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European industries can grow with green

Accelerating decarbonization doesn't need to mean compromising on growth



Achieving net-zero emissions doesn't have to be at the cost of competitiveness.

New Accenture research shows European industries can achieve emissions reductions and business growth as the low-carbon economy undergoes radical shifts.

Europe is at a pivotal moment in its clean energy transition

The European Union is raising its emissions reduction ambitions and providing incentives for industries on the continent to do the same. This, coupled with the increased viability of low-carbon solutions, could help industries overcome long-held fears of trade-offs between costly emission reduction efforts and competitiveness—positioning them for future growth. But first, they must rethink the way they invest.

In July 2020, the Union approved a €750 billion pandemic recovery plan to stimulate the bloc economy. The plan ties stimulus funding to the Union’s long-term goal of making the region climate-neutral by 2050, in compliance with the Paris Climate Agreement. Our research suggests that four EU countries—France, Germany, Spain and Portugal—could allocate between €20 and €38 billion from the Next Generation EU stimulus package to industries to help reduce emissions by 2025.

In the past, many European companies invested in emission reduction initiatives, putting around 10% of capital expenditure towards energy efficiency measures. But it’s simply not enough to achieve the region’s ambitious climate targets. What is



European industries can implement strategies in the next three to five years that will enable them to make the necessary emission reduction investments without compromising their competitiveness.

needed, is an increasing reliance on renewables to heat and power industrial processes. And that, in turn, will require significant investment.

Having the euros to invest is one thing; spending them wisely is another. The challenge here is balance and timing, given that low carbon technologies are at various levels of maturity. Investing too early could mean higher emissions reductions but lower returns while waiting too long could lead to missed opportunities in lucrative markets.

In this report, we show how European industries can implement strategies in the next three to five years that will enable them to make the necessary emission reduction investments without compromising their competitiveness. We drill down into three established European industries: chemicals, cement, and iron & steel, and three emerging European industries: battery, pharma, and data centers. Companies can use a set of short- and long-term tactics to unlock billions of euros in business growth across these sectors while remaining on track to achieve their climate goals.

Digital technologies can help power a twin transformation, unlocking new value that exists at the intersection of technology and sustainability. Our recent research shows that companies pursuing a twin transformation—that is, a combined digital and green transformation—are 2.5 times more likely to be among the companies that emerge strongest from the current crisis.²

Not changing course could risk further cost pressures and loss of share in fast-growing, low-carbon markets. Business opportunities for next-generation low-carbon solutions may come sooner than we expect.

The cost of reducing carbon emissions

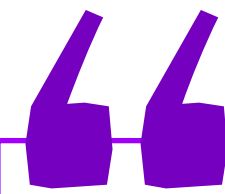
For industrial companies, balancing investment in emissions reductions with cost pressures is a complex business issue.

Europe's industries represent billions of euros in economic value and account for millions of jobs. They produce key components—steel, plastics and ammonia—used in infrastructure and products that form part of European citizens' everyday lives. But industrial manufacturing also accounts for almost a third of the continent's carbon emissions. Much of these emissions are associated with energy use in traditional energy-intensive industries such as cement, chemicals, and iron & steel production. Most of their energy needs are met by natural gas and coal—primary emitters of carbon. These three sectors alone account for a quarter of Europe's industrial carbon emissions.

There's no question that Europe's businesses are spending generously to tackle climate change. The 882 biggest companies invested €124 billion in reducing their carbon footprint in 2019, or 12 percent of their capital expenditure—capturing roughly 2.4 gigatons of lifetime emissions savings. Even so, companies are only about halfway to where they need to be to achieve their climate goals.³

As much as European companies want to adopt low-carbon solutions, developing a strategy often has them working at cross purposes. Many companies are held back by fears that costly investments in emissions reduction measures will adversely impact their competitiveness—resulting in below-target progress toward climate neutrality.

As it is, the cost of doing business has been structurally higher in Europe than elsewhere, largely due to higher energy costs. For example, the cost of ethylene production in Europe is 1.5 times higher than the US.⁴ And competitive pressures continue to mount as European businesses deal with COVID-19. In November 2020, 45% of European C-levels said they expect Europe to be less competitive than China after the COVID-19 crisis—as compared with 17% who had that view earlier in May.⁵



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Green investment can be a growth investment

Investments in emissions reductions and cost competitiveness doesn't have to be a zero-sum game. Our research shows that adoption of low-carbon solutions by European companies can drive competitiveness. Companies cannot grow sustainably without attractive returns today, which position them to take advantage of new markets tomorrow. In the short term, these investments are the logical extension of their need to achieve increased specialization, performance and efficiency in response to rising energy costs, trade barriers and global overcapacity. In the medium term, low-carbon investments can help strengthen their position in global markets.

