

## MASAN HIGH-TECH MATERIALS

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**MASAN**  
HIGH-TECH MATERIALS



# SUSTAINABILITY REPORT





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## 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 2022. 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 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.

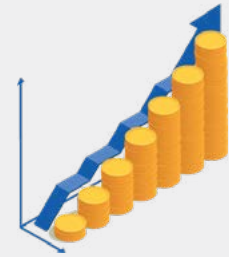
## SCOPE AND BOUNDARIES

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

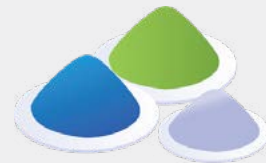




## OUTSTANDING ACHIEVEMENTS IN 2022



Net revenue reached  
 VND **15,550** billion  
 a 15% increase compared to 2021



Tungsten revenue increased by  
**13%**  
 of which 70% came from  
 deep-processing tungsten products



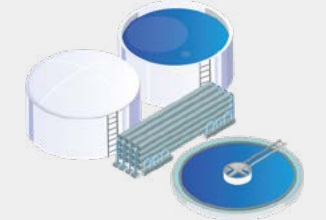
Invested  
 EUR **52** million  
 in Nyobolt, a UK-based fast-charging  
 Li-ion battery solutions company



Actual operating time of the  
 factory was  
**95.8%**



**65%**  
 of generated waste was  
 recycled



**7.3** million m<sup>3</sup>  
 of wastewater were treated before  
 discharge



Contributed  
 VND **1,192** billion  
 to the State budget



**2,237**  
 global employees



**46,223**  
 hours of training



Obtained  
**2**  
 ISO 50001 certificates  
 at MTC and Goslar



Maintained  
**4**  
 ISO 14001 certificates at MTC, Goslar,  
 Samia, and Ganzhou



Tungsten was listed in the  
**TOP 10**  
 Golden Products of Vietnam  
**TOP 50**  
 Leading Brands of Vietnam



# 2022 AWARDS AND RECOGNITION

Masan High-Tech Materials and its subsidiaries have won many prestigious awards for its efforts and accomplishments in 2022, including Tungsten - Top 10 Vietnam Gold Products, Top 50 Vietnam Excellent Brands, Top 100 Vietnam Gold Star Awards, Top 100 Vietnam Strong Brands, and Top 100 Sustainable Businesses in Vietnam. These honors represent significant acknowledgement of the Company's continued efforts, as well as encouragement for the Company to strive for larger production and commercial goals, affirming the position of Masan High-Tech Materials in both national and international markets.

## CERTIFICATE OF "VIETNAM'S TOP TEN GOLDEN PRODUCTS - 2022" FOR TUNGSTEN PRODUCTS OF MASAN HIGH-TECH MATERIALS

*Voted and awarded by Vietnam Intellectual Property Association (VIPA)*

## CERTIFICATE OF "TOP 50 VIETNAM LEADING BRANDS" FOR MASAN HIGH-TECH MATERIALS

*Voted and awarded by Vietnam Intellectual Property Association (VIPA)*

## CERTIFICATE OF "TOP 50 VIETNAM BEST GROWTH 2022" FOR MASAN HIGH-TECH MATERIALS

*Voted and awarded by Vietnam Report JSC*

## CERTIFICATE OF "TOP 50 VIETNAM EXCELLENT BRANDS" FOR MASAN HIGH-TECH MATERIALS

*Voted and awarded by Vietnam Report JSC*

## CERTIFICATE OF "TOP 100 SUSTAINABLE BUSINESSES IN VIETNAM 2022" FOR MASAN HIGH-TECH MATERIALS

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

## CERTIFICATE OF "TOP 100 VIETNAM GOLD STAR AWARD 2021" FOR NUI PHAO MINING

*Awarded by the Young Entrepreneurs Vietnam Association*

## CERTIFICATE OF "TOP 100 VIETNAM STRONG BRANDS" FOR MASAN HIGH-TECH MATERIALS

*Voted and awarded by the Vietnam Economic Times*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS EXCELLENT ACHIEVEMENTS IN BUILDING A STRONG TRADE UNION IN 2022"

*Voted and awarded by the Vietnam General Confederation of Labor*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS EXCELLENT ACHIEVEMENTS IN THE PREVENTION OF THE COVID-19 EPIDEMIC"

*Voted and awarded by the Thai Nguyen People's Committee*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS ACHIEVEMENTS IN REPAYMENT ACTIVITIES IN THE PERIOD 2017 - 2022"

*Voted and awarded by the Department of Labor, War Invalids and Social Affairs of Thai Nguyen Province*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS EXCELLENT ACHIEVEMENTS IN IMPLEMENTING REGULATIONS ON COORDINATION IN THE IMPLEMENTATION OF FIRE PREVENTION, FIGHTING, RELIEF AND RESCUE"

*Voted and awarded by Thai Nguyen Provincial Police*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR BEING "A ROLE MODEL ENTERPRISE IN THE PEOPLE'S MOVEMENT TO UNITE AND BUILD CULTURAL LIFE FOR EIGHT YEARS (2015-2022)"

*Voted and awarded by Dai Tu District People's Committee*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS ACHIEVEMENTS IN THE TET PEAK WEEK PROGRAM FOR THE POOR IN DAI DISTRICT FROM 2022"

*Voted and awarded by Dai Tu District People's Committee*

## CERTIFICATE OF MERIT FOR NUI PHAO MINING FOR "ITS CONTRIBUTIONS TO THE 100th ANNIVERSARY OF DAI TU DISTRICT ESTABLISHMENT AND DEVELOPMENT (01/08/1922 - 01/08/2022)"

*Voted and awarded by Dai Tu District People's Committee*





# GENERAL INFORMATION

- Vision & Mission
- Company Profile
- Company History
- Flagship Assets
- Our Products
- Shareholders Information





## VISION AND MISSION



### 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

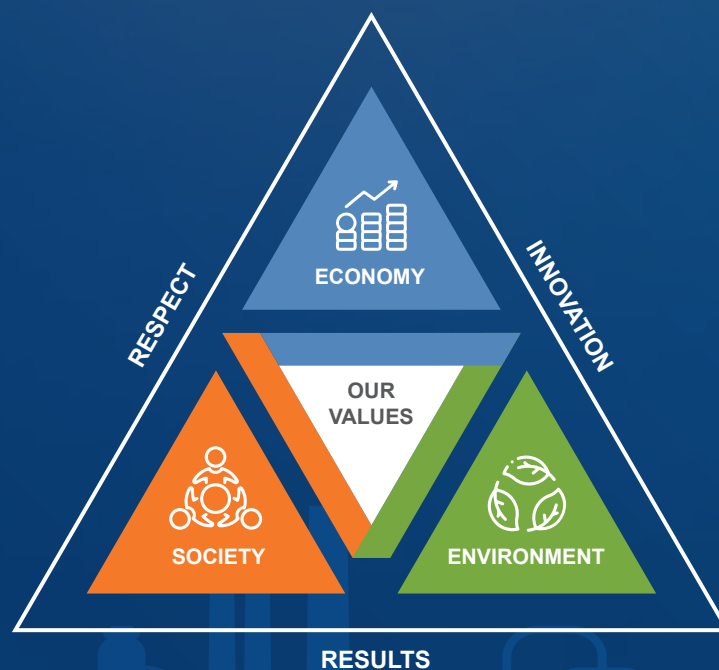
We believe caring for people, environment and community results in mutually beneficial relationships.

#### Innovation

We strive for excellence in everything we do.

#### Results

We are passionate about exceeding expectations.



## COMPANY PROFILE

### Name of the company

Masan High-Tech Materials Corporation (MHT)

### 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](http://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 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:

- Acceleration of project development for the Nui Phao Project
- In December, the National Mineral Reserves Assessment Council acknowledge the results of the Nui Phao Project's resources and reserve grade conversion
- In August, the Company received Investment Certificate No. 41122000131 from the People's Committee of Ho Chi Minh City.

- 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

### 2011 >

### 2012 >

- In February, MOIT's official approval of the Nui Phao Project's basic

### 2013 >

### 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 >

### 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 innovation and investment in new processes and technology, cost saving, change in business process, developed cooperation with NHTCM and 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



- 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

2017 &gt;

2018 &gt;

- 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 &gt;

- 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 &gt;

- 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 &gt;

- 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 Tungsten business into MHT has vindicated its effectiveness, the Company achieved net revenue of VND 13.564 billion in 2021

2022 &gt;

- Organized the International Fluorine Forum in collaboration with IMFORMED (Industrial Minerals Forum & Research Ltd). This is the first time the Forum has been held in Vietnam
- In July, H.C. Starck Tungsten Powders ("HCS"), announced the signing of definitive agreements to invest £45m (approx. €52m) into Nyobolt Limited ("Nyobolt"), a fast-charging Li-ion battery solutions company that leverages HCS's advanced tungsten materials in its anode, for a 15% equity interest on a fully diluted basis. The investment is expected to accelerate HCS's vision of becoming a high-tech, value-added business by developing new tungsten applications critical for the technologies of the future



## 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 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 (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 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<sub>3</sub>N<sub>4</sub>, 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

The Nui Phao mine is a unique polymetallic deposit with a co-occurrence of Tungsten, Fluorspar, Copper and Bismuth mineralization. These metals are considered strategic to industry and find myriad uses across a broad portfolio of high-tech applications.



### Tungsten (W)

Tungsten is a unique element having the highest melting point of all metals (3422°C), a density (19.3 g/cm<sup>3</sup>) almost twice that of lead, and a hardness close to that of diamond when in tungsten carbide form.

The name Tungsten is attributed to Axel Frederik Cronstedt who upon discovering a tungsten containing ore combined the Swedish words tung (heavy) and sten (stone) noting its density, but credit for separation of the metal goes to Karl Wilhelm Scheele, an impoverished pharmacist with a modest pension from the Stockholm Academy of Science, who in the mid 1700's discovered more new chemical compounds than perhaps any scientist before or since.

The intrinsic properties of tungsten means that it makes a critical contribution across all major heavy industries, such as manufacturing, energy generation and transmission, construction and infrastructure, mining, and many light industrial and high-tech industries as well such as automotive, aerospace, electronics, catalysis, medical and pharmaceutical. Tungsten first found a growth market as an alloying addition in tool steels and steel alloys where its ability to contribute high hardness and high temperature resistance were greatly valued; an application that it still finds use in today. The subsequent discovery and development of Cemented Carbide (a composite of Tungsten and Carbon) in the 1920's completely revolutionized the metal cutting and metal forming industries and tungsten carbide quickly found myriad uses across industry as its properties enabled rapid increases in process efficiency and part life. Cemented Carbides account for over 60% of tungsten use globally today, and engineers continue to find new applications for tungsten on a regular basis; in the last decade alone tungsten has found new commercial use in high purity semiconductor gasses for the

production of integrated circuits, and as a high performance anode material or dopant in specific Li-Ion battery chemistries.

Marketable Tungsten materials come in a variety of forms such as tungsten chemicals, tungsten metal, and tungsten carbide with each form having different characteristics and applications.



**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 directly in catalysis and fine chemistry.

Ammonium Metatungstate, Tungstic acid, and Sodium Tungstate are all tungsten salts that are soluble in water, alcohol, and ammonia, they have excellent chemical purity, high reactivity, and a uniform morphology. The unique properties of these salts 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:** Tungsten Metal is used directly as an alloying addition in steel making or for superalloy melts, and otherwise finds use in mill products; solid sintered or deep processed forms such as rods, wires, sheets, etc. The unique metallurgi-

cal and physical properties of Tungsten Metal find application in lighting, defense, aerospace, radiation shielding, electrical contacts amongst many others.

**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 usage in carbide tools allows for much high-

er cutting speeds and rate of material removal which in turn improves the efficiency and economy of the manufacturing process. Tungsten carbide usage in wear parts such as pump seals, bearing faces, knives, punches, nozzles etc. dramatically improves the useful life of the part and is ubiquitous across the energy and materials processing industries.

## FLUORSPAR (CAF<sub>2</sub>)

Fluorspar also known as Fluorite 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 (AlF<sub>3</sub>) which is an important additive for the production of Aluminium by electrolysis. Hydrofluoric acid is used as a precursor to a wide range of products including fluorocarbons, fluoropolymers, and fluorine process gasses; perhaps the most commonly known application is as PTFE a non-stick fluoropolymer coating used in household cookware and patented by DuPont in the 1930's as 'Teflon'. Fluorocarbons are used globally as the most common refrigerant found in household white-goods and air-conditioning systems, and fluorine based process gasses are used extensively in the semiconductor and uranium processing industries. An emerging application for Fluorine with significant growth potential is as an electrolyte additive and polymer separator material in Lithium-Ion rechargeable batteries.

## BISMUTH (Bi)

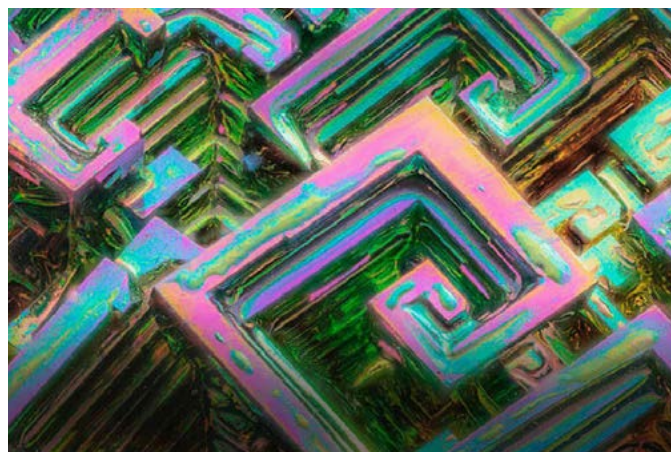
Bismuth is a minor metal with consumer and industrial applications.

For the consumer, bismuth-based chemicals are used in the health and pharmaceutical sector as a radiation protection material and as the active ingredient in 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 of irregular shaped parts for machining and as a plain bearing alloying addition.

## 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.



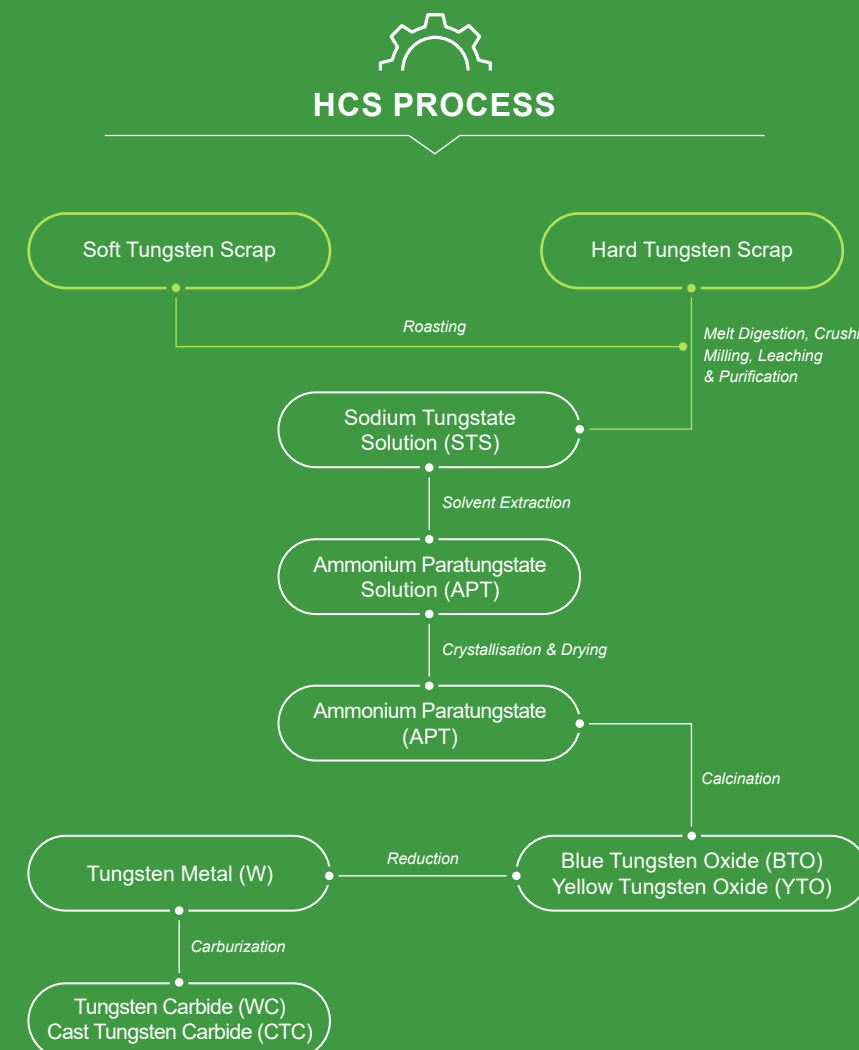
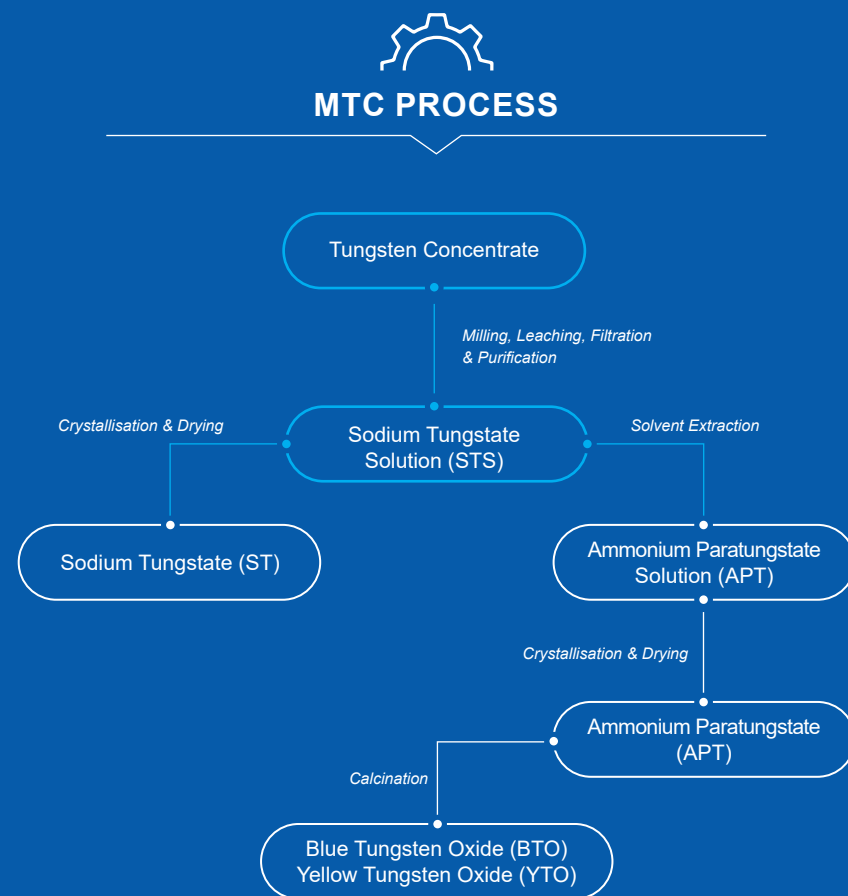
PROPERTY	INDUSTRY/TYPE OF APPLICATION
<b>Aesthetics</b>	Architecture, sculpture, jewelry, clocks, cutlery.
<b>Bactericide</b>	Door hardware, marine internal combustion engines, crop treatments.
<b>Biofouling resistance</b>	General, hydraulic and marine engineering, metalworking, aerospace, power generation, shipbuilding, off-shore oil and gas platforms.
<b>Corrosion resistance</b>	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.
<b>Ease of fabrication</b>	All of the above plus printing.
<b>Electrical conductivity</b>	Electrical power generation, transmission and distribution, communications, resistance welding, electronics.
<b>Environmental friendliness</b>	Essential for health of humans, animals, and crops.
<b>Fungicide</b>	Agriculture, preservation of food and wood.
<b>Low temperature properties</b>	Cryogenics, liquid gas handling, superconductors
<b>Mechanical strength/ductility</b>	General engineering, marine engineering, defense, aerospace.
<b>Non-magnetic</b>	Instrumentation, geological survey equipment, minesweepers, offshore drilling.
<b>Non-sparking</b>	Mining and other safety tools, oxygen distribution
<b>Elasticity</b>	Electrical springs and contacts, safety pins, instrument bellows, electronic packaging.
<b>Thermal conductivity</b>	Heat exchangers and air-conditioning/refrigeration equipment, automotive radiators, internal combustion engines, mining.



## TUNGSTEN PRODUCTION

Masan High-Tech Materials' MTC plant is designed to process the total amount of NPMC tungsten concentrate, along with externally sourced tungsten containing raw materials, into high grade ammonium paratungstate (APT) via chemical digestion followed by physical and chemical purification and, finally, crystallization. APT is packaged for external sale or otherwise undergoes calcination to produce blue tungsten oxide (BTO) and yellow tungsten oxide (YTO) for sale to external customers or for further downstream processing within the MHT Group.

H.C.Starck Tungsten's Goslar plant is designed to process intermediate tungsten chemicals produced at MTC as well as being a globally significant recycling operation for most types of tungsten containing scrap and secondary material. Scrap is processed into high grade ammonium paratungstate (APT) via chemical digestion followed by physical and chemical purification and, finally, crystallization. APT and tungsten oxides produced at HCS are further processed into tungsten metal powder, tungsten carbide powder, and cast tungsten carbide powder for sale into relevant industrial segments.



### 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

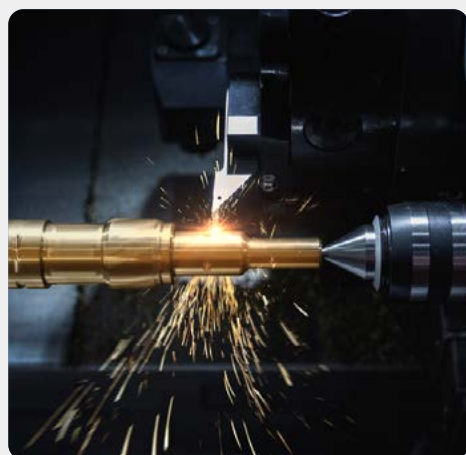
Tungsten metal powder is converted into tungsten carbide powder through a reaction with pure carbon powder in a high temperature furnace.

## TUNGSTEN AS A CRITICAL MATERIAL

Tungsten is classified as a critical mineral by both those in industry and in government because it is a relatively rare metal with unique properties that are highly valued in many high-tech, and defense applications. The demand for tungsten has increased significantly in recent years due to the growing demand for high-tech products and the expansion of the aerospace and defense industries. However, tungsten is a scarce resource with a limited geographic dispersion of

crustal abundance; more than 56% of global reserves are located in China, and currently more than 82% of tungsten production occurs in China, which has led to concerns about supply chain security and the potential for price volatility. There is a need for greater investment in sustainable tungsten mining and recycling, as well as diversification of supply sources to ensure the long-term availability and affordability of this important metal.

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 landing 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.



## HIGH TECH MATERIALS FOR A CLEANER ENVIRONMENT

Given the versatility and criticality of Masan High Tech Materials product portfolio it should be expected that our metals will play their part in meeting today's and tomorrow's challenges, such as the need for a more efficient use of resources and the reduction of emissions.

Whilst there is certainly great opportunity for tungsten, fluorspar, copper and bismuth in future applications, the materials have been contributing to a cleaner environment for many years already.

### TUNGSTEN

#### Energy Efficiency

Tungsten is used in energy-efficient lighting such as LED bulbs, which require much less energy for the same emission of light, and have longer lifespans than traditional incandescent bulbs.

#### Renewable Energy

Tungsten is used in the production of renewable technologies such as wind turbines, and solar panels, which help to reduce the reliance on fossil fuels and decrease carbon emissions.

#### Lightweighting

Tungsten Carbide tools enable extreme material removal rates and the ability to machine abrasive or challenging materials such as polymer composites and titanium alloys; therefore tungsten is directly linked to the lightweighting of components and structures. New WC tool technologies such as submicron powder grades, and advanced coatings enable high feed machining which see increasing use across automotive and aerospace to reduce weight and increase the fuel efficiency of vehicles.

#### Recycling

Tungsten has a significant End-of-Life recycling input rate sharing the 5<sup>th</sup> position in the EOL ranking of all raw materials. This high recycling rate is due to its high economic importance and also due to the fact that most of its end use applications are for industrial use rather than retail trade.

#### Lead substitution

Lead has been identified as an environmentally hazardous and toxic metal that ranks second on the US Government's Top 100 Hazardous substances priority list. Tungsten has a similar density to lead and is completely non-toxic making it a safer and greener alternative particularly in applications where there is a risk of lead exposure such as in ammunition, fishing weights, ballast weights, and radiation shielding.

#### Catalysis

Tungsten is a critical addition in Hydrotreating catalysts used in the oil refining and processing industries. 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.

Tungsten is also prevalent 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.

### FLUORSPAR

#### Renewable Energy

Fluorine is used in the production of solar panels as an etching gas during manufacturing of the silicon wafers and also as an anti-reflective surface coating to help increase the photovoltaic efficiency.

#### Energy Transition

Fluorine chemistries are beginning to gain traction as electrolytes for Lithium-Ion batteries and Fuel cells where Fluorine's high ionic conductivity results in a faster charge and discharge cycle, and its thermal and electrochemical stability results in a stable and longer life product. The current forecast is for explosive growth in the usage of Fluorine.

### COPPER

Copper is considered vital for the transition to a cleaner and more sustainable energy system. Due to its high electrical conductivity it is an essential material for the production and distribution of electricity and is present directly in renewable forms of power generation such as wind, hydro, nuclear as the windings on electric motors, generators and transformers. Copper is also critical and relatively un-substitutable as a medium for electrical transmission; the expansion of electrical grid infrastructure is likely to be the bottleneck for the roll out of new energy vehicles, and energy storage solutions.



Solar panels



Lithium-Ion battery

## SHAREHOLDERS INFORMATION

### Shareholder structure

The shareholder structure of the Company as of December 31, 2022 is as follows.

