MASAN
HIGH-TECH MATERIALS


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# SUSTAINABILITY REPORT 2021

# GROWTH THROUGH SUSTAINABILITY



# CONTENT

## ABOUT THIS REPORT

This sustainability report has been prepared for the purpose of demonstrating the key sustainability issues at Masan High-Tech Materials, how we define and address them, and our sustainability performance in 2021. The content of this report is based on the Company's business activities, the interests of our stakeholders, and material aspects that have a large influence on the economy, the environment, and the society.

The Sustainability Report was prepared in accordance with the Global Reporting Initiative (GRI), G4 Guidelines. It reflects the application of and alignment with the recognized international policies, standards and management practices, including the principles set out by the International Council on Mining and Metals (ICMM) Sustainable Development Framework, the United Nations Global Compact (UNGC), the WorldBank's guidelines on involuntary resettlement, Environmental and Social Impact Assessment (ESIA) and other policies as well as standards and practices for sustainable society and environment set out by the International Finance Corporation (IFC).

This year's sustainability report is particularly characterized with its adherence to the Sustainable Development Goals (SDGs) and the Corporate Sustainability Index (CSI).This was partly driven by the fact that the Vietnam Chamber of Commerce and Industry (VCCI) has recently provided a means to assess the level of sustainable development of Vietnamese enterprises.

## SCOPE AND BOUNDARIES

The scope of Masan High-Tech Materials' business activities covers the operation of the Nui Phao Mining Company Ltd. (NPMC) and the Masan Tungsten Limited Liability Company (MTC) in Vietnam together with the operation of H.C. Starck Tungsten Powders and ChemiLytics in Germany, Canada and China. Therefore, the content of this report includes, but not limited to Vietnam, specifically Dai Tu District, Thai Nguyen Province.

## 2021 KEY HIGHLIGHTS

**VND 13,564 billion** *in revenue*

**VND 1,142 billion**
for Taxes and Fees incurred in Vietnam

**VND 69 billion**
contributed to the socio-economic development activities in Thai Nguyen province, Vietnam

**2,074**
employees globally

**34,000**
training man-hours

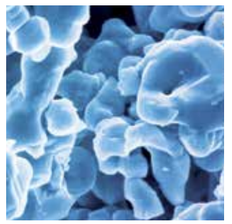
**95.2%** Operation time of Processing Plant
***(target 94,1%)***

**82.9%**
Recycling rate

**8.28%**
GJ/t ($WO_3$)
Specific energy savings
(electricity and natural gas)

**TOP 100**
**Sustainable Business in Vietnam**
**Award Winner**
4 consecutive years
*(2018 - 2021)*

**16.7%/t**
Energy savings
($WO_3$)



**Recertification as RMAP Conformance Smelter**

*Using only conflict-free sourced raw materials*

# 2021

# AWARDS & RECOGNITION

Masan High-Tech Materials and its subsidiaries remained on the list of the distinguished local and international organizations in 2021. MHT has left powerful imprints on the journey of going global, cementing its position as a leading industrial minerals manufacturer in Vietnam, contributing to Masan Group's impressive 2021 business results and putting its name on the global high-tech materials map.

Below are the awards and honors that Masan High-Tech Materials has proudly received in recognition of our efforts and accomplishments throughout the year.

**CERTIFICATE OF "TOP 50 VIETNAM BEST GROWTH 2021" FOR MASAN HIGH-TECH MATERIALS**

Voted and awarded by Vietnam Report JSC

**TOP 100 VIETNAM GOLD STAR AWARD 2021 FOR NUI PHAO MINING**

Awarded by Young Entrepreneurs Vietnam Association

**CERTIFICATE OF TOP 100 VIETNAM EXCELLENT BRANDS 2021 FOR MASAN HIGH-TECH MATERIALS**

Voted and awarded by Vietnam Economic Times

**CERTIFICATE OF TOP 100 SUSTAINABLE BUSINESSES IN VIETNAM 2021 FOR MASAN HIGH-TECH MATERIALS**

Voted and awarded by Vietnam Chamber of Commerce and Industry (VCCI)

**CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR ITS CONTRIBUTIONS TO THE ECONOMIC DEVELOPMENT OF THE NORTHERN MIDLAND AND MOUNTAINOUS AREAS, VIETNAM**

Awarded by Vietnam Chamber of Commerce and Industry (VCCI)

**CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR OUTSTANDING ACHIEVEMENTS IN THE PATRIOTIC EMULATION MOVEMENT IN THAI NGUYEN PROVINCE**

Awarded by Thai Nguyen Provincial People's Committee

**CERTIFICATE OF MERIT FOR OUTSTANDING PERFORMANCE OF RED CROSS WORK IN DAI TU DISTRICT FOR THE PERIOD 2016 - 2021**

Awarded by Dai Tu District People's Committee

**CERTIFICATE OF THE "ENTERPRISE FOR EMPLOYEES IN THE PERIOD OF 2019- 2021" FOR NUI PHAO MINING**

Awarded by Viet Nam General Confederation of Labor

**CERTIFICATE OF EXCELLENT ENTERPRISE OF THAI NGUYEN PROVINCE 2021 FOR NUI PHAO MINING**

Awarded by Thai Nguyen Provincial People's Committee

**CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR ITS BUSINESS ACHIEVEMENTS AND CONTRIBUTIONS TO THE SOCIO-ECONOMIC DEVELOPMENT OF DAI TU DISTRICT IN 2021**

Awarded by Dai Tu District People's Committee

**CERTIFICATE OF MERIT FOR ACHIEVEMENTS IN COVID-19 PREVENTION AND CONTROL IN DAI TU DISTRICT IN 2021 FOR NUI PHAO MINING**

Awarded by Dai Tu District People's Committee

# GENERAL INFORMATION

# VISION AND MISSION

***OUR PURPOSE***

*During 2021 we continued to reshape our business, strengthening our executive by reshaping it to include two new roles: Global HR Director, and, Director of Projects. These roles reflect both the global nature of the business along with the organizational need to be ready to adapt for significant future change. Importantly we were able to have 5 members of Exco physically in our Goslar operations for several weeks working directly with functional reports, with a smaller group then making a shorter visit to Sarnia.*

## VISION

To be the leading integrated supplier of high-tech advanced materials critical to global innovation.

## MISSION

We aim to be the partner of choice to high-tech industries where our products are a key component in evolving and shaping the future of our world. Through the application of our materials, we will create unparalleled solutions to drive innovation and productivity which will deliver superior outcomes for all our partners and stakeholders.

# OUR VALUES

**RESPECT**
We believe caring for people, environment and community results in mutually beneficial relationships.

**INNOVATION**
We strive for excellence in everything we do.

**RESULTS**
We are passionate about exceeding expectations.


# COMPANY PROFILE

**NAME OF THE COMPANY**
Công ty Cổ phần Masan High-Tech Materials

**ENGLISH NAME**
Masan High-Tech Materials Corporation

**ABBREVIATED NAME**
Masan High-Tech Materials

**ADDRESS**
Suite 802, 8th Floor, Central Plaza, 17 Le Duan, Ben Nghe Ward, District 1, Ho Chi Minh City, Vietnam

**TELEPHONE** +84 28 6256 3862

**FAX** +84 28 3827 4115

**WEBSITE** www.masanhightechmaterials.com

**ENTERPRISE REGISTRATION CERTIFICATE**
No. 0309966889 issued by the Department of Planning and Investment of Ho Chi Minh City on April 27, 2010, amended for the 19th time on February 11, 2022.

**CHARTER CAPITAL** VND 10,991,554,200,000

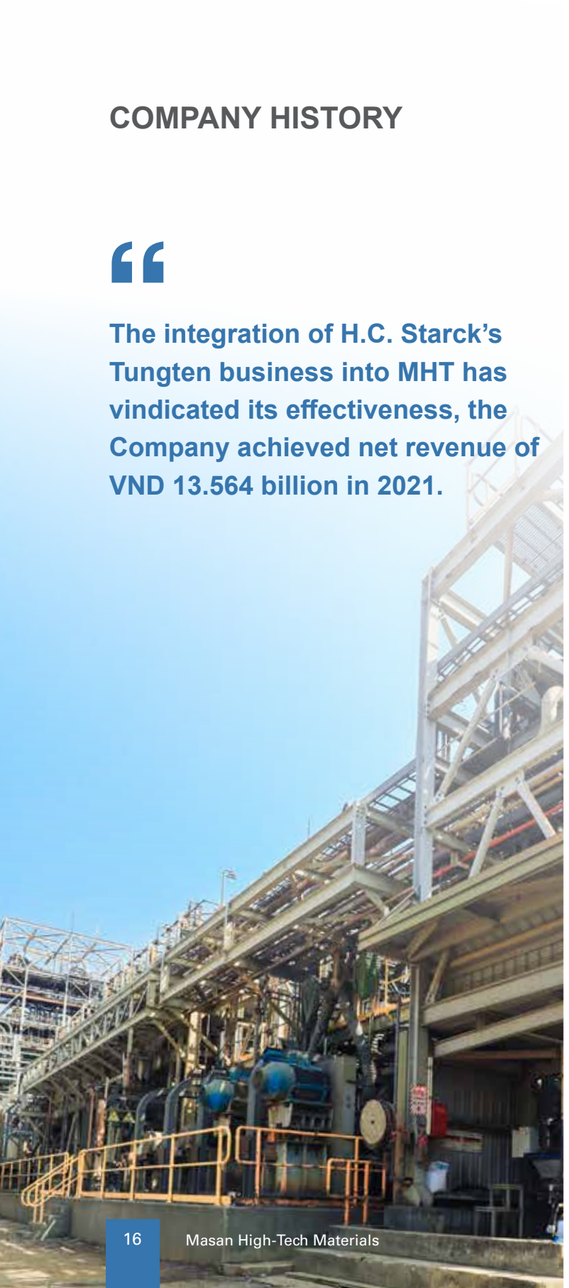
**STOCK CODE ON HNX-UNLISTED PUBLIC COMPANY MARKET (UPCOM):**
MSR

## STRATEGIC PILLARS FOR GROWTH

- Sustainability
- Innovation
- Customer Solutions Focus

# COMPANY HISTORY

**The integration of H.C. Starck's Tungten business into MHT has vindicated its effectiveness, the Company achieved net revenue of VND 13.564 billion in 2021.**



The Company was established on April 27, 2010 focused on mining and resources extraction activities as part of the Masan Group.

Significant events in the Company's business are set out below:

## 2011

- Acceleration of project development for the Nui Phao Project.
- In December, the National Mineral Reserves Assessment Council acknowledged the results of the Nui Phao Project's resources and reserve grade conversion.

## 2012

- In February, MOIT's official approval of the Nui Phao Project's basic mine design was obtained.

## 2013

- In August, the Company received Investment Certificate No. 41122000131 from the People's Committee of Ho Chi Minh City.

## 2014

- The Nui Phao Project started commercial production of Tungsten Concentrate and Copper Concentrate on March 1, Fluorspar Acid Grade on June 1, and Bismuth Concentrate on September 1.
- Established Nui Phao – H.C.Starck Tungsten Manufacturing LLC ("NHTCM"), a joint venture with HC Stark GmBH of Germany to construct and operate an advanced Tungsten Chemical factory in Vietnam.

## 2015

- Record production achieved for all four commodities. NHTCM applied for and obtained the Certificate of High Tech issued by Ministry of Science and Technology on April 24.
- Achieved design capacity and successfully commissioned the NHTCM Tungsten Chemical factory. Initiatives in committing for further developing in processing and increasing performance efficiency.
- In September, the Company successfully completed its listing on Hanoi's UPCOM exchange.
- In September, the Company hosted the 28th International Tungsten Association (ITIA) annual meeting, attended by over 120 global delegates.

## 2016

- Successfully held the first AGM after listing on April 22; ranked as premium on the UPCOM Board of the Hanoi Stock Exchange.
- Commercial production of Bismuth Cement started from July 1.
- Continued innovating and investing in upgrading with new processes and technology, cost saving, change in business process, developed engagement and cooperation with NHTCM and has significantly advanced the production volume and revenue of the value-added tungsten chemical products.
- In December, Masan Group, through its wholly owned subsidiaries, successfully completed the tender offer for shares of the Company, thereby providing an exit to Mount Kellett and increasing its ownership in the Company to 93.78%, paving the way for the next round of strategic capital and growth.

## 2017

- Upgrades undertaken on the tungsten circuit have resulted in tungsten recovery increase to 67% with room for further improvement through optimization measures.
- A significant price increase across all commodities of the Company coupled with an increased operational efficiency allowed the Company to achieve record results in all aspects of production, revenue and net profit.
- The Company's global brand recognition, underpinned by high quality and reliable products resulted in oversubscribed order book with new customers.
- Commenced procuring third party tungsten raw materials for processing in the NHTCM factory.

## 2018

- 2018 Acquired H.C. Starck GmbH's 49% stake in NHTCM for total cash consideration of USD29.1 million. Subsequent to acquisition, the name of NHTCM has been changed to Masan Tungsten Limited Liability Company ("MTC").
- Increased the third-party raw material procurement by 300% in order to maximize utilization at the MTC as well as to satisfy the growing demand for tungsten chemical products.
- Company achieved record annual results in all aspects of production, revenue and net profit.

## 2019

- Entered into an agreement to purchase the tungsten business of H.C. Starck Group GmbH – a leading manufacturer of high-tech tungsten metal powder and carbides in the world.
- In December 2019, MTC obtained the Decision of Thai Nguyen People's Committee on amendment of the Investment Certificate which registered capacity of ST, APT and BTO/YTO are 1,067 tonnes; 8,278 tonnes; 5,000 tonnes per year respectively depending on the production plan and grade.
- In December 2019, the Ministry of Science and Technology issued High-Tech Enterprise Certificate to MTC.

## 2020

- In June, MSR through its wholly owned subsidiary MTC completed the acquisition of H.C. Starck GmbH's global Tungsten business.
- In June, the Company's name was approved to be changed to Masan High-Tech Materials Corporation (MHT) at the Company's Annual General Meeting of Shareholders. This change of company name was officially effective from 6 August 2020 after the Department of Planning and Investment of Ho Chi Minh City issued the Enterprise Registration Certificate amended for the 17th time.
- In December 2020, the Company completed a private placement of shares to Mitsubishi Materials Corporation ("MMC"), making MMC the second largest shareholder owning 10% of the Company's total fully diluted shares.

## 2021

- Approved the maximum ratio of 49% of foreign ownership of the Company at 2021 Annual General Meeting of Shareholders of the Company.
- The integration of H.C. Starck's Tungten business into MHT has vindicated its effectiveness, the Company achieved net revenue of VND 13.564 billion in 2021.

# FLAGSHIP ASSETS

## Nui Phao Mining Company Ltd (NPMC)

The Nui Phao mine, which is operated by Nui Phao Mining Company Ltd. (“NPMC”), a wholly owned subsidiary of Masan High-Tech Materials, is situated within three communes (Hung Son, Ha Thuong, and Tan Linh) of Dai Tu district in Thai Nguyen province. The site is approximately 80 km from Hanoi and is accessible via highway. Road and rail links connect the mine to the nearest ports of Hai Phong and Quang Ninh province, from which the products can be shipped to international customers.

The major project components are:

- Open pit poly-metallic mine,
- Waste rock disposal facilities,
- Modern mine plant and facilities, including crushing, grinding, thickening, flotation, leaching and gravity recovery facilities,
- A suite of commercial product streams including Tungsten, Copper, Bismuth and Fluorspar concentrates which are either processed into value added products onsite (Tungsten and Bismuth) or sold as high- end commodities,
- A Tailings Storage Facility (TSF) with water and tailings management ponds,
- Buffer zones, relocation sites, haul roads, and mine services.

Products from Nui Phao are shipped to worldwide markets (including well established customer networks) from Quang Ninh Port (in Ha Long City, 197 km to the southeast of the Project site). The port is also used to receive equipment and materials required to run the mine.

NPMC operates at the cutting edge of production of its product suite. Investment in research and development continues to deliver processing, equipment, and chemical improvements. Processing operations are supported by advanced mining and processing management software to maximize recovery and minimize costs and resource loss.

## Masan Tungsten Limited Liability Company (MTC)

Masan Tungsten Limited Liability Company was established in 2014 as a Joint Venture with H.C. Starck GmbH, a leading worldwide manufacturer of technological metals and one of the biggest companies in the global Tungsten industry. The objective of the company is to enable advanced processing of Vietnam’s strategic tungsten resources into higher value tungsten chemicals, thus enabling further value extraction from the Vietnamese strategic resources.

In August 2018, NPMC acquired the 49% capital contribution by H.C. Starck GmbH in the Joint Venture. The Joint Venture then changed its name to Masan Tungsten Limited Liability Company. In September 2019, MSR announced the acquisition of H.C. Starck’s global Tungsten Division (“HCS”). In 2021 the MTC plant underwent an optimisation program which has seen a significant capacity expansion to include processing of a wide range of lower grade feed materials. The treatment of low to marginal tungsten grades greatly improves the ability to utilize more of the Nui Phao tungsten ore resource.

MTC produces high purity, world-competitive tungsten products while operating in Vietnam using local and international technical knowledge. This places it among the few tungsten suppliers outside of China who are directly connected to a resource base. The four main products of the MTC facility used in production of Tungsten and Tungsten Carbides are: APT (Ammonium Paratungstate); BTO (Blue Tungsten Oxide); YTO (Yellow Tungsten Oxide) and ST (Sodium Tungstate).

The MTC factory has the advantages of secured long term supply source (NPMC) with modern production facilities able to produce high quality products tailored to specific requirements of individual customers,

- Positive market reputation by affiliation with a technology and skills provider – H.C. Starck which has 100 years of experience and is a leading premium supplier of Tungsten products,
- Processing technology transfer from H.C. Starck Germany,
- Enhanced processing capacity in line with tungsten market and customer demands,
- Low conversion costs and preferential tax policies,
- Low grade tungsten sources treated into high end specific products,
- Opportunities for further development of in-country tungsten recycling process.

These factors have accelerated the acceptance of a Vietnamese business to the world’s Tungsten producer map as well as contributed to improved sales performance.

## H.C. Starck Tungsten Powders (HCS)

H.C.Starck
Tungsten Powders

H.C. Starck Tungsten Powders (HCS) is a company of the Masan High-Tech Materials Group and is one of the world's leading manufacturers of high-performance powders of tungsten and its compounds. H.C. Starck Tungsten Powders offers the entire range of products along the tungsten powder value chain, processing both primary and secondary raw materials and turning them into high-quality tungsten chemicals, metal powders and carbides, tailored to individual customer needs.

The company combines a century of experience in tungsten processing with high innovative power and technological expertise. Highly qualified teams in research development and in application technology are dedicated to the solutions of tomorrow.

Sustainability is a significant part of the company strategy. A large proportion of raw materials are obtained through recycling. Security of supply is an important issue in today's world. H.C. Starck Tungsten Powders has access to primary and secondary raw materials and is therefore independent of sources in China, for example.

H.C. Starck Tungsten Powders employs around 550 people at three production sites in Germany, Canada and China plus sales offices in the U.S. and Japan. The company is headquartered is at its largest production site in Goslar, Germany.

## ChemiLytics

ChemiLytics

ChemiLytics is a company of the Masan High-Tech Materials Group and is one of the largest state of the art industrial scale laboratories in Germany for inorganic elemental analysis and powder characterisation. With 70 highly qualified personnel working in teams operating 7 days a week, ChemiLytics offers analytical services in all market segments from the sunset industries of traditional manufacturing through to sunrise industries such as Additive Manufacturing, Aerospace Applications or E-Mobility. Typical samples analyzed include Tungsten ores, Tantalum and Niobium ores, all refractory powders and scrap, $Si_3N_4$, battery precursors etc.

ChemiLytics collaborates with customers allowing customization in service provision from traditional samples submissions through to developing individually customized solutions that can allow for the provision of on-line operational control sample analysis through to having the capability to develop specific analytical and technology applications for customers based on ChemiLytics unique service portfolio such as in the recycling industry.

# OUR PRODUCTS

**Tungsten, Fluorspar, Copper and Bismuth produced at the Nui Phao mine by Masan High-Tech Materials are the Vietnamese strategic metals that are globally important for many high-tech industries today.**

## Tungsten (W)

Tungsten is a unique element having the highest melting point of all metals (3422°C), a density (19.3 g/cm³) almost twice that of lead, and a hardness close to that of diamond when in tungsten carbide form.

Due to its unique intrinsic properties, tungsten is ideally suited to the needs of all major heavy industries, such as manufacturing, oil & gas, construction, energy, automotive and aviation. Tungsten is also an essential element in the steel industry, where its usage ranges from the production of stainless steel, steel alloys to super alloys.

Tungsten material could come in a variety of forms such as tungsten chemicals, tungsten metal, and tungsten carbide with each form having different characteristics:

- **Tungsten chemicals:** include ammonium paratungstate, ammonium metatungstate, tungstic acid, tungsten oxide, and sodium tungstate with various properties which would be made to fit for consumers' required specifications.

  Ammonium paratungstate is a white, crystalline powder with very high chemical purity. It is needed primarily as a universal intermediate product in the production of tungsten oxides, tungstic acid, ammonium metatungstate, and organometallic components. The compound is also used in catalysis and fine chemistry. Tungstic acid is a very finely grained yellow powder with an extremely narrow grain-size distribution, excellent chemical purity, high reactivity, and a uniform morphology. Its unique production properties allow for special applications in homogeneous and heterogeneous catalysis, fine chemistry, and surface coating technology, as well as in the production of organometallic tungsten compounds.

- **Tungsten metal:** Not only does tungsten have the highest melting point (3,422 °C) and the lowest thermal expansion of any metal it also has a high density (19.3 g/cm³), very high mechanical stiffness, and a very low vapor pressure. Thanks to these and other outstanding properties, tungsten metal is irreplaceable in many key industries.

- **Tungsten carbide:** Tungsten carbide (WC) is a compound of tungsten and carbon. The outstanding characteristic of this material is its hardness, which approaches that of diamond. Tungsten carbide is used primarily in the production of industrial tools and wearing parts that are subject to significant stress. Tungsten carbide in carbide tools makes processes such as the drilling, grinding, and milling of metals much more effective and economical.

With the Thai Nguyen facility together with our German business – H.C. Starck, we can produce raw tungsten material products from either mined tungsten concentrate or from recycled materials, which brings about a higher level of sustainability to the business.

## Fluorspar ($CaF_2$)

Fluorspar is an industrial mineral from which the element Fluorine is liberated, with two major downstream uses; the production of Hydrofluoric Acid (HF) which is used as a building block for Fluorine Chemicals, and the production of Aluminium Fluoride (AlF3) which is an important additive for the production of Aluminium by electrolysis. Fluorspar also finds application in various steel and aluminum products, glass and ceramic manufacturing and in the growing nitrogen trifluoride (NF3) sector. Examples of products containing Fluorine includes household and automotive air conditioners, Teflon products fluoxetine medicines, welding rods, glass and ceramics.

## Bismuth (Bi)

Bismuth is a minor metal with consumer and industrial applications.

For the consumer, bismuth-based chemicals are used in the health and pharmaceutical sector through radiation protection and medicines for treatment of nausea, indigestion and ulcer diseases. Due to its non-toxicity, it has also found use in cosmetics. Industrially, Bismuth is used as a non-toxic pigment in the production of certain paints and in the manufacture of electrical components. Bismuth is also used as a catalyst for vehicular emissions control, as well as in the production low melting point alloys for the reliable work holding devices for heavy machinery such as turbines.

## Copper (Cu)

Copper is a soft, malleable and ductile metal and finds wide use industrially due to its exceptional thermal and electrical conductivity. Copper is also relatively inert and corrosion-resistant and has been shown to have antimicrobial properties.

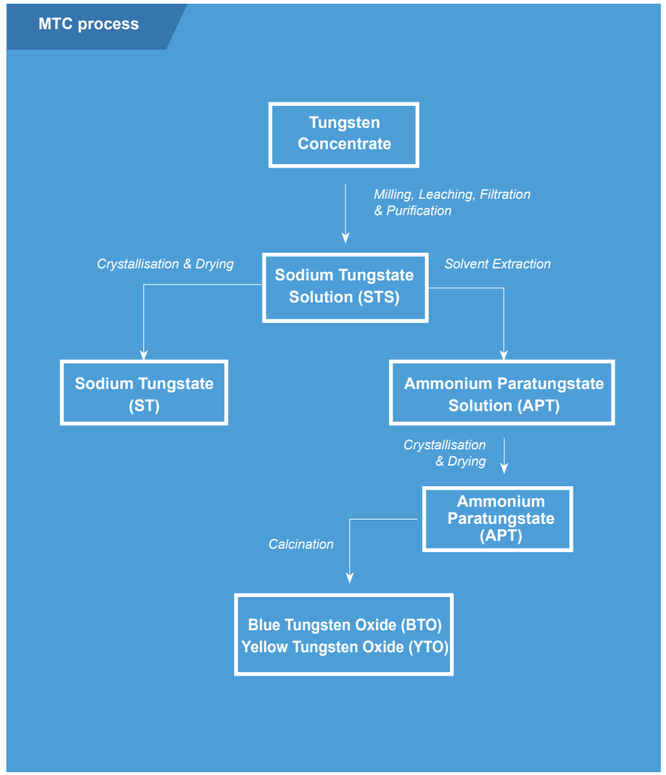
The largest application for copper is in the manufacture of electrical cables and wiring. The construction industry is also a major consumer of copper through electrical systems as well as copper piping in plumbing. Its corrosion resistance as well as its aesthetic appeal have made it popular in roofing, and it is commonly found in the construction of domes, spires and doors. Copper has nutrient qualities and is used as a fungicide in the protection of crops and plants as well as enriching the soil. When copper is mixed with zinc it produces brass, which is also used in a variety of industrial applications.

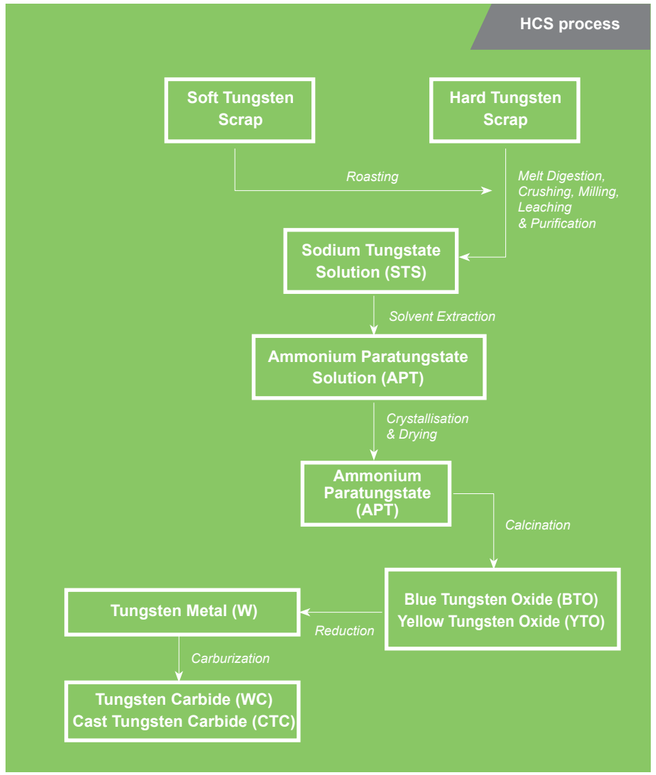
In 2021 the Company started planning to build a new copper smelter plant with the aim of producing high purity copper cathode that can be used for manufacturing copper cables and wires, one of the major industries in Vietnam with tremendous demand for pure copper cathode.

## Tungsten Production

Masan High-Tech Materials' MTC plant is designed to process the total amount of NPMC tungsten concentrate, along with tungsten concentrates and tungsten bearing materials purchased from third parties, into high grade ammonium paratungstate (APT) – via chemical digestion followed by physical and chemical purification and, finally, crystallization. APT is packaged for sale or undergoes calcination to produce blue tungsten oxides (BTO) and yellow tungsten oxide (YTO) for sale.

In addition, HCS's production processes include the recycling of tungsten bearing soft and hard scraps as well as the reduction of tungsten oxides to tungsten metal, and the carburization to (cast) tungsten carbides.




**Roasting / Grinding / Leaching:**
Milled ore concentrates and roasted soft scrap are leached at high pressure to form a sodium tungstate solution.

**Salt Melting / Dissolution:**
Hard scrap is dissolved in a salt melt under supply of air. Molten sodium tungstate is casted into crucibles and cooled down before being crushed and dissolved in water under formation of a sodium tungstate solution.

**Purification:**
A continuous technical process to remove the remaining impurities.

**Solvent Extraction:**
Using organic compounds and sedimentation vessels, sodium tungstate solution is transformed into ammonium tungstate solution in a continuous, closed loop process.

**Crystallization:**
Ammonia and water are evaporated from the ammonium tungstate solution. Crystalline ammonium paratungstate (APT) is formed from the solution.

**Calcination:**
Tungsten oxides are produced by calcination of APT.

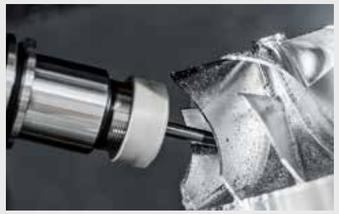
**Reduction:**
Reduction of tungsten oxides to tungsten metal is carried out in pusher and rotary furnaces. Hydrogen acts as a reducing agent.

**Carburization:**
Tungsten metal powder is converted into tungsten carbide powder through a reaction with pure carbon powder in a high temperature furnace.

## Tungsten Application

Tungsten is a strategically important rare metal that is increasingly defined as ‘critical’, both by those in industry and in government. Its unique properties, such as its hardness, its heat resistance and density make it indispensable in many key industries and high-tech applications.

Common tungsten uses include, for example:



**Mechanical engineering and toolmaking**

Today’s industrial tools and wear parts have to withstand extreme loads while offering durability and long tool life. Exceptionally hard and resistant tungsten carbide is the material of choice for the production of cutting edge cemented carbides used in tools.

**Oil and gas industry**

Tungsten finds myriad applications in the extreme environments encountered in O&G. It is used in high-performance drill heads, valves, wear parts, and functional coatings, and in shaped charges that perforate the rock around the well to allow oil and gas to flow out.

