

# HyLIFT-EUROPE

(303451)

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## HyLIFT

*Clean Efficient Power  
For Materials Handling*



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# PROJECT OVERVIEW

- HyLIFT-EUROPE - Large scale demonstration of fuel cell powered materials handling vehicles
- Topic SP1-JTI-FCH.2011.4.1: Demonstration of fuel cell-powered Material Handling Equipment vehicles including infrastructure
- Start date: 01 JAN 2013  
end date: 31 DEC 2017
- Total budget: 20.2 Mio €  
FCH JU contribution: 9.3 Mio €
- **Overall purpose:** demonstration of 200 hydrogen powered fuel cell materials handling vehicles
- Stage of implementation: 37% project duration passed

Partners HyLIFT-EUROPE  
Coordinator



Vehicles



Infrastructure



TCO



Testing



Vehicle Usage



Fuel Cell Systems



Communication



Co-Funded by



# PROJECT TARGETS AND ACHIEVEMENTS

Aspect addressed	MAIP target (2015)	Project target	Current status/ achievements	Expected final achievement
Number of industrial and off-highway vehicles	500	200	0	200



Source: Plug Power Inc.

# PROJECT TARGETS AND ACHIEVEMENTS

Aspect addressed	AIP target (AIP 2011)	Project target	Current status/ achievements	Expected final achievement
Number of FC-systems	>50 units	up to 200 units	0	200
FC system life time (h)	>7,500 h	10,000 h	No vehicles in demo yet	10,000 h
FC system efficiency (%)	>45%	45-50%	No vehicles in demo yet	45-50%
FC system sales price	<3,000 €/kW	<2,300 €/kW	No agreements with vehicle-users signed yet	<2,300 €/kW
Refuelling time	3 minutes	~3 minutes	No HRS installed yet	~3 minutes

# PROJECT TARGETS AND ACHIEVEMENTS

Aspect addressed	AIP target (AIP 2011)	Project target	Current status/ achievements	Expected final achievement
HRS availability	--	98%	No HRS installed yet	98%
H2 price at pump	<10 €/kg	8-12 €/kg (average <10 €/kg)	No agreements for hydrogen supply signed yet	8-12 €/kg (average <10 €/kg)



Source: H2 Logic

## Achievements in HyLIFT-DEMO



Source: STILL



# PROJECT TARGETS AND ACHIEVEMENTS

- In the USA ~5,400 vehicles in operation (Europe ~70)
- In the USA vehicles are close to be fully commercial (tax credit programme still in place)
- The plan in HyLIFT-EUROPE is to bring 200 vehicles in operation (currently 0)
- With the extended project duration there is a very high chance that this target can be achieved



# PROJECT TARGETS AND ACHIEVEMENTS

- Target: base projects on business plans & committed partners to continue pathway to volume deployment and commercial rollout
- As this project is the logical **next step after HyLIFT-DEMO** and before the start of the supported market deployment, the partner selection focused clearly on fully committed partners to commonly enter into the commercialisation
- Because of some changes in the focus and business plans of some of the partners, the project saw a **change in the composition of the consortium**. The required Contract Amendment is in the signing procedure
- After the finalisation of the Contract Amendment the new consortium will be in a position to base projects on the partners' business plans and **all partners are committed to continue the pathway to volume deployment and commercial rollout**

# RISKS AND MITIGATION

- As the project is still in a premature phase, the probability of achieving all project objectives and targets can be stated as being very high
- The most critical bottleneck in HyLIFT-EUROPE is of course the **identification of sufficient vehicle-users** providing the required commitment
- Based on the number and seriousness of current requests and discussions, some of them triggered by HyLIFT-DEMO, the consortium is optimistic, that the set targets can be reached
- All of the original targets are still appropriate



# SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

- HyLIFT-DEMO - European demonstration of hydrogen powered fuel cell materials handling vehicles; 2011-2014
  - Preceding project of HyLIFT-EUROPE. All experiences, learnings and non-confidential information to be applied in HyLIFT-EUROPE
  - Common partners: LBST, H2 Logic, JRC and EHA
  - STILL and MULAG vehicles have been used in HyLIFT-DEMO
- HAWL - Hydrogen At Warehouse Logistics; 2013-2016
  - HyLIFT-EUROPE will provide input to warehouse installation guidelines and to RCS work in this field
  - Common partner: Air Liquide

