatives to achieve a carbon neutral economy by 2050, the EU Taxonomy classifies economic activities according to how environmentally sustainable they are. And the increase in extreme weather events has contributed to a rise in demand from consumers for products with as little impact as possible on the environment.

However, businesses' strategies to decarbonize and reduce other environmental impacts can be costly, and some sectors are finding it difficult to find measures that will be both feasible and effective. As of today, the majority of European companies have declared ambitious commitments to reach net zero emissions before 2050. But only few companies have made advanced progress in implementing concrete measures aligned with their decarbonization ambitions.

To address this challenge, we identified seven central levers for decarbonization that companies across industries need to systematically address. We then surveyed chief sustainability officers in seven industries across European countries to determine the current and future relevance of the seven decarbonization levers. The almost 200 who replied also assessed the main challenges in implementing the levers — such as cost, the difficulty in identifying suitable use cases, and the scarcity of market offerings.

The identified seven central levers for decarbonization encompass a range of strategies aimed at reducing environmental impact while promoting sustainability. From renewable power generation and energy efficiency to combating pollution, embracing the circular economy, and optimizing resource efficiency, each lever plays a crucial role in driving down carbon emissions. Furthermore, the emergence of innovative technologies such as carbon capture and storage (CCS) and green molecules offers exciting opportunities for future decarbonization efforts. By capturing CO2 emissions and transitioning to sustainable energy carriers, industries can significantly mitigate their environmental footprint.

However, the implementation of these levers comes with challenges across all industries, including high investment costs, a lack of expertise, and the need for industry-specific solutions. Addressing these challenges requires a concerted effort from both businesses and policymakers to drive innovation, investment, and collaboration across sectors. Each industry faces unique challenges in implementing decarbonization levers, with varying degrees of readiness and perceived barriers. While some, like the energy sector, are more advanced and aware of the importance of decarbonization, others, such as consumer goods and retail, face significant hurdles due to their complex nature and supply chains.

In summary, the identification of these seven central levers provides a roadmap for businesses to navigate the complex landscape of decarbonization. By strategically addressing each lever and overcoming associated challenges, industries can accelerate their journey towards a sustainable, carbon-neutral future.

LEVERS FOR DECARBONIZATION

Utilizing renewable power

Renewable power generation harnesses natural resources that are constantly replenished and have minimal impact on the environment. It typically refers to solar, wind, hydro, geothermal, and biomass electric power.

Implementing energy efficiency measures and electrification

This lever focuses on energy-efficient technologies and the transition towards electricity as a primary energy source. The approach aims to reduce power and heat consumption, decrease greenhouse gas emissions, and enhance overall sustainability.

Combatting environmental pollution

Preventing environmental pollution involves minimizing or eliminating the release of harmful substances into the environment, thereby protecting ecosystems, human health, and the overall wellbeing of the planet. This lever aims to combat environmental harm including air and water pollution, soil contamination, and the generation of hazardous waste.

Embracing the circular economy

The circular economy refers to the shift from a traditional linear “take-make-dispose” model of production and consumption to a more sustainable and regenerative approach. Products are kept in use as long as possible. When they reach the end of their lifecycle, they are reused, recycled, or repurposed to create new value. The circular economy aims to minimize waste generation, reduce resource extraction, and promote the efficient use of materials and energy.

Optimizing resource efficiency

The efficient use of resources aims to optimize the utilization of resources including minerals, metals, water, land, and raw materials, as well as to minimize waste. The object of this lever is to achieve sustainable resource management. It implies strategies and practices that maximize resource efficiency, reduce consumption, and promote responsible resource use.

Leveraging carbon capture and storage (CCS) technologies

Carbon capture and storage (CCS) technologies aim to capture carbon dioxide (CO2) emissions from industrial processes and store them underground. This prevents their release into the atmosphere, where they would contribute to global warming.

