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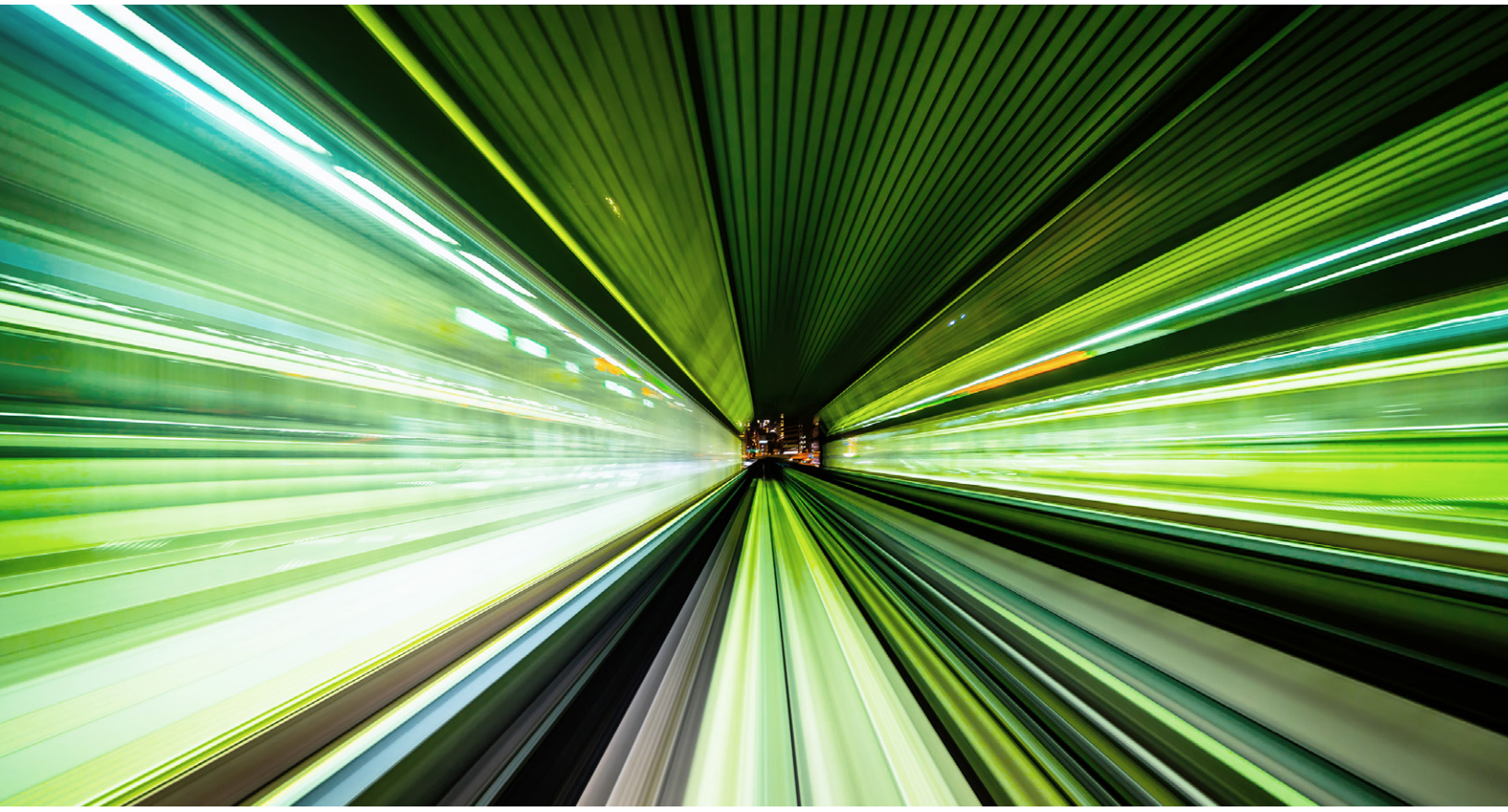
Accelerating toward net zero: The green business building opportunity

Surging demand for zero-carbon technologies, materials, and services gives companies opportunities to build new green businesses. Leaders that move quickly could see exponential growth.

by Rob Bland, Anna Granskog, and Tomas Nauclér



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Getting to net zero will require tremendous, rapid change and large-scale technology deployment across industries. The transition will create massive opportunities to build entirely new businesses.

