ICP-AGIR Best Practice for Almeria (Spain)

New infrastructure to manage H2 as energetic vector	
	CITY OF ALMERIA **(Spain)**
Departments / Institutions involved	**CIESOL-University of Almeria**
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Description of the best practice	**Almería is focusing on the transition from fossil fuels to clean production of energy by using green H_2. Incheon is an example to be studied and followed for creating the required infrastructure that can transport the hydrogen produced by a green procedure.**
Theme and sub-theme if appropriate	**Clean Energy Generation** **Circular Economy** **New infrastructure to manage H_2 as energetic vector**

Description of Best practice	
Challenge Addressed	**Development of new strategies for producing energy requires clearly the use of hydrogen as an energy vector but only it is going to be possible if this gas is obtained by an eco-benign procedure. Hydrogen generation by solar light from water is a real option but is still challenged, it requires new technologies to be practical and economical.**
Solution Implemented	**New technologies targeted to generate hydrogen are accomplished in the CIESOL (Centre of research on solar**

	energy), which is a research institute depending on the University of Almería, where efforts are focused on the production of hydrogen from water by using solar light as an energy source. The CIESOL (www.ciesol.es) is a joint research centre, between the University of Almeria and the Centre for Energy, Environment and Technology (CIEMAT) attached to the Spanish Ministry of Science and Innovation. **Hydrogen generation by solar light from water is dealt with by two different procedures:** **a) By metal catalyst harvesting the solar light and promoting the cleavage of the water molecules.** **b) Splitting water molecules by the high temperature (> 100 ºC) generated by a solar concentrator.**
Partnerships	**University of Almeria / CIESOL and INHA University / KIURI have signed an MoU in October 2022 about joint research on hydrogen energy**
Lessons Learned	**Implementation of a new energetic vector such as Hydrogen, which is targeted to substitute the current energetic dependence on fossil fuel, needs the collaboration of a large variety of experts that need to work synchronically. Obtaining Hydrogen by a green procedure requires an optimal infrastructure for its transport where is demanded. Incheon is developing an extensive network for the transport and use of Hydrogen. The experience of Incheon in this area is therefore a clear and demanding inspiration to Almeria.**
Main Milestones	**Almeria as an energetic green city.**

Materials for promotion	
Graphic Material	 $H_2 + 1/2O_2 \rightarrow H_2O + 286\ kJ$ $\rho_{H_2} = 0.084\ kg/m^3\ (20^oC, 1\ atm)$ 1 Kg → ≈120 MJ 1 L → ≈0.0108 MJ (petrol 47 MJ/Kg, 33.6 MJ/L) 
Online links	www.ual.es; www.ciesol.com http://www2.ual.es/FQM-317/