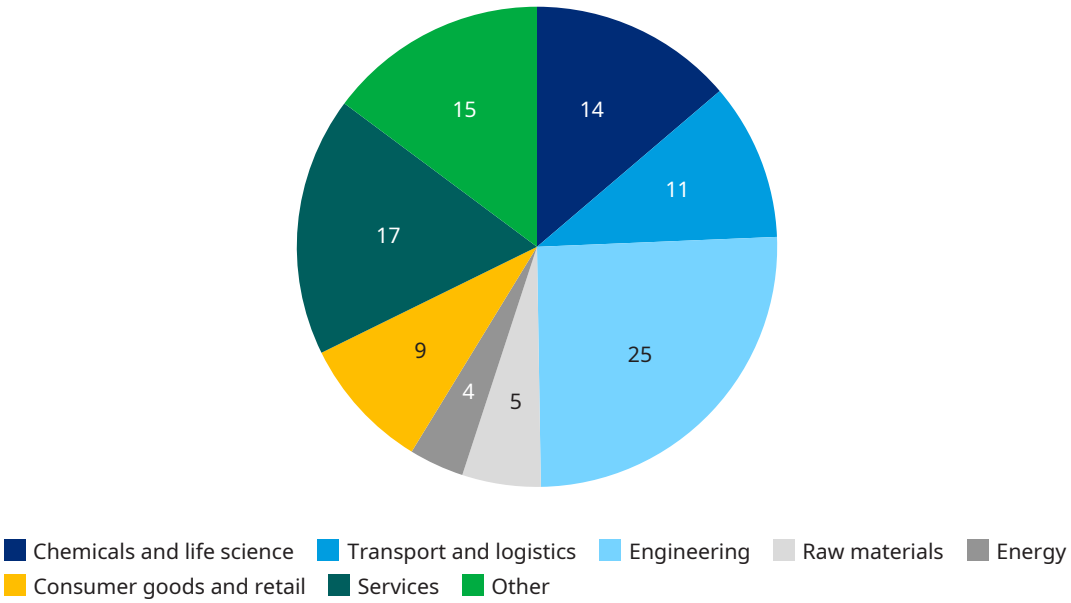
Utilizing green molecules

Green molecules are energy carriers such as green hydrogen and green biomass, and they offer an alternative to fossil fuels. When the energy they carry is generated from a sustainable source, they enable a green transformation of an industry's energy structure. Their potential is especially great in industries with high energy demand.

STRUCTURE AND RESPONDENTS OF STUDY

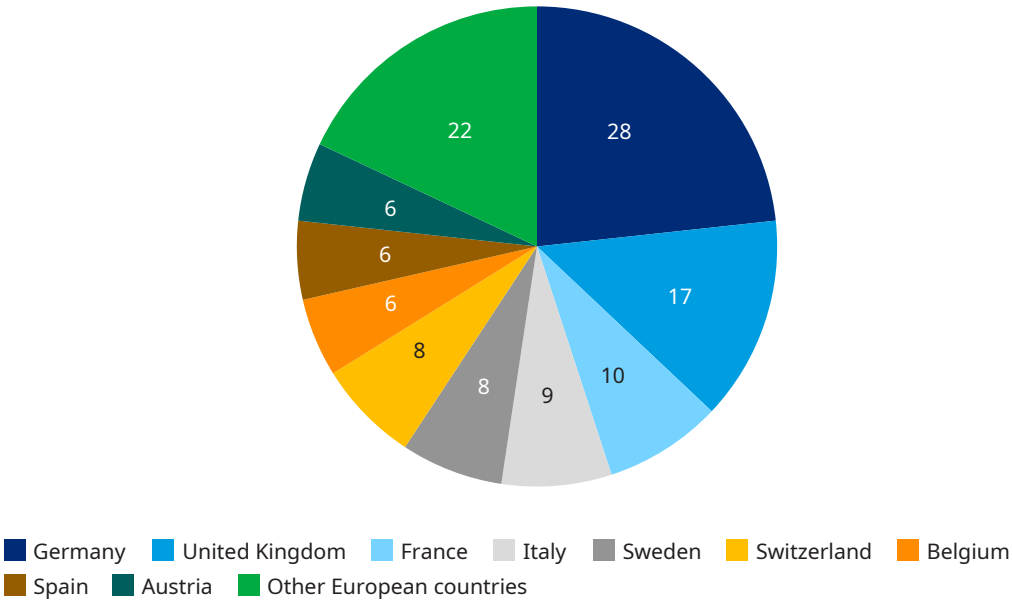
Chief sustainability officers (CSOs) in the European Union were asked about the current and future relevance of these seven decarbonization levers and the challenges to implementing them. A total of around 200 responses were received, of which 85% came from seven major industries: Chemicals and life sciences, engineering, transport and logistics, consumer goods and retail, services, raw materials, and energy (see Exhibit 1). Participants are spread across 22 European countries as depicted in Exhibit 2.

Exhibit 1: Structure of study participants across industry clusters
In % of total respondents



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

Exhibit 2: Structure of study participants across countries
In % of total respondents



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

KEY RESULTS

Green essentials are well established across industries

Renewable energy sources coupled with enhancements in energy efficiency and a shift towards electrification have become standard industry levers for decarbonization. They are already relevant and practicable for all industries, and they are essential building blocks for quick, tangible progress toward environmental goals.

