

PART 2

# H 2 FUTURE



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**HyDriven** aims to prove the potential of hydrogen to accelerate the energy transition towards zero emission. Since 2011, we have been known as 'Green Team Twente', but not anymore. We have rebranded and changed our name, logo, and colours. The reason for this drastic change is all about hydrogen, as this is a big part of our identity. We believe that achieving our goal is only possible with a brand image that screams hydrogen. HyDriven perfectly aligns with the vision of our team.

In the last edition of this magazine, we were introduced to the HyDriven, the people behind them, and how they face the challenges related to managing a diverse and multidisciplinary team of young people driven by a common goal: harnessing the power of hydrogen as a clean and efficient fuel source for cars. In this second part, we will delve more into the heartbeat of the team: hydrogen. This time, we talked to HyDriven to understand the technical challenges and opportunities linked to being the lead of innovation.



### Can you briefly explain what hydrogen is and how it is used as a fuel for cars?

**Charlotte:** There are two ways of utilizing the energy stored in hydrogen: by combustion or with a fuel cell. Combusting hydrogen is comparable to combusting any other type of fuel. In a fuel cell, hydrogen reacts with oxygen, releasing energy and water. This energy is then used to power an electric motor, which drives the car. Fuel cells are highly efficient and produce only water vapor as a by-product, making them a clean and environmentally friendly alternative to traditional fossil fuels.

### Why is hydrogen a viable alternative to fossil fuels?

**Christina:** Hydrogen is a viable alternative to fossil fuels for several key reasons. It does not emit any greenhouse gases when combusted, producing only water as a by-product, which makes it environmentally friendly. Additionally, hydrogen can be efficiently stored and used as an energy carrier. It can be produced through the electrolysis of water or by breaking down methane with superheated steam. This flexibility in production and storage, coupled with its clean combustion, makes hydrogen an interesting option for a fossil fuel.

### How does using hydrogen contribute to sustainability?

**Charlotte:** The problem with renewable energy sources is that they are highly time- or weather-dependent: there is no solar energy and less wind energy at night, so the entire energy demand needs to be produced during the day. They are also dependent on the location, so energy needs to be transported to locations with a higher energy demand than production. The energy that is produced during the day and needed at night can then be stored in hydrogen. Energy stored in hydrogen is also a convenient way of transporting energy as it can be sent through pipelines used for gas – with some small adjustments.

## What are the technical challenges related to using hydrogen for the automotive industry? How do you address those challenges?

**Christina:** Hydrogen is highly reactive with oxygen, so when it is not handled correctly and with the required safety measures it can lead to explosions. The measures to prevent that can be costly. That and a few catastrophes in the past led to a certain stigma to hydrogen about it being unsafe. This needs to be overcome as well.

## How do you envision the role of hydrogen in the future of transportation?

**Charlotte:** Hydrogen is a promising alternative to electric cars, particularly for trucks and heavy-duty vehicles. These larger vehicles already carry heavy weight, so the additional weight of hydrogen fuel systems is less of a concern compared to electric batteries. Hydrogen fuel cells offer a practical solution by providing longer ranges and quicker refueling times, making them suitable for the requirements of commercial transportation.

## How do you see the HyDriven contributing to decarbonization and circularity?

**Christina:** Our goal is to get hydrogen and the technology more attention. We also lead by example by showing that it is possible to implement a hydrogen system into a race car, therefore it is also possible to implement it into other vehicles. As explained earlier, gaining energy from hydrogen is a carbon-free process.

Of course, it only is an emission-free process if the way the hydrogen was gained is 'green', so the electrolysis is done with electricity gained from renewable energy sources.

## How are your sponsors involved in your journey and what do they hope to achieve by supporting you?

**Charlotte:** Our partners play a crucial role by contributing their knowledge, parts, or financial support to our hydrogen racing project. In return, we provide publicity to them. Additionally, they get into contact with students who have hands-on experience with hydrogen technology, potentially recruiting them as future employees. Many companies are also interested in having us test their parts or products, for which we provide valuable feedback. This allows them to further develop their products using our testing data.

## What are the next steps for your project?

**Christina:** In the short term, our goals are to finish building and testing our racing car and to compete in the Formula Student competitions. In the long term, we aim to make the battery smaller, so it functions only as a buffer. Additionally, we aspire to convince other student teams to build hydrogen cars and join the competition. By doing so, we hope to attract real competitors who will challenge us in innovation and optimization.

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In the long run, we aim to draw more attention to hydrogen technology and its potential, convincing various industries to take a closer look at the possibilities hydrogen offers. Our goal is to accelerate the transition from a fossil fuel economy to a hydrogen economy.

### Do you see hydrogen being adopted in mass manufacturing shortly?

**Charlotte:** There are already some applications, some car brands like BMW or Toyota have hydrogen models and there are also several companies that build trucks driving on hydrogen. For it to be a solution that a lot of people use I think it will still take some time.

“**Fuel cells are highly efficient and produce only water vapor as a by-product, making them a clean and environmentally friendly alternative to traditional fossil fuels.**”

### What would you like our audience to have as a takeaway from this project?

**Christina:** Hydrogen is a good alternative to batteries to store energy which is often wrongfully forgotten when talking about the energy transition, electromobility, and the lowering of transmissions in traffic

While there is still work to be done towards reducing the environmental impact of cars, we are left with a sense of optimism and inspiration. The dedication, collaboration, and innovation displayed by the HyDriven is inspiring to say the least. Hydrogen is not only a potential sustainable fuel source but also offers opportunities to inspire manufacturers and policymakers to turn their attention to sustainable fuel sources.

Thanks to the HyDriven we got a glimpse of a future fueled by clean energy, where the vehicles on the road could contribute to circularity and decarbonization of our global economy. It is a future worth striving for, and thanks to teams like this one, it's a future worth working for. ■

