



## **Research study (initial coverage)**

**A.H.T. Syngas Technology N.V.**



**Growth strategy to become a multinational CleanTec  
and clean energy providers;  
Financial year 2023 successfully concluded with record sales,  
record earnings and a promising backlog according to  
preliminary figures**

**Target price: € 37.50**

**Rating: BUY**

### **IMPORTANT NOTICE:**

Please note the disclaimer/risk warning  
and the disclosure of potential conflicts of interest in accordance with Section 85 WpHG and Art. 20 MAR from page 40

Note in accordance with MiFID II regulation for "minor non-monetary benefit" research: This research fulfills the requirements for classification as a "minor non-monetary benefit". Further information on this can be found in the disclosure under "I. Research under MiFID II"

Date and time of completion of the study (german version): 22.04.2024 (3:50 pm)  
Date and time of the first dissemination of the study (german version): 23.04.2024 (10:30 am)  
Date and time of completion of the study (english version): 13.05.2024 (4:45 pm)  
Date and time of the first dissemination of the study (english version): 14.05.2024 (10:00 am)  
Validity of the price target: until max. 31.12.2024

## A.H.T Syngas Technology N.V. \*5a, 5b, 11

Rating: BUY

Target price: € 37.50

current price: 23.00

22.04.24 / XETRA / 09:06 a.m.

Currency: EUR

### Master data:

ISIN: NL0010872388

WKN: A12AGY

Stock exchange symbol: 3SQ1

Number of shares<sup>3</sup>: 2.34

Market cap<sup>3</sup>: 52.42

Enterprise value<sup>3</sup>: 49.85

in million / in million EUR

Transparency level:

Regulated unofficial market

market segment:

Open market

Accounting:

DUTCH GAAP

End of FY: 31.12.

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### Company profile

Industry: technology

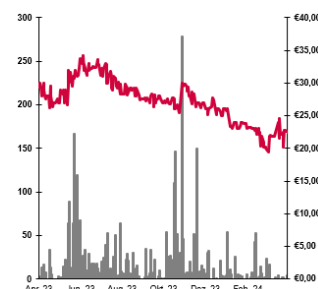
Focus: construction of CleanTec systems; contracting

Foundation: 2007

Employees: 22

Company headquarters: Overath, Bonn

Management Board: Gero Ferges, Dr. Diego Freydl



The business model of AHT Syngas Technology (AHT for short) is based on a mature and robust technology for environmentally friendly energy generation that dates back to the former Klöckner Humboldt Deutz AG. AHT has evolved into a globally active company that focuses on the development of technologies for converting carbon-containing fuels into synthesis gases. Specifically, the company develops, plans and sells innovative decentralized power plants and gas purification systems worldwide. The range of services includes compact/biomass power plants, hot gas systems for purely industrial heat applications, clean gas systems for decentralized power plants for electricity generation as well as project planning, project management and maintenance services. AHT is increasingly acting as a provider of CleanTec solutions. With its highly efficient systems, the company is making a significant contribution to defossilization and decarbonization and is thus operating in future markets.

Income statement in EURm	FY 22	FY 23e	FY 24e	FY 25e	FY 26e	FY 27e	FY 28e
Turnover	1.93	12.12*	24.30	36.40	40.35	46.25	77.15
EBITDA	-0.37	1.23	1.86	3.34	4.55	6.41	12.72
EBIT	-0.49	1.07	1.71	3.03	3.62	4.54	9.91
Net income	-0.42	0.86*	1.19	2.12	2.49	3.06	6.76

\*according to preliminary figures

### Key figures in EUR

Earnings per share	-0.18	0.37	0.51	0.91	1.06	1.31	2.89
Dividend per share	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### Key figures

EV/sales	25.83	4.11	2.05	1.37	1.24	1.08	0.65
EV/EBITDA	neg.	48.87	26.80	14.92	10.96	7.78	3.92
EV/EBIT	neg.	57.96	29.32	16.45	13.77	10.98	5.03
KGv	neg.	87.36	44.5	24.72	21.05	17.13	7.75
KBV	14.73						

### Financial dates

24.04.24: Munich Capital Market Conference

13.05.24 - 15.05.24: Spring conference

### \*\*Latest research from GBC:

Date: Publication / Target price in EUR / Rating

-

\*\* The research studies listed above can be viewed at [www.gbc-ag.de](http://www.gbc-ag.de) or requested from GBC AG, Halderstr. 27, D86150 Augsburg, Germany

\* Catalog of potential conflicts of interest on page 42

Naturally, measurement approaches as at the reporting date could lead to shifts in sales for deliveries that extend beyond a reporting date (percentage of completion or revenue recognition). We see such a risk in a corridor of +/-10%.

## EXECUTIVE SUMMARY

- AHT Syngas Technology N.V. (AHT) is a global company that develops technologies for converting carbon-based fuels into synthesis gas. The company focuses on the development, system integration and sale of decentralized power plants and gas purification systems. AHT's range of services includes, for example, compact/biomass power plants, hot gas systems for purely industrial heat applications, clean gas systems for decentralized power generation plants as well as project planning, project management and maintenance services. The AHT plants are designed to convert carbonaceous fuels such as biomass, wood, waste and coal into synthesis gas. The synthesis gas can be used as a feedstock for various applications such as power generation, heat generation and the production of chemicals and fuels.
- In recent financial years, AHT has further developed its technology and made useful additions through acquisitions. With the acquisition of FHT Hydrogen Separations GmbH, the production of hydrogen will also be an integral part of AHT's plants in future. Know-how in the field of biomass processing is pooled in the subsidiary aremtech GmbH. This will create the basis for supplying the company's own plants and at the same time lay the foundations for the future trade and sale of processed biogenic materials. Thanks to aremtech's know-how and the addition of additives, a standardized, CO<sub>2</sub>-neutral feedstock can be created from a mixture of waste materials.
- Thanks to this addition, AHT's technology covers the entire value chain of plant operation, from the provision of input materials to the generation of energy and heat. The proof of concept for AHT technology was achieved by winning a major framework agreement to supply plants to a Japanese customer. This is an important milestone for the company, especially as the contract for the delivery of 20 plants comprises an order volume of around € 160 million.
- Parallel to this important milestone, AHT intends to fully exploit the potential of its technology and also position itself as an electricity and heat supplier (contracting). Revenues from the sale of plants would then be supplemented by recurring revenues, which would also be accompanied by particularly high profit margins. This is against the backdrop that the added value remains in house, both for the input materials and for plant planning and construction.
- In addition to the expected increase in high-margin contracting sales, AHT's profitability should also benefit from the supply chain, which is increasingly geared towards series production. This is due to higher purchase volumes of components, which can lead to economies of scale for suppliers in terms of series production. Finally, new technologies such as the production of green hydrogen from biomass or the carbonization of liquid feedstock (HTC) are to be integrated into existing or new plants.
- The positive effects of the growth strategy prepared and implemented in the past financial years are already reflected in the preliminary figures for 2023. According to preliminary figures (HGB), AHT generated revenue of € 12.12 million, setting a new all-time revenue record. The new major order resulting from the investments made led to a significant improvement in earnings in line with the strong increase in sales. According to preliminary figures, a clearly positive net profit of € 0.86 million (previous year: € -0.42 million) was achieved, which is also a record figure.

- Based on the expected contracting sales and the existing framework agreement, we anticipate a significant increase in sales and a gradual improvement in profitability. Based on expected sales of € 77.15 million in the 2028 financial year, the last estimated year of our detailed planning period, the target EBITDA should amount to € 12.72 million. These plans do not include any inorganic effects that would lead to a significant acceleration in growth.
- As part of the DCF valuation model, we have determined a target price of € 37.50. Based on the current share price of € 23.00, we assign a BUY rating.

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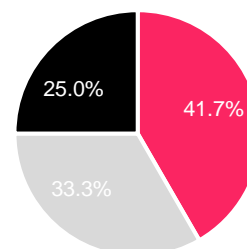
## THE COMPANY

### Shareholder structure

Shareholders	Share in %
Management, employees, family and friends	41.7%
Family offices and institutional investors	33.3%
Free float	25.0%

Source: A.H.T. Syngas Technology N.V.

- Management, Employees, Family & Friends
- Family Office & Institutional Investors
- Free Float



### Business model

The business model of AHT Syngas Technology (AHT) is based on a mature and robust technology for environmentally friendly energy production that dates back to the former Klöckner Humboldt Deutz AG. AHT has evolved into a global company focused on the development of technologies for the conversion of carbonaceous fuels into syngas. The company develops, designs and sells innovative decentralised power plants and gas purification systems worldwide. The product range includes compact/biomass power plants, hot gas systems for pure industrial heat applications, clean gas systems for decentralised power plants for electricity generation as well as project planning, project management and maintenance services. Potential customers include independent power producers, industrial companies with high energy and heat requirements, and public utilities.



The pyrolysis and gasification plants are designed to convert carbonaceous fuels such as biomass, wood, waste and coal into syngas, which can be used as a fuel for various applications such as power generation, heat generation and the production of chemicals and fuels. AHT offers a wide range of products and services in the CleanTec sector that are tailored to customer needs and ultimately make a valuable contribution to resource efficiency and decarbonisation. It should be noted that AHT's core competence lies in technology supply and system development: the implementation of process plant concepts and plant construction is outsourced and carried out by highly specialised and, in some cases, long-standing partner companies.

One of the key technologies is Advanced Pyrolysis and Gasification Technology (APGT), which enables the effective and efficient conversion of carbon-based fuels into synthesis gas. APGT technology offers excellent controllability and reliability in syngas production and is currently in use in several countries around the world. AHT is also a leader in the development of biomass and waste gasification systems aimed at reducing dependence on fossil fuels while reducing carbon emissions. In addition, the company has extensive expertise in the development of coal gasification technologies that ensure high quality and efficiency in the production of syngas.

AHT now plans and installs decentralised CleanTec plants worldwide that generate CO<sub>2</sub>-neutral electricity, heat and chemical raw materials from biogenic waste materials. AHT is increasingly acting as a provider of CleanTec solutions. With highly efficient plants and components for climate-neutral energy supply and the separation of valuable materials such as hydrogen, phosphorus or carbon, it is making a significant contribution to defossilization and decarbonisation. In doing so, the company is accelerating its future role as a driving force and innovator in the energy sector and in the extraction of raw materials, and aims to establish itself in these future markets in the long term.

## **Management and executive bodies of the company**

### **Gero Ferges - Founder and CEO**

Mr. Ferges holds a degree in plant engineering and process engineering. He has more than two decades of experience in various positions as project engineer, project and department manager in the fields of biomass and coal gasification in different companies.

### **Dr. Diego Freydl - Commercial management**

Dr. Freydl holds a doctorate in business administration with a focus on organization, controlling and industrial management. He has more than two decades of experience in leading positions in international plant engineering in the primary and secondary raw materials industry. He has supported the company for many years as an investor and in an advisory capacity.

### **Thomas Sasserath - Technical management and project management**

Mr. Sasserat holds a degree in engineering and has 15 years of industrial experience as a mechanical and electrical engineer. He has held various management positions as a plant and project manager.

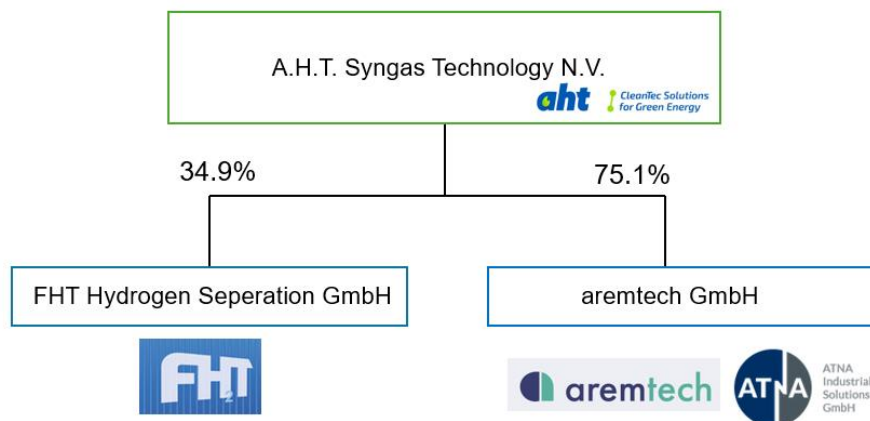
### **Kevin McDevitt - Chairman of the Supervisory Board**

Mr. McDevitt is Chairman of the Supervisory Board. He was one of the first investors in synthesis gas technologies for power generation. He previously managed a subsidiary of AHT. He also holds senior management positions in two companies in the automotive and transportation sectors.

