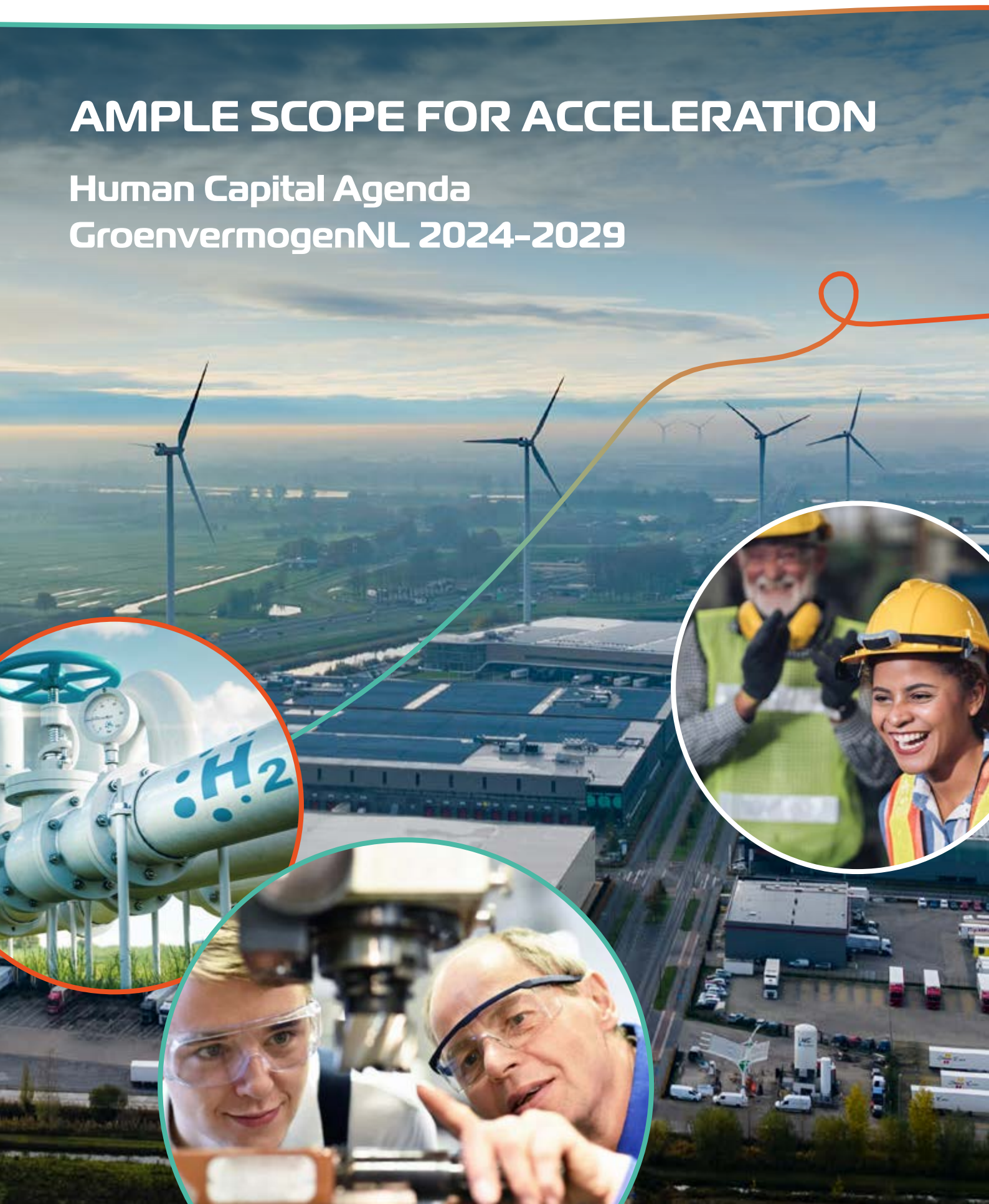
groenvermogennl | Human Capital Agenda

AMPLE SCOPE FOR ACCELERATION

Human Capital Agenda GroenvermogenNL 2024-2029



Green hydrogen transition

The Netherlands is switching from fossil to non-fossil energy sources to limit CO_2 emissions as well as to reduce dependency on foreign suppliers. This energy transition demands a large-scale restructuring of the energy system, in which various alternatives will be used, including advances in green hydrogen.
The planned developments were clearly presented in the Hydrogen Roadmap of the National Hydrogen Programme (NWP). The parties involved in this programme consider the human capital agenda of GroenvermogenNL (HCA-GVNL) as an important premise for the hydrogen economy. The hydrogen map of the Netherlands (Mission H_2) shows the initiatives already taking place in this area.

GroenvermogenNL's goal is to accelerate the green hydrogen transition by stimulating investment, promoting innovation and capitalising on scaling-up opportunities.
That demands many skilled professionals and experts with the right knowledge and skills. This comes at a time when there is a shortage of technicians, and surrounding countries are also working on their own energy transitions.

"The aim of this is to ensure there are enough skilled professionals.

From this perspective, GroenvermogenNL, in collaboration with important parties, drew up the ambitious Human Capital Agenda 'Bridge to the Future' (HCA-GVNL) in 2021. The aim of this is to ensure that there are enough skilled professionals. Businesses, knowledge institutions and governments are joining forces to create an ecosystem that can successfully tackle this challenge.

This publication builds on Bridge to the Future and sharpens our strategy even further. It provides an insight into its structure, the choices in the approach, current activities and how you can participate.
No less important is this agenda's contribution to a coherent approach to the overall energy transition. After all, we need all talents in the future!

Human capital and the hydrogen transition

There is no blueprint for the transition to green hydrogen and the impact on the labour market. There are considerable differences between sectors and areas of application. The task for the labour market is summarised in a short animation.

