Welcome to your CDP Climate Change Questionnaire 2022

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Nouryon became a standalone company in October 2018, and from the beginning, our company purpose has included our commitment to a sustainable future. We dedicate ourselves to strengthening this commitment in our own company and operations, in our R&D and solutions for customers, and in being a responsible partner to the communities in which we operate. Our 2021 sustainability progress included an unyielding focus on customers, productivity and safety, which resulted in new, innovative solutions for our end-markets and solid financial performance for Nouryon. In fact, 38% of our total revenue last year came from Eco-Premium Solutions that deliver a significant sustainability benefit to our customers over the most mainstream market alternative. Based on insights from internal and external stakeholders, we developed and rolled out our sustainability approach, which includes clear priorities and tangible sustainability targets.

Since becoming a standalone company, we have established a world-class business and built strong partnerships with our customers and our communities. Nouryon will continue to invest in solutions that bring sustainable benefits to our customers and society which, in turn, will help fuel our continued growth. Our continuing efforts to improve on key sustainability metrics is reflected in our 2021 EcoVadis Gold rating, which places us in the top 3% of companies scored by performance, safety, sustainability, and innovation.

Humankind faces numerous, urgent challenges which also present opportunities for Nouryon. Chemistry plays a vital role in solving these challenges. Nouryon works with our customers, partners, and people to develop the essential solutions our changing world needs. For example, Nouryon contributes to feeding a growing population; improving health, sanitation, and medicine; and making buildings and infrastructure more sustainable and durable, while mitigating our own greenhouse gas emissions and improving our resource efficiency and energy consumption management.

Our plans also include growing in new applications and geographies through acquisitions and partnerships; further expanding and innovating our sustainable product offering; and maximizing the capacity utilization and flexibility of our manufacturing plants. Finally, we aim to

execute successfully on cost and productivity initiatives which are also enablers of some of carbon reduction projects.

On July 1, 2021, Nouryon spun out its base chemicals business, Nobian. The spin out resulted in a restatement of all our Eco Efficiency metrics amongst other emissions of our base year 2019 and as well as for the reporting year 2020, and 2021.

As the transition to a net-zero-carbon economy accelerates, we continue to challenge ourselves to reduce impacts, mitigate risks, and harness growth opportunities related to climate change. To this end, we regularly review our operations and our products, which are also integral to the energy transition. In support of the objectives of the UN's Paris Agreement on climate change, we set 2030 targets to reduce absolute greenhouse gas (GHG) emissions (scope 1 and 2) by 40%, total waste intensity by 10%, and water consumption intensity by 10%, versus a 2019 base year. By 2050, we aspire to be a net zero organization.

Our plan to achieve our goals includes:
* Scope 1: Improving efficiency in our operations and optimizing our fuel mix.
* Scope 2: Increasing our use of renewable energy through power purchase agreements, on-site renewables, utility programs and certificates.
* Scope 3: We are currently analyzing indirect GHG emissions from activities across our value chains.

In addition, across all scopes:
* Exploring collaboration opportunities with our customers, suppliers and potential partners, including for example conducting life cycle assessments with our customers.
* Evaluating and deploying new innovation technologies such as those in the ICOS Capital Fund III, where we are a strategic investor.
* Integrating net zero and climate change considerations into our strategy and planning.

Throughout the questionnaire, we may make forward-looking statements. These are subject to and involve risks, uncertainties, and assumptions and you should not place undue reliance on these forward-looking statements or projections. Although we believe that these forward-looking statements and projections are based on reasonable assumptions at the time they are made, you should be aware that many factors could affect our actual results and could cause actual results to differ materially from those expressed in the forward-looking statements and projections.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1, 2021	December 31, 2021	Yes	1 year

C0.3

(C0.3) Select the countries/areas in which you operate.

Argentina
Belgium
Brazil
Canada
China
Finland
France
Germany
India
Italy
Japan
Mexico
Netherlands
Norway
Singapore
Sweden
Taiwan, China
United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Financial control

C-CH0.7

(C-CH0.7) Which part of the chemicals value chain does your organization operate in?

Row 1

Bulk organic chemicals

Ethylene oxide & Ethylene glycol
Polymers

Bulk inorganic chemicals

Other chemicals

Specialty chemicals

Specialty organic chemicals

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
No	

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	The Board has ultimate responsibility for incorporating sustainability and climate-related risks into the strategy and monitoring performance. In 2021, our Board established a Corporate Responsibility Committee, which provides Board-level oversight of sustainability (including climate-related targets), health, safety and environmental (HSE), product quality, social policies and programs, including inclusion and diversity, and other matters that may impact the Company's reputation. In 2022 for example, the board's Corporate Responsibility Committee was presented with new corporate reduction targets on GHG emissions and supported their adoption – specifically, updating our corporate targets and setting new 2030 targets to reduce absolute GHG emissions (scope 1 and 2) by 40%, total waste intensity by 10%, and water consumption intensity by 10%, all compared to base year 2019. The Committee also supported our aspiration to be a net zero organization in 2050.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and targets for addressing climate-related issues	Nouryon's Board of Directors is charged with oversight of the Nouryon Group and its executive management. The Board of Directors' responsibilities include setting and reviewing the company strategy and business plans, supervising our risk management, approving the annual budget, and approving major capital investments or M&A, all of which are generally informed by climate-related issues to some extent. The full Board, led by our Chairman and CEO, is regularly briefed on our sustainability initiatives and other climate-related issues, including quarterly sustainability updates from our General Counsel. The full Board also considers climate-related issues in a variety of other contexts, such as regular briefings by business unit leaders on their business strategies including commercial sustainability initiatives. In addition, in 2022 the Board was briefed on our carbon strategy by our Global Carbon Business Leader. The Board's committees also oversee certain climate-related issues. The Audit Committee oversees the company's enterprise risk management (ERM) program, which includes risks related to climate change, and is updated on the ERM program quarterly. The Corporate Responsibility Committee also provides Board-level oversight of sustainability initiatives, including climate-related targets, among its other responsibilities. In 2022 the Corporate Responsibility Committee reviewed our annual sustainability report and our new 2030 climate targets.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues
Row 1	Yes

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	Quarterly
Chief Operating Officer (COO)	Both assessing and managing climate-related risks and opportunities	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

In the organization, the highest level of responsibility for climate risks and opportunities is with our Chairman and CEO who has oversight of strategies and performance. Sustainability-related issues are also addressed by members of our Leadership Team, reporting to the Chairman and CEO. Operational and environmental sustainability, including any potential physical asset risks or impacts due to climate change is managed by the Chief Integrated Supply Chain Officer, who reports directly to the CEO. This role aligns with CDP's corresponding job category of COO, and has oversight of all manufacturing sites, procurement, and energy purchasing. This includes overseeing our performance on greenhouse gas (GHG) emissions and energy use, eco-efficiency program, and water management strategy. This ensures that our sustainability performance is supported at all our manufacturing sites around the globe. Our Global Carbon Business Leader is leading Nouryon's strategic planning to meet our GHG emission reduction goals in 2030 and beyond. He leads the global business strategy for carbon as a commercial opportunity and ensures company-wide alignment on GHG reductions initiatives and targets. This includes exploring innovative solutions and partnerships to reduce GHGs across our value chain.

The Chief Sustainability & Communications Officer, develops and oversees Nouryon's global sustainability program and approach. The CSO reports to our Executive Vice President, Business Affairs, General Counsel & Corporate Secretary.

The Chief Procurement Officer (CPO) is responsible for developing and driving the sustainability strategy with our suppliers, including improving supplier sustainability performance and reports to the Chief Integrated Supply Chain Officer. The Energy Director monitors potential transition risks such as energy price trends, delivery of our scope 2 (low carbon energy) strategy, and looks for green projects in line with our reduction targets including sourcing Renewable Energy Certificates.

To support our strategy and share information across the organization, we also have a global Corporate Responsibility Network that drives sustainability across our organization that supports the deployment of processes. The Network is chaired by the Sustainability Director and consists of representatives of all businesses and key functions across all regions. Each business has appointed a sustainability focal point to support the integration of sustainability throughout the business.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	No, not currently but we plan to introduce them in the next two years	This remains under consideration and ultimate approval would be required by our board's Compensation Committee.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	3	We consider short-term risks to be anything that impacts our business in the next three years.
Medium-term	3	5	Our medium-term focus is on major risks that may impact achievement of our strategy in the next three-to-five years.
Long-term	5	100	We recognize there are relevant risk factors beyond the five-year horizon that could impact our strategy (long-term) risks.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

We define substantive financial or strategic impact for climate-related risks in the same way we define a material impact within our financial reporting which suggests significant material concerns of an item to users of a company's financial statement. A matter is "material" if there is a substantial likelihood that a reasonable person would consider it important. Therefore, there is no specific value or percentage or earnings but rather a consideration of the impact, financial or strategic, on the valuation of the company or on our reputation.
When evaluating climate-related financial impacts, we consider a Critical impact to have an impact > US$ 100M to EBIT, High impact from >US$ 50 and <US$ 100M to EBIT, and Medium impact from > US$ 10M and < US$ 50M to EBIT. Health, Safety, Environment, and Security impacts have additional metrics related to environmental incidents that would result in regulatory actions or penalties. All these impacts are considered substantive.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

Climate-related risks are included in our overall enterprise risk management process, which is overseen at the board level by the Audit Committee. In addition, our Corporate Risk Committee, which is comprised of senior management, identifies the top risks facing our company, oversees mitigation actions and remains informed on the latest developments.
We completed a Taskforce for Climate-related Disclosure (TCFD) climate scenario analysis in 2021, including risk and opportunities and scenario analysis for both transition and physical risks. We are using the scenarios to assess risks over all time horizons, short, medium, and long term, and the analysis covers all areas of our value chain - upstream, downstream, and direct operations. The results of this analysis help inform Nouryon's understanding of substantive climate-related risks and opportunities and will help support planning, resource allocation, investment, and management decisions.

The scenario analysis process was structured around: 1) assessing the significance of climate related risks in relation to market shift, technology changes, reputation, policy and legal; 2) identifying and defining a range of scenarios for transitional risk scenarios and physical risk scenario; 3) mapping business impact for operating costs, revenues, business interruption and timing; 4) identifying potential response to changes in business models and investments in capabilities and technologies.

These impacts were assessed based on a review of: expert judgment (e.g., input from climate experts/consultants), literature review of reports relevant to the sector, transition scenarios (e.g., IEA), existing risk disclosures from suppliers, peers and customers (e.g., CDP and other disclosures).

See 3.2b for more information.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Globally, our operations are increasingly subject to regulations that seek to reduce emissions of greenhouse gases (“GHGs”), such as carbon dioxide and methane, which are contributing to changes in the earth’s climate. For example, we are already managing and reporting GHG emissions, as required by law for our sites in locations subject to U.S. federal and state requirements, EU requirements and/or ETS requirements. Although these sites are subject to existing GHG legislation, few have experienced or anticipate significant cost increases because of these programs, although it is possible that GHG emission restrictions and costs from regulations may increase over time. Potential consequences of such restrictions include capital requirements to modify assets to meet GHG emission restrictions and/or increases in energy costs above the level of general inflation, as well as direct compliance costs.
Emerging regulation	Relevant, always included	New climate-related regulations may impact direct and indirect costs. For example, new potential carbon pricing mechanisms such as the carbon border adjustment mechanism in the EU or potential carbon taxes or cap and trade programs in the U.S. could impact some of our products negatively, such as products shipped from the U.S. to the EU, or positively, such as some of our products covered by the EU ETS currently. This is relevant and always included, because climate-related policy developments could affect suppliers in the oil and gas sector and could increase our raw material prices - specifically ethylene, one of our most significant raw materials. We consistently monitor emerging regulations such as these carbon policy examples that have the

		potential to impact our business. We also foresee potential increases in expenses for new and proposed sustainability reporting requirements related to the new SEC Climate Change Disclosure Rules, the EU Corporate Sustainability Reporting Directive (CSRD) and EU Taxonomy.
Technology	Relevant, always included	As concern over climate change grows, there is the potential for our customers to substitute products with lower emissions alternatives, which is why the risk type is relevant and always included. However, the risk of our customers shifting to lower emitting products also presents opportunities for Nouryon. For example, our Eco-Premium Solutions are products that offer significant sustainability benefits over mainstream alternatives in the market while providing the same or better functionality. When developing these solutions, we put special focus on delivering environmental benefits as well as direct benefits to our customers' operations. As another example, Nouryon conducted a life cycle assessment in 2020 that shows our production process for hydrogen peroxide has superior emissions performance compared to the industry. By measuring and tracking the environmental performance of our products, we can compare ourselves to our competitors and guide innovation to keep our products competitive from both a performance and greenhouse gas emissions perspective. We regularly perform analysis to determine the product carbon footprint of our technologies and products and seek to constantly reduce the overall product footprint of our portfolio of products. This year we plan on starting a comprehensive product portfolio sustainability assessment (PSA) to proactively steer our overall product portfolio towards improved sustainability and climate performance.
Legal	Relevant, always included	Our global footprint exposes us to increasingly stringent laws and regulations on a broad range of subjects, such as safe use of hazardous compounds, environmental releases, greenhouse gas emissions, and product liability. As a chemicals company, we have extensive experience with mandates and regulations of our products. These risks are mitigated by monitoring compliance with climate-related laws and regulations through our internal subject matter experts, who provide guidance and training to the company and employees as necessary.
Market	Relevant, always included	Nouryon operates in highly competitive markets, and as a global manufacturer of chemicals we rely on certain readily available raw materials. Our internal stakeholders have identified potential fluctuations in raw material pricing and availability due to physical or transition impacts to our supply chain as a potential risk to our business going forward. To mitigate this risk, we work with multiple suppliers and

