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GREEN LAST MILE EUROPE REPORT 2022



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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The activities of the global population are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels (IPCC, 2018). Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. This may be expected to have serious implications for the increased incidence of extreme weather events

In 2021, the European CEP market exceeded 7 billion parcels and over 80 billion Euros. The expectations for 2022 are even higher*

The CEP industry is driven by very dynamic growth in e-commerce, which continues to be strengthened by restrictions in retail caused by Covid-19.

This has led to a dramatic increase in the number of parcel related vehicles on the streets and to the carbon footprint associated with them. Estimates from UPIDO suggest that the carbon footprint associated with e-commerce parcel delivery can be as much as 5.5 million metric tonnes in 2032 and it is for this reason that this is a matter of great relevance in the battle to protect our planet. More importantly, we could reduce the carbon footprint by over 91% in just a decade, or to put it more visually, save over one forest the size of the "Black Forest" in this time.

Despite increasing communication activities by many carriers regarding

their green policies, our feeling is that much of this is "greenwashing" and that only a handful of players are really making headway in creating a green last mile, at least based upon the project evidence we were able to find.

** Assumptions based on web research and Statista - 77bln Eur in 2020 and 6.5bln parcels in 2019*



EXECUTIVE SUMMARY

SUMMARY

Thanks to the foresight and support of InPost, Sameday and Nissan, we have been able to take a close look at the green Last Mile from the perspective of operators and market stakeholders. We can see that a few large players, notably DPD Group, are seeking to “walk the talk” as well as several local heroes such as Hermes, Posten Norge or Paxter.

Due to a lack of comparative data or independent audit, it is hard to fully evaluate individual projects, albeit from our research we have been able to identify key areas of opportunity and where the quick wins are, as well as the longer term potential for a greener last mile.

So what is the right way forward? While EVs appear to have a key impact in creating a green last mile, Paythru Mobility have demonstrated that the infrastructure which will allow them to be used at scale is still being developed. For now, education of all last mile stakeholders can have a major effect in achieving better and more ecological delivery via shipping less air, driving responsibly or ordering parcels when and where the consignee can really collect them.

Another tool that can arguably be rapidly implemented is the use of OOH and other forms of last

mile consolidation, which lead to aggregated parcel flows being delivered near to the consignee and allowing for 100% (or close to this) first time delivery rates. Experience from Poland and elsewhere has shown that this can reduce the carbon footprint by up to $\frac{2}{3}$ in urban areas and even more in rural ones.

Finally, manual cargo bikes or small EVs such as scooters can be an interim solution for the infrastructure problem as they require less infrastructure and can even be supported by battery change stations with pre-charged battery packs.

Of course, the best would be to combine OOH and EVs; Interestingly, the bPost ecozone project in Mechelen with a combination of e-vehicles and parcel lockers shows a possible 87% reduction of CO₂ but this will need to wait until EV (charging) infrastructure allows for this.

Unfortunately, without legislative action providing a carrot for those already inclined to “go green” and a stick for those who are not ready to act, we do not see the green last mile developing fast enough. It is the role of NGOs and those carriers and other stakeholders to impress on local and national governments. The need for action that is timely and effective.

For the sake of our grandchildren and their grandchildren, we sincerely hope that this will be the case.

FORWARD & EXPERT COMMENTARY

Comment from prof. Arkadiusz Kawa, Managing Director of Łukasiewicz – Poznań Institute of Technology



The pandemic and the resulting restrictions on shopping in traditional shops have contributed to a geometric expansion of e-commerce. On the one hand, e-commerce has enabled many people to access products and function relatively normally during this difficult period despite social distancing, but on the other hand, the Internet has become a place where it is easy and quick to buy something without a lot of thought. In 2021, online orders generated 150 billion packages worldwide, which translated into a similar number of shipments being driven billions of kilometres and millions of tons of packaging material being used. Each product must be completed, packed and shipped or handed over for collection. Although online shopping is very convenient for customers, it has a negative impact on the environment if e-commerce is not properly sustainable. A major issue is relative to transportation of individual shipments, additional packaging and materials, and returns. For this reason the continuous growth of e-commerce cannot be discussed without addressing sustainability that is a significant factor not only for online retailers but also for other actors of the e-commerce ecosystem, including suppliers, consumers and complementors. Although sustainability in e-commerce has been attracting more attention, the available research is still in its infancy and



requires a deeper insight. That is why I'm very happy that The Green Last Mile Europe Report 2022 has been published. This is a veritable compendium of knowledge, with very interesting examples and insightful conclusions.

*Prof. Arkadiusz Kawa
Managing Director of Łukasiewicz
– Poznań Institute of Technology*

DEFINITIONS

Definitions and abbreviations used in the report

■ APM	Parcel locker
■ B2C	Business to consumer
■ CEE	Central Eastern European countries
■ CEP	Courier Express Parcel
■ COD	Cash on delivery
■ CX	Consumer experience
■ D2D	Door-to-door delivery
■ ESG	Environmental, social and governance
■ EV	Electric vehicles
■ E-VEHICLE	Ecological (low emission) vehicle
■ GHG	Greenhouse gas emission
■ IDM	Interactive Delivery Management
■ LAST MILE	Leg of a journey comprising the movement of goods from a distribution centre to a final destination
■ LCV	Electric light commercial vehicles
■ LME	Last Mile Experts
■ OEM	Original Equipment Manufacturer
■ OOH	Out-of-home
■ Paczkomaty®	Reserved name for InPost parcel locker
■ PUDO	Pick up and drop off location

WHAT IS THE LAST MILE?

The term “Last mile” has been borrowed from the telecommunications industry, where it describes the difficulty of connecting user's homes or businesses to the main telecommunication network.

Our definition of the “last mile”, in logistics, covers all of the parcel flows from the moment an item leaves the outbound ramp at a manufacturer's/ retail/e-commerce warehouse. This can actually involve the “first mile” to a carrier logistics facility, the “middle mile” between various hubs and depots, and the last mile from the local delivery facility to the end consignee.

The last mile is important because it is critical for any retail/e-commerce customer experience as an item that is undelivered, damaged or late is arguably the most important service failure on the part of the merchant. Moreover, based on LME, our internal research and calculations, the last mile makes up some 30-50% of all supply chain costs for B2C parcels and, more relevant to this report, is a key element of the carbon footprint created by e-commerce B2C parcel flows.



GREEN LAST MILE VS SUSTAINABLE LAST MILE

While there is no clear or legal definition of Green Logistics, it is often practically seen as focusing on economic payback with an associated positive environmental effect.

Sustainability is a wider, more forward looking concept, which seeks to simultaneously look at the needs of society, the environment and economic benefits.

While we generally use the term "green" in this report, many of the projects we discuss actually fall more into the "sustainability" area.

Environmental sustainability issues are becoming more and more important for consumers, who are increasingly often selecting services and products that have a lower environmental impact, even if it is not the cheapest option. This is especially the case in the Nordic area.

In light of the above, some businesses have recognised the financial benefits of acting in a more sustainable manner, especially as climate change issues become increasingly evident. Legislation and policy decisions are

also beginning to support a sustainable way of thinking, especially in cities with things like low and zero emission zones, the exclusion of combustion cars, and the promotion of walking in the 15-minute city model.

The activities of the global population are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels (IPCC, 2018). Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. This may be expected to have serious implications for the increased incidence of extreme weather events, as well as threats to biodiversity, which in turn can cause a credible and imminent threat to the quality of human life. Various treaties such as the United Nations Framework for Convention on Climate Change (UNFCCC) or the Paris Accord, with its nationally determined contribution (NDC) targets, are beginning to influence national legislation and policy in order to meet these requirements.

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ABOUT THE AUTHORS AND PARTNERS

LAST MILE EXPERTS



Our focus drives Your SUCCESS!

Very few consultancies are so specialised and hence our motto

Last Mile Experts is a specialist CEP and E-commerce last mile consultancy.

Our team have joint experience of several hundred years and are supported by partnered specialists throughout the globe, who help us deliver industry best practice in even the most focused areas.

In addition to the above, we have relationships with many key suppliers of hardware and software for route optimisation, sortation or tracking and control.



WHAT WE DO AT LAST MILE EXPERTS



At Last Mile Experts, we support our clients to develop, deliver and sustain competitive advantage across a number of critical business areas but focusing on Courier Express Parcel and e-commerce last mile:

- Business operating models including cross-border
- General or specific operations solutions
- Hardware and software selection and contract negotiation
- People and organisational development
- Research and benchmarking
- Support in negotiating the best SLAs and commercial terms
- Strategic as well as operational pricing and product portfolio management

Mergers & acquisitions

including market reviews, pre-deal due diligence and post-deal advisory

E-commerce/ Amazon

and the last mile

Out-of-Home delivery

options including APM's and HUB's (lockers) and PUDO's (access points).

Strategic planning and commercial proposition

Interim/ turnaround management



AUTHOR - LAST MILE EXPERTS MANAGING PARTNER



MAREK RÓŻYCKI

Experience in courier industry

- Financial Controller - DHL Express Poland 1990
- Founder, Masterlink Express (now DPD Polska) 1991
- Turnaround CEO Masterlink Express 1999-2004
- CEO CEE, DPD 2004-2006
- CEO CSEE DPD 2006-2013
- VP Amazon Logistics Europe 2014-2015
- Deal Advisor SB Member Pekaes SA 2015-2017
- Deal Advisor SB Member Advent/InPost S.A. 2016-2017
- Deal Advisor SB Advisor Urgent Cargus S.A. 2017-2019
- Board Advisor Trendyol Turkey 2020-2022
- Board Advisor eMag/Sameday Romania 2020-
- Board Advisor Technomanija Rep. of Serbia 2021-



Achievements

- Created leading domestic CEP carrier in Poland (DPD Polska)
- Textbook restructuring of Masterlink following takeover by Swedish Post
- Successful turnaround of 7 further CSEE BU's
- Developed the most homogenous road based parcel network in CSEE
- Tripled DPD CSEE revenue from 2006-2013, with industry beating ROS
- Conceived IT4EM (ERP for several DPD markets)
- Part of start up team for Amazon Flex, Fresh and Prime Now
- Participated in creating the successful restructuring plan for InPost

Summary

Entrepreneurial ex-regional CEO with multicultural experience; a courier express parcel, restructuring and last mile e-commerce background.

A team builder with a strong industry network who has operated in various CEP markets, especially Poland, with a proven track record of success even in very challenging circumstances.

Selected Projects

- Complete nationwide PUDO/locker implementation plan in CEE
- Restructuring of some 10 CEP businesses
- Launch of fuel surcharge throughout DPD CSEE
- Launch of PUDOs throughout CSEE
- IT4EM/IDM capability at DPD CSEE
- Helped acquire or sell over 10 CEP businesses

CO-AUTHOR LAST MILE EXPERTS PARTNER



MIREK GRAL

Experience in courier industry

- Operations Supervisor, Oversea Courier Services 1992-1996
- International Operations Manager, M.S. Stolica 1996-2003 (GSA for Airborne Express, FedEx, Aramex/ GDA, Net Express)
- Founder, COO of MACS brokerage & freight forv. 1998-2004
- Key Account Manager, Frans Maas Polska 2004
- International Operations Manager, M.S. Stolica 2004-2005
- Industrial Engineering Manager, UPS Polska 2005-2010
- PM, UPS NE District 2010-2011
- Industrial Engineering Manager, UPS EMEA Region 2011-2013
- Outside Service Providers Manager, UPS Polska 2013-2014



- PM, Central Hub construction, UPS Polska 2014-2015
- COO, UPS Polska 2015-2019
- PRO Partner Last Mile Experts, CEP consultant 2020-2021
- Partner, Vice President Last Mile Experts 2021 -

Achievements

- OCS, Airborne Express, FedEx and Aramex (GDA) next day international services implementation across the Poland
- Full operational and IT integration of UPS and acquired M.S. Stolica
- UPS Nordics HQ and Stockholm package centre relocation
- UPS stage one integration with acquired Kiala B2C company
- UPS Poland central hub construction and distribution network redesign
- UPS Poland best operational performance worldwide

Selected Projects

- Co-founder of Polish Express Carriers Forum
- GSE contracts with Airborne Express, FedEx and Aramex
- UPS Polska integration with M.S. Stolica and complete distribution network redesign
- Launching UPS intercontinental flights via Warsaw airport
- First stage of Kiala B2C/PUDO business merge with UPS network
- Renegotiations of Polish UPS Outside Service Providers service agreements with new SLA implementation
- UPS Poland feeder & hub's network redesign
- BREXIT operational set up redesign for UPS Poland.
- Subject matter expert during few DD's in CEE CEP market

Summary

More than 29 years of experience in CEP industry supported by cooperation with the largest players on the international market.

Leader and Team player with organizational and planning skills followed by experience of work abroad with multinational/ multicultural environment and time critical projects.

OUR PARTNERS

IN POST



InPost is the leading locker based out-of-home e-commerce enablement platform in Europe.

Founded in 1999 by Rafał Brzoska in Poland, InPost provides delivery services through our network of more than 20,000 parcel lockers in Poland, the UK and Italy, and also provides courier and fulfilment services for more than 40,000 e-commerce merchants in Poland, including over 3,000 in the UK.

Strategically positioned in the fast growing ecommerce market, InPost's strategy is further enhanced by our investments in technology, as well as the benefits of the "flywheel" effect that provide consumers, merchants and our planet a best-in-class, lower cost, more convenient and sustainable form of last mile delivery.

Through our delivery services, InPost is creating a greener solution for e-commerce, as APM deliveries reduce CO2 emissions by up to two-thirds compared to to-door deliveries in urban areas, and by up to 90% in rural areas, as well as significantly reducing traffic and noise pollution.

In July 2021, InPost successfully completed acquisition of Mondial Relay, which operates in France, Benelux and the Iberian Peninsula towards creating Europe's leading out-of-home automated solution for e-commerce.



OUR PARTNERS

SAMEDAY



Sameday is the leading Romanian B2C parcel carrier company, providing a full range of delivery services and operating the largest automated parcel machines (APM) network in Romania and Hungary. With a strong customer centric focus, throughout its 15 years of operation, Sameday continually innovates and uses each day to learn and improve to be the most customer centric provider in the market. Accordingly, Sameday was the only company that recorded double-digit growth on each of the six pillars defining excellence in customer experience according to The Romanian 2020 Customer Experience Report developed by KPMG in Romania.



Source: <https://assets.kpmg/content/dam/kpmg/ro/pdf/2020/new-customer-kpmg-customer-experience-excellence-2020.pdf>

The Romanian courier company aims to reinvent the day-to-day delivery experience and uses technology to develop a delivery infrastructure and services that open new ways for their partners' and employees' growth. Being the result of e-commerce, last-mile and technology teams working together, Sameday benefits of the perfect combination that enables them to create value for their customers and offer correct business solutions to their clients' needs. Their determination in pursuing a vision of creating a customer centric technological last mile is the cornerstone of the continuous growth of Sameday, a company that has constantly seen double digit growth since joining the eMag Group, a Naspers company, and the largest e-commerce player in the region. In addressing its vision, Sameday acts as a "one stop shop" for its customers with Parcel Locker Delivery through the easybox network, Next Day Delivery, Express Delivery, Oversize and Bulky Delivery, International Delivery.

OUR PARTNERS

NISSAN



Nissan is a global car manufacturer that sells a full line of vehicles under the Nissan, INFINITI and Datsun brands. Nissan's global headquarters in Yokohama, Japan, manages operations in four regions: Japan-ASEAN, China, Americas, and AMIEO (Africa, Middle East, India, Europe & Oceania).

As a company worthy of trust, Nissan provides unique automotive products and services that deliver superior measurable values to all stakeholders. Since its establishment, Nissan has been passionate about creating innovative technologies in the spirit of "do what others don't dare to do." Its brand DNA is to always think about creating new value with unprecedented technologies that go beyond mobility to transform the way people drive and live.

With a corporate purpose which is "driving innovation to enrich people's lives", leveraging the brand's decades of innovation, Nissan is constantly advancing its efforts to democratize electrification and achieve carbon neutrality through an innovative and comprehensive approach.

By 2030, Nissan aims to extend its vehicle line-up with 23 new models, including 15 new 100%-electric vehicles. Nissan is also working to make electrified vehicles more competitive and attractive through investments in battery innovations and factories around the world.



RESEARCH PARTNER

ŁUKASIEWICZ PIT



The Łukasiewicz - Poznań Institute of Technology is a new, multidisciplinary scientific and research unit of international scale. With 700 employees and over 70 unique research facilities, it makes it the second largest institute of the Łukasiewicz Research Network in Poland. The six research centres of the new institute carry out work in the areas of wood technology, plastic processing, rail vehicles, agricultural and food technology, logistics and information technology.

Within the framework of the Logistics and Modern Technologies Centre, the Institute conducts activities in the area of:

- flow of goods in macro logical systems, logistic chains and enterprises,
- electronics, automation and robotics
- automatic identification, location and monitoring techniques
- information technologies with special emphasis on artificial intelligence
- measurements in the area of radio technologies and electromagnetic
- compatibility of electrical and electronic equipment.



CONTRIBUTOR



**Ian Streule,
Partner at
Analysys Mason**

Analysys Mason is the world's leading management consultancy focused on telecoms, media and technology, with a growing presence in the postal/courier communications and e-commerce sectors. We bring together expertise across four interconnected consultancy practices: strategy, transaction support, regulation and policy, and transformation.

Ian has over 24 years' experience at Analysys Mason, during which time he has delivered, managed and directed a wide range of consulting projects in the communications sector.

He leads Analysys Mason's work in the postal and courier sector, and has directed the development of postal and courier sector regulatory strategies for national authorities in the Middle East, Africa and South-East Asia. In the courier sector, Ian has advised on topics including licensing, competition, pricing and long-term options for the nationwide deployment of parcel lockers. In addition, he has provided regulatory support to the postal regulators of the UK, Ireland and Belgium, on costing, pricing, network modelling, quality-of-service monitoring and universal service issues.

In the communications sector, Ian is a recognised expert regulatory adviser to operators and regulators, and has delivered many projects in large and small markets across the globe.

Analysys Mason is currently Last Mile Expert's strategic partner for CEP regulatory projects.



Analysys Mason was awarded a 2021 Queen's Award for Enterprise for International Trade (the highest official UK awards for British businesses)

CONTRIBUTOR



**Jose Anson,
CEO of UPIDO AG**

Jose Anson is founder and CEO of UPIDO (Unlimited Parcel Intelligence & Data Outreach). He holds a PhD in economics from the University of Lausanne (Switzerland) and made a career as an economist in international organizations including the World Bank, the World Trade Organization and the United Nations. He led economic and big data research at the Universal Postal Union, where he conducted numerous postal development missions in emerging and developing countries between 2005 and 2017. He also developed the methodology for the Integrated Index For Postal Development (2IDP) which ranks the best postal services in the world every year.

Jose is the author of numerous scientific publications in peer-reviewed economic journals in the area of international trade, development economics and postal economics, and his research is extensively cited by other economists.

UPIDO provides delivery intelligence-as-a-service continually monitoring e-commerce and the CEP industry evolutions in more than 100 countries. Thanks to proprietary machine learning algorithms, it has produced highly reliable B2C parcel volumes, predictions and forecasts, enabling parcel and postal companies to anticipate better in the new delivery normal resulting from the Covid-19 crisis. UPIDO predictions have been used to prevent delivery failures, better plan the holiday season, anticipate major shifts in online consumer behavior, and design the next generation delivery services with artificial intelligence. Thanks to its accurate online shoppers' demand prediction, UPIDO brings timely insights to unleash greater lifetime value creation for all e-commerce ecosystem players. UPIDO also strongly supports postal and parcel companies to leverage their unique data assets and better serve customers in their country and worldwide.

CONTRIBUTOR



**James O'Neill,
CEO of Paythru
Mobility**

James O'Neill is CEO of Paythru Mobility. He brings substantial experience in the implementation of EV global infrastructure from his experience with charging pioneers Ensto and Innogy eMobility Solutions. He has helped many market-leading businesses deliver solutions across multiple sectors such as Fleet, Parking, Retail and major Chargepoint Operations. He is passionate about an integrated approach to the rapidly developing transition of fleets to sustainable solutions, where the vehicle fuel type is not the driving factor.

Paythru offers a flexible payments gateway service and a complementary suite of white-label, integrated, customer-focused services and applications.

We help organisations, businesses and brands to seamlessly manage their daily transactional experiences, whilst adding value that will increase customer engagement, loyalty and revenue.

Our platform's Application Programming Interface (API) technology allows rapid, cost-effective customisation for thousands of business and customer applications, with full PCI DSS Level 1 and ISO 27001 compliance.

We know by harnessing the most digitally innovative software technology, we can offer customers the most simple and effective transaction experiences.

CONTRIBUTOR



**Heleen
Buldeo Rai**

Heleen Buldeo Rai is an urban logistics expert and author who specialises in e-commerce and sustainability. She defended her doctoral thesis titled "Environmental sustainability of the last mile in omnichannel retail" in 2019 at the MOBI research group of the Vrije Universiteit Brussel, in Brussels, Belgium. She joined the Logistics City chair of the Université Gustave Eiffel in Paris, France as a postdoctoral researcher in 2020. Heleen is particularly interested in consumer behaviour and innovations in business models, warehousing practices and goods vehicles related to e-commerce.

"The last mile is the most expensive and most polluting part of the supply chain. What's more, it has a major impact on customer satisfaction as well, particularly in the e-commerce sector, emphasizing its importance even more. The Green Last Mile Europe Report 2022 clearly demonstrates the ambition and engagement of the delivery sector to reduce their environmental impact, although the work has only yet begun for low-emission and high-efficiency operations at scale. However, not only delivery companies are charged with achieving a green last mile. In the age of e-commerce, also retailers and even consumers need to be involved, as the critical stakeholders they fundamentally are".

"Retailers can advance the green last mile by considering delivery companies' sustainability performance in their outsourcing strategy and offer slower or out-of-home delivery options at check-out. Transparent and rigorous reporting on environmental action by the delivery sector is instrumental in that sense, but still requires tremendous strides, as the Green Last Mile Europe Report 2022 suggests. Consumers, in turn, can be encouraged by incentives and nudges of various types, including differentiations in price, carbon footprint indications, social media campaigns and even planting trees in return for their green delivery choice. Such encouragements tap into consumers' growing environmental awareness and are increasingly supported by research. It demonstrates incredible potential for a last mile that is slower or out-of-home, but greener instead"

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BACKGROUND TO THE REPORT

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In 2021, the European CEP market exceeded 7 billion parcels and over 80 billion Euros. The expectations for 2022 are even higher*

The CEP industry is driven by very dynamic growth in e-commerce, which continues to be strengthened by restrictions in retail caused by Covid-19.

This has led to a dramatic increase in the number of parcel related vehicles on the streets and to the carbon footprint associated with them.

Our report looks at how the last mile is affecting the environment, and seeks to identify key trends as well as initiatives aimed at mitigating a growing environmental issue.

In particular, we aim to help understand what is behind the carbon footprint and to assess what future impact this will have on our environment - assuming no action or the use of best in class Green Last Mile projects.

The CEP (Courier Express & Parcel) market is served by a combination of carriers ranging from the national postal operators to parcel locker operators' commercial carriers.

There are a number of new factors which have become more relevant in recent years, such as faster delivery times and the associated need for localised stock.

LME has in-depth knowledge of this market and there are various studies and reports we have already shared in the public domain.

Together with our partners, we aim to offer a good initial status report on an area which is much spoken about but where remarkably few significant initiatives are currently visible.

We have contacted every key operator directly and used industry media and business social media (especially Last Mile Prophets) to obtain project submissions. This has given us just under 20 projects over several markets that cover various aspects of the last mile.

One of the most important findings is that "greenwashing" (behaviour or activities that make people believe that a company is doing more to protect the environment than it really is - Cambridge Dictionary) appears to be a major issue across the board and that few players have a coherent and effective green last mile strategy and can really "walk their green talk".

On a more optimistic note, some players are taking this issue seriously and other stakeholders, in particular, local authorities and governments, are becoming actively interested in monitoring and controlling the environmental impact of the last mile.

** Assumptions based on web research and Statista 77bln Eur in 2020 and 6,5bln parcels in 2019*

What can you find in this report?

- The report covers green last mile initiatives from all Logistics & CEP players who have shared information about their green initiatives on the European arena as well as selected other projects that we have been able to identify with desk research or in expert interviews.
- We also seek to identify the most promising initiatives and to extrapolate what their impact could be if they were to be implemented on a wider scale.

What are the sources and methodology?

The main sources for the report are:

- Extensive desk research on the CEP market covering company press releases, websites and other sources.
- Use of UPIDOs advance internet search algorithm outcomes to estimate CO₂ emissions in 27 EU countries plus Norway, Switzerland and the UK. .
- Published information on the environmental impact of the last mile.
- Interviews with senior-level contacts in the market.
- Use of InPost's GLM reports and, in particular those prepared by the TOR Consulting Group
- LME's own, in depth, expert knowledge.
- Verification by subject matter experts including the LME team and prof. Arkadiusz Kawa, Marta Cudziło, Ian Streule, James O'Neill, Jose Anson and Heleen Buledo Rai have been made to confirm our data and conclusions.
- Where the actual or published date is not available, we have made estimations based upon our market knowledge.

Who will benefit from our report?

The report is intended for:

- Owners and operators of CEP networks
- Online retailers
- Governmental departments and local authorities
- Investors in these businesses
- Market regulators and policymakers
- Journalists and editors of newspapers and magazines
- Analysts, consultants and other stakeholders

Projects & Case Studies

All business cases have been described by the solution owners and have not been subject to any modifications by Last Mile Experts.

Last Mile Experts do not bear civil and legal liability for possible inaccuracies and errors in project descriptions.

Both the content and the vocabulary used in the descriptions come from the authors and owners of the projects.

NOTES TO THE REPORT

- It has been very difficult to obtain concrete carbon emissions data from companies who do not generally provide detailed or current data.
- Data has been obtained from contributors to the report, publicly available sources and from commercially available sources. The data published represents the latest information available from these sources at the time we carried out our research.
- The authors have reviewed company websites and publications or news items. Moreover, we have conducted numerous interviews (CEO, senior-level of CEP, EV and automotive experts) to develop our core knowledge and understanding of environment. We have used Last Mile Experts and our partners' own market "know how" and expectations for future developments.



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GREEN LAST MILE TOPOLOGY

GREEN LAST MILE TOPOLOGY

Projects generally fall into 3 key categories:

1**Operational:**

where the last mile is made greener due to operational efficiency (i.e. shorter routes and better first time delivery), eco driving as a result of driver training and monitoring or simply by using less polluting vehicles such as EVs or cargo bikes

2**Infrastructural:**

where infrastructure allows for consolidated collections or deliveries as is the case with PUDO, lockers or urban consolidation points or where the logistics infrastructure itself, is greener due to investment in solar cells, heat exchange pumps or simply better heat insulation

3**Administrative:**

where the carbon footprint is “offset” by planting trees or where emissions are monitored and controlled by local or central government and then charges are applied to discourage the most damaging carriers. In some cases this could even lead to a complete ban on certain vehicle/engine types in a given geography.



GREEN LAST MILE TOPOLOGY



Operational

- Low emission vehicles
- Eco driving
- Route optimisation
- Interactive Delivery Management



Infrastructural

- Out-of-home delivery
- Consolidation points
- Green facilities



Administrative

- Auditing
- Carbon offset

GREEN LAST MILE TOPOLOGY

So why are lockers (and PUDOs) so effective? Today, with the exception of COVID quarantine or home office, people are generally not at home to receive deliveries during the working day, when most carriers deliver. One of the most comprehensive reviews of actual first time delivery failure rates (Edwards et al., 2009) shows that failure can vary considerably, ranging from around 2% to an incredible 50%. Whilst the data is now over ten years old, 2019 data from Which? Research (see below) found that failed deliveries remain a key issue. This is in part due to carriers' varied policies regarding signature on delivery, Cash on delivery (common in CEE) or leave safe options (safe

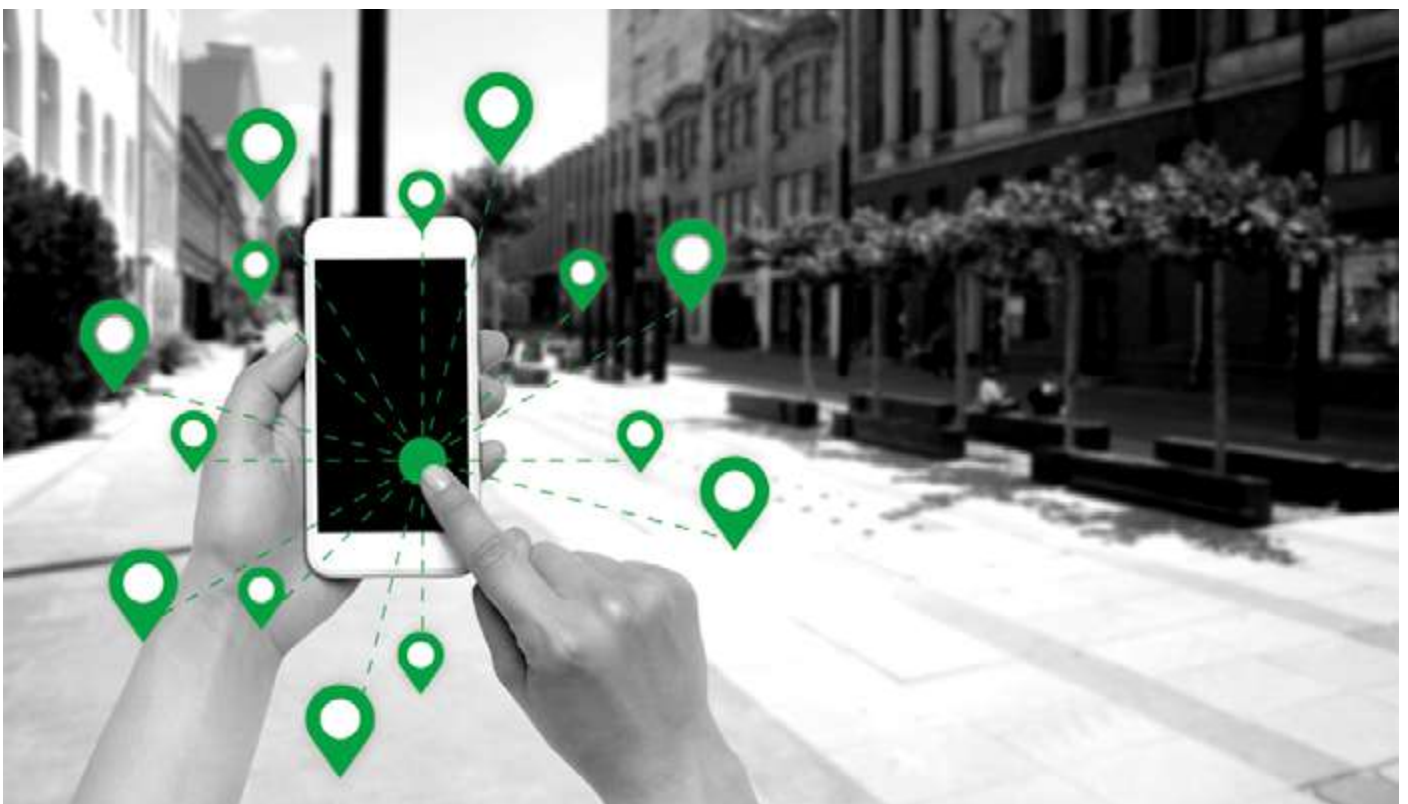
place or leave with neighbour). This is compounded by the fact that the vast majority of B2C parcels don't fit in a standard domestic letterbox.

In fact, the Which? report (2019) found that 24% of couriers did not actually follow customer instructions, probably due to poor process communication or lack of time on the carrier side.

Moreover, just 32% of consumers reported that everything 'went to plan' with the delivery.

Deliveries failed for a number of reasons including:

- 29% of deliveries arriving earlier than expected
- 17% of deliveries arriving later than expected.



GREEN LAST MILE TOPOLOGY

Repeated missed parcel deliveries often result in the customer travelling to a local depot to pick up a parcel, although Couriers tend to attempt delivery up to three times before requiring a customer to pick up a parcel. Edwards et al. (2009) analysed the relationship between distance to collect parcels from a depot and total carbon dioxide emissions. It was found that even with the shortest average distance of 15km, representing an individual's city centre-to suburb trip to collect a package, a total of 3,113g CO₂ was generated by car and 1,340g CO₂ generated when the journey is undertaken by bus. The individual trip to the local depot accounts for the vast majority of the CO₂ emissions associated with the failed delivery. While we might challenge this distance where the carrier has a dense OOH network, it is true that often failed deliveries return to the carriers depot which is sometimes several kilometres from the consignee.

Important sustainability benefits accrue from minimising the emissions associated with personal consumer travel to the depot and are key to mitigating the overall environmental impact of failed deliveries. Moreover, reliable delivery is considered by customers as a key value in e-commerce (Vakulenko et al., 2019). In an attempt to reduce failed delivery rates, leading carriers have implemented IDM (interactive Delivery Management) supported by delivery time windows and weekend and evening delivery options as well as alternative OOH (Out of Home) delivery options (Buledo Rai et al., 2019). While these developments help improve delivery success rates, they can have a negative effect on parcel consolidation and routing efficiency, especially where consignees are able to select time windows themselves, rather than having to accept carrier push ones (based upon optimised routes).

GREEN LAST MILE TOPOLOGY

As parcel lockers or PUDOs are effectively fixed “B2B like” points, usually with good visibility, parking and opening hours, simpler and more efficient routing strategies can be developed. Equally importantly, APMs and PUDOs offer a significant reduction in failed deliveries. According to Last Mile Expert's estimates, all important First Time Delivery is achieved in well over 99% of cases (less if the item is a COD/ “seller push” type product that was not necessarily wanted by the consignee).

Using some postal experience and consumer terminology, “slipper distance”* (ca 350m** in an urban area) is key for customer centric and effective delivery in the last mile and this is why in places where a dense and proximate OOH network exists, amongst others in Sweden, Finland, Poland or the

Baltic States, where these options are highly regarded by consignees. In fact, InPost research from 2021 showed that the NPS for parcel locker delivery in Poland was an incredible 72, beating all other parcel delivery methods. At the same time NPS for shipping via a locker reached 74. With some 17,000 InPost lockers in Poland, today, we can expect that this NPS has only improved.

While smart locks and private parcel boxes (or parcel-sized letter boxes) are not common today, they may present an opportunity for larger item home delivery when the consignee is away. We especially believe in smart locks (e.g. Amazon Key) as they allow for servicing items that cannot effectively be delivered OOH. The benefits will be especially clear in rural areas where the last mile “eco-cost” is highest.

*BPost term

** Based upon research from Posten Norge

Comparison of Last Mile Delivery Modes

	Attended Delivery	Dropbox/ Delivery Box	Smartlock/ Controlled Access	APM (locker)	PUDO/ Access Point
Last mile served by	Carrier	Carrier	Carrier	Consignee	Consignee
Consignee present	No	No	No	No	No
Items Shipped	All	COD/Pantry*	COD/Pantry** Fresh	COD/Pantry** Fresh*** (size restricted)	COD/Pantry** Fresh*** (size restricted)
First Time Delivery Success	High	High/Low***	High/Low***	High/Low***	High/Low***
Delivery Time Window	Fixed carrier pickup/ Customer PUDO****	Carrier operating hours	Carrier operating hours	Carrier Access Hours	PUDO hours
Collection times	N/A	24/7	24/7	24/7 (Access hourly)	PUDO hours
Consignee retrieval time	None	Minimal	Minimal	Subject to APM location rules	Subject to PUDO location rules
Drop-off time	Long	Minimal	Minimal	Subject to APM location	Subject to PUDO location
Cost per Parcel	Medium	Low	Low	Medium/Low*****	Low/Medium
Delivery cost per parcel	High	Medium	Medium	Low/Low*****	Low
Operations mode	Fixed delivery time per route per stop	Fixed for volume and density of routes and delivery	Customer picking up parcel*****	Customer pick up location	Customer pick up location
Carbon reduction in TCO	No	Medium	Medium	High/Low***	High

This table is based upon one developed by BESTUFS.net with modifications and updates by Last Mile Experts.

* Pantry = non perishable groceries

** Fresh availability is subject to chill chain requirements being met

*** Unless COD or push sell item

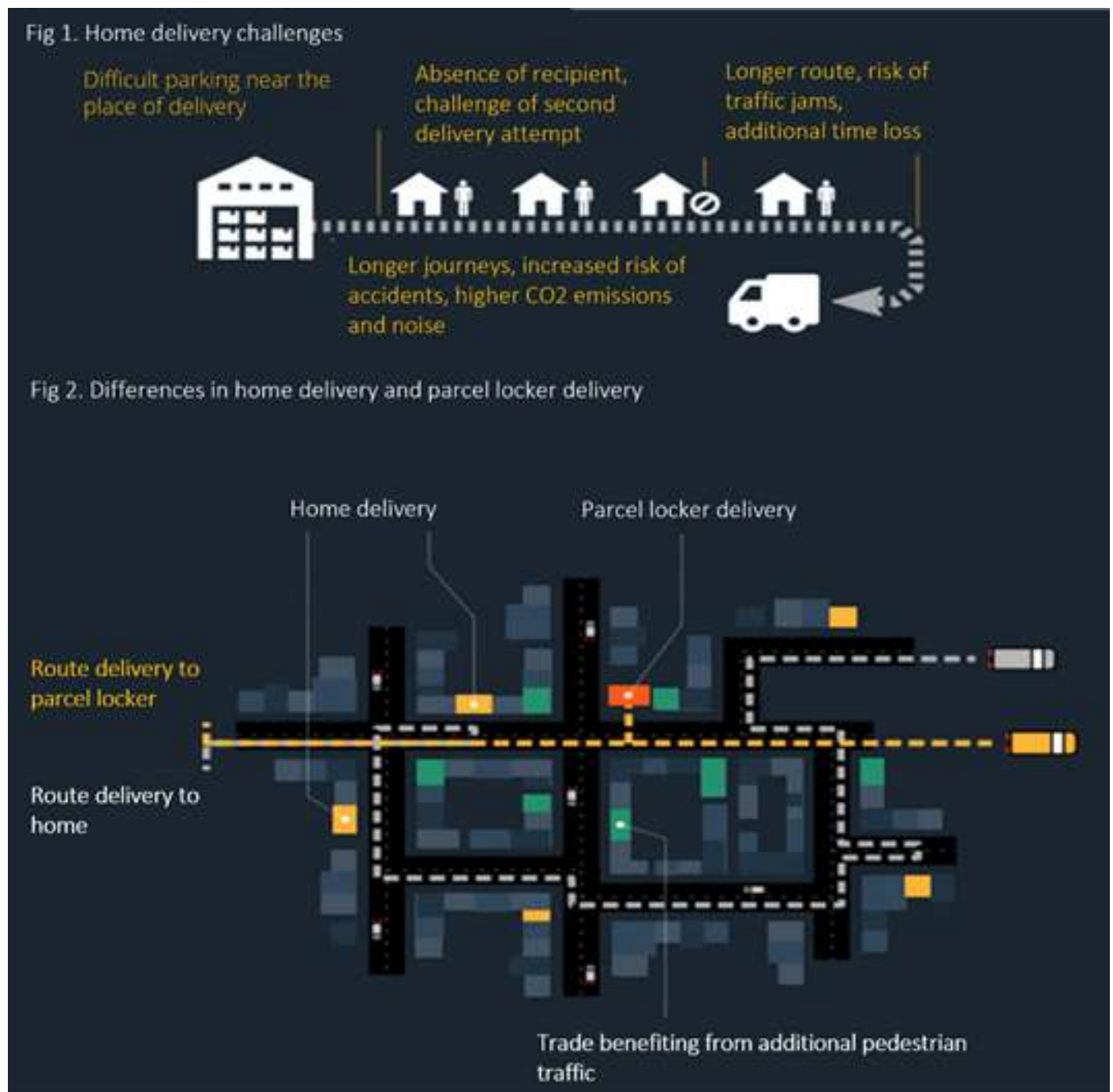
**** Generally for fresh or “white gloves”

***** Where locker use is optimised

***** Can be mitigated with cameras

GREEN LAST MILE TOPOLOGY

This nice chart from a recent InPost report by the TOR Consulting team shows the operational differences and resulting carbon footprint for home delivery and out of home (APM) delivery in a nice and easy to understand format.

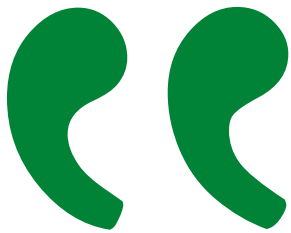


Source: TOR, Parcel locker machines report

GREEN LAST MILE TOPOLOGY – POLAND



Researcher viewpoint



Certainly, global e-commerce has stepped on the road to sustainability. Improving the social and environmental efficiency of the last mile is a challenge for all actors of the e-commerce ecosystem, especially CEP operators. Green Last Mile Europe Report 2022 is a comprehensive and precise source of knowledge about this market area and the described research results, project initiatives and insightful conclusions are the proof that the green last mile is a fact and not just a fad or marketing stunt. It is worth following the development of this area.



*Marta Cudziło,
Łukasiewicz PIT Deputy Director of the Logistics
and Modern Technologies Center*

Deliveries to parcel machines have recently become one of the most used forms of delivery. According to a survey conducted by Kantar Millward Brown (2020), 80% of online shoppers in Poland choose delivery to a Paczkomat®. This is also confirmed by the Gemius research, which shows that the available delivery option to InPost parcel machines (Paczkomaty®) encourages 81% of Internet users to make purchases; deliveries to PUDO are also highly ranked. On the supply side - 68% of the largest stores in Poland offer parcel machine delivery (research "Basket of the year 2020").

GREEN LAST MILE TOPOLOGY - POLAND

Are parcel locker deliveries more eco-friendly than direct Home delivery? Let's take a look at Poland (aka "Lockerland") due to the abundance of data here and the largest number of lockers in any country we have covered in this report. Research undertaken on the initiative of InPost shows that without any doubt that If all courier transport moved to parcel lockers, it would be possible to reduce CO2 emissions by up to 75% in relation to traditional courier delivery. It is also worth looking at the last distance covered by a parcel after its collection from a parcel locker. If every customer picked up their parcel by car, the "savings" for the environment might not be that big.

However, it turns out that in Poland, a key APM market, the average distance from the parcel machine to the customer's home is 450 metres, which means that consignees very often walk to collect parcels. According to the Green Generation report, 37% of respondents reach parcel machines walking. Moreover, according to the same survey, 62% of customers take out their parcels "on their way", for example when returning from work, traditional shopping or walking. Poles are also willing to choose a bike, certainly better for the environment, because cyclists had 84% lower CO2 emissions from all daily travel than non-cyclists and life cycle CO2 emissions decreased by 14% for each additional cycling trip**.

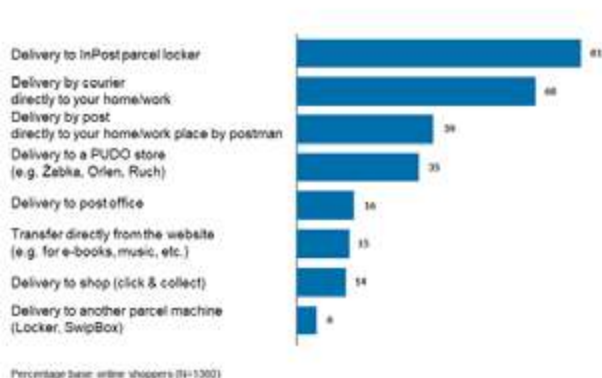
**Green Generation 2021", Mobile Institute, in partnership with Allegro and Łukasiewicz-ILiM.*

***Transportation Research Part D, Volume 93, April 2021, 102764*

Having stated that APMs have the highest CO2 reduction rate of all forms of delivery, it is worth highlighting the rationale for the development of parcel machine networks towards agnostic networks, which, being open to any

logistics operator, show even greater potential for reducing emissions at the last mile. The popularity of parcel machine deliveries is one of the main drivers for the development of these networks.

Which of the following forms of delivery of goods most encourage you to buy online?
Data in %



Source: Gemius,

„E-commerce w Polsce 2021”

GREEN LAST MILE TOPOLOGY - POLAND

In a report by ZDG TOR for InPost, when delivering goods to APMs, a courier in a comparable delivery vehicle is able to handle up to 1,000 parcels within 8 hours versus classic D2D (home delivery) of only 65-75. While we believe that the figures from D2D are conservative, and a good courier with supporting IDM (interactive Delivery management) and route optimisation tools can do well over 100 parcels on an urban route (with extremes at a level of over 200 parcels per route), we also know that a good courier delivering only to parcel lockers in a dense urban

area can now achieve over 1,300 parcels in a day

The same report concludes that CO2 emissions per parcel are three-to-twenty times lower in the case of delivery to Paczkomaty® than in the case of classic home courier delivery. This simultaneously leads to a significant increase in the efficiency of the entire last mile delivery process. Therefore, being green also saves money! InPost additionally uses various forms of rewards for customers for quick pickup, which allows it to further improve the system.

Comparison of the energy efficiency of home delivery and parcel locker delivery

Indicator	Home delivery	InPost parcel locker
Daily kilometres travelled by courier	150	70
Number of parcels handled	60	600
CO2 emissions per parcel		
Fuel consumption per parcel	0,23 l	0,01 l

Source: ZDG TOR based upon InPost data and research by B. De Maere, 2018

GREEN LAST MILE TOPOLOGY - POLAND

An AGH study from 2014 showed significant operational advantages of deliveries to the Paczkomaty® network over home deliveries, which lead to a significant reduction in CO₂ emissions per parcel. Ultimately, the way in which the customer makes his way to the machine is decisive for minimising the environmental impact of automatic delivery systems. The greatest benefits of using APMs accrue when the consumer travels to them on foot or by bike, or collects the parcel on the route that he or she normally travels anyway

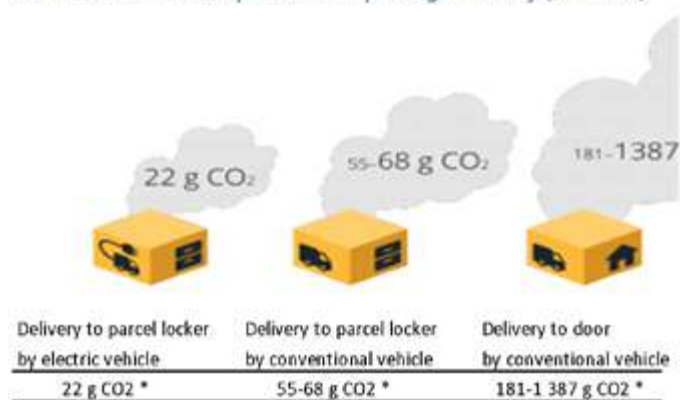
(trip chaining). Due to the proximity of APMs in urban areas, the locker is often “on my way” and the need for a dedicated trip is becoming less and less frequent



The green credentials of APMs was also confirmed by the results of the C-Liege22 project. Research conducted by the Maritime University of Szczecin shows that APM's are among the most eco-friendly forms of transporting goods in cities. Calculations by scientists from Szczecin show that the InPost APM couriers travel 120-150 km less than traditional couriers who deliver goods D2D. These figures will not, of course, be the same for all cases - they will depend on the population density (delivery costs and therefore emissions can be up to three times higher in sparsely populated areas), congestion and many other factors. They do, however, give a good

indication of how much less onerous APM delivery is vs. home delivery to the environment.

Estimated climate impact of one package delivery (last mile)



Source: ZDG TOR based upon InPost data and research by B. De Maere, 2018

*Without taking into account the customer's journey to the parcel locker

GREEN LAST MILE TOPOLOGY - POLAND

In all cases, delivery will be more eco-friendly with widespread use of APMs, even if we add to the environmental costs of collecting the package by the customer.

The results of research conducted in Poland, which give about 300 g of CO₂ per parcel, may be considered to be the most meaningful in this regard. Delivery to parcel machines in each study turned out to be less emissive,

although the values depended primarily on the distance of the machine from the recipient's place of residence (or the proximity of places where it usually stays). A dense network of APMs (and /or PUDOs) operated in an efficient manner is currently the most effective and efficient way to reduce the environmental impact of e-commerce logistics.

Not only do lockers increase operational efficiency and reduce carbon, they also save money. APMs effectively increase density of parcels per stop, which can be approximated by density of inhabitants (in fact the benefits are even greater as the locker, or PUDO, offers one stop for several consignees).

The actual cost savings can be expected to be even better provided the out of home network operates in an efficient model i.e. at capacity and with suitable courier payment systems.

Relationship between population density and cost of delivery

Density (inhabitants/km ²)	Last Mile delivery cost per package (EUR)
0-50	7,75
51-200	4,17
201-333	3,87
334-400	3,55
401-600	3,12
601-800	2,96
801-1 000	2,87
1 001-1 200	2,81
1 201-1 500	2,79
> 1 500	2,75

Source: ZDG TOR based upon InPost data and research by B. De Maere, 2018

GREEN LAST MILE TOPOLOGY - POLAND

Furthermore, the Green Generation report confirms that some 62 percent of customers pick up their parcels "on their way", for example when returning from work, shopping or walking. Only 18% of respondents usually go to an APM specifically to pick up the parcel. This is also confirmed by experience from outside Poland. Studies conducted in Austria* have shown that the use of parcel machines, provided that certain assumptions are met, translates into improved sustainability. In addition, Posti, Finland's national postal operator, presents parcel lockers as the path to climate neutrality. Posti's research shows that online shoppers can reduce their carbon footprint by as much as 70% thanks to vending

machines. Collection from an APM "on the way" somewhere implies that emissions can be as much as 83% lower.

More and more customers are also beginning to understand this. According to the Green Generation 2020 report, 76% of e-shoppers believe that ordering parcels to a Parcel Locker is more ecological than ordering a D2D courier.

Finally, the issue of reverse logistics is also important - i.e. the ability of Paczkomaty® to act as a drop off point. Due to the proximity of parcel machines to customers, it also has significant potential for reducing emissions and will be especially relevant for second life products (Vinted, OLX, eBay).

* On the Impact of Open Parcel Lockers on Traffic Matthias Prandtstetter , Clovis Seragiotto , Johannes Braith , Sandra Eitler , Bernhard Ennser , Georg Hauger , Nina Hohenecker , Reinhold Schodl and Matthias Steinbauer



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WHY IS THE GREEN LAST MILE RELEVANT TODAY?

WHY IS IT RELEVANT TODAY?

The dynamic development of worldwide e-commerce is a fact, just like global warming and the justified calls of world organizations to intensify actions for environmental protection. The combination of these two facts builds a premise for an extended approach to e-commerce and a legitimate need to expand solutions that will really develop the trend of "eco e-commerce".

If the question of how to be eco in e-commerce is absolutely justified, then it is worth analysing the areas of e-commerce that have the highest potential to generate harmful effects on the environment and society.

The Green Generation 2021 report (published by Mobile Institute in partnership with Allegro and Łukasiewicz-ILiM) indicates that 85% of the surveyed Polish Internet users notice various eco-unfriendly practices of stores while shopping online.

Consumers particularly pay attention to sub-optimal packaging of parcels - in foil, in too large cardboard boxes, with too much plastic filling material. They also notice the negative impact of product returns on the environment. However, the key to sustainable e-commerce is reducing the negative impact of transportation. It is the largest source of CO₂ emissions, and while carbon emissions from online

purchases* are on average 36% lower than those from in-store purchases, the green last mile is still a real challenge facing retailers and logistics operators. Sustainable parcel delivery requires initiatives that include, amongst others, consolidating deliveries into a repeatable route, using electric cars, utilising cargo bikes, or implementing autonomous delivery devices.



* According to a report by the MIT Real Estate Innovation Lab in partnership with Prologis.

EXPERT OPINION



"ESG themes are very relevant to the postal and courier industry"

Investors are increasingly funding companies with compelling environmental, social and governance (ESG) initiatives, and strong growth is forecast in 'sustainability fund' investment in the coming years.

Operators should therefore ensure that their progress in the ESG space is clearly visible. Consumers are also beginning to respond to ESG communications and the evidence of action (or inaction) by companies, by taking steps to choose products and services with a more positive ESG reputation.

COP26 in Glasgow highlighted that the issues caused by climate change present a huge societal challenge. Firms generally recognise the need to reduce their direct and indirect greenhouse gas emissions. Some will be aware of their Scope 1 and Scope 2 emissions and have targets to eliminate them. However, elimination strategies in the courier sector go right to the heart of the business. Here, Scope 1

emissions are from owned sources such as facilities or vehicles, and Scope 2 emissions are indirect from purchased electricity, heating, etc. If courier firms introduce, say, electric vehicles, the emissions challenge simply moves from Scope 1 to Scope 2. Furthermore, because Scope 3 emissions are those generated indirectly by suppliers, some of the challenges of reducing greenhouse gases in the sector will be pushed onto subcontractors and suppliers.

Social and governance themes also have important impacts on broader society, in terms of environmental waste management, air pollution, employee working conditions, community relations, and employee and board diversity. Some of these ESG themes are particularly relevant to the postal and courier sector, given its intrinsic logistics, significant workforce, reliance on packaging, and generally slim profit margins in what is a competitive industry.

ANALYSYS MASON'S ESG RECOMMENDATIONS



Our research in the electronic communications sector shows that operators have been inconsistent in measuring their progress on ESG initiatives, thereby weakening the impact of their efforts. For some companies, their approach to ESG in the future will be about doing more, and being seen to do more. For others, it will be about getting better results from what they are already doing.

Analysys Mason's key recommendations are that:



- Operators should continue with their environmental initiatives, ensuring management and board decisions are based on a deeper understanding of Scope 1, 2 and 3 emissions, while at the same time broadening social and governance improvements within their business and partners



- Operators should make consumers more aware of their progress on ESG initiatives, particularly as consumer familiarity with ESG issues grows, and they make ESG-driven choices



- Operators should use more-established metrics for their ESG initiatives so that progress is more clearly visible

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EVS FOR THE GREEN LAST MILE

GOING ELECTRIC FOR GREEN LAST MILE

In the race to reduce fleet emissions, but more importantly show a growing environmental conscience, the starting pistol has well and truly been fired. Faced with climate change from global warming, urban air quality concerns and demand for a more sustainable, carbon-neutral society, governments are legislating for lasting change. Improving air quality by reducing tailpipe emissions is a priority. Clean air zones are on the rise.

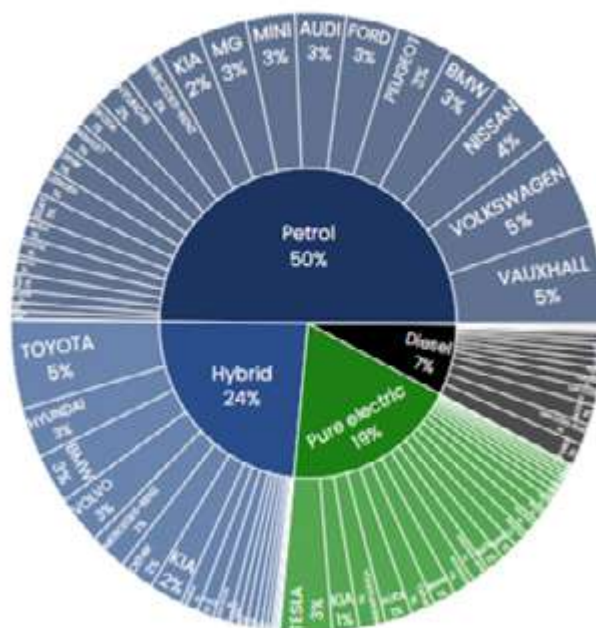
From 2030 in the UK, new combustion vehicles cannot be sold. The only new vehicles available will be fully electric. The EU is considering banning the sale of all new fossil fuel cars by 2035. From the UK consumer perspective, interest in electric vehicles is rising.

According to New Automotive data in November 2021, electric car sales were the fastest growing segment of the new car market. 19% of sales were pure battery electric vehicles, up from 9% from November 2020. Hybrid sales accounted for 23.5%, whilst petrol and diesel sales continue to fall. This consumer shift is encouraging. Even so, in 2018, according to government research*, transport accounted for 28% of all UK greenhouse gas (GHG) emissions.

Real change rests on the adoption of Electric Light Commercial Vehicles by Fleets, especially for last mile logistics. We need an EV-centric mindset that addresses parking, charging, payment and operating infrastructure nationwide.

* The Behavioural Insights Team and the Transport Research Laboratory

November 2021 new car market share



Source: New Automotive

A CLIMATE IN CRISIS: WHY THE GREEN LAST MILE MATTERS

The pressure on emissions is here and will continue to increase. We are in a global climate crisis and need to act responsibly and diligently together. In 2020, The EU produced 2.54 billion metric tons of carbon dioxide emissions.

The European Commission reports passenger cars and vans ('light commercial vehicles') are respectively responsible for around 12% and 2.5% of this total. Transitioning to electric LCV vehicles EU-wide would reduce CO₂ by 63.5 million metric tons.

The data on the impact fleets can have on reducing emissions is clear, going

electric is one part of the puzzle where impact can be made.

One cannot talk about the pressures of emissions without touching on congestion zones. Often confusing for many, a good way to understand the impact for your fleet and country is to visit the [urbanaccessregulations.eu](#) website. Emission Zones or Zero Emission Zones are expanding and can be seen across Europe, the US and beyond.

The only way to avoid the OPEX impact for your fleet is to factor these in; going electric on the right routes will help you comply and reduce costs.

Table 1

Scope of LEZ programs in selected regions

Country or Region	LEZ Scope
Austrian LEZs	Lorries over 3.5 t, stickers required, some retrofit options
Belgium	All vehicles with four and more wheels (planned), retrofit options
Czech Republic	Lorries over 3.5 t or 6 t, stickers required
Denmark	All diesel-powered vehicles above 3.5 t, stickers required, retrofit options
Finland	Buses and garbage trucks (dustbin lorries)
Germany	All vehicles with four wheels, stickers required, retrofit options
Greece	All vehicles, vehicles over or under 2.2 t
Italy	All vehicles, including mopeds and motorcycles
Italy/France, Mont Blanc tunnel	Lorries only, control at tunnel entry
Netherlands	Lorries over 3.5 t GVW, camera enforced
Norway	All vehicles (planned), transponder enforced
Portugal	Petrol & diesel, light-duty and heavy-duty
Sweden	All heavy, diesel-powered trucks and buses, stickers required
UK, London	Vans and similar over 1.205 t unladen, and vehicles over 3.5 t GVW, camera enforced, foreign vehicles need to register
UK outside London	Public service buses only, retrofit options.

Emission Standards

Source: Emission Standards: European Union: Low Emission Zones (LEZ) ([dieselnet.com](#))

GOING ELECTRIC FOR GREEN LAST MILE

However, with change comes opportunity; business benefits exist such as lower Whole Life Costs. Whilst the cost of leasing or buying an electric LCV may be higher than a conventionally fuelled equivalent, it's important to consider Total Cost of Ownership and Whole Life Costs.

For example:

- Electricity costs significantly less per mile to power a vehicle than petrol or diesel
- Within City environments, electric fleets can travel freely within Clean Air Zones and Ultra Low Emissions Zones without penalty.
- Regenerative braking, no clutch and a simpler drivetrain means there are less components to wear or

fail, typically reducing maintenance costs. Moreover, an EV has significantly fewer parts in the first place.

- Government grants for purchase – vans are often eligible for grants (subject to maximum limits)

Alongside life costs of vehicles, those going electric are also seeing wellbeing benefits for drivers. A recent study by Fiat found the quieter driving cabin of an electric van makes drivers feel less stressed. This reduces a driver's heart rate when compared to driving a traditional vehicle. With a purpose-built charging infrastructure, this becomes easier to achieve and manage.



WHAT'S NEXT FOR EVS?

Firstly, what's very clear is that superior customer experiences for payments, parking and EV charging will fundamentally drive the move to emissions-free motoring. Finance, and specifically cashless mobile payment, can drive transformative change.

Currently, fleet drivers and operators rightly have several concerns about adopting EVs. Can they find a suitable charger? Is it nearby on their route and easy to find? Is it working and is it compatible with their vehicle? How long will a charge take if time is limited? Will they need a smartphone and multiple apps to pay? How much will they get charged?

Both automotive OEMs and charge point operators are embedding sophisticated technology to aid and enrich EV journeys. Given the right understanding of the ecosystem and user expectations, a single smartphone

app can remove the stress and range anxiety often associated with using an electric vehicle for deliveries or business journeys over longer distances.

By unifying several unique mobility services through one platform, it is possible to provide fleet operators with the ability to manage EV / parking inventory; provide accurate mapping, address look-up validation and permissions to get drivers to the right location, faster and compliantly; and facilitate an 'invisible' settlement for parking and EV transactions. A smart, seamless end-to-end journey user interface can enable, faster, smarter, cleaner last-mile operations that will mean that more parcels are delivered with less fines, less charges, less congestion as well as significantly lower greenhouse gas emissions.

WHAT'S NEXT FOR EVS?

Once fleet drivers and operators are confident that they can easily locate convenient parking that offers reliable, simple charging for electric vehicles, half the perception battle to move our society away from traditionally fuelled vehicles is won. It's a point not lost in industry analysts. As the Capgemini World Payments Report 2021 concludes; "Fast forward to the new era, Payments 4.X, an experience-driven environment in which payments firms are profitably shaking things up even more by swapping out once-typical engagement practices for value-added experiences".

Therefore, the opportunity to embrace EV is here. Indeed, those that have profiled factors correctly are thriving. The question is how, and why.

In a market that is moving fast from batteries to vehicles and all-round connectivity, what is important for the fleet decision makers? A starting point

is selecting the right van based on your requirements and what is currently available in the market (see the Electric van guide - everything you need to know | Parkers).

Current electric LCV fleet vehicles use batteries ranging from 24-85+ kW, with 100kW vehicles coming. These deliver 80 – 190 miles of range, potentially up to 220 miles for City fleets, although heavy loads and cold weather can significantly reduce range. Most last mile LCV delivery vehicles don't need to cover more than 50 to 75 miles daily and can be charged overnight or fully utilise fleet driven Electric Vehicle Charging solutions to thrive.

In the short term, adoption will be limited to small fleet numbers of inexperienced users typically requiring workplace charging. As the EV market develops, technical and financial improvements will unlock a larger and more diverse fleet customer base.

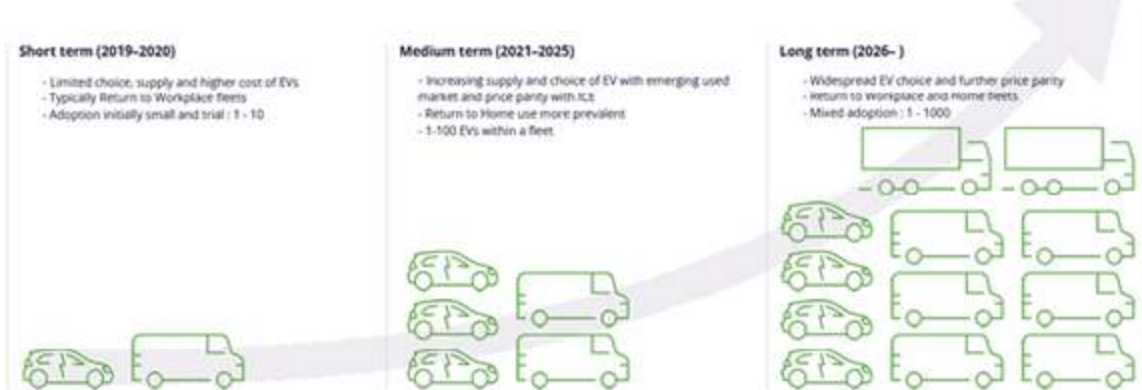
HOW TO IMPLEMENT YOUR EV FLEET?

The key to success is always paying respect to transition and taking your entire fleet on the journey – but not necessarily changing everything right away. The European fleet market like all is incredibly diverse; EVs will often only cater for a small percentage of your business needs initially. Change is dependent on profiling the right vehicles, routes and much more.

The emerging fleet opportunity will be fuelled more than anything by applicable data. Fleets fall into two main segments: return to home and return to depot/workplace. And yes, there is always a mix, with some outliers in the model.

When will electric fleets come?

In the short term, adoption will be limited to small fleet numbers of inexperienced users typically requiring workplace charging. As the EV market develops, technical and financial improvements will unlock a larger and more diverse fleet customer base.



Understanding the emerging fleet opportunity for EV

- Fleets fall into two segments: return to home or return to workplace
- Can vary in scale - from 1 to 10,000 vehicles
- Increasingly managed - data-led monitoring to understand fleet EV needs
- Fleet customers may use Total Cost of Ownership (TCO) model to quantify EV investment
- For fleets, e-fuels could mean a way to cover high mileages, without resorting to electric powertrains

Summary of European vehicle market:

			
	Passenger Vehicles	LCV	HCV
Typical vehicle	Cars of all sizes	Vans up to 3.5t	Trucks over 3.5t
Common fleet use cases	Site visits, private hire, business travel	Deliveries, trade services	Freight deliveries
Ownership	Private or business registered	Private or business registered	Business registered
Total European vehicle market	264.2 million vehicles, 2.1% annual growth	32.4 million vehicles, 2.3% annual growth	6.3 million vehicles, 0.8% annual growth
EVs	830,000 EVs	70,000 EVs	17k EVs
Fuel type of European vehicle market	54% Petrol 42% Diesel 3.7% Other 0.3% EV	8% Petrol 90% Diesel 1.8% Other 0.2% EV	1% Petrol 98% Diesel 7% Other 0.0% EV

HOW WILL GREEN FLEETS EVOLVE?

The European vehicle market will see the use of electricity, e-fuels and to a lesser more targeted extent, initially hydrogen. What is key to all of this is that magic word again, 'transition'. This isn't about splitting your fleets out; it is about embracing change. Yes, it is frustrating when people only focus on your currently small EV fleet. However, this doesn't need to be the case, not should it be. Right now, exciting solutions exist and are thriving. The rise of Hubs is here, but until recently, these were only focused on EVs and limited to the exact locations of the fleet.

Recently, companies such as Infinium logistics solutions have come to the market, embracing the complete transition. By using a simple but sophisticated mobile application and service solution to manage movements, parking and charging for electric and broader existing vehicle fleets, it lets

fleet managers:

- Locate and pre-book parking and electric vehicle chargers at convenient locations for the fleet itinerary optimising day and route planning
- Find parking and charging locations offering overnight facilities and accommodation
- Arrange parking for a driver's own vehicle during their shift
- Manage en-route parking, charging, and fuelling on the move
- Ensure charger ratings are correct for vehicles
- Manage and correctly reimburse electric car or van charging by employees at home
- Find temporary kerbside parking
- Have full visibility of journeys, mileages, schedules and costs for analysis and reporting

Interestingly, the unified platform also supports a smart daily charging strategy that reflects vehicle load, range, and potentially variable limiting factors such as cold weather. Drivers, meanwhile, get one simple app (iOS or Android) to plan parking and EV charging if needed.

Infinium's Logistics Solutions can now transition fleets by removing barriers, simplifying a fleet's changing landscape by factoring in all its vehicles' needs.

Drivers can rest easy knowing that they will get to a hub, where the vehicle can be fully charged, cleaned if required and ready for a shift. fleet managers can be assured the vehicles are safe, maintained, fully utilised and have full

access to the data on those vehicles. Using profiling, data savvy fleet managers are identifying the right routes to phase in Electric Vehicles. Location partners with the right charging/hub/micro-hub solutions now exist to work in hand with fleets.

This is an exciting time as we see a joined-up transition for fleets moving to electric - without ignoring existing vehicles.

In the not-too-distant future we will be embracing the start of more autonomy in last mile, whether that be hub/depot. Don't fear it, embrace it; those that do will surely excel.

FUTURE GREEN LAST MILE SUCCESS: AN EV PARTNERSHIP

LCV is the fastest growing segment in electrification in fleet. Talented fleet managers are pulling together ambitious propositions across sustainability, transport, and construction to meet the demands of the changing landscape.

The exciting part is they are not alone, picking the right partners, profiling the demand on the fleet and the needs of the customer.

Data, without the ability to apply it, invariably fails. Find the right partners, do the research, and don't fear the challenge. Build a collaboration with a vested interest in delivering the very best solution.

If you would like to talk more about the opportunities to collaborate in fleet to improve the experience and break down the current complexity to enable EV adoption and a greener future, please get in touch.

Bringing it all together



Source: Delta-EE - Electric Fleets; Analysis of the Value Chain

NISSAN'S CONTRIBUTION TO EV DEVELOPMENT

Nissan's "green" solutions in Europe

We live in times of very dynamic development – in the economy, in society and in the world as a whole. Recent years, even decades, have been marked by constant changes, transformations and many amazing discoveries in virtually all areas of our lives. In this pursuit of progress, however, many of us have forgotten about one very important aspect, which is of key importance not only for the further development of civilisation, but which also affects the daily lives of each and every one of us – namely the state of our planet's natural environment, which in recent years, as a result of human activity, has found itself in a situation that requires resolute action.

One of the greatest climate threats is of course global warming, something that everyone has probably already

heard about. It is caused mainly by high emissions of harmful gases, including carbon dioxide, which are now emitted in quantities unimaginable just a few decades ago. In order to counteract this, the automotive industry has in recent years embarked on a revolution, which we are witnessing today and which will probably continue for a long time to come.



Manufacturers are introducing electric vehicles on a large scale, and every day the European Union comes closer to 2035, when a complete prohibition on selling new combustion engine cars is to come into force.

Nissan started thinking about solutions to improve the quality of our climate well before it became commonplace. At a time when no one was yet seriously thinking about the mass production of electric vehicles, the Japanese brand unveiled the LEAF model as early as 2010. This visionary move was initially met with

astonishment by the industry, but over the following years it revolutionised the market for electric vehicles and inspired more manufacturers to electrify their model ranges, which, as can be seen today, was a remarkably apt and forward-looking move.



NISSAN CONTRIBUTION TO EV'S DEVELOPMENT

However, Nissan's endeavours to neutralise the negative impact of the automotive industry on the planet are not limited to offering electrified cars to customers. The company, as it has demonstrated over the past ten years, is not just concerned with the here and now, but is constantly looking to the future. That is why the ideas that Nissan has been initiating across Europe for several years now also focus on what happens to electric vehicles at the end of their useful life. While many manufacturers are focusing on introducing zero-emission models into their ranges, Nissan demonstrates that an electric vehicle is just one part of an entire ecosystem that truly contributes to improving the quality of our climate. As early as 2016, Nissan as well as Eaton and The Mobility House developed an innovative energy storage system installed at the Johan Cruijff Arena in Amsterdam – the world-famous performance venue and home of the Ajax football club. The system uses 280 battery packs from Nissan LEAFs. It is Europe's largest commercial energy storage unit utilizing end-of-life EV batteries, launched in 2018. It has a power output of four megawatts

and a capacity of four megawatt hours. Besides providing an essential back-up source of energy at the stadium, it can also supply power to the immediate vicinity of the venue when needed, preventing excessive strain on the power grid.

In addition to its work on reusing batteries from used-up vehicles, Nissan is also working on enhancing the capabilities of the electric car itself. Akin to a traditional battery, the battery installed in a zero-emission car can not only serve as a power source for the powertrain – it can also be used to power external objects. In line with this concept, in 2020 Nissan introduced an all-electric concept vehicle called RE-LEAF, based on the LEAF model, designed for emergency response services. It provides mobile power during natural disasters or extreme weather conditions. In addition to design modifications that enable it to drive on roads covered by e.g. debris chunks, RE-LEAF features weatherproof plug sockets in the bodywork for connecting 110- to 230-volt devices. The power source is a high-capacity lithium-ion battery.

NISSAN'S CONTRIBUTION TO EV DEVELOPMENT

A somewhat more “mundane” application of V2G (vehicle-to-grid) technology is tapped by the i-rEzEPT project launched in 2020 in Germany, which aims to integrate electric cars into public and private power grids. Project participants not only meet their mobility needs with a Nissan LEAF, but also use the electric car as a temporary energy storage system in their homes and a power grid for self-produced electricity. Using the Nissan LEAF's unique bidirectional charging capability, referred to as V2G technology, participants can use the cars to store solar energy generated on the roof of their house in their vehicles' batteries and, when needed, transfer it to the household or feed it into the public power grid.

Also worth mentioning is Nissan's latest £1bn investment in the EV36Zero project – a flagship Electric Vehicle Hub connected to the world's first zero-emission vehicle manufacturing ecosystem. As part of this innovative project, Envision AESC, the world's leading battery manufacturer and Nissan's long-standing partner, will create a new 9GWh gigafactory using state-of-the-art battery technology.

Built next to the factory in Sunderland, UK, the EV36Zero plant will not only boost the group's ongoing efforts to achieve carbon neutrality, but will also create a new comprehensive solution for zero-emission motoring.

As these examples illustrate, Nissan is a manufacturer that has a long-standing commitment to the planet and, with its innovative and forward thinking, and visionary approach to motoring, contributes to the electric revolution without forgetting its long-term impact on the environment. Nissan customers can rest assured that their car will be the perfect companion to their daily lives, and that when its useful life comes to an end, its recycled components will get a second life.



NISSAN'S CONTRIBUTION TO EV DEVELOPMENT

A sustainable choice for both family and business

In line with its vision of a sustainable future, Nissan has unveiled the new Townstar, the successor to Nissan e-NV200, which has been very successful in the light commercial vehicle segment. Available in both petrol and 100% electric versions, as well as combi or van variants, the Townstar is the ideal solution for entrepreneurs and private customers looking for a spacious family car. The all-electric version of the new Nissan Townstar has been developed with customer needs in mind. With a powerful 44 kWh battery, innovative technology and low operating costs, the Townstar presents an efficient, sustainable mobility solution for drivers. The car provides a range of 285 km and it takes just 42 minutes to charge from 0 to 80% using direct current (DC). The petrol variant is available with a 1.3

litre engine that is fully compliant with the latest emissions regulations (Euro 6d). This unit generates 130 hp and 240 Nm of torque, perfectly combining power with efficiency.

The new Townstar van has been developed to perfectly meet the needs of customers, including small and medium-sized businesses, who are looking for versatility, comfort and adequate cargo space, as well as modern features such as an automatic parking system, which is very useful when driving in the city. With a cargo space of up to 3.9 m³ and a swivelling partition, the new compact van can carry two Euro pallets and a payload of up to 800 kg. To accommodate the requirements of different types of businesses, the high-performance drive trains have a towing capacity of up to 1,500 kg.

The combi variant will be perfect for family travel, providing an extremely spacious interior while maintaining the comfort and quality of Nissan's passenger models. With ample luggage and personal items storage capacity of up to 775 litres, Townstar will accommodate the necessary accessories for the entire family. There will also be safety features such as seatbelt reminder, automatic emergency braking, lane keep assist, blind spot detection and traffic sign recognition. The all-new 100% electric Townstar also introduces exclusive styling to the light

commercial vehicle segment, echoing Nissan's flagship coupé crossover model Ariya through elements such as the front shield decorated with the intricate Japanese Kumiko pattern and the brand's signature V-motion design. The Nissan Townstar will be a perfect choice, whether you're looking for a new vehicle for your business or a spacious family car with a lot of cargo space. With a choice of petrol or electric powertrains, this model is accessible to a wide range of users, depending on their business or private needs.

Prepared with the support of:



**PARTICIPANTS
OF THE REPORT**

PARTICIPANTS OF THE REPORT

Companies that have made their emission-reducing projects in the distribution chain available:

- **FRANCE:** GeoPost SA / DPDgroup, Immeuble Lemnys, 26 rue Guynemer, 92130 Issy Les Moulineaux
- **CROATIA:** Croatian Post, Branimirova 4, 10000 Zagreb
- **DENMARK:** RE-ZIP ApS, Mejlgade 95b, 8000 Aarhus
- **FINLAND:** Posti Group Oyj, PL 1, 00011 Posti
- **GERMANY:** Fairsenden GmbH, Lichtburgring 16, 13355 Berlin
- **UNITED KINGDOM:** Evri, Capitol House 1 Capitol Close, Morley, Leeds, West Yorkshire, LS27 0WH
- **UNITED KINGDOM:** Lockars Ltd, 85 Bayham Street, London NW1 0AG
- **ITALY:** LESS - Leading Environmentally Savvy Shippings, Via Ampère, 30 20131 Milan
- **NORWAY:** Paxster AS, Bredmyra 3, 1739 Borgenhaugen, Sarpsborg
- **NORWAY:** Posten Norge AS, Biskop Gunnerus gate 14 A, 0185 Oslo
- **POLAND:** InPost S.A., Wielicka 28, 30-552 Krakow
- **POLAND:** Nissan Sales Central & Eastern Europe KFT Sp. z o.o. al. Jerozolimskie 176, 02-486 Warsaw
- **POLAND:** 7R S. A. Ludwinowska 7, 30-331 Krakow
- **POLAND:** Emapa S. A. Złota 59, 00-120 Warsaw
- **POLAND:** General Logistics Systems Poland Sp. z o.o. Tęczowa 10, Głuchowo 62-052 Komorniki
- **ROMANIA:** Sameday, Delivery Solutions S.A., Strada Baicului 82, București 021784
- **SLOVAKIA:** Voltia Automotive s. r. o. Dohňany 464, 020 51 Dohňany
- **SWITZERLAND:** KYBURZ Switzerland AG, Shedweg 2-8, 8427 Freienstein

PROJECTS MAP



Prepared with the support of:



REVIEW OF INITIATIVES

PROJECT TYPES

As discussed in the Green Last Mile topology slides, projects can fall into various buckets and range from simple “quick wins” to more complex, longer term projects that require partnerships (often private-public) in order to succeed.

Many of the quick wins are related to driver education and training and do not require any significant investment. Eco driving can reduce fuel consumption and gas emissions by up to 30% and can involve simple initiatives such as correctly pumped tires, less aggressive driving style or more prudent use of air conditioning.