# DISSEMINATION ACTIVITIES

- Conference participation with presentations
  - In total, about 10 HyLIFT presentations given since the project start in 2013 e.g. f-cell, EHEC
- Workshops organized by the project
  - Dissemination workshops at midterm and project end
  - Open days at vehicle-user sites
- Publications and patents
  - 7 articles (mainly German) already issued in magazines (materials handling and FCH); more to come
  - Patents not planned to be filed
- Vehicle user group to be established

# EXPLOITATION PLAN/EXPECTED IMPACT

- The technology is far from being fully commercial
- Therefore deployment support mechanisms are required beyond HyLIFT-EUROPE; on EU, national and regional level
- This has to be seen in the light of the success of materials handling vehicles in the USA, where based on very comfortable support mechanisms already 5,400 hydrogen powered FC materials handling vehicles are in operation
- **Without financial support** from further demonstration activities or comparable financial or regulatory support or market introduction mechanisms beyond HyLIFT-EUROPE the entry into **the full commercialisation of hydrogen powered FC materials handling vehicles is endangered**

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Thanks for your attention!

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Backup



# PROJECT TARGETS AND ACHIEVEMENTS

- Target: **lean consortium** to focus on demonstration activities and to involve system developers, materials handling equipment providers, technology providers, fuel suppliers, end users and supporters for permitting and RCS development
- In order to allow as much demonstration as possible the HyLIFT-EUROPE consortium comprises **only one partner for each stage** of the overall value chain (exemption vehicles)
- At the beginning the project experienced some hick-ups with regard to the consortium composition. All hick-ups could be solved in a Contract Amendment to be finalised in NOV 2014
- After the Contract Amendment the project consortium will consist only of fully committed partners. Partners from all technology segments necessary for a successful implementation of the project are on board. Intentionally, **vehicle-users are not on board**

# SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

- HyLIFT-DEMO - European demonstration of hydrogen powered fuel cell materials handling vehicles; 2011-2014
  - HyLIFT-DEMO can be seen as the preceding project of HyLIFT-EUROPE. All experiences, learnings and non-confidential information such as improvements in the customer identification process of HyLIFT-DEMO can be directly transferred and applied in HyLIFT-EUROPE. The smooth and tight cooperation between these two projects was safeguarded by LBST (coordinating both projects), H2 Logic, JRC and EHA, all participating in both projects
  - Furthermore, STILL and MULAG, whose vehicles have been already applied in HyLIFT-DEMO, are partners in HyLIFT-EUROPE
- HAWL - Hydrogen At Warehouse Logistics; 2013-2016
  - HyLIFT-EUROPE coordinates with the HAWL project and will provide input to warehouse installation guidelines and to RCS work in this field via its public deliverables. A smooth cooperation is safeguarded by Air Liquide, partnering in both projects

# HORIZONTAL ACTIVITIES

- Target: Show solid approach for permitting and provide recommendations with regard to RCS in this area
- Partner Element Energy will coordinate with the HAWL project and draft a **best practice guideline for HRS installations**
- Based on the experiences in previous demonstration activities, the HyLIFT-EUROPE partners can endorse that sufficient RCS are in place to conduct the demonstration activities planned. Identifying needs for future RCS has been completed in the framework of the HyLIFT-DEMO project. However, the initiation hereof will depend on the interest on both European and national levels, which may be out of control of HyLIFT-EUROPE
- Furthermore, with regard to Regulations, Codes and Standards HyLIFT-EUROPE has produced a draft **Deliverable “Installation of airside hydrogen refuelling stations in airports: lessons learnt and best practice guide”**
- Public awareness: the consortium participated in the CeMAT and the InterAirport fair. At both events a fuel cell vehicle has been exposed. Furthermore, a press release has been published in JUN 2013: Hydrogen to revolutionise drive trains of materials handling vehicles in Europe” (joint press release with HyLIFT-DEMO)

# DISSEMINATION ACTIVITIES

- Conference participation with presentations
  - In total, about 10 HyLIFT presentations have been given since the project start in JAN 2013 e.g.
  - 01 OCT 2013, Stuttgart, f-cell
  - 13 MAR 2014, Seville, European Hydrogen Energy Conference
- Workshops organized by the project
  - Dissemination workshops are planned after the midterm evaluation and at the end of the project, with a number of open days also occurring at vehicle-user sites targeting key enablers in the future commercialisation of hydrogen fuel cell materials handling vehicles, particularly at the airports which present a very high-profile dissemination opportunity
- Publications and patents
  - In total, 7 articles have been issued in (mainly German) magazines in the fields of materials handling and FCH. Patents are not planned to be filed