No.	Shareholder structure	December 31, 2022			
		Number of shareholders	Number of shares held	Value (by par value) (VND)	Shareholding percentage
1	<b>Domestic shareholders</b>	<b>4,131</b>	<b>987,853,145</b>	<b>9,878,531,450,000</b>	<b>89.87%</b>
	Institutional shareholders	8	949,660,874	9,496,608,740,000	86.4%
	Individuals	4,123	38,192,271	381,922,710,000	3.47%
2	<b>Foreign shareholders</b>	<b>69</b>	<b>111,302,275</b>	<b>1,113,022,750,000</b>	<b>10.13%</b>
	Institutional shareholders	2	109,917,642	1,099,176,420,000	10.00%
	Individuals	67	1,384,633	13,846,330,000	0.13%
<b>Total</b>		<b>4,200</b>	<b>1,099,155,420</b>	<b>10,991,554,200,000</b>	<b>100%</b>

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

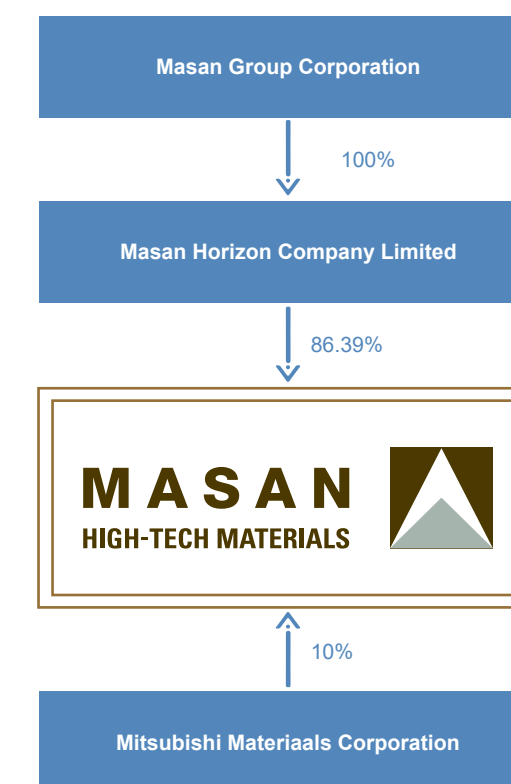
The list of shareholders holding at least 5% of the charter capital of the Company as of December 31, 2022 is as follows.

No.	Shareholder structure	Number of Shares held	Value (by par value) (VND)	Shareholding percentage
1	<b>Domestic shareholders</b>			
	Masan Horizon Company Limited	949,597,153	94,959,715,300,000	86.39%
2	<b>Foreign Shareholders</b>			
	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, 2022:





## 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

Mitsubishi Materials Corporation (MMC) 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 Exchange, and is a constituent of the Nikkei 225 stock market index.

# DEVELOPMENT STRATEGIES

Sustainability at MHT

Development Objectives

Social Development Objectives

Growth through Sustainability





## Sustainability at MHT

MHT is dedicated to building a sustainable business that not only ensures the longevity of our company but also adds value to our shareholders. Our sustainability strategy is rooted in addressing global issues, such as pandemic management, climate change, human rights, social change, and responsible sourcing.

We believe in keeping our sustainability commitments public and welcome an open dialogue on the topic. Our approach, values, success metrics, and decision-making process are communicated to our employees and shareholders, promoting a common understanding of our sustainability efforts.

At MHT, sustainability is about reducing negative impacts on the environment, society, economy, and culture while supporting and sustaining the industries and communities we operate in. Our policies are set at a global level, with a focus on local implementation. By identifying and managing risks, we aim to create a sustainable future for all stakeholders.

## Our Development Objective

MHT has set a bold objective to position Vietnam as a leader in Tungsten recycling technology. The company is actively researching and planning to construct its first Tungsten recycling plant in the country, in line with the global trend towards a circular economy and sustainable development. The project aims to reduce reliance on primary raw materials from mining activities and establish Vietnam as a regional technology hub for recycling tungsten and precious metals.

By 2027, MHT's vision is to become not only the world's leading supplier of high-tech materials, but also an innovation leader in the field of global consumer technology products. The company plans to introduce the high-efficiency rechargeable Li-ion battery to the market, positioning itself as a first-to-market player. This ambitious objective reflects MHT's commitment to innovation, sustainability and long-term growth.

## Social Development Objective

At Masan High-Tech Materials (MHT), our social development objective is to not only support the local community, but also strive for sustainable growth through responsible business practices. As part of our commitment to promoting the circular economy, we aim to recycle a similar amount of tungsten as our annual production, reducing the reliance on primary raw materials from mining activities. In addition, our focus on producing technology consumer products not only benefits the consumer, but also the environment. Our products continue to maintain market leadership across important indicators such as customer feedback, customer ratings, and pricing advantage against similar products. This demonstrates our continued value proposition to customers and our commitment to sustainable business practices.





## “Growth through Sustainability” Strategy

Since its start of operations, MHT has regarded “Sustainability” as the fundamental component of its corporate DNA, rather than a trendy buzzword. “Sustainability” continued to be central to the Company’s growth strategy after successful acquisition and integration of H.C. Starck, and the company has been working on multiple growth avenues which would be contributing to creating a sustainable ecosystem for all its global stakeholders.

### Sustainable solutions using advanced materials

MHT teams have been successfully working and launching innovative solutions for different consumer segments under its strategy of moving further downstream and getting closer to consumers by developing new and innovative applications.

The recent launch of advanced tungsten powders under its patented trademark “starck2charge” battery materials range and investment into Nyobolt Limited, a pioneer in the development and commercialization of tungsten-based fast-charging battery solutions, in FY2022, was the validation of MHT’s commitment to developing the sustainable and cost-effective solutions for the world’s energy needs today.

Through its investment and strategic partnership with Nyobolt Limited, MHT will not only be able to provide a comprehensive, cost-effective and innovative battery solutions but shall strengthen MHT’s involvement in the B2C business segments through greater access to and development of consumer-based battery and product solutions in the future.

Additive manufacturing, also known as 3D printing, is another sunrise segment that MHT is serving through its innovative tungsten products and complementary services under the trademark “starck2print”. The Company is intensively working to move further downstream using its specialized tungsten products differentiated for their flowability and optimized particle size distribution underpinning a new growth market.

### Circular economy-based growth models

In contrast to the “take-make-waste” linear and conventional business models, MHT has been consciously adopting a systemic circular economy-based approach to develop an inclusive growth platform for all its stakeholders, including its employees, shareholders, society and the environment.



In 2022, MHT successfully worked on the pre-feasibility study of setting up a tungsten scrap recycling plant in Vietnam to supplement the tungsten concentrates supply in a cost-effective manner to its fully owned subsidiary, Masan Tungsten Company Ltd, and realize the economy of scale. This was accomplished by leveraging the in-house scrap recycling expertise and intellectual property gained through decades of scrap processing experience at its subsidiary H.C. Starck Tungsten Powders located at Goslar, Germany.

Tungsten scraps required for this future plant in Vietnam would be procured domestically as well as imported when regulatory licenses and permits are obtained. On the back of sustainable manufacturing growth and commensurate tungsten demand in Vietnam, the proportion of domestic scrap procurement is expected to increase over time.

Besides developing tungsten-containing innovative materials and battery solutions, in FY2022, MHT team also commenced construction on its pilot black mass recycling facility at Goslar, Germany. The results from the pilot plant once constructed and operational will be used to finalize the technical design and bankable feasibility study for moving forward with commercialization of the project. From a design perspective the facility in commercial operation is expected to be scalable to enable multiple facilities to be completed and enable localized recycling of black mass in respective legal jurisdictions directly meeting expectations of geo-political regionalization of recycling in future.

### Operational strategies for sustainable competitive advantages

In addition to riding the growth waves, MHT has been continuously applying the concepts of sustainability for its operations in Vietnam, Germany, Canada and China. In FY2022, we delivered on various operational initiatives to achieve cost efficiencies including but not limited to raw materials, mining, processing, maintenance costs and general corporate overheads.

In order to achieve the mutually beneficial outcome in terms of security of supply and cost to the business, MHT monitors and optimizes the consumption of major consumables and ancillary services required for its operation while currently developing strategic partnerships with suppliers, contractors and other service providers. We are also working to develop in-house solutions for selected critical services required for our operations in Vietnam and Germany, either through organic or inorganic routes.



# SUSTAINABILITY PERFORMANCE REPORT

Sustainability Framework

Improved Sustainability Governance Structure

Energy Management Committee

Sustainability Innovation

Sustainability Mining & Raw Materials

Sustainability Processing

Sustainability Supply Chain Management

Sustainability Human Resources

Sustainability Health & Safety

Sustainability Security

Sustainability Environment

Sustainability Community





## 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 with aid of a document which outlines clearly and transparently 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

Sustainability means more than taking responsibility for one's environment, employees and supply chains. It must take all stakeholders into account, as well as compliance with applicable laws, regulations and guidelines.

As a global company, Masan High-Tech Materials (MHT) bears a high level of responsibility to all its stakeholders including customers, employees, investors and the communities in which it conducts business. This was summarized in the first joint Code of Conduct of the MHT Group in 2022.

The employees of MHT are taking all reasonable and necessary steps to comply with the Code, the law, as well as Company policies and procedures.



## Code of conduct - the basis for our success

### 1 Fair Competition

MHT is committed without reservation to fair competition and to fair contracting practices with its business partners. Any forms of collusion, or coordination that result in the unfair advantage for one party are prohibited among competitors, as is the abuse of a dominant market position.

### 2 Business and financial records

Documents, including those in electronic form, are the property of MHT and are kept secure. Personal data is treated with the utmost care and in strict confidence. MHT's financial reports are prepared in accordance with the relevant legal requirements and internationally accepted accounting practices and principles. All necessary measures to prevent money laundering are taken within MHT's sphere of influence.

### 3 Compliance with International Commercial Law and Provisions on Exports

MHT complies with all international agreements, conventions and treaties, as well as national laws controlling trade and financial transactions, and consistently monitors compliance with international and national export control laws.

### 4 Company assets

All employees are similarly responsible for the protection of MHT's material and immaterial assets. Particular importance is attached to the results of scientific research and technical developments, such as inventions, patents and other know-how. It is prohibited to disclose company and business secrets to third parties in any form. Third-party confidential information that is within MHT's responsibility must also be protected with the same care.

### 5 Conflicts of interest

MHT has a zero-tolerance policy for bribery and corruption. MHT does not enter into business relationships whose existence or desired scope is dependent on the payment of bribes. At MHT, preventing corruption also means obtaining information about business partners in advance. Business decisions on behalf of MHT may not be influenced by the acceptance of advantages or the granting of benefits and privileges ("perks").

### 6 Behaviour toward Government Agencies Cooperation

The Company is committed to complying with all laws and legislation regulating its businesses. Therefore MHT is dealing with all relevant government agencies cooperatively and with an open approach. If an employee learns that a government agency, legislative body, or other authorized institution, is conducting an investigation of MHT, the legal department must be informed immediately.

### 7 Environmental Protection and Safety

MHT and its employees bear responsibility for protecting people and the environment in accordance with all legal and regulatory requirements in the relevant jurisdiction, as well as international industry practice. The Health & Safety, Environment, and Quality policies are the primary guide for all employees on these matters. Safety is the top priority in all dealings involving products that pollute the environment. Additionally, every employee shares the responsibility for ensuring the occupational safety in their area.

### 8 Labour and Employment

MHT does not tolerate discrimination or harassment, abuse or corporal punishment in any form, whether by business partners, candidates or applicants, or employees. Furthermore, MHT has a zero-tolerance policy towards any form of forced labour, modern slavery or the most severe form of child labour.

### 9 Behaviour towards Suppliers of Raw Materials

MHT is working together with partners whose stance on ethical, social and environmental policy matters is consistent with that of MHT. For this reason, all suppliers of raw materials have to prove that all applicable guidelines laws and regulations, like the OECD Due Diligence and EU regulation for conflict raw materials are complied with and that they are in possession of all of the necessary permits, authorizations and approvals. Furthermore, all parties involved in our supply chain commit to complying with our purchasing guidelines.

### 10 Ensuring Compliance

MHT does not tolerate any legal violations whatsoever and consistently complies with the guidelines and rules described. Therefore compliance with this Code of Conduct, the law and Company's policies is subject to regular reviews, executed on behalf of the executive management by the supervisors.

### 11 External Relations

MHT has a policy on how to deal with external stakeholders and who is authorised to communicate with them. Therefore, in all matters concerning the company, employees who do not have authorization must avoid giving the impression that they speak on behalf of the company.

### 12 The Compliance Organisation and Contact Persons

Your Line Manager / Supervisor is the first point of contact for any questions you may have regarding the Code of Conduct. If the matter concerns your supervisor him or herself, you can contact the HR department or your next higher supervisor.

The Executive Management Team performs the corporate compliance function in the MHT Group. A member of the Team is your contact person for any questions you may have regarding the Code of Conduct. Inquiries can also be made anonymously, and all reasonable efforts are made to maintain confidentiality, although MHT is, of course, obligated to initiate investigations and comply with the law and support law enforcement.

If you have specific legal questions, particularly regarding whether certain actions are lawful, please contact the appropriate Legal Department. MHT guarantees that no employee will be subject to discrimination, retaliation or any other adverse treatment based on the employee having made a report in good faith.



## Sustainability Goals reflected in HCS Policies and Regulations

Our vision is to be the leading integrated supplier of advanced 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.

### 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.

### 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

### 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)
- Eco Management and Audit Scheme (EMAS)
- 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 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 Sustainability Team at the site Goslar.

The combination of these topics served to prepare the validation of the Goslar site according to the criteria of the Eco- Management and Audit Scheme (EMAS), the world’s strictest environmental management system.

The validation was successfully passed in September 2022. Registration with the Chamber of Industry and Commerce was applied for. 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.

The focus of sustainability management at H.C. Starck Tungsten GmbH is on climate strategy (mainly CO<sub>2</sub> 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 employees or 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 of our companies in a sustainable manner.

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

- Site Management
- Operations (Technical Services, Production)
- Maintenance; Process Control Technology
- Sales (Sales, Business Development)
- Procurement
- Technology & Innovation
- Controlling
- HSEQ Management
- Materials Management

The Sustainability Team is assigned to the following responsibilities and authorities:

- Ensuring effective implementation, maintenance and improvement of the EMS
- Establishing and maintaining action plans that lead to continuous improvement in sustainability-related performance
- Establishing criteria and procedures necessary to ensure effective functioning and governance of the EMS
- Promoting awareness of the EMS and binding commitments regarding the EMS across divisions
- Delegation of tasks
- Planning of projects relevant to sustainability and monitoring of project implementation (schedule, time, cost control)

### ACTIONS IN 2022

- Installation of 17 EV charging points for refuelling employees electric vehicles in conjunction with a design competition on the 17 Sustainable Development Goals.
- For training sessions on the topic of “illegal waste disposal”, a mobile Escape Room was set up for several days on the grounds of Metallurige Park Oker (MPO), where H.C. Starck Tungsten GmbH is also located.
- Care of the forest area planted in 2021, such as cutting away raspberries and watering the planted trees.
- Adhering to the corporate climate protection network of the Association of German Chambers of Industry and Commerce.
- Validation of the Eco-Management and Audit Scheme (EMAS) by TÜV Nord.
- Open Day of Metallurgy Park Oker, with a focus on recycling and sustainability. In addition to exhibits on the recycling of tungsten, the possibilities of sustainable living were demonstrated in “Tent 17” in connection with the 17 sustainability goals.





## FOCUS 2023

- EMAS registration by the Chamber of Commerce and Industry
- Verification by a third party of the CO<sub>2</sub>e calculation based on Scope 1 & 2
- Launch of a project to calculate Scope 3 data - the goal is to determine Product Carbon Footprint figures in 2024.



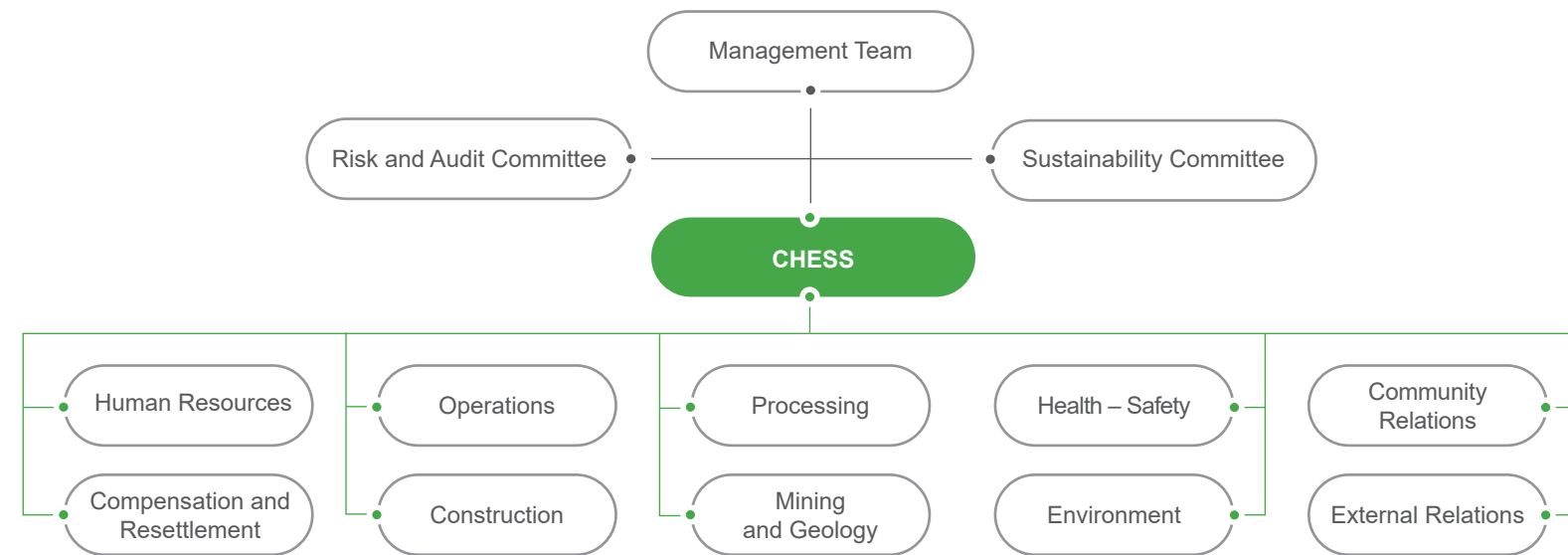


## IMPROVED SUSTAINABILITY GOVERNANCE STRUCTURE 2022

The role and influence of the CHES Committee (Community, Health, Environment, Safety & Sustainability Committee) in 2022 have been strengthened in all areas. The three key goals of CHES Committee including health and safety for employees, environmental protection, and community communication transparency continued to be drastically implemented and closely attached to the production and business activities of our company and contractors.

Members of the CHES 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 CHES 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 CHES Zalo group, and directly sending emails to CHES chairman and secretary for timely handling, combined with periodic meetings (monthly and quarterly) with the attendance of managers of the Company.





2022 was a very challenging and volatile year due to the geopolitical tensions and COVID-19 pandemic. With united efforts of MHT, each member of CHESSE Committee as a representative of different internal departments actively participated in the movements such as:



supporting the prevention and control of the COVID-19 pandemic



Coordinating with the professional Fire Fighting force to help local communities extinguish the fire



Participating in Blood donation; Voluntary donations



Participating in the emergency response and rescue to road accidents happened on the National Highway 37 near the company and in Dai Tu district



Providing internal training courses combined with other departments to inspect safety and environment in the areas as well as coordinating with the Firefighting and Rescue Police Department of Thai Nguyen province to conduct emergency response drills, etc.

In addition, the CHESSE Committee approves the “Monthly Safety Awards”, through which employees and contractors are recognized for their outstanding achievements, contributions, initiatives and typical hazard report in workplace safety, health and hygiene. This helps en-

courage our people to work relentlessly towards the goals of enhancing safety and clean environmental culture at the workplace to ensure “Everyone working at Masan High-Tech Materials returns home safe and healthy every day”.



## FOCUS 2023

In 2023, CHESSE Committee members will continue to develop their personal capacity and act as a representative of the department in the fields of community, environment, occupational safety and health. Each representative speaks on behalf of their department, raises outstanding issues for the Committee to address in a flexible and timely manner.





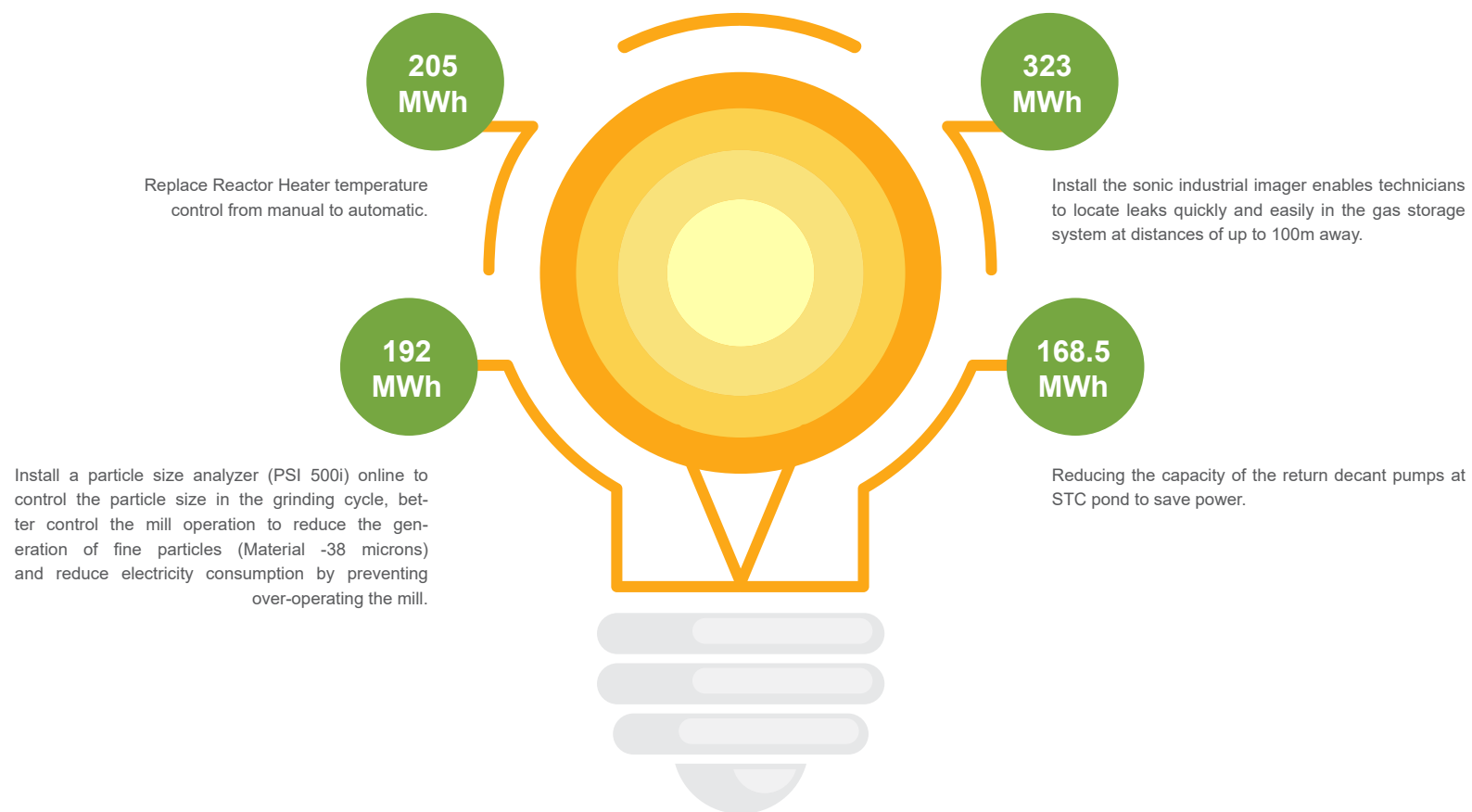
## ENERGY MANAGEMENT COMMITTEE

### Energy Management Committee at NPMC and MTC

The Energy Management Committee has been operating since 2019 to implement and monitor energy management activities with the aim of saving and using energy efficiently and effectively. In 2022, the Energy Management Committee held regular monthly meetings to discuss the implementation of savings targets as well as develop solutions to use energy more efficiently and save costs in the long run.

### NPMC – Estimated savings reach 888.5 MWh

In 2022, the production, maintenance and repair processes at NPMC were optimized by implementation of numerous solutions that yielded positive results. Total energy savings is estimated at 888.5 MWh, equivalent to 3,199 GJ.



### MTC – Successfully applied ISO 50001:2018

In 2022, MTC established and obtained certification for an energy management system in accordance with ISO 50001:2018. The application of the ISO 50001:2018 will be a prerequisite for controlling the use of energy in a strict, sustainable and systematic way in order to develop energy saving solutions.

MTC has applied a number of simultaneous solutions such as: Using trial process instead of hot water for the second wash of secondary filters to reduce the amount of steam used and load for LPI chiller; and Utilize the excess steam from condensate water to heat boiler feed water. As a result the company saved an estimated 3,114 MWh.

### FOCUS 2023

- Maintain energy management system according to ISO 50001:2018 at MTC
- Install power meters for high-power consumption equipment at MTC for tracking and control
- Implement, test and research solutions for saving energy: change the large size circuit of the crusher to the small size circuit to reduce energy consumption; Rooftop solar power...





## HCS ENERGY COMMITTEE

The site in 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 50001:2018, 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. Previously, an energy team was founded in 2019, headed by the Energy Management System Officer Andreas König in order to meet the requirements of ISO 50001:2018.

The Energy Team is assigned the following responsibilities and authorities:

- (a) Ensuring effective implementation, maintenance and improvement of the EnMS;
- (b) Implementing and maintaining action plans that result in continuous improvement of energy-related performance;
- (c) 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 interoperation energy team led by the Energy Management System officer, as well as the department heads, are responsible for ensuring that all employees receive further education and training on a regular basis.

The energy team is mainly composed of people who are familiar with our company's energy-intensive processes and technologies. Their knowledge shall be used to positively influence energy consumption within our subsidiaries in the long run.

The energy team's projects in 2022 were:

- Start heat recovery from roasting process - Completion planned in Q2/2023
- Tank insulation in the chemical plant - First calculations after completion of the project show savings of 6-7 tons of steam per month (84 tons of steam per year result in a saving of 69,491 kWh)
- Installation of steam measuring sections for chemistry - Completed.
- Optimization of the heating systems in administration buildings – ongoing in 2023
- Procurement of a hydrogen burner for reduction. Installation by the end of Q1/2023
- Throughput increase on extruder / belt dryer
- Idea start for the installation of the Triple Helix in a rotary kiln
- A PV concept was created and discussed.

Our operational and ISO 14001 environmental component targets emphasize Sarnia's efforts to conserve energy and reduce waste, specifically improving auxiliary gaseous streams and electricity use.

Significant improvement in energy consumption has been achieved by altering production scheduling to strategically optimize and balance power demands. All upgrades or replacements of current equipment, whether new or used, must take energy factors into account.

## FOCUS 2023

Heat recovery from roasting process

Replacement of control air compressors

Measuring point concept

Capacity expansion at the rotary furnace using AI (TIG Project)

Energy efficiency (TIG Project)





## SUSTAINABILITY INNOVATION

In 2022, 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 green 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, environmental impacts and contribution to the green economy.

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 alternative 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 as well as monitoring global megatrends. In 2022, 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.

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.



## Improving Recycling Capability

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 and establishes a circular economy. In this regard, below are some of the research and development activities undertaken by Masan High-Tech Materials in 2022 to increase the effectiveness and efficiency of its current and future recycling capabilities.

### Optimization and Expansion of Scrap Pyrometallurgical Digestion

From a business and sustainability perspective, the company is aiming to further expand our recycling capabilities and with MHT's strong belief and commitment to the establishment of sustainable green circular economies. The company has made the decision to construct an additional tungsten scrap recycling facility in Vietnam.

Market competition for sourcing and procuring high quality tungsten scraps continues to increase and recently exacerbated during the current geopolitical environment. 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 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. To further improve and accelerate research in this area MHT has started to develop a lab-scale and pilot-scale testing area within the MHT's Vietnam R&D facilities to complement those already in place in Goslar. This new equipment will further increase MHT's capabilities in performing advanced research in this area and recycling more diverse scrap materials.

### 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.



Tailings Dam for recycling



## More Efficient Production and Auxiliary Consumption

To remain competitive and sustainable as a company, MHT must always be investigating and developing innovative processes which have higher capacities, higher efficiencies and consume less auxiliaries. During 2022 as with past years MHT remains very active in this area.

### More efficiency in developing high-purity sodium tungstate (ST)

With special requirements from customers for high-purity ST products with very low impurities, research activities have been performed in the laboratory to develop alternate methods for producing this product with the mindset of improving efficiencies and producing high-quality ST product. A research project to evaluate the method of producing high-quality product using an internal byproduct tungsten stream was undertaken and resulted in an innovative process alternative for retreating the material in just a few simple steps to produce the required high-purity ST. The resultant product is sold directly as a final product with high quality as per customer requirements which negated the stream being recycled back to the start of the process. The new process has been applied and operated on an operational full scale basis with benefits such as reducing reprocessing costs, producing a high-quality product, and increasing plant capacity.



### Improving raw material flexibility

To develop a sustainable business within the tungsten industry there is a growing requirement to produce high-quality tungsten products in large quantities from changing and more complex feed materials. As such one of MHT key activities is constantly evaluating the new and different raw materials and either optimizing existing processing parameters in the leaching and purification parts of the process or developing new and innovative ways to treat the material efficiently and effectively. During 2022 a number of new complex feed materials were accessed and the existing process successfully adapted and optimized or new processes developed to enable the treatment of these materials on a production scale greatly increasing the diversity of the plants feed materials. Further to this, new technologies such as ion exchange were investigated on a laboratory scale to evaluate their effectiveness. Initial results showed potential and will continue to be evaluated in the coming year.



### Production reliability in a global crisis environment

The global political climate continued to greatly impact auxiliary supply chains and created issues with both availability and pricing. A significant portion of time was spent within the R&D departments focused on securing access to crucial auxiliaries and raw materials required to support our highly specialized production processes. The R&D work is comprised of evaluating new suppliers of the auxiliaries as well as the evaluation of potential new alternatives. This work enabled production and product quality to continue unhindered.



### Recycling Wastewater

In times of climate change, water is also becoming scarcer throughout the world. It is therefore important to reduce the use of fresh water in our production processes. In cooperation with a renowned German and Vietnamese research institutes, the company is investigating opportunities for recycling process wastewater in our production. This is intended to create a closed loop for the water that is used in the process. In addition to reducing the amount of fresh water, it may be possible to use heat recovery through innovative technology and thereby reduce energy consumption as well. Furthermore, chemicals contained in the wastewater can be recovered and reused in the production process.





## 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<sub>2</sub> 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 commissioning and optimisation of membrane concentration technology with the company's Ammonium Meta-tungstate (AMT) production process took place in 2022 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 several hundred tonnes of CO<sub>2</sub> emissions each year. Anticipated growth in this product area will only continue to improve the reduction in emissions.

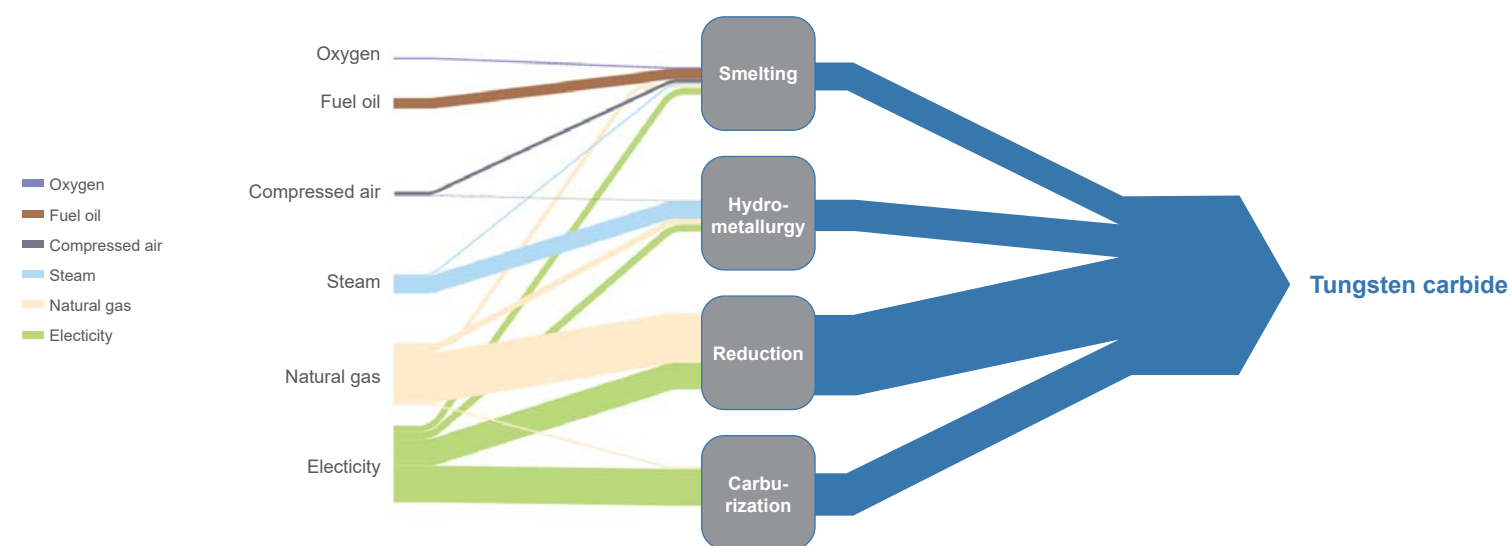
### Participation in Global Energy Reduction Programs

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.

Following the effort to decrease the global energy footprint Masan High-Tech Materials in combination with other industry leaders, universities and research institutes continue to cooperate within the German government sponsored "Innovation for Energy Revolution" program. The project investigates innovative technology to increase the energy efficiency of the hard metal production process from ore/ scrap to finished tools.

The energy demand of approx. 22 kWh/kg of product was determined in our first analyses of the energy consumption of Masan High-Tech Materials' tungsten Carbide (WC) process in Goslar, which is already roughly 20% lower than comparable non-Chinese WC production in literature. By gaining deeper insights in the energy demand of each single process step, the significant energy users were identified, which includes the reduction of tungsten oxide to tungsten metal. Thus, a close cooperation with computational specialists was set up to further develop our rotary furnaces and improve their energy efficiency. This cooperation proved to be very fruitful and the realization of the developed solutions is planned for 2023.

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 not only been certified in the areas of ISO 50001:2018 and ISO 50003:2016 for energy management but also obtained the certificate following the Eco-Management and Audit Scheme (EMAS).



Energy consumption HCS Tungsten carbide process

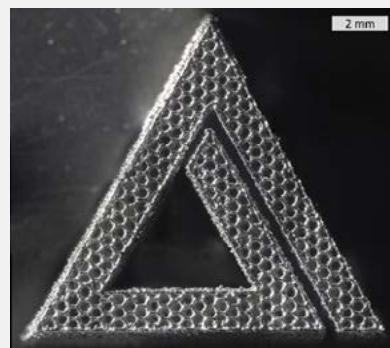


## More Sustainable Products and Processes

### Additive Manufacturing

Additive manufacturing (AM), also commonly known as 3D printing, is the direct construction of a three-dimensional object from a digital model. Conventionally, three-dimensional objects are produced subtractively, e.g. via machining of casted metal blocks. Conventional machining produces a lot of waste, as excess material needs to be removed from the object. AM constructs objects additively, thus layer by layer. Ideally, the material is deposited in a way that makes additional machining unnecessary. This saves a lot of the valuable material and is considered to be a real game changer for the sustainable production of parts.

For this purpose, MHT have developed and qualified two different tungsten metal powders with support of the well-known Fraunhofer ILT, Aachen, Germany. These two products, one dedicated for the Laser Powder Bed Fusion (LPBF) technique, the other one dedicated for the Electron Beam Melting (EBM technology), allow people to use tungsten to construct parts generating less waste. Both powders have been released within a dedicated product line called starck2print®. We are working on expanding this product line with more specifically tailored materials as well as with newly developed tungsten carbide powders.



Honeycomb structure printed with starck2print® metal powder via LPBF

### Material Development for Fusion Reactor Shielding

Fusion power generation is proposed as one potential alternative to reduce the human dependency on fossil fuels. This technique utilises the heat energy which is released when two lighter atomic nuclei are combined to form a heavier nucleus. While nuclear fusion as a source for energy has been investigated since the 1940's, major technical challenges have prevented its commercial use up to now. Only recently and for the first time in history, the US National Ignition Facility has managed to generate more power from the reaction itself than they have invested into the activation of the reaction.

Tungsten with its outstanding physical properties is a key material for bringing fusion power generation into reality. For example, tungsten metal composites are used as plasma facing materials in current setups. There is also a huge potential for tungsten carbides and tungsten borides to be used as heat and neutron shielding components applied in current and future fusion reactor setups. For this reason, we have partnered up with the Imperial College London and other partners to develop new materials enabling fusion power generation. A key question is, how certain promising powders can be produced in larger scales and with sufficient quality, because some of the common trace impurities of commercial tungsten powders may form long-lasting radioactive wastes if irradiated with neutrons. The collaboration with Imperial College London will include co-funding a PhD position dealing with this topic.

## 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.

The company is 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.

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 second Chairman on the board of REWIMET.



## Taking Part in the Global Megatrends

In the search for sustainability, the world strives towards an electric future. This includes the electrification of most technologies including almost all mobility solutions. This in conjunction with Masan High-Tech Materials' endeavour to expand its recycling horizon beyond its current capability within the tungsten space, seen the company continue to progress its Black Mass recycling project with the commencement of initial engineering and piloting test work of its innovative recycling process. Black Mass is a mixture of active materials from lithium-ion batteries and the main ingredients we aim to recycle from this black mass are for example cobalt, nickel, manganese, and lithium.

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. ChemiLytics, which is also a member of the Masan High-Tech Materials Group, is a knowledgeable and experienced analytical partner in black mass 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.





## 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 sufficient fresh ore for the processing plant and to explore revenue generating opportunities in order to produce sustainable mining outputs.

In 2022, the M&G team mined roughly 6.67 million bank cubic metres (MBCM) of material, yielding 3.45 million tonnes or 1.06 MBCM of mineral ore at a strip ratio of around 4.8 (BCM waste/BCM ore). All mining operations complied with required environmental and community standards.

### Mining

- Complete drilling programs to monitor possible contaminants in the water table
- Complete all required grade control drilling to allow accurate planning/input to the process plant system
- Maintain consistent feed grade to the mill in line with the plan
- Continue to optimize waste dumping strategies by categorizing waste products based on sulfur content, soil parameters, etc. In the following years, high Sulphur wastes will be dumped into mined-out pits and encapsulated in surface waste dumps. Low Sulphur materials will be used in the Tailings Storage Facility development, for road construction and encapsulation. Efforts will also be made to reduce the disturbed footprint and to ensure dumps are rehabilitated upon completion.
- Continue to monitor and develop the contractor by improving the maintenance and operational strategies used.



**6.67** million

bank cubic metres of material



**3.45** million tons

mineral ore



**1.06** MBCM

of mineral ore

## TSF

- MHT are committed to the prevention of hazards at tailings storage facilities that could lead to incidents affecting employees or communities, causing environmental damage and economic losses
- We adhere to the principles of effective risk-management strategies and responsible design, use, reuse, recycling, continual improvement of environmental performance, and disposal of products containing metals and minerals
- We adhere to the mine waste and tailings regulations established by the Ministry of Natural Resources and Environment (MoNRE) and the Ministry of Industry and Trade (MoIT)
- We are committed to implementing the requirements set by the Global Industry Standard on Tailings Management (GISTM) developed by the PRI, ICMM, and UNEP
- We ensure that TSF management complies with all the applicable regulatory requirements of the local jurisdiction and corporate standards
- We apply the appropriate risk management approaches to TSFs
- We take geographical conditions into account during TSF management
- We follow regulatory requirements and hold public hearings to inform/get feedback from local communities on plans to build TSF and their operations to minimise their environmental and social impact
- We improve safety and reduce risks wherever possible to ensure the safe management of TSFs
- We establish effective measures to ensure proper management during emergencies
- We only engage employees who are adequately trained and have the necessary professional skills to operate TSFs
- We constantly seek to improve our employees' professional skills by conducting regular training
- We continuously monitor the quality of discharge water and that of local water bodies to ensure competent, socially, and environmentally responsible management of Acid Rock Drainage (ARD).





## Raw Materials

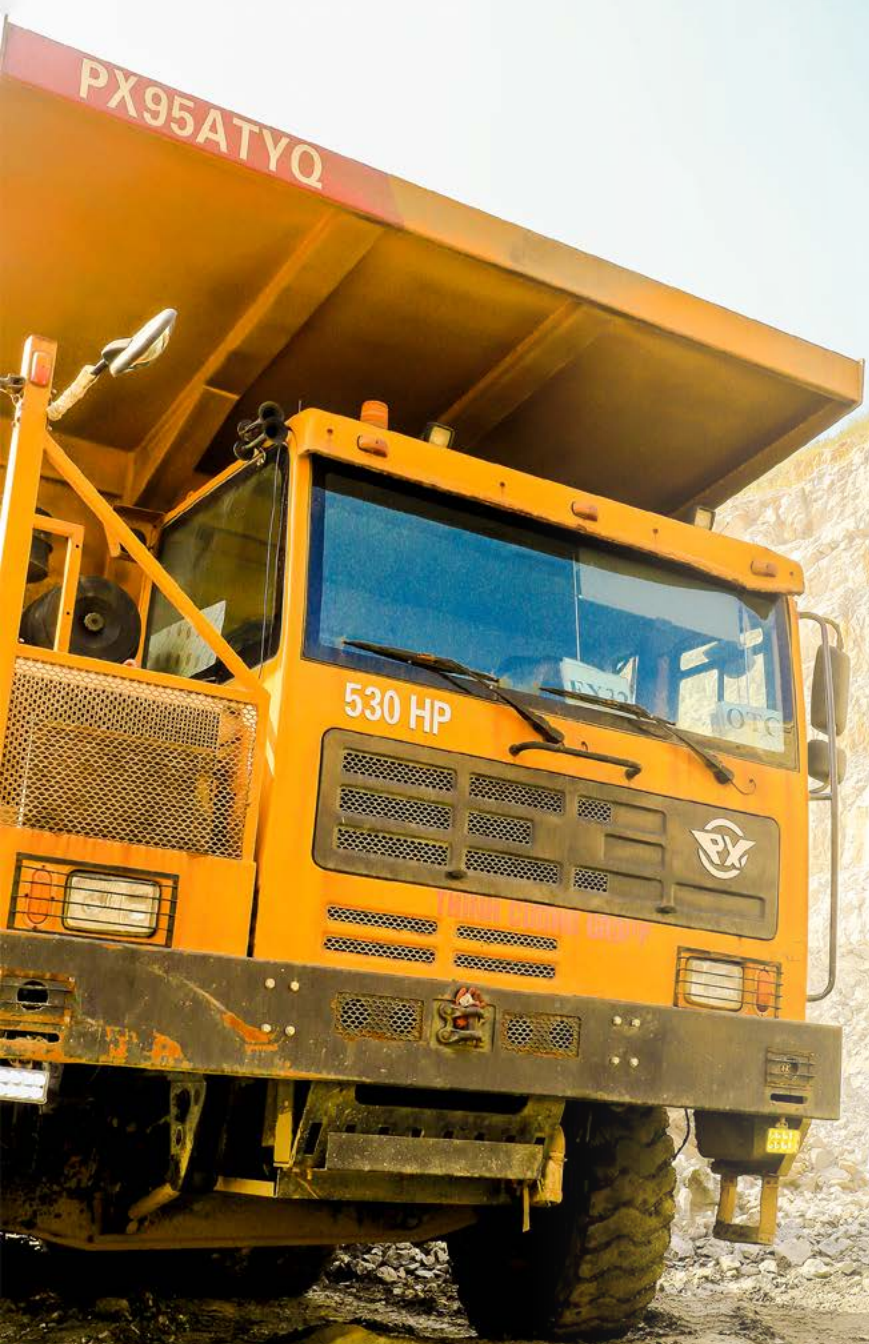
H.C. Starck Tungsten Powders' raw material sourcing is based on two principles: the continuous expansion of recycling activities and a fair, ethical, and environmentally friendly raw material sourcing.

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, ores, and gold originating from conflict-affected and high-risk areas".

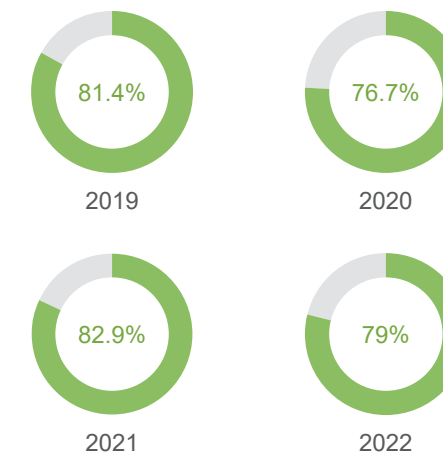
Before starting new business with a supplier, there is a detailed check by the procurement and the legal department to confirm that this potential supplier fulfils all legal requirements and the requirements of the RSCM process. This check is repeated on a regularly basis during the whole time of the 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 (three-year audit cycle, so the next audit will be in 2024). 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 from Masan High Tech Materials and within the scope of a swap from another, selected supplier, the site in Ganzhou is currently supplied by JV Partner in Ganzhou.

The global end-of-life recycling rate of tungsten is approximately 30% and, thus, belongs to the top third of the recycled metals. With our highly efficient recycling platform in Goslar we cover approx. 80% of our raw material needs from scrap.



Recycling rate of raw materials - Goslar site



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



## Focus 2023

In January 2023, the German Act on Due Diligence in the Supply Chain “Lieferkettensorgfaltspflichtengesetz (LkSG)” came into force. Even though the site in Goslar is not directly affected due to its size (less than 3,000 employees in Germany), a few obligations of customers who have to comply with the law can still be delegated to H.C. Starck Tungsten GmbH in Goslar.

It is expected that in the future we will be affected by a corresponding European regulation on the subject of due diligence obligations in the value chain, which in essence sets similar requirements to the LkSG. We are therefore planning to implement the LkSG at the Goslar site as part of a voluntary commitment in order to be prepared for the future.







## SUSTAINABILITY PROCESSING

In 2022 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 Vietnam 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.

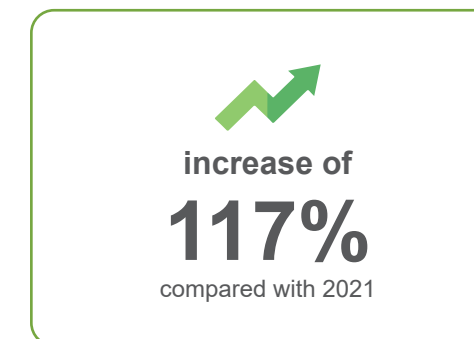
In 2022, Masan High-Tech Materials replicated the previous year's recoveries of tungsten and bismuth, as well as exceeded the previous year's recoveries of copper and acid grade fluorspar whilst transitioning from the ore bodies from the East to the West

pits with lower head grades. In the year the construction of the Oxide Expansion Project commenced which will ensure that both recoveries and throughputs will be sustained whilst processing lower grade ore whilst transitioning to the larger orebody in the Western pit. Commissioning of the Oxide Expansion project will commence in the first quarter of 2023 and is scheduled to be completed in the second quarter of 2023. Additionally, construction of the Site Water Treatment Plant commenced in 2023 with commissioning scheduled for the first quarter of 2023. The Site Water Treatment Plant is to treat additional water flows from the mine expansion to comply with the environmental discharge license limits.

### Improving production efficiency and the ability to process a wide variety of variable grade and sustainably sourced feed materials

In 2022 MTC focused on optimizing operation efficiency, maximizing process of low-grade materials to maximize resource utilisation. A total of 1,125t of  $WO_3$  from low grade tungsten concentrate by-products from NPMC were processed to high value products during the year, an increase of 117% compared with 2021. Commissioning of a Low-Grade Batch Tank will commence in Q1 2023, facilitating easier feeding of low-grade materials into the process. Additional improvements to the MTC process included optimised impurity removal capacity which permits process-

ing of a wider variety of external tungsten concentrates primarily from recycled scrap sources. These alternative sources provide a greater variation in feed materials from sustainable sources to compliment the mined high-grade and low-grade concentrates. Ongoing sustainability projects focused on improving the energy consumption efficiency with minimizing leach reactor cycle times, upgrading feed & discharge control automation and minimising steam consumption requirements.





### Advanced Management Software

At MHT, we use cutting-edge processing technology and all processed products, including Tungsten, Bismuth, Fluorspar, and other products, are recognized by the Ministry of Industry and Trade as key industrial products. Especially, MHT is the only mining company in Vietnam that adopts the world's advanced mining and processing management software to minimize resource losses and optimize the value of mineral resources by operating the German technology-based Tungsten chemical production line.





## HCS processing

### Sustainable Processing in Goslar

#### 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 program 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. In 2022 a pilot project for implementing Total Productive Management (TPM) in practice was introduced and the first optimization has already taken place.

Every year, a maintenance and shut-down schedule is drawn up thanks to close collaboration between the sales, production planning and operations teams. This allows both resources and materials to be used in specific areas, and unplanned downtimes in the facilities have been significantly reduced. In addition to the TPM project, new roles of maintenance, planners have been introduced to enhance the cooperation between Production planning operations and maintenance further.

This cooperative effort could reduce not only unscheduled shutdowns, but also energy usage. Using optimised displays, the consumed energies can be visualised more transparently, and change effects are immediately visible.

Additionally, the process control systems were upgraded to prepare for new challenges in terms of IT security, availability and optimisation of the equipment and processes. New standards in the programming of the control system were introduced for this task. The adoption of this

modular system ensures standardised programming, which also helps reduce 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.

### Sustainable processing in Sarnia in 2022

Sarnia Canada is focused on developing technological solutions for our current and future product portfolio. This includes detailed analysis to introduce state-of-the-art technology for advancements in efficiency, sustainability, and life cycle longevity.

Transitioning complex manufacturing processes to the latest technological SCADA control and automation has permitted immediate productivity improvements in troubleshooting and downtime, due to achieving real-time process control. This also enables expanded understanding and knowledge from data acquisition to continuously improve long-term efficiency and performance simultaneously across multiple disciplines.

With expanded process data accessibility, the complexity of improvement to the current high performance best in class will continue to outperform for a sustainable and extended life cycle.

### Sustainable processing in Ganzhou in 2022

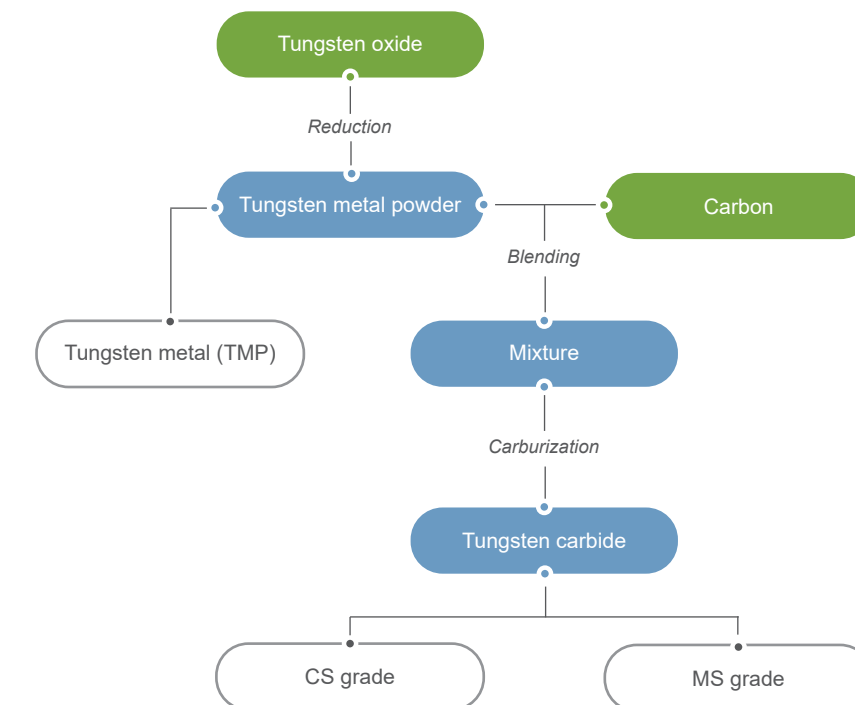
#### Sustainability processing

Using Tungsten oxide as raw material, undergoing reduction and carburization, the CS grades and MS grades products are produced by different equipment and different process parameters. Normally, CS grades products are suitable for cutting tools and MS products for mining solutions.

