

FCHgo - Fuel Cells HydroGen educatiOnal model for schools

Tiziana Altiero



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

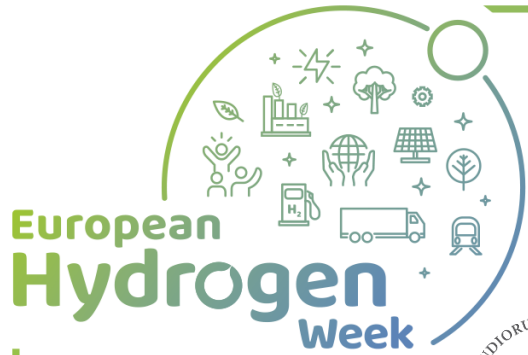
Project coordinator



www.fchgo.eu

#PRD2020
#CleanHydrogen





FCHgo partners




UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



University of Modena and Reggio Emilia

Zürcher Hochschule
für Angewandte Wissenschaften




ZHAW School of Engineering



NICOLAUS COPERNICUS
UNIVERSITY
IN TORUŃ



Nicolaus Copernicus University




Free University of Bozen-Bolzano




InEuropa




Technical University of Denmark




Steinbeis 2i GmbH

Third party




agado, Association for Sustainable Development (Steinbeis 2i GmbH)

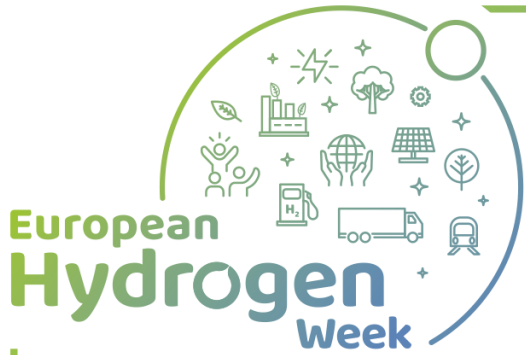



Mikado (InEuropa)



#PRD2020
#CleanHydrogen





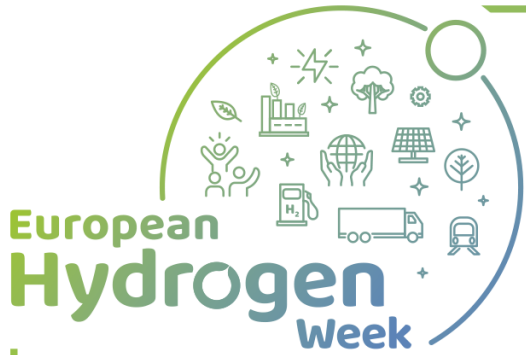
Empowering the young generation for the energy transition



Hydrogen is the most abundant element in the universe, but **the great potential of hydrogen energy and its significance for a sustainable future of our planet** are rarely treated subjects in European classrooms

#PRD2020
#CleanHydrogen





Purpose of the project



- FCHgo is dedicated to **spread knowledge** about **FUEL CELLS** and **HYDROGEN** in schools and beyond, fostering curiosity and excitement about renewable energy.
- FCHgo seeks to bring about change by delivering a **ready-to-teach toolkit**, encouraging teachers to take up hydrogen in lessons and stimulating pupils' interest and awareness for sustainable energy.
- Based on **NARRATIVE** and playful elements the FCHgo school materials shall bridge the STEM knowledge gap and **teach pupils from 8 to 18 years about the basic principles and applications of fuel cell and hydrogen technology**. Overall, the FCHgo activities shall contribute to **build up pupils' STEM competences and prepare them for a fossil-free future**.

The narrative and metaphoric approach



- Children, as well as grown-ups, learn through stories and experiences. Starting from this knowledge, FCHgo applies a **narrative** and **metaphoric** approach to science learning (Fuchs, 2015).
- The **narrative** gives a structure to the metaphors. Stories are a type of narration that help pupils to understand aspects of the **forces of nature** and their relationships.
- A **narrative approach** thus places much emphasis upon the use of natural **language, images, and plays** for ensuring an imaginative and qualitative understanding of a scientific or technical system.