A recent McKinsey report found that reaching net zero by 2050 could entail a 60 percent increase in capital spending on physical assets, compared with current levels. The required investments amount to $9.2 trillion per year until 2050, of which $6.5 trillion annually would go into low-emissions assets and enabling infrastructure. Our analysis also shows that growing demand for net-zero offerings could generate more than $12 trillion of annual sales by 2030 across 11 value pools, including transport ($2.3 trillion to $2.7 trillion per year), power ($1.0 trillion to $1.5 trillion), and hydrogen ($650 billion to $850 billion) (Exhibit 1). Such a transformation of the global economy could create significant growth potential for climate technologies and solutions.

Some technologies will be key in propelling the transition to net zero. In Europe, for example, our research suggests that just 15 technologies could drive 70 percent of the emissions abatement required to reach net zero in the region. Technologies that are mature and already available at a commercial scale, including onshore wind and solar photovoltaic, account for about 25 percent of the abatement potential in Europe, while an additional 45 percent could come from technologies that have an opportunity to be commercialized in the near future.[1] This means that, in addition to renewable-energy technologies and electric mobility, technologies for zero-carbon residential heating (such as heat pumps), carbon capture and storage, green-hydrogen-based fuels, and industrial electrification could support decarbonization at scale.

In many markets, start-ups have been the first to scale up climate-tech businesses (renewable energy and electric vehicles, for example), while incumbents have been slower to adapt. But it's not too late for established companies to break into still-maturing climate-technology domains, where the playing field remains wide open—provided that they move quickly. In addition, there will be room for thousands of surrounding players as these businesses develop and mature.

Building green businesses is top of mind for many leaders. In Leap by McKinsey's state of new-business building report, 92 percent of executives say that new businesses built in the next five years will address sustainability to some extent—and 42 percent expect to put sustainability at the center of their new businesses' value proposition. In our work with organizations that have built green

