

# Potential for Cross-Border Cooperation between the Northeast of the Netherlands and the Northwest of Germany in the field of Hydrogen as an Energy Carrier



## Project H<sub>2</sub>LinkRegions



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## Executive Summary – English

Hydrogen is expected to play an important role in the energy transition and to achieve the climate goals. Hydrogen strategies have therefore recently been developed in both Germany and the Netherlands and they are supplemented at regional level by appropriate action strategies and programmes.

The Northwest of Germany and the Northeast of the Netherlands can play a special role in this field. In particular the Dutch provinces of Groningen and Drenthe and Northwestern Lower Saxony, the Region that has been investigated in this study, have good prerequisites for building up a hydrogen economy: They are not only important production sites for renewable energy, but they also have sufficient storage capacities and a corresponding energy infrastructure. The energy sector is a very important economic factor in the Region.

While the national and regional hydrogen strategies refer to the necessity and the opportunities of cross-border cooperation, a systematic analysis of the potentials of such cooperation has so far been lacking. The Oldenburger Energiecluster (OLEC) and the New Energy Coalition (NEC) took this as an opportunity and commissioned a corresponding study.

As part of the study, inventories of actual and potential Players and of ongoing and planned Projects in the Region related to hydrogen were compiled. A total of 218 companies and organisations were identified that are already active in the hydrogen sector or are planning corresponding activities in the future. Around three quarters of these Players are companies; the proportion of SME-sized enterprises amounts to 17% of the 218. The remaining Players represent research/development/education/training, associations/clusters/non-profit and politics/administration.

About half of the Players identified are actually located in the Region. The fact that it attracts many Players from elsewhere is further evidence of the particular potential that the Region has in terms of the emerging hydrogen economy.

The upcoming role of hydrogen also becomes evident from the 67 ongoing and planned Projects that could be identified. Almost half of them concentrate on the use of hydrogen while its supply (production and logistics) accounts for about one third of the activities. Three of the Projects focus on cross-border cooperation.

An online survey was set-up to gain more insight into the potential for and obstacles to cross-border cooperation in the field of hydrogen. 21 questionnaires were completed. The obstacle that was particularly emphasised by the participants is the difference in the regulatory frameworks of the two countries. In addition, differences in national and regional action strategies and issues with financing were highlighted. These findings were endorsed by the results of a set of expert interviews. Other findings from these interviews relate to SMEs in particular; SMEs find it difficult to partner with larger companies and experience difficulties with unclear and confusing funding options. Nonetheless, almost all survey respondents and interviewees see potential in cross-border cooperation.

In order to be able to exploit this potential, the researchers make a set of recommendations:

- A. Setting up a central website, to make existing information on experiences, challenges, solutions and advice available or easier to access.
- B. Organising regular online events, to enhance news sharing and knowledge exchange and as a low-threshold opportunity e.g. for SMEs to get involved.
- C. Intensifying connections between Players from both countries via regular in-person meetings, where specific topics, ideas and projects can be discussed and initiatives can be started.
- D. Developing solutions for institutional and regulatory cross-border barriers, e.g. via round table dialogues, “real-world laboratories” (or “regulatory sandboxes”) and/or a handbook that explains the state of the art in this field.

## Executive Summary – German

Wasserstoff gilt als wichtiges Element der Energiewende und zur Erreichung der klimapolitischen Ziele. In jüngster Zeit wurden daher sowohl in Deutschland als auch in den Niederlanden Wasserstoffstrategien entwickelt, die auf regionaler Ebene durch geeignete Aktionsstrategien und Maßnahmenprogramme ergänzt werden.

Der Nordwesten Deutschlands und der Nordosten der Niederlande können dabei eine besondere Rolle einnehmen. Insbesondere die in dieser Studie untersuchte Region, bestehend aus den niederländischen Provinzen Groningen und Drenthe sowie Nordwest-Niedersachsen, hat gute Voraussetzungen für den Aufbau einer Wasserstoffwirtschaft: Sie umfasst nicht nur Standorte wichtiger Produktionsstätten erneuerbarer Energien, sondern verfügt auch über ausreichende Speicherkapazitäten und eine entsprechende Energieinfrastruktur. Der Energiesektor ist zudem ein wichtiger Wirtschaftsfaktor in der Region.

Während sich die nationalen und regionalen Wasserstoffstrategien bereits auf die Notwendigkeit und Möglichkeiten einer grenzüberschreitenden Zusammenarbeit beziehen, fehlte bisher eine systematische Analyse der Potenziale einer solchen Zusammenarbeit. Der Oldenburger Energiecluster (OLEC) und die New Energy Coalition (NEC) nutzten diese Gelegenheit und gaben eine entsprechende Studie in Auftrag.

Im Rahmen der Studie wurde eine Bestandsaufnahme der bereits aktiven und potenziellen Akteure sowie der laufenden und geplanten Projekte in der Region in Bezug auf Wasserstoff durchgeführt. Insgesamt wurden 218 Unternehmen und Organisationen identifiziert, die bereits im Wasserstoffsektor tätig sind oder entsprechende Aktivitäten für die Zukunft planen. Rund drei Viertel dieser Akteure sind Unternehmen; der Anteil der KMU an der Gesamtzahl liegt bei 17%. Die verbleibenden Akteure repräsentieren Forschung/Entwicklung/Bildung/Ausbildung, Verbände/Cluster/gemeinnützige Organisationen und Politik/ Verwaltung.

Etwa die Hälfte der identifizierten Akteure ist in der Region ansässig. Die Tatsache, dass die Region viele Akteure aus anderen Gebieten anzieht, ist ein weiterer Beleg für das besondere Potenzial, das die Region in Bezug auf die aufstrebende Wasserstoffwirtschaft besitzt.

Die wichtige Rolle des Wasserstoffs wird auch durch die 67 identifizierten laufenden und geplanten Projekte deutlich. Fast die Hälfte von ihnen beschäftigt sich mit der Verwendung von Wasserstoff, während dessen Bereitstellung (Produktion und Logistik) etwa ein Drittel der Aktivitäten ausmacht. Drei der Projekte konzentrieren sich auf die grenzüberschreitende Zusammenarbeit.

Eine Online-Umfrage wurde durchgeführt, um mehr Einblick in das Potenzial und die Hemmnisse einer grenzüberschreitenden Zusammenarbeit im Bereich Wasserstoff zu gewinnen. Das Hemmnis, das von den Teilnehmern besonders hervorgehoben wurde, sind die Unterschiede in den rechtlichen Rahmenbedingungen beider Länder. Darüber hinaus wurden Unterschiede bei nationalen und regionalen Aktionsstrategien und Finanzierungsprobleme betont. Diese Ergebnisse wurden in einer Reihe von Experteninterviews bestätigt. Weitere Ergebnisse der Interviews beziehen sich insbesondere auf KMU; für KMU ist es kompliziert, mit größeren Unternehmen zusammenzuarbeiten, und sie haben Schwierigkeiten mit unklaren und verworrenen Fördermöglichkeiten. Dennoch sehen fast alle Befragten Potenzial in der grenzüberschreitenden Zusammenarbeit.

Um dieses Potenzial zu erschließen, enthält die Studie eine Reihe von Empfehlungen:

- A. Einrichtung einer zentralen Website, die vorhandene Informationen zu Erfahrungen, Herausforderungen, Lösungen und Ratschlägen verfügbar oder leichter zugänglich zu macht.
- B. Organisation regelmäßiger Online-Veranstaltungen zur Intensivierung des Informations- und Wissensaustausches sowie als einfache Gelegenheit, sich z.B. als KMU mit geringem Aufwand zu beteiligen.

- C. Intensivierung der Kontakte zwischen Akteuren aus beiden Ländern durch regelmäßige persönliche Treffen, bei denen spezifische Themen, Ideen und Projekte diskutiert und Initiativen gestartet werden können.
- D. Entwicklung von Lösungen für institutionelle und regulatorische grenzüberschreitende Hemmnisse, z.B. mit Hilfe von Dialogen am runden Tische, Reallaboren (auch „regulatorische Sandkästen“) und/oder mittels eines Handbuchs, das den Stand der Dinge auf diesem Gebiet erklärt.

## Executive Summary – Dutch

Waterstof lijkt een belangrijke rol te gaan spelen binnen de energietransitie en voor het behalen van de doelen binnen het klimaatbeleid. Om deze reden zijn recent zowel in Duitsland als in Nederland waterstof strategieën ontwikkeld. Op regionaal niveau worden deze strategieën vertaald naar actiestrategieën en uitvoeringsprogramma's.

Het Noordwesten van Duitsland en het Noordoosten van Nederland kunnen een speciale rol spelen op dit gebied. Vooral de Nederlandse provincies Groningen en Drenthe en de Duitse regio Noordwestelijk Nedersaksen, de regio die in dit onderzoek is onderzocht, hebben goede voorwaarden om de waterstof economie uit te breiden: ze zijn niet alleen belangrijke productie locaties voor hernieuwbare energie, maar ze hebben ook voldoende opslagcapaciteit met bijbehorende infrastructuur. De energiesector is een belangrijke economische factor voor de regio.

Terwijl de nationale- en regionale waterstofstrategieën aandacht hebben voor de noodzaak en de mogelijkheden van grensoverschrijdende samenwerking, ontbrak het tot dusver aan een systematische studie van de mogelijkheden van een dergelijke samenwerking. Het Oldenburger Energiecluster (OLEC) en New Energy Coalition (NEC) hebben dit als kans aangegrepen en hebben opdracht gegeven om een dergelijke studie uit te voeren.

Als onderdeel van deze studie is een inventarisatie gemaakt van de huidige en potentiële spelers en van de lopende en geplande projecten op het gebied van waterstof in de regio. 218 bedrijven en organisaties die al actief zijn in, of toekomstige plannen hebben op, het gebied van waterstof zijn geïdentificeerd. Ongeveer driekwart van deze spelers zijn bedrijven; het aandeel van MKB bedraagt 17% van de 218. De overige spelers representeren onder andere onderzoeksorganisaties, onderwijsinstellingen, clusters, verenigingen, non-profit en politiek.

Ongeveer de helft van de geïdentificeerde spelers is daadwerkelijk in de regio gevestigd. Het feit dat ook veel spelers van buiten de regio actief zijn in deze regio, laat zien dat de potentie in de opkomende waterstofeconomie van de regio wordt erkend.

De opkomende rol van waterstof blijkt ook uit de 67 geïdentificeerde lopende en geplande waterstof projecten in de regio. Bijna de helft van deze projecten richt zich op het gebruik van waterstof, terwijl de levering (productie en logistiek) goed is voor ongeveer een derde van de activiteiten. Drie van deze projecten richten zich op (land)grensoverschrijdende activiteiten.

Een online enquête is opgezet om meer inzicht te krijgen in de kansen en obstakels voor (land)grensoverschrijdende activiteiten op het gebied van waterstof. 21 enquêtes zijn volledig ingevuld. Het obstakel dat in het bijzonder werd benadrukt door deelnemers, is het verschil in regelgevende kaders van beide landen. Daarnaast werden ook het verschil in nationale en regionale strategieën en problemen met financiering uitgelicht. Deze resultaten werden bevestigd door de resultaten van een reeks interviews met experts.

Andere bevindingen uit deze interviews hebben specifiek betrekking op MKB-ers; MKB-ers vinden het moeilijk om samen te werken met grotere bedrijven en ondervinden problemen door onduidelijke en verwarringe financieringsmogelijkheden. Desalniettemin hebben bijna alle deelnemers aan de enquête aangegeven kansen te zien voor (land)grensoverschrijdende samenwerking.

Om deze kansen te kunnen benutten, zijn er een aantal aanbevelingen geformuleerd:

- A. Het opzetten van een algemene website om bestaande informatie over ervaringen, uitdagingen, oplossingen en advies beschikbaar te maken of voor gemakkelijkere toegang hiertoe.
- B. Het regelmatig organiseren van online evenementen om het delen van nieuws en kennis te verbeteren en als een laagdrempelige kans voor bijvoorbeeld MKB-ers om deel te nemen.
- C. Het versterken van de verbinding tussen spelers van beide landen via regelmatige fysieke vergaderingen waar specifieke onderwerpen, ideeën en projecten kunnen worden besproken en initiatieven kunnen worden gestart.

D. Oplossingen ontwikkelen voor institutionele en regelgevende (land)grensoverschrijdende obstakels, bijvoorbeeld via “ronde tafel” gesprekken, echte laboratoria (ook wel “regelgevende zandbakken”), en/of een handboek over de huidige stand van zaken op dit gebied.

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## List of Abbreviations and Terms

ERDF	European Regional Development Fund
EU	European Union
FCH JU	Fuel Cells and Hydrogen Joint Undertaking
H <sub>2</sub>	Hydrogen
INTERREG	A series of programmes to stimulate cooperation between regions in and out of the EU, funded by the European Regional Development Fund.
LOHC	Liquid Organic Hydrogen Carrier
NEC	New Energy Coalition
OLEC	Oldenburger Energiecluster
SME	Small and Medium-sized Enterprise

## 1 Introduction

With the Paris Agreement being presented back in 2015, a start sign was given to speed up the energy transition. Since then, many countries have set their own goals for the reduction of greenhouse gas emissions, in line with the Paris Agreement. In order to reach these goals, innovation is required. Both the North Netherlands and Northwest Germany have started innovative projects and are currently among the leaders in the energy transition of Europe. In order to increase their competitive position, further research, development and investment is needed.

For a successful energy transition, the introduction of hydrogen technology seems essential. The great advantage of using hydrogen as an energy carrier is that renewable energy can be stored at scale and over long periods of time. Hydrogen can make a decisive contribution to efficiently coupling the electricity, transport and heating sectors. Hydrogen generated from renewable energy can also replace fossil energy and raw materials in various industrial sectors, for example steel making.

In January 2017 a Memorandum of Understanding was signed by the Dutch provinces Groningen, Drenthe, Friesland and Overijssel and the German state of Lower Saxony by which they have agreed on cooperation of further developments of a future energy system. A renewal of this memorandum is being sought for 2020/21, in which next to the current requirements of the energy sector, the subject of a “cross-border hydrogen economy” will be addressed more intensive.

### 1.1 The Concept of a Hydrogen Economy

The concept of a “hydrogen economy”, i.e. the widespread use of hydrogen in various sectors of the energy system, and in a future low-carbon energy economy in particular, is attracting increasing interest both nationally and internationally. Hydrogen technology is seen as a decisive instrument for contributing to the achievement of ambitious energy and climate policy goals. Advances in the development of hydrogen production technologies such as electrolyzers but also at the end-use level such as fuel cells have significantly improved the cost-effectiveness of hydrogen.

Both the Northwest of Germany and the Northeast of the Netherlands have strong ambitions in terms of contributing to the creation of a hydrogen economy. Cross-border cooperation could lead to benefits on both sides.

## 1.2 Cross-Border Cooperation: State of Play

### 1.2.1 Cross-border cooperation in the field of hydrogen

Strategies for advancing hydrogen technology are in place on both sides of the border. The Dutch provinces of Groningen and Drenthe as well as the Northwest of Lower Saxony have positioned themselves as energy regions and fulfil the prerequisites for a hydrogen economy. Both areas are leading in the production of renewable energy and have extensive storage capacities. Both regions act as hubs for offshore wind energy in addition.

As to be presented in Chapter 2, there are many companies and organisations that deal with the topics of hydrogen technology and introducing hydrogen to the energy sector. A cross-border exchange of experiences takes place at the political level and within the framework of transnational research projects and regional funding programs, such as the North Sea Region Programme (European Commission, 2020).