The ambition of the Netherlands to become the hydrogen hub of Europe will put considerable demands on our capacity for the storage and trans-shipment and transport of green hydrogen. That demands investment in Dutch port clusters, the installation/ adaptation of the infrastructure and its maintenance, including the (international) transport chains, on both the road as well as water to the inland and hinterland.

The large-scale production and application of green hydrogen in industry, heavy transport and possibly the built environment, will have considerable consequences. And mainly for the knowledge and skills of employees, such as chemists, electrical engineers, process operators, installers and maintenance staff.

And not to mention, it requires new expertise in the area of safety for all partners involved in the chain, including (local) governments such as licensing authorities, regulators and the fire department.

In the centrefold of this publication, an infographic illustrates the complete hydrogen chain, including the knowledge areas affected by the hydrogen transition.

Working professionals and influx of new talent

The first benchmark for the ambitious goals of the Netherlands is 2030, which is fast approaching.
That emphasises that the success of this transition largely depends on two crucial questions:

1. Can we provide professionals working in various sectors with the required knowledge and skills?

2. And, despite the growing shortage in the labour market, will we succeed in getting enough personnel available for the transition, without it being detrimental to other sectors that are essential to the success of the wider energy transition?

"The production and application of green hydrogen demands new expertise in the area of safety for all the parties involved in the chain.

Insight into the figures

To gain an insight into the nature and scope of the challenge, various studies were conducted in 2023 on behalf of HCA-GVNL.

Labour Market Research by SEO/CE-Delft revealed the challenge concerning human capital for a successful transition to a hydrogen economy. That indicates that an additional 38,000 FTE will be required in the period up to 2030. The demand for electrochemists, electrical engineers, process technologists, chemists, combustion technologists, system integrators and (micro-)biologists is growing.

Finding and training these people is an important task.

The contribution of the outflow of young talent from education is limited, considering the short space of time until 2030. Border regions in particular, face the challenge of an ageing population.

The challenge is twofold: properly preparing young people in the labour market for the hydrogen transition and, at the same time, training professionals in the labour market on a large scale.

According to research by Technopolis/Hutspot,

In the period up to 2030, an additional 38,000 FTE will be needed. Findingand training these people is an important task.

research universities, university of applied sciences and vocational education have paved the way and developed various electives and minors. At the same time, this supply is still specific and fragmented and there is a dire need for the professionalisation of lecturers.

The business community is currently reluctant to actively invest in training and schooling employees to become hydrogen professionals. That is what KPMG concluded based on its research into Lifelong Learning for the hydrogen transition. As yet, the focus is more on attracting technicians with broader training, in the hope of further developing them internally. Considering the

current shortage of technicians, this is a challenging strategy, and this approach is not always feasible for SMEs according to research by Dialogic.

The overall conclusion is let's not wait until the work is available to train people, because then we will be too late. It is essential to invest in training and schooling now and develop programmes for this together. That would enable us to make a flying start.

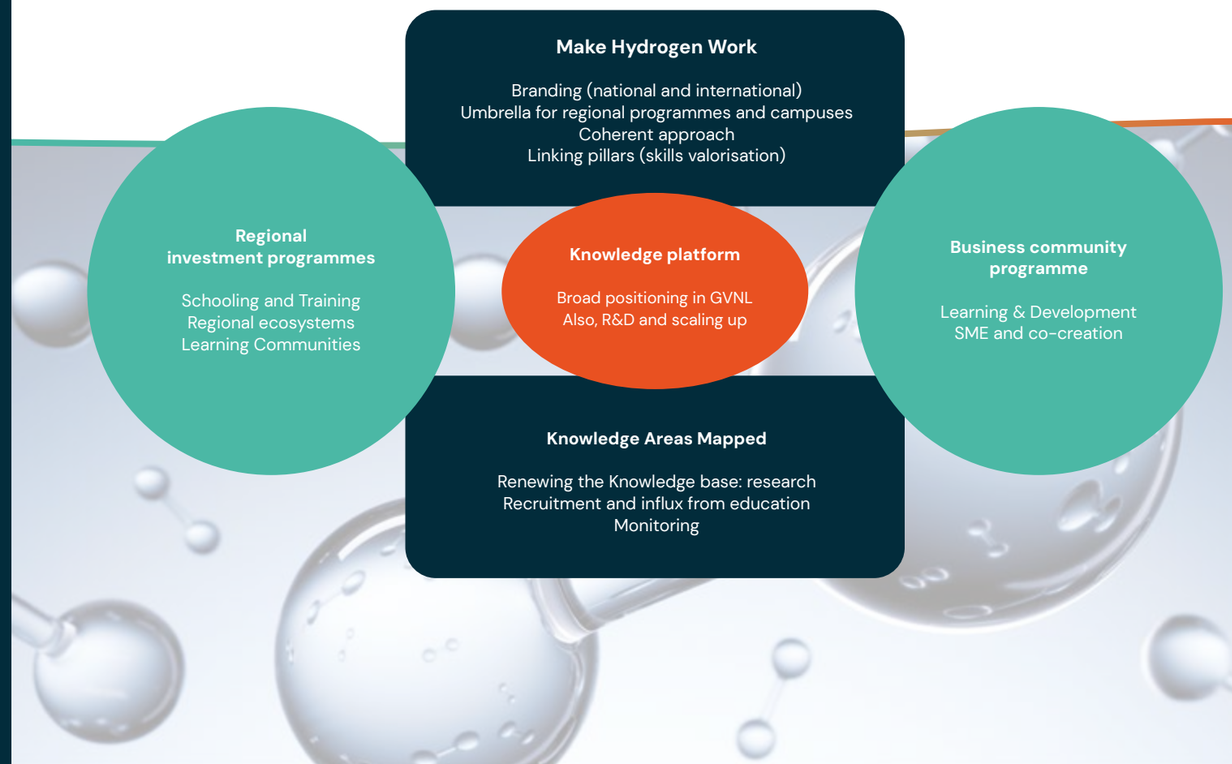
In short, it is time to roll up our sleeves and join forces!

