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Retail Practice

Decarbonizing grocery

Here's how the grocery sector can protect the planet and position itself for green growth.

by Bartosz Jesse, Alessa Perotti, and Daniel Roos

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Thinking about cutting back on carbs? Some people swear by it; others see it as just another food fad. By contrast, cutting back on carbon emissions is a universal mission that everyone in the global food system can rally behind. Unless people reduce CO_2, methane, and other greenhouse-gas (GHG) emissions, sea levels will rise and catastrophic weather events are likely.[1] Food is an important variable in this equation—what people eat, how people grow it, and how people get it from producers to consumers.

Currently, the food system accounts for more than 30 percent of global GHG emissions (Exhibit 1). While grocers' direct contribution to these emissions is relatively low, the grocery sector has a unique opportunity to become the driving force for decarbonization of the entire food system (see sidebar "Building a sustainable food system"). Moreover, decarbonization presents an opportunity for grocers to save costs—for example, by using more energy-efficient equipment—and to capture value by differentiating their offerings.

In the fight against climate change, the time is ripe for grocers to move from "playing defense" (risk mitigation) to "playing offense" (targeted value creation)—not only to help protect the planet, but also to strengthen their businesses. The pressure from multiple stakeholders to make grocery sustainable is growing. For example, 37 percent of European consumers deeply care about sustainability—a concern that cuts across all generations.[2] Importantly, according to new McKinsey research, many consumers are already paying more for sustainable options, especially for products they consider to be both beneficial for the planet and good for themselves.[3]

Sustainability also matters in the competition for talent. Employers that are perceived as sustainable stand a better chance to attract, retain, and inspire purpose-driven people.[4] Meanwhile, more and more investors are adopting environmental, social, and governance criteria and channeling capital to sustainable companies.

On the regulatory front, Europe has set binding targets for reduction of GHG emissions to achieve net zero (or no net emissions) by 2050.[5] Internationally, the UN Climate Change Conference in Glasgow (COP26) saw the first concrete methane reduction pledges,[6] and in New Zealand, the government has just unveiled a plan to charge farmers for the methane emissions from the animals they keep.[7] In the Netherlands, plans to slash emissions associated with livestock farming recently gave rise to nationwide protests by farmers, culminating in a gathering of tractors outside the parliament building.[8] Much is at stake for grocers and their

Exhibit 1

The food system emits about a third of global greenhouse-gas emissions.

Global greenhouse-gas emissions, CO_2 equivalent, %

Source: Monica Crippa et al., "Food systems are responsible for a third of global anthropogenic GHG emissions," *Nature Food*, March 2021, Volume 2, Number 3

[1] *Climate change 2022: Impacts, adaptation, and vulnerability*, Intergovernmental Panel on Climate Change, 2022.
[2] McKinsey Conscious Consumer Sentiment Survey, March 2022.
[3] For more, see Martin Boidin, Søren Fritzen, Sebastian Gatzer, and Björn Timelin, "Capturing the commercial value of sustainability in CPG," forthcoming on McKinsey.com.
[4] Oliver Pickup, "How sustainability has become an advantage in the talent war, but candidates aren't fooled by 'greenwashing,' say experts," WorkLife, November 9, 2021.
[5] "A European Green Deal," European Commission.
[6] "Global methane pledge," Climate and Clean Air Coalition, 2021.
[7] Damien O'Connor and James Shaw, "Government welcomes progress on agricultural climate action," New Zealand Government, June 8, 2022.
[8] "Startnotitie Nationaal Programma Landelijk Gebied," Government of the Netherlands, June 10, 2022.

Building a sustainable food system

This article is part of a new McKinsey series on advancing sustainability in the global food system. The series covers all stages of the value chain, from production to consumption, and various aspects of sustainability as defined in McKinsey's holistic HE^{2}AL framework: health, environment, economy, animal welfare, and livelihoods. To read other articles in the series, see our Retail insights on McKinsey.com.

For additional information on sustainability in grocery, read "Grocers' sustainability opportunity in transforming the food system" in our *Navigating the market headwinds: The state of grocery retail 2022—Europe* report. Additionally, read "Capturing the commercial value of sustainability in CPG" by Martin Boidin, Søren Fritzen, Sebastian Gatzer, and Bjorn Timelin, forthcoming on McKinsey.com.