The German National Hydrogen Strategy (Die Bundesregierung, 2020), the North German Hydrogen Strategy (Economics and Transport Ministries of the North German Coastal States, 2019), the Dutch National Hydrogen Strategy (The Minister of Economic Affairs and Climate Policy, 2020) and the regional strategies for the Northern Provinces of the Netherlands (Avebe, BioMCN, EMMTEC services et al., 2019; Buit, 2019; de Laat, 2020; The Northern Netherlands Innovation Board, 2016, 2017) refer to the importance of international cooperation. So far, however, the proposals have remained rather general.

The suggested cooperation typically relates to the comparison of the framework conditions and the creation of a corresponding infrastructure (Enagás et al., 2020; Piantieri et al., 2020). In a Joint Declaration by the economics ministries of the two

countries, it says: “*The Participants recognize the potential role of hydrogen as an important energy carrier in their energy system, for sector coupling and system integration, as well as a base material for industrial production. ... The Participants will examine the possibilities to create a common regulatory framework for hydrogen (...), with a view to developing a European regulatory framework*”.

(Federal Ministry for Economic Affairs and Energy, 2019)

### 1.2.2 Cross-border cooperation between companies

Cross-border cooperation between companies has so far been less systematically addressed. In this context, it is particularly important to understand what obstacles or barriers hinder or prevent cooperation. The two terms obstacles and barriers are used synonymously in this report.<sup>1</sup>

Border regions have received special attention in recent years: “*Cross-border regions have been seen as laboratories for European integration. Here the people of Europe would meet and experience the benefits of European integration*”.

(van der Broek, 2015)

There are various motives for cooperation, especially between cross-border regions (Sousa, 2012), which also apply to cooperation between the Northwest of Lower Saxony in Germany and the Northeast of the Netherlands, such as:

- There is an overlap of interests.
- There is a shared historical memory.
- There is a strong interdependence between the two regions due to geographical or economic factors.
- There is a political objective for future joint action.

<sup>1</sup> As a rule, obstacles describe the factors that can complicate, slow down or hinder a certain development or the implementation of a project, while barriers have a strengthening effect, i.e. can also prevent a project. The boundaries between obstacles and barriers are also floating. For example, the lack of pipelines between two countries can be a barrier to cooperation, but in the long term the barrier can be removed by investing in infrastructure. In cases where there is a cross-border infrastructure, different regulations can act as an obstacle.

In principle, cooperation is seen as an opportunity to strengthen the economic position and competitiveness. In literature on regional economics, this point is particularly emphasised with respect to structurally weak areas.

With a view to cooperation between companies, one of the strands of debate focuses on cross-border innovations. This is also important for collaboration to establish a hydrogen economy, as this market is only in the start-up phase and is being driven forward in particular by innovations. In border regions, SMEs play an important role in labour market policy, but they are also seen as drivers of innovation (European Commission, 2019; Chong et al., 2018; EPSON 2018; Eurostat, 2019).

Cross-border cooperation of SMEs presents itself as a special challenge here: It requires *“... the build-up of trust, as cooperating for innovation adds an extra dimension of uncertainty and risk to the innovation process. For most SMEs cooperation is already a rare phenomenon, within their own region and nation state, let alone cooperating cross-border for innovation. Furthermore, most SMEs lack the necessary linkages across the border and, perhaps unjust, expect cultural, juridical and administrative barriers.”* (van der Broek, 2015)

What incentives do companies have to cooperate if they are located in neighbouring border regions? Or do certain barriers to cooperation arise precisely from this spatial proximity? A current review study by (Makkonen & Leick, 2019) summarizes the results of the relatively few systematic studies on these questions. Most of the studies do not have any explicit reference to energy, but the results allow some conclusions to be drawn for the question of this study.

Figure 1-1 shows the framework for categorizing the promoting and inhibiting factors of cross-border cooperation. A distinction is made between cross-border externalities and cross-border cooperation. Positive externalities can be seen in access to a larger pool of resources and innovations or through the expansion of the sales market. The benefits that emerge for companies through cross-border cooperation then consist of improved knowledge of the market conditions, the effects of more highly qualified

workers, better sales opportunities for products and services and a higher level of innovation and thus an overall increase in competitiveness. Whether or not this potential is tapped depends on the corresponding capacities of the companies, their willingness to open up to other countries and their flexibility to adapt to new conditions.

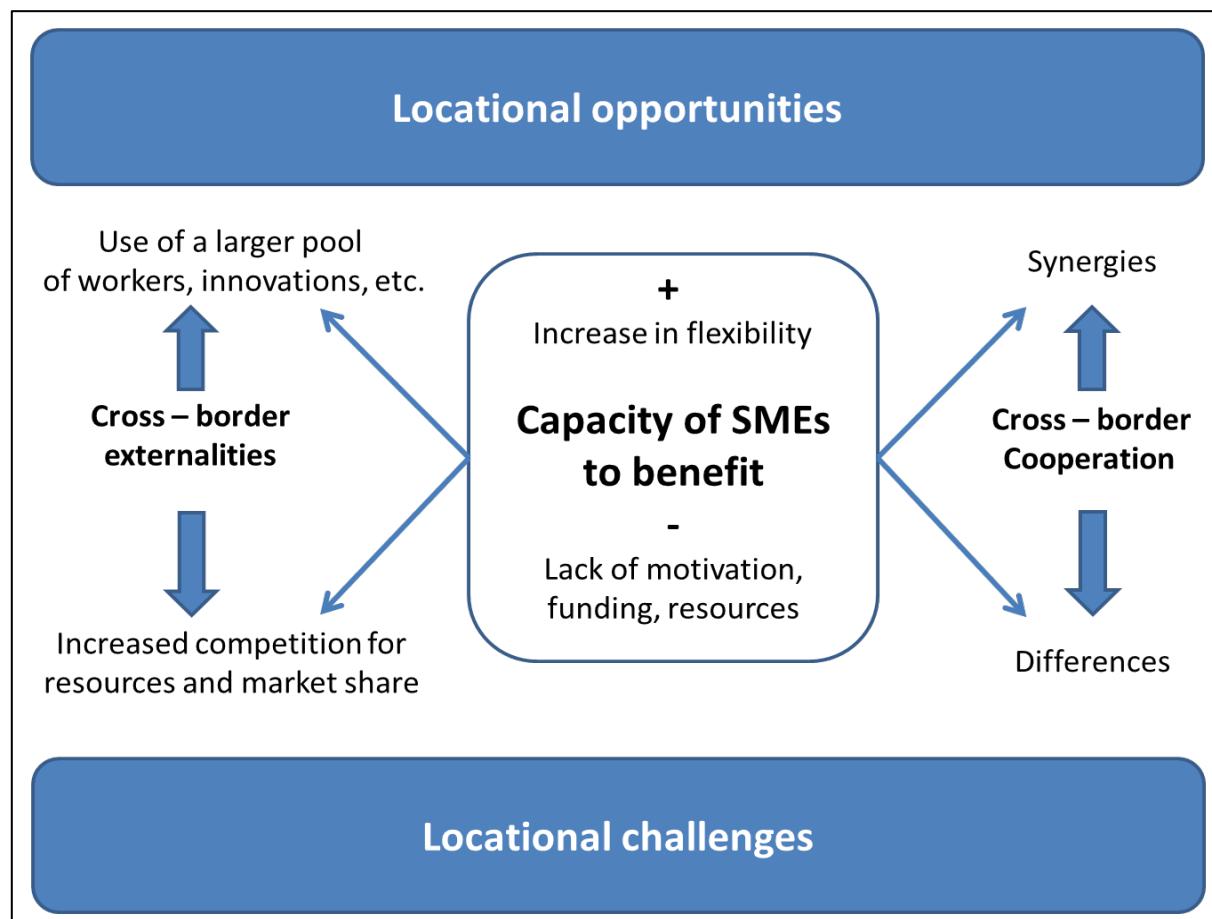


Figure 1-1: Entrepreneurship and SMEs in cross-border contexts.

Based on (Makkonen & Leick, 2019).

The close proximity of the two regions and the existence of a border can also cause negative externalities. Above all, increasing competitive pressure and the consequences for the respective local economies can play a role here. The competitive pressure can be greater if on both sides of the border the challenges and economic structures are similar.

At the same time, various factors can contribute to obstructing or preventing cross-border cooperation. Causes can lie in the company itself, such as a lack of resources

and qualifications, insufficient knowledge, lack of commitment and a fundamental rejection of cooperation. Other factors, on the other hand, are external in nature, such as bureaucratic barriers, regulatory framework conditions and uncertainty caused by uncoordinated political strategies.

How these factors interact and whether the border is seen more as an advantage or a disadvantage depends heavily on the specific local/regional conditions. For example, the more open the border is, the greater the possibility of exploiting synergies, but on the other hand, the greater the risk of excessive competitive pressure.

Most of the studies on these issues are therefore based on qualitative approaches and use expert interviews and online surveys. H<sub>2</sub>LinkRegions has also followed this approach.

### 1.3 Goal of the H<sub>2</sub>LinkRegions project

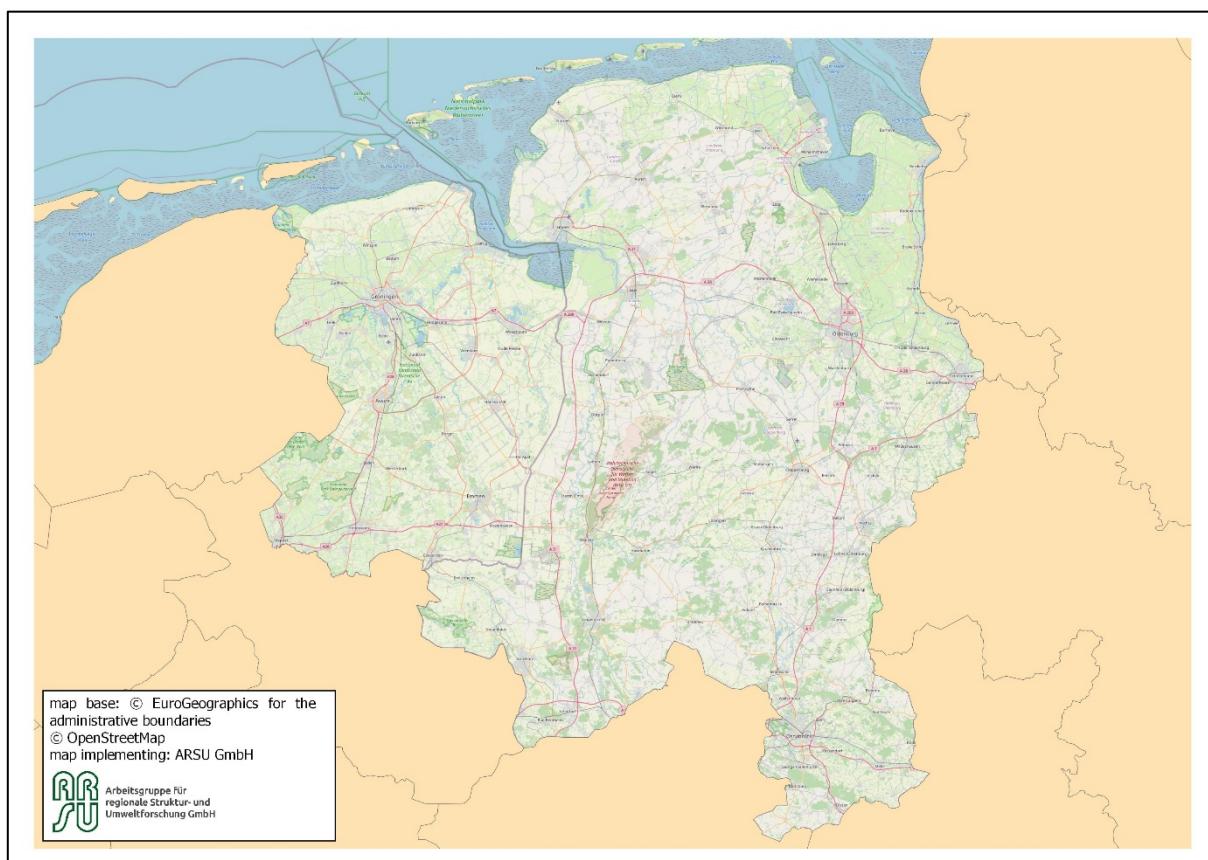
With the upcoming renewal of the above-mentioned Memorandum in mind, the New Energy Coalition (NEC) and the Oldenburger Energiecluster OLEC e.V. (OLEC) decided to further investigate the opportunities of and barriers to cross-border cooperation in the field of the hydrogen economy. This research has been named “H<sub>2</sub>LinkRegions”. It is co-financed within the framework of the INTERREG V A Programme Deutschland-Netherlands with resources from the European Regional Development Fund (ERDF) and by the provinces of Drenthe, Fryslân and Groningen as well as the federal state of Niedersachsen.

The H<sub>2</sub>LinkRegions project aims to realise added value to the Northeast-Netherlands and Northwest-Germany by knowledge exchange and joint development. It focuses on the determination of the opportunities of cross-border cooperation for projects working towards a hydrogen economy, including in the fields of storage, mobility, ports, logistics and the use of excess electricity from renewable energy sources.

## 1.4 Objectives, methodology and structure of this report

The objective of this potential study is to create an overview of the current hydrogen activities in the Region, as defined in the following paragraph, to identify the potential of and barriers to cross-border cooperation in the context of advancing a hydrogen economy, and to develop recommendations for overcoming the barriers. The study has been performed by ARSU GmbH, PLANET GbR and Summit Engineering BV, who have been contracted by NEC and OLEC.

The geographical focus of this study on the Dutch side is the provinces of Groningen and Drenthe. On the German side, it comprises the former Regierungsbezirk Weser-Ems and extends from the Dutch border to Bremen, and from the North Sea coast to the area around Osnabrück. This area will be referred to as “the Region” in this report, as shown in Figure 1-2.



**Figure 1-2: The Region considered in this report.**

The Region as studied in this report comprises the Dutch provinces Groningen and Drenthe and, on the German side, the former Regierungsbezirk Weser-Ems of Lower Saxony.

The Region is characterised by rural areas. Industry and commerce, science and research and are concentrated in several medium-sized cities. Economically, it is characterised by agriculture, agricultural engineering companies, the maritime economy and the energy industry. The Region is one of the pioneers of the energy transition with a high proportion of renewable energies and as a location for energy infrastructure (power grids, energy storage etc.).

H<sub>2</sub>LinkRegions kicked off with a workshop in Papenburg on 23<sup>rd</sup> January 2020. Around 40 experts representing relevant players from the Region came together. In the plenary and in parallel sessions, aspects of hydrogen in relation to cross-border cooperation were discussed. The results provided first input to shaping the potential study which is presented in this report.

After the first workshop, the researchers started their data collection by using desk research in order to determine the current situation with respect to players and activities. Following the data collection, an online survey was created to obtain the input from experts who are, or are interested to be, active in the field of the hydrogen economy.

A second workshop was held virtually on 2<sup>nd</sup> July 2020 with around 30 participants. It included presentations of two cross-border projects and of intermediate results from the work on this study, as well as a discussion.

Following the second workshop, interviews were carried out with respondents from the online survey and additional stakeholders.

The inventories of Players, and Projects and Initiatives can be found in Chapter 2 of this report. In Chapter 3, the opportunities and obstacles are displayed that resulted from the survey and the interviews. Chapter 4 summarises the findings and provides recommendations for enhancing cross-border cooperation.