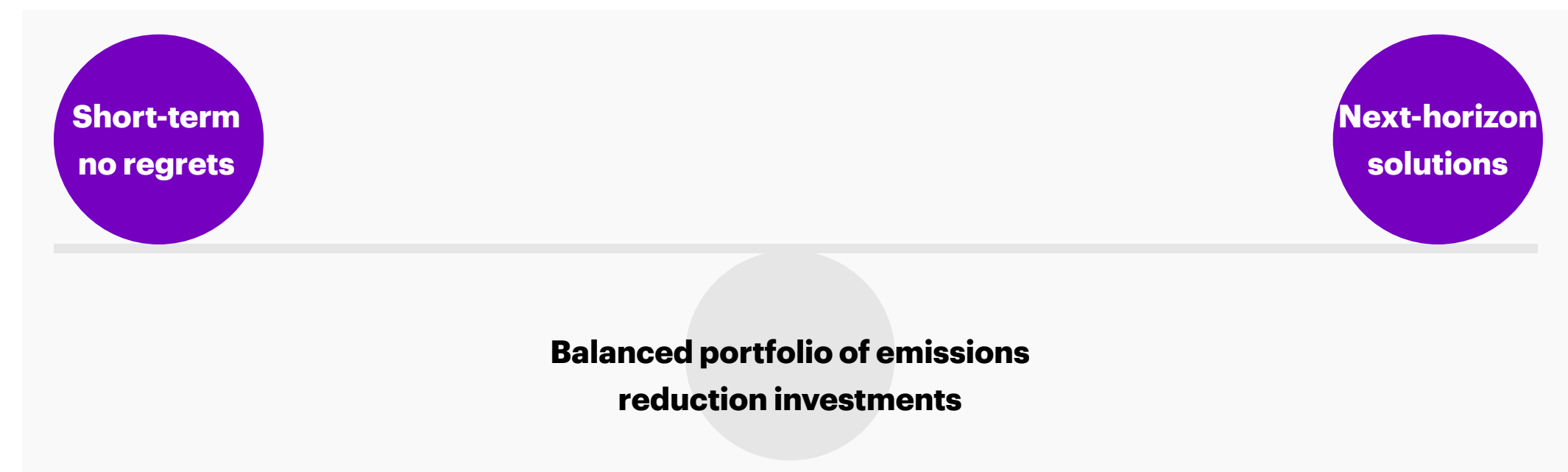
Balance and timing are critical for the success of an agenda aimed at accelerating emissions reductions and business growth.

Businesses must develop a balanced portfolio of emissions reduction investments built on the back of short-term, no-regret solutions and medium-term next-horizon solutions (Figure 1). This involves, at the outset, identifying and accelerating investments in emissions reductions that pay off today to support short-term business goals. The medium-term business opportunity requires companies to anticipate opportunities for emerging low-carbon solutions and build expertise and partnerships to gain access to these future markets.

Investing in emissions reductions may be the easy part. Scaled deployment of renewable energy supply, hydrolyzer capacity for green hydrogen production and carbon capture and storage systems will need massive investment, but public and private money is increasingly directed to these areas. And by deploying digital technologies toward their sustainability agenda, companies can scale and have a

Figure 1. Investing Smartly

A balanced portfolio of low carbon investments supports both short-term no-regrets solutions and next-horizon solutions



bigger impact in terms of cost, on the construction and operation of industrial and energy assets. With digital twin technology, for instance, companies can conceive and simulate the complete asset lifecycle at the design phase, so that these types of assets can be built faster and more efficiently than in the past, and operate with improved efficiency, performance, robustness, and environmental compatibility.

What can be difficult is getting the timing right. Low carbon technologies are maturing at uneven speeds, making it hard to time investments. Investments in fuel and technology switches that previously hadn't yielded a good return only years ago do so today. Investing too early will result in trade-offs between financial returns and emissions savings while waiting too long can mean missing out on future market opportunities.

No-regrets solutions and next-horizon opportunities

Our analysis of Europe's six industry sectors—three established and three emerging—identifies investments that deliver business value today and those that position businesses for growth in future markets for low-carbon solutions.

Our analysis suggests that the right investments in emissions reductions can unlock up to €28 billion in business value across these six sectors by 2025. The resulting carbon emissions reductions would total 137 Mt, more than the total greenhouse gas (GHG) emissions of the Czech Republic in 2018.⁶ The majority of this value resides in fuel and technology switches—from coal to natural gas, as well as renewable energy.