For a more comprehensive discussion of sustainable retail, see the sustainability chapter in the upcoming *Triple transformation of the EU retail and wholesale sector* joint report by EuroCommerce and McKinsey.

suppliers, and the challenge will only grow in the near future.

Most emissions are outside the direct control of grocers

Grocers seeking to comply with future reporting standards[9] and work toward net zero (see sidebar "Carbon neutrality versus net zero") are well advised to start by creating transparency around current GHG emissions along the entire value chain:

- scope 1 (direct emissions from grocers' operations)
- scope 2 (emissions from the generation of electricity and heat that grocers purchase)
- scope 3 (emissions from, for example, agriculture, food processing, waste, and transport upstream, as well as transport, consumption, and waste downstream)

According to a new McKinsey analysis of 40 of the world's largest grocers and their value chains, scope 1 and 2 emissions only account for about 7 percent of the total, on average, while about 93 percent of emissions are outside grocers' direct control (Exhibit 2). However, grocers can and should take advantage of their unique position in the value chain to move the needle on the decarbonization of the food system as a whole, from farmers and suppliers to intermediaries and consumers. This will not only help grocers meet their own science-based decarbonization targets[10] but will also support suppliers in their efforts to decarbonize food production and enable consumers to make sustainable choices.

Decarbonizing grocery operations (scopes 1 and 2)

About 7 percent of a typical grocer's emissions fall under scopes 1 and 2, and many retailers have already set reduction targets for these types of emissions. Indeed, most of the top grocers in Europe have set net-zero targets for scopes 1 and 2, with one leading retailer committing some €1 billion to achieve net zero by 2040, while the most ambitious among them aspire to reach net zero as early as 2030. Experience shows that energy consumption in stores can be reduced by 30–50 percent by modernizing lighting, refrigeration, heating, ventilation, air conditioning, and cooling alone. However, saving energy in stores is only one of multiple decarbonization opportunities for grocers. The principal levers they can pull to reach their scope 1 and 2 targets fall into four categories:

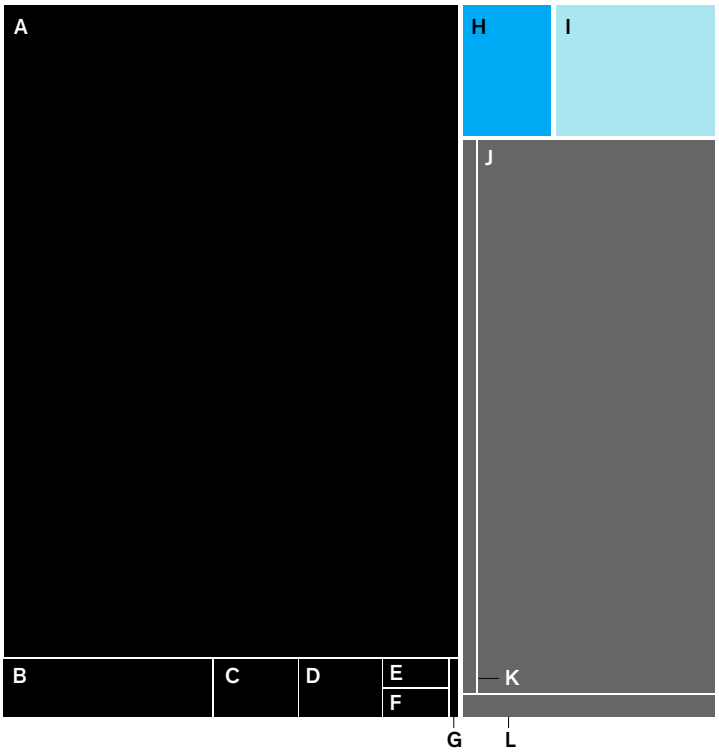
- net-zero stores
- net-zero warehouses

[9] "ISSB delivers proposals that create comprehensive global baseline of sustainability disclosures," IFRS Foundation, March 31, 2022.
[10] The Science Based Targets initiative requires companies to set specific scope 3 targets if scope 3 emissions exceed 40 percent of a company's total emissions. This is the case for the grocery sector. See *Science-based target setting manual*, Version 4.1, Science Based Targets, April 2020.

Exhibit 2

Grocers need to create a transparent baseline across all greenhouse-gas-emission scopes; scope 3 accounts for the majority of grocery emissions.

Greenhouse-gas emissions by source, %[1]



Scope 3 (upstream)

A	Purchased goods/services	58.6
B	Upstream transportation	2.5
C	Capital goods	1.0
D	Fuel and energy activities	1.0
E	Operations waste	0.4
F	Employee commuting	0.4
G	Business travel	0.1

Scope 1[2]

H	Direct emissions	2.5

Scope 2

I	Purchased energy[3]	4.4

Scope 3 (downstream)

J	Use of sold products	26.2
K	Downstream transportation	1.6
L	End-of-life treatment[4]	1.2

[1]Based on emission profiles of 44 global grocers (normalized by revenue).
[2]Scope 1 and 2 emissions provided as single totals; scope 3 emissions with negligible emissions or insufficient peer data omitted.
[3]Includes purchased electricity, steam, and heating and cooling.
[4]Most companies do not report food waste; therefore, number expected to be higher.
Source: CDP Worldwide; McKinsey analysis

— net-zero fleets

— sustainable manufacturing (for vertically integrated grocers)

In each of these categories, there are levers that are both less and more disruptive. In some cases, grocers will be able to curb emissions simply by optimizing operations—for instance, by increasing the temperature in fridges or by improving the routing of vehicles from warehouses to stores. In other cases, they will have to make bigger changes, such as substituting traditional internal combustion engine trucks with vehicles powered by electricity, hydrogen, or (as a short-term solution) biogas. A leading US retailer, for example, has started the process to convert its haulage fleet (comprising 10,000 tractors and 80,000 trailers) to low-emission technology.[11]

Another potentially powerful lever is the redesign of a grocer's network of distribution centers (DCs) to shorten routes from DCs to stores. For retailers that are also producers, manufacturing can often be made more efficient and sustainable—for example,

[11] Fernando Cortes, "Zero sum: How Walmart transportation is working to reduce emissions now and in the future," Walmart, June 8, 2022.

by using heat emissions from production to generate electricity and reducing or recycling waste.

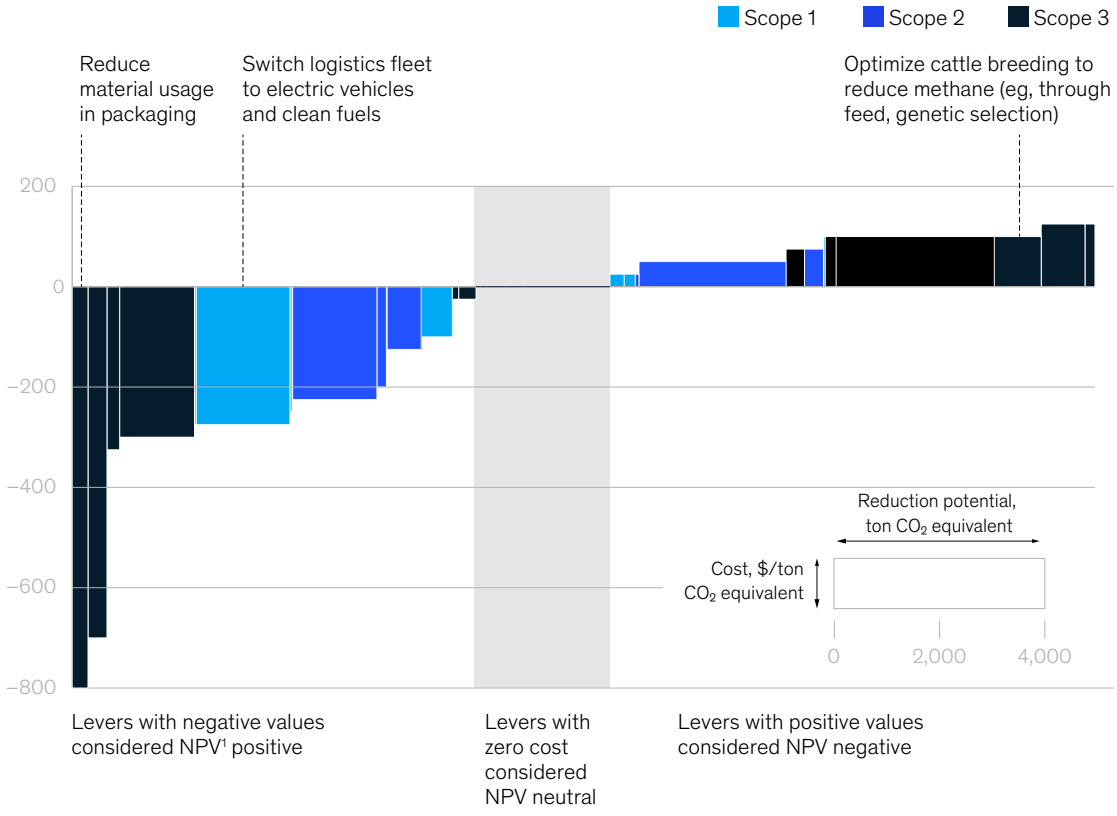
For most grocers, reduction of the majority of scope 1 and 2 emissions (60–70 percent) has a positive or at least neutral net present value (NPV). This is because emission reductions often also bring cost reductions, so the required investments benefit both the environment and the bottom line—even if the payback periods for decarbonization investments can be longer than those grocers are used to in other areas.