## Structure of the organisation

AHT's product portfolio has been selectively expanded through acquisitions and in-house development. AHT has two main strategic operating subsidiaries, which are active in the areas of process technologies and hydrogen separation:

### Organizational structure of the AHT Group



Source: A.H.T. Syngas Technology N.V.

The acquisition of 34.9% of the shares in **FHT Hydrogen Separations GmbH**, which deals with interface technology in the hydrogen segment, took place in the 2020 financial year. In this context, AHT has the option to acquire the majority of shares of the company. This is a separator that can separate hydrogen from gas mixtures such as synthesis gas. In combination with its own technology solutions in the field of synthesis gas and energy generation, AHT sees considerable future potential here and therefore a sensible addition to its technology portfolio. Specifically, AHT is working on its own hydrogen technology. For the first time, the company has succeeded in converting synthesis gas from biogenic raw materials into green hydrogen on an industrial scale. Possible areas of application include industry, the mobility sector and decentralized energy supply.

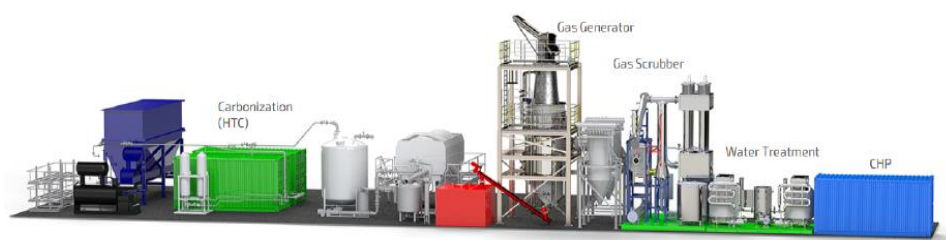
With the acquisition of all key assets of ATNA Industrial Solutions GmbH - a recognized specialist in processing technology - as part of an asset deal, AHT has further expanded its internal process chain for stock preparation, one of the most important building blocks for the use of biogenic residues. AHT holds a 75.1% stake in **aremtech GmbH** (advanced renewables material technology), which was founded for this purpose. It should be noted that AHT has the option of acquiring the majority of the shares and thus fully controlling the company. The complementary product portfolio significantly enhances AHT's existing expertise in the area of raw and residual material recycling. As a result, a large number of input materials can be fed into the gasification process in processed form as briquettes. This enables the company to cover the value chain of residual material processing in house. In addition, the expertise acquired in the field of material conditioning technologies for solid feedstocks will make an important contribution to ensuring continuous mass flows in the AHT plants on the one hand and, on the other hand, pave the way for the company's entry into the materials and additives trading market under the name "AHT Fuels".



## AHT technologies and range of services

Gas generation from renewable biomass is ideal for self-sufficient and decentralised hot gas, heat and power supply concepts and offers a high degree of independence from fossil fuels in the course of the energy transition. AHT plans and builds decentralised CleanTec plants worldwide, which generate CO<sub>2</sub>-neutral electricity, heat and chemical raw materials from biogenic residues. The company has built up a broad portfolio and is gradually expanding it to include key technologies of the future.

### Presentation of the AHT technology portfolios

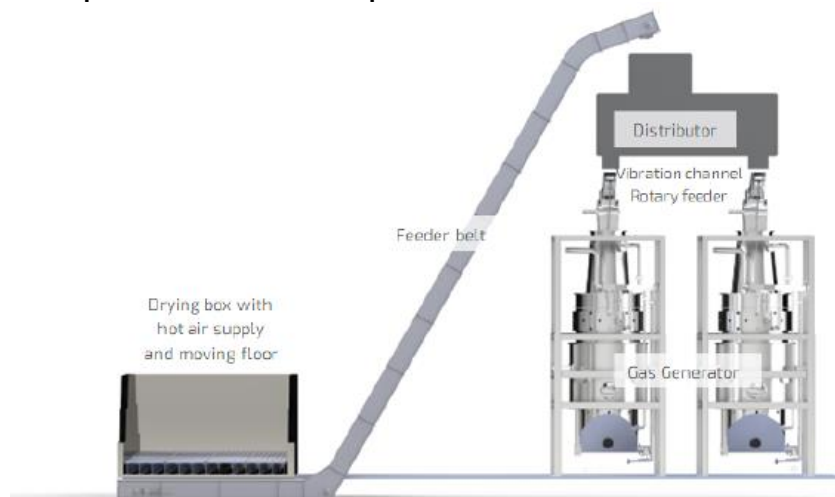


Source: A.H.T. Syngas Technology N.V.

### Recycling of raw and residual materials

By using biogenic residual and waste materials in the region or directly on site, transport routes are minimised, recyclable materials are recovered and negative environmental impacts are significantly reduced. It also reduces dependence on external energy supplies.

### Description of the task of the input material



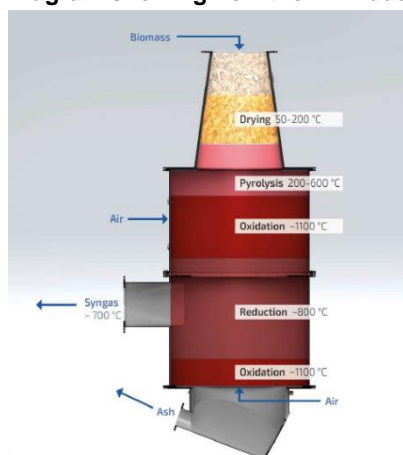
Source: A.H.T. Syngas Technology N.V.

AHT's double-fired syngas production process allows for the use of a wide range of feedstocks. Feedstocks include biogenic and agricultural residues such as rice husks, nut shells (e.g. coconut, cashew), corncob residues. Other feedstocks such as fossil coal or hydrocoal from sewage-sludge carbonisation, liquid manure, digestate and wet food waste can also be used. Residual materials, the disposal of which is becoming increasingly regulated, can thus be used to create circular value as the energy generated is returned to the process cycles.

### **AHT dual-fuel gas generator**

Within the AHT biomass power plants in the power range from 0.2 to 10 MW, AHT's efficient dual-fired gas generators ensure the thermochemical conversion of feedstock and produce a usable synthesis gas from a variety of renewable raw materials or biogenic residues. By combining ascending and descending gas generation, the dual-fired gas generator creates the basis for a very clean process gas even before gas purification.

#### **Diagram showing how the AHT dual gas fire generator works**



Source: A.H.T. Syngas Technology N.V.

The biomass, suitably preconditioned for gas production, is fed into the gas generator from above. Feeding is automatic and controlled by the level of feedstock in the conical part of the gas generator. If required, the feedstock is dried and pyrolysed.

The AHT double-fire reactor takes advantage of ascending and descending gas generation (co-current and counter-current) in two oxidation zones. Decomposition reactions take place with the metered addition of oxygen from the ambient air. The hydrocarbons in the biomass are converted into a combustible process gas. The gas leaves the gas generator in the middle section where it is extracted at negative pressure. The remaining ash is automatically discharged in the lower section via an ash grate and screw conveyor and fed into the subsequent process steps.

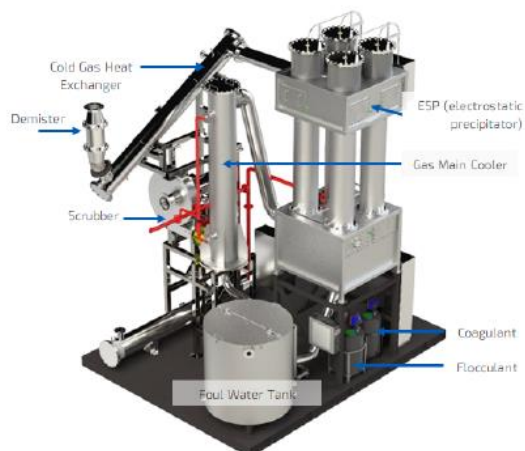
In addition to various types of wood - including treated wood - the AHT dual gasifiers can also process other feedstocks such as digestate, sewage sludge or liquid manure. The process is adapted to the input material. Treatment steps such as the HTC/VTC process can be used to gasify liquid feedstocks for further use.

Key applications for this CleanTec plant include the generation of electricity and heat from the syngas produced, or the provision of hot gas for burner and boiler systems.

### **AHT gas cleaning / gas conditioning**

Synthesis gas treatment is an important link between gas production and utilisation, e.g. in combined heat and power plants. Gas treatment is tailored to the cleanliness requirements of the downstream processes. The already very clean gas produced in the AHT double-fired reactor can be used in thermal processes without further treatment. Depending on the application, simple gas cleaning with hot gas filters is also possible.

### Illustration of the AHT gas purification system



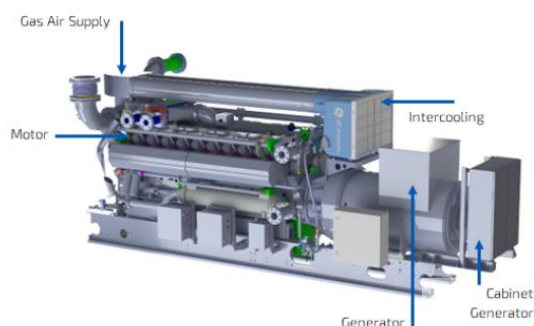
Source: A.H.T. Syngas Technology N.V.

For very high gas purity requirements (e.g.  $< 20 \text{ mg/Nm}^3$ ), the synthesis gas produced is subjected to a combined wet gas scrubbing and gas cooling process in the gas conditioning system. In the final purification step, the remaining interfering aerosols are removed in a downstream, specially-developed wet electrostatic precipitator. The purified gas can then be used in ovens and combined heat and power plants (CHP). The high gas purity ensures reliable gas transportation over long distances and highly efficient use in CHP units. This clean gas is also the basis for further processes such as gas liquefaction or other chemical processes.

### Combined heat and power unit and generator sets

The purified gas from AHT synthesis gas generation can be fed into a connected combined heat and power plant if required. There it generates electricity and/or heat, which can be regulated according to daily or seasonal requirements. A combined heat-and-power plant (CHP) generates electricity and heat simultaneously according to the principle of combined heat and power (CHP), whereby the heat generated during electricity production is fed into the heating circuit. In future, the recycling and use of biogenic waste materials can make a significant contribution to supplying electricity and heat in line with demand. In addition, the targeted use of AHT technologies can reduce water consumption in connection with wet gas scrubbing, so that no additional fresh water is required during normal operation of the power plant. In this context, the AHT process also enables a reduction in the residual material flows to be disposed of. From a business perspective, this ultimately results in considerable cost savings potential.

### AHT combined heat and power plant



Source: A.H.T. Syngas Technology N.V.

### **Hydrothermal carbonization (HTC process for short)**

An important conversion process for the input stream is hydrothermal carbonization (HTC), in which biomass is converted into biochar and water using heat and pressure. The conversion of the biomass into a lignite-like hydrochar ("biochar") takes place in a semi-closed system. By using hydrothermal carbonization (HTC), liquid and pasty input materials can be optimally processed for nutrient recovery and fuel production. In order for sewage sludge or other free-flowing input materials to be utilized effectively, they must first be mechanically dewatered and then thermally dried, which requires a great deal of energy. With conventional processes, this is very energy-intensive. When using AHT's HTC process, pre-drying is not required, which is associated with lower energy consumption. The necessary energy requirement can be covered simultaneously in combination with an AHT biomass power plant.

