

High V.LO City (GA n° 278191)

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0. Project & Partnership description (1 slide)

General Overview

- **Full title:** Cities speeding up the integration of hydrogen buses in public fleets
- **Duration:** 5 years
- **Total budget:** 31.586.671,- €
- **FCH JU contribution:** max 13.491.724,- €
- **Consortium:** 12 partners from 5 EU countries



VANHOOL



WaterstofNet



HyRaMP



Dantherm[®]
Power



Ballast Nedam

1. Project achievements

- Project description

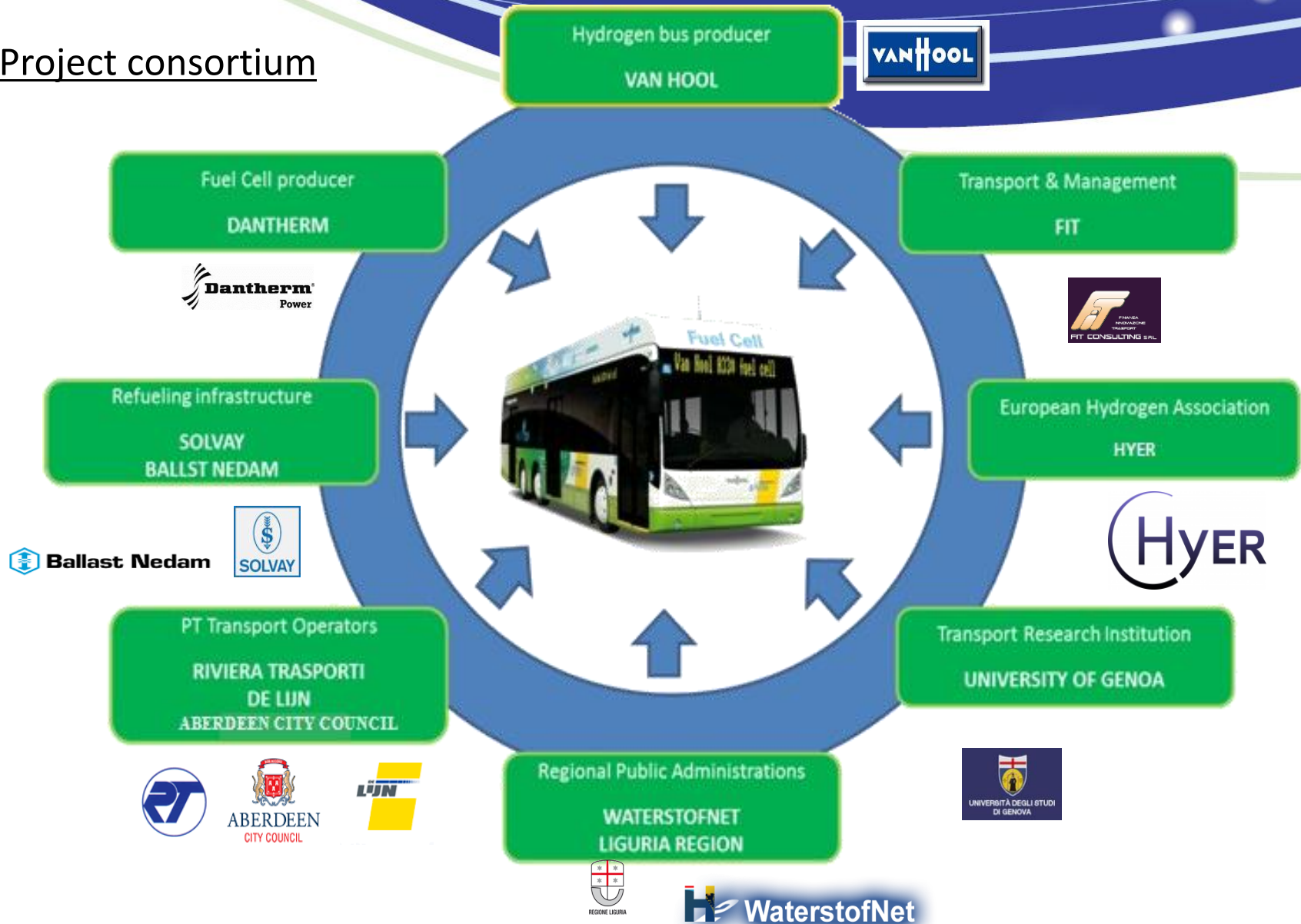
The **overall objective** of High V.LO City is to facilitate rapid deployment of the last generation FCH buses in public transport operations, by addressing key environmental and operational concerns that transport authorities are facing today.