Established industries: Chemicals, cement and iron & steel

Today's no-regret investments:

Business Value: **€26 billion**

Emissions Reductions: **130 Mt**

Stimulus Support: **€5 billion**

The potential benefits of investing in short-term, no-regret solutions are especially important for Europe's established industries since these can offset their share of the continent's emissions. For instance, the right investments in emissions reductions in the chemicals, cement and iron & steel industries can deliver up to €26 billion in business value and 130 Mt in emissions reduction by 2025 (Figure 2).

Figure 2: Investing in technology and fuel switches

The right investments in emissions reductions in the European chemicals, cement and iron & steel industries can deliver €26 billion in business value by 2025.⁷

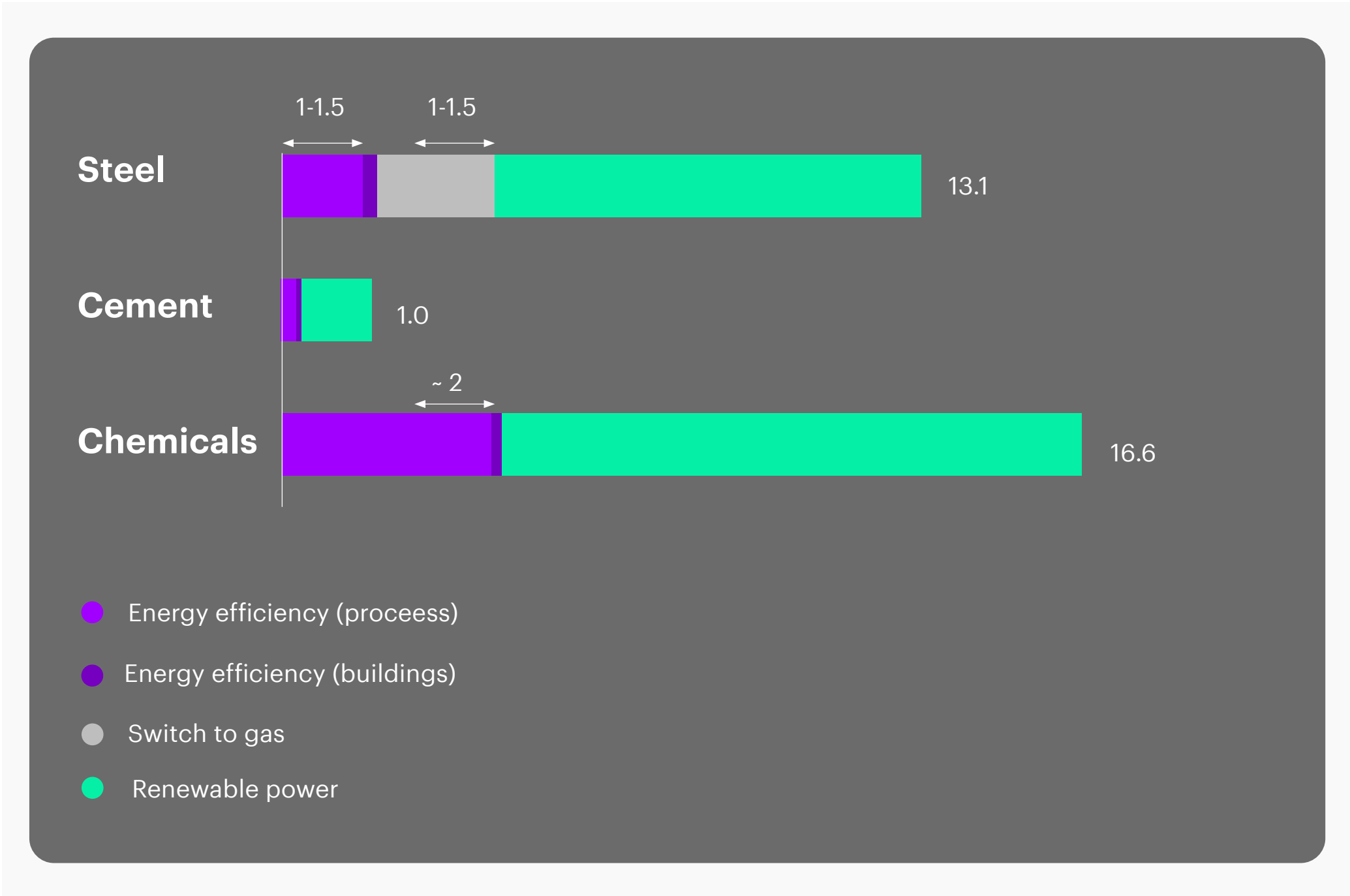


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|-------------------|--|---|
| Energy efficiency | €2.6 bln 32 Mt CO₂ | Significant potential for energy efficiency remains, especially in chemical production, to the tune of €2.6 billion business value. |
| Coal to gas | €1.7 bln 55t CO₂ | Switching from coal to natural gas is becoming increasingly financially attractive in the near term as the cost of CO ₂ emission certificates increases. Value sits primarily in the high-temperature process steps of steel production, for instance through replacing coal-powered iron blast furnace with gas-fired direct reduction of iron. |
| Renewable power | €22 bln 44t CO₂ | Rapidly declining prices for large-scale wind and solar generation and the proliferation of purchasing power agreements (PPAs) for energy-intensive industries make switching to renewable power the largest driver of business value. Sizeable opportunities for switching to renewables exist in all three sectors. In steel production, for instance, there are opportunities for switching from coal to the direct reduced iron-electric arc furnace (DRI-EAF) process powered by green electricity. In addition, a switch to the DRI-EAF process can provide substantial cost savings by replacing raw iron feedstock with recycled steel. |

These investments are viable without subsidies. However, EU stimulus funding can contribute to their accelerated uptake. An additional €5 billion in business value could be unlocked if the EU stimulus funding of the Next Generation EU package is leveraged in near-commercial low-carbon technology investments (Figure 3).

Figure 3: EU stimulus funding can accelerate the uptake of technology and fuel switches in the European industry

EU stimulus funding can unlock an additional €5 billion in business value by supporting early- and near-commercial solutions.⁸



Our analysis of the proposed allocation of recovery funding in four EU Member States (France, Germany, Spain, and Portugal) suggests that €20 billion to €38 billion could be available for decarbonization of industries—three-fourths for Spain and Germany alone.

Accenture estimates that this stimulus could:

Unlock an additional **€4 to €5 billion in business value** by supporting early- and near-commercial solutions in each of the steel, chemicals and cement sectors by 2025.