The HTC process imitates the natural formation of coal. Using state-of-the-art HTC technology, AHT is able to effectively convert very moist and even liquid materials such as sewage sludge, liquid manure, fermentation residues, but also algae or mash into so-called hydrochar within a few hours. Valuable substances such as phosphorus and nitrogen can be separated in the aqueous phase. In addition, the HTC process adapted by AHT has an efficient heat recovery system that minimizes the amount of energy used in the carbonization process. The material produced is then briquetted and corresponds in shape and structure to a lignite briquette, which can be used directly on site or optionally transported.

### **Representation of hydrochar briquette from biogenic residues**

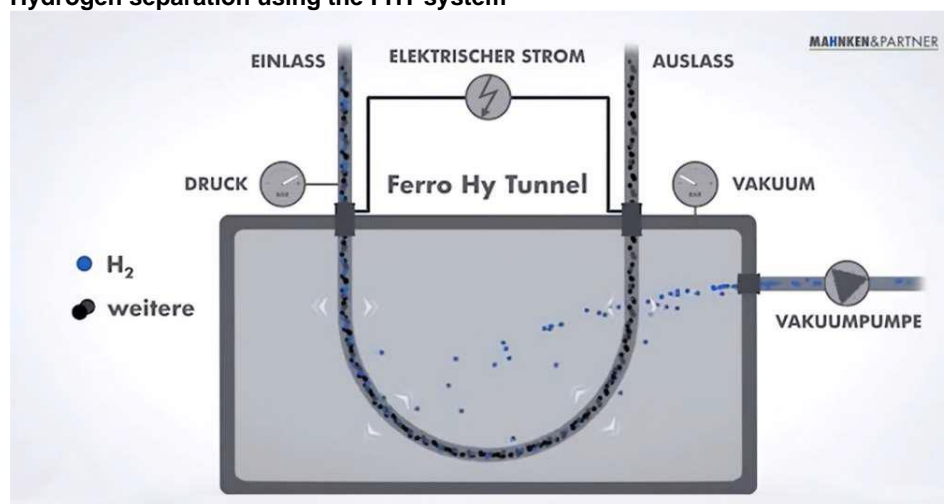


Source: A.H.T. Syngas Technology N.V.

### **Low-energy and low-pressure technology for separating hydrogen from synthesis gas using Ferro-Hy-Tunnel (FHT for short)**

The Ferro-Hy-Tunnel (FHT) was developed to obtain high-purity hydrogen from hydrogen-containing gas mixtures. In this process, gas mixtures with any hydrogen content are fed from the outside under slight overpressure into tubes made of specially prepared pure iron. The electrons emitted by the hydrogen on the outside of the pure iron tube are absorbed again on the other side of the tube after passing through the membrane. The pure hydrogen is extracted from the inside of the pure iron tube under slight negative pressure. Due to their size, all other substances and elements cannot pass or "tunnel through" this metal grid. H<sub>2</sub> separation takes place after the process has been initiated just once. As a result, hydrogen 8.0 with a purity of  $\geq 99.999999\%$  can be produced in a single pass. In the future, this technology will represent a further strategic building block in the expansion of AHT's CleanTec portfolio by enabling market access to decentralized hydrogen production and distribution through hydrogen technology.

#### **Hydrogen separation using the FHT system**



Source: A.H.T. Syngas Technology N.V.

The already-patented Ferro-Hy-Tunnel process is highly innovative and represents a unique and freely scalable technology on the market. This proprietary technology is more cost-effective and durable than the material-intensive gas separation process with palladium membranes in small and medium-sized applications. It also requires significantly less maintenance than conventional pressure swing systems (PSA) on a large industrial scale. All in all, it can therefore be said that the FHT system is freely scalable in that it can be used from a laboratory solution with just a few cubic centimetres of H<sub>2</sub> to a large-scale industrial plant.

Ultimately, all AHT plants convert waste into energy, gas into fuel and fuel into energy. The ultimate goal of the CleanTec concepts is a customized plant-and-process chain, at the end of which neither CO<sub>2</sub> nor heat are released into the environment. Supplemented by the patented Ferro-Hy-Tunnel system as part of the investment in FHT Hydrogen Separation GmbH, the company has succeeded in entering the market in the promising hydrogen sector in order to open up a further business area for decarbonization using green hydrogen.

## **Conclusion**

Industrial processes that require very high temperatures are under particular scrutiny with regard to CO<sub>2</sub> reduction and cost savings. High cost pressure, increasing environmental regulations and the desire to conserve resources are forcing action. The manufacturing industry is required to use energy highly efficiently, reduce CO<sub>2</sub> emissions and utilize all possibilities for energy recovery. Economical and stable plant operation also depends on a secure and economical energy supply. Against the background of stricter emission regulations and the use of CO<sub>2</sub>-neutral fuels, the concept of AHT synthesis gas systems is an ideal alternative to conventional heating concepts and furnaces based on pure combustion - especially when it comes to the required process heat in the high-temperature range.

Synthesis gas from renewable raw materials can be used both as a raw gas and as a processed and cooled gas and can be used in high-temperature processes with temperatures above 400° C without any problems. Existing plants, especially those based on fossil fuels such as natural gas, can easily be converted to synthesis gas. A large part of the infrastructure can continue to be used, meaning that the remaining service life of existing investments can be extended.

## **Comprehensive framework agreement as proof of concepts**

The proof of concept for the AHT technology was impressively demonstrated by a major order from Japan. The framework agreement, announced on 13 November 2023, covers the supply of 20 biomass power plants in the triple-digit million range. With an order volume of up to € 160 million, AHT is making a strong statement in the decentralised energy market and can be seen as a reference for AHT's high level of expertise in decentralised energy solutions. The order underlines AHT's successful CleanTech orientation and strengthens the company's position as a full-service provider in the field of decentralised energy supply.

In view of the company's business development to date and its size, the order from a major customer in Japan represents a milestone with a signal effect for the market. This order ensures a good order book and, therefore, predictable sales for the coming financial years and can be used as a reference for the exceptional quality of AHT's technologies. This will enable AHT to tap additional business potential in the future and to establish the entire value chain of its technology portfolio in the market.

## AHT partner network and research projects

In the project business, AHT acts both as a supplier of technology and as a provider of expertise, with the aim of pooling expertise in both the CleanTec and Clean Energy sectors, thus contributing experienced know-how to individual projects and ultimately building up a strong network. In this context, AHT has built up partnerships and expertise over decades. The concentration of business activities on the CleanTec and Clean Energy business areas has led to an allocation of expertise in the energy sector and in the area of raw material processing.

### Excerpt from partner companies

 **SIEMENS**

 **aremtech**

 **APPROVIS**



  
A member of the ABB Group

  
**BtX**  
energy

 **2G**  
Energy AG

 **SOMAX**  
BIOENERGY

Source: A.H.T. Syngas Technology N.V.

AHT has thus entered into strategic partnerships in the field of gasification of biogenic raw materials with key players in Japan in order to secure a good market position in the relevant Japanese market. In addition to working with well-known and highly specialised companies, AHT is also involved in initiatives and associations. For example, the company is involved in the Biomass Gasification Working Group, an initiative of the Energy Research Cluster of North Rhine-Westphalia (CEF NRW). This was founded with the aim of creating a platform for technical and constructive exchange between regional research institutions and companies. In particular, AHT is involved in the "Biomass Gasification Working Group" and contributes its in-depth expertise.

In addition to cooperation, research projects are important for the further development of technological know-how and the continuous improvement of CleanTec solutions. One example is the :metabolon project. This is a project with the TH Cologne. This research project has already been successfully completed and set up. A follow-up project is already in the proposal phase. This involves the development of a project to combine an electrolyser and a gasifier. The project will be carried out in a consortium, with AHT responsible for the gasification part. The aim of the project is to produce hydrogen from the combined technology line in the form of an electrolyzer and a biogas generator.



## Corporate strategy

### *...what has happened so far*

AHT has built up and developed extensive technological expertise in recent years. AHT plans and builds environmentally friendly decentralised biomass power plants. The technical basis for this is the already mature and market-proven dual-firing process for synthesis gas generation, which enables highly efficient energy production. This puts the company in a promising position as a highly innovative system integrator and technology provider in the field of gas cleaning, synthesis gas generation and residue processing. The company's focus has always been on the further development of existing technologies and the development of complementary and new technology applications along the CleanTec and Clean Energy value chain for the decarbonisation and defossilization of industry.

The development of new technologies to expand and significantly complement their technology portfolio is a key component of their strategic business focus. In this context, AHT has made strategic acquisitions that complement their existing technology portfolio in a meaningful way. The acquisitions of aramtech GmbH and FHT Hydrogen Separation GmbH have added feedstock and hydrogen production to the value chain of AHT technology.

By focusing on existing AHT technologies and developing new technological expertise, proof of concept was achieved in successful pilot projects, making customer acquisition and the establishment of an extensive partner network one of the company's key strategic milestones.

Looking at the large order from Japan, it is clear that despite the small size of the company, AHT already has a respectable and exceptional reference project. This is both an expression of the high level of technological expertise and a sign of the quality of AHT's technologies. Building on this milestone, AHT will now embark on its targeted growth phase.

### *...what is yet to come*

Based on the operating technology in the field of CleanTec plants, the full value creation potential is to be exploited in the future by transforming the company into an energy and heat supplier as part of an operating model. Operating its own CleanTec plants (contracting model) will improve the sales structure and generate more recurring revenue streams. AHT will therefore not only build and sell the plants on a one-off basis, but will also exploit the business potential by operating its own plants in its own portfolio. Building on AHT's existing market position, value-creating synergies can thus be exploited. The full-service provider approach and the associated additional potential will not only generate recurring revenues, but also sustainably improve the earnings potential of the business model.

As part of the operator model, the CleanTec plants are to be operated within project companies (SPVs). Depending on the financing structure of the SPV, the investment in plant construction could then be accompanied by a low external financing requirement.

The execution of the large order with the Japanese customer and the planned construction of plants for in-house operation will be accompanied by a significant increase in plant production. This means a change in the production concept from one-off to series production, which can also be seen as an important lever for AHT to increase profitability.



### Key components of the AHT growth strategy



Sources: A.H.T. Syngas Technology N.V.; GBC AG

The following steps are intended to support AHT's growth strategy:

- Establishment of series production: the systems are currently sourced from partner companies. As the number of units increases, a high degree of standardization is to be achieved in order to reduce production costs.
- New technologies: by 2025, hydrogen production solutions are to be used in AHT plants for ongoing operations. The company plans to become a leading provider of complete solutions for the production, storage and supply of hydrogen from biomass. In addition, the HTC process, which can be used to produce biochar (hydrochar) from liquid feedstocks, is to be increasingly used.
- Contracting: a highly profitable contracting model is to be introduced by 2027. The basis of this model is the operation of their own plants with which the company can supply green electricity to local consumers (e.g. industrial companies). Separate operating companies (SPV) are to be established for this purpose, for which an individual financing structure is possible.

**At the end of the implementation of this strategy, AHT would participate in the entire value creation of its plants and thus fully exploit the sales and earnings potential.**

## MARKET AND MARKET ENVIRONMENT

AHT Syngas Technology N.V. plans and installs decentralized Clean-Tec plants worldwide that generate CO<sub>2</sub>-neutral electricity, heat and chemical raw materials from biological waste. The company's products are primarily aimed at agricultural, industrial and municipal operations.

Renewable energies are a key topic in politics and the media. Renewable energies are already the most important source of electricity in Germany today and their further expansion is the most important pillar of the energy transition towards climate neutrality. However, climate-neutral energy supply is also playing an increasingly important role worldwide. One example of this is the Paris Climate Agreement, which has been signed by 197 countries. The following market section describes the political framework conditions and future market potential for electricity and heat generation from biomass power plants.

