

WaterstofNet

Catalyst for sustainable
hydrogen projects

New momentum for hydrogen

The difference could not be greater. In 2009, many players felt the interest in hydrogen reached a low. In 2020, there has been an explosive increase in the number of hydrogen initiatives around the world.

In the intervening decade, step by step, we at WaterstofNet have built up immense experience with hydrogen. From the development of an idea, the search for suitable partners to the realisation of groundbreaking demonstration projects: actions, not words!

A number of players from Flanders and the Netherlands now have their products, services or ideas involved with the largest hydrogen initiatives in Europe. I'm unbelievably happy and proud about this because that is exactly what WaterstofNet was aiming for: a means of leveraging hydrogen from Flanders and the Netherlands to Europe!

What began in 2009 with a number of 'hydrogen-believers', has now grown into a strong Flemish-Dutch ecosystem, united in our strong and active Hydrogen Industry Cluster ('Waterstof Industrie Cluster' or WIC).



Globally, and particularly on the European level, there has been a huge increase in the interest in hydrogen: companies, governments, knowledge institutions and other stakeholders are making plans, providing budgets and communicating their ambitions. This means that as a region, we now have to get into pole position.

Over the past few years, we have mobilised unique technology players, ambitious government groups and creative research groups. The challenge now is to help our region grow structurally into an eminent hydrogen region in hydrogen-loving Europe.

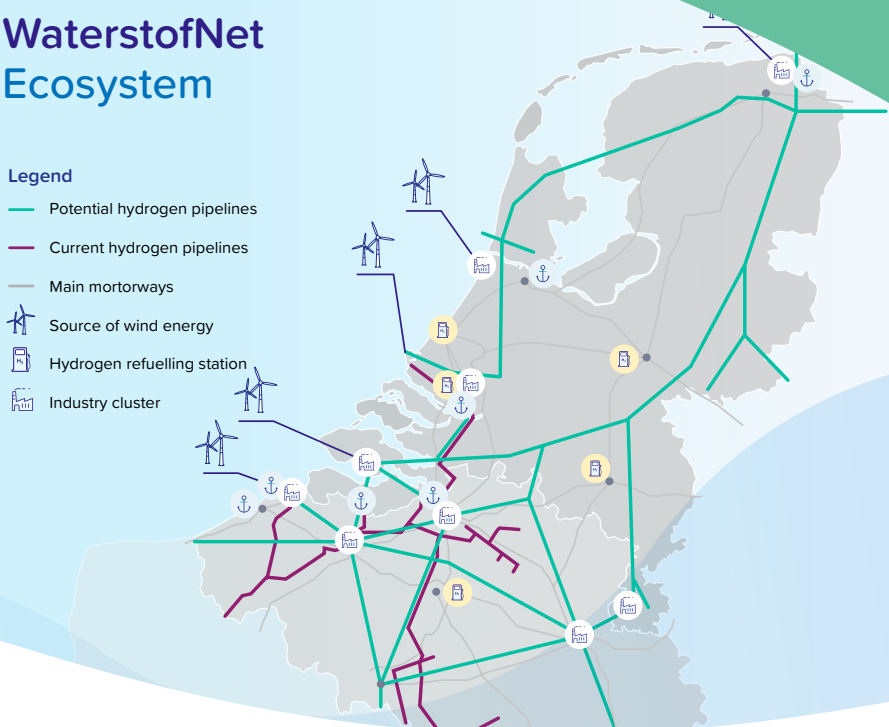
This is what WaterstofNet exists for. We will make every effort to achieve this goal with everyone who wants to contribute.