HCA GVNL's multi-faceted strategy

It is clear that the outlined challenge is considerable and demands efforts from all parties concerned. The strategy of GroenvermogenNL's human capital agenda is therefore multi-annual (2024-2029) and multi-faceted:

- Regional investment programmes for human capital in the entire hydrogen chain, with collaborative projects between companies, education and training institutions (public and private), research institutions and governments.
- A substantial boost for businesses, particularly SMEs, to create the right conditions to provide working professionals with new knowledge and skills (Learning & Development).
- The implementation of a 'responsive ecosystem' via Learning Communities, in which the collaborating parties are optimally provided with knowledge and insight, and can respond in an agile manner to the demand for new knowledge and skills at that time.
- Smart deployment of labour-saving innovations, not only in relation to technology but also aimed at organising the work, so that rapid progress can be made with the hydrogen ambitions despite the tight labour market.
- National partnerships to transparently unlock the available knowledge and programmes, bundle initiatives and create unequivocal professionalisation programmes. And to give this an appealing allure internationally with a recognisable point of contact for human capital issues related to hydrogen.

The outlined challenge is considerable and demands efforts from all parties involved.



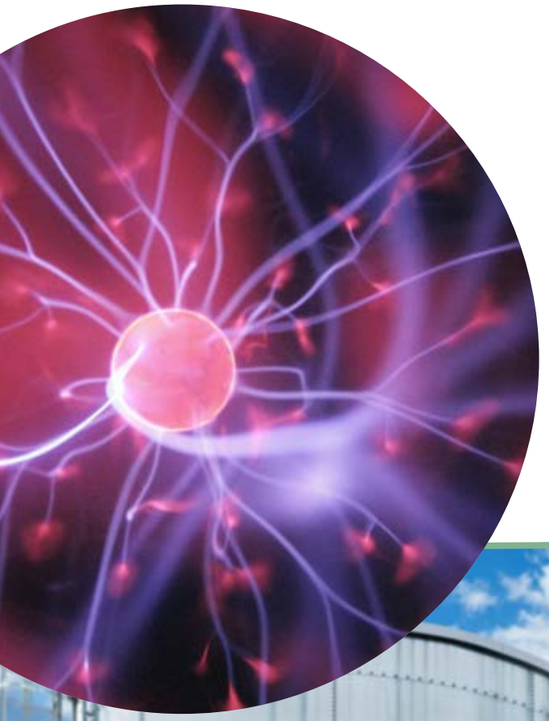
Initial start in 2023

In 2023, after a year of preparations, a start was made on implementing the human capital agenda. Until now, the focus has been on mobilising the parties concerned and preparing activities in the regions. Additionally, work has been carried out on gaining a better insight into the quantitative and qualitative challenges via labour market research, explorations into education and training programmes, and initiating national partnerships between various parties, with the establishment of a knowledge platform and a 'Make Hydrogen Work'.

There have been considerable investments in promoting the synergy and coherency, particularly within the GroenvermogenNL programme itself. That is essential because quickly applying new knowledge from innovations in businesses and new education and training programmes demands intensive collaboration with R&D and scaling-up programmes.
The ultimate goal is that members of the consortia also participate in the regional Learning Communities.

Moreover, it is important to create a synergy with other human capital programmes aimed at the energy transition such as the Just Transition Fund from Europe and the Lifelong Learning Catalyst and Professional Education Scaling-up Plan for Public-Private Partnerships. For more information about theses programmes' collaboration in the energy transition, we refer you to the publication: 'Coherent Approach to Human Capital'.

A more comprehensive explanation of the various components of the human capital agenda follows.



"There have been considerable investments in synergy and coherency, both within GroenvermogenNL itself as well as within the overall energy transition.

Regional investment programmes

In 2023, six industrial clusters started drawing up their regional Roadmaps. These identified the main developments and ambitions for the hydrogen and energy transition, and partnerships were formed between businesses, educational institutions and governments. For the implementation, each of the regions will soon draw up a multi-annual activity plan and an investment agenda.

During the inspiration tour, the regions were able to take a look behind each other's scenes. In 2024, the regional partnerships will start implementing the Roadmaps, partly financed by GroenvermogenNL.

The two pagers, which form an integral part of this publication, provide a preview of the Roadmaps, which will be published for each region shortly.
The implementation of these Roadmaps will be taken up by the regions together, and with the focus on close collaboration and using each other's expertise, results and products. For this part, the Taskforce for Applied Research SIA will function as the implementing organisation. Besides GroenvermogenNL, the regions will jointly use various supporting programmes for human capital in the energy transition (see paragraph on coherency and connection).

The most important points from the Roadmaps follow.

1. Northern Netherlands

In Northern Netherlands, various parties have drawn up an industrial investment programme for hydrogen worth a total of €9 billion. The leading programmes are HEAVENN (focused on scaling-up and acceleration in the areas of application), Hydrogen Works (focused on connecting the five industrial clusters in the Netherlands to the backbone and the connection to international networks) and NorthH_2 (focused on large-scale hydrogen production, storage and transport). Further programming and investment will take place via the National Programme Groningen (NPG).

With the GroenvermogenNL Roadmap, the region is prioritising human capital as an integral part of these investment programmes. That will be realised along the following lines:

- Campus development and integration;
- Scaling-up Hydrogen Learning Communities;
- 'Pioneer' projects within the NPG;
- Lifelong Learning aimed at sectors relevant to the hydrogen transition;
- Improved positioning of vocational education;
- Practical research with businesses and knowledge institutions.