Further support the existing business case for energy efficiency in industrial processes across the industries, worth an additional **€3 to €3.5 billion in business value.**

Help make replacing the current coal-based process with gas-fired clinker production more commercially viable.

Provide a **€1 to €1.5 billion boost** to the existing business case for switching from coal- to gas-fired iron production.

Next-horizon solutions

Next-horizon solutions in Europe's existing industries can help secure growing market share in markets expected to be worth €100s of billions from 2030 onwards.

Deeper decarbonization by industrial clusters across the continent using a combination of solutions, including carbon capture and utilization/storage (CCUS) and hydrogen production for industrial feedstock, could set the stage for future decades. Research by the World Economic Forum estimates that this can potentially eliminate industrial emissions by 2050 while creating 387,000 to 912,000 jobs and significant business value.⁹

Next-horizon solutions, such as green hydrogen production and CCUS, are undergoing rapid development, boosted by significant business and government funding. Our analysis of the EU recovery funding allocation in four EU Member States suggests that as much as 30% of stimulus funding is dedicated to the hydrogen industry (specifically for developing and scaling production through electrolysis).

Early commercial applications of these technologies exist in specific industrial clusters, where suitable industrial activities, the presence of customers willing to pay a premium, and funding are present together.





Carbon capture and storage/utilization can achieve over 80% emissions reductions in processes like high-temperature clinker production in cement manufacturing. But high capital costs mean that the cost of reducing emissions in this way is likely to be in the range of €50 to €70 per ton of CO₂ by 2025—relatively high in comparison to other solutions. Without a substantial increase in CO₂ prices, these investments will likely remain unprofitable in the short term. However, Accenture’s recent analysis of the economic viability of CCS applications in specific industrial processes in Europe suggests that they could break even for clinker production by 2030.¹⁰

Green hydrogen is becoming increasingly attractive with the decreasing price of renewable power and increasing emissions costs for existing fossil fuel-based production methods. However, the high cost of electrolysis is expected to limit adoption over the next four years. Within this timeframe, green hydrogen is unlikely to replace natural gas in the chemicals industry (e.g. syngas and methanol production), in steel manufacturing (e.g. by replacing coal in iron reduction), or in the residential and commercial building sectors (by replacing parts of the natural gas used for heating). However, production costs of green hydrogen could fall by 60% over the coming decade, accelerated by funding from the EU and Member States. Recent Accenture research suggests that green hydrogen use can unlock a net value of more than €80 billion per year by 2030 for European heavy industries alone.¹¹

Emerging industries: Battery, pharma and data centers

Today's no-regret investments:

Business Value: **€2 billion**

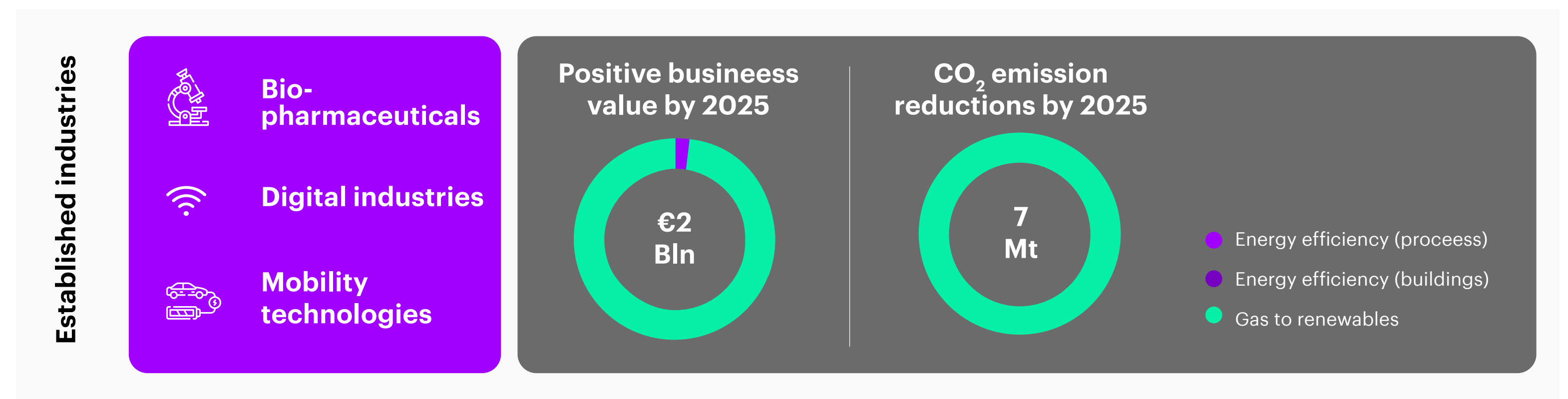
Emissions Reduction: **7 mt**

The size of the investment opportunity for emissions reductions that also deliver business value in Europe's emerging industries is relatively small. In the three sectors analyzed—battery manufacturing, (bio)pharmaceuticals and data centers—it totals €2 billion in business value and 7 Mt in emissions reductions by 2025 (Figure 4).

Switching to renewable energy is the biggest opportunity in these sectors. Opportunities for additional energy efficiency gains exist in Europe's data centers, in addition to the significant savings achieved through improved algorithms over recent years. These include raising the ambient temperature in data centers from 22°C to 30°C and recovering waste heat. At the Energy Hub Aalsmeer near Amsterdam, for instance, local data centers provide their waste heat to heat a sports center, a school and the greenhouses of the region's famous flower growers.¹²

Figure 4: Switching to renewable energy

Switching to renewable energy can unlock €2 billion in business value and a 7 Mt reduction in emissions within the three emerging industries in Europe by 2025.¹³



But size is not everything. Making the right investment decisions is vital for companies in these strategic, future-oriented sectors, enabling them to free up capital to invest in securing their long-term competitive position. Delivering these no-regret solutions will help attract the financing of increasingly discerning investors, positioning Europe as an attractive market in which companies can grow their businesses, ultimately supporting the retention, creation and rotation of jobs.

Next-horizon solutions

Next-horizon solutions in emerging industries are critical to helping position the European industry as the leader in the energy transition.

Capturing market share in the markets of the future is not always easy for European businesses, especially as they are facing cost pressures from peers in established industries. Pioneering and differentiating through investment in net-zero value chains, however, can—and in some cases do—enable European companies to build a unique competitive edge in these markets.

The role of European manufacturers in the global market for lithium-ion batteries has been small. But coordinated investment in low-carbon battery production is enabling Europe to build a differentiated competitive position. The European Commission launched the European Battery Alliance in 2017, convening key industrial stakeholders and innovation actors to create a competitive manufacturing value chain in Europe. The European differentiator? A sustainable battery cell production process. Currently, multiple European battery factories are under construction,¹⁴ built with the latest energy-efficient technologies and fully or mostly powered by low-carbon electricity. Supported by these efforts, European lithium-ion cell manufacturing could capture a 7-25% share of the global market for lithium-ion batteries for electric cars, compared to 3% in 2017.¹⁵

European data centers are positioning themselves as leaders when it comes to low-carbon operations, with local governments accelerating the imperative for net-zero. Data centers have been able to stabilize energy use despite capacity growth due to significant gains in energy efficiency with improved algorithms. Major data center operators are aiming to be fully carbon-neutral by 2025 through a combination of energy efficiency initiatives and renewable energy. In Amsterdam, for instance, data center construction or expansion is only permitted when using energy-efficient

technology and a secure supply of 100% renewable energy.¹⁶ Locations in Europe with abundant renewable energy are attractive for the expansion of data center capacity. The Nordics are positioning themselves as the ideal location, combining the advantage of low ambient temperatures (reducing cooling needs) with the high availability of renewable electricity, further supported by preferential policies for licensing, siting and taxation.

