

Chemical Week



Sustainability

Bold goals reshape strategies

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Sustainability

Bold goals reshape strategies

The role of sustainability has shifted from initiatives aimed at increasing goodwill and reducing costs to a business imperative shaping future-proof portfolio and driving strategic decision making. While industry can boast significant progress in reducing its environmental impact, increasing public and regulatory scrutiny around plastic waste has emerged as a critical issue. New technologies and massive, coordinated efforts throughout the supply chain are already being developed and mobilized to address the challenge.

▸ Rebecca Coons

The chemical industry has been a leader in implementing sustainability principles, but looming global challenges that will require new technologies and chemistries and have made sustainability an industry growth driver on par with rising populations and consumption.

The latest iterations of sustainability commitments focus less on reducing the impact of operations, where meaningful reductions have already been achieved, and more on the benefits products can provide. Several companies, including BASF and Covestro, have aligned parts their sustainability programs to the United Nations 17 Sustainable Development Goals (SDGs), which aim to address global challenges such as climate, environmental degradation, clean water and sanitation, and sustainable cities and communities.

“We’ve set a goal for 80% of our R&D to be aligned with the UN’s goals by 2025 because there is a huge business case for it,” says Rebecca Lucore, head of sustainability and corporate social responsibility (CSR) at Covestro. “It’s projected that the market opportunity for meeting these goals is \$12

trillion. So we really see a clear business case for aligning the bulk of our R&D to helping find solutions for these global challenges.”

A clear business case has propelled sustainability to the highest levels of corporate decision making. BASF, in a recent meeting announcing updated strategic targets, gave two major sustainability commitments top billing alongside financial guidance. The company said it aims to achieve annual sales with products that make substantial contributions to sustainability of €22 billion (\$25 billion) in 2025 and that it would remain CO₂-neutral at 2018 levels through 2030—despite ambitious growth targets, including the addition of a new, \$10-billion facility in Guangdong, China.

“Our new non-financial targets are integrated in our financial reporting, and in the steering of the company,” says Dirk Voeste, vice president/sustainability strategy at BASF. Sustainability isn’t a ‘program’ or ‘initiative’ for BASF. It is embedded into the company’s decision-making processes.” For example, all of the company’s investment projects globally are evaluated for sustainability before funding is approved.

Dow Chemical’s third set of ten-year goals, which it has dubbed its “blueprint goals,” also

focuses on how chemistry can address global challenges. “Blueprint in this context is a recognition that there are really large challenges that we as a people on this planet are facing,” says Neil Hawkins, chief sustainability officer and corporate vice president of sustainability, environment, health & safety for Dow. “These include climate change, health and wellness, ecosystem destruction, and the need for water. These are big challenges that no one party can solve. They can only be solved through collaboration across different groups, including the private sector, government, academia, NGOs, and civil society.”

For this reason, one blueprint goal commits Dow to be part of ten significant collaborations that will help solve major world challenges over a ten-year period. “We believe that we have a responsibility as one of the leading material science companies in the world to help,” Hawkins adds. Dow’s blueprint goals also include a mandate to innovate toward more sustainable products, and a goal targeting the circular economy. “If you’re developing more sustainable products that meet the trends of the planet, you’re going to grow.”

For Azelis, a specialty chemicals distributor, adoption of the UN SDGs and becoming a signatory member of the UN Global Compact led to a significant paradigm shift. “Interdependence of those SDGs in the complex world of today testifies that none of those goals can be reached in isolation and that nobody can solve those issues on their own,” says María Jesús Almenar Martín, head of group safety, health, environmental, and quality at Azelis. “We all need to pull the weight and recognize that the SDGs address the global challenges that we face today.”

Anne Kolton, the American Chemistry Council’s (ACC’s) executive vice president of communications, sustainability, and market outreach, says ACC is also seeing greater awareness of the role that chemistry and the chemical industry is playing in enabling a sustainable future. “There’s no question that there are real and tangible benefits for our members to incorporate these sustainability principles into their operations and decision-making,” Kolton says.

Staying aggressive

Many companies already have programs to reduce their footprint within their own gates through greenhouse gas (GHG) emissions or energy efficiency. As sustainability targets mature, however, they are becoming increasingly creative, outward-looking, or just plain ambitious.

BASF has already reduced its GHG emissions by 50% in absolute terms compared with 1990 levels, while at the same time doubling its production volumes, Voeste says. To achieve the new CO₂ emissions target, BASF will further improve efficiency of plants and, wherever possible, will purchase a greater share of electricity from renewable energy sources. The company has also launched an R&D program to develop technologies for basic chemicals that are the most CO₂ intensive to reduce emissions beyond 2030.