**Medical technology**

Precision components made of tungsten metal are used in modern X-ray diagnostics and therapy. For example, to shield and focus hard X-rays or gamma radiation.

**Aerospace**

In aviation, tungsten or tungsten alloys are used because of their high density and strength in balance weights, vibration protection parts for loading flaps or for balancing rotor blades.

**Chemical industry**

In the chemical industry, tungsten is used for many applications, especially in the field of catalysts, such as oxidation catalysts.

**Electrical industry**

A high thermal load capacity of tungsten-copper materials in combination with very good thermal and electrical conductivities predestine these materials for applications in electrical high-performance switching contacts, as heat sinks in the electrical industry or for use as erosion electrodes.

## Tungsten for a Cleaner Environment

Given the versatility of tungsten, it may be expected that tungsten-based materials and components will play their part in meeting todays and tomorrow's challenges, such as the need for a more efficient use of resources and the reduction of emissions.

While there is certainly great opportunity for tungsten in future applications, the material has been contributing to a cleaner environment for many years already.

**Lead substitution**

In the strive for a cleaner environment, lead has been identified as one of the metals that needs urgent replacement. According to the US Government's Top 100 Hazardous Substances Priority list, lead is ranked second. Furthermore, the US Environmental Protection Agency has listed lead as a toxic chemical and have set threshold limits for its concentrations in the air, soil, water and vegetation.

Due to the molecular density similarities between lead and tungsten, tungsten has been proposed as a possible substitution of lead. However, a higher cost and a greater level of machining difficulty of tungsten have often been cited as big obstacles to its introduction, despite its greater level of recycling compared to lead.

An alternative lies with tungsten polymer composites. It is a composition of various resins and tungsten powders, which are mixed to create thermoplastic tungsten, with the final material density matching that of lead. Such a material is easily malleable, has no toxic constituents and it is resistant to corrosion by weather elements. In addition to its easily moldable shapes, thermoplastic tungsten exhibits no harmful effects while handling/ processing and can be recycled without any without detrimental effects to the environment.

Polymers have also been proposed to replace depleted uranium in certain applications. The mains reasons for this lay in the similarities in the similar densities of depleted uranium and tungsten composites, however, tungsten composites bear no health risks.

**Catalysis**

Various tungsten chemicals are used in DeNOx catalysts that remove nitrogen oxides from stack gases of combustion power plants, chemical plants, cement plants or diesel engines by selective catalytic reduction with ammonia or urea.

Tungsten oxides also can be found in catalysts used in oil refining processes, including hydrocracking, hydrodesulphurization, hydrodenitrogenation and hydrodearomatisation.

These catalysts help to increase the yield of gasoline and other light hydrocarbons in crude oil processing on the one hand. On the other, they make the products, such as transportation fuels, more environmentally friendly by reducing the contents of aromatic hydrocarbons, sulphur and nitrogen compounds. With fuel specifications becoming more stringent around the world to protect the environment, their use has gained in importance and is expected to do so in coming years.

## Fluorspar Application

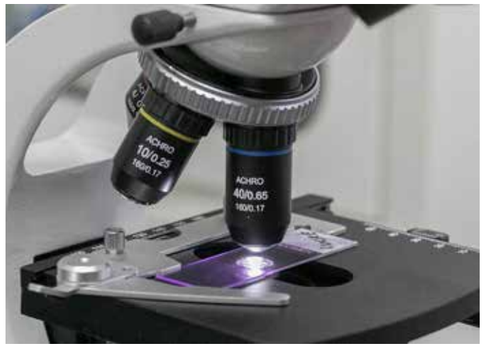
Fluorspar is the commercial name for the mineral fluorite, $CaF_2$. In its pure form it consists of 51.1% Calcium (Ca) and 48.9% Fluorine (F). In nature however, small amounts of silicon, aluminum and magnesium are usually present due to impurities. Fluorspar is found in a wide range of geological environments; however, it most commonly occurs as vein fillings in rocks that have been subjected to hydrothermal activity. These veins often contain metallic ores which can include sulfides of tin, silver, zinc, copper and other metals.

Commercial fluorspar is graded in accordance to its quality. The grades depend on the content of fluorspar and the associated amounts of impurities (calcite, quartz, Sulphur, arsenic and lead). The grades are:

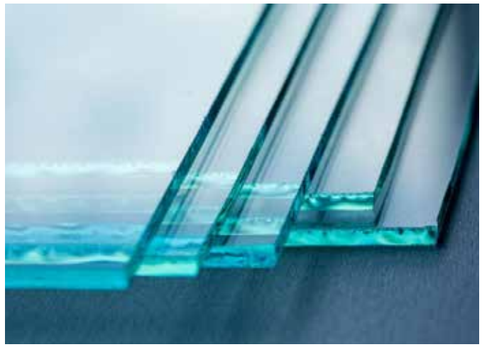
- Acid grade - contains a minimum of 97% of fluorspar, with the remaining 3% being various impurities
- Ceramic grade – contains 85% - 96% fluorspar, with the remaining 4% - 15% being various impurities
- Metallurgical grade – contains between 60% and 84% of fluorspar, with the remaining 16% to 40% being various impurities

The grade of fluorspar determines its end-use. Almost two thirds of all fluorspar production is of acid grade and is predominantly used in the production of hydrofluoric acid (HF), while approximately one third of fluorspar is of metallurgical grade and primarily used as a flux in steelmaking and in the production of aluminum. A small amount of fluorspar is of ceramic grade, where it is used in the manufacture of specialty glass, ceramics and enamelware.

HF is a highly corrosive acid, capable of dissolving glass and many other materials, primarily oxides. Due to its highly corrosive characteristic, it is used in many industries, such as chemical, mining, refining, glass finishing, silicon chip manufacturing and cleaning. Approximately 60% of global HF production is used in various fluorochemical applications, such as refrigerants, non-stick coatings, medical propellants and an aesthetics, whereas smaller amounts of HF are used in petroleum alkylation, and as a pickling agent for metal etching in the electronics industry. Furthermore, HF is also used for cleaning of silicon wafers, glass etching and in the production of polished and frosted glass.




*Fluorspar studied under the microscopes*



*Fluorspar applied in glass finishing*

## Copper Application

Due to the nature of being a soft, malleable and ductile metal with very high thermal and electrical conductivity, copper is used to many different industries, details could be found in the table below:

| Property | Industry/Type of Application |
|---|---|
| Aesthetics | Architecture, sculpture, jewelry, clocks, cutlery. |
| Bactericide | Door hardware, marine internal combustion engines, crop treatments. |
| Biofouling resistance | General, hydraulic and marine engineering, metalworking, aerospace, power generation, shipbuilding, off-shore oil and gas platforms. |
| Corrosion resistance | Plumbing tubes and fittings, roofing, general and marine engineering, shipbuilding; chemical engineering, industrial processes including pickling, etching and distilling; domestic plumbing, architecture, desalination, textiles, papermaking. |
| Ease of fabrication | All of the above plus printing. |
| Electrical conductivity | Electrical power generation, transmission and distribution, communications, resistance welding, electronics. |
| Environmental friendliness | Essential for health of humans, animals, and crops. |
| Fungicide | Agriculture, preservation of food and wood. |
| Low temperature properties | Cryogenics, liquid gas handling, superconductors. |
| Mechanical strength/ductility | General engineering, marine engineering, defense, aerospace. |
| Non-magnetic | Instrumentation, geological survey equipment, minesweepers, offshore drilling. |
| Non-sparking | Mining and other safety tools, oxygen distribution. |
| Elasticity | Electrical springs and contacts, safety pins, instrument bellows, electronic packaging. |
| Thermal conductivity | Heat exchangers and air-conditioning/refrigeration equipment, automotive radiators, internal combustion engines, mining. |

# MARKET

## A Global Approach

Nui Phao is the first mine in Vietnam to operate in accordance with international standards. That in itself is no small feat, however MHT has no intention of stopping there. We aim to position ourselves in a leadership position and to provide tungsten, bismuth, flourite and copper to the rest of the world.

The mining industry is cyclical and one of its biggest challenges is supply may at some points meet the current demand, however, a more likely scenario is that will inevitably fall into a deficit. We are aware of this, however, given that Vietnam accounts for approximately 30% of the world's supply of tungsten (excluding China) and MHT has successfully acquired H.C. Starck with 100 years of refractory metals expertise and metallurgical excellence, we are confident that MHT will continue to play a key future role in this market.

The quality of our products is recognized globally, and while we are a preferred supplier to many international consumers of scale, we were also able to find new markets with the improved international coverage. MHT's global brand recognition, is underpinned by high quality, reliable products, and agility to adapt to adversity.

2021 was a year that all economies over the world had been hit by numerous waves of Covid-19 that took a large blow into all industries, business sectors. Here is how it has affected the commodity of our products:

**TUNGSTEN**

MB APT price peaked during year end period at $320/mtu from $230/mtu at beginning of the year, which is a bright signal for the business. With MHT being responsible for over one third of global tungsten materials, 2022 is expected to be a good year for Tungsten business.

**COPPER**

Copper also had a dramatic gain of value during the year as Copper LME raised from $7,918/MT on January 4, 2021 to $9,691/MT when the year closed. With the Copper smelter being developed, MHT expects to capture a share of the copper cathode commodity domestically as well as internationally.

**FLUORSPAR**

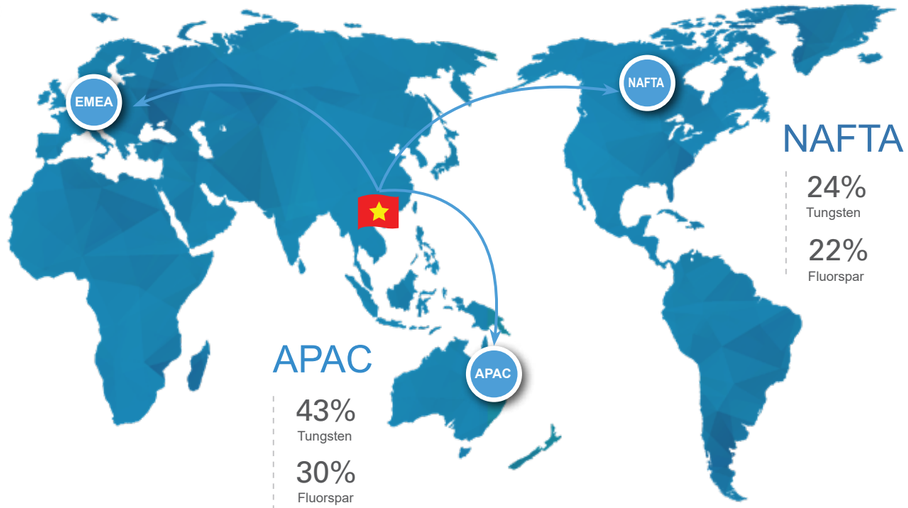
Fluorspar was the product with the most stable value over the year when Chinese Acid-spar price fluctuated between $400-$450/MT with high demand from China.

**BISMUTH**

Bismuth ingot 99.99% also experienced a dramatic rate of increase in price from $2.85/lb to $3.75/lb during the year. Even though Bismuth is not the most strategic product of MHT but an increase in trading value of the material still provides a strong boost to our business.

The mining industry has been hit by lack of energy during the year, resulting from reduced production of most materials from China. This has also created a shortage which led to the price increase of most materials. However, with China reduced production, it is also a good opportunity for other non-Chinese mining firms, including but not limited to Masan High-Tech Materials, to shorten the production quantity gap with increased material prices.

## Market Scale




**EMEA**

33% Tungsten

48% Fluorspar

**NAFTA**

24% Tungsten

22% Fluorspar

**APAC**

43% Tungsten

30% Fluorspar

100% Bismuth

MHT is a leading manufacturer of midstream tungsten products such as high-tech tungsten metal powders and carbides, with production hubs in Vietnam, China, Germany and Canada, serving customers across the globe.

A highly qualified and professional team of experts in R&D, application engineering, coupled with modern automated manufacturing processes ensure its customers benefit from the highest and consistent quality products.

MHT has the intellectual capital to apply innovative product manufacturing such as ultrafine size tungsten compounds.

In addition, MHT is now operating a comprehensive, environmentally sound tungsten scrap recycling platform backed by proprietary intellectual property. Its European scrap recycling platform, combined with MHT's low cost, stable primary supply of ammonium paratungstate (APT), provides MHT a global competitive edge in the tungsten market.

This will enable MHT to generate strong and consistent cash flows across price cycles and expand the addressable market by 3.5 times from US$1.3 billion to US$4.6 billion.

MHT has become a leading midstream tungsten products supplier across critical industries such as mechanical engineering and tool making, mining, automotive and energy, aviation and the chemical industry. The move into midstream tungsten products is also value enhancing as these products command on average a 30-50 percent premium to APT products.

This has created a global high-tech industrial company in Vietnam of scale, but more importantly, enhance Vietnam's competitive edge in global tungsten market by owning a cutting-edge R&D and technology platform and provide Vietnamese workforce an opportunity to develop engineering skills in the high-tech manufacturing space, as part of the globalization of MHT's business.

We embody the "Vietnam Can Do" spirit, and we are strongly positioned not only to significantly increase shareholder value, but more importantly to enhance social economic value as a global representative of Vietnam.

# SHAREHOLDERS INFORMATION

## Shareholder structure

The shareholder structure of the Company as of December 31, 2021 is as follows.

| | Shareholder structure | 31/12/2021 | | | |
|---|---|---|---|---|---|
| | | Number of Shareholders | Numberof Shares held | Value (by par value) (VND) | Shareholding percentage |
| **1** | **Domestic shareholders** | **5,380** | **987,958,353** | **9,879,583,530,000** | **89.88%** |
| | Institutional Shareholders | 9 | 951,114,419 | 9,511,144,190,000 | 86.53% |
| | Individuals | 5,371 | 36,843,934 | 368,439,340,000 | 3.35% |
| **2** | **Foreign Shareholders** | **55** | **111,197,067** | **1,111,970,670,000** | **10.12%** |
| | Institutional Shareholders | 1 | 109,915,542 | 1,099,155,420,000 | 10.00 |
| | Individuals | 54 | 1,281,525 | 12,815,250,000 | 0.12% |
| | **Total** | **5,435** | **1,099,155,420** | **10,991,554,200,000** | **100%** |

*Source: List of shareholders of the Company provided by VSD.*

## List of shareholders holding at least 5% of the charter capital of the Company

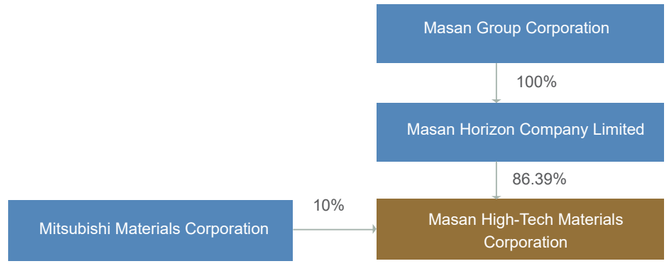
The list of shareholders holding at least 5% of the charter capital of the Company as of December 31, 2021 is as follows.

| | | Number of Shares held | Value (by par value) (VND) | Shareholding percentage |
|---|---|---|---|---|
| 1 | **Domestic shareholders** | | | |
| | Masan Horizon Company Limited | 949,597,153 | 94,959,715,300,000 | 86.39% |
| 2 | **Foreign Shareholders** | | | |
| | Mitsubishi Materials Corporation | 109,915,542 | 1,099,155,420,000 | 10.00% |

*Sources: List of shareholders of the Company provided by VSD.*

## Major Shareholders - Investors

Ownership structure of Masan High-Tech Materials as of December 31, 2021:



## Institutional Shareholders

***Domestic shareholder***


### MASAN GROUP CORPORATION

*(the controlling shareholder through its wholly owned subsidiary, via Masan Horizon)*

Masan Group Corporation ("Masan" or the "Company") believes in doing well by doing good. The Company's mission is to provide better products and services to the 90 million people of Vietnam, so that they can pay less for their daily basic needs. Masan aims to achieve this by driving productivity with technological innovations, trusted brands, and focusing on fewer but bigger opportunities that impact the most lives.

Masan Group's subsidiaries and affiliates are industry leaders in branded food and beverages, branded meat, value-added chemical processing, and financial services, altogether representing segments of Vietnam's economy that are experiencing the most transformational growth. Those include **Masan Consumer Holdings** - one of Vietnam's largest local diversified FMCG companies, manufacturing and distributing a range of food and beverage products, including soya sauce, fish sauce, seasoning, chili sauce, instant noodles, instant coffee, instant cereals, bottled beverages, processed meat, and beer. Recently, Masan Consumer is also present in the home and personal care space; **WinCommerce** (formerly Vincommerce) – the largest modern retail platform in Vietnam. WinCommerce, via WinEco (formerly VinEco), owns 14 high-tech farms WinEco which provide products of international quality standards; **The CrownX** (consumer retail platform that currently consolidates Masan's interests in Masan Consumer Holding and Wincommerce); **Masan MEATLife** - one of the largest fully integrated ("Feed-Farm-Food" business model) branded meat platform, focused on driving productivity in Vietnam's animal protein industry and ultimately directly serving consumers with traceable, quality and affordable meat products; **Techcombank** - one of the largest joint stock commercial banks in Vietnam in terms of total operating income, assets, loans, deposits, customers and distribution network. It has built industry-leading franchises in retail deposits, SME and retail lending through its consumer-centric ecosystem approach; and **Masan High-Tech Materials** - one of Vietnam's largest integrated industrial minerals and chemical producers.

***Foreign Shareholder***

### MITSUBISHI MATERIALS CORPORATION (MMC)

Mitsubishi Materials Corporation holds 109,915,542 ordinary shares (equivalent to 10.00% of the total shares in circulation). Mitsubishi Materials Corporation is an "integrated materials manufacturer" meeting customers' needs by providing such basic materials as copper and cement, mechanical parts, electronic materials and components used in automobiles, home appliances as well as the tools used to make them. Besides, MMC is also involved in recycling and energy business. Founded in 1871, it is one of the core companies of Mitsubishi Group in Japan. The company is listed on the Tokyo Stock Exchange and the Osaka Securities Exchange, and is a constituent of the Nikkei 225 stock market index.

# DEVELOPMENT STRATEGIES

H.C. Starck Tungsten Powders Factory in Goslar, Germany

H.C. Starck Tungsten Powders Factory in Sarnia, Canada

H.C. Starck Tungsten Powders Factory in GanZhou, China

Tsukuba Plant of Mitsubishi Materials Corporation in Japan, a Strategy Partner of Masan High-Tech Materials

## Sustainability at MHT

At MHT's core is a determination to continue building a sustainable business as part of our normal business activities and we see this as key to our business longevity while also being value accretive for our shareholders.

MHT's sustainability strategy includes consideration of global issues such as pandemic management, climate change, supporting and respecting human rights, advocating for social change by supporting the rights of peoples within conflict zones and responsible sourcing initiatives so that end customers have a clear choice available to them on the products and brands they accept.

Annually we choose to keep our position on Sustainability a matter of public record, and one which we do welcome and enjoy dialogue on. Our delivery of the commitments made enables our people and shareholders to understand our common approach, our values, how we measure success and the basis for our decision-making.

MHT policy is set at a global level, recognizing the requirement to act at a local level. Sustainability is about identifying and managing our risks, reducing our adverse environmental, social, economic and cultural impacts, while supporting and sustaining the industries, communities, and environments in which we work and live.

## Our Development Objectives

MHT's vision is to become the global leader and partner of choice, as the high-tech materials industry continues to shape the future of our world. Through the application of innovative, quality assured and sustainable products and processes we will create unparalleled solutions in advanced and strategic materials and superior outcomes for all our stakeholders.

During 2021 we continued performance optimization activities that started under the integration in 2020. We both strengthened and grew the customer base of our H.C. Starck (HCS) global tungsten business. Several customers took strategic long-term and larger positions across a range of different end-market categories reflecting their need for a strategic partner not previously available in the market. In ChemiLytics a new business strategy was approved to expand into providing analysis to the fast-growing battery manufacturing and recycling sectors, which also has potential synergies with other MHT R&D activities underway.

## Social Development Objectives

Openly our safety performance across our sites was mixed. Pandemic management was exceptional across all sites and a credit to all employees. However globally we also saw an increase in serious incidents compared to 2021, which were each investigated and actions taken to prevent future reoccurrence. We continue to improve the delivery on our commitment to promote the circular economy we recycled a similar amount of tungsten to the annual tungsten production of the Nui Phao mine. In addition, at MHT Vietnam we continued to increase our use of recycled tungsten units in all finished goods to meet growing sales volumes.

On review of the different metrics contained throughout this report we believe we can say that we delivered well on all items.

MHT products maintained market leadership across our indicators: customer complaints, customer ratings, and our ability to maintain pricing advantage against like products demonstrated our continued value proposition to our customers.

**Our plans for 2021 remained focused on four key areas:**

Ensure our products remain the leading products in the eyes of our customers; ensure strong cost effectiveness in the market; Continuous work to enhance our people, processes and systems, to understand and support the changing needs of industrial customers;

Promote the circular economy through the adoption of "Reduce, Reuse & Recycle" philosophy;

Safeguard the ecosystems of our people, our environment, our stakeholders; and

Ensure superior financial results on a long-term sustainable basis.

## 'Go Global' Execution Strategy

**Local knowledge with global considerations and understanding to facilitate project execution and asset optimization.**

Masan High-Tech Materials knows that a strong local understanding of the local sensitivities of community and customer concerns are critical for successful and sustainable business. During 2021 the Executive was expanded reflecting the global nature of our operations, and several senior members of the executive; CEO, CFO, Global HR Director, Head of Operational Technology & Innovation, and Director of Projects all independently spent several weeks in Goslar working with functional team members to strengthen organizational alignment and communicate and engage on business requirements. A smaller group then went on to visit Sarnia. Due to pandemic related travel restrictions a visit to the Ganzhou operation was not possible. These visits will be made in 2022 as restrictions are lifted to ensure enhanced and personalized communications across the organization.

**Use our ability to access and optimize capital and cash flows to acquire and develop quality assets.**

Throughout 2021 Masan High-Tech Materials has clearly demonstrated its ability to develop and stabilize assets to build sustainable long-term shareholder value. Of note the returns of the H. C. Starck Tungsten business detailed within the financial and sustainability parts of this report showcase what you can achieve with retaining and empowering the incumbent teams, in a challenging environment, where you are all working together towards a clear vision.

**Masan High-Tech Materials remains hedged against commodity price fluctuations through the diversification of its portfolio of metals, minerals and revenue currencies.**

The HCS acquisition has continued to demonstrate decreased tungsten revenue volatility via the expanded product range and through the increased processing of scraps sourced globally neither of which are index priced. The operations in Vietnam also continued their strong performance in producing both primary and secondary materials into their markets along with improved unit costs driven off completion of multiple processing debottlenecking projects. These projects focused in particular on increased front end throughput capacity that translated to lower grades whilst still increasing the total finished goods produced.

# SUSTAINABILITY PERFORMANCE REPORT


## SUSTAINABILITY FRAMEWORK

Masan High-Tech Materials are committed to compliance with international standards of corporate governance for the sustainable and long-term development of the Company. Therefore, the company and its subsidiaries are all developed in a manner that complies with the local regulatory requirements and World Bank guidelines/policies on social and environmental safeguards, the IFC Sustainability Framework and the Sustainable Development Framework issued by the ICMM for the mining and high-tech materials sector. We do so by integrating these practices into all our business areas towards the highest standards of transparency and consistency.

The sustainability framework makes our approach more effective by enabling us to benchmark our performance and continuously improve our sustainability initiatives. Our core values govern our approach, meaning that we place equal importance on investor returns, people and community, the environment and sound governance that adheres to our ethics.

At the highest level, policies are designed to define the standards of measurement. Procedures are derived to monitor adherence to the Company's standards, while indicators enable top management and stakeholder to track our performance transparently. Targets are periodically reviewed and updated to align with our aspirations. Finally, reports are consolidated to present the information to our stakeholders.

Our commitments and initiatives have been demonstrated through the following objectives.

- Operating in a consistent manner in line with leading international practices in all business areas towards transparency and consistency of corporate governance;
- Building and maintaining enduring relationships based on recognition and respect with the stakeholders and contributing to the long-term economic, social and institutional development of our communities;
- Seeking continual improvement in safety, health and environmental performance through robust management systems.

We embed our sustainability framework into all our operations. The sustainability framework is implemented at the employee level by aid of a document which outlines in a clear and transparent way the values employees need to demonstrate in their day-to-day activities. Our policies set out what we believe in and what we promise to achieve in the areas of health and safety, environment, community relations and supply chain management.




## Our sustainability values

In 2021 the HCS policy “Commitment to responsibility and sustainability – four principles of our success “ and the corresponding MHT policy were revised. This resulted in a new MHT company-wide policy, which is listed below:

We are convinced that our sustainable success is based on a multitude of different factors: Starting with the qualification of our employees, through active health and safety management, economic and ecological efficiency, energy efficiency, product and process quality, to the consideration of ethical and social aspects. These can be summarized in four principles.

As part of our integrated management system, we are therefore committed to the continual improvement of our products and manufacturing processes in terms of quality, energy-related performance, minimization of risks and effects on the environment, safety and health of our employees, customers and the public, and compliance with all binding legal and self-imposed requirements. The resources required for this are provided by the company accordingly.

**PRINCIPLE 1**
**Occupational health and safety**

We provide a safe working environment for all our employees and workers so that they will return home safe and healthy every day. In order to maintain this standard continually, we rely on consistent, transparent communication of information and specific training as well as active involvement of our employees.

We will only perform work that can be done safely. We know that all injuries, incidents, and work illnesses are preventable. On the basis that we are collectively and individually responsible for preventing injuries to ourselves and others. Therefore any kind of safety deficiencies, near misses and accidents at work are analysed in detail and regular risk assessments are carried out in order to eliminate sources of danger early and sustainably.

Occupational safety and health protection are important criteria even at the design and procurement stage of new processes and technologies.

**PRINCIPLE 2**
**Quality awareness**

We commit and develop our employees to quality and cost-conscious action. This enables us to assure our customers the expected or specified quality by using our experience and competence. Since quality is created at the source, we select our suppliers of raw materials, products and services in a targeted manner and develop them further in the sense of a long-term partnership. We continually develop the quality of our processes and products according to the Plan-Do-Check-Act (PDCA) cycle.

**PRINCIPLE 3**
**Environmental protection and energy use**

By using appropriate technical and economic processes in development, production and all other accompanying activities, we ensure that the environment and the resources available to us are treated with care, during mining, in all production processes along the entire value chain, and during site/mine closure.

Beside mining, the conflict-free sourcing of raw materials, the recycling of our products (closed loop) as well as of other tungsten-containing scrap are priorities for us. Furthermore, we are committed to a continuous improvement of our management systems in order to improve both our environmental and energy performance, and for the prevention of environmental pollution and waste caused by our operation activities.

We also pay attention to energy efficiency from the procurement process. In this way we can offer our customers environmentally friendly products.

To ensure that all employees and contractors will thoroughly acknowledge their responsibility in environmental protection we provide the necessary information, training and guidelines.

**PRINCIPLE 4**
**Communication**

Communication is the foundation for success and for a trusting cooperation. That is why we promote employee satisfaction through an open culture of discussion and are committed to the consultation and participation of our employees. We inform our stakeholders openly and transparently. We communicate our corporate policy on request. We inform the relevant parties about the goals derived from this and all binding obligations.”

## Sustainability Goals reflected in HCS Policies and Regulations

Our vision is to be the leading integrated supplier of sophisticated high-tech materials critical to global innovation. In order to sustain and continuously improve all our processes and functions we focus on the following:

### Customer satisfaction

We increase customer satisfaction and loyalty by responding:

- Flexibly,
- with the desired quality (Zero defect strategy)
- and competitively on customer requirements

### Occupational health & safety

Our employees enjoy a working environment in which they:

- Stay healthy
- and are actively involved in its improvement

We implement the necessary safety measures and pursue a Zero accidents strategy.

### Employee satisfaction

We promote employee satisfaction through:

- A secure job
- performance based remuneration
- an appreciative management culture
- a culture of coexistence
- and the elimination of cultural and language barriers

### Sustainability

We commit to work responsibly with the resources at our disposal. For this purpose, we:

- Use our recycling expertise, offer our customers a “closed loop” process and buy our raw materials responsibly (Conflict free sourcing)
- increase our process efficiency of energy use and availability of our production equipment
- improve both our environmental and energy performance continuously to achieve climate neutrality by 2045 at the latest
- offer our employees flexible working hours, good training and needs based education

### Competitive Ability

We maintain our competitive advantage in the marketplace:

- On the basis of our Code of Conduct and in compliance with ISO 37301
- by demonstrating a high level of security of supply through a “multi-supplier” strategy in which we continuously develop our suppliers
- by increasing process efficiency continuously
- through innovations in technologies and products. We identify new trends at an early stage and align our research and processes accordingly
- by maintaining our know-how through active knowledge management
- with a strong corporate culture

### IT safety

Availability of systems and data is ensured by negating third party criminal influence. Both personal and company data is handled responsibly

### Continued existence of the company

In order to manage risks to the continued existence of the company, we will:

- Actively manage the financial situation of the company in accordance with the defined KPIs (e.g.: sales, net income) including liquidity targets
- Monitor the sales and supply markets and react flexibly
- React flexibly to transport and storage risks
- Develop concepts to mitigate risks such as natural disasters and force majeure

### Applicable Standards

- The standards mentioned in MHT Annual & Sustainability Report 2020
- ISO standards (ISO 9001, ISO 14001, ISO 45001, ISO 50001)
- OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
- REGULATION (EU) 2017/821 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2017 laying down supply chain due diligence obligations for Union importers of tin, tantalum and tungsten, their ores, and gold originating from conflict-affected and high-risk areas
- Modern Slavery act
- REACH, RoHS

## Sustainability Management Team Goslar

Back in 1987, the United Nations World Commission on Environment and Development defined sustainability as follows: *“Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs”.*

Accordingly, sustainability affects all areas of our lives and economic activity and is thus a task for the whole society. This calls for social development that is ecologically compatible, socially fair, and economically efficient.

