Proc. of the European Safety and Reliability Conference (ESREL 2026)
Edited by José C. Matos, Paulo B. Lourenço, Michael Beer, Daniel Oliveira, Edoardo Patelli, Hélder S. Sousa, Rui A. Silva and Monica Santamaria
© 2026 ESREL 2026 Organizers. *Published by* Research Publishing, Singapore.
doi: 10.3850/ESREL2026061419_esrel26-p26208-cd

Drivers and Barriers in Hydrogen Investment Decisions: The Role of Policy Communication

BrynhildStavland

Institute of Safety, Economics and Planning, University of Stavanger, Norway. E-mail: brynhild.stavland@uis.no

Jon Tømmeråas Selvik

Institute of Safety, Economics and Planning, University of Stavanger. E-mail: jon.t.selvik@uis.no

The use of hydrogen as an energy carrier can decrease the dependence on fossil fuels and thereby be an important step towards net zero. A full-scale implementation is dependent on the development of new technologies and the adaptation of existing ones. The European Union (EU) and governments have launched ambitious hydrogen strategies but are dependent on the industry to develop, test, and implement technologies. At the same time, the industrial willingness to invest in research and development activities varies. Several energy companies are stalling their hydrogen activities, and it is important to examine the reasons for these decisions. In this article, we are concerned with how policymakers communicate with industrial actors about hydrogen opportunities and framework conditions, and how investment decisions can be affected by it. The purpose is to enable the study of drivers and barriers for investments in green hydrogen. The primary focus is on the communication between supranational organizations and national governments on one side and the industry on the other, and how it subsequently affects industrial investments in hydrogen energy. We present results from a literature search that aim to identify aspects relevant for future empirical studies of drivers and barriers. In the article, we identify aspects that can influence investment decisions and give recommendations for collection and analysis of empirical data to enable a more thorough understanding of how hydrogen investments are affected by policy communication from both the EU and national governments.

Keywords: Policy communication, hydrogen investment, investment decisions, policymakers

1. Introduction

Hydrogen as an energy carrier can decrease the reliance on carbon intensive energy sources and is often considered part of the solution for reaching international climate goals and ambitions. The fact that hydrogen can contribute towards net zero is not a recent discovery. It has periodically been considered as a substitute for oil and gas for decades (Stavland 2025). I.e., there have been waves of interest in hydrogen activities followed by a period of low activity, making it relevant to consider if the current interest and investments are going to have more long lasting effects on the energy mix than seen previously (IEA 2019; Yap and McLellan 2023).

Numerous hydrogen strategies have been developed by supranational organizations such as the European Union (EU) and governments (e.g., European Commission 2020; HM Government 2021; Norwegian Government 2020; The Federal Government of Germany 2020; U.S. Department of Energy 2023) signaling their intensions to introduce hydrogen as an energy carrier at a large scale. At the same time, these institutions are dependent on industrial actors to research, develop, test, and implement hydrogen technologies (e.g., ferries and long-haul vehicles).

A recent development is that several energy companies are stalling their hydrogen activities, and it is relevant to examine the reasons behind these decisions (e.g., