Whitepaper

How to drive green chemistry in specialty chemicals

A guide for CFOs on evaluating and implementing a sustainable approach

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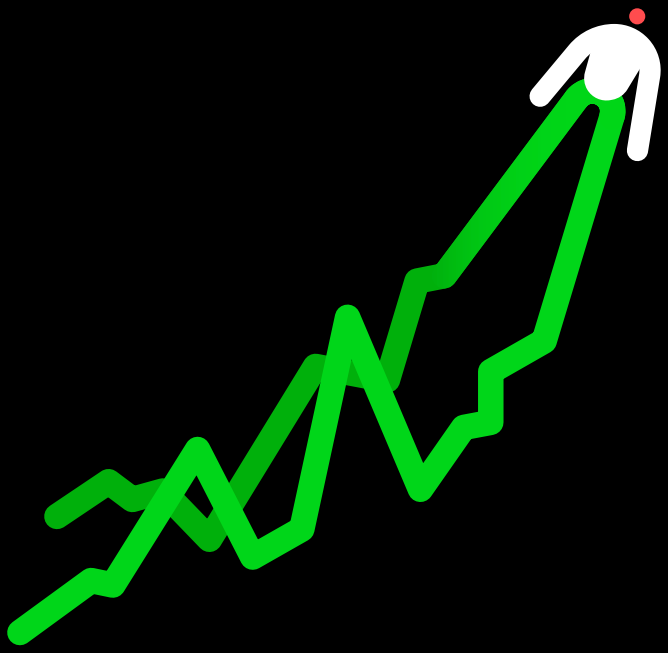

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Introduction

Specialty chemicals are a ballast for the U.S. economy. The global revenues from products such as adhesives, cosmetic additives, fragrances, polymers, and surfactants could reach 953.9 billion by 2027.[1]

But how can distributors remain relevant in this ever-lean landscape?
Chemical manufacturing is a major industry across the globe. As the specialty chemicals industry is characterized by its large, diverse manufacturing base and extensive distribution networks, it is dependent on complex supply chains to be successful. In this guide, we will set out why any strategic supply chain decisions that chemical manufacturers make going forward, must be green and driven by technology.

Not only have many governments established legally binding guidelines and international conventions on how to transport and store chemicals, but consumers and business partners are expecting chemical companies to focus on environmentally friendly approaches. Many chemical companies realize that this is more than just compliance and good PR but that there is an opportunity for improved profitability and lower risk by implementing a sustainable approach.

The challenge, though, is often making that decision to change. An industry notorious for tight regulations, deadlines, and margins, it is often easier for chemical manufacturers to stick with the operational methods they have used for years. They can be wary of implementing change and fear disruption to productivity.

However, green chemistry—the practice of greener chemicals, processes, and products—offers opportunities for profit, revenue, and margin that outweigh the investment required. This guide explores what CFOs need to know to create sustainable products, meet legislative and business aims, help their reputation, increase profit, and attract investment.

[1] Valuates Reports 2020

What is the value of green chemistry?

Becoming a green chemical manufacturer is not merely about box-ticking.

It is about positively influencing society and the workforce, and making sure that investment is put in the right places to mitigate environmental impacts to the business, such as climate change. And it is also about making decisions that are in the best commercial and reputational interests of the business—and so is highly relevant to the core mission of the CFO.

Risk and regulatory compliance—what you need to know
First, let's talk about the fundamental obligations of chemical manufacturers to have in place effective 'green' governance. Chemical manufacturing is highly regulated, and it is a day-to-day challenge to ensure that the business is abreast of regulatory changes.

Managing risk and regulatory compliance is particularly challenging if the business operates in different countries, as the company will have to navigate a web of different standards and regulations.

However, as government bodies with strong enforcement capabilities continue to mandate new processes and procedures, the following must be complied with if chemical manufacturers wish to avoid being penalized:

Global Harmonized System (GHS)
The GHS is a global system for classifying and communicating the hazardous properties of industrial and consumer chemicals. Although the GHS itself is not a legally binding international agreement, many countries will have created local or national legislation to implement its criteria.

Occupational Safety and Health Administration (OSHA)
OSHA, part of the U.S. Department of Labor, has aligned with GHS. OSHA has the federal responsibility for ensuring safe and healthy working conditions for working men and women, setting and enforcing standards, and providing training, outreach, education, and assistance.