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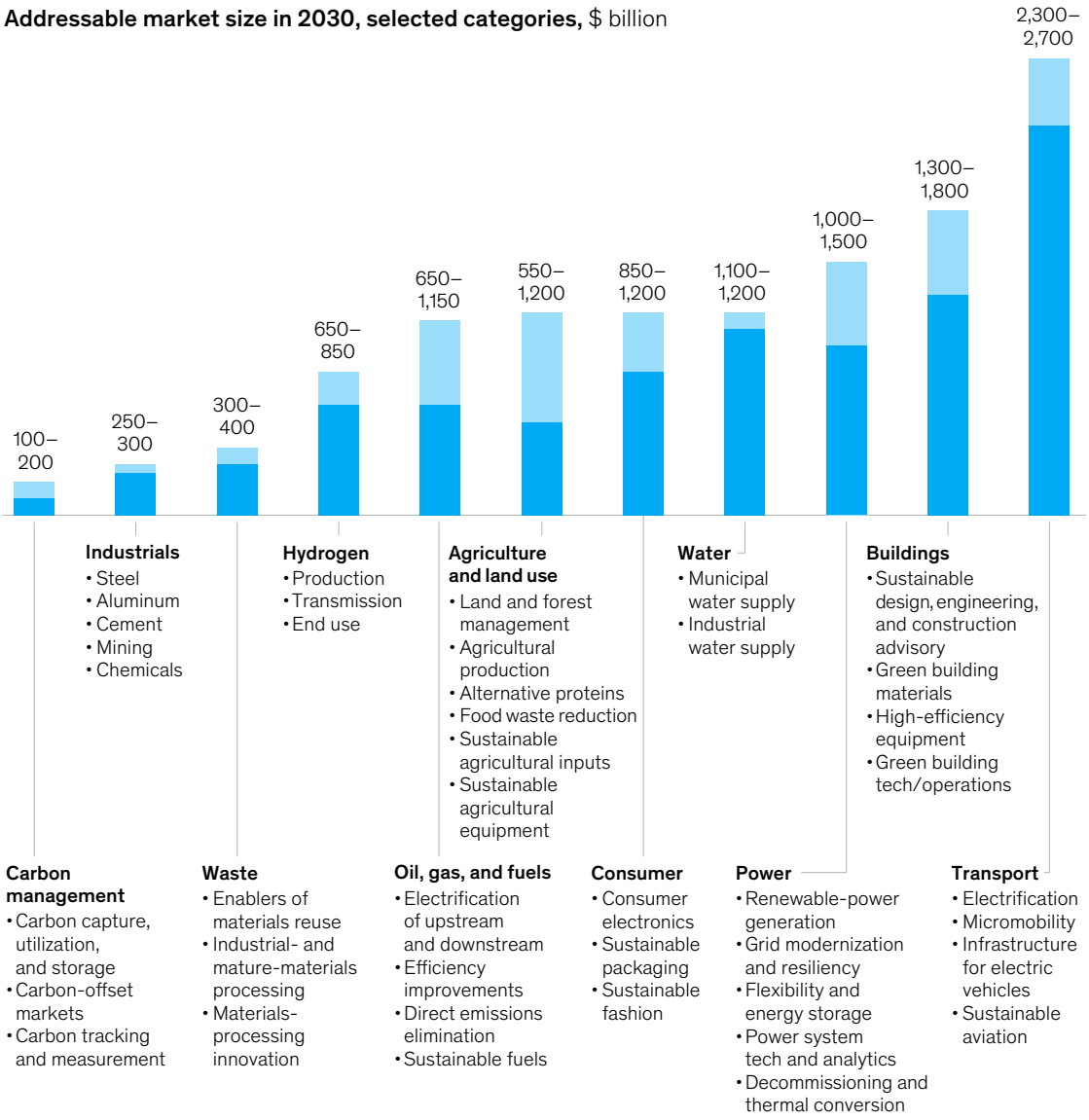
[1] Based on McKinsey analysis. For more on decarbonization pathways in Europe, see *Net-Zero Europe: Decarbonization pathways and socioeconomic implications*, McKinsey, November 2020.

Exhibit 1

Eleven high-potential value pools could be worth more than $12 trillion of yearly revenues by 2030 as the net-zero transition advances.

Addressable market size in 2030, selected categories, $ billion



Note: Preliminary, not exhaustive.

businesses, we have identified ways companies could set themselves up not only for entry into a market but also for significant growth. Green business builders will likely need to plan and scale at the speed of digital companies to accelerate the transition to net zero. They're ambitious with their growth goals and have cost advantages, often

because they move quickly. Here, we share key lessons from successful green business builders.

Moving at the speed of digital

While it took many years and significant governmental support to scale up renewable-electricity generation, broadening support for the net-zero agenda could enable the next wave of green businesses to grow more quickly.

By now, more than 3,000 companies across the world have set or are in the process of committing to an emissions reduction through the Science Based Targets initiative,[2] an institution that has created a framework around reduction commitments for businesses. Additionally, regulation (the EU taxonomy,[3] for instance, which helps to define what economic activities in the region can be considered environmentally sustainable), investor activism, and rising consumer interest, among other factors, are pushing companies to benchmark and improve the sustainability performance of their offerings. For example, suppliers in B2B value chains are facing increasingly stringent emissions-reductions requirements as more of their customers pursue net-zero strategies. All of this is likely to accelerate the adoption of cleaner materials—such as low-emissions steel in the automotive industry, as one example—and solutions (for instance, the electrification of thermal-energy processes in manufacturing). Some sustainable products, such as low-emissions steel and recycled polyethylene terephthalate (PET), the plastic most commonly used for beverage bottles, are already seeing a price premium due to a shortage of supply versus demand.