		build strong relationships with key suppliers as well as work to diversify our material supply through bio-based renewable materials, circular economy principles, and enhanced recycling practices. We consider potential supply and demand shifts in our raw materials and products continually in our market and production planning efforts as a part of our business activity.
Reputation	Relevant, always included	With increased scrutiny and focus on ESG and climate-related issues from the investor community, and the inherent carbon intensity of the chemicals sector, we face many of the same risks as others in our industry due to increased stakeholder concern and the potential for negative feedback if we are not seen to be making the necessary progress toward our climate goals. These can affect our license to operate. We are working extensively to make significant progress and provide improved disclosures to meet the growing demands from the investor community and external stakeholders. We completed a TCFD climate scenario analysis in 2021, including risk and opportunities and scenario analysis for both transition and physical risks. We are continuing to incorporate the recommendations of the TCFD within our business strategies and improving disclosures and mitigating risks.
Acute physical	Relevant, always included	Nouryon is committed to evaluating the risk of each of our facilities from acute physical risks. The evaluation of this risk is included in the Enterprise Risk Management (ERM)annual risk assessment process. Physical risks, including acute risks, are also considered in our climate-related scenario analysis. We own and operate large-scale manufacturing facilities with a wide geographic spread in the U.S., Latin America, Western Europe, Sweden, China, and India. We have large operations at warehouses in the U.S. and Sweden and various global ports that are vital to the transport and storage of Nouryon's supplies and products; the three most profitable warehouses (by product revenue) and six most relevant global ports were included in ERM's risk assessment. Interruptions at these facilities may materially reduce their productivity, or the profitability of our business. Our operations and those of our contract manufacturers are subject to hazards inherent in chemical manufacturing and the related storage and transportation of raw materials, products, and wastes. Example: Climate change can result in an increased frequency or severity of hurricanes, resulting in flooding or wind damage, causing costly production outages, downtime, or damage to equipment. Specifically, our production sites in Houston, U.S., have a historically high exposure to tropical storms and hurricanes. Mitigations for these risks have been implemented, resulting in increased capital expenditures but help to increase the resiliency of our operations. See C2.3a Risk 2 for more information.

		Approximately 1/3 of screened sites register flood inundation risk that is at least 1 meter (for a 500-year return period event or a relatively severe flood). We are working on quantifying flood damages and impacts and interruptions to the electricity and water supply and the decreased revenue due to production capacity and increased capital expenditures. Weather serves as one of the primary inputs of forward supply for raw materials used in our surfactants products – natural oils and fats (NOFA) - globally - and climate change is an important price driver. For acute physical climate risk, extreme weather, such as hurricanes or floods could negatively impact crop production. It is mitigated in part by safety stock held by our preferred suppliers, and our standard sourcing strategy typically avoids spot (30 days forward) raw material price exposure.
Chronic physical	Relevant, always included	Climate-related chronic physical risks have the potential to impact both our direct operations as well as the customers and markets we serve. Given the susceptibility of the agriculture industry to physical risks, and because agriculture is a core market that we serve, these physical risks represent a material issue for us and therefore, the evaluation of this risk is included in the ERM annual risk assessment process. Example: extreme heat was deemed relevant due to Nouryon's international presence with a number of facilities operating in equatorial temperature zones. In particular, an increase in extreme heat may lead to an increase in energy costs to cool indoor environments. Extreme heat also could impact the health and safety of staff, particularly those operating outside, through heat exhaustion. For example, Nouryon has multiple assets that face increased exposure to extreme heat intensity and duration, for example assets located in Brazil like Bahia, Imperatriz, Jupia, and Tres Lagos. The effects of climate change such as rising sea levels, drought, flooding and general volatility in seasonal temperatures could also adversely affect our operations globally. Extreme weather events attributable to climate change may result in, among other things, physical damage to our property and equipment, and interruptions to our supply chain. Nouryon has emergency response and business continuity plans in place to mitigate the impact from such physical risks. The physical risk screening of Nouryon's assets showed a number of sites with high baseline and future water stress with high inter-temporal variability among the sites. Site-specific water needs and costs are considered in our analysis. We consider increased indirect (operating)

		costs (SG&A), Increased direct costs (COGS) and decreased revenues due to reduced production capacity.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation

Carbon pricing mechanisms

Primary potential financial impact

Increased indirect (operating) costs

Company-specific description

Because Nouryon conducts international operations, we are exposed to a variety of risks of which many of them are beyond our control or which could adversely affect our business. For example, new potential carbon pricing mechanisms such as the carbon border adjustment mechanism in the EU or potential carbon tariffs in the U.S. US could impact some of our products negatively.

Though neither potential regulation is currently aimed at our sector, some chemicals do have a relatively high GHG intensity, so it's possible some of our products could be covered by such carbon tariffs in the future. For example, our bleaching chemical product lines represent larger portions of our scope 1 and 2 emissions relative to other product lines. We consistently monitor emerging regulations such as these carbon pricing examples that have the potential to impact our business.

Time horizon

Short-term

Likelihood

About as likely as not

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

12,601,522

Potential financial impact figure – maximum (currency)

23,349,879

Explanation of financial impact figure

This estimated range is based on carbon pricing values from the IEA's 2020 STEPS and SDS scenarios. The lower figure is based on the IEA STEPS 2025 carbon price for the European Union of US$ 34 / metric ton. The higher figure is based on the IEA SDS 2025 carbon price for advanced economies of US$ 63 / metric ton. We applied these figures to the sum of our 2021 scope 1, scope 2 emissions in Europe, which is 370,633 tons to calculate our potential financial impact for 2021. The financial impact will depend on several factors, including: the volume of our emissions, market prices in the EU Emissions Trading System (EU ETS), and the volume of free allocations we receive. These factors are all subject to uncertainty. The figures also do not account for reductions in emissions and energy use through projects for example.

Cost of response to risk

495,000

Description of response and explanation of cost calculation

We calculate an annual emissions inventory, which allows us to confirm our scope 1 and scope 2 carbon emissions. To support this process, including reporting of energy and emissions data from our manufacturing sites, we use software (Enablon), which requires licensing fees. In addition, we work with consultants to support the calculation of our scope 3 emissions. Calculating emissions across our operations and value chain helps us to be aware of potential costs and where they may occur across our value chain due to emerging regulation. The cost of response to this risk is the total of these costs (software fees plus consulting fees).

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Opp1

Where in the value chain does the opportunity occur?

Downstream

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Primary potential financial impact

Increased revenues through access to new and emerging markets

Company-specific description

Our innovation philosophy is centralized around our Eco-Premium Solutions which offer significant sustainability benefits over mainstream alternatives in the market while still providing the same of better functionality. 38% of our total revenue last year came from Eco-Premium Solutions. The sustainability benefits can include: lower toxicity, lower energy use for improved energy efficiency, lower emissions to air and waste, less land use, improved health effects, more efficient use of natural resources as raw materials or improved safety.

With the increased focus on improving the energy efficiency of buildings, Nouryon has a major opportunity. One example of a Nouryon solution for buildings is our cool roof coatings. Keeping buildings cool is an increasing challenge amid climate change and the higher frequency of heatwaves. There is a drive to find ways to keep buildings cool while reducing energy usage due to air conditioning), which is a contributor to climate change. According to studies, air conditioning in urban areas accounts for up to 70% of residential energy consumption in warm areas of the world. This impacts peak energy demand and puts high stress on power distribution systems. One proven approach to reducing temperatures in buildings is via the use of highly solar reflective ‘cool’ roof coatings. Traditional dark-colored roofing materials absorb sunlight, which in turn transfers heat to a building. Cool roof coatings use light-colored (usually white), highly reflective materials to regulate building temperatures while reducing electricity demand, which in some cases can result in energy consumption savings of more than 40 percent. This aligns with energy efficiency building code requirements in the US and other regions. Cool roofs can also reduce the "heat island" effect in cities, reducing temperatures, smog and emissions.
Nouryon recently introduced a new solution to address these challenges by combining our Expancel and Levasil technologies to create a concept for cool roof coatings that

resist dirt and are highly reflective. The higher reflectivity reduces absorption of heat into buildings, which means less need for cooling, increased energy efficiency, and lower greenhouse gas emissions. These coatings can reduce heat absorption by 80% and decrease roof temperatures by roughly 30 degrees Celsius vs traditional dark roofs. We have already made this offering available in Asia, Europe and Mexico and will be offering this in the US.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

18,800,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

In 2021, 38% of our revenue came from the sale of Eco-Premium Solution which represents net sales of US$ 1.88 billion or EUR 1.59 billion. We aim to maintain or grow Eco Premium Solutions by constantly innovating and growing with our customers. Increasing our Eco-Premium Solutions revenue by 1% means an increase of approximately US$18.8 million per year. (1.88 billion multiplied times 0.01 = 18.8 million).

The 1% financial impact figure includes all Eco-Premium Solutions. Cool roof coatings isare included in this, along with many others with high growth potential.

The Eco-Premium Solutions portfolio is dynamic, and we pro-actively challenge our assessments to reflect our latest understanding of markets. Solutions may stop being classified as eco-premium if similar competitive offerings become available. At the same time, new eco-premium solutions are continually introduced to the portfolio through innovation and new product launches which constantly contribute to our financial benefits.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

Comment

Eco-Premium Solutions help to create value for our businesses and customers. They provide top line growth opportunities. These solutions demonstrate improvements in our own operations and across the entire value chains in which we operate. We seek to offer solutions that allow our customers, their customers, or the end-users, to minimize their environmental and climate impacts. Activities to increase these sales are among others: 1. Customer visits to identify improvement programs 2. Integration in new commercial excellence processes to ensure sustainability is an integral element of the product propositions 3. Training and marketing materials explaining our strategy for marketing and sales. While these activities involve investments (time, R&D resources, marketing, etc.), we estimate their value to be positive and thus assume zero cost.

Eco-Premium Solutions is a fundamental driver of our growth strategy set targets at company level, monitored by the Nouryon Leadership Team. We now focus on downstream benefits that our products and services deliver to customers. This includes improving their resource efficiencies, as well as the environmental impact of their manufacturing processes and products or services in use and end-of-life. We have implemented criteria linked to Eco-Premium Solutions in our R&D innovation process.

Eco-Premium Solutions are a strong driver in R&D projects and stage gate processes – so this is the product development direction and not an add-on activity. Costs to develop new products and solutions with customer benefit are integrated in R&D costs (no additional costs). Climate change related opportunities are one of several beneficial properties.

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?

Row 1

Transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future

In 2022, we set new clear targets to reduce our carbon footprint. By the end of 2030, we have targeted reducing our absolute Scope 1 & 2 Greenhouse Gas (GHG) emissions by 40%, vs. the 2019 base year. In addition, by the end of 2030, we have targeted reducing our both total waste and water intensity 10%, vs. the 2019 base year. By 2050, we aspire to be a net zero organization.

As we develop plans to decarbonize that align with a 1.5 world, we also completed several steps in 2021:
1. We established board-level governance: see responses to C1.1, C1.1a, C1.1b and C1.1d. In 2021, we also appointed our Global Carbon Business Leader, who is leading Nouryon's strategic planning to meet our GHG emission reduction goals and ensures company-wide alignment on GHG reductions initiatives and targets.
2. We completed a TCFD climate scenario analysis, including risk (transitional and physical) and opportunities, over all time horizons, covering our full value chain – upstream, downstream, and direct operations. The results informed our understanding of potential substantive climate-related risks and opportunities. See C2.2 for more information.
3. Consistent with prior years, we completed an accurate and transparent annual emissions inventory. In 2021, our scope 1, scope 2 and scope 3 emissions (purchased raw materials) was verified by a third-party. For more information, see C10.
4. We expanded our scope 3 emissions inventory to cover our full value chain.

As we further develop our transition plan, we will focus on:
* Achieving our Scope 1 and Scope 2 goals. See 4.3C for more information.
* Analyzing scope 3 GHG emissions across our value chains to inform our plans.
* Exploring collaboration opportunities with customers and suppliers.
* Evaluating and deploying new innovation technologies such as those in the ICOS Capital Fund III, where we are a strategic investor.
* Integrating net zero, climate and decarbonization considerations into our strategic planning
* Engaging with industry associations to support effective policies
* Further analyzing potential substantive climate-related risks and opportunities, aligned with TCFD.

On this pathway towards net zero, the execution of our goals is dependent on several factors, including the outcomes of site assessments, our progress in securing renewable electricity, emerging technologies, the progress within the value chain and regulatory frameworks impacting our investment decisions.