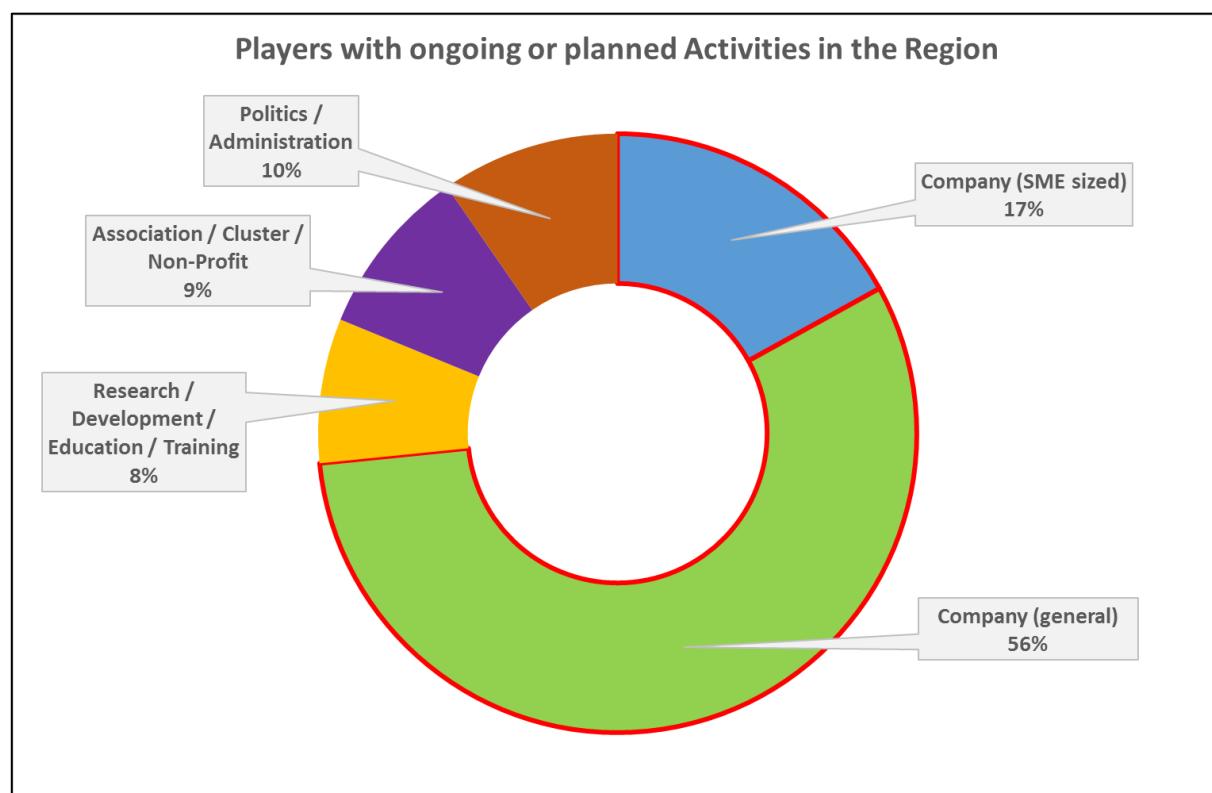
## 2 Cross-Border Cooperation in the Region: Where are we today?

Data collection for creating inventories of the Players and the Projects and Initiatives in the Region (as defined in Chapter 1.4 / Figure 1-2) took place in spring 2020. Given the recent dynamic development in the hydrogen sector, additional activities may have become public by the time this report is published, or planned Projects may have undergone changes with respect to their focus, or Players may have joined or left Projects or Initiatives.

### 2.1 Players with hydrogen-related activities in the Region

In total, 218 Players with ongoing or planned activities in the Region were identified.

Figure 2-1 distinguishes the Players by type.



**Figure 2-1: Players with ongoing or planned activities in the Region.**

Total of 218. Segments with red boundaries represent companies, which sum up to 73% or 160 of the total.

Almost three quarters of the Players (160 / 73%) are companies.

37 of the Players (17%) are SME-sized. In line with the EU definition of SMEs (Small and Medium-sized Enterprises), “SME-sized” represents companies that employ fewer than 250 persons, have an annual turnover not exceeding €50 million and a balance sheet total not exceeding €43 million<sup>2</sup>.

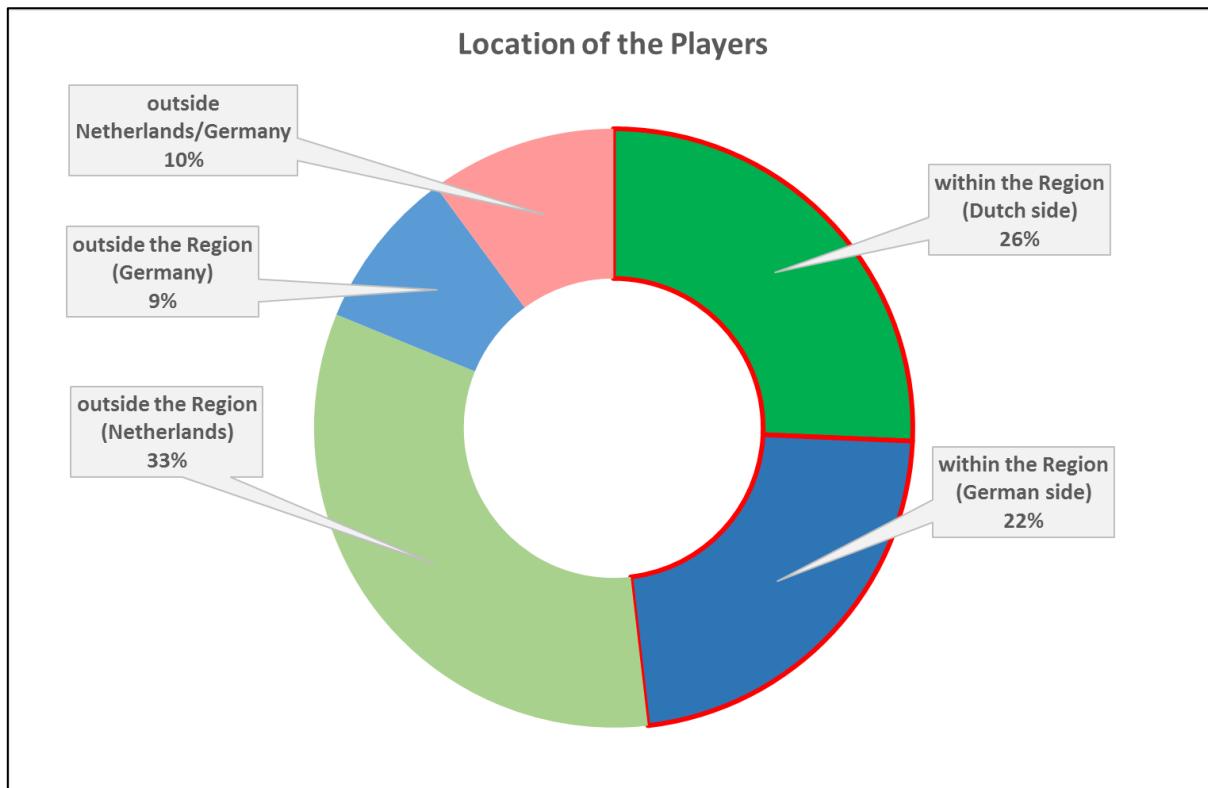
Many of the Players are known to be larger enterprises. For others, their details in terms of size could not be established. They are summarised under the category “Company (general)”, which in total includes more than half of the total (123 / 56%).

The remaining three categories account for 27% of the Players identified. There are 17 under “Research/Development/Education/Training” and 20 under “Association/Cluster/Non-Profit” and 21 under “Politics/Administration”. A full list of the Players can be found in Annex A.

Figure 2-2 reveals that less than half of the Players with ongoing or planned activities in the Region are actually located there, i.e. they have their (national) headquarters in the Region (48%, segments with a red boundary in the Figure). It also shows that 59% of the Players come from the Netherlands, almost twice as many as based in Germany (31%). The remaining 10% from outside the Netherlands and Germany are typically partners in European projects with co-funding from the FCH JU/Horizon 2020 which have activities in the Region.

When looking at the Players from the Netherlands with activities in the Region, it is noticeable that more of them are located outside the Region than there are Players from within the Region (Figure 2-2). This could be due to the fact that companies are interested in activities in the Region, as it includes North Netherlands, which has been pointed out by the Dutch government as being a leader for the national energy transition.

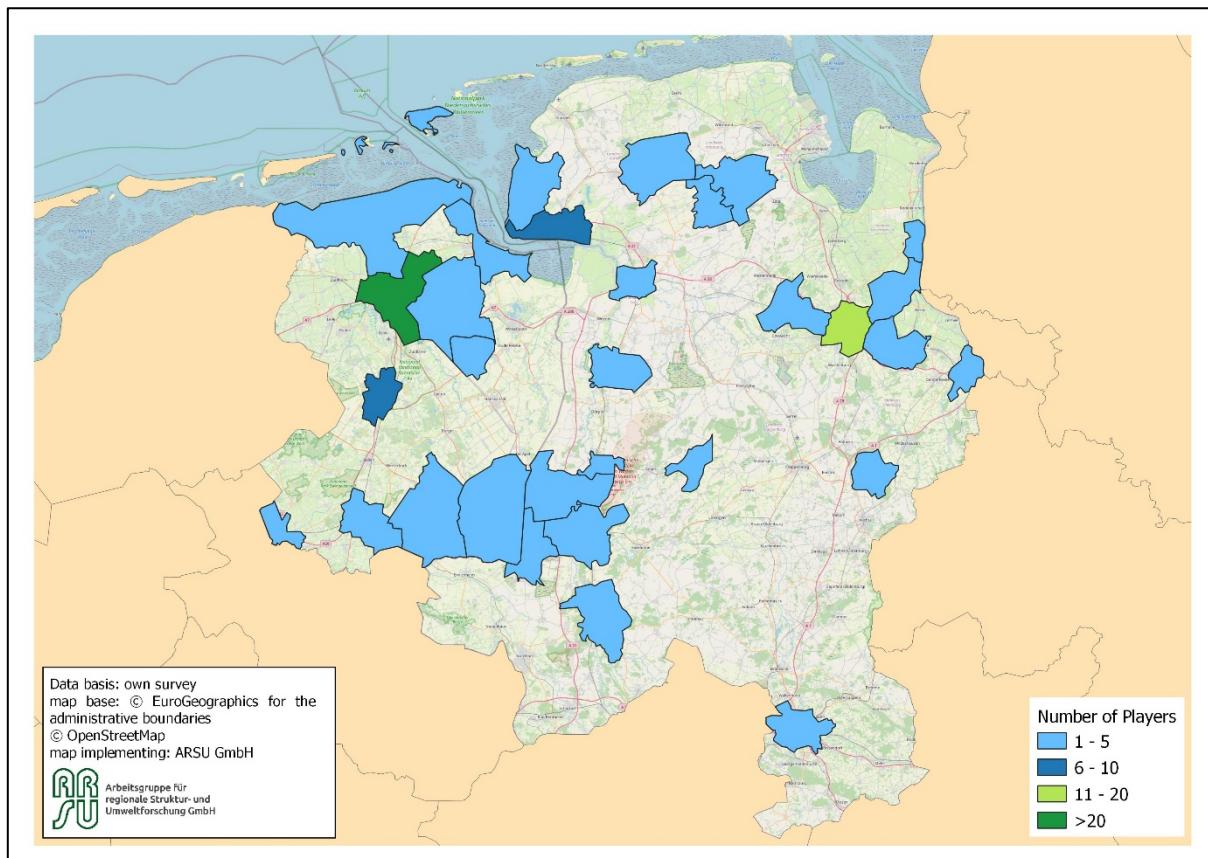
<sup>2</sup> The EU definition further includes requirements with respect to ownership, partnerships and linkages in order to qualify as an SME. Since these characteristics could not be determined for many of the Players identified in the course of the analysis, the SME-related category as used here is restricted to size.



**Figure 2-2: Location of the Players.**

Segments with red boundaries represent Players located within the Region.

Figure 2-3 maps the Players from the Region on municipality level. Many of the Players are located in and around larger places, particularly Groningen and Oldenburg, but also Assen and Emden.



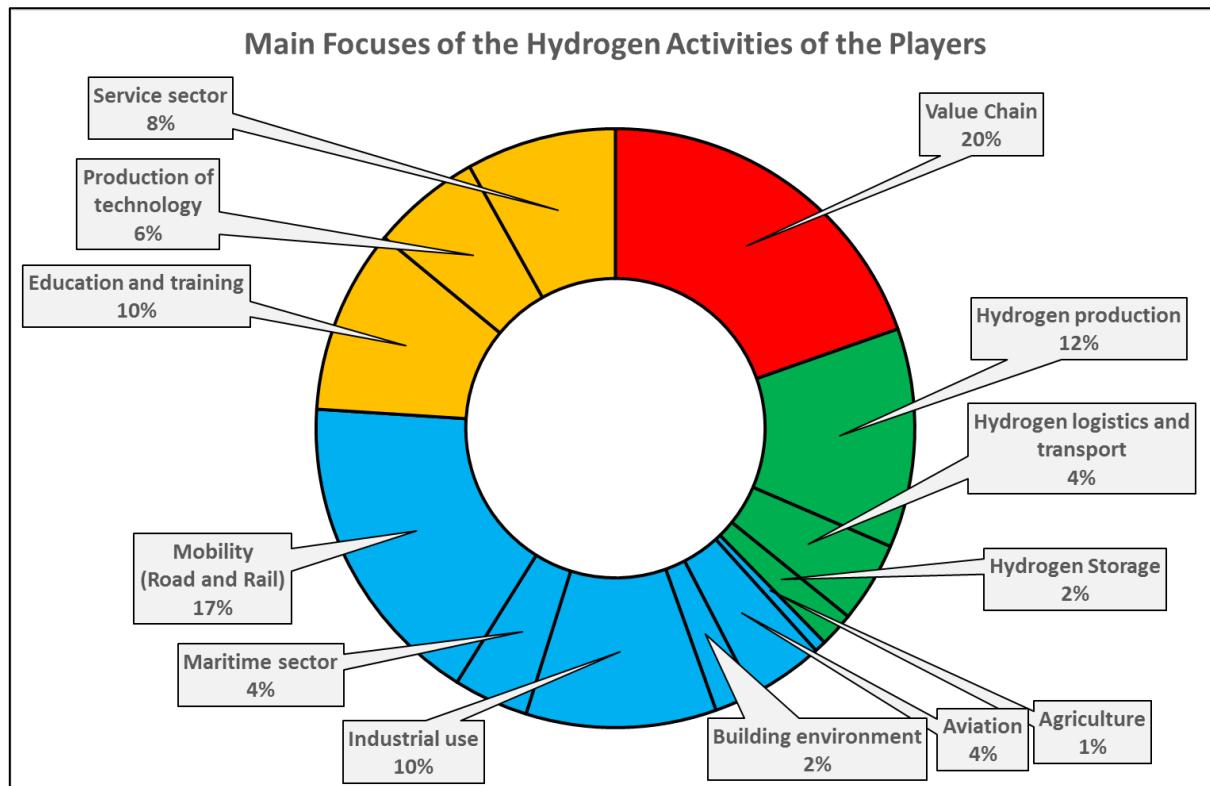
**Figure 2-3: Location of the Players within the Region.**

Players are considered to be located in the Region when they have their (national) headquarters there. The locations are mapped on municipality level.

Figure 2-4 summarises the main focuses of the Players' hydrogen activities. For many of the Players, more than one major focus area was established. The total of entries therefore is 325 here, compared with 218 Players.

20% of the entries are related to all or significant elements of the value chain (red segment in Figure 2-4). Another 18% refer to the supply of hydrogen (green segments), while the use of hydrogen attracts most attention (38% / blue segments). Cross-cutting activities account for the remaining 24%. This results in a rather balanced picture.

As regards the use of hydrogen, road and rail mobility (17%) and the application in industry (10%) appear to be most important today.