All respondents to the survey expressed the importance of these levers, and more than 89% of them attributed a high or very high relevance to them today. The key challenge is to finance these levers while remaining competitive.

Extended core for holistic protection of the environment increasingly gaining importance

These levers — preventing pollution, the circular economy, and resource efficiency — do not only target decarbonization, but rather a holistic protection of the environment. They are perceived as less immediately relevant than the green essentials: More than 68% of participants perceived these levers as immediately or highly relevant.

But their relevance is growing, and they will soon become essential. They present more challenges than the green essentials, these will need to be solved before a comprehensive implementation.

Emerging eco-revolution of carbon capture and storage (CCS) and green molecules currently with limited industry relevance

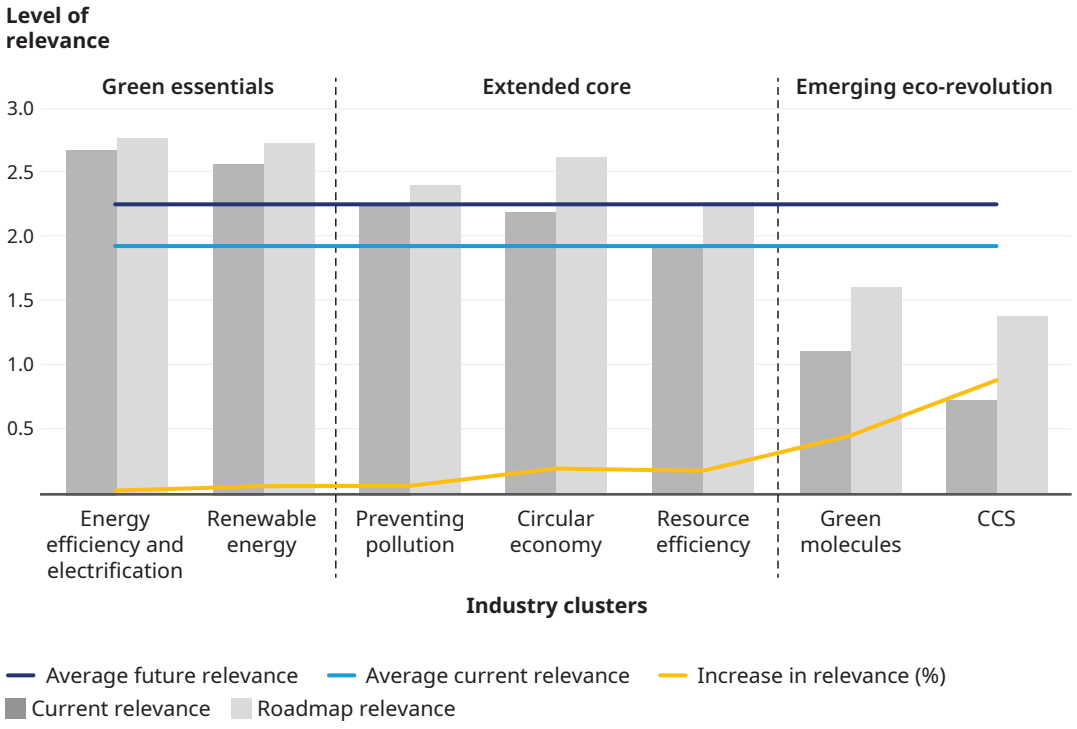
Carbon capture and storage (CCS) and green molecules have enormous potential as decarbonization levers for the future. They will drive a new revolution, propelling industries toward a future that is resilient and sustainable.

So far, however, they are less relevant to industry than the levers in the other two clusters because of the hurdles to implementation. There is still a need to build up expertise, establish use cases, and develop practical offerings — all of which will require significant investment. Respondents said that the relevance of CCS would jump 88% in future from its current level, while that of green molecules would rise 45%.

These levers will most likely take the form of industry-specific solutions. To speed up development, governments and regulatory bodies should provide the required infrastructure and subsidize innovative solutions.