Arguably, however, the largest impact can come from consolidated collection or delivery of parcels. Here lockers or PUDOs are key and according to InPost data, carbon emissions can be as much as 75 % lower for locker delivery in urban area and an incredible 95% in rural areas*.

In our opinion, the future belongs to OOH-agnostic networks, which seem to be the most effective way to increase delivery efficiency and reduce emissions, as is also confirmed by The Future of the Last-Mile Ecosystem report prepared by the World Economic Forum.

Despite our efforts and requests, we have unfortunately not received support and project descriptions from many of the companies that are active in this area. For this reason, the number and scope of projects described is limited. We sincerely hope that the next edition of our report we will be able to include many more examples of interesting and varied green last mile projects.

** As per AGH and InPost research*



EU COUNTRIES

NISSAN SALES CENTRAL & EASTERN EUROPE KFT



Summary

Nissan's EV36Zero is a £1 billion flagship Electric Vehicle (EV) Hub creating a world-first EV manufacturing ecosystem. Centred around Nissan's plant in Sunderland, UK, Nissan EV36Zero will supercharge the company's drive to carbon neutrality and establish a new solution for zero-emission motoring. As

part of the £1 billion announcement, Nissan will invest up to £423 million to produce a new-generation all-electric vehicle in the UK. EV36Zero and interconnected projects create 6,200 green jobs at Nissan and in UK supply base.



NISSAN EV36Zero

Nissan unveils EV36Zero, a £1bn Electric Vehicle (EV) Hub to accelerate the company's journey to carbon neutrality.

This world-first EV manufacturing ecosystem, based at Nissan's Sunderland Plant in the UK, will bring together three interconnected initiatives, setting a blueprint for the future of the automotive industry.

ALL-NEW NISSAN ELECTRIC CROSSOVER

- Up to £423m investment
- Over 3,000 new direct and indirect jobs
- Production capacity of up to 100,000 units

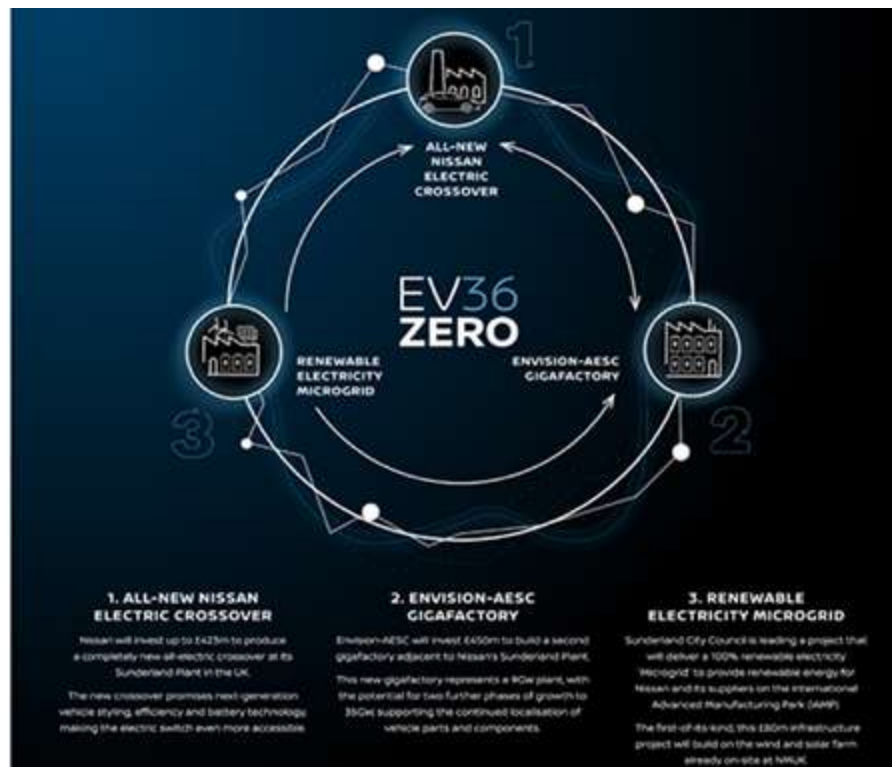
ENVISION-AESC GIGAFACTORY

- £450m investment
- 750 new jobs created and 500 safeguarded
- 90Gw plant, with the potential to grow to 350Gw

RENEWABLE ELECTRICITY MICROGRID

- £80m investment
- Saves 55,000 tonnes of carbon annually
- Total of 131Mw solar generation, as well as incorporation of existing 12.5Mw wind and solar farms at Nissan factory

Building on its pioneering role in the development of electric vehicles, EV36Zero heralds the next phase of Nissan's electrification plan.



Introduction

The transformational project has been launched with an initial £1bn investment by Nissan and its partners Envision AESC, a global player in world-leading battery technology, and Sunderland City Council. Comprised of three interconnected initiatives, Nissan EV36Zero brings together electric vehicles, renewable energy and battery production, setting a blueprint for the future of the automotive industry. Envision AESC

will invest £450 million to build the UK's first gigafactory on the International Advanced Manufacturing Park (IAMP), adjacent to the Nissan plant, powered by renewable energy and pioneering next-generation battery technology. With the ability to incorporate the existing Nissan wind and solar farms, initial plans suggest there could be as many as ten solar farms created, with an anticipated 132MW generation.

Methodology

Envision AESC, world-leading battery producer and long-standing partner of Nissan, will build a new 9GWh-capacity gigafactory equipped with state of the art battery technology. Renewable energy 'Microgrid' will deliver 100% clean electricity for automotive manufacturing in Sunderland. A 1MW battery storage system will be built using second-life Nissan EV/Envision AESC batteries, which will also allow for excess energy generated during daylight hours to be captured and used

at another time for ultimate sustainability. Additional infrastructure projects enabling the creation of the new EV Hub take the total initial investment above £1bn. UK production will be exported to the European markets traditionally served by Nissan's Sunderland plant. The new electric crossover will be built on the Alliance CMF-EV platform, with a forecasted production capacity of up to 100,000 units to be installed.

Results

A project that aims to deliver 100% renewable electricity, 'Microgrid' will save 55,000 tonnes of carbon annually. Production of the new all-electric crossover in Sunderland will create 909 new jobs at the plant, and more than 4,500 in the UK supply chain, while safeguarding a further 75 R&D jobs. The

transformational project takes the total capital investment by Nissan into the plant past £5bn. The new gigafactory, which represents an initial 9GWh plant, with potential future-phase investment of £1.8bn by Envision AESC, will generate up to 25GWh with potential on site for up to 35GWh.

Learnings

The announcement of this project comes out of lengthy discussions held within Nissan teams, and will greatly accelerate the brand's efforts in Europe to achieve carbon neutrality. The experience and know-how gained through the project will be shared globally, enhancing Nissan's global competitiveness.

Nissan will continue to leverage its strengths in electrification to become a company that continues to provide value to its customers and society. Nissan EV36Zero will transform the idea of what is possible for automotive industry and set a roadmap for the future for all.

EU COUNTRIES

DPDGROUP



Summary

Smart urban delivery is an ecosystem where all elements need to be well balanced to meet growing expectations for more simple, sustainable, and speedy deliveries. This ecosystem is achieved through finely balancing a low-emission fleet, out-of-home (OOH) delivery options (lockers, parcel shops), home delivery solutions flow management, optimised transport plan, urban hubs, and micro depots.

DPDgroup operates throughout Europe, which is an opportunity to fine-tune a local approach in line with local consumption habits, consumers' expectations, and urban planning.

Because transport companies are the link that keeps businesses and communities together, they are in a unique position to contribute to shaping the urban planning of the future and to inspire action.

When it comes to smart urban delivery, a bottom-up approach is critical. Taking advantage of our global reach is essential to accelerate DPDgroup's CO₂ reduction strategy by being "inspired by a set of local expertise".

This two-way sharing of best practice enriches the group strategy to become the international reference player in sustainable delivery.

Why is Smart urban delivery the way forward?



- > City populations throughout the world are growing. Some 40 million people living in the 115 largest cities in Europe are exposed to poor air quality, exceeding the World Health Organization's guidelines.
- > E-commerce is exploding. The Covid-19 Pandemic has triggered a major shift and boosted the number of online orders.
- > Urban centres are becoming increasingly congested and polluted, as urban mobility accounts for 40% of all CO₂ emissions of road transport.
- > To meet these challenges, DPDgroup has developed a range of innovative, user-focused delivery solutions.

Introduction

We are driven by our goals to be recognized as the international reference player in sustainable delivery and meet the expectations of our customers, who care more and more about their impact on the planet. We have noted two key trends* amongst shoppers:

- Responsibility: shoppers called "Even Less" are defined by their view of 'slow retail' as a form of re-humanised consumption. Frugal buying and preferring local to distant are calls for a simpler way of life.
- Sustainability: Demand for greener initiatives and for more sustainable modes of consumption is growing everywhere. All

consumers — even those characterised as "Always More"— want reassurance about the ability of companies to have positive and lasting impacts on social structures, the environment, and the economy today while protecting the ability of future generations to meet their own needs.

Flexibility and reliability are key to meeting consumers' expectations, when considering delivery preferences. A wide choice of options is necessary to meet changing preferences, with different working patterns and sometimes contradictory consumer behaviour. Furthermore, no single behaviour is an absolute; they all overlap somewhat.

Source: DPDgroup, New Commerce Always More and Even Less. Delve into European consumers' lives.



Alternative e-shopping behaviours

Epicurean e-shoppers' expectations towards sustainability

97% think that online purchases can be sustainable

85% "Brands and companies have to be environmentally responsible these days."

79% "I'm more likely to opt for a website / retailer / app that has environmentally-friendly delivery options."

Epicureans' notion of environmentally friendly:

48% made with low-emission vehicles

37% several orders combined and delivered together

Source: 2021 e-shopper barometer study - the data were gathered through online interviews with 40,000 interviews worldwide including 23,364 participants across European countries



The Epicureans account for 12% of the European e-shoppers. They are highly sensitive about environmental topics. Delivering in a responsible way is an important criteria to them.

Source: DPDgroup, New Commerce Always More and Even Less. Delve into European consumers' lives.

Methodology

To achieve its goal of 350 green cities by 2025, DPDgroup will deploy 15,000 low-emission vehicles, 6,700 charging points, 250 urban depots.

New alternative fleets are composed of various vehicles, depending on the city center (size of streets for example), delivery needs and local regulations. Electric vehicles (MAN eTGE, Volkswagen eCrafter, Nissan eNV-200, etc.), small electric vehicles (Tripl, Paxter, etc.) and natural gas vehicles are being deployed along with cargo bikes and bicycles, pedestrian means and trolleys.

Micro and urban depots help to further optimise delivery processes, local operations adaptation and closeness to the customer. These are being rolled out in main city centers

such as Basel, Barcelona, Berlin, Budapest, Munich, Marseille, Prague, and Warsaw, hence complementing the current network of 150 urban depots (at the end of 2021) in cities including Dublin, London, Madrid, Paris and Rotterdam.

These depots contribute strongly to the development of out-of-home (OOH) solutions, which will represent 29% of the X2C market by 2025. The more OOH solutions you offer, the more customers will be able to choose a delivery point that meets their needs for flexibility, reliability, and sustainability.

C2C is clearly an accelerator in this space, boosted by the circular economy and the second-hand market.

Results

DPDgroup's 2025 goal has accelerated the development of its low-emission fleet and last mile network.

As of December 2021, the Group has achieved:

- Fully low-emission delivery to 51 European cities
- Real-time air quality monitoring in 14 European cities,
- 4,880 low-emission vehicles (doubled vs 2020),
- CO₂ reductions per parcel of -19% between 2013 and 2020 (with an ambition to reduce by 30% by 2025 vs 2013)
- 148 urban depots
- 70,000 OOH points

Through our Air Quality Monitoring Programme, we have stepped up to the air pollution challenge by aiming to fit hundreds of our vehicles and Pickup points in 20 European cities by the mid-2022 with sensors that monitor air quality (PM 2.5) in real time. We enact change through partnerships with city authorities and other experts by sharing the data we collect to inform air quality improvement programmes, and we raise awareness about local air quality amongst consignees through an online platform so they can make the right decisions to protect their health and that of their families.

Lisbon, Portugal - A proven success story

- 73 air quality monitoring sensors on our vehicle fleet
- 19 sensors at our Pickup points
- Design of a new low emission zone in the heart of the city.
- The PM 2.5 pollution hotspots identified enabled objective decision-making to improve air quality in Lisbon for all its citizens.

- *"This initiative is really useful for our city. It is a decisive project since it enables us to obtain additional key data and to identify green areas and hot spots in the city. Thanks to our successful collaboration with DPDgroup, we can improve air quality in the city, and thus have a positive impact on our citizens' health."*

Miguel Gaspar, Deputy Mayor, City of Lisbon

Learnings

To succeed in making urban deliveries smarter and more sustainable, it is essential to cooperate and work with all stakeholders.

Sustainability is a licence to operate, which is particularly relevant for a logistics player operating thousands of vehicles every day to deliver parcels to individual doorsteps or to companies.

We embarked in 2012 on a journey to fully compensate our carbon footprint.

At the time we lacked the technology to replace our diesel fleets, so we started by compensating every gram of CO₂ emitted, for

example, through reforestation programmes. Of course, this alone is not enough, so we embarked on a bold decarbonisation programme in 2020.

We looked at where the impact was greatest and clearly, in our space and our activity, it is the urban environment where traffic and population densities are highest and therefore, where CO₂ and air pollution emissions are highest.

For us, it quickly became clear that we had to start our journey by decarbonising deliveries in the urban environment.



An automated locker in Estonia.

CROATIA

CROATIAN POST



Summary

In April of 2021, Croatian post opened a new delivery channel - a parcel locker network. Parcel machines are an important asset of the Croatian post in reducing harmful emissions.



Introduction

Parcel machines increase the percentage of first attempt deliveries, and delivery vehicles need to visit fewer locations, which contributes to a reduction in emissions. Dozens of shipments can be delivered to just

one parcel machine, and such machines are usually located in busy and easily accessible locations, which in most cases can be reached on foot, by public transport or by bicycle.

Methodology

An important milestone of the project was to ensure the functional final product with a simplified, easy-to-use user interface. After the final development was completed, a further goal was to install as many parcel

machines in urban and easily accessible locations. This way the Croatian Post took the right step to ensure the prompt utilization of the Parcel Machine solution.

Results

Since April, we have installed more than 100 parcel machines out of the 300 that will be available throughout Croatia by the end of next year. More and more customers are getting accustomed to this new delivery

channel, but concrete results regarding the reduction in emissions will be available once we complete the delivery network of 300 parcel machines.

Learnings

This type of delivery channel is becoming increasingly popular in EU countries, including Croatia, not only on account of their convenience, but also because of their future role in reducing harmful

emissions. In alternative delivery methods, parcel machines, automated devices with compartments of various dimensions that enable contactless delivery of shipments, are at the forefront.



Source: <https://www.upu.int/en/Blogs/Parcel-lockers-can-contribute-to-the-fight-for-a-sustainable-future>

DENMARK



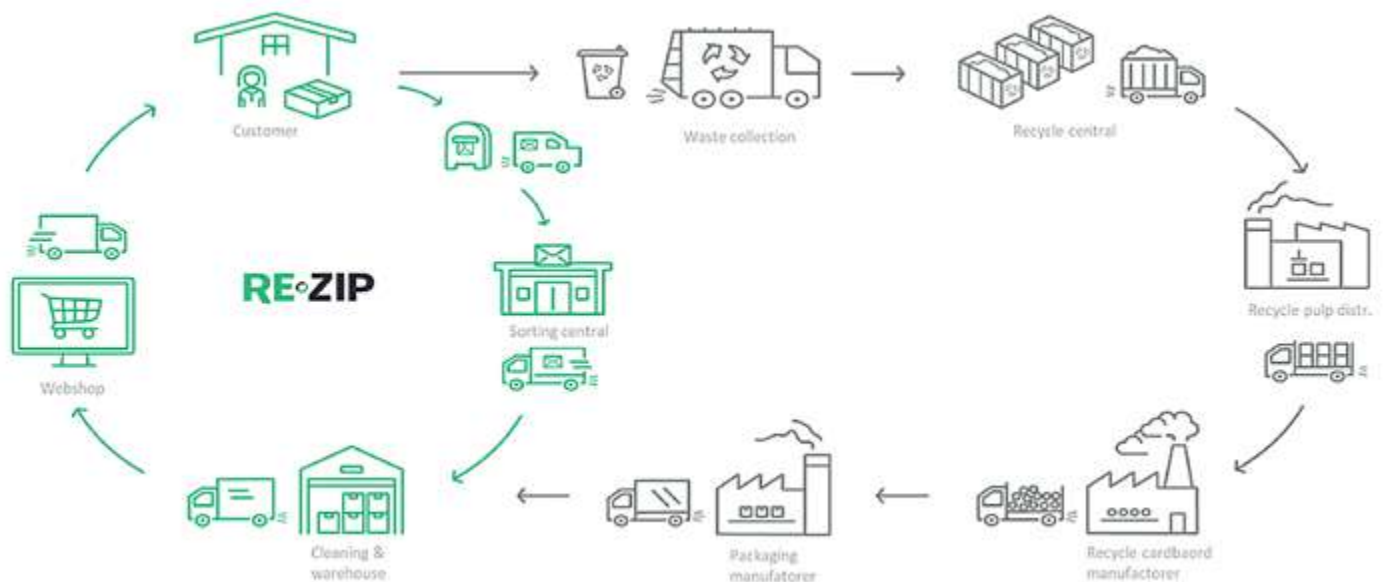
RE-ZIP APS

RE-ZIP
YOUR SUSTAINABLE CHOICE

Summary

Even the best-produced recycled packaging has virtually no CO₂-reducing effect compared to single-use packaging, as the recycling processes are very heavy. Therefore,

RE-ZIP offers a circular packaging system: packaging that is reused many times before being recycled.



By reusing our packaging, online shops can save 100% on packaging costs, increase retention and provide customers with a sustainable alternative with a financial

incentive for returning, which at the same time reduces the carbon footprint by up to 88% compared to single-use packaging.



RE-ZIP packaging

BOX AND BAG PACKAGING

- Patented foldable packaging for any shipment.
- Comes in eight different sizes which can contain anything from jewelry and clothing to boots, electronics, applied arts etc.
- See the different sizes. [Click here.](#)

3 SIMPLE STEPS:

YOU CAN OFFER RE -ZIP THIS EASILY

1. Create profile on [appre-zip.dk](#)
2. Order packaging
3. Offer RE -ZIP as a field on the shop

DESIGN YOUR OWN PACKAGING

- If you have any wishes for your own packaging, we will do what we can to fulfill them.
- Design packaging size and and special models.
- Sealing tape with your own logo.
- White label packaging at a minimum of 20.000 pcs.

RE-ZIP

Introduction

Re-use (before recycle) to reduce is the key value driver at RE-ZIP.

RE-ZIP has over the past 3 years developed packaging, a tech platform as well as infrastructure to support a circular loop to re-use RE-ZIP bags and boxes several times.

RE-ZIP is offered to online shoppers as a sustainable alternative to ordinary single-use packaging during check-out in web shops

for a small fee, in return for a voucher to the web shop upon return of the packaging. The packaging can be returned in PUDOs, mailboxes and parcel lockers at the customers' convenience using the RE-ZIP app to scan, return and not least, receive the voucher. The RE-ZIPs are returned to a cleaning facility for a quality check, cleaning and redistribution again and again and again....

Methodology

By securing what we at RE-ZIP refer to as Financial Viable Sustainability, meaning value-added for all stakeholders in the circular loop, there is a common incentive to re-use our packaging.

- Web shops: Savings on packaging (purchase price equal sales price), increased retention and customer loyalty

and reduced carbon footprint for the green accounts.

- Online shoppers: Receiving the voucher, feel good, part of something sustainable
- PUDOs (retailers): Paid per return, increase store traffic, part of a green initiative which leaves the environment with huge savings on CO₂, water and consumption.

Results

RE-ZIP used Deloitte to calculate and verify the Life Cycle Assessment of current packaging solutions in the circular loop.

Results for designed use are:

Box @ 10 circulations 88% CO₂ reduction compared to a single-use recycle cardboard box.

Bag @ 30 circulations 63% CO₂ reduction compared to a single-use plastic bag.

Besides the CO₂ reductions as well as savings on water, the re-use entails less risk of cardboard and even worse, plastic bags ending up as litter in natural surroundings.

Example:

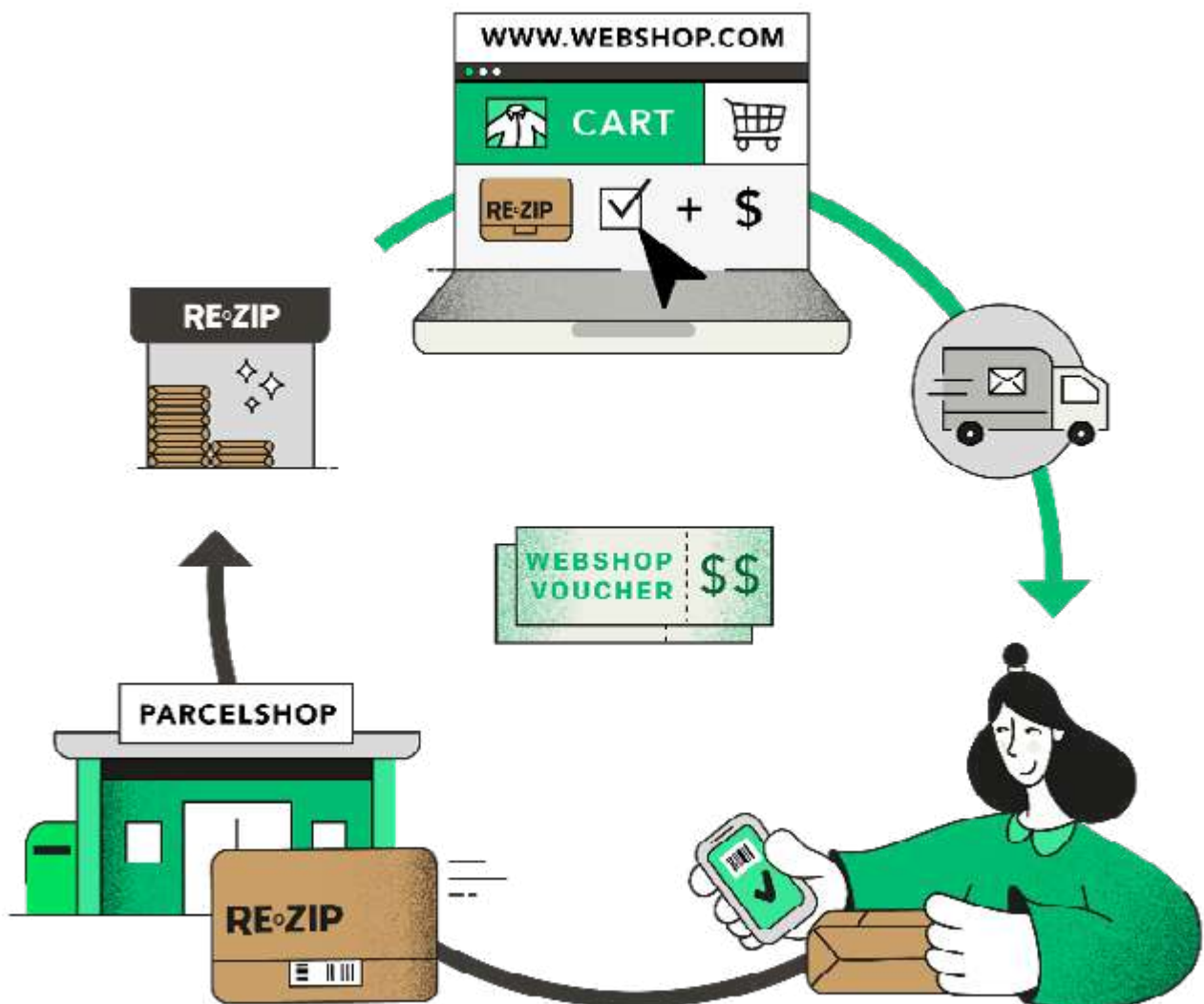
A web shop with 1,000,000 parcels a year with 80/20 box/bags at a 20% conversion to RE-ZIP's with a return rate of 90%:

- Relative savings (CO₂eq): 78%

- GHG emissions (CO₂eq): 30.135 tonnes
- Number of plastic bags saved: 40,000
- Number of cardboard box's saved: 144,552

Learnings

- Online shoppers that have tried circular packaging are very satisfied with an NPS score of 78.
- Circular packaging design to focus on low weight, use recycled materials and be designed for a limited number of circulations (10) as it is the actual return rate that decides the number of circulations. We shall not design for a 100 uses if the actual average returns are 10!
- Eliminate all process friction (integration, scans etc.) at web shops so that circular packaging becomes "ordinary" packaging, hence no additional work.
- To create Financial Viable Sustainability and limit the use of mailboxess (process) and setup infrastructure via PUDO points (retailers and parcel lockers).



FINLAND

POSTI GROUP OYJ



Summary

In October 2021, we initiated a separate parcel home delivery network in Helsinki to achieve two goals: improved customer experience and CO₂-free deliveries.

We created a new operating model, where the recipient of a parcel receives a narrower, +-30 minutes, delivery window, faster deliveries, and real-time map tracking for their delivery. We also acquired 18 fully-electric vans.

Both goals were achieved; home deliveries

in Helsinki take place emission-free, saving approximately 100 tonnes of CO₂ annually, and the customer satisfaction is an incredible 4.8 on a scale from 1 to 5. The model is scalable and will be utilized next in other big cities in Finland.

This specific case is serving as one solution in a toolbox we use on our way to reach totally fossil-free deliveries by 2030. Last year alone we reduced our own absolute emissions by 14 percent.

Introduction

Posti is a company that is almost 400 years old, and sustainability has always been part of our DNA. For example, we have been working for the environment for a long time. We started using electric cars in the 80s and started our first environmental program in the late 90s.

Today, sustainability is a key part of our strategy, our values, and the purpose; responsibly delivering what matters to you – on your terms. To continue to transport things sustainably also in the future, we need to operate without negative environmental impacts and ensure that people are feeling well. That is why the two cornerstones of our recent sustainability program are the environment and the people.