Adwin Martens
Managing Director WaterstofNet

WaterstofNet Ecosystem

Legend

- Potential hydrogen pipelines
- Current hydrogen pipelines
- Main motorways
- Source of wind energy
- Hydrogen refuelling station
- Industry cluster



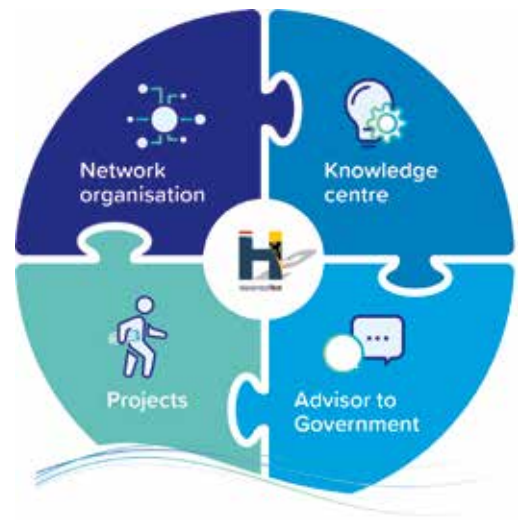
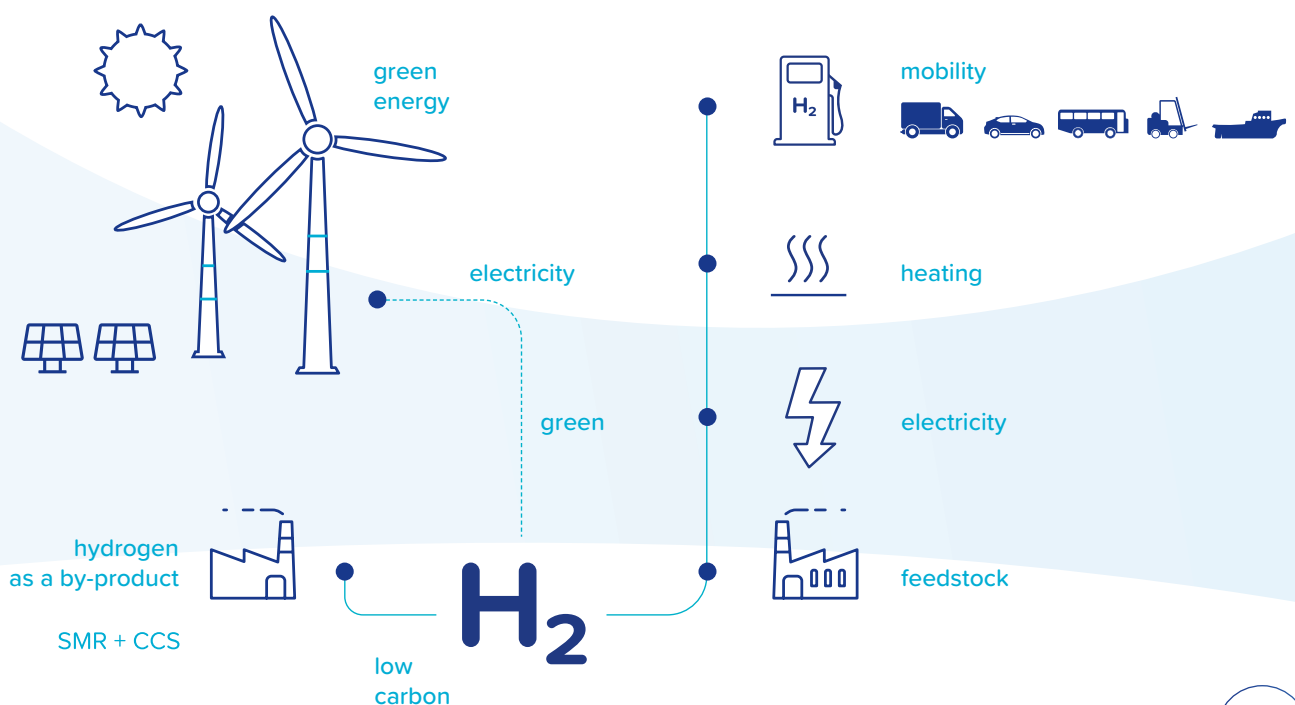
What does WaterstofNet do?

As a knowledge and collaboration platform, WaterstofNet contributes to a carbon-neutral society. We do this by supporting and executing hydrogen projects in Flanders and the Netherlands. Together with industry representatives and governments, we pave the way for concrete realisations, laying the foundations for further collaboration. In doing so, we help Flanders and the Netherlands to flourish as a combined pre-eminent hydrogen region.

