Nouryon

Reporting Principles

for the Nouryon Sustainability Report 2022

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3. Reporting Context

3.1 Organizational Boundaries

The reporting of our performance indicators is based on financial reporting: operations and activities, fully owned or with more than 50% ownership by Nouryon are 100% included in the reporting process. Operations and activities that are owned 50% or less by Nouryon are not included in this reporting.

Acquired operational activities are included in our performance reporting as of the month in which financial consolidation takes place. Divested activities cease reporting as of the month in which financial consolidation takes place. Exception: the Fort Amanda Joint Venture, does report only on Safety as the employees operating the production facility have a Nouryon contract while the Environmental indicators are part of facility owned by the Joint Venture which is 50% owned by Nouryon and not part of the reporting process.

3.2 GHG Protocol Alignment

We assess our carbon footprint annually as much as possible aligned with the Greenhouse Gas Protocol Corporate Value Chain Accounting and Reporting standard[1]. Our footprint is measured across our value chain – including scope 1 & 2 and scope 3 upstream and downstream emissions. Scope 1 and 2 are aligned with the Greenhous Gas Protocol standard and are part of the assurance scope. Scope 3 is aligned, except for categories 2, 8 and 15. These categories are Nouryon estimates, based on available data, not aligned with the Greenhouse Gas Protocol Scope 3 standard. These estimates are included in our Scope 3 total but excluded from the scope of our limited assurance.

3.3 Healthy, Safety and Environmental (HSE) performance indicators

For tracking and reporting health, safety and environmental related performance indicators we use a software system, Enablon. This system includes several integrated modules. Performance indicators used for external reporting are tracked in the Metrics Module.

Our organization is reflected in the Enablon structure in a layered number of reporting entities where consolidated manufacturing, logistics, research, and office activities are represented. The Metrics reporting is done on a selected number of reporting entities on the L4 and L5 levels. Health Safety and Security reporting is done on a monthly basis. Energy and Environment reporting is done on a quarterly basis.

Offices and research facilities (with the exception of our Deventer Innovation Center) are excluded from reporting in Energy and Environment as their contribution to the company total is considered immaterial.

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[1] The following standards: GHG Protocol. *A Corporate Accounting and Reporting Standard Revised edition.* WRI and WBCSD 2004., GHG Protocol Scope 2 Guidance. *An amendment to the GHG Protocol Corporate Standard*. WRI and WBCSD 2015., GHG Protocol. Technical Guidance for Calculating Scope 3 Emissions Supplement to the Corporate Value Chain (Scope 3) Accounting & Reporting Standard, 2013.

With the mentioned frequencies, questionnaires (datasheets) are generated and sent to representatives of the selected reporting entities. These questionnaires are partly prefilled with data extracted from other Enablon modules, and site representatives enter the remaining data. Automatic calculations are done within the system. The Enablon system can generate reports in different forms, periods, and cross sections of the company.

HSE data are entered at the reporting entity level data by a designated contributor who sends the completed questionnaire on to a validator (usually the site manager). After completion of the Q3 reporting campaigns an extended data integrity check is executed involving Regional and Corporate HSE experts. This exercise is repeated after the closing of the Q4 reporting campaigns.

3.4 Suppliers acknowledging our Business Partner Code of Conduct

The progress on signed Business Partner Code of Conduct declarations across Nouryon is reported on a yearly basis using our Ariba Purchase Order system. Procurement categories or regions report their progress on signed Business Partner Code of Conduct declarations using a standard template. Suppliers must sign the Business Partner Code of Conduct or confirm that it has equivalent business principles in place.

Data on suppliers covered by the Business Partner Code of Conduct are consolidated at corporate level with the percentage of spend covered extracted from our Ariba Purchase Order system and reviewed annually.

3.5 Site certifications

Nouryon tracks ISO, OSHAS, and related certificates for all manufacturing sites. Many of the certificates are combined regional certificates (e.g., we have an ISO14001 management system standard for sites in South America). Certificates are available on our public Nouryon.com site.

ISO information per site such as certificate type and expiration date are collected yearly and consolidated at the corporate level. Our ISO certification percentage metric includes sites that have been in our portfolio for one year or more. This is to allow sufficient time required for activities reviewed by the certification process (*e.g.,* pre-start up safety reviews, management reviews, production, and/or internal audits if relevant). Any exceptions will be identified.