To capture both the environmental and the commercial benefits of decarbonization, grocers should consider not only creating transparency around their baseline emissions but also developing abatement strategies. Marginal abatement cost curves (MACCs) help decision makers identify and prioritize decarbonization levers that create incremental value, reduce costs, or at least pay for themselves (Exhibit 3). For example, a leading British grocer installed technology derived from Formula 1 racing in its fridges to redirect cold air back into the fridges, resulting in a 15 percent reduction in

Exhibit 3

Marginal abatement cost curves can support grocers' decisions on the implementation sequence of strategies for CO_2 reduction.

CO_2 abatement cost and reduction potential for grocery retailers, 2030 view, by abatement lever



Note: Additional potential from scope 3 downstream levers not included.
[1]Net present value.
Source: McKinsey analysis

energy use without having to install fridge doors (which can be perceived as a sales barrier[12]).

For some scope 1 and 2 emissions (30–40 percent), the decarbonization business case is currently NPV negative. But this could change as technology advances and energy costs rise. For example, the McKinsey Center for Future Mobility predicts that electric-powered light commercial vehicles (those weighing fewer than 7.5 tons) for urban use will achieve total-cost-of-ownership parity with diesel trucks by 2023, thanks to the growing range and decreasing cost of electric vehicles. By 2028, all e-truck segments are predicted to reach cost parity.

To take advantage of new technology as it becomes available, many grocers are picking up the pace at which they upgrade equipment. For example, one Southern European grocer used to refurbish its stores every ten years; now it has switched to a five-year cycle to reduce scope 1 and 2 emissions.

Decarbonizing food production and consumption (scope 3)

As discussed, the bulk of grocery emissions occur during production and consumption—up and down the value chain—and outside a grocer's direct control. Tackling these emissions is far more difficult than reducing scope 1 and 2 emissions.[13] One of the biggest challenges is the key role dairy and meat play in the Western diet, as these products account for almost half of all product-related scope 3 emissions (Exhibit 4). If the global cattle population were considered a country, it would be among the top three for GHG emissions.[14]

From a value-chain perspective, two-thirds of all scope 3 emissions occur at the farming and food-processing stages. One-third occurs during consumption, primarily driven by refrigeration, cooking, and waste disposal.