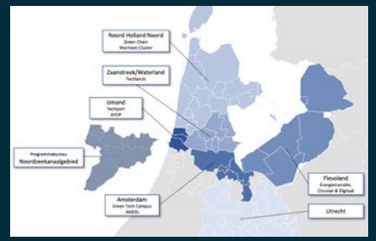
Due to the range of programmes and available resources, including those from the JTF and other Growth Fund programmes, the Northern Netherlands Roadmap strives for a coherent and integrated approach to deploying these resources as effectively as possible. Important parties in the Northern Netherlands Roadmap are the large industrial clusters in the region, Seaport Groningen, the Province of Groningen, educational institutions at university of applied sciences and vocational education level, Entrance Centre of Expertise and the New Energy Coalition.

2. Northwestern Netherlands

In 2023, the Province of North Holland acquired European Hydrogen Valley Status, the Flevoland Hydrogen Valley (FLHY) platform was established in Flevoland, and the Province of Utrecht signed the 'Hydrogen Utrecht' Covenant. The region of Northwestern Netherlands is distinctive due to its ambitions on every level of the hydrogen chain. Proposed activities include:

- Further developing Learning Communities in at least two of the seven identified clusters, such as those shown on the map below.
- Implementing flexible educational and training pathways for both initial education as well as schooling professionals and lateral entrants, with an emphasis on vocational and university of applied sciences education.
- Expanding and establishing laboratory facilities aimed at developing a physical regional lab infrastructure for practical training and practical research.
- Strengthening and expanding the regional ecosystem by bringing together the parties involved and promoting synergy between R&D and innovation, scaling up and innovation, and other programmes in the energy transition.

The key partners of the Northwestern Netherlands Roadmap include the North Sea Canal Area (NZKG) programme office, the Noord-Holland Noord development company, Amsterdam University of Applied Sciences, various businesses in the region, the provinces, municipalities, the Amsterdam Metropolitan Area (MRA) and knowledge institutions at vocational, university of applied sciences and research university level.



3. Eastern Netherlands

The Eastern Netherlands region Roadmap is aimed at various focal areas, being Lifeport (Arnhem/Nijmegen), Brainport (North Brabant), the Stedendriehoek and Twente. Lifeport has a strong focus on the broader energy issue and hydrogen's role in that, while as a technological cluster, Brainport focuses on high-tech industry that is essential for the development of facilities for hydrogen production and storage, as well as its application in transport. The Stedendriehoek and Twente focus on SMEs and the Clean- tech production industry. That has led to a focus in the Roadmap on decentralised hydrogen applications (for example, in the built environment), applications in transport and mobility and the high-tech industry as producer and developer of facilities and as hydrogen consumer. The following activities are included:

- Stimulating interest in young people and professionals to work on the energy transition, including via a young professional network.
- Developing education and training programmes, including via traineeships.
- Strengthening practical research, thus enabling knowledge from innovations to be quickly applied in practice, with the involvement of vocational education as a crucial element.
- Committing to shared facilities between education and the business community to strengthen the ecosystem in a natural way.

The Eastern Netherlands Roadmap is supported by various businesses, regional governments from various regions, collaborative platforms such as Lifeport and Brainport, and important knowledge institutions in the field of vocational, university of applied sciences and research university education.

4. Western Netherlands

The Western Netherlands region, with its ambition to be the hydrogen hub of Europe, faces a considerable challenge in terms of hydrogen production, transit and hydrogen. This concerns two large industrial complexes (Europoort and Moerdijk), the production, landing, storage and transhipment, and transit of hydrogen via inland shipping and cargo transport. That demands a lot, particularly in relation to enough and skilled professionals. Furthermore, the region has a considerable labour capacity potential that is currently unused. This combination of factors results in the following approach in the Western region Roadmap.

- Further development of the Hydrogen Learning Community.
- Implementing educational, training and study programmes in partnership with businesses.
- Updating educational programmes and professionalisation of lecturers.
- Activating and deploying unused labour potential.

More than 40 partners, including large and small businesses, Deltalinqs, knowledge institutions, the Port Authority, the municipality of Rotterdam and the province, have already got behind the plans in the Western Netherlands region Roadmap.

5. Southwestern Netherlands

Zeeland's industry is the largest purchaser of grey hydrogen in the Netherlands. It is therefore extremely important that Zeeland's industry is supported in the transition to green hydrogen to achieve the climate goals of both Zeeland and the Netherlands. The Roadmap contains the following aspects:

- Developing educational programmes, including teacher training, for eight vocational and eight university of applied sciences courses.
- Partnerships with businesses to educate and train working professionals (Lifelong Learning), organised from the Energy Campus Zeeland.
- Establishing Learning Communities to support Zeeland's industrial cluster and assist business parks with regional innovation.

Core partners for the Southwestern Netherlands Roadmap include Smart Delta Resources and Energyport Zeeland, meaning more than 300 businesses, all knowledge institutions, the province and municipalities are involved in the region's Roadmap.

6. Southeastern Netherlands

Access to green hydrogen is vitally important for making Chemelot sustainable. Important goals are the connection to the hydrogen backbone and local production of sustainable hydrogen. Besides its use as a raw material, hydrogen offers opportunities for Limburg as a European freight hub, particularly as an energy carrier for making heavy transport sustainable.

The list of priorities includes the development of a (post-)initial supply that responds to the need for knowledge from businesses, governments and other organisations in the context of a broader Energy Transition Academy. Establishing field labs and expanding the approach of the CHILL Learning Community to hydrogen applications contribute to these goals. Furthermore, the focus will be on accelerating knowledge application, mainly through scaling up breakthrough technologies such as the plasma pilot for CO_2-free hydrogen production.

