



## D5.1 Supply of provisional HRs and hydrogen for temporary sites

Report Status FINAL  
Report September 2015

PU – Public

### Acknowledgement

The research leading to these results has received funding from the European Union's 7<sup>th</sup> Framework Program (FP7/2007-2013) for the Fuel Cells and Hydrogen Joint Undertaking Technology Initiative under Grant Agreement Nr. 303451.



The project partners would like to thank the EU for establishing the fuel cells and hydrogen framework and for supporting this activity.

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## Contents

<b>Figures</b> .....	<b>4</b>
<b>Executive Summary</b> .....	<b>5</b>
<b>1 Forklift demonstration : AL / STILL at Carrefour premises</b> .....	<b>6</b>
<b>2 Air Liquide supports for demonstration</b> .....	<b>8</b>
2.1 A truck to facilitate the hydrogen demonstrations in warehouse .....	8
2.2 Transfill system for OEM qualifications.....	9
<b>3 Conclusion</b> .....	<b>10</b>

## Figures

Figure 1:	Demonstration of a Hydrogen fuel cell forklift at Carrefour .....	6
Figure 2:	Demonstration of the principle of the hydrogen charging station with a dispenser installed onsite .....	6
Figure 3:	Explanations of the functioning of the Hydrogen Charging Station to Carrefour management .....	7
Figure 4:	Air Liquide for demonstrations at end-user premises .....	8
Figure 5:	Inside view of the truck with the hydrogen.....	8
Figure 6:	Example of a worker coming inside the truck to fill in a forklift .....	9
Figure 7:	Air Liquide transfilling system.....	9

## Executive Summary

This document aims first to report the demonstration of the hydrogen solution in warehouses, organised by Still and Air Liquide, which took place at Carrefour premises, in France, in 2014. In a second part, it displays the tools developed by Air Liquide to enhance the hydrogen demonstrations, both for the end-users of the solution and for the OEMs (Original Equipment Manufacturers).

## 1 Forklift demonstration : AL / STILL at Carrefour premises

In October 2014 Still and Air Liquide organized together a demonstration of the hydrogen solution at Carrefour premises, in France, at Plaisance du Touche (31).



**Figure 1: Demonstration of a Hydrogen fuel cell forklift at Carrefour**

During this demonstration, 2 STILL trucks (one pallet trucks and one order picker) have been tested. A hydrogen dispenser had been installed onsite to show the exact principle of the solution and to give the possibility to the end-users to charge the forklifts.



**Figure 2: Demonstration of the principle of the hydrogen charging station with a dispenser installed onsite**



**Figure 3: Explanations of the functioning of the Hydrogen Charging Station to Carrefour management**

The feedbacks from Carrefour following the demonstration were very positive. They are still considering implementation of the solution.

## 2 Air Liquide supports for demonstration

### 2.1 A truck to facilitate the hydrogen demonstrations in warehouse

Experience has shown that the end-users appreciate to have the possibility to deploy the solution onsite over a couple of days. Their main objectives are to understand better the solution and to test globally its interest before committing to deploy the hydrogen solution onsite which goes with the installation of a proper Hydrogen Charging Station.

For this specific purpose, Air Liquide developed a truck to make short onsite demonstrations easier. The truck contains a temporary Hydrogen Charging Station (HCS), with a lower capacity to refill than a permanent HCS but which has the major advantage to be movable from one site to another easily. The pictures which follow give more details for this product.



**Figure 4: Air Liquide for demonstrations at end-user premises**



**Figure 5: Inside view of the truck with the hydrogen**





**Figure 6: Example of a worker coming inside the truck to fill in a forklift**

This demonstration truck has not been used at Carrefour premises because it was not compatible with the site specificities: there was not enough room to park the truck in the optimal position. For this reason, another system has been used, which is further explained in next section.

## 2.2 Transfill system for OEM qualifications

To develop the market, the qualification of the forklifts with existing fuel cells is essential. This requires that the OEMs could make tests with hydrogen at their own facility for a longer period. For this purpose, Air Liquide developed a transfilling system to answer this specific need.



**Figure 7: Air Liquide transfilling system**

### **3 Conclusion**

Demonstrations play a significant role to further extend the social acceptance and to convince the end-users. Another demonstration took place at SEAT Barcelona in 2015, in Spain and was also a success.

The two supports for hydrogen demonstrations specifically developed for the forklift market by Air Liquide, represent valuable tools to launch the market and to convince the first end-users. They can contribute both to convince the end-users and to promote the forklifts qualifications directly at the OEM's factory sites.