



PERMASCAND TOP HOLDING AB

**SUSTAINABILITY  
REPORT  
2022**



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## About Permascand | Introduction

Permascand's products enables the green transition. The company uses its expertise to provide electrochemical solutions to meet the needs of current generations, without compromising the ability of future generations to meet their needs.

Permascand's catalytic coatings, electrodes and electrochemical cells are the core technologies in many sectors seeking to build a more sustainable economy for mankind. Permascand recognizes that this means addressing economic, environmental and social needs. The company therefore commits to considering such needs, for the present and the future, throughout the life cycle of its products, including manufacturing and procurement of materials and services.

### Electrochemical solutions for the green transition

Permascand's activities are focused on providing electrochemical solutions for the global green transition.

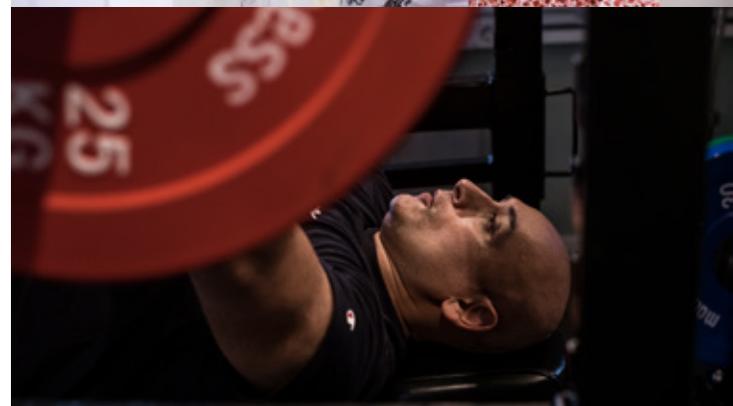
Permascand works to increase the positive effects of its products and strategically tries to identify sustainability problems that can be addressed by utilizing the know-how of its employees. To enable this Permascand's business strategy is aligned with the UN Sustainable Development Goals (9, 12, 13 and 14) and the EU taxonomy areas (1, 3 and 4). The company also tries to reduce the negative effects connected to operating its business by tracking impact and identifying areas where to improve. Since 2018, the company's primary focus has been on improving Permascand's operations in terms of emissions, resource and energy usage and improving work place environment and safety in operations. In 2022, Permascand started

analyzing at life cycle data of primary material flows to enable benchmarking of suppliers and to help prioritize which material flows to initially focus on. These efforts will continue in 2023 and onwards.

### Enablers of the green transition

Several of Permascand's products are key enablers of the global green transition towards a more sustainable future as they aim to:

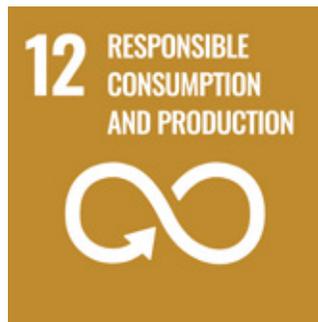
- ▶ Reduce energy consumption and avoid high downtime and product failure costs for several industrial processes.
- ▶ Provide technology for the efficient extraction of lithium, copper, and nickel, which are important compounds in the global sustainable energy transition due to their uses in fossil-free transportation.
- ▶ Create the infrastructure for energy storage and transferal which is needed for the transition from the fossil-based economy.
- ▶ Apply materials knowledge in niche areas of power transmission technology.
- ▶ Provide technology for reducing energy consumption and cost in the manufacturing of hydrogen. Hydrogen is an important industrial material which is also set to play a key role in transportation and energy storage enabling non-fossil energy production to compete on the largest scale as green hydrogen.
- ▶ Preserve marine ecosystems through ballast water treatment systems. These use electrolysis to produce an active substance that disinfects water to eliminate the threat to biodiversity posed by biological pollution.



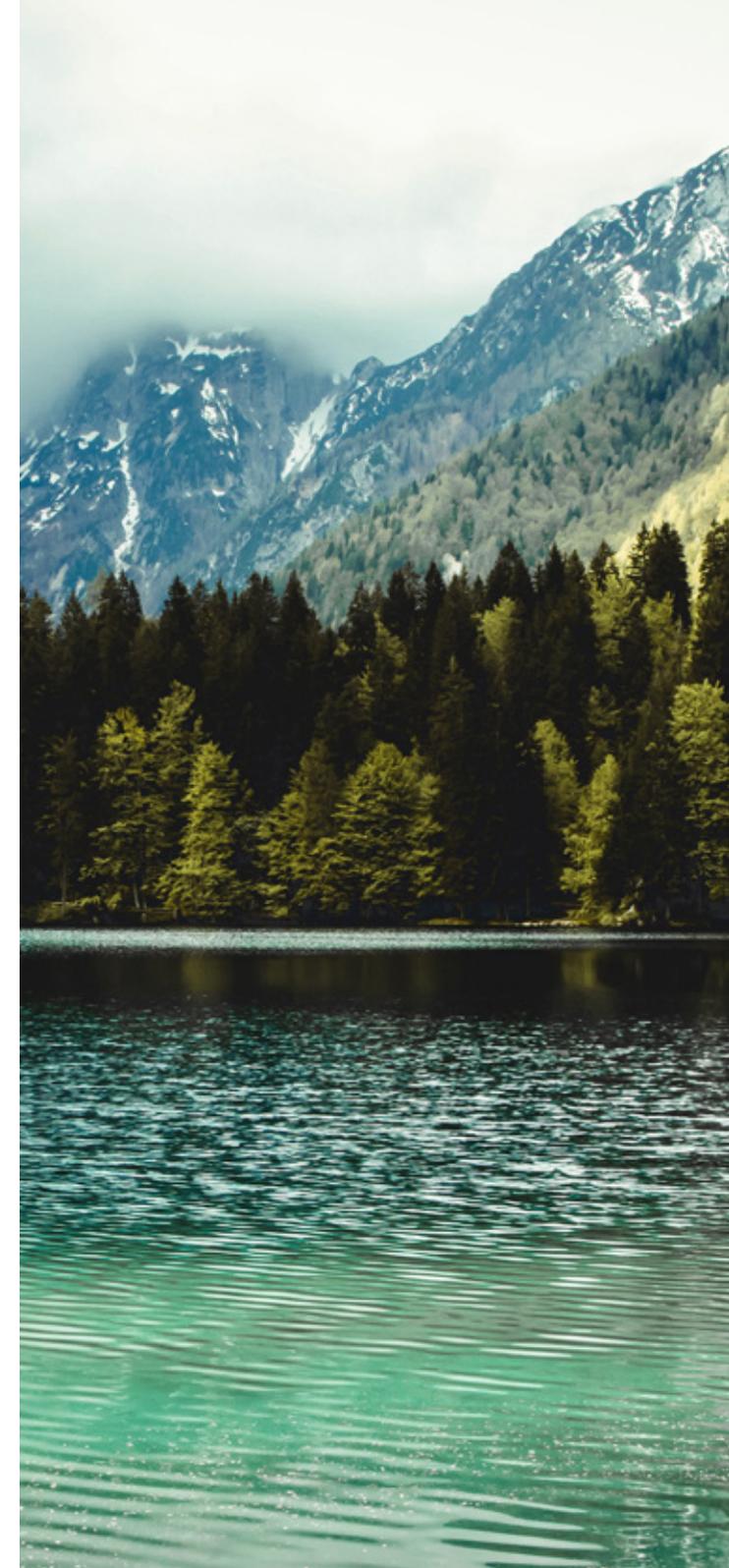
## About Permascand | Introduction

United Nation's Sustainable Development Goals and EU Taxonomy Areas.

	<b>UN SDG 9</b> Industry, Innovation and Infrastructure	<b>UN SDG 12</b> Responsible Consumption and Production	<b>UN SDG 13</b> Climate Action	<b>UN SDG 14</b> Life Below Water	<b>EU TAX 1</b> Climate Change Mitigation	<b>EU TAX 3</b> Climate Change Adaption	<b>EU TAX 4</b> Transition to a Circular Economy
Water Treatment	X	X		X			X
Industrial Solutions	X	X	X		X	X	X
Electrification & Renewables	X	X	X		X	X	X



Permascand's contribution to selected UN Global Sustainable Development Goals.

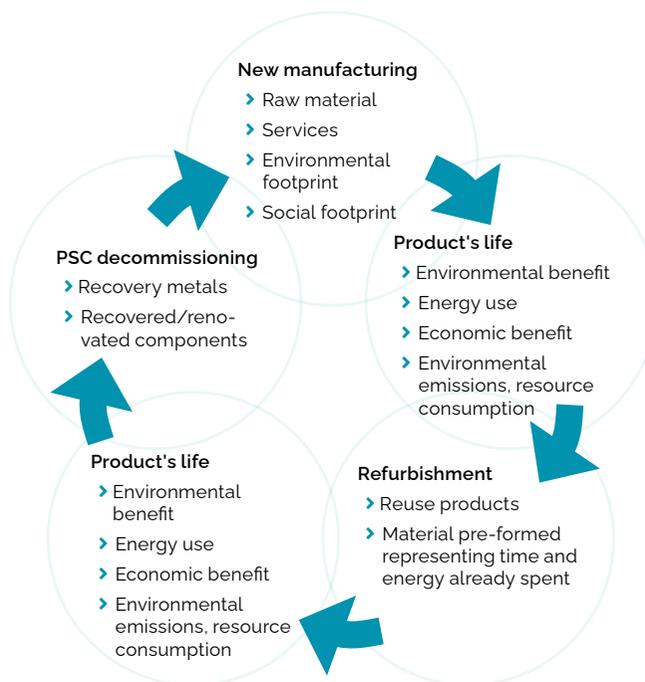


## About Permascand | Circular Business Model

Permascand has a business model in which the initial revenue comes from manufacturing new electrodes and electrochemical cells with the company's proprietary catalytic coatings. Over time, the catalytic coating wears out and needs to be replaced to maintain energy efficiency and operational reliability in the customers' electrochemical processes. At this point, Permascand can offer a refurbishment service which enables the customer to use the products for another operational cycle. For most electrochemical technologies, this refurbishment service can be performed 3-4 times before exchanging the original equipment for a new one. At end-of-life, Permascand offers support in decommissioning to recover and recycle as much as possible of the scrap goods.