Finally, from what is called a 'Work Centre', which coordinates various initiatives including concerning training work seekers and retraining professionals, the region will focus on improving matching the demand and supply for labour.

In the coming five years, the region needs many hands just for the installation of and connection to the hydrogen networks on behalf of Chemelot.

The Southeast Netherlands Roadmap is supported by all public and private parties stakeholders of the Limburg Hydrogen Agenda 2.0, including the Chemelot industry cluster, the province, LIOF, Zuyd, Vista, UM, TMO (all involved with the Chemelot Circular Hub), LWV Employers Association and the Limburg Hydrogen Coalition.

During the inspiration tour, the regions got a chance to take a look behind each other's scenes. The regional partnerships will commence in 2024.

Human Capital Agenda: Impact on skills, training and education

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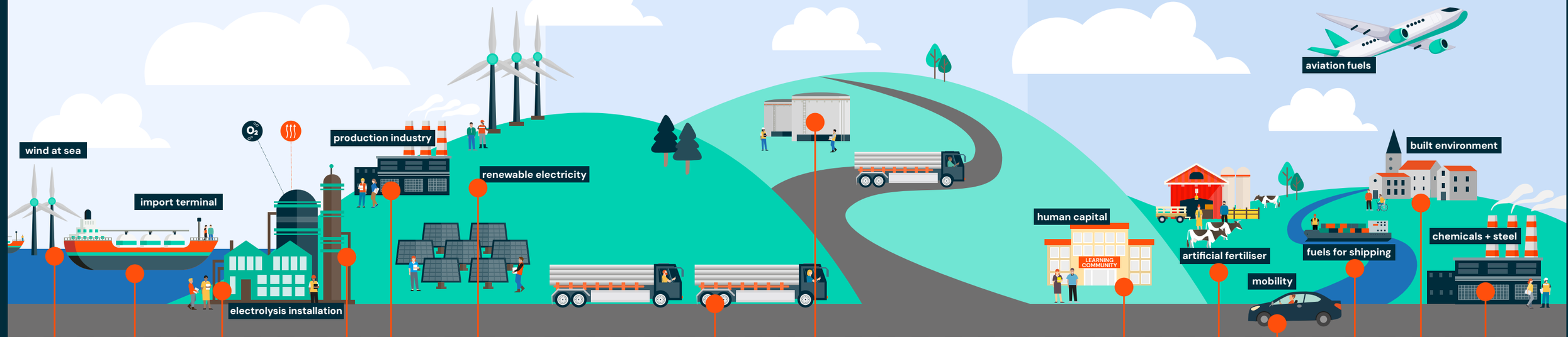
NETWORK OF LEARNING COMMUNITIES ACROSS THE ENTIRE CHAIN, SKILLS VALORISATION, MAKE HYDROGEN WORK

Import + Local production

Transport + Storage

Application



Wind at Sea, installation and maintenance, landing

Import, transport and storage and transit-safety with large-scale application

Installation of production facilities, system integration; sustainable solutions

Building production facilities, knowledge about smart chain collaboration and business models

Improving the sustainability of electrolysis parts, reliability, circularity and reducing expensive and scarce materials

Challenges in system integration, such as minimising grid congestion and linking intermittent energy generation of renewable energyto electrolysis systems

Knowledge about underground storage

salt caverns

Road transport, applications in heavy transport by road

Coordinating supply and demand of H_2 via flexible production, purchase, connection to the H_2 network and storage

Installation, adaptation and maintenance of pipes and infrastructure

Learning Communities, practical research, training and education, professionalisation of lecturers and trainers, public-private partnerships, Lifelong Learning

Stimulating flexible demand for H_2, for example by adapting application processes and developing (temporary) hybrid solutions

Local mobility, motor vehicles, tank installations, infrastructure

Transport by water; applications in heavy shipping

Built environment, decentralised application, system integration

Chemical and steel industry. Hydrogen as raw material and as energy carrier

SAFETY, COSTS, SYSTEM INTEGRATION, CERTIFICATION, INFLUX OF YOUNG TALENT

CONNECTION WITHIN GROENVERMOGENNL WITH R&D-SCALING UP-HUMAN CAPITAL, COHERENT APPROACH TO HUMAN CAPITAL ENERGY TRANSITION

What is going to happen in 2024-2029?

Regional Investment Impetus

In the coming years, there will be an active focus on the regional investment impetus based on the Regional Roadmaps as previously described. In each region, dozens of businesses, knowledge institutions, governments and public-private partnerships will work together on creating an ecosystem that will ensure parties can jointly meet the demand for skilled professionals for the hydrogen transition.

Besides implementing this investment impulse in the regions, vigorous work will be carried out on the other national programme components of HCA-GVNL between 2024 and 2029.

Make Hydrogen Work

Various regions are working on establishing an expertise centre where professionals and tradespeople can follow training courses. Make Hydrogen Work (MHW) resulted from this initiative. The MHW functions as a central label for the HCA-GVNL and will also serve as a national 'launch pad' for the regional campuses and practical centres that the regions want to set up. Moreover, the regional campuses can collaborate through the exchange of educational resources, standardisation and certification of the supply (such as safety requirements) and the collaboration with the national business community to use the existing supply (such as 'Be an Engineer' and other hydrogen-specific offers). A crucial starting point is that the MHW is demand driven. Due to its expertise and relevant network, the National Platform Science & Technology (PTvT) is a suitable implementation partner.

Of course, the connection to the Expertise platform is part of this initiative. The plans for the MHW are currently being developed further, with the aim of starting in 2024.

