

Linde Material Handling

Linde

SHAPING THE FUTURE – CREATING VALUE



Sustainability at
Linde Material Handling

LINDE – FOR YOUR PERFORMANCE

Linde Material Handling develops high-performance material handling and logistics systems that are tailored to customers' specific needs, enabling them to achieve a lasting competitive edge. The Company is one of the world's largest manufacturers of forklift trucks and warehouse technology, and has been setting standards in the areas of industrial-truck solutions, fleet management, driver assistance systems and services for over 50 years.

→ www.linde-mh.de

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Transparent performance

2014 marked the first time Linde Material Handling had published a Sustainability Report. The report made the Company's efforts clear and comprehensible, as it was produced in an open, transparent way and in accordance with international standards. With this brochure we aim to provide a brief, easy-to-read report on our current performance without losing ourselves in minute detail. However, we have also provided an in-depth online factsheet for those who still want to know all the facts and figures. In parallel, Linde Material Handling's achievements and KPIs will also be included in the KION Group's Sustainability Report – which is published annually and encompasses the entire Group.

For more information, visit www.linde-mh.de.
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Companies bear responsibility – for customers, business partners, employees and neighbours, for protecting the environment and for making a positive contribution to the society of which they are a part.

It is a responsibility that Linde Material Handling meets in a variety of ways: with reliable, efficient and safe products for our customers; as a dependable and fair business partner that sets high standards throughout its supply chain; and as a good employer and committed corporate citizen. In short: as a Company that actively prioritises sustainability, ethical principles and long-term actions over short-term success.

As a Company steeped in over 100 years of tradition, we know that only those who ask the right questions will find answers to tomorrow's challenges. This is why we pursue a systematic and comprehensive approach through our sustainability management system, with clearly defined action fields and concrete goals. In 2014 we gave a transparent account of our efforts, objectives and challenges for the first time in our Sustainability Report. This brochure shows where we are today in terms of our progress towards becoming a more sustainable Company.

At the same time, our achievements will be incorporated in the new KION Group Sustainability Report, which provides an annual account of the Group's sustainability activities. This is because sustainability demands transparency and openness, not only regarding achievements and successes, but also about the challenges and opportunities that still lie ahead of us. And even if we are still far from perfect, we are absolutely steadfast in getting closer our objectives day by day. This enables us to provide our customers with vital competitive advantages, secure the prerequisites for a future worth living in and ensure our Company's success.

Yours sincerely,

Andreas Krinninger
 Chief Executive Officer & Chief Financial Officer
 Linde Material Handling

PRODUCT RESPONSIBILITY – SUSTAINABILITY CREATES COMPETITIVE ADVANTAGES



State-of-the-art quality, safety, reliability and performance are the hallmarks of Linde Material Handling's vehicles and warehouse technology, and assets our customers value. Whoever uses a Linde product can rely on this commitment, one we have delivered to our customers for over 110 years now. Furthermore, sustainable business principles and the responsible use of resources have long been a part of this commitment. This is because real efficiency is only achieved when the total cost of ownership (TCO) is considered – the cheapest resource still being the one that does not need to be used.

Based on this conviction we help our customers save energy, reduce emissions and optimise their environmental footprint. At the same time, through our commitment to maximum safety and an ergonomic design we help ensure that the people who use our vehicles can avoid risks as far as possible.

This is why we strive to achieve sustainability in every area of our Company, leverage our capacity for innovation and create real competitive advantages for our customers that pay off – for their company as well as the environment in which we all live.

Products and solutions

OPTIMUM PROTECTION FOR PEOPLE, GOODS AND OPERATIONS



The quest for perfection is a key part of Linde Material Handling's DNA. A continuous process of improvement is the consequence, where the solutions our developers devise are only ever good enough until the next stage of optimisation. The capabilities, eco-friendliness and safety of Linde's products are built on this understanding of how the Company sees itself.

The development of a comprehensive safety philosophy is also based on this attitude. The concept that underpins our philosophy is 'Vision Zero – Safety in your World' which places people at the heart of every aspect of our work. Through 'Vision Zero – Safety in your World' we create the best conditions for our customers to reduce the risk of occupational accidents in logistics to zero. The concept represents our ambition to support our customers through continuous technical innovations in industrial trucks and intelligent assistance systems. This includes extensive training programmes, consulting services and innovative digital solutions. In doing so, Linde Material Handling continually raises the bar a little higher both for itself and for the competition.

We apply our philosophy right from the development stage of our vehicles, which are quite literally built around people. All the controls are tailored to the operator's needs and are intuitive to use, with active and passive safety systems protecting the driver's health and helping to prevent the risk of accidents. In this respect, Linde Material Handling follows in the footsteps of a long tradition. The foundation was laid with the development of the hydrostatic drive over 50 years ago; since then, numerous innovations have been created based on operators' requirements, which reduce stress on the driver and offer increased comfort, convenience and safety.

The guiding principle of ergonomics also shapes development activities beyond the trucks themselves at Linde Material Handling. Whether it concerns safety equipment, fleet-management software or service solutions – everything is focused on the perfect interaction between operator and machine.



Dynamic Mast Control LOW-OSCILLATION

Reach truck drivers are familiar with this issue: the higher the mast gets, the sooner it starts to oscillate. This makes collisions with shelving racks and damage to loads and equipment hard to avoid. Plus, precious time is wasted waiting for the mast to stop wobbling. The innovative driver assistance system Dynamic Mast Control (DMC) from Linde Material Handling solves this problem while increasing productivity and safety. This is how it works: an electric, highly responsive reach system compensates for mast movements with specific counter-movements. Thanks to this, the system ensures that handling processes involving large lift heights are significantly quicker and safer. In addition, DMC reduces the risk of damage to goods or racks.



Linde Safety Pilot DIGITAL CO-PILOT

The Linde Safety Pilot is a milestone in the development of safety systems. As an intelligent passenger, the system keeps the driver continuously updated on key parameters. These include values such as the current load weight and maximum permitted lift height based on speed. On top of this, as soon as a specific limit is reached, the Linde Safety Pilot actively intervenes and prevents operator errors. The system can be tested and evaluated by interested customers in a driving simulator specially developed for the Linde Safety Pilot. The simulation realistically demonstrates how effectively the Linde Safety Pilot intervenes in dangerous situations and thus helps prevent serious accidents.