Despite facing significant challenges in 2022, such as city lockdowns due to the pandemic and sluggish downstream demand, the Ganzhou plant successfully managed to still achieve relative high levels of production and sales volume, while maintaining profitability. The plant's success is attributed to management's implementation of measures to enhance production efficiency, to optimize the supply chain, and to ensure employee safety during the pandemic.

Aiming to improve overall equipment management and increase the work efficiency of the maintenance team, a new program named EAMic for "Equipment management" is tested. This program covers equipment and asset management, maintenance documents, automatic scheduling of preventive maintenance plans, work order management and even spare parts management. It is also a powerful program to generate technical, managerial reports for all maintenance activities. Moreover, this program allows maintenance staff to work with mobile devices and bar code system, so that papers like the Inspection Checklist or maintenance worksheet can be saved. All information recorded via mobile devices and computers will be automatically saved in a local server and is transparent to all related authorities. This program can be connected to SAP and all data can be transferred into SAP for accounting purposes. It is not only in the language of Chinese but also in English, Germany and Vietnamese and is running based on international standards, which can be implemented in the whole group.

Processing flow at the Ganzhou site





## SUPPLY CHAIN MANAGEMENT REPORT 2022

2022 was the year that showed promising signs of an end to Covid-related restrictions and the possibility of a semblance of order returning to the world of Supply Chain within the NPMC and MTC operations. The Supply Chain Management (SCM) team had been working hard during Covid times, enduring many new challenges that they have never had to face before. However, despite the promising signs that lockdowns and restrictions were finally disappearing from our daily lives and that overloaded shipping lines and ports were starting to show signs of clearing, a new set of challenges were looming on the horizon to test the strength and sustainability of our SCM and its team once again.

The first challenge was China's decision to shut down industrial activities in order to clear the skies before the Winter Olympics and the second was the Russian – Ukraine conflict. These two major issues added new challenges for the team to overcome with many manufacturers seeing the cost of raw materials increasing and shortages of many other materials starting to appear as SCM departments around the world pushed the panic button and started the wheels in motion to stretch already burgeoning Supply Chains to new lengths.

Despite these and many other issues the Supply Chain Department continued to ensure that throughout 2022 both the NPMC and MTC processing plants received all required materials to operate at targeted production levels. They also made sure that the site maintenance team received all critical plant spares on time so they could continue providing the high levels of plant availability for which they are renowned.





### Inventory reduction



The increase in inventory levels and value at the start of 2022 due to concerns with manufacturer production lead times and shipping delays resulted in an increase in site safety inventories to cover for the longer delivery times throughout the Covid period of 2020-2022. Prices were rising as manufacturers continued to raise the costs of a number of the 32 reagents used in the processing facilities, as well as many of the crucial spares and consumables necessary to maintain the processing plants and activities working at peak efficiency. As we moved into the second half of 2022 and saw the backlogs at manufacturers and shipping lines starting to clear, plans were being developed as well as risk evaluations being conducted to start the process to bring down the safety levels of a number of reagents during 2023. Many business improvement initiatives were also developed to reduce inventory levels and subsequently the values for 2023 and beyond.

### Logistics initiatives



Our logistics team including inbound, outbound and site were kept busy with the many demands from all parts of the business and operations calling on them to perform to a level they had not been to before. The inbound/outbound team were using all their skills and knowledge to work miracles with our logistics partners to bring materials from all parts of the globe, including the many construction packages ordered by the projects team. In an effort to reduce costs we will be looking at how we can better utilize the rail and barging systems in Northern Vietnam in 2023 to move our finished goods and inbound freight in and out of the site. This will help reduce our reliance on road transport.

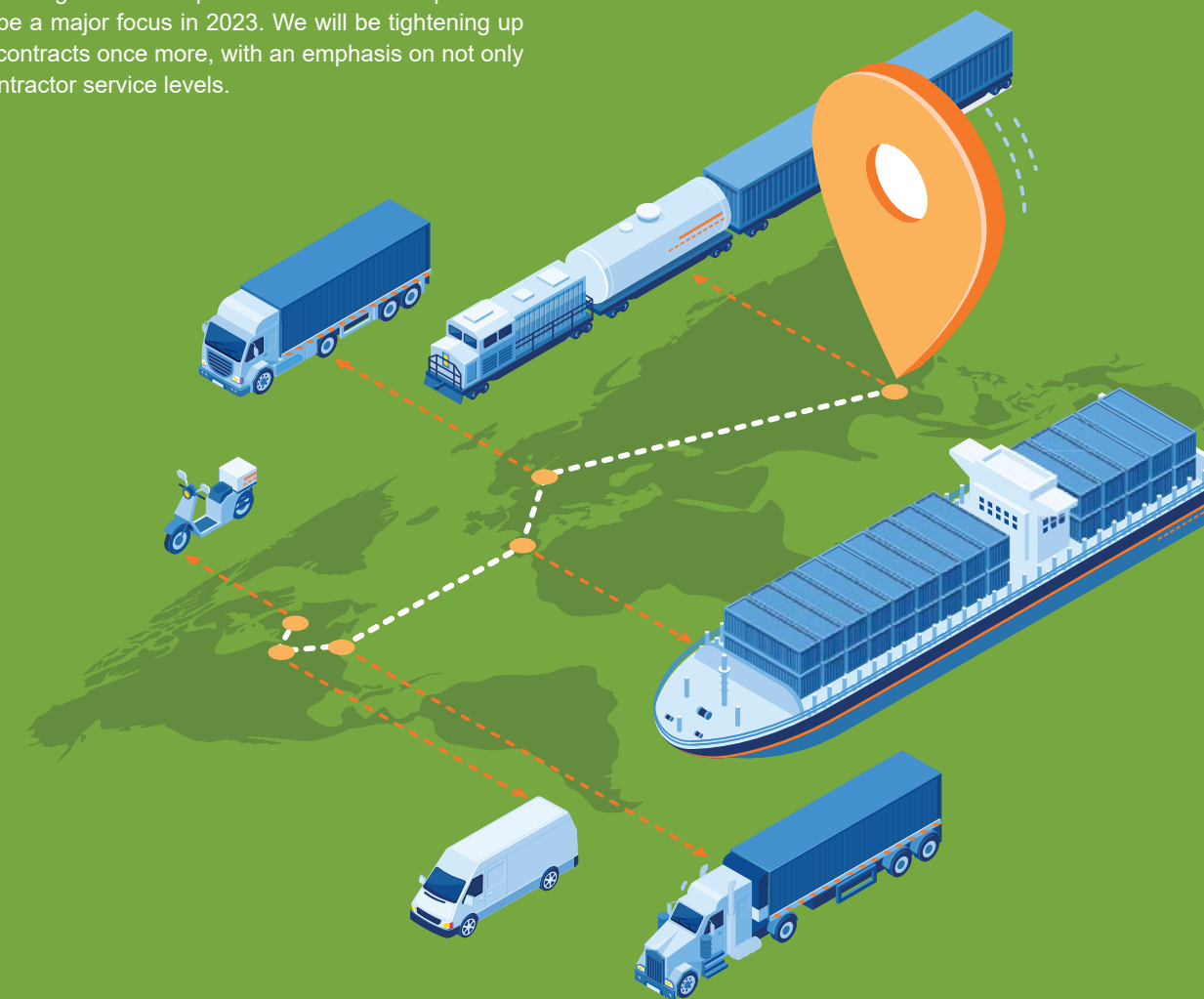
### Internal audit



SCM during the year was audited by both the internal audit and compliance teams. A number of issues were found within our processes and functions of the various areas of our Supply Chain. The SCM and IA teams have worked hand in hand to resolve the issues and build a stronger, more resilient and cost-effective SCM team moving into 2023 and beyond.

## FOCUS 2023

Tough conditions for Supply Chains over the last two years forced us to place some of the cost saving and streamlining plans for the SCM function on hold while we battled through the maze that was Covid. In 2023 our focus will be on cost reductions through inventory and vendor optimization, building up our Fixed Price Agreements coverage through the implementation of a sourcing department focused primarily on cost reduction. Our procurement team will be focused on process optimization and building a structure around their daily/weekly workloads to ensure we are putting more emphasis on expediting of orders already in the system as a way to improve inventory optimization. Contract management and optimization on both the processes and contractor selection will be a major focus in 2023. We will be tightening up on how we evaluate and award contracts once more, with an emphasis on not only cost but also management of contractor service levels.





## HCS sustainability within materials management global

### Logistics

One main focus in 2022 was to establish our own logistics team in order to be able to handle the inbound/outbound shipments independently from January 2023 onwards.

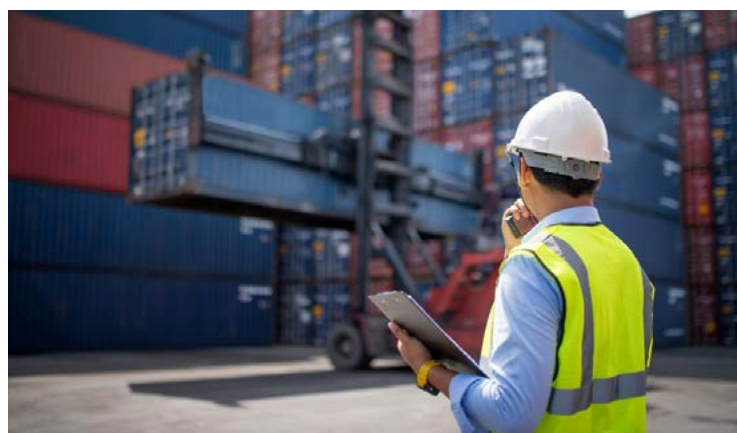
In the past, the logistics approach of H.C. Starck Tungsten included a large amount of outsourcing logistics services such as warehousing and shipping to a logistics service provider. Establishing the expertise and know-how of logistics within H.C. Starck Tungsten now allows us to review and evaluate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

2022 was marked by heavy congestion in the ports with an impact on the entire logistics industry. For example, in the Port of Hamburg the situation has been very tense for several months. In October the vessels had to wait up to one week for container unloading, customs clearance took up to two weeks, and in addition there was a shortage of trucks and drivers.

According to an official statement, the delayed arrival of containers or the fact that it is not always possible to find an optimal parking space for a container due to the increased capacity utilization also had an impact on other transport routes such as road and rail and thus on the entire logistics industry. At the end of the year, congestion in container shipping slowly receded at a high level.

### 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.

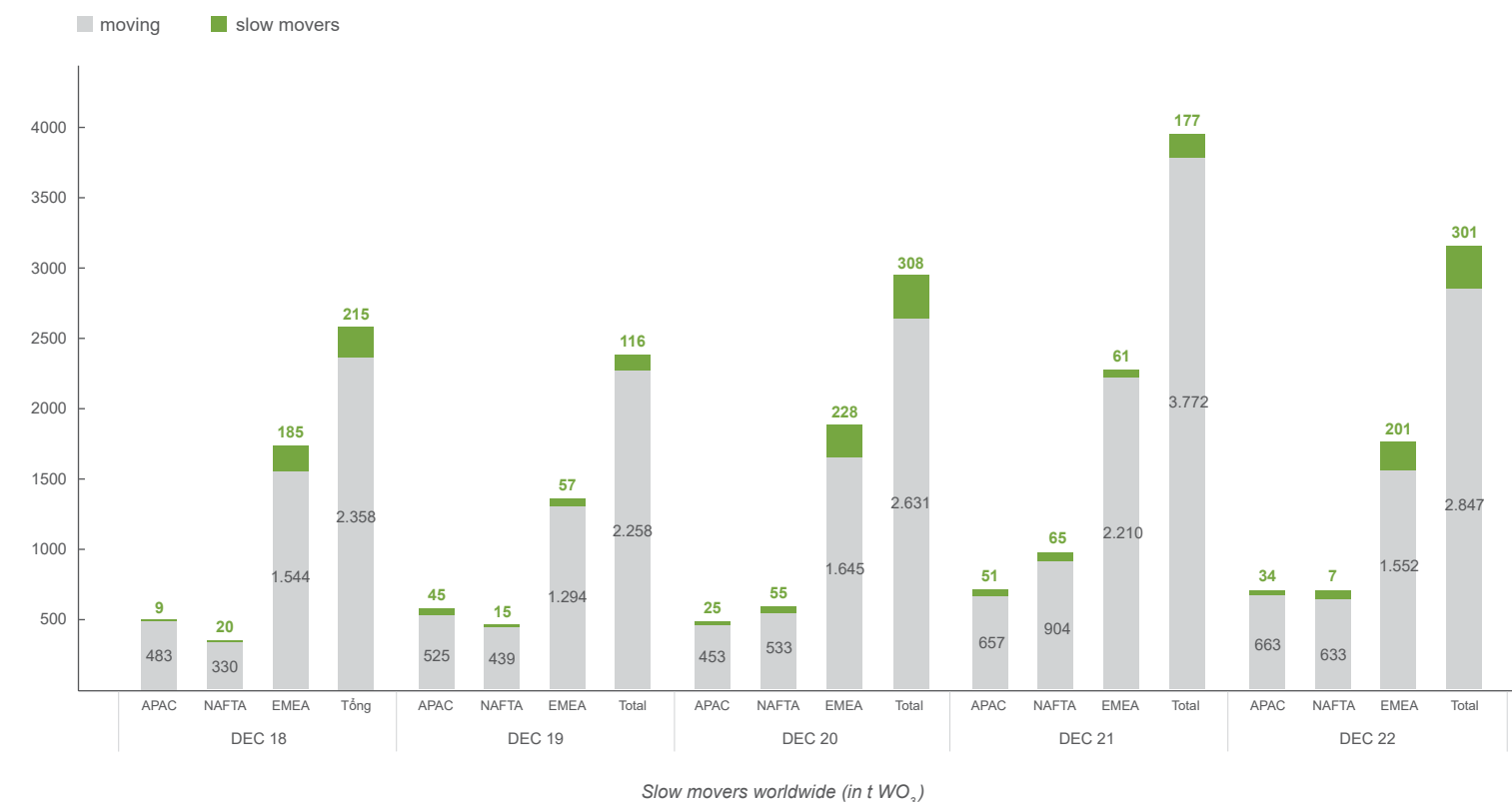


### Raw Material & Inventory Planning (RMIP)

The Covid-19 pandemic and its related effects on logistics, longer lead times and hence higher inventory levels to buffer against these supply chain disruptions have made it difficult to control slow-moving inventory (defined as no inventory turns for more than 90 days).

In 2022, we saw that deliveries to/from APAC took much longer compared to previous years. This had a direct impact on the on-time supply of raw materials to Goslar and Sarnia.

It is a major challenge to balance these framework conditions with on-time production and at the same time a stock reduction, which became decisive in the course of 2022 due to the global economic circumstances, especially in view of the war in Ukraine and the energy crisis in Europe. Cooperation with a real-time supply chain visibility platform to track shipments has helped a lot to stay up-to-date and make timely decisions.





## 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 2021 continued in 2022 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 13 percent in 2022 compared to 2021.

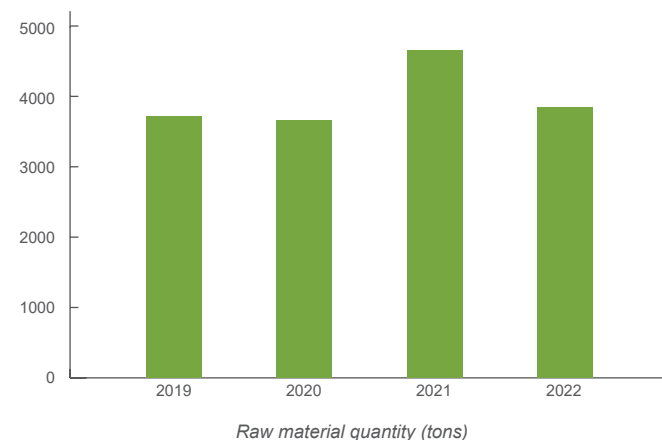
Air freight accounted for an average of 0.21% of the total volume handled from Goslar. That represents 3.7% of the overall freight costs.

## Technical Materials/ Equipment Procurement in Ganzhou

The lead time is incredibly long for 2022 due to the ongoing Covid-2019 and the unforeseen war in Ukraine. The Technical Procurement Department in Ganzhou has worked hard to ensure that all materials/services/miscellaneous and petty construction projects, excluding raw materials, were delivered in the right quality, at the right time, and in the right quantity to support the regular operation of equipment and production as required by every related department. Also, the technical procurement department was able to save ¥138.98k through negotiating a lower price and optimizing 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.

## Raw Material Procurement in Ganzhou



Although the sales order has been challenging during the Covid pandemic and its impact on the decline in demand for raw materials we managed to ensure a steady supply of raw materials, and the qualified rate of raw materials is getting higher.

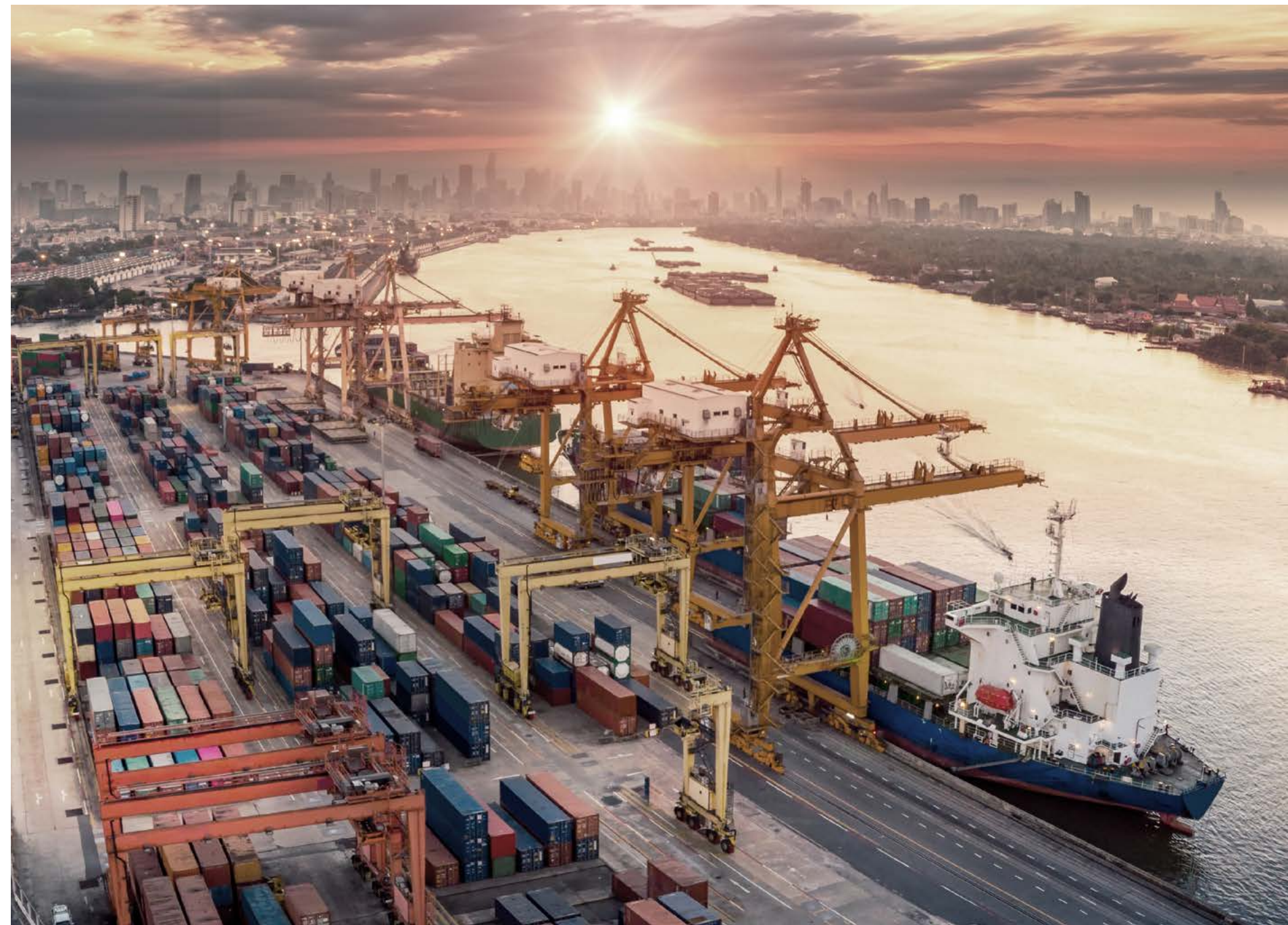
## Supply Chain Management in Sarnia

Pandemic challenges continued for the Sarnia site in 2022, specifically with regard to supply chain constraints and rapid inflation, requiring robust materials management from the Sarnia team to leverage critical supply and delivery relations

The increasingly challenging environment was countered with significant improvements to logistics tracking, supplier negotiations, and inventory control. This includes achieving a new successful and competitive long-term electricity and steam agreement that allows Sarnia opportunities to meet future carbon neutrality targets

Achieved a newly negotiated long-term service level agreement for electricity and steam

New logistical channels and gateways were developed to meet the challenges of new and increasing European customer base





## SUSTAINABILITY HUMAN RESOURCES

People are the key factor in the development of an organization, especially during the process of post-Covid19 business production recovery and growth. The world is strongly changing due to the impact of various factors, including change in economy, politics, society and technology. To adapt to such rapid changes, organizational building and development is strongly focused with specific actions to adapt flexibly and maximize the strength of human resources and make them truly happy in an engaged environment.

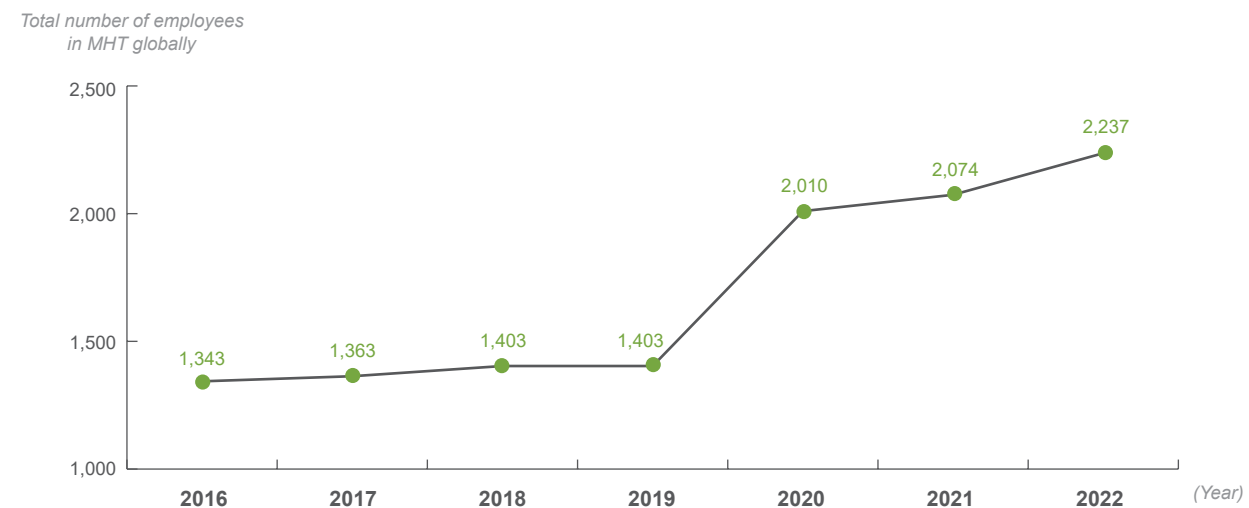
At Masan High-Tech Materials, we call it personnel reshaping, a key mission for 2022, to identify methods and human resources programs to create more value for the organization and employees.

With ongoing operation toward global centralization, we comply with the Code of conducts and core policies, including Human Resource Policy, Compliance policy, Commitment to responsibility and sustainability - four principles of our success, and External Relations Policy.



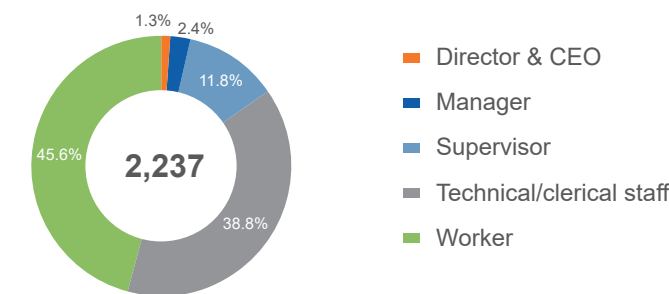
# WORKFORCE STRUCTURE

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



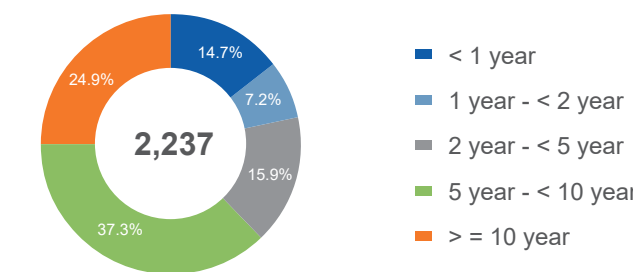
## BY RANK

The highest percentage in MHT's workforce structure is direct operators, accounting for 45.6%. Next, technicians and supervisors account for 11.8% and 38.8% respectively. Members of the Board of Directors and middle management account for 1.3% – 2.4% respectively.



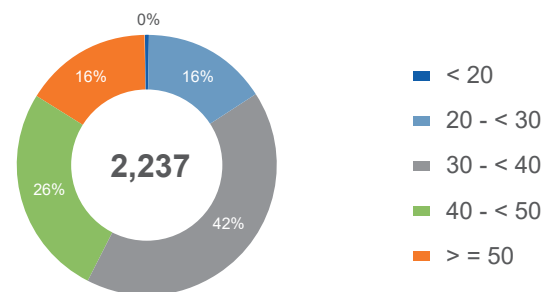
## BY LENGTH OF SERVICE

A friendly and engaging work environment helps attract and retain the employees. The length of service indicator has showed that 24.9% of the employees have worked at MHT for more than 10 years, 37.3% and 15.9% of employees have worked for 5-10 years and 2-5 years respectively, and percentage of new hired employees increased by 14.7%.