The development of green businesses could be much faster for an additional reason: some climate technologies can only compete on price when they are being manufactured at a large enough scale (more on this idea in a later section). The need to scale up quickly to compete could propel new green businesses to achieve execution speeds that are more familiar to the digital economy. Commercializing many green technologies will likely require significant investments in physical assets, which aren't required for software development or digital engineering; these investments could reach billions of dollars or euros per plant. Nevertheless, green business builders can learn lessons from digital-business builders, including aggressive growth plans, working with agility, and being a first mover. Historically, scaling sustainable technologies has been done carefully, step-by-step over years, to manage both the technological and commercial risks involved.

A few companies in the alternative-proteins and alternative-dairy categories illustrate how embracing the speed of digital could create a market advantage. For one, some of these players did not allow their lack of manufacturing capacity to get in the way of growth. They were early to get their products distributed through leading fast-food and coffee chains, which helped to elevate brand awareness. Some relied on co-manufacturing, even though this typically hurts margins in the short term. And now, as their revenues have grown, some of these players are building up their own manufacturing capacity to help meet demand, often with larger plants that produce goods at lower unit costs.

In some cases these players could experience scaling pains—when demand outpaces expanded production capacity, for example. However, being early to market and growing quickly has resulted in strong market share, with the distribution and cost advantages that come along with such a position. Gross margins tend to be strong for these players, too, since many consumers have been willing to pay a premium for their products. These companies have typically reinvested profits back into the business.

The alternative-proteins and alternative-dairy examples are, of course, B2C cases. However, scaling early and quickly is an approach that, based

[2] "Companies taking action" dashboard, Science Based Targets, accessed June 3, 2022.
[3] "EU taxonomy for sustainable activities," European Commission, accessed June 3, 2022.

on our experience, may help to separate strong green businesses, whether B2B or B2C, from competitors or followers in the same space.

Seven keys to scaling green businesses

For green business building, incumbents may have advantages, including access to capital and deep institutional knowledge. Some corporate leaders have identified success factors for building a new business in general, such as providing ring-fenced investment in the new business and setting realistic expectations with both internal and external stakeholders on investment needs. However, building a green business can also come with new challenges for incumbents. For example, when scaling a new climate technology, it may be difficult to balance the time it takes to validate the technology on a demonstration scale while also planning industrial-scale installations across different conditions and geographies. Start-ups typically have been the first movers on some green ventures, as they are often equipped with a higher tolerance for risk-taking and the ability to operate at faster speeds.

Through our work with organizations that have built and scaled green businesses successfully, we have identified seven key principles.

— *Lead with game-changing ambition.* Effective green business builders tend to set their sights on creating something significant from the start. Game-changing ambition may mean aspiring to produce a zero-carbon product at a competitive cost (which enables a competitive price), compared with a less sustainable alternative, and scaling new capacity fast. Leaders tend to think about what it will take for the product to achieve significant market share within the next, say, five years—instead of 15—and engineer backward from there, much like in the world of digital business building. Our experience shows that operating with such ambition could result in companies reaching their targeted costs faster. By setting firm production-capacity goals, a new business might better position itself to reach lower unit costs faster and potentially be competitive on price from the start (more on cost advantages shortly). Leading with game-changing ambition could also encourage certain markets to make the shift to net zero faster. For example, H2 Green Steel, a Swedish company founded in 2020, is building a fossil-fuel-free steel mill that relies on a hydrogen-based production process. Last year, H2 Green Steel announced that total financing for the first phase of the project is approximately €2.5 billion ($2.7 billion), and the company plans to begin production in 2024.[4] Industry incumbents in Europe may have already been planning green-steel investments, but H2 Green Steel's launch has coincided with incumbents now pursuing at least 20 other green-steel projects in the region.[5]