**Figure 2-4: Main focuses of the Players' activities in the field of hydrogen.**

Total of 325. Red segment: complete or major parts of the value chain. Green segments: hydrogen supply. Blue segments: hydrogen use. Orange segments: cross-cutting activities.

## 2.2 Ongoing and planned hydrogen-related Projects and Initiatives

Overall, 67 Projects and Initiatives, ongoing or planned<sup>3</sup>, were identified.

Most of them are located within the Region (46 / 69%, segments with red boundaries in Figure 2-5). Located here means that hardware-based activities take place or are planned to take place in a municipality in the Region. Where this was not clear or not foreseen, the municipality where the coordinator is based was chosen, such as in the case of Initiatives, i.e. networks and clusters. The same applies to the location of

<sup>3</sup> It is sometimes difficult to distinguish between planned and ongoing. For example, the project "Hyways for Future" has been approved for funding from the HyLand initiative while its details are still being finalised in spring/early summer 2020, e.g. demonstration sites and final set of partners. That also implies that the same analysis carried out at end of 2020 could lead to somewhat different results.

planned Projects when details such as the site for a hydrogen refuelling station were not clearly decided when the analysis had to be completed<sup>4</sup>.

Only two of the 46 Projects and Initiatives in the Region focus on cross-border cooperation, Power to Flex and SEREH (see Chapter 2.3). The others are located on either the Dutch or the German side of the Region only.

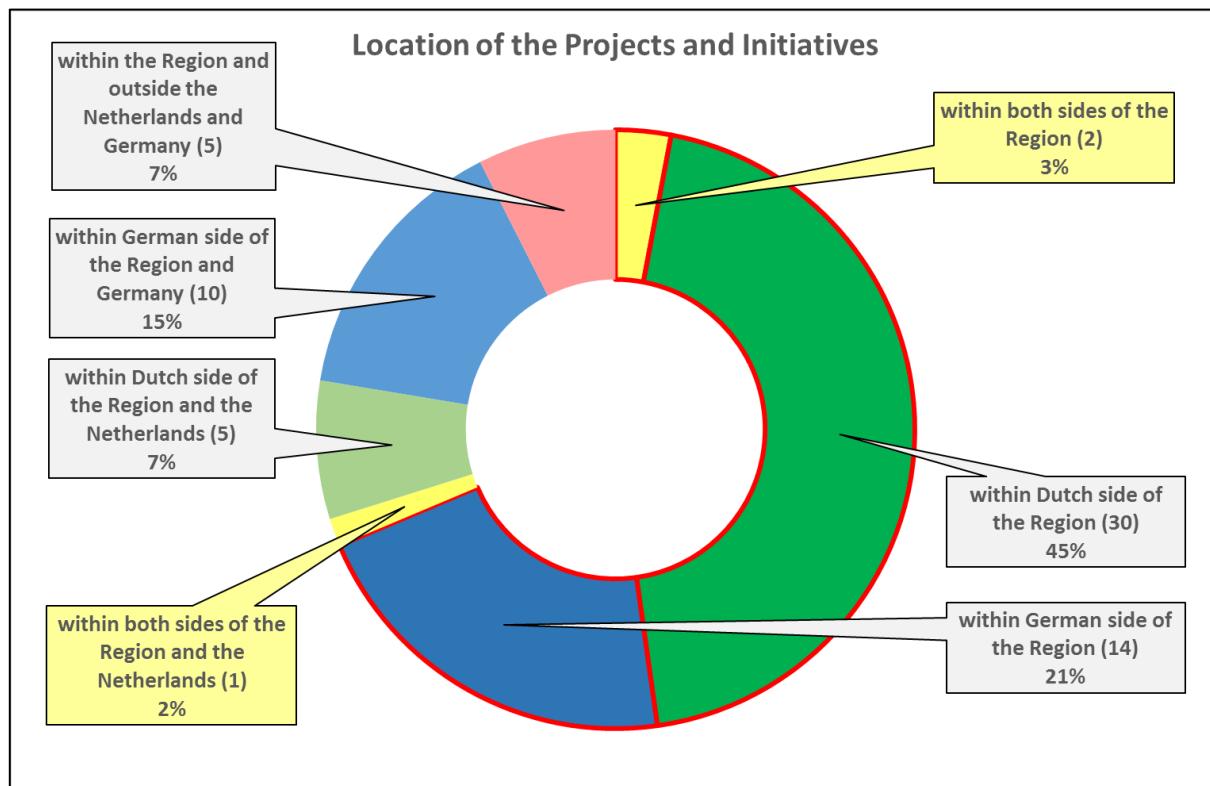
However, there is a third cross-border cooperation project, H<sub>2</sub>Watt. Since it includes a demonstration site on the island of Ameland (located outside the Region) and one on the island of Borkum (inside the Region) and partners from both sides of the Region, it constitutes its own category in Figure 2-5 (see the light-yellow segment on the bottom left).

Therefore, three of the 67 Projects and Initiatives identified do focus on cross-border cooperation. These three, H<sub>2</sub>Watt, Power to Flex and SEREH, are introduced in the following section.<sup>5</sup>

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<sup>4</sup> For example, that applies to the project “Hyways for Future” with activities planned across the Metropolregion Nordwest (which included several Landkreise/counties and cities) and the project “H<sub>2</sub>-Region Emsland” with activities planned across the Landkreis Emsland.

<sup>5</sup> To illustrate what is said above about the location of the Projects and Initiatives: The project “HEAVENN”, centred in the Dutch side of the Region, has partners from outside the Region, including one partner from its German side. However, unlike H<sub>2</sub>Watt, Power to Flex and SEREH, it has no activities in terms of demonstration etc. foreseen outside the Dutch side of the Region. Therefore, it is considered a project located in the Dutch side of the Region only.



**Figure 2-5: Location of the Projects and Initiatives.**

Segments with red boundaries represent Projects and Initiatives that are located within the Region exclusively. Yellow segments represent Projects with a focus on Dutch-German cross-border cooperation.

Figure 2-6 maps the Projects and Initiatives on municipality level. It shows a strong concentration of activities in Groningen and its neighbouring area.

Figure 2-7 summarises the main focus of the Projects and Initiatives, employing the same categories and colouring as Figure 2-4. For some of them, more than one major focus area was established. The total of entries therefore is 72 here, compared with 67 Projects and Initiatives.

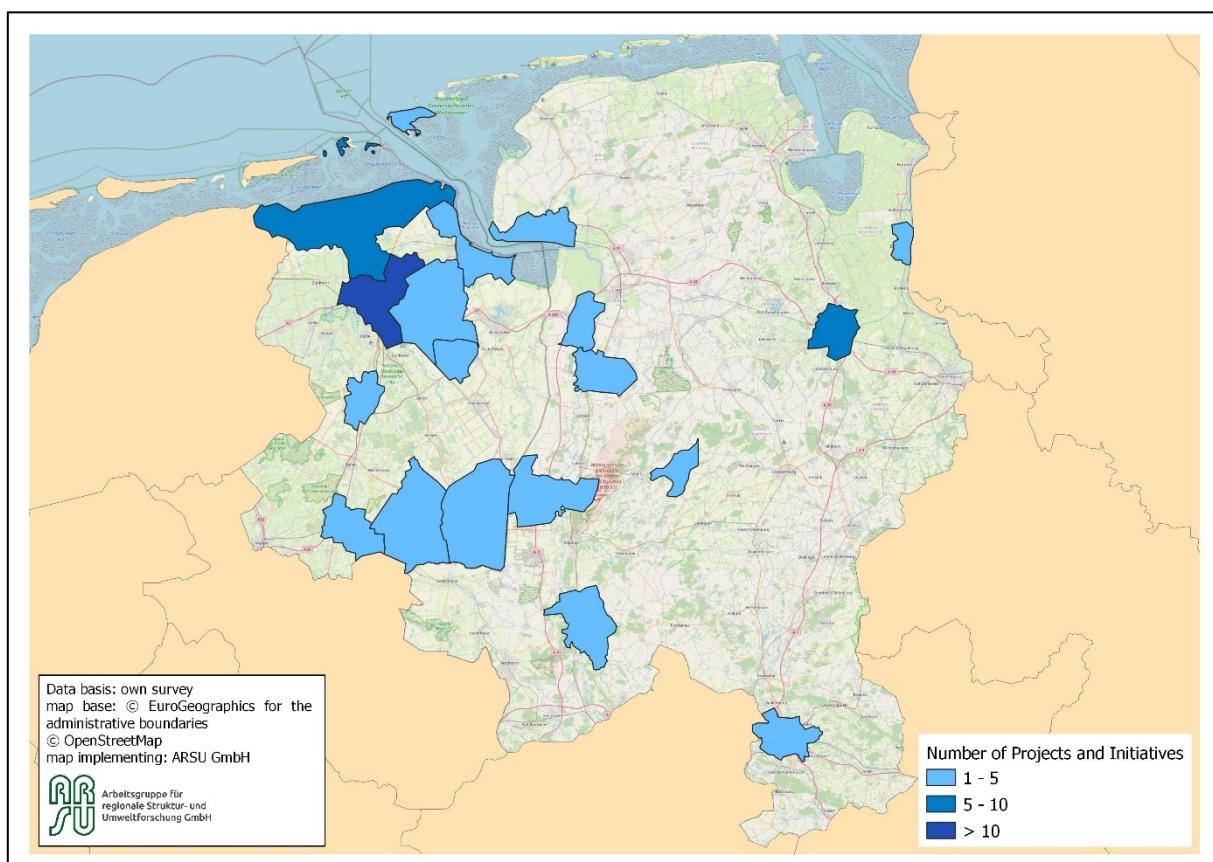
14% of the entries are related to all or significant elements of the value chain (red segment in Figure 2-7). 31% refer to the supply of hydrogen (green segments), while the use of hydrogen in various sectors again attracts most attention (45% / blue segments). Cross-cutting activities account for the remaining 10%.

Compared with the focuses of the Players (Figure 2-4), the Projects and Initiatives are less centred on the value chain and cross-cutting activities. The supply of hydrogen gets

more attention. The shares of hydrogen supply and hydrogen use sum up to more than three quarters.

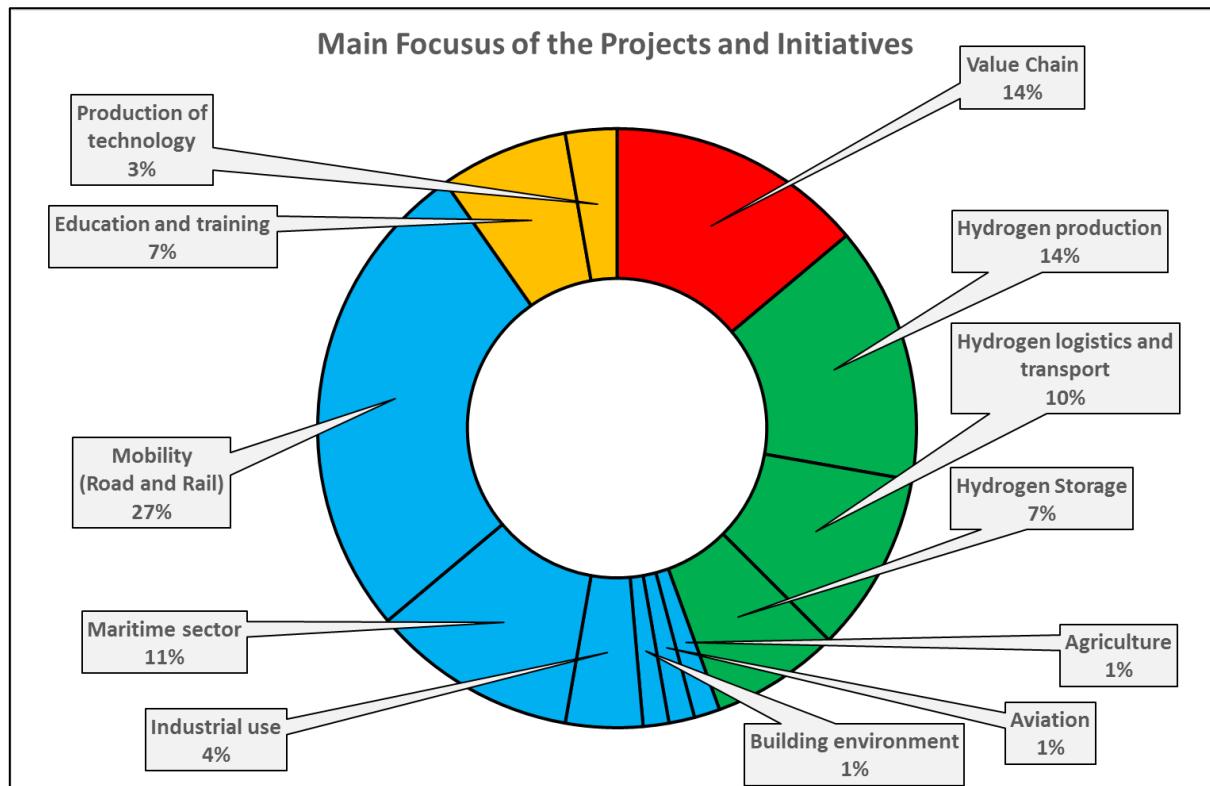
With respect to hydrogen use, mobility on road and rail is dominant (27%).

With respect to the primary goals of the Projects and Initiatives, research development and demonstration are dominant today (45% / blue segments in Figure 2-8). Activities with a market focus, including dissemination, account for 27% (orange segments).



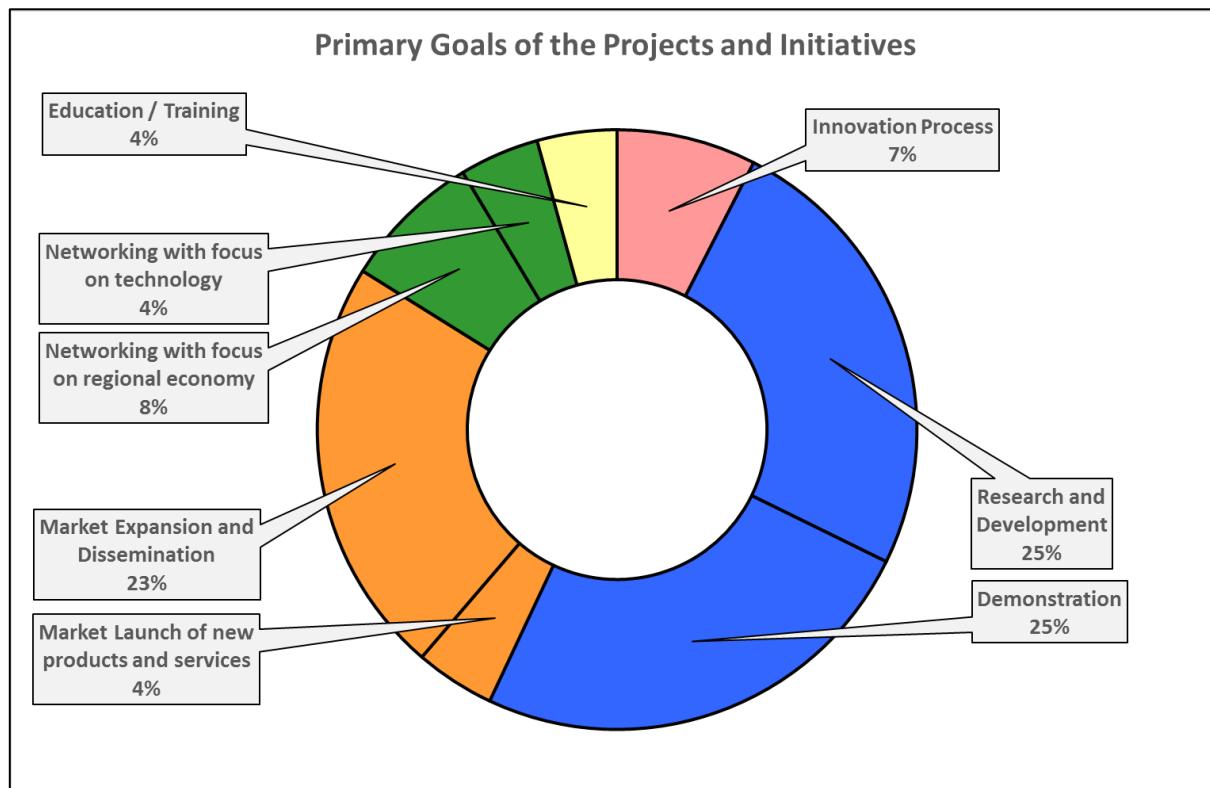
**Figure 2-6: Location of the Projects and Initiatives within the Region.**

The locations are shown on municipality level. See page 26 for what “location” means with respect to Projects and Initiatives, and mind the explanations provided in section 2.2.