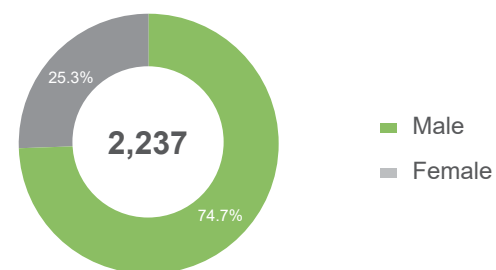
## BY AGE

The Company's employee age ranges within the golden working age, mostly from 30 to 40 years old, accounting for 41.7%.



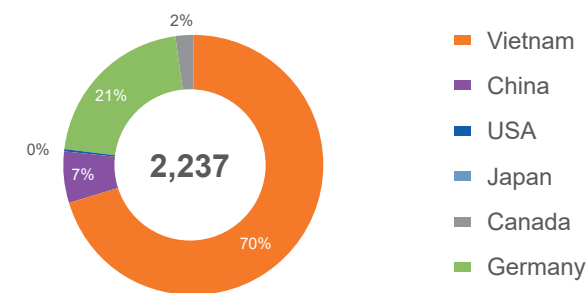
## BY GENDER

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 25.3% of the total workforce in 2022.



## BY COUNTRIES

With 5 processing plants and many business operations, representative 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.





Total number of employees and average income at MHT Vietnam:

YEAR	2016	2017	2018	2019	2020	2021	2022
<b>Total employees</b>	1,343	1,363	1,403	1,403	1,403	1,454	1,575
NPMC	1,027	1,072	1,150	1,157	1,096	1,133	1,219
MTC	316	291	253	246	307	321	356
<b>Of which</b>							
Vietnamese	1,236	1,261	1,303	1,309	1,329	1,394	1,516
Expatriates	107	102	100	94	74	60	59
<b>Average income (VND million per month) for Vietnamese employees</b>	<b>10.3</b>	<b>11.1</b>	<b>11.4</b>	<b>11.8</b>	<b>11.9</b>	<b>11.9</b>	<b>12.3</b>

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

## TALENT ACQUISITION, TRAINING AND DEVELOPMENT - A CLEAR HUMAN RESOURCES PATH

During implementation of the talent acquisition and development programs, MHT conducts small surveys on reasons why the talented have chosen to work for and engage with MHT. The main reason from the feedback is a transparent, honest and respected working environment. Talent acquisition is the initial important step to create a distinct competitive advantage of the business. Our know-how for effective talent recruitment, acquisition and retention is to build a skilled, knowledgeable, healthy and flexible workforce based on valuing people. In 2022, we maintain a flexible and effective online and offline recruitment methods; optimize recruitment channels, develop an external relations network with potential candidate groups; build a diverse, rich recruitment data system; establish a good relationship with universities, colleges, vocational training facilities, career orientation and job promotion centers through external relations, exchange and participate in job fairs etc. All of these activities help the Company quickly access young, potential candidates, especially building an employer image and branding, trust and attraction of the Company in a challenging and competitive labor market.

Being well aware of the importance of talent training and development, we are willing to invest in and accompany our employees in getting harmonized with the corporate culture, and adapt to work on the basis of employee respect.

In 2022, MHT has rolled out training activities by group and by job following learner-centered approach, while trainers are competent, qualified to teach and guide training activities to achieve expected outcomes. We continue to take advantage of the robust development of information technology and online training platforms to design learning materials, class management tools for various in-house training courses that bring new experience to attendees, including Awareness course on Internal Labor Regulations, Collective Labor Agreement, and IT Security Training Campaign, etc.

The trainers and trainees at MHT do not just teach or learn in the classrooms, but are directors, managers, engineers, scientists, accountants or purchasing officers, etc. in charge of daily management and expertise. They accompany the organization in building and developing an



active culture, continuous learning and look forward to improvement of each individual and team. Especially, together we and employees create a learning environment with the mentoring of leaders, commitment to accompanying and allowing for making and correcting mistakes with a lot of opportunities for learning and challenges.

Each and every MHT employee seems to be transplanted with a special genome containing 3 core values of "Respect, Innovation, Results." With this genome, we set out action plans, nurture and develop specific career path for each individual, create opportunities for them to shine based on their internal strength and our companionship, and together we create greater value on the journey of development of MHT.





### MHT in Germany

H.C. Starck in Goslar, the largest site in the HCS structure of MHT with around 470 employees, around 500 training hours in addition to the usual onboarding of new employees and on-the-job training activities for the year 2022. In addition, around 12,000 online training courses have been rolled out covering cross-cutting topics such as compliance, data protection and occupational safety and health. In addition to first aid courses and fire drills (around 500 hours p.a.), "Safety Days" are held on a regular basis. (around 1,800 training hours p.a.).

In order to counter the increasing shortage of skilled workers in Germany and to counteract the impending loss of elementary know-how and process experience due to the high average age of the workforce, the clear focus at H.C. Starck still is personnel development. In order to be able to increasingly develop junior staff from within its own ranks, H.C. Starck has once again significantly sharpened its strategy for the areas of training and qualification in 2022.



### MHT in China

In 2022, total professional training man-hours are 952.5 hours with 249 training sessions. A number of internal and external training courses for employees were conducted such as New Employee Orientation, Operational skill training, Equipment Training, Technology process Training, HSEQ Training, Processing and Maintenance Management, Confidential Management Regulation Training, special equipment operation training such as forklift, cranes, etc.

The Company further focuses on individual capacity building and leadership development, 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.

In the first step, the existing structure for the professional entry of young school graduates is to be further expanded both with regard to new job profiles and to cross-divisional knowledge transfer. In a further step, the topics of qualification and knowledge transfer are to be structured and developed more comprehensively in the overall organization. In order to remain a recognized market partner in HCS's industry segment in the future, issues such as sustainability, environmental protection and energy management are increasingly playing a differentiating role. These aspects will therefore also require more attention in the future in the context of training and continuing education.

In order to take account of these complex requirements, approval has now been given for a separate departmental structure focused on the development of these topics, which is to start work as soon as possible at the beginning of 2023.



### MHT in Canada

Training and employee development are indispensable parts in the human resource strategy, contributing to providing a safe and efficient work environment. Three employees attended management and leadership courses at the Canadian Management Center. It is a standard practice for all new hires to attend specific health and safety training provided by Industrial Educational Cooperative (IEC) and in 2022, 7 employees attended this course provided with outstanding support for learners and best practice approaches, which has met various training requirements and helped to improve qualification and competence for 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 and career progression.



### MHT in Vietnam

In fact, 93% of the employees say they will serve longer when the Company invests in their career development. To adapt to the post Covid-19 "new normal", MHT has focused on human resources development to keep pace with the market. Training activities have gradually resumed starting from QII/2022 with offline training sessions and outsourced training programs after more than 2 years of disruption due to the Covid-19 pandemic. As of December, the number of training man hours recorded was 43,423 hours for 24,250 attendees of both NPMC, MTC and Contractors.

The anywhere-anytime learning model diversely delivered either online or offline or self-study methods has provided employees with opportunities to choose, experience and understand their jobs. Site tours, orientations, and exchanges of practical, valuable experience from typical personnel have helped employees get more motivated for self-development within the organization. In 2022, 257 employees were promoted and internally transferred to other roles, an increase by 162% compared to 2021, contributing to effective human resources optimization for the Company. Especially, the Company focused on attracting talented students, create human resources and develop talented engineers for key positions within the organization. MHT employs around 25 - 30% of the students doing an internship at the Company each year. This is also a channel to help promoting the Company's image to the young, potential labor market.



## DEVELOP A TRANSPARENT ORGANIZATION AND CHANGE MANAGEMENT

Together we touch, look in the same direction and take action for one goal; together we move on, respect and innovate on a road to gain success, this is the common ideal for MHT people. We keep in mind MHT is home. Only if MHT employees are engaged, healthy and happy will the organization be well-engaged, strong and happy by geometric progression to reach new heights and deliver outstanding values to business partners. So, the unique engagement experiences with profound meaning, touching people's heart, love, compassion and responsibility for employees, their families and community has been fostered every day.

We are so proud of our global excellent management team who understand the true value of two-way communication between the Company and employees and therefore, besides maintaining public announcement of the Company business performance, the management is willing to take time to participate in Q&A sessions or employee dialogues. Especially, in 2022, MHT officially launched "Your voice matters" service, an independent whistleblowing service managed by a third party on behalf of MHT to receive information from employees and external sources globally on violations relating to the matters such as abuse of influence, bribery/corruption, breach of policy/procedure, bullying/harassment, conflict of interest, discrimination, fraud, health/safety/environment, supplier misconduct, theft, other unethical behavior or misconduct.

This service allows and encourages employees and business partners to make their voice heard, based on which MHT would investigate and take proper action accordingly. All reports and disclosure are completely confidential, and whistleblowers are not required to reveal their identity unless they choose to do so to secure the information as well as protect the whistleblowers.

Change management is implemented through regular interaction, establishing switching programs with information sharing forums and dialogues, creating tools for employees to contribute their opinions, share ideas and together with the management address the issue, help the management to get closer to employees, while employees feel their voice is heard, respected and want to devote to the organization.

Business Process Management (BPM) Unit and Portfolio Management Office (PMO) are established in 2022 with the purpose of identifying key improvement opportunities and providing a prioritized plan of initiatives to harmonize and manage business processes across the whole MHT Group, as well as to establish a framework of governing its portfolio of transformation initiatives in order to achieve the Company's strategy of being one consistent and integrated platform and system.

### CHANGE MANAGEMENT



## ENHANCE EMPLOYEE EXPERIENCE - BUILD A HAPPY MHT

Recognizing initiatives, ideas of work performance improvement, plant performance improvement, cost effectiveness in business and production, and long-term value creation, MHT has presented 45 Monthly Star Awards to individuals and teams for the recognition of their outstanding achievements, 13 employees with Kaizen awards, 11 employees with Certificates of Merits by Chairman of Thai Nguyen Provincial People's Committee, and 111 employees with 10 years of service Awards. In addition, the Company has also held production skills competitions in some sites, including China and Germany at the end of 2022. The company also held the annual commendation award for outstanding employees and gave service awards in January in some countries. Especially, 02 outstanding MHT employees in Top 20 warriors selected from 40,000 employees of Masan Group have demonstrated their preeminent competence of 6 qualities of Masaner. We are so proud of the prestigious awards and prizes for our colleagues. This helps each and every MHTer motivate to contribute to the sustainable development of Masan High-Tech Materials.

Life has gradually resumed to normal in many countries. Picnics and offline meetings have been held to enhance cooperation and engagement such as cultural exchange events and expertise exchanges between employees all around the world. Especially, a series of business process management (BPM) workshops gathered all the global top management in Vietnam. In addition to the discussions on the existing processes across MHT's locations and functions, getting alignment to proceed, the leaders were also engaged in various cultural activities and interesting destinations in Vietnam to refresh after every working day.





Let us review highlights of 2022 in Vietnam through the pictures below:



Open MHT Football Tournament 2022



Summer tour program 2022 "Beyond limits"

### Employee engagement activities

Annual cultural, sports and travel activities have been continually improved with the support of the Company and NPMC Trade Union taking care of both physical and mental health for employees and their families. It's the Blog Radio - MHT in my heart, Beloved Shutdown, Summer BBQ lunch, MHT Detox, MHT Football Club, Cozy Tet, MHT Amazing Race, Dragon boat Festival and Children's Day etc. These programs not only care for the employees' well being, but also they care for their families, parents, spouse and children with both practical physical and mental values.

### The 12<sup>th</sup> anniversary of Masan High-Tech Materials

In 2022, in celebration of the 12<sup>th</sup> anniversary of Masan High-Tech Materials, all the sites and business operations in China, Canada, Germany and Vietnam held a meaningful celebration activity with the theme "Beyond Limits". Activities like mountain climbing, celebration, picnic training, travel with family by thousands of MHTers have strengthened our determination and effort to reach a new height together.

### Masaners care for Masaners Fund

The spirit of "No one left behind" is a guiding principle for us to accompany, take care of each other through "Masaners care for Masaners Fund" (established on 18/06/2021). Every year, employees and the Company contribute to the Fund to maintain and develop meaningful activities. As of now, the Fund plays an important role during the Covid-19 outbreak and helps timely visit, support people with disadvantaged conditions, and scholarships to the students with outstanding academic performance.

### The MHT Amazing Race

In December, the MHT Amazing Race was held with a wide participation of over 400 employees across MHT, creating a healthy playground for each employee to build an exercise habit such as walking, running or cycling to boost physical health as well as to spread positive energy to community. Every MHTer chose a suitable sport and participated in the exercise activities of the company for 21 consecutive days. Participants have a chance to join an online sports competition with interesting experience with their colleagues and family members. Total distance gained is 23,163 km equivalent to 1.8 times of the distance around the Earth. Each employee's step also contributed to Masaners' Fund for Masaners' Care. In Canada, 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. In 2022, more than 85% of the employee submitted claims which is new record.





**Health care programs**

The Company focuses on improving healthcare programs for employees, not only improving the work environment, but also providing tools and methods to support employees such as Company Clinic, health expert, and in the future, we are intended to expand the scope of healthcare, provide mental health packages for employees. Health experts provide health consultation services, organize and work with all teams to analyze potential risks and actual occupational health situation within the organization to give out measures to improve the health for employees.

Our colleagues in Germany have their own area in our intranet to get an overview about all health and safety activities at H.C. Starck and ChemiLytics Germany, for example, information on yoga classes, massage, including registration links and other important dates for health and safety activities. Furthermore, the colleagues have the possibility to find recipes and links for healthy food under a steering committee called "Well home".

Below there are outstanding sports events of HCS in 2022:



Altstadt Lauf Goslar (Running event)

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.

Notably, the management change, establishment and adjustment of the business, production plan to adapt to the actual situation, organizational restructure and strengthening employees' experience, etc. are important efforts and advancement of MHT over the past years.

In 2023, we continue to set out important and consistent goals to clearly determine the strategy, develop a plan and together follow the right track with the ambition of global sustainable development for Masan High-Tech Materials.



A team cooking event, led by a nutritionist







## SUSTAINABILITY HEALTH & SAFETY

## HEALTH AND SAFETY AT VIETNAM

- In 2022, the Covid-19 pandemic was controlled in Vietnam, however, the Company continued to put preventive measures in place in order to guarantee the health and wellbeing of employees.
- Assess the working conditions to classify and register an additional list of arduous, hazardous and dangerous occupations.
- Coordinate and develop a training matrix for each individual and department.
- Implement the program “Rank Your Day” (R.Y.D) to encourage positive attitude and improve the active role of each individual in safety.
- Maintain area safety observation with the participation of Supervisors, Managers and Management Team.
- Analyze the conformity of the company’s Health and Safety Management System with the Occupational Health and Safety standard ISO 45001:2018 in order to get ready for applying this standard at MHT.

### HEALTH

#### OUR CLINIC

There are 10 healthcare workers providing 24-hour support in the MHT Vietnam Clinic, consisting of four doctors having general practitioner degrees and medical specialty certificates, five nurses, one medical assistants, one pharmacist with full equipment and facilities to take over daily healthcare services for employees as well as response to emergency cases. In 2022, the Clinic provided health care for 5,573 employees, and flu vaccines for 1,196 employees.

Frequently taking part in emergency drills on various scenarios in partnership with the Emergency Response Team ensures that rescue equipment is used proficiently and that emergency circumstances are handled as best as possible. Also, we collaborate closely with local authorities and hospitals to deliver quick and efficient emergency care.

Training courses were conducted throughout the year to upskill healthcare workers and meet the legal requirements. These include continuous medical training, ear, nose and throat endoscopy, safety vaccination, occupational health, working environment monitoring, chemical safety.



Medical staff participated in a chemical incident response drill



**1 Covid-19 prevention and control**

In early 2022, the Covid-19 pandemic broke out, infecting more than 70% of the MHT workforce. Yet, by adopting preemptive steps in the Covid-19 prevention and control, MHT was only minimally affected by the pandemic, no employees were hospitalized for treatment, and the business continued as usual. Despite the low risk, MHT always maintains vigilance, tracks and evaluates the epidemic condition, and makes preparations to handle any recurrence of the Covid-19.

**2 Periodic health checkup and occupational disease prevention**

Pre-employment health screening and routine health checkups are conducted in parallel to the planned occupational health examination twice a year. In 2022, the Clinic examined and gave medical advice to 1,864 employees (559 employees and 1,305 in batch 1 and 2 respectively).

In 2022, the Health and Safety Department also gave advice to contractors to conduct health checks for their employees working at MHT based on the list recommended by the Company.

**3 Training, health communication & community support**

Community support, health communication and training activities continued to be conducted, specifically as below:

- Conduct mandatory training programs on occupational health prevention for employees before starting work, and other occupational health training sessions.
- Offered 27 first aid training courses for 276 MHT employees with a total of 1,104 training hours.
- Provided guidance on disinfection and storage of the respiratory protection equipment (RPE) for MTC employees.
- Released and conducted health talks on the following topics: heat-wave, heat stroke prevention, flu prevention, monkeypox prevention, dengue fever, etc.

- Successfully organized the “Health Day” program in conjunction with the launch of “MHT Amazing Race 2023” with exciting and appealing physical activities, promoting the exercise and sports movement. Through this event, the analysis and statistics of health trends were shared and discussed positively, solutions were recommended to improve the health of employees.
- In addition, the company’s professionalism and competence were well regarded when working with the neighboring health centers to provide free medical services, conduct health examinations and first aid in case of emergencies.



Internal first aid training



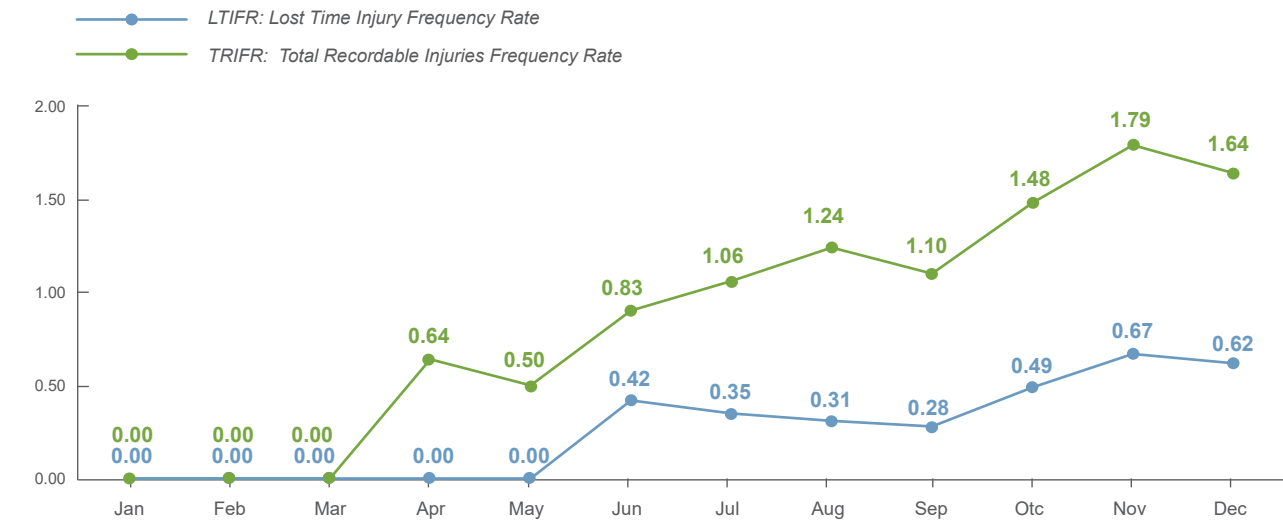
Health Day and launching exercise program

**SAFETY**

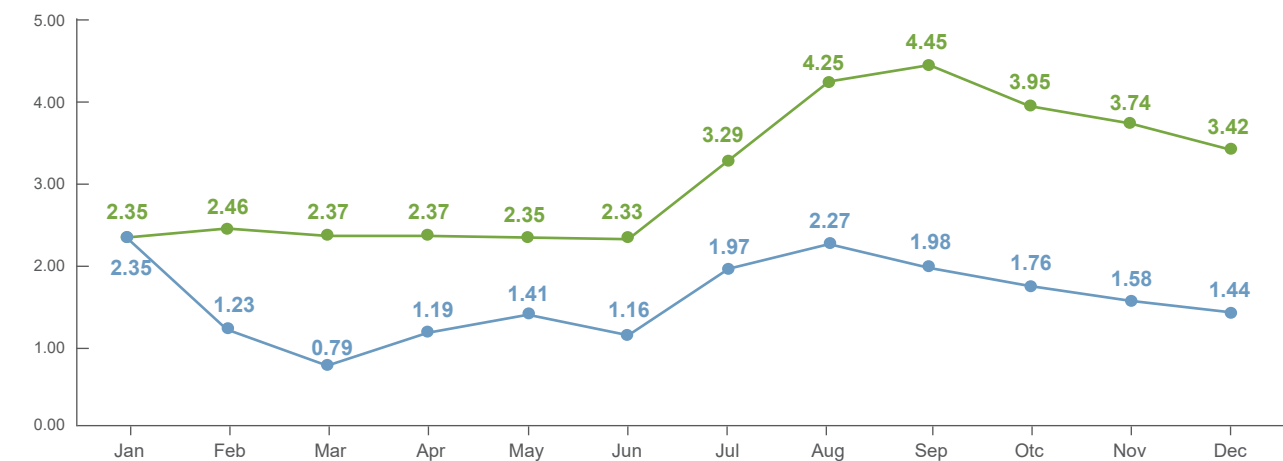
**1 Accident and Incident**

The incident report for 2022 indicated that occurrences tended to rise, but it also revealed that incident reporting had improved throughout the organization. Most of the incidents were related to traffic, chemicals, and equipment maintenance activities. One serious traffic accident claimed the life of a contractor worker who was moving around the

mine site. This urged us to pay more attention to hazard identification and implement it closely and comprehensively; it is also required to strictly and effectively implement actions to eliminate, control the risk as well as prevent the incident.



YTD Injury Frequency Rate - 2021



YTD Injury Frequency Rate - 2022



**2 Management system**

In 2022, our Standard Operating Procedures (SOP) related to Health and Safety (HS) were reviewed and revised. We planned to move on to review and update the procedures according to the document management system.

With the aim of standardizing management systems, the Company commenced the implementation of the Occupational Health and Safety

(OHS) Standard Management System ISO 45001:2018 after analyzing the OHS management system's compliance with the Standard. The Company developed action plans to standardize in preparation for the ISO 45001:2018 completion and implementation next year.

The safety principles for hazards mainly identified from some specific processing operations at MHT were also reviewed and amended in 2022:



8 SAFETY PRINCIPLES

Moreover, the amendment and application of the Guidelines on Contractor Health and Safety Management will help assess and provide guidance for contractors to understand as well as proactively meet the

standards and specific requirements on Health and Safety so that they can well prepare for their activities at MHT Vietnam in an effective and safe manner.

**3 Hazard identification and risk management at the workplace**

**Risk assessment**

The Company focuses on comprehensive risk analysis and assessment for all activities on a regular basis, then take additional preventive measures and stronger and more effective actions. In 2022 risk assessment period, there were 17 new risks related to Health and Safety and processing operations were identified and controlled.

**Occupational hygiene and working environment**

In 2022, in order to thoroughly assess the employees' working environment, an additional 219 sampling points were added increasing the total sampling points of 1,212 points with 98.1% satisfactory samples.

Conduct monthly food safety and hygiene assessments at the Company's catering service area, and request them to improve.

Assess the working conditions to classify and register an additional list of arduous, hazardous and dangerous occupations. Complete the job titles at the Company in accordance with legal regulations.

**Vehicles and equipment safety**

Standardize the list and management procedures for equipment with strict occupational safety and health requirements.

There were 158 equipment due which were inspected throughout the year, ensuring 100% equipment was inspected and registered for use according to the regulations.

Maintain the pre-start checks for plant and equipment, periodic equipment inspection by Departments.

One of the measures to enhance the efficiency and ensure safety for vehicles is establishing a Vehicle and Mobile Equipment Safety team with the participation and involvement of high-expertise employees to raise awareness, controlling and problem-solving skills for operators; ensure compliance with the regulations and standards; monitor the reliability of vehicles through proactive maintenance, test and inspection, etc.

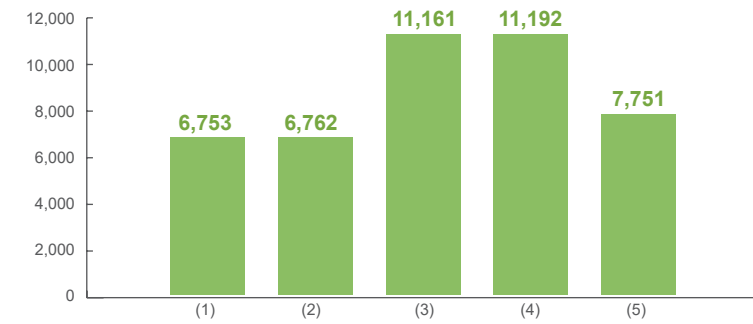




**Safety supervision and inspection**

Each employee is encouraged to self-inspect safety through task observation, hazards observation and identification, incident reporting by various methods, including "Hazard Report" tool on the Ocsafe system and Take5 step.

Online Take5 has been applied since August 2022 and is convenient for users. In Quarter 4/2022 only, there were 19,388 Online Take5 completed with 43,619 hazards identified related to 5 major hazard groups. These are useful statistics from the actual activities of each employee in hazard identification and making appropriate control plans.



Most of hazards identified through Online Take5 in Quarter 4, 2022

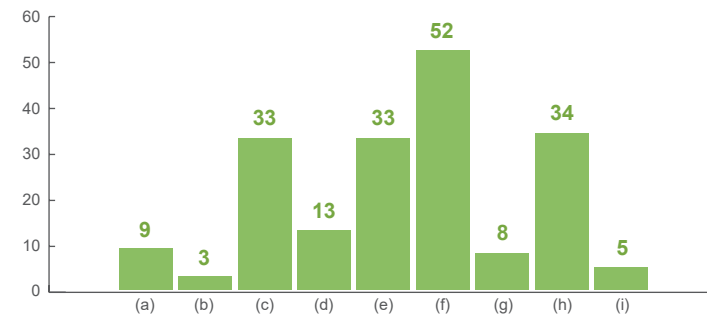
**Note:**

- (1) Sharp, pointed edge
- (2) Electrical equipment/chemical/high pressure/falling object
- (3) Slippery, strip, fall, untidiness
- (4) Emitted gas/fumes, noise/vibration, dust, smoke, biological
- (5) Manually moving heavy object

Safety officers worked with internal departments to conduct regular and monthly inspections at the processing areas.