Registration, Evaluation, Authorization and Restriction of Chemical Substances (REACH)
REACH is an EU regulation that asks businesses to identify and manage the risks linked to the substances they manufacture and market in the EU. Companies must demonstrate they safely use materials, as well as show evidence of communicating risk management measures.

SAICM (Strategic Approach to International Chemicals Management)
SAICM is a global policy framework to foster the sound chemical management of chemicals throughout their life cycle.

Green reporting—why is it important for CFOs?
Depending on the size and location of the chemical manufacturer, regulations will differ. Ultimately, regional standards and regulatory compliance are a necessity, and government-mandated product labeling regulations can mean the difference between market entry and exclusion. It is also increasingly common for the public, customers, and lawmakers to raise environmental issues, with plastics in particular pinpointed as an area of concern.

As such, there is an emerging requirement for CFOs not only to consider risk and compliance but to evaluate and make public green running costs and performance with efficient reporting tools.

Sustainable products, services, or processes undoubtedly affect your cash flow and need to be accounted for. The market demand, though, for eco-friendly products can, in some cases, enable a company to charge more for their products.

Investors have come to expect this kind of detailed and useful reporting when it comes to non-financial performance, as it can give them a better indication and measurement of the overall health of a business.

And if a CFO examines and analyzes the adoption of sustainable economy strategies and projects, he or she is well placed to quantify and project the financial opportunity, too.

Why an efficient and sustainable supply chain matters

Chemical manufacturing production is particularly complicated.

Is it a continuous or batch process? Are they intermediate (bulk) material or finished goods? Make-to-stock or make-to-order? Not to mention the various streams and chemical processes that can merge or demerge.

Additional variables make planning, costing, formulation, and quality management complicated, as the supply chain must operate under the constant pressure of minimizing asset downtime and maximizing asset utilization.

On top of that, chemical companies often cannot foresee the full reach and scope of their products or molecules that are usually only an intermediary step toward another final product—typically produced downstream.

A well-running downstream and upstream supply chain is necessary when it comes to green product development. By creating new products that have more efficient and sustainable properties, chemical manufacturers can be more successful in the long-term.

Having a better functioning and more visible supply chain would allow chemical manufacturers to protect themselves from regulatory problems, as well as the risks associated with environmental impacts.

What are the barriers to change?
There is no getting away from the fact that improvements in supply chain management require investment in digital technology and a move away from legacy tools that make it impossible to achieve end-to-end transparency.

Price and performance are often cited as reasons for the lack of sustainable investment and focus on green chemistry. Although there can be significant savings in a total cost analysis, such as reduced hazardous waste handling and disposal, this can be hard for CFOs to quantify adequately. Particularly in times of difficulty, it is easy to turn to cost-cutting that can undoubtedly help margins in the short-term but do nothing to improve the long-term sustainable health of an organization.