Exhibit 3: Relevance of decarbonization levers across all industries sorted by current relevance

Responses on scale from no relevance (0) to high relevance (3) for current and future relevance



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

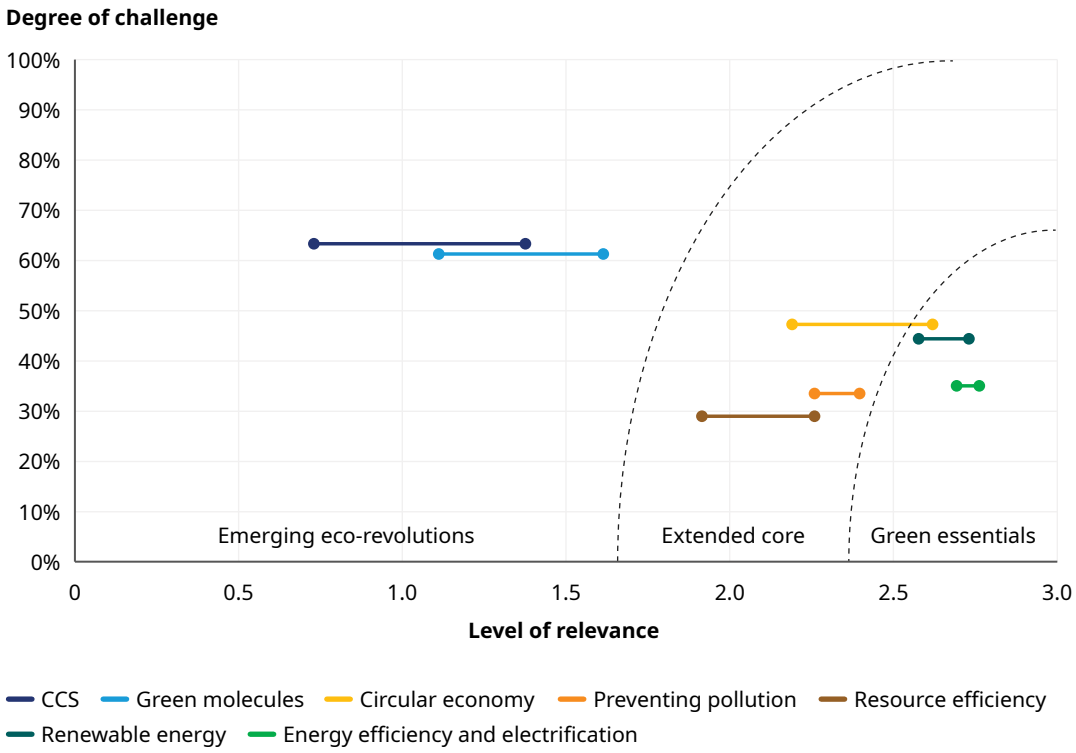
MATRIX VIEW ON DEGREE OF CHALLENGE FOR IMPLEMENTATION OF THE THREE CLUSTERS

One challenge in all levers and for all industries is the high initial investment and subsequent recurring costs. For each lever, all the respondents from at least one industry agreed that costs were a challenge: This was the case for the green molecules lever and the raw materials industry, for example.

Cost is a particular concern for industries where there is a large amount of competition, such as transport and logistics and consumer goods and retail. Companies likely fear losing customers if spending on the levers forces them to raise prices during the transition.

However, at least for the first two clusters (green essentials and the extended core), available solutions exist. Respondents indicated a low degree of challenge for these decarbonization levers, making them natural places for companies to pursue decarbonization efforts (see Exhibit 4). That is not the case with the two levers in the emerging eco-revolution cluster.

Exhibit 4: Distinct clusters for decarbonization levers in Europe across industries
Clustering based on reported current and future relevance and on challenges



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

SPOTLIGHT ON CCS AND GREEN MOLECULES: HIGHEST INCREASE IN RELEVANCE BUT SIGNIFICANT DIFFERENCES AMONG THE INDUSTRIES

Two levers stood out in the results due to their drastic change in relevance over the next years. Carbon capture and storage (CCS) and green molecules exhibit the lowest reported current relevance due to the substantial challenges they present. But their revolutionary nature means these levers are expected to play a pivotal role in the final phase of decarbonization, and they registered the highest expected increase in relevance. Regulatory bodies should therefore focus on making them cheaper and more widely available (see Exhibit 5 and 6).

Carbon capture and storage

There is currently a lack of available offerings and expertise in CCS, while approximately 70% of respondents perceived high investment costs as a significant — or at least moderate — hurdle (see Exhibit 7). However, most participants do not consider the lack of acceptance as a key challenge for CCS adoption.

The steel industry is actively engaged in the development of CCS, and there is a broad consensus that the technology will play a crucial role in achieving sustainable production. Steel might be more advanced in the field than other industries, but this also means it has a deeper awareness of the associated costs and implementation challenges. Highest rated challenges are the large investment required, the need to identify suitable offerings and the right way to implement the technology.