The MHW represents a considerable part of knowledge in the Netherlands related to hydrogen and is thereby an interesting export product. Besides the regional campuses, there are opportunities for private suppliers to export their knowledge[1]. The transition to wind at sea has demonstrated that working on European standards forms an important basis for education and additional training. Therefore, the European positioning will be explored and provide input for the MHW's development agenda. The EU programme, Greenskills for hydrogen, is interesting in this because it aims to contribute to the development of skills in Europe for the hydrogen transition. Globally, countries currently determine their position in the hydrogen market. The Netherlands organises multiple trade missions to promote partnerships with countries such as Chilli, South Africa and Spain. In collaboration with the Young Professionals Programme from the UN Global Compact Netherlands (UN GCNL), the international branding of the MHW will be further elaborated, with the involvement of regional liaisons, the Dutch Ministry of Economic Affairs and Climate Policy (EZK) and the Dutch Ministry of Foreign Affairs (BUZA) and Topsector Energie. The Dutch, European and global positioning will be combined and elaborated within the MHW. The MHW and the business programme are closely connected, whereby the ownership of the MHW lies largely with the regional campuses, and thereby education and the business community.

1. Research by KPMG shows that a limited number of players are already offering private hydrogen training courses.

Business programme

The focus within the business programme lies on developing an SME programme and implementing the recommendations from Dialogic in their research 'Voorverkenning mkb-programma GroenvermogenNL' (Preliminary exploration of SME programme, GroenvermogenNL) from 2023. Furthermore, it focuses on creating a lively network of Learning & Development (L&D) professionals, a combination of the GroenvermogenNL quartermaster and the results, and the research network of KPMG.

SME programme

Via co-creation, the SME programme focuses on setting up a monitoring function, supporting growth, disseminating knowledge (using the knowledge platform), creating testing and learning environments (partnership in learning communities), strengthening the supply of training courses and the outflow.
A natural connection with the network and L&D is essential in this (see later in the text). The national commitment to this component is mainly providing the framework and strategic, with a focus on standardisation, certification, supply of training courses, bridging the gaps between clusters, international coordination and benchmarking. A close collaboration with the MHW is important in this.

On a regional level, the commitment is more practically oriented and operational, with roles as game distributor, broker and technology information at sector level. By thinking carefully about the legitimacy of this commitment, including monitoring and evaluation, we expect the greatest impact and chance of success.

L&D Network and innovation programme

The extent to which the L&D function is developed for hydrogen in businesses varies from absent/undeveloped to highly innovative using the latest technologies. Considering the hydrogen transition will place great demands on existing working professionals and demands smart learning (quick, effective, flexible), GroenvermogenNL strives for further professionalisation and knowledge exchange between businesses by organising network activities and peer-to-peer learning. The Knowledge Platform (see hereafter) will be used to share knowledge with and make it available to businesses. Through this L&D Network, the regional Learning Communities and the National Learning Network Communities, GroenvermogenNL wants to disclose the latest scientific and evidence-based knowledge and insights, and set up a research and innovation programme to shorten the time-to-job.

National Knowledge Platform

The National Knowledge Platform opens up the vast amount of knowledge already available and that is yet to be generated, and makes this accessible to people involved in hydrogen, irrespective of whether that is technical, educational or policy based.
It serves as a digital foundation for the Make Hydrogen Work and provides various functionalities for scaling up and accelerating green hydrogen:

- Providing information and extensive knowledge about hydrogen.
- A hydrogen community with specialist knowledge experts.
- Educational opportunities related to hydrogen and its applications.

Information

Various research reports, articles, whitepapers and milestones about hydrogen production, applications, storage, distribution, technologies and developments are currently spread over the various platforms and regions. The Knowledge Platform brings this information together and translates it into educational programmes and training courses for professionals. It also serves as an inspiration, for example via good practical examples and insights into the latest developments.

Community

The platform simplifies searching for and finding the right expertise by connecting knowledge experts who altruistically share their knowledge. There is space for interaction and discussion where consumers can respond to the articles and enter discussions with one another. The Knowledge Platform serves as a (digital) community where knowledge is exchanged, new issues and knowledge areas are discussed, questions are answered, and proposals for new initiatives and partnerships can be launched.

Education

A significant focus of the Knowledge Platform lies on making educational and training modules accessible to (future) hydrogen professionals. These modules cover all aspects of the hydrogen chain, from production and transport to storage, and important areas of application such as industry, heavy transport and the built environment. Intersecting themes, such as safety are included in this.

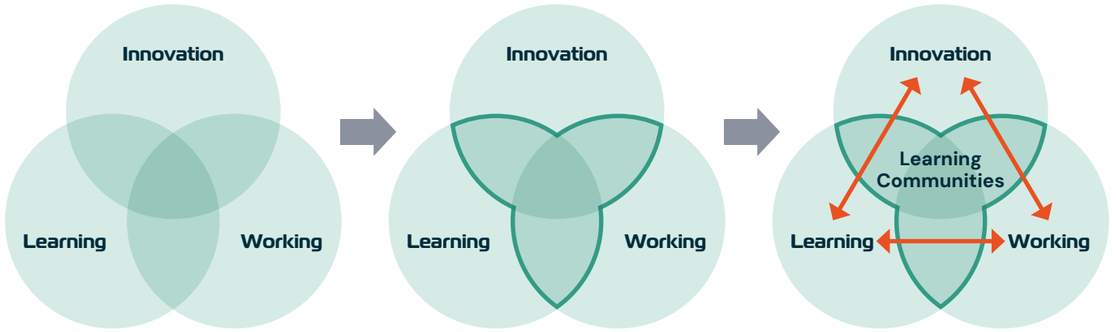
Existing networks and platforms are being built on, considering the amount of investment this has taken place in recent years. During the programme, connections will be made with these platforms, whereby a transparent structure will be maintained to retain the investments already made.

Building on Learning Communities

The responsive infrastructure for the hydrogen transition will be shaped by various forms of Learning Communities in all regions. Initiatives are being developed in close collaboration between businesses, education and training institutions to quickly apply new knowledge and innovations in daily practice in both businesses as well as training courses.