The site in Germany is certified according to the standards Energy (ISO 50001:2018) and Environment (ISO 14001:2015). The scopes from these two areas, supplemented by the topics of "social" and "economic", are combined in the newly established sustainability team at the site Goslar.

The focus of sustainability management at H.C. Starck Tungsten GmbH is on climate strategy (mainly CO2 emissions and water consumption), emissions, wastewater and waste. The area of energy is mapped via the energy management system (EnMS). External and internal issues as well as the requirements and expectations of interested parties were taken into account when defining the scope of the EnMS. In addition, however, social aspects are also incorporated, whether for the company's own employees or for the community, such as a tree planting campaign in Goslar initiated by H.C. Starck Tungsten GmbH in November 2021.

The sustainability team essentially consists of people who have knowledge of the environmentally relevant processes and technologies in our company. Their knowledge is to be used to positively influence the direct and indirect environmental aspects in our companies in a sustainable manner.

Sustainability Management Officer Jan Torben Bornkessel, as Head, is therefore supported by representatives of the following corporate divisions:

a. Site Management

b. Operations (Technical Services, Production)

c. Maintenance; Process Control Technology

d. Sales (Sales, Business Development)

e. Procurement

f. Technology & Innovation

g. Controlling

h. HSEQ Management

i. Materials Management

The Sustainability Team is assigned the following responsibilities and authorities:

a. Ensure effective implementation, maintenance and improvement of the EMS.

b. Establishing and maintaining action plans that lead to continuous improvement in sustainability-related performance

c. Establishing criteria and procedures necessary to ensure effective functioning and governance of the EMS,

d. Promoting awareness of the EMS and binding commitments regarding the EMS across divisions.

e. Delegation of tasks

f. Planning of projects relevant to sustainability and monitoring of project implementation (schedule, time, cost control).

As described above, the ISO14001:2015 standard forms a central basis for the work of sustainability management. Therefore, in addition to Jan Torben Bornkessel, Site Manager Juliane Saupe and Director HSEQ, RSCM and Product Stewardship Dr. Markus Zumdick have also trained as Environmental Management Officers in 2021 and successfully passed their exams.

### ACTIONS IN 2021

In 2021, employees, together with their families planted 500 trees for the reforestation of the Harzforest and another 1000 trees were donated.

Development in workshops of possible topics presented to the management in December. The resulting tasks will be examined for opportunities and risks in various working groups in 2022 and options for implementation will be developed.

Start of installation of charging stations for refuelling employees' electric vehicles.

Founding of and participation in an interest group (Harz chemical network) with the focus on reducing $CO_2$ emissions and conversion to "green" energy.

### FOCUS 2022

EMAS certification in fall 2020: the EMAS (Eco Management and Audit Scheme) is currently considered the most stringent environmental standard and will replace ISO 14001 and ISO 50001 certifications at the site. In addition to enhancing the company's image, certification is expected to lead to easier dealings with authorities (fewer inspections by the authorities) and, above all, to simplified approval procedures for new plants and thus to corresponding cost savings.

Set up Climate Strategy for plant Goslar.

# IMPROVED SUSTAINABILITY GOVERNANCE STRUCTURE

The role and influence of CHESS Committee (Community, Health, Environment, Safety & Sustainability) in 2021 have been strengthened in all the areas. The three key goals of CHESS Committee including health and safety for employees, environmental protection, and community communication transparency continued to be drastically implemented and closely attached with the production and business activities of our company and contractors.

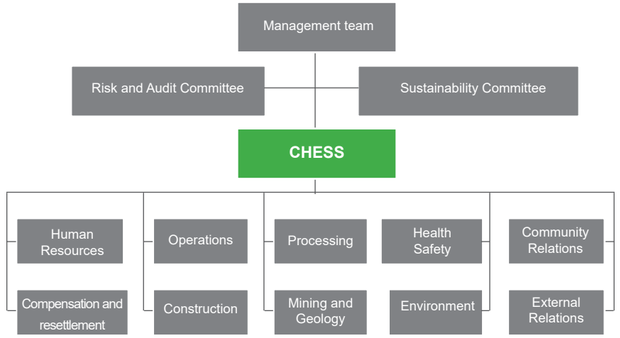
*CHESS Committee quarterly meeting*

Members of the CHESS Committee are active participants in the activities of all departments and divisions within MHT and its subsidiaries, collaborating to execute the sustainability initiatives as well as providing additional supervision and strategic guidance.

Acting as a bridge to connect internal departments, the members of CHESS Committee for the 2020-2022 term have actively participated in the safety inspection of the areas, monitored compliance, conducted communication activities, and implemented the performance assessment of the Committee through a lot of issues reported and updated on CHESS Zalo group for timely handling, combined with periodic meetings (monthly and quarterly) with the attendance of managers of the Company.

2021 was a very challenging and volatile year due to the Covid-19 pandemic. With united efforts of MHT, each member of CHESS Committee as a representative of different internal departments actively participated in the movements such as: Supporting the prevention and control of Covid-19; Blood donation; voluntary donations; Coordinating with the professional Fire Fighting force to help local communities extinguish the fire; Participating in the emergency response and rescue to road accidents happened on the National Highway 37 near the company and in Dai Tu district, etc.

In addition, the CHESS Committee approves the “Monthly Safety Awards”, through which employees and contractors are recognized for their outstanding achievements, contributions, initiatives and typical hazard report in the workplace safety, health and hygiene. This helps encourage our people to work relentlessly towards the goals of enhancing safety and clean environmental culture at workplace to ensure “everyone working at Masan High-Tech Materials returns home safe and healthy every day”.




**Looking forward, in 2022 MHT will focus on mobilizing all resources to improve the sustainability governance structure with the following commitments.**

Promoting activities of CHESS activities to enhance the values of safety and environmental sanitation for their employees and contractors.

Continuing to implement the CHESS policies to undertake commitments and support employees, contractors, customers, business partners and local communities in sharing the responsibilities to meet the related requirements.

Strengthening control measures to achieve the hazard-free target assessed by local communities and bring about socio-economic and environmental benefits to the society.

## Focus 2022

In 2022, CHESS Committee members will continue to develop their personal capacity and act as a representative of the department in the field of occupational health and safety. The representatives are the common voice of respective departments, raising the common issues for the Committee to address in a flexible and timely manner:

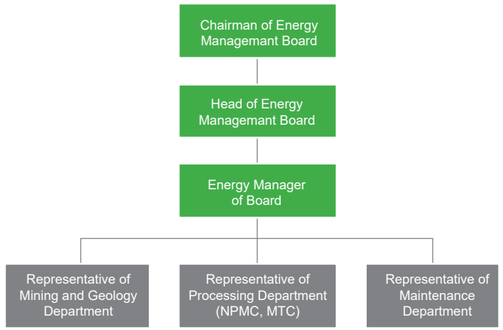
- Provide a consistent communication in all aspects as well as accurate and timely information updates.
- Continue to nominate and vote typical representatives for the CHESS Committee’s “Monthly Safety Awards”.
- Promote rapid information dissemination through Zalo channel
- Maintain monthly CHESS meetings as an employee engagement mechanism enabling the Company to continue delivering its goals in 2022

# ENERGY MANAGEMENT COMMITTEE

## MHT Energy Committee

The Energy Management Board (EMB) at MHT was established in order to implement and monitor energy management activities, save and use energy efficiently and effectively.

In 2021, the staff of EMB consolidated and more streamlined. EMB's operational regulations have also been adjusted and supplemented to concretize the responsibilities of the members as well as the Board's duties. The structure of the new EMB is as follows.




At the end of 2021, EMB organized and coordinated with the contractor to conduct periodic energy audits for NPMC and MTC for the 3-year period from 2019 to 2021 to propose effective energy-saving solutions. In order to realize the "Net Zero" goal of MHT, EMB has researched and explored the source of "green power" - solar farms as well as promoted the search for other solutions. In particular, in 2022 EMB sets a target to prepare and apply an Energy Management System - ISO 50001. This will be the most important task of EMB in 2022 to focus on continuous improvement, effective solutions to save energy and reduce costs.

### FOCUS 2022

- Reduce 5.0% energy consumption per product unit compared with 2021 at MTC;
- Install an online particle size analyzer to control the crushed particle size;
- Replacing the existing screening system by screening has useful surface area larger;
- Replace Reactor Heater temperature control from manual to automatic.

## HCS Energy Committee

The site in Goslar, Germany is the only one within H.C. Starck Tungsten Powders that is certified to ISO 50001:2018.

The aim of the energy management system (EnMS) in accordance with ISO 50001, which we are committed to complying with, is to continuously improve energy performance. As part of the energy management system (EnMS), all facilities and processes were assessed, in particular those with significant energy use (SEUs). The focus of the work in 2021 was to normalize the data of the SEU's in order to facilitate the ongoing improvement of the EnPIs ("Energy Performance Indicators") taking into account the influences of relevant variables.

In order to meet the requirements of ISO 50001:2018, an energy team was founded in 2019, headed by the new energy management officer Andreas König.

The Energy Team is assigned the following responsibilities and authorities:

- Ensure effective implementation, maintenance and improvement of the EnMS.
- Implementing and maintaining action plans that result in continuous improvement of energy-related performance
- establishing criteria and procedures necessary to ensure effective operation and management of the EnMS, such as:
- Promoting awareness of the EnMS and energy goals across divisions
- Delegation of tasks
- Planning energy efficiency projects and monitoring project implementation (schedule, time, cost control).

The energy management system representative with the energy team, as well as the department heads, are also responsible for the consistent further education and training of all company employees.

Since energy management is teamwork for us, the energy team consists of the energy management system officer as leader and representatives of the following divisions:

- Operations (Technical Services, Production)
- Maintenance
- Process Control Technology
- Engineering
- Procurement
- Technology & Innovation
- Controlling
- Site Management
- Quality Management
- Materials Management
- ITLC

The energy team consists mainly of people who have knowledge of the energy-intensive processes and technologies in our company. Their knowledge is to be used to positively influence energy consumption in our companies in the long term.

## The energy team’s projects in 2021

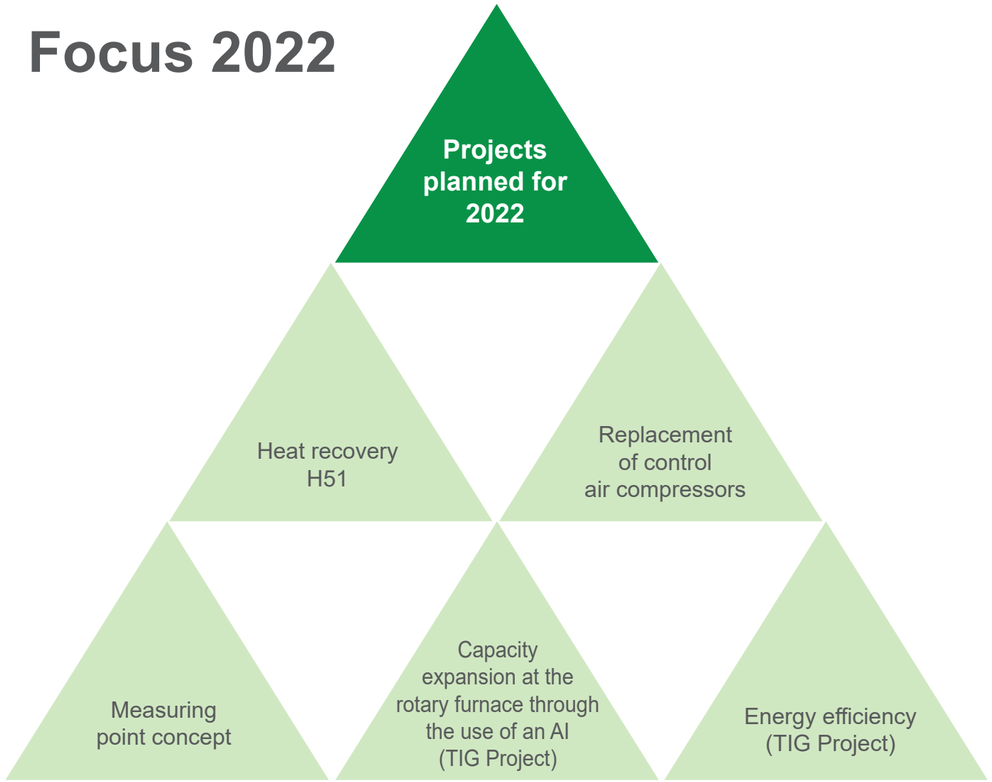
Start heat recovery H51

Tank insulation G81

Installation of steam measuring sections for chemistry

Optimization of the heating systems in administration buildings

## Focus 2022



# SUSTAINABILITY INNOVATION




**In 2021, a multitude of R&D research activities targeting areas such as high product purity, raw material flexibility and new efficient production processes continued to support Masan High-Tech Materials' efforts in the areas of overall sustainability and establishing global circular economies for the materials it produces currently and possibly in the future.**

Innovation has long been key to making significant improvements in corporate environmental performance and sustainability. Masan High-Tech Materials has understood the importance of innovation in sustainability since its inception and consequently has a well-established platform for cultivating a strong culture of technological innovation.

Masan High-Tech Materials operates two state-of-the-art research facilities with one located in Germany and the other located in Vietnam. These facilities are focused on technology and innovation across the entire mineral and metal processing chain and recognised as a key pillar in Masan High-Tech Materials' success in the business arena and maintaining long-term sustainability. With the ongoing commitment and continuously high expenditures in technology and innovation over all its process chains, Masan High-Tech Materials not only secures the technology leadership position in the processing and production of Tungsten, Fluorite, Bismuth, Copper, and other materials. It also results in significant improvements in the company's sustainability and environmental impacts.

Substantial funding and manhours are dedicated to the support and optimisation of Masan High-Tech Materials' global network of processing facilities with the objective of improving the consistency of product quality and production efficiency. Superior and more precise production processes result in increased product yields, reduced waste, and minimisation of important environmental factors. Consumption of items such as energy, water, reagents, and other auxiliaries can all be reduced and the production of waste and by-product streams minimised, therefore improving the sustainability and environmental impact of the processes being utilised.

One way in which sustainability is fostered is through focusing on new and alterative product development. Special sustainable R&D issues are also shaped with an ongoing dialogue with key customers and downstream users of our high-tech materials. In 2021, we continued to have an open ear to better understand their needs and to develop - under mutual confidentiality - new and innovative products for the future. By mindful listening to the market, we do advanced research and development to accurately adapt the chemical and physical properties of our materials according to customer needs and requirements.

*Technology & Innovation Global Expert working in the laboratory*

Masan High-Tech Materials' commitment to advanced technological development and innovation is not only demonstrated through the highly efficient and highly automated processing facilities that it operates around the world. But also, through the issuance of over 105 patents for the manufacturing of innovative products. Its Vietnamese MTC production facility has also been granted Hi-Tech Enterprise status by the government of Vietnam.

To achieve and maintain its focus on research and development, Masan High-Tech Materials utilises the latest in analytical laboratory technology in combination with extensive pilot plants that can mimic all parts of its own and customers manufacturing processes. With the ability to conduct systematic research and development activities for hydrometallurgical, pyrometallurgical and classical physical metallurgical process technologies, these facilities are pivotal in refining and improving our products and processes.

*Technology & Innovation Global Technical Centre*

## Improving Recycling Capability and Efficiency

The recycling of tungsten scraps and wastes plays an important part and is one of the foundations of Masan High-Tech Materials sustainability within the industry. This enables not only access low-cost tungsten units but also prevents these materials being disposed into landfill preserving primary tungsten resources.

**Tungsten is one of the main materials produced by Masan High-Tech Materials and the Tungsten process chain can roughly be divided into 4 parts.**

Mineralogical extraction and concentration of primary tungsten minerals into ore concentrates.

Hydrometallurgical processing and purification of ore concentrates and crude Sodium Tungsteate (ST) to generate pure Ammonium Paratungstate (APT). From this intermediatory product additional Tungsten chemicals (like Tungstic Acid or Ammonium Meta-tungstate) can be produced through additional steps of hydrometallurgical refinement.

Pyrometallurgical recycling of secondary resources (scrap and industrial wastes) to generate crude ST

In this regard, below are some of the research and development activities undertaken by Masan High-Tech Materials in 2021 to increase the effectiveness and efficiency of its current and future recycling capabilities.

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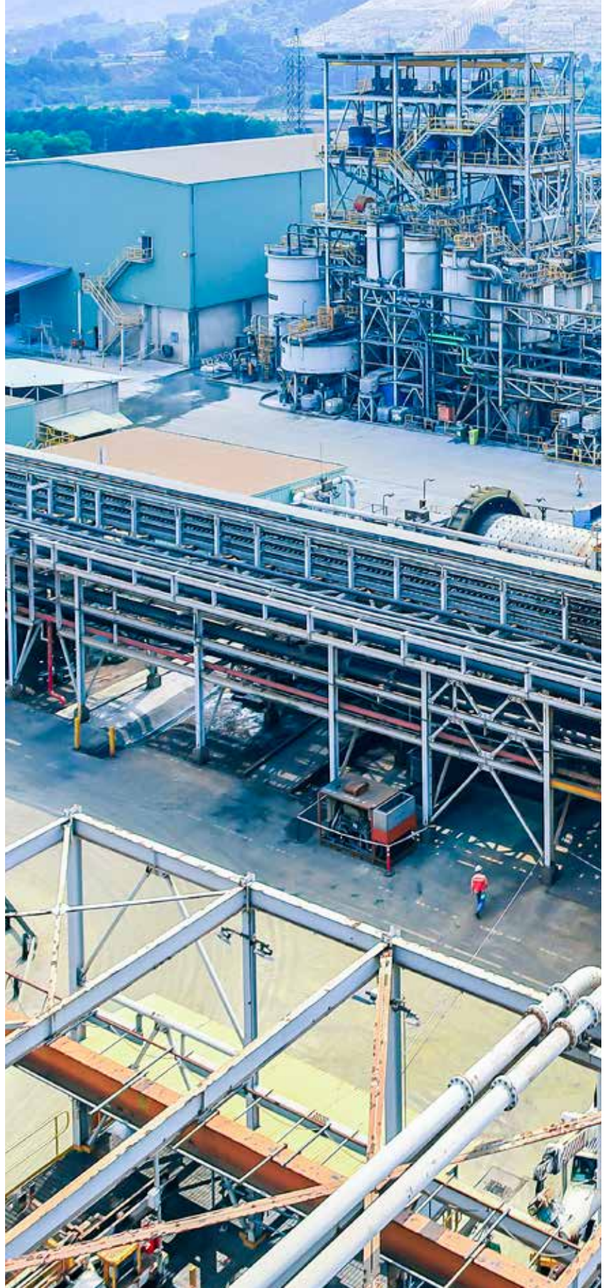


### *Optimization of Scrap Pyrometallurgical Digestion*

From a business and sustainability perspective, the company is aiming to further expand our recycling capabilities. Market competition for sourcing and procuring high quality tungsten scraps continues to increase and recently exacerbated during the Covid-19 pandemic. However, quite a lot of different tungsten-containing materials are not being recycled. According to the International Tungsten Industry Association (ITIA), recycling rates for cemented carbides scraps can reach up to 80 %, whereas tungsten containing spent catalysts are often deposited in hazardous waste disposal sites, which of course, is not a sustainable solution and presents an area where we definitely strive to improve.

The reason for these materials not being recycled is usually that tungsten units are contaminated with other elements, like molybdenum, which are difficult to be separated. Therefore, it is crucial to understand the chemical behavior of these materials within the established process.

To achieve this, the company has developed a new lab-scale equipment to simulate our smelting process with just a few grams of raw material. This enables us to evaluate the digestion of different scrap types in a relatively short time. This allows for not only the fine tuning of the treatment of existing feed stocks, but also the evaluation of other raw materials such as spent W/Mo catalysts and W/Pb scraps. This makes it possible to develop specifically tailored digestion recipes aimed at higher tungsten selectivity, thus enabling us to expand our resource base to formerly unattractive materials.

### *New Mixing Device for Tungsten Soft Scraps in the Goslar Smeltery*

Another important source of tungsten is the so-called “soft scrap”, consisting of a broad spectrum of different soft scrap types. Each type of soft scrap has its own set of unique parameters, make it difficult to process them efficiently. The amount of variability inherent with this type of scraps makes it unattractive for most tungsten recyclers, however, the efficient recycling platform in Goslar allows this material to be recycled economically. To maintain a high degree of input flexibility and to maintain the highest throughput through the soft scrap recycling process. A new process system was designed to homogenize different soft scraps with the help of an intensive mixer. The production scale unit was installed in 2021, and it now allows us to stabilize our soft scrap processing, resulting in reduced energy consumption and emissions.

*Laboratory Digestion Furnace*

*Intensive Soft Scrap Mixer*

### *Processing of Low-grade Tailings*

As extraction and processing technologies advance over time it makes the retreatment and recycling of historical low-grade tungsten mine tailings a significant opportunity to source additional primary tungsten units in a more sustainable manner.

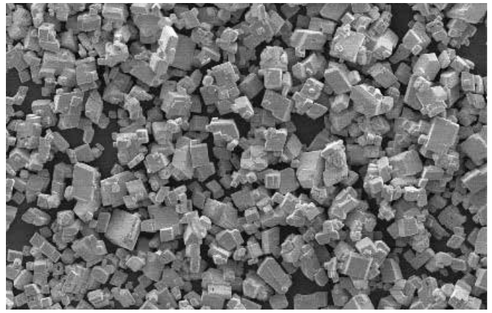
Masan High-Tech Materials has not only completed extensive test work on its own tailings to evaluate the economic extraction of additional Tungsten units in the future but is also participating in a joint research project investigating the recycling low-grade Tungsten containing tailings in Brazil. Partners in the project include multiple government departments, universities and industry players from both Germany and Brazil.

Masan High-Tech Materials is also investigating alternative uses for its tailings within other industries such as the cement manufacture and fabrication within Vietnam.

*A part of the ore tailing dam site at Nui Phao mining in Vietnam*

### *Development of fine APT sludge recycling process*

During the production of Ammonium Para Tungstate (APT) a solid by-product is formed that is traditionally recycled back to the start of the production process. Reprocessing of this material incurs additional costs and product losses as well as reducing productivity of the entire circuit. This stream has desirable APT physical properties but contains some deleterious impurities. With the mindset of improving efficiencies and reducing wastage, Masan High-Tech Materials is always searching for ways to improve process efficiency. A research project to evaluate alternative methods to reprocess the by-product was undertaken and resulted in an innovative process alternative for retreating the material in just a few simple steps which no longer required it to be recycled back to the start of the process. The resultant product is sold directly as a final product. The new process in currently under construction and will be brought into full scale operation in 2022.



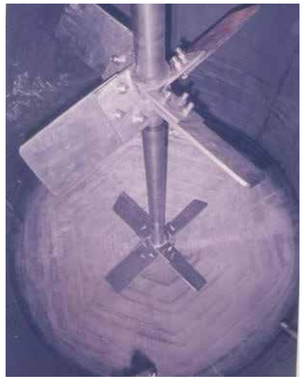
*An example of oxides produced at MTC*

## Energy Efficiency

Energy efficiency is also a focus area of Masan High-Tech Materials's research and development activities. Innovation in this area not only delivers a reduction in the company's direct and indirect $CO_2$ emissions but also delivers substantial cost savings to the business. Some of the key areas of innovation in energy efficiency are discussed below:

### *Implementation of Membrane Technology in the AMT Production Process*

The much-anticipated installation and commissioning of membrane concentration technology with the company's Ammonium Meta-tungstate (AMT) production process took place in 2021 and continued to be supported by the MHT R&D departments. This process was developed earlier on in 2017 from lab to pilot-scale in close collaboration with an industrial equipment supplier. At the end of 2018 a substantial funding was granted for the project by the German Federal Ministry for the Environment, Nature Conversation and Nuclear Safety (BMU). Besides debottlenecking of the existing production plant and making it more efficient, the introduction of this innovative concentration approach using modern environmentally friendly membrane technology allows the company to significantly reduce the energy consumption within the AMT production line. This reduction corresponds to yearly savings of more than 900t of $CO_2$ emissions.



*A pitched-blade agitator in the leaching autoclave*

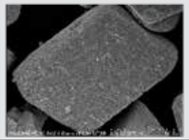
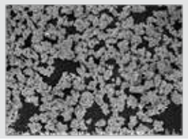
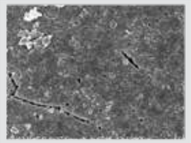
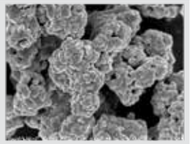
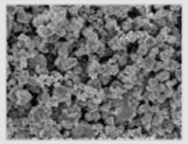
### *Agitator upgrade on leaching autoclaves*

The original design of the leaching autoclaves at Masan High-Tech materials was a reverse pitched blade agitator, which is an ineffective design that causes sediment to accumulate at the bottom of the vessel, reducing heat transfer efficiency and increasing cleaning times. As a result, scaling at the bottom vessel reduces heating efficiency and causes a dead zone and blockages. To resolve this the agitator was reviewed and re-designed.

Several prototypes and trials upon completion resulted in a new blade design that would improve the agitation within the vessel and significantly reduce scaling at the bottom of the autoclaves. This not only enabled better heat transfer efficiency reducing the energy requirement but also allowed for an increase in the particle size distribution of the feed slurry into the leaching reactor. This further reduced the energy requirement in the upstream milling sections and improved washing efficiency in the downstream filtration section improving overall metal recoveries. The new design also increased the service life of the agitator.

### *Micro-sized YTO*

Typically, the high-quality yellow tungsten oxide produced at Masan High-Tech Materials has a Fisher value at an average of 18 µm for the traditional tungsten market. With new applications of fine tungsten powder field, fine yellow tungsten oxide product with Fisher value in the range from 0.6 – 1.8 µm is required to meet this market demand. A few alternative routes have been investigated, with one optimal method of using an existing stream in the process to generate an intermediate product. This product is in turn converted to YTO, resulting in the desired Fisher value. This path has the potential to replace the traditional mechanical size reduction process with lower cost and energy consumption.

| Zoom/ | Normal YTO | Micro YTO 01 | Micro YTO 02 |
|---|---|---|---|
| X1000 |  |  |  |
| X10000 |  |  |  |

*Micro YTO structures compared to normal YTO*

### *Participation in Global Energy Reduction Programs*

As a responsible corporate citizen, Masan High-Tech Materials actively engages in government and industry programs to reduce energy consumption across its global footprint. This is not only done at each of its individual operating centres but also in a holistic approach covering the entire life cycle of the materials that it produces.

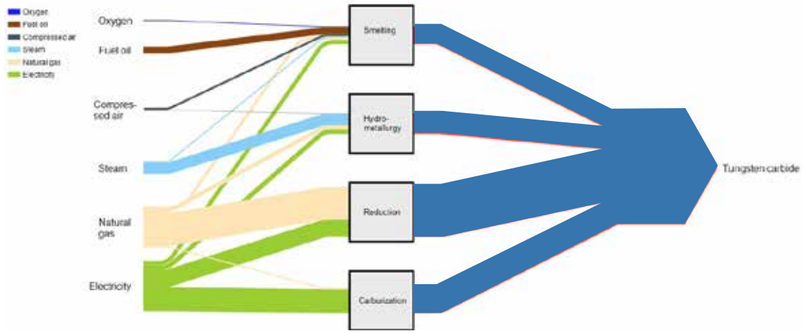
As part of this activity Masan High-Tech Materials in combination with other industry leaders, universities and research institutes have jointly proposed a three-year research and development project and successfully applied to participate in a German government sponsored “Innovation for Energy Revolution” program. The project will investigate innovative technology to increase the energy efficiency of the hard metal production process from ore/scrap to finished tools.

Using an annual basis of 4,300t hard metal production in Germany, the ambitious target of the project is to reduce energy consumption by more than 100 GWh/a, and to lower the $CO_2$ footprint by more than 50.000 t/a. To achieve this goal the project will be focused on developing new innovative production processes such as optimized green machining, alternative sintering techniques, and additive manufacturing. It will also be focusing on working with equipment manufacturers to improve the efficiency of significant energy using equipment such as furnaces.

First analyses of the energy consumption of Masan High-Tech Materials’ tungsten Carbide (WC) process in Goslar between January and August 2021 show an energy demand of approx. 22 kWh/kg of product. This number is the sum of six different energy sources, whereby natural gas and electricity represent the main share. Compared to literature values of Furberg et al. depicting a non-Chinese WC production (ca. 28 kWh/kg) the energy consumption of HCS’s process is already roughly 20% lower today. To further optimize our efficiency, a close cooperation with computational specialists was set up to develop/redesign different significant energy users.

Energy Management Teams have been established at all of Masan High-Tech Materials’ production sites which are in turn all overseen by the company’s sustainability committee. The goal of these teams is to better understand and manage energy consumption with the drive to either reduce or move to more sustainable sources of energy. Through the actions of these teams the company has determined a number of opportunities that will be actioned in future years. In addition, the Goslar operation has been certified by the International Organization for Standardization (ISO) in the areas of ISO 50001:2018 and ISO 50003:2016 for energy management.

**Energy consumption HCS Tungsten carbide process**



## Innovating for the Future and Strengthening Circular Economies

A large part of achieving sustainability is through the establishment of circular economies whereby the consumption of raw materials and primary resources are minimised, waste streams are minimized and the processing and reuse of recycled material is enhanced. This is an inherent part of Masan High-Tech Materials' current business and innovation focus but also extends externally where it regularly participates in industry and government initiatives promoting and advancing the topic.

