Pillars of the Green Transition 2025

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For all the fervor that once animated climate discourse, fatigue has begun to creep in. Companies that made sustainability a central pillar now face funding slowdowns and political reversals, rendering 2025 a precarious juncture in the green transition.

"The external environment has shifted," says Jim Andrew, CSO of PepsiCo. "In 2020–2021, there was momentum: talk of systemic change, financing, infrastructure upgrades, electrification, recycling, policy alignment, and cross-sector collaboration. Much of that has since become a headwind."

Those headwinds are palpable across industries. Ishan Palit, CEO of testing and certification company TÜV SÜD, notes that while consumer pressure has played a role in steering progress, it "isn't yet strong enough to fill the gap left by retreating government subsidies."

With five years to meet 2030 deadlines - the Paris Agreement, UN Sustainable Development Goals, and corporate net-zero pledges - the moral case alone won't be sufficient to sustain hard-won momentum.

Cyril Garcia, Global Sustainability Services & Corporate Responsibility Head of Capgemini, observes: "Even when companies understand the urgency and have the right solutions, many hesitate. They worry about how the market will perceive the cost and whether now is the right time." Yet, he stresses: "long-term resilience is precisely what sustainability provides."

Today, that resilience is measured in hard economic terms. Energy sovereignty is becoming synonymous with national security. Sweeping rules on packaging and recycling are reconfiguring supply chains for consumer goods. And in transportation, one of the highest-emitting sectors, reforms are unfolding into inevitability. These three arenas form the focus of this report.

Market volatility and shifting policies cloud the horizon, but they also reveal players who grasp sustainability as a competitive imperative. At the fault line, the next decade's winners will be those with enough conviction to act before missed targets exact a hefty cost - in both capital and carbon.

IN THIS REPORT...

FRANCESCO LA CAMERA | DIRECTOR GENERAL, **INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA)**

Political reversals like the U.S. exiting the Paris Agreement can create uncertainty and revive fossil fuel narratives, but they don't change the data.

KATHARINA TOMOFF | SENIOR VICE PRESIDENT OF GLOBAL ESG, **DHL GROUP**

Strong government support can be a real catalyst. But we won't wait for subsidies. This isn't a political issue. The cost of inaction is far greater than the one of decarbonization.

PHILIPPINE DE T'SERCLAES | CSO, **DASSAULT SYSTÈMES**

The underlying goals of efficiency, resilience, and adaptability are still driving investment and innovation. In that sense, the business case for sustainability is more robust than ever.

PATRICK CROMBEZ | GENERAL MANAGER HEATING AND RENEWABLES EMEA, **DAIKIN EUROPE**

A key area is the decarbonization of heating in Europe. There is a strong movement away from combustion heating toward renewable heating through heat pumps, which significantly reduce carbon emissions, and their impact will only grow as electricity sources become more renewable.

HÅKAN AGNEVALL | CEO, **WÄRTSILÄ**

Studies suggest that, if the IMO proposal is adopted, operating costs for heavy fuel oil could double by 2035. In shipping terms, that's soon. These are unprecedented events.

HENRI POUPART-LAFARGE | CEO, **ALSTOM**

Sustainable mobility is high on the political agenda, especially in Europe. But it requires consistent, long-term funding. That's often hard to sustain in changing political environments.

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>
> DEBASHIS GHOSH | PRESIDENT, LIFESCIENCES, HEALTHCARE, ENERGY-RESOURCES AND UTILITIES BUSINESS GROUP, **TATA CONSULTANCY SERVICES**

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Circularity Under Strain

Nowhere else do evolving sentiment and material innovation converge so visibly as in consumer goods. The purchasing power of eco-conscious shoppers, paired with measures like the 2022 Plastic Packaging Tax and the recent EU Packaging and Packaging Waste Regulation (PPWR), which mandates recyclability by design, has transformed supermarket aisles into showcases for big brands' eco-commitments.