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy
Row 1	Yes, qualitative and quantitative

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Physical climate scenarios RCP 7.0	Company-wide		.Nouryon conducted its first in-depth qualitative scenario analysis with the support of ERM (consulting firm) in 2021. The results of scenario analysis help inform Nouryon's understanding of substantive climate-related risks and opportunities and will help support planning, resource allocation, investment, and management decisions. Through a series of workshops, discussions were conducted to better understand climate-related impacts, categorized according to the TCFD guidance: Transition Risks: Market, Policy, Technology, Reputation and Physical Risks: Acute, Chronic. Physical Scenario: Nouryon conducted a climate-related scenario analysis by drawing upon publicly available data from the IPCC's peer reviewed climate models to extract indicators for future climate exposure across a range of site locations. SSP3-RCP7 is the scenario that Nouryon considered for this analysis, which represents a pessimistic outlook of both a 4°C warming by 2100 as well as global demographic projections that are unfavourable for climate mitigation and adaptation efforts. Nouryon used geographic system modelling to extract climate indicators for each site, warehouse, or port. Time Horizon: This analysis extracted data and identified trends to 2050. This time horizon was chosen to provide a sufficiently long-term horizon to incorporate all potential risks and opportunities into Nouryon's risk management strategy. Area of Organization: The chosen locations were deemed as both critical to Nouryon's key enterprise while additional sites were included that represented three priority outplant warehouses. Also included in the analysis were six global ports that are vital to the transport and storage of Nouryon's products. The scenario analysis covered all parts of Nouryon's business including products and services, operations, and the value chain. Eight priority risk topics were identified through research and engagement with Nouryon: 1) Carbon pricing mechanisms; 2) regulation of end markets, 3)

			raw material prices and availability 4) high investment cost of transition technology, 5) flooding, 6) hurricanes 7) water stress 8) extreme temperatures. Three priority climate-related opportunity areas were identified through research and engagement 1) Products and services: helping customers achieve climate goals; 2) Markets: access to new markets; 3) Resource efficiency: circular economy.
Transition scenarios IEA NZE 2050	Company-wide		Transition Scenario: Nouryon conducted its first transition scenario analysis. Following the guidance of the TCFD, the company has assessed different IEA Climate scenarios: Incremental 2.5° to 3°C warming STEPS Intermediate Scenario, Transformative 1.65°C warming Sustainable Development Scenario SDS Ambitious scenario and Net Zero 1.5°C NZE Most ambitious scenario to identify potential risks and opportunities to the company. The scenarios are the basis for the review of how potential climate-related risks and opportunities might impact Nouryon. We have used the scenarios to assess risks over all time horizons, short, medium, and long term. The analysis covered all areas of our value chain, upstream, downstream, and direct operations. We have also assessed the physical climate risk of the most critical sites in our direct operations and supply chain. The transition risks and opportunities included: carbon pricing mechanisms, regulation of end markets, policy risks, market risks of raw material price and availability, cost of transition technology, product and service opportunities related to customer goals, circular economy resource efficiency opportunities and access to new markets opportunity.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

What are the priority risks and opportunities for Nouryon?
What are the primary drivers for climate risks and opportunities?
What variables and data are needed to support decision making?

Results of the climate-related scenario analysis with respect to the focal questions

What are the priority climate risks and opportunities for Nouryon?
Eight priority risk topics were identified: 1) carbon pricing mechanisms 2) regulation of end markets 3) raw material prices and availability 4) high investment cost of transition technology 5) flooding, 6) hurricanes 7) water stress 8) extreme temperatures.
Opportunity areas include 1) products and services: helping with climate goals 2) access to new markets 3) resource efficiency: circular economy.
As an example, our Gulf Region sites experienced more than 20 hurricanes, and potential financial damages and risks are assessed, and each facility is prepared for increased wind speeds and flooding.

What are the primary drivers for climate risks and opportunities?
The drivers include: A) Carbon pricing mechanism may impact Nouryon by increasing tax liability, emissions credit prices, and/or the costs of inputs. B) Mandates on Existing Products and Services: Regulations that limit the geographies of fossil fuel extraction, increase costs of production, or support competing technologies may decrease Nouryon's business by reducing energy supply activities. C) Increased Cost of Raw Materials: Competing demands for materials in low carbon transition applications, carbon pricing, and high investments costs. D)Transitioning to Lower Emissions Technology: Costs for transition technologies may not meet internal hurdle rates. E) Development of low emission goods and services - Customer emissions targets, specifically relating to scope 3, will require both the expansion of existing technologies and the new developments. F) Access to new markets: Increasing renewables and grid investments will significantly increase market size for products supporting electrification. As grids modernize and expand to accommodate new renewables, Nouryon's polymer specialties may experience substantial growth for wire insulation with increased grid investment.

As an example, Nouryon has sites located in tropical climates (Brazil, Asia) which have projected at least 100 days of abnormal "heat wave" by 2050 and we are assessing the associated costs and power grid vulnerabilities.

What variables and data are needed to support decision making?
The following variables are important for strategic climate decisions: GHG accounting and associated costs; global fossil fuel production data for the STEPS, SDS and NZE scenarios; CO2 costs of raw materials; costs of transition technologies, such as carbon capture, hydrogen, and electrified steam crackers; marginal costs of carbon abatement; recycling rates of plastics; infrastructure investment costs; historical flood events: number of days of business interruptions, damage costs, impacts to the electricity and water supply; financial damages from hurricanes; daily quantification of water interruptions; site surveys.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	In 2021 we continued our growth strategy aligned with sustainability opportunities and advanced our commitments to Sustainability. Our goal is to deliver not just the desired functionality but improved sustainability performance that contributes toward the transition to a low carbon society. We work together with customers, suppliers, universities, and other partners to develop innovative and sustainable solutions (our Eco-premium Solutions). These include a growing share of bio-based and biodegradable products and circular raw materials. When developing these solutions, we put special focus on delivering environmental benefits like improving our customers' operations by decreasing their energy consumption, lowering the product carbon footprints of our solutions and providing sustainable solutions (which for example lower the end customer carbon footprint), all contributing to a lower carbon economy We see these solutions as aligned with climate-related opportunities in all time horizons - short, medium, and long-term. For example, our polymer catalysts contributed to creating over 20 million standard solar panels (ca. 8.600 MW) and creating roughly 70.000 km of high voltage power cable (almost twice around the world) – supporting low carbon energy transitions in electrical power grids and renewable energy growth. Our piperazine amine products also enable our customers to capture significant amounts of carbon. We also see circular solutions as climate-opportunities. In 2021, Nouryon signed an agreement with Renewcell to provide specialty chemicals and engineering solutions for its new textile recycling plant in Sundsvall, Sweden. The facility is the first of its kind in the world and could potentially save hundreds of millions of garments from landfill and incineration each year, contributing to a reduction in greenhouse gas emissions. Our Eco-Premium Solutions are products that offer

		significant sustainability benefits over mainstream alternatives in the market while providing the same or better functionality. These benefits can apply to several specific criteria (e.g., toxicity, energy use, use of natural resources, emissions and waste, land use, risks, health). In 2021, 38% of our revenue came from the sale of Eco-Premium Solution which represents net sales of US$ 1.88 billion or EUR 1.59 billion.
Supply chain and/or value chain	Yes	We see sustainability not only as the right thing to do, but also as a true business opportunity by providing new solutions that have smaller footprints or deliver other benefits in order to mitigate climate change. We believe that striving for a sustainable future also means being a safe and reliable partner for customers, employees, business partners, and communities, and we ask all our suppliers to work with us as we strive to lower our emissions in the short, medium and long-term. For example, in the near and medium term, we are evaluating the carbon performance of our outbound logistics and incorporating this in our carbon roadmap. In another example, for logistic suppliers in Europe, we do business with transporters using low emissions diesel engines or companies using low emissions ships as much as possible. As part of our strategic planning in the near-term, we are considering potential scope 3 targets, in collaboration with suppliers. Using EcoVadis, we measure and track the sustainability performance of suppliers based on their policies, actions, and results. The assessment covers topics related to environmental, ethics, labor practices, and human rights, as well as sustainable procurement. Specific to climate, EcoVadis assessments include checks on supplier actions related to energy efficiency, GHGs, renewable energy, offsets, waste heat recovery/CHP, fuel switching, CCS, response to CDP- and employee training on these topics – as well as activities to reduce GHG emissions in suppliers' own supply chains (actions to engage suppliers, select suppliers based on GHG emissions, and partnering) We made the decision that suppliers scoring 45 or lower will be asked to provide improvement plans to demonstrate continuous improvement. Suppliers declining to make a self-assessment will be informed that such refusal will be

		considered as part of supplier selection decisions. Suppliers scoring 45 or lower or with no score who are assessed as high risk and either critical or strategic in IQ will be required to improve within 12 months. Such suppliers failing to show improvement will be placed in the 'Phase Out' segment of Nouryon's supplier segmentation and Nouryon will reduce business as far as is consistent with business objectives including where possible exit from the supplier.
Investment in R&D	Yes	A number of societal trends are driving demand and presenting opportunities for Nouryon's sustainable solutions. These include a growing and aging population, a rising and increasingly health-conscious middle class, climate change, and natural resource preservation. For example, our solutions help increase crop yields and improve crop quality; make products more biodegradable and easier to recycle; make buildings and vehicles more energy efficient; and increase the durability of bridges and wind turbines. Our segments, Performance Formulations, and Technology Solutions, use their expertise and collaboration with customers and other partners to develop sustainable, innovative, and high performing new products that meet the needs of our customers and society in an increasingly sustainable way. Within Performance Formulations, we base our sustainable innovations on a range of biodegradable and bio-based products, including chelating agents, surfactants, and polymers based on natural materials. We work to extend our product platforms through partnerships, acquisitions, and technology innovation. For example, acquiring JM Huber's CMC business in 2020 enhanced our portfolio and technical capabilities in the field of cellulosic derivatives. Our Technology Solutions business contributes positively to sustainability through both product and process innovations. Our new product innovations promote benefits for our customers and the environment. Our process innovations reduce waste, wastewater, and emissions to air, and we continually strive to increase yields and reduce energy consumption to mitigate climate related risks of our customers.
Operations	Yes	Nouryon is committed to reducing our carbon footprint and energy use. We do this by increasing operational efficiency to reduce our energy consumption and expanding the sourcing of renewable energy. Thanks to ongoing

		improvement and innovation efforts, we reduced our average carbon footprint (scope 1 and 2) per ton of product between 2009 and 2021 by 9%. In support of the objectives of the UN's Paris Agreement on climate change, we set a goal to further reduce carbon emissions from our operations and energy use. In 2022, this target was revised to our new 2030 target, which provides a longer-term point in time to show continued progress toward our aspiration toward becoming a net zero organization by 2050. We made the decision to set our 2030 target to reduce our scope 1 and scope 2 greenhouse gas emissions 40% vs. 2019. See more information in 4.1a. Furthermore, by 2050, we aspire to be a net zero organization. Nouryon has a strong drive to embed continuous improvement in manufacturing, energy efficiency and consumption across the supply chain. We track and report our eco-efficiency performance on a quarterly and annual basis. The input is checked and validated twice a year. Since 2009, we have incrementally decreased our energy intensity while also supporting customers' sustainability ambitions. To strengthen our sustainable energy sourcing capabilities, we established the Nouryon Energy Team (NET) with cross-functional expertise in Energy, Procurement, Finance, and Sustainability and this group is continuously developing and implementing strategic plans for low-carbon energy solutions globally. Nouryon's site HSE&S improvement plans include eco-efficiency parameters and aim to decrease other emissions and waste and increase our efficiency in raw materials and water usage. These efforts benefit the environment and the community, as well as our business performance, by simultaneously reducing operational costs, ensuring our license to operate, and lowering our environmental impact and climate risks. For physical acute risks, we have incorporated mitigations into our strategic planning, including capital improvements to improve resiliency. We will continue to incorporate climate-related risks and opportunities into our strategy to increase the resiliency of our operations.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues	We consider climate risks and opportunities as we build our strategy around new market opportunities – including aligning investments in products that serve markets that will expand to meet the transition to a low carbon economy. These include sales into renewable energy markets (wind turbines, crop solutions to improve yields to battle potential soil depletion). One example is sales of our amine related products such as piperazine used in carbon capture. Piperazine / MDEA formulations are recognized as a preferred gas treatment solution for capturing CO2 in industrial applications. Thus, carbon capture solutions to mitigate climate change, presents a business opportunity. For our financial planning, we work with our customers and align future production to the estimated growing demand for piperazine and amine related products that is foreseen for the coming years. Piperazine helps our customers capture several million metric tonnes of carbon annually. The time horizon for this planning is short and medium term. We actively plan investments around Eco Premium Solutions both in product development as well as facility investments and production capability to meet market demand, including consideration of low carbon and emission reduction policies impacting our customers and affecting potential market demand. We also consider raw material sourcing plans as part of these market strategies.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number
Abs 1

Year target was set
2020

Target coverage
Company-wide

Scope(s)
Scope 1
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)

Base year
2019

Base year Scope 1 emissions covered by target (metric tons CO2e)
522,522

Base year Scope 2 emissions covered by target (metric tons CO2e)
894,250

Base year Scope 3 emissions covered by target (metric tons CO2e)

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)
1,416,802

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1
100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2
100

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2025

Targeted reduction from base year (%)

25

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

1,062,601.5

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

549,587

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

884,609

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

1,434,196

% of target achieved relative to base year [auto-calculated]

-4.9107779351

Target status in reporting year

Underway

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

Target ambition

Please explain target coverage and identify any exclusions

As of July 1, 2021, a significant portion of our business was spun out from Nouryon to the Nobian company.

Nouryon has set the aspiration to be a net zero organization by 2050. Our current carbon reduction target for 2030 to reduce our absolute carbon Scope 1 and Scope 2 emissions with 40% is part of our transition plan to achieve net zero.

Plan for achieving target, and progress made to the end of the reporting year

This target was revised to our new 2030 target. As we look to increase our renewable electricity consumption, including through the purchase of energy attribute certificates, we will likely overachieve our 2025 target. In addition, our 2030 target provides a longer-term point in time to show continued progress toward our aspiration toward becoming a net zero organization by 2050.

We aim to achieve our GHG reduction target through a wide range of actions that include focusing on energy efficiency measures and increasing our renewable energy usage. Our solutions can also contribute to GHG reductions for our customers.