### Political framework conditions

#### *The Paris Agreement*

The expansion of renewable energies is the focus of politics today in order to move towards climate neutrality. An important building block is the Paris Climate Agreement, which was agreed by 197 countries in 2015 and replaced the Kyoto Protocol in 2021. The agreement has now been legally confirmed by almost all countries. The agreement is based on national voluntary commitments: i.e. each nation can decide for itself by what percentage it wants to reduce its climate-harming emissions. In contrast to the Kyoto Protocol, emerging and developing countries have also committed themselves to such voluntary commitments alongside the industrialized countries.

The aim of the Paris Agreement is to curb global warming through various measures. A central element is the reduction of emissions. The signatory states have agreed to limit the increase in the global average temperature to well below two degrees Celsius compared to pre-industrial times, ideally even to 1.5 degrees Celsius. This would significantly reduce the risks and effects of climate change. The aim is for global emissions to peak soon and then be rapidly reduced on the basis of the best available scientific evidence.

#### *The Renewable Energy Sources Act (EEG) / The Climate Protection Act*

Building on the Paris Agreement, the EEG 2023 was passed in Germany last year. It is the biggest energy policy law in recent decades and lays the foundation for Germany to become climate-neutral. To this end, the rapid expansion of renewable energies is being accelerated in order to increase their share of gross electricity consumption to at least 80.0% by 2030. The Renewable Energy Sources Act (EEG) is thus being consistently geared towards achieving the 1.5-degree target and is taking many far-reaching measures. For example, the approval process for renewable energies will be significantly accelerated. In future, they will take precedence over other concerns in so-called balancing decisions, such as whether to build a biogas power plant. This will significantly increase the speed of planning and approval procedures. Without this step, the expansion of renewable energies to the target value - which corresponds to a doubling of the current share - would not be possible.

Last year, the German government also passed a new version of the Climate Protection Act, thereby presenting a new, comprehensive climate-protection program. The Climate Protection Act is the central core of national climate policy and sets international standards with the climate targets to be met.

Some changes have been made compared to the previous version of the law. Firstly, the focus is now primarily on the future. The focus is now more on future emissions in order to be able to better check whether the measures were sufficient or whether they need to be tightened further.

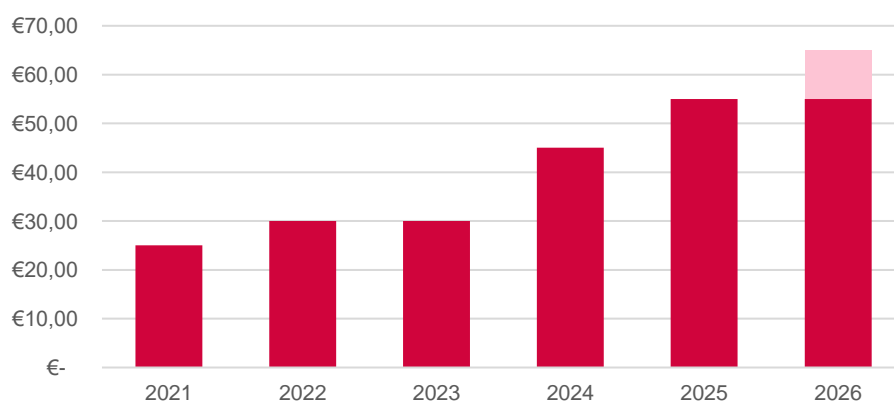
In addition, the new version aims to increase flexibility between the sectors. The focus is now on reducing greenhouse gases across all sectors. Emissions are to be reduced first where there is the greatest potential for savings. There will therefore no longer be clear targets for each individual sector, but the overall picture will be given greater consideration. Nevertheless, full transparency will continue to be created in the individual sectors in order to keep an eye on whether all sectors are on track to achieve the ambitious climate targets.

Together with the Climate Protection Act, the Climate Protection Program was also adopted by the federal government as a package of measures. The climate protection program aims to reduce greenhouse gas emissions by 65.0% by 2030. Emissions are even to be reduced by 88.0% by 2040. Germany is to be completely climate-neutral by 2045.

### **CO<sub>2</sub> taxation**

From 2021, a CO<sub>2</sub> tax will be payable in Germany on natural gas, heating oil, petrol and diesel, for example. This tax is reflected in a CO<sub>2</sub> price, which is intended to create incentives to reduce the consumption of climate-damaging fuels and switch to climate-friendly technologies. CO<sub>2</sub> pricing for emissions from coal combustion also started at the beginning of 2023, and waste incineration has also been subject to a CO<sub>2</sub> levy since the beginning of this year.

#### **Development of the CO<sub>2</sub> price (in EUR)**



Sources: *Finanztip*; GBC AG

CO<sub>2</sub> pricing began in 2021 with a price of € 25.00 and has been at € 45.00 since January 2024. It is planned to gradually increase the price further in the coming years. From 2027, the CO<sub>2</sub> price is to be set freely via the European trading market for emission allowances and thus exclusively via supply and demand. This price is already reflected today via the EUA Daily Future, which is currently quoted at around € 60.00. At the time of the energy crisis in 2022, however, the future was already quoted at just under € 100.00. The revenue from the carbon tax and the sale of emission allowances flows into the Climate and Transformation Fund.

Rising costs due to increasing regulation and taxation create incentives in the industry to reduce emissions and thus contribute to cost efficiency and ultimately to decarbonization. Providers of CleanTec technologies such as AHT can benefit from this.

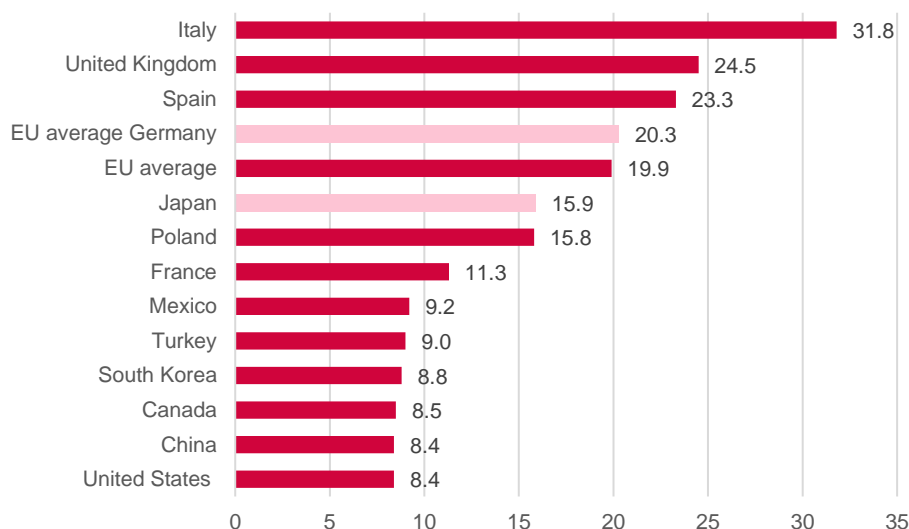
## Development of electricity prices

### *International comparison of electricity prices*

In addition to avoiding emissions, the price of electricity is another key factor for AHT's business activities. A study by the Bavarian Industry Association (vbw) shows that electricity prices - in this case, industrial electricity prices - differ significantly in an international comparison. While the USA, the People's Republic of China, Canada and South Korea have industrial electricity prices of less than nine cents/kWh, the countries of the European Union in particular are far ahead with the highest industrial electricity prices.

The key regions for AHT Syngas Technology N.V. are the European Union—particularly, Germany as its home market (contracting business)—and Japan (plant construction). Electricity prices there are in the top third by international standards.

### **Industrial electricity prices in global comparison (in ct/kwh)**



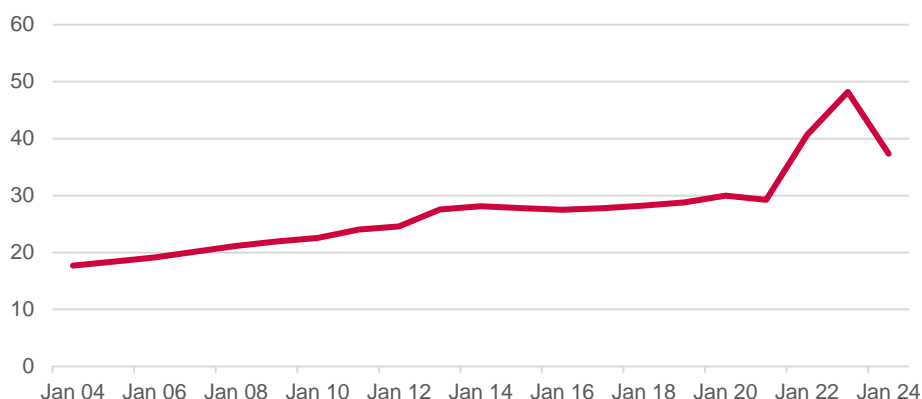
Sources: vbw; GBC AG

High electricity prices due to the predominantly fossil energy sources used to date are an ideal market environment for AHT, as there is increasing demand for climate-neutral electricity generation options with low production costs.

### ***Electricity price trends in Germany***

According to surveys by the Verivox portal, the price of electricity for German households has risen continuously over the last 20 years. A slow rise in electricity prices can be observed until 2021. From 2022 and the start of the Russia-Ukraine war, electricity prices rose rapidly. As a result of the war, gas prices have risen enormously in recent years, meaning that gas-fired power plants produce very expensive electricity. Gas-fired power plants are therefore the reason for the high electricity prices.

### Development of the average consumer electricity price (in cents/kwh)



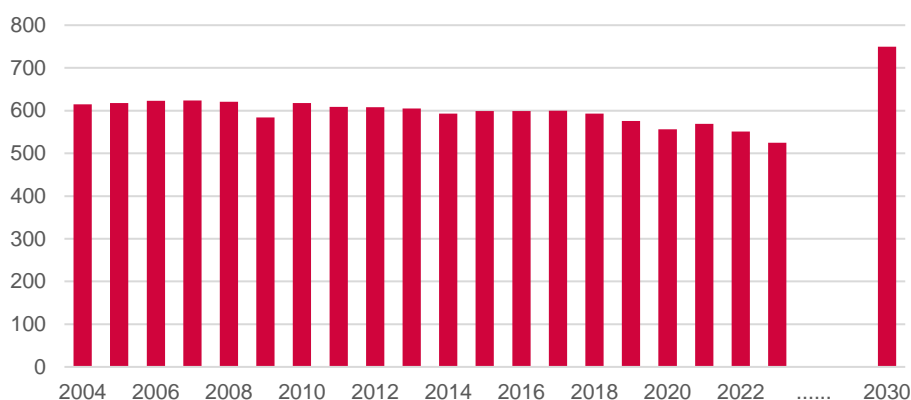
Sources: Verivox; GBC AG

Due to their base load capability, gas-fired power plants are currently needed to cover electricity demand at peak load times. However, biomass power plants are just as capable of meeting base load requirements and are also CO<sub>2</sub>-neutral. This means that biomass power plants, such as those being developed by AHT, are not tied to daily or seasonal weather fluctuations like wind or solar power plants. As a result, biomass power plants can replace expensive gas-fired power plants with increasing expansion.

### Development of electricity demand

The latest survey by the Federal Environment Agency on electricity demand in Germany shows that electricity demand has fallen continuously since 2010. This is due to the fact that the German government at the time set the target of reducing electricity demand by 10.0% by 2020. This target was also achieved due to the special situation caused by the coronavirus pandemic. At 525 terawatt hours, electricity demand in 2023 reached a new low since the beginning of reunification.

### Development of electricity demand in Germany (in TWh)



Sources: Federal Environment Agency; Federal Government; GBC AG

However, the demand for electricity in Germany is expected to increase significantly in the future. Under its current calculations, the German government assumes an increase in electricity demand to 750 terawatt hours by 2030. The reason for this sharp rise is the increasing electrification of industrial processes, heat generation and transportation. In particular, the high demand for heat pumps in private households will cause electricity demand to rise in the future. The turnaround in transportation with the expansion of rail transport and the increasing number of electric vehicles on the roads will also lead to higher electricity demand. The German government has set a target of 15 million electric

vehicles on German roads by 2030. Even if experts consider this target to be unrealistic, it is nevertheless clear where the electrification of transport is heading. In the first half of 2023, the number of electric vehicles in Germany was only 1.1 million.