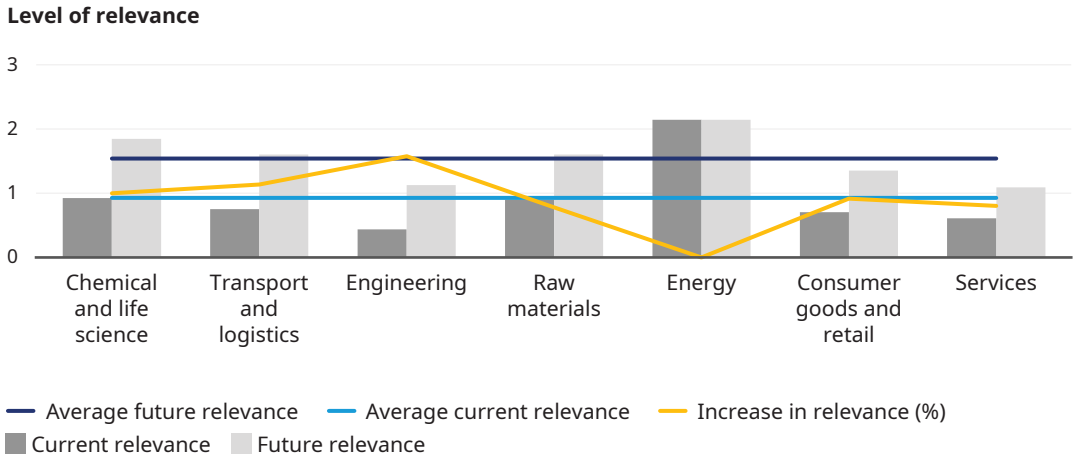
Green molecules

Green molecules have the potential to revolutionize the production and use of chemicals, fuel, and other forms of energy, making them more sustainable. The main challenge is to identify use cases and the right implementation paths — a contrast with CCS, for which potential use cases are abundant (see Exhibit 8).

The technology appears especially relevant to the raw materials, energy, chemicals and life sciences, and transport and logistics industries. Other industries with less-clear applications, such as engineering, rate challenges lower. Green molecules could be particularly significant for the raw materials industry, both at present and in the future, given the sector’s current non-sustainable energy sources and resulting high emissions.

Exhibit 5: Relevance of carbon capture and storage (CCS) across all industries

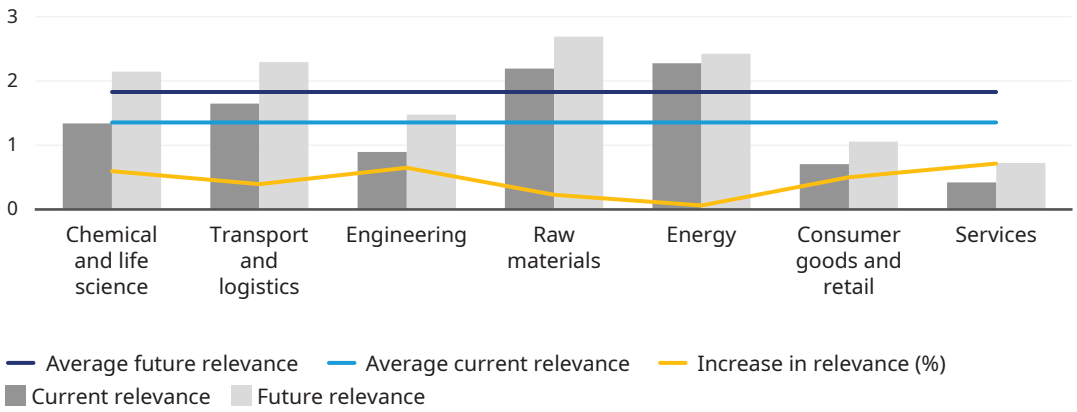
Responses on scale from no relevance (0) to high relevance (3) for current and future relevance