Why hydrogen?

Hydrogen is a key that fits many doors. In some cases, it is the only way to a carbon-neutral energy system. It is not the silver bullet that will solve the energy crisis, but it does offer an excellent foundation from which to make molecular energy sustainable. This is most definitely the case in sectors where alternatives are barely available, if at all.

Hydrogen will contribute to zero-emission transport and serve as a sustainable raw material for industry, as a medium for energy storage and a carbon-free source for providing heat. It therefore forms an important – and in some cases, irreplaceable – element of a sustainable economy and energy provision solution.



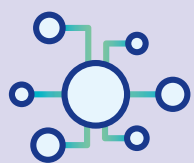
How do we do this?

Network organisation: Via the Hydrogen Industry Cluster ('Waterstof Industrie Cluster' or WIC), we unite the hydrogen industry in Flanders and the Netherlands. Together with them, we detect and develop hydrogen projects.

Projects: WaterstofNet develops and realises projects in collaboration with governments and industry. At the moment, we are participating in about 25 Flemish, Dutch and European hydrogen projects.

Knowledge centre: We are the point of contact on matters of hydrogen for governments, companies and the broader public. WaterstofNet makes plans and performs studies on hydrogen. Through our own range of education products and services, and the organisation of hydrogen conferences, we ensure knowledge is properly disseminated.

Advisor to government: WaterstofNet is the preferred hydrogen partner for governments and authorities in Flanders, Belgium and the Netherlands. We work together with them to realise their hydrogen goals and support them in their vision and legislation in relation to hydrogen.



Network
organisation

The Hydrogen Industry Cluster

WaterstofNet coordinates the Hydrogen Industry Cluster ('Waterstof Industrie Cluster' or WIC), an industrial partnership with about 70 members at present. The WIC is involved in networking, knowledge exchange, project identification and performs as a sector federation for diverse governments and authorities.

Strong growth across the value chain

The cluster was established in 2016 and has grown unceasingly since. There are primarily industrial players involved, as well as a number of research institutions and public organisations. This network is unique in the way it covers the entire hydrogen value chain; it consists of players involved in the production of green energy, the production of hydrogen, the transport and storage of hydrogen, and organisations active in hydrogen technology and applications, all the way through to end-users.



From Flanders to the entire Benelux region

Most partners are based in Flanders due to the history of the cluster, but there are more and more Dutch partners becoming involved. This expansion is actively coordinated and substantively supported by WaterstofNet, as we are active in both regions. The WIC is currently the largest hydrogen network in the Benelux region. It is our continued ambition to strengthen the network with other players from the hydrogen world.



Networking and knowledge sharing are crucial in a developing market. This is why, every three months, we organise a meeting with all members at the location of one of the cluster members. In the meantime, there are occasions for catch-ups, workshops, mailouts, work visits, a conference and many other events that give maximum flow to knowledge and contacts. Cluster members can rely on the more than ten years of experience that WaterstofNet has in the hydrogen world. Dozens of projects have been realised in our region and still more are in the pipeline. The cluster itself is a source of project ideas. Partners find each other or are brought together around specific challenges or opportunities. In this way, we work together with industry representatives on concrete realisations.

Governments play an important role as well. As a cluster, we form a preferential point of contact for the Flemish, Belgian and Dutch governments. By working together to make standpoints recognisable, we perform as a sectoral federation. We also work to support policy by formulating recommendations for legislation related to hydrogen.

Are you interested?

Companies performing activities or with ambitions involving hydrogen are always welcome in the cluster. In this phase, it is important to join forces to spread the hydrogen story. In the Benelux region, there is a unique industrial ecosystem of companies with knowledge and experience in hydrogen. By allowing this network to collaborate to the highest degree possible, we are working on a carbon-neutral future and ensuring economic returns for our region.

Exactly what do we do as a cluster?



More information is available via our website or by contacting our project managers Isabel François, Yannick Van den Broeck, Davine Janssen and Samira Farahani.