**Figure 2-7: Main focuses of the Projects and Initiatives.**

Red segment = complete or major parts of the value chain, green segments = hydrogen supply, blue segments = hydrogen use, orange segments = cross-cutting activities.



**Figure 2-8: Primary goals of the Projects and Initiatives.**

Red segment: focus on the overall innovation process. Blue segments: focus on hardware. Orange segments: focus on market entry/expansion. Green segments: networking focus. Yellow segment: focus on education and training.

## 2.3 Ongoing cross-border cooperation Projects in the Region

As shown in the previous section, many projects take place in the Region but only very few focus on cross-border cooperation within the Region. These three projects, Power to Flex, SEREH and H<sub>2</sub>Watt, are supported by the INTERREG Deutschland/Nederland Programme.

In Power to Flex (2016 - 2020) companies, knowledge institutions and authorities from the Region have developed pilot projects for storing renewable energy in households and small businesses, for mobility, and in larger business and housing complexes. The fluctuating supply of energy from solar and wind is stored in batteries, heat combined with a heat pump and in hydrogen systems, which enable seasonal storage. The goal of the project is to support mainly SMEs in developing new products and expertise to strengthen their market position and, based on this, initiate further cross-border cooperation.

In the SEREH project (2018 - 2022) the municipalities of Haren (Ems) and Emmen are managing sustainable generated electricity across borders and therefore create a ‘decentralised cross-border electricity and energy market’, to be achieved by 2025. SEREH is aimed at a more regional use of sustainable energy via cross-border energy exchange, including hydrogen as a storage medium, rather than transporting “surplus” renewable power generation to distant places. It is expected that this can also reduce system costs. The project partners are local authorities, knowledge institutes and two energy companies, one from the Netherlands and one from Germany.

H<sub>2</sub>Watt (2019 - 2021) focusses on the production, transportation, storage and use of hydrogen in the Wadden Sea with partners from all over the Netherlands and the Northwest of Germany. The demonstration activities of the project will be located on the islands of Borkum and Ameland. These include a residential area using hydrogen, a hydrogen train on Borkum and a hydrogen water-taxi on Ameland.

### 3 Perspectives of Cross-Border Cooperation in the Region: Findings from a Survey and from Interviews

#### 3.1 Results of the online survey

An online survey was carried out to gain more insight into the potential for and obstacles to cross-border cooperation. The link to the survey was distributed with the “Save the date” invitation to the second workshop and via the networks of OLEC and NEC.

The survey was not intended to be representative, and in order to increase willingness to participate it was kept short (see Annex C for the questionnaires in Dutch and German). However, the results are considered important for deriving recommendations for future cross-border activities.

34 persons took part in the survey, but only 21 questionnaires were completely filled out. The questionnaires that were only partially completed have not been considered for further analysis.

Apart from one exception, the respondents' companies and organisations already have experience in cross-border cooperation, and not only within the European framework (Figure 3-1).

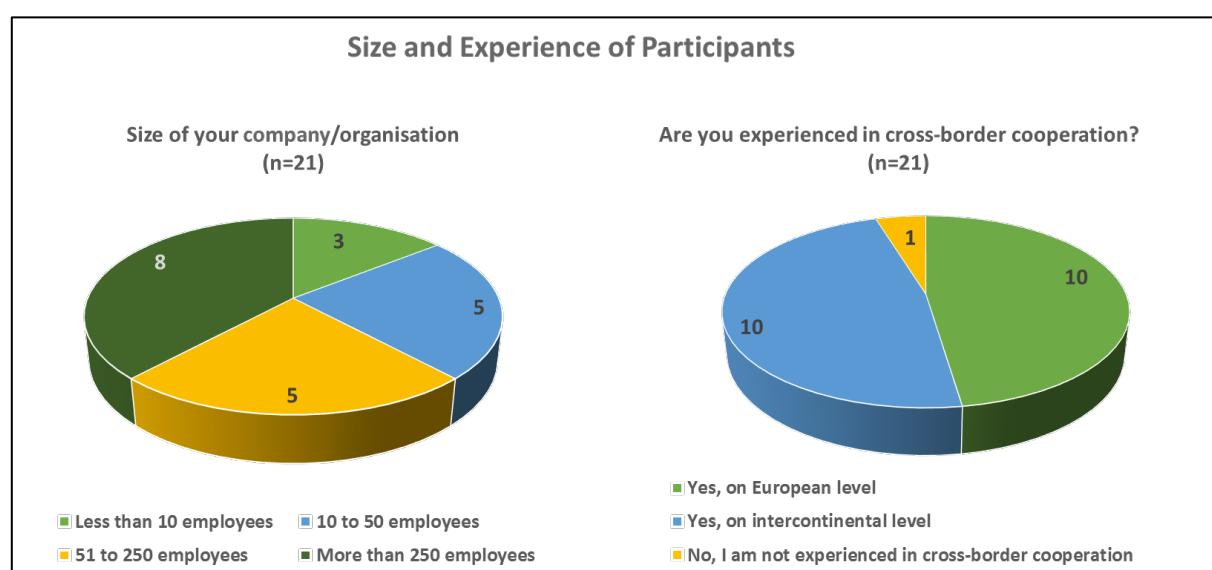
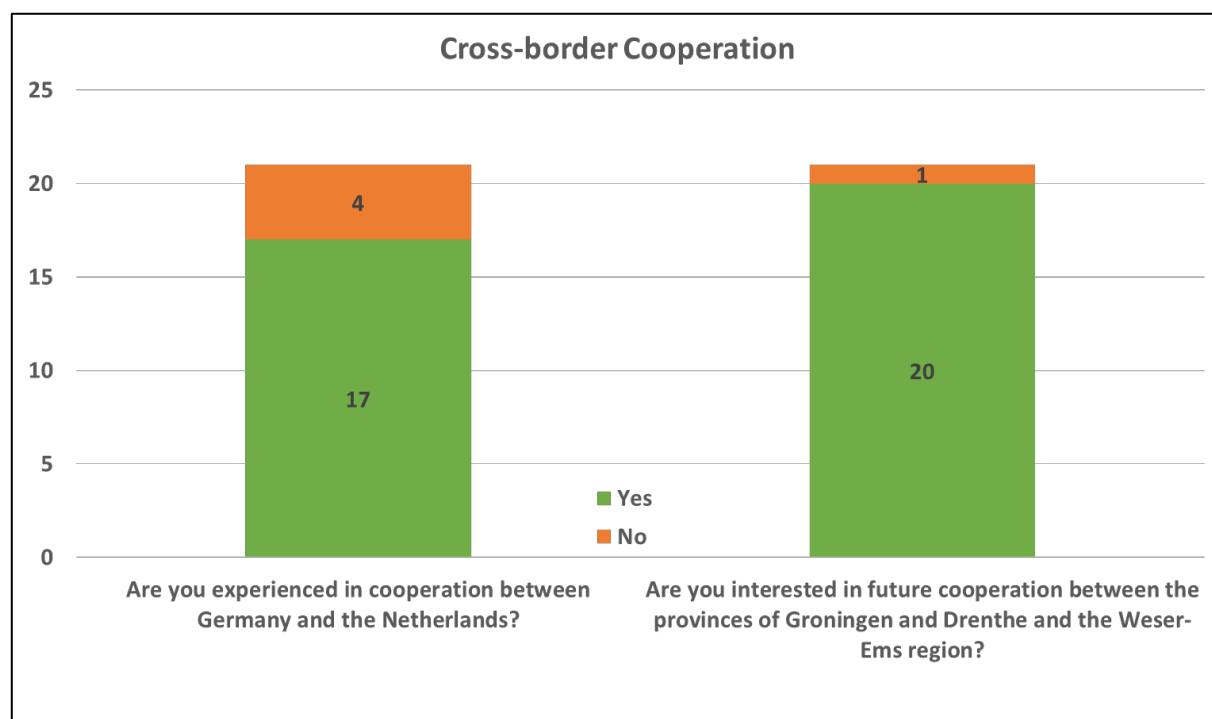


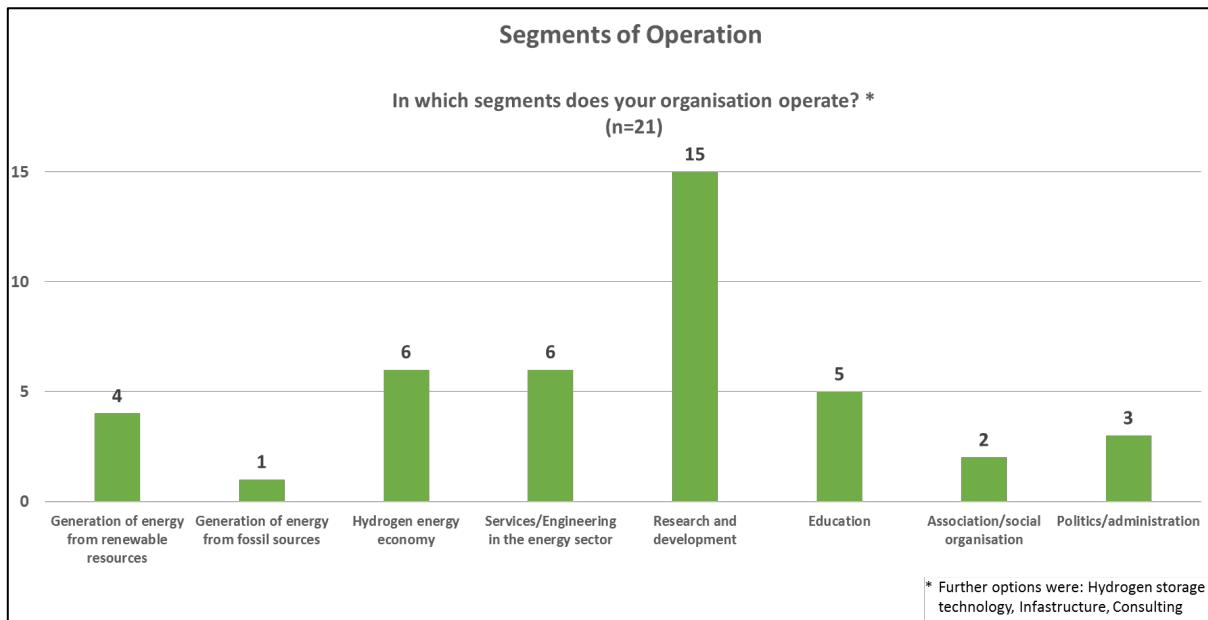
Figure 3-1: Size of company/organisation and experiences in cross-border cooperation.

The majority of those responding have experience with cross-border cooperation between Germany and the Netherlands (Figure 3-2, left bar). Almost all participants see potential in cross-border cooperation in the field of hydrogen (right bar).

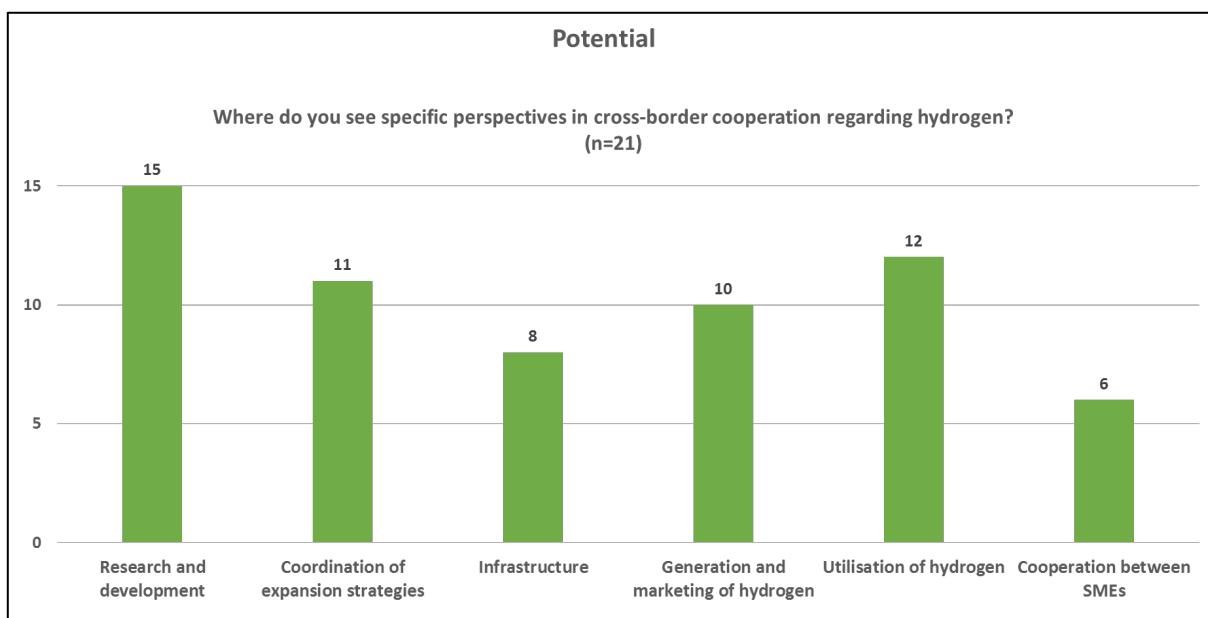


**Figure 3-2: Cross-border cooperation: State and future perspective.**

A look at the participants' fields of activity shows that Research and Development is rather strong (15 out of 42 entries from the 21 respondents in Figure 3-3). Accordingly, Research and Development is also considered the most promising area with respect to potential for cross-border cooperation (15 out of 60 entries in Figure 3-4), although several other areas score similarly high, for example the utilisation of hydrogen. An important finding is the fact that there was very little mention of potential for cooperation between SMEs while the majority of the respondents is affiliated with SME-sized entities in terms of the number of employees (see Figure 3-1, left pie). That seems to indicate that SMEs are interested in cross-border cooperation but within this context not primarily with other SMEs.