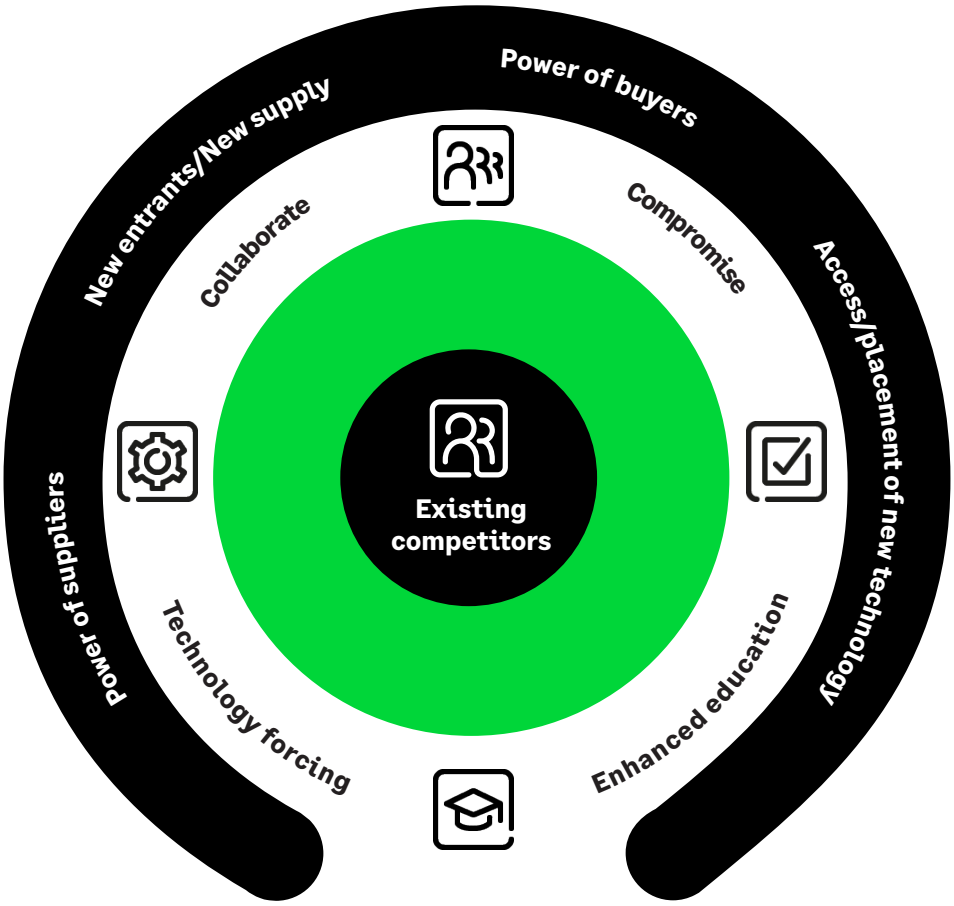
Chemical manufacturers may not be incentivized to offer a consistent volume of efficient and sustainable specialty chemical products. There are costly overheads in bringing new green chemistry products to market—hence no motivation to change this if the competition is not apparent. Also, there is often not enough real or perceived demand to make increased production of sustainable products worth the investment.

Chemical manufacturers have struggled in committing to supplying sustainable chemical specialty products. Without compromise and collaboration to increase demand and supply— in tandem with the required supply chain infrastructure—investment in long-term innovation will be stalled. As a result, suppliers will struggle to identify early adopters and find it challenging to go beyond the traditional supply chain for new options.

Driving sustainable change in chemical manufacturing

In chemical manufacturing, collaboration and transparent, even 'radical,' rules might push sustainability—so how can CFOs look at influencing the green chemistry argument and bring it inside their control?

TFA Consulting says there are four ways to change the paradigm and push sustainability and green chemistry in a business: Collaboration, Technology Forcing, Compromise, and Enhanced Education.



Collaboration

To build a sustainable chemical manufacturing strategy, CFOs should look at their business, creating a broad range of stakeholders across the supply chain. Collaboration among suppliers, manufacturers, and customers, is potentially the most critical step in becoming a green chemical manufacturing business.

CFOs must close the gap between what players in the supply chain say they want and their lack of understanding of the impact of change at each position in the supply chain. Collaboration can also happen outside the direct supply chain with key influencers such as non-profits and government regulatory bodies.

Technology forcing: non-regulatory

Leading chemical manufacturers with significant "buyer power" can, in effect, force change, and even create de facto regulations. Marketplace Technology Forcing can, like government regulations, drive sustainability, and green chemistry. If businesses want to do this, an appropriate level of collaboration and compromise is needed to set and meet project goals.

Also useful is collaboration between sourcing and sustainability groups at consumer products and retailer organizations, to ensure green chemistry and price/performance needs are acknowledged.

Compromise

When compromising, companies can accelerate the adoption of sustainable and green chemistry by embracing the principle of reasonable trade-offs. Accepting continuous improvement will accelerate the adoption of greener chemistry. Making small changes is better than staying with the status quo. It will not be a complete solution, but at least provides a step in the right direction.

Chemical manufacturers should look at establishing timetables for improvement, which must be continuously evaluated, with decisions made on which performance parameters are crucial and which ones are more flexible. They should also help in moving the process along through the temporary easing of business standards like inventory turnover and supply terms.

Enhanced education

Education and information can fuel the growth of green chemical manufacturing, and the easiest way to accelerate the availability and adoption of sustainable principles is a clued-in and educated workforce. Also, chemical manufacturers working directly with consumers that help drive growth by educating customers about the benefits.

Chemical manufacturers looking to become sustainable might also benefit from becoming more agile. This is driven by the right technology to enable your employees.