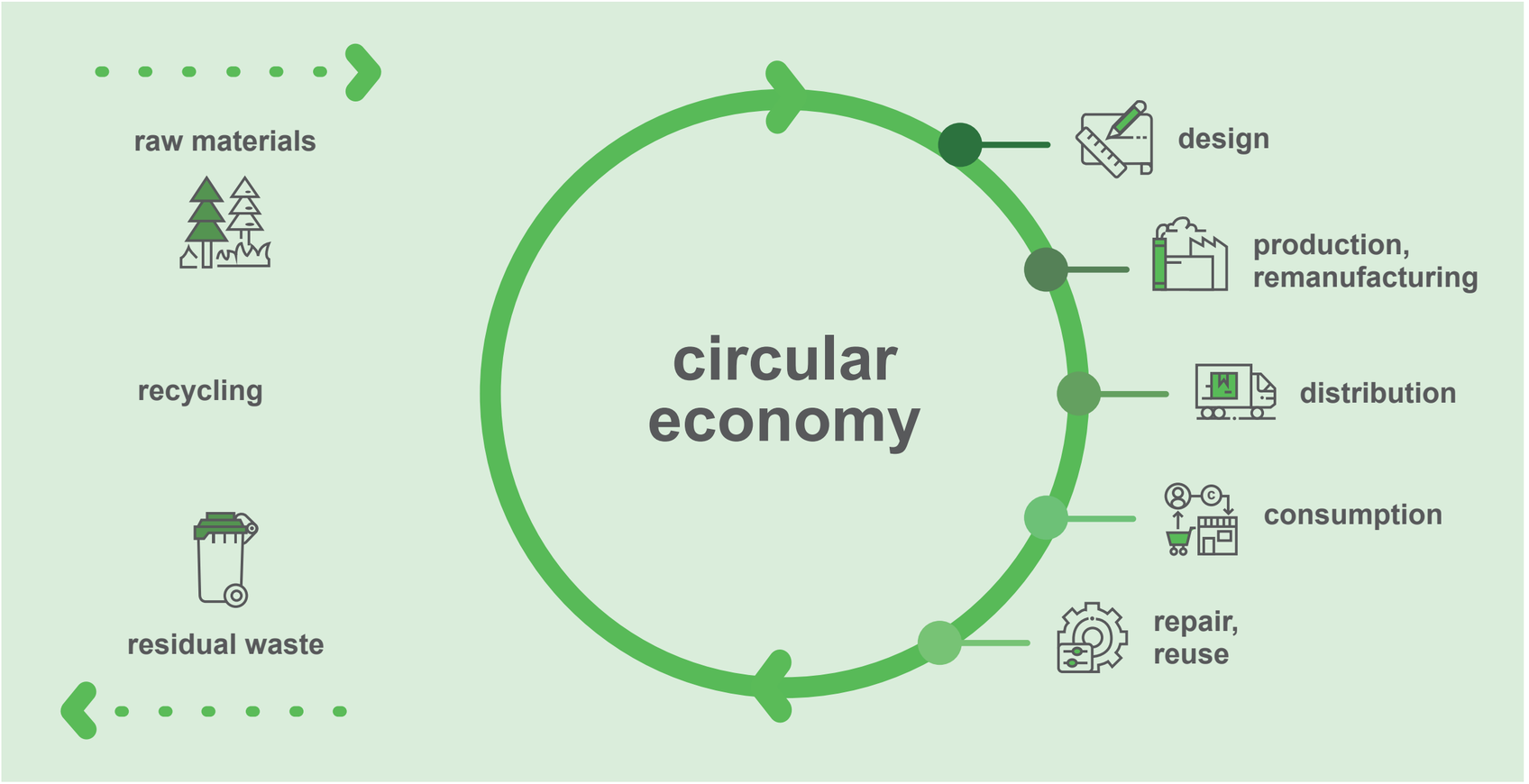
**In 2021 this included the following:**

Being a technical expert member of the European Raw Materials Alliance (ERMA) focusing on "Materials for Energy Storage and Conversion" and to support the Secretary General of the European Recycling Industries' Confederation (EuRIC) in his work to strengthen the production of raw and advanced materials and more specially the recycling of lithium ion/polymer batteries.

In the context of "How companies improve critical raw materials circularity" the Goslar research and development department delivered a lecture on "Paradigm Tungsten Processing" during "Raw Materials Week". This is an initiative international round table on materials criticality, gathering a wide range of stakeholders so that they can discuss and exchange initiatives and policies in the field of raw materials.

Ongoing participation in REWIMET e.V. which is a cluster of companies, scientific institutions, and local authorities mainly within the Harz region, Germany. Its main purpose is to ensure the availability of raw materials through recycling. H.C. Starck Tungsten currently holds the seat of 2nd Chairman on the board of REWIMET. At this year's summit the company was invited to present on "Closed Loop in Practice – Challenges in Tungsten Recycling".

REWIMET
Recycling Cluster wirtschaftsstrategische Metalle



### *Cobalt and Beyond*

With Masan High-Tech Materials' endeavour for a new recycling horizon beyond its current capability within the tungsten space. A new high priority project was established during 2021 focusing on the development of cobalt recycling. With the aid of a considerable government grant for researching "Sustainable Co-Recycling", the project will focus on the recovery of Cobalt and other materials from hard metal sludges and EV recycled battery Black Mass. Masan High-Tech Materials not only has considerable knowledge and expertise in developing and operating complex processing circuits and are highly experienced in the recycling business, but also apt at maintaining the rigorous HSE requirements for handling materials across the business chain.

As demonstrated above there are many synergies with the existing business but more specifically, these can be summarised as follows.

*Heavy metal sludges*

For many decades cobalt and tantalum containing sludges have been a by-product of the MHT hard metal recycling process. Making it readily available as a feed source.

*Historic Producer*

Up until 2003 the company was a producer of several hundred tonnes of cobalt metal powder per year. The facility was operated at the company's Goslar site and produced cobalt from both primary and recycled materials.

*EV Battery Black Mass*

A global competitive market arena with increasing recycling standards and rising minimum recycling quotas around the globe will be established within the upcoming decade. H.C. Starck Tungsten also possesses historical expertise in this space being a former participant in the LIB cathode material business with insights into specifications, development, and production.

*Analytical Edge*

ChemiLytics, which is also a member of the Masan High-Tech Materials Group, is a knowledgeable and experienced analytical partner in LIB chemistries giving direct support to its research and development facilities.

### *Nurturing new innovators*

**Innovation plays a major part in achieving and improving the sustainability of a business. Not only does it deliver improvements in environmental practices and performance but also improvements in social welfare and economic growth. Masan High-Tech Materials is very cognisant of this fact and is why it places such a high importance on ensuring the company has a strong culture of innovation.**

Successfully embracing a culture of technological development and innovation within a company not only requires support from company directors and funding of strategic work programs. It also requires a sustainable supply of intelligent and skilled individuals capable of developing these innovative solutions for not only for the benefit of the company but also the industry and the world. This is recognised by Masan High-Tech Materials and to ensure that it has access to the required talented individuals, it cultivates close relationships and works collaboratively with universities, scientific institutes and local schools in both Vietnam and Germany. This involves establishing joint projects, providing access to company resources, sponsorship of key awards and events and regular tours and site visits to each of our production and research facilities. These activities nurture and support the development of young academics and scientifically interested students into the field of technological innovation therefore ensuring its sustainability into the future.

Of particular note in 2021 and in conjunction with the Solid State Chemistry and Materials Science of the German Chemical Society (GDCh) the bi-annual "H.C. Starck Tungsten Award" for an outstanding doctoral thesis in the area of inorganic chemistry was granted to two young academics.

# SUSTAINABILITY MINING & RAW MATERIALS

The Mining and Geology (M&G) Department's efforts are focused on producing sustainable mining outcomes by reducing costs, minimizing ore loss and dilution, providing fresh ore for the processing plant and explore revenue-generating opportunities in order to produce sustainable mining outputs.

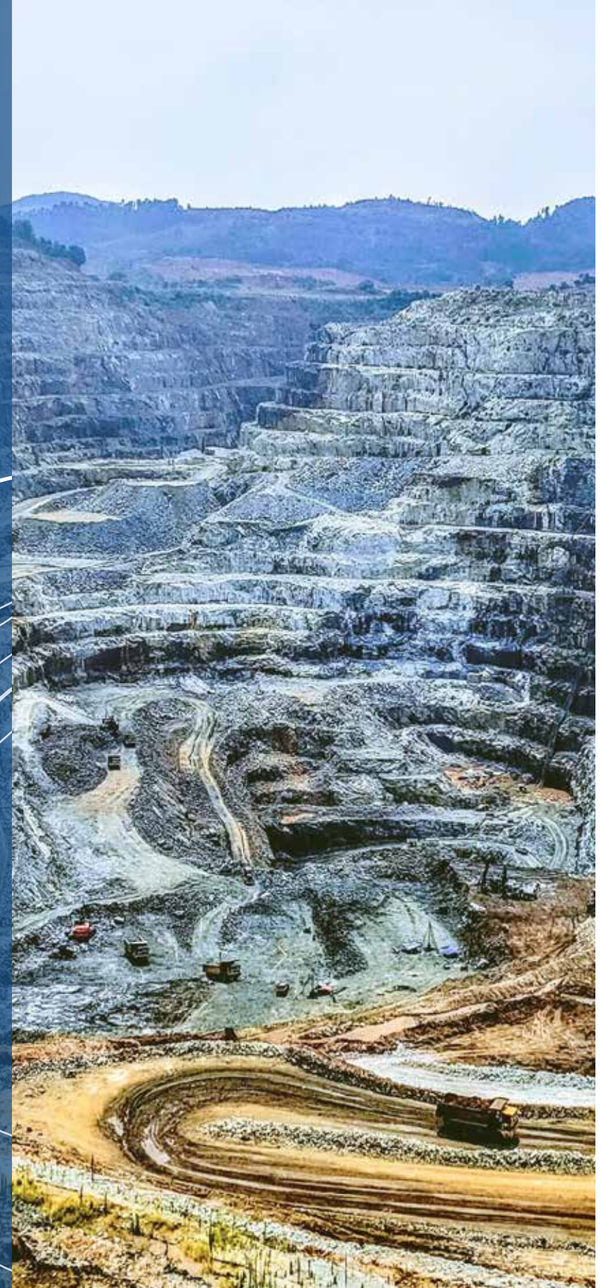
In 2021, the M&G Department mined roughly 5.53M bcm of material, yielding little more than 3.50Mt of mineral ore or 1.1M bcm of ore and 4.43Mbcm of waste for a strip ratio of 4. All mining operations complied with both environmental and community standards.

**5.53M bcm**
**of material**

**3.50Mt bcm**
**of mineral ore**

**1.1M bcm**
**of ore**

**4.43Mbcm**
**of waste**







## MINING

**A summary of the results M&G achieved within the year**

- **Complete 2021 TSF construction lift to 116mRL for OTC, 138mRL for STC and 116mRL for HSD in time and in budget.**

- **Continue to receive praise for the professional completion of the TSF by ITRB board.**
  TSF construction is critical every year to enable the tailings deposited in the TSF to not breach the height of the walls, therefore ensuring safety for the community living close to our site. The walls act as a safety barrier to hold back tailings material while also capturing water for processing to use. By completing the dam wall ahead of time, we have been making the dam more stable and secure.

- **Complete the cut off trench to help monitor and understand heavy metal in the area**

- **Complete Willstock survey to understand the movement of heavy metal within the community area**

- **Drilling Horizontal holes on 0mRL resulting in 20% water level reduction allowing for stable walls**

- **Categorizing mining waste to reuse and save resources**
  We have different waste categorization such as 3S, 3O, High Sulfur, Low Sulfur, Soil and Soft Rock. All these different waste rocks are separated and placed in different areas of the mine. For example, 3O is used to build the TSF embankment of OTC and 3S is used to build the upstream embankment of STC. The reason for waste separation is to ensure the potential sulfur impact into the environment is contained to a specific area. There is potential for 3O waste rock to be sold in the future, similar to the soil project.

- **Waste dump management plan being developed**
  In planning for our future waste placement, we understand the impact of disturbance we have in our mining license, thus developing plans to engage environment and community to support us in preparing the areas to be cleared or compensated ahead of time. The waste dump management plan allows us to have tighter control of our mine sustainability as we have future foresight of the areas that affect land disturbance.

# RAW MATERIALS

H.C. Starck Tungsten Powders' raw material sourcing is based on two principles: the continuous expansion of recycling activities and a fair, ethical, and environmentally friendly raw material sourcing.

The stringent, globally applicable procurement guidelines detailed in the Responsible Supply Chain Management System (RSCM) guarantee that H.C. Starck Tungsten Powders buys raw materials only from suppliers who comply with strict requirements with regard to environmental protection, occupational safety and social responsibility.

H.C. Starck Tungsten Powders condemns all activities in connection with the unlawful exploitation of mineral resources, no matter where such activities take place. As part of this commitment we have implemented an on-going policy of only purchasing raw materials that are conflict-free and that always meet the requirements of the OECD (relevant version of the "OECD Due Diligence Guidance for Supply Chains of Minerals from Conflict-Affected and High-Risk Areas"), and the "Regulation (EU) 2017/821 of the European Parliament and of the Council of 17 May 2017 laying down supply chain due diligence obligations for Union importers of tin, tantalum and tungsten, their ores, and gold originating from conflict-affected and high-risk areas".

Before starting new business with a supplier, there is a detailed check by the procurement and the legal department to confirm that this potential supplier fulfils all legal requirements and the requirements of the RSCM process. This check is repeated on a regularly basis during the whole time of the business relationship. Also, H.C. Starck Tungsten GmbH has incorporated due diligence requirements into legally binding agreements with direct suppliers. H.C. Starck Tungsten Powders has repeatedly been awarded the certificate for the processing of "conflict-free" Tungsten raw materials; the last audit was conducted in October 2021. All corresponding evaluations were done by independent auditors on behalf of the Responsible Minerals Initiative (RMI), a joint effort by the Responsible Business Alliance (RBA) and the Global e-Sustainability Initiative (GeSI).

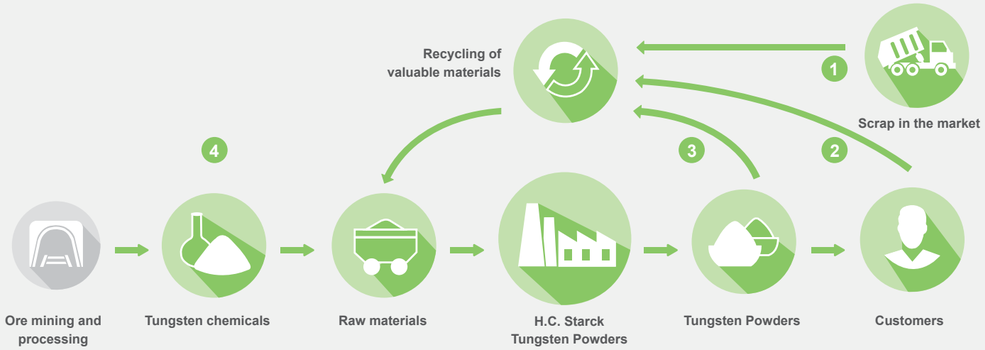
Both the H.C. Starck Tungsten Powders Raw Materials Procurement Statement and the current OECD 5-Step Report, audit report and certificate can be viewed and downloaded from the H.C. Starck Tungsten Powders website.

At the Goslar site, the focus is on the recycling of scrap metal as a raw material, which we obtain both on the free market and from our customers. Intermediates such as APT or tungsten oxides are mainly purchased from MHT. While the plant in Sarnia gets tungsten oxide exclusively from Masan High Tech Materials, the site in Ganzhou is currently supplied by JV Partner in Ganzhou.

**Recycling rate of raw materials - Goslar site**


The global end-of-life recycling rate of tungsten is approximately 30% and, thus, belongs to the top third of the recycled metals.[1] With our highly efficient recycling platform in Goslar we further seek to push this recycling rate. Research efforts in Central Technology & Innovation Global (TIG) Department focused in 2021 therefore also on expanding the currently processable scrap base in terms of flexibility and throughput. For more details, have a closer look at the chapter "Sustainability in Innovation" in this report.

**Backed by decades of experience we are able to recycle almost all our products and compounds after use**




*The closed-loop production cycle at MHT*

*[1] B. Zeiler, W.-D. Schubert, A. Bartl, Recycling of Tungsten – Current share, economic limitations and future potential, ITIA Newsletter May 2018, International Tungsten Industry Association, 2018*

## Focus 2022

**Implementation of recommendations from the 2021 RMAP to continuously improve the RSCM system**

# SUSTAINABILITY PROCESSING

In 2021 Nui Phao Processing Operations (NPMC and MTC) has maintained and improved our sustainability performance across all functional areas with the goal of contributing to the overall sustainability of Masan High-Tech Materials. This coupled with the integration of H.C. Starck has continued the development of a holistic approach to tungsten product development commencing in Vietnam with mining to concentration and then high-end specific tungsten products delivered to the world.





## MHT PROCESSING

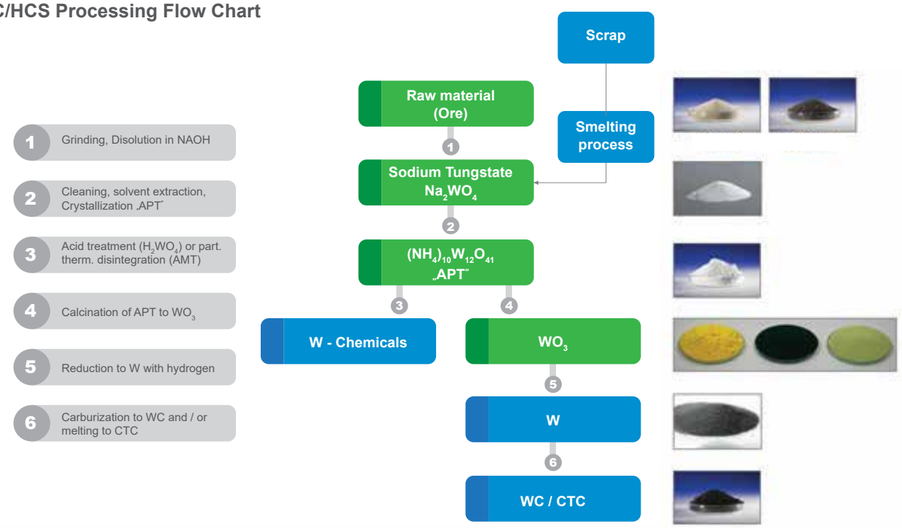
### Producing More with Less

The Nui Phao Operation mines and processes around 3.5 million tonnes of ore per year, containing tungsten, bismuth, fluorspar, copper, and small amounts of gold. It is a polymetallic orebody, and given the nature of the minerals, we are continuously identifying opportunities and implementing them in a prioritized manner to extract more products from the resource and do all activities with a lower impact.

In 2021, Masan High-Tech Materials replicated previous year's high production achievements despite the changing global landscape. This included maintaining similar copper, tungsten and acid grade fluorspar production and recoveries. Furthermore, bismuth production exceeded the previous year's production following the extensive maintenance program in the previous year. Ongoing continuous improvement (CI) strategies across the business units have yielded successes with stabilized production which has in turn enhanced efficiency and metal recovery performance. Development of circuit upgrades in the NPMC and the MTC areas has been the main focus of 2021 to enable the circuit to effectively process lower feed grades and subsequently process more of the strategic resource contained within the Nui Phao orebody.

*Operating processing equipment at MTC*

## MTC/HCS Processing Flow Chart




## Committed to R&D Investment

The application of modern technology and advanced production and processing lines at MHT ensures minimization of resource losses and optimisation of the value of natural resources, with a mineral recovery rate of over 96%. Tungsten chemical products such as APT, YTO, BTO are recognized by the Ministry of Industry and Trade as an industrial product with a purity of over 99%.

The mining and metals industry is considered relatively mature from the technological point of view, since its spending on R&D is usually low. In recognition of NHTCM's contribution to Vietnam's development of high-tech industries, Vietnam's Ministry of Science and Technology has awarded the Company with a "High-Tech" Certificate. After the acquisition, Masan Tungsten (MTC) became one of the leading producers and a global supplier of high specification tungsten chemicals (Ammonium Paratungstate ("APT"), Blue Tungsten Oxide ("BTO") and Yellow Tungsten Oxide ("YTO")). In order to reinforce our globally recognized brand and reputation of a trusted supplier, MTC continues to invest into R&D expenditure as per statutory requirements, to maintain our "High-Tech" certification. A well-equipped laboratory was established in late 2017 to carry out the research and innovation activities for improving the efficiency and develop new technological solutions for our production lines in both MTC and NPMC.

## Examples of Improving the Efficiency of Our Refining Process

In 2021 MTC capacity improvement project was implemented to increase the budgeted plant capacity, historical MTC process feed capacity has been in the order of 6,500 tons $WO_3$ per year, the successful target was increased above 7,400t of $WO_3$ per year. This allows feed grade flexibility from previous 40-45% $WO_3$ limits to significantly lower 30-35% $WO_3$, with the processing capacity to increase feed material throughputs.

Reduction of MTC feed grade requires feeding low-grade NPMC concentrates which also improves resource utilisation. The circuit improvements allow greater throughputs of low-grade TC by-products from NPMC which are currently being partially processed or stockpiled. At the beginning of March 2021, some 520t of $WO_3$ was tied-up in these products which could be processed to marketable APT, on top of the ongoing annual production of 540tpa of $WO_3$ contained in Low Grade (HG & HIMS) containing 9% $WO_3$ on average.

Improvements to the MTC circuit included significant mechanical and automation upgrades which de-bottlenecking the filtration and leach reactor sections to allow more feed. These upgrades significantly reduced the required operator manual intervention during the filtration operation. Subsequent additional benefits included significant reduction in OH&S risks for operators relating to exposure to hazardous chemicals with less time required in the area and removing them from the vicinity of equipment during the hazardous periods of the filtration cycle. The change improves the business in terms of reducing operational risk, utilizing more of the Nui Phao resource and improving the cash position.

*Studying samples at the R&D center in Vietnam*

## Integration of H.C. Starck Global Tungsten Business

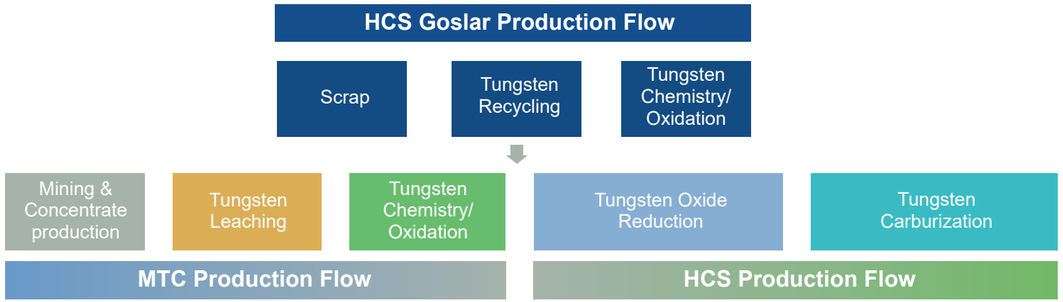
With the purchase of the tungsten business of H.C. Starck Group GmbH, integration activities have been ongoing during 2021 despite the persisting global issues separating the business units. Successes have been achieved with a number of technical and business opportunities progressed during the year.

MHT is a leading global manufacturer of high-tech tungsten metal powders and carbides (midstream tungsten products) including production hubs in Europe, North America, and China serving customers across the globe. A highly qualified and professional team of experts in R&D, application engineering, coupled with modern automated manufacturing processes ensure its customers benefit from the highest and consistent quality products. MHT remains committed to HCS's innovative product development program including ultrafine size tungsten compounds.

In addition, MHT is now one of few companies in the world with comprehensive, environmentally sound tungsten scrap recycling platform backed by proprietary intellectual property.

This transaction is a strategic step in executing MHT's vision to become a leading vertically integrated high-tech industrial material platform in the world. Including low cost, stable primary supply of APT combined with dominant recycling scrap platform will provide MHT a global competitive edge.

MHT has become a leading midstream tungsten product supplier across critical industries such as mechanical engineering and tool making, mining, automotive, energy, aviation, and the chemical industry.




*MTC Processing plant in Vietnam*

*H.C. Starck Cananda – Sarnia plant*

*Advanced process control ensuring highest quality*

## Advanced Management Software

At MHT, we are applying advanced processing technology and all processed products are recognized by the Ministry of Industry and Trade as industrial products: tungsten, bismuth, fluorspar, and other products. Especially, MHT is the only enterprise in the mining industry in Vietnam that applies the world's advanced mining and processing management software to minimize resource losses and optimize value of mineral resources by operating the German technology-based tungsten chemical production line.

# HCS PROCESSING

## Sustainability from a maintenance perspective

Different and changing challenges have an impact on a company and therefore on the availability of the equipment. The machinery at H.C. Starck Tungsten GmbH consists of continuous, quasi-continuous and batch-operated machines. Therefore, it is essential that the maintenance programme is flexible and specifically designed for each machine. For this reason, a strategy mix of reactive, preventive and condition-oriented maintenance is used and will be continuously improved.

Due to good cooperation between sales, production planning and the team from operations, a maintenance and shut-down schedule is drawn up every year. This allows both resources and materials to be used in specific areas, and unplanned downtimes in the facilities have been significantly reduced.

Not only unplanned shutdowns could be reduced through this good cooperation, but also the energy consumption. The used energies can be visualised more transparently through optimised displays and change effects are immediately visible.

In 2020, a new platform was implemented. It allows maintenance notifications to be reported in a simple and standardised way and it is possible to view the processing status at any time. In daily workshops, the received reports are discussed, prioritised and responsibilities and executing trades are defined. Completed work can be reported back immediately and directly on site. Thanks to this system, which is transparent in all directions, both efficiency and employee satisfaction have increased in 2021.

In order to be prepared for new challenges in terms of IT security, availability and optimisation of the equipment and processes, the process control systems were updated. For this task, new standards were introduced in the programming of the control system. The use of this modular system ensures standardised programming, which also has a positive effect on costs and effort.

As part of the restructuring and modification of the maintenance strategies, it was therefore possible to have a positive influence on operating and maintenance costs.

The objective of our maintenance is to increase the availability and reliability of the equipment in the long term, and we will continue working towards this goal.

*First-class education in own machine shop*

## Maintenance activities in Sarnia in 2021

### • Pusher Furnace Capacity Improvement

Pusher Furnace was retubed, tubes were treated with High Emissivity coating to promote more uniform heat distribution. Maintenance improvements were concentrated on restoring design capacity and increasing Mean Time Between Failure (MTBF) of the Tubes. As a result, full Furnace capacity was restored to 18 Tubes.

### • Rotary Kiln(s) PLC Upgrade

Rotary Kilns 1,2 and 3 obsolete PLCs were upgraded at a cost of ~20 K ($ Can) each, which will improve reliability and make troubleshooting easier and therefore faster.

### • Preventive Maintenance - Rotary Kiln H2 Filters

Old filters were creating higher dP across the filter, causing the H2 system pressure to operate near the high limit, leading to frequent process upsets. Therefore, a Preventive Maintenance Program was established for H2 Filters. Lower dP across these filters has improved H2 process stability.

### • Downtime Reduction

To achieve less unscheduled downtime, Maintenance and Engineering were both involved in production planning meetings to discuss all possible equipment risks and find solutions to mitigate unplaced downtime.

# SUSTAINABILITY
# SUPPLY CHAIN MANAGEMENT

The global pandemic strongly impacted supply chains in 2020 with most major manufacturing countries shutting down in a worldwide effort to ride down the pandemic wave. Unfortunately, 2020 was only the curtain raiser to how 2021 was to play out to our already stretched Supply Chain.

With over 25,000 material lines and 32 different processing reagents arriving from various global locations, the pressure was on for our SCM teams to get together with our onsite customers to establish a working plan that ensured the continuity of supply and quality of product without adversely affecting costs.

Given the rising shipping expenses due to escalating fuel prices and a growing scarcity of shipping containers, 2021 was shaping up to be a mountain to be climbed.

The base camp was established. The first hill to get over was the growing scarcity of reagents. It was becoming a major issue and had the possibility of adversely affecting our production if we couldn't navigate our way through the issues. Our procurement team immediately went into overdrive contacting current and alternative vendors to ensure continuity to our customers on site.

In a short time, we had locked in supply of all our reagents ensuring, minimal interruption to supply and little affect to our costings. The next hill to climb was shipping times. Most of our reagents are shipped on a DDP basis, so working with our vendors to ensure we were always at the top of the paperwork pile, in the beginning, middle and end of the shipping cycle was our number one priority. Transhipments were becoming an issue as ports became clogged with mountains of transiting containers and scores of vessels waiting to be offloaded. Credit must be given to our Inbound Logistics team who, under immense pressure, worked tirelessly, contacting vendors, shipping agents and tracing shipments to ensure that the squeaky wheel got the oil, in our case, our containers on the ship.

In the background our Inventory teams were busy working with our processing teams to establish safety stock levels to ensure we would always have stock at or on the way to site to cover any shortages due to increased manufacturing and shipping times. They were able to fine tune the stocks using our customers current and forecasted usage data to ensure we kept a balance between stock arriving and being used. All this was done with a mind to managing the available storage space on site.

With a lot of the hard work now done and everything looking to be on track, we had only enough time to take a few breaths before the next challenge came before us.

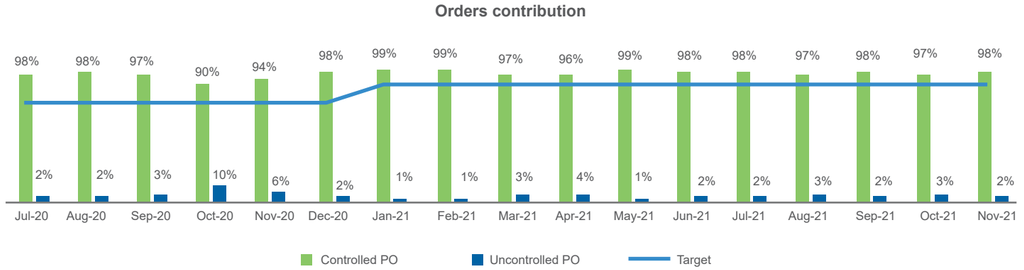
In the second half of 2021, the world started coming out of lockdown, reopening manufacturing and placing major orders for inventory products. One of those just happened to be our most used reagent, Caustic Soda. Most manufacturers had depleted their inventories and minimised production, then throwed into this the electricity shortage in China, the largest manufacturer in Taiwan having major production issues and the festive season fast approaching, we were again facing another mountain to climb. The SCM teams were already suited up and ready to climb that mountain. They pulled together as a team to climb that mountain and safely come down the other side with no shortages or production loses.

