TÜV SÜD exclusive: How certification can bridge the gap in regulation and decarbonisation

By Stephen B. Harrison on Apr 30, 2020 | Translate NEWS

Mass production of hydrogen from electrolysis is jumping off the drawing board to become an industrial reality. As it does, standards and the associated inspection, testing and certification are of increasing importance to manage this transition.

They can help to navigate the path to a decarbonised future and safely bridge the gap between current practice and future regulation.

To find out more, Stephen B. Harrison spoke exclusively to Dr. Thomas Gallinger, Director of Business Development for the Energy Sector at TÜV SÜD's central office in Munich, for H2 View.

First and foremost, thanks for your time. Let's begin by asking, what role does TÜV SÜD play in the hydrogen energy transition?

In many fields, such as medical ethics or the use of internet social media, practice can lead regulation by several years. The same can be said for hydrogen energy. There are many pilot projects in place which have been sponsored by European and National agencies and early adopters of hydrogen technologies. However, we do not yet have the supportive regulatory framework that will fully unleash the potential of hydrogen as an energy vector.

To build a bridge between the present and that future, a key role for my team is to develop guidelines and standards and use those to test, inspect and certify hydrogen installations.

Beyond the TÜV SÜD activities, our affiliated company Ludwig-Bölkow-Systemtechnik (LBST) supports the hydrogen energy transition with detailed analyses on the associated technologies and their economies and with feasibility studies.

Which testing, inspection and certification services does TÜV SÜD offer related to hydrogen?

The construction of hydrogen electrolysers is one example. We were involved in the certification of the largest system that operating in Germany today, which is rated at 6 MW. Hydrogen electrolysers are evolving from one-off prototypes to structured modular systems and we are aware of several installations in the planning stage which are rated at 100 MW. As the scale increases the degree of industrialisation will also increase. Our role is to validate that these systems conform to applicable standards to ensure safe and reliable operation.

Another area is related to the pipeline infrastructure and covers hydrogen injection to the natural gas grid or 100% hydrogen grids. We get involved in topics like flow measurement and metering research for mixtures of natural gas and hydrogen, compatibility of existing pipeline construction materials and components with hydrogen, or the development of methods for an integrated safety review for hydrogen systems.

Do you also play a role beyond the hydrogen production and distribution infrastructure?

Yes, TÜV SÜD also offers testing and certification services for hydrogen applications. For example, fuel cell electric vehicles which rely on hydrogen.

Beyond that, the development of the first hydrogen-powered regional train in regular service was accompanied by TÜV SÜD.

All these mobility power systems require testing and certification to give everybody the confidence that they have been designed to function effectively.

And what about the certification of green hydrogen?

I have heard just about every colour of the rainbow, and a few others, used to describe various types of hydrogen in the past few years. The terminology could certainly benefit from consistent definitions: perhaps that's an area for future standardisation.

However, in the field of green hydrogen we are fortunate there is now a clear certification programme in the EU called CertifHy. TÜV SÜD collaborated in a consortium with four other partners* to develop this certification, which was funded by the EU Fuel Cells and Hydrogen Joint Undertaking (FCHJU). Under that scheme, if there is a traceable chain from renewable electricity production in one location to hydrogen generation in another then the hydrogen can be certified to be 'green'.

Does CertifHy also recognise other colours of hydrogen?

Yes, it also recognises 'low carbon hydrogen'. While CertifHy *Green Hydrogen*refers to hydrogen generated by renewable energy with carbon emissions 60% below the benchmark emissions intensity threshold, CertifHy *Low Carbon Hydrogen*is hydrogen created by non-renewable energy with emissions below the same threshold, for example by capturing and sequestering a significant share of the associated carbon dioxide.

A natural gas-fed steam methane reformer (SMR) has been selected as a baseline for the 60% emission reduction requirement, as this is the production technology accounting for 95% of the current merchant hydrogen market.

Can you foresee international harmonisation of the hydrogen classifications?

It is important that consumers can make informed decisions about energy sources – and this needs to be a uniform system like we have achieved in the EU for the labelling of foods or chemicals. The CertifHy system and the associated definitions that we have been developing and piloting in Europe for the past three years certainly has the potential to be rolled out in other countries. In fact, we believe that there is clear interest to replicate the scheme in Japan.

Is there enough renewable power to satisfy the demand for green hydrogen?

That remains to be seen. At present consumers and industry can also purchase renewable electrical power under the same kind of traceability system for their homes and factories. So, in addition to the production of green hydrogen, there is lots of competition for the electricity produced form hydroelectric schemes, solar farms and wind turbines.

The good news is that the EU Renewable Energy Directive II advocates the parallel development of renewable power and green hydrogen. It does that by incentivising the installation of additional renewable power generation capacity and the close coupling of the power generation with the hydrogen electrolysers to avoid burdening the transmission grid infrastructure.

Close coupling the power generation and consumption also reduces the cost of electricity used hydrogen production in some countries, such as Germany, because the grid transmission fees can be avoided.

Do you think hydrogen's role as an energy vector is now secured?

Good question. I have been saying for many years that the full potential for hydrogen will be noticed soon. On some of those occasions my comments were premature. But this time I really sense momentum in the whole value chain and a tremendous wave of public and political motivation to drive change.

The catalyst for the next step will be a regulatory framework which recognises hydrogen and offers equitable incentives for investment that have been applied to renewable energy sectors such as wind and solar power. Through policy documents such as the 'Nationale Wasserstoffstrategie' here in Germany, the EU and member states have it in their hands to set the right boundary conditions.

If they get the appropriate framework in place, I feel sure that the probability that hydrogen will successfully be introduced to decarbonise our future in the coming decades will increase from 95% to 100%.