We are committed to reducing our own

emissions to zero and transporting fossil-free by 2030. The Science Based Targets initiative has approved Posti's goals. In 2020, we reduced our absolute emissions by 14 percent compared to 2019.

Posti is a leading delivery and fulfilment company in Finland. Our job is to help our clients, such as e-tailers, to boost their business. Two recognised end-user drivers are a better last mile customer experience and sustainable deliveries. Whereas we, as a company, improve both in many areas, in this particular case we wanted to create a separate network for home deliveries where we can both offer a totally new kind of customer experience and deliver 100% CO₂-free.

Methodology

In October, we started a new operating model in home deliveries, where the recipient of a parcel receives a narrower, +/-30 minutes, delivery window and real-time map tracking for their delivery. Parcels will also be delivered to homes a day faster than previously.

In the capital of Finland, Helsinki, having population of 630 000, we created a separate delivery network of 18 fully electric vans. Therefore, all home deliveries in Helsinki using

narrower delivery windows and map tracking are 100% electric. All electricity used by Posti is renewable, so parcel home deliveries in Helsinki are completely CO₂-free.

Our goal is to make all home deliveries completely CO₂-free in the future. Electric delivery in Helsinki is one step toward this goal. In the near future, we will be announcing new regions where we will implement fully electric deliveries

Results

Both goals have already been met: we are able to do home deliveries completely CO₂-free and the customer experience of the new model has improved significantly. Creating a separate network of 18 e-vans saves 44 500 litres of diesel annually. That equals approximately to an avoidance of 100 tons of CO₂ emissions.

The feedback we have received regarding

home deliveries has been excellent. The average is an incredible 4.8 on a scale from 1 to 5. Our drivers have received high praise for their friendliness and professional attitude. Online shopping is becoming more and more popular, and we want to make receiving online purchases as easy and convenient as possible – being as sustainable as possible at the same time.

Learnings

Eating an elephant is a huge task and it needs to be done piece by piece. We have committed to deliver fossil-free by 2030 – that includes our subcontracted deliveries as well. We have already achieved a lot; we, for example, reach 40% of households in Finland electrically in postal deliveries. Biofuels and electricity are a key means, beside the route optimization technology, that make it possible for us to deliver more by driving less, to reach our goal.

Our leading b2b-customers are already

demanding emission-free deliveries, so mere compensation is not enough anymore. We have proven that a separate, scalable, electric delivery network is a working solution where we can let our b2b-customers provide emission-free deliveries to their clients in specific large areas. Our next step is to scale this model into the next big cities in Finland. Overall, Posti will have, by the end of the year, some 70 e-vans and the number is estimated, at least, to more than double by the end of next year.

GERMANY

FAIRSENDEN GMBH



Summary

Today, the transport of goods in inner-city areas is largely carried out by vans. Due to increasing online trade, the transport of goods is a rapidly growing sector, which contributes to traffic jams, exhaust fumes and bad air due to stop-and-go traffic in cities. Freight transport and delivery services have been responsible for a third of all traffic volume in cities. Since supply services traditionally rely on fossil fuel-using internal combustion engines, they are inevitably contributing to a high amount of carbon

emissions, traffic jams and air pollution. This problem is especially prevalent in inner cities, where living space and parking lots are getting more and more scarce. But there are solutions to solve that problem of the crucial last mile: by using the logistics system employed by Fairsenden GmbH based on an entirely electrical fleet, optimized IT structure and the use of Micro Hubs, we will show how much CO₂ can be saved on the last mile.

Introduction

Ideally, changing the thought process on the last mile should not only be the task of one specific delivery service. Municipal administration, consumers, merchants, regulations and directives, federal and national laws and architectural city planning should all be involved in revolutionizing the last mile. In this case, Fairsenden GmbH pioneers this project, which is aiming to show how much CO₂ can be saved by deploying an all-electric fleet and IT infrastructure optimized for the last mile. All research has been conducted by Fairsenden GmbH in cooperation with sustainable natives eG in the Berlin branch of the Fairsenden GmbH. Fairsenden's heterogenous Berlin fleet

consists of 13 electric cargo bikes and 3 e-vans.

The use of cargo bikes is overall preferable if at least one of the following factors apply:

- medium distance routes
- medium size of deliveries
- many stops on one route
- condensed delivery areas
- routes only accessible by bikes or pedestrians

These conditions can only be applied in places with a dense population. We anticipate a drastic reduction of carbon emissions on the last mile in comparison to the traditional delivery by cars using fossil fuels.

Methodology

In order to compare the transport-related emissions from a Fairsenden Cargobike (BringS from BAYK) with business-as-usual (BAU) cases, manufacturer data (from BAYK) was compared with DEFRA data. Vans weighing up to 3.5 tonnes were assumed for the BAU scenarios. In BAU scenario 1, the van is diesel powered.

Results

Fairsenden uses 100 per cent green electricity. Therefore, there are no transport-related emissions (which explicitly exclude production-related emissions). For transparent comparability, the transport-related emissions were calculated using the German electricity mix: BAYK specifies a nominal continuous line of 250 Watts at maximum for the BringS cargo bike. The specific emission factor of the German electricity mix in 2020 was 0.366 kg CO₂ per kilowatt hour of electricity.

A full load of 200 kilograms would result in an output of around maximum 1 kilowatt hour per 100 kilometres, consequently emissions of 0.366 kg CO₂ emissions. If one kilogramme of freight is transported one kilometre, emissions of 0.00366 kilogrammes of CO₂ result. This corresponds to 0.0183 kilograms of CO₂ equivalent per tonne-kilometre. BAU Scenario 1 (van, diesel): DEFRA gives specific tank-to-

In BAU scenario 2, the van is an E-van (as also operated by Fairsenden, although no manufacturer data is available here). Emissions related to the manufacturing of vehicles are considered out of scope (leased vehicles) and for comparison of day-to-day deliveries only.

wheel emissions of 0.6163 kgCO₂e/ton.km, and well-to-tank emissions of 0.1487 kgCO₂e/ton.km. This results in a total emission factor of 0.7649 kilograms of CO₂ equivalent per tonne-kilometre. BAU Scenario 2 (van, electric): DEFRA gives specific tank-to-wheel emissions of 0.2727 kgCO₂e/ton.km, and well-to-tank emissions of 0.0376 kgCO₂e/ton.km. This results in a total emission factor of 0.3103 kilograms of CO₂ equivalent per tonne-kilometre. Although not included as a set variable in the study, Fairsenden also saves CO₂ by using micro hubs and reducing the route in comparison to warehouses situated in the outskirts of Berlin. A strong example was the test run between North and South Berlin that shortened a complete route of 199 km per parcel to a route of 8.5 km per parcel on the last mile.

Learnings

There are numerous factors that influence the consumption of eCargo bikes. A selection:

- Weight (load & total)
- Geographical conditions (incl. gradients etc.)
- Battery power (decreasing over the service life)
- Proportion of muscle power & auxiliary motor

There are numerous factors that determine the consumption of the BAU scenario:

- Range (drive type)
- Weight (load & total)
- Average speed (share, stop-and-go etc.)

Note: All calculated values have been plausibly-checked using literature values - for example: specific emissions for peddles or small diesel trucks in urban stop-and-go traffic

GREAT BRITAIN

EVRI



Summary

We're firmly on the road to net zero thanks to our ongoing exploration of alternative fuels across the first, middle and final mile.

The UK's biggest Bio-CNG biomethane delivery fleet:

Over a quarter of our fleet is already powered by Bio-CNG and growing. In 2018, Hermes placed the largest ever initial order of (CNG) tractor units in the UK. We've ordered another

70, bringing the total to 160 – 50% of our core tractor fleet.

Electric vehicles:

In 2018 we launched a fleet of 100% electric vehicles to service London's low emission zone. Electric vans give us an alternative fuels option for all journeys. In 2021 we had 30% of our parcelshop fleet being EV which equates to 168 Vans.

Introduction

Environmental Targets:

Net Zero for direct and indirect emissions by 2035

As Evri is one of the UK largest delivery companies, we are aware that we needed to lower our carbon footprint, especially with our fleet. In 2018 we took the decisions to start this journey and placed orders for our first low carbon vehicles. Since then we have grown this to be a large percentage of our total fleet. We also continue to trial new technologies and stay ahead of the curve in the UK with emerging technologies.

In 2021 we also set our 2035 net zero target for our indirect and direct emissions. Our fleet continue to be a material part of our carbon footprint and therefore, we continue to put capital and innovation into reducing this to net zero.

On trunking, we use a biomethane CNG (compressed natural gas) powered fleet as an alternative to diesel and currently have 90 CNG tractor units. We've ordered another 70, bringing the total to 160 – 50% of our core tractor fleet. This will give us the UK's largest CNG parcel delivery fleet. Approximately 40% of our first-mile fleet is powered by CNG in 2021 with this set to grow to 50% next year.

Electric:

Electric vans give us an alternative fuels option for all journeys. We started this journey with our Gemini site operates with 100% electric vehicles to service final-mile deliveries in central London. The 32-van fleet delivers an average of 6,500 parcels per day, rising to 11,000 during peak. Since then we have expanded to our out of home network.

Methodology

Bio- CNG Fleet:

What is Bio-CNG? The Biomethane CNG or compressed natural gas we use for our trucks is derived from food and animal waste which offers a 100% renewable and sustainable alternative to diesel. We partner with CNG



Fuels, which sources 100% renewable bio-CNG for its stations. This is sourced from food waste, independently verified and approved by the Department for Transport's Renewable Transport Fuel Obligation.



Results

Bio-CNG:

Each new IVECO S-WAY unit reduces CO2 emissions by more than 80% when compared to a Euro 6 diesel vehicle – a reduction of 150 tonnes of CO2 per vehicle and 4200 tonnes of CO2 across the entire CNG fleet annually.

Other benefits include reductions in air pollution impact, such as 70% less NOX, 99% less particulate matter, 90% less NMHC and 88% less methane. They're also 50% quieter than diesel equivalents.

From a driver perspective, fuelling is just as quick as diesel and takes approximately three to five minutes to complete. Also, drivers prefer filling gas to diesel as the process is cleaner.

Learnings

Bio-CNG:

We are committed to reducing our fleet's carbon footprint. However, migrating to 100% sustainable fuels is a challenging journey. Bio-CNG isn't perfect, but it's the best solution for right now. We continue to test

Electric:

We've ordered 168 new zero-emission Mercedes-Benz eSprinters to service our out of home ParcelShop network. This is the most carbon-efficient way to send, receive and return parcels, and we aim to undertake all ParcelShop collections with electric vehicles at the earliest opportunity. We've commissioned Pod Point UK to install charging points at our hubs and depots.

Efficiency:

In 2019, we invested in double decker trailers to increase the parcel capacity of our trucks by 33%, reducing our mileage by up to 1.5 million miles a year.

The use of telematics throughout our fleet has reduced CO2 emissions by 4,806 tonnes

new technologies including the first EV HGV next year and HVO for areas where Bio-CNG infrastructure is not available. We will also continue to roll out Bio-CNG and work with the right companies to expand the filling infrastructure.

GREAT BRITAIN

EVRI



Summary

Our Out of Home (OOH) network means a customer can pick up their parcel from one of the 10,000 shops and lockers across the UK. These are serviced by 30% electric vehicles, which are set to grow year on year. Due to

the efficiency of multi parcel deliveries to one shop, increased EV usage and a reduction on failed deliveries, this can be a carbon saving of up to 90% per parcel



Introduction

Customers are increasingly demanding alternatives in the delivery experience. There is demand for increased flexibility and control. OOH delivery consists of delivering a parcel to a locker or shop. The parcel can then be picked up by the customer at convenient time, within a selected time frame.

We have increased our Out-of-Home network with over 10,000+ locations across the UK, adding 2,300 lockers to our network that are

open 24/7. Currently, it is modelled that 90% of UK ParcelShops and lockers are within 15 min walking distance.

We're building the UK's biggest and fastest growing Out of Home network. With expected growth as follows:

- 10,500 locations by March 2022
- 15,000 locations by March 2023
- 20,000 locations by March 2024

Methodology

OOH delivery consists of delivering a shipment to a point or machine that is in a convenient place for the customer. A parcel can be picked up on the customer's

commuting path at convenient time, within a time frame of some days. OOH is most commonly found in two forms: parcel locker (APM) and PUDO (pickup, drop off) point.

Results

OOH Reduces the carbon footprint by up to 90%

- Consolidated vehicle deliveries, therefore, increases delivery efficiency.
- Increase of low carbon vehicle usage.
- Reduced failed deliveries.

The carbon footprint for OOH delivery can be 10% of home delivery alternatives. Switching 1 million home deliveries to out-of-home deliveries results in a CO2 reduction of

270 metric tons. By 2022, up to 30% of our ParcelShop fleet will be electric.

Divert to ParcelShop and Locker - Customers can divert their parcel earlier in its journey – before it's even on the road. We can avoid the final-mile part of the journey by using our electric van fleet to deliver the parcel to the desired out of home location. OOH is a priority because delivery/collection via ParcelShops and Lockers reduces CO2.

Learnings

We understand convenience is paramount to the success of OOH delivery and ensuring our parcel shops and lockers are easily accessible to everyone is of key importance. We therefore are working to ensure easy and convince access to our OOH locations to make sure they have the update required. We are in partnership with Tesco to provide convenient locations for customers. We are also growing our EV network to

our OOH as a priority in our fleet, as we understand this is the most material savings on deliveries due to the high fill rates of this final mile.

We are now working with our clients to help with the customer web touchpoint and helping inform customers as to why it is a more sustainable and potentially convenient choice.

GREAT BRITAIN

LOCKARS LTD



Summary

The project is to assess the impact of parcel locker usage when consumers have the power to select a parcel locker delivery independent of the retailers PUDO delivery options. The current locker usage is predicated on the locker location being on the retailer's checkout delivery options menu, and the consumer selecting a locker if one is offered convenient for them.

If the consumer is offered a different approach to selecting a locker delivery separate from those offered by the retailers, what will be the uptake?

It is well understood that parcel locker deliveries are more efficient and as a

consequence of this, the number of delivery vans is reduced, reducing CO2 emissions and traffic congestion.

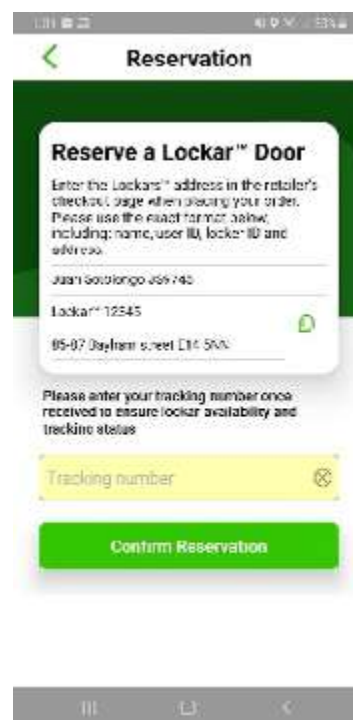
Putting the power of selecting a locker via an app and in the hands of a consumer, is a new approach never tried before. At Lockars we have created such an app, and will be launching operationally it in conjunction with the initial deployment of our lockers.

Prior to the launch we conducted several focus group meetings and surveys to assess what consumers reaction to such an app would be, and the results are very positive, having the potential for a significant impact on the use of parcel lockers



Prior to the launch, we conducted several focus group meetings and surveys to assess what consumers reaction to such an app

would be, and the results are very positive, having the potential for a significant impact on the use of parcel lockers.



Introduction

As a new venture in the parcel locker sector, we are challenged in having to build sufficient scale before retailers integrate us into their delivery options and the same can be said for integration with the parcel carriers.

The way we are addressing this challenge is to turn it on its head, and give consumers the power to select a Lockars locker convenient to them, and use that locker's delivery address as their delivery address when they make online purchases. This applies for any retailer, and with any parcel carrier. This service is free for the consumer to use. The consumer does not have the scale expectation. They only care if there is a locker convenient to them. If there's one close to their home or work place, that satisfies their scale expectation.

Operationally, we had to design a solution that enabled a secure delivery by any courier driver. The processes we have designed is to incorporate a unique user id in the address format for the locker as well as asking the consumer to provide us with the tracking number once they receive it.

When the courier arrives at the locker, they scan the tracking barcode, and if we had received it from the consumer, the parcel is delivered. If we had not received the tracking number, then the courier driver enters the unique user id which is part of the address, and then delivers the parcel. In either case, the consumer is informed that the parcel is delivered and given the pin code to collect their parcel.

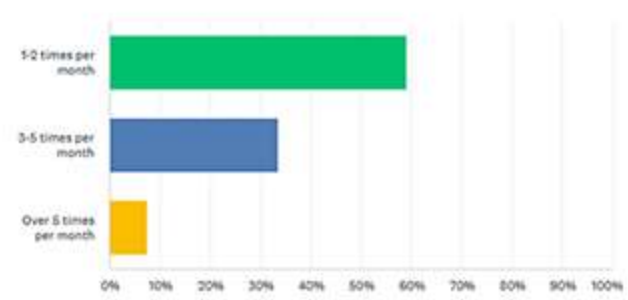
Methodology

Our approach was to do consumer market surveys, to measure the acceptance of parcel lockers to consumers, where they are the decision maker. They decide if and when to use a locker, and select the one closest to them. We also asked about their frequency of use on a monthly basis. The results were very positive. More than 61%

of consumers answered that they would use a parcel locker of their choice, 31% said maybe, and only 7.5% said they would not use them. For those that would use them, the average was 4 parcels per month. For returns, the answers were even more positive, with 64% saying they would use the parcel lockers, on average.

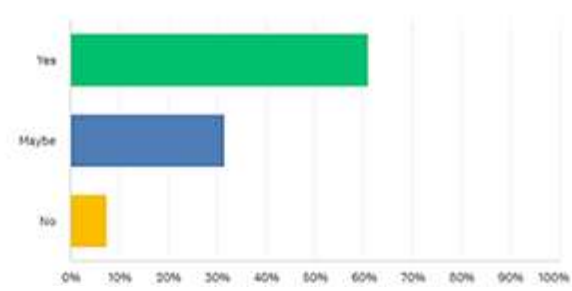
If you answered Yes, how often would you use them?

Answered: 200 Skipped: 0



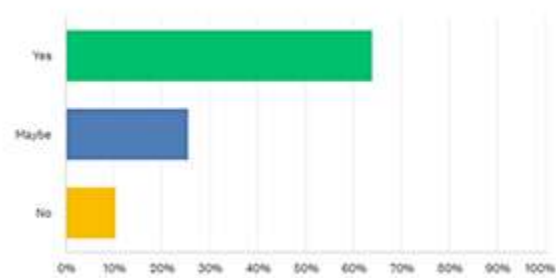
If a parcel locker was conveniently located near your home or work, would you use it regularly?

Answered: 200 Skipped: 0



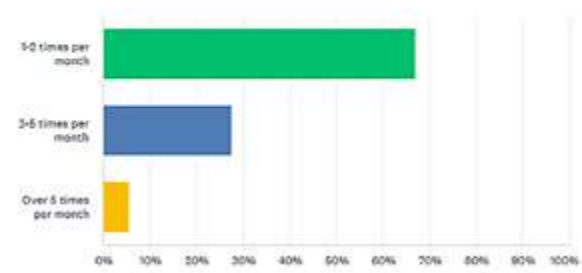
Would you use the locker for your returns?

Answered: 200 Skipped: 0



If you answered Yes for returns, how often would you use the lockers?

Answered: 200 Skipped: 0



Results

The implications of the results are potential game changers with respect to home deliveries in urban areas by the deployment of a dense parcel locker network, open to all carriers, and enabling the consumer to choose a locker of their choice for their deliveries.

To take London as an example, our models indicate we would need 5,200 locker locations in order to provide the proximity factor of 250-300m that consumers indicate provides the convenience level they are looking for. For London, this means on average 3.3 lockers per sq km, and each sq km has 6,000 inhabitants. If we reduce the inhabitants to account for children and others where a locker would not be a suitable solution, we are left with approximately 4,000 inhabitants per sq km of,

and 1,212 per locker within that sq km. If each of those consumers used the lockers based on the survey results, each locker would receive 4,848 parcels per month, or 58,000 parcels per year.

The entire network would have approximately 300m annual parcels, which represents about 30% of the total London volume.

The potential impact on CO2 emission reduction can have many factors, but what is not up for debate is that parcel consolidation at parcel lockers increases delivery efficiency, hence reducing the number of required vans. For London, the potential is a reduction of 4,500 vans, which equates to a reduction of 26 million kgs of CO2 per year and lower traffic congestion in one of the most urban cities in the world.

Learnings

What we have determined is that by putting the consumer in charge of their delivery options, parcel lockers receive a very positive response. By using the power of our app, and empowering consumers to select any locker, and use that location as their delivery address,

with any retailer, regardless of carrier, they are much more in control.

The issue of scale, or how many lockers we have deployed in our network, is of little concern to the consumer. All they care is that there be one locker convenient to them.

ITALY

LESS - LEADING ENVIRONMENTALLY SAVVY SHIPPINGS

Summary

Leading Environmentally Savvy Shippings (aka LESS) is a novel Green-Tech Company. It aims at delivering disruptive changes in Last Mile Architectures entirely based on transparent CO2 reduction KPIs. Operating as an economically sustainable Non Profit, the company produces Open Source Software, Free Online Services, re-usable Operational Models, and Open Hardware for Cargo Bikes. The Goal of LESS is to enable hyper-local cooperation and coopetition among all stakeholders involved in the last mile process, becoming the most diffused and used carrier-

neutral PUDO and Micro-delivery network in the market.

The way we aim to achieve this ambitious goal is by producing, sharing and fostering adoption of our Software Platforms, out of which the first and most important step is OpenPUDO.

OpenPUDO is the very first and unique De-Centralized and Dis-Intermediated PUDO Solution enabling anyone to startup PUDO Networks with SAAS (Software as a Service) model at no cost.



The key innovation of OpenPUDO is to enable direct collaboration between the proximity stakeholders, namely Local Shops and Local e-commerce users, in turn fostering unregulated signups and pursuing demand/offer matching with the PUDOs with the aim of defining what they want in exchange for their pick-up services:

- A Bar may wish the user to grab a Coffee to pick-up your Parcel

STRATEGIC VISION FOR A DISRUPTIVE LAST MILE CHANGE



Introduction

LESS started from the assumption that proximity is the key to sustainability. As a result, the foundation plan is based upon engaging, activating and enabling all the proximity stakeholders involved within the Last Mile transformation, without risky lock-in or nasty competitive tactics set by industry players.

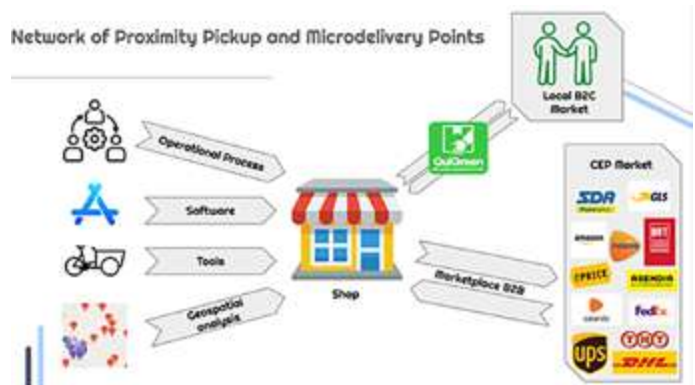
The main steps of the Last Mile change plan, within each country where this model will get adopted, are:

- 1st - deploy the most diffused and used Dis-intermediated and De-Centralized PUDO network
- 2nd - enable the PUDO stakeholders to provide services to CEP and Retailers via a Marketplace
- 3rd - extend PUDO services to proximity Micro-Delivery operating as a Micro-Hub
- 4th - increase Micro-Delivery coverage with Low-Cost, per-parcel billed Cargo Bike

- A Gym to be a Subscriber
- A City Council to be a local citizen, etc

The most logical solution for a sustainable and future-proof last-mile is to involve the most numerous stakeholders to offset the Last Mile innovation scalability due to the fierce competition represented by the CEP and Big Retailers.

THE BUILDING BLOCKS FOR DECENTRALIZED PROXIMITY PICKUP AND MICRODELIVERY POINTS



The Free and OpenSource Software Toolkit being developed by LESS engineers includes the following:

- OpenPUDO: a PUDO Platform with Mobile Clients and Backend Software Platform
- CrowdShip: a Micro-Delivery Platform extending OpenPUDO
- Planner: Geo-Analysis software to help City Councils, CEP, High Volume Shippers to plan changes in the Last Mile Infrastructure
- CargoBike: a Parcel Micro-Delivery Cargo Bike, Open Hardware designed for Low-CAPEX production costs and massive distributed production
- LastMarket: a Last Mile Marketplace Solution to engage with proximity stakeholders

Following the decentralization rules, the new architecture is expected to become the most economically convenient and environmentally sustainable solution for last mile delivery.

Methodology

The three key pillars of the environmental change promoted by LESS are:

- To engage the most numerous stakeholders (mostly end users and shops)
- To leave the economic value locally
- To be able to easily replicate the Last Mile model elsewhere

Most of the green Last Mile innovation approach starts from the initiatives or main interests of the CEP Industry players and the main online retailers, who wish to maintain control for competitive reasons, without placing e-commerce consumers and local shops, by far the most numerous stakeholders, at the centre.

The economic value, the sustainability value and the convenience value must be directly obtained by each of the local stakeholders,

be it the e-commerce user, the shop, the city council, the school, the CEP industry player or the online retailer, regardless of their size or market position.

Furthermore, the replicability of the mode must be without lock-in, and be cost-free in order to facilitate and speedup the deployment of a CO₂-friendly last mile model in any country in the world in the most frictionless way as possible:

- All the Software Source code is published for collaboration on <https://github.com/lessgreen>.
- All the documentation, schema, presentations, plans are published in Documents section of LESS website <https://less.green/documents/>

Results

The first free and OpenSource PUDO software has been published on <https://github.com/lessgreen/OpenPUDO>.

Starting from here, anyone willing to set up a PUDO network will be able to cooperate on technology and operation models.

The first OpenPUDO network has been started in Italy under the brand QuiGreen <https://quigreen.it>.

Free Android and Apple Apps are available on Mobile App Stores and marketing artefacts are being made available in a localized format.

The First PUDO Analysis in Italy has been conducted by actively developing software to scrape the existing PUDO Networks. The results are available at the following URL: [https://docs.google.com/presentation/](https://docs.google.com/presentation/d/1UXMqXJNCs3VKA4AYKb-dhFQJBdzUFS79)

[d/1UXMqXJNCs3VKA4AYKb-dhFQJBdzUFS79](https://docs.google.com/presentation/d/1UXMqXJNCs3VKA4AYKb-dhFQJBdzUFS79)
The goal is to transform any PUDO information into OpenData to push coopetition and cross-network acquisition. PUDO exclusivity must become something of the past.

In the hope others would be able to follow and cooperate, LESS PUDO Business Model has been published, with re-usability and replicability in mind, at the following URL: <https://docs.google.com/presentation/d/1cFW2EiS6RLMGVRvyLTLgiOfYzU58XoMJrq7BTd2BZ4>.

The aim is that all the public effort focused on replicability will trigger development of dozens of Dis-intermediated and De-Centralized PUDO networks in the world based on OpenPUDO.

Learnings

After just more than two years of preliminary research, we learned the need to ensure that all the stakeholders involved in the last mile

delivery get their fair share of advantage in the most simple and direct way, **because it just makes sense.**

NORWAY

PAXSTER AS



Summary

What happens when a last mile operator replaces one of their EVs? And does it really matter?

The short answer is YES. The vehicle condition after its "first life" has a major impact on expected life span for that particular vehicle, and for EVs, life span is key to achieving a real climate benefit.

Rough, continuous driving is part of the nature of last mile fleet operations. This style of driving wears down vehicles at a phase that is faster than normal, shortening the vehicles lifespan. When taking CO₂ from EV production into account, this reduction in expected

lifespan is leading to a significant reduction in climate performance.

Through process innovation, we managed to create a "mid-life service" that would in fact double the expected lifetime of used vehicles, whilst recycling 97% of the materials, and thereby lowering the threshold for EV conversion in countries and applications that would otherwise select conventional alternatives.

The project also benefits new vehicle customers, in terms of ensuring environmentally sustainable solutions, even after their first use is completed.

Introduction

The manufacturing process of an EV requires significantly more energy and resources than ICE-powered alternatives, giving the EV an initial disadvantage. The “break-even” point is determined by a variety of factors including battery size, energy source and fuel economy of the vehicle in comparison, according to a study published by Reuters. And while the “distance to equality” varies, most scientific studies agree that the climate first begins to benefit after some time in use.

6-10 hours per day, all year round with rough commercial use, significantly accelerates the wear on any last mile delivery vehicle, ultimately shortening the expected life span of the vehicle. As major fleet operators, last mile companies will without doubt increase environmental performance by converting from ICE to EVs, but taking measures to

increase the expected life span, even after initial use, should not be underestimated. Our 2ndDrive program builds on circular thinking, giving last mile operators insurance that vehicles will continue to benefit the environment even after first use. The project designed an advanced industrial refurbishment process that doubles the life expectancy of vehicles coming out of their initial use. The “as-good-as-new” vehicles provide green last mile alternatives to countries and applications that would otherwise choose ICE-powered or less suitable alternatives.

And while the benefit of doubling life expectancy is significant, the process itself has been designed in a way that allows us to reuse between 95-97 % of the original parts and components.

Methodology

Building on our commitment towards the climate, the project group defined the following problem:

How and by how much can Paxster increase the life expectancy of vehicles after their initial use?

The team started off by defining performance requirements along five different dimensions, including 1) Sustainability, 2) Technology, 3) Aesthetic standards, 4) Reliability and 5) Safety.

The team then proceeded to evaluate a great number of vehicles due for replacement after its initial use, carefully identifying the gap between actual condition and the specified performance requirements. All vehicles were completely disassembled, and all

main components were carefully inspected, including EV batteries, chassis, drivetrain, and safety equipment. In addition, suppliers were involved to look at more environmentally friendly solutions for plastic components. Knowledge created during the research phase provided the necessary foundation to design an advanced industrial refurbishment process. Several prototypes revealed that the novel refurbishment process was able to recondition most of the vehicle (95-97%) while at the same time meeting the performance requirements. The team then evaluated the actual condition of 2ndDrive vehicles against the performance standards of our standard new vehicles. Technical analysis of the batteries and reconditioned standard indicate at least 4-6 additional years in last-mile applications.

Results

The 2ndDrive project resulted in a novel green business area, in which Paxster can offer new-car customers the opportunity to sell back vehicles after initial use, providing assurance that they will go through a climate-friendly refurbishment process, ultimately resulting in a green, reliable, safe, and technologically up-to-date opportunity for last mile customers with a lower budget.

It essentially becomes a win-win-win situation for new-vehicle customers, 2ndDrive customers and the environment. Our last mile new-vehicle customers usually have

strong, strategic direction towards greening their operations, and 2ndDrive acts as a reinforcement of this commitment, while at the same time making it easier to renew their fleet on a regular basis.

On the other side, last mile operators that usually find it more difficult to invest in green vehicles like Paxster, now have access to “as-good-as-new” vehicles that will deliver strong performance for years to come. The 2ndDrive offering is sparking a real interest from last mile customers across Europe.

Learnings

As an automotive manufacturer of specialized last mile vehicles, regaining access to the vehicles after initial use is providing unique value. Through the 2ndDrive remanufacturing process, our team of assembly workers and engineers gain valuable knowledge on the performance of our products. As an extension of the project, we have been able to set up

a strong knowledge-link between 2ndDrive, R&D and Production. This knowledge allows us to build even better new vehicles, optimizing the residual value of our cars. We are also working with universities and research institutions to verify the 2ndDrive environmental performance through a Life Cycle Analysis (LCA) to document the process.

NORWAY

POSTEN NORGE AS



Summary

Through the articulation of a clear and well-defined strategy, Posten Norge (Norway Post) has been able to achieve impressive sustainability results in the past few years. Those actions have materialised in both the physical network, where our fleet will be 43% fossil fuel free in 2022, but also through

our customers adopting our new green services. To make this change a reality, we have developed a digital platform called Glow that orchestrates all of our delivery activities, from checkout to doorstep, centred around transparency and user friendliness.

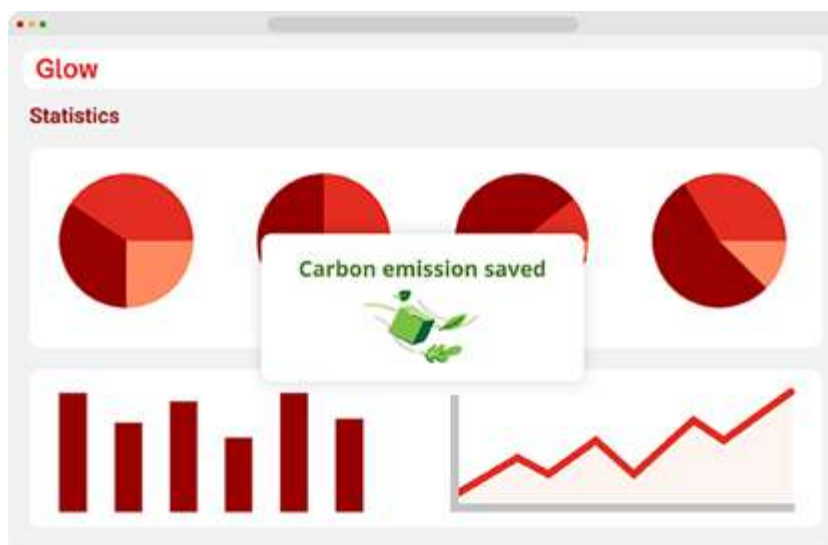
Introduction

Climate change is the biggest challenge of our time, and the logistics sector is responsible for 30% of national greenhouse gases emissions. At Norway Post we have focused on being part of the solution in our efforts to make a positive difference. In fact, since 2012 we've had an ambitious environmental strategy which has helped us to reduce our carbon emission by 45%, and to continuously sharpen our environmental strategy going forward. As example, we are making substantial investments to incorporate fossil-free alternatives in our fleet, both for last mile and linehaul, and for 2022, we're aiming to reach a share of 43%. We are also investing in more parcel lockers (1,000 locations deployed in Norway in only one year) and city hubs in Nordic cities to make our last mile delivery activities elevate more sustainable

delivery methods using bikes and electrical vehicles.

To reduce carbon emissions while meeting the increasing customer expectations in their last-mile delivery experiences, we have also developed our own logistics platform called Glow. The system orchestrates all parts of the last mile logistics and allows us to optimize routes and keep track of how our fleet is used, while providing customers and recipients with a world class user interface for real-time tracking and reporting. In this optic, we built a transparent operational network, and through Glow, we can visualize deliveries made by fossil-free vehicles and measure how much carbon emissions have been prevented from being released into the atmosphere, throughout the entire value chain.

We have developed a digital platform that orchestrates route optimizing, reporting and sustainability communication



We are investing in a fossil-free fleet featuring bikes and electric powered mopeds, vans, trucks and trains



Methodology

In order to reach our ambitious goals within the organization, we focus our efforts around an agile methodology, continuously iterating to meet the entire group's desired objectives. In this innovation philosophy everything is interconnected, we therefore focus on the big picture and rather than stand-alone projects.

Norway Post has a long tradition of innovation and trying out emerging technologies. We have been an early adopter of electric vehicles and contributed to the development of Paxster, as early as 2012. Over the years we have tested and learned as new fossil-free alternatives have been made available on the market. This stems from a strong local leadership culture, where we strive towards

Results

Since 2012 Norway Post has decreased its carbon emissions by 45% and in 2030, will reduce them further by 42%, and at the same time grow its business by 41%.

We have implemented around 2200 fossil free vehicles, most of them are electric. The total share of fossil free vehicles in our fleet will be 43% in 2022 and we have the largest fleet of electric vehicles in Norway.

Glow is a central component to reach our objectives as the platform drives our route optimizations so that we can use the existing fleet more effectively. By using automatic route planning, the productivity has increased

creating a green network, both in the last mile, but also in the whole value chain.

Glow started as a pilot in 2018 lead by customer needs and changes in the market of last mile logistics, and since then, we have scaled rapidly, implementing Glow in many more parts of our logistics operations and in new markets. We have a test-and-learn approach allowing for new features to be continuously developed and implemented. Today, we have grown Glow's reach, offering it as a SaaS solution to other external logistics companies and supporting them in their daily last mile operations and efforts to become more sustainable.

with up to 30% compared to manually planned routes. This means that more deliveries can be made with less kilometres driven, which in return reduces our emissions. It's also easier not only for us, but also for our customers to monitor their deliveries and generate reports about carbon emissions. We can track driver behaviour and advise them on greener practices to perform more sustainable routes. Our customers and recipients can also see what type of vehicle would deliver their parcels and allows them to choose a sustainable delivery vehicle at check-out.

Learnings

To be able to lead all of our organization in the same direction towards our ambitious environmental goals, we believe that we need a clear and digestible strategy communicated from the top and down. Furthermore, we have learned that the importance of giving people freedom to try out new solutions and create new systems without heavy decision-making processes is paramount.

Developing Glow has been a continuous journey working closer to our users, customers and recipients, to really understand their needs and how they operate. It has been important to challenge the way we work

together so that we can adapt faster to new and more sustainable working processes. Starting small and then scaling to new areas and markets have proved to be a success criterion for Glow.

Last, agility is our strength. By building an inhouse delivery platform centred on automatic route planning, reporting and customer needs, while meeting recipient expectation from the get-go, we have been able to have a powerful impact in the development of more sustainable services to perform in the ever-evolving last mile logistics arena.

POLAND

INPOST S.A.



Summary

In 2021 we, created an innovative program for the biggest and medium-sized cities under the name:

"InPost Green City".

The program aims to significantly reduce pollution emissions resulting from the development of e-commerce by reducing CO₂ emissions and car traffic in city centres and introducing electric vehicles in place of internal combustion engine ones. As part of the program, we support the implementation of the idea of a "smart city - idea of 15-minute

cities" i.e., mobile access to a variety of city services and the construction of a network of electric chargers located in the vicinity to the Group's APMs and air pollution sensors. APMs are the most sustainable form of delivery. Over the course of the year, we generated more than 200,000 tons of CO₂ savings to the environment, while simultaneously reducing traffic and noise pollution. InPost Green City projects aim to educate consumers and support local governments to reduce air pollution in Poland.

Introduction

APMs are the most sustainable form of delivery. Over the course of the year, we generated more than 200,000 tons of CO₂ savings to the environment, while simultaneously reducing traffic and noise pollution.

As part of our InPost Green City program, we execute a number of measures, such as:

- expansion of the APM network so that more consumers have access to the most sustainable form of delivery,
 - expansion of electric delivery vans,
 - testing cargo bikes that will further help to reduce the amount of carbon footprint in cities,
 - APMs powered by RES energy.
- In addition, we plan to initiate a number of projects which will have positive impact on the local environment:
- environmentally friendly transport, for example deploying bicycle stations nearby the Group's APMs for short-term bicycle parking,
 - creating green areas in cities near the APMs,
 - other sustainability focused projects initiated by cities and in line with local needs.

Methodology

The program InPost Green City aims to significantly reduce pollution emissions resulting from the development of e-commerce by reducing CO₂ emissions and car traffic in city centres and introducing electric vehicles in place of those with internal combustion engines.

APMs are the most sustainable form of delivery. InPost Green City projects aim to support local governments to reduce air pollution, giving them access, among other benefits, to an even more extensive network of InPost APMs.

Last mile deliveries are responsible for the

biggest share of CO₂ emissions in the whole logistics process. This is due to, among other things, customers providing an incorrect address, difficulties with finding the location or absence of the recipient, which results in multiple delivery attempts. During standard courier working hours, customers are usually not at their place of residence or the delivery time may not be convenient for them. This necessitates a re-delivery of the parcel to the same address. The re-delivery problem pertains to approximately 20-30% of all customers, generating excess amounts of CO₂.

The use of automated parcel machines contributes to the reduction of traffic and noise pollution associated with the transport and, consequently, a reduction of harmful emissions. For example, a courier who delivers a number of parcels to one single location generates much lower mileage per parcel than one who makes numerous individual deliveries. Ultimately, the collection of parcels using APMs significantly addresses the problem of the last mile.

According to our research, as many as 37% of APM users walk to the machine to collect the parcel. In addition, 62% of InPost users admit that they pick-up parcels from APMs only while driving to work or doing other things. The carbon footprint of deliveries to the APM

is even lower if the parcel is collected on the way to work or during shopping. Due to the proximity and accessibility of the APMs, we also promote reaching them on foot or by bicycle.



Results

In 2021, 19 cities joined the InPost Green City Program:

Kraków, Łódź, Częstochowa, Kielce, Wałbrzych, Zielona Góra, Sopot, Rybnik, Białystok, Bobrowniki, Chełm, Rzeszów, Wrocław, Gorzów Wielkopolski, Bytom, Tarnobrzeg, Nowy Sącz, Konin, Pabianice.

The residents of those cities will gain access, among other benefits, to an even more

extensive network of InPost APMs in new locations, and a more comprehensive range of city services, including electric vehicle chargers located near our APMs and air pollution sensors. In accordance with the contract entered into with those cities, InPost will gradually expand its fleet of electric vehicles to achieve the full zero-emission target.

Learnings

In 2021, cooperation with local governments convinced us that the InPost Green City project is important and responds to the needs of cities. Local governments confirm the benefits for residents. We are sure that we can bring cities closer to the idea of 15-minute cities. The most important thing in this project is effective communication and education. We continually promote and educate our customers and consumers that APMs are the most sustainable form of e-commerce delivery, providing the best-in-class user experience, while minimizing the carbon footprint of parcel deliveries. We encourage customers to walk to the APM and contribute to reduction of emissions of harmful exhaust gasses and to recycle the packaging from parcel deliveries. We also inform our customers how to precisely pack items in cartons to optimise space. In addition, we encourage customers to select, when packing a parcel, a package that is only a little bigger than the item being mailed.

As a result, we are able to transport more parcels per trip, and thus reduce CO₂ emissions. In 2022 we plan to strengthen our sustainability efforts and encourage individual customers to live a “zero-waste” life. Our experience has given us the knowledge of how to communicate effectively with local government officials. They made us sure that the dialogue between business and local authorities is needed.



POLAND



INPOST S.A.



Summary

Our goal is to improve consumers' knowledge and inspire sustainable behaviour.

We want our customers to know that we deliver their parcels in a sustainable and responsible manner, which we believe will help them make informed decisions regarding the choice of delivery for their orders. With this in mind, we have created a carbon footprint calculator for both corporate and individual customers.

The carbon footprint of each shipment (courier or Parcel Locker) is calculated separately. Regardless of a given customer's shipment volume. This is what makes the calculator unique - we count each shipment individually, instead of relying on statistical averages. The

algorithm "checks" the distance and type of route (urban, rural) and the parameters of CO₂ emissions for its individual sections - based on shipment data imported from InPost's internal systems, the location of the branches and of the Parcel Locker.

The distance from the sorting plant to a specific sending branch is also taken into account. It is this stage of transport that generates the most CO₂ emissions. The percentage of parcels delivered to the Parcel Locker and to a home address is also significant. It is only the sum of the carbon footprints of individual shipments that gives the total CO₂ emissions for a given customer.



Source: <https://inpost.pl/en/paczkomat-trzemeszno-treozn-langiewiczza-paczkomaty-wielkopolskie>

Introduction

Climate change caused by anthropogenic factors is currently one of the most important environmental challenges. Despite the introduction of many innovative sustainable technologies, fast economic growth and growing consumption of many materials and energy result in an increasing impact on the environment, often including GHG emissions. In Poland, which is a signatory of the UN Framework Convention on Climate Change, there has been, since 1988, a reduction in the total national CO₂e emissions, which the latest report of the National Center for Emissions Management (KOBiZE) puts at 413.78 million tons of CO₂e in 2017. However, according to the "Global Carbon Budget 2019" report, which was presented at the UN climate summit in Madrid, Poland is in 18th place in the world in terms of carbon dioxide emissions and is the third EU Member State in the EU ranking of largest emitters, which has increased emissions (mainly from fuel combustion) in 2018 by 2.1%.

Businesses increasingly report their GHG

emissions, e.g. in their CSR reports, and announce the introduction of environmentally friendly solutions, including searching for ways to offset emissions. Initiatives undertaken by enterprises providing various services, including transport (courier) services, are also important. Among the measures used to reduce the carbon footprint of their activity, it is necessary to mention, first of all, the replacement of internal combustion engines with more environmentally friendly propulsion (e.g. electric, hybrid, and LPG), reducing the number of journeys, and route optimization. This is often accompanied by legal regulations resulting from national and international laws. As awareness of the problem improves, enterprises increasingly see these not merely as restrictions, but also as an opportunity for development and improving their image by including environmental and social activities in their business strategy. Therefore, the ability to determine one's impact on the environment becomes crucially important.

Methodology

The calculator results are based on actual delivery data provided by InPost, taking into account both the dispatch and collection locations. For the calculations, we relied on data relating to, among others, the average number of parcels delivered to a Parcel Locker compared to the average number of parcels delivered to a customers' home, distances between parcel machines, branches, and sorting plants. We also took into account the types of cars parcels are delivered with, their fuel consumption and CO₂ emissions on urban and non-urban routes.

The carbon footprint for the transport of parcels was determined on the basis of the Ecoinvent database for 3 types of routes:

- Sorting plant - Branch
- Branch – Parcel Locker / POP
- Branch - HD

The use of cars with the 4th and 5th fuel consumption standards was assumed. Due to the different areas of branch operations, two types of emission factors were adopted for vans with a capacity of up to 3.5 tons (i.e. urban and extra-urban route), which were additionally distinguished for courier (Home Delivery) and parcel locker / POP operations.

Methodology

A route in an urban area is characterized by higher emissions per 1 kilometer of the route due to the specificity of urban traffic (e.g. traffic jams, traffic lights, speed limits). The third ratio has been proposed for cars running between sorting plants and branches. Transport from and to the Sorting Plant is characterized mainly by longer distances and mostly concerns extra-urban routes. When calculating the carbon footprint of a product or company, it is essential to use a database of emission factors. The indicators presented in Table 2 were developed on the basis of the Ecoinvent database using the ILCD 2011 MIDPOINT + (EC-JRC Global)

calculation method. It is the world's leading LCI (Life Cycle Inventory) database that provides comprehensive, transparent and consistent product and process data. Due to the fact that the indicators in the emission bases are developed for regions (e.g. Europe [RER - Represents Europe], the world [GLO - Global], the rest of the world [RoW - Rest of the World]) or countries due to local conditions, efforts were made to choose them in such a way as to reflect Polish conditions or the most similar. All emission factors are presented in kilograms of carbon dioxide equivalent (ie kg / g CO2e).

Results

Parcel Lockers are the most sustainable form of delivery. A courier delivers about 150 parcels to a Parcel Locker at a time - reducing CO2 emissions by 430 g as compared to home delivery by courier. One Parcel Locker prevents every day the emission of an amount of CO2 comparable to what 9 trees absorb in a year. If we multiply this result by 16000 Parcel Lockers, we do as much to reduce CO2 emissions every day as 144,000 trees do in a year.

Delivery to a Parcel Locker means up to 75% less CO2 emissions as compared to home delivery by courier on the last mile.



Chart 1. The environmental impact of InPost customers, both when using home delivery and Parcel Lockers, FOR THE ENTIRE SHIPMENT ROUTE



Chart 2. The environmental impact of InPost customers, both when using home delivery and Parcel Lockers, FOR THE LAST MILE

Learnings

The “last mile” is the final stage of delivery - from the local branch directly to the customer. It generates the most CO₂ per shipment, especially in the case of direct home delivery. Parcel Lockers reduce the problem of additional CO₂ emissions. A courier delivers many parcels to one place, so the delivery does not emit CO₂ from going to different customers, who often live far from each other. The recipients decide when to pick up the shipment themselves - they can do it around the clock, at any time convenient for them. When going on foot or picking up a package

while taking care of other matters, they help the environment.

Thanks to Parcel Lockers InPost is sustainable from the beginning to the very end.



Source: <https://inpost.pl/aktualnosci-eko-czyste-paczkomaty-inpost>

POLAND



INPOST S.A.



Summary

InPost is a company that attaches great importance to the development of electromobility, believing that it is not only necessary in the logistics industry, but also responsible and sustainable. Thanks to the constant development of the Automated Parcel Machines (APM) network and the subsequent development of the EV car park, we can constantly reduce our carbon footprint.

On October 5th, 2020, the Polish Alternative Fuels Association, together with the City of

Łódź, initiated one of the largest researches related to the e-mobility sector in Central and Eastern Europe. The overriding aim of the study "ELAB - Clean City Transport" was, among others, to indicate the environmental benefits from the operation of electric vehicles. Assumptions included the provision of comprehensive knowledge in the field of commercial use of vans and passenger EVs and substantive support for enterprises in the field of making decisions on investments in electromobility.



POLAND

INPOST S.A.



Summary

A multi-stage, 16-week pilot study was carried out, which allowed for the collection of an extensive database, based on the use of electric and internal combustion cars in real conditions. The invitation to this research was crucial and important for us, because we have very ambitious decarbonisation plans, and its key element is the development of the electric fleet. The goal and mission of InPost is to surprise people by using the potential of technology. We want to change the lifestyle

of tomorrow, change cities, combat climate change and drive people and companies.

Over the next few weeks, we plan to join recognized international initiatives whose mission is to bring together companies that lead the way to a carbon-free economy, stimulate innovation and drive sustainable growth by setting ambitious, science-based targets for reducing CO₂ emissions, all the way to climate neutrality.

Introduction

Road transport is one of the main sources of greenhouse gas emissions and air pollutants. In the years 1990-2017 in the European Union, the average increase in GHG emissions from this sector amounted to 28%, and in Poland by as much as 206%. Smog is also an increasingly serious problem in Polish cities.

According to IQAir data from 2019, out of one hundred European cities most polluted with PM 2.5 dust, as many as 29 are located in Poland. Moreover, Poland is the fourth most polluted country of PM 2.5 in the European

Union. This problem is particularly important in large urban agglomerations where the concentration of cars often leads to an inefficient flow of vehicle traffic. This generates additional emissions.

The conducted research allowed for a comparative analysis of the impact of electric and internal combustion vehicles on the environment under real operating conditions and illustrated the overall benefits of fleet electrification from an ecological standpoint.

Methodology

The size of the car fleets in Poland makes estimating emissions from internal combustion vehicles very difficult in practice. In the case of new vehicles, estimates derived from the results obtained in the approval tests may be considered. Such a model was adopted for the purposes of this analysis - all cars used in the project were manufactured in 2020. The values of their emissions expressed in grams per each kilometre driven are shown in Table below.

The adhibition of the above methodology to used vehicles results in significant divergences from the actual situation. After many years of use, the values indicated in the approval do not reflect the technical

degradation of cars. A reliable estimate of the number of emissions generated at the operational stage is possible thanks to the direct comparison of electric and internal combustion cars of the same segments. Regardless of the structure of the energy mix, fleet electrification brings environmental benefits and contributes to reducing both carbon dioxide production and pollution.

In the 2020 report "How clean are electric cars? T & E's analysis of electric car lifecycle CO₂ emissions" it was indicated that fully electric cars contribute to the reduction of carbon dioxide emissions in Poland by 22-28%, even if they are powered by energy generated in coal-fired power plants.

Emission g/km

Model	CO ₂ *	PM	NO _x	CO
Renault Clio TCe 130 EDC	131	0,23	27,5	150,7
Renault Kangoo Express Maxi	166	0,09	21,2	246
Renault Master L3H2 dci 135	259	0,24	54,8	150

*Average according to WLTP

Table 1. The value of gas and pollutant emissions from internal combustion vehicles participating in the test (manufacturer data)

Results

Replacing combustion cars with electric ones ensures a reduction of carbon dioxide emissions at the operational stage in all tested vehicle segments. The largest reduction was recorded in the large delivery vehicle segment.

In this case, company cars powered by renewable energy sources emit an average of as much as 25.9 kg less carbon dioxide for every 100 km travelled. When such vehicles are powered by the electricity grid, the reduction in CO₂ emissions is still significant - more than 10 kg for each 100 km travelled.

In the passenger car segment, electric vehicles powered by renewable energy sources reduce CO₂ production by 13.1 kg for each 100 km travelled, and in the segment of light commercial vehicles - by 16.6 kg. During the ELAB project, combustion cars emitted a 3,314 kg of total carbon dioxide. The obtained results indicate that the implementation of electric vehicles to the company's fleet, while ensuring their power from renewable energy sources, is the most effective method of implementing the sustainable transport policy in the enterprise.

Results

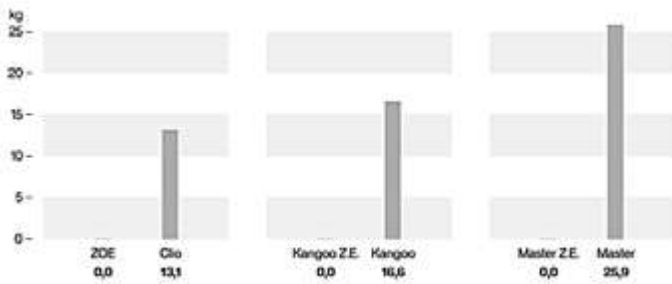


Diagram 1. Average value of CO2 emissions per 100 km in the case of using electricity from renewable sources

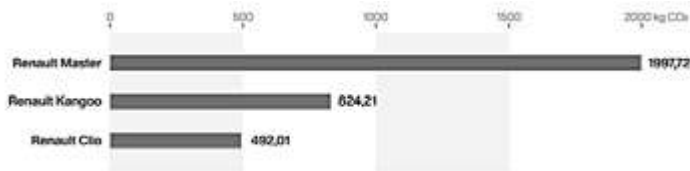


Diagram 2. Total CO2 emissions of individual combustion vehicles tested under the ELAB project

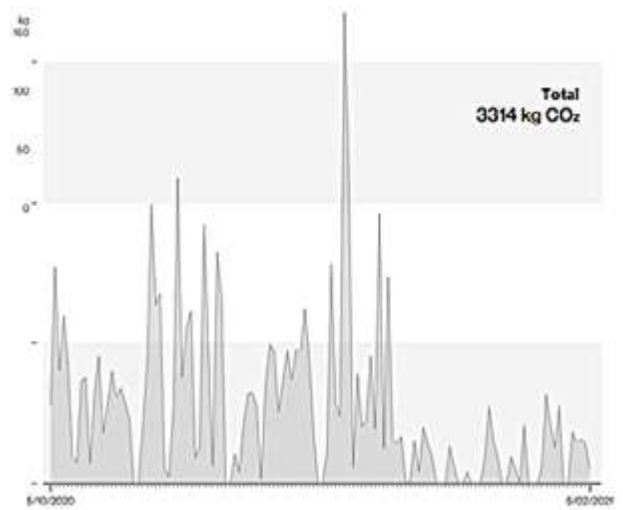


Diagram 3. Total CO2 emissions of all combustion vehicles tested under the ELAB project

Learnings

The beneficial environmental effect resulting from the electrification of the vehicle fleet deepens with the change of the energy mix. Indirect emissions of electric cars at the operational stage strictly depend on the source of energy used to power EVs. The fact that electric vehicles are 100% based on renewable energy sources (RES) makes them completely emission-free in the use phase. In Poland, there is the so-called "a copper plate" model: each generation source produces energy to the common grid and has equal access to it. Consequently, consumers

have a practical possibility to choose the source of energy. This allows the electric car charging stations to be powered with "green" energy coming entirely from renewable sources. This approach allows the reduction of indirect emissions generated by EV to zero. Currently, we have almost 264 electric courier vehicles of the Nissan Voltia e-NV200 and Mercedes eSprinter on the streets of Kraków, Warsaw, Łódź, Wrocław, Poznań and Gdańsk. Almost 90% of EV vehicles are electric Nissan e-NV200 in an enlarged version of XL Voltia with a cargo area of 10 m³.



Source: PSPA

As far as possible, we try to "assign" electric cars to specific parcel lockers - we can then say that the delivery to a specific parcel locker becomes almost completely emission-free in the last mile. In addition to EV cars delivering

parcels to parcel lockers, we have 15 electric cars that are driven by an eco-service fleet. Therefore, we are at the forefront of courier companies in Poland that implement EV solutions.

The fact that we are a leader among logistics companies implementing EV solutions is evidenced by the special award granted during the e-Mobility Media Awards. The Polish Alternative Fuels Association awarded InPost a special award - Brand of the Year 2021 - for a significant impact on the development of the electromobility market in Poland.

POLAND

7R S. A.

Summary

7R City Flex Gdansk II is an A-class facility close to Kowale near Gdansk, at the Tri-City ring road. Its distinct advantage is a short

distance to the centre of Gdansk and Gdynia as well as the international Gdansk Lech Walesa Airport.

Introduction

Due to the latest environmentally friendly solutions increasing the energy efficiency of

the facility, 7R City Flex Gdansk II is BREEAM certified.

Methodology

The facility uses, among others, LED lighting, a gas radiator system, skylights and smoke

vents, as well as natural light in inbound areas and destratifications.

Results

The use of glass wool isolation on the roof and PIR insulation in the walls of 7R warehouses generates energy savings of

several percent. Destratifications discharging warm air from the ceiling to the lower parts of the building account for another 8%.

Learnings

Low-carbon buildings are an important response to climate change. By building in an eco-friendly standard we are able to reduce energy consumption and carbon dioxide emissions by. This brings 7R closer to its goal of climate neutrality.



POLAND

EMAPA S. A.



Summary

In today's society, the transportation of goods is an important task. On a daily basis, people must send packages, documents and other important things from one location to another. How can new solutions for transportation improve the logistics industry?

Presently, one of the greatest challenges facing logistic companies is route planning. Specifically in the area of warehouse to client distribution.

Many companies try to reduce the transportation cost with traditional solutions, instead of optimising unprofitable routes. Optimising route cost by even a small factor

can translate into real multi-million dollar savings for a company by lowering the service cost of a given car fleet or by the intensification of vehicle use decreasing the total number of needed vehicles. This means considerable savings in fuel consumption and therefore lower carbon dioxide emissions. Today, Emapa is developing advanced VRP (Vehicle Routing Problem) algorithms, breaking world records in this field. Each of the VRP records is a reduction in the total distance travelled by vehicles, which translates to greater cost savings in real-world applications.

Introduction

Example of a courier company:

Most clients expect to receive a package within 1-2 days. This makes the courier service industry an essential tool in the belt of each company. For this reason, the aim of courier companies is to ensure that the package delivery process meets the clients' highest expectations. In order to achieve that, every day courier companies spend huge amounts of money on fuel, equipment and its maintenance as well as salaries. Time is money, and picking the most efficient route for package delivery may substantially

lower the time needed to complete these deliveries. They contribute to cutting the costs of transportation.

Initial assumptions:

There are 5,000 couriers employed in the courier company
 Each courier route is approximately 150km
 Fuel cost of 1 route is approx. 88.50 PLN (18.94 EUR)
 By optimizing routes, we want to reduce the number of couriers and thus reduce CO₂ emission.

Outcome:

Shortening the total length of combined routes (-7%)

Reducing the number of couriers (-350 people and vehicles)

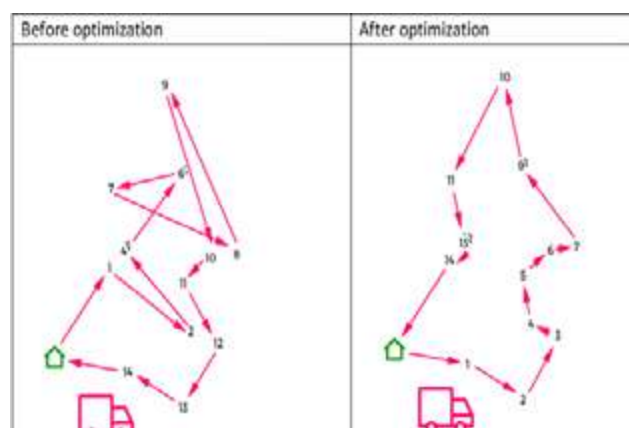
Saving time and maintenance cost of a vehicle fleet (-154,900 PLN/day = -33,160 EUR/day)

Planning a rational order of customer

point visits, taking into consideration their geographical location and preferred pickup/drop-off times

Planning an optimal number of vehicles needed to service a set number of orders

Optimising vehicle fleet in line with current business needs



1. The courier route before and after optimization.



2. A sample set of routes after optimization. a green leaf means routes that are economical in terms of CO2 consumption.

Methodology

We know how long the total routes are before optimization, how many points to visit and how many couriers are needed. Using the intelligence of the algorithms we developed, we managed to reduce the number of couriers needed by 7%, which means 350 couriers less. On this basis, we can draw conclusions about the CO2 reduction according to the calculations from point 4.

Even minute improvements and optimized routing may result in a considerable improvement in absolute terms. We may make the routes shorter, economize fuel consumption, and also lower CO2 emissions. Companies may use their resources more efficiently. This will increase the quality of a customer service and create savings in transportation.

Results

Route optimization in the courier industry:
Before optimization:

1 courier route = 150km, 5,000 couriers in the company

As a result of optimization, the number of couriers was reduced by 7% and amounted to 4,650 couriers. (350 couriers less)

Average CO2 emission of the vehicle = 123 g/km

Thus the savings in CO2 emission were:

Monthly: 129.15 tons of CO2 less

Annually: 1549.8 tons of CO2 less*

*These savings apply when we reduce the number of couriers by 350. The CO2 emission produced by the other 4650 vehicles will increase slightly, as they will have more parcels to deliver. The assumption of the advanced optimization VRP, however, is that these increases in kilometres should be minimal.

Additional benefits:

- customer satisfaction and continued use of our services
- cost savings in general (vehicles, fuel, employees)
- planning time reduced by 90%
- more orders at the same time

At first look, courier services may seem straightforward. However, the constantly changing business needs and internal processes, rendering them extremely difficult.

Courier companies are increasingly under pressure to deliver products on time and eliminate delays. While doing that, they have to make sure that their overhead is not too high. The reduction of transportation costs necessitates that by a number of factors. Those are, for example, traffic, fuel consumption, weather conditions, etc. By applying advanced VRP algorithms and software, it is possible to achieve optimal routing.

Learnings

Our knowledge base about algorithms is located here:

<https://blog.emapa.pl/podstawowe-pojecia-z-dziedziny-ptymalizacji-vrp/>

Benchmark research:

<https://www.sintef.no/projectweb/top/vrptw/homberger-benchmark/>

<https://www.sintef.no/projectweb/top/pdptw/li-lim-benchmark>

By providing similar results to clients based on their data, we observe that they are often very surprised. Properly implemented advanced VRP algorithms provided by Emapa are able to revolutionize their business activity, generating significant savings even on the scale of one day. Their daily savings multiplied by the number of days a month and then the months of the year are impressive and hard to believe. But it is pure math that leaves no illusions. An additional tangible benefit is the saving of time needed for route planning by

up to 90%. A planner who previously spent the whole day planning a few days' routes using Excel and maps, now uses Emapa tools to do it in a few minutes. Intelligent VRP algorithms will take into account the parameters entered by the user, such as time windows, a driver's working time, vehicle load capacity and other vehicle features. The planner will indicate the priority points and the software will arrange the routes with regard to them first. Algorithms will help to arrange the goods on the vehicle so that its unloading at the next points of the route and will not be a problem for the driver. The example described here is a relatively simple optimization problem. Emapa provides technology that optimizes much more complex issues.

Who once starts using the intelligence of VRP algorithms, certainly will not go back to the days of paper and pencil.

POLAND

GLS POLAND



Summary

GLS is on the road to climate neutrality. In 5 years we will be delivering 40 percent of our domestic shipments using zero-emission or low-emission means of transport. Increasing the number of electric vehicles in our fleet is a key point in our strategy.

Courier bikes fit perfectly into the idea of sustainable development. We always analyze local conditions. We implement bikes where they are an optimal solution for both the needs and comfort of our customers. In the zones with traffic restrictions, this is the optimal solution; agile and zero-emission. Such a vehicle will enter wherever bicycle traffic is allowed. It can also avoid certain disadvantages that conventional delivery trucks are faced with, such as parking issues or traffic.

It is a perfect example that pro-ecological goals can easily harmonize with business goals. That is why we will introduce more courier bikes – in the next months another 13 will start operating in 10 of the biggest cities in Poland.



Source: <https://log24.pl/news/gls-z-kolejnymi-rowerami-kurierskimi/>

Introduction

In 2019, Kraków created first Polish Clean Transport Zone, where it was established that entry was possible only for low- and zero-emission vehicles. It was a clear sign that big cities in Poland might be more and more aware of the problem of smog, pollution and emissions and that they are ready to open such zones as well.

GLS used that fact as an occasion for piloting the regularly operated courier bike route. GLS's Courier bike meets the legal definition of a bike, so it was allowed to enter each part of the restricted zone, avoiding the need for the courier to walk with the packages and make delivery process more efficient. The Initial assumption was to accelerate the

delivery process (by excluding walking time) and reduce CO2 emissions for deliveries made in the city centre.

Together with the bike, we opened a sending and receiving point Parcel Shop with a full range of services near the Old Town area. Apart from the benefits for the clients, it is also a reloading point for the bike. Closeness to the bike route also allows for a few loadings, so the number of parcels delivered by bike daily is not much smaller compared to the van.

Positive results of the pilot phase led to GLS making the decision to implement another 15 bikes in other Polish cities, regardless of their Clean Transport Zone plans.

Methodology

Pilot phase & analysis of potential:

The Courier Bike project, after the pilot phase, began with a detailed analysis of the cities and their delivering potential. We checked how big the area could be, how many parcels we can deliver there, and where we would open our Parcel Shop or a reloading micro-hub.

Bike construction:

Having the list of cities where at least one regular courier route is possible and efficient, we planned how the bike should look like and started cooperation with the producer who constructed bikes according to our requirements. The construction of the new bikes is a bit different than the first generation model and includes all the improvements.

Implementation plan:

The implementation of the bikes is divided into phases. Next, two bikes are already operating in Wrocław (Old Town area) and Warsaw (City Centre). After few weeks of

testing, a list of subsequent improvements was created and added to following pieces.



Source: <https://logistyczny.com/aktualnosci/nawosci-dla-tsl/item/6557-gls-uruchomi-15-rowerow-kurierskich>

Results

We observed that the couriers delivering with bike, first in Kraków, later on in Wrocław and Warsaw, were met with positive reactions. Our customers appreciate the convenience of this solution and the fact that it does not emit excess fumes or noise. The ecological benefits are very tangible. The use of just one

bicycle for regular shipment handling allowed us to save about 15 tons of CO₂ emissions. It results from the fact that the delivery of each package is an average of 1.3 kg of CO₂, half of which is attached to the so-called last mile - the final stage of delivery.

Learnings

Key conclusions from piloting and implementing the first courier bike routes is that zero-emission deliveries are very important for the inhabitants. Old Town areas and city centres are often crowded (both with cars and with people – tourists for example). The fact that we do not emit anything, we do not block parking places and do not generate noise is highly appreciated and praised.

We learned how to plan the bike routes to make them efficient and profitable – lower capacity is not an obstacle. We also found out

that according to Polish law, standard cargo bikes don't meet the definition of a bike, so they cannot i.e. use cycling infrastructure and do not fall under cycling regulations. This might be an impediment for quick bike fleet development.

Zero-emission and low-emission vehicles will play a significant role in the Last Mile in the next few years. Apart from the bikes, we plan to have electric cars (or small vans) and reloading micro-hubs in each city centre.



ROMANIA



SAMEDAY



SAMEDAY
#theopenway

Summary

At Sameday, we took on the mission of revolutionizing the Romanian last mile by developing the easybox parcel locker network, a delivery infrastructure that has a proven positive impact on reducing emissions, and improving traffic in the cities where we operate. Considering the dynamic development of sales in e-commerce channels, which generates a very large volume of B2C shipments, our decision of creating the largest APM network in Romania took into consideration the positive impact of the out of home delivery option. The solution significantly reduces the number of kilometers travelled by the courier and offers



a sustainable response to the environmental challenges entailed by the last mile delivery. Our aim is to reach 0 emissions for the deliveries made at the easybox parcel lockers.

Introduction

In 2019, Sameday decided to reinvent the delivery experience in Romania by developing the largest network of lockers in the country, based on the most innovative technologies. The company aim was to introduce a delivery method that was fast, convenient, low-polluting and generating lower traffic. Given the novelty of the service, Sameday embarked on a mission to build infrastructure and educate the consumers about the benefits that this delivery method has on lifestyle and environment.

In less than 2.5 years since its launch, easybox, the brand name of the Sameday APM, became one of the most popular delivery methods for e-commerce consumers in cities



all around Romania. In 2020 and 2021, the adoption of lockers increased significantly, driven by the fast development of the Sameday APM network, as well as the growth in e-commerce due to the restrictions caused by the pandemic, and services benefits.

Today, the easybox network counts 2,300 lockers for 19.29 million people, basically 1 locker for every 8.769 person, and the company plans to keep up the development pace.

Methodology

Following the market, the need for customers to keep good quality and easy to access delivery services as they become more environmentally friendly, is becoming clearer. At the end of last year, we collaborated with a company specialized in market research in order to have a clearer vision on people's demands from the industry.

Moreover, we have a partnership with a software company that uses AI to decide where the easybox are most needed and help us maximise the locker potential.

We also monitor our locker deliveries separately, taking into account metrics like the number of packages delivered by a courier to a locker per day, the number of kilometres, the total amount of CO₂ emissions and the total number of CO₂ emissions per package.



Below we exemplify the differences that show us how much a locker delivery reduces the Co₂ emissions:

		Packages	Total packages	KM	Total KM	Km/ package	Co2 emission g/km	Total Co2	Total Co2/package
Easybox Carrefour Bulbucă	Hypermarket	1,595	3,201	585	585	0.18	200	117,000	36.55
Easybox Musicescu	Residential	1,606							
TM-ND-108		1,640	4,446	1,371	4,071	0.91	200	814,200	183.13
TM-ND-112		2,806		2,700					

As we can see in the exemple, the easybox delivery have with 80% less CO₂ emissions that door-2-door delivery service, in this specific case.

Results

The studies carried out at the request of Sameday show that Romanians demand efficient and environmentally friendly services. We found out that the adoption level of the lockers has increased, it is now over 55%, and 56% of Romanians say they will use easybox for delivery, compared to 29% who say they use will PUDOs. Advantages:

- Reduces pollution on packages delivered by almost 50%
- Reduces traffic in crowded areas. One courier delivers more than 50 packages a day to a locker and streamlines traffic, with couriers traveling up to 50% fewer kilometres than home delivery
- Sustains the local economy.

At the end of 2021 we inaugurated the 2000 easybox, the first parcel locker fully powered by solar energy and equipped with an air quality monitoring sensor. The autonomous locker includes photovoltaic panels, which allow direct supply of solar energy and has a high-capacity internal battery, optimized by the Sameday specialists. This ensures the operation of the device, regardless of the weather conditions. After testing various energy efficiency technologies for the easybox service, Sameday specialists have developed the technical solution for the

standalone locker. After 2 months from the first autonomic easybox launch, we decided to install more. In Romania, now, we have 10 energy-efficient easybox lockers, saving approximately 500 Kwh, the equivalent of the monthly consumption of two average households. Permitted by the increasing adoption rate of OOH, we, together with our customers who choose this service, contribute to reducing pollution in Romania. As a next step in this direction, we intend to increase the standard easybox network and reach the number of 4000 lockes by April 1st 2023. With this expansion and the increase in the proportion of deliveries in easybox , we get implicitly the reduction of carbon footprint. Additionally, we aim for 0% CO2 emission last mile deliveries in easybox by setting as a goal the installation of up to 200 new energy independent lockers in the coming year and using electric vehicles for easybox deliveries. In conclusion, compared with the western countries of the EU, Romania is at the bottom of the ranking when it comes to innovation in the delivery industry for a lower environmental impact. However, Sameday has educated and prepared the Romanian market for more, economically and environmentally friendly OOH methods.

Learnings

Since we implemented parcel machine deliveries, we have observed an increasing desire among our customers and business partners to use them, as the solution brings tangible benefits to all participants in the process:

- Care for the environment, because the easybox locker is a green service, powered by electric cars,
- Deliveries 24/7 in the proximity, whenever clients want, simple and fast, without standing in line,
- An Increase in the commercial potential of the area by attracting new customers,

- Increased traffic in the area and on the premises where our business partners run own business, so an increased flow of customers.



SLOVAKIA



VOLTIA A.S.



Summary

Voltia operates across all EU countries, bringing the most affordable electric light commercial vehicles (e-LCVs) to market thanks to innovations in technology and financing.

Voltia started with the development of its first electric delivery van and battery swapping technology in 2011. In 2012, advisory services for fleet operators were added. In 2014, the company then started with the development of a public EV charging network, which has now been spun off as the GreenWay Network, the biggest charge point operator in the CEE region. In 2016, Voltia set out to change the slow automotive industry and to accelerate the development and manufacturing of new e-LCV models by taking small e-LCVs as platforms and developing them into new larger models.

Small EVs are too small and big EVs are too expensive. Voltia is the ideal midway that provides a viable solution for urban logistics.

In last 7 years, Voltia implemented over 1,000 units to 17 EU countries which represent a total reduction of CO₂ on the level of 11,760 tons.



Introduction

The goal is to offer e-LCV models that outperform the best diesel vans and have a better price. For the majority of the van segment, when the technical & practical parameters are comparable, the particular deal and even the market which wins, is the one with a lower price. Price in its various aspects plays the key role here. Purchase price, leasing price or total cost of ownership refers to the price topic only from different angles.

Higher purchase price is compensated by operating expenses (up to 80% less for energy cost and 30-50% less for repair and maintenance).

As a result, higher mileage over the life of the vehicle means higher cost-effectiveness of the electric vehicle.

By removing the barrier of high purchase costs with 1:1 leasing price to diesel, this can bring massive improvement to air quality in the cities, lowering both noise and air pollution.



Source: <https://www.electrive.com/2020/10/21/volta-e-van-leasing-costs-less-than-diesel-vans/>

Methodology

Our approach is to create an ecosystem for a successful transition of fleets to electric. This includes vehicles, financing and the use of following tools – Switches:

- Feasibility study
- Analysis of routes suitable for electrification
- EV selection, pros & cons of models
- Total cost of ownership (TCO), Electric vs Diesel comparison
- Charging infrastructure optimization

- Online training, fleet managers and driver EV onboarding
- EV supply and financing structures
- Deployment plan, results presentation

Voltia switch to electric tailored approach is helping avoid common mistakes and get through EV rollout obstacles, saves time & money.

Results

Based on our analysis and deployment plans, we have implemented hundreds of cars in recent years all over Europe. Our customers have achieved the following results with the use of our vehicles:

- 49 million carbon neutral km driven since 2015
- 62 million parcels delivered
- Emissions saved:
- CO₂ 11,760 tons carbon dioxide - the key

climate change inducing atmospheric element

- NO_x 6,272 kg nitrogen-oxides - health hazard and primary cause of yellow smog
- PM_{2,5} 3,548 kg particulate matter - health hazardous, accumulates in lungs for a lifetime
- CO 63,406 kg carbon monoxide - toxic residue of fossil burning, most common source of fatal air poisoning

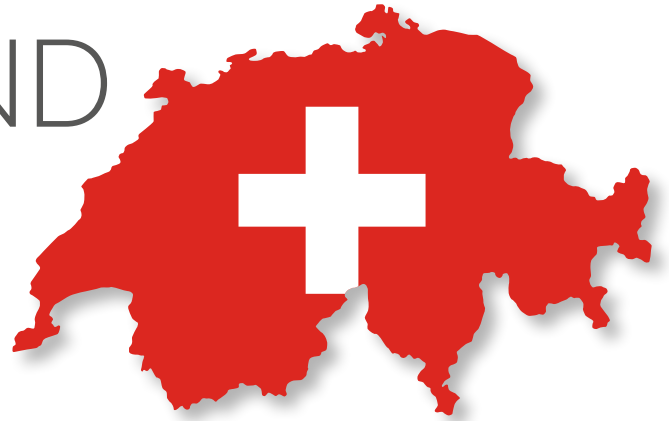
Learnings

A key advantage of the Voltia van when compared to the competition in the e-LCV market is the lower vehicle purchase price and the resulting TCO per m³. The big e-LCV category with cargo volume of more than 10 m³ has the potential to be more cost effective from the point of price per m³ of

volume transported. The Voltia van's TCO is one of the cheapest in the small and midsize e-LCV category and when considering other important parameters such as range, reliability, technology maturity and service network, the Voltia Van is the best overall model available.



SWITZERLAND



KYBURZ SWITZERLAND AG



Summary

More than ten years ago, SWISS POST began to equip its delivery staff with KYBURZ DXP small electric vehicles (SEV). The delivery fleet was converted from combustion engine scooters to full electric delivery vehicles for mail and small parcel delivery.

Today, mail delivery all over Switzerland is performed with over 6,000 Kyburz DXP vehicles. CO₂ emissions have been reduced by 77.7 Mkg for the 350 Mkm driven so far (battery-to-wheel). The life cycle of the vehicles could be extended to 8 years (7 years were expected). After this period, the vehicles can be refurbished and used as 2nd

life vehicles. Due to the extended primary use and further deployment, the grey energy decreases.

The three-wheeled vehicles are safer compared to the previously used two-wheeled scooters and have a higher transport capacity, which increases operational efficiency.

Changing operational requirements not only calls for close cooperation between the delivery company and the equipment supplier, but also demands constant change in order to increase parcel volumes up to 1cbm, for example.



Source: https://de.wikipedia.org/wiki/Kyburz_Switzerland

Introduction

The initial objectives of the project in 2010 were diverse and challenging; savings in petrol, a reduction of emissions and increased safety of both the driver and the payload.

As an experienced producer of electric light vehicles, KYBURZ knew how to meet the needs of a national mail provider like SWISS POST.

The convincing characteristics of the KYBURZ DXP vehicle in terms of efficiency and economy were convincing; savings in intermediate storage of mail, all mail of a round fits on the vehicle and the trailer, which results in fewer empty runs.

The autonomously standing tricycle provides time savings by eliminating the need to have the vehicle secured. Hop-on hop-off time

is minimized. The few seconds each stop sum up to significant time and cost savings. Compared to the traditional mopeds with combustion engines, lower maintenance costs and higher reliability could be expected. The economic benefits must be the business case for the introduction of electric vehicles. Besides lower lifetime costs, quick savings in ongoing operations outweigh the higher initial costs.



Fig. 1 Piaggio Liberty 125cc ICE incumbent delivery vehicle (left) and the Kyburz DXP electric delivery vehicle (right)

Parameters	Internal Combustion Veh.	Kyburz DXP SEV
Empty weight kg	95	210
Maximum load capacity kg	89	270

Table 1. Physical characteristics of the delivery vehicles

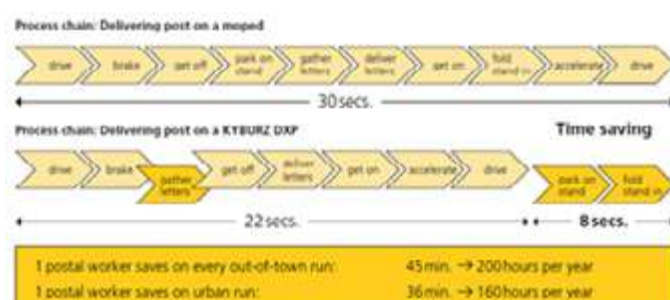
Methodology

Parameters of conventional two-wheeled delivery vehicles with combustion engines are compared with the KYBURZ DXP on energy consumption, CO₂ emissions and efficiency. The data on the DXP is based on evaluations of actual journeys made with the fleet management system developed by KYBURZ. Approximately 350 Mkm were driven with all DXPs in the SWISS POST fleet by 2021. The consumption of the DXP (battery-to-wheel) is 84 Wh/km, which corresponds to emissions of 12 g CO₂/km (based on the Swiss electricity mix with 143 g CO₂/kWh). Experience shows that the fuel-powered scooter consumes 10 l of fuel per 100 km, which, based on the generally accepted conversion (1 l of fuel leads to 2.34 kg of CO₂

emissions), results in emissions of 234 g CO₂/km.

For lifecycle emissions (not battery to wheel) we assume emissions of 100 g CO₂/km for the DXP and 296 g CO₂ / km for the combustion scooter.

The changeover to three-wheeled vehicles with an automatic parking brake also led to a noticeable increase in effectiveness by eliminating the time needed to secure the vehicle, as shown in the following figure:



Results

For the total of 350 Mkm travelled so far in the past 10 years, the use of the DXP SEV has reduced CO₂ emissions by 77.7 Mkg (battery-to-wheel) compared to the previous combustion engine-powered scooter. Considering the grey energy for vehicle production including the batteries, a reduction of CO₂ emissions of 68.6 Mkg CO₂ is achieved. This does not yet take into account the extension of the operating time from the originally planned 7 years to 8 years (operating time of the fuel scooters is 2.8 years), which leads to a reduction in grey energy. The higher payload capacity of the

DXP SEV reduces empty runs for reloading. Their emissions are eliminated.

After 8 years of service with SWISS POST, the vehicles are inspected at KYBURZ, partially dismantled and reassembled as 2ndLife vehicles. This further reduces the proportion of grey energy. The further use of batteries in stationary energy storage systems as a 3rdLife application comes before recycling. KYBURZ has developed a process whereby 91% of the battery's original materials are separated and reused without the addition of thermal energy or chemicals.

Table Life cycle modeling results for the DXP SEV, compared to the incumbent ICE the DXP exhibits far superior performance

gCO ₂ -eq./km	Glider	Powertrain	Energy storage	Maintenance	Energy chain	Direct emissions	Road	Total
Best case EV	28	10	16	4	8	0	6	71
Mean case EV	32	11	36	4	10	0	6	100
Worst case EV	37	13	42	5	12	0	6	116
ICE	11	9	0	11	42	217	6	296

Learnings

The combination of various modifications leads to striking results in the field of CO₂ emission and efficiency. The understanding of the operational processes and requirements are essential for the implementation of such a project on the side of the vehicle manufacturer. A close cooperation between Post and the supplier is needed. Good engineering capacities are needed to adapt off-the-shelf products for efficient use. Beside the actual reduction in CO₂ in operations, an important key to increased

sustainability is the life cycle extension of products to avoid wasting grey energy. The use of LFP batteries has proven its worth especially with regard to their safety and durability.

The needs of the customer in projects with thousands of vehicles over a decade are changing. Once established, an electric fleet concept can adapt to changing needs like more parcel delivery, while maintaining or even increasing services for the benefit of the postal logistic structure.

Prepared with the support of:



ASSESSMENT OF THE VALUE OF PROJECTS

HIGH LEVEL ASSESSMENT OF PROJECTS

Thanks to our sponsors, and companies which submitted their applications, we were able to learn about several valuable initiatives in a sea of “Greenwashing”. Due to the low number of projects and a general lack of audited data, it is hard to assess individual projects objectively. We have, however, sought to have some kind of appraisal.

First and foremost **InPost** and **Sameday** are leaders in the area of OOH deliveries in their core markets, while **Nissan** are producing electric cars which have been identified as a key tool in reducing carbon emissions. These companies have agreed to finance this initiative as they have a strong belief in the need for more knowledge in this key area.

DPDGroup, with its programme to support the smart urban delivery initiative, which is to be implemented in 225 European cities by the 2025, has the potential to be one of the leaders in the area of emissions reduction.

Similarly, **Hermes** in the UK, whose OOH network and investment in electric city vans and trucks powered by Biomethane has demonstrated that it can really “walk the talk” in the green last mile.

Finally, POSTEN Norge has chosen to combine a number of activities into a holistic model, where route optimisation software, OOH network construction and the introduction of electric vehicles are producing excellent results in reducing carbon emissions.

However, let us remember that the last mile is not only vehicles, OOH points or route optimisation. It is also buildings whose modern construction methods and advanced technologies allow for a significant reduction of heating, ventilation or lighting costs, as exemplified by the facilities built by **7R**.

And finally, an aspect that is developing faster and faster, the reusable packaging presented by **RE-ZIP**, which, with the right consumer education, will serve us for many shipping cycles.

HIGH LEVEL ASSESSMENT OF PROJECTS

Our report featured projects from different areas of the CEP industry and all of the solutions presented have a positive impact on the environment. In our opinion, the most effective ways to reduce emissions and negative environmental impact in the short term relate to the education of all stakeholders about the benefits and relative ease of an eco-friendly last mile as well as strong promotion of consolidated out-of-home delivery (PUDOs and parcel lockers). UPIDO's research (referred to later in this report) suggests that operating fleets of EVs has the greatest single impact on our environment. It will nonetheless be several years, if not decades, before the infrastructure is ready for this and all legacy vehicles can be economically mothballed. Moreover, in some countries, particularly in CEE, electricity is obtained via fossil fuels and is therefore

To be frank, the activities of individual companies or institutions in the field of environmental protection are extremely important and necessary, but only united actions promoted by legislators and local/central government will accelerate the process of making the last mile truly "green". This joint effort should include:

- **Consumers**, who should consciously and responsibly order online, choosing delivery methods that generate low emissions,
- **Retailers**, to adapt their packaging

less "clean" than one might expect. Of course, manual cargo bikes or small EVs such as scooters can be an interim solution for the infrastructure problem as they require less infrastructure and can even be supported by battery change stations with pre-charged battery packs. Understanding the whole problem leads us to the basic conclusion that the fastest way to achieve a significant reduction in emissions is to EDUCATE all stakeholders.



so as not to "carry air" and to promote OOH or EV delivery as the most environmentally friendly solution,

- **Carriers** (courier companies, post offices) who should train their couriers and drivers in economic driving, run low emission fleets or facilities and promote OOH,
- **Legislators** and city authorities who, through legislation or fiscal benefits, can stimulate (accelerate) change to improve the quality of the surrounding environment.

Prepared with the support of:



THE ENVIRONMENTAL IMPACT OF THE LAST MILE

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Methodology and key assumptions

We have conducted a long-run assessment of the impact generated by last mile deliveries in terms of the carbon footprint in Europe. The purpose was to compare different scenarios and forms of mitigating CO₂ emissions in the last mile, by stressing what could happen in ten years time. The analysis focuses on possible last mile delivery solutions and technologies that could be deployed in 2032. We expect alternatives to today's main delivery systems, such as parcel lockers or the use of electric vehicles to be implemented at a larger scale by 2032. It must be noted that the transition path between 2022 and 2032 is not detailed

since the speed of implementation of decarbonised solutions for the last mile may vary from one country to another in the European Union, the United Kingdom, Switzerland and Norway. We simply assume a convergence between countries in the application of new last mile solutions by 2032.



On the first stage, total European B2C parcel delivery volumes were forecasted for the year 2032. Then, in a second stage, this forecast was used to estimate CO₂ emissions in the last mile for the group of countries made of the European Union members, the United Kingdom, Switzerland and Norway. We extrapolated the carbon footprint estimations produced in several detailed studies (especially from Poland, due to the quantity and quality of available data) regarding the impacts of parcel locker networks and adoption of electric vehicles for last mile delivery.

Given the different geographic features of Poland compared with other European countries, such as population density, we adjusted key

parameter values for European CO₂ emission estimates according to the most relevant geographic differences between Poland and other European countries. As a rule, we took the most conservative estimates out of the different calculations that were run for this exercise in order to minimise any possible over-estimation of some effects. We assumed that the density of OOH delivery networks will have become high enough in 2032 to allow for decarbonised collection of parcels by consumers (such as walking to the collection point and by so-doing avoiding any additional trip by car). We also assumed that pick-up and drop off points (PUDO) could achieve the same level of last mile energy efficiency as parcel lockers.

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Last mile delivery: carbon footprint scenarios

The environmental impact of last mile delivery will depend on the next generation of delivery and automotive technology, which are the key dimensions to be considered in any carbon footprint assessment scenario in the long run (Table 1). On the one hand, transitioning from traditional home deliveries, in the coming ten years, to a "new last mile" made of dense out-of-home (OOH) parcel lockers networks, pick-up and drop-off (PUDO) points or unattended home delivery solutions, such as residential parcel boxes or smart home lockers, will determine part of the reduction in CO₂ emissions.

On the other hand, electric vehicles (EV) will contribute to mitigate or even eliminate most of CO₂ emissions once deployed for most European B2C parcel deliveries by 2032. We focus here on the possible impacts of the adoption of out-of-home delivery and electric vehicles in the last mile, while acknowledging the potential of other solutions for fulfilling emission reduction pledges in the CEP industry. Eventually a mix of environmentally friendly technologies will be applied by different postal and parcel companies over the next decade.

EV adoption OOH adoption	No adoption <i>parcels delivered by EVs in 2032: 0%</i>	Intermediate adoption <i>parcels delivered by EVs in 2032: 50%</i>	High adoption <i>parcels delivered by EVs in 2032: 100%</i>
No adoption <i>parcels delivered in lockers or PUDOs in 2032: 0%</i>			
Intermediate adoption <i>parcels delivered in lockers or PUDOs in 2032: 50%</i>		Carbon footprint scenarios	
High adoption <i>parcels delivered in lockers or PUDOs in 2032: 100%</i>			

Table 1
Carbon footprint of last mile delivery in the EU+UK+CH+NO in 2032: scenarios and impacts according to different levels of OOH & EV delivery adoption

Source: UPIDO

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Running away from the worst last mile scenario

Decarbonisation of last mile deliveries requires a very fast shift from traditional delivery methods to cleaner ways of bringing convenience to online shoppers. We evaluated the impacts of various scenarios combining different degrees of adoption of out-of-home (OOH) delivery and electric vehicles (EV) (Table 2). The goal is to quantify the benefits from avoiding the worst-case scenario, that is the one without adoption of OOH delivery and EVs. Our base-case scenario assesses the impacts of an intermediate level of adoption of OOH and EVs. This scenario is closer to what could be expected

for 2032 today. However, these efforts might turn out to be insufficient should global warming be limited to an increase of 1.5°C. Thanks to OOH and EVs, greater climate ambitions could be pursued.

The base case is compared with three other scenarios: the case of full adoption of OOH but no adoption of EVs, namely the OOH-only scenario; the case of full adoption of EVs but no adoption of OOH, namely the EV-only scenario; and finally, the best-case scenario combining both a full use of OOH and EVs.

EV adoption \ OOH adoption	OOH adoption		
	No adoption parcels delivered by EVs in 2032: 0%	Intermediate adoption parcels delivered by EVs in 2032: 50%	High adoption parcels delivered by EVs in 2032: 100%
No adoption parcels delivered in lockers or PUDOs in 2032: 0%	Worst-case scenario		EV-only scenario
Intermediate adoption parcels delivered in lockers or PUDOs in 2032: 50%		Base-case scenario	
High adoption parcels delivered in lockers or PUDOs in 2032: 100%	OOH-only scenario		Best-case scenario

Table 2
Carbon footprint of last mile delivery in the EU+UK+CH+NO in 2032: estimating the impacts according to different levels of OOH & EV delivery adoption

Source: UPIDO

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Coping with 40 billion deliveries in the last mile

We forecast 40 billion B2C parcel deliveries in the European Union, the United Kingdom, Switzerland and Norway in 2032 (with an error margin of two years). As shown in Table 3, this would result, on average, in CO₂ emissions ranging from 13 to 139 g of CO₂ per parcel across the different scenarios and European countries under analysis. Following the base-case scenario route would only lead to 55 g of CO₂ per parcel in 2032. This means that there is still a very large room for improvement in order to achieve a carbon footprint per parcel equivalent to 13 g of CO₂ in the best-case scenario

for 2032. Policies focusing on a single way to reduce emissions cannot bring the most desirable outcome alone (compare, in Table 3, the 32 g CO₂ per parcel through electric vehicles only or the 36 g CO₂ through out-of-home delivery only to the 13 g CO₂ with high adoption of OOH and EVs). Only a strong combination of last mile instruments fighting climate change, as illustrated here by the carbon outcomes for relatively high levels of adoption of OOH delivery and EVs, can lead to the lowest emissions per parcel in European countries (as highlighted in darker green colors in Table 3).

EV adoption \ OOH adoption	No adoption parcels delivered by EVs in 2032: 0%	Intermediate adoption parcels delivered by EVs in 2032: 50%	High adoption parcels delivered by EVs in 2032: 100%
No adoption parcels delivered in lockers or PUDOs in 2032: 0%	139 g CO ₂	86 g CO ₂	32 g CO ₂
Intermediate adoption parcels delivered in lockers or PUDOs in 2032: 50%	87 g CO ₂	55 g CO ₂	23 g CO ₂
High adoption parcels delivered in lockers or PUDOs in 2032: 100%	36 g CO ₂	24 g CO ₂	13 g CO ₂

Table 3
Carbon footprint of last mile delivery in the EU+UK+CH+NO in 2032: CO₂ emissions per parcel for different levels of OOH and EV delivery adoption

Source: UPIDO estimates, and calculations based on previous studies commissioned by InPost.

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Dividing European last mile emissions by eleven

By 2032 the total amount of European CO₂ emissions generated by last mile deliveries could be reduced from 5,568,000 metric tons of CO₂, if B2C parcels are delivered without any support from OOH and EVs, to 510,400 metric tons of CO₂ should all deliveries be made with electric vehicles to parcel lockers or pick-up and drop-off points (Table 4). The complete elimination of CO₂ is not possible as long as last mile deliveries impact the movements of individual non-electric vehicles on the road, such as personal cars with internal combustion engines. Achieving these new emission milestones would

require a much more intensive use of the OOH infrastructure than today, since the growth of parcel lockers and PUDOs could be physically limited in space for various reasons. It is critical that parcel lockers and PUDOs can be used several times a day to their full capacity, which also means that the average parcel collection time of one day or more must be dramatically reduced (through better IDM for instance). From an EV perspective, EU regulations have been adopted to ensure minimum procurement levels of EVs by parcel companies.

EV adoption \ OOH adoption	No adoption parcels delivered by EVs in 2032: 0%	Intermediate adoption parcels delivered by EVs in 2032: 50%	High adoption parcels delivered by EVs in 2032: 100%
No adoption parcels delivered in lockers or PUDOs in 2032: 0%	5,568,000 metric tons CO ₂	3,429,888 metric tons CO ₂	1,291,776 metric tons CO ₂
Intermediate adoption parcels delivered in lockers or PUDOs in 2032: 50%	3,497,400 metric tons CO ₂	2,199,244 metric tons CO ₂	901,088 metric tons CO ₂
High adoption parcels delivered in lockers or PUDOs in 2032: 100%	1,426,800 metric tons CO ₂	968,600 metric tons CO ₂	510,400 metric tons CO ₂

Table 4
Carbon footprint of last mile delivery in the EU+UK+CH+NO in 2032: total European CO₂ emissions for different levels of OOH and EV delivery adoption

Source: UPIDO estimates, and calculations based on previous studies commissioned by InPost.

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

Towards ambitious emissions reduction targets?

Our base-case scenario with an intermediate level of adoption of OOH delivery and EVs would correspond to a 61% reduction in European last mile delivery emissions. In Table 5, only three out of nine scenarios would be compatible with CO₂ emissions reduction targets higher than 80% by 2032 (see dark green colors). New generations of consumers are expected to become very demanding in terms of carbon footprint requirements related to their online purchases. Customer loyalty and sales growth,

which are key drivers of customer lifetime value creation, are more and more likely to depend on ambitious targets of CO₂ emission reductions. On top of contributing to the fight against climate change, there is a real business opportunity in targeting the greatest CO₂ emission reductions. Given that last mile delivery is at the heart of the customer experience, the acceleration of the transition towards an ever cleaner last mile should be prioritized by postal and parcel companies in the new post-pandemic normal.

EV adoption \ OOH adoption	No adoption parcels delivered by EVs in 2032: 0%	Intermediate adoption parcels delivered by EVs in 2032: 50%	High adoption parcels delivered by EVs in 2032: 100%
No adoption parcels delivered in lockers or PUDOs in 2032: 0%	5,568,000 metric tons CO ₂	3,429,888 metric tons CO ₂	1,291,776 metric tons CO ₂
Intermediate adoption parcels delivered in lockers or PUDOs in 2032: 50%	3,497,400 metric tons CO ₂	2,199,244 metric tons CO ₂	901,088 metric tons CO ₂
High adoption parcels delivered in lockers or PUDOs in 2032: 100%	1,426,800 metric tons CO ₂	968,600 metric tons CO ₂	510,400 metric tons CO ₂

Table 5
Carbon footprint of last mile delivery in the EU+UK+CH+NO in 2032: percentage reduction in total CO₂ emissions for different levels OOH & EV scenarios

Source: UPIDO estimates, and calculations based on previous studies commissioned by InPost.

THE ENVIRONMENTAL IMPACT OF THE LAST MILE

The benefits of a greener European last mile

The impact of OOH and EV delivery on CO₂ emissions in 2032 can also be measured in terms of preserved forested land. Table 6 shows the number of trees that could be planted, for the different scenarios under consideration, thanks to carbon

footprint reduction instruments in the last mile.

The most ambitious scenarios allow for planting the equivalent of all trees, or more, of the Black Forest every year. Indeed, a greener last mile does matter for a greener Europe.



EV adoption \ OOH adoption	No adoption parcels delivered by EVs in 2032: 0%	Intermediate adoption parcels delivered by EVs in 2032: 50%	High adoption parcels delivered by EVs in 2032: 100%
No adoption parcels delivered in lockers or PUDOs in 2032: 0%	0.00 x Black Forest	0.47 x Black Forest	0.94 x Black Forest
Intermediate adoption parcels delivered in lockers or PUDOs in 2032: 50%	0.45 x Black Forest	0.74 x Black Forest	1.02 x Black Forest
High adoption parcels delivered in lockers or PUDOs in 2032: 100%	0.91 x Black Forest	1.01 x Black Forest	1.11 x Black Forest

Table 6
Impact of OOH and EV delivery on forested land in the EU+UK+CH+NO in 2032: how many "Black Forests" could be planted with OOH and EV delivery every year?

Source: UPIDO estimates, and calculations based on previous studies commissioned by InPost.

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**HOW DO
WE PLAN TO
DEVELOP THE
REPORT FOR
NEXT YEAR?**

HOW DO WE PLAN TO DEVELOP THE REPORT FOR NEXT YEAR?

While we believe that our 2022 Green Last Mile report is already the most extensive compendium of relevant last mile projects in the addressable markets. We have been surprised at the lack of concrete and meaningful data available.

Our team have approached most major carriers and Posts directly and have made several efforts to promote the call for submissions with strong support from Last Mile Prophets.

As can be seen from the report, many of the operators who flag themselves as truly green have not shown any interest in this initiative which suggests that either the Green Last Mile is not really a priority for them or that their projects are actually more of a "green-washing" exercise than a reality.

We are in this for the long term and we plan for our Green Last Mile report to become something of an

industry benchmark, so while this is very disappointing and unexpected, we believe that as this report gains momentum, we can either entice (or "shame") players reporting green credentials into walking the talk and participating in future editions.

For now we would like to thank and congratulate the companies who have sent in submissions. This time we have made some general analysis on the effect of selected green initiatives. Next year we shall seek to start evaluating the individual projects with a view to selecting the best initiatives in their respective areas.

Finally, without our sponsors; InPost, Sameday and Nissan, and our expert partners Łukasiewicz PIT, Analysys Mason, UPIDO, PAYTHRU and Heleen Buledo Rai, this report would not have been possible. We would like to thank them for their time, effort and engagement.

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CONCLUSIONS AND THE FUTURE

CONCLUSIONS AND THE FUTURE

The environmental impact of the last mile

The logistics consulting activities carried out by the Logistics and Modern Technologies Center within Łukasiewicz- Poznan Institute of Technology (Łukasiewicz - PIT), confirm that the green last mile is not just fashion, but a real challenge faced by retailers and logistics operators.

More and more companies, operating in an omnichannel model, are looking to optimise logistics. They pay attention not only to the economic dimension of transport and distribution, but also to the requirement for sustainable transport, which should be low-emission and human- and environment-friendly. Sellers are aware that the requirements of customers, especially online ones, no longer end with the requirement of a low-cost and fast delivery. Many e-commerce customers are willing to pay more knowing that the delivery of their

package will be environmentally friendly.

Consumer awareness is of great importance for the development of the green last mile. Due to the nature of e-commerce logistics service, the challenge of making the last mile greener is mainly faced by CEP operators.

Based upon UPIDO's calculations, EVs alone have the most significant carbon reduction effect. Their mass implementation is nonetheless not possible at scale for some time, due to, amongst others, restrictions in charging infrastructure and the numbers of legacy vehicles in use. This means that OOH implementation or "eco education" for merchants, drivers and consignees is arguably the most important short term weapon in the carbon beating armoury.



CONCLUSIONS AND THE FUTURE

The environmental impact of the last mile

More than 40 billion B2C parcel deliveries in Europe will generate additional stress on the environment after 2032 during a period that will be critical for limiting global warming to a 1.5oC increase above pre-industrial levels. Our impact analysis of different last mile instruments fighting climate change show that the European CEP industry is already equipped with powerful green last mile solutions that could significantly contribute to mitigating global warming.

Deploying these green last mile instruments, such as out-of-home delivery alternatives or electric vehicles, but also whatever can substantially increase the odds of reaching the most ambitious decarbonisation goals as early as possible, should be at the heart of the business models of postal and parcel companies as never before.

Consumers are also likely to strongly call for the use of these new cleaner ways of providing last mile delivery services. Given that last mile delivery emissions represent such a major part of total parcel delivery emissions, getting closer and closer to eliminating most of the last mile-induced pollution can decisively contribute to strongly limiting the overall carbon footprint of online shopping delivery, in turn enabling the digital economy to transit to more sustainable levels. Continual measured progress towards these ambitions is needed to ensure corrective actions can be taken on time by all last mile stakeholders, from delivery companies to regulators and customers alike. New data-driven last mile sustainability strategies should be designed given the current urgency for saving our planet. The last mile towards a better future must be secured.



CONCLUSIONS AND THE FUTURE

Conclusions re APMs

The impacts are relatively similar for further settings as well. However, we want to stress that no general view that “a parcel locker will reduce the emitted CO₂” can be made. This is mainly since the individual surroundings and framework conditions have to be considered. For example, a badly placed parcel locker might actually have a negative impact as huge detours have to be taken to collect the parcels or may be empty as consignees don't wish to use it. It is important that either the rate of D2D successful first time deliveries or, preferably, the utilisation rate of parcel lockers is increased. Especially in rural settings, one can

expect that the majority of citizens are not at home during the day. Therefore, three strategies could be followed:

- Increase successful first-time deliveries via access to a safe locations. This is, obviously, only possible if access to the property can be granted and if a safe location is available.
 - Increase parcel locker usage. By increasing the usage rate of parcel lockers, unsuccessful deliveries at home locations are reduced.
 - Implement best in class IDM so consignees can control and influence where and when delivery is executed
-

Given the perceived level of “greenwashing”, we firmly believe that it is now the task of the (political) administration to establish basic conditions that promote all or some of the above mentioned strategies. This could be to introduce incentives for the usage of OOH or to compel carriers to combine last mile delivery resources. Already cities like Salzburg, London or Łódź and many others are taking steps to make the green last mile a reality.

Similarly, urban infrastructure planning should place even greater emphasis on the construction of cycleways and other infrastructure to encourage the spread of zero emission vehicles such as cargo bikes and e-mopeds. NGOs and other stakeholders can help

by lobbying politicians and helping to educate consignees, merchants and carriers about the short and long term benefits of the Green Last Mile. Of course, time will tell if we are fast enough in developing truly green strategies. For the sake of our grandchildren, we hope that this will be the case.



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CONTACT



Last Mile Experts Sp. z o.o.
Ul. Kiedacza 8a
Warszawa, Polska



www.lastmileexperts.com



info@lmexpert.com



Marek Różycki



Mirek Gral