McKinsey drills down to identify the critical trademarks of agile organizations, including:

A network of empowered teams—with clear, accountable roles and hands-on governance.
This kind of flat structure is key to achieving a 'North Star' approach—one where everyone shares a shared vision and purpose, with the ability to sense opportunities as they arise and flexibly allocate resources to make the most of them.

Rapid decision and learning cycles—enabled by information transparency and action-oriented decision-making.
This is about putting trust in employees so that they can make empowered decisions, which is easier to do when you know they have the right data and insights.

Next-generation enabling technology—integrated and core to every aspect of the organization as a means to unlock value and enable quick reactions.
This journey to agility can seem more demanding for the chemical industry, especially considering its hugely complex multinational supply chains and tight regulations. However, the step that brings it all together is to use next-generation enabling technology. Indeed, it provides functionality for all the other steps.

Green manufacturing technology—where to start

To become a successful green business, chemical manufacturers will need to have greater agility and achieve more with less. If not on a path already, they need to investigate what underlying technology they can best leverage to drive real digital transformation.

For example, digital transformation can support supply chain reliability and efficiency. It encourages the adoption of systems that save money due to being easy to integrate, operate, and audit, increasing levels of availability, production, efficiency, and quality.

Looking at systems that can plan, forecast, and handle inventory, alongside financial information related to the supply chain, will be invaluable. Such platforms can help make impactful decisions and simplify complex processes such as expansion into new markets. With the systems in place to control data, chemical manufacturers can look at leveraging emerging technologies such as artificial intelligence, automation, and machine learning to assist further.

But where to begin? A sustainable chemical manufacturer should consider technology to improve the following processes:

Demand planning
Utilize tech that helps forecast the demand respective of the unique variables in the specialty chemical segment they operate in. Analytics and business intelligence should also be used to examine information such as sales data and customer orders to make smart decisions about inventory and production levels.

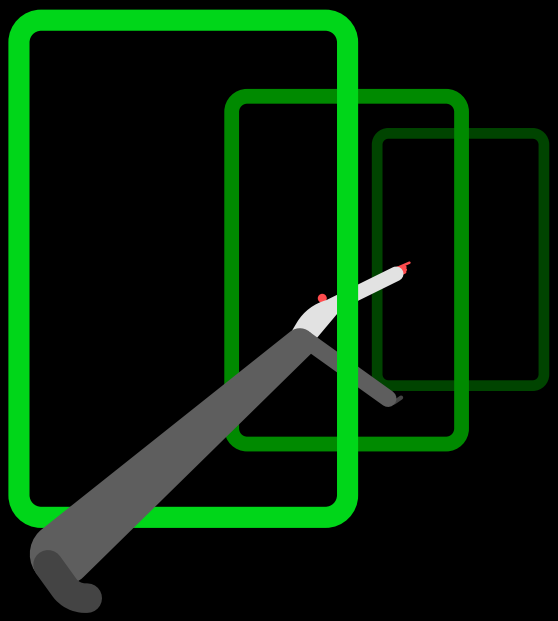
Real-time decision-making
Supported by data provided through the Internet of Things (IoT) with connected devices, chemical manufacturers can combine historical and real-time sensor data for analysis. Combine this data with machine learning algorithms and create predictive models and patterns which pinpoint the likely point of failure.

Sourcing
When it comes to supply, chemical manufacturers will want the right technology that can help them analyze what they buy, from whom, at what price, and at what volume. With costs soaring, this tool provides value for money, in a sustainable way. Having technology in place can help find reliable, affordable, and quality suppliers, that can find a balance between the quality of materials and affordability.

Production
Technology can help chemical manufacturers efficiently plan, develop, manufacture, and deliver goods or services. The right systems can help gain insights into production processes to make smart business decisions.

Inventory management
Chemical manufacturers should keep a detailed real-time record of the products they hold, containing information used in sales, purchasing, warehousing, and production, allowing complete quality control.

Logistics
The right systems can help chemical manufacturers efficiently move products, assisting packaging, transportation, distribution, and delivery through multiple channels.



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Big data and artificial intelligence (AI)
Chemical manufacturers generate a lot of data, which allows better insight into the business and improved efficiency of operations. Data can be collected through computer and manufacturing systems, as well as IoT sensors on the factory floor.

Chemical manufacturers can also use IoT technology to maintain equipment, which continually updates the status of machinery in real-time and provides notifications if components are likely to fail. IoT device data can help optimize performance and reduce waste.