2021 has been a challenge, a mountain that our SCM team has had to climb time and time again. Through all of it, the team have all learnt valuable new skills and we now have a much stronger and more resilient SCM team and Supply Chain, ready to take on the challenges of 2022 and beyond.

## Procurement

### *Controlled vs un-controlled purchase orders Controlled vs un-controlled purchase orders*

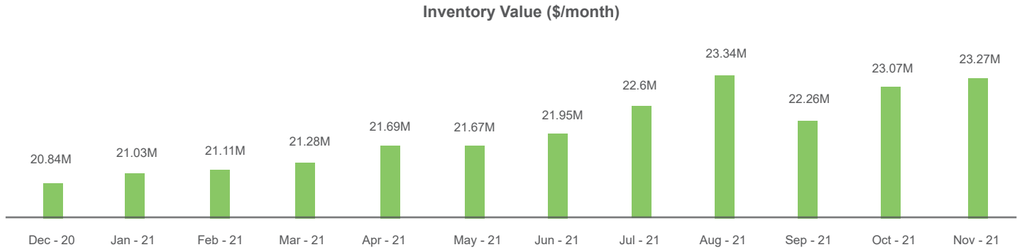
Despite the disruption to worldwide supply chains the MHT Vietnam business continued to ensure that procurement activities were managed in a controlled manner.




## Materials Management

### *Inventory value 2021*

Due to the disruptions in worldwide supply chains, the business had to increase stock levels to ensure safe and stable operations were maintained throughout 2021.



## HCS SUSTAINABILITY WITHIN MATERIALS MANAGEMENT GLOBAL

In the year 2021, H.C. Starck Tungsten's previously called Supply Chain Management department was renamed as Materials Management Global. Besides the existing areas of Raw Material & Inventory Planning (RMIP), Distribution Management (DM) and Production Planning (PP) it has now been extended by two areas of expertise: Logistics (in March 2021) and International Trade law & Customs (ITLC; in June 2021). The merging of these formerly separate organizational entities allows for integrated solutions and cost as well as process optimizations to improve our overall ability to deliver high-quality products and services to our customers, especially considering the adverse effects that the Covid-19 pandemic had on worldwide logistics, the Brexit as well as new regulations such as the re-classification of hazardous goods that required new storage concepts.

### Logistics

In the past, the logistics approach of H.C. Starck Tungsten included a large amount of outsourcing logistics services such as warehousing and shipping to a logistics service provider. Establishing the expertise and knowhow of logistics within H.C. Starck Tungsten now allows us to review and evaluate all aspects of logistics such as warehousing, internal logistics as well as external transportation/shipping. It is our overall logistics strategy to become more independent, be more agile, flexible, and faster, have better cost transparency and tighter cost control as well as general control over logistics processes.

Since March 2021, Logistics has achieved a significant reduction of the use of special pallets for storing Tungsten raw materials, intermediates, finished products as well as consumables, packaging and spare parts. The percentage of special pallets decreased from 75 percent to 47 percent leading to a storage cost reduction of around 6000€ from March to November 2021. Shifting storage to standard pallets is not only more cost effective, but also preserves natural resources (wood) as standard pallets are smaller in terms of length and width.

In cooperation with H.C. Starck Tungsten's logistics service provider for shipping, we identified several alternative freight forwarders in 2021 allowing H.C. Starck Tungsten to choose from shipping options in terms of availability, price, and service, and in the future sustainability as we are incorporating environmental considerations in freight forwarding more and more. Among others we started tracking the carbon footprint of our transports. A few other projects were initiated to further reduce H.C. Starck Tungsten's carbon footprint: (1) maximising vehicle utilization for the internal production logistics and (2) a modal shift to rail transportation for a reliable, cost effective and environmentally friendly alternative to road transport.

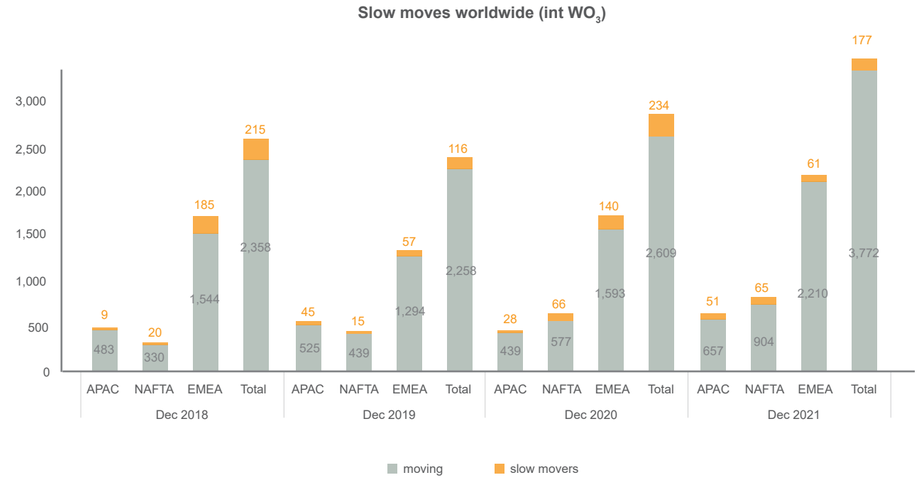
### International Trade law & Customs (ITLC)

Our ITLC team supports the entire organization navigate the complex and changing rules that govern the import and export of Tungsten products. Export control, for example, is an integral part of compliance by establishing internal control measures to ensure that H.C. Starck Tungsten adheres to relevant export control regulations. Besides their contribution to compliance, ITLC also fosters sustainability by facilitating our international trade, which in general is recognized as a contributing factor to global warming. ITLC's role is to streamline customs clearance procedures, use best practices and tools to control trade transactions so that they can reduce the time and cost of moving goods across borders.

### Raw Material & Inventory Planning (RMIP)

The control of slow-moving inventory (means no inventory turns for more than 90 days) has been challenging during the Covid-19 spandemic and its related effects on logistics, longer lead times and hence higher inventory levels to buffer against these supply chain disruptions. Although inventory levels rose overall due to strategic stocks to deal with the market uncertainty and supply chain disruptions, slow mover levels could even be reduced further compared to previous years from worldwide 8 percent in 2018, 5 percent in 2019, 10 percent in 2020 to now 4 percent in 2021.

RMIP and Logistics also contracted a new external warehouse location to account for a change in the harmonised classification of Cobalt by the European Union and ensured that H.C. Starck Tungsten is compliant with regards to the storage of Cobalt containing Tungsten scraps.



## Distribution Management

Continuing the close cooperation with the logistics service provider, Distribution Management successfully kept our airfreight volumes at a constantly low level. The roll-out of a new release process for airfreight shipments in 2021 increased awareness throughout the organization and supports our goal to keep volumes, costs, and carbon footprint at a minimum. The trend from 2018 to 2020 was continued in 2021 despite the severe supply chain disruptions and logistics challenges that the Covid-19-pandemic caused. Overall shipping volumes by air, sea and road increased by 22 percent in 2021 compared to 2020. However, we still managed to ship only 1 percent of our overall volumes by air in 2021 accounting for 15 percent of the overall freight costs (based on preliminary year-end freight cost statistics for 2021).

Finally, first trials to optimize container space were started in 2021. In cooperation with Sales, Distribution Management could agree on filling big bags with Tungsten Chemicals to the maximum load for certain customers. Further improvements could be achieved in cooperation with the logistics service provider by stacking two layers of pallets in a sea freight container, doubling the volume we can ship in one container. Overall, this combined improvement of big bag load and container stacking not only smoothens Operations, but also saves approximately an entire 40' container load per delivery to the customer.

| | | Percentage Gross Weight | Percentage Net value |
|---|---|---|---|
| 2018 | Airfreight | 11% | 68% |
| | Seafreight | 7% | 5% |
| | Truck | 82% | 27% |
| 2019 | Airfreight | 4% | 31% |
| | Seafreight | 18% | 24% |
| | Truck | 77% | 39% |
| 2020 | Airfreight | 1% | 15% |
| | Seafreight | 19% | 38% |
| | Truck | 80% | 48% |
| 2021 | Airfreight | 1% | 15% |
| | Seafreight | 21% | 41% |
| | Truck | 79% | 44% |

## Technical Materials/Equipment Procurement

In 2021, the Technical Procurement Department in Ganzhou has made efforts to guarantee that all materials and services, excluding raw materials, were delivered in the correct quality, on time, and in the proper quantity to support the regular operation of equipment and production as required by the production department.

Under this premise, the technical procurement department saved ¥288.3k through negotiation, down price and optimization of suppliers.

Furthermore, the team completely supported and collaborated with the Production & Equipment department in order to move forward with the investment project and promote it in order to meet the production capacity and product quality targets on time.

# SUSTAINABILITY
# HUMAN RESOURCES

2020-2021 were two challenging years for each business, individual; however, the Company continued to resiliently follow the leadership of the Management team and combined efforts and unity of all employees. For Masan High-Tech Materials, these challenges are also opportunities for us to build a sustainable engagement among its employees, uplift the corporate culture and promote growth mindset, providing leverage for the sustainable development of the Company. Employees are the focus of the development and breakthrough of the Company.

In the middle of difficulties lie opportunities, together we have developed specific action plans to safely, flexibly adapt and overcome challenges, create and seek new opportunities, and improve optimal efficiency in the global human resource management. Besides providing a favorable working environment, ensuring benefits and policies for employees in a transparent and equitable manner, keeping the entire workforce healthy and safe in the pandemic period is a key factor.

With the aim of organizational consolidation, we make constant efforts to amend and develop the policies, regulations of human resources to suit the new situation such as amendment of Internal Labour Regulations; Recruitment Policy and Process; Transfer, Promotion and Concurrent Work Assignment Process; Procedure for Disciplinary Action; Guidelines for Work From Home; Health Checkup Guidelines; Guidelines for health declaration; Guidelines for Quarantine and Benefits to employees under quarantine of Covid-19. Especially, we issued a set of policies across MHT, taking a step in the organizational design and operation towards centralization and management by core policies including Human Resources Policy, Compliance Policy, Commitment to responsibility and sustainability - four principles of our success, External Relation Policy.

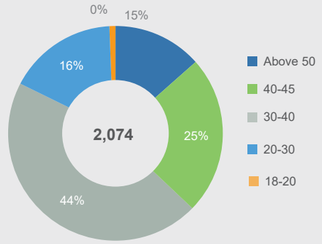
## WORKFORCE STRUCTURE

The total number of employees in MHT globally is provided in the table below:

| Year | The total number of employees in MHT globally |
|---|---|
| 2016 | 1,343 |
| 2017 | 1,363 |
| 2018 | 1,403 |
| 2019 | 1,403 |
| 2020 | 2,010 |
| 2021 | 2,074 |

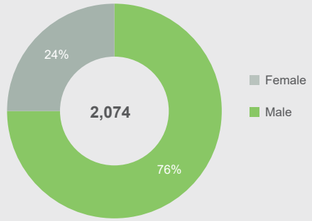
### By Age

The Company's employee age ranges within the golden working age, mostly from 30 to 40 years old, accounting for 44%. The number of employees over 50 years old accounts for 15%. The age group just entering the labor market accounts for 16%.




### By gender

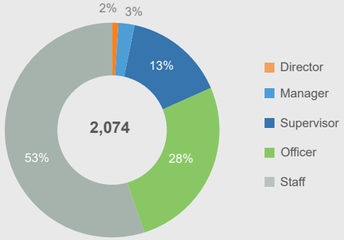
Due to the characteristics in a heavy industry and mining company with special working roster, good physical health, the number of female employees remains stable, accounting for 24% of the total workforce in 2021.




### By Rank

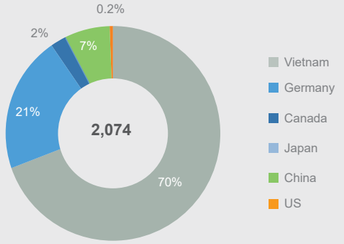
The highest percentage in the MHT's workforce structure is direct operators (53%), 7% higher than 2020. Next, technicians and supervisors account for 28% and 13% respectively.

Members of the Board of Directors and middle managers account for 2% and 3% respectively, higher than 2020.



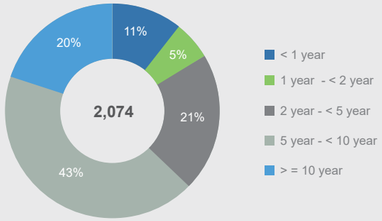

### By Countries

With 05 processing plants and many business operations, marketing offices located in many countries in the world, the workforce percentage of MHT by workplace is 70%, 21%, 7%, 2% in Vietnam, Germany, China and Canada respectively, and the rest in USA and Japan.




### By length of service

A friendly and engaging work environment helps attract and retain the employees. The length of service indicator has showed that 20% of employees have worked at MHT for more than 10 years, 43% and 21% of employees have worked for 5-10 years and 2-5 years respectively, and the percentage of new hiress is less than long-service employees.



**Number of employees and average income at MHT in Vietnam**

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Employee number in total | 1,343 | 1,363 | 1,403 | 1,403 | 1,403 | 1,454 |
| NPMC | 1,027 | 1,072 | 1,150 | 1,157 | 1,096 | 1,133 |
| MTC | 316 | 291 | 253 | 246 | 307 | 321 |
| Of which | | | | | | |
| Vietnamese | 1,236 | 1,261 | 1,303 | 1,309 | 1,329 | 1,394 |
| Expats | 107 | 102 | 100 | 94 | 74 | 60 |
| **Average income (VND million per month) for Vietnamese employees** | 10.3 | 11.1 | 11.4 | 11.8 | 11.9 | 11.9 |

** In compliance with the information security policy, the detailed information of employees working in other countries is not provided*

## TRAINING AND DEVELOPMENT

It has been proven in practice that countries with limited natural resources have unfavorable natural conditions, yet such countries flourish and "take off" as they value and stay focused on development and promotion of their available human resources. Human resources training and development is one of the top priorities at MHT based on continuous improvement and robust transformation of training quality in combination with recruitment policy, talent retention and benefits.

In 2021, all training activities in most of MHT's subsidiaries are carried out through both internal and external training courses with well-known training establishments, providing qualitative training courses, supporting training cost, meeting the demand on capability development for the employees. In order to ensure safety during the pandemic outbreak period, most of the training courses are delivered virtually, making it easy and convenient for our employees to arrange their work and fully join, obtain good outcomes. The training plans are developed and implemented more flexibly to adapt the pandemic situation and meet social distancing regulations by local government, ensure to maximize the time of direct learning for learners and meet the training objectives.

For global connection, we make full use of online applications such as Microsoft Office Teams, Google Hangouts Meet, Zoom and use English language to communicate as a bridge to connect with employees in other countries where our business units operate. All training materials are developed in English language, so it can be used globally, and tailored in the local countries by native language. We encourage, attract, prioritize and value candidates who are able to speak many languages such as Chinese, Japanese, English, German and Vietnamese to effectively support the organization and improve the performance of individuals.

*International specialists and Vietnamese engineers discussing projects at NPM plant*

We stay connected with one another through training activities on global human resources policies that are considered a human resources philosophy critical to the organization. Besides, we organized virtual workshops with the aim of both training and discussion on the strategy to transform into a unified and synchronous system.

Depending on the nature of each subsidiary, its training methods can be adjusted to suit the actual conditions, making full use of available resources to conduct internal training and actively adapt virtual training method in a flexible manner, improve the effectiveness of training activities, contributing to the growth of the organization.

## MHT in China

In 2021, total professional training man-hours are 962 hours with 214 training sessions. A number of internal and external training courses for employees were conducted such as New Employee Orientation, Basic Skills including operation skill training, equipment training, technology process training, HSEQ training, production and maintenance management, eight disciplines (8D) problem solving training, professional skills, special equipment operation training such as forklift, crane, etc.

The Company further focuses on individual capacity building and team learning, creating favorable conditions for employees to learn at their demand, orients future career planning and promotes their work ability to deliver better achievements for the Company.

## MHT in Germany

Vocational training for young people is of particular importance, and so is it at H.C. Starck. What they all have in common is that the training in each case consists of a combination of practical in-company training and activity and theoretical-school instruction and must be completed with an official certificate examination by a commission at the Chamber of Industry and Commerce in order to be recognised as a vocational qualification in Germany. Besides maintaining the training in the profession of chemical engineering and industrial mechanic, the Company have added new professions of industrial clerk at Tungsten and chemical laboratory assistant at ChemiLytics, in a course of 2.5 to 3-year apprenticeships, providing qualified human resources, forming the basis for all laboratory services offered by ChemiLytics, as well as knowledge in the area of research & development at Tungsten. At present, 20 young people are undergoing training at Tungsten and ChemiLytics.


*Working in modern offices at HCS, Goslar*

## MHT in Canada

Training and employee development are indispensable parts in the human resource strategy, contributing to providing a safe and efficient work environment. In 2021, there were 03 employees participating in the internal audit training course of ISO 14001. The company also cooperated with the Canadian Management Training Center which is one of 20 members of the Industrial Educational Cooperative (IEC), through high quality, effective and cost training, providing many learning opportunities for employees by provision of training courses, sponsorship for excellent learners and introduction of world best practices to meet various training needs, improving the qualifications and capacity of the employees.

In addition, employees participated in an annual 2-day training course to improve the current skills through training modules, including external training conducted by IEC, on-the-job training by external training providers and internal exercises to simulate different scenarios. Especially, the company provides financial support for employees to join capacity building courses, helping attract and retain the employees who are interested in improving their knowledge, skills for career progression.

*Effective teamwork is the key to success*

## MHT in Vietnam

In 2021, 1,488 training contents have been delivered with a total of 6,753 professional training man-hours, equivalent to 25,841 training man-hours for all employees and 18,574 attendees.

In 2021, most of the training topics focused on maintaining a safe work environment for employees and regulatory compliance:

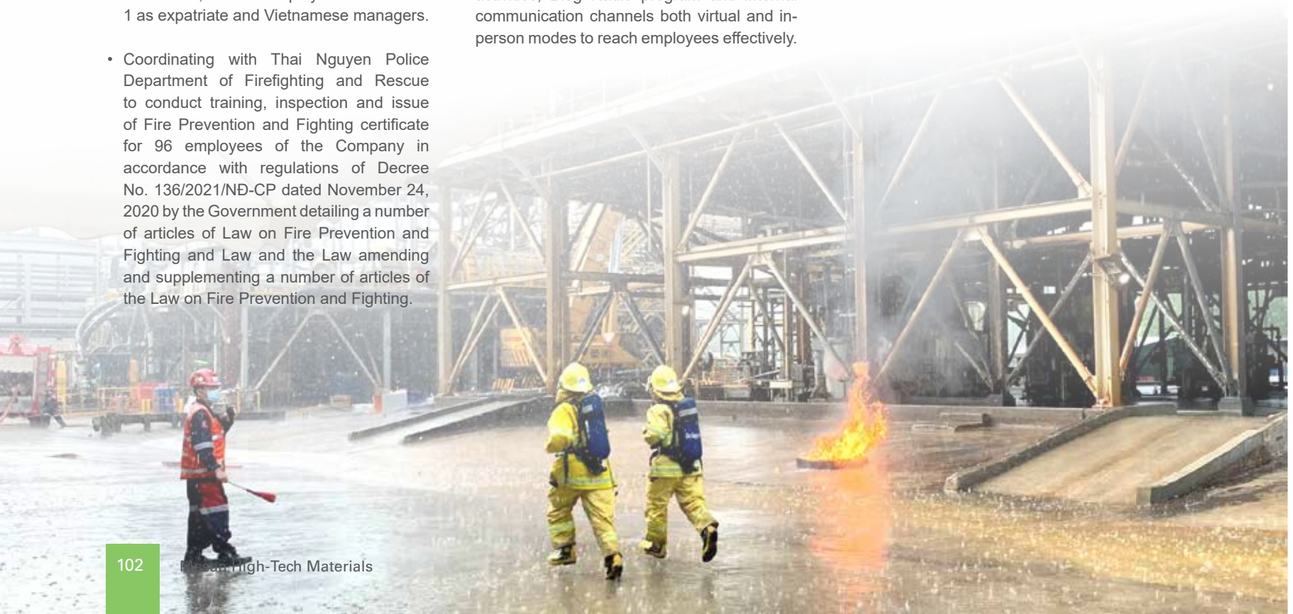
- Safety training courses are conducted regularly for MHT employees and contractors with a total of 11,675 attendees.
- Cooperation with Thai Nguyen Technology and Trade College to organize an occupational safety and hygiene training course as per the regulations of Decree No. 44/2016/NĐ-CP on occupational safety and hygiene training for 366 employees in the rank 3, and 38 employees in the rank 1 as expatriate and Vietnamese managers.
- Coordinating with Thai Nguyen Police Department of Firefighting and Rescue to conduct training, inspection and issue of Fire Prevention and Fighting certificate for 96 employees of the Company in accordance with regulations of Decree No. 136/2021/NĐ-CP dated November 24, 2020 by the Government detailing a number of articles of Law on Fire Prevention and Fighting and Law and the Law amending and supplementing a number of articles of the Law on Fire Prevention and Fighting.

The company also invested in human resources development through compulsory internal training programs such as labor discipline; awareness on non-compete and non-conflict of interest agreements, internal policies for employees; upskill training for workers to operate equipment, professional training for young engineers, skill development for successors.

In order to help employees adapt to the new normal, the Company often organizes workshops to enhance awareness on health and protective measures for employees and their family members such as: high blood pressure issues, thyroid gland disease, life insurance for health protection and financial accumulation, safe adaptation to Covid-19. The Company also disseminated brief training topics to employees through engagement activities, Blog Radio program and internal communication channels both virtual and in-person modes to reach employees effectively.

The training courses help the employees apply knowledge and skills both at work and in their daily life. Employees feel delighted because the Company is always concerned about their personal growth, capacity building, and as a result, they want to stay with the Company for a long time.

In parallel with HR training, talent development, succession development plan, creating opportunities for career development are also strengthened in most of the internal departments. In this regard, we must mention the important role of the foreign specialist team in the process of transferring experience, knowledge and skills to Vietnamese teams. In 2021, 106 Vietnamese employees have been promoted to higher positions or transfered to other roles to meet the requirement of business.





# ENGAGED - HEALTHY - DYNAMIC WORKFORCE

A united team always creates extraordinary synergy to overcome any challenge. This is clearly proven in the context of Covid-19 globally where is facing a lot of challenges and obstacles. At MHT, the employee engagement has created great motivation to go through such challenges together, because MHT's subsidiaries make constant effort to maintain and develop our business operation as well as ensure material and mental life, health and engagement among employees in the company.

**MHT in Vietnam**

The employee engagement is strengthened through direct two-way discussion between Managers and employees, especially the presentation sessions on the site quarterly performance made by the General Manager for employees, helping them understand the business performance situation, opportunities, challenges and feel willing to share with the Company.

We create strong belief among employees by ensuring and maintaining their benefits given the complicated situation of the Covid-19 pandemic such as: maintaining healthcare insurance for employees and their family members, promoting the skills and capacity of internal health care team: rapid advice and response during Covid-19 period, seasonal flu vaccination, maintaining annual heath checkup program, providing a safe shield for employees by Covid-19 vaccination, offering insurance package "Stay healthy during the pandemic", supporting employees in completing procedures for Covid-19 support package from unemployment insurance fund in a proper and timely manner, support package for employees buying life insurance or non-life insurance.

The company and internal Trade Union jointly organized various cultural, sport, art programs and events that inspire, motivate and strengthen the faith and engagement of the employees in the whole Company: International Women's Day (March 8), Vietnamese Women's Day (October 20), Labor Day, Mid-autumn Festival, Tet holidays. Beloved Shutdown, Christmas, Blog Radio, Company Day, Masan Group Day, etc. Especially, the Program "MHT stays strong in the Covid-19 pandemic" with a wide participation of MHTers and their family members, together joining in the exercise competition, boosting their health to beat Covid-19 with the spirit of "A happy, healthy and vibrant life for a strong MHT".

*Blood donation – an annual CSR activity at MHT*

*Celebrating International Women's Day in Thai Nguyen site, Vietnam*

A series of events make our employees feel excited and emotional such as Masan Serving, Masan Pride and Masan Sharing. Especially, the charity program “Masan Sharing” at local schools helps poor children overcome difficulties, go to school, support the people in Covid-19 prevention and control as well as help colleagues reduce difficulty and feel peace-of-mind to work for the Company. At the end of 2021, employees participated in the 7th Blood donation program that successfully organized with the record blood donors, and 254 donated blood units.

During the year, the Company always encourages employees to develop their capability, contribute initiatives and ideas in the improvement of performance, plant efficiency, cost effectiveness. Total 46 Star Awards were presented to individuals and teams with the aim of recognizing their outstanding achievements in 2021, and 24 employees received the certificate of 10 years of service for the development of the Company.

The positive results from these activities demonstrated a high stability of workforce and long-term service to the Company. In 2021, the turnover rate was always under control, accounting for 9.05%, of which voluntary and compulsory turnover rates were 6.95% and 2.1% respectively.


## MHT in China

The company held the annual commendation award in January 2021 for outstanding employees and gave certificates of 5 years of service. Through this activity, employees were honored and valued, motivating them to obtain better achievements in the coming year. Besides, the Company held a number of engagement activities such as International Women's Day (March 8th), International Children’s Day, trips for employees by group, Site tour for local graduates, etc.

The Company successfully passed the labor inspection by the Government and awarded the “A Law-abiding integrity unit” in two consecutive years of 2020 and 2021.

*Celebrating International Women’s Day in Ganzhou site, China*


*Annual commendation for employees in Ganzhou*


*Outings for Ganzhou employees*

## MHT in Germany

As part of the Company's health management program, the Easter Egg Hunting competition held by the Health team from March 30th to April 5th, 2021 received the enthusiastic participation of the employees (89%). On April 12th, the Company organized a lucky draw program for hard-working Easter egg hunters with individual and team prizes. The competition not only brought a happy atmosphere but also gave a lot of healthy gifts for participants.

*Easter egg hunt*

In May and June 2021, the "Pedometer Challenge" was held with the participation of 19 teams from the companies operating in the Metallurgiepark Oker with 7 members each team, of which 11 teams from H.C. Starck Tungsten Powders and ChemiLytics achieved outstanding results with a total of 747.664.096 steps, equivalent to around 1.5 circum navigations of the Earth. Each participant walked the average of 17,125 steps per day with meaningful commitment "Donate one green tree for every 1,000 steps to join hands in reforestation in the Harz Mountains". With this wonderful commitment, a total of 1,500 trees were planted here. Besides, a number of trees were also planted in the forest city of Goslar in November under the instruction of the Goslar-based "Forest for tomorrow" Association. Interestingly, the program was joined by Mr. Craig Bradshaw (MHT CEO) and Mr. Marc Roos (Global Human Resources Director) and it was also time for the first snow in Harz in the year.

*MHT CEO joined with HCS at "Forests for Tomorrow" campaign*

In a further event, managers from the site management area plus HSEQ management met for a guided mountain bike tour "around Goslar". For some colleagues, this was a great opportunity to get together and experience trails around Goslar in a new way.

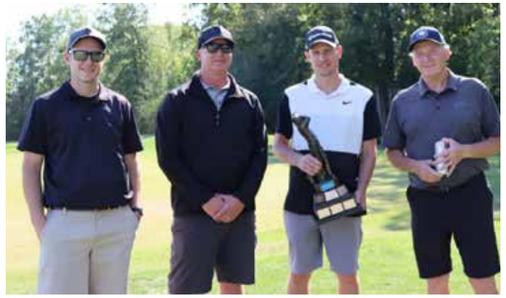
In addition, the company health management includes many other offers such as yoga classes, massages, ergonomics support, the "mobile break", fruit baskets, etc. The Company also started to install charging stations for employees' electric vehicle, establish and participate in interest group (Harz chemistry network) with the focus on reducing $CO_2$ emissions and transforming to "green" energy.

## MHT in Canada

Many internal activities were organized throughout the year 2021, contributing to building an environment culture, close relationship at workplace, including:

- BBQ lunch (including burgers & hot dogs and ice-cream during the summer)
- Expanded fitness: Employees were given the opportunity to buy any item/ product that relates to fitness and wellbeing such home gym equipment, bicycles, yoga matt, and sporting equipment such as golf clubs, rackets etc.
- Christmas Events
- Annual Golf tournament addition, employees had a chance to join in the charity activities in the community such as
- Christmas Food Drive - onsite for Inn of Good Shepherd to help poor workers, the unemployed and the homeless. This is a joint fundraising event between TODA Advance Materials and H.C. Starck
- Christmas Gifts for under-privileged children in the community
- Celebration of Lights - Set-up of annual light display in central community park
- Little League Sponsorships - Hockey and Baseball


*BBQ lunch*



*Annual Golf Tournament*

*Celebration of Lights*

Each activity has a significant impact on employee engagement at each subsidiary of MHT. We work together to build a friendly working environment where everyone can learn from one another, interact, unite and be determined to take MHT reach further.

## HR RISK MANAGEMENT

Since risk management has a direct impact on our business performance, all MHT subsidiaries are always proactive in identifying and managing risks, as well as implementing suitable and effective risk management procedures.

### In Vietnam

The Steering Committee for Covid-19 prevention and control actively developed specific action plans to adapt the complicated situation in the battle "fighting the pandemic is like fighting the enemy", issued directives and guidelines on the health protective measures, Covid-19 preventive measures to all employees in a timely manner and well prepared for responding emergency events caused by Covid-19 outbreak in Thai Nguyen province in particular and in Vietnam in general.

A series of measures to control the risk of infection have been implemented such as completion of a new travel approval system, work from home for administrative block, practice "5K" message recommended by the Ministry of Health; social distancing on shuttle buses, in the guest houses provided by the Company to ensure safety for employees, change of the rosters of employees to minimize the risks of physical contact, policy for expatriate employees affected by travel restrictions due to the long-lasting pandemic, etc. All information related to the Covid-19 situation is regularly updated and promptly disseminated to our employees, business partners and contractors. Especially, the company jointly worked with local government, health facilities to organize Covid-19 vaccination program for all MHT employees and contractors working at site with 93% of people receiving the second dose as of the end of 2021.