- 3 demonstration pilots
- Creation of Clean Hydrogen Bus Centers of Excellence



	FC Bus	H2 production
Aberdeen (UK)	4	Sustainable production
Liguria (Italy)	5	Sustainable production
Antwerp (Belgium)	5	Industrial by product

- Project consortium



- Project technical goals & targets

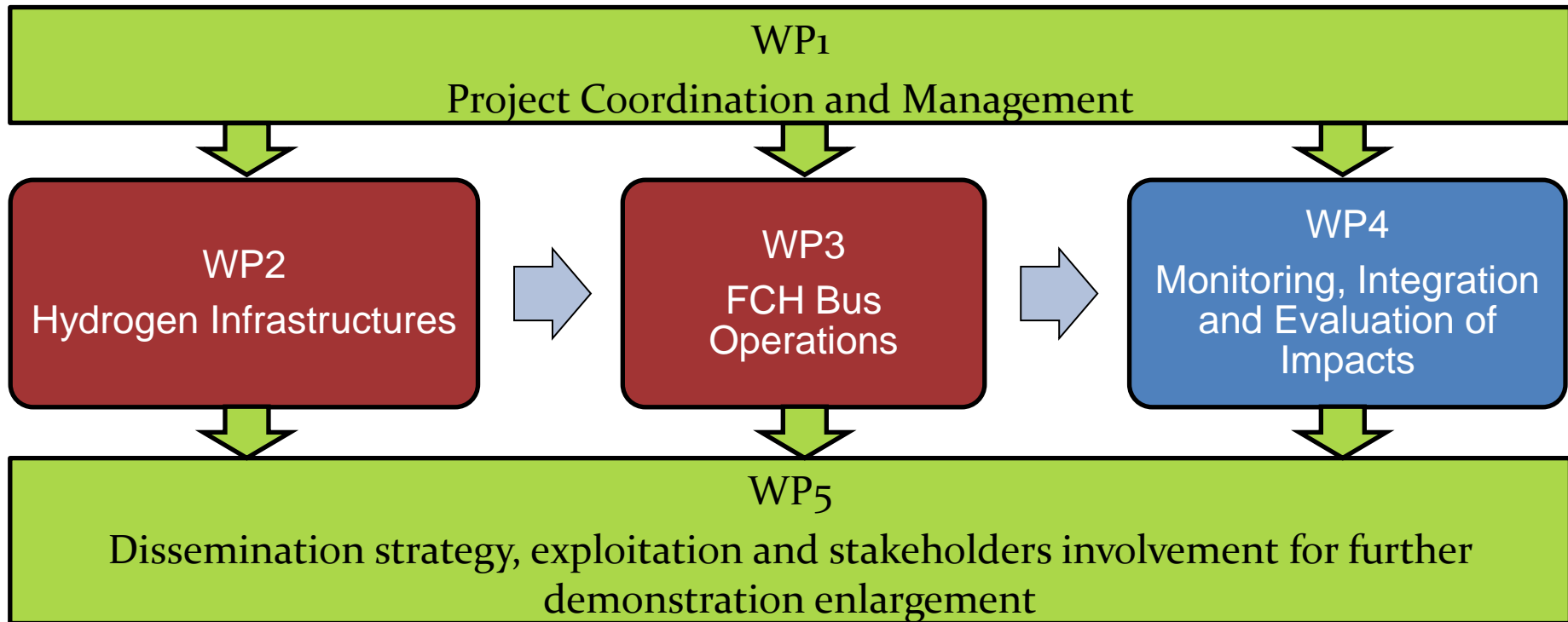
Sites	Flanders	Liguria	Scotland
FC Buses	5	5	4
FC Module Warranty	>12.000 operating hours = 15.000 hours		
Bus Availability	90% (excl. P.M.)		
H ₂ Consumption	9-10kg/100km		
Refuelling infrastructure	Industrial by-product	Sustainable production	Trucked-in gas
Capacity	300kg H ₂ /day		
Pressure	350-570bar		
Refuelling time	<10 minutes		
Availability	98%		