To create a robust fact base for the reduction of scope 3 emissions, GHG emissions can be analyzed

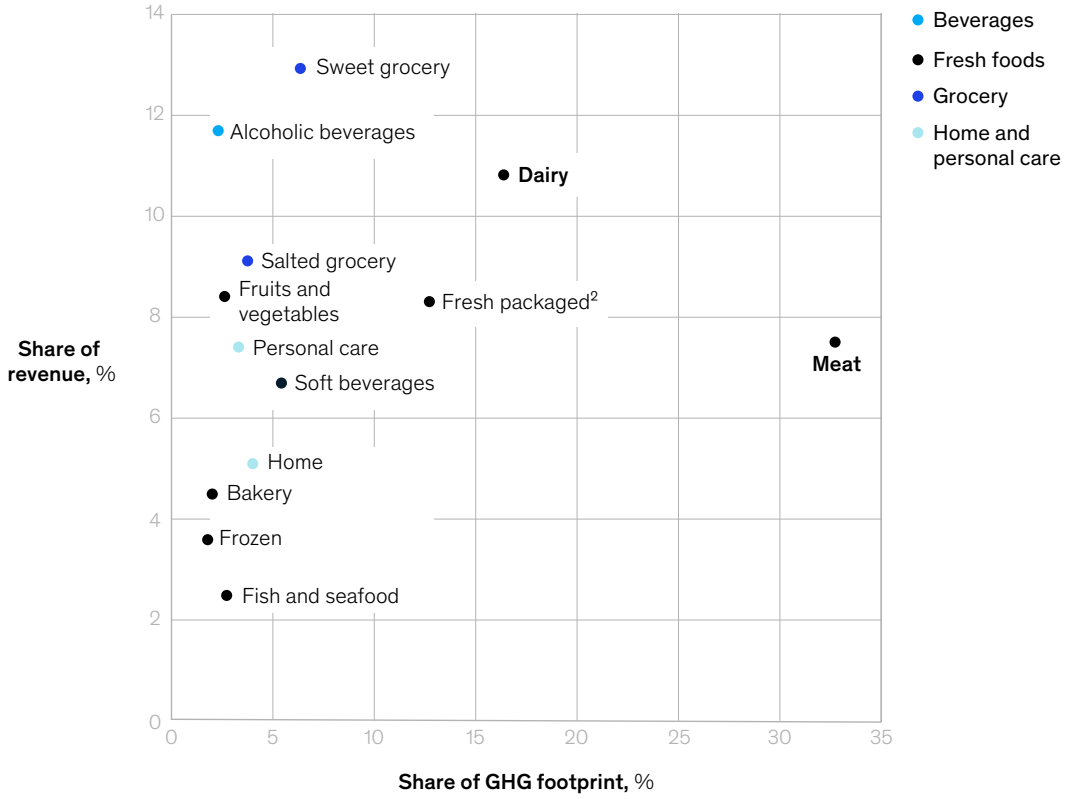
One of the biggest challenges in decarbonizing grocery is the key role dairy and meat play in the Western diet, as these products account for almost half of all product-related scope 3 emissions.

[12] "Study sees fridge doors as sales barrier," Cooling Post, March 28, 2018.
[13] For more, see Peter Spiller, "Making supply-chain decarbonization happen," McKinsey, June 14, 2021.
[14] Including both dairy and meat production.

Exhibit 4

From a category perspective, meat and dairy are the top sources of greenhouse-gas emissions in grocery.

Grocery revenue vs greenhouse-gas (GHG) footprint, 2021, by category[1]



[1]Revenue share based on average revenues of Western European grocers; share of greenhouse-gas (GHG) footprint calculated by multiplying category volumes with average GHG impacts per category.
[2]Processed meats, processed seafood, and others (pizza, ready meals, soups, etc).
Source: Euromonitor; Thomas Nemecek and Joseph Poore, "Reducing food's environmental impacts through producers and consumers," *Science*, June 2018, Volume 360, Number 6,392; McKinsey analysis

at the product level, using product-specific emission factors, and aggregated for categories, business units, and markets as needed. Five strategies to reduce scope 3 GHG emissions are especially promising:

— *Provide more sustainable options, including both branded and private-label (PL) products.* The most powerful assortment-related lever is to offer plant-based alternatives to dairy and meat. Leading researchers advocate a largely plant-based planetary health diet that ensures healthier lives for consumers, lower resource consumption, and lower GHG emissions. McKinsey analyses confirm that eating less meat leads to a substantial reduction in GHG emissions. For example, substituting beef with plant-based alternatives can lead to a 90 percent reduction of emissions.[15] Indeed, one leading European retailer aspires to ensure 60 percent of all protein products in its assortment will be derived from plants by 2030. Additional

[15] Gregory A. Keoleian and Martin C. Heller, "Beyond Meat's Beyond Burger life cycle assessment: A detailed comparison between a plant-based and an animal-based protein source," University of Michigan Center for Sustainable Systems, September 14, 2018.