Projects

Mobility



Hydrogen is a zero-emission fuel for all sorts of applications in the transport sector. It can be used in combination with a fuel cell that transforms hydrogen into electricity to drive an electric motor. For very heavy applications, such as in the logistics sector or in shipping, it's possible to consider combustion engines or turbines with hydrogen.

Today, hydrogen is being used to power buses, trucks, forklifts, garbage trucks, ships and cars. WaterstofNet has facilitated the entrance of dozens of vehicles in our region.

In aviation and maritime sectors, pure hydrogen and a liquid fuel (derived from hydrogen) will be used, because the lower energy density of hydrogen will sometimes be insufficient in these applications.



Cars

WaterstofNet has had a hydrogen car on the roads since October 2014 – without any issues. This allows us to introduce the broader public to the concept of driving using hydrogen as a fuel. Furthermore, we are coordinating a European project to make it possible for hydrogen-powered vehicles, with the infrastructure they require, to be made more prevalent in the Benelux region. In this way, we are putting dozens of vehicles on the roads.



Trucks

Trucks running on hydrogen have attracted increased attention. In our region, 27- and 44-ton models have been developed and demonstrated in collaboration with WaterstofNet. Furthermore, we are actively working on projects that will be putting hundreds of trucks on the streets in Flanders and the Netherlands in the coming years.

Garbage trucks

Garbage trucks that run on hydrogen have been developed in recent years and demonstrated in our region. WaterstofNet is currently involved with diverse projects to bring 20 garbage trucks into active service in cities like Antwerp, Amsterdam, Breda, Groningen and Helmond.



Buses

WaterstofNet is participating in diverse projects that roll out hydrogen buses in cities including Antwerp, Rotterdam and Groningen. At present, there are a number of buses driving around in Flanders and the Netherlands; many more are expected in the coming years.



Forklifts

WaterstofNet worked on the introduction of a hydrogen refuelling station and the implementation of one of the first fleets of hydrogen-powered forklifts in a logistics centre. We are also actively looking at the implementation of heavy logistics applications in port environments.





Infrastructure for mobility

The introduction of hydrogen-powered vehicles is not realistic if there is no infrastructure in place for refuelling. The infrastructure is relatively new and as such, still expensive. There are also challenges relating to the technical implementation and safety. In order for them to be financially viable, there needs to be adequate amounts of hydrogen purchased from a refuelling station. In order to break through this chicken-or-the-egg situation, WaterstofNet has invested in both the vehicles and the realisation of the refuelling infrastructure.

Own experiences

Since 2013, we have had hands-on experience with our own hydrogen refuelling station in Helmond. This was the first one in the Benelux to have an electrolysis system, through which vehicles with pressure requirements of 350 bar (buses, garbage trucks, etc.) as well as vehicles requiring 700 bar (cars) are able to refuel.

The station serves as a test platform for different types of hydrogen vehicles from other hydrogen projects, although owners of a hydrogen car are welcome to fill up there. Since 2014, a total of 12,000 kg of sustainable hydrogen has filled about 3,000 vehicles.

In order to demonstrate experiences with hydrogen, for a number of years, we have invested in a mobile hydrogen refuelling station that has been used for short-running demonstrations of hydrogen vehicles.



Coordination in the Benelux region

As well as the realisation of our own refuelling station, in recent years, WaterstofNet has been encouraging and working towards the realisation of hydrogen refuelling stations by partners.

As well as this, we are working closely with the corporate world to coordinate the roll-out of eight additional refuelling stations in the Benelux region. In doing so, we are paying attention to the creation of demand. We aim at deploying 10 hydrogen vehicles for each refuelling station.



Industry

Within various industrial sectors, there is a great demand for hydrogen as a resource. For example, the steel industry, or the petrochemical industry where hydrogen is used for the desulphurisation of fuels. As well as existing applications, hydrogen may be the foundation of new processes, such as in sustainable chemistry.

In industry, hydrogen may also provide certain electricity and heat demands for which other alternatives are difficult to find. Today, the existing demand for hydrogen is primarily met by fossil hydrogen made by natural gas. The current and future demand for producing hydrogen more sustainable is a key challenge.