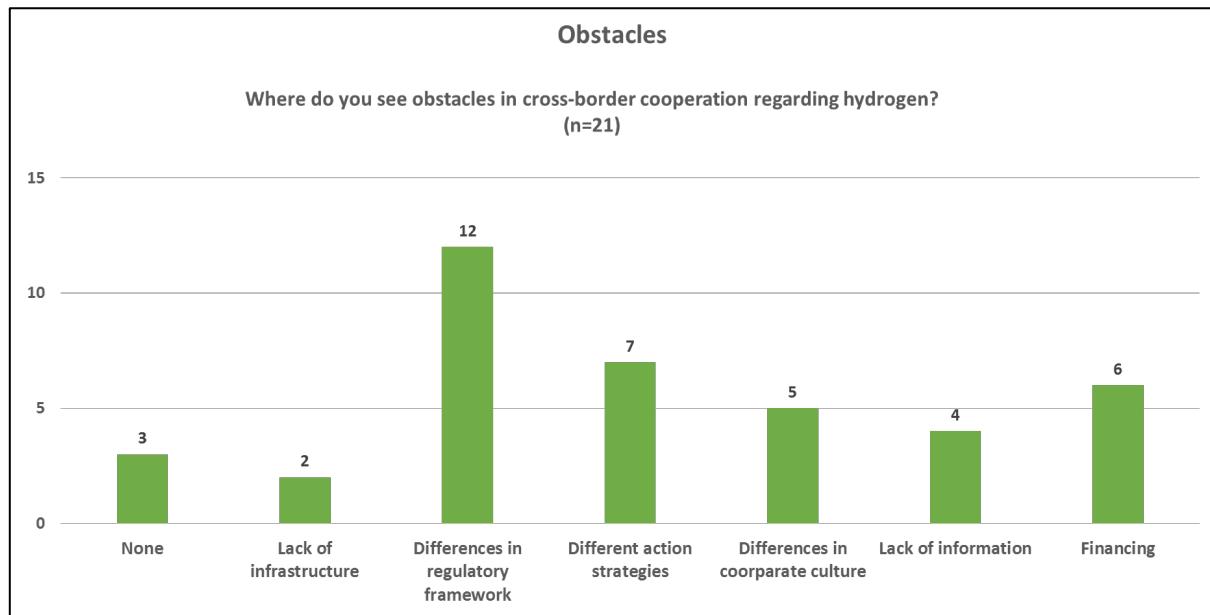


**Figure 3-3: Segments of operation of the participants.**



**Figure 3-4: Cross-border cooperation in the field of hydrogen: Potentials.**

The participants were asked to select from a list of factors those items that, in their view, hinder cross-border cooperation in the field of hydrogen. Figure 3-5 shows that particular obstacles are seen in different regulatory frameworks (12 of 39 entries), while areas such as inadequate infrastructure or a lack of information seem to play a subordinate role.



**Figure 3-5: Cross-border cooperation in the field of hydrogen: Obstacles.**

Participants were also asked what steps or specific measures from their point of view are necessary to promote cross-border cooperation. In the following, the answers are clustered according to the area of activity. The sequence of these areas has been aligned with Figure 3-5, starting with the regulatory frameworks:

### Regulatory frameworks

The importance of the regulatory frameworks was not only particularly emphasised in the survey but also at the two workshops as part of the project. Several suggestions by the respondents therefore also relate to these framework conditions:

- Overview of the legal standards.
- Standardise the legal framework at EU level.
- Implementation of existing EU guidelines.
- Alignment of the energy market regulations in order to achieve the same conditions on both sides of the border.

## Coordination of strategies

The importance of the hydrogen economy for the restructuring of the energy system is also reflected in the various strategies, concepts and roadmaps (see Chapter 1.2.1).

The survey participants criticised the lack of coordination and proposed the following:

- Strategic synchronisation of generation, storage and consumption across borders as a North Sea region.
- Coordination between the Northern German federal states and the Netherlands towards European regions of hydrogen.
- Bilateral Dutch-German funding programmes.
- A coordinated action strategy.

## Funding

Most feedback relates to the improvement and standardisation of the funding modalities:

- Simplifying the application process for funding scientific projects.
- A clear research and development programme on the subject.
- Joint funding projects and funding structures.
- Investment grants for pilot and demonstration projects.
- Common funding instruments and incentive systems.

## Infrastructure

Proposals for this area relate to the development of a cross-border infrastructure. The construction of hydrogen pipelines was mentioned as being required, based on a common infrastructure concept. Another idea relates to the establishment of hydrogen hubs in border regions in which several activities are bundled.

## Availability of information and opportunities to meet and exchange

The exploitation of the potentials of cross-border cooperation also depends on whether the market participants and actors have sufficient information. Participants made some suggestions in this respect:

- Introduction of a platform or a network.
- Regular events to get to know and exchange ideas.
- Promotion of project planning, feasibility studies etc.
- Matchmaking at the level of knowledge institutions, governments, SMEs, ports and large companies.

## Ideas for future cooperation

Finally, the participants were asked to give specific examples of collaborations for which they see particular opportunities. The entries are listed below without prioritisation, as the participants did not indicate how significant they consider the activities that they suggested.

- Cross-border networking projects as well as pilot and demonstration projects.
- Establishment of a European hydrogen region.
- Projects for the design of hydrogen infrastructure, especially for mobility purposes.
- Operation of electrolysis plants with wind turbines coupled with LOHC (liquid organic hydrogen carrier) storage, establishment of a supply chain and market activation.
- Cooperation with shipping companies and shipyards for LOHC applications in the maritime sector.
- Knowledge transfer and building a cross-border infrastructure and cross-border trade.

- In the area of generation and marketing of renewable energies (electricity / hydrogen) with the aim of initially using the renewable energies as far as possible on site.
- Joint implementation projects and real laboratories that work across the border.

In summary, the findings from the survey show that most of the participants that took part have experience with cross-border cooperation and are interested in (further) Dutch-German cooperation. The general prospects of working together are seen as positive. In line with the fields of operation of the participants, particular potential is seen in Research and Development, which is high on the agenda, followed e.g. by the utilisation of hydrogen. Obstacles are seen primarily in the different regulatory frameworks.

### 3.2 Results of the expert interviews

In addition, eight interviews were carried out as part of the project, four in the German part and four in the Dutch part of the Region. Above all, the question of whether and where they see obstacles to cross-border innovation activities in the field of hydrogen was discussed with the experts<sup>6</sup>.

Input from the interviewees can be outlined and clustered as follows:

#### General Framework

- In their economic development, border regions in particular often lag behind the average national level.
- Typically, there are relatively few large companies in border regions. The aim of politics should therefore be to support SMEs in these regions, especially by promoting new technologies, and to see the border region as a sales market.

<sup>6</sup> Representatives from companies in the sectors of mobility, power production from renewable energy and hydrogen; representatives from a research company and a funding institution.

- Both the North 2020+ strategy of the Netherlands and the Weser-Ems 2020-2027 regional action strategy are specially designed for the current regional problems and challenges and thus create good conditions for cross-border solutions.
- Against the background of the climate crisis, new opportunities and possibilities for new business fields, especially for SMEs, are seen, particularly if it is possible to use existing know-how and existing cross-border cooperation.

### Potential obstacles

- The subject of language can have an inhibiting effect on cross-border cooperation relationships; this can be problematic, especially in the context of regulation, because resistance to the use of the English language is seen at the official level in Germany.
- Different approaches of German and Dutch actors to certain challenges do not necessarily have to be negative. They can also turn out to be positive in the course of a process: “Inspiration to take a different path”.
- There are differences in corporate cultures; however, they are not regarded as a particularly serious obstacle.
- An interviewee noted that cross-border cooperation is currently not a focus for Dutch SMEs, as the development in the Netherlands already is a challenge.
- SMEs focus on their day-to-day business and often do not have sufficient capacity (e.g. resources, man-hours) to initiate innovations or take part in larger initiatives.
- A lack of overview of financing/funding options is noted as a general obstacle for SMEs, limiting them to initiate activities.
- An interviewee mentioned that in ownership structures of SMEs can be challenging when older and more conservative owners are less open to new developments.
- Interest for (participation in) hydrogen activities was expressed, however getting ideas “off the ground” was pointed as an obstacle.

- Inadequate financial resources can prove to be problematic, especially for SMEs.
- Political framework conditions are seen as less problematic; it was pointed out that municipalities in the Region under consideration are often ecologically and socially very open.
- There are some long-term and successful partnerships; work should be done to win over other actors for these cooperations.
- Regulatory hurdles complicate cooperation in the field of power-to-gas technologies, measurement procedures or approval procedures in connection with the construction of hydrogen filling stations.
- Interview partners pointed to the dilemma that the development in new technologies is generally very dynamic, but the regulatory framework cannot be continuously adapted; this also results in corresponding uncertainties for companies.
- Uncertainties arise from political programmes in which measures and subsidies are often announced. The implementation of the measures is then not regulated in a binding manner.
- COVID-19 has a large impact on the development of hydrogen activities.

### **Recommendations by the interview partners**

- Problems in cooperation are often project-specific; general recommendations are therefore often not possible or can only be made to a limited extent.
- A regulatory impact assessment is proposed, in which the consequences of certain legal regulations for cross-border cooperation are determined in advance; this could improve the chances of cooperation by actively counteracting coordination and communication hurdles.

In summary, the interviewed players emphasised the special opportunities offered by cross-border cooperation, but also pointed to obstacles beyond the differences in the

legal and the regulatory framework. Cooperation problems are often project-specific so that one-size-fits-all solutions are not possible.

## 4 Summary, and Recommendations for Supporting Cross-Border Cooperation in the Field of Hydrogen in the Region

In this chapter, the researchers make recommendations based on the results that have been introduced in the previous chapters. They are being presented by the means of two tables. The main findings have been summarised, in order to provide a detailed and straightforward overview of the recommendations.

Table 4-1 summaries the main findings from the activities carried out in the course of the study. In the right column, corresponding potential follow-up activities and measures are sketched if applicable.

Table 4-2 shows a concise set of key recommendations, based on the most prominent findings, with details on how their implementation could look like. The items have been sorted by the term in which actions/recommendations can be implemented/followed up: Item A: “Make existing information available or easier to access” can be implemented most short-term. The final item D: “Develop solutions for institutional/regulatory cross-border barriers” will certainly require most persistence and patience.

When implementing these recommendations, existing networks and initiatives should be involved, in order to avoid parallel activities and double work. It will be important to join forces to be efficient and effective.

In principle, the framework conditions and prospects for more intensive cross-border cooperation in the field of hydrogen are favourable. The (political) will is there on both sides and has been manifested in many statements. The important thing now is to bring these intentions and concepts to life. In summary, most of the recommended activities are of organisational nature. Setting up a proper framework to support the search for connection between parties and creating a structural overview of possible steps towards new activities will be key.

One of the participants of the survey has expressed his/her sense of urgency in an utmost concise phrase: “Stop talking, start doing!”.

**Table 4-1: Summary of Findings, and Potential Follow-up Activities and Measures.**

Not all findings require a follow-up.

	<b>Findings</b>	<b>Potential Follow-up Activities and Measures</b>
<b>Workshop January 2020</b>	<ul style="list-style-type: none"> <li>An overview of hydrogen activities in the Region was requested.</li> </ul>	<ul style="list-style-type: none"> <li>Inventories of Players and Projects/Initiatives have been drawn up as part of this study, but given the dynamic development in the field, this information will soon be outdated.</li> <li>Regular updates may be beneficial.</li> </ul>
	<ul style="list-style-type: none"> <li>The need for better exchange of knowledge was expressed.</li> </ul>	<ul style="list-style-type: none"> <li>Set up events (online/offline), to foster regular contacts.</li> <li>Draw up and keep up-to-date an online repository of knowledge available.</li> </ul>
	<ul style="list-style-type: none"> <li>Projects were suggested, but hardly any with a cross-border character.</li> </ul>	
<b>Inventory of Players and Projects/Initiatives</b>	<ul style="list-style-type: none"> <li>More than half of the Players with ongoing or planned activities in the Region are larger companies while less than 20% are SMEs.</li> </ul>	<ul style="list-style-type: none"> <li>Support to SMEs in participating in/developing hydrogen activities.</li> </ul>
	<ul style="list-style-type: none"> <li>Use of hydrogen appears to be the most attractive (38%), followed by cross-cutting activities (24%), integrated</li> </ul>	<ul style="list-style-type: none"> <li>There is potential in all focus areas in terms of new products and services; the integration of activities could be improved.</li> </ul>

	<b>Findings</b>	<b>Potential Follow-up Activities and Measures</b>
	<p>activities along the value chain (20%) and hydrogen production/logistics/storage (18%).</p> <ul style="list-style-type: none"> <li>Many Players are interested in more than one of the focus areas along the hydrogen value chain.</li> <li>30 of the 46 Projects identified as taking place exclusively within the Region are located on its Dutch side while there are 14 on its German side.</li> <li>3 current projects have a cross-border character.</li> <li>The focuses of ongoing and planned Projects do not match the focuses of interest expressed by the Players in the Region.</li> </ul>	<ul style="list-style-type: none"> <li>Hydrogen production, logistics and storage may require more attention.</li> <li>Stronger support for activities aiming for cross-border cooperation projects.</li> </ul>
Survey	<ul style="list-style-type: none"> <li>Respondents are experienced in cross border cooperation and interested in further cooperation within the Region.</li> <li>Potential is mainly seen in research and development; generation, marketing and use of hydrogen; coordination of expansion strategies; Potential is rather not seen in cooperation <i>between</i> SMEs.</li> </ul>	

	<b>Findings</b>	<b>Potential Follow-up Activities and Measures</b>
	<ul style="list-style-type: none"> <li>Differences in regulatory frameworks are seen as the largest obstacle in cross-border cooperation, followed by differences in action strategies and by financing.</li> <li>Respondents have made suggestions to promote cross-border cooperation, related to regulatory frameworks, the coordination of strategies, the availability of information, opportunities to meet and exchange, funding, infrastructure, as well ideas for new activities.</li> </ul>	<ul style="list-style-type: none"> <li>Ways to remove or reduce such barriers need to be investigated and the suggested solutions to be published, implemented and/or forwarded to the relevant institutions.</li> <li>Evaluate the suggestions made and take steps to put them into practice, e.g. work actively on suitable regulatory frameworks and towards harmonised hydrogen strategies in the North Sea region.</li> <li>Initiate cross-border “real-world laboratories” that are allowed to trial e.g. suggested adaptations to regulatory frameworks.</li> </ul>
<b>Workshop July 2020</b>	<ul style="list-style-type: none"> <li>Ongoing cross-border Projects are running well and the parties involved show interest in follow-up and new future activities.</li> <li>Current regulatory frameworks, especially in the power sector (exchange of electricity in the lower levels of the grid) constitute a barrier to cross-border cooperation.</li> </ul>	<ul style="list-style-type: none"> <li>Compiling “Lessons Learned” and “Best Practice” can help boost the momentum from the current activities and increase efficiency and success of later projects.</li> </ul>
<b>Interviews</b>	<ul style="list-style-type: none"> <li>Language barriers can hinder cross-border activities.</li> </ul>	

	<b>Findings</b>	<b>Potential Follow-up Activities and Measures</b>
	<ul style="list-style-type: none"> <li>Differences in company structures and behavioural patterns can act as an obstacle (business culture, capacities, openness) but can also help finding alternative paths/solutions.</li> </ul>	
	<ul style="list-style-type: none"> <li>SMEs should receive particular support.</li> <li>SMEs often find difficulties in partnering with larger companies as they do not have sufficient funding or labour-hours to invest.</li> <li>Interest in hydrogen activities but uncertain how to implement ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Create match-making opportunities.</li> <li>Create a platform for knowledge exchange.</li> <li>Explain the opportunities for SMEs that arise from the various national and regional hydrogen strategies.</li> </ul>
	<ul style="list-style-type: none"> <li>The options for funding are unclear and confusing, in particular for SMEs.</li> </ul>	<ul style="list-style-type: none"> <li>Provide clear information about available funding and the application processes.</li> <li>Improved communication of the economic opportunities for SMEs that result from climate protection strategies in general from hydrogen in particular.</li> </ul>
	<ul style="list-style-type: none"> <li>Regulations/the regulatory framework is difficult to deal with, on different levels (European/Dutch/German) and seen an obstacle.</li> <li>Permitting/approval processes can take a lot of time.</li> </ul>	<ul style="list-style-type: none"> <li>Carry out an impact assessment with respect the regulatory environment.</li> </ul>
	<ul style="list-style-type: none"> <li>Cross-border cooperation is not a focus for many Dutch SMEs at present, because the developments in the Netherlands are already challenging for them.</li> </ul>	

**Table 4-2: Recommendations.**

The recommendations are largely based on the potential follow-up activities and measures of the preceding table.

