



# NX Filtration Shades of Green assessment

 Sector: Water Treatment

 Region: Europe

May 28, 2021

**NX Filtration is a Dutch company providing membrane technology for water treatment and purification.** NX Filtration was incorporated in 2016 and is still a young company, having only recently begun its industrial scale commercial roll out. The company's customers are in the industrial and municipal water treatment sector. The company's products are nano-, micro- and ultrafiltration membrane modules, with the majority of revenues being generated from its nanofiltration membrane modules.

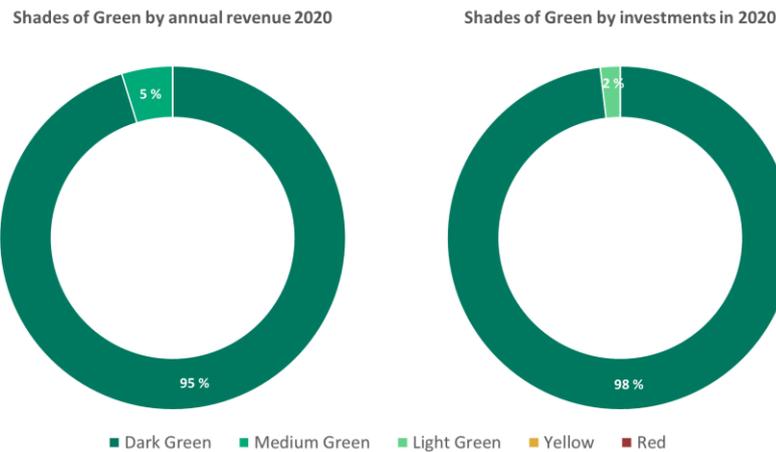


Figure 1: NX Filtration 2020 revenue and investments by Shade of Green. The figures are aligned with NX Filtration's financial reporting.

**CICERO Green considers NX Filtration's products to be important for climate adaptation and resilience.** The International Panel on Climate Change (IPCC) has concluded that about 80% of the world's population suffers from threats to water security and that climate change can worsen the availability of water and further threaten water security. Climate change can also increase the need for treatment of i.e. surface water after heavy rainfalls.

**NX Filtration's direct nanofiltration (dNF) membrane technology used for water treatment has the potential to reduce the energy use with up to 70% and substantially or completely reduce chemical use over a lifetime perspective, compared to other existing membrane technologies if treating water to the same quality.** The microfiltration (MF) membranes are used in specialised treatments in e.g. the food- and beverage industry and are estimated by the company to use 30-50% less energy than formerly used systems, as well as generate less waste. Water treatment using ultrafiltration (UF)-membranes will need additional cleaning steps to achieve the same water quality as NF and by this use more energy and chemicals. CICERO Green finds it likely that the water quality standards will be tightened in the future, which will increase the environmental benefits using the NF-membranes.

**The main environmental impacts of NX Filtration's products are realised at the customer's water treatment facilities.** NX Filtration serves a variety of municipal and industrial customers. NX Filtration's industrial customers are e.g. the food and beverage industry, textile factories, power generating plants and data centers. NX Filtration has informed us that they are currently not active in the coal, oil and gas segment. However, the investor should be aware that the company has not excluded the fossil fuel or other sectors as potential future clients. CICERO Green encourages the company to be transparent on revenues from such customers which will not be seen as green.



**There are also environmental impacts associated with the membrane manufacturing, which according to the company, are low compared to the emission reduction potential in the use phase.** The company is currently using some natural gas for heating of the premises and in the production process; however, they have informed us that volumes will be reduced in the planned new manufacturing facility. The investor should be aware that part of the input for the membranes developed by NX Filtration are based on fossil fuels (produced from synthetic organic polymers). CICERO Green encourages the company to establish a plan to further reduce the use of natural gas and to engage with the producers of the polymers to reduce the content of virgin fossil fuels in the membrane materials.

**Revenue associated with NX Filtration's nano- and micro-filtration membranes has been allocated the Dark Green shade due to its contributions to a climate resilient future by providing clean water solutions and at the same time reduce the need for energy and chemicals in the use phase.** Revenue associated with UF-membranes have been allocated the Medium Green shade. The shading is based on an increased need for clean water as the effects of climate change are increasing. However, UF is viewed as a bridging technology, presenting improved environmental performance, but not at the same scale as the NF-technology. NX Filtration has informed us that their focus as a company is on the Dark Green NF-technology.

**NX Filtration's investments all support the company's core innovation, the nanofiltration membrane technology. Investments have therefore been screened for fossil fuel and otherwise been allocated the Dark Green Shading.** CICERO Green has allocated a Light Green shading to the purchase of a transport vehicle supporting the company. NX Filtration does not have revenues or investments shaded Yellow or Red.

**Investors should note that CICERO Green has relied on the company's documentation and not conducted their own research on NX Filtration's membrane technology.** Furthermore, our assessment is based on data reported or estimated by the company and has not always been verified by a third party.

**NX Filtration's activities are considered to enable climate change adaptation and mitigation, however, the key environmental objective for NX Filtration is a substantial contribution to the sustainable use and protection of water and marine resources.** This is one of the six objectives under the EU Taxonomy. However, there is currently no delegated act specifying criteria for this objective.

**NX Filtration demonstrates a high awareness of environment and sustainability for a newly established company and is in the process of setting up a governance structure for sustainability contributing to the Sustainable Development Goals.** CICERO Green finds it positive that the company also is in the process of establishing targets related to climate and environment. The company has not yet established reporting of Greenhouse Gas emissions, nor conducted a climate risk assessment and has no current plans to start reporting according to the TCFD.

