LOGISTICS FORUM: INOVATION IN PRACTICE OCTOBER 17-18, 2023 | CHICAGO



DHL.

GLOBAL INNOVATION CENTERS

DHL's commitment to driving innovation in logistics

Americas Innovation Center Chicago, USA Est. <u>2019</u>





MEA Mobile Innovation Center Dubai, UAE Est. Oct <u>2021</u>



Europe Innovation Center Troisdorf, Germany Est. 2007





Asia Pacific Innovation Center Singapore Est. <u>2015</u>

Agenda – Day 1

Time	Topics	Presenter
12:00 – 01:00 pm	Arrival & Lunch	
01:00-01:15 pm	Welcome & Introduction	David Fox
01:15 – 01:45 pm	Keynote Accelerated Digitalization	Tim Tetzlaff
01:45 – 02:15 pm	Warehouse Automation Solutions (1/2)	Matthew Dippold & Casimira Federspiel
02:15 – 02:30 pm	Coffee Break (short)	
02:30 – 03:30 pm	Warehouse Automation Solutions (2/2)	Daniel Koenka, Meredith Williams, Alicemarie Geoffrion
03:30 – 04:00 pm	Coffee Break (long)	
04:00 – 05:00 pm	Transport & Visibility Forum: 1) RFID in Logistics 2) IoT Innovation Projects in Practice 3) IoT Solutions in Logistics Now & Tomorrow	1) Nicholas Gaudi 2) Benjamin Dippolito & Sascha Kaczmarek 3) Cedric Grosch
05:00 – 05:05 pm	Closing Remarks Day 1	David Fox
05:05 – 05:35 pm	Innovation Networking	All
05:35 – 10:00 pm	Networking & Dinner	

Agenda – Day 2

Time	Topics	Presenter
08:30 – 09:00 am	Coffee, Snacks & Welcome	
09:00 – 10:00 am	Supply Chain Orchestration	George Kanupka & Brett DeShay
10:00 – 10:30 am	Sustainability in Practice	Jonathan Spearing
10:30 – 11:00 am	Coffee Break	
11:00 – 11:30 am	Innovation in Practice Workshop	1) Joan-Eva Sainte Claire 2) Emilia Endara 3) Sebastian Lamberts
11:30 – 12:00 pm	Look into the Future: Trend Radar 6.0	Benjamin Perlson
12:00 – 12:10 pm	Closing Remarks & Picture	David Fox
12:10-01:00 pm	Lunch & Farewell	

DHL SUPPLY CHAIN ACCELERATED DIGITALIZATION

INNOVATION IN PRACTICE @ DHL INNOVATION CENTER AMERICAS 17 OCTOBER 2023, CHICAGO

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DHL Group









DHL Supply Chain is the #1 contract logistics player Operating >2,000 locations in 50+ countries

~180,000

Full time
ASSOCIATES

Countries covered by DHL Supply Chain

Partnership

Warehouses in all commercial centers

Services in every

major country

Countries covered worldwide

2,0005 Warehouses and

locations

8



Ever-increasing customer expectations

Tightening labor markets



Accelerating technology pace

OUR ACCELERATED DIGITALIZATION JOURNEY **STARTED YEARS** AGO, IS FAR **ADVANCED AND INDUSTRY-**LEADING

We bring key operational technologies to a wider number of operations through our focused funnel approach

Research and Proof of Concept

Productization

Commercialization and Industrialization



100+

IDEAS

Partners engaged

12 Focus technologies defined

1200+ Sites touched We work with a clear focus on technologies that make a difference; #togetherunstoppable with a team across all functions

Focus technologies identified along entire logistics process Intelligent (un)Loading Assisted Process Technologies Picking Robots Automation Goods-to-Person Sortation AI & Data Analytics Robots Technologies Packing Smart Supporting **Technologies** Operations **Robots**

Wearable

Devices

Large scale automation including ASRS, mechanized sortation, packing/ labeling automation and more



Investment of choice Productivity and utilization

increase, cost reduction

Indoor Robotic

Transport

Provider of choice Customer satisfaction increase

Asset Tracking

& Monitoring

Employer of choice Employee attraction and retention, overall satisfaction

We work with focus and consistence across all regions – to rapidly identify and replicate best practices...