Research and development and quality control teams could sift through data at every stage of the manufacturing process—from getting the raw materials in at the start to the end where the product is packaged up and distributed. Through this manufacturing lifecycle, chemical manufacturers can end up storing a massive amount of useful data, which technology can manage in a practical, efficient, and effective way.

Today we have computing technology, interconnected systems, automation, and AI, which can analyze massive amounts of environmental and IoT-generated factory data. All this allows chemical manufacturers to build optimized and integrated end-to-end manufacturing processes, creating better products, and pushing quality chemicals into the market faster.

Complying with regulatory change through traceability

Regulations mean that chemical manufacturers have to capture and store data from complicated operational processes, which aids the production of more sustainable chemical products while driving efficiency and quality. The ability to trace raw materials and finished goods forward and backwards within the supply chain, helps companies be more responsive to regulators and customers. It also enables them to provide more significant details on the source of raw materials especially if they want to promote their support of sustainable suppliers.

By integrating business systems, end-to-end traceability is viable, and the information can be compiled and submitted as required by different regulatory bodies. As regulation complexity and sustainability demands grow, the challenge is to ensure data can be made available and traceable across the business. New technology is the best way to integrate a traditionally siloed workplace.

What technology is needed?

Technology aids better traceability in a VUCA (Volatile, Uncertain, Complex, and Ambiguous environment), ensuring that it seamlessly fits into the business model and is not just a one-off solution.

The aim is to bring all critical data together across ERP, Supply Chain Planning, CRM, and manufacturing operations, to achieve better outcomes and reduce inefficiencies in the supply chain manufacturing and financial systems.

When it comes to traceability, chemical manufacturers should ask:

- Do they have visibility of your core manufacturing processes?
- Can they fully trace products quickly and efficiently?
- Do they fully understand how much production costs them?

As well as transparency and traceability, chemical manufacturers should look for technology that provides:

- A complete view of the global operation, with an understanding of worldwide distribution to third-party supply chains across borders with ever-high levels of competition.
- A complete view of the ecosystem, extending into supply chains' transparency and traceability to comply with regulations, no matter how complex they become, with full data visibility and management across production and supply.
- Optimization to help achieve environmental responsibility and insight and capabilities to manage renewable raw materials, source responsibly, and improve production methods.
- A way to focus on innovation where it matters, where investment will deliver the best return, adapting quickly to meet specific customer needs ahead of the competition.
- The ability to better tailor offerings by market. This will help chemical manufacturers fight against stiff competition from local markets who may charge less.
- Product and process consistency. It would be best if chemical manufacturers looked for a robust single and multi-level bill of materials management to ensure the highest levels of product consistency, quality, and collaboration.

By adopting the right kind of supply chain technology, chemical manufacturers can support sustainability. It is not about merely buying into a solution—it is about embracing a business model.

Take action to become a green chemical manufacturer

The CFO at any chemical manufacturing firm is in pole position to drive green chemistry for commercial success. These are the key questions to consider:

Who needs to be influenced?
Discern who in the business needs to be educated and influenced about sustainability. If the CEO is on-board, then that's a good start, but a list of other notable names must be drawn up. Explore what their objectives, priorities, and motivations are. What is their agenda, and what challenges are they facing? What do they need to be successful, and how can green chemistry and sustainability help?

People in different departments will have different priorities—insight will be needed into senior management, operations, procurement, innovation, and marketing functions' understanding of what sustainability means.

What does sustainability and green chemistry mean for the business internally and externally?
Communicate the value of the green model and think about how sustainability can also support existing corporate messaging, strategy, values, and commitments of the business. For example, there may be environmental and social targets to meet or benefits to protect, such as designing out waste and pollution.

Sustainability brings significant benefits through new product innovation, brand reputation, and cutting costs. Look for practical solutions to problems that already exist and new opportunities that come about. Highlight the benefits of new approaches and the downside of current ones.

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Can you learn from the success of others?
Many businesses, both large and small, and across many industries, have adopted sustainable principles and strategies. Look at case studies for information and insight. Build a green chemistry story by identifying the shortcomings of standard processes and the value that can be created, building an argument on why change is necessary, and addressing any misconceptions people may have. When it comes to activating a sustainable strategy, start small, and move quickly by developing trials and pilots to prove the benefits.