Carbon neutrality versus net zero

While there may not be a formal definition of "carbon neutrality," the term is commonly used to refer only to CO_2 and is often associated with the practice of offsetting emissions rather than reducing them. In contrast, the term "net zero" denotes more comprehensive, more ambitious standard. It refers to all greenhouse-gas emissions (CO_2, methane, nitrous oxide, and others). It entails a focus on rapid, real emission cuts. Achieving net zero requires companies to set quantified targets—for instance, halving emissions by 2030—including for indirect emissions (scopes 1, 2, and 3) across their entire value chains.[1]

[1] For more, see "The net-zero standard," Science Based Targets.

assortment-related levers include refillable packaging, products sold without any packaging, and reduced package size. In some cases, a radical redesign or reformulation of products may be required (for example, soft drink concentrates consumers can mix with water in their homes). In the United Kingdom, a pioneering retailer has partnered with a circular shopping platform to offer more products in reusable containers, helping consumers cut down on single-use packaging. Finally, grocers can offer more seasonal choices and a higher share of regionally sourced products. As an added benefit, seasonal and regional sourcing can also shield grocers from supply chain disruption.

— *Create transparency for consumers.* As a minimum standard, all PL products in a grocer's assortment should have labels specifying their impact on consumer health and the environment. EcoScore and Nutri-Score are examples of labels many grocers are experimenting with in these areas. Grocers can also seek to provide full transparency about sustainability across all channels. A leading Scandinavian retailer, for example, has launched an app that enables customers to track and analyze the climate impact of their purchasing behavior. The app logs purchases automatically; no additional effort is required for consumers to stay on top of their GHG footprint. In the same spirit, a German retailer displays the "true cost" of selected products next to the sale price to raise awareness and promote better stewardship of finite planetary resources. Some players also integrate sustainability-related incentives into their loyalty programs. Additionally, grocers can work to make it easy for consumers to choose sustainable products. A top French retailer is leading the way in this area by placing plant-based meat alternatives right next to real meat at the butchers' counters in pilot stores.

— *Collaborate with farmers.* As grocers define the specifications of the fresh products they buy, they are in a unique position to support farmers in their efforts to reduce emissions, especially for dairy, meat, and produce. Grocers should help farmers understand how to abate emissions, set quantified targets, provide access to funding, and extend contract periods as needed. For example, a top Swiss grocer has set up a dedicated climate fund to help finance emission reduction projects along its entire value chain, with a focus on sustainable farming practices in categories such as cocoa, dairy, meat, and rice. Specific levers for farmers to reduce emissions include improving breeding and feeding efficiency, supporting the move to regenerative agriculture, converting biogas into energy, increasing the use and restoration of peat soils, using electricity from renewable sources, and sequestering CO_2. To achieve change at scale, grocers can consider partnering with farming cooperatives and consumer packaged goods (CPG) companies. A leading European dairy producer, for example, is working closely with almost 8,000 farms in seven countries to promote sustainable agricultural practices, such as circular farming. As a result, the carbon footprint of milk production for the company is less than half the global average (per kilogram). In total, the group has reduced its carbon footprint by 24 percent since 1990.[16]

[16] Ibid.

— *Collaborate with small and medium-size suppliers.* Grocers can work closely with smaller suppliers of packaged products (PL, as well as branded) to optimize product design, reduce packaging, and decarbonize suppliers' operations. While most major CPG manufacturers have already launched their own decarbonization programs, many smaller suppliers still have significant improvement potential in this area. Often, smaller suppliers don't have the expertise or the resources to engage in decarbonization at scale. Grocers can support them in setting quantified, science-based targets; providing analytical support regarding abatement cost curves; and entering into decarbonization partnerships. For instance, a major US retailer set up a lighthouse project to engage suppliers and other stakeholders in climate action (energy use, resource consumption, waste, packaging, transportation, product design, and product use), aiming to remove one billion metric tons of GHG emissions from the global value chain by 2030.