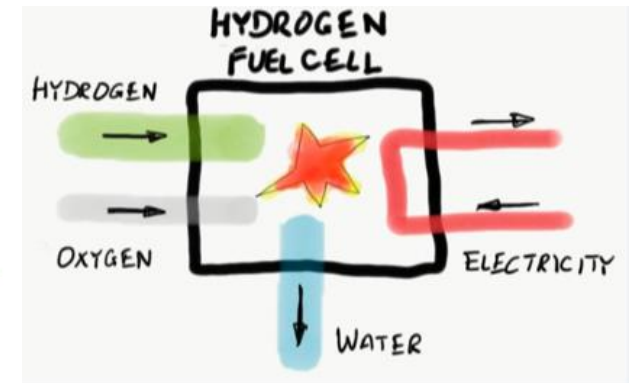
The FCHgo Toolkit

Available at: <https://fchgo.eu/toolkit-development/>

1. Introduction to Fuel Cells and Hydrogen Technology

Hydrogen and Fuel Cells — How, What for, and Why?

Hans U. Fuchs, 2019



2. Comprehensive teacher guides on FCHgo lessons for pupils



#PRD2020
#CleanHydrogen



FCHGO EPDM TRIALS

**TEACHER GUIDE—GENERAL ASPECTS OF A DIDACTIC PATH
FOR GRADES THREE AND FOUR (PRIMARY SCHOOL)**

FCHgo EPDM Team, October – December 2019

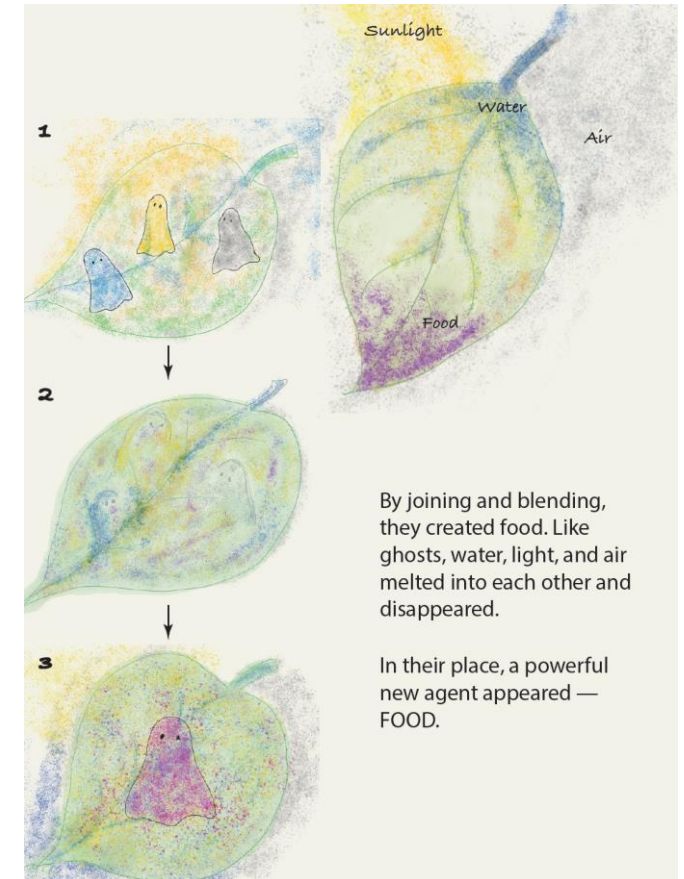
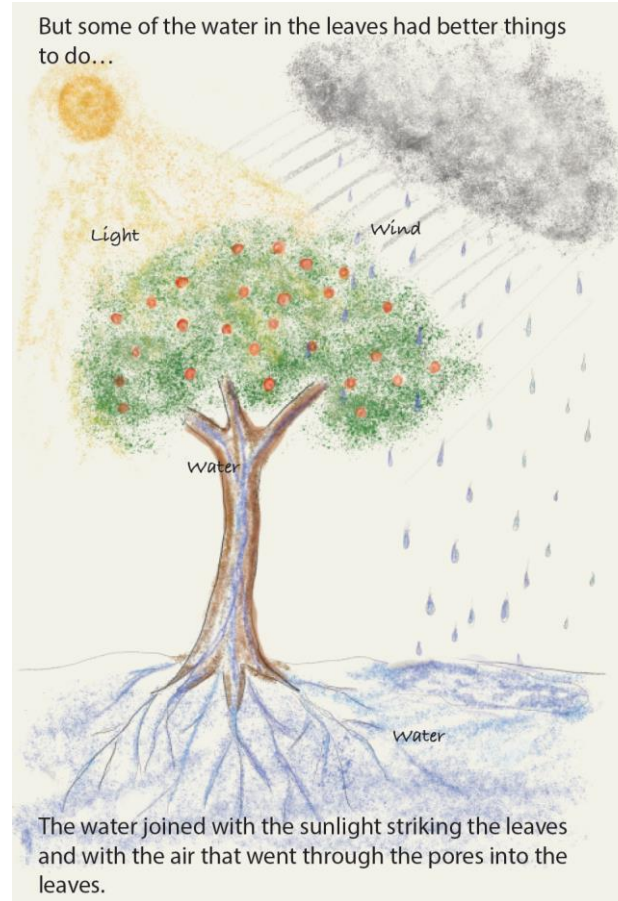
This is a brief outline of the *teaching/learning sequence for a narrative approach to the technology of hydrogen fuels and fuel cells* for teachers and students of primary and middle (lower secondary) school. In its present form, the *Teacher Guide* is most suitable for Grades 3 and 4 (there are two more versions of the *Teacher Guide*, one for Grades 5-6 and one for Grades 7-8).



The FCHgo Toolkit

Available at: <https://fchgo.eu/toolkit-development/>

3. Apple story



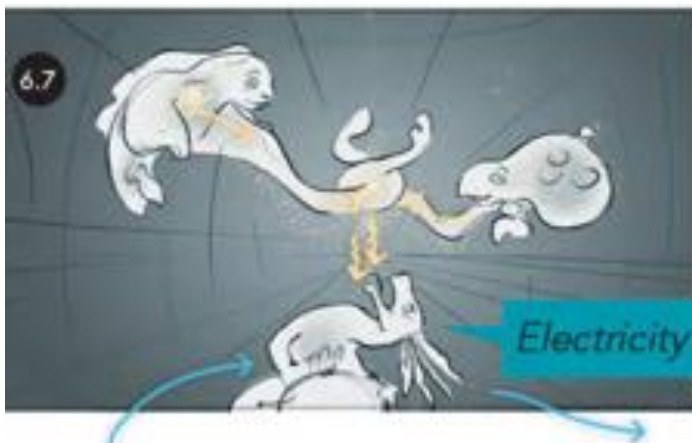
The FCHgo Toolkit

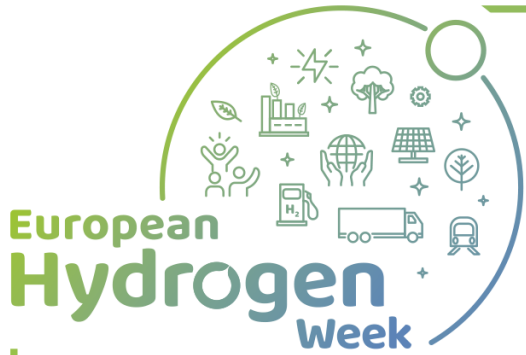
Available at: <https://fchgo.eu/toolkit-development/>

4. The Perpetuum Mobile movie (Deichmann 2014)



5. The Hydrogen movie (Deichmann 2020)

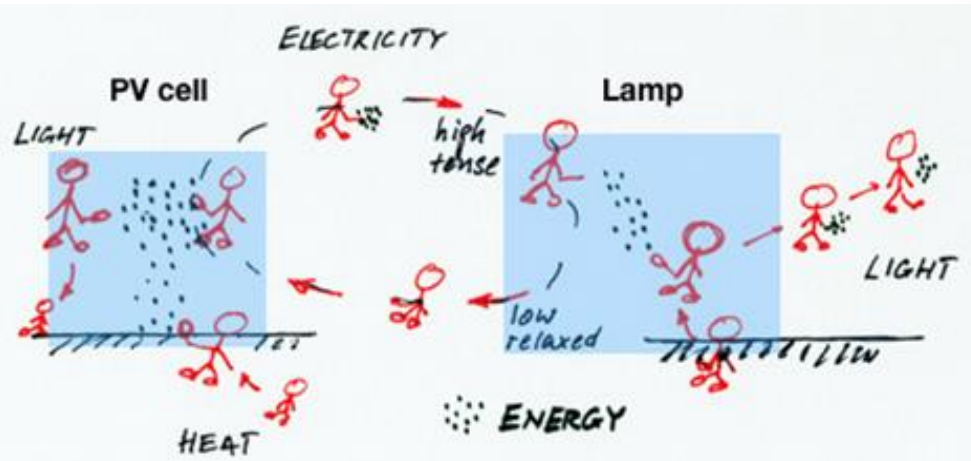
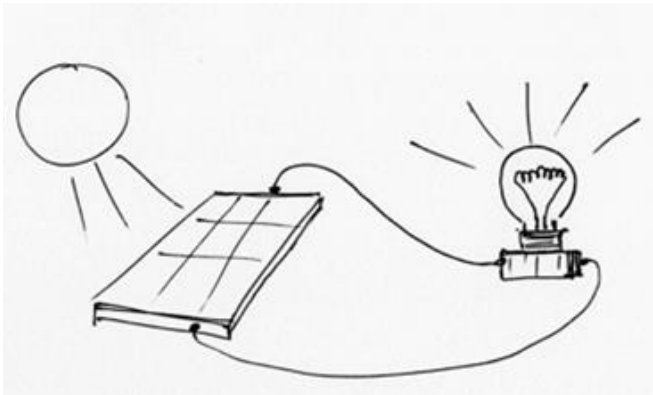




The FCHgo Toolkit

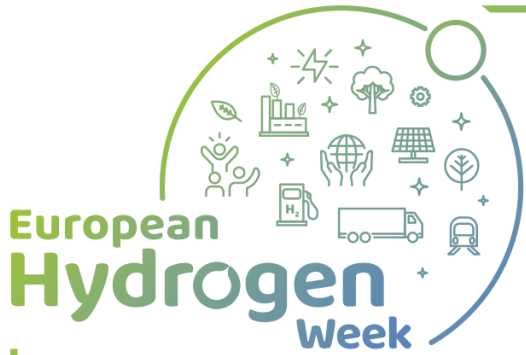
Available at: <https://fchgo.eu/toolkit-development/>

6. Energy role plays



#PRD2020
#CleanHydrogen

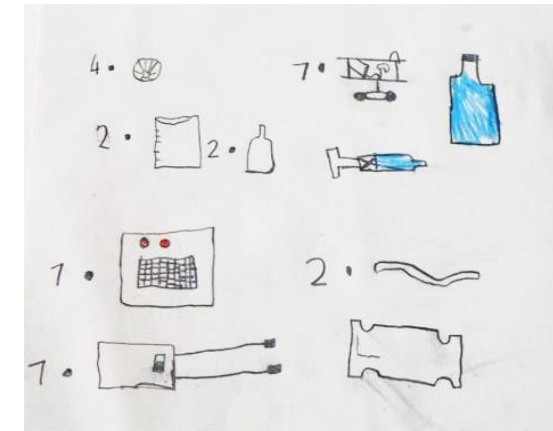
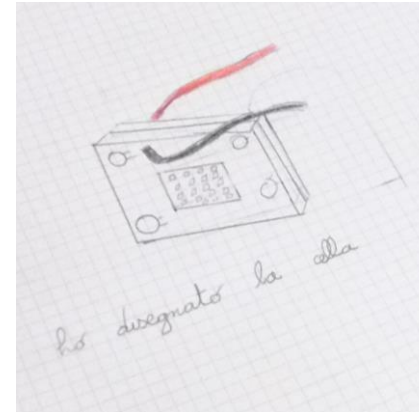




The FCHgo Toolkit

Available at: <https://fchgo.eu/toolkit-development/>

7. Toys/Analysis of Models

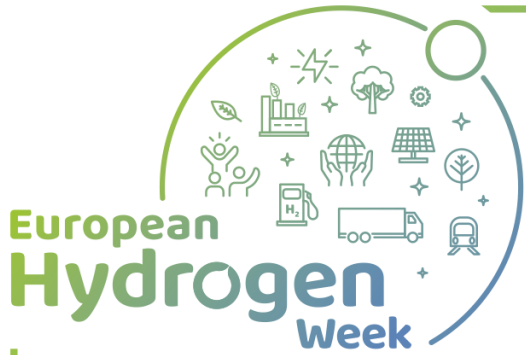


8. Energy playing cards



#PRD2020
#CleanHydrogen





The FCHgo Toolkit

Available at: <https://fchgo.eu/toolkit-development/>

9. PowerPoint presentations and videos for pupils age 13-18



#PRD2020
#CleanHydrogen



Training Teachers



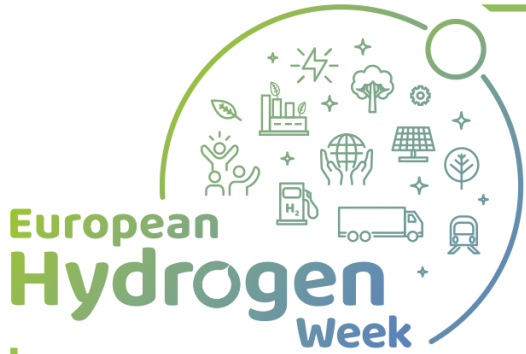
Dąbrowa, 25.08.2019



Toruń, 06.12.2019



Bozen, 04.10.2019

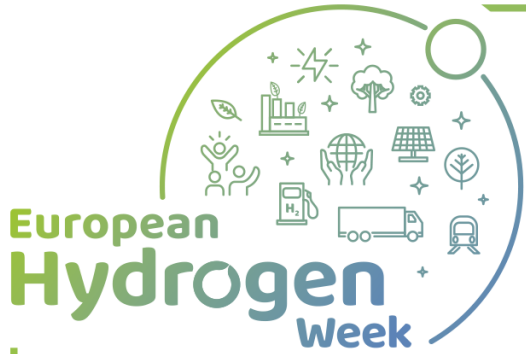


FCHgo Classroom Activities



#PRD2020
#CleanHydrogen





FCHgo Classroom Activities

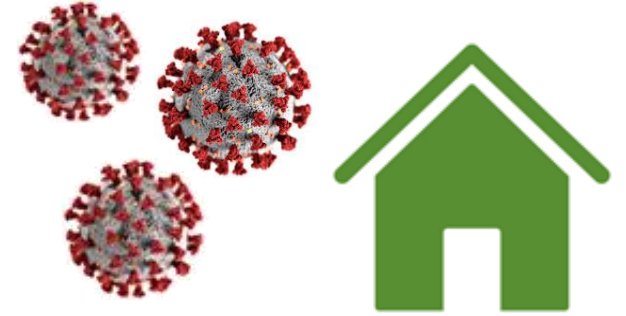
- **5 countries** (Italy, Switzerland, Poland, Germany, and Denmark)
- **1300 students** (more than expected in the phase of Project planning)

The first results have been encouraging. Students follow lessons with interest and teachers are happy with the contribution brought by FCHgo experts in different fields, according to the division of tasks:

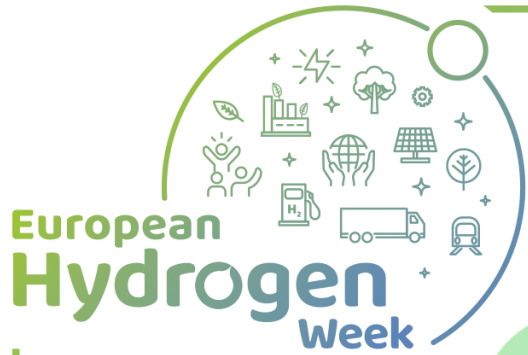
- ✓ narrative physics in the subject of energy
- ✓ environmental sensitivity
- ✓ technological aspects of alternative energies and hydrogen fuel cells.

- End of the evaluation process of the classroom activities: **December 2020**
- Final validation of the EPDM toolkit with the SAB members: **January 2021**

FCHgo at Home



- In the context of the current closure of schools in many countries around the world at this time of health emergency due to the COVID-19, the “FCHgo at Home” initiative intends to extend the participation in the FCHgo project also to **those who are staying at home with their families**, to those who are engaged in **distance learning** or those who are curious to learn about hydrogen.
- FCHgo at Home is a **selection of some materials of the FCHgo toolkit**, which are particularly easy to do at home. This allows to perform fun activities that are not limited to a classroom setting.