## **Energy mix in Germany**

According to the Fraunhofer Institute for Solar Energy Systems, the energy mix for electricity generation in Germany currently consists of around 59.0% renewable energies. Wind energy accounts for 32.0% of this, solar energy for 12.0%, biomass for 10% and hydropower for 5.0%. The largest proportion of fossil fuels, 26.0%, is generated by coal-fired power plants.

A comparison of these figures with previous years shows a clear trend towards the increased use of renewable energy sources. In 2013, just under half of electricity generation still came from coal-fired power plants and 17% from nuclear power plants. At that time, only around a quarter of electricity came from renewable energy sources. This path is to be consistently continued in the future. The German government has set Germany the target of increasing electricity generation from renewable energies to 80% by 2030. By 2050, 100% of electricity demand is to be covered by renewable energies.

Energy generation from biomass plays an important role in achieving this goal. This is because biomass can be used flexibly in many areas: it can be used to generate heat and electricity as well as fuel. It is, therefore, the most versatile of all renewable forms of energy and can replace fossil fuels in many areas.

In order to make electricity generation from biomass flexible and to compensate for fluctuations in electricity production from wind and sun, "subsidized direct marketing" was included in the Renewable Energy Sources Act (EEG) in 2012. This funding option provides incentives for plant operators to sell their electricity on the electricity market, particularly at times of high demand for electricity. By the end of 2018, more than 5,000 MW of installed capacity was available for flexible electricity production. Further flexibilization of biogas plants is expected, which should lead to an increase in the capacities available for the electricity market.

## **Biogenic waste**

In addition to the factors described above that favor the use of AHT technology, the market for input factors also plays an important role in the future business development of AHT. According to an estimate by the Federal Environment Agency, the volume of biogenic waste will amount to 16.12 billion tons in 2021. In recent years, the volume delivered has risen slightly and could reach a new record in 2021. When recycling biogenic waste, a distinction is made between wet biowaste and food waste, which is suitable for fermentation with biogas utilization, plant material containing lignin and cellulose, which is sent for composting, and woody components of green waste, which are used as fuel in biomass power plants.

## **Market development of green hydrogen**

Another business area of AHT Syngas Technology N.V. is the production of green hydrogen from synthesis gas. Just last year, the German government announced the update of the national hydrogen strategy, thereby adapting the 2020 strategy to current developments. The German government has set itself the goal of becoming the market leader in this newly emerging market for the production of climate-friendly hydrogen, as hydrogen

is the only way to make large parts of industry and transportation emission-neutral. To this end, the German government has formulated four key points:

- An electrolysis capacity of 10 gigawatts is to be built up by 2030 in order to cover an estimated 30% to 50% of Germany's hydrogen demand. An import strategy is being developed by the National Hydrogen Council to cover the remaining demand.
- The successful introduction of the hydrogen economy depends largely on the availability of hydrogen at the right locations. By 2032, an 11.000-kilometer core network for hydrogen will be created, connecting large producers with consumers. The hydrogen filling station network will also be greatly expanded.
- Climate-friendly hydrogen has the potential to significantly improve the environmental footprint of industry and transportation. However, this will require fundamental restructuring in various industrial sectors, particularly in the steel and chemical industries and in the transport sector. The EU and national governments are supporting this important transformation process.
- An effective hydrogen economy requires an appropriate legal framework. The updated National Hydrogen Strategy Update therefore provides for an accelerated implementation of planning and approval procedures.

## HISTORICAL COMPANY DEVELOPMENT

P&L (in € million)	FY 2020	FY 2021	FY 2022	FY 2023*
Sales revenue	0.57	0.83	1.93	12.12
EBIT	0.02	-0.30	-0.49	n/a
EBIT margin	3.0%	-35.9%	-25.4%	n/a
After-tax result	0.03	-0.24	-0.42	0.86
EPS in €	0.02	-0.11	-0.18	0.37

Sources: AHT; GBC AG; according to preliminary figures in accordance with HGB

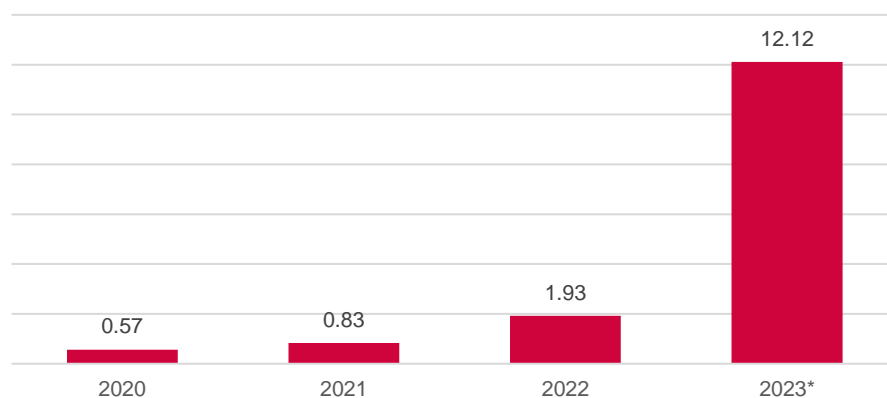
When looking at the historical development of sales, it is important to note that the sales base is based on project planning and therefore revenue streams are only generated after project or sub-project completion. Accordingly, AHT's sales development is subject to project-specific, milestone-dependent fluctuations. The main sources of revenue are the sale of design services and the supply of system components. The company also generates after-sales revenue from maintenance services and the supply of spare parts. In addition, AHT acts both as a technology supplier and as a competence partner, i.e. as a provider of expertise in the field of CleanTec solutions, which also generates revenue for the company.

### Historical sales development

Over the past two to three financial years, AHT has continued to develop its business model while, at the same time, creating the technological basis for targeted growth. This includes, for example, the acquisition of aremtech GmbH and FHT Hydrogen Separation GmbH, which have extended the value chain. The major order from the Japanese customer is proof of the growth strategy.

Due to a preparatory phase lasting several years as part of their full positioning as a CleanTec provider, business development was naturally characterised by low sales. This is related to the project execution of the systems already installed. With the start of implementation of the framework agreement signed with the Japanese customer last year, AHT has already recorded a sharp increase in sales. According to preliminary figures (in accordance with the German Commercial Code (HGB)), these amounted to €12.12 million, well above the previous year's figure and a new all-time sales record.

### Sales revenue in the period under review from 2017 to 2022 (in € million)



Sources: AHT; GBC AG; according to preliminary figures in accordance with HGB

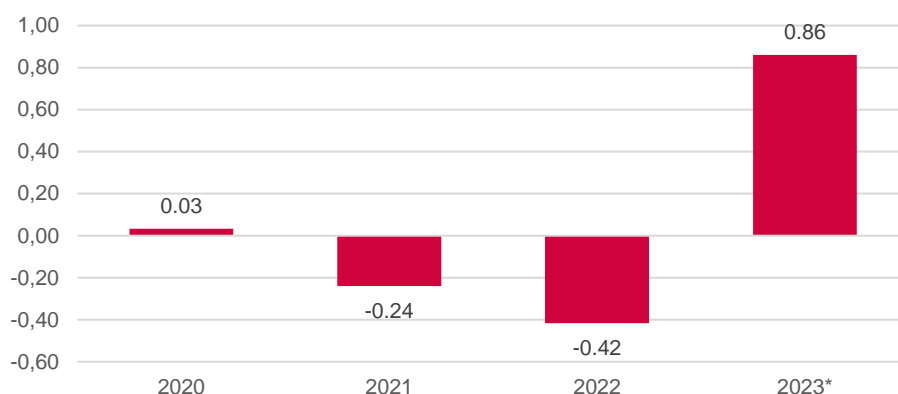


## Historical earnings performance

It should be noted that the company procures its systems from selected partner companies, which means that AHT's added value and expertise currently lies primarily in the planning and development of the systems. Accordingly, the current cost picture is largely characterised by the cost of materials, the cost ratio of which ranged between 78.7% and 86.3% in the last three financial years. 86.3% in the last three financial years. These fluctuations are related to the progress of each project. With the future coverage of the concession model, the cost-of-materials ratio should decrease and the overall quality of the operating result should improve.

Due to the investments made in recent years to focus the business model, negative EAT figures were reported in both 2021 and 2022. However, the new major order resulting from the investments made will lead to a significant improvement in earnings in 2023, in line with the strong increase in sales. According to the preliminary figures for 2023, a clearly positive after-tax result of € 0.86 million (previous year: € -0.42 million) was achieved, which is also a record value.

### Development of the after-tax result (in € million)



Sources: AHT; GBC AG; according to preliminary figures in accordance with HGB

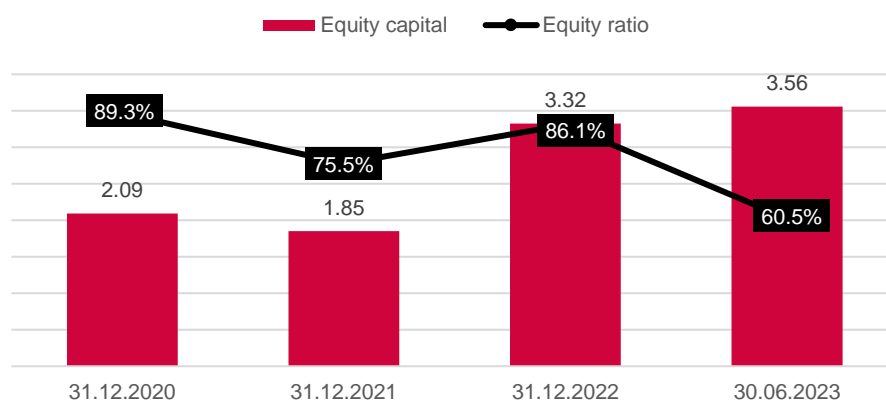
## Presentation of the balance sheet and financial position

in € million	31.12.2020	31.12.2021	31.12.2022	30.06.2023
Equity capital	2.09	1.85	3.32	3.56
Equity ratio	89.3%	75.5%	86.1%	60.5%
Operational AV	0.65	0.62	0.49	0.43
Asset intensity	27.7%	25.2%	12.7%	7.3%
Net working capital	0.98	0.75	1.42	0.99
Financial liabilities	0.16	0.17	0.17	0.18
Net debt	-0.42	-0.46	-0.89	-2.37
Cash and cash equivalents	0.57	0.63	1.06	2.55
Cash ratio	24.5%	25.6%	27.5%	43.3%
Cash flow (operating)	0.14	-0.11	-0.28	0.51

Source: A.H.T. Syngas Technology N.V

As AHT's preliminary figures only include information on the equity ratio and total assets, we have not included them in the following balance sheet analysis. AHT's capital structure is basically very solid. On the last balance sheet date, 30 June 2023, the company had equity of € 3.56 million (30 June 2022: € 3.22 million), which corresponds to an equity ratio of 60.5% (previous year: 92.2%). This clearly shows that the company is currently predominantly self-funded and therefore has limited recourse to debt financing.