3.6 Human Resources (HR) Data

Nouryon uses SuccessFactors as a global HR system for managing employee data, including talent and performance management, recruitment and learning data. The system stores a range of personal and job information, including reporting line, salary, job history, etc. SuccessFactors is a real time system running Nouryon’s processes and forms the basis of monthly or quarterly internal reporting as well as HR reporting in the sustainability report. Data is entered and authorized at defined levels in country and business organizations.

4. Indicators

4.1 Health and Safety indicators

4.1.1 People Safety

4.1.1.1 OIR

All injuries are reported following OSHA[2] guidelines. Recordable injuries are reported as Medical Treatment, Restrictive Work, Lost Time Injuries or Fatalities. The OSHA Incident Rate (OIR) is the total number of recordable injuries per 200,000 hours worked. This is reported as the OIR for (1) Nouryon employees and temporary workers, and (2) for contractors.

4.1.1.2 LTIR

The Lost Time Injury Rate (LTIR) is the number of Lost Time Injuries per 200,000 hours worked. This is reported as the LTIR for (1) Nouryon employees and temporary workers, and (2) for contractors.

4.1.2 Process Safety

4.1.2.1 Process Safety Events

Process Safety Events are reported according to the API RP 754 guidelines. The incident investigations of PSE level 1 and level 2 incidents are supported by the Process Safety Management (PSM) expert team.

4.1.2.2 PSTIR

The Process Safety Total Incident Rate (PSTIR) is the number of Process Safety Incidents per 200,000 hours worked. It is reported as (1) a PSTIR for PSE1 incidents and (2) as a PSTIR for the combined number of PSE1 and PSE2 incidents.

4.2 Environmental indicators

Environmental indicators are obtained in many ways using different measurements: weight, volume, flow, concentration, process information systems and Nouryon calculations. Where possible, internal measurements are aligned with external measurements: invoices from utility suppliers (electricity, steam, water) and service providers (waste handling, wastewater treatment facilities). Sites define how indicators are obtained (governed by our HSE procedures). In many cases, reporting overlaps with reporting required for regulatory authorities.

[2] US Occupational Safety and Health Administration

4.2.1 Waste

Reported waste is waste relate to normal operations and shipped off site during the reporting period. Project waste related to for example construction demolition or soil remediation projects is not included. The reported waste is grouped in 8 different categories related to hazardous and non-hazardous classifications, reusable and non-reusable destinations, and the way of processing. Hazard classification follows local regulations. In many cases, our sites utilize certified external waste handling contractors that manage waste, aligned with local and regional regulations.

4.2.2 Water

4.2.2.1 Fresh water intake

Fresh water intake is reported as intake from Ground water, Surface water or provided by a supplier (Potable and Process). Total Fresh Water Intake is the sum of these indicators.

4.2.2.2 Fresh water use

Fresh water use is reported as Use Cooling, Use Process and Use Other.

- Use Cooling is specifically for open (once through) cooling systems where cooling water is returned to the same water body from where it was taken – the only difference being an increase in temperature.
- Use Process includes water usage for cleaning, rinsing, extraction, reaction dilution and water contained in products. Use process also includes water evaporation from cooling towers.
- Use Other is a calculated indicator. It is calculated from the difference between the Total Fresh Water Use and the sum of the use of Cooling and Process water.

4.2.2.3 Fresh water consumption

The Fresh Water Consumption is the sum of the Fresh Water Use Process and the Fresh Water Use Other.

4.2.2.4 Wastewater

Most Nouryon sites have wastewater treatment facilities. The treated wastewater can either be discharged to surface water, sent to an off-site wastewater treatment facility or sent to a Nouryon owned spray field. In cases where facilities do not have wastewater treatment facilities, wastewater is sent to an off-site wastewater treatment facility. Reporting entities report the COD in water sent to surface water and COD sent to off-site wastewater treatment facility. In the latter case, if COD measurements are not available, the reporting entity estimates COD.

4.2.3 Air Emissions

4.2.3.1 Direct CO_2

4.2.3.1.1 Direct CO_2 from Fuels

We defined the following standard fuels: Natural Gas, LPG, and Fuel Oil. The consumed quantities are multiplied by a Lower Heating Value (standards provided but sites are to enter site specific factors if available). The resulting Fuel Energy is multiplied by a Fuel Emission Factor (from public sources) to calculate the Direct CO_2 from Fuels. In case a non-standard fuel is consumed sites need to provide the related Lower Heating Value and Fuel Emission Factor for the energy and Direct CO_2 calculations.

4.2.3.1.2 Direct Process CO_2

For processes where CO_2 is generated as a result of a chemical reaction (different from combustion) the resulting CO_2 quantities are calculated by the reporting entities and entered in the Enablon Environmental Questionnaire under Direct Emissions.