Strengthen safety observation at working areas with the participation of the Management Team, Health and Safety Department and related departments.

Through safety inspections and observations, existing hazards or issues are identified, monitored and addressed completely with the support of the top management.

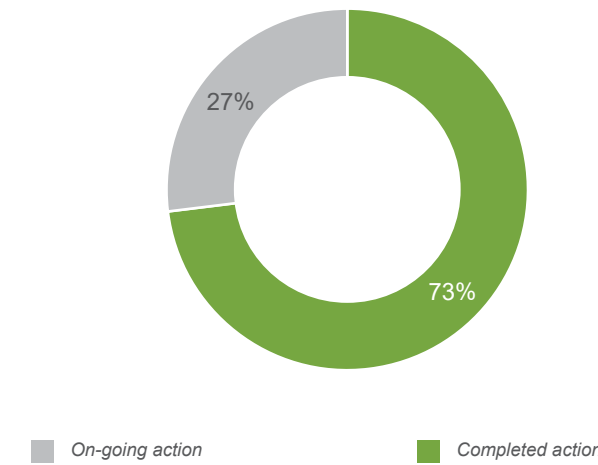


Main importer points from the observation of the management team

**Note:**

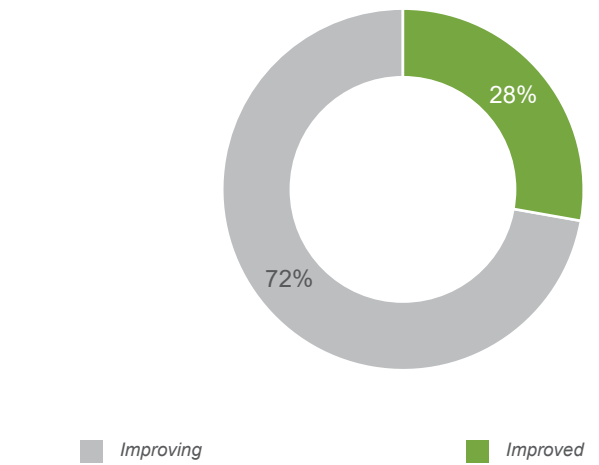
- (a) Chemical
- (b) Corrosion
- (c) Procedure
- (d) Emergency Equipment
- (e) Equipment
- (f) Hygiene/5S
- (g) Lifting Equipment
- (h) SOP/JHA
- (i) PPE

Completion rate of recommendations from safety observation report



**Contractor safety assessment**

Improvement of improper points by contractors:



From the effectiveness of the contractor occupational safety and hygiene (OSH) assessment program conducted for the first year (2021), the Company continues to maintain and strengthen this program. Taking this to encourage contractors to promote their good points, improve their inappropriate points in OSH performance at MHT by identifying and implementing corrective actions.

Contractors rectified and completed 187 out of 261 improper points identified.



**4 Building a safety culture**

In 2022, MHT conducted various action programs to raise awareness aiming towards the objective of building a safety culture at the Company, specifically:

- Implemented safety discussion sessions with the direct participation of managers with employees.
- Released 40 occupational health and safety topics that were useful and outstanding issues at the Company.
- The “Safety Day” was successfully held with a wide participation of employees and contractors. The Health and Safety team and the Management Team shared Health and Safety trend for the participants; praised the teams and individuals with high achievements, and launched the implementation of 5S at workplace.
- Rolled out “Rank Your Day” (R.Y.D) program to all departments and individuals. R.Y.D program is to encourage a positive attitude and enhance the active role of each individual in safety, help the management get informed and provide prompt support in the rectification of the identified hazards. The program is well received by departments and will continue to be communicated to all employees and contractors.



Safety training

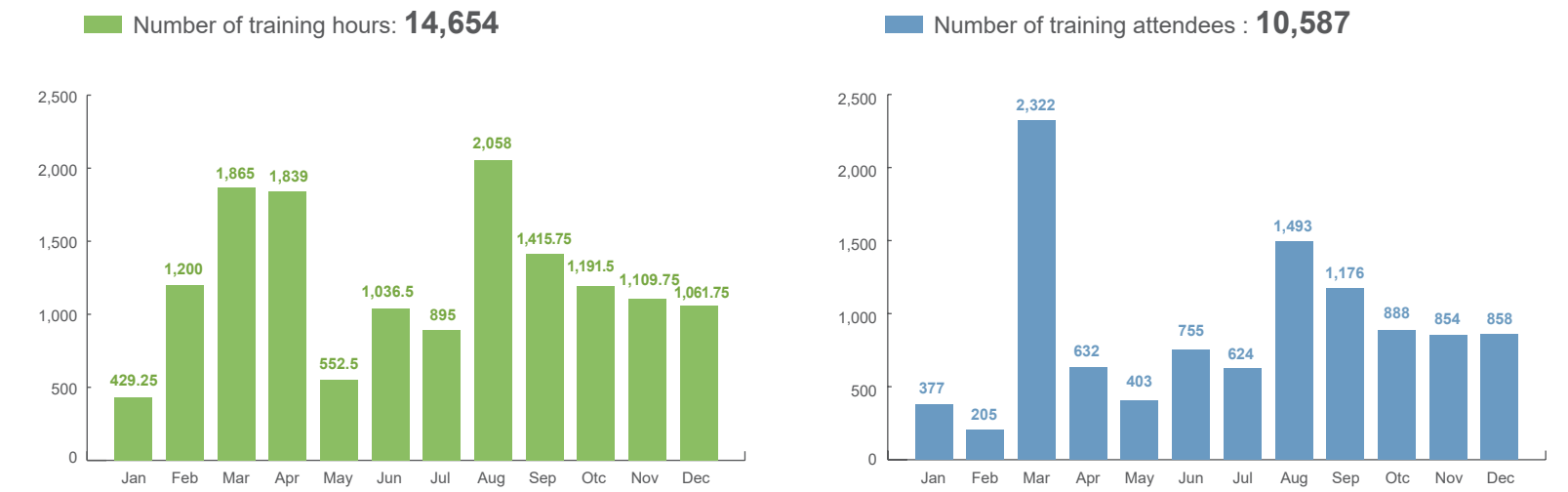


The “Safety Day”

**5 Enhancing the capability and awareness of occupational safety and hygiene (OSH)**

In parallel to maintaining the OSH trainings for employees, improving capability and awareness of OSH in 2022, we:

- Coordinate and develop a training matrix for each individual and department. The training matrix consists of 97 compulsory training contents, 27 internal training contents related to OSH. This enabled us to make a plan and allocate appropriate personnel to conduct more training courses or necessary skills for each employee.
- The task observation is added to the General Site Induction to help new employees get familiar and practice identifying related hazards, determine control measures in each area or participating activity.



Statistics of internal safety training in 2022



## FOCUS 2023

Standardize and apply MHT's occupational health and safety management system according to ISO 45001:2018.

Strengthen vehicle and equipment safety control program.

Maintain the implementation of the R.Y.D program for all departments, individuals and contractors.

Optimize medical examination and treatment for employees.

Enhance risk management, focus on supporting departments in implementing corrective and preventive actions.

Maintain and expand the assessment scope on health and safety performance of contractors.



## 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.

The SARS-Cov-2 pandemic was a recurrent subject in 2022, just as it was in 2020 and 2021. Numerous measures were decided upon and put into place to prevent a decline in performance. These included flexible work schedules, 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 email and information screens about the results of the meetings.

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. The incidents, along 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. Additionally, components of the monthly reporting are also the reported safety deficiencies, which are discussed in the companies at the daily morning meeting.

After the main cause of accidents in Goslar in previous years was due to a lack of attentiveness, no trend could be identified here in 2022. Compared to 2021, there was a slight increase in the number of accidents in Goslar in 2022. In order to achieve a permanent reduction in the number of accidents at this site, the previously outsourced occupational safety and health department was reintegrated into the HSEQ department of H.C. Starck Tungsten GmbH Goslar. As a result, HCS GS is appropriately positioned to address H&S issues in the depth necessary to sustainably reduce accident rates and strengthen preventive work. There were fewer accidents at the Sarnia and Ganzhou sites in 2022 than in 2021.

The cooperation with the previous service provider in the field of Health & Safety will continue in a reduced form in order to maintain and coordinate the cooperation of the companies located at the MPO.

As part of the cooperation:

- In 2022, 19 inspections and safety tours were carried out (18 in 2021 and 14 in 2020), 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, 15 work area analyses / control measurements were carried out in 2022 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 forming the basis for the procurement of blower respiratory protection.
- Committee meetings for occupational safety (2020: 4 / 2021: 4 / 2022: 4), with the security safety officers (2020: 6 / 2021: 7 / 2022: 4), and with the foremen (2020: 1 / 2021: 2 / 2022: 2) were held.
- 61 first aid training were 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 were organized by the trade association BGRCI (2020: 8 courses / 2021: 12 / 2022: 31).

In addition to the security training courses offered online, some of which are required by law, 4 "Days of Security" (2020: 4 / 2021: 4; participants: all employees of Operations and Site Management) were held with extensive instruction and information. One component is the fire drills for all employees, which are flanked by unannounced evacuation drills, PMG-training or the handling of personal protective equipment (PPE).





**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 perform services on our behalf. Before starting work at H.C. Starck Tungsten, employees of external companies must complete and pass a Tungsten-specific safety training course in addition to receiving a preliminary safety briefing from plant security upon entering the premises.

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 serve as the contractors' contact persons and, as required, carry out inspections of equipment that the contractors

bring in. The coordinator is responsible for the security 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. PPE 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.

Statistics of the Fire Brigade

	2020	2021	2022
Fire operations	5	1	3
False alarm (Fire alarm system)	11	29	27
Technical assistance	22	41	58
Other missions (on-call service)	38	104	280
<b>Total</b>	<b>76</b>	<b>175</b>	<b>368</b>



Responders performed a total of 318 response hours in 2022, of which approximately 32 hours were performed by the On-call service alone.

A total of 5 fire prevention inspections were carried out with the district of Goslar in 2022. In addition, 2 unannounced evacuation exercises took place at H.C. Starck Tungsten GmbH.





**Sarnia Plant**

The Sarnia location supports involvement and participation in a local large multi-industrial cooperative that promotes safety culture which has provided the Sarnia site with world-class management tools that have enabled the continued achievement of safety objectives.

HS&E leadership is prevention-based which includes a Joint Health and Safety Committee that is committed to improvement through proactive workplace inspections, personal and group training, and risk prevention.

The 2022 transition to post pandemic society continued with an improved employee fitness and benefits program resulting in high team-mate contributions with low absenteeism rates.

H.C. Starck Sarnia respects employees' rights and has developed and implemented policies within current guidelines and culture with regard to "Employees' Right to Disconnect" from the workplace and "Workplace Employee Electronic Monitoring" notification.



Sarnia Plant

**Ganzhou Plant**

**Traffic Safety**

Given the poor condition of current roads and notably the government's recent increase in road construction, road traffic safety is particularly important for most employees who commute to work by electric vehicle. The traffic police were invited to conduct road traffic safety training for employees. As a result, no road accidents occurred in 2022.



Traffic Safety training at Ganzhou



**Fire protection**

In order to

- improve the staff's fire protection knowledge,
- equip every employee with basic knowledge of fire protection,
- know how to put out small fires with a fire extinguisher and large fires with fire hydrant water,
- and to eliminate the fire in the early stage of the fire, professional firefighters have conducted special training for the employees. This training will be conducted on a yearly basis in the future.

**Training about Health/ Safety/ Environment**

In order to improve and strengthen the knowledge and awareness of safety, occupational health and environmental protection, HSEQ engineers organized several rolling relevant training and analyzed the production cases together to make correct improvement actions. Like the fire protection, training on a yearly basis will be implemented.

**Review of production safety standardization**

The Ganzhou plant was one of the first local enterprises to pass the standardization of safety production. In 2022, the plant was proudly selected by the local government as one of the several enterprises to receive the inspection of the national Emergency Department. Although the national inspection team did not come due to the epidemic, the safety work was recognized by the local government.

**INCIDENT DATA MANAGEMENT****In Goslar**

	2022	2021	2020	2019	2018
Fatal Accidents (FA)	0.00	0.00	0.00	0.00	0.00
DAWC with 1-3 Days Away From Work	3.00	0.00	2.00	2.00	0.00
DAWC with >3 days away from work (BGC)	2.00	2.00	4.00	2.00	2.00
Days Away From Work Cases (DAWC)	5.00	2.00	6.00	4.00	2.00
Total Recordable Cases (TRC)	5.00	2.00	6.00	4.00	2.00
Days Away From Work (Total DAW)	12.00	75.00	67.00	33.00	16.00
Lost Calendar Days (incl. Weekend)	12.00	21.00	83.00	43.00	18.00
Headcount (HC)	352.00	358.00	349.00	332.00	249.00
Total Hours Worked (THW)	532,918.00	524,927.00	493,289.00	492,143.00	336,575.00
Number of Regular Occupational Health Checkups	539.00	600.00	520.00	397.00	562.00
First Aid trained employees	61.00	24.00	52.00	36.00	24.00
Number of Days Away from Work Cases of third party Contractors (DAWC 3)	127.00	0.00	0.00	0.00	0.00
Health and Safety training for HCST employees. (Number of training courses completed)	44.00	52.00	38.00	37.00	32.00
German Accident Rate (MAQ)	9.38	3.81	12.16	8.13	5.94
German Accident Rate (BG-MAQ)	3.75	3.81	8.11	4.06	5.94
German Severity Rate (USQ)	22.52	142.88	135.82	67.05	47.54
German 1,000 employee Rate (1000-Mann-Quote)	5.68	5.59	11.46	6.02	8.03
Total Recordable Cases Rate (TRCR)	1.88	0.76	2.43	1.63	1.19
Days Away From Work Cases Rate (DAWCR)	1.88	0.76	2.43	1.63	1.19
Severity Rate (according to OSHA)	4.50	28.58	27.16	13.41	9.51



## In Ganzhou

	2022	2021	2020	2019	2018
Fatal Accidents (FA)	0.00	2.00	0.00	0.00	0.00
DAWC with 1-3 Days Away From Work	1.00	0.00	1.00	1.00	0.00
DAWC with >3 days away from work (BGC)	<b>0.00</b>	<b>2.00</b>	<b>4.00</b>	<b>3.00</b>	<b>3.00</b>
Days Away From Work Cases (DAWC)	1.00	2.00	5.00	4.00	3.00
Total Recordable Cases (TRC)	1.00	4.00	5.00	4.00	3.00
Days Away From Work (Total DAW)	1.00	39.00	92.00	57.00	135.00
Lost Calendar Days (incl. Weekend)	1.00	53.00	106.00	69.00	189.00
Headcount (HC)	135.00	136.00	128.00	132.00	122.00
Total Hours Worked (THW)	310,014.00	289,428.00	285,487.00	287,834.00	274,252.00
Number of Regular Occupational Health Checkups	145.00	109.00	141.00	145.00	122.00
First Aid trained employees	25.00	25.00	25.00	20.00	30.00
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)	248.00	220.00	207.00	356.00	345.00
German Accident Rate (MAQ)	3.23	13.82	17.51	13.90	10.94
German Accident Rate (BG-MAQ)	0.00	13.82	14.01	10.42	10.94
German Severity Rate (USQ)	3.23	134.75	322.26	198.03	492.25
German 1,000 employee Rate (1000-Mann-Quote)	0.00	29.41	31.25	22.73	24.59
Total Recordable Cases Rate (TRCR)	0.65	2.76	3.50	2.78	2.19
Days Away From Work Cases Rate (DAWCR)	0.65	1.38	3.50	2.78	2.19
Severity Rate (according to OSHA)	0.65	26.95	64.45	39.61	98.45

## In Sarnia

	2022	2021	2020	2019	2018
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	0.00	1.00	0.00
DAWC with >3 days away from work (BGC)	0.00	0.00	0.00	<b>0.00</b>	<b>1.00</b>
Days Away From Work Cases (DAWC)	0.00	1.00	0.00	1.00	1.00
Total Recordable Cases (TRC)	0.00	1.00	0.00	1.00	1.00
Days Away From Work (Total DAW)	0.00	2.00	0.00	2.00	4.00
Lost Calendar Days (incl. Weekend)	0.00	2.00	0.00	2.00	4.00
Headcount (HC)	50.00	46.00	42.00	48.00	49.00
Total Hours Worked (THW)	103,534.00	89,012.22	87,209.94	99,421.18	101,172.00
Number of Regular Occupational Health Checkups	8.00	6.00	4.00	15.00	18.00
First Aid trained employees	25.00	32.00	0.00	0.00	22.00
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)	25.00	21.00	19.00	54.00	18.00
German Accident Rate (MAQ)	0.00	11.23	0.00	10.06	9.88
German Accident Rate (BG-MAQ)	0.00	0.00	0.00	0.00	9.88
German Severity Rate (USQ)	0.00	22.47	0.00	20.12	39.54
German 1,000 employee Rate (1000-Mann-Quote)	0.00	0.00	0.00	0.00	20.41
Total Recordable Cases Rate (TRCR)	0.00	2.25	0.00	2.01	1.98
Days Away From Work Cases Rate (DAWCR)	0.00	2.25	0.00	2.01	1.98
Severity Rate (according to OSHA)	0.00	4.49	0.00	4.02	7.91



# SECURITY

## Security

The Security team has well fulfilled its roles in safeguarding the inviolability of the Company's assets, employees' lives and health, maintaining the plant security, contributing to the development of the business, strengthening integrity and transparency at workplace and voluntary compliance culture for all employees.

In 2022, the Security team strengthened a far-reaching role in various aspects:

- **Product security:** Prevention of theft, loss inside the processing lines, ensuring the optimization of productivity, high performance and future development. Close surveillance of input and output goods, development and application of cross-check procedures between Security, Processing and Supply Chain Management department.
- **Supply chain security:** Ensure safe logistics and procurement activities, reduce the risks of loss. Give advice on and coordinate to handle complicated issues arising with business partners to prevent risks of financial and legal fraud and maintain our advantages against contractors and suppliers in the cooperation.
- **Internal security:** Ensure a spotless and strong human resources team, advise on the purging or not hiring of individuals with complicated backgrounds, contribute to the human resources development strategy. Investigate and handle fraudulent, negative acts and violations of 10 employees (of which 8 were fired) and reclaim VND 1.5 billion.
- **Community security:** Contribute to the resolution of existing issues and relationship conflicts between the company's business expansion and community interests by preventing, addressing and harmonizing them. Especially, sign and maintain a Coordination Regulation with the Public Security of Ha Thuong commune and Hung Son town, effectively assist in the resolution of emerging issues and ensure security for blasting activities.



## Fire Fighting and Rescue

- Conduct more than 10 emergency response drills on fire prevention and fighting, chemical spill response, and rescue. Among these, the provincial-level drill on large NaCN leakage response was most notable.
- Advise and complete application for appraisal and acceptance certificate of fire prevention and fighting for two new important projects, namely OEP and SWTP.
- Support the locality in responding to fire fighting and rescue cases in Dai Tu district, especially serious road accidents that occur on National Highway No. 37.





**7,677**  
thousand m<sup>3</sup>

Of wastewater are reused at  
Nui Phao mine



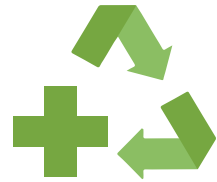
**7,307**  
thousand m<sup>3</sup>

of wastewater is treated  
before discharge



**1.15** ha

of land for planting trees,  
rehabilitating the environment



**65%**

of waste generated  
is recycled



**2**

**Certificates of ISO 50001**  
for MTC and Goslar



**Maintain 4**

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



## ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT – FUTURE ADAPTATION

Environmental protection is particularly important in MHT's strategic orientation for sustainable growth. In 2022, environmental protection activities was focused on maintaining and strengthening the administration of environment protection and development. With significant efforts in environment protection and sustainability achievements, Masan High-Tech Materials has been recognized by the Vietnam Chamber of Commerce and Industry (VCCI) as leading "Sustainable Business in Vietnam" for the 5<sup>th</sup> consecutive year.



## WATER AND WASTEWATER MANAGEMENT

Natural water is a limited and vulnerable resource. Therefore, implementing smart water management will contribute to the company's protection and efficient use of resources. Following the goals of water circulation, reuse and quality wastewater treatment from previous years, MHT continued to implement effective water management solutions in 2022.

### Water consumption

The water sources for production in recent years at MHT include surface water and groundwater (self-extracted or provided from suppliers), deionized water and recycled water. In 2022, the total water volume used by MHT was 11,797 thousand m<sup>3</sup>.

YEAR	2018	2019	2020	2021	2022
<b>Total water volume used (thousand m<sup>3</sup>)</b>	<b>13,482</b>	<b>12,482</b>	<b>12,136</b>	<b>12,740</b>	<b>11,797</b>
<b>NPMC and MTC</b>	<b>11,520</b>	<b>10,683</b>	<b>10,231</b>	<b>10,986</b>	<b>10,024</b>
Surface water	2,393	2,576	2,517	2,355	2,346
Ground water for domestic	37	36	31	8	0
Ground water for production	98	0	0	0	0
Recycle water	8,992	8,071	7,682	8,623	7,677
• Water from OTC	2,951	2,574	2,163	2,286	2,254
• Water from STC	5,603	4,613	4,415	5,474	4,987
• Water from PTP	414	275	443	137	48
• Recycled water from DP2	24	0	0	0	0
• Recycled from Cut-off trench		609	662	726	388
<b>Goslar, Sarnia and Ganzhou</b>	<b>1,962</b>	<b>1,799</b>	<b>1,906</b>	<b>1,754</b>	<b>1,774</b>
Surface water	1,820	1,648	1,742	1,599	1,598
Water from suppliers	134	142	157	148	167
Deionized water	8	8	7	7	8

More water was needed for the mineral extraction procedures at NPMC than for the operations in MTC, Goslar, Sarnia, and Ganzhou, accounting for 85% of the total water usage in the entire MHT. However, 76.6% of the water was reused.

### Surface water

NPMC and MTC used water extracted from the Cong River for production purposes under the License granted by Thai Nguyen Provincial People's Committee, while the Goslar, Sarnia and Ganzhou plants used surface water source drawn from nearby rivers that were operated by licensed users. In 2022, MHT used 3,944 thousand m<sup>3</sup> of surface water (of which: 2,346 thousand m<sup>3</sup> for NPMC and MTC, 1,598 thousand m<sup>3</sup> for plants at Goslar, Sarnia and Ganzhou), accounting for 33.4% of the total water use of all plants.

### Other water sources

At our Goslar, Sarnia and Ganzhou plants in Germany, Canada, and China, beside using water extracted from local rivers, we also use water supplied by vendors in the form of steam and deionized water that used in specific tungsten production stages. In 2022, 175 thousand m<sup>3</sup> of water were used there, accounting for 1.5% of the total water use of all plants.

### Recycled water for production

Reusing wastewater in manufacturing has the potential to reduce industrial water supply and wastewater treatment costs and reduce pressure on water resources.

At NPMC processing plant, most of the wastewater from the TSF (OTC and STC ponds) is circulated to the processing plant for reuse. The remaining water from the OTC and STC ponds that currently cannot be reused is pumped for treatment at the wastewater treatment plant prior to being discharged through discharge point (DP2) into the Thuy Tinh stream. Water from our mining activities is also managed within this system.

In 2022, NPMC re-used 7,677 thousand m<sup>3</sup> of wastewater for production, accounting for 76.6% of the total water use in NPMC and MTC.

Like any industrial plant MHT operations have measurable impacts on the environment. We have chosen to reuse wastewater to demonstrate what can be done to minimize impact to the environment, and actively looked for ways to increase wastewater reuse.

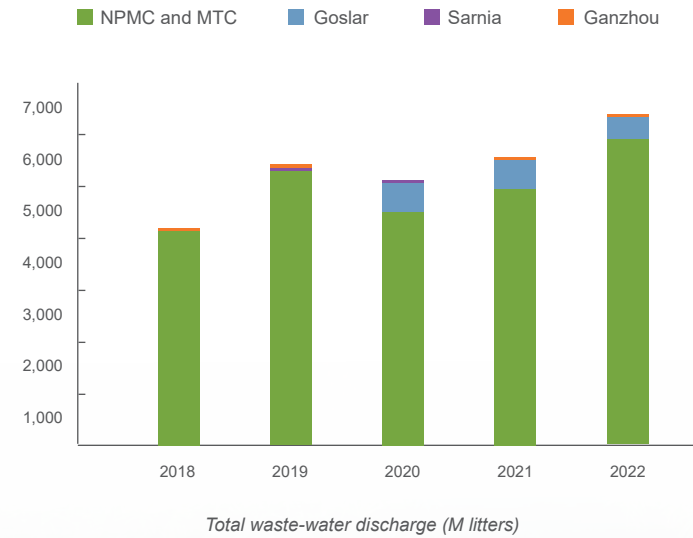




### Wastewater discharge quality and quantity

MHT plants are all licensed to discharge wastewater according to the laws 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 2022, the total amount of wastewater discharge was 7,307 thousand m<sup>3</sup>. Of which, NPMC and MTC's operations accounted for 93% of the total wastewater volume. Wastewater was treated and monitored to meet the standards of the host country before being discharged into the environment.