...and leverage our collective expertise to create off-the-shelve deployable solutions to get your business ready for the future

Project 1	Project 2	
Co-branded technology		
RFID sensors	Custom document creation & storage	
Integration with legacy packaging automation	Custom pick face /shelving setup	
Industry-leading value creation		
Performance and effective continuous improvement from day one		
Effective safety, IT security and service models		
Fast and most effective deployment		
Rapid integration into IT landscape		
Optimal technology and partner selection		

We have scaled our technology deployments across all geographies; we know what works where – and also where we don't see a payback yet



Real innovation is when you implement at large scale...

... otherwise, it's just a nice idea.



We apply our funnel approach also for data analytics/ AI to maximize the impact of our scale advantage – for our customers, employees and investors



Warehousing & transport safety



Generative AI for back-office tasks (and much more)



Inventory accuracy



Vision & sensing technology for robots



...and much more to come

We are best in ORCHESTRATING multiple vendors of IT solutions, robotics and analytics



OUR PEOPLE – Your ultimate Sidekicks

What's next?

TODAY



Deep dive into selected technologies by process

BEYOND TODAY



(Un)loading

and the

E.

1

(un)Loading – How yesterday looked



Our unloading technologies are in the Productization phase – we are looking at unloading of loose and palletized loads



Trailer Unloading- Fox Robotics DHL continues to deploy units throughout its North America region.

- > No IT or WMS integration required
 - Uses 4G or WIFI connection for data transmission
- Setup time takes ~30 minutes per dock door
- Detects pallet load patterns on the fly
- Improves safety on the inbound dock, and reduces load damage
- Unload rates of 25-35 pallets per hour, depending on load quality and complexity



Trailer Unloading- Boston Dynamics DHL has entered into a multi-year agreement with Boston Dynamics to commercialize the Stretch® robot.

- Collaborative relationship with DHL since 2018
- First mobile unit with fully autonomous manipulation
- No WMS integration required
- Additional use cases are being explored with DHL







Inventory Movement – How yesterday looked



Indoor Robotic Transport carry out fully automated inventory movement



Indoor Robotic Transport

Ongoing labor concerns continue driving customer demand for autonomous reach trucks. DHL's partnerships with key technology companies helps prioritize the solutions that will provide maximum benefits.

- 1st US deployment was July '21 with Campbell Soup Company through partnership with Crown Equipment
- 20% efficiency gains with faster pick and putaway tasks
- > 98% truck reliability as lifts cycle in/out of work
- Additional benefits beyond labor (ex: inventory accuracy, improved work environment)









PICKING – How yesterday looked









Our picking technologies manage rising order volumes and improve efficiency by eliminating unproductive walking



Wearable Devices: Vison Pick provides up to 15% productivity improvement over conventional RF picking

- Picker wears Smart Glasses for picking, location identification, item scanning, Counting Back, and Alternative handling
 - Picking-to-Pallet will be **highlighted on Smart Glasses screen**, together with picking item, picking quantities, and picking from location
 - Totes/ Cartons will be highlighted on Smart Glasses screen, and match picking cart configuration, to increase accuracy rate and productivity
- Preferred language by user profile

Benefits:

- > 7% 10% picking productivity increase for unit pick
- > 10% 15% picking productivity increase for case pick
- ➢ 50% training time reduction



Assisted picking robots provide up to 70% productivity improvement over manual cart picking







D UPH increase 1.5X-2.5X

Reduction of

walking time

Cycle time reduction by 50%

Training time



Goods to person system automatically transports racks or bins (totes) containing products to a pick station via robots, improving productivities and space utilization

- Variety of GTP solution to fit different product sizes and throughput requirements
- Improve picking productivity through elimination of travel and ergonomic pick stations
- Standardize process reduces order errors
- Faster implementation timeline compared to mechanized solutions
- Scalable capacity by adding robots and workstations





Goods to Person: Shelf to Person Robots



Sortation

and the

3

9998

O.A.A

2

0

SORTATION – How yesterday looked






Sortation technologies



DHL introduced a first-of-its-kind robotic sorter solution to the business. This solution addresses the void for sorting solution with medium volume ranges & many sorting destinations

- Ist US deployment was May 2023 with key Ecommerce customer through partnership with Addverb
- > Mitigate the risk of a single point of failure
- > Easily adapt to changing sorting requirements



Packaging

In-DC Packaging Operations



1. Materials Management

Planning, Sourcing, and Purchasing of all Packaging materials by leveraging a preferred supplier network to aggregate spend and drive savings.

2. Contract Packaging

Primary, Secondary, and Specialty Packaging services performed In-DC to drive time and cost efficiencies.





A TRUE PARTNER WITH SIZE, SCALE AND KNOWHOW TO MANAGE AND EXECUTE PACKAGING OPERATIONS

Materials Management

Materials Management Services Include



Materials-neutral design support and coordination lowers total cost of ownership (average 10%-30% savings) and increases speed to market

Buying strategies analyze, aggregate, standardize, and competitively bid across our preferred supplier network to deliver a stronger, more resilient network with shorter lead times and reduced spend

Manage material flow to have the right products on hand while minimizing materials obsolescence

- E2E management w/client, design partners, suppliers & DHL to optimize designs, line setup, communication, and ongoing value while giving you full inventory visibility throughout the packaging process
- Fully integrated proprietary system for transparency, data analytics, quality tools, real-time tracking, and more

Contract Packaging



Key Contract Packaging Stats in North America

8.000+

Packaging employees

OPERATIONAL

99+% on time in full

EXCELLENCE

PRODUCE >1 MILLION pallets a year

Packaging lines

600+

.

+70% OF PRODUCTION LINES include automation (and increasing)

AGILITY IN ACTION

non-forecasted projects make up 30% of our Packaging projects



DHL

All Regions

Packaging operations in all our regions with DHL supply chain

376+

Customers that DHL supply chain contract packages for globally

Sustainability

Focused sustainable options within our operations

All Sectors

Packaging activities across all sectors: in all sectors : AEMCE, Tech, Consumer, Retail, LSHC



Technologies and Automation



These are just some examples of the automation solutions in DHL's packaging innovation funnel Our team of subject matter experts continually identifies & implements technologies which are best fit for each client 43

Packing technologies



Packaging on Demand

Reduce On-Hand Inventory / Space Requirements

> 8+ Week Reduction in Lead Times

\$1+m
Annual Cost
Savings

44

What's next?

TODAY



Deep dive into selected technologies by process

BEYOND TODAY



IOT SOLUTIONS IN LOGISTICS NOW AND TOMORROW

INNOVATION IN PRACTICE DHL INNOVATION CENTER – CHICAGO

> Cedric Grosch IoT Business Development & Innovation



ΙοΤ Present in all aspects of our life





Key considerations for choosing the right IoT solution Lessons learnt from everyday deployments





IoT Solution Categories Use cases - where IoT can make a difference





Full real-time visibility on truck load of high value shipment

Shipment mo	nitoring
STATUS	PRODUCTIZED
CUSTOMER	DHL Supply chain Technology provider
TECHNOLOGY	Customer Portal: DHL IoT Platform Transmission: Cellular network Hardware: Various



CHALLENGE

- Ensure the safe transport of high value electronics transported in last mile distributions or high value products on road freight or rail
- No visibility during transport if goods are at risk of thief
- Cross boarder and multi modes transports, challenging to provide precises ETA



SOLUTION

- Implementation of location trackers Tive to accompany high value products during shipments
- Identification of light events if doors or containers are opened during transit
- Immediate reporting of location



- Low cost multi or single use devices
- Setup geofences at critical points to be alerted when entering
- Customizable interval settings (e.g. update location down to every 60 sec)



WHAT IS NEXT?



ACTIVE SMART LABELS CLOSER LOOK - WHERE ARE WE TODAY?



USE CASES / REASONS

- Trend to monitor smaller things, down to single unit level
- **Quality monitoring** of shipments/ goods
- Tracking of **high value goods**
- Monitoring of consigned inventory
- New features / new information on shipment status (shipment opening, tampering)
- Bringing innovation / new things to customers
- On site printing of labels



WHAT IT IS

- Thinnest shipment tracker, new form factor
- Measurement of Temperature, Motion, Tamper

WHAT IT IS NOT (YET)

- 100% AFR ready not all airlines approved
- Tamper-proof missing security additional stripes
- Infinite life 300 messages
- Use globally NorAm, EU, Singapore first

THANK YOU!

10 1

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IOT PROJECTS IN PRACTICE

INNOVATION IN PRACTICE DHL INNOVATION CENTER – CHICAGO

Ben Dippolito

DHL CSI Sr. Innovation Specialist

Sascha Kaczmarek Co-Founder, COO MotionMiners



OUR INNOVATION FUNNEL







THOUGHT

LEADERSHIP

EXHIBITS & PROJECTS CUSTOMER ENGAGEMENT

POC / PILOT

11

PRODUCTIZE & SCALE

DHL CSI | DHL Logistics Trend Radar 6.0



Avanti West Coast

LEVERAGING IOT TECHNOLOGY FOR FOOD WASTE REDUCTION

AVANT

Jill Yu (CSI SST) Ben Dippolito (CSI ITR)

DHL Customer Solutions & Innovation



Avanti West Coast- Logmore Project Situation & Challenge





CONDITION MONITORING: Solution overview



- HOW IT WORKS
 - Scan QR code with any
 smartphone/scanner using camera app
 - Data will be uploaded to the portal automatically

31%

1 2020 20 18 4

500

10.82 0

Logger information

CUSTOMER BENEFITS

- Quality monitoring of shipments/ goods
- Can be incorporated into DHL offering
- Access all the data on the platform

SMARTSENSOR Scan the QR code to collect & view: b^t Temperature @ Light humidity % Shocks 11 Tilt



((•)) SENSOR

- Passive temperature (+ other) monitoring
- Available with external probe for dry-ice
- No infrastructure is needed
- Temperature, humidity and location



Nacitáni sada: 0007

MotionMiners

LEVERAGING WEARABLE IOT TECHNOLOGY FOR
 PROCESS OPTIMIZATION

MOTIONMINERS

Ben Dippolito (CSI ITR) Sascha Kaczmarek (Co-Founder MotionMiners)

DHL Customer Solutions & Innovation







Motion-Mining[®] Our solution for a data-driven process analysis





Advantages of Motion-Mining[®]





Apply Motion-Mining[®] Have it measured or do it yourself

CONSULTING

MOTIONMINERS

WINSIGHTS Full-Service Self-Service

Minors CmbU@ 202

Together on the way to efficient and ergonomic processes!



MOTIONMINERS

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Connect with me on LinkedIn!



RFID IN LOGISTICS

INNOVATION IN PRACTICE DHL INNOVATION CENTER – CHICAGO

Nicholas Gaudi

DHL Global Forwarding

Jim Giedraitis

Head of DHL Americas



BIOGISTICS TREND READ RADAR





High Impact Revolutionary applications that are potentially disruptive.

Low Impact Evolutionary changes with incremental improvements.

Realization The common way of operating and doing business in logistics.

SMART LABELS

...refers to the use of printed paper, plastic, or fabric labels upgraded with special intelligent inlay technology that can digitally capture and communicate more information than is printed on the physical label.

Use-Cases

- End-to-End Visibility
- Combatting Counterfeit
- Perishable Goods Quality Control
 - No Labels

<u>Outlook</u>

This trend should be **PASSIVELY monitored,**



with applications still mostly being developed or explored.

<u>Example</u>

DHL's SmartSensor team offerings include smart labels that provide end-to-end visibility for shipment tracking, as well as condition monitoring throughout a parcels journey from shipper to consignee. Already widely scaled out, these labels enable customers and consumers to have seamless quality control of fresh-chain and perishable goods, especially relevant to the Life Sciences & Healthcare sector.



MODERATE < 5 YEARS Focus Areas: Customer Experience Visibility & Resilience Trend Clusters:	
Focus Areas: Customer Experience () Physical & Digital Security () Visibility & Resilience ()	
Customer Experience 🚳 Physical & Digital Security 💩 Visibility & Resilience 🚳	
Visibility & Resilience	
Trend Clusters:	
Internet of Things 💧 Packaging & Containers 💧	
ectors:	
Auto-Mobility 🚳 Energy 🊳 Engineering & Manufacturing	٠
Life Sciences & Healthcare 👍 Technology 🍓	



Next Generation Freight Station-RFID Project

Nicholas Gaudi (DGF US)



Next Generation Freight Station - RFID Project Situation



- DHL Global Forwarding: Air, Ocean, Rail, Road, and Customs
- Operating Cross-Dock Gateways



Next Generation Freight Station - RFID Project Challenges





- 1. Lengthy search process for freight that have been moved locate freight
- 2. Slow inventory cycle counts
- 3. Quality check of outbound consolidation

Next Generation Freight Station - RFID Project Solution



- Shipments labeled with printed passive RFID labels, storing shipment information
- RFID proximity sensing helps locating shipments
- 2. RFID reader sensing RFID labels during inventory check
- Consolidation check comparing read RFID labels , Cargo Load
 Plans, and Screening statuses

RFID reader + application & RFID label







THANK YOU!
DHL LLP - SUPPLY CHAIN ORCHESTRATION CSI INNOVATION IN PRACTICE

DHL Supply Chain - Excellence. Simply delivered.





Brett DeShay

Director of Logistics





VP LLP - NORAM



Adina Constantin

Sr. Director Product LLP - Global



WHAT WE DO OUR CUSTOMERS' INNOVATION IN PRACTICE Q&A'S



WHO ARE WE?

......



DHL LLP - ONE GLOBAL PARTNER





>25 years of operating **EXPERIENCE TO MINIMISE RISK**



>90 customer accounts
DIVERSIFICATION & LEARNINGS
FROM ALL SECTORS



 >Global operations
 FOLLOW THE SUN PRINCIPAL AND LOCAL RELATIONSHIPS



>High spend under management ECONOMIES OF SCALE AND PROCUREMENT POWER



A proven track record in value creation TANGIBLE COST SAVINGS AND LOGISTICS COST MANAGEMENT

HOW IS INNOVATION RELEVANT IN YOUR WORLD?

WE BELIEVE YOUR NEEDS ARE CHANGING...

Digital technologies & new market provider choices

Desire for more integrated & connected services

Needing global simplification, consistency & operational resilience

Valuing **easier access to the wider DHL** Logistics Marketplace



Agility and Resilience In a VUCA World





WE BUILT OUR SOLUTION AROUND OUR CUSTOMERS NEEDS





WE IDENTIFY YOUR CHALLENGES & CONTINOUSLY IMPROVE YOUR SUPPLY CHAIN



INNOVATION IN PRACTICE WITH OUR CUSTOMERS





Let's Talk Analytics and Clean Operations for Climate Protection





Brett DeShay Director Of Logistics – DIAGEO North America

GOLD LABE

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DIAGEO

WHO WE ARE

The *perfect* blend of *people* and *brands*

DonJulio CÎROC OBUCHANAN'S.

JB

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Who *we* are

With over 200 brands sold in more than 180 countries, we are driven to be the world's best brand builder, leading the way in premium drinks.



Our ambition

Our *ambition* is to create one of the *best performing, most trusted* and *respected* consumer products companies in the world.

Our portfolio

Our *portfolio* spans the spectrum of tastes and occasions, moving at pace with the latest trends. From much-loved, *established* brands to the *latest innovations*, we provide products, tastes and experiences for people to enjoy as part of celebrations big or small.



Purpose, culture and values

Celebrating life, every day, everywhere.

Our accessible purpose provides a platform for us to be the best we can be at work, at home and in our communities – it's about *celebrating life* in its broadest sense.

We take great care in building *sustainable* supply chains.





Building sustainable supply chains is essential; in protecting the environment and the natural resources we all rely on; and in our commitment to skills development, empowerment, inclusion and diversity.

Our goals are built on the most material issues affecting our business and the opportunities we see, based on what we have learned through the delivery of our previous targets.

Society 2030 Spirit of Progress pillars

OUR COLLABORATION AND INNOVATION JOURNEY: DHL & DIAGEO



CUSTOMER CHALLENGES

...Be a Technology Leader ...Transparency and Access to Data

...Predictability and Real Time Decision

...Business Model Delivering Cost, Service, and ESG Targets

...True Adoption

DHL SOLUTION

1. Data – Analytics & Insights



2. ESG – Carbon Reduction and Alternative Fuels

3. ESG – Procurement





1. Data – Analytics & Insights



"...I need to optimize total costs based on Diageo's core values (e.g., service, carbon emissions, supplier diversity, total cost management)" Brett DeShay

VISUALIZING VALUE THROUGH DATA ANALYTICS



Full Suite of cost, service, diversity, budgeting, carbon reporting metrics



Active adoption by 45+ Diageo decision makers

 Real time access to drive strategic decision making



YoY On time service improved by xx% & EDI increased by xx%, while delivering >\$xxM in annual savings / avoidance





"Diageo and DHL are Culturally Aligned on being Sustainability Leaders across the Globe"

George Kanupka

DHL SUSTAINABILITY IN FIGURES



DIAGEO SOLUTION





DIAGEO AND DHL RELATIONSHIP





organ



"Truly Integrated 4pl Solutions Promote Data Driven Collaboration and Accountability"

George Kanupka

DIAGEO & DHL CO-CREATION SESSIONS



Aligned Procurement Approach

Pass Through Freight Expense, Full Transparency

Agreed to Targets & Objectives

Joint Carrier Selection

DIAGEO CO2 REDUCTION

DHL's & Diageo's commitment to utilizing efficient transit modes and SmartWay carriers drives significant CO₂e reductions YOY.

Key CO₂ Reduction Levers



Optimize vehicle utilization



Optimize routing



Reduce air/road freight, increase multimodal



Ensure carriers are US EPA SmartWay partners



CLOSING THOUGHTS: DIAGEO/DHL RELATIONSHIP





Let's Talk Aviation:

INVENTORY OPTIMIZATION

USING DIGITAL TWIN

TECHNOLOGY





CUSTOMER CHALLENGE

DHL SOLUTION

"... I need my inventory at the right place at the right time ... "

"...in a very global fast supply chain .with many SKUs and stocking locations ..."

"... whilst I need to improve my overall cost to serve"





BUILDING A DIGITAL TWIN





MANAGING Over 250

GLOBAL STOCKING LOCATIONS



Over 100 SUPPLIERS

1110+ sкиз

EXPORTING TO

25 COUNTRIES



SUSTAINABILITY IN PRACTICE

INSIGHTS INTO IMPLEMENTING SUSTAINABLE LOGISTICS

18 October 2023 Jonathan Spearing Head of Sustainability, CSI Americas

DHL Customer Solutions & Innovation

DIESES FAHRZEUG FAHRT MIT ELEKTROANTRIEB.+





Changing Agriculture

Extreme Weather Events

Biodiversity Loss

Mass Migration

Ocean Acidification

Geopolitical Instability Water Scarcity

And more...

It is time to make a decision!

stylised global mean temperatures 1850-2200; design by @alxrdk based on warming stripes from @ed_hawkins

Sustainability Accountability



Sources: 1) World Bank, 2) McKinsey, 3) Supply & Demand Chain Executive, 4) SHRM 5) UN Principles of Responsible Investing, CFA Institute
Transport responsible for ~16% of all GHG emissions or 49.4bn T CO₂e



Modal Efficiency



Emissions Factors in CO₂e kg-km

Not all decarbonization technologies are fully available today 2050 EMISSION AND TECHNOLOGY DEVELOPMENT OUTLOOK



PPA: Power Purchase Agreement, HVO: Hydrotreated vegetable oils, CNG: Compressed natural gas, LNG: Liquified natural gas, BEV: Battery-electric vehicle, FCEV: Fuel-cell-electric vehicle, SMF: Sustainable maritime fuels, FAME: Fatty acid methyl ester, SAF: Sustainable aviation fuels, HEFA: Hydroprocessed esters and fatty acids, AtJ: Alcohol-to-Jet, Gasif-FT: Gasification-Fischer-Tropsch, PtL: Power-to-liquid

Interim solution

Long term solution



BY 2030 **REDUCE GHG EMISSIONS TO <29 MILLION TONNES**

By 2030, we want to reduce direct and indirect emissions (Scopes 1 and 2) by 42% and logistics-related¹) Scope 3 emissions by 25% in total.

DHL Group has committed 7bn EUR to decarbonization



Decarbonization measures and targets (schematic representation)



2) Logistics-related GHG categories: 3) (Upstream fuel and energy), 4) (Upstream transport and distribution), 6) (Business travel):

CLIMATE-PROTECTION PRODUCTS - "GoGreen Plus" products are based on true decarbonization measures rather than compensation **OVERVIEW SUSTAINABLE PRODUCTS & SOLUTIONS**



Transparency: **Carbon Reports**

Transparency and visibility for our customers via tailored Carbon Reports and interactive Dashboards



Green Optimization Reduced carbon emissions with optimized supply chain design and energy efficient technology



Clean Fuels & Technology Decarbonization of logistics services by using sustainable fuels and low carbon technologies

Insetting via GoGreen Plus products

Insetting enables us to directly replace fossil fuels with sustainable biofuels. We thereby protect the environment and the climate along our own supply chain.



GOGREEN





Air freight

Ocean freight

Road freight

Solutions for dedicated local operations





Warehousing Solutions

Dedicated Transport

As a starting point we provide transparency and are launching an updated Carbon Reporting Dashboard NEW POWER BI CROSS-DIVISIONAL CARBON DASHBOARD



There's never been a better time

It's now possible to not only reduce your emissions but **decarbonize your supply chains**.

Unprecedented visibility

With today's technology, we can gain unprecedented visibility across the supply chain – we can identify emissions and optimize to burn less

Carbon-neutral transports

With more options to burn clean coming online, such as the availability of sustainable fuels, we can increase the share of clean, carbon-neutral transport movements



Overview of Green Logistics Levers

Mode	Service		Cost	Ronofits + 9	Sustainahility	Lever	_		-Sustainabili	itv
		Carrier Selection	Modal Shift	Routing Optimiz-	Network Design	Consoli- dation	Customized Equipment	Green Ware- housing	(using sustainable	Offsetting (note: not SBTi
		Operat	ional	ation					Financial	relevant)
Air	Express									
	Air Freight									
Ocean	Sea Air								٩	
	FCL									
	LCL									
Rail										
Road	Dedicated									
	FTL								Q	
	LTL				Real Estate				Q	
Warehousing										

Optimization Can Reduce Your Emissions And Save Costs- But Only To A Certain Degree



Sustainable Aviation Fuel (SAF) Is A Green Alternative To Traditional Jet Fuel

SAF produced from **alternative feedstock** with an improved sustainability profile (e.g., used cooking oil, corn, waste, hydrogen or CO₂ synthesis)

- Similar chemical structure of SAF allows for the use as a 'drop-in' fuel, blending with kerosene in aircraft
- Current blending rates are capped at 50% due to legal obligations
- SAF can effectively reduce lifecycle emissions of typical aviation fuel emissions by up to 70-80%
- SAF reduces other harmful emissions like particulates and Sulphur by 90% and 100% respectively



1 - Jet fuel based on CORSIA baseline prescribed by SBTi. SAF LCA values based on ICCT data, assuming full lifecycle emissions from Used cooking oils, and vegetable oils derived from plants

Burn Clean – GoGreen Plus

THE GOGREEN PLUS SOLUTION

The underlying philosophy:

One-Atmosphere Approach

To overcome geographical or physical sustainable fuel constraints we need to look at the airfreight or ocean shipping industry as one network

The commercial concept:

Insetting

Decarbonization of given transport footprint by ensuring that a verified sustainable fuel switch takes place in the same transport mode; i.e. same network but not same aircraft/vessel

- 1. Booking: Shipper decides on fuel switch scope
- 2. Verification: DHL calculates emissions, facilitates fuel switch and ensures 3rd party verification
- 3. Claiming: Shipper receives verified reduction certificate



Sustainable Logistics Strategy Idea



Key Points:

- Improvements to sustainability happen in series of discrete steps
- Stakeholder expectations are often for continuous improvement and steady progress towards targets
- Sustainable fuels are controllable, fast, flexible, verified and cost effective
- Good strategy is to combine sustainable fuels and optimization projects to help achieve goals

Takeaway: Start your decarbonization journey today...

Foundation	 Know your carbon footprint Setup emission reduction targets & budget
SC Optimization	 Optimize your SC network locations Select optimal mode & routes Fully utilize container / parcel space
Transport	 Switch to sustainable fuels Ensure adaption to green technologies in your supplier base (e.g. Evs for final-mile)
Warehousing	 Retro-fit existing facilities with key technologies (e.g. solar PV, LED) Build new facilities climate neutral

LOOK INTO THE FUTURE

POWERED BY INSIGHTS FROM THE LOGISTICS TREND RADAR 6.0



Dr. Klaus Dohrmann Vice President Head of Innovation & Trend Research

Troisdorf, September 2023





WHAT WE BELIEVE IN...



Close to Customers Close to Technology Close to Operations

DHL Innovation Ecosystem

LOGISTICS TREND RADAR Delivering insight today. 6.0





High Impact Revolutionary applications that are potentially disruptive.

Low Impact Evolutionary changes with incremental improvements.

Realization The common way of operating and doing business in logistics.



SUPPLY CHAINS OF THE FUTURE

ATTRIBUTES DEFINING







CUSTOMER-CENTRIC



AUTOMATED



CONNECTED



DATA-DRIVEN

100%



SUSTAINABLE

CONNECTED & DATA-DRIVEN

Capturing data to generate actionable insights



INNOVATIO CENTER

DATA-DRIVEN ((i)) IoT Sensor Outlook

2HIL



Smart Labels

- Thin shipment tracker with printed battery
- Measurement of Temperature, Humidity, Motion, Tamper
- Tracking of high value goods
 - Monitoring of consigned inventory
 - Getting new information on shipment status (open / close)

No Labels

- Unique code generation using natural paper structure (referred to as its 'fingerprint') as identifier
- Patent pending technology to track parcels without labeling
- Return shipments without paper & labeling for ecommerce customers

DATA-DRIVEN

Computer Vision Safety in the Workplace

Artificial Intelligence Proof of Concept

- Computer vision solution to build safety rules and define the parameters around it
- Processing historical footage as well as real-time streams of video data to rapidly identify anomalous events
- Create analytics to capture evidence for transparency, improvement, and training
- Dashboard output enables H&S management to make data driven decisions
- No Hardware, no sensors, no installation- compatible with 90% of IP cameras









DATA-DRIVEN Sound AI Predictive Maintenance





Artificial Intelligence Proof of Concept

- Prediction of mechanical failure-based sorter outages
- AI-enabled noise sensors identified to provide best correlation to maintenance needs
- Objectives: increase asset availability & reduce maintenance efforts



SUSTAINABLE Leveraging the Innovation Ecosystem





LOGISTICS IS A PEOPLE BUSINESS

DHL Future of Work Trend Report





... believe technology has been helpful to their role the past 5 years

9 in 10

Leaders should utilize the workforce's enthusiasm and readiness to learn new to collaboratively transform and shape a Future of Work together.



Investment in human capital and workplace culture must come first, superseding efforts to create modern work environments.



Fulfilling the workforce's varying expectations must be carefully and



Future of Work in Logistics



IF YOU WANT GROWTH, INNOVATE. IF YOU WANT <u>EXPONENTIAL</u> GROWTH, CONNECT.

BHARAT N. ANAND

Henry R. Byers Professor of Business Administration Harvard Business School





LOGISTICS TREND RADAR

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Delivering insight today, creating value tomorrow.

YOUR TOOL TO NAVIGATE THE FUTURE!



THANK YOU!

VERIMIN