— *Set ambitious targets for major CPG companies.* Large manufacturers of branded consumer products have the critical mass, the funds, and the personnel to make a real difference regarding the decarbonization of the global food system. They are already under pressure from investors, nongovernmental organizations, and other stakeholders to increase the sustainability of their operations. Grocers can use their unique position as the gatekeepers between manufacturers and consumers to provide additional incentives for CPG companies to decarbonize their operations. Indeed, one leading British supermarket chain has asked its top 150 suppliers to set new, ambitious targets for the reduction of carbon emissions by the end of 2022.

Grocers should not hesitate to use their unique position in the value chain to accelerate the decarbonization of the food system. That said, achieving real, fast, and lasting change will require a joint effort by all players—including producers, CPG companies, grocers, industry associations, regulators, and nongovernmental organizations.

Making it happen

Transforming the global food system not only requires cross-stakeholder collaboration but also will take many years—sitting and waiting is not an option for grocers. Even today, consumers pursuing a lifestyle of health and sustainability (LOHAS) are switching from traditional grocers to innovative attackers. To protect businesses from immediate erosion, participate in green growth, and build resilience to future disruption, grocers are well advised to embark on their decarbonization journeys today and position themselves at the forefront of the transformation by pursuing initiatives across three areas:

— Get the basics in place:

- Increase transparency around key sustainability metrics, starting with PL and fresh products, but with the ambition to expand across the entire assortment.
- Implement a scope 1 and 2 abatement strategy (unless already in place).

— Enhance the current business model:

- Develop a compelling sustainability value proposition to consumers, backed by a well-defined path to commercial value creation and a clear communication strategy.
- Take advantage of innovative solutions, such as a carbon footprint app, to make sustainable choices hassle free and even fun for consumers.
- Rethink the product offering of both branded and PL products to enable low-emission choices across all price tiers and benefit from the above-average growth of sustainable products.
- Develop scope 3 abatement strategies for key product categories, starting with the most carbon-intensive ones, and work with suppliers to reduce emissions.

- Establish a straightforward yet holistic system of decarbonization incentives and KPIs to promote and track real change at scale.

— Explore opportunities for disruptive business building:

  - Install charging infrastructure for electric vehicles in store parking lots to help decarbonize mobility, encourage existing customers to spend more time in the store, and attract new customers.[17]

  - Partner with innovators and conduct pilot projects around next-generation food production, such as vertical farming and cultured meat.[18]

  - Test the water in areas such as sustainable energy retail, net-zero last-mile offerings, food waste services, and circularity.

Today, net zero is the really important "low-carb craze," especially from a planetary perspective. It's time to put the entire food system on a diet—a low-emission diet. Decarbonization is the issue of the current time, and grocers have a unique opportunity to lead in this space for the good of both the planet and their businesses.

Key takeaways

Decarbonization is both a necessity and an opportunity for grocers. They can be proactive and play offense with a strategy that combines what's good for the planet with what's good for business growth.

Starting by reducing scope 1 and 2 emissions is a no-regrets move—all grocers will need to reduce their direct emissions, and many levers are NPV positive.

However, grocers also need to address scope 3 emissions. Comprehensive decarbonization is an opportunity to create competitive advantage; leading players already use it to grow their market shares. Product-level carbon abatement cost curves can help grocers understand what to do and who to collaborate with.

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[17] "Carrefour plans EV charging stations at French hypermarkets, supermarkets," Reuters, March 30, 2022; "Projet de loi Climat & Résilience: le Gouvernement poursuit le verdissement du parc automobile et complète le plan d'action pour le déploiement des bornes de recharge pour véhicules électriques," French Ministry of Ecological Transition and Territorial Cohesion and Ministry of Energy Transition, April 10, 2021.
[18] *Navigating the market headwinds: The state of grocery retail 2022—Europe*, McKinsey, March 2022.