**NX Filtration has established a Code of Conduct (CoC) targeting their suppliers and a CoC targeting their employees and other personnel (in the broadest sense).** The supplier CoC is attached to contracts of new suppliers, which CICERO Green views as positive. CICERO Green considers that there are potential social risks related to the company's suppliers purchase and manufacture of raw materials, and NX Filtration should strengthen how they identify these potential risks.



**Figure 2 CICERO Green assesses NX Filtration's governance structure and practice to be Good.**

**NX Filtration is newly established with good intentions related to sustainability.** However, investors should be aware that because the technology is novel, there is a risk that the actual environmental performance will not meet the expectations. Examples of important KPIs to follow are listed below:

- GHG emissions (Scope 1, 2 and 3)
- Volume municipal and industrial water treated with each membrane type (m<sup>3</sup>)
- Energy use per volume water treated (kWh/m<sup>3</sup>)



# Contents

---

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>NX Filtration sustainability management</b>                | <b>4</b>  |
|          | Company description .....                                     | 4         |
|          | Governance Assessment .....                                   | 4         |
|          | Sector risk exposure .....                                    | 5         |
|          | Sustainability Management .....                               | 6         |
|          | Key issues .....  | 7         |
| <b>2</b> | <b>Assessment of NX Filtration's revenues and investments</b> | <b>12</b> |
|          | Shading of NX Filtration's revenue and investments .....      | 12        |
|          | EU Taxonomy .....   | 13        |
| <b>3</b> | <b>Terms and methodology</b>                                  | <b>14</b> |
|          | Shading corporate revenue and investments .....               | 14        |
|          | <b>Appendix 1: Referenced documents list</b>                  | <b>16</b> |
|          | <b>Appendix 2: Background</b>                                 | <b>17</b> |
|          | <b>Appendix 3: About CICERO Shades of Green</b>               | <b>18</b> |

---



# 1 NX Filtration sustainability management

## Company description

NX Filtration is a Dutch company providing nanofiltration membrane technology for water treatment and purification. NX Filtration was incorporated in 2016 and is still a young company, having only recently begun its industrial scale commercial roll out. The company currently has two manufacturing plants and offices in the Netherlands and is planning an additional manufacturing plant in the Netherlands in the next two to three years.

The company has two business lines:

- Municipal water treatment (46% of 2020 revenues of sale of goods): providing products that purify drinking water from surface or well water, and products for treating and reusing wastewater.
- Industrial water treatment (54% of 2020 revenues of sale of goods): providing products that purify process water from surface or well water, treating wastewater to enable reuse and recovering raw materials as dies and chemicals from wastewater streams.

NX Filtration is providing nano-, ultra- and microfiltration membrane modules, with a focus on its nanofiltration membrane technology (direct nano filtration technology based on hollow fiber membranes; dNF). Assembly of the filtration installations is carried out at customer site by original equipment manufacturers (OEMs)/system installation companies.

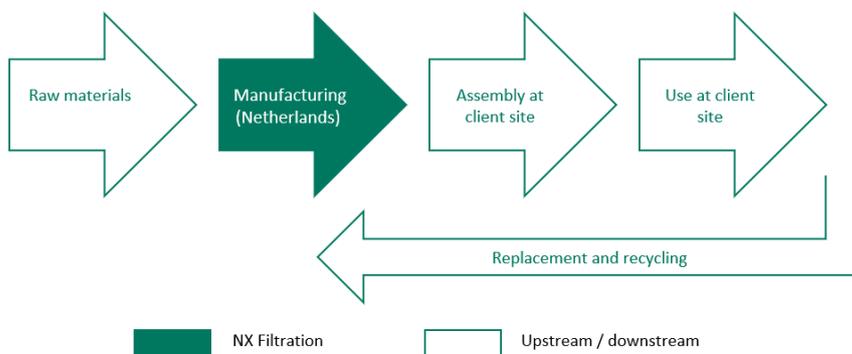


Figure 3: The figure shows the value chain of NX Filtration's operations.

## Governance Assessment

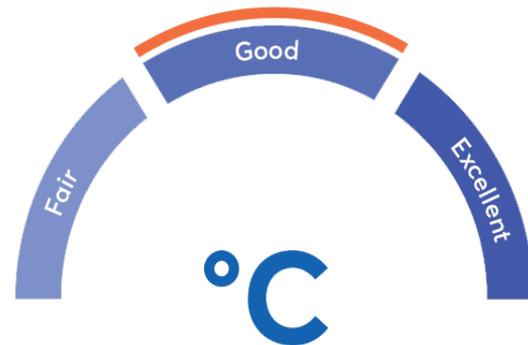
NX Filtration demonstrates a high awareness of environment and sustainability for a newly established company and is in the process of setting up a governance structure for sustainability contributing to the Sustainable Development Goals (SDGs). CICERO Green finds it positive that the company also is in the process of establishing targets related to climate and environment. The company has not yet established reporting of Greenhouse Gas emissions. Furthermore, NX Filtration has not conducted a climate risk assessment and has no current plans to start reporting according to the TCFD.

The company has conducted a materiality assessment identifying environmental and social risks, and the assessment formed the company's Code of Conduct (CoC). NX Filtration has established a Code of Conduct (CoC) targeting their suppliers and a CoC targeting their employees and other personnel (in the broadest sense). The



supplier CoC is attached to contracts of new suppliers, which CICERO Green views as positive. The supplier CoC is addressing both environmental and social issues. It is considered a strength that NX Filtration has established a whistle blower function that will help the company identify violations towards the CoCs. However, the CoC does not state that the company's suppliers shall evaluate their suppliers with regards to e.g. workers' rights. CICERO Green considers that there are potential social risks related to where/how the company's suppliers purchase/manufacture the raw materials NX Filtration uses, and NX Filtration should strengthen how they identify these potential risks.

NX Filtration is newly established with good intentions related to sustainability. After some time in operation, the company should be able to demonstrate that the good intentions have been realised. To improve the governance the company should conduct climate risk assessments, finalise and implement targets towards climate and environment and start reporting on GHG-emissions.



The overall assessment of NX Filtration's governance structure and processes gives it a rating of **Good**.

### Sector risk exposure

The below text box highlights some key risks for the water treatment sector. See Appendix 3 for additional background on the sector more generally.

**Physical climate risks.** Extreme events and flooding are affecting all sectors and regions already. Due to historical emissions, we are de facto already locked in for approximately 1.5°C global warming.<sup>1</sup> Given today's policy ambition, the world is most likely heading toward 2-3°C warming in 2100 which implies accelerated physical climate impacts, including more extreme storms, accelerated sea level rise, droughts and flooding.<sup>2</sup> For near-term physical risk, investors and companies must consider the probabilities of physical events and resiliency measures to plan for and protect against the worst impacts. For the European manufacturing sector, the most severe physical impacts will likely be increased flooding, snow loads and urban overflow, as well as increased storms and extreme weather. Developing projects with climate resilience in mind is critical for this sector. The issuer must also consider the physical climate risks affecting the manufacturing facility, the supply chain as well as the assembly sites.

**Transition risks.** NX Filtration is operating in a sector that likely will benefit from reduced water availability and quality due to climate change. However, increased carbon prices may influence profitability considering that parts of the raw material are fossil fuel based.

**Environmental risks.** The manufacturing industry is at risk of polluting the local environment during production of raw material, during manufacturing and during disposal of the products. Pollution can also come from poor waste handling in the value chain, depending on the hazardousness and handling of the waste.

**Social risks.** The social risks related to NX Filtration are mainly risks related to corruption and human rights violations in their supply chains, including risks for violations of workers' rights.

---

<sup>1</sup> <https://www.cicero.oslo.no/en/posts/news/scientists-demystify-climate-scenarios-for-investors>

<sup>2</sup> [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf)



## Sustainability Management

NX Filtration is integrating sustainability into its business model, and the overarching corporate goal is to be the leading provider of direct nanofiltration membrane technology for producing pure and affordable water to improve quality of life.

NX Filtration has established a Code of Conduct (CoC) targeting their suppliers and a CoC targeting their employees and other personnel (in the broadest sense). The Code of Conduct applies to the company and wholly- and majority-owned subsidiaries. The supplier CoC is attached to contracts of new suppliers. NX Filtration is in the process of requiring suppliers to commit to the CoC and ensure compliance with relevant laws and regulations and best practices relating to conflicts of interest, child labor, health, safety and environmental matters, employee wellbeing, corporate social responsibility, anti-bribery and data protection, privacy and security. To be free from child labor and forced labor and to commit to the CoC is also included as a clause in the framework agreement template for suppliers. The CoC also explicitly refers to the UN declaration on Human Rights and the ILO conventions on child labor.

## Governance structure

NX Filtration is an early-stage company and is in the process of setting up a governance structure for sustainability. The company has established an ESG (environmental, social and governance) framework to embed ESG in the whole value chain, consisting of three pillars. The first pillar is focusing on the use of NX Filtration's technology in addressing the global challenges related to water scarcity and water quality, the second pillar is focusing on reducing the energy and chemicals used by their customers, and the third pillar is NX Filtration's own organisation. The company has an EHS policy, which includes environmental, health and safety considerations for key stakeholder groups. The policy specifies that management is responsible for environmental issues, and the safety of employees and communities, and that each employee is responsible for carrying out the policy.

The results of the materiality assessment the company has conducted were used to identify the SDGs most material and applicable for the company. NX Filtration has identified SDG 6 Clean water and sanitation, as well as several sub-targets under SDG 6 to be most applicable for their business area. According to the company, KPIs will be established in the second half of 2021 for the relevant sub-targets under SDG 6 as well as under the other SDGs the company identified to be relevant to its business, being SDG 8, SDG 9, SDG 12 and SDG 17. Examples are to contribute to safe and affordable drinking water and to improve water quality.

NX Filtration obtained ISO 9001 certification for the quality management system in January 2021 and are in the process of obtaining ISO 14001 for the environmental management system.

NX Filtration has a strong focus on R&D and is cooperating with universities and research institutes around the world, including the University of Twente, Saxion University of Applied Sciences and the Universität Hamburg.

## Risk assessment

NX Filtration has performed a stakeholder survey amongst employees, customers, suppliers, communities and partners to form its materiality matrix. The most material issues identified were sustainable innovation and technology, people and process safety, and climate change and water challenges. Other issues of "very high" importance to stakeholders or NX Filtration were business ethics, employee engagement and customer satisfaction.

## Reporting

As a currently unlisted company, NX Filtration has limited public reporting. Going forward, NX Filtration intend to report publicly on their ESG KPIs and achievements in their annual report. It is currently not decided whether the report will be externally verified.



## Key issues

### *GHG Emissions*

According to the issuer, main Scope 1 emissions are related to the production of the membranes used in the filtration systems. Scope 2 emissions come from the indirect emissions due to purchased electricity, heating & cooling for NX Filtration's own use. Scope 3 emissions will come from the downstream production of the raw materials and from transport. According to the issuer, the main emissions will come from the upstream use of the membrane systems at the customer sites, among others due to the pressurised membrane systems that require a certain amount of energy. NX Filtration informs that they are striving to reduce emissions from transport by selection local suppliers as far as possible.

The company does not have a clear overview of the Greenhouse Gas (GHG)-emissions relating to its business. However, according to the company they aim to report Scope 1, 2 and 3 GHG-emissions in the future, and is also considering reporting in line with the GHG protocol.