Residual hydrogen plant

In 2013, WaterstofNet coordinated the building of the largest hydrogen fuel-cell plant in the world in the port of Antwerp. The installation transformed residual hydrogen (a by-product resulting from chlorine production) into 1 MW electricity. The project laid the foundations for many follow-up programmes.

Studies

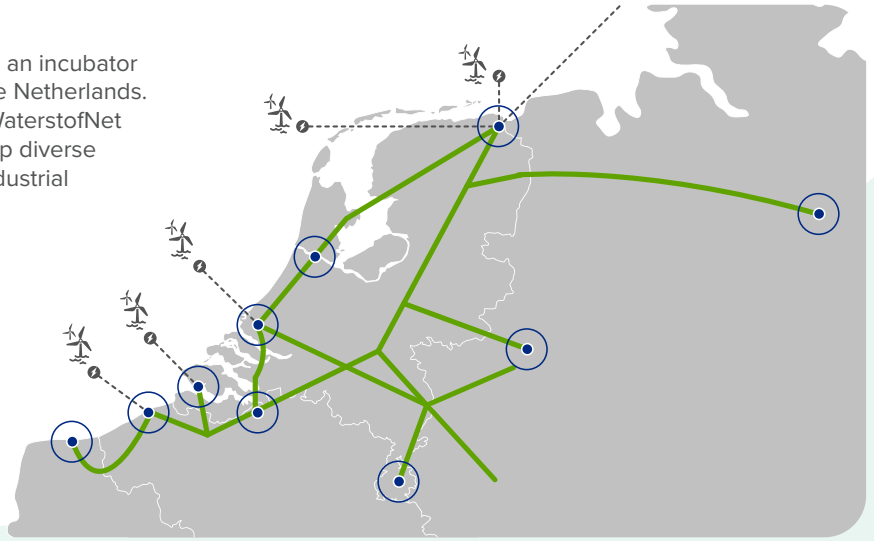
The link of the production of sustainable hydrogen to industrial demand is crucial to making industrial processes more sustainable. The realistic calculation of such business cases is not easy; WaterstofNet is working in diverse projects to link supply and demand to each other.

Specifically, we participated in the 'Green Octopus' umbrella project, investigating a major hydrogen connection between seaports and large consumption clusters in Flanders, the Netherlands and Germany. Within the Hydrogen Import Coalition (the 'Waterstof Importcoalitie') possible import scenarios have been considered for importing hydrogen to our region.



Industrial network

The Hydrogen Industry Cluster serves as an incubator for hydrogen projects in Flanders and the Netherlands. Together with the companies involved, WaterstofNet works on projects. This has already set up diverse collaborations, including those for the industrial purchase of hydrogen.



The built environment

Today, there are a number of technologies aimed at sustainably responding to the demand for heat and electricity in the built environment. As a result, the role that hydrogen can play in buildings is sometimes overlooked. However, there are several possibilities.

Hydrogen can make the current use of natural gas more sustainable if it is mixed into the gas. In the long term, natural gas could even be completely replaced as a 'green gas'. In addition to a central supply, it is possible to produce hydrogen locally for use on-site. Hydrogen can be used to respond to demand for electricity and heat, and serve as a storage medium.

Diverse technologies, such as fuel cells, hydrogen boilers, hydrogen panels or a combined heat and power (CHP) system are suitable for various applications. In this phase, deciding what role hydrogen can meaningfully play in the urban environment needs to be properly studied and demonstrated.

Studies

WaterstofNet actively works on different scenarios within the built environment where, for certain user cases, energy and cost profiles are calculated. The end-goal is a demonstration project in Flanders.

A number of companies from the Hydrogen Industry Cluster are actively involved in demonstrating their specific technology in the region. In this way, the knowledge that is built up is incorporated into subsequent steps.





Knowledge centre

Knowledge centre

With around ten years of experience in dozens of projects on the Flemish, Dutch and European levels, WaterstofNet has established itself as a knowledge centre for hydrogen. Companies, governments and the broader public can turn to us for actions and advice for anything that is related to hydrogen.