The European pharmaceutical sector faces steep cost challenges while competing on the global stage. Relatively high production costs mean that European pharmaceutical production facilities must specialize to attract commissions for drug development and production. The European Commission aims to boost the competitiveness of the European pharmaceutical sector, reduce direct dependence on manufacturing in non-EU countries, and improve environmental standards. It seeks to position European companies as innovative world leaders in low-carbon practices, in line with the continent's ambition for a net-zero economy by 2050.¹⁷



Getting it right when aiming for net-zero

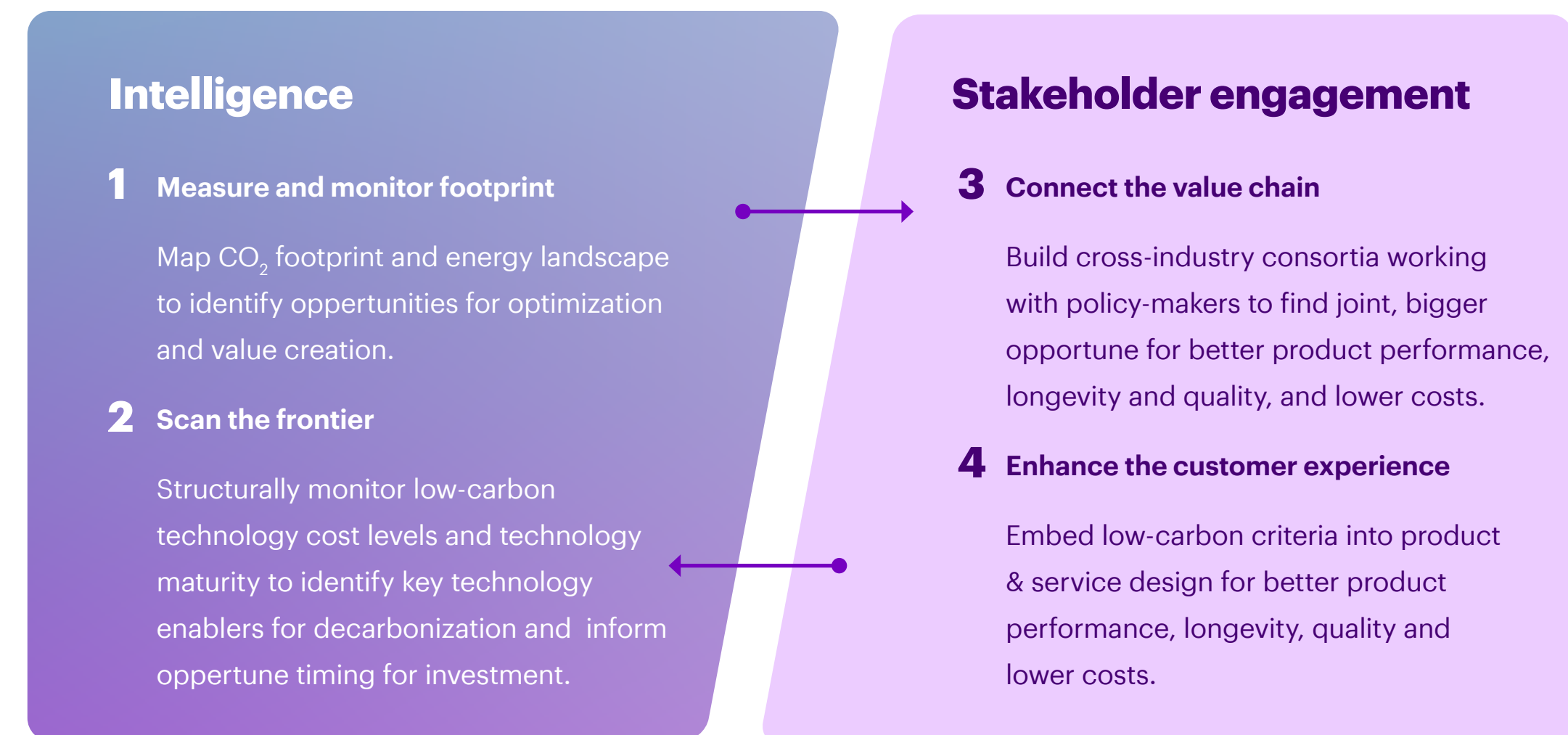
Practical steps for European companies' energy transition

Europe's energy transition is highly dynamic. Technologies mature, policies change, and consumer expectations shift. The ability to anticipate change and act is imperative to remaining competitive.