But progress has by no means been linear. This year, PepsiCo and Coca-Cola both downgraded packaging targets, citing limited investment and policy support and prompting sharp criticism from groups like Greenpeace and Break Free From Plastic. In defence, PepsiCo argues that accelerating faster than global timelines, mostly set for 2050, is unrealistic; goals must evolve with what they call "external realities". It's a reminder that setbacks often stem from market-driven limitations rather than an absence of corporate will. Tom Szaky, CEO of TerraCycle, puts it bluntly: "Recycling is driven by for-profit companies, so it's not about capability, it's about profitability. A cardboard box is recycled because the cost of collecting and processing it is lower than its material value. In contrast, 95% of products aren't recycled because they cost more to process than they're worth." In other words, ambition can clash with market logic long before technical feasibility is achieved. As commercial realities come knocking, the spotlight moves to what should (or could) replace plastic.

Closing the Innovation Gap

Paper is emerging as the leading contender, yet for many applications, the lack of a reliable waterproof barrier remains a limitation. It's where the adage, "the customer is always right," may need a rethink. Widespread disdain for soggy paper straws and flimsy compostable lids suggests that when people sense a trade-off, performance and convenience typically win out.

Seeking to close that gap, as part of its 'Repackaging tomorrow' strategy, Norwegian manufacturer Elopak invested in Blue Ocean Closures to develop firm, fully recyclable fiber closures to replace plastic lids on its paperboard cartons. "One million plastic bottles are produced every minute globally, yet only 8% are recycled, a clear sign of the need to reduce plastic use. That leaves 920,000 bottles per minute unaccounted for. We must reduce plastic use," says Elopak's CEO Thomas Körmendi, targeting the US market as part of its expansion.

Japanese producer Oji Holding Corp is redirecting its business from paper toward sustainable materials, with food packaging as a key focus. President and CEO Hiroyuki Isono says the company's three-year plan for 2025–2027 will serve as a foundation for this transformation. "Maybe the price is higher, but we should move to sustainable materials. Regulation is needed. In Europe, it's coming. People are starting to pay more to meet those regulations," he adds. From Europe to North America, paper innovation is moving from niche pilots to mainstream. Smurfit Westrock is working with Danone, Alpro, and Ferrero to replace plastic in cartons, biscuit tubes, and Coca-Cola multipacks. In the UK, Reckitt is shifting Dettol and Lysol into solid board and paper packs, while its Finish dishwashing range, once in multilayer plastic, now launches in Europe with 85% paper content. Together, these moves suggest paper is edging toward challenging plastic at scale.

Green, in this Economy?

Economic squeezes don't hit only businesses; households also are tightening the purse strings. With energy prices at record highs, the principled choice becomes a calculated trade-off, fueling the perception that green living is an elusive luxury. Inevitably, this has real-world implications for the transition. Take recycled metals. This year, Pandora Group completed a transition to 100% recycled gold and silver, a move it projects will cut CO_2 emissions by 58,000 tonnes annually. Rather than passing the estimated $110 million extra cost onto consumers, the company absorbed it. While that choice reflects commitment, it leaves a lingering question, says Mads Twomey-Madsen, Senior Vice President of Global Communications & Sustainability, Pandora Group.

"Will consumers ever be willing to pay more for sustainable products? That's the big question. Is sustainability going to be a value-add or a brand qualifier? Will consumers deselect brands that don't meet certain standards? Historically, they have done that." This doesn't signify an abandonment, merely a redirection. Consumers may resist paying a green premium, but are likely to embrace products that also promise long-term savings. Juliette Sicot-Crevet, CSO of Groupe SEB, sees a way forward: "Most consumers aren't willing or able to pay more for sustainable products when budgets are tight. That said, with energy bills rising, energy efficiency has started to become a priority and resonate more."

The Energy Imperative

Europe's decades-long dependence on foreign energy boiled over following Russia's 2022 invasion of Ukraine, a shockwave that still ripples across the continent. This year, the near-collapse of the Iberian Peninsula's power grid triggered 16-hour blackouts, exposing the fragility of European infrastructure. What was once economic policy

JOACHIM SCHÖNBECK | PRESIDENT & CEO, **ANDRITZ**

Pulp is increasingly replacing plastics. You see it in everyday life. Your coffee cups and even the lids are often made from pulp, not plastic.