In Northern Netherlands, EnTranCe and its hydrogen partners have already made considerable progress in this area, for example. A solid foundation has also been laid in Limburg with what are called Communities for Development. Other regions have taken tentative first steps with regards to hydrogen.

In the Eastern region for example they are working with the challenge-based learning communities' model on the development of the H_2 Hub.
Last year, the way in which Learning Communities are being developed was mapped out for the knowledge areas that are relevant to the hydrogen transition for all regions. Together with the regions, the agenda is also being drawn up for the requisite continuous development, considering the specific context and substantive development per region. Besides the continuous development of Learning Communities, we are exploring what a national agenda could look like to strengthen this regional development. This takes place in the context of the MHW, in partnership with the national Learning Communities Network and participants in the SPRONG programme via Taskforce for Applied Research SIA, focused on Learning Communities.



Organising innovation, working and learning close together

Investing in the intersections and transition zones

Realising Learning Communities for hydrogen

> **The hydrogen transition offers great opportunities to show young people how new technology can contribute to solving social issues.**

H_2 in Education

Sustainability and a healthy climate are important themes to young people. The hydrogen transition offers great opportunities to show young people how new technology can contribute to solving social issues, in particular the energy transition. GroenvermogenNL wants to actively participate in the approach that PTvT has developed through the course of the years to provide young people with greater insight into the world of technology by aligning it to their perspective (Bèta&TechMentality). The 'Hydrogen in Education' programme was developed for that purpose. Modules can be added to the current curricula of schools in primary and secondary education, through which young people will be introduced to the energy transition via hydrogen. The aim is to collaborate with more than 100 schools from 2024 to 2029. By closely connecting to the programme that PTvT is currently preparing for the National Growth Fund 'Investing in the talent of tomorrow', this could be scaled up significantly in time.

Monitoring

To work effectively and be able to adequately manage activities, it is essential to have a good overview of both qualitative as well as quantitative data. Part of these 'qualitative' data were collected in 2023 via various studies. The aim of this is to be able to implement effective interventions in the various workflows of HCA-GVNL by having a continuous insight into the human capital issue at education, labour market, partnerships and policy level. Using this insight, we can learn, manage and justify the choices made. With the development of Learning Communities, HCA-GVN encourages the use of the peer review methodology. This enables regional Learning Communities to systematically learn from each other. The peer review is conducted by peers (critical friends). This methodology has been developed for the RIF programme (Vocational Education Regional Investment Fund), and in the context of the NGF Professional Education Scaling-up Plan for Public-Private Partnerships programme, the methodology has been further refined. Additionally, the output will be measured with Katapult's Public-Private Partnerships impact measurement. This measurement mainly indicates the reach of the Learning Communities in terms of the number and type of interventions, the number of businesses and educational institutes involved, any other partners, and the number of students and lecturers reached, etc.

The monitoring results include the following:

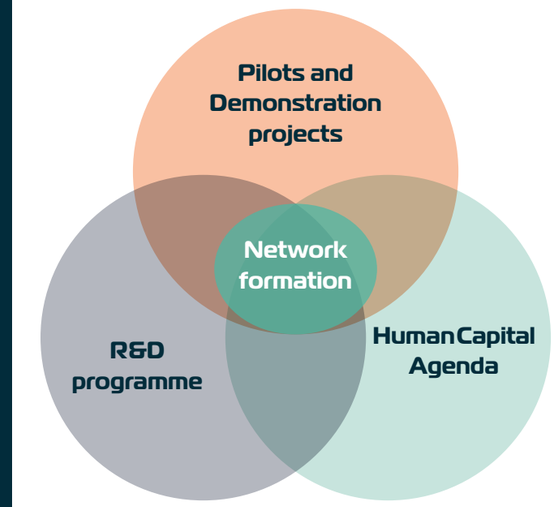
- Annual adjustment of the labour market dashboard based on the knowledge map, the knowledge platform and various labour market monitors.
- The monitoring method for HCA-GVNL.
- Bi-annual development advice for the regional Learning Communities.

Coherency and connection

Linking pillars

GroenvermogenNL is an integrated programme focused in scaling up and accelerating the hydrogen transition. Within the programme itself, the aim is for a connective approach between the development of new knowledge in R&S programmes, its use in scaling up and acceleration projects, and guaranteeing that enough people can apply this knowledge in time. Important focal points include the involvement of regional Learning Communities in the consortia of the R&D work packages. The Learning Communities contribution lies in quickly bringing new knowledge into daily practice through practical research, enabling this to be applied in businesses and new education. Within the consortia, Learning Communities can adapt the formulation for skills development (education and Lifelong Learning), which increases the effectiveness and efficiency of valuable facilities. Last but not least, Learning Communities contribute to the fact that working professionals can familiarise themselves 'as a matter of course' with the opportunities offered by the hydrogen transition, through training, schooling and learning on the job.

The diagram below illustrates how this works in practice.

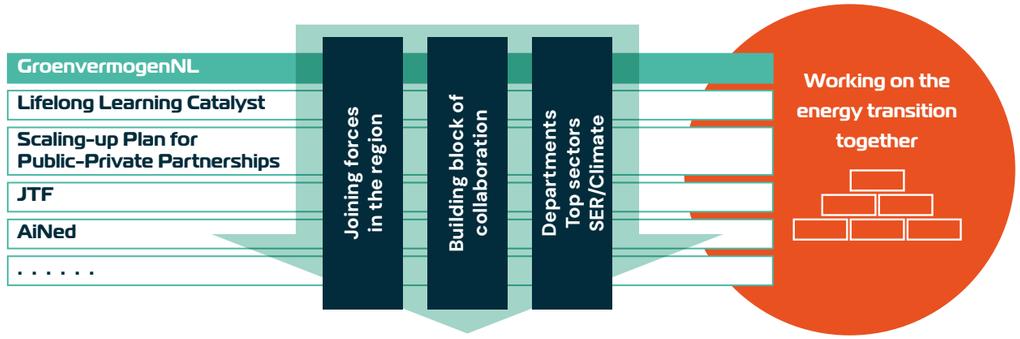


How does this work in practice?