Our analysis identifies four practical investment steps that can help companies achieve the dual goals of accelerated emissions reductions and business growth while positioning them for future opportunities (Figure 5). Digital technologies are critical enablers for executing these steps effectively and at scale, enabling real-time monitoring, facilitating collaboration across consortia and ecosystems, and providing transparency and convenience for consumers.

Figure 5: Key steps for climate action and business growth

Measuring carbon footprint, keeping tabs on maturing decarbonization technologies, building cross-industry consortia and clusters, and engaging with customers are all key to achieving climate goals and business growth.



1. Measure and monitor footprint

Map carbon footprint and energy landscape to identify opportunities for emissions reduction, process optimization and value creation.

Identifying opportunities for emissions reductions starts with a detailed understanding of the carbon footprint and energy landscape of business operations. Flows of energy and materials in industrial processes are highly complex. IoT embedded assets combined with advanced analytics capabilities enable a detailed and forward-looking understanding of energy waste and emissions.

Smart moves

- Embed IoT and AI technology into assets and processes to gain real-time insight into energy and emissions footprints.
- Set targets to reduce impacts by processes and KPIs for continuous improvement.
- Adapt frameworks for decision making (e.g. business cases) to include emissions and energy use criteria.

Honeywell: Improving efficiency with data analytics

Honeywell, a technology and performance materials company based in Charlotte, North Carolina, has a vision of the future: One that is characterized by the use of technology (connectivity and artificial intelligence, among others) to optimize energy and resource use. To this end, in 2019, Honeywell launched Honeywell Forge, an IoT platform that helps clients collect, analyze and act on operational data. The intent is to use software to improve operational efficiency, reducing waste and energy costs. The company has improved its energy efficiency by 70 percent since 2004.¹⁸

Merck: Measuring sustainable business value

US pharma giant Merck aims to support human progress for more than one billion people through its sustainable science and technology solutions.

To measure progress, the company developed an internal process called the Sustainable Business Value methodology. This methodology quantifies all impacts of business operations in monetary terms. It examines six dimensions, combining environmental, social and governance parameters with measures of economic value, ethics and consumer well-being. A seventh dimension, digitalization, was under development as this report was written; it will reflect the impact of evolving digital business models on society.¹⁹

Merck also assesses the impacts of its products with the tool DOZN™, tracking resource use, energy efficiency, and human and environmental hazards.

2. Scan the frontier

Structurally monitor low-carbon technology cost levels and maturity to identify key decarbonization enablers and investments.

Technologies that enable emissions reductions have developed rapidly over the past decade. Some, like renewable energy generation, have developed into mature, commercial markets. E-mobility solutions and intelligent energy management are also reaching this stage, while others remain pre-commercial and sub-scale. Understanding how solutions are moving across horizons is essential for accurately timing investments.

Smart moves

- Create dedicated teams responsible for understanding technology trends and exploring relevant opportunities.
- Integrate scenario thinking into business strategy to anticipate demand for sustainability solutions.
- Engage with external experts and partners to share and develop cutting-edge market intelligence.

Ørsted: Preparing for emerging green markets

Danish power company Ørsted shifted business models in anticipation of the rise of renewable energy. In 2009, it announced that it would flip its portfolio from being 85% “black” (powered by coal, oil and gas) and 15% “green” (powered by renewable sources) to the reverse ratio within a generation. By 2018, 75% of Ørsted’s energy output was green. That same year, it reported a healthy US\$2.3 billion in operating profit.²⁰

In 1991, Ørsted was the first operator of a wind farm and has since grown to become the largest offshore wind producer in the world. The company has installed more than 25% of the world’s offshore wind capacity.²¹

SusChem: Promoting sustainable chemical and biotech innovation

SusChem, the European Technology Platform for Sustainable Chemistry, supports sustainable chemical and biochemical innovation.²² It develops and leads large-scale, integrated research and innovation programs on behalf of its members, and also disseminates critical intelligence. This includes, for instance, a common strategic research and innovation agenda²³, which identifies key technology priorities to address EU and global challenges.

3. Connect the value chain

Build cross-industry consortia that can work closely with regulators and local governments to identify joint, large-scale opportunities for reducing emissions and unlocking trapped value.

Opportunities for emissions reductions do not end at company boundaries. Collaboration creates new opportunities for larger emissions reductions. Waste energy and material streams can find useful applications at partners on a single

Smart moves

- Establish consortia across industrial clusters to create, test, and scale technology solutions for sustainability impact

site or along the value chain. And the pooling of resources and expertise can accelerate the commercialization of new solutions for emissions reduction by identifying and testing early use cases, supported by stimulus and subsidy funding. Consortia at industrial clusters can serve as early test-beds for new concepts that bundle multiple solutions (e.g. large-scale renewable supply and hydrogen production).