KAREN PFLUG | CSO, **INGKA GROUP**

Policy must go beyond end-of-life waste management and start rewarding circular design and upstream interventions, where the greatest impact often lies.

DAVID CROFT | GROUP HEAD OF SUSTAINABILITY, **RECKITT**

For plastics, challenges remain around effective recycling. In many regions, the networks to support effective recycling simply do not exist yet and need support to develop.

ANDREA MONDONI | GENERAL MANAGER (NORTH AMERICA), **BEIERSDORF**

High-quality recycled materials are priced up compared to conventional, virgin plastic. We try to save material, impact and cost through lightweighting our packaging, while integrating recycled materials.

YANNICK FIERLING | CEO, **ELECTROLUX GROUP**

Nudges are built into the user experience; it's not just about features, it's about helping people form more sustainable habits.

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As an energy carrier, hydrogen will be a critical part of a sustainable energy mix, and for it to succeed, standards must evolve to match. So, we're seeing increasing standardization in ESG reporting, but independent validation and verification methods are still under debate.

ISHAN PALIT | CEO, **TÜV SÜD**

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has been elevated to a matter of national security. Could this be the tipping point to propel renewable energy into ubiquity? "The fact that solar and renewables are now part of this dialogue shows that we're no longer fringe. We're material and mainstream," says Raghu Belur, Co-founder and Chief Products Officer of Enphase. "Every market is competitive, but energy is uniquely so. We're not just competing with other solar providers, but also fossil fuel-based systems. That makes innovation critical." However, cost remains a sticking point in the transition. "I worry that people are increasingly skeptical of the cost of renewable energy initiatives. The issue lies in the narrative we have been told: the transition to renewable energy will be smooth and not cost more. However, the reality is that renewable energy is not as cheap as hydrocarbons, and many are unwilling to pay extra for sustainability," cautions Håkon Volldal, CEO, Nel Hydrogen. While the EU has advanced through supportive legislation, he notes that the bloc "simply does not have the resources to fully fund the green transition right now."

Anatolia Rising

As Europe looks outward for solutions, attention is homing in on nearby regions with untapped potential; perhaps none more strategically located than Türkiye. Straddling the crossroads of East and West, Türkiye's latitude strikes a winning balance: far enough north to avoid equatorial efficiency losses, yet close enough for generous solar exposure. The country also lies along a major wind corridor favored by migrating birds, signaling strong, consistent winds.

PHIL DELLEVILLE | PRESIDENT & CEO, **MALTA INC**

Governments are keen on ensuring energy self-sufficiency, with industrial competitiveness and decarbonization following closely behind.

CHARLOTTE BLOMMESTIJN | HEAD OF SUSTAINABILITY, **KALUZA**

For major energy retailers, concerns are about barriers and risks to achieving those goals. These include grid stability, customer affordability, and ensuring an equitable transition.

CHRIS KALNIN | CEO AND FOUNDER, **BKV CORPORATION**

The world wants energy that's available 24/7, affordable, and not harmful to the environment. That's our goal: to combine traditional energy like natural gas with new approaches like carbon capture, electrification, and decarbonization.

WESAM ALGHAMDI | CEO, **NEOM GREEN HYDROGEN**

Just like oil and gas evolved, hydrogen will require years of innovation from engineering firms and technology providers. From a production standpoint, the business case is already behind us.

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"These resources are crucial for energy independence and addressing Türkiye's significant foreign trade deficit, which can be 70-80% driven by energy imports in certain years," says Dr. Murtaza Ata, CEO, Kalyon Enerji whose solar power plant project Karapınar (supported by Türkiye's Ministry of Energy) secured $820 million in financing with a second 500-megawatt plant scheduled for completion in late 2026, reflecting a strong national push for energy independence. Ankara-based Alfa Solar Energy, while also focused on the Turkish market, hopes to present a competitive alternative to Eastern suppliers by expanding its presence beyond Greece and Romania into Southern Europe and the Balkans.