FCHgo Dissemination



@FCHgoproject



@fch_go



FCHgo project

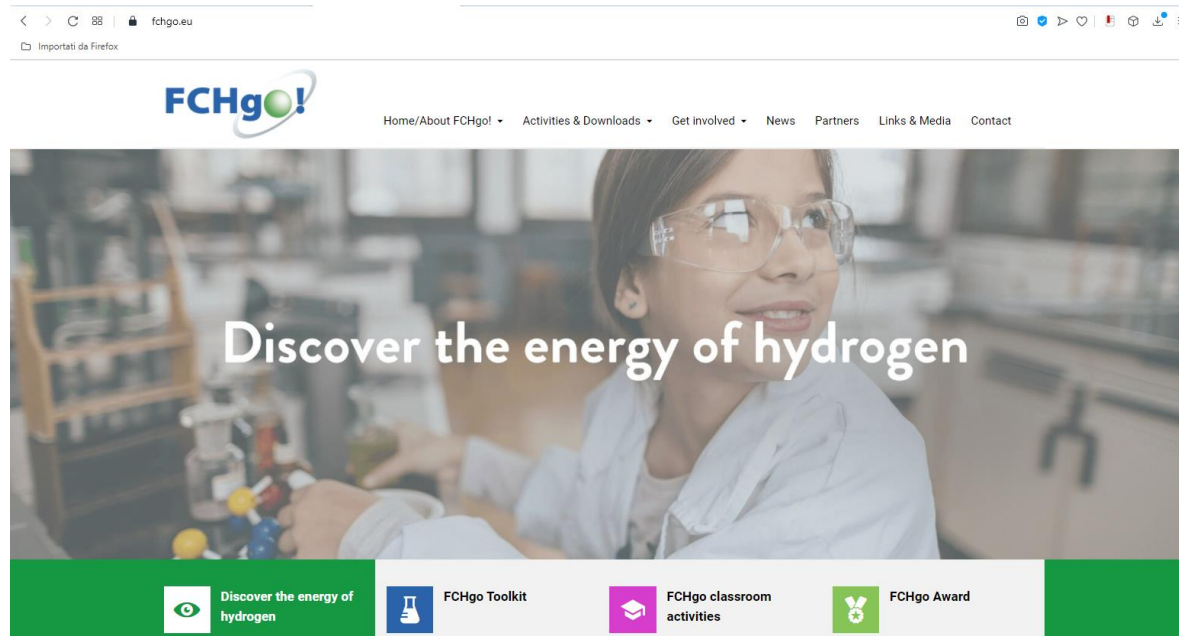


@fch_go



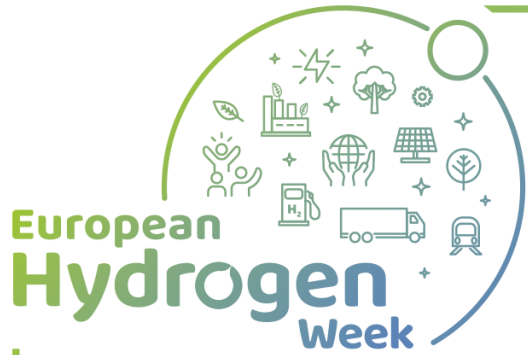
www.fchgo.eu

Social Media and website



#PRD2020
#CleanHydrogen





FCHgo Dissemination

Introduction Video

00:00 – 00:58

1st Part:
Introduction of the
FCHgo by Tiziana Altiero



00:58 – 01:36

2nd Part:
Experiment of a
FCH powered car



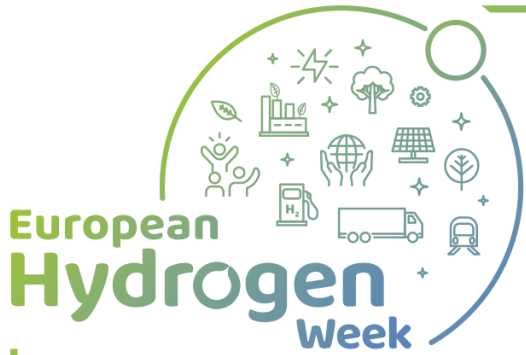
01:36 – 01:54

3rd Part:
Invitation to the FCHgo
Award by Tiziana Altiero



#PRD2020
#CleanHydrogen





FCHgo Dissemination

Cards

IS HYDROGEN DANGEROUS?

i It is a flammable gas, not worse than many other fuels, but it allows us to have energy and save the environment from pollution and greenhouse gases.

ARE HYDROGEN FUEL CELLS EXPENSIVE?

NO!

If we remember, that the first „pile“ of Volta was made of silver and tin coins: so only rich people could afford it.

The hydrogen cell is **NOT** expensive!

It is still relatively expensive, but all new technologies are such until somebody invents improvements: Volta who in his second cell used cheap zinc and cheap copper.

FCHgo!

@FCHgoproject @fch_go FCHgo project @fch_go www.fchgo.eu

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (JU) under grant agreement No 632046. The JU receives support from the European Union's Horizon 2020 research and innovation programme in France, Denmark, Poland, Germany, Switzerland.

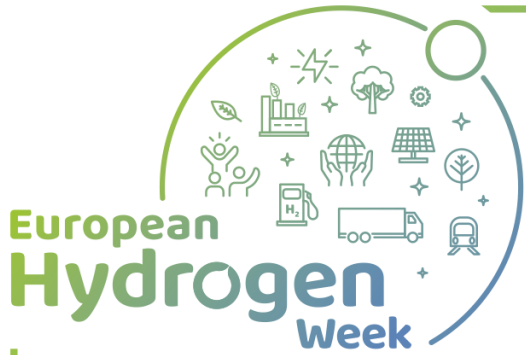


The project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (JU) under grant agreement No 632046. The JU receives support from the European Union's Horizon 2020 research and innovation programme in France, Denmark, Poland, Germany, Switzerland.



#PRD2020
#CleanHydrogen





FCHgo Dissemination

Stakeholders interviews



FCHgo intervista Ing. Nicola Cavedagna - Landi Renzo S.p.A.



FCHgo intervista Katia Ferrari - Clust-ER Greentech



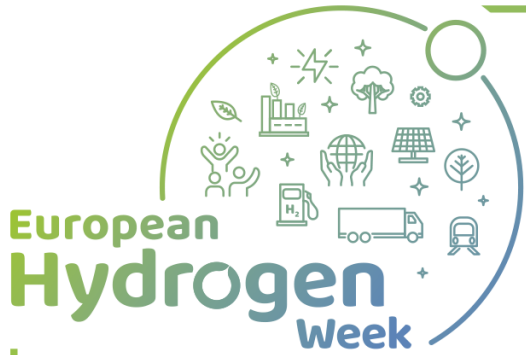
Scopri l'energia dell'idrogeno



Scopri l'energia dell'idrogeno

#PRD2020
#CleanHydrogen





FCHgo Award



World of the future: the best FCH application

- Teams of pupils are invited to submit a **project** – a **movie**, **photo story**, **collage**, **model**, or any **other creative product** focusing on future application(s) of FCH technology.