We stand out through our practical experience, built up with hydrogen refuelling stations and vehicles. As well as this, we have deep roots in industrial networks, as a result of which we know what is available or trending on the market. We also know the European level, where hydrogen policies are set.

We make all this knowledge and these contacts available to companies, governments and authorities, and the broader public. We are building an industrial ecosystem in the Hydrogen Industry Cluster and are working through concrete projects.

Governments, from local to European, can turn to us for hydrogen advice. We inform them about the possibilities of hydrogen, pointing out collaboration opportunities. The drafting of a hydrogen plan or the examination of a case study are among the possibilities.

We also inform the broader public about hydrogen. Through an innovative website, we release the latest hydrogen news and offer information on the basics of hydrogen. With high-quality events, such as an annual conference, we give everyone the opportunity to get to know us, our projects and our partners.

Hydrogen Academy

In the autumn of 2020, despite the coronavirus, the first Hydrogen Academy took place. With three-hour long sessions held over five evenings, we deeply acquainted companies and government institutions with all aspects of hydrogen.

The knowledge shared extended from the basics of hydrogen and safety aspects to legislation and the do's and don'ts for hydrogen projects. Following the first successful edition, WaterstofNet will hold the Hydrogen Academy at least once a year.

As well as the initiatives of the Academy, a structural collaboration with education partners has been examined as a way in which to give hydrogen the place it deserves in the curriculum for higher education.

Studies and road maps

As a knowledge centre, WaterstofNet puts its efforts into the creation of diverse road maps and studies on topics related to hydrogen. This can happen within a project or on request from, for example, a government. We have already worked on documents about the roll-out of refuelling stations, recommendations on a legislative level, a potential study and many other subjects. Take a look at our website to read more about it.





Advisor to Government

Government advisor

We have a structural collaboration with the Flemish government. WaterstofNet offers support in the structuring and support of the Flemish innovation landscape. We monitor and create an inventory of the hydrogen industry in Flanders, working on the structural collaboration on innovation for hydrogen between Flanders and the Netherlands.

Vision

WaterstofNet is recognised by the Flemish government as the collaboration and knowledge platform for hydrogen. We work to support policy and draft opinions in the area of legislation and regulations for matters relating to hydrogen. Spearhead clusters from Flanders can call on us for information or collaboration within projects.