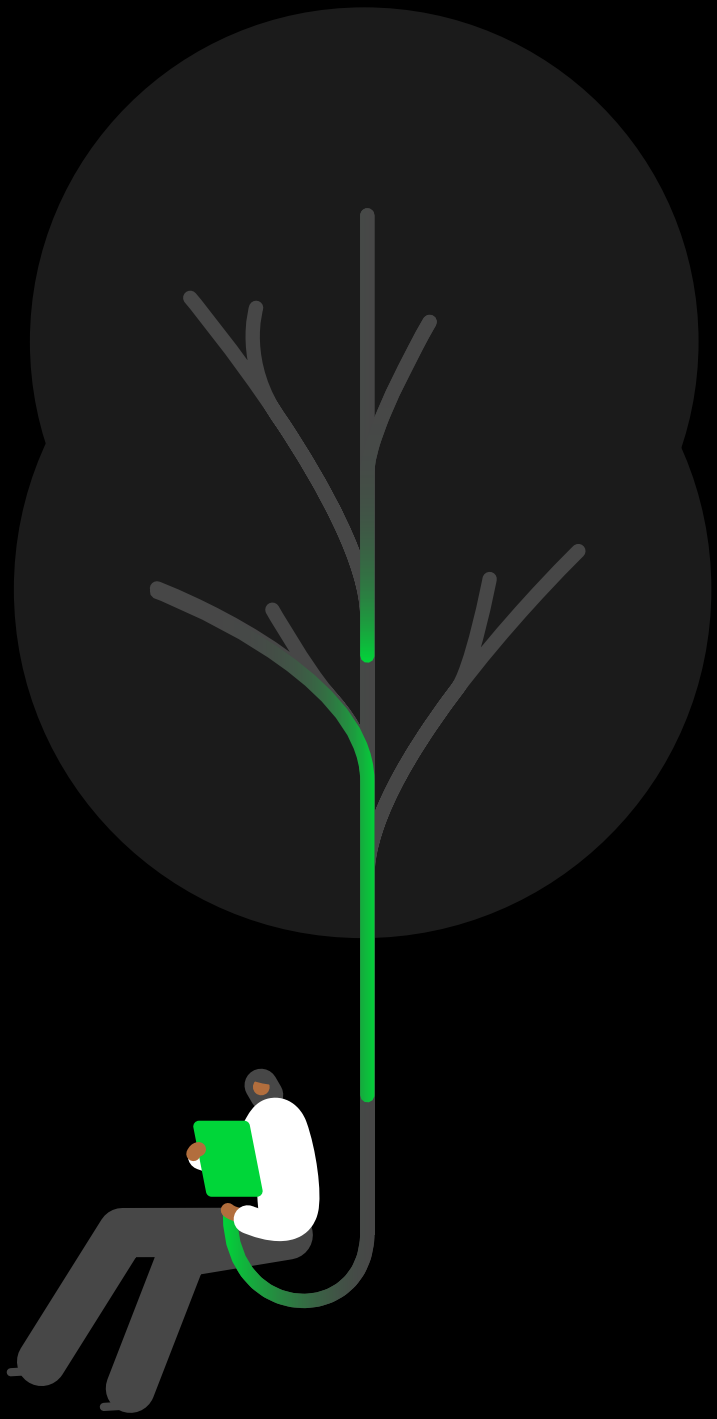
Can you calculate the value of green chemistry? At the end of 2018, businesses had a new way
to report on material environmental, social, and governance (ESG) issues using a standardized, comparable format. SASB (Sustainability Accounting Standards Board) launched a set of standards covering 77 industries so that companies could provide more decision-useful, consistent, and similar sustainability disclosures to the market.

CFOs could also consider developing an environmental profit and loss (EP&L) report, which assists in making the business decisions to reduce the environmental impact of the supply chain, production processes, and sourcing of raw materials. It was Puma's parent company Kering that published the world's first EP&L statement in 2011. Kering open-sourced its methodology, linking it to natural capital protocol—a cross-sector initiative aimed to develop a global methodology for environmental accounting.[2]