We have a strong drive to embed continuous improvement in manufacturing, energy efficiency and consumption across our supply chain. This includes tracking and reporting our energy and environmental data on a quarterly and annual basis. Between 2009 and 2021, we increased our energy intensity by 6% in line with increased production and revenues.

Low carbon energy refers to energy generated using processes such as renewable, biomass and nuclear energy, which result in substantially lower greenhouse gas emissions than conventional processes. In 2021, 59% of our energy came from low carbon and renewable sources such as hydro, wind, solar, biomass for power, and steam from bio-waste. This was equal to the previous year.

List the emissions reduction initiatives which contributed most to achieving this target

Target reference number

Abs 2

Year target was set

2022

Target coverage

Company-wide

Scope(s)

Scope 1
Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

522,552

Base year Scope 2 emissions covered by target (metric tons CO2e)

894,250

Base year Scope 3 emissions covered by target (metric tons CO2e)

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

1,416,802

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2030

Targeted reduction from base year (%)

40

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

850,081.2

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

549,587

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

884,609

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

1,434,196

% of target achieved relative to base year [auto-calculated]

-3.0692362094

Target status in reporting year

New

Is this a science-based target?

No, and we do not anticipate setting one in the next 2 years

Target ambition

Please explain target coverage and identify any exclusions

As of July 1, 2021, a significant portion of our business was spun out from Nouryon, to the Nobian company.

Nouryon has set the aspiration to be a net zero organization by 2050. Our current carbon reduction target is a key milestone in the transition plan towards net zero.

Plan for achieving target, and progress made to the end of the reporting year

We aim to achieve our GHG reduction target through a wide range of actions that include energy efficiency measures and increasing our renewable energy usage. Our solutions can also contribute to GHG reductions for our customers. For example, making packaging lighter with our Expancel® thermoplastic microspheres, which drives transportation fuel efficiency and reduces transportation-related emissions. Similarly, our solutions are essential to renewable energy related products such as lightweight composite parts in wind turbines and insulation for high-quality, high-voltage cables, and for helping to make solar panels durable and highly efficient.

We have a strong drive to embed continuous improvement in manufacturing, energy efficiency and consumption across our supply chain. This includes tracking and reporting our energy and environmental data on a quarterly and annual basis. Between 2009 and 2021, we increased our energy intensity by 6% in line with increased production and revenues.

Low carbon energy refers to energy generated using processes such as renewable, biomass and nuclear energy, which result in substantially lower greenhouse gas emissions than conventional processes. In 2021, 59% of our energy came from low carbon and renewable sources such as hydro, wind, solar, biomass for power, and steam from bio-waste. This was equal to the previous year.

List the emissions reduction initiatives which contributed most to achieving this target

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to increase low-carbon energy consumption or production

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number

Low 1

Year target was set

2020

Target coverage

Company-wide

Target type: energy carrier

All energy carriers

Target type: activity

Consumption

Target type: energy source

Low-carbon energy source(s)

Base year

2019

Consumption or production of selected energy carrier in base year (MWh)

8,277,778

% share of low-carbon or renewable energy in base year

59

Target year

2025

% share of low-carbon or renewable energy in target year

70

% share of low-carbon or renewable energy in reporting year

59

% of target achieved relative to base year [auto-calculated]

0

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes, our target on % low carbon and renewable energy will contribute to lower scope 1 and scope 2 emissions (25% reduction) in 2025 compared to the base year 2019.

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain target coverage and identify any exclusions

The base year number includes energy consumption. As of July 1, 2021, a significant portion of our business was spun out from Nouryon to the Nobian company.
In 2022, Nouryon set the aspiration to be a net zero organization by 2050. Our current carbon reduction target for 2030 is part of this aspiration.

Plan for achieving target, and progress made to the end of the reporting year

This target was underway in 2021. In 2022, we retired this target and published our new 2030 targets. Based on current plans to increase renewable electricity consumption through the purchase of energy attribute certificates globally, we are likely to achieve the 2025 low carbon energy target in the next reporting cycle. In addition, emission reductions from low carbon energy usage will be reflected in the scope 2 portion of our 2030 target.

List the actions which contributed most to achieving this target

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	45	48,073
To be implemented*	6	23,668
Implementation commenced*	31	7,938
Implemented*	8	2,434
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Energy efficiency in production processes

Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)

1,635

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

177,997

Investment required (unit currency – as specified in C0.4)

1,724,420

Payback period

4-10 years

Estimated lifetime of the initiative

11-15 years

Comment

We have an overview of all our projects being implemented in 2021 with CO2 savings, Capex and yearly savings.

Initiative category & Initiative type

Low-carbon energy consumption

Other, please specify

Renewable energy consumption with Wind, Hydro and Solar as sources

Estimated annual CO2e savings (metric tonnes CO2e)

498

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

276,250

Investment required (unit currency – as specified in C0.4)

0

Payback period

No payback

Estimated lifetime of the initiative

11-15 years

Comment

We are constantly exploring opportunities for low carbon energy using sources like renewable, biomass and nuclear energy, which result in substantially lower greenhouse gas emissions than conventional processes. In 2021 our renewable energy sources were hydro, wind, solar, biomass for power, and steam from bio-waste.

Initiative category & Initiative type

Other, please specify

Other, please specify

Replacement by more efficient equipment

Estimated annual CO2e savings (metric tonnes CO2e)

301

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

49,106

Investment required (unit currency – as specified in C0.4)

125,620

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

We often explore for opportunities to improve efficiency, including with replacing equipment, such as motors, with higher efficiency units.
This example shows the benefits to equip chiller with high efficiency motors, replace

cooling tower electricity driven motor to hydraulic driven, both in Ningbo. In Jiaxing were upgraded electrical motors with high efficiency types and in Tachia we installed motors by type equipped with Variable Frequency Drives.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Compliance with regulatory requirements/standards	Many of our capital investments drive emission reductions by improving the effectiveness and efficiency of our operations. Also, our capital investments are compliant with regulatory requirements, standards, and regulations as well as safety standards in every region in which we operate. We are considering putting carbon tax into our financial models for capital investments. In partnership with our customers, we also develop and invest in innovative, sustainable solutions designed to meet end-use application performance specifications, sustainability requirements such as bio-based, regulatory requirements, and environmental laws and regulations. Our long-term plan to achieve our emission reduction goals includes: • Scope 1: Improving efficiency in our operations and optimizing our fuel mix. • Scope 2: Increasing our use of renewable energy through power purchase agreements, on-site renewables, utility programs and certificates. • Scope 3: We are currently analyzing indirect GHG emissions from activities across our value chains. In addition, across all scopes: • Exploring collaboration opportunities with our customers and suppliers. • Evaluating and deploying innovation technologies such as those in the ICOS Capital Fund III, where we are a strategic investor. Integrating net zero and climate change considerations into our strategy and planning

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Group of products or services

Taxonomy used to classify product(s) or service(s) as low-carbon

Other, please specify

Life Cycle Assessments

Type of product(s) or service(s)

Road

Other, please specify

Low-density fillers

Description of product(s) or service(s)

Nouryon Engineered Polymers creates extremely low-density fillers that are commonly used in plastics and paper for reducing the amount of raw material needed to create products and are very small in size and weight but displace a significant amount of material (such as plastic or wood) used in manufacturing when expanded to their full size. Low density fillers help displace material but are bulky and expensive to ship. For large volume end users, the number of trucks needed to transport filler from the production facility to the end using facility can be significant. For improved Environmental Protection, Nouryon has created an onsite expanding machine and process for shipping unexpanded fillers, in microsphere form, to customers and leases the equipment, which enables customers to take advantage of the product quickly and easily without large capital expense. Nouryon also sends an experienced technician to set up and install the equipment so there is minimal learning, expense, or effort invested by the end user. When installed and operational, the onsite equipment takes unexpanded microspheres and expands them on demand. Typical expansion creates a filler volume equivalent to 40 – 60x the original unexpanded microsphere size. This new approach significantly reduces the need for transporting low density fillers resulting in fuel and emission reductions, and cuts the number of trucks on the road.

Mainstream alternative: transport of expanded Expancel to the customer

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify

Life Cycle Assessments

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Cradle-to-gate

Functional unit used

1 kg of unexpanded Expancel deliverd to customer

Reference product/service or baseline scenario used

Expanded Expancel at the manufacturing site

Life cycle stage(s) covered for the reference product/service or baseline scenario

Cradle-to-gate

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

1,612

Explain your calculation of avoided emissions, including any assumptions

Shipping unexpanded microspheres vs. the full-size expanded version results in high fuel efficiency, which reduces emissions. Since onsite volume increase is 40 to 60 times the unexpanded microsphere volume, we conservatively estimate only 1/40th of the energy and packaging supplies is what is consumed in the improved process. Environmental savings results in only a fraction of the fuel and oil used to power those fleets, 1/40th the amount of packaging that would be used, and 1/40th the amount of greenhouse gas released from shipping material to those consuming end locations. The CO2 avoidance by transporting unexpanded Expancel instead of expanded is 1.68 ton CO2_eq per ton sold Expancel. In 2021 we sold 959.4 ton in this segment so avoiding 959.4 times 1.68 makes 1,612 ton.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

0.4

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

Yes, other structural change, please specify

In 2021, Nouryon spun off Nobian, our base chemicals business, which still is subsidary of Carlyle.

Name of organization(s) acquired, divested from, or merged with

Nobian.

Details of structural change(s), including completion dates

The businesses MCA and DME remained part of Nouryon belonging to our business line Paints and Coatings as of Q3 2020.

The spin out of Nobian was officially completed first of July 2021.

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in methodology Yes, a change in boundary	Change in methodology; Until 2021, the energy consumption was derived from the consumption expressed in Fuel Equivalents (including the efficiency loss of generating electricity in power stations). During 2021 we started to express the energy consumption in direct fuel consumption in GJ and we have also recalculated the consumption for the years 2018 and 2019 from Fuel Equivalents to direct energy consumption. Change in boundary: In support of our Carbon Business Strategy, we recently expanded our scope 3 emissions calculations beyond upstream raw materials and developed a full scope 3 emissions inventory covering emissions across the value chain. We focused on a detailed analysis of emissions in the following categories seen to be significant for Nouryon: • Purchased goods and services specifically, purchased raw materials (Category 1) • Fuel and energy related activities (Category 3) • Waste generated in operations (Category 5) • End-of-life treatment of sold products (Category 12) For the other categories, we used the GHG Protocol's Quantis scope 3 Evaluator Tool. This project started in 2021, using prior year data, and the basis of the scope 3 calculations is 2020. We also will include scope 3 calculations for the year 2021 in this submission.

C5.1c

(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	Yes	Based on the guidelines in the GHG protocol, we have updated our base year emission data due the spin out of Nobian. With M&A and divestitures we apply a 5% difference as threshold of total emissions. The effect on the base year emissions due the spin out of Nobian was above this 5% which is our threshold.

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

522,552

Comment

The base year number includes scope 1 emissions from our own operations and is corrected compared to our submission in 2021 (over 2020) because:
- Nobian was spun out in 2021, with the exception of MCA Delfzijl and DME.
- The MCA and DME business lines reporting to the Nobian business remained part of Nouryon and report to our business line Paints and Coatings as of Q3 2020.

Scope 2 (location-based)

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

0

Comment

No location based scope 2 emissions.

Scope 2 (market-based)

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

894,250

Comment

The base year number includes scope 2 emissions from our own operations and is corrected compared to our submission in 2021 (over 2020) because:

- Nobian was spun out in 2021.
- MCA Delfzijl and DME Rotterdam remained part of Nouryon as of Q3 2020.

All our scope 2 emissions are market based.

Scope 3 category 1: Purchased goods and services

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

2,432,576

Comment

All raw materials spend volumes for 2020 were derived from our SAP data system. All top 70 raw materials in volumes were cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors to calculate the carbon footprint of these top 70 raw materials representing 90% of the volume and 95% of the total raw material carbon footprint. The carbon footprint of the remaining 5% was extrapolated to 100% coverage. Packaging and services spend data were grouped into buckets by sector from the World Input-Output Database (WIOD). The total spend for each category was converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Scope 3 category 2: Capital goods

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

152,859

Comment

Capital goods spend data were grouped into buckets by sector from the WIOD. Total spend for each category was converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint. Spend was cross-checked against services (Category 1) to avoid double-counting.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

374,682

Comment

Upstream energy carbon footprint calculations were based on 2020 scope 1 and scope 2 for Electricity and Fuels (natural gas, LPG, fuel oil).
All energy sources were mapped to emission factors from DEFRA database. We applied country- specific emission factors for electricity and region-specific electricity emission factors for facilities located in the U.S.
The total amount of fuels and electricity were multiplied by energy source-specific emission factors and resulted in the summed upstream carbon footprint for each energy source showing the total Category 3 carbon footprint.

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

43,530

Comment

Upstream transport spend data were converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Scope 3 category 5: Waste generated in operations

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

51,021

Comment

The category 5 carbon footprint calculations were based on 2020 waste generation data provided based on eight unique streams for hazardous and non-hazardous waste. All waste streams were mapped to datasets from GaBi and Ecoinvent LCI databases and applied proxy datasets where fate- or material-specific datasets were unavailable. The total waste volume for each stream was multiplied with the waste stream-specific emission factors showing the total summed carbon footprint for each waste stream and summed up to the total Category 5 carbon footprint.