Linde Safety Scan SAFETY FIRST

With its new Linde Safety Scan solution, Linde Material Handling is also making its safety experience available for the design of complete logistics chains, and supporting its customers in analysing and eliminating safety risks. Linde Safety Consultants, specially trained experts, evaluate the internal movement of people and vehicles within a facility, and together with the customer produce specific recommendations for action regarding organisational and technical solutions. They also support the customer in implementing these recommendations. Underpinned by Linde Material Handling's long-standing experience, the Linde Safety Scan helps to increase the safety of the customer's employees and vehicles, while improving productivity at the same time.



Linde Roadster GREATER VISIBILITY – INCREASED SAFETY

The Linde E20 to E35 range of electric forklifts with a 2.0 to 3.5 tonne load capacity are among Europe's best-selling electric warehouse trucks. Overhead tilt cylinders are one specific feature of all Linde trucks – and now this technical advantage is being used in a new, revolutionary truck concept: the Linde Roadster, models Linde E20R to E35R. Designed without the A pillar and available with an optional overhead safety glass guard, the new Linde Roadster offers the driver a unique view of the driving path and immediate surroundings, thus providing additional safety benefits.

The advantages of the new solution can be fully exploited, particularly with indoor use, since onboard cabins, doors or heating are not required here. Convenience features requiring a mounting, such as the Linde Safety Pilot display, a mobile phone or clipboard are mounted on a dashboard behind the steering column, offering maximum convenience to the driver. Linde also offers further equipment options, including a frameless windshield, also made from safety glass, as well as a frameless rear window.



Truck development TESTING IS THE KEY

Prior to any new truck going into serial production, Linde Material Handling conducts extensive tests to exhaust every potential in terms of quality and handling. These include an 800-hour continuous load test in which seasoned drivers document even the tiniest abnormalities. For many years now, Linde Material Handling has included a demanding series of tests in its testing programme, which include a variety of carefully documented test criteria. Since almost all forklift functions are now controlled by electronic systems, the truck's electrical and electronic systems must also undergo thorough testing. One of the many test procedures used is called 'Hardware in the Loop' (HiL), which provides a wealth of virtual test data that is compared with data from real-world tests. This provides developers with a complete picture of the functionality of the hardware and software used in a truck, including its electronic components. Findings and evaluations from these tests are incorporated into the development processes of current and future models.



Pre-op check app FORKLIFT CHECK VIA A SMARTPHONE

German regulations require pre-operation checks for all industrial trucks. The Linde 'pre-op check' app allows these to be performed very conveniently using a smartphone or tablet prior to the truck being used. Only when the test has been completed successfully can forklifts or warehouse technology be put into operation. The driver can immediately document any damage or leaks by taking a photo, thereby improving the availability and safety of vehicles. Wireless transmission of the data set as well as its documentation and further processing with the 'connect:' software is also possible.



Impact Drop Test ZERO COMPROMISES

Linde trucks undergo extensive tests to prove that they always meet the highest safety standards. This includes the Impact Drop Test, where a load of up to 1.7 tonnes is dropped from a height of 2.5 metres onto the truck's overhead guard frame. By law, the overhead guard frame deformation limit is 250 millimetres from the upper rim of the steering wheel; however, Linde Material Handling's own stringent standards go beyond the legal requirements. To keep the driver's head protected, before each new vehicle goes into production the Company ensures that the guard frame deforms even less in an Impact Drop Test, thereby surpassing statutory requirements.



Linde Speed Assist SAFELY ON THE MOVE

Since forklift trucks are often accelerated heavily in outdoor use, caution should be exercised especially when driving back into indoor areas such as warehouses or factories. Linde Speed Assist is controlled by latest-generation radar sensors and helps drivers to reduce their speed automatically and adapt to the surrounding conditions. This prevents speeding through carelessness or inattention causing damage to property or even injury to people. Linde Speed Assist is weatherproof, can withstand operating temperatures between -40° and +65° C and can be adapted easily and quickly to individual customer requirements.

Ergonomics and safety as guiding principles FOCUSING ON THE INTERACTION BETWEEN OPERATOR AND MACHINE

Providing the best support and protection for drivers and operators of forklift trucks and warehouse technology in their daily work is the top priority of all innovations at Linde Material Handling. This is why Linde Material Handling's focus is constantly on ergonomic and safety aspects in the development and enhancement of products.

The Company has developed a large number of its own test procedures and established a test centre with various test tracks and driving courses, together with several larger and smaller testing facilities to meet its own requirements. At the Test Centre over 100 engineers, specialists and test drivers perform continuous load tests, check the tipping stability of trucks, evaluate the impact of accidents on trucks, and conduct driver safety tests.

Linde Material Handling continues to work intensively on optimising the ergonomic design of its products, focusing on research and development work into technologies that help protect the operator effectively from vibrations, shocks and impacts. This is because while these human body vibrations – the technical term – are usually barely noticeable, taken as a whole they have a considerable impact on drivers and operators. As a result of this product development, which is consistently geared towards ergonomic needs, Linde Material Handling products go beyond statutory requirements.

The hydrostatic drive – developed over 50 years ago – was the starting point: it offers unrivalled precision in control and makes the driver's job much easier by offering especially gentle acceleration and braking. Further developments followed such as the patented twin drive pedals. Alongside these, the systematic decoupling of the individual assemblies, for instance from the chassis and driver's work station, protects the driver in particular. Essentially, Linde Material Handling sees the ergonomic design of the driver's work station as the key to safe, comfortable and efficient operation. A unique feature of the Linde forklift truck is the optional rotating driver work station. It rotates, not the driver, and offers an unrestricted view even when reversing – without the need for the driver to twist their upper body and head. This greatly improves the ability of the driver to stay focused and free of fatigue for longer periods.

Increasing digitisation is changing the interfaces between the way the operator and machine interact, turning the focus to the user- and safety-centric design of the entire work environment. Assistance systems such as the Linde Safety Pilot and Dynamic Mast Control are playing an increasingly important role in harmonising ergonomics and safety. By reducing stress on the driver, the risk of accidents also declines, sick-leave drops, and productivity improves.