4.2.3.1.3 Direct Process emissions from other greenhouse gases

We do not report process emissions from other greenhouse gasses (methane, nitrous oxide, or other refrigerants). From internal analysis in 2019 and earlier, these emissions were less than 1% of our scope 1 CO_2 emissions and determined to be immaterial.

4.2.3.2 Indirect CO_2

4.2.3.2.1 Indirect CO_2 related to Electricity Purchase

Indirect CO_2 related to Electricity is calculated from the quantity of purchased electricity and a carbon emission factor. In 2022, we updated our scope 2 emissions calculations in alignment with the GHG Protocol. This includes reporting market and location-based emissions and applying the GHG Protocol’s emission factor hierarchies.

For market-based scope 2 emission factors, in cases where energy attribute certificates, renewable contracts or supplier-based emissions factors are not available, we use eGrid for grid average emission factors in the US and for Europe, we use the residual grid factors from the Association of Issuing Bodies. Where residual grid factors are not available and in other regions, we use national electricity emission factors from the International Energy Agency (IEA). For 2022 data, this was based on IEA 2020 estimate data

4.2.3.2.2 Indirect CO_2 related to Steam Purchase

The Indirect CO_2 related to Steam is calculated from the energy content of the purchased steam and a steam emission factor. This steam emission factor depends on the type of fuel used to generate the steam and how it is generated (for example: steam boiler or Combined Heat Power unit).

4.2.3.3 NOx

NOx related to fuels is calculated based on a defined ratio specific to each fuel type. If a site has primary data (for example based on stack measurements), measured values can used instead. For chemical processes that generate NOx, the resulting NOx quantities are calculated by reporting entities and entered under Direct Emissions.

4.2.3.4 SOx

SOx related to fuels is calculated based on the sulfur content of the fuel. For chemical processes that generate SOx, the resulting SOx quantities are calculated by reporting entities and entered under Direct Emissions.

4.2.3.5 VOC / HAP

VOC and HAP emissions to air are calculated by the reporting entities based on either spot measurements, modelling, or mass balance.

4.2.4 Energy

4.2.4.1 Total Energy Consumption

The Total Energy Consumption is the sum of Energy Fuels, Energy Electricity, Energy Steam and Energy Hot Water (condensate).

4.2.4.2 Renewable Electricity %

The Renewable Electricity % is the ratio of external electricity from renewable (wind, solar, hydro and biomass) sources divided by total electricity consumption.

4.2.4.3 Renewable Energy %

The renewable Energy % is the sum of external electricity from renewable (wind, solar, hydro and biomass) sources, external steam supply from renewable (biomass) sources and renewable fuel (biomass) relative to the Total Energy Consumption.

4.2.5 Production Quantity

The Production Quantity of a reporting entity is the number of metric tons of commercial products produced and leaving the reporting entity on “as is basis”. This means that solvents which are added to the reactive components are included in this amount. If a commercial product from one reporting entity is used as a raw material for another reporting entity this quantity is still included. This is not the case with non-commercial intermediates: these are not included in the production quantity.

Intensity-based metrics are based per unit of production.

4.3 Scope 3 Indicators

For scope 3, we strive to utilize data sources that are temporally relevant and geographically representative. Where possible, we prioritized physical quantities (mass of purchased raw materials and generated waste, miles traveled) vs. spend-based data.

With the support of an external consultancy, we conducted a review of all categories to further improve our calculation approach vs. 2021. Where possible, we used more recent data sources, such as the US EPA Supply Chain spend-based method.

4.3.1 Primary and Secondary Data Definitions

From the GHG Protocol[3]

Primary Data: Data from activities within a company's value chain, including data provided by suppliers or other value chain partners. Primary activity data may be usage or spend, or emissions data calculated by suppliers specific to suppliers' activities.

Secondary Data: Data that is not from specific activities within a company's value chain. This includes industry-average data (e.g., from published databases, government statistics, literature studies, and industry associations), or financial data. In certain cases, companies may use specific data from one activity in the value chain to estimate emissions for another activity in the value chain. This type of data (i.e., proxy data) is considered secondary data, since it is not specific to the activity whose emissions are being calculated.

4.3.2 Category 1 – Purchased Goods and Services

This category includes upstream emissions from the production of products purchased by Nouryon as raw materials in the reporting year as well as packaging and services. The upstream emissions are related to the extraction, production, and transportation of goods and services purchased by Nouryon in the reporting year, not otherwise included in Categories 2– 8:

Primary data:

- Raw materials – Average-data Method – Mass of purchases
- Packaging – Spend-based Method – Spend on purchases
- Services – Spend-based Method – Spend on purchases

Secondary data:

[3] GHG Protocol. Technical Guidance for Calculating Scope 3 Emissions Supplement to the Corporate Value Chain (Scope 3) Accounting & Reporting Standard.

- Raw materials – Average-data Method – Mass-based ecoinvent and Sphera Emission Factors (Global focused)
- Packaging – Spend-based Method – US EPA Supply Chain Emission Factors
- Services – Spend-based Method – US EPA Supply Chain Emission Factors

Nouryon's Category 1 footprint is calculated as the sum total of raw materials, packaging and services. Our raw materials emissions are estimated by multiplying the mass of raw material purchases by material-specific emission factors. Our Packaging and services emissions are estimated by and multiplying packaging and services spend by sector-specific emission factors.

4.3.3 Category 2 – Capital Goods (Nouryon estimate)

This category includes upstream emissions from the production of capital goods (for example, plant equipment used in manufacturing) purchased by Nouryon in the reporting year.

Primary data:

- Spend-based Method – Spend on capital projects

Secondary data:

- Spend-based Method – US EPA Supply Chain Emission Factors

Nouryon's Category 2 footprint is calculated by multiplying spend by sector-specific emission factors.

4.3.4 Category 3 – Fuel- and energy-related activities, not included in Scope 1 or Scope 2

This category includes emissions related to the production of fuels and energy purchased and consumed by Nouryon in the reporting year that are not included in scope 1 or scope 2. From the GHG Protocol[4]

- Upstream emissions of purchased fuels – Extraction, production, and transportation of fuels consumed by the reporting company
- Upstream emissions of purchased electricity – Extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by the reporting company
- Transmission and distribution (T&D) losses – Generation (upstream activities and combustion) of electricity, steam, heating, and cooling that is consumed (*i.e.,* lost) in a T&D system.

[4] GHG Protocol. Technical Guidance for Calculating Scope 3 Emissions Supplement to the Corporate Value Chain (Scope 3) Accounting & Reporting Standard.

Primary data:

- Quantity of fuels and electricity used

Secondary data:

- T&D Losses for Electricity – Average-data Method – Country specific Emission Factors from IEA (from 2019)
- Well to tank (WTT) for Fuel – Average-data Method – DEFRA Emission Factors by fuel type
- WTT for Electricity – Average-data Method – DEFRA Emission Factors by country and grid loss from IEA (from 2019)

Nouryon's Category 3 footprint is calculated by multiplying fuel and electricity use by emission factors for upstream fuel extraction and transmission & distribution losses.

For fuel related calculations, the most commonly used fuels (natural gas, LPG, fuel oil) are included. Calculations for biomass fuel and other smaller use fuels (gasoline) are excluded as their contributions is minor.

The impact of purchased steam is not included in category 3 reporting.

4.3.5 Category 4 – Upstream Transport

This category includes upstream emissions from the transportation and distribution of products by Nouryon in the reporting year.

Primary data:

- Spend-based Method – Spend on transportation, distribution, and logistics

Secondary data:

- Spend-based Method – US EPA Supply Chain Emission Factors assuming all transport by truck

Nouryon's Category 4 footprint is calculated by multiplying spend by mode-specific emission factors, with an assumption that all transport is done by truck.

4.3.6 Category 5 – Waste Generated in Operations

Primary data:

- Waste-type Specific Method – Mass, region, and waste stream of waste generated

Secondary data:

- Waste-type Specific Method Mass-based ecoinvent Emission Factors

Nouryon's Category 5 footprint is calculated by multiplying mass of waste generated by treatment-route-specific emission factors.

4.3.7 Category 6 – Business Travel

Primary data:

- Spend-based Method – Spend broken down by travel category – Public transit and food.
- Distance-based Method – Mileage broken down by flights, personal car, and rental car.
- Hotel broken down by nights.

Secondary data:

- Spend-based Method – US EPA Supply Chain Emission Factors for spend-based category
- Distance-based Method – DEFRA Emission Factors used for activity/mileage-based categories.

Nouryon's Category 6 footprint is calculated by multiplying distance traveled or number of nights stayed by activity-specific emission factors, which are then added to the spend-based activity data multiplied by sector-specific emission factors.

This category includes 171 tons CO2 for food for 2022, which is also included in category 1 as part of Services. This instance of overreporting will be corrected in future reporting.

4.3.8 Category 7 – Employee Commuting

Primary data:

- Number of employees by country.