Made in America

Of the Paris Agreement's 195 signatories, only one nation has begun formal withdrawals. This summer, President Trump signed the contentious One Big Beautiful Bill Act (OBBBA), sweeping legislation aimed at curbing energy tax credits and environmental programs from 2022's Inflation Reduction Act (IRA). The IRA marked a seismic investment in renewables, designed to bolster domestic manufacturing and supply chains. Coupled with new tariffs, the future of renewable projects hangs in the balance. According to Anne-Laure Chassanite, CEO of ENGIE Resources and ENGIE North America, the most immediate impacts have been felt in battery storage, where the company is directing much of its upcoming projects: "Tariffs impacted the battery market the most because of the Chinese footprint, but we have inventory. The key issue will be restrictions on components from certain foreign entities starting at the end of 2025."

Under current rules, wind and solar projects must begin construction by mid-2026 to remain eligible for incentives. Chassanite is confident that this is a sufficient window to capitalize on benefits and keep investors engaged; whether it triggers a clean-energy gold rush remains to be seen. That optimism, she cautions, is tempered by bottlenecks further down the value chain: "Industrial and commercial customers want to avoid power-related crises and understand the benefits of renewables. What they don't always see is the looming issue of grid congestion... Even when the investment is ready, it's not always enabled in a timely manner. Grid congestion and long permitting times are the big threats to power availability in a massive load growth context."

Undeterred, Canadian Solar announced more than $2 billion in investments across Indiana, Kentucky, and Texas, covering battery storage and solar cell and module production. French technology and Earth data company Viridien is also doubling down on locations where legacy energy and transition projects are developing concurrently: "The US is key, especially in the shallow Gulf, where sequestration projects are growing. Houston is becoming a major energy hub... Europe moved earlier on carbon storage, but US incentives helped it catch up," explains CEO Sophie Zurquiyah. Seeking funding to scale its BrightLoop chemical looping platform, Babcock & Wilcox aims to convert feedstocks like biomass and waste into clean hydrogen, fuels, or power while capturing CO_2. "The money is out there, whether it's public support from the U.S. Department of Energy or private

Our target over the next four to five years is to grow to at least five gigawatts of solar and wind capacity and 1,000 megawatt-hours of storage.

DR. MURTAZA ATA | CEO, **KALYON ENERJI**

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Renewable energy for a sustainable future

We are accelerating the transition to a future of clean energy. Guided by sustainability principles and development goals, we are dedicated to continuous improvement and making impact investments in the renewable energy sector.

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CSR INTERNATIONAL EXCELLENCE AWARDS 2025

COMMUNITY & ENVIRONMENT AWARD
MULTIPLY EXCELLENCE AWARDS 2023

NATIONAL SILVER AWARD
GREEN APPLE AWARDS 2025

BUILDING AWARD
TÜRKSMD 16TH ARCHITECTURE AWARDS

BEST BUILDING
WORLD ARCHITECTURE FESTIVAL 2024
(Manufacturing, Energy and Logistics)

> At Viridien, our geoscience expertise, comprehensive Earth data and advanced technology enable lower-impact and low-risk natural resource extraction, while supporting carbon storage, critical mineral exploration, and renewable energy initiatives.
>
> SOPHIE ZURQUIYAH | CEO, **VIRIDIEN**

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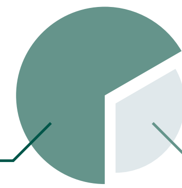
Global Energy Investment 2025

Clean tech: **$2.2 trillion** renewables, nuclear, electrification etc.



Fossil fuels: **$1.1 trillion** oil, natural gas, coal

Source: International Energy Agency, 2025

backing," says CTO Brandy Johnson. While the transition is slower than expected, Debashis Ghosh, President, Lifesciences, Healthcare, Energy-Resources and Utilities Business Group, Tata Consultancy Services, assures that companies are not abandoning renewables: "It will take a mix, not a single breakthrough... In AI, there was one ChatGPT moment, but in energy, there will be no single silver bullet, rather, a combination of technologies and behaviours that achieve the balance we need." Despite policy flux in Washington, companies betting billions on the U.S. hint at a momentum that politics alone may not be able to derail. Still, clean generation alone won't tip the scales. The real test will come at the point of use: whether consumption can keep pace with production.

