THE WORLD'S FIRST CERTIFIED CLIMATE-NEUTRAL CONTAINER TERMINAL

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Electrification and automation are the keys to sustainable success at the HHLA Container Terminal Altenwerder in Hamburg.

The port's central location within Hamburg, a city of over 1.8 million inhabitants, poses challenges for port operations. Hamburger Hafen und Logistik AG (HHLA), which operates five container terminals in Europe, is aware of its responsibility to protect the climate in the Port of Hamburg and has been implementing measures for economically efficient and environmentally sustainable container handling for many years. The self-imposed target to reduce CO2 emissions per handled container by at least 30% by 2020 was thus achieved ahead of time in 2018. HHLA has now set itself new goals. The European logistics company is working on halving its absolute CO2 emissions by 2030 against the figures from 2018. The aim is to make the entire HHLA Group climate-neutral by 2040.

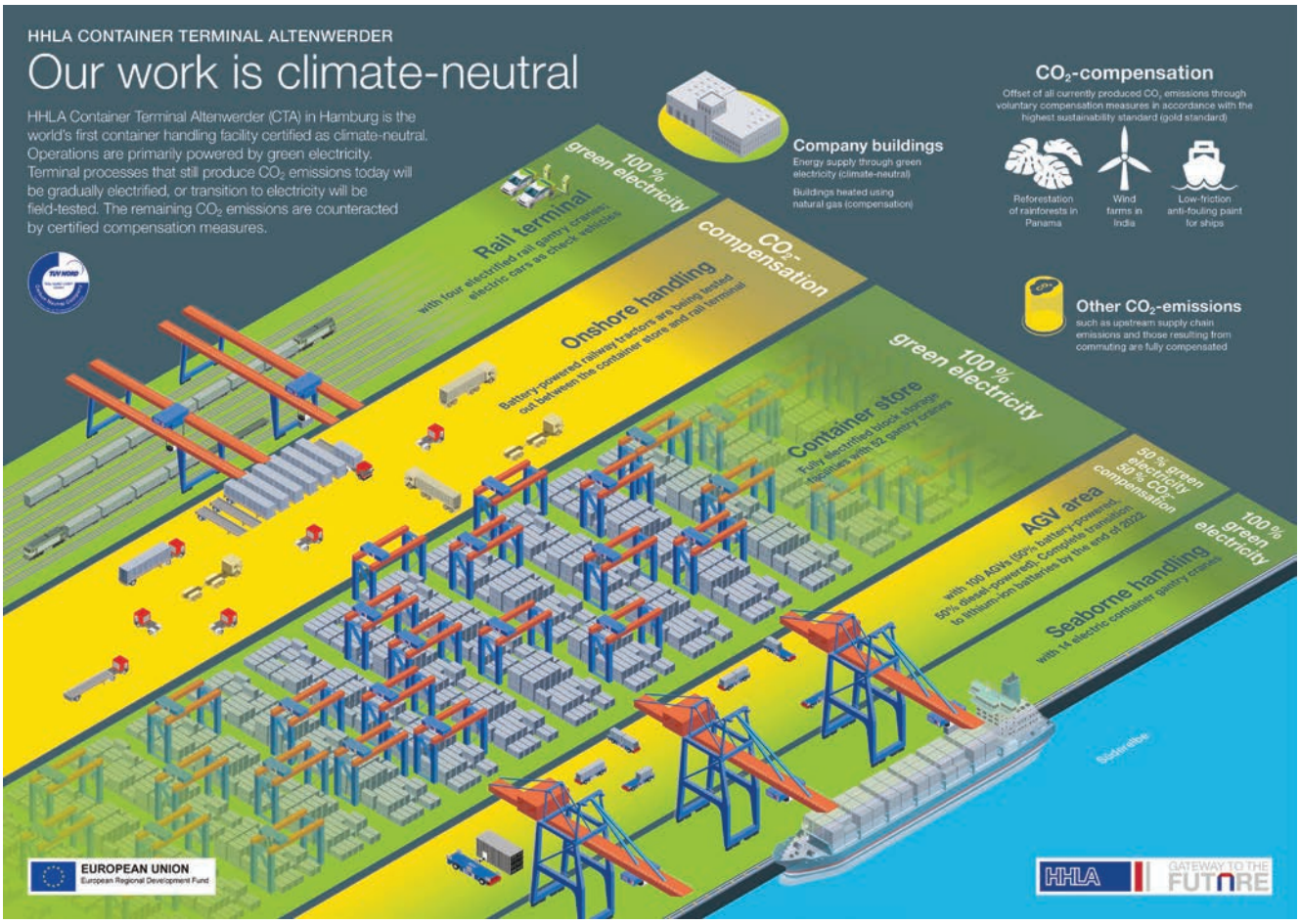
In implementing its "Balanced Logistics" sustainability strategy, HHLA is emphasizing its commitment to bringing together environmental, social and economic responsibility. Each is a prerequisite for the others: through economic success, the company has the means and opportunity to invest in climate-friendly technologies and to meet its responsibility to society and the environment.

USING TECHNOLOGICAL EXCELLENCE TO BECOME A CLIMATE-NEUTRAL GROUP

In view of the above, HHLA regards innovation and technical excellence as crucial elements in developing sustainable solutions, being environmentally responsible and operating successfully. Investing in innovative, climate-friendly technologies at an early stage will allow the company to achieve sustainable results faster, which are equally accepted by shareholders, customers, employees and society.

