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SMART GREEN MOBILITY

HyTruck

HyTruck Breakfast Briefing

LATVIAN HYDROGEN ASSOCIATION

March 6th 2024





Latvian Hydrogen Association is an NGO established in 2005 with an aim of hydrogen application development and implementation in Latvian and the Baltic States region as also to support development of Hydrogen economics by using only local renewable resources and hydrogen as energy carrier to provide energetics, transportation and manufacturing industries with the least negative effect to nature, and to support environment friendly energy source for production and consumption.

H2LV mission is to unite scientist and businessman societies, who work with technologies and materials while exploring renewable resources and their potential, to solve questions that hold importance to society as whole.

Member of **Hydrogen Europe**



BSR Hydrogen Air Transport

Preparation of Baltic Sea Region Airports for Hydrogen Air Transport

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Latvian Hydrogen Association
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BSR Hydrogen Air Transport

Project partnership: 16 project partner and 24 associated organisations, 40 airports

Associated organisations

No.	Organisation (English)	Organisation (Original)	Country
AO 1	Everfuel A/S	Everfuel A/S	DK
AO 2	Wielkopolska Hydrogen Platform	Wielkopolska Platforma Wodorowa	PL
AO 3	Aviasabiedriba Liepaja Ltd. (Liepaja Airport)	SIA "Aviasabiedriba "Liepāja""	LV
AO 4	Swedish Transport Administration	Trafikverket	SE
AO 5	Airport Regions Council	Airport Regions Council	BE
AO 6	VITERA OY	VITERA OY	FI
AO 7	Ministry of Transport and Communication	Liikenne- ja viestintäministeriö	FI
AO 8	Ministry of Transport Republic of Latvia	Satiksmes ministrija	LV
AO 9	Civil Aviation Agency	Valsts aģentūra "Civīlās aviācijas aģentūra"	LV
AO 10	Estonian Aviation Academy	Eesti Lennuakadeemia	EE
AO 11	Estonian Association of Hydrogen Technologies	Eesti Vesinikutehnoloogiate Ühing	EE
AO 12	Non-profit association Estonian Aviation Cluster	MTÜ Eesti Lennundusklastar	EE
AO 13	Estonian Transport Administration	Transpordiamet	EE
AO 14	University of Tartu	Tartu Ülikool	EE
AO 15	Ministry of Economic Affairs, Transport, Employment, Technology and Tourism Schleswig-Holstein	Ministerium für Wirtschaft, Verkehr, Arbeit, Technologie und Tourismus des Landes Schleswig-Holstein	DE
AO 16	Ministry of Environmental Protection and Regional Development	Vides Aizsardzības un Reģionālās Attīstības Ministrija	LV
AO 17	Hamburg Aviation	Hamburg Aviation e.V.	DE
AO 18	ZeroAvia Inc.	ZeroAvia Inc.	Other
AO 19	Estonian Air Navigation Services	Lennuliikuteeninduse Aktsiaselts	EE
AO 20	Diamond Sky	Diamond Sky OÜ	EE
AO 21	ZAL Center of Applied Aeronautical Research	ZAL Zentrum für Angewandte Luftfahrtforschung GmbH	DE
AO 22	Ministry of Economy and Innovation	Behörde für Wirtschaft und Innovation Hamburg	DE
AO 23	Air Baltic Corporation AS	Air Baltic Corporation AS	LV
AO 24	Regional Jet OÜ	Regional Jet OÜ	EE

¹⁾ Further project partner in Latvia: SIA Gulfstream Oil, Latvia University of Life Sciences and Technologies