Growing BASF’s annual sales from products that make a significant contribution to sustainability—dubbed Accelerator products—from €15 billion in 2017 to €22 billion in 2025 will require “a strong development pipeline that focuses on sustainability as a growth driver and a differentiator,” Voeste says. In 2017, the regular review of BASF’s products found 13,000 products that are classified as Accelerator products. Products classified as “Challenged,” while legally compliant, represent a “significant sustainability concern.” BASF is actively working with customers to replace these with

better solutions and phase them out within five years after identification.

Hawkins says Dow’s Valuing Nature goal—in which the company will deliver \$1 billion in value through products that are good for business and better for ecosystems by 2025, and, by 2020, screen all capital and real estate projects through Nature’s Future Value tool that was co-developed with the Nature Conservancy—is the most innovative out of its blueprint goals. “We are three years into this goal and have already reached more than \$200 million in economic value from around 50 completed projects,” Hawkins says.

One such project in Midland, Michigan, closed an ash pond site in a way that created 23 acres of conserved wetland habitat while improving nearly one mile of riverfront across from downtown Midland. By using less material and reducing the need for operation and maintenance, the result saved the company more than \$2 million, and the site now provides key ecological functions, such as improving water quality, retaining floodwaters, and improving air quality, Hawkins says. He believes the valuing nature goal will be culture changing for Dow, and that in ten years’ time valuing nature will be like safety within Dow—something factored into all business decisions.

Dow’s blueprint goals also include a target for safe materials for a sustainable planet. “We as an industry really need to work collaboratively with our stakeholders—be it government, NGOs, and academia—to create a consensus around the safety of our products so that the beneficial uses can continue,” Hawkins says. “Society continues to voice concerns about various products and we as an industry need to be ahead of that, anticipating changes in toxicology and making sure that we’re explaining ourselves very transparently. We need to continue to build trust with the public and be sure of the safety of our products.”

Martin says Azelis is seeing an evolution in the formulating landscape where the natural content or credentials of a raw material is not the primary focus anymore—the efficacy of the raw material is now becoming more important. “Consumers are becoming more conscious and knowledgeable about the products they use and how they are sourced,” Martin says. “They expect products with low impact to the environment and that these come from a fair business, which doesn’t compromise on human

rights and labor.” The company rolled out its CSR program in April 2018 and performance has already evolved in several ways since then. “We are continuously fine-tuning the best ways to measure our performance and further develop our CSR commitments,” she adds.

As a global distributor, Azelis also must make sure suppliers around the world are also engaged in similar CSR strategies. “We therefore have the obligation to verify that

these commitments are respected at all times and we do this through regular assessments, as part of our sustainable procurement policy,” Martin says.

Meanwhile, Covestro has set a goal to reduce GHG emissions by 50% a year after achieving a 40% decrease. “It’s an ambitious target, but when it comes to sustainability it’s important to challenge yourselves, step outside of the box, and have real, ambitious goals,” Lucore says.

Covestro’s goals also include a plan to get more value out of carbon, which includes technology to use carbon as a feedstock. Covestro’s cardyon is raw material for the production of flexible polyurethane foams that is made of 20% CO₂. “We’re also looking at more biomass material and new ways to make aniline. So this is a very active area of R&D for us,” Lucore says. There is a strong business case to innovate and invest in these technologies, Lucore adds. “The chemical industry is really in a unique and empowering time, so we’re looking at these global challenges and seeing the contributions our products and technologies can have.”

A strong culture of sustainability is also key for attracting and retaining engaged employees. “People want to work for a company that takes sustainability seriously, and we are proving that day in and day out,” Voeste says. “It helps us both attract young talent and retain experienced colleagues who feel working at BASF enables them to contribute to global challenges.”

Thinking holistically

One challenge for industry is ensuring that sustainability decision-making occurs in a holistic manner, Kolton says. “I think a lot of a lot of times there’s a tendency to make sustainability-oriented decisions on a single factor. Is something recyclable? What’s the CO₂ footprint of producing it? ACC is working



VOESTE: Sustainability embedded in decisions.

to foster a more holistic approach to sustainability and making sure that when decisions are made about what is and isn't sustainable, that we're looking at the entire picture."

Earlier this year, ACC launched a set of industry-wide sustainability principles designed to promote the safe use of chemicals and address the health and environmental impacts of industry's operations and products. The principles, a natural extension of ACC's Responsible Care performance initiative, spell out a coordinated industry approach to sustainability, Kolton says. "I think many, if not most, of our companies have been engaged in individual activities and initiatives to promote sustainability in their operations and through their products and their communities," she says. "But [ACC's sustainability initiatives] are really more of an effort to take a look at what's going on around us and what do we need to do as an industry to respond—not only to sustainability challenges that we as an industry face, but then also how do we leverage what we do."