NX Filtration is in the process of establishing climate and environmental related targets. Measures used include optimisation of process conditions minimising the water, chemical and energy usage, to recuperate heat from waste streams and to invest in more efficient production installations. To reduce the Scope 2 emissions, the company aims to invest in renewable energy sources and to highly reduce or stop the use of natural gas in the new manufacturing facility.

KTH<sup>3</sup> has carried out a life cycle analysis (LCA) showing that the nanofiltration membrane technology is the most environmentally friendly technology for water treatment that has been assessed in the study. However, the results are likely influenced by differences in the CO<sub>2</sub>-intensity of the electricity grids used for the different filtration systems. The nanofiltration system in the study was tested in a region with a low CO<sub>2</sub>-intensity.

### *Energy*

Energy is used upstream for raw material production, manufacturing of the membranes and units, and down-stream in the water treatment process.

NX Filtration uses electricity from the grid in their production processes. The company informs that they use green electricity generated from renewable energy sources, safeguarded by guarantees of origin. Some natural gas is used for heating of the premises, heating of process water and in the membrane drying process. The company informs that the gas used is CO<sub>2</sub>-compensated from the energy provider ENGIE. The company further informs that in the new manufacturing facilities it aims to avoid the use of natural gas (if technically possible). The existing facilities are expected to be used for R&D-purposes in the future. This means that even if the facility still will be heated using natural gas, the gas consumption related to membrane drying processes will be minimised. The company further informs that the existing facilities are rented, and that they have limited possibilities to affect how energy is generated. In addition to minimising the use of natural gas for membrane drying, the company has a plan to recuperate the heat from their wastewater to heat up their process water.

The company informs that they intend to install solar panels on the roof of the new manufacturing facility and reuse waste heat from neighbouring buildings, reducing the need for electricity from the grid.

---

<sup>3</sup> Royal Institute of Technology in Sweden, <http://kth.diva-portal.org/smash/get/diva2:1509059/FULLTEXT01.pdf>



The main energy use is however related to the downstream water treatment processes, e.g. due to the pressurised membrane systems. Emissions will therefore also depend on the GHG-intensity of the electricity grid used by the customers. According to the company, NX Filtration has developed an energy efficient membrane manufacturing process. The company further informs that water treatment using the dNF-membrane systems result in a high water quality, removing e.g. micropollutants. To achieve the same water quality using e.g. UF-membranes, the membranes must be used in combination with other technologies like reverse osmosis, which in total result in higher energy use and higher use of chemicals for pre-treatment. The dNF-membrane systems therefore require less energy than conventional systems to achieve the high water quality standard. External pilot studies indicate<sup>4</sup> that the gross energy requirements for the dNF-systems is around 70% less energy per m<sup>3</sup> water treated, compared to other existing technologies. CICERO Green does not have information on the energy use for the other membrane systems utilised by NX Filtration, but NX Filtration confirms that approximately 75% of the membrane modules sold is based on the nanofiltration technology.

The microfiltration (MF) membranes are mainly used in the food- and beverage industry and is estimated by the company to use 30-50% less energy than the conventional technology based on kieselguhr. MF also generates significantly lower volumes of solid waste.

The company further informs that the existing rented office space and production facilities received an EPC Label A. The Energy Label is related to the primary energy demand of the building and is not related to the actual energy used in the production process.

#### *Chemical use*

With other technologies, chemicals will generally be needed for pre-treatment of wastewater to avoid fouling (accumulation of unwanted material on solid surfaces), and also for cleaning of the membranes when in use if e.g. chemical cleaning is used. According to the company, the NX Filtration's dNF technology offers sustainability benefits compared to conventional water treatment methods, as it avoids the use of pre-treatment chemicals in the water treatment process and also requires a low cleaning frequency.

According to the company, NX Filtration's coating process for its nano-filtration membranes is based on water-based chemistry, in contrast to conventional organic solvent-based coating processes which normally use less environmentally friendly chemicals. NX Filtration's customers are furthermore using a mechanical back-washing cleaning technology in respect of NX Filtration's products with no or minimal use of cleaning chemicals.

#### *Materials*

Membranes used in water treatment systems can be produced from inorganic or organic material, the latter originating from fossil fuels. The main inputs to the membranes used in NX Filtration's membrane systems are synthetic organic polymers, epoxy used for assembly of the modules, model housings, flanges and end caps. The company informs that the polymers are originating from virgin fossil fuels, and that the epoxy consists of some organic and some bio-based components. Model housings, flanges and end caps are made from plastics.

#### *Waste*

Waste will originate from the manufacturing processes, from packaging, and from end of life. There will also be certain volumes of materials retained by the membrane systems, when in use. Some of this will be waste in form of a cake layer or similar that must be managed, but some retained material can also be recovered and reused, such as retained dye in wastewater from a textile factory.

---

<sup>4</sup> Source: Energie en Grondstoffenfabriek, Water Factory, The New Source, 2019.



Waste from the company's manufacturing process consists of packaging materials and treatment fluids, as well as product waste (membranes and epoxy). The packing waste is collected by the supplier or a certified waste collector. Non-hazardous treatment fluids are disposed through the sewer. According to the company, NX Filtration is designing a treatment process for treatment fluids and is also working on minimising this waste stream by optimising the treatment process. The product waste is processed in line with Dutch regulations. Waste disposal is carried out by a certified disposal company. According to the company, all waste is sorted as per Dutch waste management requirements.

NX Filtration is not involved in the end of life at the customer site, this is done by the customer or at the equipment manufacturer's site. However, according to the company, recycling and replacement is an integral part of the product design. The connections to the membrane modules are reused and only the pipe with the membranes would need to be replaced and the PVC pipe can be recycled locally. Furthermore, the pipe can be easily dismantled, which makes it as convenient as possible for the end-user to make repairs for non-functioning membrane modules. It is at this point unclear if the membranes can be recycled.