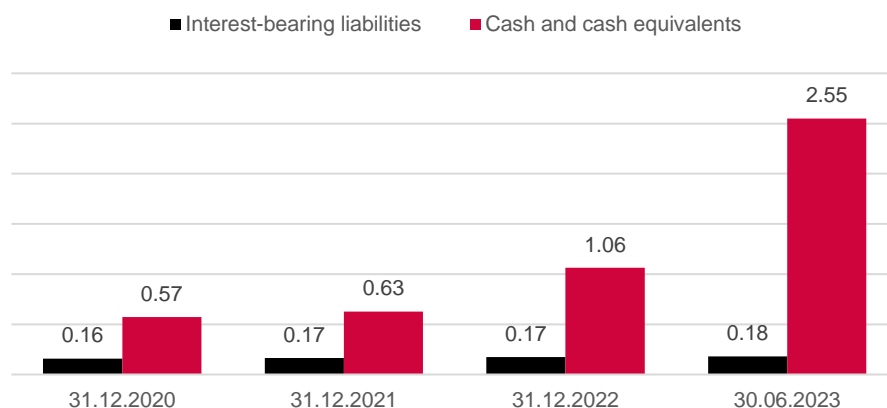
### Development of equity (in € million) and equity ratio (in %)



Source: A.H.T. Syngas Technology N.V

In addition to a strong equity base, the company has cash and cash equivalents of € 2.55 million (previous year: € 1.96 million). In addition to the cash inflows from operations, the generation of liquidity is also due to the implementation of capital measures to finance the company's growth. These include capital increases in the 2019 financial year (+400,000 shares) and a capital increase of 190,000 shares in the 2022 financial year. The high equity ratio combined with a solid liquidity ratio ensures a stable financial base. Overall, it should be noted that their operating business is not very capital-intensive and that the need for outside capital has therefore been low to date. This means that AHT will continue to have sufficient room for manoeuvre to raise external capital for the forthcoming implementation of the contracting model.

### Interest-bearing liabilities compared to cash and cash equivalents (in € million)



Source : A.H.T. Syngas Technology N.V

The high level of equity is matched by a correspondingly low level of debt in the overall capital structure. Interest-bearing liabilities at the end of the first half of 2023 amounted to only € 0.18 million (previous year: € 0.17 million). Cash and cash equivalents are significantly higher than interest-bearing liabilities, which means that AHT has no net debt.

To date, AHT has pursued an asset-light strategy, which is characterised by a low capital commitment in fixed assets. This goes hand in hand with a low asset intensity, which has a positive effect on adaptability and agility in response to changing conditions. The capitalisation ratio was only 7.3% (previous year: 7.5%). As a result of the low level of capital employed and the associated low level of revolving investment in fixed assets, the company tends to have a low CAPEX.

## FORECAST AND VALUATION

P&L (in € million)	FY 2023e	FY 2024e	FY 2025e	FY 2026e	FY 2027e	FY 2028e
Sales revenue	12.12 <sup>*1</sup>	24.30	36.40	40.35	46.25	77.15
EBITDA	1.23 <sup>*2</sup>	1.86	3.34	4.55	6.41	12.72
EBITDA margin	10.2% <sup>*2</sup>	7.7%	9.2%	11.3%	13.9%	16.5%
EBIT	1.07 <sup>*2</sup>	1.71	3.03	3.62	4.54	9.91
EBIT margin	8.9% <sup>*2</sup>	7.0%	8.3%	9.0%	9.8%	12.9%
After-tax result	0.86 <sup>*1</sup>	1.19	2.12	2.49	3.06	6.76

Source: GBC AG; <sup>\*1</sup> according to preliminary figures; <sup>\*2</sup> according to GBC estimates; naturally, valuation approaches as at the reporting date could lead to shifts in sales for deliveries that extend beyond a reporting date (percentage of completion or sales recognition). We see such a risk in a corridor of +/-10%.

When presenting the underlying sales and earnings forecast, it should be noted that we have preliminary figures for the 2023 financial year. However, as these are preliminary figures, we still consider the 2023 financial year to be a forecast period. With the preliminary figures, AHT has also published a forecast for the current fiscal year 2024 for the first time. According to this, sales of more than € 20 million and EBIT of more than € 1.2 million are expected. Compared to last year's figures, this would mean a continuation of the dynamic growth.

### Sales forecasts 2024e - 2028e

Of course, a cut-off date approach could lead to shifts in sales for deliveries that extend beyond a cut-off date (percentage of completion or revenue recognition). We see this risk in a corridor of +/-10%. Our forecast assumptions are based on the company's growth strategy. AHT plans to fully exploit the potential of its technology and generate recurring revenue streams by implementing an operator model (contracting). The aim is to add recurring revenue components to the sales structure on a sustainable basis.

The underlying sales estimates for plant engineering are largely based on agreements in a framework contract with a major customer in Japan. According to the company's press release dated 13 November, AHT announced the conclusion of such a framework agreement in the triple-digit million range. According to the company, key milestones have already been defined in the framework agreement, providing AHT with planning security and thus an excellent order situation for the coming financial years. Although the framework agreement covers the delivery of 20 biomass power plants, we conservatively expect 16 plants with a nominal capacity of two MW each to be delivered by 2026.

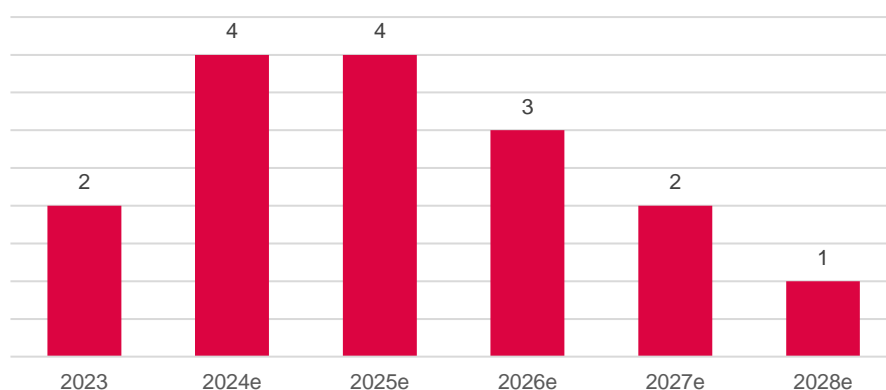
Future business development will focus on tapping new markets and business areas, including new customer groups. This includes, for example, generating revenue from technologies such as hydrothermal carbonisation or FHT hydrogen separation, which will complement the company's revenue mix in the future.

For the purposes of revenue forecasting, we distinguish between three revenue segments: plant construction, plant operation (contracting model) and technology expansion revenue.

### **Plant engineering sales segment**

The key assumptions are based on the expected revenue streams from the framework agreement with the major Japanese customer. Our forecast assumes the construction of a total of 16 plants and a construction period of two years per plant until the end of the forecast period in 2028. In the first year of the forecast, we assume that a maximum of four plants will be built. It should be noted that, according to the company, there is potential for further plant construction orders and thus additional sales.

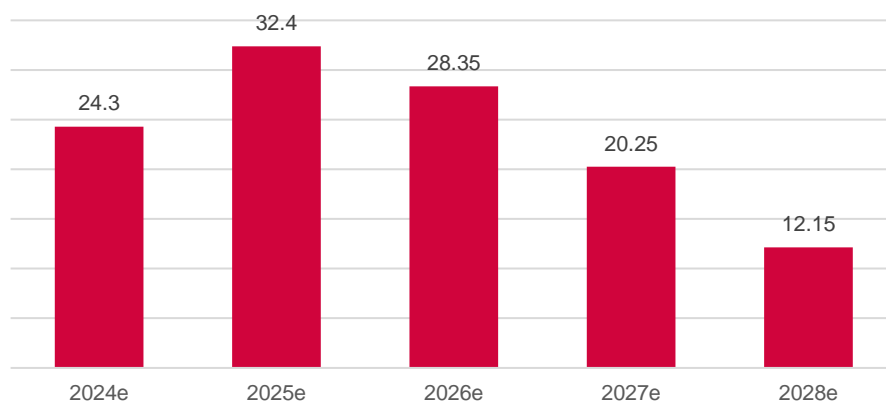
#### **Expected deliveries of systems (number of units) by the end of the 2028 forecast period**



Source: GBC AG

We only take into account the agreed orders from the framework agreement described above, as these have a relatively high probability of being realised. In terms of pricing per system, we assume an average sales price of € 8.1 million, which is largely fixed by contract. Other ancillary revenues such as service and maintenance revenues are not taken into account.

#### **Expected sales development in plant engineering 2024 to 2028 (in € million)**



Source: GBC AG

Accordingly, in the first forecast year, 2024, we expect revenue from the systems business to increase to € 24.3m (previous year: € 12.12m), doubling year-on-year. In the following year, 2025, we expect a further significant increase in revenue to up to € 32.4m. This figure represents our forecast maximum revenue from plant construction, as we expect the number of plants built for Japanese customers to decline in the coming financial years. In contrast, the contracting model described below will be expanded.

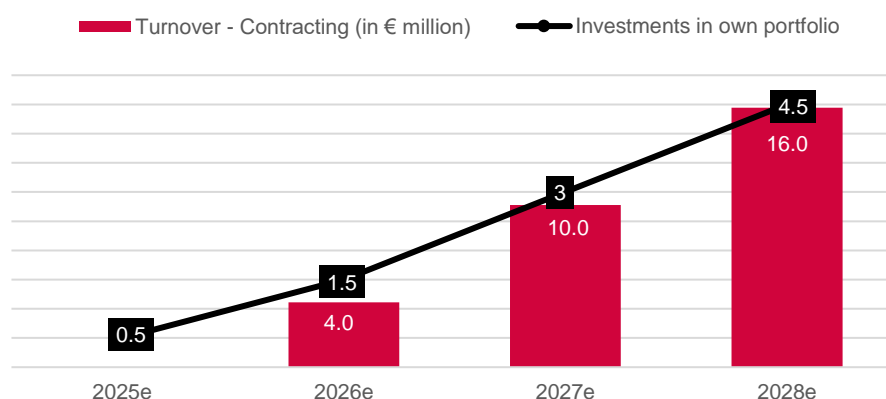
### Contracting sales segment

Construction of the first plants for the operator model is scheduled to start in 2025, and we expect to gradually broaden the basis for this revenue stream in subsequent financial years.

Self-operated plants can be set up as separate property companies (SPVs), which opens up the possibility of creating different investment structures. For example, the customer can invest directly in the SPV. However, for our forecast we assume that the SPVs are wholly owned by AHT and therefore fully consolidated. The systems could be installed directly at the customer (e.g. industrial companies), which we consider the most likely scenario, as this would eliminate grid fees and make the electricity price particularly favourable.

Our revenue estimates are based on 8,000 operating hours per plant and an average price (electricity and heat) of 12.5 cents/kWh. With an installed capacity of two MW/plant, this gives an annual revenue of around € 4.0 million/plant.

### Expected contracting sales (in € million) and installations in own portfolio (average)



Source: GBC AG

The transition to an operator model is associated with investments in operating assets. By the end of our forecast period, the investments for our assumed construction of nine own facilities will total € 59.25 million. As shown, these investments are to be made within the company's own property companies. In addition to partial financing through equity, we estimate that debt capital will also be raised.

Overall, the contracting model will not only lead to better predictability of sales revenues, but will also be accompanied by a significantly higher gross margin of 50% compared to pure plant construction.

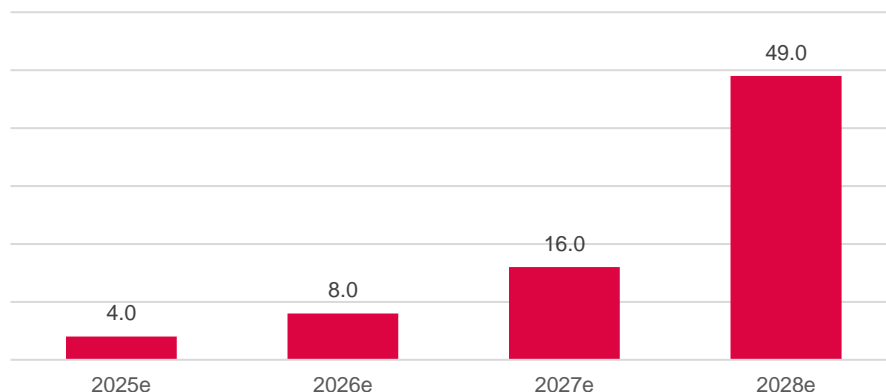
### Sales segment technological expansion

New technologies and business areas are gradually being added to the plant engineering sales. The FHT technology in the field of hydrogen separation is particularly worthy of mention. FHT can be used to produce green hydrogen for energy supply, and we believe that AHT is thus addressing promising target markets in the clean-tech and clean-energy sectors.