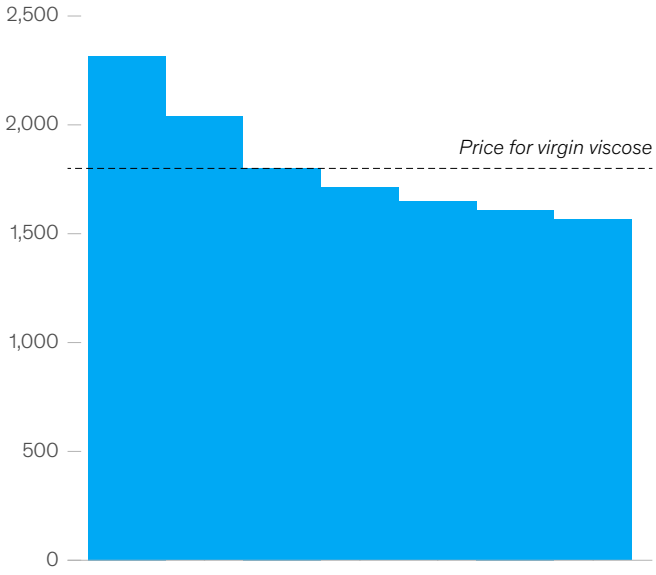
— *Secure a cost advantage by identifying a scaling break point for any new technology.* Building a business around a clean technology may require analyzing different technological pathways, including some technology options that are not yet commercialized. When analyzing a new technology, leaders must understand the scale break point for cost competitiveness, so business viability can be reached as quickly as possible. Take recycled textiles, for example. Based on our experience, many fashion and apparel players are looking to introduce materials that require the scaling of textile-recycling technologies. Our analysis of one of the technologies identified the scale break point at which producing recycled man-made cellulosic fibers, an alternative to virgin viscose, would likely be cost competitive. In this case, only when average plant size and the number of plants reaches a critical scale could costs be expected to become competitive (Exhibit 2). Before committing to investments at scale,

[4] "H2 Green Steel to build large-scale fossil-free steel plant in northern Sweden," H2 Green Steel press release, February 23, 2021.
[5] Fastmarkets; company websites; press search.

Exhibit 2

Recycled, man-made cellulosic fibers have the potential to become cost competitive with a virgin equivalent at a scaling break point.

Estimated price of recycled, man-made cellulosic fibers at 15% margin by plant size and number of plants,[1]
$ per ton



Average plant size, newly built, kiloton	10	60	70	90	140	190	280
Number of plants built	1	1	3	4	6	6	7

[1]Assumes that industry scales with typical industry learning curve; assumes scalable cost data from detailed example of 60,000 ton plant. Estimated price level includes legacy plant sizes from scaling up (eg, plant built in 2023 still running in 2028) leading to weighted averages of estimated price level. Excludes investments needed to reach optimized greenhouse-gas emissions (eg, electrification).
Source: Anna Brismar, "Textile streams," Green Strategy, 2014; expert interviews; Fisher International; *Annual report 2020*, Lenzing Group; Bahareh Zamani, "Carbon footprint and energy use of textile recycling techniques," Chalmers University of Technology case study, 2011; McKinsey analysis

leaders may benefit from knowing the relative maturity of the technologies, assessing their performance under different scaling speeds, and understanding the environmental footprint.

— *Sign up captive demand before scaling.* Green business builders often tackle the commercial side of investment risk by signing up captive demand for their output before they start to physically scale—as Swedish battery manufacturer Northvolt AB did with Volkswagen and BMW.[6] Many green business builders—including Northvolt—also invite their customers to invest in the business up front, as a way to align interests even further. Alternatively, when larger corporations start a green business, they might themselves be the ideal first captive customer. For example, shipping company Maersk and ferry operator DFDS are major investors in a new e-ammonia project (e-ammonia is a green shipping fuel).[7]

— *Build capacity with parallel scaling.* To reach scale-up goals, the ability to drive several investments or market introductions in a limited time frame is key. Often we've seen leaders "parallelize the scaling" from the start—that is, initiate additional growth waves before they

[6] "Northvolt receives $14 billion battery cell order for Swedish gigafactory from Volkswagen," Northvolt press release, March 15, 2021; "BMW Group signs long-term supply agreement for battery cells with Northvolt," Northvolt press release, July 13, 2020.
[7] "Maersk backs plan to build Europe's largest green ammonia facility," Maersk press release, February 23, 2021.