CLÉA MARTINET | VP OF GROUP SUSTAINABILITY, **RENAULT GROUP**

What concerns me most is that sustainability could threaten vehicle affordability and competitiveness. Without mass adoption, we won't see a real climate impact.

MOHAMMED BEN SULAYEM | PRESIDENT, **FÉDÉRATION INTERNATIONALE DE L'AUTOMOBILE (FIA)**

Electrification is just one solution. We're pushing all options. By 2026, all FIA championship vehicles will be required to run on 100% sustainable energies.

DIRK VOESTE | CSO, **VOLKSWAGEN**

The pace of change in China is remarkable. More than 50% of cars sold in the market last year were electric. That's forced us to rethink how we design, develop, and deliver vehicles.

FREDRIKA KLARÉN | HEAD OF SUSTAINABILITY, **POLESTAR**

The key is energy storage. Renewables like wind and solar fluctuate, so we need better ways to store that energy during times of low generation and here, EVs can be part of the solution.

ALICE ASHPITEL | HEAD OF SUSTAINABILITY, **MERCEDES-BENZ AMG PETRONAS F1 TEAM**

We're not just trying to reduce our footprint, we're aiming to demonstrate, test and promote technologies that can truly change how people travel.

ANTONIA HÖÖG | CSO, **KEOLIS**

We don't pit one mode against another; they need to work together. The entire transport sector is undergoing a major transition away from fossil fuels, but there's still a long way to go.

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Bon Voyage to Cheap Carbon?

The movement of people and goods underpins our modern economy. At the heart of this is shipping; the engine transporting 80 percent of world trade according to the UN. Despite its reputation as the most sustainable large-scale mode of transport, this vast network incurs a hidden cost: about 3 percent of global emissions. Cleaner alternatives to conventional fuels exist, but most carry a punishing price tag. Yet equipment makers continue to innovate: in Finland, Wärtsilä has been supplying multi-fuel engines, hybrid battery systems and onboard carbon capture, and is currently developing hydrogen technology. Samskip is investing in shore power, allowing ships to plug in at port instead of running engines, sharply cutting emissions.

"There's strong support for unified regulation. Shipowners, engine makers, and fuel producers all want clear rules and a level playing field...Some are waiting for the perfect fuel or regulation, but waiting is the bigger risk," says Øistein Jensen, CSO of Odfjell Group. Alas, long-sought clarity may be on the horizon. This autumn, the first-ever mandatory global carbon pricing scheme of any major sector is expected to roll out. That move - eight years in the making - could rewrite maritime economics. The International Maritime Organization (IMO) framework proposes a mixture of incentives and penalties: low-emission vessels and early adopters would earn exemptions and credits, while polluters face levies of $380 per extra ton of CO_2 if they emit above a fixed emissions threshold. If implemented, it's projected to generate up to $10 billion annually, funds earmarked for developing countries, port infrastructure, and support for early adopters. For many, this represents a watershed moment. Maersk's Group Representative for Europe Simon Bergulf, believes "It would finally create a global level playing field and could unlock large-scale investments in production. It's historic, and if the vote fails in October, we don't just try again next year. We'd be delaying progress by 10 years at least, which would be a huge missed opportunity."

Could the proposal sink before it sails? Support has been strong, with backing from China, India, Brazil, Singapore, and much of Europe. However, in the most recent voting round, the US abstained, and several OPEC nations, including Saudi Arabia and Venezuela, voted against. Still, the IMO's Secretary-General Arsenio Dominguez remains confident a consensus can be reached. "The concerns are real; some fear impacts on fuel costs, food security, and trade, especially for oil-dependent or developing economies... But a vote doesn't mean division; we're still working as one organization. I'm very confident it will pass. The conversations haven't stopped between sessions." In the meantime, the pathway is less about a single breakthrough fuel and more about multi-fuel capability. Given that the IMO reported half of last year's vessel orders were designed for alternative fuels, the momentum looks encouraging.

> While the green transition is proving slower, costlier, and more uneven than early champions had envisioned, we've arrived at a point of no return. The test now will be whether governments, companies, and consumers can reckon with these hard truths as the conditions of progress. Rather than a stalled experiment, this volatile period could lay the foundation for a more competitive and enduring order.