BSR Hydrogen Air Transport
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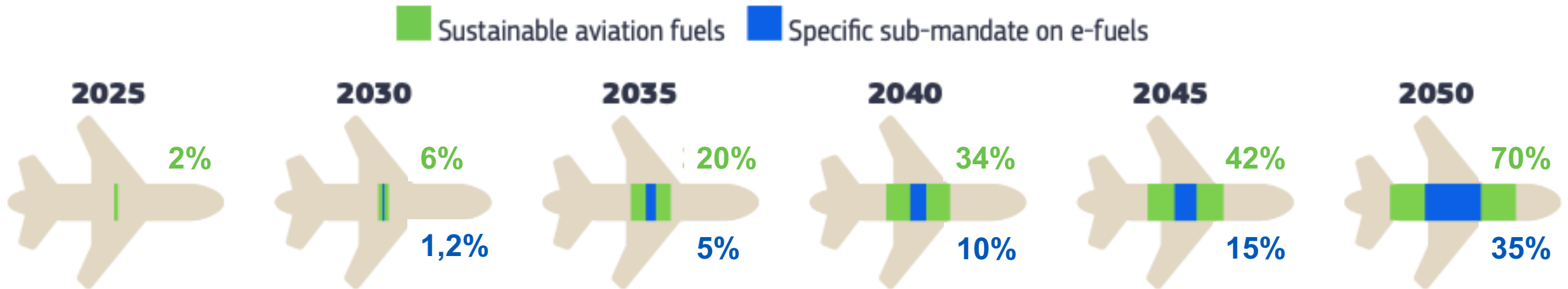
Project partners



BSR Hydrogen Air Transport

Background

- Demand for gaseous hydrogen (GH₂) powered general / regional aircrafts (<20 seats)
- First aircraft prototypes available, increasing players on the market
- Fitfor55 / European Hydrogen strategy (goals, requirements, demands, politics)



BSR Hydrogen Air Transport

Objectives

- Creating hubs for gaseous hydrogen at regional partner airports
- Contribution to development of legal frameworks
- Generate knowledge regarding technical requirements
- Combined infrastructure for General / Regional Aviation **and** Ground Support Equipment (synergy effects)
- Improvement of the functional and stable destinations network

Preparation of Baltic Sea Region Airports for Hydrogen Air Transport

Project structure

WP1

Preparing solutions

- Elaborating solutions for the use of hydrogen at Baltic Sea Region airports

WP2

Piloting and evaluating solutions

- Piloting and evaluating concept solutions for use of hydrogen at Baltic Sea Region airports

WP3

Transferring solutions

- Enabling target groups to get ready for hydrogen powered aircraft / vehicles

Elaborating solutions for the use of hydrogen at Baltic Sea airports

Work Package 1: Preparing Solutions

WP1

Preparing Solutions

for the use of hydrogen at Baltic Sea Region airports

- **WP 1.1 Legal Framework** – Identification of relevant legal requirements, needs for amendment, and development of suggestions for legal standards on GH₂ supply at airports
- **WP 1.2 Supply Chain** – Demand analysis and production/supply analysis for GH₂ at Baltic Sea Region airports, analysis on requirements and solutions for the transport and storage of GH₂ to/at airports
- **WP 1.3 Aircraft Handling** – Requirements and solutions for the transport of GH₂ to aircraft and the fuelling process, development of additional standards and safety measures for handling of GH₂ powered aircraft
- **WP 1.4 Airport Equipment** – Use cases and solutions for different uses of GH₂ as a source of energy for airport facilities and airport equipment
- **WP 1.5 Business Case** – Estimation of costs for GH₂ provision at Baltic Sea Region airports, analysis of business cases and possible funding needs for GH₂ supply chains and infrastructure

Piloting and evaluating concept solutions for hydrogen at airports

Work Package 2: Piloting and Evaluating Solutions

WP2

Piloting and Evaluating Solutions

for the use of hydrogen at Baltic Sea Region airports

- **WP 2.1 Supply Chain** – Piloting proposed GH₂ supply chain logistics to selected Baltic Sea Region airports and testing on-site storage solutions for GH₂ at airports
- **WP 2.2 Aircraft Handling** – Testing and evaluating concepts on handling of GH₂ powered aircraft and proposed processes for aircraft refuelling at Baltic Sea Region airports including demonstration flights on routes of scheduled air transport
- **WP 2.3 Airport Equipment** – Piloting and assessing proposed solutions for GH₂ powered ground equipment at Baltic Sea Region airports
- **WP 2.4 Business Case** – Reviewing and amending the business case concepts based on findings of pilots and tests on GH₂ uses at Baltic Sea Region airports