Green business builders often tackle the commercial side of investment risk by signing up captive demand for their output before they start to physically scale.

have completed the first one. They create a modular, replicable standard for production based on the first business deployment rather than a tailor-made, one-off pilot. They also incorporate key lessons from each growth wave into the next, as a way to help manage costs and keep ambitious deployment timelines on schedule. One example of the parallel-scaling approach is a zero-carbon metals player that is planning to start building a second plant halfway into the construction of the first—and aims to complete it in approximately half the time as the first. The parallelization of scaling is also something to consider when growing adjacent businesses.

— *Proactively create business ecosystems.* Many green business building efforts are also value-chain-building efforts. Consider circular materials, like the recycled textiles example mentioned earlier. There is a need to secure effective collection, appropriate sorting and processing, and market-based demand for the recycled textile fibers. No one player is the natural investor in all steps of the value chain. But investments in a single step may be less feasible without all the other steps already in place. Similarly, many new green businesses require new infrastructure around them. In the case of the e-ammonia project, substantial investments in upstream hydrogen and renewable electricity capacity are needed, as well as new transportation and fueling infrastructure downstream. Green business builders look to collaborate with players in their value chains and make sure that the infrastructure and investments come together in a coordinated manner. This could be done through joint feasibility studies or demonstration pilots where relevant players team up. When done successfully, these collaborations could also lead to the captive-demand arrangements described earlier. Once the framework of a new value chain starts to operate and has a financial underpinning, more ecosystem players may start gravitating toward it.

One example of new ecosystem players getting together is the Long Duration Energy Storage (LDES) Council.[8] The CEO-led group has brought together key actors—from technology providers to end customers—with the aim of understanding the technology landscape and pathways to economic breakthrough and scaling. Council participants are in a position to help shape their industries and drive collaborations.

[8] McKinsey has collaborated with the LDES Council as a knowledge partner, including on the reports *Net-zero power: Long duration energy storage for a renewable grid*, November 2021, and *A path towards full grid decarbonization with 24/7 clean Power Purchase Agreements*, May 2022.

— *Lead on sustainable operations, through ambitious targets, innovation, and partnerships.* Successful green business builders are leaders in how their operations minimize carbon emissions and other environmental impacts. For example, Northvolt, the Swedish battery manufacturer, has set a target to produce batteries that have a lower carbon footprint than most current EV batteries—by 80 to 90 percent—by leveraging green electricity and recycled input materials. Sustainable-textile company Spinnova has designed a manufacturing process with a water and chemicals footprint that is lower than that of similar products. Many green business builders also partner with organizations that share the same mentality. This 360-degree dedication to sustainability could help to drive credibility and encourage partnerships and innovation that may keep these companies ahead of their peers.

— *Dedicate recruiting resources early in the process.* Many green business builders, whether they're start-ups or corporates, are seeking the talent they need to scale quickly—and the range of skills required to pull off successful green businesses can be wide. Green business builders identify individuals who could help shape and (as needed) pivot strong business models and explore potential partnerships and financing structures. Many new green businesses benefit from those who understand customers' technical, investment, and decision-making processes. Consider the specific skill sets the organization may need to meet business goals. For B2B technologies, for example, there could be a need to build awareness and acceptance. In B2C, strong brand-building skills could be beneficial to create messaging that speaks to green credibility and tangible, real-world impact. Finally, physical technology ramp-up, factory construction, and supply chain scaling at an ambitious speed typically require bringing along the best of the best in operations skills. Dedicating resources for recruiting early in the endeavor could be a critical enabler of scaling quickly, especially in areas where there may be a scarcity of talent.

Building a green business is no small feat. It often requires moving at unprecedented speed, setting ambitious growth targets, and planning multiple steps ahead. The mindset green business builders have demonstrated is very close to that of the digital leaders of our time: they have been adept at creating and shaping markets rather than spectating and waiting for the markets to appear, and they have embraced the notion of accelerated scaling. This mindset combined with a few key principles could help propel green business building on the global journey to net zero.

Rob Bland is a senior partner in McKinsey's Bay Area office, **Anna Granskog** is a partner in the Helsinki office, and **Tomas Nauclér** is a senior partner in the Stockholm office.

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