*MHT employees complying with social distancing measures during the Covid-19 pandemic*

### In Germany

Strict requirements of health protection measures for employees are provided, and all employees must adhere to the standards of occupational health and safety. In addition, we supported employees in drug prevention, nutrition advice, stress management and based on the development of average age of the workforce as well as additional health preventative measures like vaccination or medical checkup in purposes to determine risks of heart attack or stroke of each employee. In addition, we also have healthcare workers and doctors who are experienced, willing to care for employees' health, give advice and help prepare tests of physical health and workplace assessment, especially giving advice on the Covid-19 prevention and control measures during the Covid-19 outbreak period. Because most of office workers work from home, we developed a virtual training course as a further measure in the sense of health management and protection for employees.

### In Canada and China

The Company updates related policies in Covid-19 period, ensures compliance with the updated regulations in the locality, enforces to implement advanced measures and updated procedures as well as provides strict guidelines for both employees and customers on working methods to reduce the infection of Covid-19 at the workplace. Besides, we focus on determining potential risks of environment, health, and safety at the workplace. Effectively handling all potential risks, therefore minimizing negative outcome, and ensuring a safe workplace. Emergency response drills are conducted at least once a year. Employees have chance to give response to emergency situations which might happen in reality and test their ability and readiness in giving response to those events. Workplace audit is conducted monthly by members of the Committee of Health and Safety. The findings are reported to the area manager and timeline will be given to address the issues. Employees are also trained on both theory and practical aspects of handling a chemical spill incident.

***Controlling risks and safeguarding employees' health will contribute to creating a safe working environment, maintaining a stable workforce, ensuring our continuous production and business as well as greater chance for business expansion and the ability of our assets to operate efficiently.***

# SUSTAINABILITY
# HEALTH & SAFETY

## HEALTH AND SAFETY IN VIETNAM

### SAFETY

#### From Company to Community

At MHT, we provide a safe working environment for all employees and workers so that they can return home safe and healthy every day. In order to maintain this standard continually, we rely on consistent, transparent communication of information and specific training as well as active involvement of our employees.

We only perform the jobs when the hazards at the workplace have been identified and addressed as well as all safety requirements have been met. We know that all injuries, incidents, and work-related diseases can be prevented on the premise that we are all accountable for preventing damage to ourselves and others, both collectively and individually. Therefore, any kind of safety deficiencies, near misses and accidents at work are analyzed in detail and thorough measures are taken in order to eliminate or diminish the causes of danger as soon as possible and provide a safe workplace.

Occupational safety and health protection are important criteria as a prerequisite for commencing the work, even at the design stage, application of processes or purchasing new technologies.

## Effective control of Covid-19 pandemic at the workplace

In 2021, we experienced an outbreak of the Covid-19 pandemic. Joining hands with the whole country to beat Covid-19, MHT strengthened preventive measures in order to maintain our business continuity and ensure the health and safety for employees.

**1,396**

**employees vaccinated**

*Covid-19 rapid testing for employees in Thai Nguyen, Vietnam*

This helped us achieve positive outcomes in the Covid-19 prevention and control below:

- Number of F0 cases advised and controlled: 03
- Number of F1 cases advised and controlled: 52
- Number of F2 cases advised and controlled: 620
- Number of employees vaccinated: 1,396 and 2nd dose of 97.8%.

These accomplishments are the result of the tireless efforts of the health care professionals (Health team) and prompt instruction of the Board of Directors in the disease prevention and control to protect the health for all employees and contractors of the company.

- Health team plays an important role in advising the Steering Committee for Covid-19 Prevention and Control.
- Follow up 24/7 to update the epidemic's progress and situation as well as regulations from competent authorities to ensure that it will not affect the business activities of the company.
- Actively support Covid-19 vaccination activities as well as conduct Covid-19 tests for all employees of the company and contractors.

## Safety

In 2021, the Company continued to implement Safety activities, including:

- Conducting inspections and assessment of contractors' compliance in the occupational safety, health and fire prevention, and supporting the contractors in taking corrective actions for related issues.
- Developing and issuing Procedures to ensure compliance with safety regulations at MHT, including permit to work procedure on occupational health, safety and security.
- Preparing check lists and conducting periodic inspections of work locations, plants and equipment to ensure guarding measures, job hazard analyses and pre-operational checks are in place.
- Inspecting all equipment, machine etc., to ensure proper equipment maintenance, prevent failure during operation as well as avoid risks and incidents related to the equipment.

The continued implementation and development of the safety programs has demonstrated the relentless efforts of the company in building a working environment with a strong safety culture.

However, a serious incident outside the plant site that resulted in the loss of a worker in October 2021 showed that efforts to strive for occupational safety are never enough. From this incident, the Company has taken more stringent measures for both internal and external plant sites, outlining the orientations for its operation management, particularly for contractors and business partners, so as to meet production and workplace safety requirements.

## Enhancing Safety Culture

Throughout the year, a total of 18 fundamental safety messages have been communicated to all employees and contractors through email, bulletin boards and intranet sites.

In addition, the Company stays focused on review, revision and release of regulations, rules on health, safety and security. The Golden Rules of safety are also posted in prominent locations to provide information for all company employees, contractors and visitors, as well as help enhance employee awareness.

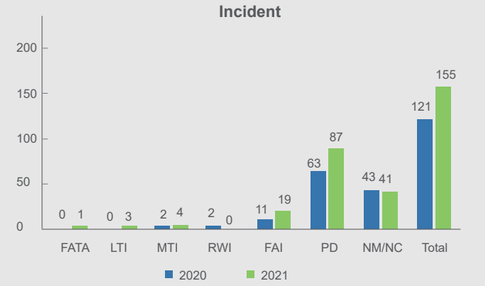
MHT also look to feedback or suggestions from employees through surveys on safety culture, then take appropriate measures or improvements.

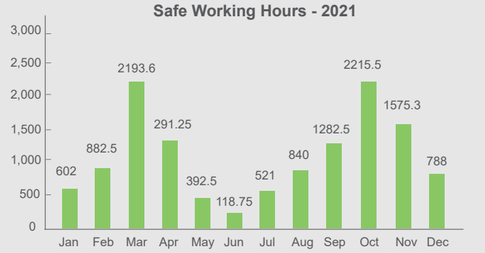
## Safety Training

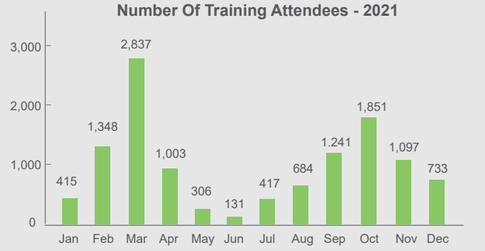
The training courses at MHT play a very important role in realizing the goal of "Every person working at Masan High-Tech Materials returns home safe and healthy everyday".

Training materials are updated and revised to suit the actual situation and roles such as: General safety induction for visitors, OHS induction training for hazard identification, assessment etc. The flexible online training has helped the Company conduct general safety induction training course for 100% of new employees, refresher training or advanced safety training courses for long-service staff.

Especially, in 2021, the Company developed a training program "Awareness of Safety Attitudes" to add the training list to promote the safety culture for all employees of the company and contractors.



# HEALTH

## Human Capital - A Driving Force for Sustainable Economic Growth

At MHT, we follow the motto “People are the most valuable assets of the business. Having healthy and competent human resources is a profitable investment and the key to sustainable development”. In this approach, we provide an overall robust health assessment program to all of our people.

The company provides a kaleidoscope of comprehensive, workplace and family health care programs aligned with national health programs, towards long-term health care solutions.

The solutions are focused on preventing and minimizing health risks as well as providing health education and timely intervention, as the situation may be. The ultimate goal of health policies is to protect human resources while also attracting talent through health care as a significant medical benefit.

This program centers around four key health areas:




## Solutions for each specific risk area

***Occupational disease***

Conduct pre-employment health checkup and periodic health checkup, including occupational health examinations in accordance with national occupational health program.

Carry out planned occupational surveillance twice a year as well as ad-hoc occupational surveillance at all our operations, using best industrial monitoring practices and working closely with professional government agencies.

Conduct mandatory training programs on occupational health prevention for employees before starting the work, and other occupational health training sessions throughout the year.

Assess the health trends and medical solutions to prevent occupational health risks for employees and develop preventive measures in place to reduce the likelihood of exposure.

***Annual checkup***

In 2021, the Clinic reviewed and gave medical advice to 1091 and 244 employees of NPMC and MTC respectively (100% of employees). The report on annual health checks is the basis to set up healthcare programs to deal with emerging health problems.

***Occupational hygiene***

At our site operations, our occupational hygienist, in collaboration with a certified government agency; the National Institute of Occupational and Environmental Health (NIEOH) and Institute of Environment Science and Public Health (IESH) regularly perform monitoring and conduct high standard occupational hygiene training programs. In 2021, there were extensive surveillance workplace samples taken and several monitoring programs conducted in support of our drive to ensure a healthy environment for our workforce. Below are some key activities:

*Medical check-up and health advice for MHT employees*

- Assessment of 807 samples of physicochemical and ergonomic factors at all working areas from operation areas to administrative areas. The ergonomic assessment is conducted and supported by the National Institute of Occupational and Environmental Health (NIOEH), then a number of activities are implemented to improve working posture to prevent musculoskeletal diseases for employees.
- Conduct monthly occupational hygiene inspections at the plant site to promptly identify and take measures to improve the issues in the working environment.
- Food hygiene and safety inspection of company and catering service providers.
- Our occupational hygienist worked with Human Resources Department to review and re-evaluate the working conditions and the list of arduous, hazardous and dangerous occupations in the Company to ensure the proper benefits for employees in accordance with regulations of the law.

***Medical Training***

Other medical training courses were conducted, including:

- Training on hearing protection for a total of 1,006 employees and contractors.
- Training on Covid-19 preventive measures for supervisors or higher.

***Our Clinic***

There are 12 healthcare workers in the Vietnam Clinic, consisting of four doctors having general practitioner degrees and medical specialty certificates, one nurse, five medical assistants, one pharmacist cum administrative clerk and one occupational hygienist. The medical clinic provides 24-hour support.

Our Clinic personnel also attended and completed several courses during the year such as technical training course on SARS-CoV-2 specimen collection, storage, packaging and transport; training course on Covid-19 preventive measures. A comprehensive development plan helps develop our medical personnel and keep them abreast of changes in medical legislation and procedures as well as maintain a high level of skill. The training courses were conducted for healthcare workers throughout the year:

- 01 doctor is studying in Ear Nose and Throat (ENT) specialist - Level one.
- 01 occupational hygienist is studying in a master's degree in public health.
- Medical staff, in collaboration with the Emergency Response Team (ERT), conduct weekly and monthly internal training on chemical management, rescue equipment practice and field drills on various emergency scenarios.

***Injury and medical emergencies***

Our site medical facilities are manned by doctors, nurses and paramedics that are internationally trained to provide emergency medical care during an emergency.

- Our site services are manned 24/7 throughout the year and extend emergency medical care services to the surrounding community.
- Our dedicated Emergency Response Team and medical staff, regularly participate in emergency drills and undergo robust fitness training.
- The medical facilities are well equipped to manage routine and emergency health care and the medical staff are certified to operate specialized medical equipment.
- Our emergency personnel work in collaboration with surrounding government and community medical facilities to provide rapid and effective emergency care.

*Rescue exercise at MTC*

## FOCUS 2022

Obtain a certification of MTC AFFF system by Police Department of Fire Fighting and Rescue under Ministry of Public Security.

Conduct compliance assessment on occupational safety and health and fire prevention for contractors, follow up and urge them about the progress of corrective actions.

Develop regulations, procedures, and rules of Safety.

Develop “Awareness of safety cultures” training materials.

Initially build a safety system following ISO 45001:2018.

Conduct a compliance assessment program on occupational safety, hygiene, and fire prevention and fighting for contractors based on the the laws and MHT regulations.

Continue to hold CHESS Committee grand meetingss and monthly meetingsss.

Provide additional occupational workplace monitoring for the areas of high risk and concern.

Actively and continuously take preventive measures of Covid-19 infection.

Further education and training for safety personnel.

## SECURITY

Over the years, Masan High-Tech Materials has built and strengthened the security forces in terms of expertise and professionalism to meet the requirements of ensuring security at the Company, safeguarding the inviolability of the Company's assets, contributing to the sustainable operation of the business, and creating a safe environment for all employees.

The Security team controls and maintains the order of all site access and exit activities for people, vehicles and assets to ensure compliance with internal rules and regulations; limit the losses and prevent theft; manage risks related to the order and security.

In 2021, the Security team strengthened a far-reaching role in various aspects:

- **Product security:** Prevention of theft, fraud, loss inside the processing lines, ensuring the optimization of productivity, high performance and future development.
- **Supply chain security:** Ensure safe logistics and procurement activities, reduce the risks of loss, financial and legal fraud, and maintain our advantages against business partners.
- **Internal security:** Ensure a spotless and strong human resource team, advise on the purging or not hiring of individuals with complicated profile, contribute to the human resource development strategy.
- **Compliance control:** Investigate and handle individuals, violations, and negative acts.
- **Community security:** Contribute to the resolution of lingering issues and relationship conflicts between the company's business development, expansion and community interests by preventing, addressing and harmonizing them.

In addition, the Security team also contributes significantly to crisis management such as responding to Covid-19 pandemic together with Health & Safety Department and working with Group Security to effectively implement the program "Restructure - Streamline" at MHT with the aim of having a streamlined, effective and optimal organizational structure.

### Assured Security

- Coordinated with the local police to arrest 05 offenders in the locality stealing the assets of the company for detainment or reformatory education, helping make the locality more peaceful.
- Coordinated with the Community team and local government to handle 04 cases of local people (Hamlet 6, Ha Thuong commune, Lien Gioi residential group – Hung Son town) who opposed and obstructed the Company's activities.
- Coordinated with Dai Tu District Police to arrest 01 mineral broker selling MTC's products and confiscated 35.5kg of finished products.
- Investigated, advised and participated in handling complaints and lawsuits related to the Company.
- Investigated and handled a labor disciplinary breach involving contractor vehicles and corporate personnel, resulting in a fatal accident.
- Gave advice on the sale and purchase to avoid potential legal and financial risks

### Fire Fighting and Rescue

- Conducted 03 training and communication courses for 97 employees, 11 drills of fire prevention and fighting plan, 220 drills of equipment operation, 02 big drills on fire prevention and fighting.
- Advised and completed application for anss appraisal and acceptance certificate of fire prevention and fighting for MTC.
- Supported the locality in responding to 08 fire fighting and rescue cases in Dai Tu district that were directly contacted by local people.

# HEALTH AND SAFETY AT HCS

## SAFETY

### Maintain a Zero Harm Working Environment

The safety and health of all employees, both those employed by the company and external companies on the factory premises, is a top priority for H.C. Starck Tungsten Powders. This is also documented by the certification of the Goslar and Ganzhou sites according to ISO 45001 "Management Systems for Safety and Health at Work"; the Sarnia site is pursuing the goals of a Toxic Reduction Plan.

As in 2020, in 2021 the SARS-Cov-2 pandemic was a dominant theme. Numerous measures were decided and implemented to avoid a loss of performance. These included mobile working, increased use of virtual meetings, special protection for high-risk patients and staggered working hours to reduce contact. Regularly SARS Cov-2 meetings were held between management, site management and the operating board in order to be able to react immediately to current developments. All employees were informed via Mail and information screens about the results of the meetings.

Addictive substances such as alcohol or other mind-altering drugs endanger both your own safety and that of your colleagues. To counter these dangers, the working group addiction has developed a guideline on addiction as part of the company health management system. This has been made available to managers and provides recommendations for identifying addiction problems and for further action.

In order to achieve the "zero accidents" target set in the company's objectives, both accidents and near-hits are handled according to a defined process and the incidents, together with the resulting measures and lessons learned, are presented at the monthly management meetings and partly (fatal accidents and accident with days off) at the Critical Incident Report. A further publication takes place on the information screens. Additional, components of the monthly reporting is also the reported safety deficiencies, which are discussed in the companies at the daily morning meeting.

At the Goslar site, H.C. Starck Tungsten GmbH works closely with the specialist department for occupational safety in the Metallurgical Park, which also provides the officers for occupational safety.

As part of the cooperation:

- Inspections and safety tours are carried out (2020 14 / 2021 18), which are supplemented by regular tours of the company's safety officers,
- To determine and assess the concentrations of hazardous substances in the air in working areas, work area analyses / control measurements are carried out in accordance with the Technical Rules for Hazardous Substances 402 (TRGS 402) (2020: 7 / 2021: 10). In a few areas, limit values were found to have been exceeded, requiring measures to be taken and also forming the basis for the procurement of blower respiratory protection.
- The committee meetings for occupational safety (2020: 4 / 2021:4), with the security safety officers (2020: 6 / 2021 7), and with the foremen (2020: 1 / 2021 2) are held.
- First aid training is offered (2020: 52 participants / 2021: 24), whereby H.C. Starck Tungsten GmbH already clearly exceeds the required minimum of 10% of all employees to be trained as first aiders.
- Further safety training courses organized by the trade association BGRCI (2020: 8 courses / 2021:12).

In addition to the security training courses offered online, some of which are required by law, the "Days of Security" (2020: 4 / 2021 4; participants: all employees of Operations and Site Management) are held annually with extensive instruction and information. One component is the fire drills (for all employees), which are flanked by unannounced evacuation drills (2020: 2 / 2021 3), 1 PMG-training (for 2020 / 2021 each for lone work) or the handling of personal protective equipment (PSE). For PSE, H.C. Starck Tungsten has invested 490107 € in 2020 and a comparable amount in 2021.

## Incident Data Management

***In Sarnia***

| | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|
| Fatal Accidents (FA) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| DAWC with 1-3 Days Away From Work | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| DAWC with >3 days away from work = German BG Case (BGC) | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| Days Away From Work Cases (DAWC) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Total Recordable Cases (TRC) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Days Away From Work (Total DAW) | 2.00 | 0.00 | 2.00 | 4.00 | 0.00 |
| Lost Calendar Days (incl. Weekend) | 2.00 | 0.00 | 2.00 | 4.00 | 0.00 |
| Headcount (HC) | 46.00 | 42.00 | 48.00 | 49.00 | 48.00 |
| Total Hours Worked (THW) | 89,012.22 | 87,209.94 | 99,421.18 | 101,172.00 | 98,019.00 |
| Number of Regular Occupational Health Checkups | 6 | 4 | 15 | 18 | 17.00 |
| First Aid trained employees | 32 | 0 | 0 | 22 | 0.00 |
| Number of Days Away from Work Cases of third party Contractors (DAWC 3) | 0 | 0 | 0 | 0 | 0.00 |
| Health and Safety training for HCST employees. (Number of training courses completed) | 21 | 19 | 54 | 18 | 24.00 |
| | | | | | |
| German Accident Rate (MAQ) | 11.23 | 0.00 | 10.06 | 9.88 | 0.00 |
| German Accident Rate (BG-MAQ) | 0.00 | 0.00 | 0.00 | 9.88 | 0.00 |
| German Severity Rate (USQ) | 22.47 | 0.00 | 20.12 | 39.54 | 0.00 |
| German 1000 employee Rate (1000-Mann-Quote) | 0.00 | 0.00 | 0.00 | 20.41 | 0.00 |
| Total Recordable Cases Rate (TRCR) | 2.25 | 0.00 | 2.01 | 1.98 | 0.00 |
| Days Away From Work Cases Rate (DAWCR) | 2.25 | 0.00 | 2.01 | 1.98 | 0.00 |
| Severity Rate (according to OSHA) | 4.49 | 0.00 | 4.02 | 7.91 | 0.00 |

*In Ganzhou*

| | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|
| Fatal Accidents (FA) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| DAWC with 1-3 Days Away From Work | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| DAWC with >3 days away from work = German BG Case (BGC) | 2.00 | 4.00 | 3.00 | 3.00 | 2.00 |
| Days Away From Work Cases (DAWC) | 2.00 | 5.00 | 4.00 | 3.00 | 2.00 |
| Total Recordable Cases (TRC) | 2.00 | 5.00 | 4.00 | 3.00 | 2.00 |
| Days Away From Work (Total DAW) | 39.00 | 92.00 | 57.00 | 135.00 | 163.00 |
| Lost Calendar Days (incl. Weekend) | 53.00 | 106.00 | 69.00 | 189.00 | 269.00 |
| Headcount (HC) | 136.00 | 128.00 | 132.00 | 122.00 | 120.00 |
| Total Hours Worked (THW) | 289,428.00 | 285,487.00 | 287,834.00 | 274,252.00 | 263,528.50 |
| Number of Regular Occupational Health Checkups | 109.00 | 141.00 | 145.00 | 122.00 | 125.00 |
| First Aid trained employees | 25.00 | 25.00 | 20.00 | 30.00 | 25.00 |
| Number of Days Away from Work Cases of third party Contractors (DAWC 3) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Health and Safety training for HCST employees. (Number of training courses completed) | 220.00 | 207.00 | 356.00 | 345.00 | 361.00 |
| | | | | | |
| German Accident Rate (MAQ) | 13.82 | 17.51 | 13.90 | 10.94 | 7.59 |
| German Accident Rate (BG-MAQ) | 13.82 | 14.01 | 10.42 | 10.94 | 7.59 |
| German Severity Rate (USQ) | 134.75 | 322.26 | 198.03 | 492.25 | 618.53 |
| German 1000 employee Rate (1000-Mann-Quote) | 14.71 | 31.25 | 22.73 | 24.59 | 16.67 |
| Total Recordable Cases Rate (TRCR) | 1.38 | 3.50 | 2.78 | 2.19 | 1.52 |
| Days Away From Work Cases Rate (DAWCR) | 1.38 | 3.50 | 2.78 | 2.19 | 1.52 |
| Severity Rate (according to OSHA) | 26.95 | 64.45 | 39.61 | 98.45 | 123.71 |

*In Goslar*

| | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|
| Fatal Accidents (FA) | 0 | 0 | 0 | 0.00 | 0.00 |
| DAWC with 1-3 Days Away From Work | 0 | 2 | 2 | 0.00 | 3.00 |
| DAWC with >3 days away from work = German BG Case (BGC) | 2 | 4 | 2.00 | 2.00 | 3.00 |
| Days Away From Work Cases (DAWC) | 2.00 | 6.00 | 4.00 | 2.00 | 6.00 |
| Total Recordable Cases (TRC) | 2.00 | 6.00 | 4.00 | 2.00 | 6.00 |
| Days Away From Work (Total DAW) | 16 | 67 | 33 | 16.00 | 94.00 |
| Lost Calendar Days (incl. Weekend) | 21 | 83 | 43 | 18.00 | 124.00 |
| Headcount (HC) | 358 | 349 | 332 | 249.00 | 211.00 |
| Total Hours Worked (THW) | 524927 | 493289 | 492,143 | 336,575.00 | 305,106.00 |
| Number of Regular Occupational Health Checkups | 600 | 520 | 397 | 562.00 | 551.00 |
| First Aid trained employees | 24 | 52 | 36 | 24.00 | 23.00 |
| Number of Days Away from Work Cases of third party Contractors (DAWC 3) | 0 | 0 | 0 | 0.00 | 0.00 |
| Health and Safety training for HCST employees. (Number of training courses completed) | 52 | 38 | 37 | 32.00 | 26.00 |
| | | | | | |
| German Accident Rate (MAQ) | 3.81 | 12.16 | 8.13 | 5.94 | 19.67 |
| German Accident Rate (BG-MAQ) | 3.81 | 8.11 | 4.06 | 5.94 | 9.83 |
| German Severity Rate (USQ) | 30.48 | 135.82 | 67.05 | 47.54 | 308.09 |
| German 1000 employee Rate (1000-Mann-Quote) | 5.59 | 11.46 | 6.02 | 8.03 | 14.22 |
| Total Recordable Cases Rate (TRCR) | 0.76 | 2.43 | 1.63 | 1.19 | 3.93 |
| Days Away From Work Cases Rate (DAWCR) | 0.76 | 2.43 | 1.63 | 1.19 | 3.93 |
| Severity Rate (according to OSHA) | 6.10 | 27.16 | 13.41 | 9.51 | 61.62 |

## Ensuring a Secure Plant

Work in chemical industry plants is associated with specific risks. In addition to the described measures and training for H.C. Starck Tungsten employees, we also feel responsible for the safety of employees of external companies who work on our behalf. In addition to an initial safety briefing by plant security when entering the premises, employees of external companies must complete and pass a tungsten-specific safety training course before starting work at H.C. Starck Tungsten.

We have implemented a system of coordinators, H.C. Starck Tungsten Engineers, who are responsible for the execution of work by third parties and discuss the risks with them on site. The coordinators are the contact persons for the contractors and also carry out inspections of equipment brought in by the contractors, as required. The coordinator is responsible for the safety of “his” construction site.

The plant area in Goslar is fenced in and monitored 24/7 by factory security via CCTV and regular inspection tours. Visitors and external companies are registered in advance by the receiver / requester at H.C. Starck Tungsten and must identify themselves at the access control. Vehicles belonging to outside companies are weighed at the entrance and exit to and from the factory premises, bag checks (also for H.C. Starck Tungsten employees) are carried out at random. PSE will be made available to visitors by plant security if required. Private cars and bicycles are not allowed on the entire fenced-in factory premises, parking spaces are located outside.

## Goslar Plant

### *Fire Brigade*

To combat fires and chemical accidents, a plant fire department with two full-time firefighters and volunteer firefighters from the plants is available 24/7 in Goslar. Regular training with the fire departments surrounding the plant ensures smooth cooperation between the fire departments in the event of major damage. The plant fire department can be called in from outside if necessary due to their experience in fighting chemical accidents.

| | 2020 | 2021 |
|---|---|---|
| Fire operations | 5 | 1 |
| False alarms (fire alarm system) | 11 | 29 |
| Technical assistance | 22 | 41 |
| Other missions (On-call service) | 38 | 104 |
| Total | 76 | 175 |

*Statistics of the Fire Brigade*

Responders performed a total of 368 response hours in 2020, of which approximately 60 hours were performed by the On-call service alone.

In addition, 4 clearances and 38 fire alarm shutdowns were performed for the companies Tungsten in the MPO. This corresponds to approximately 41 working hours.

*Emergency evacuation and fire drill in Goslar*

## Sarnia Plant

In 2021, two additional AEDs were installed on Site for employees to attend emergency first aid training course. Expert tutoring and practical exercises were given to learners on the topics of basic life support (CPR), safety aspects of defibrillation and breathing management. Employees are now able to use the onsite defibrillators after gaining practical experience in using the equipment.

To mitigate tripping hazards in the milling area, a condux mill - vacuum line was relocated. This worked as preventative measures to help reduce the risk of potential ergonomic issues.

## Ganzhou Plant

### *Traffic Safety*

Most of our employees ride electromobile to work while the road conditions are not very good, especially recently the government is increasing road construction. Therefore, road traffic safety is particularly important at Ganzhou. We specially invited the traffic police to conduct road traffic safety training for our employees.

*Road traffic safety training in Ganzhou*

### *Health and Safety*

In order to let our employees know how to use some fire facilities, in an emergency, how to use them to protect human life, we invited firefighters to carry out professional training for our employees.

*Professional training on using fire facilities in an emergency*

### *Fire protection*

In order to improve the staff's fire protection knowledge, we invited professional firefighters to carry out the special training to our employees and examination. In the next years to come, this training will be conducted once a year. Every employee is to have the basic knowledge of fire protection, including how to put out small fires with a fire extinguisher and large fires with fire hydrant water, and how to eliminate the fire in the early stage of the fire.

*Comprehensive emergency drill*

*Comprehensive emergency drill*

## Ensuring Healthy Workforce

Our employees enjoy a working environment in which they stay healthy and in which they are actively involved in the improvement of safety and health at work. In the suggested improvement system there is a category for safety improvement; reported safety deficiencies are handled with the highest priority.

In addition to the trained first responders (the relevant training is repeated by the first responders every two years), there is a first-aid service at the Goslar site that can be reached on site 24/7. In addition to providing first aid to injured persons and the associated documentation, the medical service is also responsible for cleaning protective masks.

Pre-care and post-care examinations are carried out by the company doctor, as are consultations (e.g. before business trips abroad) and vaccinations. In 2021, a total of 1835 hours of care was provided by the safety specialists and the company doctor (actuarially required: at least 1861 hours). To ensure specific medical care for our employees - e.g. after accidents - in the surrounding hospitals, the doctors there are trained by the company doctor.

The long-term preservation of the health of our employees is the task of the company health management (CHM). The CHM is run by the Health Circle, which is made up of various specialist departments, with the advice of a health manager, and is available to all employees free of charge. Topics of the CHM include:

- monthly training with electrical muscle stimulation
- weekly in-house yoga classes
- courses for progressive muscle relaxation
- a pedometer challenge with 133 employees
- action day “screen workstation”
- non-smoker coaching
- monthly health coaching
- team cooking courses
- flu vaccinations
- Covid-19 vaccinations

In Sarnia, an updated Covid-19 policy was introduced in 2021, ensuring compliance with latest provincial regulations as well as provided strict guidelines to both employees and visitors in terms of the protocols. Therefore, the plant maintained its operation with minimum disruption.

In Ganzhou, HSEQ engineers conducted multiple rolling relevant trainings and reviewed the production instances together to make right improvement measures in order to develop and strengthen knowledge and awareness of safety, occupational health, and environmental protection. In the future, this will be our standard training strategy, assisting staff in gaining expertise and resolving any probable issues.

After the first phase of the tungsten powder and tungsten carbide project was completed and accepted in 2014, the following construction in Ganzhou took approximately six years to complete. The second part of the project was completed and accepted in 2021, with the exception of the nano manufacturing line, which was not yet introduced.