Scope 3 category 6: Business travel

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

14,929

Comment

Business travels spend data by type (travel mode, hotel stay, etc). This data was converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Scope 3 category 7: Employee commuting

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

12,750

Comment

Number of employees was entered into the Quantis tool to calculate the carbon footprint.

Scope 3 category 8: Upstream leased assets

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Nouryon does not have leased assets upstream.

Scope 3 category 9: Downstream transportation and distribution

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

96,601

Comment

Downstream transport spend data were converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Scope 3 category 10: Processing of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

We do not have information of CO2 emissions at our customers in using our products.

Scope 3 category 11: Use of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Category 11 carbon footprint calculations were based on 2020 production data for 22 product lines.

All potential end-use applications of all product lines were researched to identify if any products are being combusted or used as blowing agents or otherwise emitted during use.

No products that are emitted (namely, DME used as an aerosol propellant) have a GWP according to IPCC's AR5 report. Therefore, the carbon footprint for category 11 is zero.

Scope 3 category 12: End of life treatment of sold products

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

1,099,364

Comment

Category 12 carbon footprint calculations were based on 2020 production data for 22 product lines.
Researched waste fates for Asia, Europe and US (regions of production) Land filled and incinerated product lines result in GHG emissions. All landfill streams by region of production were mapped and connected to datasets from GaBi and Ecoinvent LCI databases. We used stoichiometry to calculate emissions from combustion of incinerated products. The volumes of the product lines were multiplied by product-specific landfill emissions factors showing the summed carbon footprint for each product line for total Category 12 carbon footprint.

Scope 3 category 13: Downstream leased assets

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Nouryon does not have downstream leased assets, so not applicable.

Scope 3 category 14: Franchises

Base year start

January 1, 2020

Base year end

December 31, 2020

Base year emissions (metric tons CO2e)

0

Comment

Nouryon does not apply Franchises, so not applicable.

Scope 3 category 15: Investments

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
262,250

Comment
Investment data were grouped into buckets by sector from the WIOD. Total investment amount for each category was converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Scope 3: Other (upstream)

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
0

Comment
Not other scope 3 upstream emissions.

Scope 3: Other (downstream)

Base year start
January 1, 2020

Base year end
December 31, 2020

Base year emissions (metric tons CO2e)
0

Comment
No other downstream scope 3 emissions.

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
The Greenhouse Gas Protocol: Scope 2 Guidance

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

559,587

Start date

January 1, 2021

End date

December 31, 2021

Comment

The base year number and reporting year 2021 included emissions from our own operations. Data is excluding Nobian, which was spun off July 1, 2021.

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)

536,800

Start date

January 1, 2020

End date

December 31, 2020

Comment

The base year number and reporting year 2020 includes emissions from our own operations. Data is excluding Nobian, which was spun off July 1, 2021. The Elotex business reporting to Performance Formulations was divested as of Q3 2020, the Huber CMC site Äänekoski in Finland was acquired as of Q3 2020. The MCA and DME business lines reporting to the Nobian business remained part of Nouryon and report to our business line Paints and Coatings as of Q3 2020.

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are not reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

All scope 2 emissions are based on the local electricity grid fuel mix per site location. Purchased RECs or OGs are included in the final CO2 reporting.

The base year number includes emissions from our own operations. The Elotex business reporting to Performance Formulations was divested as of Q3 2020, the Huber CMC site Äänekoski in Finland was acquired as of Q3 2020. The MCA and DME business lines reporting to the Nobian business remained part of Nouryon and report to our business line Paints and Coatings as of Q3 2020.

Data is excluding Nobian, which was spun off July 1, 2021.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Start date

January 1, 2021

End date

December 31, 2021

Comment

The reporting year 2021 number includes emissions from our own operations. Data is excluding Nobian, which was spun off July 1, 2021.

Past year 1

Start date

January 1, 2020

End date

December 31, 2020

Comment

The reporting year 2020 number includes emissions from our own operations. The Elotex business reporting to Performance Formulations was divested as of Q3 2020, the Huber CMC site Äänekoski in Finland was acquired as of Q3 2020.

Data is excluding Nobian, which was spun out July 1, 2021 with the exception of MCA and DME. The MCA and DME business lines reporting to the Nobian business remained part of Nouryon and report to our business line Paints and Coatings as of Q3 2020.

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

No

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

2,492,544

Emissions calculation methodology

Hybrid method

Spend-based method

Other, please specify

Raw Materials spend in tons cross referenced with Ecoinvent 3.7 and Sphera emissions factors

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

All raw materials volumes for 2021 were derived from our SAP data system. The top 70 raw materials in volumes were cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors to calculate a carbon footprint. These top 70 raw materials represent 90% of the volume and 95% of the total raw material carbon footprint of our raw materials. The carbon footprint of the remaining 5% was extrapolated to 100% coverage. Packaging and services spend data were grouped into categories by sector from the World Input-Output Database (WIOD). The total spend for each category was converted from EUR to USD and entered into the Quantis tool to calculate the carbon footprint.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

158,454

Emissions calculation methodology

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Capital goods spend data for 2021 was grouped into buckets by sector from the WIOD. Total spend for each category in USD was entered into the Quantis tool to calculate the carbon footprint. Spend was cross-checked against services (Category 1) to avoid double-counting.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

399,106

Emissions calculation methodology

Hybrid method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Upstream energy carbon footprint calculations were based on 2021 Scope 1 and Scope 2 for Electricity and Fuels (natural gas, LPG, fuel oil).
All energy sources were mapped to emission factors from the DEFRA database. We applied country-specific emission factors for electricity and region-specific electricity emission factors for facilities located in the U.S. The total amount of fuels and electricity were multiplied by energy source-specific emission factors and resulted in the summed upstream carbon footprint for each energy source showing the total Category 3 carbon footprint.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

48,400

Emissions calculation methodology

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Upstream transport spend data for 2021 in USD and were entered into the Quantis tool to calculate the carbon footprint.

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

54,884

Emissions calculation methodology

Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The category 5 carbon footprint calculations were based on 2021 waste generation data provided based on eight unique streams for hazardous and non-hazardous waste. All waste streams were mapped to datasets from GaBi and Ecoinvent LCI databases and applied proxy datasets where fate- or material-specific datasets were unavailable. The total waste volume for each stream was multiplied with the waste stream-specific emission factors Showing the total Summed carbon footprint for each waste stream and summed up to the total Category 5 carbon footprint.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

11,111

Emissions calculation methodology

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Business travel spend data for 2021 by type (travel mode, hotel stay, etc). This data in USD were entered into the Quantis tool to calculate the carbon footprint.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

12,750

Emissions calculation methodology

Other, please specify

The emissions were calculated by entering the number of employees into the Quantis tool to arrive at a carbon footprint.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

No data was obtained from suppliers for this category.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

For 2021, we do not have upstream leased assets in our company.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

147,619

Emissions calculation methodology

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We calculated this category by entering downstream transport 2021 spend data in USD was into the Quantis tool.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Please explain

For 2021, we do not have information of CO2 emissions at our customers in using our products.

Use of sold products

Evaluation status

Not relevant, explanation provided

Please explain

Category 11 carbon footprint calculations were based on 2021 production data for 22 product lines.
All potential end-use applications of all product lines were researched to identify if any products are being combusted or used as blowing agents or otherwise emitted during use.
No products that are emitted (namely, DME used as an aerosol propellant) have a GWP according to IPCC's AR5 report. Therefore, we estimate the carbon footprint for category 11 is zero.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,168,787

Emissions calculation methodology

Other, please specify

Production volume base per product line using an analysis on end-of-life scenarios per product line.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Category 12 carbon footprint calculations were based on 2021 production data for 22 product lines.
We conducted research to obtain waste fates in case our products end up as waste to Landfill or are incinerated at their end of life for production regions Asia, Europe and US (our regions of production). All landfill streams for the regions of production were mapped and connected to datasets from GaBi and Ecoinvent LCI databases. We used stoichiometry to calculate emissions from combustion of incinerated products. The volumes of the product lines were multiplied by product-specific landfill emissions factors showing the summed carbon footprint for each product line for total Category 12 carbon footprint.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

For 2021, Nouryon did not have downstream leased assets.

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

For 2021, Nouryon did not have Franchises.

Investments

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

129,723

Emissions calculation methodology

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Investment data were grouped into categories by sector from the WIOD. Total investment amount for each category in USD were entered the Quantis tool to calculate the carbon footprint.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Please explain

No other scope 3 upstream emissions

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

No other downstream scope 3 emissions.

C6.5a

(C6.5a) Disclose or restate your Scope 3 emissions data for previous years.

Past year 1

Start date

January 1, 2020

End date

December 31, 2020

Scope 3: Purchased goods and services (metric tons CO2e)

2,432,576

Scope 3: Capital goods (metric tons CO2e)

152,859

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

374,682

Scope 3: Upstream transportation and distribution (metric tons CO2e)

43,530

Scope 3: Waste generated in operations (metric tons CO2e)

51,021

Scope 3: Business travel (metric tons CO2e)

14,929

Scope 3: Employee commuting (metric tons CO2e)

12,750

Scope 3: Upstream leased assets (metric tons CO2e)

0

Scope 3: Downstream transportation and distribution (metric tons CO2e)

96,601

Scope 3: Processing of sold products (metric tons CO2e)

0

Scope 3: Use of sold products (metric tons CO2e)

0

Scope 3: End of life treatment of sold products (metric tons CO2e)

1,099,364

Scope 3: Downstream leased assets (metric tons CO2e)

0

Scope 3: Franchises (metric tons CO2e)

0

Scope 3: Other (upstream) (metric tons CO2e)

0

Scope 3: Other (downstream) (metric tons CO2e)

0

Comment

In support of our Carbon Business Strategy, we recently expanded our Scope 3 emissions calculations beyond upstream raw materials and developed a full Scope 3 emissions inventory covering emissions across the value chain. We focused on a detailed analysis of emissions in the following categories seen to be significant for Nouryon:

• Purchased goods and services specifically, purchased raw materials (Category 1)
• Fuel and energy related activities (Category 3)
• Waste generated in operations (Category 5)
• End-of-life treatment of sold products (Category 12)

For the other categories, we used the GHG Protocol's Quantis Scope 3 Evaluator Tool. This project started in 2021, using prior year data, and the basis of the Scope 3 calculations is 2020.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

No

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.000292

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

1,434,196

Metric denominator

unit total revenue

Metric denominator: Unit total

4,917,000,000

Scope 2 figure used

Market-based

% change from previous year

8.75

Direction of change

Decreased

Reason for change

The intensity number for 2020 was 0.00032 based on 4,207 billion US$ and 1,362,000 kton CO2 scope 1 and 2. The intensity number for 2021 was 0.000292 based on 4,917 billion US$ and 1,434,196 ton CO2 scope 1 and 2. The emissions in 2021 were higher compared to 2020 (plus 5.3%) mainly as a result of portfolio effects and changes in production volume off set by process efficiency improvements. The main driver for the decrease in emissions intensity is higher revenues. Our 2021 revenue was 17% higher versus 2020. Our emission reduction activities are included in C4.3b.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

No

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	167,325
Brazil	15,539
Mexico	4,030
Canada	823
Argentina	17,663
Japan	754
China	79,690
Singapore	695
Taiwan, China	1,167
Italy	1,534
Sweden	188,656
Netherlands	18,582
Germany	34,080
India	469
Belgium	18,576

France	3

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Performance Formulations Segment	316,586
Technology Solutions Segment	233,000

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Comment
Chemicals production activities	549,586	All production activities world wide.

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
United States of America		393,940
Brazil		2,736
Mexico		12,118
Canada		835
Argentina		5,872
Japan		2,561
China		353,021
Singapore		958
Taiwan, China		1,495

Finland		14,947
Italy		1,841
Sweden		2,344
France		8,570
Netherlands		35,480
Germany		17,399
India		1,870
Belgium		0
Norway		28,620

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Performance Formulations Segment		357,747
Technology Solutions Segment		526,860

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Chemicals production activities		884,607	All production activities world wide.

C-CH7.8

(C-CH7.8) Disclose the percentage of your organization's Scope 3, Category 1 emissions by purchased chemical feedstock.

Purchased feedstock	Percentage of Scope 3, Category 1 tCO2e from purchased feedstock	Explain calculation methodology
Ammonia	3.2	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Aromatics extraction	0.9	Solvents were classified under Aromatics Extraction Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Ethanol	0.6	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
High Value Chemicals (Steam cracking)	11.6	Ethylene and ethylene-derived chemicals were classified under high-value chemicals. Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Methanol	2	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Other base chemicals	72.9	Elements and simple molecules were classified as other base chemicals. Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Polymers	0.1	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Solid biomass	0.8	Cellulose was classified as solid biomass Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Specialty chemicals	6.5	Fats, Oils, Tallow, and complex chemicals that did not fit into other categories were classified as specialty chemicals. Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.

Adipic acid	0	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.
Natural gas	1.3	Based on spend volumes for 2021 derived from SAP data and cross referenced with Ecoinvent 3.7 and Sphera raw materials emission factors. See C6.5.

C-CH7.8a

(C-CH7.8a) Disclose sales of products that are greenhouse gases.

