

Human Capital Agenda GroenvermogenNL

Initial education: and exploration



GroenvermogenNL is a National Growth Fund programme that focuses on scaling up the application of hydrogen and enhancing knowledge and innovative capacity for the deployment of hydrogen in the Dutch energy system. As part of GroenvermogenNL's Human Capital programme, an exploratory study was carried out into education and development programmes with the use of an analytical framework based on desk study, data analyses and interviews. The exploratory study provides insight into:

- The current education landscape, including a survey of education programmes.
- A more in-depth study of that education landscape.
- An analysis of the degree to which the education landscape is dynamic and responsive to the hydrogen transition.

In addition to this study, KPMG also conducted an exploratory study into further education and development programmes, while SEO and CE Delft conducted a study of the labour market.

Education and development programmes for green hydrogen

The energy transition has a huge influence on education. As a potentially important technical solution for the energy transition, hydrogen forms an important part of this. Hydrogen is often addressed in the elective components of education programmes. This often involves a limited commitment of time (12.5–15%), and often hydrogen is only a sub-component (such as a project) within such an elective component.

There are various types of education programmes. For example, energy technology programmes have a broadly technical character, with hydrogen as one of the components. General technology programmes teach students important knowledge about basic processes, but do not specifically focus on energy or hydrogen. These programmes may also be sector-specific, with a focus on a specific area of application in which hydrogen plays a relevant role in the transition. There are also transition studies, which are programmes with a more holistic perspective, mostly taught in social disciplines.

Vocational institutions mostly provide elective components defined at the national level. An elective component with a broad, generalised energy technology profile is currently the most common form. Other elective components are more sector-specific and are taught only to a limited extent. The universities of applied sciences offer minors with a broad energy-related and technical character that are designed by the institutions themselves. The research universities focus mainly on fundamental knowledge that is broadly applicable and relevant to hydrogen. In general, research universities place less emphasis on areas of application and more on fundamental knowledge.

In general, education programmes for hydrogen focus particularly on technical training. The theme of hydrogen is taught less often in the social disciplines and broader transition studies. Programmes appear to focus less on systemic infrastructure (midstream) than on upstream and downstream processes.

Despite the fact that there are many relevant studies that address the hydrogen transition as a whole, the exploratory study reveals that only limited numbers of students currently come into direct contact with hydrogen. For example, the portfolio analysis of 54 programmes with hydrogen as a theme reveals that about 25% of students are actually involved with hydrogen, while only about 2% of the total study hours of all students of these 54 programmes involves hydrogen.

Current education programmes for green hydrogen

As described above, the commitment to green hydrogen within current education programmes is mainly give shape in elective components and projects. Other aspects of education largely follow general trends, and green hydrogen is no different to other subjects. For instance, since the COVID-19 crisis, there have been more developments in digital education, with areas of attention being the available practical setups and systems, the continued growth within the research universities, and the decline in the vocational institutions and universities of applied sciences. As the current commitment to hydrogen is in keeping with the still limited market demand, no bottlenecks are yet visible in terms of the capacity of the educational institutions.

The current commitment is largely met by subsidised projects, often involving partnerships between educational institutions and businesses. There are excellent examples of fruitful partnerships, such as the New Energy Coalition in the Northern Netherlands, H2Hub in Twente, H2Lab in Arnhem-Nijmegen and Green Village in Delft. Learning Communities are evolving and starting to take shape in the various regions.

There is a lot of competition for technically skilled employees in the labour market. At the moment, there is only a limited demand for graduates with hydrogen knowledge, and most of these graduates currently still end up in traditional industries. Students who have developed both broad knowledge and specific hydrogen knowledge quickly find employment, and continue to develop their knowledge throughout their careers.

Education and the transition to green hydrogen

There is a positive momentum around the energy transition, which will certainly continue into the future. The specific commitment to hydrogen is tentative for now. There is some uncertainty about the deployment of hydrogen in specific areas of application, and about technologies such as green hydrogen. A broad educational base will make graduates more agile in the labour market. The importance of lifelong learning (LLL) is also stressed in this context, while it should also be pointed out that the lifelong learning (LLL) concept itself is still under development.

Educational institutions are slightly ahead of the market in their commitment to hydrogen. Students are very interested in the energy transition and are open to the topic of hydrogen. However, the market demand is still limited, so educational institutions still consider a more significant commitment to hydrogen too risky.

The education system does not adapt quickly and is therefore not particularly 'dynamic' nor 'responsive'. This is partly because some years must pass before a student graduates, and also because of the requisite quality assurance built into the education system. Furthermore, it takes time to implement major changes in existing education programmes. There are thus more opportunities in the form of elective components, and particularly through hydrogen-focussed projects and assignments. Learning Communities are very important for such projects and assignments, and there are opportunities in this area. Learning Communities also offer further advantages in the realm of sharing infrastructure, not reinventing the wheel, improving the visibility of hydrogen employers, etc. The latter point is of great importance given the competition in the labour market.

Recommendations

Several recommendations are offered for addressing the hydrogen transition in education. The importance of Learning Communities (and the involvement of hydrogen employers in them) for further education and development is also highlighted. A commitment to increasing the visibility of the employers and matching businesses to talent is also important in this regard.

This report is a translation by GroenvermogenNL
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