	<b>Recommended Activity</b>	<b>Details</b>
A	<b>Make existing information available or easier to access</b>	<ul style="list-style-type: none"> <li>• <u>A website</u> that hosts or provides links to existing information that contain experiences, challenges, solutions and advice (“Lessons Learned” and “Best Practice”) with regard to:             <ul style="list-style-type: none"> <li>- Cross border cooperation in general</li> <li>- Hydrogen production, logistics and use</li> <li>- Cross-cutting aspects such as education and training, and acceptance</li> <li>- Funding opportunities</li> <li>- Regulatory matters.</li> </ul> </li> <li>• Such website could include an inventory of Players and Projects/Initiatives, which is regularly updated.</li> </ul>
B	<b>Enhance news sharing/spreading</b>	<ul style="list-style-type: none"> <li>• <u>Online events</u> to inform existing and potential Players from the Region about ongoing and new activities, ideas, cooperation partners sought.</li> <li>• Low-threshold opportunity e.g. for SMEs, to keep up to date and to get involved (no travel time spent)</li> <li>• Monthly; one hour per event, with 5-minute slots.</li> </ul>
C	<b>Improve connections between Players from both countries</b>	<ul style="list-style-type: none"> <li>• <u>In-person events</u> to get to know each other, with short presentations, each focussing on a particular topic or initiative (but typically not on a company), possibly followed talks in smaller groups.</li> </ul>

	Recommended Activity	Details
		<ul style="list-style-type: none"> <li>• Could include topics such as “How does business work in the Northeastern Netherlands / Northwestern Germany?” (what is different, what is similar, beyond the usual stereotype).</li> <li>• Varying locations, sometimes with “hardware on display”.</li> <li>• Limited number of participants per event to stimulate in-depth discussions.</li> <li>• Quarterly; three hours per event with two coffee breaks for informal talking/mingling.</li> </ul>
<b>D</b>	<b>Develop solutions for institutional/regulatory cross-border barriers</b>	<ul style="list-style-type: none"> <li>• Draw up a worklist of the most relevant problems, ask the Players for feedback.</li> <li>• Consider the work and results of the HyLaw project and others.</li> <li>• Define a project/process to develop solutions to these problems, involving the relevant stakeholders, e.g. via round table dialogues.</li> <li>• Facilitate cross-border “real-world laboratories” (or “regulatory sandboxes”) should be allowed to trial potential solutions in practice, before they become binding rules of revised regulatory frameworks.</li> <li>• Develop requirements and recommendations that address the various institutions that have an impact on revising institutional/regulatory frameworks.</li> <li>• Compile a handbook that explains the state of the art in this field, as guidance for new cross-borders (hydrogen) projects.</li> </ul>

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## Annex A List of the Players

The table below lists the 218 Players with ongoing or planned activities in the Region.

Name	Location
3N Kompetenzzentrum Niedersachsen Netzwerk Nachwachsende Rohstoffe und Bioökonomie e.V.	Werlte
Aberdeen City Council	Aberdeen / United Kingdom
abh Ingenieur-Technik GmbH	Emden
ACHT-ELF-ELF DAS TAXI GmbH	Oldenburg
Adverio Engineering	Groningen
Aebi Schmidt Nederland	Holten
Agrotech Valley Forum e. V.	Osnabrück
Agrowea GmbH & Co. KG	Twist
AkzoNobel	Arnhem
Alfa College	Groningen
Alstom	Ridderkerk
Amazonen-Werke H. Dreyer GmbH & Co. KG	Hude
Arcadis	Amsterdam
ARGE Netz GmbH & Co. KG	Berlin
Arriva	Heerenveen
ARSU GmbH	Oldenburg
Autohaus K. Gerdes GmbH	Oldenburg
Automotive Nordwest e.V.	Bremen
BAM	Bunnik
BAM Infra	Bunnik
Bekaert	Assen
Bioclear	Groningen
BioMCN	Delfzijl
Bohlen & Doyen GmbH	Wiesmoor

Name	Location
Borkum Nordseeheilbad GmbH	Borkum
Borkumer Kleinbahn und Dampfschiffahrt GmbH	Borkum
Bremer Mineralölhandel GmbH	Bremen
Buses4Future GmbH	Oldenburg
Bytesnet Groningen	Groningen
Cedel	Assen
CEMTEC	Fonden / Denmark
Century	Groningen
Chempport Europe	Groningen
Cogas	Almelo
Conexxion	Hilversum
Contrall	Apeldoorn
Corre Energy Storage BV	Groningen
De Burgh	Eindhoven
De Nora	Milan / Italy
DEEP.KBB GmbH	Bad Zwischenahn
DEKRA	Arnhem
Desmet Ballestra	Zavetem / Belgium
DEUTSCHE KREDITBANK AKTIENGESELLSCHAFT	Berlin
DGO Express BV	Hoogeveen
DLR – Institut für Vernetzte Energiesysteme e.V.	Oldenburg
DNV-GL	Groningen
DOW	Farmsum
EBN	Utrecht
ECN	Petten
ECOS Consult	Osnabrück
EIT Climate-KIC	Utrecht
Emmtec Services	Emmen

Name	Location
ENERCON GmbH	Aurich
Energy BV	Eelde
Energie-Achse Ems	Papenburg
Energinet	Fredericia / Denmark
Energy Company	Haren
Energy Engineers	Gelsenkirchen
Energy Stock	Veendam
Enexis	Den Bosch
Engie	Zwolle
Equinor	Stavanger / Normway
ERIG	Bonn
E-Trucks Europe	Westerhoven
European Association for Storage of Energy	Brussels / Belgium
European Hydrogen Association	Brussels / Belgium
European Marine Energy Centre	Orkney / United Kingdom
EWE AG	Oldenburg
EWE Gasspeicher GmbH	Oldenburg
Frames	Alphen aan den Rijn
Fundacion Para El Desarrollo De Las Nuevas Tecnologias Del Hidrogeno En Aragon	Huesca / Spain
GasTerra	Groningen
Gasunie	Groningen
GASUNIE DEUTSCHLAND TRANSPORT SERVICES GMBH	Hanover
Gasunie Transport Services	Groningen
Gemeente Ameland	Ballum
Gemeente Amsterdam	Amsterdam
Gemeente Coevorden	Coevorden
Gemeente Den Haag	Den Haag

Name	Location
Gemeente Emmen	Emmen
Gemeente Groningen	Groningen
Gemeente Hoogeveen	Hoogeveen
Gemeente Rotterdam	Rotterdam
Green Planet Real Estate BV	Pesse
GREENPEACE ENERGY EG	Hamburg
Groningen Seaports	Delfzijl
H2 Storage BV	<i>not clear, assumed outside the Region</i>
H2BX - Wasserstoff für die Region Bremerhaven e.V.	Bremerhaven
H <sub>2</sub> Tec	Eelde
Haldor Topsoe	Kgs. Lyngby / Denmark
HAN Automotive	Arnhem
Hanzehogeschool Groningen	Groningen
Hinicio	Brussels / Belgium
Hochschule Bremerhaven	Bremerhaven
Hochschule Emden-Leer	Emden
Hochschule Osnabrück	Osnabrück
Hogeschool van Amsterdam	Amsterdam
Holthausen	Hoogezaand
Hydrogen Ireland Natural Resources Association	Ireland
HyEnergy	Crowthorne / United Kingdom
HyMove	Arnhem
HyTruck Consult BV	Beverwijk
Imperial College London	London / United Kingdom
Innogy	Den Bosch
Institute for Sustainable Process Technology (ISPT)	Amersfoort
Instituut Fysieke Veiligheid	Zoetermeer

Name	Location
INTIS – Integrated Infrastructure Solutions GmbH	Lathen
Jaske & Wolf Verfahrenstechnik GmbH	Lingen
JP Energiesystemen	Austerlitz
Kiwa	Rijswijk
KLM	Amsterdam
Koninklijke Oosterhof Holman	Grijskerk
Kremer Zand en Grint	Emmen
LEE Landesverband Erneuerbare Energien Niedersachsen/Bremen e.V.	Hannover
Landkreis Emsland	Meppen
Lenten Scheepvaart	Nieuwegein
Liander	Arnhem
Loven	Tilburg
Ludan Environmental Technologies	Amsterdam
MARIKO GmbH	Leer
Maritime Cluster Norddeutschland e. V. Geschäftsstelle Niedersachsen	Elsfleth
MBP Solutions	Gouda
McPhy	La Motte Fanjas / France
Metropole Ruhr AGR Gruppe	Herten
Metropolregion Bremen-Oldenburg im Nordwesten e.V.	Delmenhorst
MEYER WERFT GmbH & Co. KG	Papenburg
Ministry of Economic Affairs and Climate (Ministerie van Economische Zaken en Klimaat)	Den Haag
Ministry of Infrastructure and Water Management (Ministerie van Infrastructuur en milieu)	Den Haag
Mission Zero Leasing BV	Groningen
NAM	Assen
Nederlandse Particuliere Rijnvaart-Centrale Cooperatie	Rotterdam
Nedstack	Arnhem
Neocon Tech BV	Hoogeveen

Name	Location
New Energy Coalition	Groningen
NG Shipyards	Lauwersoog
Niedersachsen Ports GmbH & Co. KG	Oldenburg
NOM	Groningen
Noorderpoort College Groningen	Groningen
Nordwest Gruppe Solar + Neue Energien	Werlte
North Sea Port	Terneuzen
Nouryon	Amsterdam
N-Tra	Meppel
OCI Nitrogen	Amsterdam
Oegema Transport Dedemsvaart	Dedemsvaart
OFFIS e.V.	Oldenburg
OLEC e.V.	Oldenburg
OPEN GRID EUROPE GMBH	Krummhörn
Orange Gas	Heerenveen
Orsted	Den Haag
OV Bureau Groningen Drenthe	Assen
Pitpoint clean fuels	Nieuwegein
PLANET GbR	Oldenburg
Polizei Osnabrück	Osnabrück
Port of Amsterdam	Amsterdam
Port of Rotterdam	Rotterdam
Proprete Brussels	Brussels / Belgium
ProRail	Utrecht
Provincie Drenthe	Assen
Provincie Groningen	Groningen
Qbuzz	Groningen
Rabobank	Utrecht

Name	Location
RENDÖ	Meppel
Resato	Assen
Rijksuniversiteit Groningen	Groningen
Rika Greenpark	Groningen
Rosen Germany GmbH	Lingen (Ems)
Royal Haskoning DHV	Amersfoort
Royal Schiphol Group	Amsterdam
RWE	Essen
SBE	Farmsum
Schleswig-Holstein Netz AG	Quickborn
SCHULZ Systemtechnik GmbH	Visbek
Sent Wanige Hoogeveen	Hoogeveen
Shell	Den Haag
SHV Energy	Hoofddorp
Siemens	Münich
SkyNRG	Amsterdam
SNN	Groningen
Solarfields	Groningen
Stadt Brake	Brake
Stadt Haren (Ems)	Haren (Ems)
Stadt Oldenburg	Oldenburg
Stadt Osnabrück	Osnabrück
Stadtwerke Emden	Emden
Stadtwerke Lingen GmbH	Lingen (Ems)
STORAG ETZEL GmbH	Friedeburg
Stork	Utrecht
Suez	Wildervank
Susteen Technologies	Sulzbach-Rosenberg

Name	Location
TCNN	Groningen
TechnipFMC	London / United Kingdom
TenneT	Arnhem
THHIMA GmbH & CO. KG	Elsfleth
Thyssengas	Dortmund
ThyssenKrupp Marine Systems GmbH	Emden
TNO	Den Haag
Topconsortia voor Kennis en Innovatie (TKI)	Amersfoort
Touraine Vallee de l'Indre	Sorigny / France
Truckland	Amsterdam
TU Delft	Delft
Utrecht University	Utrecht
UVO Vervoer BV	Uithuizermeeden
Van Campen Ecotechniek	Leusden
Van Hool	Lier / Belgium
Van Tilburg Basianen	Breda
Vattenfall	Amsterdam
Verkehr und Wasser GmbH	Oldenburg
Visser & Smit Hanab	Papendrecht
VNO-NCW MKB Noord	Groningen
Vopak	Rotterdam
Vriend BV	Coevorden
VW Emden	Emden
WaterstofNet	Turnhout / Belgium
Wind to Gas Energy GmbH & Co. KG	Brunsbüttel
Wirtschaftsbetriebe Duisburg - AÖR	Duisburg
Yara	Vlaardingen
Yokogawa	Amersfoort

Name	Location
Zukunft Emden GmbH	Emden

## Annex B List of the Projects and Initiatives

The table below lists the 67 ongoing or planned Projects and Initiatives activities in the Region.

Abbreviation	Full Name
Agrotech Valley Forum	Agrotech Valley Forum e. V.
Audi e-gas	Audi e-gas-Produktion mit CO <sub>2</sub> aus einer EWE-Biogasanlage
Caes-Zuidwending	Compressed Air Energy Storage-Zuidwending
CEC Haren	Clean Energy Conversion Haren
De Waterstofwijk	Hydrogen Hoogeveen
DJEWELS	Delfzijl Joint dEvelopment of green Water Electrolysis at Large Scale
DSL-01	DSL-01
e4ships2	E4SHIPS - Fuel cells in marine applications
Element One	Element One
ENaQ	Energetisches Nachbarschaftsquartier Fliegerhorst Oldenburg
Get H <sub>2</sub> Lingen	Get H <sub>2</sub> Lingen
GET H <sub>2</sub> Nukleus	H <sub>2</sub> -Infrastruktur Lingen-Gelsenkirchen
GZI Next	GZI Next
H <sub>2</sub> OL	Initiative H <sub>2</sub> OL
H <sub>2</sub> Projekt Haurup	H <sub>2</sub> Projekt Haurup
H <sub>2</sub> -Allianz Niedersachsen	H <sub>2</sub> -Allianz Niedersachsen
H2BrakeCO2	CO2-freie Hafen- und Logistikprozesse durch Wasserstofftechnologie - am Beispiel der Stadt Brake - Wesermarsch
H2GROw	H2GROw
H <sub>2</sub> -Kompendium VNB	Kompendium Wasserstoff in Gasverteilnetzen
H2M	Hydrogen to Magnum
H2 Mobile PSM Equip	H2 Mobile Public Space Maintenance Equipment
H <sub>2</sub> -Region Emsland	H <sub>2</sub> -Region Emsland
H2RenT	H2RenT