Refurbishment represents a significant reduction in raw materials compared to new production. Permascand uses metals which have high longevity as products, can be repaired and refurbished and ultimately are recyclable. Compared to virgin materials, recycled materials have a smaller environmental footprint.

This model is congruent with cyclical business. In effect, ever since the company's initial production of dimensionally stable anodes in 1972, Permascand has focused on product longevity and reparability over and above the energy efficiency of the product. The scrap value of the most basic raw materials, titanium, steel and nickel, means that the company has always recycled most raw materials in terms of weight. However, there are opportunities to improve the circularity of products and the business model by eliminating material losses and degradation in the life cycles of a product. Focus areas that have been identified include spent coating, fugitive material emissions, metals from surface



preparation, and recirculation of solvents and waterflows. The circular business model is a good fit for Permascand. It addresses the problem of using mined materials as it seeks to preserve materials already in the industrial cycle. Many of the raw materials used represent a significant investment in environmental capital, and ensuring these materials provide economic, social, and environmental benefit for a long time is paramount.



# Goals & Strategy

## #1 goal and strategy

Manufacturing and refurbishing electrochemical solutions can have a positive impact on society when applied in green industries or to enhance sustainability. Permascand has set a goal to become the number one independent supplier of electrochemical solutions for green technology.

To achieve this goal, Permascand looks for ways in which its capabilities can be applied to address the United Nations Sustainability Goals and the EU taxonomy.

### *United Nations Sustainable Development Goals*

The company's business purpose revolves around the United Nation's Sustainable Development Goals:

- › UN 9: Industry, Innovation and Infrastructure
- › UN 12: Responsible Consumption and Production
- › UN 13: Climate Action
- › UN 14: Life Below Water

Permascand also strives for sustainability to permeate the entire company's operations. Several of Permascand's products are key enablers in the global transition towards a more sustainable future.

### *EU taxonomy alignment*

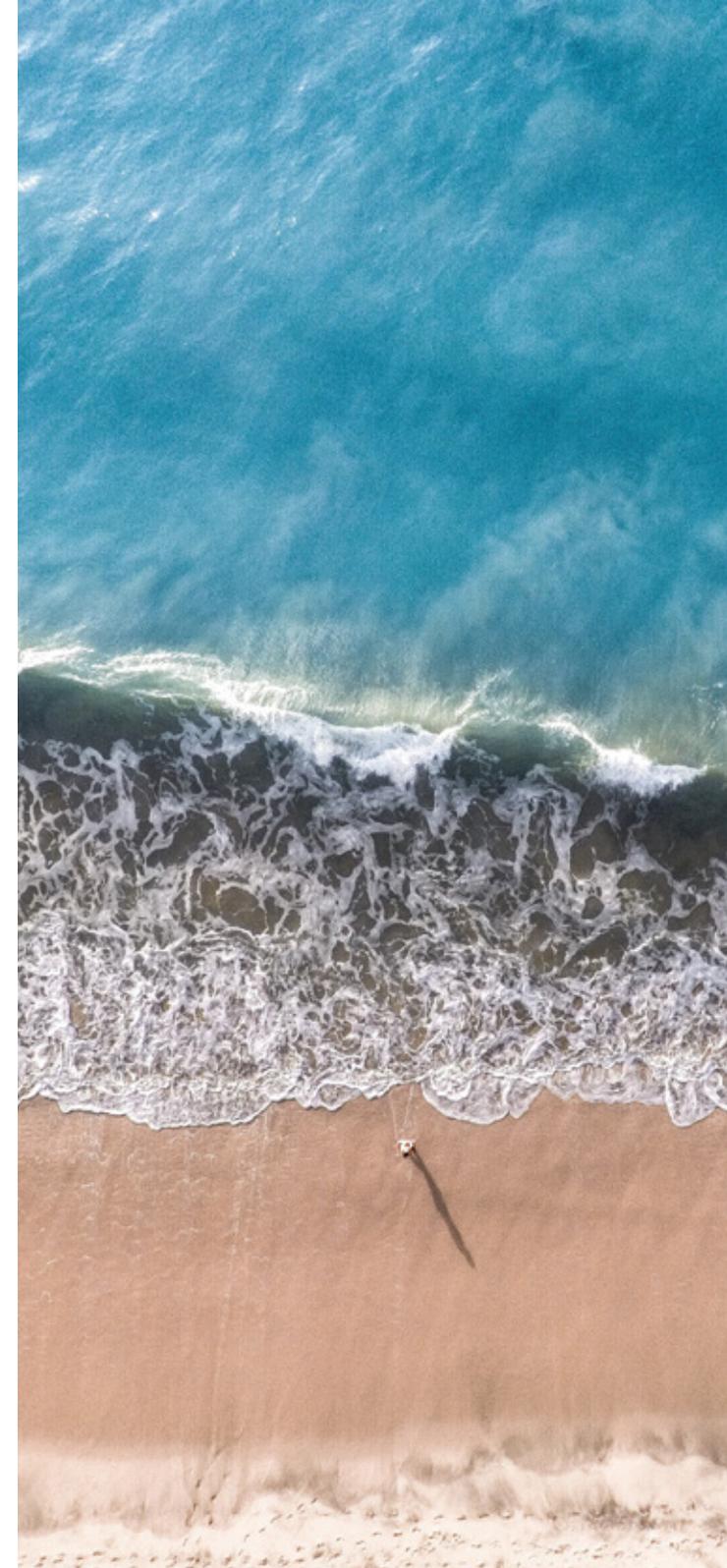
The business areas of Permascand are to a large extent aligned with the areas 1, 3 and 4 of EU taxonomy. In 2022, an opportunity to enter area 5 using water treatment technology was identified. Taxonomy areas:

- › EU Tax 1: Climate change mitigation
- › EU Tax 2: Climate change adaptation
- › EU Tax 3: Sustainable use and protection of water and marine resources
- › EU Tax 4: Transition to a circular economy
- › EU Tax 5: Pollution prevention and control
- › EU Tax 6: Protection and restoration of biodiversity and ecosystems.

Climate change mitigation in the EU Taxonomy refers to activities that aim to reduce greenhouse gas emissions and slow down global warming. This includes activities such as renewable energy production, energy efficiency improvements and carbon capture and storage. The objective of climate change mitigation is to achieve net-zero emissions and limit the rise in global temperatures. To be classified as a climate change mitigation activity under the Taxonomy, an activity must make a substantial contribution to one or more of the objectives of the Paris Agreement.

The sustainable use and protection of water and marine resources in the EU Taxonomy refers to activities that aim to ensure the responsible and efficient use of freshwater and marine resources, while preserving the health and productivity of these ecosystems for future generations. This includes activities such as water conservation, sustainable water management and protection of wetlands and aquatic habitats. To be considered a sustainable use and protection activity under the Taxonomy, an activity must not cause harm to water-related ecosystems or limit their ability to provide essential services, and must align with the EU's water-related policies and legislation, such as the Water Framework Directive.

The transition to a circular economy in the EU Taxonomy refers to activities that aim to create a more sustainable and resource-efficient economy. This involves reducing waste and emissions and using resources in a more closed-loop system, where waste and by-products from one process are used as inputs for another. Examples of activities in the circular economy include waste reduction and recycling, the use of renewable materials and the implementation of closed-loop production processes. To be considered a transition to a circular economy activity under the Taxonomy, an activity must demonstrate a significant reduction in the use of finite resources and the creation of waste, and must align with the EU's circular economy policy objectives.



# Goals & Strategy

## #2 goal and strategy

The second goal entails to addressing economic, environmental and social needs in all aspects of the product life cycle, and making production and procurement more sustainable.

The primary material inputs into Permascand's offerings are mined materials such as steel, titanium, nickel and noble metals. The consumables are a mixture of mined materials like aluminum oxide, chemicals derived from fossil or mineral feedstocks, and inputs that can be renewable including electricity, water and wood pellets. All these resources have an environmental footprint which needs to be accounted for. Many resources also have a social footprint which must be considered and be accounted for to enable good decision making.

To a large extent, Permascand relies on mined materials, the natural stock of which will not be replaced once consumed. It is therefore imperative to consider the scarcity of such materials versus the current and future demand. The company seeks to keep such material within the industrial cycle to so that it remains available for economic activity in the future when possible.

For renewable materials Permascand tries to ensure that resources are exploited at a rate that is within the capacity of the materials to replenish. In this regard, the sourcing must be considered on a locality basis as a resource may be over-exploited locally even if the global use is within sustainable limits.

Another key aspect to take into account is the

environmental and social footprint of getting the materials to the site gate. The extent of these footprints must be investigated to enable decision-making and prioritise the company's efforts.

Overall though, these considerations need to be weighed up against product function and longevity and the positive and negative impact over the total product life cycle.

### Circular business model and life cycle analysis

Permascand intends to use life cycle analysis (LCA) tools to facilitate good decision-making regarding materials and services. This is a commonly used methodology for describing environmental and social impacts. The potential benefits of LCA are:

- **Identifying environmental hot spots:** LCA can identify the stages of a product or service's life cycle that have the greatest environmental impact, such as raw material extraction, manufacturing, transportation, use and end-of-life. By focusing on these hot spots, Permascand can prioritise improvements that will have the greatest environmental benefit.
- **Comparing alternatives:** LCA can be used to compare different materials, manufacturing processes and transportation options to identify the most sustainable option. For example, LCA can be used to compare the environmental impact of different raw materials used to focus initial efforts on where there is most payback.
- **Setting sustainability targets:** LCA can help set sustainability targets for company products, such as reducing greenhouse gas emissions, water usage or waste generation.

These targets can be used to drive improvements and measure progress over time.

- **Designing for sustainability:** LCA can be used to inform product and service design to optimise for sustainability. For example, LCA can be used to identify opportunities to reduce the environmental impact of a product by using less energy or materials, reducing waste, or improving the product's durability.
- **Overall,** LCA can provide valuable insight and data that can be used to inform decisions and drive improvements that enhance the sustainability of a product or service throughout its entire life cycle.

In 2022, Permascand gradually started to use LCA tools, with the assistance of external partners and their proprietary software. The initial stage involved mapping primary material flows against LCA data representative of market conditions.

However, the mapping does not include any effects of processing and forming the material, nor does it cover transportation of the material, so the model will be improved in the future. It is to be emphasized that the information provided is only indicative, not factual. Relevant LCA data for most materials has been found. Some of the noble metals used do not have LCA data yet, but Permascand's suppliers have informed the company that an initial study will be available in 2023.

Generic data is used for the waste streams, in some instances, this substituted LCA data from an available waste stream thought to have a similar footprint.

# Environmental Sustainability

Permascand acknowledges that its operations have varying degrees of environmental impact. Therefore, the company seeks to reduce its negative footprint as much as possible through the application of innovative technologies and techniques. Examples include improving energy efficiency at its installations and reducing waste, while promoting the efficient use of resources through improved design and process improvements. Moreover, refurbishment activities extend the lifespan of electrochemical cells spreading the environmental burden over more years of utility.

## Energy and direct greenhouse gas (GHG) emissions

Energy consumption continues to be a significant aspect of our efforts. Permascand has already taken the first step by having transitioned to green electricity, bio pellets for heating and having harvested the low hanging fruits in energy-efficiency gains.

Electricity procured is generated with (renewable) hydro-power. A bio-pellets heating system was implemented in December 2019 to replace oil-based heating. Oil is now only used as a support fuel. The data presented demonstrates that Permascand has to some extent been successful in decoupling its growth from its direct fossil carbon footprint and energy consumption in recent years. The variation in energy intensity from oil and pellets since 2020 is within expected ranges between the years due to differences in temperatures.

Permascand has observed that the company is generating an increasing economic value per GWh electricity. Both total consumption and revenue contribute to this factor. On the consumption side, Permascand is helped by efficiency gains from updating equipment and procedures but there may also be a product mix component.

Electricity consumption has a zero contribution to carbon dioxide (CO<sub>2</sub>) in the calculation of direct emissions. A calculation using the LCA partners, tool to estimate CO<sub>2</sub> equivalent impact of procuring green electricity assuming a European context results in 116.3 tons of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) for 2022.

## RELATIVE CONTRIBUTION TO CLIMATE FOOTPRINT

Before analyzing Permascand's climate footprint the data will be subjected to scrutiny.

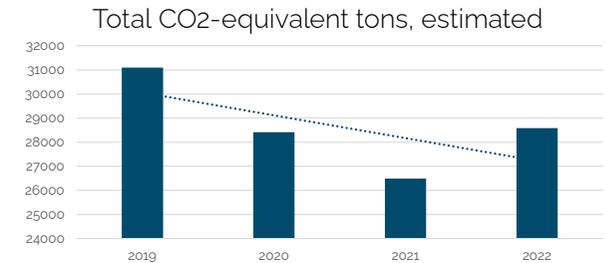
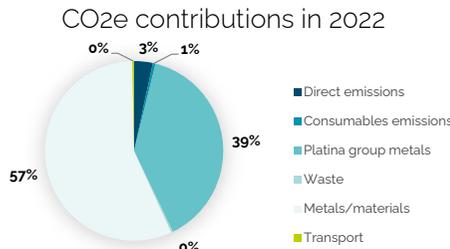
Assuming the same climate effect as in a typical European context, Permascand's green electricity consumption was 116.3 tons of CO<sub>2</sub>e for 2022. The contribution from the direct energy production represented here is from oil and bio-pellet burning including non-fossil CO<sub>2</sub> and the effect of nitrous oxides and methane from these combustion processes. Direct energy consumption and generation represent 3% of total contribution. Direct energy consumption is set to have zero contribution.

The consumables selected to be used in these calculations are the main materials used in direct production. Permascand procures various consumable materials that are not represented in this figure. In the future, more materials may be included in these calculations but these are currently considered to be of less relative importance. Given that this group of materials contributes 1% of the total footprint, other consumables will be unlikely to seriously affect the overall result.

As the LCA data on the platinum group of metals only partially covers the materials that Permascand consumes in this group, the company has to estimate the footprint of the group. Given that this group of materials is the primary contributor to the carbon footprint over time and the second largest contributor in 2022 according to the calculations, obtaining real data for the remaining metals is paramount to the reliability of Permascand's CO<sub>2</sub> performance assessment. An LCA study has been undertaken by the International Platinum Group Metals Association (IPA), which Permascand hopes to have access to before the next reporting year. Based on the assumptions made, this group of metals contributed 39% of total emissions in 2022.

Permascand only has partial data for waste streams on the level of CO<sub>2</sub>, and aims to get reliable data for the remaining sources of CO<sub>2</sub> from suppliers and LCA databases as the reporting develops. The waste accounted for in the data is not a significant contributor to Permascand's climate footprint at >1%, and this will not change significantly if the remaining waste streams are added. The lost opportunity represented by losing materials from the waste stream may be the most significant risk related to climate performance due to the missed opportunity for recovered materials replacing new materials in the procurement stream.

Metals and materials were the dominant CO<sub>2</sub> contributors in Permascand's operations in 2022, this is mainly due to high titanium consumption given the high share of new build projects. It has been assumed that the environmental performance of Permascand's supply chain is average when selecting LCA data. When the material is sourced from a specific region, Permascand has selected datasets specific to that region if available. The LCA selection may become more sophisticated as the company further investigates this area. These materials will soon be given top priority, both for securing representative data and for securing as environmentally sound sourcing as possible, given their relative contribution of 57% in 2022.



# Environmental Sustainability

## Direct electricity consumption

Permascand procures solely green electricity, which is primarily sourced from mature hydroelectric schemes supplemented by other more recent sources of green electricity such as onshore wind power.

Hydroelectricity is a low-impact source of renewable energy, but it is not completely without environmental impacts. One of the potential impacts of hydroelectricity on global warming is related to the emissions of methane, a potent greenhouse gas, from the reservoirs that are created behind hydroelectric dams.

When a hydroelectric dam is constructed, it creates a reservoir by flooding a large area of land. As the vegetation in the flooded area begins to decompose, it can release methane, which is a greenhouse gas that is many times more potent than carbon dioxide. Since the amount of methane emitted from hydroelectric schemes typically decreases over time as the reservoir stabilizes and the decomposing vegetation is depleted, the effects are minimal for the hydroelectric dams in Ljungandalen.

Wind power is a growing part of the green energy mix in the region where Permascand is located with many projects being developed and coming online. The common impacts of wind power include changes to land use, impacts on wildlife and ecosystems, visual impacts, noise, and vibration, and impacts on local communities. The specific impacts of a given project will depend on a range of factors and should ideally be assessed on a case-by-case basis which is beyond the scope of this report.

The fact remains that green energy is not fully carbon neutral nor for that matter without environmental impact. Permascand has an impact of 116.3 tons of CO2 equivalent, and to gauge the scale of this impact Permascand has applied a calculation based on LCA from its LCA partners, thought to be representative of an average European context. It is not sure how relevant this number is to the electricity purchased; thus, this figure only provides an estimate.

For comparison, assuming an emission factor of 890 grams of CO2 per kWh for electricity generated from coal in Europe, the total greenhouse gas emissions from 2,318,819 kWh of electricity would be 2064.5 tons of CO2e. So, the choice to procure green electricity nevertheless represents a large carbon saving.

Permascand recognizes that renewable energy has a negative impact even though it is much smaller than typical fossil sources. Also, every unit of energy consumed adds to the total societal energy demand. To contain the risk, efforts have been made to reduce energy consumption, via LED lighting and updating equipment and machinery such as laser sources. Efforts continue to make efficiency gains. In 2023 a new energy mapping will be done to guide the next capex cycle on electricity.

## Direct CO2 emission calculations

Calculations of CO2 emissions have been made using the company's consumption numbers and the emission factor from the Swedish Environmental Protection Agency's 2022 reference data for oil. The same reference was used to calculate the non-fossil CO2 emission factor of bio pellets. An emission factor for fossil emissions from pellet burning was provided by the supplier of the pellet burning plant. It has not been possible to validate the source of this reference value and the company has chosen to apply this factor rather than zero.

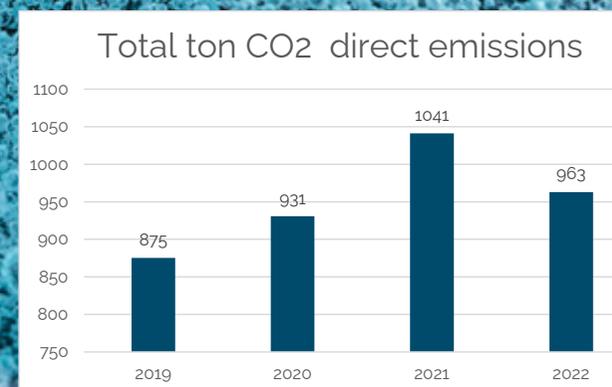
A closer look at direct CO2 emissions in relation to revenue shows that Permascand's direct emissions are not directly related to revenue. This is logical given that the company's direct emissions are related to heating. Thus when revenue increases using the current workshop area, this footprint does not grow.