- GNVL wants new knowledge from innovations to be applied quickly in businesses and education. Human capital is not an isolated activity but contributes to releasing the overlying objectives of GroenvermogenNL as a whole.
- Working with **Learning Communities** in the regions.
- Including **human capital as a criterion** in the regulations for R&D and Scaling-up.
- **University of applied sciences (and vocational education) in the consortia** for R&D and Scaling up to make rapid transitions.
- Stimulating fast application via **practical research** with dedicated teams,
- **Roadmaps** should indicate the roles of R&D and Scaling up in the region. Parties must be reflected in the Roadmaps.

Coherent approach

The hydrogen transition unquestionably relies on the limited availability of professionals who are essential to the success of the energy transition as a whole. That is why HCA Groenvermogen works closely with other programmes in the energy transition. Examples of this have been mentioned, such as the Just Transition Fund from Europe and the Lifelong Learning Catalyst and Professional Education Scaling-up Plan for Public-Private Partnerships financed by the National Growth Fund. These programmes not only join forces nationally but also mainly ensure that the region is able to use these programmes coherently to realise their own urgent labour market agenda. GroenvermogenNL's liaisons have the specific role of achieving this coherency within their Roadmaps. A brief overview of how this is implemented in the region is provided below.



How does this work in practice?

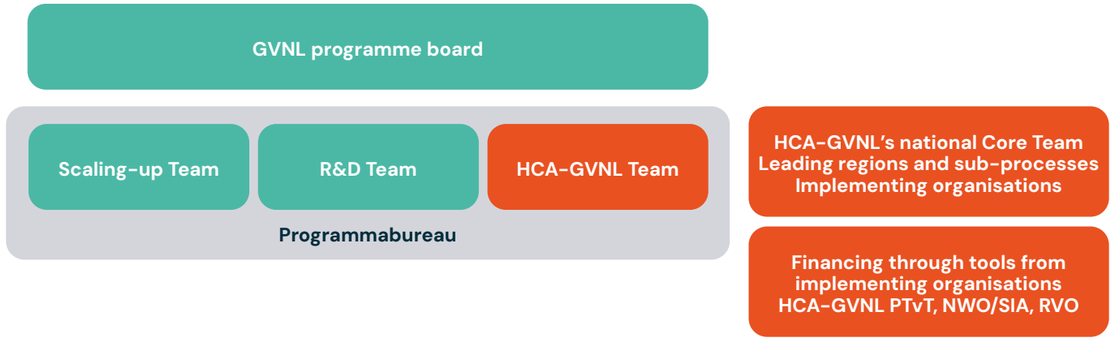
- GroenvermogenNL wants regions to indicate in the Regional Roadmaps how they will realise the regional agenda using the various programmes. GroenvermogenNL is not an isolated subsidy but contributes to making an impact.
- As a region, we want closer collaboration between businesses and education. Therefore, stronger infrastructure for public-private partnerships via the Scaling-Up **Plan for Public-Private Partnerships**.
- As a region, we want to focus more on training our population. And therefore, we are professionalising those Public-Private Partnerships with the **Lifelong Learning Catalyst**.
- We also want to strengthen the field of hydrogen in particular. Thus, we are loading and programming that Public-Private Partnerships/Lifelong Learning infrastructure with Hydrogen via **GroenvermogenNL**.
- We have many jobs in the 'fossil' sectors in the region. Through training, we want to guide people to sustainable jobs including for hydrogen via the infrastructure with the **Just Transition Fund**.
- **GroenvermogenNL's Regional Liaison Team** manages and programmes that coherency.

More information about the collaboration of these programmes in the energy transition is available in the publication called 'Coherent approach to human capital'.

Organisation of HCA-GVNL

The GroenvermogenNL board manages all programme components via the programme office. The HCA-GVNL Team, consisting of a programme manager, senior and junior project leaders, and a project secretary, is responsible for the implementation of the human capital agenda. This team coordinates, safeguards progress, aligns and develops practical approaches to respond to the dynamic scenarios within this field. The programmes and projects are mainly implemented in the region, where liaison teams are active (coming from six universities of applied sciences in 2023). The overarching knowledge exchange and operational coordination of the programme activities take place via HCA-GVNL's national Core Team, with input from the regional liaisons and the Learning & Development network. The programmes and projects are financed by the implementing organisations involved including the National Platform Science & Technology, Taskforce for Applied Research SIA, NWO and RVO.

Together, all these organisations form the organisational and implementing structure for HCA-GVNL, as illustrated in the diagram below.



Ample scope for acceleration

With this multi-annual and coherent commitment in relation to human capital, GroenvermogenNL and its partners want to give ample scope to the acceleration of the hydrogen transition. The focus lies on realising enough and skilled professionals for both the hydrogen energy transition as well as the broader energy transition. Dozens of businesses have joined the Roadmaps at both national as well as regional level, and most educational institutions, ranging from vocational education to research universities, are participating. Many national and regional (semi-) government institutions are involved. More than a hundred organisations are working together in this way in GroenvermogenNL's HCA.

Together, we make it possible.

Together, we give ample scope to acceleration of the hydrogen transition.

HCA-GVNL Team

Would you like to participate or want more information?

- Consult GroenvermogenNL's website
- Contact one of the members of the HCA-GVNL Team.
- Or contact one of the Liaisons in your region.

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