“Across Europe, we are seeing growing interest in safety solutions and additional equipment for forklifts and warehouse technology”, confirms Tobias Siegler, Product Manager at Linde Material Handling, regarding development trends. Linde Material Handling has summarised its safety efforts under the concept ‘Vision Zero – Safety in your World’. Besides its innovative assistance systems, consulting services to optimise the safety of operating procedures, such as those Linde Material Handling offers with its Linde Safety Scan, are in high demand.

Whether in forklift or warehouse technology from Linde Material Handling, where driver and machine become one, or in the vehicle operating environment where ergonomics and safety drive developments at Linde Material Handling, ensuring the operator and technology are in perfect harmony always takes top priority on our developers’ spec sheet.

Products and solutions

EFFICIENT ALTERNATIVES



Where will the energy come from in future for forklifts and warehouse technology systems? Lead-acid batteries, Li-ion batteries, fuel cells – or perhaps still from conventional internal combustion engines? There are good arguments for every solution. In terms of procurement costs and efficiency, conventional systems are still very popular. Nevertheless, Linde Material Handling has been working tirelessly for many years now on the development of efficient alternatives to the traditional internal combustion engines or lead-acid batteries. The key considerations are always the field of application and the intensity of use.

To have the best possible solution available to meet any particular requirement, Linde Material Handling drives forward technical developments in all areas with the goal of always offering customers the most productive turnkey system and one which also is perfectly suited to their specific requirements.



Propulsion solutions

SIGHTS SET FIRMLY ON TOMORROW'S TECHNOLOGIES

Whether Li-ion battery or fuel cell technology, Linde Material Handling is familiar with the full spectrum of future scenarios, and continues to drive forward research and development in these and related areas. Not only the proponents of Li-ion batteries have good arguments on their side, such as faster charging, more power and a longer lifespan – the supporters of fuel cells also see good medium to long-term chances for their preferred solution becoming the propulsion technology for the future of intralogistics. Hydrogen power also offers a host of advantages, with high availability, use of regeneratively produced hydrogen with minimal environmental impact, extremely rapid refuelling and no need to swap out batteries.

Joint tests conducted by Linde Material Handling, the BMW Group and the Technical University of Munich have already demonstrated the viability of the hydrogen drive for industrial trucks. Further tests at the DB Schenker transshipment warehouse in Hörsching, Austria, have demonstrated the real-world feasibility of a hydrogen infrastructure without disruptions to operations or vehicle downtime. There were also interesting findings regarding the environmental footprint: in Hörsching the hydrogen came from converted biogas, resulting in greenhouse gas emissions reductions of around 75 percent compared to vehicles with lead-acid batteries that were charged with EU-mix electricity.

As far as viability is concerned, Li-ion technology is ahead of fuel cells, with the technology already catching on increasingly in markets. It is also finding favour with Linde Material Handling customers thanks to its raft of advantages in routine operations such as performance, flexibility, safety, and last but not least, cost benefits. Model calculations show that Li-ion batteries offer significant cost savings versus lead-acid batteries, particularly in demanding multi-shift operation. This is because Li-ion technology is up to 30% more efficient in everyday use thanks to its higher energy density and high overall system efficiency.

What sets Linde Li-ion powered models apart is that a special, fully comprehensive turnkey solution has been designed for each model. Thanks to this, the customer receives a turnkey package that offers complete peace of mind. Specifically, this means that Linde Material Handling provides a guarantee and warranty not only on the truck, it also covers the battery and battery-management system. The quality of service is also guaranteed, with 8,500 service engineers ensuring qualified, expert support is always close at hand for our customers. One thing is certain: whichever technology finally prevails in future, Linde Material Handling is well prepared!

Interview: Focus on alternative propulsion solutions
»WE FIND THE OPTIMAL, TAILORED SOLUTION FOR EVERY CUSTOMER!«



An interview with Frank Bergmann, Product Manager Counterbalance Trucks, Linde Material Handling.

Mr Bergmann, as a Product Manager for Counterbalance Trucks at Linde Material Handling you closely examine the market opportunities presented by alternative propulsion solutions. Which form of propulsion do you believe has the greatest potential for forklifts?

That is a tough question to answer. Basically, our customers can choose from a wide range of truck propulsion systems that range from gas and diesel engines, through electric drives with lead-acid batteries or Li-ion batteries, even through to fuel cells. Every type of drive has its advantages, but there is no 'does-it-all' technology that is superior to the others in every respect.

Ultimately, it always comes down to how the solution will be used on-site, its cost-effectiveness and, increasingly, environmental aspects. The complete picture is always what matters – and to draw this picture we support our customers with help and advice as well as an extensive, highly skilled sales structure.

What does this mean specifically?

Our aim is to convince customers not to make decisions fixated on short-term investment costs. A forklift's cost-effectiveness only becomes apparent over the long term – and this should also shape

the decision behind opting for a particular propulsion system, as sometimes diesel or lead-acid battery trucks are perfect for the job. That said, a whole set of specific use cases show that our Li-ion batteries offer not only a significant number of advantages in everyday use, but are often the most cost-effective in the medium to long term. And from a sustainability viewpoint, this solution is interesting for our customers. This is why we currently see the greatest future potential with Li-ion batteries.

What factors determine cost-effectiveness?

We need to consider the sum of investment, energy, maintenance and infrastructure costs, as the most important cost drivers. Li-ion technology scores points in this regard too, as the batteries have a longer service life and are virtually maintenance-free over this period. For the customer, this reduces the risk of downtime, cuts maintenance expenditure and very significantly reduces energy and water consumption. Furthermore, this technology lowers infrastructure costs, as there is no need for fume-extraction systems and battery-swapping equipment. As you can see, the overall picture is a complex one, so tailored customer consulting is important – something we dedicate a lot of time to.

What is involved in a typical customer consultancy?

We review the existing truck fleet and infrastructure to ensure that the system, battery and charger are right for the job. Among other things, our field tests have shown that a high level of truck availability is even achievable with small – and therefore more cost-effective – batteries in conjunction with a powerful charger. We share such findings with our customers to achieve the perfect solution for them.

Lead-acid batteries continue to dominate the market. When does it make sense for a customer to switch to Li-ion technology?

To determine this, we ask our customers a series of questions. Do you have to swap and maintain batteries daily? Do you operate in a multi-shift schedule? Have you already suffered accidents when swapping batteries? Is the ventilation of charging areas and charging points an issue for you? Do you want to reduce your energy consumption significantly, and are you eco-friendly and open to new technologies? If the answers to most of these questions are 'yes', it is highly likely that a switchover is worthwhile for the customer.