## Focus 2022

**Set up own Health & Safety Department in 2022 - 2023**

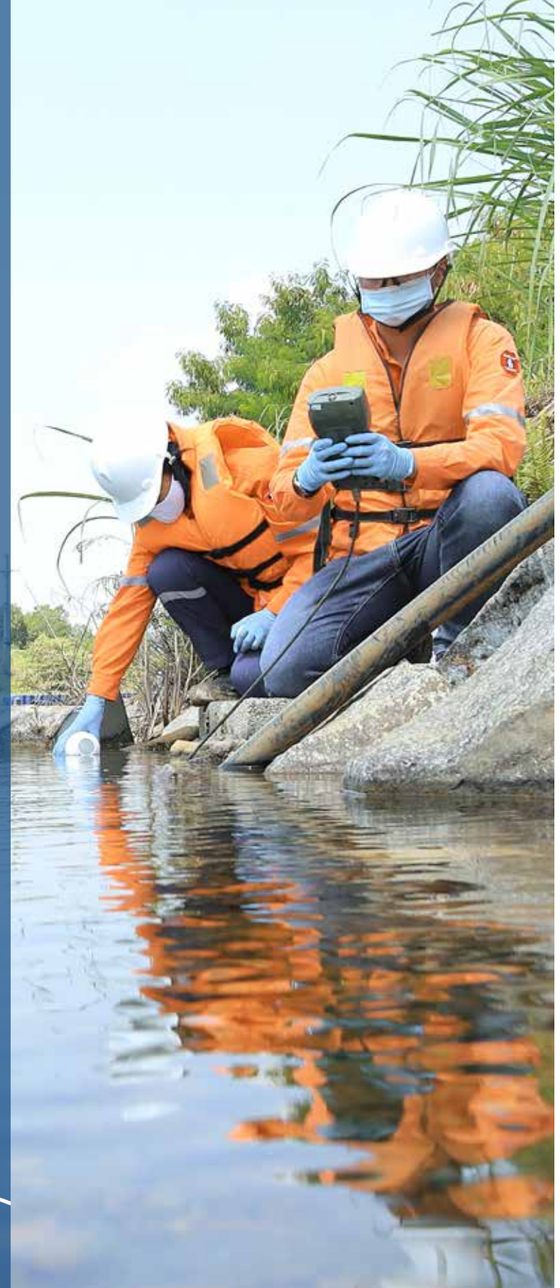
**4 Days of Safety**

**Further education and training of safety officers**

# SUSTAINABILITY ENVIRONMENT

## *PASSPORT TO THE FUTURE*

Throughout 2021, the world continued to face unprecedented economic and social difficulties due to the prolonged Covid-19 pandemic, while needing to address the environmental issues of everyday life and on-going development. This question of how to maintain environmental protection activities in the context of the Covid-19 pandemic is a difficult one for many organizations and businesses not only in Vietnam but also around the world. Consistent with the theme that "Environment sustainable development is our passport to the future", MHT continued to maintain and strengthen the management, protection and development of our sustainable business activities globally. Those efforts and achievements were recognized within Vietnam with MHT receiving the title of "Vietnam Sustainable Development Enterprise" for the fourth consecutive year from the Vietnam Chamber of Commerce and Industry (VCCI).



**78.5%**
Of wastewater is reused at Nui Phao mine

**6,626 M litters**
Of wastewater is treated before discharge

**2.4 ha**
Of land for planting trees, rehabilitating the environment

**48%**
Of waste generated is recycled

**01**
**Certificate**
Of completion of environmental protection works for MTC

**04**
**Certificates of ISO 14001**
for MTC, Goslar, Sarnia, Ganzhou

# WATER AND WASTEWATER MANAGEMENT

Water is a critical resource for both our production and life, which needs to be managed and used economically and efficiently. With the mindset of “Water is the core of sustainable development”, the economical use, increased circulation - reuse, and process-controlled wastewater treatment are the approaches that MHT has developed to protect the water resources it uses for the present and future generations.

## Water consumption

Water sources for production at MHT include surface water and groundwater (self-extracted or provided from suppliers), deionized water and recycled water. In 2021, the total water volume used by MHT was 12,740 million liters, a slight increase compared to 2020 (12,136 million liters).

| Year | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| **Total water volume used (M litters)** | **13,482** | **12,482** | **12,136** | **12,740** |
| **NPMC and MTC** | **11,520** | **10,683** | **10,231** | **10,986** |
| Surface water | 2,393 | 2,576 | 2,517 | 2,355 |
| Ground water for domestic | 37 | 36 | 31 | 8 |
| Ground water for production | 98 | 0 | 0 | 0 |
| Recycle water | 8,992 | 8,071 | 7,682 | 8,623 |
| - Water from OTC | 2,951 | 2,574 | 2,163 | 2,286 |
| - Water from STC | 5,603 | 4,613 | 4,415 | 5,474 |
| - Water from PTP | 414 | 275 | 443 | 137 |
| - Recycled water from DP2 | 24 | 0 | 0 | 0 |
| - Recycled from Cut-off trench | | 609 | 662 | 726 |
| **Goslar, Sarnia and Ganzhou** | **1,962** | **1,799** | **1,906** | **1,754** |
| Surface water | 1,820 | 1,648 | 1,742 | 1,599 |
| Water from suppliers | 134 | 142 | 157 | 148 |
| Deionized water | 8 | 8 | 7 | 7 |

MHT’s mineral extraction processes in Vietnam are more water intensive than the operations in Germany, Canada and China, accounting for 86.2% of MHT’s total water use.

### *Surface water*

In Vietnam, surface water for production activities is extracted from the Cong River under the License granted by Thai Nguyen Provincial People's Committee. At our plants in Germany, Canada, and China, surface water supplies come from local rivers operated by licensed users. In 2021, MHT used 3,954 million liters of surface water (2,355 million liters for NPMC and MTC, 1,599 million liters for HCS's plants), accounting for 31% of the total water use of all plants.

### *Ground water and other sources*

In 2021, eight million liters of groundwater were extracted in Vietnam from GK-03 borehole in the first 5 months of the year to serve the purpose of serving our contractor campsite needs. From June 2021, this facility was decommissioned and the GK-03 borehole was backfilled in accordance with Vietnamese regulations. The amount of groundwater extracted only accounted for 0.06% of the total water use of all plants.

At our factories in Germany, Canada, and China, water was sourced from local rivers, and water in the form of steam and deionized water is also used to supply specific tungsten production stages. In 2021, 155 million liters of water were used there, accounting for 1.2% of the total water use of all plants.

### *Recycled water for production*

Within MHT wastewater has long been considered a resource, and the reuse of wastewater is considered an effective measure to reduce pressure on water resources, supplement water supply, and make an important contribution to the goal of achieving a sustainable circular economy.

At the Nui Phao processing plant, most of the wastewater from the OTC and STC tailing reservoirs is circulated to the processing plant for reuse. Water that currently cannot be reused is pumped for treatment at the dedicated Wastewater Treatment Station prior to being discharged into the Thuy Tinh stream. Water from our mining activities is also managed within this system.

In 2021, NPMC used 8,623 million liters of wastewater for production, accounting for 78.5% of the total water use in Vietnam (up more than 3% compared to 75% in 2020), accounting for 67.7 % of total water used by all plants.

Like any industrial plant MHT’s operations have measurable impacts on the environment. We choose to reuse wastewater to demonstrate what can be done to minimize damage to the environment, and actively seek new ways to increase our reuse of process waters. At the Goslar site, we are currently investigating whether tungsten-containing wastewater from tungsten reduction can be reused in the raw material preparation process during dissolution. This would also reduce the loss of tungsten powder, which would otherwise be lost in the wastewater.

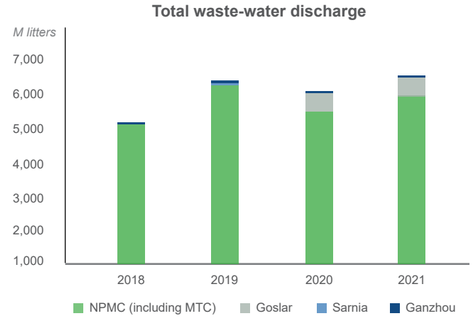
## Wastewater discharge quality and quantity


*Overview of the wastewater treatment plant and DP2 outlet at NPMC*

MHT's factories are all granted licenses to discharge wastewater according to the regulations of the host-country or have contractual agreements with an approved third party (industrial zone management board) to treat our wastewater before discharging into the environment.

In 2021, the total amount of wastewater discharged was 6,626 million liters. Of which, Vietnamese operations accounted for 91.4% of the total wastewater volume. Wastewater is treated and monitored to meet the standards of the host country before being discharged into the environment.

In Vietnam, our wastewater sources (production wastewater, domestic wastewater), contaminated rainwater are collected into reservoirs, then pumped for treatment at the wastewater treatment plant with capacity 36,000 m3/day. At the discharge points, NPMC operates automatic monitoring stations to monitor the wastewater quality before being discharged into the environment. The treated wastewater has reached the allowable limit according to the discharge permit issued to NPMC by the Ministry of Natural Resources and Environment. In 2022, NPMC plans to build and commission an additional physicochemical treatment system with a capacity of 400 m3/h to enhance the treatment capacity and support for the existing Wastewater Treatment Plant.




At our HCS Goslar facility, groundwater is managed to the plan as agreed with local authorities that "No contaminated groundwater leaves the factory premises". This means that groundwater is extracted from the wells specified in the plan and then treated using a combination of activated carbon and ion exchangers prior to being discharged.

In the scope of water / wastewater, HCS in Germany has a contract with Chemitas to treat and release wastewater. The permit for direct discharge of rainwater and wastewater via the Central Wastewater Treatment Plant is held by Chemitas. For indirect discharge into the sewerage system, there is a contract between HCS Tungsten GmbH, HCS Infrastructure GmbH and Chemitas, which performs the operator duties. An official exemption from the indirect discharge permit is currently being prepared. The amount of wastewater is not measured directly but calculated by the purchase of fresh water and chemicals.

## WASTE MATERIAL MANAGEMENT

The types of waste materials generated from the mine are mainly in the form of topsoil, waste rock from mining activities and tailing from processing activities. These materials are classified and managed by NPMC according to the process to avoid the risks of pollution as well as ensure that the beauty is not affected.

| Waste materials | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| **Renewable materials ($m^3$)** | **1,177,317** | **1,319,299** | **987,051** | **960,883** |
| Waste rock for construction of TSF wall-dam | 924,832 | 1,135,775 | 482,233 | 699,031 |
| Soil for TSF dam construction | 198,305 | 111,552 | 112,675 | 129,694 |
| Waste soil and rock for other civil projects | 54,180 | 71,972 | 392,143 | 132,158 |
| **Non-renewable materials ($m^3$)** | **4,768,241** | **4,813,180** | **3,963,178** | **2,439,943** |
| Clean waste soil and rock dumped into Waste Dump | 3,896,736 | 3,821,551 | 3,312,552 | 1,718,013 |
| High sulfide waste dumped in STC | 871,505 | 991,629 | 650,626 | 721,930 |
| Tailing (ton) | 3,489,328 | 3,490,988 | 3,566,034 | 3,442,556 |
| OTC tailing | 2,035,201 | 2,166,363 | 2,154,965 | 2,104,799 |
| STC tailing | 1,454,127 | 1,324,625 | 1,411,069 | 1,337,757 |

### Renewable materials

Clean waste soil and rock are used as construction materials for internal mine works (TSF wall-dam construction, road repairs, leveling), the remaining material is disposed into dedicated waste dumps. In 2021, NPMC reused 960,883 $m^3$ of clean waste soil and rock to construct TSF wall-dam and other civil projects.

*Using waste rock to build dams for OTC and STC ore tailing reservoirs*

### Non-renewable materials

At the Nui Phao mine site, clean waste rock that has not been reused is stockpiled in the dedicated North and South waste dumps of the open-pit, waste rock with potential for acid generation (waste rock with high sulfide content) is stored in sulfide ore tailing reservoir (STC) to prevent oxidation of the sulfide that generates acid.

In 2021, mining activities generated 2,439,943 $m^3$ of waste soil and rock, of which 1,718,013 $m^3$ of clean waste soil was placed into the waste dumps and 721,930 $m^3$ of soil and rock with high sulfide content were placed into the STC. NPMC's processing plant produced 1,337,757 tons of sulfide tailings which were stored in the STC and 2,104,799 tons of oxide tails stored in the OTC.

At our HCS sites, which are well established manufacturing sites with less frequent site disturbance, the issue of renewable and nonrenewable materials is much more limited and is still managed by local regulations as and when ground activities occur.

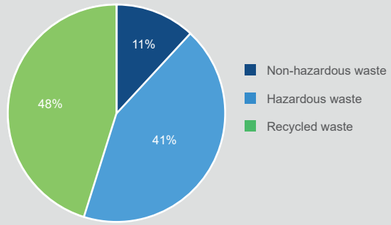
*Dumped waste soil and rock at the Northern Waste Dump*

## WASTE MANAGEMENT

In the context of increasing climate change, thinking about waste management has changed, from “disposal” to “management” then “integrated management”, from “waste” to “consider waste as resources”, from “linear economy” to “circular economy”. Accordingly, the integrated management of solid waste is prioritized to apply, including prevention, reduction, classification, collection, reuse, recycling and final treatment. Integrated solid waste management helps to protect human health, protect the environment, save resources, adapt to climate change and towards sustainable development.

| | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| **Total of waste volume (ton)** | **4,926** | **4,966** | **5,152** | **5,704** |
| **Recycling rate total** | **51%** | **54%** | **45%** | **48%** |
| **NPMC and MTC** | **2,893** | **2,911** | **3,878** | **3,919** |
| Non-hazardous waste | 1,349 | 725 | 502 | 524 |
| Hazardous waste | 562 | 1,185 | 1,945 | 2,002 |
| Recycled waste | 983 | 1,001 | 1,431 | 1,394 |
| Recycling rate | 34% | 34% | 37% | 36% |
| **Goslar, Sarnia, Ganzhou** | **2,056** | **1,274** | **1,457** | **1,785** |
| Non-hazardous waste | 85 | 85 | 55 | 110 |
| Hazardous waste | 269 | 296 | 98 | 341 |
| Recycled waste | 1,703 | 893 | 1,304 | 1,334 |
| Recycling rate | 83% | 70% | 90% | 75% |

Practice shows that the effectiveness of waste management comes from strict adherence to classification regulations. Across MHT, waste segregation is done at source. In 2021, the total amount of waste generated and recycled and treated was 5,704 tons, of which recycled waste accounted for 48% of the total amount of waste generated. The recycling rates of all kinds of waste at HCS's factories is very high (75%).




*Percentage of types of waste generated*

In Germany, the handling of waste is regulated by law via the Closed Substance Cycle Waste Management Act. Here, the order of waste prevention, preparation for reuse, recycling applies, other recovery, in particular energy recovery and backfilling, disposal. The Goslar site focuses in particular on points 1 and 2., because production by-products are usually very rich in valuable materials (especially metals other than tungsten) which in turn can be used as raw materials by other companies. This significantly reduces the volume of our waste and results in the recycling rate being at a very high level, 73% in 2020 and 79% in 2021. A contribution to the high recycling rate was also made by the increased recycling of filter dusts, which are now returned to production as a raw material instead of being disposed of.

# ENERGY AND GREENHOUSE GAS EMISSION

## Energy consumption

Being well aware that energy-saving and the efficient use of energy is the foundation for sustainable development, energy-saving solutions are always sought and promoted at factories across MHT globally.

Our Goslar plant is certified to ISO 50001 - Energy Management Systems - demonstrating its commitment to continuous improvement in energy-related performance. However, as part of the matrix certification of all HCS sites, energy targets and continuous improvement have also been implemented in Sarnia and Ganzhou. In Sarnia four new Nitrogen Flow Meters across the plant's distribution network were installed to get an improved understanding regarding the amount of nitrogen consumed in the different key areas across the distribution network. The new instruments allowed an in-depth analysis of nitrogen consumption across the network leading to significant, lasting advantages for H.C. Starck throughout the nitrogen billing process with TODA. In Vietnam, the Energy Management Board also plans to implement the application of an energy management system according to ISO 50001 standard in 2022.

In 2021, the total energy consumption was 1,309,427 GJ, an increase of 1.2 times compared to 2020. The increased consumption, which is shown here in absolute values, is mainly due to the coronavirus pandemic, which led to a significant reduction in production at all of the Group's plants in 2020. In order to achieve better comparability of the values, it is planned to collect and issue specific data in the future.

| Year | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| **Total of energy consumption (GJ)** | **1,260,757** | **1,165,386** | **1,084,324** | **1,309,427** |
| **NPMC and MTC** | **883,019** | **801,773** | **753,918** | **907,147** |
| Power | 615,387 | 609,530 | 594,734 | 674,811 |
| DO | 33,054 | 42,685 | 45,054 | 53,379 |
| Gasoline | 2,144 | 2,186 | 1,549 | 1,700 |
| Coal | 232,435 | 147,373 | 112,581 | 177,256 |
| **Goslar, Sarnia and Ganzhou** | **377,738** | **363,613** | **330,406** | **402,280** |
| Power | 140,740 | 156,887 | 150,583 | 174,856 |
| Natural gas | 213,625 | 186,735 | 161,543 | 207,493 |
| DO | 22,420 | 19,020 | 17,282 | 18,783 |
| FO | 953 | 971 | 998 | 1,148 |

## Greenhouse gas emission

The main greenhouse gases (GHG) are carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$). The gases with low concentrations but with high potential for greenhouse gases are hydrofluorocarbons (HFCS), perfluorocarbons (PFCS), sulfur hexafluoride ($SF_6$) and nitrogen and trifluoride ($NF_3$). Our factories conduct such inventories of greenhouse gas emissions according to the guidelines of the Intergovernmental Panel on Climate Change (IPCC) and convert them into tons of $CO_2$ equivalent ($CO_2$eq).

| Year | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| **Total of GHG emission volume (ton of $CO_2$eq)** | **197,473** | **187,592** | **178,696** | **206,294** |
| Total of direct GHG | 41,341 | 31,142 | 25,990 | 36,282 |
| Total of indirect GHG | 156,132 | 156,450 | 152,705 | 170,012 |
| **NPMC and MTC** | **172,223** | **162,409** | **155,318** | **181,727** |
| Total of direct GHG | 27,641 | 19,203 | 15,589 | 23,184 |
| Total of indirect GHG | 144,582 | 143,206 | 139,729 | 158,543 |
| **Goslar, Sarnia and Ganzhou** | **25,250** | **25,183** | **23,377** | **24,567** |
| Total of direct GHG | 13,699 | 11,939 | 10,402 | 13,098 |
| Total of indirect GHG | 11,550 | 13,244 | 12,976 | 11,469 |

In Vietnam, Decree No. 06/2022/ND-CP dated 07/01/2022 Regulations on mitigation of greenhouse gas emissions and protection of the ozone layer takes effect from January 7, 2022. Accordingly, responsible businesses must inventory GHG so that the Government can progressively implement emission reduction regulations. The GHG inventory at MHT Vietnam since its operation until now will be the foundation for us to implement the above regulations as part of our carbon neutral journey.

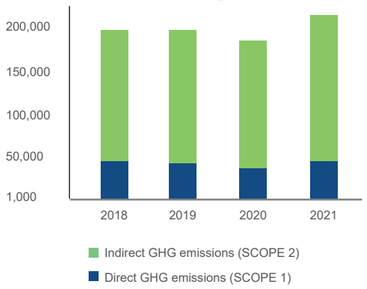
### *Direct GHG emissions (scope 1)*

Direct greenhouse gas emissions are generated from the use and consumption of gasoline, natural gas, diesel, fuel oil and coal for vehicles, equipment, boilers and backup generators. In 2021, we emitted 36,282 tons of $CO_2$, an increase of nearly 1.4 times compared to 2020.

### *Indirect GHG emissions (scope 2)*

Indirect greenhouse gas emissions are generated from the use of power for all production and operational activities of factories. In 2021, we emitted 170,012 tons of $CO_2$, an increase of more than 1.1 times compared to 2020.

**Total of GHG emissions volume (tons of $CO_2$)**



## $CO_2$ neutrality - an inevitable trend of sustainable development

The world is experiencing resonance effects at the worse level and scale than ever from three disasters, including the Covid-19 pandemic, climate change and natural resource scarcity, leading to major consequences on many aspects of the current and future life. have been the “warmest” period recorded on earth, especially the year 2020 witnessed the highest level of carbon dioxide ($CO_2$) ever recorded in our atmosphere. The development of green industries towards the goal of carbon neutrality, and actively reducing the need for fossil fuels is an inevitable trend of sustainable development.

To respond to climate change, the United Nations Climate Agreement was adopted in Paris in 2015. Its goal is to keep global warming well below 2°C, but better below 1.5°C through further measures. This includes efforts to reduce emissions of climate-damaging gases to "net zero" as far as possible by 2050. Approximately 190 countries have ratified this agreement, including Vietnam, Germany, Canada and China.

Meeting the internationally recognized 1.5°C climate target and the impacts associated with climate change, such as the increasing scarcity of drinking water, requires all of our efforts. To this end, we are striving to achieve $CO_2$ neutrality according to greenhouse gas (GHG) protocol and locally defined timelines, as well as to significantly reduce freshwater consumption and continuously improve our environmental and energy performance.

We have therefore adopted a corresponding climate policy. This states, among other things, that MHT will reduce our carbon footprint (Scope 1 and 2) in accordance with country requirements by further developing our processes, using new technologies, and using renewable energies. We aim to be $CO_2$ equivalent neutral in 2045. This relates to all activities that we can influence ourselves.

As a first measure, the Goslar site has switched its electricity supply to so-called "green" electricity, thereby saving approx. 6300 tons of CO2 per year since 2021. Further measures, such as the replacement of steam-heated crystallization by an osmosis process (start-up Q4/2021), will enable the $CO_2$ footprint to be significantly reduced further from 2022. At the Sarnia site, the switch to an electricity supplier whose CO2 footprint in energy production is significantly lower is being discussed.

The first measure to achieve climate neutrality is to reduce actively our $CO_2$ footprint. However, we are aware that we will not achieve $CO_2$ neutrality according to the GHG in this way. An internationally recognized method to further minimize its footprint is to compensate remaining $CO_2$ emissions. This is made possible through the calculation of Carbon credits to invest in projects that actively reduce $CO_2$ emissions around the world. This is the fastest way to reduce $CO_2$ in the air and the only way to be carbon neutral.

Based on the general framework of the United Nations Sustainable Development Goals and the Paris Agreement on climate change, MHT has taken the initial approaches for the journey towards carbon neutrality:

***Calculating the amount of carbon absorbed from environmental rehabilitation activities and the area of replacement plantations in Dinh Hoa district, Thai Nguyen province***

Since the Nui Phao mine was put into operation, the Company has planted dozen hectares of Acacia trees under the environmental restoration and rehabilitation program, which not only minimizes the impact of pollution sources from mining and mineral processing activities but also acts as important carbon absorption sinks.

In addition, the Company will monitor to calculate the amount of carbon absorbed from the area of reforestation in Dinh Hoa district, Thai Nguyen province. Since 2018, the Company has deposited VND 1.5 billion to Thai Nguyen Forest Protection and Development Fund for reforestation of 26,7ha forests which has been compensated for land clearance to implement Nui Phao Project. Thai Nguyen Forest Protection and Development Fund has used this amount of money to plant 50ha of protective forest and special-use forest at Bao Linh, Dinh Bien and Phu Dinh commune in Dinh Hoa district, Thai Nguyen province.

The trees that are planted and protected in this forest area are cinnamon, green ironwood, flower slices and regenerated woody plants, which are currently growing and creating good canopy. The Company has coordinated with the Thai Nguyen Forest Protection and Development Fund to collect information, calculate the carbon sequestration capacity through the planted forest area, and also work on researching investment cooperation programs on afforestation in the future in Thai Nguyen province. Based on initial calculations, the amount of $CO_2$ accumulated from the planted forest area under the plan of annual environmental rehabilitation and restoration and the area of replacement planted forest in Dinh Hoa district is about 5,736 tons. Carbon offset by planting as a bridge solution needs to be focused on towards the goal of carbon neutrality and climate balance.

***Developing a solar farm at Nui Phao mine***

Green power and clean energy are the necessary solutions to improve carbon neutrality. Currently, NPMC has been working with a number of partners to find opportunities to develop and install solar farms at Nui Phao mine. This project has great significance and feasibility to be implemented in alignment with the Company's energy consumption strategy in the next 5 to 10 years.

***The idea of investing in afforestation to sell Carbon credits***

Carbon Credit is a license issued by a government or other regulatory agency that allows the credit holders to emit GHG (converted to $CO_2$). Each carbon credit is equal to one tonne of $CO_2$ equivalent, carbon credits can be exchanged, bought and sold between parties participating in the carbon market. Accordingly, forest carbon credits are determined by calculating the ability to absorb $CO_2$ in the atmosphere through the biomass of the forest. Vietnam is identified as one of the countries with great potential to sell forest carbon credits.

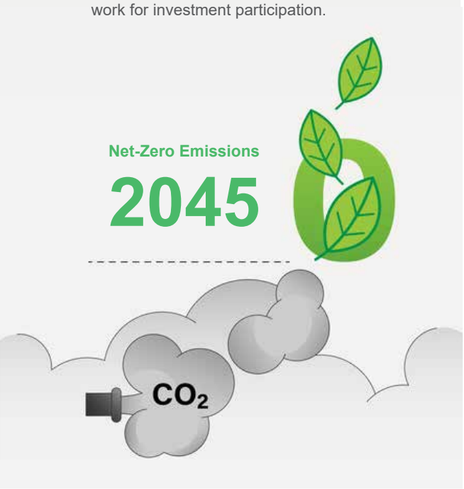
On October 22, 2020, Vietnam signed an agreement with the Forest Carbon Fund (FCPF) through the World Bank. Vietnam is expected to sell about 10.3 million tons of $CO_2$ through its REDD+ program (Program to reduce greenhouse gas emissions from deforestation and forest degradation) in the period from 2020 to 2025 in 6 provinces in the North Central region. According to calculations, each year Vietnam can sell up to 50 million forest carbon credits, earning trillions of dong. Up to now, Vietnam has not had business investment projects, buying and selling forest carbon credits from the REDD+ program between foreign businesses and Vietnamese organizations and individuals. Thus, the Government has approved of Quang Nam province implementing a pilot project on trading forest carbon credits from the REDD+ program, with the pilot period from 2021-2025. The success of the pilot project will bring huge opportunities to other provinces in Vietnam.

Currently, Masan High-Tech Materials is closely monitoring the development and implementation progress of the carbon credits market in Vietnam, as well as completing the legal framework to guide this activity so that the Company will be ready to take the lead in participating in the carbon credit market, contributing to the common goal of reducing greenhouse gas emissions and protecting the environment.

1. **Caculate the amount of carbon absorbed**
   Calculattion of carbon sequestration from environmental rehabilitation and replacement plantations of Nui Phao project: 5,736 tons.

2. **Opportunity to develop solar farm at Nui Phao mine**
   Working with partners to find opportunities to develop and install solar farms at Nui Phao mine.

3. **The idea of planting forests to sell forest carbon credits**
   Closely monitor the roadmap and legal framework for investment participation.



## ENVIRONMENT REHABILITATION

In 2021, at our operations in Vietnam MHT continued to rehabilitation in areas where land work has been completed, and monitored and maintained the renovated and restored areas from previous years in order to reduce erosion, improve soil and improve ecosystems.

*Afforestation in dump slopes at Nui Phao mine in Vietnam*

During the year, we completed the environmental rehabilitation of approximately 2.4 hectares in waste rock dumps. Many different types of plants and materials are used to increase efficiency in environmental rehabilitation. In 2021, NPMC planted about 4,000 Acacia hybrids; sowed 160 kg of grass seeds and used 7,080 kg of fertilizer for the new planting and care of planted trees from the years 2018, 2019, 2020. The total area that has been rehabilitated by the end of 2021 is 61,62ha.

In addition, we also commenced trial planting of native hardwood trees to survey and evaluate the possibility of using these trees for future environmental rehabilitation programs.

In Goslar MHT is obliged to remediate the contaminated site. The remediation is carried out in accordance with a remediation plan declared to be binding under the remediation goal "No contaminated groundwater leaves the factory premises." For this purpose, the extraction and treatment of groundwater by means of activated carbon and ion exchangers takes place from the wells specified in the remediation plan.

**4,000**
Acacia hybrids

**160 kg**
of grass seeds

**61,62 ha**
rehabilitated area

## ENVIRONMENT COMPLIANCE AND TRANSPARENCY

### Environment monitoring

In 2021, Vietnam wetook 8,148 environmental samples, including: 266 surface water samples, 755 ground water samples, 6,704 wastewater samples, 282 solid waste samples, 48 soil and sediment samples, 14 environmental samples ambient air, 41 emission gas samples and 38 noise measurements in 24 hours.

Automatic monitoring stations for wastewater, ambient air, and vibrations are also operated to ensure timely provision of data at all times for environmental quality control and assessment.

In Goslar, the wastewater is monitored by online analytics in the area of the central wastewater treatment plant. In addition, the limit values are monitored by the responsible water supervisory authority. In 2020, 38 samples were taken by the authority, 25 samples in 2021. In a few cases, limit values were exceeded. These were analyzed and, where necessary, measures were taken to remedy the situation.

For monitoring the emissions, Chemitas operates a total of 16 measuring points to monitor the situation at the entire Goslar site (MPO) and to intervene if necessary if anomalies or exceedances should be detected, as the official measurements are not published promptly.

Of these, 9 are located on the MPO site and 7 off-site in the immediate vicinity. The limit values (annual mean values) according to TA-Luft (4.5.1 TA-Luft 2021) apply to all assessment areas that are located outside the plant premises (MPO). Sampling and analysis are carried out on a monthly cycle (monthly averages).

### Reporting and information transparency

In 2021, within Vietnam MHT submitted a total of 06 reports, 04 annual environmental reports, 02 reports on annual water resources.

In addition within Vietnam, in order to provide timely information on the implementation plan of the recommendations of MONRE (according to the 2017 inspection conclusions), in 2021, we submitted 04 updated quarterly reports on the implementation progress to VEA, DONRE and Ha Thuong DPC.

Through two periodic inspections by the Ministry of Natural Resources and Environment in 2021, the Company's efforts and efforts for environmental protection have been recognized and appreciated. In particular, the lining PTP pond with HDPE membrane was completed 02 months ahead of the commitment deadline.

In Germany, HCS submitted a total of 14 reports to the various Federal and State Ministries covering Hazardous waste, emissions, inspections, and accidents. A further 7 reports are required on a 3-4-year cycle as per the applicable regulations again covering emissions, waste or inspections. In 2021, two reports for six emission sources were prepared.