According to NX Filtration, their membrane technology enables the recovery of water and sometimes even raw material from some wastewater streams, such as indigo in the textile industry or cleaning chemicals in beer breweries. However, the company cannot control whether retained material is managed according to internationally acceptable waste principles by all customers.

#### *Climate resilience*

The company has not carried out assessments related to physical climate risks that their downstream, midstream and upstream value chain may be exposed to. However, NX Filtration has confirmed that their new manufacturing facility is located ca 38 meter above sea level with low risk of disruption from increased sea level in the short term. The company has no current plans to report according to the TCFD-recommendations.

#### *Key social issues*

The company's materiality assessment identified social risks to be related to health & safety, working conditions and human rights. The company has addressed these risks in a Supplier Code of Conduct for the upstream value chain (health & safety, working conditions, human rights). In the downstream value chain, the issuer informs that their products can contribute to mitigating social risks by providing access to clean potable water in rural and water scarce areas, and by end users not having to work with dangerous chemicals.

To capture violations of the CoC the company has established a whistleblowing procedure for employees. According to the company, no incidents have yet been reported. Furthermore, to monitor compliance with the CoC, the company has implemented a set of internal control measures and compliance policies, including amongst others, an authorisation policy, levels of segregation of duties, approval of bank payments (4 eyes principle), and reporting and monitoring frameworks.

Regarding labor conditions, employees are educated on safety risks and on workplace hazards and safe work practices in accordance with the company's safety policy.

Suppliers are selected based among others product quality, performance, exclusivity, intellectual property protection and competitive commercial conditions. NX Filtration has established a critical vendor list as an internal analysis tool to assess critical suppliers' functions towards poor performing suppliers which need to be audited. NX Filtration intends to conduct supplier audits and expects to be doing the first audit towards the end of 2021, followed by audits both towards suppliers and internally on a regular basis.



Raw materials are sourced from established manufacturers like BASF, Solvay and Henkel localised in regions considered to have strong regulatory frameworks, in Europe or the US/Canada. NX Filtration is in the process of requiring its suppliers to commit to its supplier code of conduct.

NX Filtration supplies nanofiltration modules globally to customers within both the municipal and the industrial sector. The municipal market for drinking water and wastewater is characterised by relatively large central plants in locations with existing infrastructure as well as smaller plants in greenfield areas. In the Asian market, drivers are e.g. related to water stress. In Europe the market is also driven by new regulations on water quality.

NX Filtration's industrial customers are e.g. the food and beverage industry, textile factories, power generating plants, and data centers. NX Filtration has informed us that they are currently not active in the coal, oil and gas segment. However, the company has not excluded this or other segments as future customers. According to the company, industrial customers are primarily reputable players in the water treatment market. In case a customer request comes from a country under international sanctions the company will have a close dialogue with the respective embassy and conduct background checks to verify if the company can supply membrane solutions.

**Table 4 CICERO Green assessment of NX Filtration's management of key environmental issues**

| Key issue     | CICERO Green comments  |
|---------------|--|
| GHG emissions | <ul style="list-style-type: none"><li>✓ CICERO Green finds it positive that NX Filtration is in the process of establishing concrete climate targets. We encourage the company to establish concrete targets also related to the phase out of natural gas and to work to reduce Scope 3 emissions by e.g. working with their customers to reduce the GHG-intensity of the grid by increasing the use of renewable energy.</li><li>✓ CICERO Green finds it positive that the company aims at reporting Scope 1, 2 and 3 emissions in their annual reports.</li></ul>  |
| Energy        | <ul style="list-style-type: none"><li>✓ It is a strength that systems using the NX nanofiltration membrane modules seem to use 70% less energy than other existing membrane technologies to achieve a high water quality. Investors should be aware that CICERO Green has relied on the company's documentation and has not conducted their own research on NX Filtration's membrane systems compared with other existing technologies.</li><li>✓ CICERO Green encourages the company to establish a plan to reduce the use of natural gas.</li><li>✓ The company should consider reporting amount of water treated per unit of energy used (kWh/m<sup>3</sup>).</li></ul> |
| Chemical use  | <ul style="list-style-type: none"><li>✓ CICERO Green is encouraged to learn that systems using the NX Filtration's membranes seem to need less chemicals than other existing technologies.</li></ul>   |