Enabling target groups to get ready for hydrogen powered aircraft

Work Package 3: Transferring Solutions

WP3

Transferring Solutions

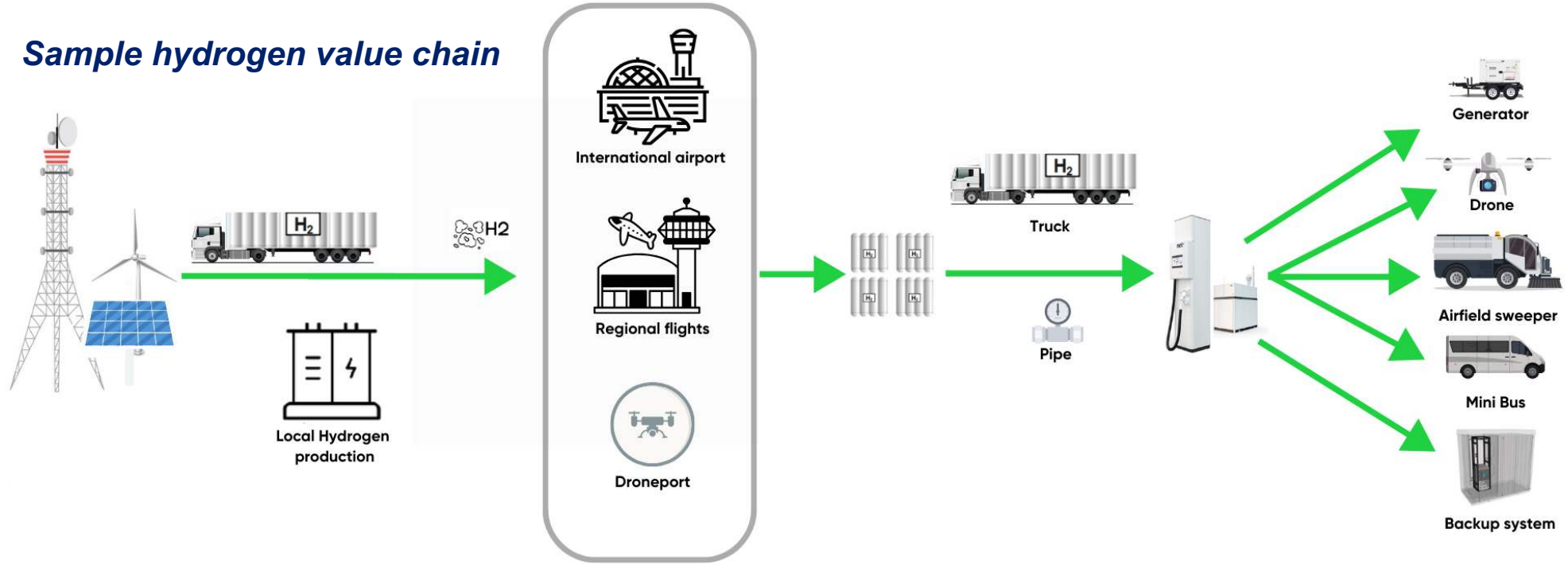
for the use of hydrogen at Baltic Sea Region airports

- **WP 3.1 Communication** – Communicating and transferring ready solutions to target groups both inside and outside of the partnership and encouraging use by target groups
- **WP 3.2 Durability Plan** – Elaborating further use of project results by project partners and planning of activities to keep solutions functional beyond project duration

BSR Hydrogen Air Transport



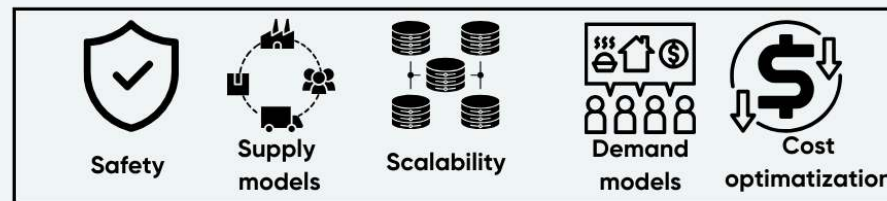
Sample hydrogen value chain



Procedures



Research



Fuel Cell Back up Power solution



Development of Fuel Cell Back up Power solutions unit

AI Cooperation Ltd

5 kW 48VDC

Proton exchange membrane (PEM) hydrogen fuel cell

Hydrogen capacity for 12 h operation, upgradable

Project supported by «Energetikas un Transporta Kompetences Centrs»





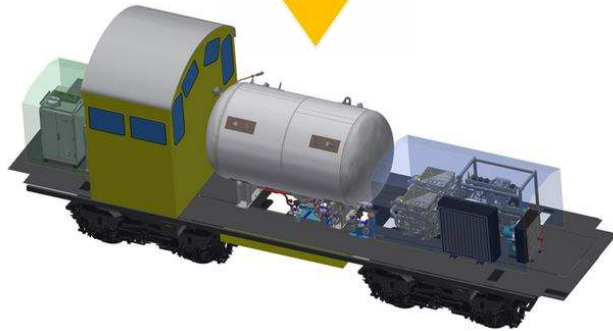
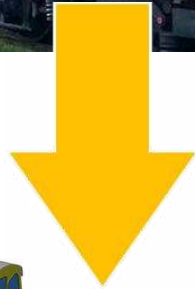
COOLERGY S.L.

FROM THE SPRING TO THE STREAM

RETROFITTING OF
LOCOMOTIVE TGM4

PARTS LIST			
QTY	DESCRIPTION	UNIT	REMARKS
1			
1	CCHT0512.02.101-01	Disk	
1	CCHT0512.02.102	Ring	
1	CCHT0512.02.102-01	Ring	
1	CCHT0512.02.103	Plug	
1	CCHT0512.02.104	Shell	

Fuel Cell solution in railways



Hood: new for better visibility

Items to be removed:

- Diesel Engine
- Fuel tank
- Hydromechanical transmission
- Batteries

New Compressor: driven by electric motor

New Traction System

New Control System

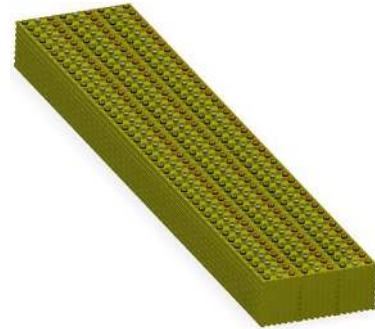
New Power Generation System:

- Fuel cell
- Battery pack
- Hydrogen tank

Fuel Cell solution in railways



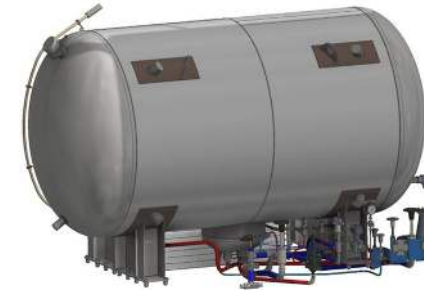
- AC traction motor 400 kW,
- Pragoimex, Czechia
- Gearbox,
- Aurora Engineering, Czechia
- Compressor
- MONDO, Czechia



Battery pack, 200 kWh
MoreRange, Spain



Fuel cell, 200 kW
Ballard, Canada



Hydrogen tank,
350kg H2
Coolergy, Spain

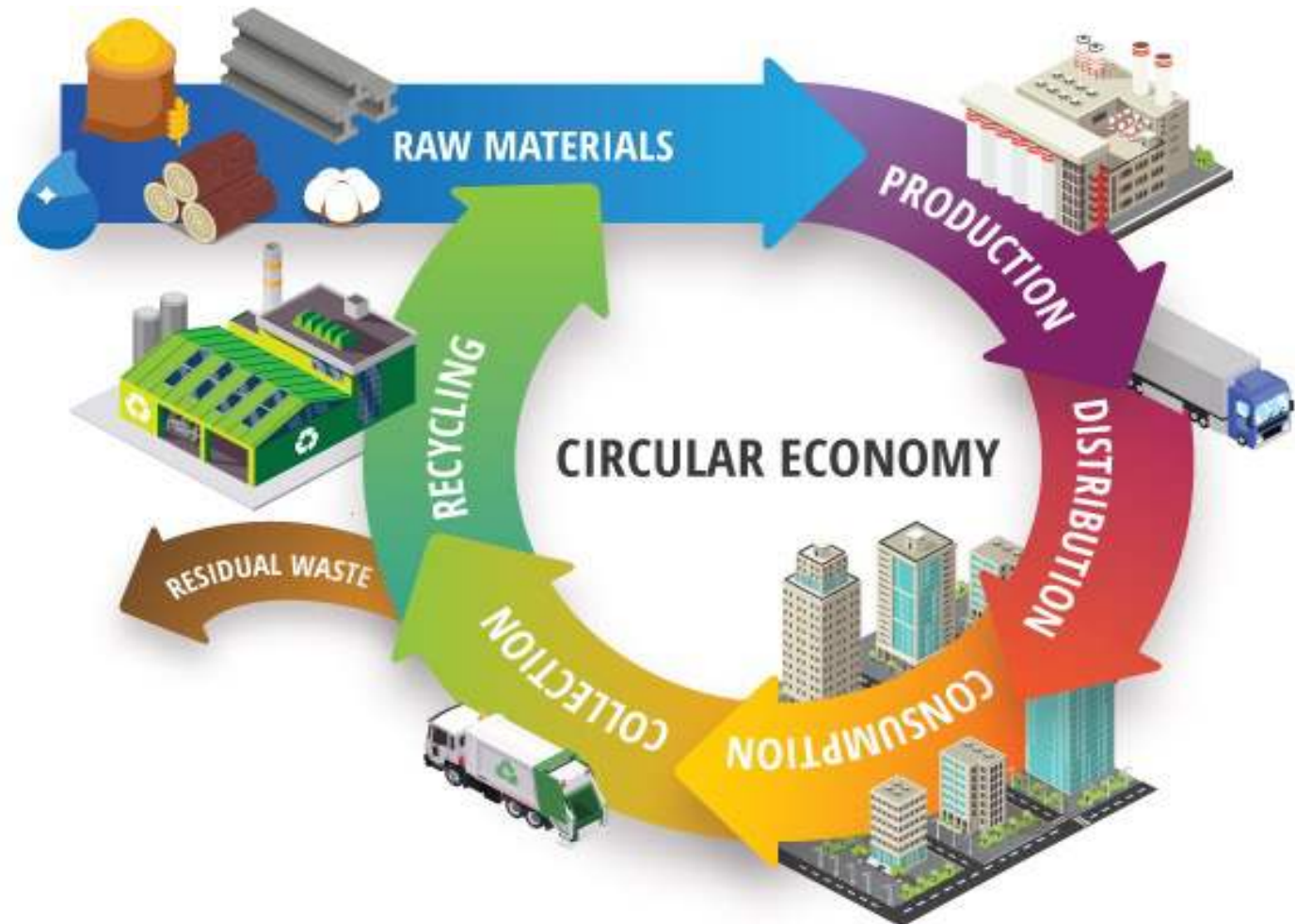
The Circular Economy for Riga and Tartu Waste Management Facilities CERITA aims to promote a circular economy approach in managing waste. The CERITA seeks to utilize the potential of hydrogen and its derivatives to improve the value chain of waste management facilities in the region.

Circular Economy for Riga and Tartu Waste Management Facilities

The traditional method of disposing of waste in landfills is no longer sustainable due to the impact it has on the environment.

Waste management facilities need to move towards a more sustainable and circular approach to reduce the amount of waste that is landfilled and to minimize the environmental impact of waste management.

There is a need for innovative solutions that utilize new technologies and business models to create a more sustainable waste management system.





Thank you!

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