In addition, the HTC process, i.e. the carbonisation of liquid substances, will increasingly complement the input flow of AHT plants. The HTC process is a technology that AHT has already introduced to the market via test pilots and has thus achieved "proof of concept"

status. As a result, the HTC technology is also suitable for retrofitting to existing third-party plants. The proven HTC process is versatile and optimises both systems and existing processes.

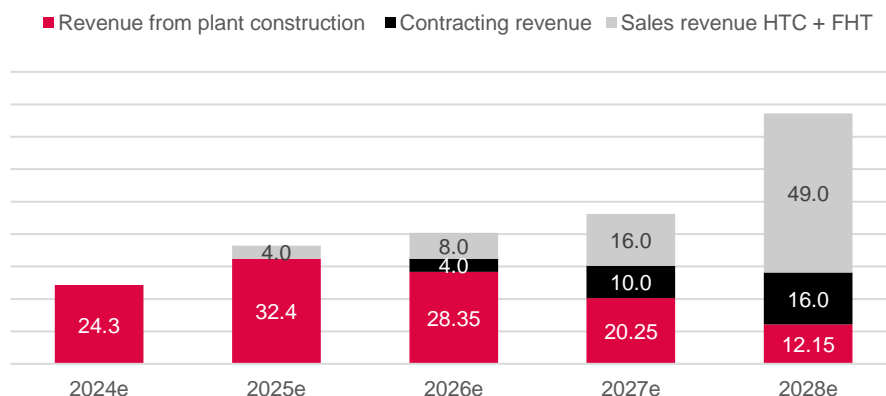
#### Expected sales development of technological expansion (in € million)



Source: GBC AG

For the financial years to come, we assume that existing plants will be retrofitted with HTC technology. The jump in sales we expect in 2028 is related to the expected first delivery of a biomass-to-hydrogen technology, for which we assume a comparatively high selling price of € 25.0 million/plant. In addition, the patented Ferro-Hy-Tunnel (FHT for short) will become a further series product in the future when the hydrogen market enters series production. Together with self-produced hydrogen, hydrogen separation is a driver for renewable energy production using green hydrogen.

#### Expected total sales in the period under review from 2024 to 2028 (in € million)



Source: GBC AG

Overall, we expect the three sales segments to make a significant contribution to total sales. In terms of the future sales structure, the new business areas will sustainably increase AHT's sales volume. The dependence on purely project-related plant construction will be significantly reduced by means of an accelerated operator model (contracting), which will open up new opportunities in the energy sector.

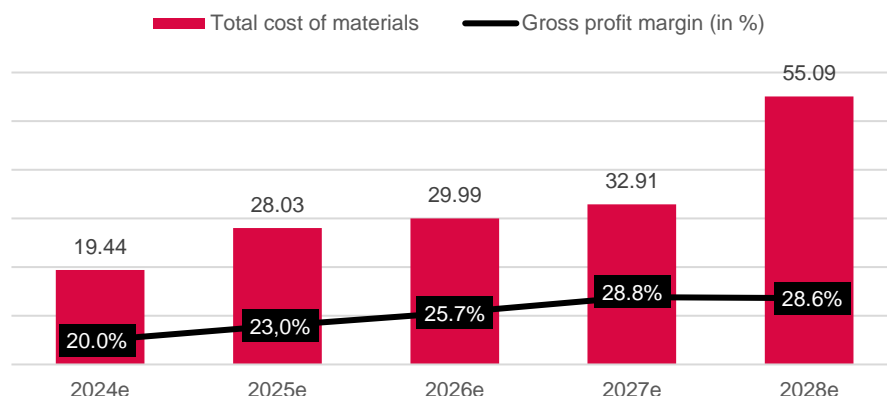
#### Earnings forecasts 2024e - 2028e

The cost structure in the engineering business is primarily dependent on the procurement of system components and their price development. The planned increase in volume is intended to achieve a high degree of standardisation, which should also result in cost

savings for suppliers. Cost savings will be achieved through the introduction of serial production or bulk purchasing of components combined with effective procurement management. The improved cost base will therefore be reflected in an improved margin structure for AHT. We expect the current cost of materials ratio to improve from 80.0% to 77.0%.

The future operation of the company's own portfolio (contracting) will also change the cost picture, as the operator model should improve the company's margin structure. This will be reflected in a higher gross profit and therefore a lower cost of materials as a percentage of sales.

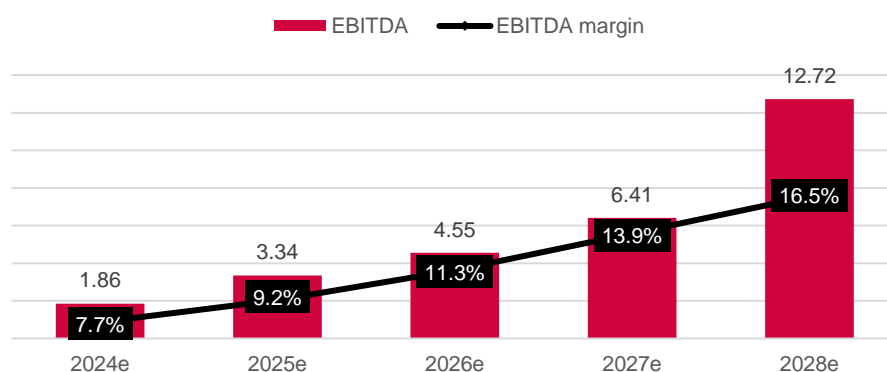
#### Expected development of total cost of materials (in € million) and gross profit (in %)



Source: GBC AG

In addition to sales-related variable costs, personnel costs and other operating expenses represent the company's fixed costs. We assume a relatively constant fixed cost ratio in a corridor of 12.1% to 15.0% in the specific forecast period from 2024 to 2028. The improvement in the gross profit margin that we have assumed should have a significant positive impact on the EBITDA margin, given the expected stable development of other expenses. For our specific forecast period, we expect the EBITDA margin to improve from 7.7% to 16.5%. This outlined margin improvement illustrates the earnings potential of AHT's business model.

#### Expected EBITDA (in € million) and EBITDA margin (in %)



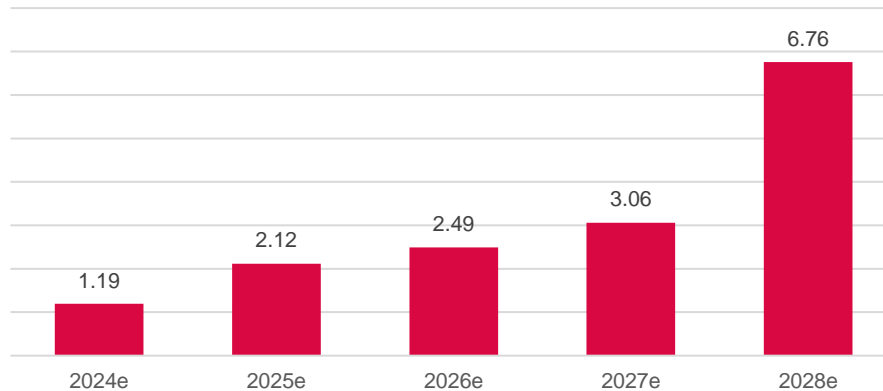
Source: GBC AG

However, it should be noted that the planned transition to the operator model (contracting) will increase asset intensity with a corresponding impact on the income statement. The capitalisation of assets will lead to a significant increase in depreciation charged to the income statement. In addition to higher depreciation, the increased asset intensity will also lead to an increased need for external financing, which should result in an increase in



financial expenses. Nevertheless, AHT should also be able to report a significant and, above all, sustainable increase in profit after tax.

**Expected development of the after-tax result (in € million)**



Source: GBC AG

Finally, it should be noted that our forecast assumptions have been made on a business-as-usual basis. This means that only organic growth is assumed. Additional company growth through acquisition effects has not been taken into account. The implementation of an acquisition strategy would accelerate AHT's future growth rate and thus significantly increase the level of sales and earnings. AHT would then be in a position to exploit additional sales and earnings potential.

## Rating

### ***Model assumptions***

A.H.T. Syngas Technology N.V. was valued by us using a three-stage DCF model. Starting with the specific estimates for the years 2024 to 2028 in phase 1, the second phase from 2029 to 2030 involves a forecast based on value drivers. In the second phase, we expect sales to increase by 10.0 %. We have assumed an EBITDA margin target of 16.5%. We have included a tax rate of 30.0% in phase 2. In the third phase, a residual value is also determined after the end of the forecast horizon using perpetuity. In the terminal value, we assume a growth rate of 3.0%.

### ***Determination of the cost of capital***

The weighted average cost of capital (WACC) of A.H.T. Syngas Technology N.V. is calculated from the cost of equity and the cost of debt. The fair market premium, the company-specific beta and the risk-free interest rate are used to determine the cost of equity.

The risk-free interest rate is derived from current yield curves for risk-free bonds in accordance with the recommendations of the IDW's Expert Committee for Business Valuations and Business Administration (FAUB). This is based on the zero bond interest rates published by the Deutsche Bundesbank using the Svensson method. To smooth out short-term market fluctuations, the average yields of the previous three months are used and the result is rounded to 0.25 basis points. The risk-free interest rate currently used is 2.5%.

We use the historical market premium of 5.5% as a reasonable expectation of a market premium. This is supported by historical analyses of equity market returns. The market premium reflects the percentage by which the equity market is expected to outperform low-risk government bonds.

According to the GBC estimation method, a beta of 1.49 is currently determined.

Using the assumptions made, we calculate a cost of equity of 10.67% (beta multiplied by the risk premium plus the risk-free interest rate). As we assume a sustainable weighting of equity costs of 75%, the weighted average cost of capital (WACC) is 9.13%.

### ***Valuation result***

As part of our DCF valuation model, we have determined a target price of € 37.50. This is mainly due to the positive forecast assumptions, as we expect considerable sales and earnings potential based on the growth strategy. Based on the framework agreement with a major Japanese customer (order of magnitude: € 160 million), we expect predictable and significant increases in sales. It should also be noted that the company is addressing future markets and can participate in prospering market developments in the CleanTec and Clean Energy sectors thanks to its advantageous market positioning as a system integrator and technology supplier. Considering the current share price level of € 23.00 per share, there is attractive upside potential. We therefore give the stock a BUY rating.