---

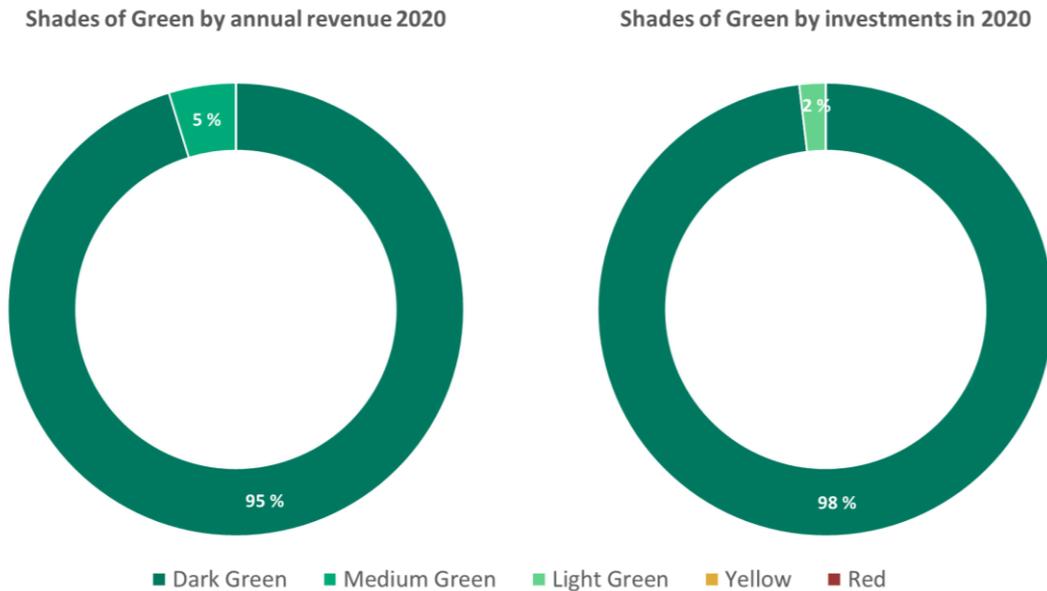
|                    |  |
|--------------------|--|
| Materials          | <ul style="list-style-type: none"><li>✓ NX Filtration's main raw material is polymers originating from fossil fuels. The company informs that to ensure the membrane quality it is important that the polymers are being made of virgin materials. They also confirm that they have no current plans to work with their main suppliers to reduce the content of virgin fossil fuel and thereby the CO<sub>2</sub>-footprint. CICERO Green encourages NX Filtration to engage with its relevant suppliers to reduce the content of virgin fossil fuels in the membrane materials. The company furthermore informs that parts of the organic components in the epoxy used during assembly of the membrane modules are bio-based.</li><li>✓ Membranes can also be produced using inorganic materials like ceramics. CICERO Green has not sufficient information to say whether inorganic membrane materials are better or worse than organic membrane materials in terms GHG-emissions during production or in terms of functionality.</li></ul>                                  |
| Waste              | <ul style="list-style-type: none"><li>✓ It is positive that NX Filtration is working to establish a process to reduce the discharge of treatment fluids, and also working on minimising this waste stream by optimising the treatment process.</li><li>✓ CICERO Green encourages the company to establish waste targets, related to e.g. degree of recycling, and to work with their customers to ensure safe management of potential waste from material retained at the customer site.</li></ul>   |
| Climate resilience | <ul style="list-style-type: none"><li>✓ It is a pitfall that the company has not conducted climate risk assessments. Even if the short-term climate change indicated for Europe can be considered to be on the lower side, there are potential risks related to long-term climate risks related to e.g. flooding, sea level rise and increase frequency of extreme weather. This may disrupt the company's value chain. CICERO Green encourages the company to conduct climate risk assessments based on acknowledged climate scenarios, including also the upstream and downstream value chain.</li></ul>   |
| Key social issues  | <ul style="list-style-type: none"><li>✓ NX Filtration has established Code of Conducts towards both employees and suppliers and seems to have systems to identify potential violations of the principles laid down in the CoC. However, the CoC does not state that the company's suppliers shall evaluate their suppliers with regards to e.g. workers' rights, nor does it state that the biggest suppliers should have whistle blowing-functions or similar mechanisms to identify violations on human and/or workers' rights. CICERO Green considers that there are potential social risks related to where/how the company's suppliers purchase/manufacture the raw materials NX Filtration need, and NX Filtration should strengthen how they identify these potential risks.</li><li>✓ The company has customers in countries in Asia with possibly less strict requirements related to environmental and social issues. CICERO Green encourages the company to pay extra attention to the environmental and social issues in countries with lax regulations.</li></ul> |

---



## 2 Assessment of NX Filtration’s revenues and investments

### Shading of NX Filtration’s revenue and investments



**Figure 4: NX Filtration 2020 revenue and investments by Shade of Green. The figures are aligned with NX Filtration’s financial reporting.**

The Shade of Green assigned to an activity reflects its overall climate risk and environmental impact. In assigning a shade of green to NX Filtration’s revenue streams and costs, we have considered NX Filtration’s Governance Score of Good and the company’s management of key environmental concerns.

All NX Filtration products have sustainability as a core value proposition. The company’s membranes contribute to the treatment of water. The International Panel on Climate Change (IPCC) has concluded that about 80% of the world’s population already suffers from threats to water security and that climate change can worsen the availability of water and further threaten water security. Industrial, agricultural, and domestic activities produce large volumes of wastewater, and re-use of wastewater through cleaning will be increasingly important for water security.

NX Filtration’s membrane products contributes towards a necessary activity for the low carbon and climate resilient future. However, the membrane systems also have emissions and negative environmental impacts associated with the process resulting mainly from energy use, chemicals, and the treatment of waste resulting from the water treatment. In addition, there are also emissions and environmental impacts associated with the production of the membranes. However, the environmental impact of membrane production is significantly lower than the use phase.



NX Filtration's nanofiltration technology has the potential to reduce the energy use by around 70% and substantially reduce the chemical use compared to other existing membrane technologies treating water to the same quality, and revenue associated with this technology has been allocated the Dark Green shade.

Dark Green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. These projects should be Paris aligned or have zero emissions around mid-century. Revenues associated with pilots and grants have also been shaded Dark Green. Investors should note, however, that CICERO Green has relied on the company's documentation and has not conducted their own research on NX Filtration's membrane technology compared with other existing technologies.

NX Filtration also sells ultra (UF) and microfiltration (MF) membrane modules for water treatment. MF-membranes are used in specialised treatment in among others the beer industry and is using 30-50% less energy and generate less waste than the conventional technologies it is replacing. Revenue streams associated with MF-membranes have been allocated the Dark Green shade. The UF-membranes will need additional cleaning steps to achieve the same water quality as NF. UF is considered a bridging technology, presenting environmental performance, but not at the same scale as the nanofiltration membranes. Revenue streams associated with UF have been allocated a Medium Green shade. Medium Green is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet. These products provide a valuable environmental service, but there are more emissions associated with the life cycle of these membrane systems, when compared to NX Filtration's dNF.