*"Permascand has significantly reduced its direct fossil emission footprint."*

## BRIEF FACTS ABOUT CO2E

- ▶ CO2e stands for "carbon dioxide equivalent" and is a unit used to measure greenhouse gas emissions, including gases other than carbon dioxide that impact the climate.
- ▶ CO2e calculates the total amount of greenhouse gas emissions generated by a specific activity or event, by converting all emissions of different gases to an equivalent amount of carbon dioxide.
- ▶ CO2e is used to compare emissions from different sources and calculate a total climate impact, which can help businesses and organizations take steps to reduce their emissions and become more climate-friendly.

Direct energy consumption	2019	2020	2021	2022
Green electricity GWh	6	3.4	2.4	2.3
MSEK revenue/electricity GWh	86	139	157	221
Direct emission CO2 tons, fossil	875	181	214	150
CO2 emission tons, non-fossil	0	749	827	813
CO2 equivalent effect from NO2 and methane ton	2.7	4.5	5.0	4.8



## Environmental Sustainability

### *Methane and NO<sub>2</sub> emissions*

A direct emission of methane and NO<sub>2</sub> from the burning of fuel oil and bio pellets has been calculated using reference data from the Swedish Environmental Protection Agency.

To calculate the CO<sub>2e</sub> of methane or nitrous oxide emissions, the emissions (in tons) are multiplied by their global warming potential (GWP), which is a measure of their ability to trap heat in the atmosphere relative to CO<sub>2</sub> over a specific time horizon. The GWP of methane is 28 over 100 years, while the GWP of nitrous oxide is 265 over 100 years according to the information provided. However, other factors also impact the climate impact of greenhouse gases, such as the atmospheric lifetime, location, timing, and potential for indirect effects which are not accounted for.

Note that the calculations show that the global warming effect from NO<sub>2</sub> and methane are minor in the overall picture of direct emissions. There has been an increase from the implementation of the pellet plant but not significantly in the scheme of the overall effect from direct heating.

### *Oil and bio pellets emission management*

Fuel oil is now used as backup fuel, which has reduced fossil CO<sub>2</sub> emissions and minimized SO<sub>x</sub>. The company's pellet boiler has been designed to minimize emissions of NO<sub>x</sub> and CO. The flue gases are then directed to a separate chimney, which is about 15 meters to reduce the local impact. Periodic testing is conducted to ensure proper combustion and pollution abatement to reduce emissions and retain efficiency. Recognizing that combustion of wood material emits CO<sub>2</sub>, NO<sub>x</sub> and particulates, and requires wood to be harvested and replanted, Permascand will try to reduce its consumption. The company may have slightly low generating capacity from pellets in a bottleneck situation. This

increases its reliance on oil and could eventually lead to a need to increase the pellet burning capacity if no other solution is available. This would lead to more emissions and further resource exploitation. Permascand intends to try to resolve this issue by increasing efficiency in the heating system. In late 2022 a project was initiated to build a CAD model of a heat distribution system.

Permascand does not have a viable alternative to oil to supplement heating needs when burning pellets is not viable. The company will be looking into the possibility of further reducing the need to supplement heating from fuel oil but in 2023, the company will primarily focus on improving the efficiency.

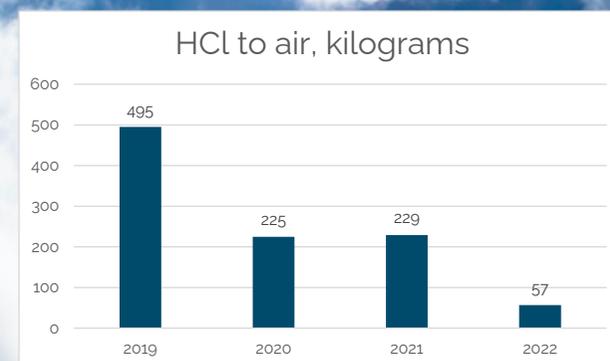
### *HCl emissions*

In 2022 a new maintenance procedure coupled with optimization of the scrubbers showed promising results in reducing HCl emissions. This has been enabled by reorganizing and dedicating a full-time member of staff to maintenance in the coating and surface treatment plant.

Permascand has the requisite environmental permits for HCl emissions to air and for pH and metal salt content of its discharged process water.

Several improvements, not least in the operational efficiencies in the coating process and scrubber management, have led to a significant reduction in HCl emissions. The measuring methodology and sample analysis have also been further developed to give more accurate numbers.

Wastewater has not been treated on-site since autumn 2020 due to a rebuilding of the treatment plant. The new wastewater treatment plant will be in operation from 2023 and reporting of emissions will be started again.



# Environmental Sustainability

## Waste

The primary supplier of waste processing has added a service allowing a CO2 equivalent report to be produced. Permascand is now able to supply data on CO2 for the waste streams managed by this provider.

The total climate effect of this waste stream in 2022 was 93.5 ton CO2e.

The data comes from the supplier's LCA work and calculations are made on average performance from that type of waste stream in the supplier's operations.

Smaller amounts of hazardous waste are treated by this supplier, such as minor chemicals and fluorescent light tubes. These do not figure in 2022 statistics as the amounts generated in 2022 were included in January 2023 and will appear in the 2023 statistics.

The primary sources of CO2 from waste include two types of combustible waste followed by acid. Acid represents 18% of the CO2e footprint and will be treated on-site from 2023 onwards in the wastewater treatment plant.

Spent shotblasting material and filtered material from the wastewater plant is sent for recycling and material recovery. The supplier recovers titanium and noble metals from spent coating and filtered material. Filtered material will be sent for recovery again from 2023 as it is generated on-site from wastewater treatment.

Metal scrap from nickel, titanium and steel is sold to different suppliers. The decision on when to sell scrap is partially controlled by the price of scrap as well as availability. The graph on the right shows the calculation of the CO2 footprint of materials sent for recycling versus the footprint of materials bought for comparison. As the company typically does not collect/handle the customer's product for final disposal

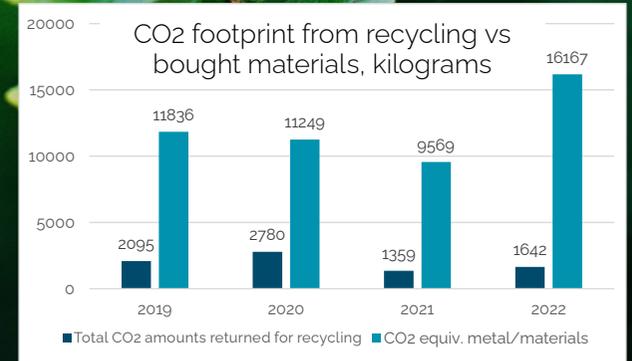
yet, the procurement footprint outweighs the footprint of the material for recycling. Customers typically also send end-of-life materials for recycling. Permascand hopes to close the gap in the future and add product recovery at end of product lifetime to Permascand's business model.

## Recycling and recovering from waste

The company sorts and recycles all waste from mechanical operations and has licensed third-party operators to collect hazardous waste streams generated in the on-site research laboratory and minor waste streams produced during production.

Permascand has been working to recover noble metals, such as ruthenium and iridium, from waste streams and processes. Noble metal recovery activities were completed in 2020 and 2021, and in 2022 the company assessed these projects to determine their potential for forming a new recovery strategy. A new strategy is being developed in 2023, as further viable alternatives were identified in 2022. One new supplier of recovery service was identified as part of this work and a supply agreement is in place, and a promising alternative to shotblasting is being researched in 2023.

The company has established a new water treatment plant, performance that is consistent with the previous plant. Permascand thereafter decommissioned the tanking station that allowed the supplier to tanker process water for off-site waste treatment. To reduce long-term wastewater production, Permascand is currently optimizing plant performance and establishing new procedures. The company recovers titanium and noble metals from filter material produced in its wastewater plant, with the process now active again in 2023 after rebuilding the plant.



# Environmental Sustainability

## Management of key material issues for sustainable production and consumption practices

Permascand strives to consider environmental, social, and economic sustainability issues to improve its sustainability performance. The company manages and classifies all known negative environmental factors in accordance with significance, and plans and executes remedial actions based on significance and the company's ability to address problems. After problems are addressed the impacts are reclassified.

### *Material consumption reduction*

During 2022 activities to reduce material consumption have by largely focused on reducing the consumption of noble metals and chemicals in coatings.

The test plant for coating application has been approved by the authorities and single samples have been processed in the plant. So far, the sample tests conducted have shown a high level of quality. A number of areas for improvement have been identified. The platform will be modified to improve health and safety and certain parts will be replaced with parts made of more suitable material. Work will be undertaken to verify the first product groups in the test plant and to quantify the emission profiles as well as optimize health and safety aspects during 2023.

New sensor technology has been installed in the main coating plant which will lead to a minor improvement in coating consumption initially. Further improvement to plant operations can be derived from the platform further downstream as other sensing technologies may be applied giving more sophisticated process control.

The implementation of the new automated nibbling line has transferred processes from the laser leading to a reduction in protection gas consumption. Consumption has been reduced by 39 tons compared to 2021, but this is partially explained by the absence of a product which had high argon consumption in previous years.

### *Recovery of materials*

A new promising supplier in the recovery of noble metals has been developed which will have a significant improvement in noble metal recovery from certain streams. The same supplier is investigating other streams and is likely to present further improvement options in 2023.

A potential alternative to shotblasting was identified in 2022 and a project has been initiated to investigate the application's, suitability for recovering coating's, which may be more efficient than recovering coating from spent shotblasting material.

### *Re-manufacturing*

During 2022 Permascand continued to refurbish products as usual. However, as the business develops, Permascand is seeing proportionally more new manufacturing as signified from the increase in titanium consumption.

### *Material consumption footprint*

Material consumption is a significant part of Permascand's environmental footprint. The company has been aware of this for a long time and worked systematically to increase material efficiency in its products. However, it has come to a point where Permascand needs to quantify the footprint of these materials. To help inform decision-making and follow up the effect of initiatives, Permascand focuses on CO<sub>2</sub> equivalents, as the company has been focusing on this metric in the direct emissions for a few years.

The mapping has been carried out against the baseline raw materials, it does not include any effects of processing and forming the material and it has not been possible to cover transportation of the material. The model will be refined in the future. The information provided should be treated as indicative of the real conditions, not fact.



# Environmental Sustainability

## Impact comparison materials – consumables

This category consists of the primary consumables of which Permascand uses a significant amount in direct production. The development of the consumption of consumables shows a general positive trend toward a smaller CO2 footprint.

## Raw materials – platinum group metals

An average of the known value for palladium and platinum has been used to derive a reference for other platinum group metals Permascand uses. LCA data on other metals in the group will soon become available, but until then a proxy value is used. The value cannot be considered as correct but can be used to estimate the rough scale of the impact.

Taking this into consideration the graphs on the right show a trend towards reduced consumption during 2019-2022. This is partially due to the continuous improvements Permascand is making in both processes and products. A clear part of this is related to the product mix with certain products being more intensive in regard to platinum group metals. Also, Permascand placed a large order to reserve materials in 2019 for one of the projects. The gradual reduction of this stock partially explains the trend. Separating these effects is beyond the scope of this report.

## Resource consumption-noble metals

The extraction of noble metals used in catalytic coatings can have significant local impacts and it represents a use of a scarce and non-renewable resource. The analysis work using LCA data undertaken in 2022 indicates that this impact is indeed likely to be one of the major impacts of Permascand's operations. The related risk is managed by process optimization to reduce consumption per produced unit and efforts are ongoing to reclaim materials from the waste streams. In this regard, the main activity in 2021 was the implementation

of more efficient application equipment in the main coating plant. This has led to higher coating yields by reducing overspray and improving coating quality, thus reducing the noble metal footprint of Permascand's products overall.

## Metals and materials

The data shows the contribution from raw materials to CO2 footprint is growing. This is because Permascand's growth in the new manufacturing area.

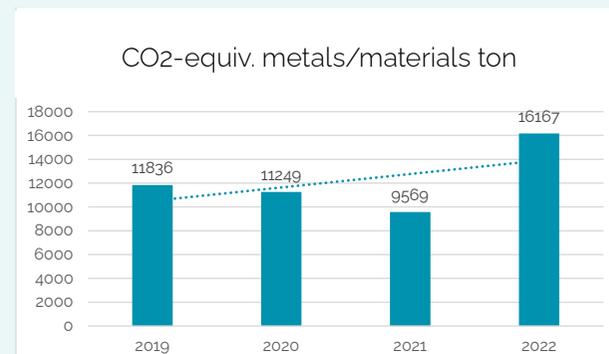
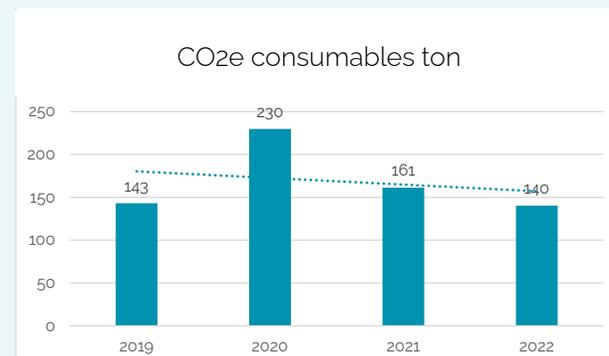
The primary material inputs to products are titanium, nickel, steel, and fiberglass. Fiberglass is related to the *Water Treatment* sector where the shell housing is made from FRP.

Titanium and nickel are used across several business areas, follow production volumes and are associated with new production. Steel is primarily associated with *Industrial Solutions*. It is independent of new versus re-manufacturing as steel is typically recycled after each life cycle.

Titanium consumption went up in 2022 because of a high number of new products associated with greenfield development. Fiberglass was on downward trend in 2020 and 2021 as production moved to smaller units that are lighter and the next generation of cells reduced material input as a design feature. Steel consumption follows the *Industrial Solutions* sector.

Permascand's conclusion is that, titanium consumption dominates the CO2 impact for raw materials and metals. This is due to a combination of high consumption of titanium and the high per ton impact of this material. In the future, nickel is likely to become a more significant contributor as the *Electrification & Renewables* segment grows.

Considering the impact of production in 2022, titanium is the highest CO2 contributor which dominates the overall trend followed by fiberglass. Nickel is still procured in small volumes and steel has a lower per unit CO2 equivalent impact than titanium and fiberglass.



# Environmental Sustainability

## Metals

When it comes to the environmental burden of the production of titanium, nickel, and steel Permascand manages the risk in a number of ways; through re-manufacturing, extending product life, recycling of titanium, steel and nickel scrap from end-of-life products and offcuts, recycling from the wastewater treatment system, and optimizing product design and sourcing to eliminate offcuts.

## Fiberglass

Given the environmental burden of producing composites identified in the life cycle analysis data, and the fact that Permascand procures a significant amount of composites annually, this is an area that must be managed.

The use of FRP products poses a challenge at the end of their life cycle as they are difficult to recycle due to their composite nature. As a result, many FRP products end up in landfills where they can take hundreds of years to degrade, and potentially release harmful chemicals into the environment.

Permascand tries to remedy such waste problems by designing FRP parts with the intention to reuse shells when Permascand later refurbishes water treatment systems, and this prolongs the useful lifetime and maximizes the environmental benefit generated by products per unit of FRP used. It is difficult to predict with certainty what advancements will be made in waste management methods for FRP in the coming years. However, there is ongoing research and development in this field, and it is likely that more sustainable solutions will become available in the future. Governments and organizations are increasingly recognizing the importance of addressing waste management issues with composites. The interest and investments in research and development to find more sustainable solutions are strategically important in wind power and many other sectors.

Permascand has worked to reduce the amount of FRP material per unit when designing the most recent generation of ballast water treatment products. See the case studies section.

## RAW MATERIALS - ENVIRONMENTAL FOOTPRINT

Permascand has assessed the primary material flows in production, using the LCA data. The company looks at the relative impact of these materials by combining data for each sub-group of material with actual consumption data. The analysis indicates the following conclusions.

Assuming that platinum group metals can be modelled using information on palladium and platinum, the analysis confirms past thinking that platinum group metals and titanium have the highest environmental impact amongst the raw materials used by Permascand. Improving efficiency in using noble metals and ensuring recovery of noble metals must therefore remain an area of primary concern for the company.

For titanium, Permascand has worked continuously to increase material efficiency via design and procurement choices. It is therefore not reasonable to assume that sufficiently large gains can be made in these areas to compensate for the fact that the business growth will lead to increased consumption of this material. This also applies for nickel. When Permascand enters new business areas, initially it requires more virgin material in proportion to re-manufacturing. Therefore, the impact of procurement is expected to grow.

Permascand has historically focused less on nickel due to procuring relatively small amounts in recent years. Its primary use has been on customer owned materials, so the ability to make efficiency gains or use substitutes has been very limited. This is expected to change as Permascand expands its business in the *Electrification & Renewables* segment.

An initial investigation has informed Permascand that there is significant variability in global warming potential and other environmental effects between different nickel production methods and sources. Recycled nickel has a significantly lower impact. Permascand needs to improve its understanding of this as the company increases its nickel consumption.

The LCA data assessed so far has proven useful in conjunction with material consumption data to identify the most impactful areas for improvement. This does not mean that Permascand should ignore the non-metal materials.

# Environmental Sustainability

## *Transportation and travel*

This is the area where Permascand's reported level is far from the actual impact. The calculations show this area to be trivial in comparison to other contributors, but this is likely to be incorrect due to methodological weakness.

Permascand has retrieved data from suppliers for transportation and travel. The data is directly based on the actual transportation scenario and thought to be of high quality. However, the company purchases only a small fraction of the transportation associated with Permascand's procurement and transport to customers. Most often the suppliers and customers purchase the transportation. Permascand's material streams are shipped all over the world and the actual footprint may well be many times higher the reported footprint. Assessing the impact of all the transportation to and from Permascand purchased by third parties is a substantial challenge. It requires analyzing the mix of road, sea, rail and air transport and estimating distances. More expertise in this area is needed to develop a method to make qualified estimates.

The data on personal travel is not divided into different travel categories and making a reasonable calculation of CO2 equivalent is not possible. Permascand is working with suppliers to improve the reporting, but the results are not available in time for this report.

In summary, Permascand needs to develop a model for how to assess the impact of travel and transportation further.

## *Transportation of incoming and outgoing goods*

The most significant risk is from road transport by lorry which has a high footprint per unit compared to shipping. Air transport, which has a higher environmental footprint, is only utilized on the rarest of occasions, and only when required by urgent customer need. Permascand systematically works with suppliers to reduce the number of transportations and further work is needed to create a relevant measure for determining the effects of Permascand's efforts. During 2021 Permascand started transitioning to the next generation of ballast water treatment cell models, which were redesigned in 2020 to create a smaller transport and materials footprint. Further information is presented in the case studies section. During 2022 Permascand has started to quantify the impact of transport to help focus future efforts. It is apparent that most transportation to and from Permascand is purchased by suppliers and customers.

## *Goods transportation*

Currently it is not possible to estimate the full environmental or climate effects of goods transportation. However, Permascand accounts for the CO2 footprint from the transportation services purchased by the company, using CO2 estimates provided by Permascand's suppliers. Transport of goods purchased by Permascand resulted in a footprint of 75,6 tons of CO2 equivalent.

## CASE STUDIES

### **A new generation of PERMACHLOR® BWT cell**

One of Permascand's primary product lines is in the ballast water treatment sector. To reduce cost, production and installation complexity as well as the environmental impact of FRP consumption, Permascand has launched a new generation of PermaChlor® BWT cells.

The calculated reduction, as CO2 equivalents, from the FRP material saving from this new generation compared to the previous generation of cell was 298 tons for the full-year deliveries in 2022. This equates to almost double of Permascand's non-fossil CO2 emissions in the same year.

On top of this, the reduced weight and product footprint also gave a significant reduction in the carbon footprint relating to transportation to/from the site of the FRP shell and the finished PermaChlor® BWT cells.

### **Refurbishment of products in the Industrial Solutions area**

Permascand has served customers in the *Industrial Solutions* business segment with refurbishment services for more than 50 years. In many cases, after three refurbishment cycles and 40 years in operational service, more than 95% of the raw material in the original manufactured product remains in the refurbished product.

## Environmental Sustainability

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### *Personal travel*

As a company operating in a global market and in a location far from transportation hubs, Permascand's use of car and air travel is significant - Company cars are run on HVO - a diesel replacement derived from waste streams - electricity, petrol, electricity hybrids, or electrical vehicles are used.

Limited-service travel with the company cars was reported in 2022. The fleet of vehicles consisted of hybrid vehicles and there are two fully electric vehicles in the fleet. Two diesel vehicles from the original car scheme remain. Full fossil-fuel cars will be phased out of Permascand's car pool in 2023.

During the pandemic Permascand was able to run operations with a much-reduced need for personal transport by utilizing video conferencing more and having employees working from home. Permascand observed that there is a large need to establish personal contact in 2022 following the pandemic. In the current stage of the business, with Permascand building many new relationships with new customers and suppliers, the need for travel may remain high. Permascand will continue to use video conferencing as a supplement to physical visits.

Permascand will continue to utilize work-from-home as a tool in reducing its transport footprint going forward and a policy has been created to balance the need for physical presence against working from home.

It is unclear whether the level of the travel observed in 2022 represents the future need of the company and this will be tracked in the years to come. Information from Permascand's travel supplier indicated that Permascand purchased the following amount of travel in 2022. 93,367,322 person kilometres.

Permascand has used the lessons learned during the pandemic regarding digital cooperation tools to allow more members of staff to work from home. This reduces the impact of staff members travelling to work on-site.



## Promoting Social Responsibility

The number one priority for Permascand is the health and safety of employees, and the company has a target of zero accidents leading to time off, which is evaluated every year. All such incidents are reported to the health and safety authority regardless of severity. In 2022 there were no incidents.

### Health and safety

Permascand is ISO 9001:2015 and ISO 45001:2018 certified, welding activities are separately certified with the ISO 3834-2 and 4. The QHSE manager is responsible for monitoring compliance with health and safety protocols within company activities. Health and safety are discussed during management meetings on a weekly basis, and the company has health and safety committee to manage risk. Monthly committee meetings are held with union representatives, safety inspections of all departments are carried out four times a year. On top of this, every project for construction or equipment installation is reviewed and risk and safety plans are documented and followed up.

### Incident management

Permascand systematically records and follows up reported near misses and incidents and internal risk management procedures, routines and instructions covering health and safety are standard.

Far fewer incidents were reported in 2022. The company has discussed this reduction in reported incidents in the safety committee with all the elected safety representatives and concluded that there is higher awareness in the organization. The company will continue to work actively with reporting and use the monthly town hall meetings to communicate the importance of such reporting.

### Chemical management

At Permascand the use of hazardous chemicals are used in a responsible manner and only by trained personnel. A list of surplus chemicals was developed in 2019 and these were removed, as a result. Nevertheless, certain chemicals cannot be replaced due to client requests or a lack of alternatives. Since 2019 the company has focused on reducing consumption of chemicals. Sodium Dichromate (SVHC) is used for research purposes to model electrode performance in the chlorate industry where the material is still in use.

Permascand continuously monitors airborne chemical exposure in production utilizing its occupational health services provider to control that abatement equipment and PPE are effective.

### Noise and vibrations

During 2022 Permascand has monitored external noise twice and the results show that Permascand does not currently have a noise problem. The calculation of the noise dissipation shows that Permascand is well within legal limits and approaches background levels at the nearest neighbour. Permascand continues to monitor employee noise exposure and handles noise exposure using a combination of PPE, processes, and equipment modification.

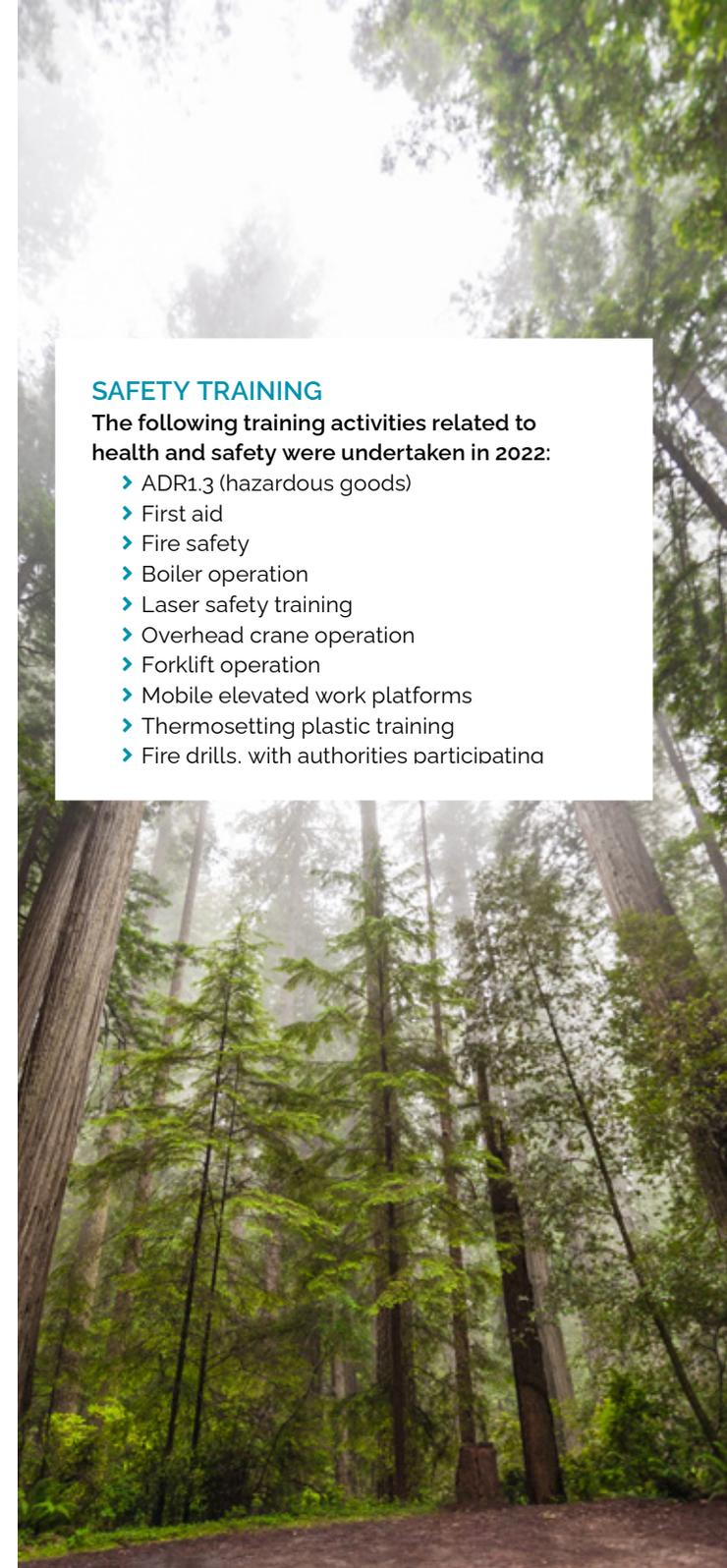
Permascand works to reduce vibration exposure in the workshops and periodically uses an occupational health services provider to monitor exposure in manual processes that use hand tools.

Automation of several processes was completed during the years 2020-2022, which has reduced exposure to safety risks in the area of vibration, noise exposure, welding gas exposure, optical radiation exposure and manual handling.

### SAFETY TRAINING

The following training activities related to health and safety were undertaken in 2022:

- › ADR1.3 (hazardous goods)
- › First aid
- › Fire safety
- › Boiler operation
- › Laser safety training
- › Overhead crane operation
- › Forklift operation
- › Mobile elevated work platforms
- › Thermosetting plastic training
- › Fire drills, with authorities participating



## Promoting Social Responsibility

### Wellbeing and happiness

Permascand conducts an anonymous employee survey to monitor many aspects of staff wellbeing and satisfaction every year. The survey has been conducted over a number of years and the company can track the development and performance from one year to another.

### Leadership

One central and important part of the survey is the leadership index. Last year's result was 79% in comparison to the goal of 80%. This is a very good result when compared with Permascand's peers and demonstrated the effect of leadership training and people development programs.

The program consisted of individual targeted leadership training, a general education program and targeted mentorship.

Four new leaders were appointed since the last report, and these will continue their onboarding in 2023.

Permascand scored higher than ever on leadership in the employee survey with 79% and sees a continuing trend towards improvement. Reaching the target of 80% in an employee survey is ambitious, it is of great importance to continue promoting leadership development vigorously.

Permascand prioritizes four important aspects for success in good leadership:

- Proactive - Making decisions with speed and conviction.

- Long term - Engaging for impact.
- Structured - Adapting proactively.
- Sustainable - Delivering reliably.

### Wellbeing

At Permascand the presence rate is monitored to emphasize the value of employees being at work and set as a target of 97% presence at work and similar sick leave rate of 3% in average. The goal is in comparison a challenging goal and in 2022 the presence rate was 95.9% and a decrease from previous years. The reduction from 2020 and 2021 results was largely caused by the pandemic during January repeated again during the summer.

Industry standard and the peer group for sick leave in Sweden is 5-6%. In comparison, the company is performing very well, and employees have high work presence. Permascand's employee health and wellbeing is a central aspect of the company culture and sick leave is a standing item on the monthly meeting agenda.

### Health consultation

Permascand offers health consultation to all employees as part of the company health plan. The consultation contains a physical test and health interview in which a health professional offers advice and makes recommendations including on-line services.

The results show that employees have good physical health and indicate that they are satisfied with their physical work environment, receive adequate organizational support and feel confident in the development of the company.

The company supports employees in managing a healthy lifestyle by offering a fully equipped company gym at the Ljungaverk site, a free massage chair, a periodic massage service on-site, yoga sessions, occupational health services and consultation on-site regularly during the year. Permascand also holds an annual walk, run and cycle event called PermaRace, a friendly competition over a set course of 5 or 10 kilometers.

HEALTH AND SAFETY	GOAL	2022	2021	2020
Presence rate,%	97%	95.9%	96.9%	96.5%
Leadership index	>80%	79%	N/A	74%
Bullying/harassment	0	N/A	3	3
Accidents leading to sick leave	0	0	1	1
Reported HSE deviations	>2022	23	42	37

0

Accidents leading to sickleave

96%

Presence rate

79%

Leadership index

# Promoting Social Responsibility

## Social responsibility

Permascand respects all internationally recognized human rights agreements and strives to provide good working conditions for all employees. Evaluations are regularly conducted to ensure that any misconduct is identified and addressed within supplier and customer contacts.

Permascand makes no distinction between gender, sexual orientation, age, race, skin colour, ethnic background, religion, trade union membership or physical ability.

Permascand works to ensure that the company does not use, directly or indirectly, forced labour, illegal child labour or unlawful migrant labour.

## Diversity and equality

The company has a diversity and equality policy which states that Permascand values all people equally. This means that everyone is valued according to their own unique experience and competence. The policy applies to employees, people looking for work at Permascand, customers and suppliers.

The policy commits Permascand to give all people the same rights, obligations and opportunities in connection with work, terms of employment, promotion, and skills development. This includes equal pay for equal work and a commitment to create a working environment that is welcoming to all. Permascand strives for an equal distribution of men and women in all Permascand's different professional roles and at all levels of the company.

There is zero tolerance for discrimination or harassment. There is no retaliation against employees for reprimanding, reporting or participating in an investigation regarding discrimination and harassment.

Equality at Permascand means that people should have the same rights, obligations and opportunities in all

significant aspects of life. Permascand's fundamental ethical principles are to:

- Actively seek to ensure that both the physical and psychosocial work environment is suitable for all employees.
- Make it easier for all employees to combine work and parenthood.
- Prevent harassment.
- Investigate all cases of discrimination and harassment in the workplace and take appropriate action.
- Provide all employees with the opportunity for development and training.
- Actively promote a more even gender distribution in activities.
- Provide all employees with equal pay and terms and conditions for equal performance when the work performed is the same or of a similar nature and is of comparable level of difficulty.

The Policy is backed up by an action plan which is revised every 3 years. The current version covers 2020-2022, which includes actions such as: an anonymous annual staff survey including questions on harassment, discrimination and views on how well Permascand meets the targets in the policy, planning of opportunities such as training, important meetings outside school holidays, obligation for flexible working hours for parents, active recruitment targeting women from technical colleges and regular pay structure reviews to assess equal pay. The plan includes a mapping of gender distribution.

The most recent anonymous survey had a 97% response rate. It showed that almost all employees agree that Permascand has a zero tolerance towards discrimination and harassment and that the company provides equal opportunities.



FIGURES 2022		
Number of employees	118	
New employees	17	
Number of training hours	2.676	
Distribution men/women	Women	Men
Board of Directors	2	5
Executive management	3	4
Middle management	1	8
Employees	18 (15%)	100 (85%)

## Promoting Social Responsibility

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### *Fairness*

- › Most employees are represented by unions in accordance with the Swedish Collective agreements between Permascand and the unions.
- › Employees are surveyed every year; appraisals are completed annually and cover work pressure and employee satisfaction topics.
- › The company complies with ILO standards.
- › An employee questionnaire will be conducted to monitor progress on ESG issues.
- › Training activities are expected to increase during 2023.

### *Role in society*

Permascand plays a significant role in the local community in a rural location by supplying skilled, high quality industrial jobs in a region that has lost many such jobs. Ljungandalen was historically an industrial hub for the Swedish chemical industry and Permascand is one of the few remaining companies.

- › Employees are surveyed annually on how successful Permascand is in providing fair and equal opportunity employment.
- › Permascand regularly reports to the local authorities bolstering their good relations.
- › Permascand sponsors young sales talents and hires work placement students from the local high school in Ånge (every semester); two students for workshop activities, and two economics students for specific internal projects.
- › An annual environmental report is presented to the local authority providing information on emission levels that could potentially be harmful to the local population.



## Responsible Governance

In the governance structure in Permascand the Board approves all policies and changes to policies and sets out objectives for the company at the highest strategic level. The management team is tasked with achieving the objectives set out in the policies. The management team assesses the risks and opportunities related to improving the sustainability of the company products and operations and develops a response to these. The management team develops strategies and policies for the Board to approve and tasks the organization with activities and goals to achieve. The management team is helped by the ISO 9001/14001/45001 certified management system.

### Policies and guidelines

There is a hierarchy to the governance documents of the company. Policies are approved by the Board and set out the intention of the company and what it aims to achieve. Guidelines and codes are approved by the management team, and have direct rules to be followed. Procedures and instructions set out how staff achieve objectives, these are the primary controlling documents in the ISO management system. They are created and approved through a system of delegations set out by the CEO and the management team.

### Risk management

The top-level risk management is managed in accordance with the risk management policy. In the day-to-day running of the business there is a risk management procedure with an associated methodology, which is widely used to assess risks and opportunities to enable decision making.

### Performance monitoring and reporting

#### Auditing

The company retains the services of external auditing bodies to audit and certify the ISO management system's performance. There are 2.5 external audits per year. The main audit is the compliance audit for ISO 9001/14001/45001 certification. This

is carried out annually and recertification takes place every 3rd year. The ISO 3834/2 certification audit takes place annually and controls the welding part of the management system. The compliance audit for EX audits, QAN/QAR ensures the suitability of the management system in ensuring safe EX certified products. This audit follows an 18-month cycle. The last two audits primarily focus on quality and are mostly relevant to sustainability though the longevity, suitability and safety of the products.

Internally a management review and an internal auditing are carried out by the QHSE department, and the systematic review cycle triggered by the incident management system, where incidents and events are logged, investigated and followed up.

Permascand systematically audits its suppliers. This work is carried out by the Purchasing department with the support of other departments like QHSE, as needed. All strategic suppliers are audited annually, which can take the form of site visits or remote interviews. Less strategic suppliers are also audited but less frequently.

#### Environment report

The company submits a legally mandated environment report to the Swedish authorities, which focuses on permit compliance, emissions and resource use, and is publicly available information.

#### Sustainability report

Published on the company website, updated annually, and compiled by the QHSE department on behalf of the company. It describes to external stakeholders how the company addresses sustainability, sets out the current strategy, explains what functions are in place to improve sustainability performance, updates on activities that have been carried out, are ongoing or are being planned for the next year, related to sustainability. The report also supplies some key data on Permascand's performance on sustainability.

### List of guidelines, approved by management:

- › Protection guideline for mobile phones
- › Guidelines on pay
- › Social media guidelines
- › Equality and diversity guidelines
- › Guidelines on company cars
- › Guidelines for intern
- › Guidelines for remote work
- › Guidelines on dress code
- › Code of conduct

### List of policies, approved by the Board:

- › Travel policy
- › Sanctions policy
- › Risk management policy
- › Procurement policy
- › IT and information policy
- › Insider policy
- › HR policy
- › Financial policy
- › Corporate governance policy
- › Business policy
- › Anti-corruption policy
- › Whistleblowing policy
- › Information policy

# Responsible Governance

## *ESG report*

Every year Permascand commissions an ESG report from external partners. To get an outside view on how Permascand is governed, and benchmark performance against similar industries, Permascand engages external consultants to help investigate ESG performance. This work results in the ESG report, which in the future will be published in parallel with the Sustainability report.

This report covers the key ESG issues in the industry relating to the upstream impact of resources, the used chemicals' impact on ecosystems, the health and safety of employees, and energy used for manufacturing. Upstream sustainability impact primarily relates to sourcing of noble metals and others.

Manufacturing and refurbishing of electrochemical solutions can have a positive impact on society when applied in green industries. Moreover, refurbishment activities extend the lifespan of electrochemical cells.

This is in line with the findings in this report.

## **Stakeholder engagement**

### *Customers*

Permascand engages with customers in many ways. The sales team leads all efforts. The customer has one point of contact with Permascand which manages all interaction with other Permascand personnel. Sales personnel assist the customer from the development of technologies all the way through to the end of the product's life cycle, bringing in the right expertise as needed. Permascand offers refurbishment for most of its products and strives to assist customers for the entire duration of the product lifespan, and builds long-term partnerships. More information about Permascand's formal partnerships can be found on Permascand.com.

### *Employees and labour unions*

Permascand engages with employees collectively through corporation committees, the health and safety committee and sub-committees and through a monthly town hall meeting. Permascand also adheres to the collective agreement "Teknikavtalet". Permascand conducts an annual anonymous staff survey through which individual employees can address concerns or suggest improvements, as well as rate the company's performance on leadership, health and safety, diversity and much more. An incident management system is maintained which all employees can use to report incidents and suggest improvements. A whistle-blower function is in place in case any employee wants to address an issue they feel could have negative consequences for them to address openly.

### *Communities*

Permascand is active in professional bodies such as the Chlorine institute, Electrochemical society, Eurochlor, Hydrogen Sweden and the International Society of Electrochemistry. More information can be found at Permascand.com.