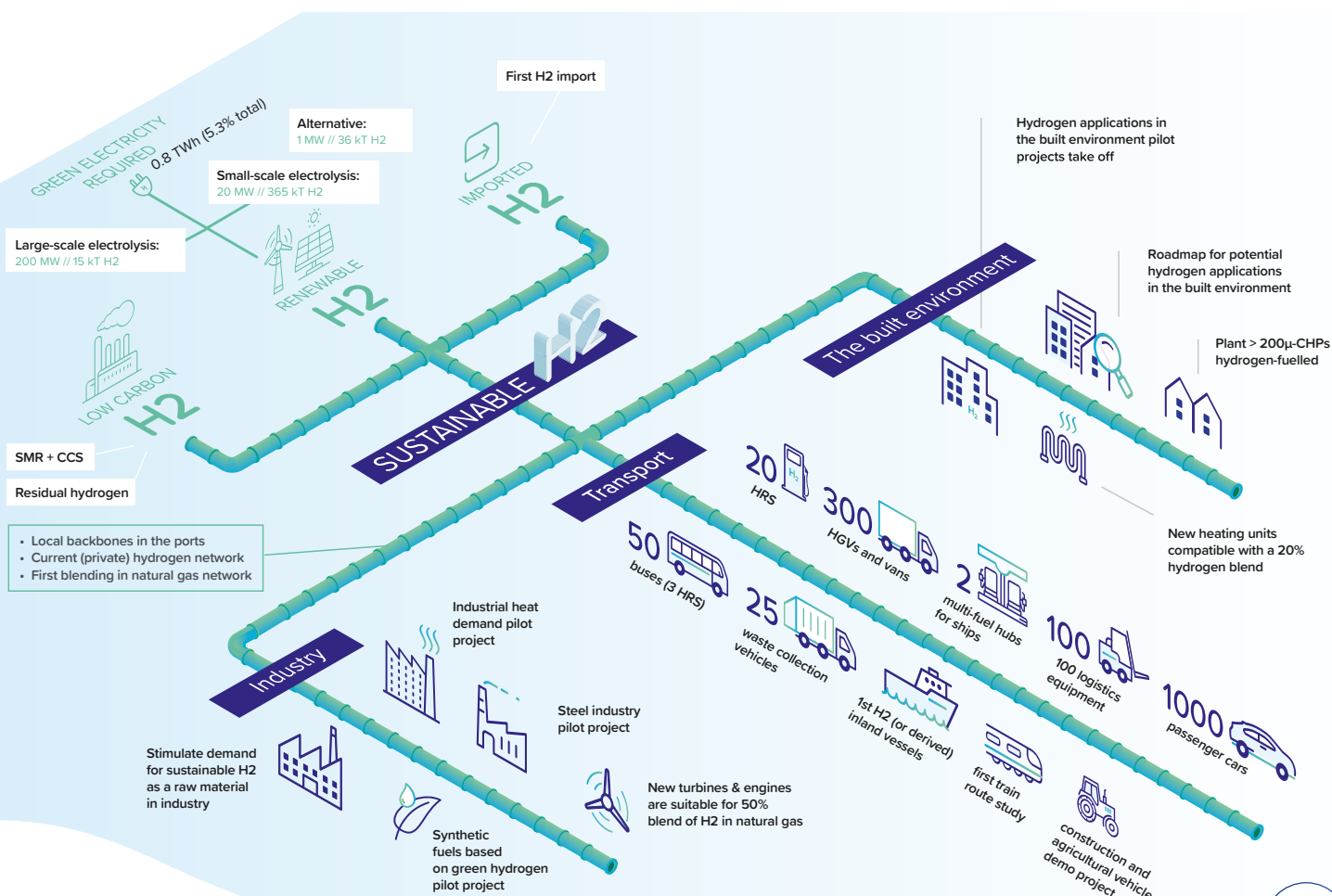
It goes without saying that there also good contacts with diverse government institutions on the Belgian and Dutch levels. At WaterstofNet, we have regular

consultations with diverse governments about how the next steps in hydrogen can be taken in an ambitious and realistic manner.

To support the Flemish government in its ambitions to roll out a hydrogen plan, a bottom-up strategic vision for Flanders was formulated by the Hydrogen Industry Cluster ("Waterstof Industrie Cluster") in the autumn of 2020.

WaterstofNet is ready to join governments and companies in making these goals a reality!

Ambitions for 2025 as formulated by the Hydrogen Industry Cluster:



What we offer

Everyone can call on WaterstofNet for our expertise in the field of hydrogen. We offer different services depending on the type of organisation and needs. A selection from what we offer:

1. Project realisations

Do you have an idea for a hydrogen project? WaterstofNet is happy to discuss it with you. We will look for suitable partners and financing channels. As a project organisation, we follow the most important project calls and develop proposals.

2. Studies and consultancy assignments

You can also turn to WaterstofNet for individual assignments. On request, we will perform short studies or consultancy activities. They might extend from business case calculations for the realisation of tank infrastructure or electrolysis to the drafting of a hydrogen plan for a site, city or larger region.

3. Industrial collaboration

Do you, as a company, public authority or knowledge institution, have plans or ambitions related to hydrogen? By partnering with the Hydrogen Industry Cluster, you receive immediate access to the largest hydrogen network in the Benelux region with expertise at every step of the hydrogen chain. Furthermore, you're able to call on the knowledge and skill of WaterstofNet for clear guidance with your hydrogen ambitions.

4. Internship or thesis

In recent years, diverse students have found their way to WaterstofNet, looking for an internship or a subject for a thesis. We are happy to look at the possibilities!