*Completed the PTP pond lining*

At MTC, Goslar, Sarnia and Ganzhou, the environmental management system according to ISO 14001:2015 standard continues to be maintained.

## Certificate of completion of environmental protection works for MTC

In 2018, MTC Company set up a project to increase production capacity which was approved by the People's Committee of Thai Nguyen province. Since then, in accordance with the approval, the factory has focused on implementing improvements and measures to optimize production, improve product quality and reduce waste generated. In addition, a number of environmental protection works have also been invested, upgraded and renovated such as general waste storage, hazardous waste storage, domestic wastewater treatment tanks, etc. Wastewater and exhaust gas treatment continues to be maintained by the Company.

After completing the project, MTC Company conducted trial operation of environmental treatment works from the end of June to the beginning of October 2020. The purpose of the trial operation is to assess the treatment efficiency of environmental protection works and have a plan to adjust and improve if not suitable. The results of monitoring wastewater and emissions during trial operation show that the environmental treatment works of MTC Company are operating effectively, the environmental parameters to be treated meet the permitted standards.

After a period of trial operation, the above environmental treatment and protection works have been physically checked by the Department of Natural Resources and Environment, confirming and appreciating the Company's investments and efforts in the environmental protection. On April 28, 2021, MTC Company received the Certificate of Completion of the Environmental Protection Works issued by the People's Committee of Thai Nguyen Province to confirm the above environmental protection contents.

Obtaining the Certificate of Completion of Environmental Protection Works of MTC Company is not only a matter of complying with the provisions of the law, but also making a common contribution to sustainable development, strengthening the foundation of compliance environment regulatory of MHT.


# Focus 2022

- Complete all requirements in compliance with the EIA report approval and current regulation
- Establish the EIA report of Tungsten recycling project
- Increase use of renewable generated electricity across the organization
- Approval for EIA report of New Mining License
- Environment protection works completion certification for TSF-SP lining
- Increased recycling of production filter dusts
- Research project on afforestation to sell forest carbon credits
- Adopt more energy efficiency programs including waste heat reuse programs
- Install charging points for electric vehicles in some locations

# SUSTAINABILITY COMMUNITY



### Economic Recovery Fund

- Contributed VND 1.7 billion to 12 community development projects.
- Total 39 households accessed preferential loan from this fund.
- 97% of 39 households improved their own household economic conditions.

### Health, Water and Sanitation

- Offered free clean water supply to 101 households with VND800 million.
- Supported VND400 million for rural clean water program in Ha Thuong commune under the World Bank loan project.

### Micro-Livelihood Model for vulnerable people groups

- 11 single moms with disadvantaged circumstances accessed model of livestock raising and castle breeding – 100% of chicken developing well.
- Organized 14 training courses and one study tour for 899 households to improve their capacity in farming, manufacturing and processing of VietGap tea, organic tea and fruit-trees, beekeeping, etc.

### Humanitarian and charity activities

- Free 200 Tet gifts for poor households, equivalent to VND100 million.
- Offered scholarships and gifts to 70 disadvantaged students totaling VND70 million.
- VND400 million donated to the Fatherland Front in joining hands with Communities to beat the Covid-19 pandemic.

## ECONOMIC RECOVERY FUND

In 2021, MHT worked with the Dai Tu district Social Policy Bank, trust organizations of Ha Thuong, Hung Son town, Phuc Linh, Tan Linh and Cat Ne communes to verify 39 households' eligibility for loan capital to implement the household economic development models, typically: cattle and poultry farming, fruit-tree cultivation, tea newly planting and sustainable cultivation, etc., with a total amount of VND 1.7 billion.

**39** households

**1.7** VND billion

**Nhat Thuc Tea Cooperative – Khuu 2 hamlet, Phuc Linh commune**

Khuu 2 hamlet, Phuc Linh commune is a Project-affected household. In 2021, the Cooperative was entitled to borrow 50 million from the Economic Recovery Fund of MHT to invest in purchasing tea products from the farmers in Phuc Linh commune and create jobs for 15 disadvantaged women (ethnic minority people and the elderly) with a stable income of VND 4.5-5 million per month. The money obtained from the Loan Fund at the preferential interest rates aided the Cooperative in providing support and creating jobs, as well as improving the living standards of nearby employees.

*Helping local farmers adopt VietGAP tea farming models*

## ECONOMIC RECOVERY

*Supporting local people in safe vegetable cultivation*

*Helping local people raise black snails as part of the economic restoration program*

*Support the model of beekeeping as part of the economic restoration program with local people*

### Agricultural Extension

#### *VietGAP tea*

Two VietGAP safe tea cooperative groups of 51 households with a total area of 14.3 ha was established in Khuon Ga 2 residential group, Hung Son town and VietGAP Khuu 3 tea cooperative group in Phuc Linh commune with the support of Nui Phao Mining in the technical training and economical tea irrigation system totaling more than VND 60 million (70% funded by the Company, 30% counterpart capital from the people per ha).

#### *Clean vegetable*

In 2021, the Company continued to support Hung Son Clean Vegetable Cooperative in getting VietGAP certificates for a total area of 5.6 ha/34 households. With the positive outcomes of the wells for watering the safe vegetables in the previous years, Nui Phao Mining continued to sponsor nearly VND 40 million for 5 additional wells for Hung Son town safe vegetable cooperative, bringing the total number of wells to 19/36 hectares.

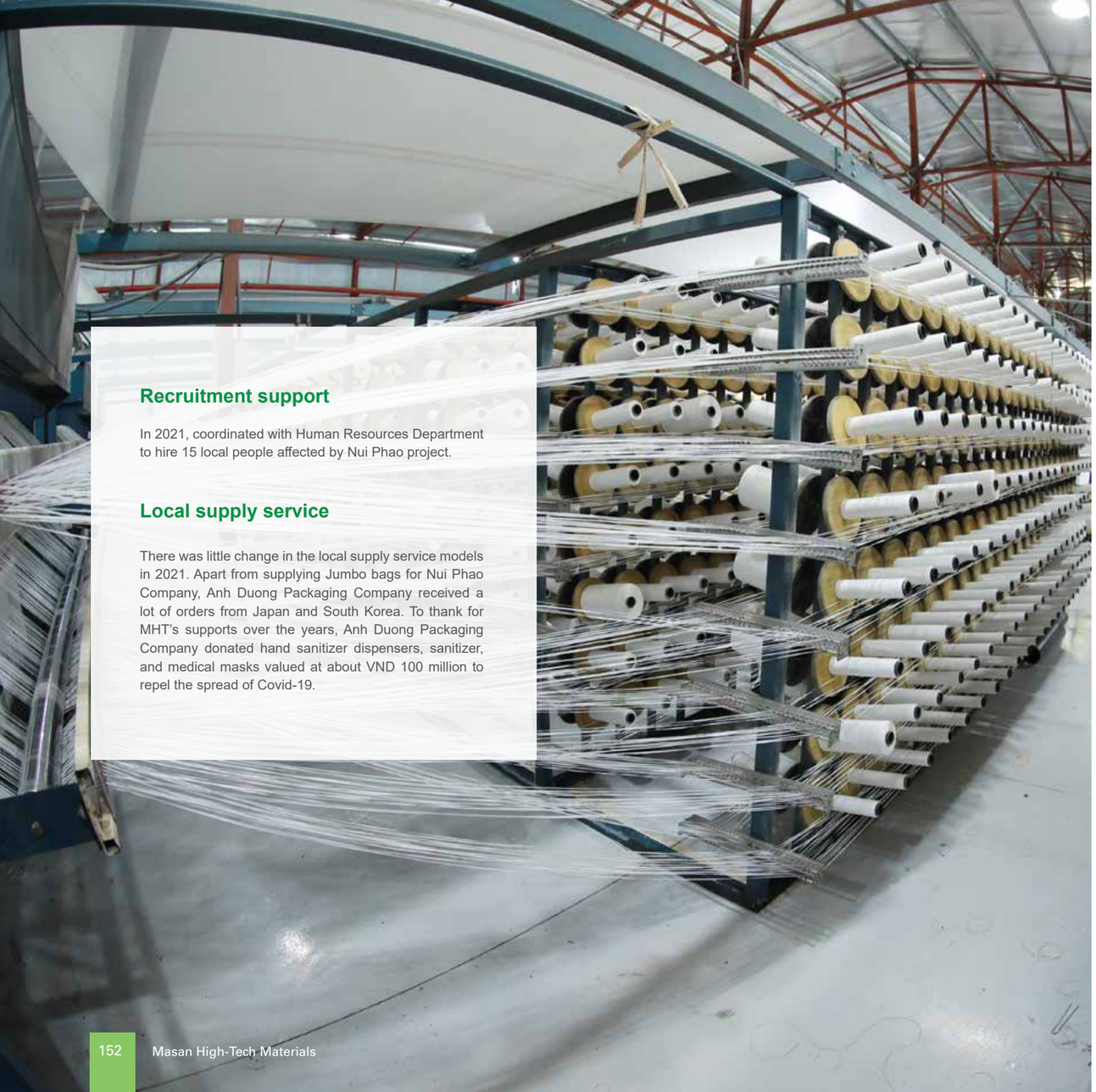
#### *Organic Tea*

Implementing the organic tea farming model in the communes of Tan Linh and Phuc Linh with a total area of 12 ha for 40 households, in 2021, the Vietnam Certification Center (QUACERT) after inspection and assessment granted a certificate for the area of 3.64 ha eligible for organic tea conversion in accordance with TCVN 11041-1:2017; TCVN 11041-2:2017; TCVN 11041-6:2018, the remaining one continues to cultivate and will be assessed in 2022. Besides, the Company supported nearly VND 50 million for the 4.0 hi-tech tea spray and irrigation model.

#### *Micro-economic model*

With the help of VND 45 million from the micro-economic model, 13 poor women in Ha Thuong commune and Hung Son town are able to carry out the egg-laying model.

| No. | Content of Training/Study Visit | No. of courses | Number of participants |
|---|---|---|---|
| 1 | Training on farmer's daily farm logs for VietGAP 2 Tea Cooperative Group, Khuu 3 hamlet, Phuc Linh commune | 1 | 20 |
| 2 | Training on farmer's daily farm logs at VietGAP 2 Cooperative Group, Khuon Ga residential group, Hung Son town | 1 | 30 |
| 3 | Training on farmer's daily farm logs at VietGAP vegetable Cooperative, Xuan Dai residential group, Hung Son town | 1 | 30 |
| 4 | Communication on classification of waste at source and recycled waste collection to raise fund in Trung Hoa residential group, Hung Son town | 1 | 60 |
| 5 | Study tours to the tea cultivation model in Khe Coc commune, Phu Luong district, Thai Nguyen Province | 1 | 20 |
| 6 | Training and launching the apple snail farming model | 1 | 50 |
| 7 | Training on the model of tourist reception at destination | 1 | 60 |
| | **Total** | **7** | **270** |



## Recruitment support

In 2021, coordinated with Human Resources Department to hire 15 local people affected by Nui Phao project.

## Local supply service

There was little change in the local supply service models in 2021. Apart from supplying Jumbo bags for Nui Phao Company, Anh Duong Packaging Company received a lot of orders from Japan and South Korea. To thank for MHT's supports over the years, Anh Duong Packaging Company donated hand sanitizer dispensers, sanitizer, and medical masks valued at about VND 100 million to repel the spread of Covid-19.





# CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

World Environment Day: Coordinate with Environment Department in raising public awareness about waste classification to clean up the world and support garbage trolley and dustbins valued at VND 75 million in 2 communes near Nui Phao project.

Responding to the Vietnam Fatherland Front Committee's call for "everyone to cooperate in Covid-19 prevention and control", Masan High-Tech Materials donated Thai Nguyen province VND 400 million; supported the local communes with medical equipment, supplies and other activities in Covid-19 prevention and control, worth VND 80 million.

On the occasion of Mid-Autumn Festival, MHT presented gifts to more than 5,000 children in 47 hamlets of 4 affected communes, town (Ha Thuong, Phuc Linh, Tan Linh, Hung Son communes, Dai Tu district) with a total amount of VND15 million. This is one of our annual activities to show the corporate social responsibility to the local community. Especially, this is an opportunity to strengthen the long-term relationship between the Company and the local authorities and people, as well as show the caring for the children at the project-affected area.

On the occasion of Vietnam's War Invalids and Martyrs Day (27/7), Masan High-Tech Materials had a lot of practical and meaningful activities to show gratitude to families of war invalids, martyr and persons with meritorious service to the revolution across Dai Tu district area such as offering incense in tribute to the heroes and martyrs at the July 27 National Historic Site; giving 50 gift sets to wounded and sick war veterans, persons with meritorious service to the revolution and orange agent victims from 6 communes of Ha Thuong, Tan Linh, Phuc Linh and Hung Son town.

Masan High-Tech Materials supported the Study Promotion Fund of the University of Mining and Geology for disadvantaged students with the value of VND 50 million.

Responding to the peak Tet week for the poor in 2022 launched by Thai Nguyen province, Masan High-Tech Materials contributed VND 100 million, equivalent to 200 gift sets for the poor in the communes and towns in Dai Tu, Thai Nguyen (VND 500,000 each set). The MHT's Board of Directors also supported VND 100 million for construction of 02 great solidarity Houses and VND 50 million for the public CCTV program of Dai Tu district.

In 2021, provided clean water for 386 people of 101 households in hamlets 2 and 6 Commune, Ha Thuong commune, totaling VND 800 million.

## ACHIEVEMENTS 2021

- Maintained and expanded VietGAP tea area of 5ha in Hung Son town.
- Expanded micro livelihood models for 11 most disadvantaged/ vulnerable households.
- Actively participated in charitable and social activities in Dai Tu district and Thai Nguyen province.
- Continued to support and monitor the 12-ha organic tea project in Phuc Linh and Tan Linh communes (2019-2023).
- Further improved the performance and capacity of over 100 local supply groups and companies.
- Supported in the fight against Covid-19 (VND 400 million).
- Blood donation program at MHT (total 254 blood units donated).

## COMMUNITY TRANSPARENCY

At Masan High-Tech Materials, the transparency mechanism has always been maintained, improved and developed in order to exchange two-way information between Company and the stakeholders, particularly the local communities. Therefore, the community-related activities are conducted in a transparent manner in the spirit of cooperation and result-oriented development in 2021 as follows.

**992** information items published with 107 contents

**17** number of visitors to the Information Center

**59** meetings, field inspection and community consultation with 834 participants

**54** written complaints resolved

## Diversified Information Disclosure Channels

At MHT, a variety of channels to disseminate information were deployed with the aims of giving people the information they need to participate in an informed manner. Stakeholders, particularly project-affected communities are provided and exchanged with two-way communication through channels such as Public Consultation and Disclosure Plan (PCDP), complaint and grievance mechanism, information corners in the community, meetings, dialogues, survey, mine site visits, information center, company's quarterly and annual publication. The channels also enabled us to gain valuable insights into what we do well and where we need to improve.

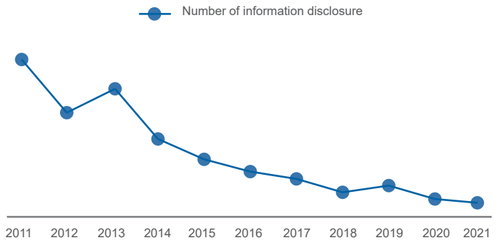
## PCDP - an approachable communication channel for communities

In 2021, the Public Consultation and Disclosure Plan (PCDP) continued to prove itself an effective two-way communication between the Company and stakeholders, particularly local communities. The community relation team actively engaged with internal and external stakeholders to maximize information accessibility opportunities for local people and timely address their concerns. Due to the impacts of Covid-19 pandemic, some public consultation and information disclosure activities were restricted and will continue to conduct in the coming year.

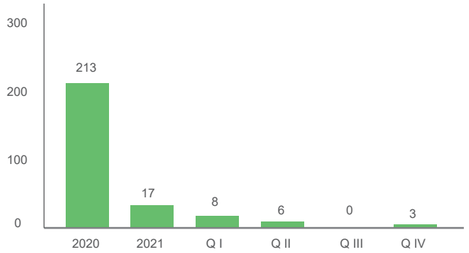
In 2021, there were 992 information items published with 107 contents and 17 visitors to the Information Center. There are numerous channels for local communities to access to the information of the Company, of which the Information Center is remained easy-to-approach channels for community as they can walk in or make a phone call due to the impact of Covid-19 pandemic to talk about compensation and relocation inquiries, environmental impact concern or just to get accurate and update information about employment, casual job opportunities and other issues.

During the year, the community relation team conducted 59 meetings, surveys and community consultation with 834 participants. This is the result of the community consultation and field investigation with the goal of determining the needs for infrastructure improvement, economic development, environmental sanitation, and health care for the surrounding communities. Such meetings, field investigation also help the Company further understand the needs and concerns from community to provide the warning measures to mitigate the environmental impacts and timely resolve their concerns.

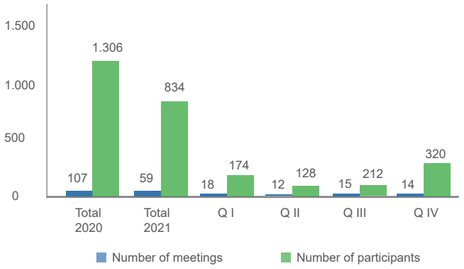
**Information disclosure by year (2011-2021)**




**Visitors to Information Center in 2021**




**Number of meetings, surveys and community consultation in 2021**




## Complaint and Grievance Resolution

### *MHT in Vietnam*

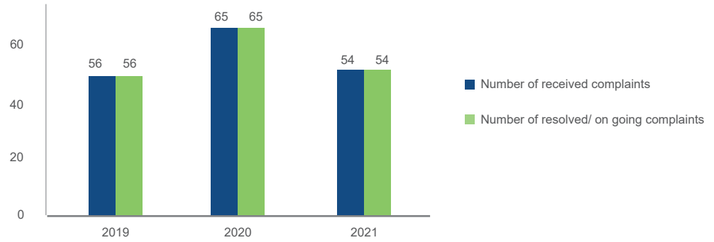
During the 2021, we received 54 written complaints all of which were forwarded, connected to relevant departments/team within the company as well as required involvement of local authorities to address the concerns. In order to reduce the complaint and grievance from community, the community relation team seek to proactively engage with relevant internal departments to regularly inspect the areas of the Project and surrounding communities to timely provide measures to minimize the impacts. The consultation is also strengthened with the involvement of community to address their concerns or queries in a timely manner. However, during the year, there were several repeated cases which required involvement of local authorities and regulators at all levels to address. Concerns about environmental effect were expressed by locals in hamlet 6 of Ha Thuong commune, while relocation and compensation requests were made by residents in hamlets 2, 3 and 4 of Ha Thuong commune in prior years. These concerns have the potential to impact communities and develop into far-reaching stakeholder opposition to our activities if not handled properly. Thus, the Company seek to actively engage with internal departments and governmental functional agencies to address these concerns in a timely manner.

### *H.C. Starck*

The Goslar site borders on an area with mixed development including residential areas and industrial plants. Therefore, the neighborhood is equally as important stakeholders of H.C. Starck Tungsten GmbH as its own employees or employees of other companies on the site of the Metallurgical Park Oker (MPO). In 2020, a total of 7 nuisances due to noise, odors or clouds of smoke/steam were reported by residents from the neighborhood or by employees on the plant premises, which were attributable to the production of H.C. Starck Tungsten GmbH. All occurrences were investigated and appropriate measures were taken if necessary. After a significant decrease in the number of complaints in 2020 compared to 2019, this number was even lower in 2021. In total, only 4 complaints, which could be assigned to incidents at H.C. Starck Tungsten, were registered for the reporting period.

The other two plants of ours in Sarnia and Ganzhou are located in purely industrial areas. In both cases there were no complaints from neighbors or other third parties.

**Complaints and grievance 2019 - 2021**



# HCS COMMUNITY DEVELOPMENT

## In Goslar, Germany

H.C. Starck Tungsten GmbH, as an important and well-known company in the region, is aware of its social responsibility, but also competes with other companies on the labour market for skilled workers.

### *Educational support*

To get young people interested in chemistry at an early age, we use our own equipment to support chemistry lessons at schools during the so-called “discovery days”, invite school classes and student groups to the plant and sponsor the Chemistry Olympics at a university. We actively participate in the so-called “Future Days”, where school children can spend a day getting a taste of business areas. We support schools with donations in kind. For example, protective glasses for chemistry lessons.

Regarding academia, HCS sponsors the H.C. Starck Tungsten-Award for outstanding theses in the fields of solid-state chemistry and materials research. The dissertation award is granted biennially by the German Chemical Society’s “Solid-State Chemistry & Materials Research” Division.

*Winners of the H.C. Starck Tungsten-Award 2021*

### *Community communication transparency*

The close proximity of the Goslar site means that we bear a special responsibility for our neighbours. We have developed an emergency management system which, in addition to averting danger, places particular emphasis on providing comprehensive and transparent information to those affected. Information material on how to act in the event of an emergency and contact addresses have been distributed. We are pleased to invite all interested parties, but especially relatives and neighbours, to an open day on the plant premises next year again so that they can find out about our work on site. We also invite people who feel disturbed by noise or odours from HCS production to explain the causes and present our measures to prevent further nuisance.

### *Prevention and management of Covid-19*

While some local community events could still not be carried out in 2021 due to the SARS-CoV-2 pandemic, HCS plans to resume its engagement once the situation allows. In the meantime, HCS continued to donate FFP-2 masks for the benefit of the community, e.g. to Goslar’s food bank.

*Operations supporter Ahmet Kaba hands over 350 FFP2 masks to the local primary school’s head teacher*

### *Donation for tree planting*

The company donated to a local association that engages in reforestation. The donation is to provide for the planting of a total of 1,500 trees. In a related team event that was organized by HCS’ Sustainability Team, employees and their family members joined hands in planting some hundreds of trees themselves, too.

*MHT CEO Craig Bradshaw and HCS CEO Hady Seyeda at the tree planting team event*

## In Sarnia, Canada

Below are the several projects and activities H.C. Starck in Sarnia supported and/or sponsored in the city and the region in 2021.

### *Christmas Food Drive - onsite for Inn of Good Shepherd*

The Inn of the Good Shepherd is a local charity that provides food, clothing and shelter to the working poor, the unemployed and the homeless. Employees donating food and cash receive draw tickets for an opportunity to win prizes which are sponsored by both companies. The company with the highest fundraising total per employee wins the coveted Golden Can trophy. This is a joint fundraising event between TODA Advance Materials and H.C. Starck. In total, around 150 food items and $500 were donated in the past two years.

### *Santa Clause Parade Sponsor*

The Kinsmen is a local charity that hosts the Santa Claus Parade every year. The parade typically consists of 40 floats and a number of large marching bands. This a major event that is attended by thousands of people from Sarnia and surrounding areas. This showcases the involvement of the company in local community events. HC Starck is a major sponsor of the float Santa Clause rides on, which gets the most attention during the parade, thereby maximizing the company's exposure in the community.

### *Celebration of Lights*

Set-up of annual light display in central community park. The Celebration of Lights is a spectacular display in which the Sarnia- Lambton county is set aglow under a blanket of illuminated lights. This event is set up each year and attracts thousands of people from Sarnia and the surrounding areas. Ongoing sponsorship of the event and set up of our own display to enhance the company's profile as an active and engaged participant in community events.

### *Little League Sponsorships (Hockey and Baseball)*

Employees are given the opportunity to the apply to H.C. Starck for sponsorship to benefit their local team or club. The name of the company becomes more widely known in the community, both as a sponsor of local sporting activities and a potential employer. This also provides an opportunity to under privilege children to participate in competitive sports.

### *"Adopt- a-Family" Christmas Gifts - the Inn of the Good Shepherd*

Adopt-a-Family is a project where local businesses, families, churches, service clubs and individuals are paired with a family that cannot afford to provide their children with Christmas gifts. The children provide a "wish-list" for Santa and receive their gifts on Christmas morning.

In 2021, H.C. Starck in Sarnia donated money in order to buy Christmas gifts for under privileged children in the community, including eight children from two families. Through this act, we provide employees with an opportunity to be actively involved in supporting a local charity and under-privileged children.

## Focus 2022

- Support and successfully develop the organic tea project in Tan Linh commune.
- Maintain and expand the VietGAP tea area in the project-affected communes.
- Connect, train to improve the capacity of the health care, life skills for the students in Dai Tu district.
- Closely cooperate with stakeholders for resource optimization and sustainable development.

## SUSTAINABILITY FINANCE

Despite the continuing impact of Covid-19, Masan High-Tech Materials Corporation (“Company” or “MHT”) net business revenue for the year 2021 was VND13,564 billion, a significant increase of VND6,273 billion in comparison with the previous year, mainly resulting from strong demand and pricing of MHT Tungsten products in Q4/2021 and full year consolidation of the HCS business (12 months 2021 vs. 7 months 2020). The Company’s EBITDA of VND3,070 billion, in which HCS EBITDA was VND746 billion whilst the Vietnam based businesses (NPMC and MTC) contributed VND2,324 billion to the overall result. The HCS business contributed significantly to the overall MHT result with an NPAT Post-MI of VND181 billion (inclusive of amortization of goodwill adjustment from acquisition) for 2021. This result vindicates the decision to purchase the HCS business in the early stages of the Covid-19 pandemic in 2020 and sets MHT up well for the future.

MHT has continued to maintain the salaries, bonuses to the employees, fulfill its tax obligations and fees payment responsibilities to the state and provincial budget which amounted to VND778 billion among incurred VND1,142 billion for 2021.

**Some highlights that MHT achieved in 2021**

Net revenue increased by **86%**

EBITDA increased by **114%**

Tungsten (contained) product increased by **97%**

Attributable net profit increased **399%**

## ABBREVIATIONS/ DEFINITIONS

| | |
|---|---|
| ACCA | Association of Chartered Certified Accountants |
| AFFF | Aqueous Film Forming Foam |
| AGM | Annual General Meeting |
| ANCO | Argo Nutrition International Joint Stock Company |
| APEC | Asia-Pacific Economic Cooperation |
| APT | Ammonium Paratungstate |
| APT Plant | Tungsten Chemicals Processing Plant of Masan Tungsten LLC |
| BGC | German BG Case |
| BImSchG | Bundesimmissionsschutzgesetz (Federal Emission Control Act) |
| BOD | The Board of Directors of the Company |
| BOJ | Bank of Japan |
| BTO | Blue Tungsten oxide |
| C&R | Compensation and Resettlement |
| CEO | Chief Executive Officer |
| CFO | Chief Financial Officer |
| CHESS | Community, Health, Environment, Safety and Sustainability committee |
| Company | Masan High-Tech Materials/Masan High-Tech Materials Corporation and its subsidiaries |
| CSI | Corporate Sustainability Index |
| CSR | Corporate social responsibility |
| DAW | Days Away From Work |
| DAWC | Days Away From Work Cases |
| DAWC 3 | Number of Days Away from Work Cases of third party Contractors |
| DAWCR | Days Away From Work Cases Rate |
| DP2 | Discharge Point 2 |
| DP3 | Discharge Point 3 |
| EBITDA | Earnings before Interest, Taxes, Depreciation and Amortization |
| EC | Electro-chromic |
| EIA | Environmental Impact Assessment |
| ENV | Environment |
| E-PRTR | European Pollutant Release and Transfer Register |
| ERD | Economic Restoration Development |
| FA | Fatal Accidents |
| FY | Financial Year |
| GDP | Gross Domestic Product |
| H.C. Starck or HCS | H.C. Starck  Tungsten Powders |
| HC | Headcount |
| HNX | The Hanoi Stock Exchange |
| HR | Human Resources |
| HRD | Human Resources Department |
| HSD | Hill Side Dyke |
| HSS | Health, Safety and Security Department |
| IC | Integrated Circuit |
| IED | Industrial Emissions Directive |
| IT | Information technology |
| ITIA | The International Tungsten Industry Association |
| ITLC | International Trade law & Customs |
| ITRB | Independent Tailings Review Board |
| Law on Enterprises | Law on Enterprises No. 68/2014/QH13 dated November 26, 2014 of the National Assembly of the Socialist Republic of Vietnam |
| LCD | Liquid Crystal Display |
| LTI | Lost-Time-Injury |
| LTIFR | Lost Time Injury Frequency Rate |
| M&A | Mergers and Acquisitions |
| M&G | Mining & Geology |
| MAINT | Maintenance |
| MAQ | German Accident Rate |
| Masan Group | MSN and its subsidiaries |
| Masan Horizon or MH | Masan Horizon Company Limited |
| Masan Resources or MSR | Masan Resources Corporation |
| MCH | Masan Consumer Corporation |
| MHT | Masan High-Tech Materials Corporation |
| MNSMML | Masan Nutri-Science CorporationMasan MEATLife Corporation |
| MONRE | Ministry of Natural Resources and Environment |
| MRTN | Masan Thai Nguyen Resources Company Limited |
| MSN | Masan Group Corporation |

| | |
|---|---|
| MTC | Masan Tungsten Limited Liability Company |
| mtu | 1mtu = 10kg |
| NHTCM | Nui Phao - H.C. Starck Tungsten Chemicals Manufacturing |
| NPAT | Net Profit After Tax |
| NPMC | Nui Phao Mining Company Ltd |
| PCDP | Public consultation and information disclosure program |
| PROC | Processing |
| R&D | Research & Development |
| RMI | Responsible Minerals Initiative |
| RMIP | Raw Material & Inventory Planning |
| S&M | Sales and Marketing |
| SCM | Supply chain management |
| THW | Total Hours Worked |
| TNTI | Thai Nguyen Trading and Investment Company Limited |
| TRC | Total Recordable Cases |
| TRCR | Total Recordable Cases Rate |
| TRIFR | Total Recordable Injuries Frequency Rate |
| TSF | Tailings Storage Facility |
| USD or US$ or $ | The official currency of United States of America |
| USQ | German Severity Rate |
| VAS | Vietnamese Accounting Standards |
| VAT | Value-added tax |
| VBCSD | Vietnam Business Council for Sustainable Development |
| VND | The official currency of Vietnam |
| VNR | Vietnam Report Corporation |
| YTO | Yellow Tungsten Oxide |



# Global Innovations
# **for a Sustainable Future**