	Sales, metric tons	Comment
Carbon dioxide (CO2)	8,945	Sales in 2021 to a third party from our Ethylene Oxide plant in Stenungsund. Other sites do not sell CO2.
Methane (CH4)	0	
Nitrous oxide (N2O)	0	
Hydrofluorocarbons (HFC)	0	
Perfluorocarbons (PFC)	0	
Sulphur hexafluoride (SF6)	0	
Nitrogen trifluoride (NF3)	0	

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable	3,355	Increased	0.25	All manufacturing units report their fuel and electricity consumption in our Enablon HSE system quarterly. Data on

energy consumption				use and purchase of renewable energy is available. In 2021 the total share of renewable energy has decreased to 51% in 2021 compared to 2020 where we reported 52%. Hence 1 % decrease compared to 2020. Our low-carbon energy remained flat at 59%. The expected CO2 emission change due to a lower percentage renewable energy for 2021, was determined by calculating the Scope 1 + 2 CO2 emission per % non-renewable energy in 2020 multiplied by the % non-renewable energy in 2021 minus the Scope 1 + 2 emissions in 2020. The non-renewable % for each year was calculated by 100% - minus renewable % - minus Nuclear %. The non-renewable % for 2020 is 100% minus renewable % being 52.2% minus Nuclear % being 7.2% makes 40.6%. The non- renewable % for 2021 is 100% minus renewable % being 51.3% minus Nuclear % being 8.0% makes 40.7%. The difference between the 2021 emission due to change in the renewable percentage is 1,361,751 tons Scope 1+2 2020 divided by 40.6% as non-renewable % 2020 times 40.7% as non- renewable % 2021 minus 1,434,196 tons Scope 1+2 2021 makes 3,355 ton which is 0.25% of the total scope 1+2 for 2020 (3,355 ton divided by 1,361,751 tons Scope 1 + 2 in 2020).
Other emissions reduction activities	2,434	Decreased	0.2	This number includes the effects from all energy efficiency projects at our sites and replacement by high efficiency motors. Also mentioned at chapter 4.3a. So, 2,434 tons improvement compared to 2020 makes. Divided by scope 1+2 2020 being 1,361,751 ton is 0.2%.
Divestment	0	No change	0	On July 1, 2021, Nobian was spun off. Emissions for all years, including the based year, were corrected. So, zero change compared to 2020 makes 0

				divided by scope 1+2 2020 being 1,361,751000 ton is 0%
Acquisitions	0	No change	0	In 2021, there were no acquisitions. The acquisition of former Huber CMC plant in Äänekoski in Q3 2020 was already corrected in the base year 2019 and reporting year 2020. So, zero change compared to 2020 makes 0 divided by scope 1+2 2020 being 1,361,751000 ton is 0%
Mergers	0	No change	0	Nouryon did not have any mergers in 2021. So, zero change compared to 2020 makes 0 divided by scope 1+2 2020 being 1,361,751 ton is 0%
Change in output	50,717	Increased	3.7	All manufacturing units in Nouryon report in the corporate Enablon HSE system quarterly. This allows us to do detailed analysis. Although overall production increased, there was no significant change in production of the energy intensive units, which is confirmed by a stable overall energy use. The 2021 expected CO2 emission due to production change was determined by calculating the specific CO2 emission per ton of products in 2020 multiplied by the production in 2021. The difference between the 2021 emission due to growth and 2020 emissions gives the CO2 change due to change in output. So, 1,361,751 tons CO2 in 2020 divided by 3,330,000 tons of product in 2020 times tons of product in 2021 gives 1,412,717 tons CO2 in 2021 due to growth. The change in output is the 2021 tons CO2 being 2,412,717 minus the CO2 emissions in 2020 is 50,717 tons increase. Divided 50,717 tons increase by the CO2 emissions in 2020 so 50,717 tons CO2 divided by 1,361,751 tons gives an increase of 3.7%.
Change in methodology	0	No change	0	No change in methodology.

Change in boundary	0	No change	0	No change in boundary.
Change in physical operating conditions	0	No change	0	No change in physical operation conditions.
Unidentified	0	No change	0	No unidentified effects.
Other	20,362	Increased	1.5	This is the effect of production portfolio changes compared to 2020. We made more carbon intensive products. This is calculated by subtracting the increase of 72,000 ton in 2021 compared to 2020 by all other effects: Portfolio effects is 32,980 ton minus effect of renewable energy, improvements and production delta, improvements: 72,000 - 3,355 + 2,434 + 50,717 = 23,650 ton. Divided by the CO2 emissions in 2020 so 20,362 tons CO2 divided by 1,361,751 tons gives an increase of 1.5%.

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 5% but less than or equal to 10%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes

Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	10,333	2,012,724	2,023,057
Consumption of purchased or acquired electricity		3,779,371	1,608,816	5,388,187
Consumption of purchased or acquired steam		823,834	759,473	1,583,307
Consumption of self-generated non-fuel renewable energy		0		0
Total energy consumption		4,613,538	4,381,013	8,994,551

C-CH8.2a

(C-CH8.2a) Report your organization's energy consumption totals (excluding feedstocks) for chemical production activities in MWh.

Consumption of fuel (excluding feedstocks)

Heating value

LHV (lower heating value)

MWh consumed from renewable sources inside chemical sector boundary

10,333

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

2,012,274

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

2,023,057

Consumption of purchased or acquired electricity

MWh consumed from renewable sources inside chemical sector boundary

3,779,371

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

1,608,816

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

5,388,187

Consumption of purchased or acquired steam

MWh consumed from renewable sources inside chemical sector boundary

823,834

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

759,473

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

1,583,307

Consumption of self-generated non-fuel renewable energy

MWh consumed from renewable sources inside chemical sector boundary

0

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

0

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

0

Total energy consumption

MWh consumed from renewable sources inside chemical sector boundary

4,613,538

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

4,381,013

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

8,994,551

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	0	0	0	0
Heat	1,218,723	1,218,723	0	0
Steam	804,334	804,334	10,333	10,333
Cooling	0	0	0	0

C-CH8.2d

(C-CH8.2d) Provide details on electricity, heat, steam, and cooling your organization has generated and consumed for chemical production activities.

Electricity

Total gross generation inside chemicals sector boundary (MWh)

0

Generation that is consumed inside chemicals sector boundary (MWh)

0

Generation from renewable sources inside chemical sector boundary (MWh)

0

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0

Heat

Total gross generation inside chemicals sector boundary (MWh)

1,218,723

Generation that is consumed inside chemicals sector boundary (MWh)

1,218,723

Generation from renewable sources inside chemical sector boundary (MWh)

0

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0

Steam

Total gross generation inside chemicals sector boundary (MWh)
804,334

Generation that is consumed inside chemicals sector boundary (MWh)
804,334

Generation from renewable sources inside chemical sector boundary (MWh)
10,333

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
10,333

Cooling

Total gross generation inside chemicals sector boundary (MWh)
0

Generation that is consumed inside chemicals sector boundary (MWh)
0

Generation from renewable sources inside chemical sector boundary (MWh)
0

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
0

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Sourcing method
Direct line to an off-site generator owned by a third party with no grid transfers

Energy carrier
Electricity

Low-carbon technology type
Sustainable biomass

Country/area of low-carbon energy consumption
Brazil

Tracking instrument used

Other, please specify

Electricity is provided from customers using sustainable biomass (supported by FSC certification)

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

1,021,333

Country/area of origin (generation) of the low-carbon energy or energy attribute

Brazil

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Electricity is provided from customers using biomass supported by FSC certification to show the origin. For example, our plants in Brazil which are delivering Bleaching Chemicals to co-located customer pulp mills (Bahia, Imperatriz, Jacarei, Jupia, and Tres Lagoas), are receiving 100% electricity generated by the pulp mills via a direct connection without grid transfer (generated by Bio-mass which is FSC certified, mostly from waste bio-mass from Eucalyptus trees like bark and rejects). All wood from our major customer in Brazil, is FSC® or PEFC/CERFLOR certified in origin or that still meet the criteria of FSC® controlled wood or PEFC/CERFLOR controlled courses. The wood used in their production is planted origin and mostly comes from its own areas, ensuring that come exclusively from forest plantations and do not compromise recognized areas of high conservation value.

Sourcing method

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

Energy carrier

Electricity

Low-carbon technology type

Sustainable biomass

Country/area of low-carbon energy consumption

Brazil

Tracking instrument used

I-REC

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

368,538

Country/area of origin (generation) of the low-carbon energy or energy attribute

Brazil

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Electricity is provided from customers using biomass supported by FSC certification to show the origin. For example, our plant in Brazil which are delivering Bleaching Chemicals to co-located customer pulp mill (Jundiai), is receiving 100% electricity generated by the pulp mill via a grid transfer certified by an I-REC (generated by Bio-mass which is FSC certified, mostly from waste bio-mass from Eucalyptus trees like bark and rejects). All wood from our major customer in Brazil, is FSC® or PEFC/CERFLOR certified in origin or that still meet the criteria of FSC® controlled wood or PEFC/CERFLOR controlled courses. The wood used in their production is planted origin and mostly comes from its own areas, ensuring that come exclusively from forest plantations and do not compromise recognized areas of high conservation value.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Renewable energy mix, please specify

Combined renewable sources based on Solar, Wind and Hydro

Country/area of low-carbon energy consumption

Canada

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

559,002

Country/area of origin (generation) of the low-carbon energy or energy attribute

Canada

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Electricity provided by utility company supported by GO and RECs to show the origin.

Sourcing method

Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier

Electricity

Low-carbon technology type

Nuclear

Country/area of low-carbon energy consumption

France

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

209,433

Country/area of origin (generation) of the low-carbon energy or energy attribute

France

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Electricity provided by utility company supported by GO to show the origin in this case % Nuclear.

C8.2g

(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.

Country/area

Argentina

Consumption of electricity (MWh)

15,583

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

15,583

Country/area

Belgium

Consumption of electricity (MWh)

26,917

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

26,917

Country/area

Brazil

Consumption of electricity (MWh)

1,414,300

Consumption of heat, steam, and cooling (MWh)

490,834

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,905,134

Country/area

Canada

Consumption of electricity (MWh)

566,639

Consumption of heat, steam, and cooling (MWh)

4,167

Total non-fuel energy consumption (MWh) [Auto-calculated]

570,806

Country/area

China

Consumption of electricity (MWh)
213,778

Consumption of heat, steam, and cooling (MWh)
425,695

Total non-fuel energy consumption (MWh) [Auto-calculated]

639,473

Country/area
Finland

Consumption of electricity (MWh)
252,031

Consumption of heat, steam, and cooling (MWh)
296,472

Total non-fuel energy consumption (MWh) [Auto-calculated]

548,503

Country/area
France

Consumption of electricity (MWh)
294,750

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

294,750

Country/area
Germany

Consumption of electricity (MWh)
20,583

Consumption of heat, steam, and cooling (MWh)
69,194

Total non-fuel energy consumption (MWh) [Auto-calculated]

89,777

Country/area

India

Consumption of electricity (MWh)

2,500

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2,500

Country/area

Italy

Consumption of electricity (MWh)

4,500

Consumption of heat, steam, and cooling (MWh)

306

Total non-fuel energy consumption (MWh) [Auto-calculated]

4,806

Country/area

Japan

Consumption of electricity (MWh)

4,806

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

4,806

Country/area

Mexico

Consumption of electricity (MWh)
24,070

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

24,070

Country/area
Netherlands

Consumption of electricity (MWh)
43,912

Consumption of heat, steam, and cooling (MWh)
146,333

Total non-fuel energy consumption (MWh) [Auto-calculated]

190,245

Country/area
Norway

Consumption of electricity (MWh)
66,806

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

66,806

Country/area
Singapore

Consumption of electricity (MWh)
1,722

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,722

Country/area

Sweden

Consumption of electricity (MWh)

1,013,944

Consumption of heat, steam, and cooling (MWh)

64,167

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,078,111

Country/area

Taiwan, China

Consumption of electricity (MWh)

2,361

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2,361

Country/area

United States of America

Consumption of electricity (MWh)

1,418,981

Consumption of heat, steam, and cooling (MWh)

88,222

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,507,203

C-CH8.3

(C-CH8.3) Does your organization consume fuels as feedstocks for chemical production activities?

Yes

C-CH8.3a

(C-CH8.3a) Disclose details on your organization's consumption of fuels as feedstocks for chemical production activities.

Fuels used as feedstocks

Natural gas

Total consumption

58,595

Total consumption unit

thousand cubic metres

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit

2.42

Heating value of feedstock, MWh per consumption unit

12

Heating value

LHV

Comment

Natural gas is used as feed stock for manufacturing of CS2 and HCN as well as for making Hydrogen by applying steam reforming.

Fuels used as feedstocks

LPG

Total consumption

9,476

Total consumption unit

metric tons

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit

3.05

Heating value of feedstock, MWh per consumption unit

14.2

Heating value

LHV

Comment

LPG used as feed stock for manufacturing making Hydrogen by applying steam reforming.

C-CH8.3b

(C-CH8.3b) State the percentage, by mass, of primary resource from which your chemical feedstocks derive.

	Percentage of total chemical feedstock (%)
Oil	1
Natural Gas	99
Coal	0
Biomass	0
Waste (non-biomass)	0
Fossil fuel (where coal, gas, oil cannot be distinguished)	0
Unknown source or unable to disaggregate	0

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description

Waste

Metric value

15.4

Metric numerator

Total waste generated in 2021 being 53,068,000 kg.

Metric denominator (intensity metric only)

Total production in 2021 being 3,454,000 tons

% change from previous year

0.65

Direction of change

Increased

Please explain

Our waste intensity slightly increased from 15.3 kg per ton of production in 2020 to 15.4 in 2021 due to higher waste generation (53,068 tons in 2021 compared to 50,872 tons in 2020) compared to a lower increase of our production (3,454,000 tons in 2021 compared to 3,330,000 tons in 2020).