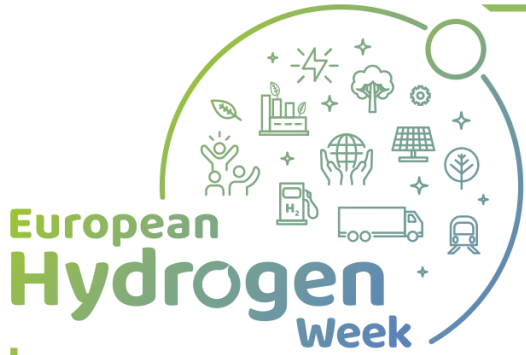
Teachers, parents and industry stakeholders are encouraged to support pupils' applications.

- **National level:** selection of 3 national winner teams, one for each school category (8-11 yo; 11-14 yo; 14-18 yo) in each project country
- **International level:** definition of 3 winner teams, one for each school category, which will be awarded in the final award ceremony

Award ceremonies: June 2021

#PRD2020
#CleanHydrogen



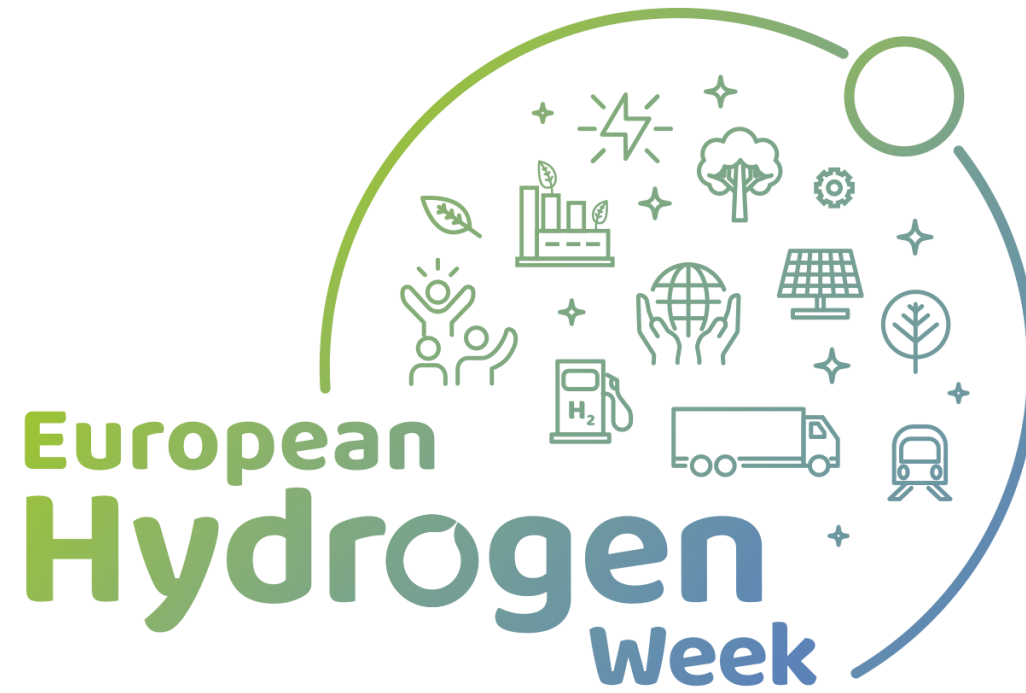


FCHg!

**Thank you very
much for your
attention**

#PRD2020
#CleanHydrogen





European
Hydrogen
Week

#PRD2020
#CleanHydrogen