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

Exhibit 6: Relevance of Green Molecules across all industries

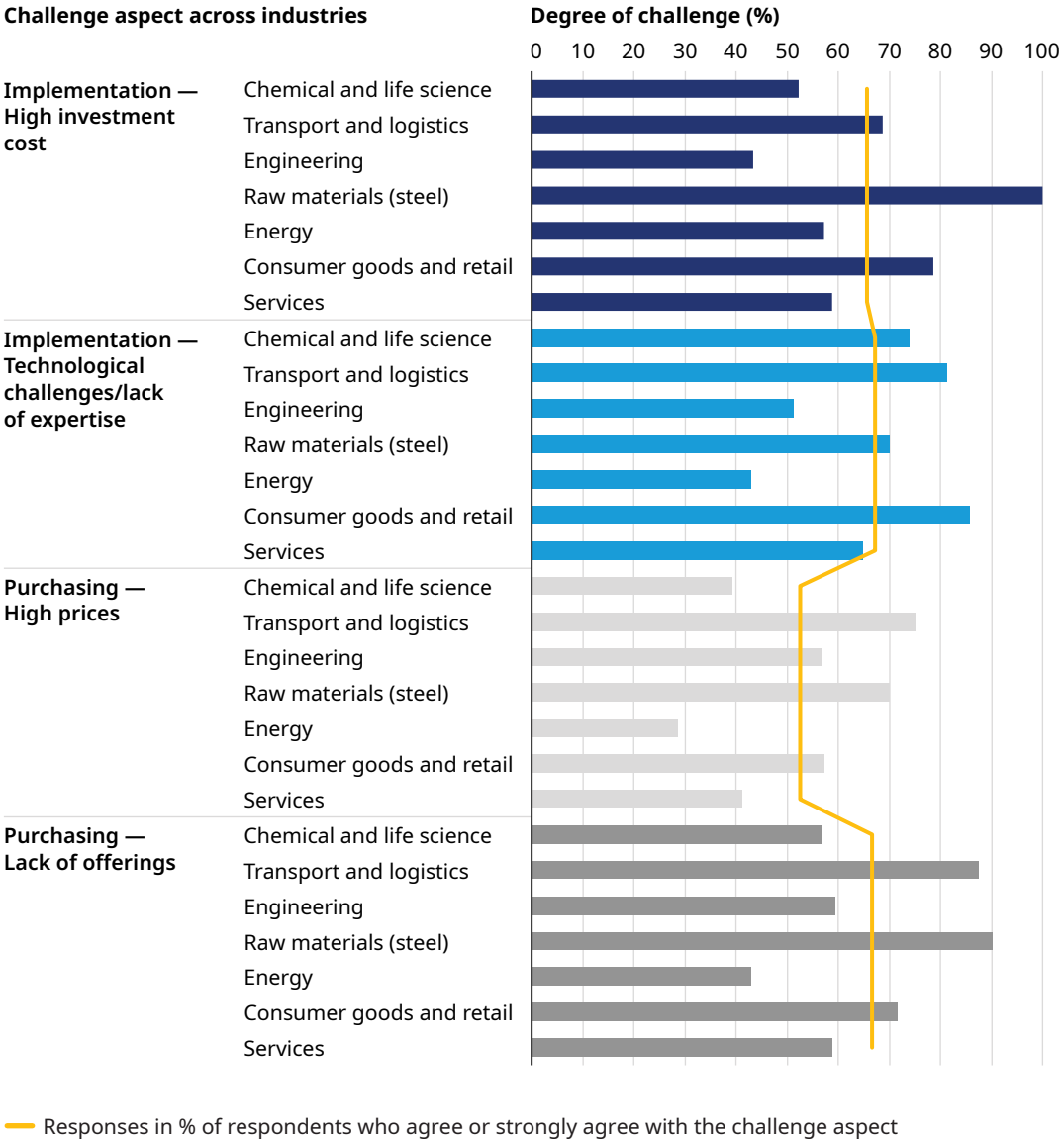
Responses on scale from no relevance (0) to high relevance (3) for current and future relevance



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

Exhibit 7: Core challenge aspects regarding Carbon Capture & Storage (CCS) across all industries