Decreasing waste will lower three Scope 3 impact categories which are category 1 Purchased Goods and Services (Raw Materials efficiency), category 5 Waste Generated in Operations and category 12 End of Life of Sold products (Raw Materials efficiency).

C-CH9.3a

(C-CH9.3a) Provide details on your organization's chemical products.

Output product

Specialty chemicals

Production (metric tons)

3,454,000

Capacity (metric tons)

3,636,000

Direct emissions intensity (metric tons CO2e per metric ton of product)

0.415

Electricity intensity (MWh per metric ton of product)

1.56

Steam intensity (MWh per metric ton of product)

0.55

Steam/ heat recovered (MWh per metric ton of product)

0

Comment

On average our plants are operating on 95% of their capacity. This was the basis for calculation the overall capacity of the company. So the capacity is 3,454,000 divided by 95% gives 3,636,000 tons of capacity.

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	"Low carbon " (indicators used to measure low carbon) is a strong driver in R&D projects and stage gate processes – so this is the product development direction and not an add-on activity. Costs are integrated in R&D costs. "Low carbon" related opportunities are one of several beneficiary properties. Costs due to this cannot be separated from total R&D costs. We have used the main drivers for our carbon footprint reduction as indicators for low carbon products like renewable energy, renewable raw materials or energy efficient production processes. Examples of low carbon products are chemicals produced with renewable energy, chemicals produced from renewable raw materials or products produced in more energy-efficient production processes compared to mainstream. 29% of our total revenue are sales of low carbon products to our customers being US$ 1,408 mln out of US$ 4,917 mln.

C-CH9.6a

(C-CH9.6a) Provide details of your organization's investments in low-carbon R&D for chemical production activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Other, please specify Cradle to Gate Carbon footprint reduction	Pilot demonstration	≤20%		Design of new processes resulting in a lower product carbon footprints.
Other, please specify low carbon product development	Applied research and development	≤20%		We will develop more low carbon products with lower GHG emissions during manufacturing or decreasing the GHG

				emissions when applied our customer end solutions.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

ERM CVS - Assurance Statement for Nouryon 2021 20-MAY-2022 Signed.pdf

sustainability-report-2021-en-fullversion.pdf

Page/ section reference

Attached is Nouryon's ERM Assurance report which is an independent audit company. Please refer to Pages 1 – 2 of the attached Assurance Statement.

Additionally, Nouryon's Sustainability Report 2021 has been attached which identifies our Environmental data sheet and metrics. Please reference Page 76 and 77.

Relevant standard

ERM GHG Performance Data Assurance Methodology

Proportion of reported emissions verified (%)

100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach

Scope 2 market-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

ERM CVS - Assurance Statement for Nouryon 2021 20-MAY-2022 Signed.pdf

sustainability-report-2021-en-fullversion.pdf

Page/ section reference

Attached is Nouryon's ERM Assurance report which is an independent audit company. Please refer to Pages 1 – 2 of the attached Assurance Statement.

Additionally, Nouryon's Sustainability Report 2021 has been attached which identifies our Environmental data sheet and metrics. Please reference Page 76 and 77.

Relevant standard

ERM GHG Performance Data Assurance Methodology

Proportion of reported emissions verified (%)

100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category

Scope 3: Purchased goods and services

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

ERM CVS - Assurance Statement for Nouryon 2021 20-MAY-2022 Signed.pdf

sustainability-report-2021-en-fullversion.pdf

Page/section reference

Attached is Nouryon's ERM Assurance report which is an independent audit company. Please refer to Pages 1 – 2 of the attached Assurance Statement. Only Scope 3 GHG emissions from purchased raw materials were checked [kton CO2_eq].

Additionally, Nouryon's Sustainability Report 2021 has been attached which identifies our Environmental data sheet and metrics. Please reference Page 76 and 77.

Relevant standard

ERM GHG Performance Data Assurance Methodology

Proportion of reported emissions verified (%)

100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C8. Energy	Energy consumption	ERM CVS' assurance methodology, based on the International Standard on Assurance	Next to GHG emission, also energy consumption in GJ and energy intensity in GJ/ton of production was checked. The energy mix determines the GHG emissions in large extend. See also energy consumption in C8.2a, C8.2b where the breakdown per fuel type is mentioned.

		Engagements ISAE 3000 (Revised)	Verification is each year for our Sustainability report and conducted over a certain proportion of your operations. 1
C8. Energy	Renewable energy products	ERM CVS' assurance methodology, based on the International Standard on Assurance Engagements ISAE 3000 (Revised)	Low-Carbon and Renewable energy (as % of total energy use) were checked. The energy mix determines the GHG emissions in large extend. See also C8.2c for renewable fuel types. Verification is each year for our Sustainability report and conducted over a certain proportion of your operations. 1
C7. Emissions breakdown	Other, please specify Reported emission per production facility.	ERM CVS' assurance methodology, based on the International Standard on Assurance Engagements ISAE 3000 (Revised)	• Interviews with relevant staff at Nouryon corporate offices to understand and evaluate the data management systems and processes (including IT systems and internal review processes) used for collecting and reporting the selected data; • A review of the internal reporting criteria, definitions and conversion factors used; • Virtual site visits to Columbus (USA), Ningbo (China) and Stockvik (Sweden), to review local reporting processes and consistency of reported annual data with selected underlying source data for each indicator. We interviewed relevant staff, reviewed site data reporting methods, checked calculations and assessed the local internal quality and assurance processes; •An analytical review of the data from all sites and an assessment of the completeness and accuracy of the corporate data consolidation; and • Year-end assurance activities at corporate level including the results of internal review procedures and the accuracy of the consolidation of the data for the selected metrics; and • A Review of assured metrics in Nouryon's Sustainability report. Verification is each year for our Sustainability report and

			conducted over a certain proportion of your operations. 1

[1]ERM CVS - Assurance Statement for Nouryon 2021 20-MAY-2022 Signed.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

EU ETS

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

EU ETS

% of Scope 1 emissions covered by the ETS

29

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1, 2021

Period end date

December 31, 2021

Allowances allocated

47,383

Allowances purchased

10,500

Verified Scope 1 emissions in metric tons CO2e

157,286

Verified Scope 2 emissions in metric tons CO2e

0

Details of ownership

Facilities we own and operate

Comment

Scope 1 emissions covered by Emission Trading Schemes or carbon taxes are related to energy generation.
Allowances allocated and purchased in tons CO2.

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

The EU ETS is an important level of the EU's policy to combat climate change and its key tool for cost efficiently reducing of greenhouse gas emissions.

As one of the world's major carbon markets, it is based on a 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by the installations covered by the system and is reduced over time. Within the cap, installations buy or receive emissions allowances, which they can trade with one another as needed. The limit on the total number of allowances available ensures that they have a value.
After each year, an installation must surrender enough allowances to cover fully its emissions. If an installation reduces its emissions, it can keep the spare allowances to cover its future needs or sell them to another installation that is short of allowances.
Trading brings flexibility and encourages low-cost emission reductions. A robust carbon price also promotes investment in innovative, low-carbon technologies.

Nouryon complies with the EU ETS through multiple ways since the start of EU ETS We have a clear focus on improving energy efficiency in our production processes, take CO2 costs into account in our dispatch decisions and actively participate in the EU ETS market. Our European energy intensive sites are all on ETS: MCA Delfzijl, Stenungsund, Stockvik, Mons and Cologne. All these actions result in cost savings and minimize the amount of certificates to purchase.

We use a robust HSE reporting software system Enablon in reporting CO2 emissions per quarter based on fuel and electricity. Reporting is validated and reviewed by members of the corporate sustainability and HSE governance teams. Reporting CO2 is a formal part of our HSE management system and for internal compliance, internal audits are conducted on every site at least once every 3 years. These audits include emissions data and reporting. Internal audit provides an independent, objective means to evaluate and improve the effectiveness of governance, risk management, and internal controls. We also completed an external limited assurance of our energy and emissions data that assessed the reporting of 2021 data in accordance with the principles of completeness, comparability (across the organisation) and accuracy (including calculations, use of appropriate conversion factors and consolidation). See chapter 10 for more information.

Through the European Chemical Industry council association (CEFIC), we engage in policy development, for example with the revision of the EUR Directive for 'phase 4 EU ETS'. We are also closely monitoring the developments on carbon tax and emission trading schemes (ETS)

in China, i.e., through participation in the national chemicals associations AICM and CPCIF. In 2016 Nouryon (as part of AkzoNobel) made an analysis of how a Chinese emission trading scheme (ETS) could impact our Specialty Chemicals businesses and sites. The Chinese National ETS program was established last year, which only included the power generation industry. The chemical industry has not been included yet, but we will be prepared once chemical industry has been announced to be included.

The provincial ETS programs have been already conducted in 9 provinces: Beijing, Tianjin, Shanghai, Guangdong, Shenzhen, Hubei, Chongqing, Sichuan and Fujian. None of Nouryon sites in China has been officially included in one of these provincial ETS programs, but Nouryon's site in Ningbo City, Zhejiang Province has already been required to report their carbon emissions on an annual basis.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit purchase

Project type

Other, please specify

VTRM Renewable Energy

Project identification

Certificate of Verified Carbon Unit (VCU) Retirement
Verra, in its capacity as administrator of the Verra Registry, have certified on June 8 2022, that 200 Verified Carbon Units (VCUs) were retried on behalf of Nouyron Chemicals LLC
Project name: VTRM Renewable Energy 2
VCU Serial number:11090-279897352-279897551-VCS-VCU-1491-VER-BR-1-1903-01032019-30092020-0

These credits were retired to compensate the remaining scope 1 CO2 emissions for our Brazilian sites Eunápolis, Imperatriz, Jacarei, and our two sites at Três Lagoas for the year 2021.

Verified to which standard

VCS (Verified Carbon Standard)

Number of credits (metric tonnes CO2e)
200

Number of credits (metric tonnes CO2e): Risk adjusted volume
200

Credits cancelled
Yes

Purpose, e.g. compliance
Voluntary Offsetting

C11.3

(C11.3) Does your organization use an internal price on carbon?
No, but we anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
Yes, our suppliers
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
Engagement & incentivization (changing supplier behavior)

Details of engagement
Run an engagement campaign to educate suppliers about climate change

% of suppliers by number
13

% total procurement spend (direct and indirect)
49

% of supplier-related Scope 3 emissions as reported in C6.5
0

Rationale for the coverage of your engagement
Our key supplier management process focuses on suppliers with whom we have:
- Contractual relationships
- Opportunities for meaningful value creation

- Partnerships or joint innovation projects or who have a material impact on our upstream carbon footprint.

We work with our suppliers to create a sustainable supply base and deliver customer benefits. Our Sustainable Supply program continues to evolve. Sustainable procurement is not only about managing risks but also to reduce costs and increase revenue. We have a Supplier Sustainability Framework via EcoVadis and IQ EcoVadis in place. Nouryon's commitment to ethical business practices is outlined in our Code of Business Conduct & Ethics. We will start with engaging with our suppliers on supplier related Scope 3 emissions in 2022.

The 49% spend mentioned above is covering 462 of the 3,600 suppliers for which we measure their CSR performance by the EcoVadis Score (13% of our total number of suppliers).
By the end of 2021, 96% of our suppliers (% of external spend) suppliers were assessed on Risk IQ EcoVadis (80% based on spend in 2020).

Impact of engagement, including measures of success

We engage with Key suppliers via the EcoVadis platform to perform sustainability assessments. One of the high-priority areas EcoVadis evaluates is company policies having objectives and targets, including environment. The EcoVadis assessment includes requesting evidence on supplier actions related to energy efficiency, GHGs, renewable energy, offsets, waste heat recovery/CHP, fuel switching, CCS, response to CDP- and employee training on these topics – as well as activities to reduce GHG emissions in suppliers' own supply chains (actions to engage suppliers, select suppliers based on GHG emissions, and partnering). All of these are considered in developing supplier scorecards, improvement areas and scores.

Suppliers scoring 45 or lower are engaged directly and may be required to provide improvement plans to demonstrate continuous improvement. Suppliers declining to make a self-assessment will be informed that such refusal will be considered as part of supplier selection decisions. Suppliers scoring 45 or lower or with no score who are assessed as high risk and either critical or strategic in IQ will be required to improve within 12 months. Such suppliers failing to show improvement will be placed in the 'Phase Out' segment of Nouryon's supplier segmentation and Nouryon will reduce business as far as is consistent with business objectives including where possible exit from the supplier.

All these actions will lead to the decrease of our carbon related footprint for raw materials, packaging and services. Actions are being developed to include the availability of carbon footprints of raw materials in the negotiations of procurement process related.
In another example, for logistic suppliers in Europe, we do business with transporters using low emissions diesel engines or companies using low emissions ships as much as possible.

Comment

We work with our suppliers to create a sustainable supply base and deliver customer benefits. Our Sustainable Supply program continues to evolve. Sustainable procurement is not only about managing risks but also to reduce costs and increase revenue. We have a Supplier Sustainability Framework via Ecovadis and IQ Ecovadis in place. We also use a Business Partner Code of Conduct which informs our business partners what we expect of them with regard to our Core Principles and Values. We will start with engaging with our suppliers on supplier related Scope 3 emissions in 2022.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

Nouryon provides solutions that are essential in applications ranging from pharmaceuticals and farming to electric vehicles and building and construction materials. Our goal is to deliver not just the desired functionality but improved sustainability performance as well. We work together with customers, suppliers, universities, and other partners to develop innovative and sustainable solutions that have smaller footprints or enable our customers to be more sustainable. These include a growing share of natural bio-based and biodegradable products.