What are the specific advantages of Li-ion batteries, and what impact do these have?

Li-ion batteries are more energy-efficient than other types of battery. In the case of a lead-acid battery used in conjunction with a high-frequency charger, the system efficiency is around 60 percent – with a Li-ion battery and a comparable charger, the system efficiency is 87 percent. On top of this, there are a number of advantages when it comes to usage: shorter charging times, no need for fume-extraction systems and battery-swap areas. And last but not least, there are the safety aspects. Swapping a lead-acid battery is not entirely risk-free, as people can make quite a few mistakes. By contrast, Li-ion batteries from Linde Material Handling are built around a multi-level safety strategy, and therefore meet the highest safety standards.

It sounds like Li-ion batteries only offer advantages ...

As I mentioned, there is no one single technology that provides every advantage. It always comes down to the angle from which you look at things. Critics say that Li-ion technology doesn't pay for itself, and that it's difficult to recycle the batteries. There are also questions

regarding the technology's carbon footprint in respect to its complex production process. The fact is that in terms of their environmental footprint, when it comes to their manufacture Li-ion batteries score worse than lead-acid batteries. But when you consider the whole picture, the long utilisation phase and much higher level of efficiency, in the end everything – including the environmental footprint – speaks in favour of Li-ion batteries.

What does this overall picture look like?

Lead-acid batteries are the bottleneck when it comes to performance in today's trucks, especially given the trend of increasing tonnage. In this regard, the poor efficiency of the lead-acid battery is a real problem, with constant charging detrimental to service life and increasing maintenance expenditure. In the 4- or 5-tonne range, the batteries are really at the limit of their capabilities, and quickly run hot. In the 6- to 8-tonne range the lead-acid battery finally reaches its performance limit. Furthermore, lead-acid batteries are designed to support around 1,200 charging cycles; Li-ion batteries can support an amount three to five times higher than that. What's more, their energy efficiency is higher and they emit 28% less CO₂. To me, these are very strong arguments in favour of Li-ion technology.



What about fuel cells?

Linde already offers a wide range of fuel-cell trucks, with the goal of having another future-proof alternative drive technology in our portfolio. The fuel cell offers numerous advantages, including fast refuelling, which increases forklift availability in multi-shift operation, as well as the renewable generation of hydrogen from wind power, solar power and climate-neutral natural gas – with corresponding positive impacts on its carbon footprint. Current hurdles that still hinder the spread of this technology include higher servicing costs, lower efficiency compared to Li-ion technology due to the complexity of hydrogen production and its conversion to electricity, and in some cases, the high investment costs associated with building the hydrogen infrastructure. Depending on the application, the technology is already cost-effective, and it is being continuously further developed. The entry point will also continue to fall in the coming years. Anyhow, we are very well prepared – and have already proven this in various pilot projects, such as the one together with BMW.

So is Li-ion technology the future?

At Linde Material Handling way back in 2000 we were already convinced that electric drives are the future. Since then we've invested consistently in developing our e-forklift trucks – after all, even a fuel-cell forklift is ultimately driven by electricity. Today, I am certain that Li-ion technology will at least shape the immediate future, there's no doubting that. We are currently almost 20 years ahead of the public discussion on internal combustion engines, and we have really done our homework. In Germany we are now market leader in the Li-ion e-forklift segment, an achievement we are quite proud of, and we will continue our efforts. Compared to 2016, in 2017 alone we quadrupled the number of Li-ion trucks we sold. We also expect our product portfolio in the Li-ion segment to continue developing very dynamically over the coming years. In brief, we have every reason to be optimistic. And our customers will benefit from this.

Report FUTURE AT WORK



»At first, I was sceptical about how reliable the truck would be. But now I'm convinced. We've not suffered any downtime whatsoever.«

Two-shift operation demands total concentration, with driver and machine pushed right to the limit. At the NORA Vehicle Workshop Distribution Centre in Wolfsburg, Germany, extended breaks or downtimes are unthinkable. New spare parts need to be stored according to a precise code or made available right on time in for forwarding. "Since in the morning we still don't know what orders will be heading our way in the afternoon, the order-processing timeframe is often very tight", says Frank Wieland, Logistics Director at NORA. Everything has to run like clockwork and the slightest delay can cause huge problems. Reliability is a must.

From the minuscule screw to a four metre-long vehicle spare part, at NORA a large variety of goods need to be delivered reliably and punctually to the warehouse ramp. Eight Linde industrial trucks are the heart of the exacting logistics system this requires. The fleet comprises six electric Linde E16 P and E20 PHL electric front-loader forklifts and two Linde V08 and V10 order-pickers. Approximately 2,000 customers are supplied every day and around 250 pallets handled, which adds up to an average of 27,000 pallets per year.

Minimal maintenance effort and maximum range are key to industrial trucks scoring points in logistics. The highly skilled local official Linde distributor takes care of maintenance for NORA's Linde fleet. The two organisations have known and valued each other for years, with customer proximity a decisive factor here. In principle, the range of Linde lead-acid battery forklifts is not an issue either: they are hard at work non-stop from 5:30am to midday, and then after 30 minutes' break on the charging point, back on duty again without a break from 12:30pm to 7:30pm – that's the trucks' daily workload. It's a job they handle with ease thanks to their integrated high-frequency chargers



and electrolyte circulation batteries. Despite this, a few months ago NORA decided to try out an alternative and invest in a Linde four-wheeled E16 P electric forklift with Li-ion battery instead of an additional Linde E20 PHL electric forklift with a lead-acid battery. "At first, I was sceptical about how reliable the truck would be. But now I'm convinced. We've not suffered any downtime whatsoever", is Frank Wieland's positive summary following the pilot test. And the advantages versus the lead acid-powered model are clear: the sheer simplicity of the charging procedure, the high level of safety, cost reductions thanks to high energy efficiency and higher availability thanks to flexible interim top-up charging scheduling. The new technology has not only impressed Frank but everyone at senior level at the NORA Centre in Wolfsburg.

A large swap-body trailer is about to leave – one of the many trucks that arrive at the Distribution Centre every day. Linde forklifts are ready to transport the goods – as always: fully reliably, day-in, day-out. "We have been very happy with Linde vehicles for many years",

says Frank Wieland. Nevertheless, he is open to technological innovations. He knows that the demands for flexibility and reliability in an age of increased connectedness, particularly in the distribution industry, will continue to grow. In a highly interconnected world, punctual delivery combined with cost-effectiveness and environmental aspects are synonymous with ensuring a business's survival.