## DCF model

### A.H.T Syngas Technology N.V. - Discounted cash flow (DCF) analysis

Value drivers of the DCF model after the estimate phase:

Consistency phase		Final phase	
Sales growth	10.0%	Perpetual sales growth	3.0%
EBITDA margin	16.5%	Perpetual EBITA margin	15.9%
AFA to operating fixed assets	11.1%	Tax rate in the terminal value	30.0%
Working capital to sales	10.0%		

#### Three-stage DCF model:

Phase in EUR million	Estimate						Consistency		Final value
	FY 23e	FY 24e	FY 25e	FY 26e	FY 27e	FY 28e	FY 29e	GJ 30e	
Turnover (US)	12.12	24.30	36.40	40.35	46.25	77.15	84.87	93.35	
US change	528.8%	100.6%	49.8%	10.9%	14.6%	66.8%	10.0%	10.0%	3.0%
US to operating fixed assets	24.23	48.60	11.01	4.79	2.75	3.05	3.05	3.05	
EBITDA	1.23	1.86	3.34	4.55	6.41	12.72	13.99	15.39	
EBITDA margin	10.2%	7.7%	9.2%	11.3%	13.9%	16.5%	16.5%	16.5%	
EBITA	1.07	1.71	3.03	3.62	4.54	9.91	11.19	12.31	
EBITA margin	8.9%	7.0%	8.3%	9.0%	9.8%	12.9%	13.2%	13.2%	15.9%
Taxes on EBITA	-0.32	-0.51	-0.91	-1.09	-1.36	-2.97	-3.36	-3.69	
to EBITA	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
EBI (NOPLAT)	0.75	1.20	2.12	2.53	3.18	6.94	7.83	8.62	
Return on capital	0.0%	59.9%	96.5%	40.2%	25.5%	32.3%	23.8%	23.8%	26.8%
Working capital (WC)	1.50	1.70	3.00	4.04	4.63	7.72	8.49	9.34	
WC to turnover	12.4%	7.0%	8.2%	10.0%	10.0%	10.0%	10.0%	10.0%	
Investments in WC	-0.13	-0.20	-1.30	-1.04	-0.59	-3.09	-0.77	-0.85	
Operating assets (OAV)	0.50	0.50	3.31	8.42	16.84	25.26	27.79	30.56	
AFA on OAV	-0.16	-0.15	-0.31	-0.94	-1.87	-2.81	-2.80	-3.08	
AFA to OAV	32.1%	30.0%	9.4%	11.1%	11.1%	11.1%	11.1%	11.1%	
Investments in OAV	-0.28	-0.15	-3.12	-6.05	-10.29	-11.23	-5.33	-5.86	
Invested capital	2.00	2.20	6.31	12.45	21.46	32.97	36.27	39.90	
EBITDA	1.23	1.86	3.34	4.55	6.41	12.72	13.99	15.39	
Taxes on EBITA	-0.32	-0.51	-0.91	-1.09	-1.36	-2.97	-3.36	-3.69	
Total investments	-0.40	-0.35	-4.42	-7.08	-10.88	-14.32	-6.10	-6.71	
Investments in OAV	-0.28	-0.15	-3.12	-6.05	-10.29	-11.23	-5.33	-5.86	
Investments in WC	-0.13	-0.20	-1.30	-1.04	-0.59	-3.09	-0.77	-0.85	
Investments in goodwill	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Free cash flows	0.51	1.00	-1.98	-3.62	-5.83	-4.57	4.54	4.99	155.08

Value of operating business (reporting date)	78.93	85.14
Present value of explicit FCFs	-5.21	-6.68
Present value of the continuing value	84.14	91.82
Net debt	-1.61	-2.61
Value of equity	80.54	87.75
Minority interests	0.00	0.00
Value of the share capital	80.54	87.75
Outstanding shares in € million	2.34	2.34
Fair value of the share in EUR	34.42	<b>37.50</b>

#### Determination of the cost of capital:

Risk-free return	2.5%
Market risk premium	5.5%
Beta	1.49
Cost of equity	10.7%
Target weighting	75.0%
Borrowing costs	6.0%
Target weighting	25.0%
Tax shield	25.0%

WACC	<b>9.1%</b>
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Return on capital	WACC				
	8.5%	8.8%	9.1%	9.4%	9.7%
26.3%	42.28	39.32	36.67	34.28	32.12
26.6%	42.75	39.76	37.09	34.67	32.48
26.8%	43.22	40.20	<b>37.50</b>	35.06	32.84
27.1%	43.69	40.65	37.91	35.44	33.21
27.3%	44.16	41.09	38.32	35.83	33.57

## SUSTAINABILITY ANALYSIS

Sustainability is one of the key issues of the 21st century and therefore one of the defining topics of our time. The discourse on this topic has now reached the heart of society. Topics such as sustainable products and consumption patterns, sustainable investments, climate-friendly investments and the responsible use of resources are omnipresent today.

Accordingly, the topic of sustainability and ESG is also increasingly coming into focus on the capital market and is gaining in importance for both investors and other stakeholders. Against this backdrop, both private and institutional investors and rating agencies, for example, are increasingly demanding that ESG-specific capital market communication by companies becomes more transparent and comprehensive in terms of breadth and depth. This is being actively promoted by regulation, by the European Union in this case, as part of the implementation of the EU's taxonomy.

The EU taxonomy for sustainable investment is of central importance for the transformation of the economy and the mobilization of capital for sustainable activities. The regulation, which came into force in 2020, defines what can be understood as environmentally sustainable economic activity in line with the Paris Climate Agreement. It is therefore a central instrument of the EU action plan "Financing Sustainable Growth".

In this context, we conducted a sustainability analysis based on AHT's business activities and business orientation and classified and analyzed them accordingly. The analysis is based on our standardized and proprietary sustainability questionnaire in order to create a company-specific ESG profile and identify specific sustainability-oriented corporate activities.

### **ESG profile: classification of corporate activities in the areas of environmental and climate management, social issues and corporate governance**

AHT plans and installs decentralized CleanTec plants worldwide that generate CO<sub>2</sub>-neutral electricity, heat and chemical raw materials from biogenic waste materials. AHT is thus increasingly acting as a provider of CleanTec solutions. With highly efficient plants and components for a climate-neutral energy supply and the separation and recycling of valuable materials such as hydrogen, phosphorus or carbon, the company is making a significant contribution to defossilization and decarbonization. In doing so, the company is pushing to act as a driving force and innovator in the energy sector and the sustainable extraction of raw materials in the future and to establish itself in the markets in the long term. Consequently, the commitment to sustainability and environmental protection is an integral part of the corporate philosophy.

The main focus of the ESG analysis is on analyzing the operational and strategic business orientation in a sustainability-related context. This essentially involves a presentation and classification of business activities and sustainability-oriented corporate measures in the areas of environmental and climate management, social affairs and corporate governance, taking sustainability aspects into account. AHT's ESG profile is presented below.

## SUSTAINABLE DEVELOPMENT GOALS



### Environmental



### Social



### Governance

#### Environmental

Concrete measures for environmental and climate protection:



- The responsible use of resources is firmly anchored in AHT's corporate philosophy. Wherever possible, the "cradle to cradle" approach is followed and only materials that can be returned to the cycle are used. In this context, AHT also uses used parts and components in the CleanTec systems, for example, in order to do justice to the circular orientation and to consistently pursue the sustainability approach.
- According to the company, AHT is making a significant contribution to decarbonization with the CleanTec systems currently in operation. Accordingly, CO<sub>2</sub> emissions are being reduced by 200 tons per AHT employee.

#### Social

Measures for a sustainable working environment as well as staff and child development :

- Employees are offered free training and further educational opportunities such as IT training and other courses to expand their range of skills in the CleanTec area.
- AHT employees receive additional social benefits such as subsidies for public transportation, loyalty bonuses and the payment of capital-forming benefits.

#### Governance

Measures for sustainable and long-term orientated corporate orientation -Sustainable corporate governance :



- AHT's overarching corporate goal is to establish itself as a leading provider of Clean-Tec and clean energy technologies and thus make a contribution to defossilization and decarbonization. The focus is on efficient proprietary technologies and processes for gas generation and gas purification from residual materials and the circular procurement of input materials for energy supply. The commitment to sustainability and environmental protection is thus firmly anchored in the corporate philosophy.
- In addition to supporting environmental organizations, AHT is also involved in various initiatives and professional associations. For example, it takes part in the "Biomass Gasification Working Group", an initiative of the NRW Energy Research Cluster (CEF NRW). This was founded with the aim of creating a platform for technical and constructive exchange between regional research institutions and companies. Specifically, AHT is involved in the "Biomass Gasification Working Group" and contributes its in-depth expertise.

## GBC conclusion on the ESG profile

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G

Overall, the ESG analysis shows that AHT's ESG profile is characterized by a holistic consideration of sustainability aspects in the examined areas of environmental and climate management, social issues and corporate governance. AHT is thus consistently implementing its sustainability-oriented business focus as a technology provider in the CleanTec and Clean Energy sectors. The expertise and applications of AHT technologies actively contribute to decarbonisation and defossilisation.

Measures are defined in the areas of environmental and climate protection, social affairs and corporate governance to continuously align the company's goals and operational business development with the targeted sustainability aspects in order to generate social and ecological added value in addition to economic added value. In this way, profitability and sustainability are considered together.

## SDG reference: company-specific contribution to the 17 UN Sustainable Development Goals (excerpt)

The following is an analysis of AHT's business activities with regard to the company's specific contribution to achieving the global UN Sustainable Development Goals. It should be noted that the company makes a direct contribution through its business activities on the one hand and indirectly by supporting sustainability-related projects on the other.



Source: United Nations

**Overall, this analysis shows that AHT essentially makes a direct or indirect contribution to nine out of 17 SDGs.** The main focus is on SDGs 7, 9, 11, 12, 12, 13 and 17, which are achieved both through direct business activities and indirectly through support for sustainability-oriented projects in the energy sector.

### 7. Affordable and clean energy - "Ensuring access to affordable, reliable, sustainable and modern energy for all"



AHT plans and builds decentralized CleanTec plants worldwide that generate CO<sub>2</sub>-neutral electricity, heat and chemical raw materials from biogenic waste materials. In the future, AHT itself plans to act as an energy supplier from renewable energy sources.

**9. Industry, innovation and infrastructure - "Building a resilient infrastructure, promoting inclusive and sustainable industrialization and supporting innovation"**



AHT Syngas Technology is a leader in the development of biomass and waste gasification plants with the aim of reducing dependence on fossil fuels while cutting carbon emissions. The company thus offers innovative technologies and processes for energy supply and raw material processing. AHT therefore acts as an innovator in the CleanTec and Clean Energy sector.

**11. Sustainable cities and communities - "Making cities and settlements inclusive, safe, resilient and sustainable"**



AHT technologies make a valuable contribution to decarbonization and defossilization. CleanTec solutions are therefore important instruments in the energy transition that has already begun. Sustainable energy supply and efficient resource management are important key factors in the transformation process.

**13. Climate protection measures - "Take immediate action to combat climate change and its effects"**



Environmental and climate protection are an important part of the strategic business focus. AHT focuses on decentralized, environmentally friendly and cost-effective waste-to-energy and waste-to-resource solutions to reduce CO<sub>2</sub> emissions and increase the use of renewable energy sources such as biomass power plants as part of the global energy supply.

**17. Partnerships to achieve the goals - "Strengthening the means of implementation and revitalizing the global partnership for sustainable development"**



In line with a holistic sustainability strategy that goes beyond its direct business activities, the company strives to enter into partnerships and collaborations. In addition to its international business focus, AHT also conducts global research projects. In cooperation with the Rottenburg University of Applied Forest Sciences and Sunyani University, a pilot project was realized in Ghana that supplies the local community with electricity, biogas and cooling. By using its own gasification technology, AHT provides decentralized, low-emission and safe electricity from sustainable forest waste wood. AHT also supplies heat, which is converted into cold. With this project, AHT is positioning itself as a solution provider for industry and, above all, local people.

## **GBC sustainability summary**

In summary, AHT addresses a total of nine of UNESCO's 17 sustainability goals and thus makes a corporate contribution to achieving these goals. This guarantees an investment in a company that operates sustainably and is therefore well suited to a sustainability-oriented portfolio. The company offers a wide range of services and CleanTec solutions that can be used in various industries. AHT's strategic business orientation is aimed at developing technologies for generating electricity from unconventional energy sources and thus reducing CO<sub>2</sub> emissions as well as using residual and raw materials sustainably in the sense of the circular economy. In addition, ecological added value is created through increased environmental awareness and intact environmental and climate protection management. In our view, AHT therefore represents an impact investment.



## APPENDIX

### I.

#### **Research under MiFID II**

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2. The research report is made available to all interested investment service providers at the same time.

### II.

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The respective recommendations/classifications/ratings are associated with the following expectations:

BUY	The expected return, based on the calculated target price, including dividend payment within the corresponding time horizon is $\geq + 10\%$ .
HOLD	The expected return, based on the calculated target price, including dividend payment within the corresponding time horizon is $> - 10\%$ and $< + 10\%$ .
SALE	The expected return, based on the calculated target price, including dividend payment within the corresponding time horizon is $\leq - 10\%$ .

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- (6) b) There has been a change to the draft financial analysis based on legitimate indications from the third party and/or issuer
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Other person involved in this study:

**Manuel Hölzle, Business graduate, Chief Analyst**

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