CIM LOGISTICS SOFTWARE SPECIALISTS

Whitepaper

Green Intralogistics

Taking Responsibility for Building a Greener Future

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Contents

Intralogistics as a lever for setting the ecological agenda

The urgency of supporting the green transition is growing and becoming an increasingly important focus of politics, business and everyday life.[1] A reversal of our thoughtless and wasteful behaviour in the past and the resulting depletion of the environment is imperative if we are to secure the future of our planet. This introduction is not intended to conjure up images of doom, but to make us aware of the fact that we urgently need to take responsibility.

With targeted measures and collaborative, proactive solutions, we can all do our part to usher in change. A turnaround is imperative on both a large and small scale. It is relatively easy to change habits and become more eco-conscious in our everyday personal lives. But we also need to think bigger and not overlook the numerous economic processes that need to be adapted and made greener.

Logistics and intralogistics play an essential role since they are pivotal to so many aspects of the economy. They are the point where manufacturers, retailers, service providers and customers meet; where goods are produced, received, linked up again and shipped onwards. Logistics is a highly diverse field providing enormous potential for creating pathways towards a sustainable future: from low-emission transportation through energy-efficient logistics centres right up to process redesign and digitalisation.

The logistics sector has long recognised the need to restructure processes for greater sustainability.[2] It is imperative for all partners along the chain to work together so that far-reaching results can be achieved. Besides large corporations, medium-sized companies are especially important since they are the backbone of the ›

[1] Cf. Luft, Christian: „Zukunft und Nachhaltigkeit müssen zusammen gedacht werden“, https://www.bmbf.de/de/zukunft-und-nachhaltigkeit-muessen-zusammengedacht-werden-10407.html, 18.12.20219, called up on 14.01.2021.

[2] Cf. Abschnitt: Kestner, Tim: „Ressourceneffizienz in Handel und Logistik“, Zentrum Ressourceneffizienz: VDI ZRE Publikationen: Kurzanalyse Nr. 27, 2020, page 18.

› economy, particularly in Germany. Realising the importance of green (intra)logistics in theory should ideally dictate a specific course of action. From measures to redesign your warehouse right through to sustainable packaging management and alternative conveyor technologies, there are a variety of steps that can be taken. The need for investment should not be underestimated, but the focus should be on the enormous potential of transitioning to greener and more sustainable operations.

Our white paper is intended to provide some food for thought in terms of how you can make your processes more eco-friendly. After all, ecological awareness and economic efficiency go hand in hand.

What is green (intra)logistics?

There is no standardised, universally applicable definition for the term ‘green logistics’. The companies who participated in a 2010 survey agreed on the following lowest common denominator: “‘Green logistics’ includes all measures for optimal capacity utilisation, bundling and route optimisation, to reduce traffic and traffic-related emissions.”[3] There was no widespread support of any further-reaching measures back then, nor a willingness to create environmentally friendly logistics products. Ten years later, awareness of the need for additional environmentally protective measures has significantly increased.

The term can essentially be understood as the transformation of logistics strategies and operations towards ecological sustainability. Measures to increase efficiency from an ecological and economic point of view are used to design more environmentally friendly processes.[4]

This white paper concentrates on the area within logistics centres or similar facilities and attempts to elaborate the essential features profitably.

[3] Lohre, Dirk; Steffen, Herschlein: „Grüne Logistik, Studie zu Begriffsverständnis, Bedeutung und Verbreitung ‚Grüner Logistik‘ in der Speditions- und Logistikbranche“, Hochschule Heilbronn, Institut für Nachhaltigkeit in Verkehr und Logistik, 2010, page 4.

[4] Kestner: Ressourceneffizienz in Handel und Logistik, page 18.

Green ecology and economy – a successful partnership

Can I afford to make my business greener? The issue of economic efficiency is closely linked to the question of green logistics. Experts were asked about the trend towards green logistics in a study conducted back in 2014. This study clearly demonstrated that ecological measures need to be economically feasible in order to be successful.[5]

A further study carried out in 2017 examined logistics trends such as increasing cost pressure, customisation and process complexity. It showed that new costs arise not only from switching to sustainable processes. Developments such as the rise of e-commerce as well as demographic changes are some of the factors forcing the logistics sector into action. In the following we shall attempt to explain why ecological action is not just another compounding factor with regard to current trends and challenges, but can even alleviate the complexity of these tasks.