In light of this, Frank Wieland is certain that the future belongs to the Li-ion powered Linde forklift. Interim top-up charging works perfectly, and the maintenance-free battery and stable power output have



raised productivity. "If the longer battery life compared to the lead-acid version is confirmed, I think we will switch over progressively to Li-ion technology at the NORA Centre."

Frank Wieland is convinced that the future belongs to the Li-ion powered Linde forklift truck.

MINIMAL ENVIRONMENTAL IMPACT – THROUGHOUT THE ENTIRE PRODUCT LIFECYCLE



Linde products are a byword for reliability, quality and sustainability – throughout the entire product lifecycle. In the Company itself, especially in production, environmental protection, safety and the conservation of resources are the fundamental elements of our understanding of sustainability.

We employ innovative approaches to continuously minimise the Company's environmental footprint and to be a highly responsible partner to our customers. Our high standard of performance today therefore always represents a special commitment to the future.

Environment

PROTECTING THE ENVIRONMENT, IMPROVING EFFICIENCY



With ambitious goals and a comprehensive HSE management system (Health, Safety, Environment – see also the chapter Employees), Linde Material Handling has been continuously reducing the environmental impact of its activities for many years now. And because resources are expensive, sustainable solutions also make a key contribution to greater efficiency within the Company, with energy and waste as the main focus areas. “This is where we have the greatest leverage and where we can not only reduce our environmental impact considerably, but also generate significant cost benefits”, says Dr. Holger Hoppe, Head of Sustainability Management at the KION Group and at Linde Material Handling.



Dr. Holger Hoppe, Head of Sustainability Management at the KION Group and at Linde Material Handling.

The Company also records and assesses water consumption and the emission of VOCs (volatile organic compounds) produced as a result of the manufacturing process. It reports on them regularly to the management, with the individual operating units called upon to minimise their environmental impact.

In this regard, a targeted and systematic approach is critical to success. As a pioneer within the KION Group, Linde Material Handling established a highly effective sustainability management system that was used as a blueprint to create a corresponding programme at Group level. For many

years now, the relevant environmental data has been collected at all production plants as well as at sales and service units worldwide. Every site follows clear reduction and efficiency targets, which are monitored locally by HSE managers.

All relevant operating units at Linde Material Handling have also established appropriate HSE management systems. These implement clear, verifiable processes and require the documentation of achieved standards; in doing so they lay the basis for systematic further development in central action fields. Since 2017 these systems have been certified according to internationally recognised environmental standards such as ISO 14001 and ISO 50001. Through this approach nothing is left to chance, risks are minimised and efficiency potentials are raised. Regular audits at Group level also ensure compliance with the specified standards.

That said, sustainability does not end at the Company gates. This is why Linde Material Handling is increasingly involving its suppliers in its activities, and setting specific environmental and ethical requirements in purchasing that apply globally. “As part of the KION Group, we apply the Group-wide purchasing guidelines”, explains Dr. Hoppe. “The aim is to ensure that the manufacture of input products or components respects human rights, does not involve child labour, and takes place under conditions that are as safe and environmentally friendly as possible. This too is an important aspect of the ongoing commitment we make to our customers.”

Reducing environmental impacts VISIBLE SUCCESSES IN PRODUCTION

> 70 %

ISO 14001 CERTIFICATION ACHIEVED

To continually improve its services, Linde Material Handling takes a systematic approach to ensure its individual locations are externally certified. Over 70 percent of our locations, including every plant, are certified to the international environmental standard ISO 14001. Incidentally, the same applies to occupational health and safety according to OHSAS 18001, with over 70 percent of the Company's locations certified.

7 l/100 km

GAS-POWERED SERVICE VANS

In Linde Material Handling's national companies in Switzerland and Spain, service vans have been converted to run on eco-friendly gas. This has resulted in significant reductions in local emissions and much lower average fuel consumption levels per vehicle: the vehicles, which weigh several tonnes, now only require around seven litres of gas to travel 100 kilometres on assignments for customers.

- 10 %

LESS COAL, LOWER EMISSIONS

A highly practical approach to environmental protection: measures such as roofing the coal/coke depot save around ten percent of coke at the foundry in Weilbach, Austria. Efficient use of energy is also reducing carbon emissions, and by substituting ethanol with water-based coatings, the foundry is also lowering its VOC emissions.

Life Cycle Assessments ANALYSING THE STATUS QUO – CREATING TRANSPARENCY

Just how eco-friendly are forklifts, pallet trucks and similar? Customers of Linde Material Handling that want to evaluate and optimise their own environmental performance receive reliable data thanks to Life Cycle Assessments (LCAs). These are based on a methodology that the Company developed together with the Fraunhofer Institute for Building Physics (IBP), and which was recertified in 2016 by TÜV Rheinland.

Based on the ISO 14040 and 14044 standards, the entire lifecycle of the key product lines is examined in detail – from the extraction of raw materials, the production of each component and utilisation by the customer, through to recycling at the end of the product's life. A Life Cycle Assessment is also performed on each means of transport as well as the Spare Parts Service.

Across the individual product groups, the results show that the customer utilisation phase has the greatest environmental impact – accounting for up to 90 percent of the overall environmental impact. In the case of electric trucks, the production and utilisation of the battery system also plays a key role. Furthermore, the production of an industrial truck has almost the same environmental impact as its maintenance; by contrast, shipments and service trips have only a minor impact. Recycling the product at the end of its lifecycle generates environmental credits, particularly regarding metals, and also of the battery in the case of e-forklifts.

Life Cycle Assessments provide the basis for the strategic implementation of environmental aspects in the development process of future Linde products, and to specifically improve their environmental performance. In doing so, the approach of the Life Cycle Assessment ensures that optimisation of individual system components has no negative impact on the overall Life Cycle Assessment.