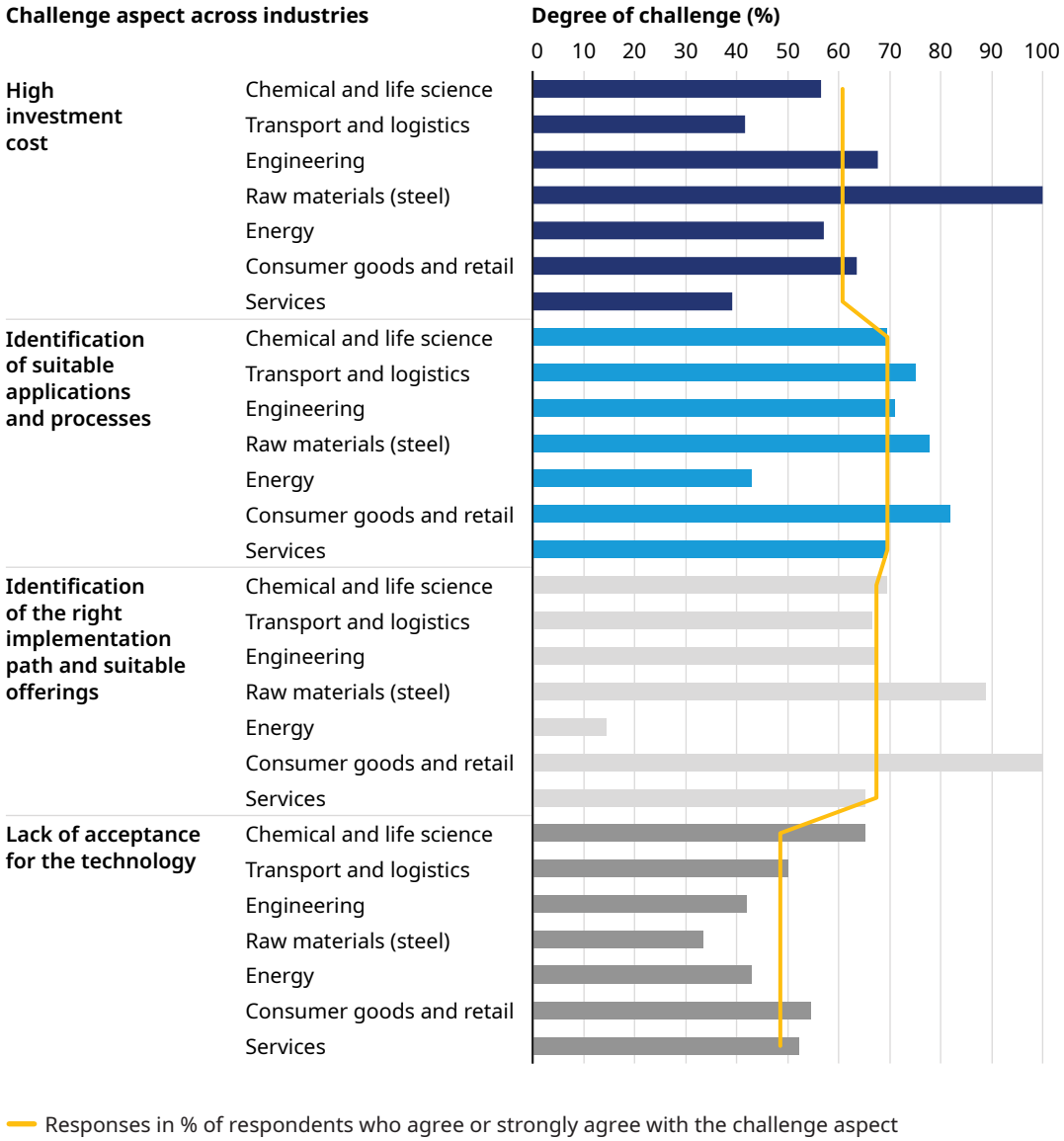
Grouped by challenge aspect



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

Exhibit 8: Core challenges regarding green molecules across all industries

Grouped by challenge aspect



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

Insights across challenges — challenges vary by industry with consumer goods seeing the highest hurdles and the energy industry the lowest

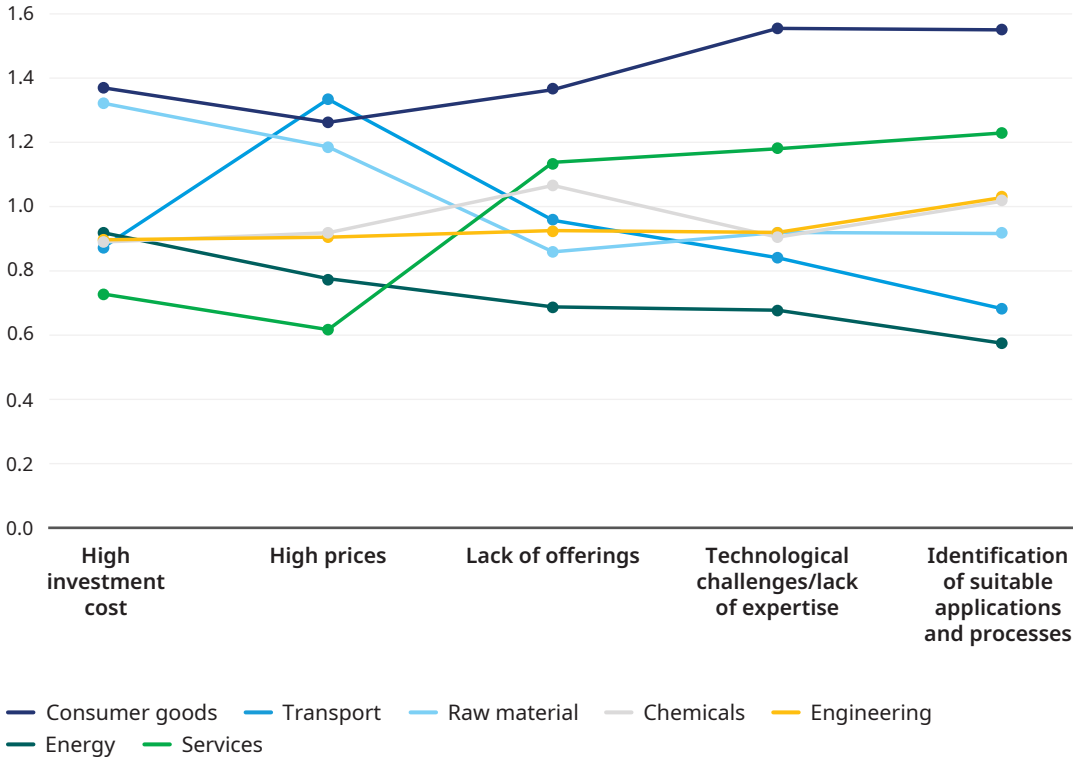
Different industries face different challenges with decarbonization (see Exhibit 9). Some — notably, those with a high degree of competition — are extremely price sensitive. This is the case with raw materials and transport and logistics: They are well aware of the offerings and use cases but fear a possible loss of customers during the green transition if adoption of sustainable technology causes a rise in prices.