Permascand engages with local educational institutions and offers internships and rewards for exceptional students. This is a part of Permascand's larger involvement with the local area to help promote economic development and opportunities for local people.

Permascand engages with the local authorities in the area as an interested stakeholder, and as one of the largest employers in the area Permascand is called on to engage in public hearings and sit on committees. These efforts are primarily handled by the CEO and the HR department.

Permascand regularly engages with the media. This engagement is regulated because Permascand is a publicly listed company. Some information must be legally shared through proper channels via press release to all investors.

All interaction with the media goes through the CEO unless delegated, to ensure compliance with regulations and internal policies.

### *Supply chain management*

The supply chain is managed under the procurement policy, which encompasses all direct and indirect spend, (the purchase of goods and services not directly being incorporated into Permascand's manufactured products). Employees and third parties who are authorized to initiate or make purchases on behalf of Permascand adhere to the policy. The procurement process involves selecting and approving suppliers, negotiating contracts, establishing commercial terms, and the management of the actual purchase transaction via the most appropriate purchase channel. The procurement function's objective is to achieve the best overall value and prevent risk when acquiring or contracting for goods and services while enabling growth for the business.

Furthermore, employees involved in procurement must follow related processes such as the Employee Travel and Entertainment Expenses Policy, the Delegation of Authority (DoA) Policy and the Anti-corruption Policy.

Suppliers are managed in accordance with ISO 9001/14001/45001 certified procedures with the latest addition being the supplier development handbook, which was rolled out in 2020. Permascand classes all suppliers in accordance with their relative importance and supply volumes. More highly-ranked suppliers represent the majority of Permascand's sustainability impact cradle-to-gate and they are therefore assessed more often (minimum once a year) in accordance with procedures covering in amongst other things suitability in quality, health and safety and social and environmental performance. Audits are carried out in person, by video link and telephone.

## Forward-Looking Statement

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This report highlights that over the last 5 years, Permascand has focused on improving processes and performance related to sustainability.

While Permascand has shown significant improvements in this area, however, the work is by no means done. The company concludes that it must start focusing on quantifying upstream and downstream activities to enable better decision making.

The work done to try and quantify the environmental impacts of the primary material groups shows that the direct emissions from Permascand's manufacturing activities are relatively small in comparison to the impact generated upstream.

### The next steps

The material analysis shows that Permascand has focused on the most relevant material streams and that the company should continue to do so. It is important to recognize the need to develop this analysis further to obtain a more accurate picture of the relative impacts.

Permascand recognizes the need to further analyse the material streams of titanium and nickel to identify opportunities to reduce impact. The relative importance of nickel is expected to grow.

Permascand will continue to focus on increasing the efficiency of the consumption of platinum group metals and on

recovering these materials where possible.

Permascand has identified a weakness in analyzing the overall impact of the transportation of material, and this must become an area of investigation to build a better life cycle model for activities.

Overall Permascand shows that it has managed to improve performance over the last four years in most of the measured parameters, especially when viewed in relation to earnings. In the future, there are likely to be areas where environmental impacts will grow incrementally as manufacturing capacity needs to be added.

Permascand will continue to work on reducing direct emissions as the company has direct control over these. Permascand is at the end of one capex cycle and about to enter the next phase. Thus, the current focus is on mapping and monitoring performance and identifying opportunities to improve.

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*Direct emissions from Permascand's manufacturing activities are relatively small in comparison to the impact generated upstream.*

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# Forward-Looking Statement

THEME	COMMENT	2023 GOALS	
(Hazardous) Materials	<ul style="list-style-type: none"> <li>Responsible use of hazardous chemicals and external monitoring in place.</li> </ul>	<ul style="list-style-type: none"> <li>No incidents in 2023.</li> </ul>	
Energy and GHG emissions	<ul style="list-style-type: none"> <li>ISO 14001:2015 certified; hydro electricity used in production, bio-pellets replaced, oil-based heating in Dec. 2019. Increase future transport efficiency for road transport, via product design created in 2020 and brought to market in 2021. Company cars run on waste derived diesel replacement. Company cars offered from 2021 are either electric or hybrid vehicles. 6 EV-charging posts installed at the Ljungaverk site.</li> <li>Proof of concept for coating test plant which uses a less energy-intensive coating application technology. Could have a significant impact if applied at scale in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Metal forming line for membrane cells to be established in 2023 that will reduce reliance on sub-suppliers and cut out transportation to and from their sites.</li> <li>Completion of transition to LED, reduce power consumption.</li> <li>CAD model heating system, and energy mapping to prepare for next energy/heating capex program.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor travel needs development post pandemic.</li> <li>Develop foundation next energy Capex.</li> <li>Develop a way to monitor transportation of raw material and products not paid for by Permascand.</li> </ul>
(Hazardous) Waste and wastewater	<ul style="list-style-type: none"> <li>Permascand is still working to optimize the performance of the wastewater treatment plant. This includes optimizing the treatment of acid from the nickel pickling line.</li> </ul>		<ul style="list-style-type: none"> <li>Trim and improve water treatment performance and safety.</li> </ul>
Employee health and safety	<ul style="list-style-type: none"> <li>Safety training planned:</li> <li>BAM/SAM Systematic occupational health and safety training (Swedish standard/regulations).</li> <li>OSA (organizational/psychological health and safety training).</li> <li>Hot Work, hot works permitting training.</li> <li>Fire Safety.</li> </ul>	<ul style="list-style-type: none"> <li>First Aid.</li> <li>Forklift Operation.</li> <li>Overhead Crane Operation.</li> <li>Access control system (SSG) installation. Following the fire drill in 2022 Permascand identified a need to improve management of on-site presence. The system will also improve the management of contractors.</li> </ul>	<ul style="list-style-type: none"> <li>No accidents leading to time off.</li> <li>Sick leave less than 3%, employees present at work 97%, excluding parental leave holidays etc.</li> <li>0 incidents of harassment between employees.</li> <li>Leadership index &gt;80%.</li> </ul>
Supply chain management	<ul style="list-style-type: none"> <li>Permascand will continue to calibrate its LCA model in the supply chain by comparing supplier performance against the benchmark in the LCA model.</li> </ul>		<ul style="list-style-type: none"> <li>On time delivery &gt;97%.</li> </ul>
Material efficiency of noble metals	<ul style="list-style-type: none"> <li>Project for more efficient coating application technology was completed in 2021. Results show reduced coating consumption across the board. In 2022 integration with a new sensor was completed in the coating plant, this will enable further development in process, may even lead to minor improvements from 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Test plant new coating application method was built in 2022.</li> <li>A coating line concept with an alternative application method – proof of concept 1st product to be conducted in 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Keep performance in the coating plant at the levels seen at project completion in 2021 or better during the whole of 2023.</li> <li>Complete proof of concept, minimum one product.</li> </ul>
Noble metal and titanium recovery waste streams	<ul style="list-style-type: none"> <li>Re-establish recovery of PGM and titanium water treatment filter material.</li> <li>Implement new recovery with supplier developed in 2022.</li> </ul>	<ul style="list-style-type: none"> <li>Complete project on recovery method for spent coating and preservation of substrate integrity.</li> </ul>	<ul style="list-style-type: none"> <li>Create a comprehensive program for improving noble metal recovery.</li> <li>Identify further avenues of investigation into noble metal recovery.</li> </ul>
Material consumption efficiency	<ul style="list-style-type: none"> <li>Complete project on recovery method for spent coating and preservation of substrate integrity.</li> </ul>		<ul style="list-style-type: none"> <li>Assess the results of treatment of the first batch of noble metal containing waste with new supplier, establish noble metal recovery program plan.</li> </ul>
Hydrogen - Electrification & Renewable market	<ul style="list-style-type: none"> <li>Meet increased need for hydrogen production capacity and electrowinning capacity emerging in the market.</li> <li>Metal forming line for membrane cells to be established in 2023 to reduce reliance on sub-suppliers and cut out transportation to and from their sites.</li> </ul>	<ul style="list-style-type: none"> <li>Establish new separate nickel shot blasting line. Nickel has been a secondary material in terms of volume. A small older capacity plant will be replaced by a full capacity plant in late 2023 or early 2024.</li> </ul>	<ul style="list-style-type: none"> <li>Progress on establishing new coating line. Project expected to finish Q3 2023.</li> <li>Increase capacity and reduce lead time in the membrane technology sector.</li> <li>Ensure larger capacity for treating nickel, have two shotblasting waste streams.</li> </ul>
Water Treatment market	<ul style="list-style-type: none"> <li>Development of global capacity for cleaning ballast water continues, supply the customers in the retrofit marked at a competitive cost.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare for aftermarket ballast water treatment.</li> <li>Develop emerging effluent treatment business.</li> </ul>	<ul style="list-style-type: none"> <li>Keep supporting customers' needs while retaining scalability.</li> <li>Service new customers in testing their technology.</li> </ul>



## The auditor's opinion regarding the statutory sustainability report

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To the general meeting of the shareholders of Permascand Top Holding AB co.reg. no. 559227-6124

### **Assignment and division of responsibilities**

The Board of Directors is responsible for the preparation of the 2022 Sustainability report pages 1-24, and that the information therein gives a fair presentation in accordance with the Annual Accounts Act.

### **Direction and scope of the examination**

Our examination has been conducted in accordance with FAR's recommendation RevR 12 *Auditor's opinion on the statutory sustainability report*. This means that our examination of the sustainability report is different and substantially less in scope than with an audit conducted in accordance with International Standards on Auditing and generally accepted auditing standards in Sweden. We believe that the examination has provided us with a sufficient basis for our opinions.

### **Opinion**

A sustainability report has been prepared.  
Stockholm, April 5, 2023  
KPMG AB

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**Helena Nilsson**

Authorized Public Accountant



 **PERMASCAND**

[www.permascand.com](http://www.permascand.com)