

# Human Capital Agenda GroenvermogenNL

Labor market research into hydrogen transition



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Innovation engine for the  
green hydrogen economy

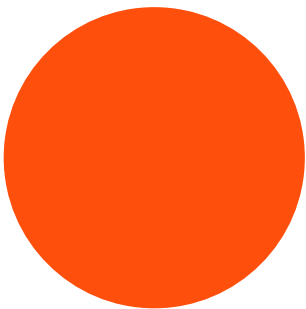
At the request of Platform Talent for Technology (hereafter 'PTvT'), Dialogic innovation & interaction (hereafter 'Dialogic') conducted a study into tools for encouraging innovation in SMEs in preparation for the development of an innovation and incentive programme for the SME sector.

### Understanding hydrogen value chains

The most common way to classify hydrogen value chains is using the classification system borrowed from the oil and gas sector. This system distinguishes between the production (upstream), conversion, transport and storage (midstream), and use (downstream) of hydrogen. Imported hydrogen is expected to play an important role to meet the total potential demand of the Netherlands.

The sector currently comprises around 200 parties in the Netherlands, with precise estimates depending on how the sector is defined. The number of involved parties is rising. Demand for employees is rising sharply and will eventually reach some 31,000 temporary jobs and 7,000 permanent jobs. There are potentially three to four times more employees available through the output of graduates, lateral entry and labour migration, but there is strong competition for this scarce technical talent from the other energy transition sectors (such as grid reinforcement, the built environment and offshore wind). This will result in a tight labour market, at least in the short term, and thus inhibit the sector's opportunities for growth. Given the competition between the various transition goals, this labour scarcity is expected to persist at least until 2035.

The main challenges facing the sector concern the dependencies between supply and demand (chicken-and-egg problem), technology choices, value chain components which must all be developed simultaneously, difficulties that smaller parties face in scaling up, shortages of qualified technical and other employees, safety awareness, standards and regulations, certification, cost reductions, and the need to minimise the use of scarce raw materials.



## SME instruments (Supply)

When designing policy instruments, policymakers should think carefully beforehand about the legitimacy of government intervention and the barriers that an instrument aims to remove. Carefully considering the rationale for an intervention in advance also makes it easier to determine at a later stage whether it has been successful and whether it should be downscaled or upscaled.

There are already many generic instruments available for encouraging innovation by SMEs in the hydrogen sector. Fewer instruments are available specifically for talent development. We have included a comprehensive overview in Annex 3.

The lessons learned from the existing range of education programmes reveal that there is a lot of fragmentation of and unfamiliarity with the initiatives. Moreover, parties experience barriers to participation (time and money) and the administrative burden of participation is too high, especially for SMEs. The extended preparation time and/or duration of a project is a bottleneck here, as are the challenges to forming a suitable consortium (for example because the own network is too limited). Parties appreciate the need to focus on megawatt-scale generation, but at the same time it is precisely the smaller scale projects that can be most attractive to smaller, innovative SMEs. Furthermore, we see that relevant specific policy instruments are still being developed, so it is difficult to assess the extent to which there are still 'blank spots' in the existing supply. It is also difficult to assess the success of the existing interventions: monitoring and accountability are not always organised regarding the outputs and impacts, and it is particularly difficult to estimate in advance which instrument will work best where.

## Support requirements of the SME sector (Demand)

We have identified a variety of innovation support requirements that, if met, could increase SMEs' involvement in the hydrogen transition. For example, there is a need for shared R&D and test facilities and a national commitment to standardisation, safety protocols, certification, licensing, and knowledge development in relation to these. It is also important to identify the demand for hydrogen at the local and regional scale and determine whether access to an adequate supply of hydrogen has been secured. Parties call for wider funding opportunities, especially for the final TRL stages (application/scaling up). Parties call for a joint exploration of the potential of automating production environments to reduce costs. Up-to-date overviews of relevant projects, businesses and innovations, complemented with the knowledge and networks of innovation brokers, are also mentioned as a requirement. Furthermore, the market will benefit from a strong vision and technology choices and laws/regulations that steer the transition in the right direction.

Regarding talent, solutions to the urgent shortage of technically skilled employees are particularly required. In this respect, it is not helpful that process and manufacturing industries have a poor image and are unappealing, although startups in this sector appear to be positively diverging from this poor image. Scarcity of employees also creates competition between various sectors and subsectors in the energy transition, such as for the electrification of industry and mobility, the circular economy, etc. Overall, matching education programmes to practice and retraining opportunities require continued attention. A challenge here is the lack of trainers and work placements. Solutions are required (and are being found) to make the education sector more flexible, improve cooperation between SMEs and knowledge and educational institutions, and recruit foreign talent.



Finally, the support requirements appear to be sequential: given the current stage of technology development and application, the support requirements are now shifting more to innovation support. Later, assuming the hydrogen transition truly gets under way, the interviewees expect the demand for more employees to come to the forefront (from quality to quantity). Taking into account the match between the existing policy mix and SMEs' support requirements, we will now sketch the contours of an SME education programme, including suggestions for governance and a number of considerations to take into account.

## Contours of an SME education programme (Matching supply and demand)

As far as we are concerned, the primary focus of the programme will be on establishing an 'early-warning' function, providing support for growth, knowledge transfer, testing and learning environments, strengthening the range of education programmes, and increasing the output of graduates.

In terms of governance, we suggest that the national commitment should mainly be limited to establishing a strategic framework, with a focus on standardisation, certification, the range of education programmes, the missing links between the clusters, international coordination and benchmarking. Regionally, the commitment should be much more focussed on working practice and operationalised with roles for game-changers, brokers and sectoral technology education. We anticipate that the greatest impact and best likelihood of success will be achieved by always carefully considering the legitimacy of each intervention, including effective monitoring and evaluation.

Finally, we recommend that the hydrogen education programme should be predictable and consistent, that stakeholders (staffing) and implementing organisations should commit to it, that it should focus on high-potential gains, and that it should learn from other transitions.