Abbreviation	Full Name
H <sub>2</sub> Watt	Entwicklung eines grenzübergreifenden Technologie-Clusters für den Aufbau von Real-Laboren zur Entwicklung von Kompetenzen, Verfahren und Systemen zur effizienten Produktion, Speicherung, Nutzung und zum Transport von Wasserstoff im Wattenmeer / Ontwikkeling van een grensoverschrijdend technologiecluster voor de oprichting van 'fieldlabs' (proeftuinen) voor de ontwikkeling van competenties, processen en systemen voor de efficiënte productie, opslag en gebruik van waterstof op de Waddenzee
HEAVENN	Hydrogen Energy Applications in Valley Environments for Northern Netherlands
HECTOR	Hydrogen Waste Collection Vehicles in North West Europe
HyCavMobil	Untersuchung von Salzkavernen als potenziellen Speicherort für Wasserstoff
HyDelta	HyDelta
Hydrogen Ready	Hydrogen Ready
HydroGreenN	Hydrogen Regional Energy Economy Network
Hydrohub Gigawatt Scale Electrolyser, phase 1 and 2	Hydrohub Innovation Program Gigawatt Scale Electrolyser, phase 1 and 2
Hydrohub Gigawatt Scale Electrolyser, phase 3	Hydrohub Innovation Program Gigawatt Scale Electrolyser, phase 3
Hydrohub MW Test Center	Hydrohub Innovation Program MW Test Center
HyNetherlands	HyNetherlands
HySpeed	Hy-Speed for H <sub>2</sub> -Trucks
HyStock	HyStock
HyTrec2	Hydrogen Transport Economy for the North Sea Region
HyWay27	HyWay 27
Hyways for Future	Hydrogen Ways for Future Mobility – HyWays for Future
JIVE	Joint Initiative for hydrogen Vehicles across Europe
JIVE 2	Joint Initiative for hydrogen Vehicles across Europe 2
KEROSYN100	Entwicklung und Demonstration einer dynamischen, effizienten und skalierbaren Prozesskette für strombasiertes Kerosin
MultiSchiBZ	Entwicklung eines Brennstoffzellensystems auf Basis von Diesel und Erdgas als Kraftstoff zur umweltschonenden Bordstromversorgung von Fahrgastschiffen

Abbreviation	Full Name
North <sub>2</sub>	North H <sub>2</sub>
NSWPH	North Sea Wind Power Hub
OLEC Arbeitskreis Wasserstoff	OLEC Arbeitskreis Wasserstoff
Pa-X-ell 2	Untersuchung und Entwicklung eines dezentralen Energienetzwerkes und eines hybriden Energiesystems mit einer neuen Generation von Hochtemperatur (HT)-PEM Brennstoffzellen für den Einsatz auf Hochsee-Passagierschiffen
Power to Flex	Power to Flex - Flexible Energy Supply through Energy Storage
Power2Hydrogen	Power2Hydrogen - Energiewende zum Anfassen
SEREH	Smart Energy Region Emmen - Haren
TSO2020	Electric Transmission and Storage Options 2020
WAsh2Emden	Wasserstoff-Anwendungen im Seehafen Emden
Westereems	Westereems
	Duurzaamheidscentrum Hoogeveen
	Einsatz eines BZ-Streifenwagens
	Energy Points
	Groene Waterstof Booster
	H2 Fueling Station (Pesse)
	Hydrogen Buses (Groningen/Drenthe and other places)
	Hydrogen Cars (Coevorden)
	Hydrogen Cars (Drenthe)
	Hydrogen Cars (Uithuizermeeden)
	Hydrogen Education Centre (Coevorden)
	Hydrogen Fueling Stations (Coevorden)
	Hydrogen Refueling Station (Groningen/Drenthe)
	Hydrogen Ships Lauwersoog
	Hydrogen Trains

## Annex C Questionnaires

The survey was run in Dutch and German.

### **[Enquête over de landgrensoverschrijdende samenwerking]**

#### **H2LinkRegions**

#### **Landgrensoverschrijdende samenwerking op het gebied van waterstof: Best practices, kansen en uitdagingen**

Graag vragen we u deel te nemen aan een korte online enquête. Uw antwoorden zullen bijdragen aan het H2LinkRegions onderzoek. Dit onderzoek richt zich op de mogelijkheden voor een intensievere samenwerking op het gebied van de waterstof economie tussen Noordwest-Duitsland en Noordoost-Nederland.

Deze enquête is anoniem en de resultaten zullen worden samengevoegd en als geheel worden gepresenteerd. Indien u uw deelname aan het onderzoek wilt vergroten, dan kunt u uw contactgegevens aan het einde van de enquête invullen. Eén van de onderzoekers zal dan op korte termijn contact met u opnemen voor een interview.

Het H2LinkRegions project wordt gezamenlijk georganiseerd door Oldenburg Energy Cluster (OLEC) en New Energy Coalition (NEC) en wordt gefinancierd door de Eems Dollard Regio (EDR).

Bedankt voor uw deelname!

Er zijn 12 vragen in deze enquête.

### **Vragen over het potentieel voor grensoverschrijdende samenwerking**

#### **Ziet u, voor uw organisatie, kansen voor een sterkere landgrensoverschrijdende samenwerking op het gebied van waterstof? \***

**❶ Kies één van de volgende antwoorden**

Kies één van de volgende mogelijkheden:

- Ja, ik zie kansen  
 Nee, ik zie geen kansen

**Op welke vlakken ziet u mogelijkheden voor landgrensoverschrijdende samenwerking op het gebied van waterstof?**

(Vink één of meer vakjes aan)

\*

Beantwoord deze vraag alleen als aan de volgende voorwaarden is voldaan:  
Antwoord was 'Ja, ik zie kansen' bij vraag '1 [P01]' (Ziet u, voor uw organisatie, kansen voor een sterkere landgrensoverschrijdende samenwerking op het gebied van waterstof?)

❶ Meerdere antwoorden mogelijk

Kies alle voor u geldende mogelijkheden:

- Onderzoek en ontwikkeling
- Coördinatie van actiestrategieën
- Infrastructuur
- Productie en/of verkoop van waterstof
- Gebruik van waterstof
- Samenwerking tussen MKB-ers

Anders, namelijk:

**Op welke gebieden ziet u obstakels voor landgrensoverschrijdende samenwerking op het gebied van waterstof?**

(Vink één of meer vakjes aan) \*

**➊ Meerdere antwoorden mogelijk**

Kies alle voor u geldende mogelijkheden:

- Ik zie geen obstakels voor landgrensoverschrijdende samenwerking
- Gebrek aan infrastructuur
- Verschillende wettelijke regelgevingskaders
- Verschillende actiestrategieën
- Verschillende bedrijfsculturen
- Ontbrekende informatie
- Financiering

 Anders, namelijk: **Wat zouden volgens u belangrijke stappen/maatregelen zijn om landgrensoverschrijdende samenwerking op het gebied van waterstof te promoten?****➋ Vul minstens één antwoord in****Vraagen over uw organisatie****Hoe groot is uw bedrijf? \*****➌ Kies één van de volgende antwoorden**

Kies één van de volgende mogelijkheden:

- minder dan 10 medewerkers
- 10 tot 50 medewerkers
- 50 tot 250 medewerkers
- 250 en meer medewerkers

**Is uw organisatie of bedrijf gevestigd, of heeft deze een vestiging, in één van de genoemde regio's?**

\*

❶ Kies één van de volgende antwoorden

Kies één van de volgende mogelijkheden:

- Provincie Groningen of Drenthe
- Weser-Ems-Region
- In geen van deze regio's

**Vindt één (of meer) van de activiteiten van uw bedrijf plaats in de provincie Groningen of Drenthe of in de Weser-Ems-Regio? \***

❶ Kies één van de volgende antwoorden

Kies één van de volgende mogelijkheden:

- Ja
- Nee

**Op welke vlakken is uw organisatie actief?**

(Vink één of meer vakjes aan) \*

**❶ Meerdere antwoorden mogelijk**

Kies alle voor u geldende mogelijkheden:

- Energieopwekking: hernieuwbare energie
- Energieopwekking uit fossiele brandstof
- Energie: waterstofeconomie
- Energie: services / engineering
- Onderzoek / ontwikkeling
- Onderwijs / opleiding
- Vereniging / non-profit
- Politiek / overheid

 Overige: **Vragen over ervaringen met grensoverschrijdende samenwerking****Heeft u ervaring met landgrensoverschrijdende samenwerking? \*****❶ Kies één van de volgende antwoorden**

Kies één van de volgende mogelijkheden:

- Ja, op intercontinentaal niveau
- Ja, op Europees niveau
- Nee, ik heb geen ervaring met landgrensoverschrijdende samenwerking

**Heeft u ervaring met een samenwerking tussen Duitsland en Nederland? \***

Beantwoord deze vraag alleen als aan de volgende voorwaarden is voldaan:  
Antwoord was 'Ja, op intercontinentaal niveau' of 'Ja, op Europees niveau' bij vraag '9 [E01]' (Heeft u ervaring met landsgrensoverschrijdende samenwerking?)

- ❶ Kies één van de volgende antwoorden  
Kies één van de volgende mogelijkheden:

- Ja  
 Nee

**Bent u geïnteresseerd in landsgrensoverschrijdende activiteiten tussen de provincies Groningen of Drenthe en de Weser-Ems-Regio in de nabije toekomst? \***

- ❶ Kies één van de volgende antwoorden  
Kies één van de volgende mogelijkheden:

- Ja  
 Nee

**Op welke gebieden ziet u concrete mogelijkheden tot samenwerking?**

Beantwoord deze vraag alleen als aan de volgende voorwaarden is voldaan:  
Antwoord was 'Ja' bij vraag '11 [E02]' (Bent u geïnteresseerd in landsgrensoverschrijdende activiteiten tussen de provincies Groningen of Drenthe en de Weser-Ems-Regio in de nabije toekomst?)

Vul uw antwoord hier in:

## Umfrage zur grenzüberschreitenden Zusammenarbeit

### H2LinkRegions

#### Grenzüberschreitende Zusammenarbeit im Bereich Wasserstoff: Best Practice, Chancen und Herausforderungen

Wir möchten Sie bitten, an einer kurzen Online-Umfrage teilzunehmen. Ihre Antworten werden dann mit in die H2LinkRegions-Studie einfließen. Diese Studie konzentriert sich auf das Potenzial einer intensiveren Zusammenarbeit im Bereich der Wasserstoffwirtschaft zwischen dem Nordwesten Deutschlands und dem Nordosten der Niederlande.

Diese Umfrage ist anonym und die Ergebnisse werden nur aggregiert dargestellt. Wenn Sie sich jedoch etwas mehr in diese Studie einbringen möchten, können Sie am Ende der Umfrage Ihre Kontaktdaten angeben. Einer der Projektpartner wird sich dann in Kürze mit Ihnen in Verbindung setzen, um ein Interview zu vereinbaren.

Das H2LinkRegions-Projekt wird gemeinsam vom Oldenburger Energiecluster OLEC und der NewEnergyCoalition (NEW) organisiert und von der Ems-Dollart-Region (EDR) finanziert.

Vielen Dank für Ihre Teilnahme!

In dieser Umfrage sind 12 Fragen enthalten.

## Fragen zu Potenzialen für eine grenzüberschreitende Zusammenarbeit

**Sehen Sie für Ihre Organisation oder Ihr Unternehmen Potenziale  
für eine stärkere grenzüberschreitende Zusammenarbeit im Bereich  
Wasserstoff? \***

● Bitte wählen Sie eine der folgenden Antworten:  
Bitte wählen Sie nur eine der folgenden Antworten aus:

- Ja, ich sehe Potenzial
- Nein, ich sehe kein Potenzial

**In welchen Bereichen sehen Sie besondere Perspektiven für eine grenzüberschreitende Zusammenarbeit im Bereich Wasserstoff?**

(Mehrfachauswahl möglich) \*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:

Antwort war 'Ja, ich sehe Potenzial' bei Frage '1 [P01]' (Sehen Sie für Ihre Organisation oder Ihr Unternehmen Potenziale für eine stärkere grenzüberschreitende Zusammenarbeit im Bereich Wasserstoff?)

❶ Bitte wählen Sie die zutreffenden Antworten aus:

Bitte wählen Sie alle zutreffenden Antworten aus:

- Forschung und Entwicklung
- Koordination von Ausbaustrategien
- Infrastruktur
- Erzeugung und Vermarktung von Wasserstoff
- Nutzung von Wasserstoff
- Zusammenarbeit zwischen KMU
- Sonstige Bereiche (bitte nennen):

**Wo sehen Sie besondere Hindernisse für die grenzüberschreitende Zusammenarbeit im Bereich Wasserstoff?**

(Mehrfachauswahl möglich)

\*

**❶ Bitte wählen Sie die zutreffenden Antworten aus:**

Bitte wählen Sie alle zutreffenden Antworten aus:

- Ich sehe keine Hindernisse für die grenzüberschreitende Zusammenarbeit  
 Mangel an Infrastruktur  
 Unterschiedliche rechtliche Rahmenbedingungen  
 Unterschiedliche Handlungsstrategien  
 Unterschiedliche Geschäftskulturen  
 Fehlende Informationen  
 Finanzierung

 Sonstige (bitte nennen): **Was wären aus Ihrer Sicht wichtige Schritte bzw. Maßnahmen zur Förderung der grenzüberschreitenden Zusammenarbeit im Bereich Wasserstoff?****❶ Bitte mindestens eine Antwort ausfüllen****Fragen zu Ihrer Organisation****Wie groß ist Ihre Organisation bzw. Ihr Unternehmen? \*****❶ Bitte wählen Sie eine der folgenden Antworten:**

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Weniger als 10 Mitarbeiter\*innen  
 10 bis 50 Mitarbeiter\*innen  
 51 bis 250 Mitarbeiter\*innen  
 mehr als 250 Mitarbeiter\*innen

**Hat Ihre Organisation bzw. Ihr Unternehmen einen Standort in einer der benannten Regionen? \***

❶ Bitte wählen Sie eine der folgenden Antworten:

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Provinz Groningen oder Drenthe
- Weser-Ems-Region
- In keiner dieser Regionen

**Sind Sie mit Ihrer Organisation bzw. Ihrem Unternehmen mit Aktivitäten im Bereich Wasserstoff in den Provinzen Groningen oder Drenthe oder in der Weser-Ems-Region tätig? \***

❶ Bitte wählen Sie eine der folgenden Antworten:

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Ja
- Nein

**In welchen Bereichen ist Ihre Organisation bzw. Ihr Unternehmen aktiv?**

(Mehrfachauswahl möglich) \*

**❶ Bitte wählen Sie die zutreffenden Antworten aus:**

Bitte wählen Sie alle zutreffenden Antworten aus:

- Energieerzeugung: erneuerbare Energien
- Energieerzeugung aus fossilen Brennstoffen
- Energie: Wasserstoffwirtschaft
- Energie: Dienstleistungen / Ingenieurwesen
- Forschung / Entwicklung
- Bildung / Ausbildung
- Verein / gemeinnützig
- Politik / Verwaltung

- Sonstige (bitte nennen):

**Fragen zu Erfahrungen mit der grenzüberschreitenden Zusammenarbeit****Haben Sie Erfahrungen mit grenzüberschreitender Zusammenarbeit?**

\*

**❶ Bitte wählen Sie eine der folgenden Antworten:**

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Ja, auf interkontinentaler Ebene
- Ja, auf europäischer Ebene
- Nein, ich habe keine Erfahrung mit grenzüberschreitender Zusammenarbeit

**Haben Sie Erfahrungen mit der Zusammenarbeit zwischen Deutschland und den Niederlanden? \***

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:  
Antwort war 'Ja, auf interkontinentaler Ebene' oder 'Ja, auf europäischer Ebene' bei  
Frage '9 [E01]' (Haben Sie Erfahrungen mit grenzüberschreitender Zusammenarbeit?)

● Bitte wählen Sie eine der folgenden Antworten:

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Ja  
 Nein

**Sind Sie in naher Zukunft an einer grenzüberschreitenden Zusammenarbeit zwischen den Provinzen Groningen und Drenthe und der Weser-Ems-Region interessiert? \***

● Bitte wählen Sie eine der folgenden Antworten:

Bitte wählen Sie nur eine der folgenden Antworten aus:

- Ja  
 Nein

**In welchen Bereichen sehen Sie für sich konkrete Kooperationsmöglichkeiten?**

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:  
Antwort war 'Ja' bei Frage '11 [E02]' (Sind Sie in naher Zukunft an einer  
grenzüberschreitenden Zusammenarbeit zwischen den Provinzen Groningen und  
Drenthe und der Weser-Ems-Region interessiert?)

Bitte geben Sie Ihre Antwort hier ein: