Future Trends in Safety and Quality Assurance for Ground Operations

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Acknowledgment to IATA

- - Thank IATA for their invaluable contributions and leadership in safety, sustainability, and innovation.
- - This presentation incorporates data and insights from IATA's latest workshops, particularly the **August 2024** Ground Operations Workshop.
- - IATA continues to shape the future of airside operations through their rigorous standards and guidance.

IATA Asia Pacific Ground Operations Workshop
5/6-Aug-2024

Monika Mejstrikova, Director Ground Operations, IATA

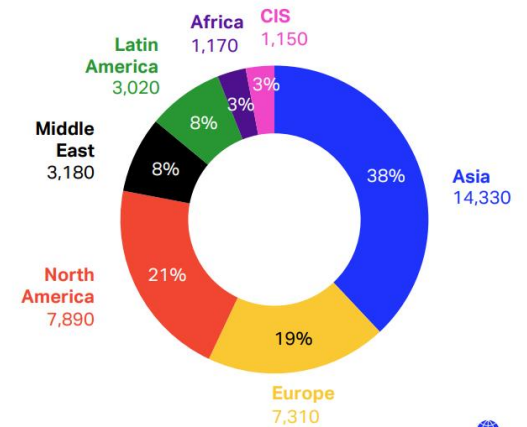Massimo Cicetti, Head of Innovation and Efficiency, IATA

Depending on the time of day or time of year, there could be anywhere from 8,000 to 20,000 planes mid-flight at any given moment,

Key Context

38,050
new airplanes
2015 to 2034

Africa 1,170   CIS 1,150
Latin America 3,020
Middle East 3,180
North America 7,890
Asia 14,330
Europe 7,310

3% 3% 8% 8% 21% 19% 38%

112

IATA

TOPIC :

1   Ai Automation in Ground Operations(Airside)
2   Green Operations

Ground Operations Service in Airport Ramp Area

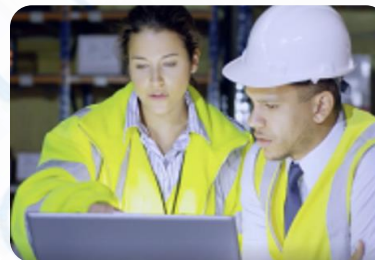Passenger Handling

Aircraft Turn-Around

Baggage Handling

Load Control

Aircraft General Safety / Servicing Operation

Airside Safety Operational Overside

AI Technology in Airside Ground Operations

- - AI-Powered Ground Support Equipment (GSE) is revolutionizing efficiency in airside operations.

- - Examples include autonomous cargo loaders, AI-assisted turnaround management systems, and self-driving tugs.

- - Benefits: Enhanced safety, optimized resource allocation, and real-time decision-making through AI data processing.
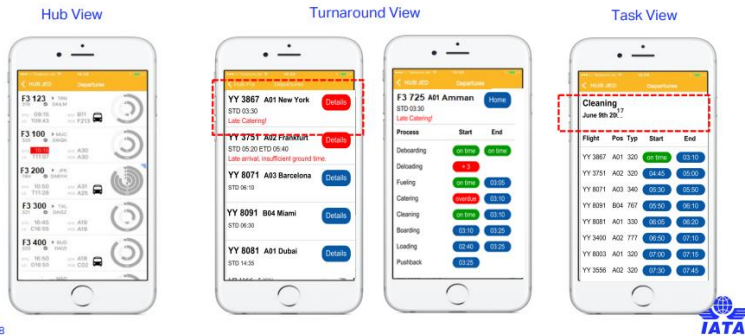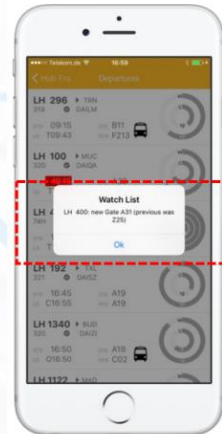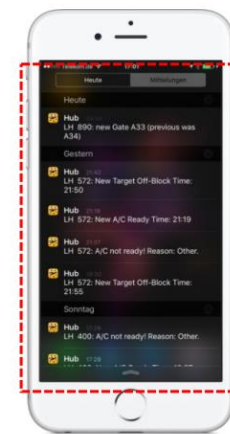
Ground Ops in Apps

Passenger Experience
Booking · Check-In · Re-booking · Navigation · Boarding
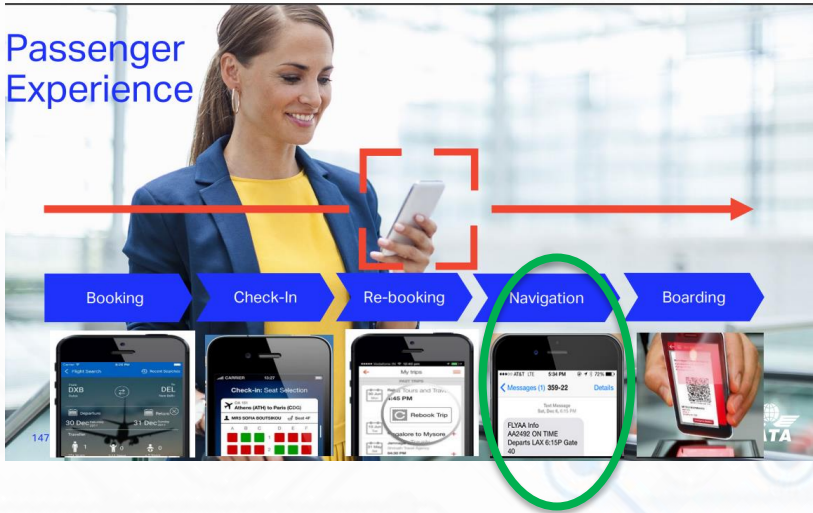
AHM 732 **Delay Code** Structure
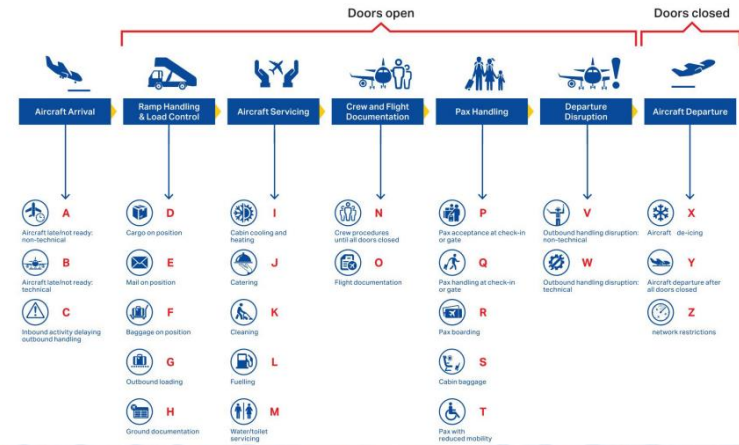
Digital Turnaround

Hub View · Turnaround View · Task View
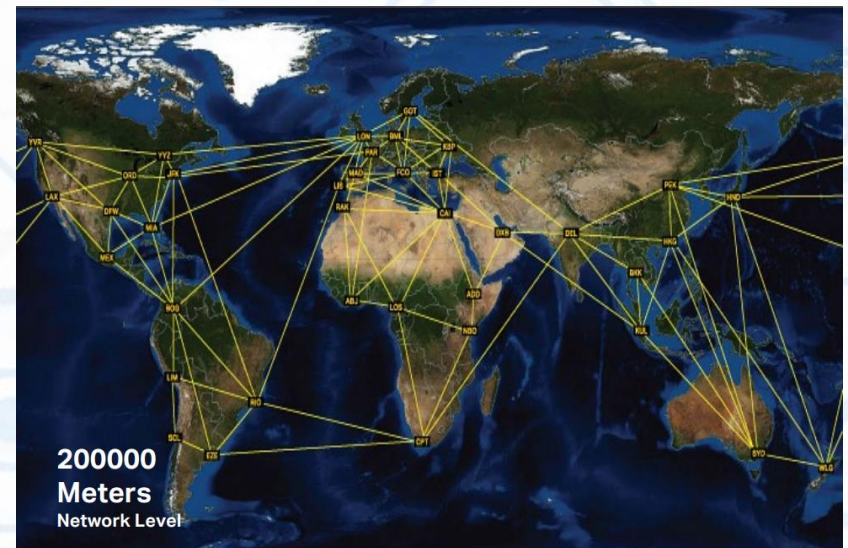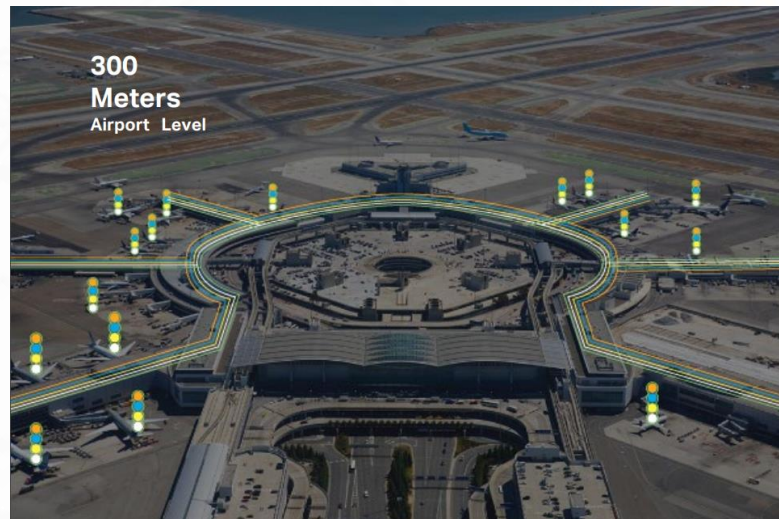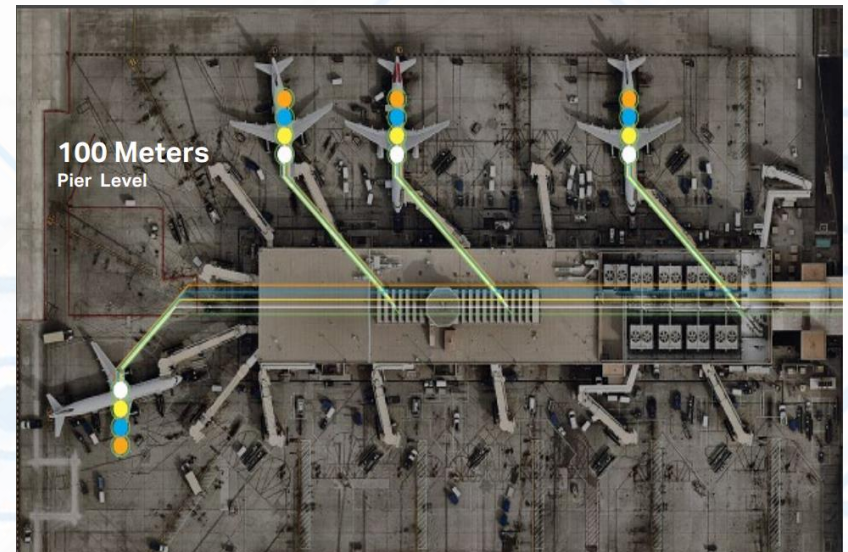

Notification · Notification Message Center · Flight related Notifications

Ai Monitor , tracking , Data : Analysis

Satellite tracking position+ monitor Operations
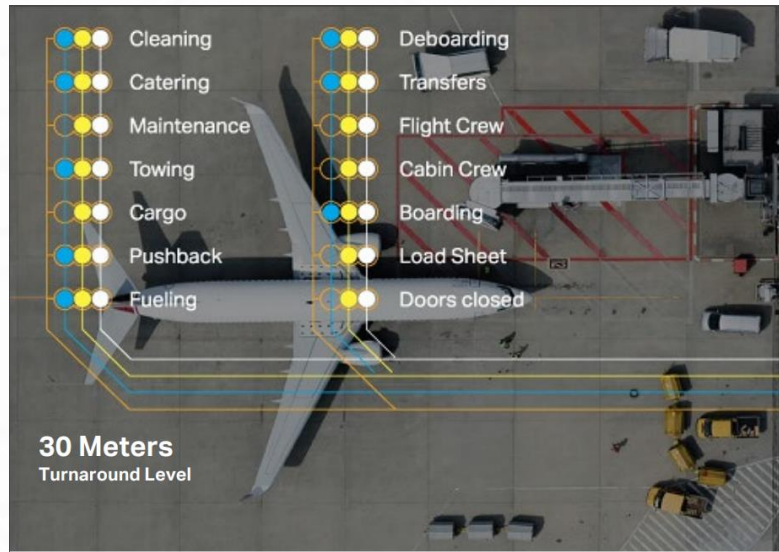
Benefit for Change

Benefits

Aircraft ... ing and Loadsheet Errors reduced 80%+

Aircraft Loading Delay reduced by 40%

Data Sto...

Paper Saved

Ground Ops. Cost Breakdown

- ✈ Aircraft Turnaround
- ⚗ Operational Delays
- 🔧 Aircraft Damage
- ✚ Health & Safety
- ☁ Environment

ROBO Taxi + No pilot on commercial flight

Topic 2 : Green Ops

2020 - 2050

How to achive

Developing Hong Kong's carbon markets

The development of voluntary carbon markets will play an important role in the fight against climate change.

Annual voluntary carbon credits issuances
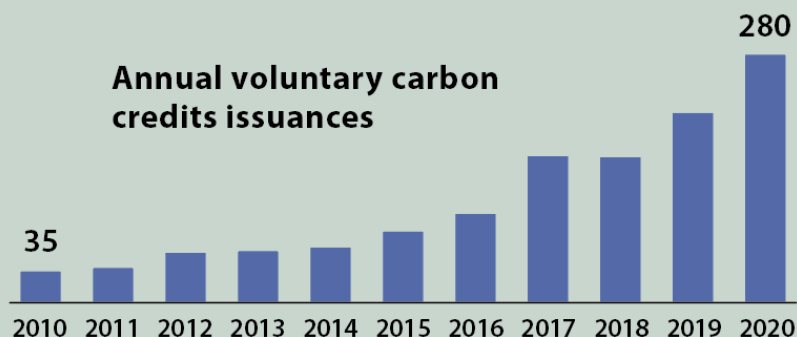
Hong Kong is well-placed to play a leading role in voluntary carbon market development. Due to its:

- Proximity to Mainland China
- Strong connections with international investors
- Deep experience in capital markets

To capitalise on the huge carbon market opportunities, Hong Kong can do the following:

- Adhere to widely recognised carbon credit standards
- Ensure an abundant supply of high-quality carbon credits
- Create a conducive ecosystem covering registries, onboarding and settlement

Source: FSDC

Things to consider - Energy Mix

World: Oil 31.9%, Coal 27.1%, Natural Gas 22.1%, Biomas 9.1%, Nuclear Energy 4.9%, Water 2.5%, Renewable Energy 1.6%

China*: Oil 18.4%, Coal 64.8%, Natural Gas 5.8%, Biomas 3.8%, Nuclear Energy 1.9%, Water 3.4%, Renewable Energy 2.0%

USA: Oil 36.3%, Coal 15.8%, Natural Gas 30.1%, Biomas 4.7%, Nuclear Energy 10.1%, Water 1.1%, Renewable Energy 1.6%

EU-28: Oil 32.9%, Coal 14.9%, Natural Gas 23.9%, Biomas 9.7%, Nuclear Energy 13.7%, Water 1.9%, Renewable Energy 2.9%

*excluding HKG
IEA World Energy Database

Legend: Oil, Coal, Natural Gas, Biomas, Nuclear Energy, Water, Renewable Energy, Other

How to collect data , IF state Authorities Request

GSE CO_2 Emissions

GSE Category	Average GSE Fuel* Consumption liter per hour	Average CO_2 Emissions Traditional GSE kg/h	Average GSE Electricity Consumption kWh per Ops Hour	Average CO_2 Emissions eGSE kg/h
Cargo / Baggage Tractor	6.32	16.75	12.10	5.74
Cargo Load / High Loader	5.50	14.58	7.80	3.70
Belt Loader	5.79	15.34	12.24	5.80
Container / Pallet Transporter	2.70	7.16	12.70	6.02
Push-back / Tow Tractor	11.20	29.68	27.50	13.03
Aircraft Refueling Vehicle	15.71	41.63	15.71	41.63
Ground Power Unit (GPU)	12.20	32.33	27.50	13.04
Catering Vehicle	3.12	8.27	15.90	7.54
Lavatory Service Vehicles	2.70	7.16	13.90	6.59
Potable Water Trucks	2.28	6.04	12.40	5.88
Passenger Stairs	1.20	3.18	0.00	0.00
Crew Bus	0.99	2.62	2.93	1.39
Passenger Bus	3.35	8.88	11.34	5.38
Car / Van	0.88	2.34	2.32	1.10
Pick-ups of ramp personnel	1.18	3.12	2.62	1.24
Air Conditioning Unit (ACU)	20.00	53.00	85.00	40.29
TOTAL	**95.12**	**252.07**	**261.95**	**158.35**

GSE Noise Comparison

Very high ≥ -13dB(A)
High ≥ -10dB(A)
Medium ≥ -3.1dB(A)
Low ≤ -3dB(A)

GSE Category	Noise Emissions Traditional GSE dB(A)	Noise Emissions eGSE dB(A)	Difference dB(A)	Impact
Cargo / Baggage Tractor	83.00	70.70	-12.30	High
Cargo Load / High Loader	84.87	77.80	-7.07	Medium
Belt Loader	80.55	67.50	-13.05	Very high
Container / Pallet Transporter	81.00	73.50	-7.50	Medium
Push-back / Tow Tractor	86.20	78.40	-7.80	Medium
Aircraft Refueling Vehicle*	79.00	N/A	0.00	N/A
Ground Power Unit (GPU)	76.50	63.40	-13.10	Very high
Catering / Cleaning Vehicle	74.00	68.00	-6.00	Medium
Lavatory Service Vehicles**	75.40	68.20	-7.20	Medium
Potable Water Trucks**	74.90	69.20	-5.70	Medium
Passenger Stairs	65.00	63.00	-2.00	Low
Crew Bus	73.00	65.00	-8.00	Medium
Passenger Bus	74.80	64.90	-9.90	High
Car / Van	67.00	58.00	-9.00	Medium
Pick-ups of ramp personnel	73.19	65.00	-8.19	Medium
Air Conditioning Unit (ACU)***	85.00	82.00	-3.00	Low
Ambient Noise	63.00	63.00	0.00	
TOTAL			Ø -7.50 dB(A) per GSE	

Aircraft Types & GSE Assumptions

RJ / TP

A320 Neo (ULD)

A320 Bulk

B737F

A350

B747F

Assumptions:

- Drive & idle emissions included in the averages
- Nose-in parking (push-back needed)
- Fueling w/o hydrant
- Lavatory / Potable Water / Catering dependent on the station
- Stairs used instead of Boarding Bridge
- Stairs only use energy while being positioned, afterwards they are off and secured
- Use time of cargo / baggage tractors includes shuttle between facility / warehouse and the aircraft
- Mobile GPU use

CO_2 Emissions Difference per Turn-Around

| Aircraft Type	Average CO_2 Emissions Traditional GSE kg per Turn-Around	Average CO_2 Emissions eGSE kg per Turn-Around	Difference
RJ / TP	50.4	26.0	- 48.41 %
A320 (ULD)	112.3	65.9	- 41.32 %
A320 (Bulk)	104.6	50.0	- 52.2 %
B737F	77.8	40.82	- 47.53 %
A350	278.91	181.36	- 34.97 %
B747F	268.55	142.48	- 46.95 %

GREEN GSE

NOISE
Reduction between 5.5 dB(A) up to 8.3 dB(a) of Noise

CO_2
Reduction between 35% up to 52.2% of CO_2 emissions
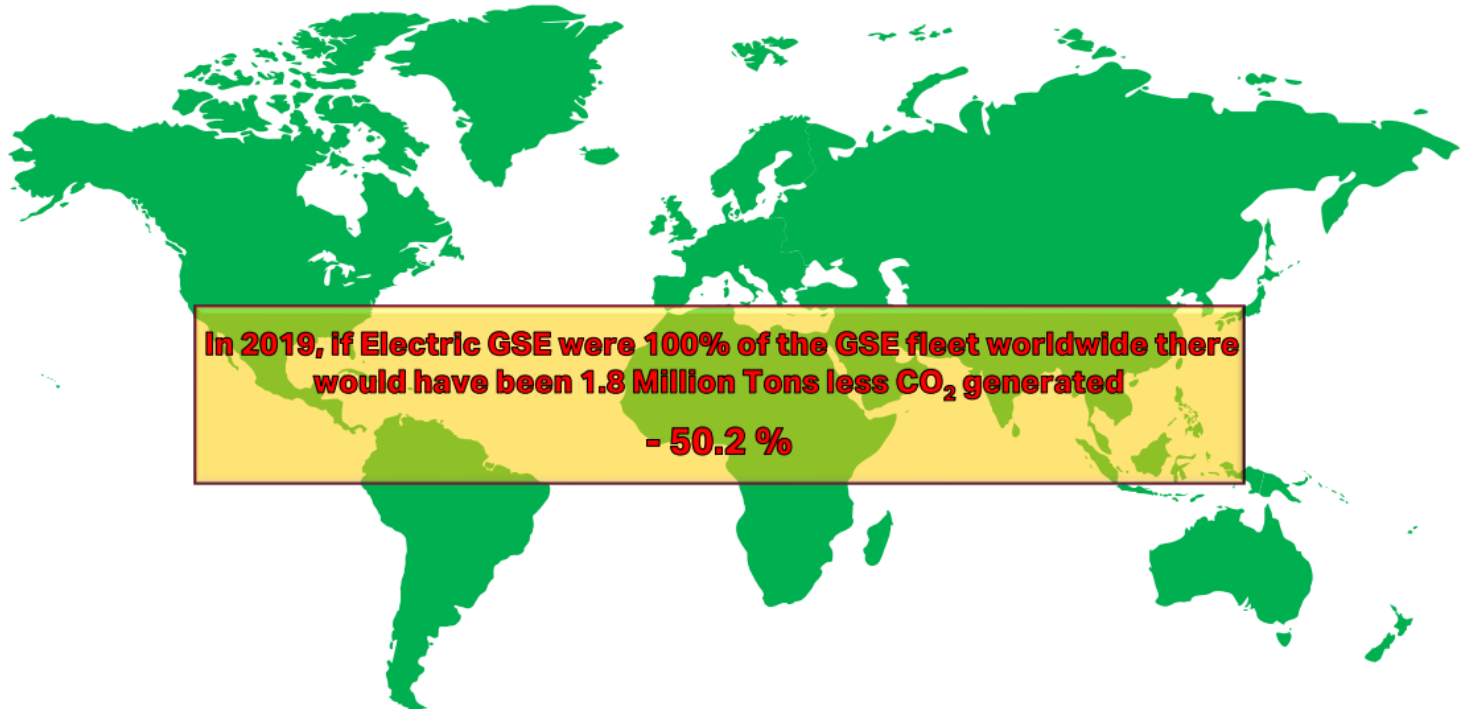
In 2019, if Electric GSE were 100% of the GSE fleet worldwide there would have been 1.8 Million Tons less CO_2 generated

- 50.2 %

Green Operations in Airside Activities

- - Transitioning to electric Ground Support Equipment (eGSE) reduces carbon emissions by up to 52% and noise by up to 13 dB(A).

- - Green technology includes electric-powered pushback tugs, energy-efficient baggage handling systems, and sustainable fuels for ground operations.

- - Real-world examples from leading airports adopting IATA's green operational standards.

Green Operations and the 4 P's

- - **People**: Improving staff working conditions and safety with cleaner, quieter technology.

- - **Planet**: Lowering emissions, reducing environmental impact, and complying with global sustainability goals.

- - **Partnership**: Collaborating across the aviation industry to standardize and promote green practices.

- - **Profit**: Achieving long-term savings with reduced fuel consumption, lower maintenance costs, and improved efficiency.

AI-Driven Ground Support Equipment
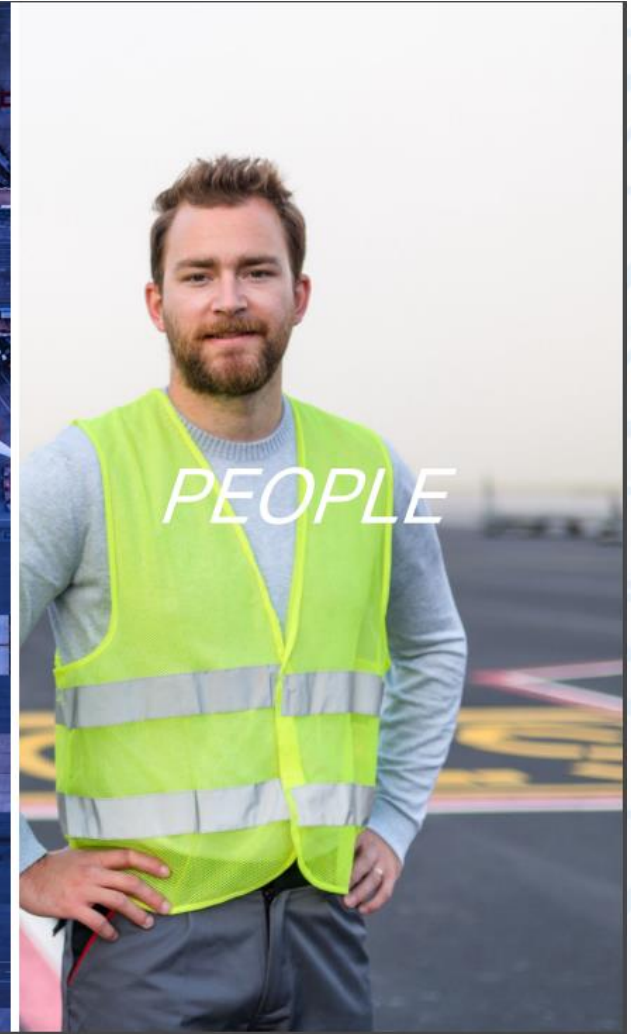
Sustainable Ground Support Equipment

Green GSE

Sustainable fuel

GSE pooling

Sustainable taxi

Conclusion

- - New AI technologies and green operations are critical for the future of airside ground handling.

- - Electric GSE, AI-driven equipment, and sustainable practices offer operational improvements while reducing environmental impact.

- - Industry-wide collaboration, led by organizations like IATA, is essential for achieving these goals.

Questions?

- - Thank you for your attention!
- - I'm happy to answer any questions about AI and green innovations in airside ground operations.

THANK YOU