The necessary investment costs can be daunting at first, of course, but in the long run they offer enormous savings potential since a complete changeover can yield a great deal of savings. Faster order processing, lower heating costs in the warehouse and less fuel consumption on the road are just three obvious examples. In addition, switching to green or greener logistics enhances your competitive advantage, whether in terms of efficiency or clear business positioning and corporate strategy. Because partners and customers are also increasingly embracing sustainability, they expect the same from service providers, retailers and other cooperation partners.

Ultimately, the switch to sustainability has another advantage in purely practical terms: in order to meet state climate targets, companies must comply with stringent regulations and requirements. Acting early means that you can cross a number of items off your checklist without rushing into a fast-track change process.

[5] Cf. Abschnitt Kestner: Ressourceneffizienz in Handel und Logistik, page 16.

Where to start

Digitalisation and automation of intralogistics processes

The trend towards green (intra)logistics is closely linked with the mega trend of digitalisation. In 2020 more than ever before, we witnessed how switching to digital processes can open up new avenues. Digitalisation of intralogistics makes for more transparent processes, increasing efficiency and ultimately providing better services for customers.

What does this mean in practical terms? In a digitalised logistics centre, staff always know exactly which goods are in the warehouse at any given time and exactly where they are located. Manual and automated picking routes can be tracked and streamlined, and goods can be grouped for optimal picking efficiency. Specific requirements such as production within the warehouse can be effectively integrated. And if goods need to be moved quickly from the receiving to the shipping area, a single click is all it takes to bypass putaway, picking and retrieval. Going one step further: your warehouse data is analysed in order to streamline processes and predict future workflows. Stocks are replenished in a timely manner, complex processes are coordinated and synchronised, and bottlenecks are prevented.

The trend toward digitalisation often goes hand in hand with automation, currently a central focus for many companies. Price pressure driven by increasing competition, faster delivery times and a shortage of skilled labour can be alleviated through an automated or partially automated warehouse. Robots and other intelligent systems provide support for fast and secure materials handling. What's more, idle resources are identified and temporarily shut down, thus helping to reduce carbon emissions. Perhaps dark warehouses are the future where full automation of ›

› material handling equipment means that lights are not necessarily needed to operate, improving efficiency and saving energy. In terms of sustainability, however, this extreme variant also has a negative impact since it minimises the need for human input. Read more about warehouse automation in our white paper on warehouse and logistics automation.

A smart method in the field of digitalisation and automation is the digital twin.[6] Using the digital twin, decision-makers can test and understand the impact of different scenarios in a virtual environment in order to identify the best possible solution for the real-world warehouse. But existing warehouses can also benefit from a digital analysis. The digital twin is fed with operational data from the real-world warehouse and alternative processes can be tested without disrupting ongoing operations.

Unnecessary material consumption can be prevented by collecting data on equipment and personnel. Instead of processing multiple individual orders, work steps can be bundled, increasing efficiency and using materials more sustainably.

The above examples are just a few of the numerous opportunities offered by warehouse digitalisation and automation. Depending on the storage requirements and the complexity of the processes, the right tools can open up new ways of rethinking warehouse mechanisms from the bottom up.

[6] Cf. Kestner: Ressourceneffizienz in Handel und Logistik, page 34.

WMS in the cloud

These digital opportunities are realised by implementing a warehouse management system (WMS). Logistics processes can be controlled and optimised using a WMS. From goods receipt and order picking right through to goods issue, it's much easier to keep everything organised, tracked and documented and to adapt your processes to changing circumstances. Our white paper on choosing a WMS provides guidelines on how to find the best WMS software for your company's needs.

You can choose between an on-premises model and a cloud-based solution. Benefits of a cloud-based WMS: this level of digitalisation means that you can dispense with in-house servers and routine maintenance tasks. From an ecological point of view, internal power costs are cut and you save on the time and resources usually allocated to purchasing and provisioning hardware. The energy you save is consumed elsewhere, of course, namely by the cloud provider. You can ask the provider about how they consolidate their energy resources to be as efficient and environmentally responsible as possible.

Find out if they have taken any of the following measures in their data centre:

- Installation of motion-sensor light switches
- Mounting of LED lighting
- Implementation of a cold aisle containment system
- Installation of heat pumps
- Reuse of waste heat from servers to heat other spaces

Rethinking processes with the help of WMS functionality

In the warehouse

If we take a closer look at the processes, there are a number of ways to make your intralogistics greener.

Below are a range of examples from various different categories:

- When **choosing labels** for your warehouse, opt for GS1 logistics labels. GS1 is a worldwide standard and saves considerable time and resources since there is no need to print new labels at each station.

- Use smart **resource management** to distribute workloads intelligently and efficiently. If there are repeated peaks in energy demand at certain times, redistribute jobs such that resources are more evenly distributed. This initially means extra work in terms of analysis and control tasks, but you benefit in the long term from lower energy costs and longer equipment life.

- Using a **dashboard** and a **business intelligence tool**, you can monitor, track and review workflows in real time:
  - Are there quiet periods and peak times in the warehouse?
  - Have you optimised transport routes?
  - Are all your items stored in the best location?
  - Do you need to perfect your material flow strategy?

- Based on **evaluation of this data**, you may need to rethink your warehouse processes in order to relieve the burden on personnel, optimise picking routes (with a view to reducing energy consumption and wear and tear on floor conveyors), reduce the need for printing and get the goods to the customer faster. This allows you to become both more ecological and more economical.

- There are many warehouses where **goods** are not only stored but actually **produced and finished**. Here in particular, waste can be avoided by using materials with foresight. Finished goods and returns can be disassembled into individual parts and reused, for example. Or a single defective part can be removed and replaced without having to destroy the entire product.

- Special care must be taken if **foodstuffs** are stored in your warehouse. Once items have passed their expiry date, they need to be thrown away, wasting resources on a large scale. With the right WMS functionality, you can track best-before dates, keep an eye on shelf-life and issue automatic warnings about approaching expiry dates.

- Last but not least, a good, **networked control system in the warehouse** reduces the risk of injury to personnel and damage to goods or transport equipment. In the case of hazardous materials storage, for example, only employees who have the appropriate certification and are trained in handling the material are allowed into these areas. Careful routing prevents collisions of transport vehicles which can otherwise lead to injuries to staff or damage to equipment. Optimised storage, picking and retrieval processes help to transport goods correctly and prevent damage.

In addition, networking leads to lower error rates in processing and a reduction in material consumption.

In turn, protecting employees and expensive equipment helps conserve resources and speed up operations.

4.3.2 Mobile apps

Use the functions of a warehouse management app.

With mobile devices such as smart glasses or tablets, your employees are guided through their work steps on the shortest route through the warehouse. The app takes account of height restrictions, locked areas and zones where other staff or transport vehicles are currently on route. In addition, mobile picking control adjusts workflows by prioritising certain orders or limiting empty transports.

App functions such as interleaving assign tasks to employees in ways that make use of each trip that they and their associated equipment make during their shift. The environmental and economic benefits are obvious: increased efficiency saves your business time, money and resources.

Order picking and goods issue

Especially in terms of goods issue, there is a great deal of potential for eco-friendly work steps.

- If the warehouse management software discovers orders that can be bundled, it sets the relevant process in motion. This saves on packaging materials and transports, with the goods being delivered to the customer in a single delivery.
- Or the intelligent software calculates the correct size of packing unit for shipping the goods at the packing area. This means that less packaging material is used, since boxes which are too large are not considered. In turn, less space is required in the relevant transport vehicles.
- With two-step order picking, the same items are picked simultaneously for different orders and then allocated to the deliveries. This avoids multiple trips to the same storage location.
- Using crossdocking, goods that have just arrived at the goods receipt area and are already required at goods issue do not have to be placed in storage at all. The WMS registers the goods receipt and acts immediately so that the items are taken straight to goods issue: no unnecessary work effort for your staff, no avoidable trips within the warehouse. Instead, fast shipment to the customer – a win-win situation for everyone.

In other words, smart warehouse management can make your intralogistics more efficient and ecological. There is no standard to-do list; different adjustments are needed for different warehouses. Small changes in individual work steps can lead to a major restructure: if goods are moved more efficiently and in coordination with transport management, ERP and other systems, the amount of storage space required can even be reduced.

Switching to a smaller warehouse saves energy costs and land usage. This is where a host of positive aspects begins to unfold. The initial investment generates the potential for large-scale savings in the future.

Resource-friendly packaging

Sustainable packaging is an important driver of green intralogistics.

Packaging regulations in Germany are governed by the German Packaging Act (VerpackG).[7] There is also a ranking of waste management measures as one of the core provisions of the Waste Management Act (KrWG/Kreislaufwirtschaftsgesetz) for more sustainable packaging. This starts with the avoidance of packaging and also includes recycling and disposal.

In your intralogistics, for example, you can consider whether to work with reusable packaging or one-way packages. This often depends on the product and sector. Reusable packaging does not always have the smallest carbon footprint since it is often heavier and obviously has to be returned to the producer. A case-by-case analysis is required based on the overall life cycle of the packaging.

As mentioned in the previous section, choosing the right packaging helps greatly in reducing material consumption and optimising transport. Packers working under time pressure often choose a box which is too big leading to a lot of empty space. The outcome: packaging material gets wasted and packing capacity is not used optimally. Too many vehicles are used causing greater wear and tear and producing higher emissions. If employees have technical support in choosing the right packing unit, they are more likely to select the right size without having to invest extra time or effort.

Companies are also switching to green alternatives with regard to the production of packaging materials. From recyclable cardboard boxes to corn starch packaging and biodegradable plastics, packaging is being redesigned. There are still critical considerations to make when selecting these new types of packaging, however: are the eco-plastics designed to break down fast, or do they present a problem for composting facilities? Materials may be environmentally-friendly, but how far do they have to be transported to get to you?

Depending on your assessment, you may even decide to stick with the materials you have used in the past. But it is always important to be aware of new options and revisit and optimise your intralogistics processes on a regular basis.

[7] Cf. Abschnitt Kestner: Ressourceneffizienz in Handel und Logistik, page 74.

The impact of e-commerce

The boom in e-commerce has turned the industry on its head.

While the opportunities provided by this ‘new world’ are being developed further and further, people are also becoming increasingly aware of the downside of such ruthless action. The major burden of returns and a lack of structured management mean that almost 490 million returned items are destroyed in Germany each year instead of being returned to the store or warehouse.[8]

The return rate in the textile sector is as high as 50 percent. This means that fully functional products are being disposed of instead of being reused. These losses are already factored in to the price of the goods. Resources are thus being consumed for nothing, and transporting the products also represents a waste of time and resources. From an economic perspective, customers are paying more than they should be and retailers often miscalculating their losses.

Efficient returns management therefore has great potential for the environment and the economy. Returns management can be an integral component of any warehouse management system. Instead of being overwhelmed by the sheer volume of returned items, returns can be processed as a matter of course.

It is also crucial to think out of the box in this regard. The logistics sector cannot take sole responsibility. Free shipping and generous returns and refund policies encourage indiscriminate ordering by customers. Every one of us can help reduce the volume of returned goods by consuming more cautiously.

[8] Cf. Abschnitt „Nachhaltigkeit im Online-Handel: So gelingt der effizientere Umgang mit den Retouren“, https://www.ecommerce-magazin.de/nachhaltigkeit-im-online-handel-so-gelingt-der-effizientere-umgang-mit-den-retouren/, 30.06.2020, called up on 15.01.2021.

The warehouse as an ecological cornerstone

An important factor for green intralogistics is the warehouse itself. Significant improvements are possible here, from the choice of location to how the building is equipped. In addition to sending a positive message to business partners and customers in terms of environmental friendliness, buildings constructed in an environmentally conscious manner also have clear economic benefits as energy and operating costs can be reduced. A considered choice of location not only shortens transport routes and reduces fuel consumption, but also increases customer satisfaction through faster deliveries and means that employees have a shorter distance to travel, preferably by public transport.

There are clear ratings that facilitate the selection of a suitable building. Certifications such as the German seal of approval DGNB make sustainable construction plannable, assessable and measurable.[9] This certificate from the German Sustainable Building Council includes economic and socio-cultural aspects in the assessment in addition to ecological criteria. Other similar certificates are LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method).[10]

The following are examples of the type of questions asked in order to award a green building rating:

- Is the warehouse built in an environmentally friendly and resource-saving manner?
- Were regional building materials used?
- How high is the water and energy consumption?
- Are green electricity and alternative energy sources used?
- How are waste products handled? Are they recycled?

Converting a building initially seems daunting from a financial point of view. In this regard, we would like to quote the experts from the DGNB:

„One prejudice persists when it comes to sustainability in general and sustainable building in particular: the allegedly high costs. However, it is worth taking a second look and comparing the different products available."

The surprising thing is that products which fulfil sustainability criteria are often not more expensive. And if you make a conscious decision to opt for sustainable products, you can even end up saving money. They pay for themselves over time since they ensure that operating costs are lower in the long term.

[9] Kerstin Schultze: „Grüne Lager helfen Logistikern im Wettbewerb“, Logistik-aktuell.de, 09.06.2016, https://logistik-aktuell.com/2016/06/09/nachhaltige_immobilien/, called up on 05.01.2021.

[10] Cf. Schultze: Grüne Lager helfen Logistikern im Wettbewerb.

Hardware and intralogistics

Another aspect of green intralogistics is the hardware used in the warehouse. Using digital aids such as smart glasses in conjunction with a warehouse management system (see section on digitalisation), employees are guided through the warehouse on the shortest route. They can work more efficiently since they reach their destination faster and have their hands free. In addition, work processes are paperless and therefore conserve resources.

Hardware such as printers can also be checked for energy performance standards and certified by programs such as Energy Star.[12] When devices are not in use, they are best switched to energy-saving mode. Charging times and power consumption can be improved for scanners: inductive charging prevents wear and tear of sockets and speeds up power transmission, therefore improving energy efficiency.

The issue of packaging is also a factor when purchasing new hardware:

- What is the packaging made of?
- Can the materials be recycled?
- Are multiple devices packed together in one box?

Energy-saving industrial trucks or conveyors are a good alternative. One option is to switch to electric forklift trucks, which are generally state-subsidised. If you have already switched to electric, you can check what kind of batteries are used by the forklifts.[13] It is worth considering a switch from lead-acid batteries to the more efficient lithium-ion technology. Another variant are fuel cell forklifts. There is also sophisticated hardware that recovers and reuses the braking energy generated when the fork is lowered.

Particularly when it comes to food warehouses with deep-freeze areas, the advantage of energy-efficient conveyor technology is obvious.[14] Every piece of equipment generates heat that needs to be cooled down again. If the conveyor vehicles are optimised for this purpose, the energy consumption for cooling the rooms is reduced. Several positive aspects are combined: electricity consumption is reduced, which is important from an ecological and economic perspective. In addition, the valuable foodstuffs are preserved and the quality of the product can be kept stable.[15]

[12] Cf. „Energy Star“, https://www.umweltbundesamt.de/umwelttipps-fuer-den-alltag/siegelkunde/energy-star, called up on 13.01.2021.

[13] Cf. „Nachhaltige Logistik in nvaur 5 Schritten“, https://www.toyota-gabelstapler.info/nachhaltigelogistik-in-nur-5-schritten/, called up on 16.01.2021.

[14] Cf. „Technik-Trend Fördertechnik - Energiesparen beim Fördern“, https://www.materialfluss.de/fordertechnik-undkomponenten/technik-trend-fordertechnik-energiesparen-beim-fordern-6.htm, called up on 12.01.2021.

[15] Ein weiterer zentraler Baustein ist ohne Zweifel die Prüfung des Fuhrparks für den Transport der Waren. Dieses Themenfeld geht aber über den Intralogistik-Bereich hinaus. Wir möchten dafür aber auf die sehr informative Analyse von Herrn Kestner „Ressourceneffizienz in Handel und Logistik“ verweisen.

Helping to actively shaping the green transformation

What is clear from the above: there is still a long way to go, but a lot can be moved with just a few changes. You should not feel overwhelmed by the many possibilities, on the contrary. Start by taking small steps and work your way towards bigger changes. The desire for more sustainability is growing and is particularly evident with regard to economic crossing points such as intralogistics. The sooner you start to make proactive changes, the lower the need to respond to new state regulations and requirements at short notice later on.

Of course, there are always external challenges and circumstances that threaten to undermine the climate action agenda. When customers insist on specific delivery times, it can suddenly seem impossible to consider peak load distribution and order bundling. With well thought-out concepts and intelligent support such as a WMS, however, such difficulties can be solved and compromises reached. Because in green intralogistics, the economic factor is a decisive factor as well as the ecological focus.

A major driver for a successful transition to green intralogistics are above all your employees. They are the foundation of your business at every level. Technical modifications are of little use if your employees are not on board. The best solution is to involve your employees in your plans early on and take them with you on the journey. If your team is sensitised, trained and qualified for any new procedures, there will be more understanding for your ecological measures and the transition will be much easier. Moreover, your employees are likely to come across new ideas for environmental protection in their daily work that may not have been considered before.

There is enormous potential in green intralogistics. In the long run, you will gain an important advantage over your competitors and greater visibility on the job market, where skilled labour is in short supply. In addition to these pragmatic aspects, the switch to green intralogistics is about nothing less than creating a viable legacy for future generations. Taking on these challenges as a company demonstrates a deep sense of responsibility and foresight towards society.

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