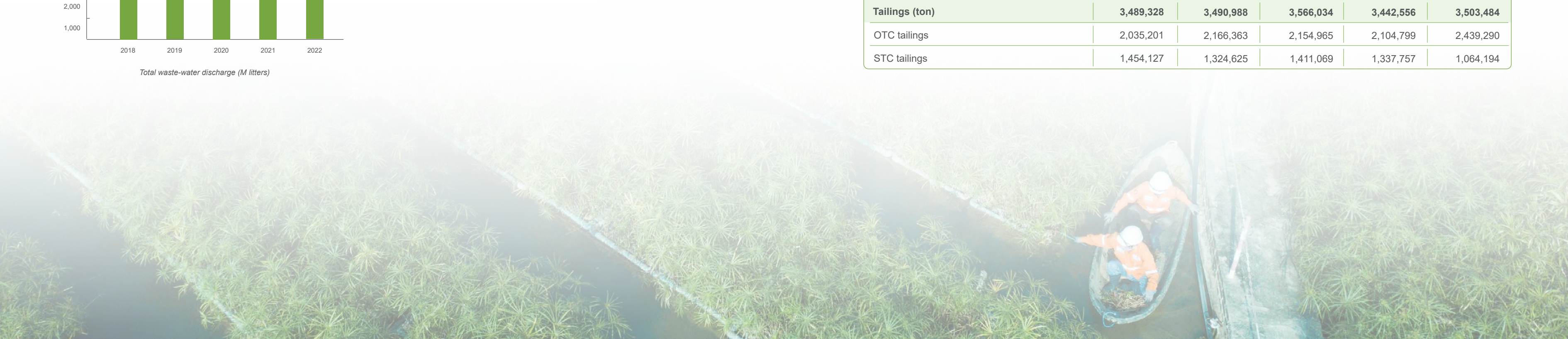
In NPMC and MTC, our wastewater sources (production wastewater, domestic wastewater) and contaminated rainwater are collected into reservoirs, then pumped for treatment at the wastewater treatment plant with capacity 36,000 m<sup>3</sup>/day. At the discharge points, NPMC operates automatic monitoring stations to monitor the wastewater quality before being discharged into the environment. The wastewater after treatment always ensure under the allowable limit according to the discharge permit issued to NPMC by the Ministry of Natural Resources and Environment. In 2022, NPMC built and installed additional chemical treatment system No.2 with a capacity of 9,600 m<sup>3</sup>/day to strengthen and support the existing wastewater treatment plant.

The plant in Goslar has got a contract with Chemitas to treat and re-lease wastewater. Chemitas is the holder of the permit for direct discharge of rainwater and wastewater via the central wastewater treatment plant. 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 tailings 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.

YEAR	2018	2019	2020	2021	2022
<b>Renewable materials (m<sup>3</sup>)</b>	<b>1,177,317</b>	<b>1,319,299</b>	<b>987,051</b>	<b>960,883</b>	<b>501,079</b>
Waste rock for construction of TSF wall-dam	924,832	1,135,775	482,233	699,031	72,157
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	428,922
<b>Non-renewable materials (m<sup>3</sup>)</b>	<b>4,768,241</b>	<b>4,813,180</b>	<b>3,963,178</b>	<b>2,439,943</b>	<b>3,121,620</b>
Non-potentially acid generating waste rock dumped into Waste Dump	3,896,736	3,821,551	3,312,552	1,718,013	1,165,685
Potentially acid generating waste rock is submerged in STC	871,505	991,629	650,626	721,930	1,955,935
<b>Tailings (ton)</b>	<b>3,489,328</b>	<b>3,490,988</b>	<b>3,566,034</b>	<b>3,442,556</b>	<b>3,503,484</b>
OTC tailings	2,035,201	2,166,363	2,154,965	2,104,799	2,439,290
STC tailings	1,454,127	1,324,625	1,411,069	1,337,757	1,064,194





## Renewable materials

Some waste soil and rock is used as building materials for internal mine works (TSF wall-dam construction, road repairs, leveling, etc.), and the remaining material is disposed into designated waste dumps. In 2022, NPMC reused 501,079 m<sup>3</sup> of waste soil and rock for construction of TSF wall-dam and other civil projects.



## Non-Renewable materials

At the Nui Phao mine site, non-potentially acid generating waste rock which has not been reused is stockpiled in the dedicated Northern and Southern waste dumps of the open pit. Waste rock with potential for acid generation is submerged in sulfide tailing cell (STC) to prevent oxidation of the sulfide that generates acid.

In 2022, mining activities generated 3,121,620 m<sup>3</sup> of waste soil and rock, of which 1,165,685 m<sup>3</sup> of non-potentially acid generating waste rock was dumped into the waste dumps and 1,955,935 m<sup>3</sup> of potentially acid generating waste rock dumped in STC for submerge. NPMC's processing plant produced 1,064,194 tons of sulfide tailings which were submerged in the STC, and 2,439,290 tons of oxide tailings stored in the OTC.

At Goslar, Sarnia and Ganzhou 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.

## Recovering waste soil – a stepping stone for the future

Early in 2021, NPMC submitted to the Department of Geology and Minerals for consideration and approval of waste soil recovery plan (accompanying minerals) in order to serve the needs of ground leveling for construction works as well as to make the most of and avoid wasting resources. This was done during the extraction of tungsten ore at Nui Phao mine.

On June 22, 2022, the Ministry of Natural Resources and Environment approved of the waste soil recovery plan in principle, allowing NPMC to recover and use waste soil during the extraction of tungsten ore at Nui Phao mine to make ground leveling materials for construction projects in Thai Nguyen province. In which, the total volume of waste soil recovered and used is 2.7 million m<sup>3</sup>, the implementation time is 2 years. However, due to the process of waiting for approval, to ensure the removal of soil and release the field to serve the mining plan, the main mineral is tungsten - polymetallic ore, the waste soil that NPMC applied for recovery has been dumped at the Northern Waste Dump according to the provisions of the approved environmental impact assessment report. However, this will be a favorable stepping stone for similar projects of Nui Phao mine in the future.

## WASTE MANAGEMENT

Sustainable solid waste management will ensure efficient use of resources, significant reduction in the amount of solid waste generated and minimize the impact on the environment. At MHT, solid waste is collected, classified and recycled in accordance with the Law.

YEAR	2018	2019	2020	2021	2022
<b>Total of waste volume (ton)</b>	<b>4,904</b>	<b>36,051</b>	<b>14,870</b>	<b>16,964</b>	<b>24,667</b>
<b>Recycling rate total</b>	51%	94%	81%	82%	65%
<b>NPMC and MTC</b>	<b>2,894</b>	<b>33,995</b>	<b>13,596</b>	<b>15,186</b>	<b>22,737</b>
Non-hazardous waste	2,332	32,810	11,651	13,184	15,415
Hazardous waste	562	1,185	1,945	2,002	7,322
Recycled waste	983	32,085	11,149	12,660	15,022
Recycling rate	34%	94%	82%	83%	66%
<b>Goslar, Sarnia, Ganzhou</b>	<b>2,010</b>	<b>2,056</b>	<b>1,274</b>	<b>1,778</b>	<b>1,930</b>
Non-hazardous waste	1,622	1,784	975	1,444	1,124
Hazardous waste	388	271	298	334	805
Recycled waste	1,521	1,703	893	1,334	1,042
Recycling rate	76%	83%	70%	75%	54%

In Goslar and Sarnia, the by-products of the manufacturing process are often very rich in metals. So they are recycled by other companies, used as raw materials. Waste recycling rates at the Goslar and Sarnia plants are high, at 54% and 67% respectively. At the MTC plant, the rate of waste being recycled is also very high, reaching more than 71%, mainly coming from the use of leaching residues (PLR residues) that meet low grade lime standards to provide for the pH neutralization activities of Nui Phao.

At Sarnia plant, we continuously monitor new recycling and waste reduction opportunities. In 2022, significant gains were made in reduction of packaging materials by implementing returnable containers with strategic customers and utilizing cargo dunnage diverted from waste streams.

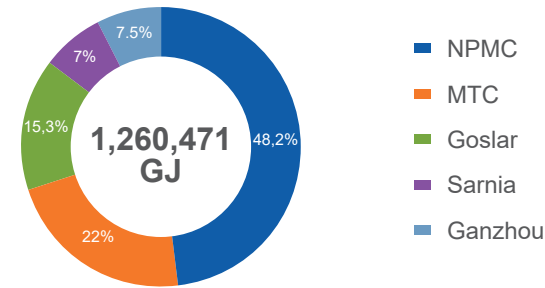


## ENERGY AND GREENHOUSE GAS EMISSION

### Energy consumption

Using energy economically and efficiently is a practical solution to help protect the environment and reduce greenhouse gas emissions. This is not only vital in the production and operations of business, but also for the socio-economic development of the country.

The total energy consumed across MHT plants in 2022 is 1,260,471 GJ. In which, NPMC, MTC and Goslar are the most energy intensive plants with consumption rates of 48.2%, 22% and 15.3% respectively. In Sarnia and Ganzhou, energy consumption is quite low, accounting for only 7.0% to 7.5% of MHT's overall energy use.



YEAR	2018	2019	2020	2021	2022
<b>Total of energy consumption (GJ)</b>	<b>1,260,757</b>	<b>1,165,386</b>	<b>1,084,324</b>	<b>1,309,427</b>	<b>1,260,471</b>
<b>NPMC and MTC</b>	<b>883,019</b>	<b>801,773</b>	<b>753,918</b>	<b>907,147</b>	<b>885,209</b>
Power	615,387	609,530	594,734	674,811	634,472
DO	33,054	42,685	45,054	53,379	65,507
Gasoline	2,144	2,186	1,549	1,700	2,017
Coal	232,435	147,373	112,581	177,256	183,213
<b>Goslar, Sarnia and Ganzhou</b>	<b>377,738</b>	<b>363,613</b>	<b>330,406</b>	<b>402,280</b>	<b>375,262</b>
Power	140,740	156,887	150,583	174,856	160,172
Natural gas	213,625	186,735	161,543	207,493	195,830
DO	22,420	19,020	17,282	18,783	1,087
FO	953	971	998	1,148	18,173

In 2022, MTC established an energy management system according to ISO 50001:2018 and obtained certification for it. The application of the ISO 50001:2018 will be a premise to control the use of energy in a strict, sustainable and systematic way in order to develop energy saving solutions.

The Goslar plant continues to maintain ISO 50001:2018 certification for energy management system. At Sarnia and Ganzhou plants, energy objectives are also established and continuous improvements that are made to demonstrate a commitment to improving energy efficiency.

At Sarnia plant, operating an environmental management system in accordance with ISO 14001:2015 includes not only compliance and specific environmental aspect objectives, but also implementation of improvements to reduce energy consumption to reduce carbon emissions and improve the dust capture of air borne particulates.

### Greenhouse gas emission

The main greenhouse gases (GHG) are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). The gases with low concentrations but with high potential for greenhouse gases are hydrofluorocarbons (HFCS), perfluorocarbons (PFCS), sulfur hexafluoride (SF<sub>6</sub>) and nitrogen and trifluoride (NF<sub>3</sub>). Our plants conducted 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<sub>2</sub> equivalent (CO<sub>2</sub>eq).

### 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. Especially, from 2022, NPMC and MTC have studied and calculated more greenhouse gas emissions from blasting activities and from refrigerants. In total, we directly emitted 38,561 tons of CO<sub>2</sub>eq in 2022, of which NPMC and MTC emitted 26,466 tons of CO<sub>2</sub>eq, HCS's Goslar, Sarnia and Ganzhou plants emitted 12,095 tons of CO<sub>2</sub>eq.





### Indirect GHG emissions (scope 2)

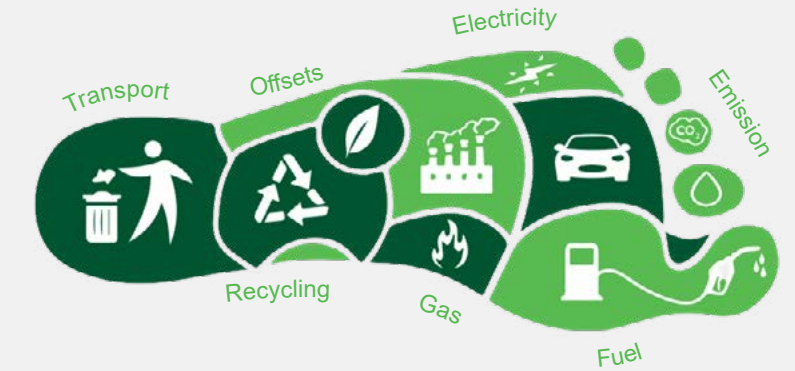
Indirect greenhouse gas emissions are generated from the use of power for all production and operational activities of factories. In 2022, we emitted 151,563 tons of CO<sub>2</sub>.

YEAR	2018	2019	2020	2021	2022
<b>Total of GHG emission volume (ton of CO<sub>2</sub>eq)</b>	<b>197,473</b>	<b>187,592</b>	<b>178,696</b>	<b>206,294</b>	<b>190,124</b>
Total of direct GHG	41,341	31,142	25,990	36,282	38,561
Total of indirect GHG	156,132	156,450	152,705	170,012	151,563
<b>NPMC and MTC</b>	<b>172,223</b>	<b>162,409</b>	<b>155,318</b>	<b>181,727</b>	<b>168,183</b>
Total of direct GHG	27,641	19,203	15,589	23,184	26,466
- From gasoline, diesel, fuel oil, coal	27,641	19,203	15,589	23,184	24,751
- From blast					1,565
- From refrigerants					150
Total of indirect GHG	144,582	143,206	139,729	158,543	141,716
<b>Goslar, Sarnia and Ganzhou</b>	<b>25,250</b>	<b>25,183</b>	<b>23,377</b>	<b>24,567</b>	<b>21,942</b>
Total of direct GHG	13,699	11,939	10,402	13,098	12,095
Total of indirect GHG	11,550	13,244	12,976	11,469	9,847

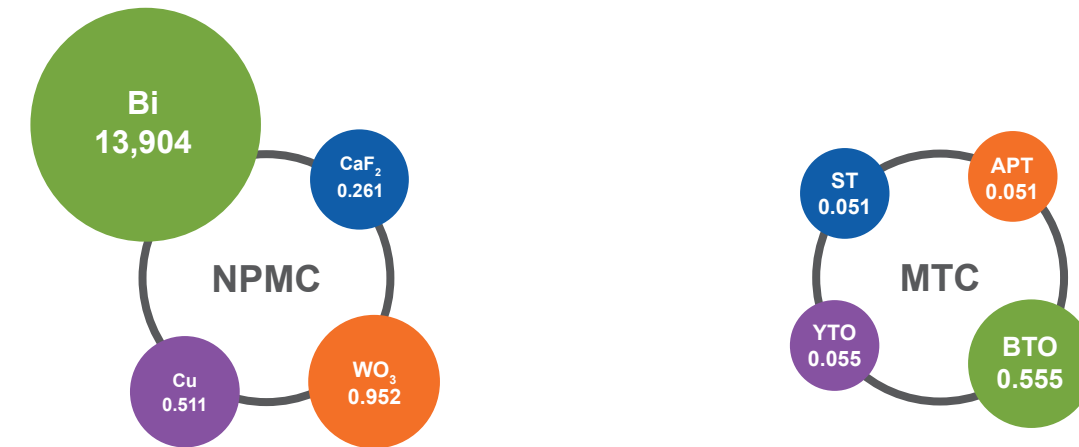
In 2022, a reverse osmosis plant was commissioned at the Goslar site in tungsten chemistry for the crystallization of ammonium metatungstate (AMT). It replaces an older, energy-intensive plant in which liquid was removed by heating the solution with steam. The energy saving (in terms of GJ) is approximately 80% - 95%. In addition, since the energy source changes from natural gas to "green" electricity, this process is now CO<sub>2</sub> neutral. The savings are around 1,000 tons of CO<sub>2</sub>eq per year.

### Carbon footprint

Carbon Footprint is the total amount of greenhouse gas emissions that come from the production, use and end of life of a product or service. At NPMC and MTC, we studied and initially calculated greenhouse gas emissions for each product line according to IPCC guidelines. This will be the premise for MHT to find solutions to control greenhouse gas emissions for each product when exporting to foreign countries.



The results of calculation of total greenhouse gas emissions for each product at NPMC and MTC are as follows:



Unit: tons of CO<sub>2</sub>eq/tons of product



## ENVIRONMENT REHABILITATION

In 2022, NPMC continued to conduct the rehabilitation plan in the areas where there is soil disturbance, and take care of trees planted from previous years in order to reduce erosion, improve soil and improve ecosystems.

During the year, we completed the environmental rehabilitation of approximately 1.15 hectares in waste dumps and other areas where the soil has been disturbed during the mining and production process. Many different types of plants and materials are used to increase efficiency in environmental rehabilitation.

In 2022, NPMC planted about 3,900 Acacia trees; 2,840 perennial woody plants; sowed 160 kg of grass seeds and used 4,128 kg of fertilizer for the new planting and care of planted trees in previous year. The total area that has been rehabilitated by the end of 2022 is 59.58ha.



Northern Waste Dump is planted with Acacia trees

### CPEP – Climate Protection Project through the Energy crops planting

From 2016 to 2018, NPMC participated in the Climate Protection Project through Energy crops Planting (CPEP) through a cooperation agreement program with UFU (Institute for Independent for Environmental Affairs - Germany). The project has obtained positive results when finding a suitable type of Acacia to serve the process of environmental rehabilitation of Nui Phao mine. Continuing the obtained results, from 2020 to 2022, NPMC will continue to coordinate with UFU to implement the CPEP phase 2 project with the purposes of: (i) Research on the resilience and reclamation of the area's land planted energy crops in phase 1; (ii) Calculation of biomass of Acacia after harvesting in 2022.

In 2022, NPMC collaborated with UFU to take soil and Acacia tree samples to study the soil improvement and carbon sequestration capacity of Acacia trees. Phase 2 of the CPEP project at Nui Phao mine has been agreed by NPMC and UFU to extend research cooperation until the end of February 2025 to obtain more information and analysis data to serve the evaluation of the project's effectiveness.

On September 23, 2022, at the workshop "Environment rehabilitation after mineral exploitation through planting energy crops - Opportunities and challenges", environmental experts from Vietnam and Germany both appreciated the positive values the project brought about in the improvement and restoration of the mine environment and contributes to the reduction of greenhouse gas emissions – adaptation to global climate change. Strengthening international cooperation will help NPMC have more opportunities to find more solutions to environmental protection, sustainable development in production and business activities.



Plant energy trees

## ENVIRONMENT COMPLIANCE AND TRANSPARENCY

### Environment monitoring

In 2022, NPMC and MTC took 8,756 environmental samples for monitoring and wastewater quality control. These include 603 surface water samples, 600 ground water samples, 7,164 wastewater samples, 324 solid waste and sediment samples, 32 emission gas samples, 16 ambient air samples and 17 noise measurements times.

Automatic monitoring stations for wastewater, ambient air and vibrations are also operated to always ensure timely provision of data 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 in 2021, and 28 samples in 2022. 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).



Wastewater monitoring at DP2, NPMC



### Reporting and information transparency

In 2022, NPMC and MTC submitted a total of 6 reports to regulators, in which: 4 annual environmental reports, 2 reports on annual water resources.

In addition, within NPMC and MTC, in order to provide timely information on the implementation plan of the recommendations of MONRE (according to the 2017 inspection conclusions), in 2022, we submitted 3 updated quarterly reports on the implementation progress to VEA, DONRE and Dai Tu District.

Through two periodic inspections by the Ministry of Natural Resources and Environment in 2022, the NPMC's efforts and efforts for environmental protection have been recognized. The lining TSF-SP pond has been carried out by NPMC since the end of October 2021 and completed in March 2022.

In Germany, HCS submitted a total of 12 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 2022, a report for one emission source was prepared.



Completed the TSF-SP pond lining

### Promote environmental education and training

Within the framework of the entry training program for new employees of the Company and contractors, 305 new employees of the Company and 1,038 new employees of the contractors received Environment training as part of the entry training program at NPMC and MTC in 2022. Through training classes on Environmental Policy, waste classification and plastic waste reduction, people have gone from understanding to concern, from awareness to action to protect the environment.

Besides, the Company hosted events in response to the World Environment Day 2022, Clean-up the world campaign 2022 for the neighboring communes near the Nui Phao Project, including Ha Thuong, Tan Linh, Phuc Linh, and Hung Son.

### Environmental Management System according to ISO 14001:2015 standard

Given society's growing concern over environmental protection, the establishment of a management system to minimize negative impacts from production activities is more and more focused on businesses. At MTC, the Environmental Management System (EMS) according to ISO 14001:2015 has been established and maintained voluntarily from 2017 till now.

The EMS of MTC (formerly Nui Phao Tungsten Refining Company Limited – H.C.Starck) has been certified by TÜV Nord Cert GmbH to conform to the requirements of the ISO 14001:2015 standard with effect from January 21st, 2017 to January 12th, 2020.

In 2019, the re-certification the conformity of EMS with the requirements of the ISO 14001:2015 standard carried out by BSI was successful. MTC received ISO 14001:2015 Certificate for the next 3-year period, valid from February 21st, 2020 to January 12th, 2023. In 2022, MTC continues to contract with the BSI to carry out a re-certification of conformity with the requirements of ISO 14001:2015 and has been certified by BSI for the next 3 years. Valid from February 21st, 2023 to January 12th, 2026

At Goslar, Sarnia and Ganzhou, the EMS according to ISO 14001:2015 standard continues to be maintained.

The Goslar site was validated in September 2022 in accordance with the Eco Management and Audit Scheme (EMAS), the world's strictest environmental standard.

At NPMC, we are also establishing and developing the EMS according to ISO 14001:2015 standard and is planning for certification audit in the near future.



### Environmental licenses for Nam Song Cong and Hung Son 3 resettlement areas

Two resettlement zones, Nam Song Cong and Hung Son 3, Hung Son town, and Dai Tu district, were established to address the housing needs of the displaced households in the Nui Phao project area. Construction on these two resettlement zones started in 2006, and households moved in by 2008. For the resettlement region, NPMC has constructed infrastructure including housing lots, roads, a drainage system, and a domestic wastewater treatment facility. NPMC currently only operates a domestic wastewater treatment station and has transferred assets and technical infrastructure work of the resettlement area for homes. It has a residential wastewater treatment station with a designed capacity of 400 m³/day in the Nam Song Cong resettlement area and one with a designed capacity of 80 m³/day in the Hung Son 3 resettlement area.

In 2012, Thai Nguyen Provincial People's Committee issued wastewater discharge licenses for two resettlement areas to discharge wastewater reaching column B, QCVN 14:2008/BTNMT (National technical regulation on domestic wastewater) after treatment at the station to discharge waste into the Cong River. However, based on the planning for allocation and protection of surface water resources in Thai Nguyen province, the Cong River is a water source exploited to serve domestic purposes. Therefore, Thai Nguyen Provincial People's Committee has recommended to NPMC that wastewater treatment be done at domestic wastewater treatment stations of two resettlement areas to ensure the achievement of column A, QCVN 14:2008/BTNMT. Based on the recommendation of Thai Nguyen Provincial People's Committee, NPMC has renovated and upgraded two domestic wastewater treatment stations of the resettlement area from 2019. From 2020 to 2021, NPMC conducted commissioning operation of the two stations in accordance with the law. The treatment results show that the output wastewater quality is within the allowable limits of column A, QCVN 14:2008/BTNMT.

According to the provisions of the Law on Environmental Protection 2020, effective from 2022, these two resettlement areas need an Environmental License. Therefore, NPMC has prepared and completed the dossiers and procedures to apply for this License for the resettlement area. Based on the dossier submitted by NPMC along with the results of the actual inspection, Thai Nguyen Provincial People's Committee has appraised and approved of the Environmental Licenses for the two resettlement areas.

Investing in the resettlement area, building a domestic wastewater treatment station for residents, and completing relevant environmental procedures is also a way for NPMC to demonstrate its commitment to sharing benefits, sustainable development with the community.



## Focus in 2023

- Complete all requirements in compliance with the EIA report approval and current regulations

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- Approval for EIA report of New Mining License

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- Establish the EIA report of Tungsten recycling project

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- Development of an energy concept for the Goslar with the aim of achieving a regenerative energy supply independent of external suppliers

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- Development of an energy concept taking into account renewable energies and self-sufficiency for Goslar.

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- Addition of Scope 3 to the carbon footprint determination, verification of the calculation by independent third parties.



## SUSTAINABILITY COMMUNITY

### 2022 HIGHLIGHTS



#### Economic Recovery Fund

- 133 households are beneficiaries from the Economic Recovery Fund with a total capital of VND 6.3 billion.
- 100% of households improved their economic conditions.
- 53 households eligible to access the loan capital with a total of VND 2,618 billion to implement the household economic development models.



#### Health, Water and Sanitation

- 40 Fingertip Pulse Oximeters worth VND 18 million were donated to the Health Center of Dai Tu district
- 1,000 Covid-19 test kits worth VND 82.5 million provided for five communes adjacent to Nui Phao Project
- Health examinations and medicine provision for 200 policy beneficiaries at two poor communes with the total medicine budget of VND 30 million
- Portable water supply to 91 households worth VND 349 million



#### Economic Development Model

- **Tea production linkage model:** Supported Khuon Ga tea cooperative Group, Hung Son town to visit and study tea production practices and seek production linkage in Tan Cuong commune with the purpose of establishing a tea cooperative.
- **Honey beekeeping linkage model:** Supported Tan Linh commune's Honeybee cooperative group in training on beekeeping technique, bought three four-frame honey extractors, visited the beekeeping and product packaging model
- **Product consumption support** for Nhat Thuc tea Cooperative and Tan Linh honey Cooperative Group



#### Humanitarian and Charity Activities

- 200 Tet gifts for poor households worth VND100 million
- 20 gift sets for policy beneficiary families in the program of introducing Vietnam products to mountainous area
- 40 scholarships to disadvantaged students totaling VND40 million
- VND15 million support for 350 students to take the national high school graduation examination in two days





## ECONOMIC RECOVERY FUND

In 2022, MHT worked with the Dai Tu district Social Policy Bank, trust organizations of Ha Thuong, Hung Son town, Phuc Linh and Tan Linh communes to verify 53 households' eligibility for disbursements of loan capital to implement the household economic development models. Specifically, these 53 households were engaged in the following activities:



with a total loan amount of  
**VND2.6** billion

By the end of 2022, 133 households have benefited from the fund with a total capital of

**VND6.3** billion

### Vu Thi Sinh (Bui Van An) household, hamlet 12, Tan Linh commune

Mrs. Sinh's family is a near-poor household of five (with three workers). Ms. Sinh and her husband take care of their 93-year-old mother and one child who is a first-year student. In 2022, her family borrowed VND 30 million from the Company's Economic Recovery Fund to invest in another 15 honey beehives, for a total of more than 30 honey beehives. In 2022, the first-year honey production grew by 1.5 times, from 2.5 quintals to 6-7 quintals. With their hard work and perseverance, their life is gradually transforming and escaped poverty. For seven months, their beekeeping income jumped from VND 45 million up to VND 108 million.