- Project's Milestones

n°	Project milestone	Month
MS1	Contingency Plan for evaluation of impact	3
MS3	Definition of refuelling stations	3
MS6	Definition of FCB's technical improvements	9
MS5	Test of functionalities of HRI	11
MS10	Web based data collection and KPI calculation	12
MS2	Mid-Term assessment	30
MS7	Assessment of Bus operational aspects	30
MS8	Measurements of the improvements within the experiments	37
MS9	Stakeholders paper on how to set up CHBCE	48
MS	Final evaluation of the project results	56

1. Project achievements

- Approach in performing the activities



- Progress towards overall project and state of the art

- Technical performance of buses and HRI at the 3 demonstration sites is recorded completely automatically
- Daily performance parameters are forwarded to the evaluation manager (DITEN – University of Genua)
- Monthly reports are generated to evaluate the technical progress

KPI n°	Hydrogen Refuelling infrastructure	
1	Availability of the station	%
2	Reliability of the station	%
3	Capacity of the station	kg/day
4	Electric consumption for H ₂ production	kWh/kg
5	Total energy consumption	kWh/day
6	Total cost for maintenance	€/kg

- Progress towards overall project and state of the art

KPI n°	Hydrogen Refuelling infrastructure	
1	Daily consumption of the FCB	kg/day
2	Overall availability of the FCBs	%
3	Overall reliability of the FCBs	%
4	Distance driven (each FCB)	km/day
5	Operational hours (per FCB)	h/day
6	Safety incidents	-

- Correlation of High V.LO city with MAIP AA

	MAIP Target 2015	High V.LO City Objective
<i>Action application 1: Transport & Refuelling Infrastructure</i>		
Volume	500 buses at 10EU sites (at least 7 new ones)	14 FC buses 3 new EU sites
Cost & technology	System cost +/- 100€/kW	2500€/kW
Cost & technology	Durability: 5000h	Durability: 12.000h warranty
Cost & technology	Roadmap for the establishment of a commercial HRI	Demonstration of 3 completely functional HRI's
<i>Action application 2: Hydrogen production & distribution</i>		
Volume	10-20% of H ₂ demand should be produced free/carbon lean	2/3 of hydrogen is produced with sustainable technology

Gaps/ bottlenecks in RTD&D proposed by MAIP/AIP

- Public transport companies have the perception that working with FC buses is complex and expensive. Address the issues of complexity and unfamiliarity.
- Explore Alternative Financing methods of the acquisition cost balance
- Make Applications for EU funding more flexible and easier to maintain :
 - Reduced number of consortium members and buses/HRI
 - Simplified proposal
 - Separate programs for FCB and HRI
 - Year round submission process
 - Defined pre-commercial procurement rules
 - Dedicated budget for urban buses

- Training and Education
 - *Action plan to transfer project achievements to other sites*
- Safety, Regulations, Codes and Standards
 - *Standardisation of authorization protocols of HRI*
- Dissemination & public awareness :
 - *detailed dissemination plan to reach citizens and decision-makers*
 - *setup of the CHBCE network (Clean Hydrogen Bus Centers of Excellence)*
 - *3 local workshops, 2 general workshops and 2 congresses to stakeholders*
 - *Action plan to transfer project results*
 - *Public disseminations in the High V.LO City project: 10 (overview can be found on project website: www.highvlocity.eu)*

4. Enhancing cooperation and future perspectives

- Technology Transfer / Collaborations

High V.LO City participates and collaborates with other EU supported projects:

- CHIC
- HyTransit

High V.LO City participates in local, national and international initiatives.

Among them:

- WaterstofNet
- Sustainable energy week (Brussels)
- TEN-T days
- Batterie und H2-Technologietag (Stuttgart)

4. Enhancing cooperation and future perspectives

- Project Future Perspectives
 - Proposed future research approach and relevance
 - *Technical answers for project objectives are worked out now*
 - *Buses & HRI come in service during 2013*
 - Develop market relevant business cases to deploy FC buses in EU including financing schemes (such as operational lease) to support successful market entrance strategy.
 - Interact more with international fuel cell bus actions