Resource conservation A NEW LEASE OF LIFE FOR USED TRUCKS



»With this programme developed by Linde Material Handling, we guarantee the same level of quality for our used vehicles throughout Europe.«

The latest technology is used not only in Linde Material Handling's new vehicles, but also in the refurbishment of used trucks. Giving used industrial trucks a second lease of life has a long tradition at Linde Material Handling. Exacting product quality – and thus long service cycles – are the hallmarks of all vehicles from Linde Material Handling – something that extends to used vehicles, as without an extensive refurbishment prior to getting a second lease of life as a used truck, these quality products would never be allowed to leave the factory floor.

In Germany Linde Material Handling's distributors take care of this job. And wherever the distributor network is patchy outside Europe, the Company has its own Refurbishment Centres. Recently, Linde Material Handling opened a Centre in Velké Bílovice near Brno in the Czech Republic. There, the 4,500m² facility prepares up to 1,000 used forklifts annually for their second career. Used trucks are refurbished according to a detailed process that is standardised across Europe. "With the programme developed by Linde Material Handling, we

guarantee the same level of quality for our used vehicles throughout Europe", explains Paulina Juarez, Senior Director Used Trucks and Short Term Rental EMEA.

The uniform 'Approved Trucks' quality standard comprises three levels which differ according to the degree of refurbishment and warranty period: Linde Plus, Linde Super and Linde Ultra. The truck's general condition is also a deciding factor. Paulina adds: "Typically, our approved used trucks are selected returns from our short or long-term rental fleets, which have been maintained by our engineers during their service life." This is a tremendous benefit, as a transparent, full vehicle history helps to accelerate the evaluation process required in the first step of refurbishment.

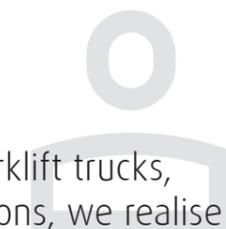
Nothing is left to chance. Following a thorough high-pressure hose-down, experienced engineers take a close look at every part of the used truck. Alongside the drive unit, the experts pay particular attention to the battery and charger. If it's 'thumbs up', the used truck has passed its first suitability test: refurbishment and corrective maintenance is cost-effective. If parts need to be replaced, only original spare parts are used. In doing so, all refurbished trucks comply with the relevant European legal safety requirements for handling technology.

The refurbishment and resale of used trucks has become an important business area for Linde Material Handling. Christophe Lautray, Chief Sales Officer at Linde Material Handling, comments: "We aim to offer our customers the widest possible range of material handling solutions. 'Linde Approved Trucks' are a high-quality, cost-effective alternative to new trucks."

The result of this refurbishment for used industrial trucks is impressive: in the new hall of the Brno Refurbishment Centre, freshly painted, shiny trucks are lined up in a row. To the untrained eye, the used trucks are hardly distinguishable from brand-new ones. And they are not only well equipped on the outside for their second career, also on the inside; the technicians have done a great job. There's no doubt about it: even after a long initial career in everyday logistics, Linde trucks are still far from ready for scrapping.



PEOPLE MAKE THE DIFFERENCE



As the world's largest manufacturer of forklift trucks, warehouse technology and system solutions, we realise that our employees are the basis for our success – both today and going forward.

We aim to be a good employer, attracting people who can make a difference. We offer our employees personal development opportunities and prospects as only an international company can. These are based on clear goals, unambiguous leadership requirements and a corporate culture that values innovation, collaboration, courage and excellence. After all, this is the only way we can live up to our promise to always offer our customers the best possible service and quality.

We are meeting the challenges of demographic change with age-appropriate working conditions, health programmes and semi-retirement models. It also goes without saying that a Company like ours meets the highest international standards in terms of workplace safety and ergonomics.

Diversity and equal opportunity are the core elements of our HR activities. And because we know that tomorrow's success is dependent on the training and education we provide today, our activities also focus on developing talented individuals.

Employees

GOOD EMPLOYER



Training
OVER 75 YEARS OF EXPERIENCE IN TRAINING YOUNG PEOPLE

Apprentices benefit from our expertise in the same way as pupils and students, whose advancement has a long tradition at Linde Material Handling. Through internships in Germany and abroad, we give budding talents the opportunity to gain valuable insights into the practical side and future of intralogistics. We support students with their undergraduate or postgraduate dissertations by assigning seasoned employees with many years of hands-on experience in day-to-day logistics to assist them.

Further education and training
SHARING KNOWLEDGE EFFICIENTLY AND HANDS-ON

Through numerous methodology, foreign language and specialist courses we support our employees in adding to their qualifications, thereby laying the basis for them to adapt quickly and efficiently to new requirements. Via our Linde Progress platform, over 10,000 Linde EMEA employees can take advantage of numerous e-learning and blended-learning courses, offering them the perfect mix of theory, interactive learning and hands-on exercises. The broad and target group-specific offering ranges from specialist training courses to training on methodologies, such as for conflict-management, self-management or project management. The online tool gives employees access to courses, videos and files; it also allows them to see their own course history and share ideas on which topics they would like to see added. By offering this, we can ensure our employees are always provided with the training and education best suited to their needs.

Occupational health and safety
RESPONSIBILITY FOR PEOPLE AND THE ENVIRONMENT

The safety of people and the environment takes top priority at Linde Material Handling – in our own business processes and in the utilisation of our products on-site. Linde therefore implements its Health, Safety and Environment (HSE) Policy worldwide, demonstrating that it is a responsible employer. Our employees are trained systematically in occupational health and safety, product safety, and environmental risks. Every year, KION honours the best performances at the KION Group Safety Awards, a Group-wide competition that includes every location.

Professional mobility
A COMPANY WITH INTERNATIONAL CONNECTIONS

As a global Company, we work hard to ensure our employees can network across national borders, so they can share knowledge internationally – which benefits both the Company and its employees. Through its support for local talent, Linde assumes its responsibility for improving opportunities for local workers at its global locations. It does this in many ways, for instance by ensuring that specialist functions are only staffed by experienced Linde employees until a local successor can be found and trained. We also support cross-border virtual teams in working together on suitable projects through the use of the latest communications media.

Interview FUTURE QUESTIONS



Linde Material Handling EMEA's Vice President Human Resources, Frank Oppenländer, and Works Council Chairman, Özcan Pancarci, discuss the Company's attractiveness as an employer, the effects of digitisation and the labour market of tomorrow.

Mr Oppenländer, Mr Pancarci, is Linde Material Handling a good employer?

Pancarci: Yes, definitely. But that doesn't mean that there is no more we can do to improve our attractiveness. I believe we need to do this, as demographic change and the challenges posed by digitisation are placing new, highly specific demands on us – and this applies to both the employer and the employees.

Oppenländer: We certainly don't have to shun comparison. As an employer, Linde Material Handling is a recognised brand, not only in Germany but throughout Europe. The average length of service across the EMEA region is twelve years. The Company's working environment and further development opportunities are ideal. Wages also play a role, but we know from experience that it is even more important to our employees that they enjoy what they do, that opportunities are available and that there is a good fit in terms of colleagues and the environment. This is certainly the case at Linde Material Handling. We are now also deliberately trying out new approaches to attract new employees – and

to continue to retain our current employees going forward. In return we do of course expect our employees to be willing to develop further. Those who are open to learning new things must and will be supported by Linde Material Handling.

You refer to advancing digitisation. Why are proven methods and tools no longer any use in this respect?

Oppenländer: The much-discussed 'war for talent' has changed massively in recent years. Qualified talent remains difficult to attract, but candidate profiles are also changing with digitisation. We are investing heavily in new technologies, and offering our customers a comprehensive range of intralogistics products and services, but our employees need the skills to master these technologies and translate them into added-value benefits for our customers. Training and further education will play an even more important role in future – and the willingness to change and learn on a daily basis will become a key factor for a successful career at Linde Material Handling.

So, are your employees sufficiently prepared to meet these challenges?

Pancarci: While many employees see the risks of digitisation, an increasing number are also seeing the opportunities and want to seize them for themselves. Historically speaking, we are currently undergoing a unique process of transformation. We want to make it a positive one and take the workforce along with us on the journey. Everyone must have an opportunity to develop, gain qualifications and play an active role in shaping the change. The willingness to change depends largely on whether we communicate openly and in discussion with the individual employees. The aim of the Works Council is for 75 percent of newly created positions to be filled by employees within our own ranks. We will need to find the remaining 25 percent externally.

That's an ambitious target ...

Pancarci: Yes of course, but you need to have this ambition – this is what employees also expect of us. And I'm confident that we have the right people in the Company, otherwise we wouldn't be as successful as we are today.

Oppenländer: It would be great if we could fill 30 to 40 percent of these new posts internally. But naturally, the more, the better! We follow the performance-based principle, and those who are willing to give it all they've got are with the right firm at Linde Material Handling.

Pancarci: Our workforce is well trained and we have a good base of technically skilled employees – now we have to highlight the prospects for every employee in the Company. The new LMH HR Strategy is essential for the transformation process. We have enough models, agreements and presentations; now it's time to implement them all too. I believe we're making very good progress in this regard.

Oppenländer: This also includes thinking about our training. Are the job profiles still the right ones? Or do we have to adapt our current apprenticeships, and provide knowledge on other technologies? Specifically, this raises the question of whether providing vocational training to become an industry mechanic or mechatronics engineer still the right approach? Or do we need to take Industry 4.0 into greater consideration? This

extends right through to our technical university Dual Studies courses: we need to ask ourselves whether there are enough course places. Are they the right ones? And how can we strengthen contact with universities and convince their graduates to come and join us? This includes compelling employer branding and active, efficient university marketing.

Does your training match your needs?

Oppenländer: Without a doubt, yes it does! And we are prepared to take on those young people who demonstrate good performance and who are prepared to leave their comfort zone during their apprenticeship. Of course, we don't just expect this attitude to performance from apprentices, but from all our employees.

Pancarci: I fully agree with Mr Oppenländer. But we need to be clear about our future needs. Training, professional development, education – we need to make them all fit for the future. This is a key question for the future success of the Company and its competitiveness. The firms that have the best answer to this will continue to have a competitive edge.



Countering demographic change and promoting talent were key aims of the existing HR Strategy, which was described in the Sustainability Report 2014. What progress has been made in recent years?

Oppenländer: Quite a lot! And all of this is reflected in our new HR Strategy. Here are just a few examples: we will have our own Recruitment Centre in future, where our new university marketing activities will be based. Furthermore, we are planning to expand the Linde Training Centre to provide employees with even more comprehensive training, particularly in the fields of automation and digitisation. We have strengthened our talent management system to enable us to better identify internal talent and develop it. On top of that, we will have a trainee programme and a special mentoring programme for young talent. The topic of diversity also plays a major role, as we want to – no, we need to – do more in this respect.

Currently, women only make up 16.6 percent of Linde Material Handling’s workforce – a rather low figure.

Pancarci: True. We are facing challenges, particularly in ensuring work-life balance. And I don’t see this as a ‘women’s topic’: on the contrary, an increasing number of men are now taking parental leave, so change is underway – also within families. But let me emphasize once again: we can do more! By the way, this is also something we’re discussing with the Supervisory Board.

Oppenländer: This is of course also an industry-specific topic – there are still too few women studying engineering, for instance, very similar to the automotive industry. But irrespective of that, we also need to employ other channels, such as events and websites that female graduates and executives

browse. Incidentally, the many women who develop careers at Linde Material Handling are excellent ambassadors for us.

Mr Pancarci, co-determination and management participation by the workforce are regulated by law in Germany. However, co-determination is often ‘lived out’ differently in practice. What role does this play at Linde Material Handling?

Pancarci: We have a strong culture of co-determination both at Linde Material Handling and throughout the KION Group. Even when you look back, internal consensus within the Company has been a factor in its success. In short, we talk to each other. At the end of all discussions, the common goal is to make the best decision for the Company and its employees. This culture also shapes the relationship between the management and executives, especially in terms of HR matters.

Is this true for Europe as a whole or just Germany?

Pancarci: Group-wide, we treat each other very respectfully, also in other countries such as France, Spain and Italy. That said, I would of course like us to have a culture of co-determination throughout Linde Material Handling just like we have in Germany. This is because statistics show that where such a culture exists, it typically brings business success with it.

Oppenländer: What’s more, Linde Material Handling holds regular workshops on trust-based cooperation between the Works Council and management. I’ve never experienced anything like that and I value these meetings



very highly. We address questions in the workshops such as, how can we work together in the best way possible? How can we avoid conflicts? How do we inform our partners promptly and comprehensively? How do we ask for the other person’s opinion? So far, we’ve met four times – and that’s certainly not the last time we’ll come together. The most important thing when dealing with others is mutual respect.

Pancarci: Talking to and not talking ‘at’ each other is the guiding principle here. What can we learn from one another? This establishes rules for dealing with each other, as well as values such as respect and mutual appreciation. All this is then also carried forward within the Company – leading by example, you might say.

Where do you both see Linde Material Handling and its HR activities over the next five years when you compare the Company to the competition? What goals do you have?

Oppenländer: We are a premium supplier and we also intend to remain a premium employer for our employees, by which I mean topping the rankings in terms of employer attractiveness. Above all, this means that over the next few years we will need to develop as many people internally as possible – all the while being so attractive externally that we can easily fill positions that cannot be filled internally.

Pancarci: I see things in a similar way. The indicator for our success will be to shape the transformation process in the equal interests of our workforce and the Company – and to retain and develop as many positions as possible.

HELPING TOGETHER



Effective, pragmatic and purposeful – a good description of Linde Material Handling's community engagement. As a good corporate citizen the Company focuses on social and humanitarian projects, with education, science and environmental protection also included in the project-selection process.

Linde Material Handling follows a decentralised approach, and uses its strong international presence to support local people at all of its locations. This means that the Company always directs its efforts to where they are needed most. The employees are encouraged to actively involve themselves and support initiatives. In doing so, many individual activities combine to form a global effort that has a real impact.

Corporate citizenship

WORLDWIDE ENGAGEMENT



France HELPERS WITH A HEART

Many people are dependent on the willingness of the community to provide help and support. This is why the French initiative 'Restaurants du Coeur' (Restaurants with a Heart) has been distributing food and essentials to the needy in France since 1985. Every year they are helped by 'Volunteers for the Day' who talk to supermarket customers outside stores, encouraging them to donate some of the items they have purchased such as food or hygiene products. The French subsidiary Fenwick-Linde has been a partner of this initiative since 2014, actively supporting the collection campaigns. This includes giving Fenwick-Linde employees the opportunity to take half a working day off each year to assist the initiative – an offer that 288 employees took up in 2017.

To ensure the donations are also transported to as well as distributed and stored at the correct distribution centres, Fenwick-Linde also provides technical equipment. In addition, the company has audited the overall goods-organisation approach at one of the initiative's

warehouses in Lucé to identify optimisation potentials, including ways to improve transportation, warehouse management and staff safety. After all, the logistics effort involved in this national initiative is quite considerable. On the two campaign days in March 2017, 76,000 volunteers gathered around 7,500 tonnes of food and hygiene products at over 6,830 supermarkets – enough for over 7.5 million extra meals for the needy.

On the 30th anniversary of Fenwick-Linde in 2015 a solidarity run was also organised at every company location in France. The principle behind it was as simple as it was effective: for every kilometre covered, one euro was donated for food. In the end over €12,000 was collected thanks to the huge sign-up. Going forward, Fenwick-Linde aims to further expand its community engagement by helping qualified people in need reintegrate into working life.

Spain and Portugal A DECADE OF HELPING THE NEEDY

»Linde Solidaria«, the corporate volunteering programme of Linde Material Handling Ibérica, celebrated its tenth anniversary in January 2017. What began in the Madrid and Barcelona branches now includes other areas of Spain and even Portugal, with the programme supporting over 5,000 socially disadvantaged people.



The original idea is convincing: instead of giving Christmas presents to customers, Linde Ibérica makes donations to selected non-profit organisations. Employees and their family members are also actively involved. During the annual Fiestas Solidarias campaign days at the Barcelona, Madrid, Seville and Lisbon branches, they help people with physical or mental disabilities, accompany them on activities and turn the day into a shared experience. The company contributes to the campaign with monetary and in-kind donations to the organisations.

And whenever special assistance is needed, Linde Solidaria is ready to lend a helping hand, such as with forklift trucks for surplus food collection and distribution projects, social grocery stores or the Red Cross. Other forms of help include food and hygiene products for people threatened by social exclusion, or food allowances for children suffering rare diseases and who therefore need extended hospital stays.

Germany STAPLER-CUP HILFT E.V.

Competing for the ForkliftCup, which was initiated by Linde Material Handling, has long since become an institution among forklift drivers. Skilled operators gather from all four corners of the globe to display their talent. First, the hunt for the best of the best takes place in regional and national competitions held around the world. The finalists then go on to compete in the ultimate deciding battle held in Aschaffenburg, Germany, in the fight to win the German national,



international, corporate and finally the world champion titles. 2017 was no exception, and marked the thirteenth time the ForkliftCup finals had been held in Aschaffenburg. There, the finalists got to showcase their skills and safe-driving techniques over the course of the three-day competition. Every year around 2,000 participants compete in the various disciplines worldwide. In total, over the past twelve years more than 20,000 men and women have taken part in the competition – attracting up to 15,000 spectators each year in Aschaffenburg alone.

Alongside the competition, since 2008 community engagement has also been a clear focus area. The StaplerCup Hilft e.V. association works to support social organisations involved in looking after sick or disadvantaged children, as well as young people and the elderly in need. Since it was founded, the association has already donated over € 250,000 to charitable organisations. Alongside numerous prominent backers of the association, apprentices at Linde Material Handling collect donations every year. The charity raffle held for this purpose is organised and run by apprentices on their own initiative as part of a training project. They organise everything themselves, from acquiring the prizes, such as hotel stays or bicycles, to selling the tickets.

Once again the results of the ForkliftCup 2017 gave cause for celebration, with € 21,000 donated to cross-regional projects of the prominent backers as well as social institutions based near Linde's head office. Among other recipients, the volunteers of the Aschaffenburg Outpatient Child and Youth Hospice Service were delighted to receive over € 4,000.

HOW CAN THE COMPANY IMPROVE?



The guiding principle of our Company founder Carl von Linde also shapes our commitment to greater sustainability. We keep this firmly in view every day, and face up to the questions and challenges that still lie before us. In doing so, we constantly work towards becoming a little better every day, more sustainable and, therefore more successful.

Our commitment gives our customers key competitive advantages and secures our own future at the same time. This is based on the conviction that sustainability and economic success go hand in hand. Our tradition, which extends back over 100 years, shows that this approach is the right one – for our customers, our Company, its employees and the people around us.

Linde – for your performance!

Imprint

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Linde Material Handling

The Linde logo consists of the word "Linde" in a white, elegant, cursive script font, centered on a solid red rectangular background.

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