Secondary data:

- Average-based Method – Average country commute data and DEFRA activity-based Emission Factors

Nouryon's Category 7 footprint is calculated by multiplying average commute distance traveled (country data) by an activity-based emission factor (DEFRA). Countries with less than 10 employees are grouped under rest of world which uses average commute distance from other countries.

For 2022, we assume all commuting is done via car. The contribution of the category is less than 1 % compared to the total scope 3.

4.3.9 Category 8 – Leased Assets (Nouryon estimate)

Primary data:

- Average-data Method – List of warehouses, storage size, location, and activity.

Secondary data:

- Average-data Method – Energy intensity factors and Country specific Emission Factors from IEA (from 2019).

Nouryon's Category 8 footprint is calculated by multiplying storage square footage by energy intensity factor and country specific emission factors.

For the calculations for category 8 only warehouses are taken into consideration, and we have excluded administrative spaces and tank terminals.

Our Scope 3 reporting contain estimates for this category which contribute to the total Scope 3 but is excluded from the assurance scope.

4.3.10 Category 9 – Downstream Transport

While outbound transportation and distribution services are typically excluded from category 9 and included in category 4, because we include the transport costs in the delivered selling price to our customers, we include transport emissions in this category.

Primary data:

- Spend-based Method – Spend on transportation, distribution and logistics by mode

Secondary data:

- Spend-based Method – US EPA Supply Chain Emission Factors

Nouryon's Category 9 footprint is calculated by multiplying spend by mode- and sector-specific emission factors.

4.3.11 Category 10 – Processing of Sold Products

This category is not included in our scope 3 calculations. Given the wide variety of intermediate products sold, data is impractical to collect with confidence. Results would be based on broad assumptions, that could result in potential inaccuracies.

4.3.12 Category 11 – Use of Sold Products

Primary data:

- Direct use-phase Emissions – Sales volume by region and description of product end uses

Secondary data:

- Direct-used Phase Emissions – IPCC AR6 global warming potentials

Nouryon's Category 11 footprint is calculated by multiplying emitted product volumes and volumes of combustion products from combusted products by the latest available global warming potentials.

Considering potential end-use applications of our product lines, we consider that no sold products are combusted, nor are used as blowing agents or otherwise emitted during use. One product (DME) is used as an aerosol propellant but does not have a global warming potential (GWP) according to IPCC AR6 (2021). Thus, we assume no emissions from direct use-phase.

The full product line of Nouryon is consisting of intermediates and indirect use phase of certain chemicals is unknown. Therefore, this category has been excluded from reporting.

4.3.13 Category 12 – End-of-Life Treatment of Sold Products

Primary data:

- Waste-type Specific Method – Sales volume by region and description of product end use

Secondary data:

- Waste-type Specific Method – Average regional waste fate from World Bank and mass-based ecoinvent Emission Factors. Recycling and Wastewater treatment
- (WWT) pathways added for EOL.

Nouryon's Category 12 footprint is calculated by multiplying product sales volumes by waste fate by region and by treatment-route-specific emission factors.

4.3.14 Category 13 – Leased Assets

Nouryon does not have downstream leased assets.

4.3.15 Category 14 – Franchises

Nouryon does not own or operate any franchises.

4.3.16 Category 15 – Investments (Nouryon estimate)

Primary data:

- Average-data Method – Investment value and ownership stake. For those controlled by Nouryon, included.

Secondary data:

- Average-data Method – US EPA Supply Chain Emission Factors

Nouryon’s Category 15 footprint is calculated by multiplying investment value by sector-specific emission factors.

Our Scope 3 reporting contain estimates for this category which contribute to the total Scope 3 but is excluded from the assurance scope.

4.4 Procurement indicators

4.4.1 Suppliers acknowledging our Business Partner Code of Conduct (% by spend)

Defined as % Product Related (PR) and Non-Product Related (NPR) spend (measured by value in USD) with suppliers who have signed our Business Partner Code of Conduct over total spend. This excludes: vendors providing NPR services such as pension funds, tax consultants, or local authorities, and spend without a related PO.

4.5 ISO 14001 percentage

Defined as the % of our sites having a valid ISO/RC14001 certificate at a defined point in time (for the 2022 Sustainability report this was March 23, 2023). This is calculated by dividing the number of sites with valid certificates by the total number of sites in our portfolio. This is based on sites that have been in our portfolio for one year.

4.6 Female workers percentage

Percentage of total Female employees at all levels over total Nouryon employees as of December 31, 2022. All data includes regular employees, expatriates, and interns derived from data, extracted from the SuccessFactors system.