Consumer goods and retail is another price-sensitive industry, but it faces additional challenges because of a lack of offerings and expertise for the various levers. In addition, the use cases for most of the levers are still unclear.

The services industry is less price sensitive, but it lacks applicable offerings and expertise. The engineering, chemicals and life sciences, and energy industries do not face any particular challenges with the seven levers.

Exhibit 9: Cross lever comparison — deviation in degree of challenge compared to the mean of all industries

Responses in % of respondents who agree or strongly agree with the challenge aspect for the industry over mean for all industries



Source: Decarbonization Survey 2023 TUM x Oliver Wyman

The survey revealed particular challenges for each of the seven main industries that respondents are active in. Here are some observations for each industry.

Chemicals and life sciences

The levers presenting the biggest challenges for chemicals and life sciences are CCS and green molecules. The industry is already advanced in the fields of environmental protection and efficient use of resources, and respondents perceived these to present a low degree of challenge.

However, the chemicals and life sciences industry face more challenges than other industries in finding suitable applications and processes for the decarbonization levers.

Transport and logistics

The main challenges for transport and logistics are in CCS, green molecules, and the circular economy. The transport and logistics industry is already highly aware of the importance of environmental protection and the efficient use of resources. Respondents perceived these to have a low degree of challenge. However, the industry is one of those most challenged by the additional costs of some of the levers.

Services

The services industry is less carbon-intense than many other industries, but it must still identify ways to decarbonize. In general, it perceives lower degrees of challenge than other industries with the decarbonization levers. In particular, it is significantly less concerned with the costs.

But the industry faces challenges in finding applicable solutions, use cases and expertise. Among the levers, the circular economy is found challenging, as are those levers seen as challenging for other industries — that is, CCS and green molecules.

Energy

The energy industry finds the same levers challenging as other industries: CCS and green molecules. The most significant challenge is high investment costs.

In general, however, the industry perceives the degree of challenge for all levers as significantly lower than other industries. That is likely because the energy industry is highly aware of the need for and importance of these levers, and many energy companies are already exploring the available options.

Consumer goods and retail

Compared to other industries, consumer goods and retail ranks the relevance of the seven levers as low and the degree of associated challenges as by far the highest. The industry finds CCS, green molecules, and the circular economy to be the most challenging levers.

One difficulty likely comes from the industry's high product diversity, which makes it hard to establish effective applications and use cases. Another is the complex value and supply chains. These chains stretch from production to retail, which implies that a high percentage of the industry's emissions are Scope 3 — that is, they are generated in the value chain and therefore hard for individual companies to control. As a result, the industry needs to take a holistic approach to decarbonization.

Engineering

As with other industries, the main challenges in engineering come in CCS, green molecules, and the circular economy. The industry perceives a relatively low degree of challenge in environmental protection and the efficient use of resources, likely thanks to actions in those fields that are already well established in the industry. However, engineering is finding it slightly more challenging than other industries to find suitable applications and processes for decarbonization.

Raw materials

As with other industries, the main challenges are in CCS and green molecules — but the raw materials industry finds the circular economy less challenging. In all levers, the raw materials industry finds the additional costs more challenging than do most of the other industries.

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