“I'm so grateful to the Company for providing us a preferential loan when we were in difficulty. It helps us develop family economy and take care of our children. Due to my weakened health, I have gradually shifted from cultivating tea to honey beekeeping. Through Tan Linh beekeeping cooperative, my family received support from the Company in the form of a preferential loan, and got the chance to participate in technical training and visit beekeeping models, thanks to which we could enhance our beekeeping techniques, thus boosting productivity and improving product quality. Therefore, our family economy becomes better and more stable. I would like to thank Nui Phao Company very much.” Mrs. Sinh said.



## ECONOMIC RECOVERY

### Agricultural Extension

#### Linkage in tea production, processing and consumption

Over the recent years, the Company supported Khuon Ga 2 tea Cooperative Group, Hung Son town in the technical training and economical tea irrigation system to change to VietGAP tea production. In 2022, the Company continued to support 30 members of the cooperative group in study visit to the production-consumption linkage models under Tan Cuong Tea Cooperative model. The study visit serves as a basis for the cooperative group to establish a cooperative and build a local tea brand that will improve the product quality and value as well as consuming market accessibility.

#### Support Nhat Thuc Tea Cooperative in product consumption

Over the past years, the Company has supported Nhat Thuc Tea Cooperative in developing a raw material region based on organic tea and VietGAP tea standards as well as accessing the Economic Recovery Fund to invest in and expand its production and business. Up to now, the Cooperative has produced various products of the OCOP standards and created stable jobs for about 15 employees with disadvantaged conditions (ethnic minority and elderly people), with a stable income of VND 4.5 to 5 million per month. In 2022, the Cooperative continued to receive support from the Company in product consumption through registration as a service supplier to the Company.

#### Linkage in honey beekeeping

Tan Linh beekeeping Cooperative Group, with the Company's support, was established in 2020, where its members support each other in beekeeping techniques, cooperate, and share experience of processing, quality control, and product consumption. Previously, the Cooperative Group's product quality and consumption market were not stable. So, in 2022, the Company invited experts from Thai Nguyen Gardening Association to share experience in production, processing to ensure the quality and food hygiene; organized study tours for members to An Khanh Beekeeping Cooperative; supported three four-stainless frame honey extractors. Besides, the Company also supported in designing product labels and package and registered the Cooperative Group as a honey supplier for the Company.



### Recruitment support

In 2022, the Community Relations team coordinated with Human Resources Department to hire 05 local people affected by Nui Phao project.





### Local service supply business

Anh Duong Packaging Company, with the Company's support, was founded in 2013 with 17 employees with the aim of becoming a supplier of Jumbo bags to MHT. Anh Duong Packaging Company has extended the international market and equipped a production line from tape stretching to final packaging after ten years of development. Along with providing Jumbo bags to Nui Phao Corporation, the business has also gotten a significant number of orders from South Korea and Japan. 130 workers made up the company's whole workforce in 2022, and each earned an average of VND 6 million.

Khanh Hien Tailor was supported to establish in 2014, is a protective clothing supplier for Nui Phao Company. Up to now, Khanh Hien Tailor has also supplied protective clothes for SGS Contractor and made clothes for local people. In 2022, the company employed nine female workers out of working age with an average income of VND 5 million per month.

Nui Phao catering service was established in 2015 under the economic recovery program for Nui Phao Project's affected households. In 2022, these kiosks delivered meals that meet food safety and hygiene standards for more than 1,000 MHT employees. Nui Phao catering service employs 10 people, each earning an average monthly income of VND 5 million.



## CORPORATE SOCIAL RESPONSIBILITY ACTIVITIES

### World Environment Day activities

On the occasion of the World Environment Day, June 5<sup>th</sup>, the Company organized four communication sessions to raise public awareness about waste classification at source for nearly 20 female members at four communes adjacent to the Company; supported garbage trolley and dustbins and planted trees in the cultural houses accounting for VND 39.7 million. On the Clean-up the World Campaign, the Company communicated to raise awareness about environmental protection for more than 800 students at two secondary schools in Ha Thuong and Tan Linh communes.

As part of its ongoing efforts to aid the community in the prevention and control of Covid-19, the company gave 1,000 Covid-19 test kits for the Company's neighboring communes as well as 40 fingertip pulse oximeters to the Dai Tu District Medical Center. The total support value is more than VND 100 million.

### Mid-Autumn Festival for children

On the occasion of the Mid-Autumn Festival, the Company organized mid-autumn festival celebrating activities for children in the communes near the Nui Phao Project, with folk games and quizzes with gifts worth VND 30 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 in the project area.

### Tribute to war veterans

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, martyrs 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 in Ha Thuong, Tan Linh, Phuc Linh communes and Hung Son town worth VND 25 million. Also in this occasion, the Company assigned a team of doctors, medical staff and volunteers to join in a free-of-charge health examination and medication provision for 200 policy beneficiaries from twos disadvantaged towns of Tan Linh and Phu Thinh, with the medication value of VND 30 million.

### Educational support

In 2022 the National high school graduation examination assistance program was successfully carried out. We supported 60 boxes of bottled water, VND 10 million for food and mobilized more than 10 employees from the Company to voluntarily cook and distribute free lunch packs and drinking water to 350 students within 2 days of the national high school graduation examination.

The Company also donated VND 30 million for investment in research equipment for the key laboratory of the Mining and Geology University, contributing to the enhancement of teaching and learning quality of the university.

### Infrastructure development

In 2022, the Company contributed outdoor sport sets at the cultural houses and flower gardens in 3 resettlement areas and 3 hamlets near the Project; supported in installation of surveillance camera and lighting systems for 4 communes/towns; gave stone bench for schools on the occasion of the opening ceremony of the new school year; constructed irrigation channels, worth VND 200 million in total. These contributions not only help improve the community health, ensure social security and order, but also enable the locality to gradually complete the goals of building an advanced new rural area.

The company also provided clean water for 91 households, 349 people in hamlets 2 and 6, Ha Thuong commune, totaling VND 626 million.

### Supporting local social-cultural activities

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 Company actively participated in social-cultural activities in the local area such as: Celebration of 100 years of establishment and development of Dai Tu district; the National Great Unity Day at residential areas; the establishment days of political, social organizations and summary of annual performance at communes and other religious and belief activities, etc. with a total value of VND 50 million.



## ACHIEVEMENTS 2022



Continued to support Tea cooperative Groups and Tea Cooperatives to link in production and product consumption.



Supported the beekeeping cooperative Group in technical training, processing equipment, package design and product consumption.



Actively participated in social-cultural, humanity and charity activities in Dai Tu district and Thai Nguyen province.



Supported to complete social-economic infrastructure works in the locality.



Organized communication trainings to raise awareness about environmental protection for nearly 1,000 people, including students and women.



Donated equipment and supplies for prevention and treatment of patients with Covid-19.



## 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 2022 as follows.

**812** Information items published with 133 contents

**67** Meetings, field inspection and community consultations with 473 participants

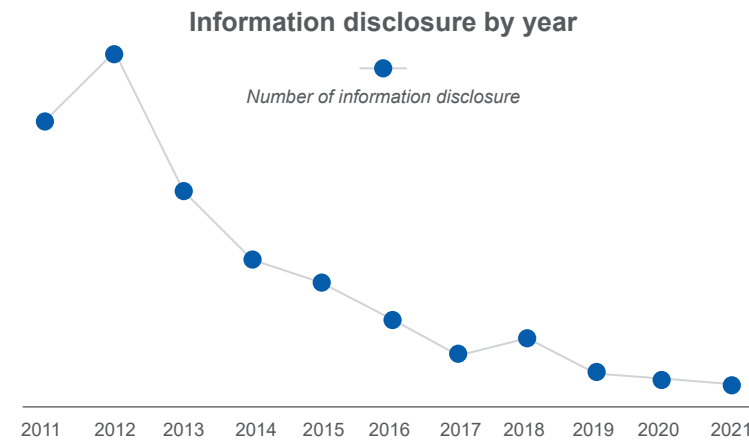
**31** Written complaints resolved





### Diversified Information Disclosure Channels

At MHT, a variety of channels to disseminate information were deployed with the aim 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.



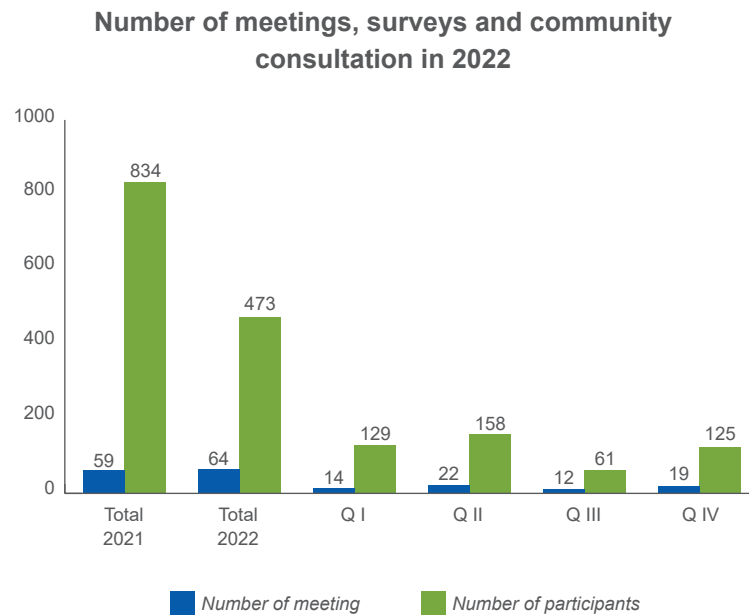
### PCDP - an approachable communication channel for communities

In 2022, 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.

Information was mainly exchanged and communicated to the community through written documents, mobile phone and Zalo app instead of directly coming to the Information Center.

In 2022, there were 812 information documents disclosed with 133 contents, 11 direct visits and hundreds of phone calls to the Company's Information Center.

During the year, the community relation team conducted 67 meetings, surveys and community consultation with 473 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

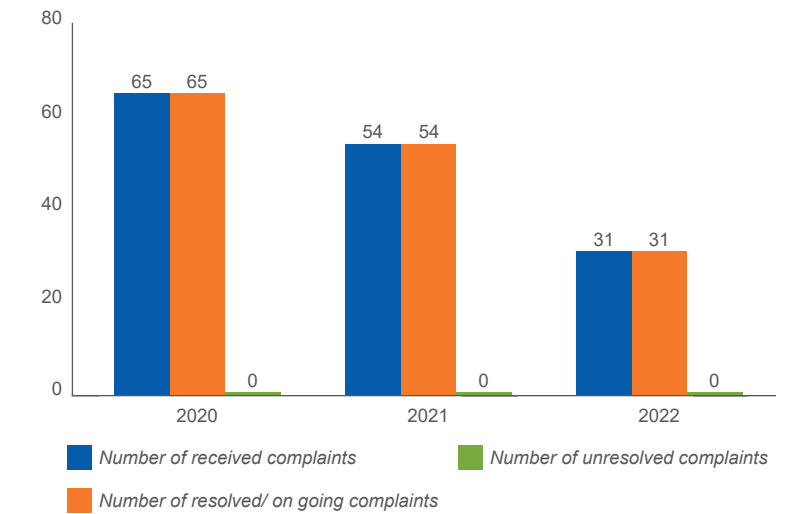


### Complaint and Grievance Resolution

#### MHT Vietnam

In 2022, we received 31 written petitions all of which were forwarded, connected to relevant departments/team within the company as well as required involvement of local authorities to address the petitions. 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 that may occur. Consultation is also strengthened with the involvement of community to address their concerns or queries in a timely manner.

### Complaints and grievance 2020 - 2022



#### 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 2022 only 2 incidents 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:

- Complaint about noise: a "turbine-like" noise was heard
- Visible leakage of nitrous gases

In both cases, the causes were identified and appropriate measures were taken. This was reported back to the respective complainant.

This continues the positive trend from previous years. After 7 complaints in 2020 and 4 in 2021, the number of the previous year was halved in 2022. This is due, among other things, to the consistent follow-up of complaints.

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.







## LAUNCH OF WHISTLEBLOWING SYSTEM 'YOUR VOICE MATTERS'

Misconduct can have a detrimental impact on our workplace and reputation. Only by reporting misconduct can we prevent such behavior and ensure a FAIR, SAFE AND TRANSPARENT WORK ENVIRONMENT.

Derived from the EU directive requiring companies with more than 50 employees to provide a platform whereby anyone with concerns can raise the matter securely, anonymously and without fear of punishment, MHT has decided to expand our capabilities to all of our overseas sites even if our legal duties only apply to the European Union because we believe this to be a best practice in the business.

At the end of 2022, MHT partnered with Deloitte - a qualified and experienced provider who not only operates these services but also provides numerous global companies with similar systems. In developing 'Your Voice Matters'. This is an independent whistleblowing system managed by Deloitte on behalf of Masan High-Tech Materials for all of our subsidiaries with five languages, including Vietnamese, English, German, Chinese and Japanese.

This system is designed to receive disclosures relating to the matters below:

- Bullying
- Bribery/Corruption
- Conflict of interest; Discrimination
- Policy/procedure breach
- Health/Safety/Environment
- Fraud
- Sexual harassment and assault
- Misconduct
- Theft
- Other serious violations

The report will be made anonymously and delivered to a dedicated representative at Masan High-Tech Materials within one business day. Reports are 100% confidential, reporters are not required to reveal their personal information unless they want to.

'Your Voice Matters' is considered the most constructive foundation for MHT's problem solving, integrity and quality improvement, with an aim to creating a fair, safe and transparent workplace that values Respect – Innovation - Results.



### YOUR VOICE MATTERS WHISTLEBLOWING SYSTEM

Scan QR code for information



## 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 in 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.

#### Tree care and watering

Having supported a local initiative that engages in local reforestation projects in 2021 already, a group of employees has continued its commitment: This time, the focus has been on tree care and watering to face the drought that had put stress on the young plants during the summer months.



Having had planted hundreds of trees the previous winter, employees took care of them, cutting back blackberry bushes



Supported by one of the site's fire trucks, the team watered the young plants

#### Donations

The company continued donating to various local organizations, such as sports clubs and the city's youth welfare, to support activities and projects that benefit the regions' youth and their education and to acknowledge their achievements and contributions to a more sustainable society.

Extending our engagement, the company decided to break with one of its traditions by not sending any Christmas gifts to business partners anymore. Instead, the funds were donated to charity to help children in need.

#### Celebrating the rich heritage of Goslar

On the occasion of the 1,100<sup>th</sup> anniversary of Goslar, H.C. Starck Tungsten and ChemiLytics were able to present themselves to residents and tourists. There were a lot of engaging discussions and intriguing stories, demonstrating how significant H.C. Starck was and continues to be for the city.



A group of employees at the economical exposition



**Community transparency on Open Day at Goslar site**

The close proximity of the Goslar site means that we bear a special responsibility for our neighbors, so we were pleased to invite all interested parties to an open day on our plant premises. In September more than 1,500 visitors came to see what goes on behind the scenes of H.C. Starck Tungsten and ChemiLytics. Through an exhibition, visitors were invited to find out more about products, company history and specific sustainability projects. There was further a possibility to take guided tours of the research and the production facilities. The presentation of the training program also aroused great interest among the young people. In the meantime, the youngest had fun at the kids' playground.



Visitors received first-hand information from employees



Of course, fun for the little ones has not been missed out on the open day



The training program met with great interest

**Design competition for UN's Sustainable Development Goals**

H.C. Starck Tungsten has installed 17 new EV charging points for employees. In order to bring more focus to sustainable efforts, we announced a competition in which young people could participate and create designs related to the Sustainable Development Goals of the United Nations. This competition was a great success, and we were able to unveil the charging points on the Open Day and honored the participants.



Installed EV charging points raise awareness for the Sustainable Development Goals



### 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 2022.

#### Christmas parties

Two Christmas parties are hosted annually one specifically caters to employees with young families (children under 12) and the other is a formal event for adults only.

#### “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 2022, H.C. Starck in Sarnia donated money in order to buy Christmas gifts for under privileged children in the community, including five children. Through this act, we provide employees with an opportunity to be actively involved in supporting a local charity and underprivileged children.

#### Celebration of Lights

Set-up of annual light display in the central community park. The Celebration of Lights is a spectacular display in which the Sarnia- Lambton county



Christmas Party

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 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.

#### Golf

The annual Golf tournament is a highlight on the social calendar and is well attended by employees and retirees alike.

#### Sponsorship

Two sport activities were sponsored by H.C. Starck in Sarnia. On the one hand, an indigenous youth summer sports camp was held at the Aamjiwnaang First Nation. On the other hand, a provincial high school basketball tournament in Sarnia.



Winning Team Golf Day



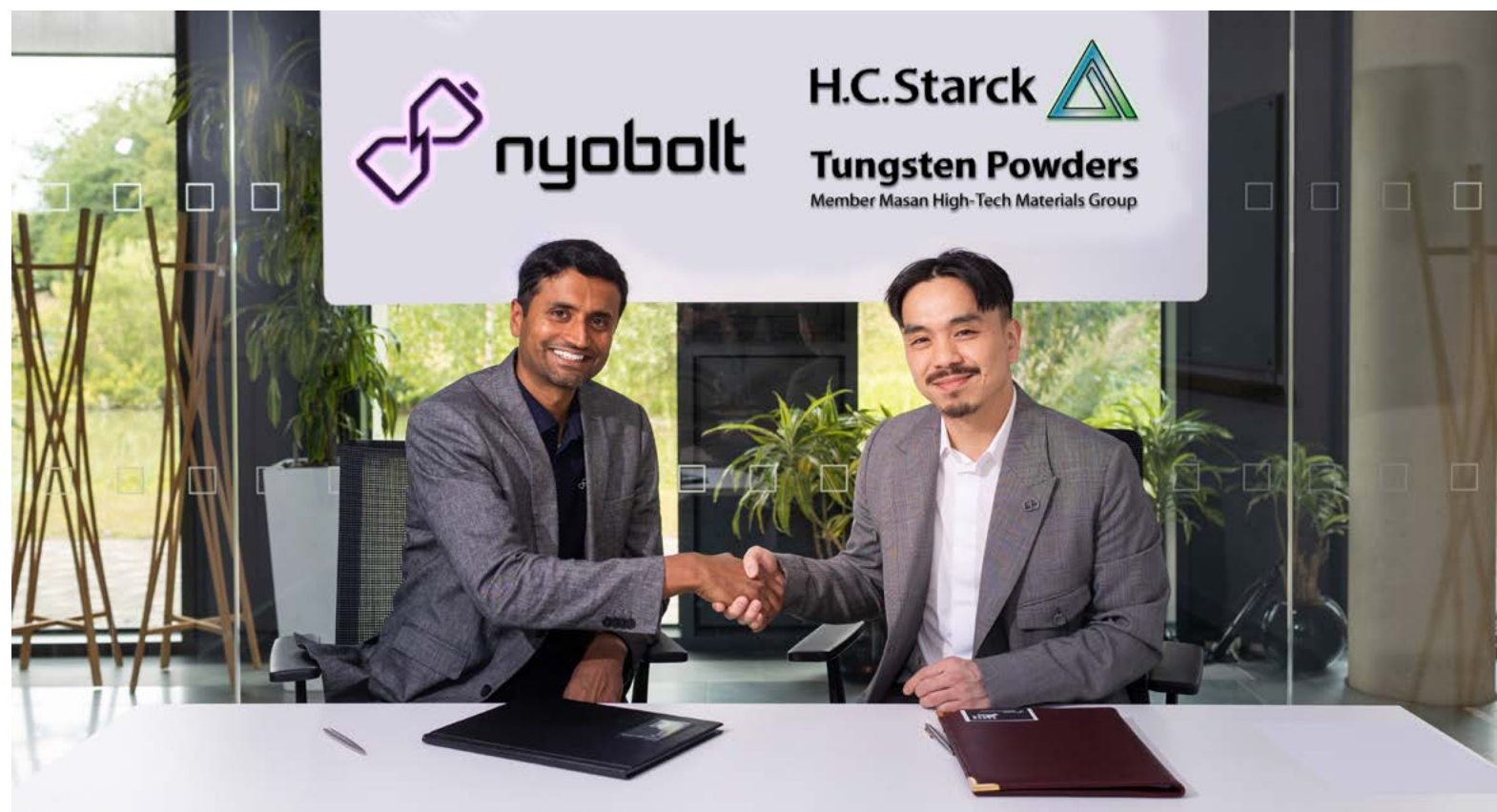


## FINANCE OVERVIEW

On the back of ongoing continued strong demand and pricing for Tungsten products, Masan High-Tech Materials Corporation (“Company” or “MHT”) delivered the full year 2022 record revenue of VND15,550 billion, a significant improvement of VND1,985 billion over FY2021. The Company’s EBITDA was VND3,203 billion, an increase of 4% compared to 2021 and the second-highest EBITDA ever achieved. The attributed NPAT Post-MI was VND69 billion – a reduction of 65% over FY2021 (VND196 billion) primarily due to the impact of higher input raw material and processing costs.

On 15 July 2022 HCS executed definitive agreements to invest £45m (approx. €52m) into Nyobolt Limited (“Nyobolt”), a fast-charging Li-ion battery solutions company. This investment is expected to accelerate MHT’s vision of becoming a high-tech, value-added business by developing new tungsten applications critical for the technologies of the future.

MHT has continued to maintain the salaries, bonuses to the employees, fulfill its tax obligations and fees payment responsibilities to the Vietnam state and provincial budget which amounted to VND1,046 billion among incurred VND1,363 billion for FY2022.



Representatives of HCS and Nyobolt shake hands at a signing ceremony on July 15 in Germany

Net Revenue increased by

**15%**

EBITDA increased by

**4%**

HCS recorded a revenue increase of

**12%**

Contribution to state government budget increase of

**34%**  
at **VND268 billion**



## CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This communication contains information that may constitute “forward-looking statements”. Generally, the words “believe”, “expect”, “intend”, “aim”, “estimate”, “anticipate”, “project”, “will” and similar expressions identify forward-looking statements, which generally are not historical in nature. However, the absence of these words or similar expressions does not mean that a statement is not forward-looking. All statements that address operating performance, events or developments that we expect or anticipate will occur in the future – including statements relating to volume growth, share of sales and earnings per share growth, and statements expressing general views about future operating results – are forward-looking statements.

Management believes that these forward-looking statements are reasonable as and when made. However, caution should be taken not to place undue reliance on any such forward-looking statements because such statements speak only as of the date when made. Masan High-Tech Materials Corporation undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. In addition, forward-looking statements are subject to certain risks and uncertainties that could cause audited results to differ materially from our company’s historical experience and our present expectations or projections. These risks include commodity pricing risks and the prices

we obtain for our Tungsten, Copper, Fluorspar and Bismuth are determined by, or linked to, prices in world markets, which have historically been subject to substantial volatility. Fluctuations in commodity prices can occur due to price shifts reflecting underlying global economic and geopolitical factors, industry demand, increased supply due to the development of new productive resources, technological change, product substitution and national tariffs. Volatility in global economic growth has the potential to adversely impact future demand and prices for commodities. This has the potential to negatively impact future earnings and cash flows. These risks and uncertainties include, but are not limited to, those described elsewhere in this report and those described from time to time in our future reports filed with the Hanoi Stock Exchange.

This communication is not for distribution in the United States. This communication and the information contained herein are not an offer of securities for sale in the United States. Securities may not be offered or sold in the United States absent registration pursuant to the U.S. Securities Act of 1933, as amended, or an exemption from registration. Any public offering of securities to be made in the United States will be made by means of a prospectus that may be obtained from the issuer or selling security holder and that will contain detailed information about the company and management, as well as financial statements.

### CONFIRMATION BY THE COMPANY’S LEGAL REPRESENTATIVE



**Craig Richard Bradshaw**  
Chief Executive Officer

## 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
CHES	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
EMAS	Eco Management and Audit Scheme
E-PRTR	European Pollutant Release and Transfer Register
ERD	Economic Restoration Development
FA	Fatal Accidents
FY	Financial Year



GDP	Gross Domestic Product	MTC	Masan Tungsten Limited Liability Company
H.C. Starck or HCS	H.C. Starck Tungsten Powders	mtu	1mtu = 10kg
HC	Headcount	NHTCM	Nui Phao - H.C. Starck Tungsten Chemicals Manufacturing
HNX	The Hanoi Stock Exchange	NPAT	Net Profit After Tax
HR	Human Resources	NPMC	Nui Phao Mining Company Ltd
HRD	Human Resources Department	PCDP	Public consultation and information disclosure program
HSD	Hill Side Dyke	PROC	Processing
HSS	Health, Safety and Security Department	R&D	Research & Development
IC	Integrated Circuit	RMI	Responsible Minerals Initiative
IED	Industrial Emissions Directive	RMIP	Raw Material & Inventory Planning
IT	Information technology	S&M	Sales and Marketing
ITIA	The International Tungsten Industry Association	SCM	Supply chain management
ITLC	International Trade law & Customs	THW	Total Hours Worked
ITRB	Independent Tailings Review Board	TNTI	Thai Nguyen Trading and Investment Company Limited
Law on Enterprises	Law on Enterprises No. 68/2014/QH13 dated November 26, 2014 of the National Assembly of the Socialist Republic of Vietnam	TRC	Total Recordable Cases
LCD	Liquid Crystal Display	TRCR	Total Recordable Cases Rate
LTI	Lost-Time-Injury	TRIFR	Total Recordable Injuries Frequency Rate
LTIFR	Lost Time Injury Frequency Rate	TSF	Tailings Storage Facility
M&A	Mergers and Acquisitions	USD or US\$ or \$	The official currency of United States of America
M&G	Mining & Geology	USQ	German Severity Rate
MAINT	Maintenance	VAS	Vietnamese Accounting Standards
MAQ	German Accident Rate	VAT	Value-added tax
Masan Group	MSN and its subsidiaries	VBCSD	Vietnam Business Council for Sustainable Development
Masan Horizon or MH	Masan Horizon Company Limited	VND	The official currency of Vietnam
Masan Resources or MSR	Masan Resources Corporation	VNR	Vietnam Report Corporation
MCH	Masan Consumer Corporation		
MHT	Masan High-Tech Materials Corporation		
MNSMML	Masan Nutri-Science Corporation Masan MEATLife Corporation		
MONRE	Ministry of Natural Resources and Environment		
MRTN	Masan Thai Nguyen Resources Company Limited		
MSN	Masan Group Corporation		





**GROWTH THROUGH  
SUSTAINABILITY**