In keeping with this conviction, the world's first certified climate-neutral container terminal has now been developed: HHLA Container Terminal Altenwerder (CTA) in the Port of Hamburg. The CTA's certification is a clear example of how innovation and automation can help container handling to become climate-neutral. Certification was first carried out in 2019 through TÜV NORD CERT GmbH.

The facility located at Hamburg's Süderelbe river is one of the most technologically modern and efficient container terminals in the world and has been in continual development since it commenced operations in 2002. Operations at CTA are now primarily powered by green electricity. Terminal processes that



still produce CO2 emissions today will be gradually electrified, or their transition to electrical power will be field-tested.

AGV TRANSITION TO LITHIUM-ION BATTERIES

Seaborne handling (14 container gantry cranes) and block storage (26 storage blocks/52 gantry cranes) have always been electrified and are powered by up to 100% green energy. The approximately 100 automated guided vehicles (AGV) used at CTA for transport between block storage and container gantry cranes are currently being gradually converted to use lithium-ion batteries as their source of power. Of the AGVs, 50% are already powered entirely by green electricity. By 2022, all AGVs are to dispense with combustion engines and will have made the switch to lithium-ion technology. Upon completion of these measures, the eco-friendly vehicles will be able to independently and automatically recharge using green energy at 18 electric charging stations.

For onshore handling, prototype tests of battery-powered tractor units for the transportation of containers between block storage and the rail terminal are currently being carried out. As soon as a technically satisfactory, operationally feasible and commercially viable solution for emission-free tractor units has been found, it will be implemented. The rail terminal which, with four rail gantry cranes and nine tracks, is the largest of its kind in Germany, will also be powered exclusively by green energy. Even the check vehicles which staff members use to get around the terminal are climate-neutral electric vehicles.

COMPENSATING FOR UNAVOIDABLE EMISSIONS

The CTA has been certified by the TÜV NORD in accordance with the TN-CC 020 standard "Calculation & Verification of Carbon Footprints & Carbon Neutrality" to compensate for the CO2 emissions that are still being released. As an independent verification body, TÜV NORD has calculated the current CO2 footprint of CTA. This included factors such as continued diesel and gas consumption, employees' daily commute and upstream supply chain emissions for all energy sources used. A 5 percent uncertainty factor is included in the calculation of the CO2 value and is counteracted by HHLA's targeted compensation measures. The uncertainty factor is deliberately very high, to be on the safe side in calculating CO2 emissions.

HHLA compensates for CO2 emissions that are still being generated through emissions reduction certificates and supports three compensation projects, which are certified according to the highest gold standard of Voluntary Emission Reduction (VER): wind farms in India, low-friction anti-fouling paint for ship hulls and reforestation of rainforests in Panama. CTA's CO2 footprint will be reviewed again by TÜV NORD this year.

CTA AS TEST LABORATORY FOR MOBILE POWER STORES

As a highly automated and electrified handling facility, CTA is also used for the research that is being conducted for a number of forward-looking projects. For example, there is research and development work being carried out as part of the funded project FRESH. The acronym FRESH stands for Flexibilitätsmanagement und Regelenergiebereitstellung von Schwerlastfahrzeugen im Hafen (Flexibility Management and Balancing Energy Provision for Heavy-Duty Vehicles in the Port). One of the greatest challenges of the energy transition in Germany is the safeguarding of grid stability. By now, the share of renewable energy sources in the German electricity mix sits at 40%. This development requires technical solutions by the network providers so that companies and private consumers may

soundly be supplied with electricity at all times. Together with its partners, HHLA is determining the extent to which the battery capacities of the automated guided vehicles used at CTA could be connected to the German grid as flexible power stores in order to provide primary balancing power under commercial conditions to ensure grid stability. A process and software solution for electricity market access will be developed in the course of the three-year research project. It will digitally control the demands of the virtual power plant operator and smooth terminal operations. After all 100 AGVs have made the switch to fast-charging lithium-ion batteries by 2022, on the basis of calculations, HHLA could make 4 megawatts of power available to the electricity market at the CTA's 18 future electric charging stations. Through this, HHLA would be carrying out pioneering work in the field of grid stability and supporting the energy transition in Germany.

ABOUT THE AUTHOR

Jan Hendrik Pietsch, an industrial clerk and business administration graduate, is responsible for ensuring the sustainability of operations and the reconciliation of environmental, social and economic responsibilities at Hamburger Hafen und Logistik AG (HHLA). His areas of responsibility include calculating the Group's carbon footprint, initiating and coordinating projects that are relevant to sustainability and maintaining a dialogue with stakeholders regarding matters relating to sustainability. His maxim is: "Sustainability is always the sum of many small ideas and measures."

ABOUT THE ORGANIZATION

Hamburger Hafen und Logistik AG is a leading European port and transport logistics company. Its core business is container handling in seaports and container transports between ports and the German and European hinterland. HHLA's seaborne handling facilities in Hamburg (Germany), Tallinn (Estonia) and Odessa (Ukraine) are logistics hubs for world trade. Its rail subsidiary, METRANS, is a leading rail operator for intermodal container transports in Europe. HHLA also offers a broad spectrum of port, consulting and other services.

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