

# Foreword

Hydrogen technologies have the potential to contribute to the decarbonisation of economies and help tackle the climate crisis, by producing hydrogen from clean energy sources. Low-emission hydrogen can provide solutions to several “hard-to-abate” sectors that still rely heavily on fossil fuels, balance energy supply variabilities, and provide a green transport alternative, especially for heavy-duty and long-distance transport. As climate change becomes increasingly visible and the world faces shocks to energy markets, this potential becomes even more important. However, to promote hydrogen solutions and accelerate their safe and widespread use, a robust and agile regulatory framework is needed.

Based on current practices, future trends, and the regulation of hydrogen across countries, this report provides recommendations on the regulation of hydrogen in the Netherlands to support more widespread use of low-emission hydrogen. The recommendations address the governance of hydrogen along the regulatory cycle from risk assessment to policy development and regulatory delivery and include a range of safety considerations. These recommendations can help the Netherlands, as well as other countries, build regulatory frameworks that encourage rather than hamper new hydrogen technologies to decarbonise economies. As hydrogen is expected to play an important role in achieving ambitious climate objectives, progress in this direction could bring broad societal benefits.

Technological and scientific advances have reduced uncertainty around hydrogen risks, allowing countries to better manage them. Well-informed public deliberation and decision making can yield more accurate and up-to-date risk perceptions, avoid biases and achieve a well-managed balance of risks. Targeted approaches to licensing, inspections and enforcement can ensure regulatory requirements remain proportionate to actual risks and remove unnecessary burdens. Through effective communication and guidance, governments can improve public trust, drive consistency and foster a positive investment climate.

While the recommendations in this report are tailored specifically to the context of hydrogen regulation in the Netherlands, they might also provide inspiration for other countries and the regulation of other low-carbon energy applications. However, the research on safety risks and measures in the report is focused only on hydrogen and did not cover other related fuels such as ammonia.

The report builds upon international best practice in regulatory governance and complements other findings, in particular the report *Understanding and Applying the Precautionary Principle in the Energy Transition* (OECD, 2023). A set of additional background documents on hydrogen risk and regulation are added as separate parts to the current report. It includes the following parts:

- Part I – Report on literature review;
- Part II – Regulatory review;
- Part III – Review of international experience with hydrogen pilot projects;
- Part IV – Review on incident database and lessons learnt;
- Part V – Hazard and consequences analysis;
- Part VI – Lessons learned and preliminary findings regarding hydrogen safety elements; and
- Part VII – Quantitative risk assessments.

Disclaimer: The abovementioned parts contain background material that was used as input for the current report on *Risk-based regulatory design for the safe use of hydrogen*. They have been drafted by external experts following OECD guidance for the purpose of the project and do not necessarily reflect the views of the OECD.

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