[2] **Kering 2020**

Conclusion

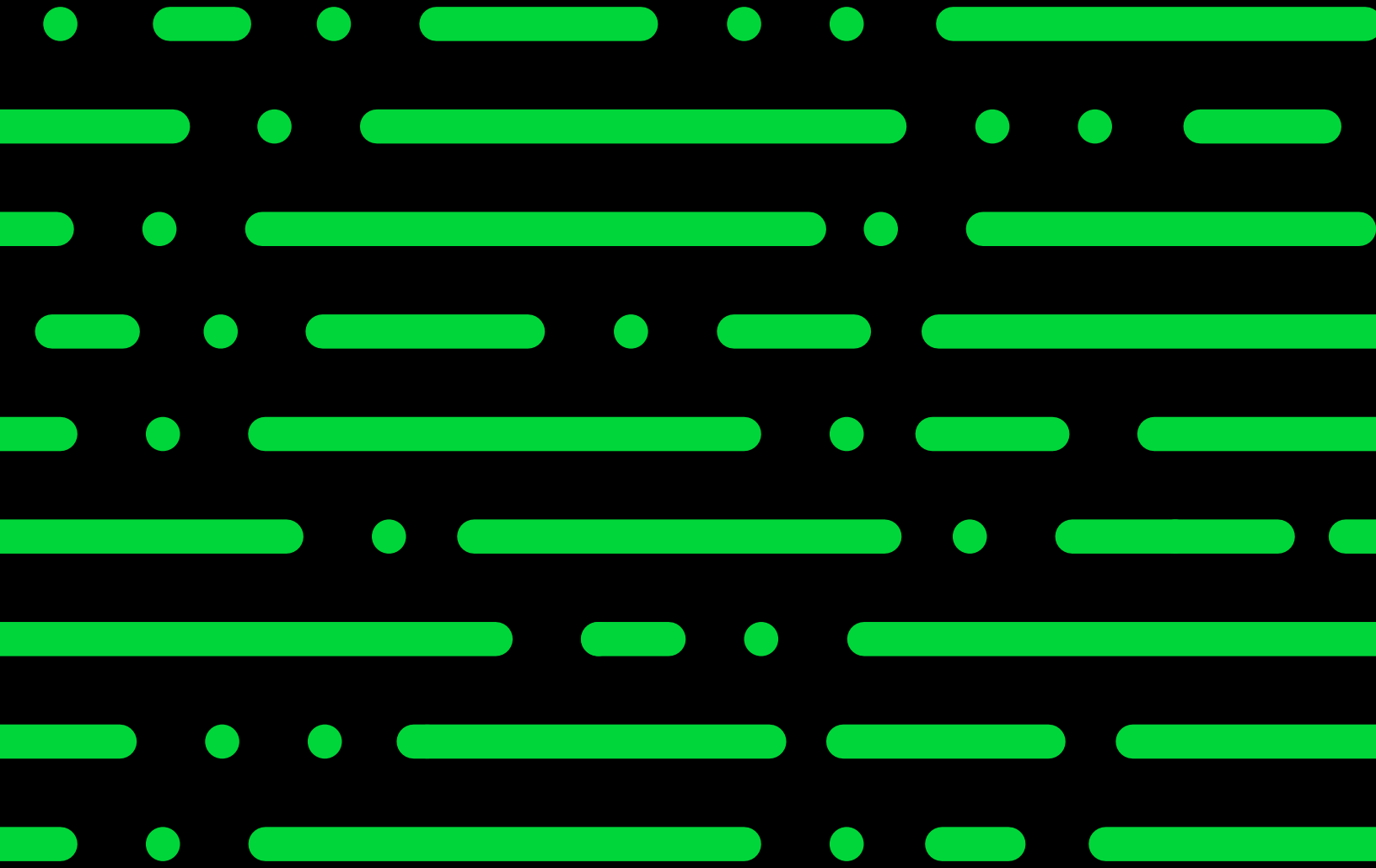
Chemical manufacturers must ensure that the chemicals created and used in processes are as green as possible.



In a post-coronavirus world, it is wise to invest in processes that minimize supply chain issues and boost business growth, while countering negative environmental impacts, and meeting legislative industry standards.

Industry 4.0 technologies can undoubtedly support green chemistry:

- To ensure a more flexible and agile supply chain that uses alternatives to conventional fossil-driven raw materials.
- To use smarter and more efficient production processes that, in turn, create a more diverse range of products and adapt more quickly to changing market demands and conditions.
- To improve the quality and functionality of chemical products, allowing better response to trends in the supply chain in a way that is safe and secure.



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