- Utilize technology such as blockchain to trace resource use across the business ecosystem.
- Closely work with peers, national and local governments, and policymakers towards an orchestrated European energy transition strategy that safeguards its competitive edge.

Northvolt and Siemens: Optimizing low-carbon battery production

Northvolt, a newly established Swedish battery manufacturer, aims to develop a blueprint for next-generation lithium-ion battery manufacturing that is low-carbon by design. Clean energy will power battery cell manufacturing. Strict environmental controls will minimize emissions, and chemical recycling processes will recover more raw materials from spent batteries and redirect them back into manufacturing.²⁴

Vertical integration is central to Northvolt’s ambitions. The company is working directly with local suppliers so that many of its raw materials are refined closer to where they are mined, rather than shipped from halfway around the world. It expects to make cells with 60–70 percent lower carbon emissions than the equivalent batteries made in China.²⁵

Siemens has partnered with Northvolt to facilitate battery recovery and recycling. Northvolt will use the Siemens Digital Enterprise portfolio, encompassing everything from manufacturing planning and design software to automation, including industrial communications networks and cloud solutions, for its battery production. Siemens will purchase batteries from Northvolt once its large-scale production facility is up and running.²⁶

Schneider Electric: Activating a global business community to promote renewables

French multinational Schneider Electric convened the New Energy Opportunities (NEO) Network²⁷ to explore growth models in just this way. The NEO network is a global community and online market platform of more than 300 corporate renewable energy purchasers and providers, supported by leading market analytics, that aims to match supply with demand. Schneider teamed up with a retail company to use this network to support the retail company's aim to reduce CO₂ emissions that would otherwise have been created through their value chain.²⁸

4. Improve user experience

Embed low-carbon criteria into product and service design that improves affordability and provides better performance, longevity, safety and quality.

Action on reducing emissions starts to drive competitive advantage when it informs product design and customer experience. Helping customers meet their climate ambitions through low-carbon products takes business benefits beyond cost savings. And ever-improving technology means that low-carbon design can also provide better performance, longevity, safety and quality—at affordable prices.

Smart moves

- Optimize emissions and energy footprints of products by integrating these criteria into product design briefs, supported by digital twin technology.
- Develop and market low-carbon premium product ranges to help customers reduce their footprint.
- Use traceability technologies such as blockchain for greater transparency around resource use.

LafargeHolcim: Reducing carbon footprint with digital design and capital project delivery

Swiss multinational LafargeHolcim launched ORIS, a digital pavement design and sourcing tool for low-carbon, smart road design. With ORIS, the carbon footprint of road construction can be reduced by up to 50%, while increasing road lifespan by up to three times and lowering the costs by 15 to 30 percent.²⁹

The tool assesses road design from construction to maintenance, analyzing parameters such as local resources, expected traffic and weather conditions, to propose design solutions that reduce costs and emissions and extend lifespan. It uses a suite of digital platforms, hybrid cloud, digital design services, AI and Industrial IoT to incorporate and assess materials knowledge in cement and concrete products and building solutions.

Chiesi: Applying life-cycle perspectives into product development

Chiesi, an American specialty pharma company, has chosen a double purpose model, one that pursues financial targets as well as the advancement of society while benefiting all stakeholders including people, communities and the environment.³⁰ Chiesi applies a life-cycle perspective in the R&D process by embedding sustainability criteria into design. The life-cycle perspective helps designers evaluate the impact of products at all key stages of their development, from pre-clinic to commercialization.³¹

Chiesi is investing €350 million in developing the first low-carbon, pressurized Metered Dose Inhaler (pMDI) for asthma and chronic obstructive pulmonary disease patients. This new formulation will reduce the carbon footprint of pMDIs by 90 percent.³²

Going green is good business

Europe stands on the precipice of great change as the low-carbon economy undergoes radical shifts. As the EU tightens its emissions goals and ties pandemic-related stimulus to its clean energy transition, businesses must respond by accelerating their emissions reductions.

In the past, while businesses have invested significantly in decarbonization, fears of tradeoffs between costly clean energy technologies and competitiveness have held them back from more decisive action. However, our research shows that making smart moves now can unlock massive business value in both the short and medium term.

Net-zero solutions supported by digital technologies can provide cost-effective ways of achieving emissions reductions. By pursuing strategic short-term no-regret investments and next-horizon opportunities, European companies can not only position themselves to achieve the ambitious target of 55% emissions reduction by 2030 but also unlock around €28 billion in business value across six sectors — chemicals, cement, and iron & steel, battery, pharma, and data centers —by 2025.

Change is the only certainty in the pursuit of net zero. The ability to act on emerging opportunities will be the difference between those who position themselves for growth and those who lag behind.



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