Responsible Care established a consistency in how companies approach their operations that allows ACC to carry shared values forward in the sustainability principles, Kolton says. "Even when you're talking about the different chemistries and products made by our member companies, you can take it back to the principal level: We, as an industry, want to operate in a way that is protective of the environment, protective of people, and helps leverage our products' sustainability benefits." ACC is currently working on metrics for the sustainability principles so there are "real, tangible ways that we can measure and demonstrate performance," Kolton says.

Addressing plastic waste

An emerging threat—plastics waste and resulting consumer and regulatory backlash—is an emotional one, escalated by highly publicized photos of marine life choked by plastic and large, floating patches of single-use products at sea. According to the Ellen MacArthur Foundation, 67 million tons of global plastic packaging waste are generated annually, and much of this waste ends up in oceans and waterways. However, considerable efforts to address this crisis are underway, with the industry and the value chain uniting behind aggressive infrastructure and technology investments.

Industry is working to bring converters, brand owners, retailers, and waste handlers together to tackle the challenge, LyondellBasell CEO Bob

Midland, MI: Valuing nature project created 23 acres of conserved wetland.



Patel told attendees in an opening address at the recent 38th Latin American Petrochemical Annual Meeting (APLA), held in Cancun, Mexico. "All will play a role in [ensuring] the circularity and sustainability of plastics," Patel said. "We've got to prevent the mismanagement of plastic waste through programs that improve recovery and collection."

In May of this year, ACC revealed ambitious targets for managing the lifecycle of plastics, including a goal of recycling or recovering 100% of plastic packaging in the United States by 2040. ACC also intends to make all plastics packaging recyclable or recoverable by 2030 and have all US manufacturing sites operated by plastics division members participating in Operation Clean Sweep Blue—a stewardship program to keep plastic materials out of waterways—by 2020, with all sites across North America in the program by 2022.

The problem of marine litter highlights the rapidly improving quality of life in parts of the world like Southeast Asia, but the concurrent lack of infrastructure to keep up with it. "The solution will require a lot of heavy lifting," Kolton says. "But we have a chance to potentially help these parts of the world implement a newer, more circular model that leapfrogs over the old technologies and approaches by building more recycling and new ways of recycling from the outset," she adds.

LyondellBasell is making its own investments to improve plastics sustainability, including the acquisition earlier this year of a 50% stake in Quality Circular Polymers (QCP), a plastics-recycling joint venture with SUEZ in the Netherlands. The company is also working with Karlsruhe Institute of Technology (Karlsruhe, Germany) on molecular recycling, including development of catalyst and process technology to decompose post-consumer plastic waste into monomers for reuse in polymers.

SABIC announced last week that it has signed a memorandum of understanding with chemical plastics recycling firm Plastic Energy Ltd. (London) for the supply of feedstock, from waste plastics, for SABIC's petrochemical operations in Europe. Plastic Energy's

technology uses thermal anaerobic conversion (TAC) to convert a wide range of end-of-life, dirty, and contaminated plastics—hardly recyclable for conventional processes and that would otherwise end up burnt or in landfills or oceans—into oil or virgin plastic. The company operates two such plants in Spain. SABIC and Plastic Energy will build a commercial plant in the Netherlands to refine and upgrade oil from the TAC process. The plant is expected to come online in 2021.

BASF is currently working on a ChemCycling project with plastic recyclers and other partners in the value chain. Via thermochemical processes, a wide range of end-of-life, dirty and contaminated post-consumer plastics is converted into oil or virgin plastic.

"Plastic waste is a very hot topic in the minds of stakeholders, communities, and consumers, and the entire value chain needs to step up to solve it," Voeste says. "Scalability of technical solutions to end plastic waste will be important. A lot of lighthouse projects have been announced, which either focus on low-hanging fruit or are very close to the entities' own capabilities. This is great—I encourage participation from all companies, small or large. But we need to, as a value chain, collaborate to scale solutions." BASF strongly believes that ChemCycling can become such a scalable solution. "There will certainly be processes, where economically viable, to isolate and recycle some materials, but at the end of the day, there will be a large amount of unsorted post-consumer plastic waste," Voeste says. "This is where chemical recycling fits in."

However, technological and regulatory conditions must be met before the project is market-ready. For one thing, the existing technologies to transform plastic waste into recycled raw materials such as pyrolysis oil or syngas must be further developed and adapted so that consistently high quality is assured. Furthermore, regional regulatory frameworks will considerably influence to what extent this approach can be established in each market.

Ultimately, a mix of solutions will be required. "Of course, we must find new alternative materials," Lucrore says. "But we also must find better ways to recycle, reuse, or not use in the first place. We must change behavior. We also need to invest in structures and waste management systems in Southeast Asia and parts of the world where a lot of this waste is originating." The challenge will be a big one, not only for industry but across the whole supply chain, she adds. "It will remain a big focus area for coming decades." ■