NX Filtration's investments all support the company's core innovation, the nanofiltration membrane. Investments have therefore been screened for fossil fuel and otherwise, allocated the Dark Green Shading. CICERO Green has allocated a Light Green to the purchase of a transport vehicle supporting the company. This vehicle class should also be decarbonised, however, necessary heavy-duty vehicles supporting green industries can be allocated the Light Green shade.

Investors should note that our assessment is based on data reported or estimated by the company and has not always been verified by a third party. We analyse revenue, operating costs and investments, however there is typically not an explicit link between sustainability and financial data<sup>5</sup>. Our shading often requires allocating line items in financial statements to projects or products, for this we rely on the company's internal allocation methods. In addition, there are numerous ways to estimate, measure, verify and report e.g. data on emissions, which may make direct comparisons between companies or regulatory criteria difficult and somewhat uncertain.

## EU Taxonomy

The EU Taxonomy has established six environmental objectives and issued in April 2021 delegated acts to outline proposed criteria for the two first objectives Climate change mitigation and Climate Change adaptation. The mitigation criteria in the EU taxonomy includes specific thresholds and do no significant harm (DNSH) criteria<sup>6</sup>. The company's activities relate mainly to the environmental objective Sustainable use and protection of water and marine resources, where a delegated act specifying the requirements has not yet been issued. Alignment with the EU Taxonomy has therefore not been assessed in this Company Assessment.

---

<sup>5</sup> Most accounting systems do typically not provide a break-down of revenue and investments by environmental impact, and the analysis may therefore include imprecisions and may not be directly comparable with figures in the annual reporting.

<sup>6</sup> [Taxonomy-regulation-delegated-act-2021-2800-annex-1\\_en.pdf \(europa.eu\)](#)



### 3 Terms and methodology

The aim of this analysis is to be a practical tool for investors, lenders and public authorities for understanding climate risk. CICERO Green encourages the client to make this assessment publicly available. If any part of the assessment is quoted, the full report must be made available. Our assessment, including on governance, is relevant for the reporting year covered by the analysis. This assessment is based on a review of documentation of the client's policies and processes, as well as information provided to us by the client during meetings, teleconferences and email correspondence. In our review we have relied on the correctness and completeness of the information made available to us by the company.

#### Shading corporate revenue and investments

Our view is that the green transformation must be financially sustainable to be lasting at the corporate level. We have therefore shaded the company's current revenue generating activities, as well as investments and operating expenses.

The approach is an adaptation of the CICERO Shades of Green methodology for the green bond market. The Shade of Green allocated to a green bond framework reflects how aligned the likely implementation of the framework is to a low carbon and climate resilient future, and we have rated investments and revenue streams in this assessment similarly. We allocate a shade of green to the revenue stream and investments according to how these streams reflect alignment of the underlying activities to a low carbon and climate resilient future and taking into account governance issues.

| SHADES OF GREEN   | EXAMPLES  |
|---|---|
|  <b>Dark green</b> is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future.  |  Solar energy projects  |
|  <b>Medium green</b> is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet.   |  Green buildings with a high level of certification and energy efficiency      |
|  <b>Light green</b> is allocated to transition activities. These projects and solutions could have lower emissions, but do not by themselves represent or contribute to the long-term vision.  |  Substantially more efficient manufacturing of fossil fuel intensive materials |
|  <b>Yellow</b> is allocated to projects and activities that do not contribute to transition. These activities could have some emissions and be exposed to climate risks. This category also includes activities with too little information to assess. |  Efficiency in fossil fuel infrastructure                                      |
|  <b>Red</b> is allocated to projects and activities that have no role to play in a low-carbon and climate resilient future. These are heaviest emitting assets, with the most potential for lock-in of investments and risk of stranded assets.        |  New infrastructure for coal  |

In addition to shading from dark green to red, CICERO Shades of Green also includes a governance score to show the robustness of the environmental governance structure. When assessing the governance of NX Filtration, CICERO Green looks at five elements: 1) strategy, policies and governance structure; 2) lifecycle considerations including supply chain policies and environmental considerations towards customers; 3) the integration of climate considerations into their business and the handling of resilience issues; 4) the awareness of social risks and the management of these; and 5) reporting. Based on these aspects, an overall grading is given on governance strength



falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

In March 2020, a technical expert group (TEG) proposed an EU taxonomy for sustainable finance that included a number of principles including “do-no-significant-harm (DNSH)-criteria” and safety thresholds for various types of activities<sup>7</sup>. In April 2021, EU published its delegated act to outline proposed criteria for climate mitigation and adaptation, which it was tasked to develop after the EU Taxonomy Regulation entered into law in July 2020<sup>8</sup>.

Do-No-Significant-Harm criteria include measures such as ensuring resistance and resilience to extreme weather events, preventing excessive water consumption from inefficient water appliances, ensuring recycling and reuse of construction and demolition waste and limiting pollution and chemical contamination of the local environment, as well as restriction on the type of land used for construction (no arable or forested land).

CICERO Green has assessed potential alignment against the mitigation thresholds and the DNSH criteria in the delegated acts published in April 2021.

In order to qualify as a sustainable activity under the EU regulation 2020/852 certain minimum safeguards must be complied with. The safeguards entail alignment with the OECD Guidelines for Multinational Enterprises and UN Guiding Principles on Business and Human Rights, including the International Labour Organisation’s (‘ILO’) declaration on Fundamental Rights and Principles at Work, the eight ILO core conventions and the International Bill of Human Rights. CICERO Green has completed a light touch assessment of the above social safeguards with a focus on human rights and labor rights risks<sup>9</sup>. We take the sectoral, regional and judicial context into account and focus on the risks likely to be the most material social risk.