For example, our solutions help increase crop yields and improve crop quality all over the world; make products more biodegradable and easier to recycle; make buildings and vehicles more energy efficient; and increase the durability of bridges and wind turbines.

Our Eco-Premium Solutions are products that offer significant sustainability benefits over mainstream alternatives in the market while providing the same or better functionality. These benefits can apply to several specific criteria (e.g. toxicity, energy use, use of natural resources, emissions and waste, land use, risks, health). When making comparisons, we ensure that our solution does not have adverse effects on any of the other criteria. We believe that a sustainable future also means being a safe and reliable partner for customers, employees, business partners, and communities, and we ask all our suppliers to work with us on this topic.

In a unique collaboration with UV system supplier Van Remmen UV Technology and Wasser 3.0, a non-profit company that operates at the crossroads between materials science, water management, and water technology, Nouryon will participate in a pilot study of innovative processes for the removal of micropollutants and microplastics at the Landau-Mörlheim wastewater treatment plant in Germany.

We are a member of the Roundtable on Sustainable Palm Oil (RSPO) and Responsible Care®, and partner with Swedish regional corporate cooperative Hållbar Kemi (Sustainable Chemistry). Furthermore, we are a strategic investor in the Icos Capital Fund III, a fund that supports innovative start-ups, including companies focused on carbon capture, software and process technologies for manufacturing in agriculture, food, and chemical industries.

In 2021, we were excited to announce our industrial scaling plans of the SPINNOVA® fibre, together with our partner in South America, the world’s largest pulp producer Suzano. The SPINNOVA® fibre – created out of wood and waste results in considerably less water use and

CO2 emissions than the cotton alternative and is planned to available to global textile brands in 2022. In 2021, we also have signed a 15-year agreement with Suzano, a world leading eucalyptus pulp producer. Under the long-term agreement, we will commission our sustainable Integrated Manufacturing Model for the new Suzano eucalyptus pulp mill in the municipality of Ribas do Rio Pardo, located in Mato Grosso do Sul, Brazil.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, suppliers have to meet climate-related requirements, but they are not included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement

Other, please specify

Engage key suppliers with EcoVadis sustainability assessments

Description of this climate related requirement

We are in the process of engaging a portion of our suppliers, prioritized based on various criteria, including spend. 64% of suppliers by spend were invited to submit an assessment via Ecovadis and expected to comply with the criteria in our supplier statement, described below. We will continue to invite additional suppliers over time. We engage with suppliers via the EcoVadis platform to perform sustainability assessments. One of the high-priority areas EcoVadis evaluates is company policies having objectives and targets, including environment. EcoVadis assesses evidence on supplier actions related to energy efficiency, GHGs, renewable energy, offsets, waste heat recovery/CHP, fuel switching, CCS, CDP response, training, and activities to reduce GHGs in suppliers' own supply chains. These are considered in supplier scorecards and improvement areas. Suppliers scoring 45 or lower are engaged and may be required to provide improvement plans. Suppliers declining to make a self-assessment will be informed that such refusal will be considered as part of supplier selection decisions. Suppliers scoring 45 or lower or with no score who are assessed as high risk and either critical or strategic will be required to improve within 12 months. Suppliers failing to show improvement will be placed in the 'Phase Out' segment of Nouryon's supplier segmentation and Nouryon will reduce business as far as is consistent with business objectives including where possible exit from the supplier.

% suppliers by procurement spend that have to comply with this climate-related requirement

64

% suppliers by procurement spend in compliance with this climate-related requirement

42

Mechanisms for monitoring compliance with this climate-related requirement

Supplier scorecard or rating

Response to supplier non-compliance with this climate-related requirement

Retain and engage

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers

Yes, we engage indirectly through trade associations

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

Yes

Attach commitment or position statement(s)

Nouryon recognizes that climate change has a fundamental impact on the global environment, society and business economics and we aim to reduce the greenhouse gas emissions of our operations. We recognize and support the UN Paris Climate Agreement as the global framework for combatting climate change. We use carbon footprint as a measure of our resource efficiency. We focus on increasing the energy and raw material efficiency of our operations through continuous improvement of existing processes as well as the adoption of innovative processes and technologies and through the use of low-carbon energy. See attached our Sustainability report on page 16 and our position statements on climate change and carbon reduction, circular economy. We hold memberships member of various associations: American Chemistry Council (ACC), the China Petroleum & Chemical Industry Federation (CPCIF), the Europe European Federation of the Chemical Industry (CEFIC), the Association for the German Chemical Industry (VCI), the association of the Dutch Chemical Industry (VNCI), the Association for Innovation and Chemical Industries in Sweden (IKEM), and the Chemical Industry Federation of Finland.

In 2021, we completed a comprehensive qualitative analysis using the Task Force on Climate-related Financial Disclosures (TCFD) framework, including scenario analysis for both transition and physical risks - using leading climate models.

Positions Statements June 2022.pdf

sustainability-report-2021-en-fullversion.pdf

Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

Nouryon has a climate policy team in place that helps ensure we have proper coordination between various functions that impact and guide these issues. In particular, we develop and agree on positions related to climate that accurately characterize our ongoing efforts to reduce our carbon footprint as well as our corporate objectives and commitments. By aligning the various functions on the internal policy team, we ensure that our engagement activities and related messaging are consistent with our overall climate strategy."

We are in the process of incorporating results from our 2021 TCFD analysis, including scenario analysis for both transition and physical risks - using leading climate models – in our planning.

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?

Focus of policy, law, or regulation that may impact the climate

Renewable energy generation

Specify the policy, law, or regulation on which your organization is engaging with policy makers

EU Renewable Energy Directive (RED II)

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

Belgium
Finland
France
Germany
Italy
Netherlands
Norway
Sweden

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

Directly and through our engagement in several associations in the EU, the Netherlands and Sweden, we have engaged with policy makers on creating the right conditions and policy approach for green hydrogen and on implementing legislation for the EU Renewable Energy Directive (RED II).
We proposed language to reinforce the position of green hydrogen over blue hydrogen, on certificates of origin, and on grid access (relevant for Nobian in 2021, which was part of Nouryon until July 1 2021 when it was spun out).

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Other, please specify

Improve Energy Efficiency

Specify the policy, law, or regulation on which your organization is engaging with policy makers

EU Energy Efficiency Directive (EED)

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

Belgium
Finland
Germany
Italy
Netherlands
Norway
Sweden

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

Directly and through our engagement in several associations in the EU and the Netherlands, we have also engaged with policy makers on creating the right conditions and policy approach, for example with implementing legislation for the EU Energy Efficiency Directive (EED) and on innovation funding for more efficient technologies.

Proposed language on improved energy-efficiency performance of buildings. Non-

legislative advocacy to make more EU innovation funding available for breakthrough technologies.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Emissions trading schemes

Specify the policy, law, or regulation on which your organization is engaging with policy makers

Chinese legislation on a cap-and-trade system for carbon emissions.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

China

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

In China, we are actively engaged in the advocacy efforts of industry and trade associations related to the ongoing development of Chinese legislation on a cap-and-trade system for carbon emissions.

We have shared with the Chinese policy makers our insights and experience with cap and trade schemes elsewhere in the world (in particular in Europe) in reducing CO2 emissions.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Other, please specify

Carbon reduction

Specify the policy, law, or regulation on which your organization is engaging with policy makers

Non-legislative.

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

Sweden

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

In Sweden we are actively engaging with authorities to seek financial support to replace our current gas installation by hydrogen electrolyzers in two of our plants.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3b

(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association

Other, please specify

The Association of the Dutch Chemical Industry (VNCI)

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We have already influenced them to change their position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

VNCI is an active participant in the negotiations Dutch Climate Agreement to reduce carbon emission with 49% by 2030, promoting carbon reduction, low- carbon hydrogen, energy efficiency, and carbon capture and storage, while maintaining industrial competitiveness (e.g. a level playing field for energy cost).

We actively participate in working groups via our membership on the board. Our Senior Vice President, Transformation and Strategy, Performance Formulations is board member of the VNCI. By participating in working groups and via the board, Nouryon has actively advocated for and achieved a more pro-active approach of VNCI on energy-efficiency as well as renewable energy like bio-steam. We also led efforts to make better use of residual heat of industry for heating the buildings in neighboring residential areas.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

0

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

European Chemical Industry Council (CEFIC)

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We have already influenced them to change their position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The European chemical industry federation (Cefic) and its members supports the Paris Climate Agreement and a strong action on climate change in line with the scientific advice provided by the Intergovernmental Panel on Climate Change (IPCC). Cefic also supports the European Green Deal and Europe's ambition to become climate neutral by 2050. Reaching this goal will only be possible with the help of climate-neutral and circular economy solutions developed by our industry. Nouryon wants to see Europe become a global innovation hub and a hotspot for investments into breakthrough climate-neutral and circular technologies.

Nouryon actively participated in this. We actively participate in Cefic bodies to influence

their position, in particular on energy & climate (energy-efficiency, green hydrogen), and on the EU Chemicals Strategy for Sustainability, by bringing in our views and experiences and promoting a pro-active focus of Cefic on innovation as a key means to drive climate change while remaining competitive. We also stepped up our engagement by taking over the Chairman position of the Cefic Advocacy Forum.

Our President, Technology Solutions (Board member) is member of the executive committee of Cefic.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

0

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

American Chemistry Council

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We have already influenced them to change their position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The American Chemistry Council (ACC) and its members believe chemistry plays an integral role in solving our world's sustainability challenges. ACC is therefore committed to advancing safe, innovative, effective, and economically viable chemical products and technologies that are key to unlocking sustainability solutions.

We have been involved and have been actively stimulating ACC's efforts to develop key metrics on sustainability over the last two years and are participating in the pilot phase. We also have been strong supporters of the development of the ACC sustainability principles. As a member of the American Chemistry Council (ACC), we are committed to upholding the highest standards of protecting health, safety, and the environment. We support ACC's commitment to improved environmental, health, and safety performance through the globally recognized Responsible Care® initiative and ACC's sustainability principles.

Our executive Vice President and President of Performance Formulations and Americas acts as Board member of the American Chemistry Council.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

0

Describe the aim of your organization's funding

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In voluntary sustainability report

Status

Complete

Attach the document

sustainability-report-2021-en-fullversion.pdf

Page/Section reference

Whole document including assurance statement and reporting according SASB.

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics
Other, please specify

People and process safety figures and targets, diversity and inclusion, our revenue on sustainable products, our % of R&D projects with sustainable benefits.

Comment

Nouryon became a standalone company in October 2018, and from the beginning, our company purpose has included our commitment to a sustainable future. We dedicate

ourselves to strengthening this commitment in our own company and operations, in our R&D and solutions for customers, and in being a responsible partner to the communities in which we operate. This annual sustainability report is an opportunity to share progress with regards to this commitment. In 2020, Nouryon strengthened our foundation and made further progress following our first sustainability report in 2019. Based on insights from internal and external stakeholders, we developed and rolled out our sustainability approach, which includes clear priorities and tangible sustainability targets.
Our continuing efforts to improve on key sustainability metrics is reflected in our 2021 EcoVadis Gold rating, which places us in the top 3% of companies scored by EcoVadis.

This report includes information related to our strong performance and programs which helped us achieve this rating. It also includes more information about Nouryon, our sustainability approach and its pillars and metrics, and key innovations and improvements we made in 2021. It also illustrates how we will continue to make progress and further improve from this strong starting position.
We report metrics in accordance with the Sustainability Accounting Standards Board (SASB). A full overview of Environmental, Social, and Governance (ESG) data for investors and auditors, reference to TCFD and UN Global Compact as well as an SASB index, can be found at the end of this report. For more information, please visit www.nouryon.com/company/sustainability.

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues
Row 1	No, and we do not plan to have both within the next two years

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity
Row 1	No, and we do not plan to do so within the next 2 years

C15.3

(C15.3) Does your organization assess the impact of its value chain on biodiversity?

	Does your organization assess the impact of its value chain on biodiversity?
Row 1	No, and we do not plan to assess biodiversity-related impacts within the next two years

C15.4

(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Other, please specify Engagement with suppliers on RSPO: “Nouryon sites in Mons, Belgium; Stenungsund, Sweden; Sundsvall, Sweden; and Herkenbosch, Netherlands hold RSPO Mass Balance (MB) certification. MB is a mix of uncertified and certified palm oil.

C15.5

(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	Other, please specify We measure and disclose our NOx emissions which is closely connected to Biodiversity performance.

C15.6

(C15.6) Have you published information about your organization’s response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Other, please specify Use of Bio-based sources as raw material	Page 36: Use of sustainable produced Bio-based sources enable a more circular economy and can also have a lower carbon footprint versus alternatives across their life cycle, reducing greenhouse gas emissions. Page 69: our case study on RSPO. 1

[1]sustainability-report-2021-en-fullversion.pdf

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Our Chief Integrated Supply Chain Officer. This role has oversight of all manufacturing operations, procurement, logistics, and energy purchasing.	Chief Operating Officer (COO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member

Scope of emissions

Allocation level

Allocation level detail

Emissions in metric tonnes of CO2e

Uncertainty (±%)

Major sources of emissions

Verified

Allocation method

Market value or quantity of goods/services supplied to the requesting member

Unit for market value or quantity of goods/services supplied

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

The European Climate Pact Submission

Please indicate your consent for CDP to showcase your disclosed environmental actions on the European Climate Pact website as pledges to the Pact.

Yes, we wish to pledge to the European Climate Pact through our CDP disclosure

Please confirm below

I have read and accept the applicable Terms