One address for all your questions:
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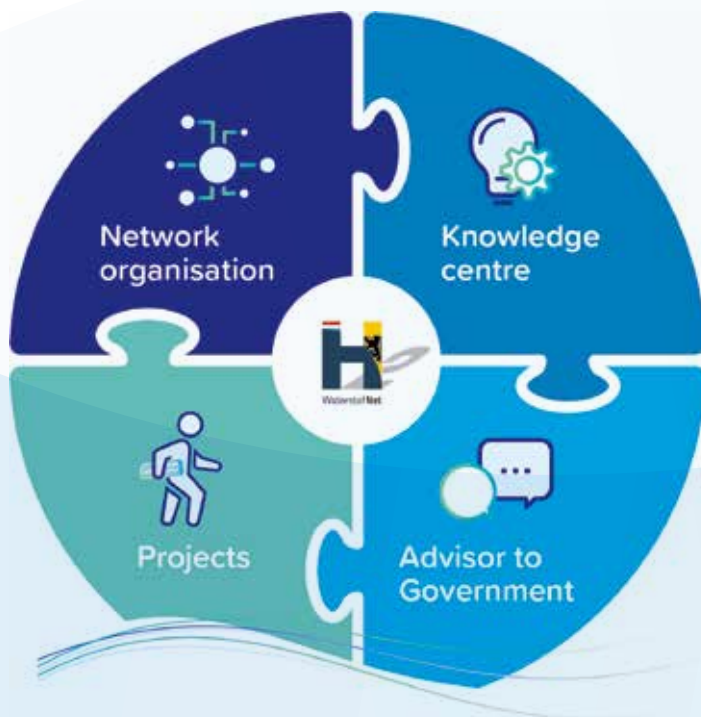
Looking forward

It is clear that hydrogen currently enjoys unprecedented interest. Governments, companies and knowledge institutions are making strong efforts in the area of hydrogen. We can speak about ‘Hydrogen, the next level’.

‘Hydrogen, the next level’ also requires WaterstofNet to move to the next level.’

This is in **content** as well as **form**.

This means a different **house style**, a new **website**, but especially a **significant focus** on the **following pillars**:



Network organisation

- Expansion and coordination of a growing Hydrogen Industry Cluster as a leading cluster in the Benelux region.

Projects

- Development and realisation of demonstration projects developed from innovative concepts.
- Direction of the cross-border upscale of hydrogen initiatives.

Knowledge centre

- Dissemination of knowledge via the Hydrogen Academy, conferences and other education channels.
- Advising companies and knowledge institutions on hydrogen.

Advisor to government

- Development and support of government policy (Flemish, Dutch, European).
- Active proposals and substantiation of necessary policy measures, in dialogue with governments and industry.

With more than **ten years** of experience, our team of **twelve employees** is looking at the future of hydrogen. Your ideas, plans and ambitions trigger us to think actively with you. Together with you, we want to pursue regional benefits and turn ambitions into concrete realisations, thus becoming a powerhouse in Europe.

Adwin Martens
Managing Director WaterstofNet



Projectportfolio

WaterstofNet is currently involved in about twenty hydrogen projects. They are mostly European projects focused on mobility and refuelling infrastructure. The current and past projects have resulted in a hydrogen ecosystem in Flanders and the Netherlands, as well as invaluable experience for WaterstofNet as a project organisation.

- Waterstofregio 2.0



- H2-Share



- 3E-Motion



- Life 'n Grab Hy



- Revive



- H2Benelux



- EPOC



- H2Haul



- ISHY



- Procura



- H2Rent



- Green Octopus



- Greenports



- Hydrolog



- PDA Regions



- Waterstofimportcoalitie



- BathyBuild



- HyTrucks



- StasHH



Interreg
North-West Europe
H2-Share

3E
MOTION

Life 'n' Grab Hy

REVIVE

H2
BENELUX

EPOC

H2HAUL

Interreg
2 Seas Mers Zeeën
ISHY

H2
RENT

H2

FCH
PROJECT DEVELOPMENT
ASSISTANCE FOR REGIONS

BathyBuild

HyTrucks

STASHH

All information about our projects is available at www.waterstofnet.eu

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