Our assessment of potential alignment against the EU Taxonomy is based on a desk review of the listed source documents against the Taxonomy Delegated Act and following our own shading methodology.

---

<sup>7</sup> Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, March 2020. [TEG final report on the EU taxonomy \(europa.eu\)](#)

<sup>8</sup> [taxonomy-regulation-delegated-act-2021-2800-annex-1\\_en.pdf \(europa.eu\)](#)

<sup>9</sup> CICERO Green is in the process of further developing its assessment method to ensure that it encompasses the object and purpose of the minimum safeguards.



## Appendix 1: Referenced documents list

| Document Number | Document Name   | Description  |
|-----------------|---|--|
| 1               | NX Filtration Supplier Code of Conduct, 2020.                                   | Code of Conduct for suppliers and sub-contractors.   |
| 2               | NX Filtration Code of Conduct, 2021.  | Code of Conduct for subsidiaries and others working on NX Filtration's behalf.   |
| 3               | EU Taxonomy Assessment, dated 09-04-2021.                                       | High-level third party taxonomy assessment.  |
| 4               | NX Filtration Holding, Annual report, 2019 and 2020.                            | Summarising financial results for 2019 and 2020.   |
| 5               | NX Filtration, Draft Environmental, Health and Safety (EHS) policy, 2021.       | Summarising EHS-principles.  |
| 6               | NX Filtration Draft Corporate Social Responsibility, May 2021.                  | Laying down NX Filtration's Environmental, Social and Governance ESG Framework.  |
| 7               | NX Filtration, Diversity Policy, 2021.  | Giving input to composition of the Management and Supervisory Boards.  |
| 8               | NX Filtration Early Look Presentation, May 2020. Investor presentation.         |  |
| 9               | NX Filtration Critical Vendor List, dated 06-05-2021.                           | Giving input to vulnerability in the supply chain.   |
| 10              | NX Filtration, Diversity Policy, 2021.  | Giving input to composition of the Management and Supervisory Boards.  |
| 11              | NX Filtration, Draft Business Prospectus, dated 15-05-2021.                     | Laying down NX Filtration's business strategy.   |
| 12              | NX Filtration, ISO 9001 certificate, dated 15-01-2021.                          | Certifying that NX Filtration's quality system for development and production is complying with NEN-EN- ISO 9001:2015. |
| 13              | Product certificates from Kiwa (01-02-2019/01-04-2019/15-01-2019), KTW and NSF. | Certifying that NX Filtration's membrane technologies comply with relevant national regulations.                       |
| 14              | Status update ESG implementation plan, dated 14-05-2021.                        | Giving input to NX Filtration's work on sustainability.  |
| 15              | NX Filtration Supplier audit template.  | Supplier audit template.   |
| 16              | NX Filtration Green IPO Framework.  | Including NX Filtration's Green IPO approach   |



## Appendix 2: Background

Water is a fundamental resource for economic and social development. These resources have historically been considered as abundant. With the increase of population and the developments brought by climate change, water demand has increased. IPCC has concluded that about 80% of the world's population already suffers from serious threats to its water security, as measured by indicators including water availability, water demand and pollution and has concluded that climate change can alter the availability of water and threaten water security. Industrial, agricultural, and domestic activities produce large volumes of wastewater, and re-use of wastewater through cleaning will be increasingly important for water security<sup>10</sup>.

Water treatment is any process that improves the quality of water to make it appropriate for a specific end-use. The end use may be drinking water, industrial water supply, irrigation, river flow maintenance, water recreation or many other uses, including being safely returned to the environment. Membrane technologies play a significant role in water purification. A membrane is a barrier which separates two phases from each other by restricting movement of components through it in a selective style. There are four main types of these processes: microfiltration (MF), ultrafiltration (UF), nano filtration (NF), and reverse osmosis (RO). The main difference exhibited by these processes, apart from their pressure requirements, is their membrane pore sizes. Different pollutants will be separated and retained depending among others on the pore sizes in the membranes. Pressure driven membrane processes are the most applied membrane processes in wastewater treatment and rely on hydraulic pressure to achieve separation.

The membranes can be produced using either organic or inorganic raw materials. Organic membranes are made from synthetic organic polymers originating from fossil fuel. Mostly, membranes for pressure driven separation processes (microfiltration, ultrafiltration, nano filtration and reverse osmosis) are made from synthetic organic polymers. Inorganic membranes are made from e.g. ceramics, metals, zeolites, or silica and are chemically and thermally stable and used widely in industrial applications like ultra- and microfiltration.

Membrane cleaning is important to restore the flux of a membrane which is lost as a result of fouling. This involves the removal of deposited materials on the membrane. Membrane cleaning can be classified as among others physical, chemical, or biological/biochemical.

Physical cleaning is a mechanical treatment of the membrane to remove foulants from the membrane, or periodic back flushing using pressure on the permeate side of the membrane, causing a backward movement of the permeate through the membrane. This causes deposited materials to be lifted off the membrane surface. Backwashing is the most widely used cleaning technique used in industry and is known to effectively regain flux from fouling caused by the deposition of materials on the surfaces of the membranes as a gel or cake layer from synthetic organic polymers<sup>11</sup>. Physical cleaning will use less chemicals than e.g. chemical cleaning.

---

<sup>10</sup> [SR15\\_Chapter3\\_Low\\_Res.pdf \(ipcc.ch\)](#)

<sup>11</sup> [Membranes | Free Full-Text | Membrane Technologies in Wastewater Treatment: A Review \(mdpi.com\)](#)



## Appendix 3: About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green, sustainability and sustainability-linked bond investments. CICERO Green also provides Company Assessments, providing an assessment and shading of a company's revenues and investments as well as assessing the governance structure to indicate the greenness of a company. CICERO Green is internationally recognised as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD).

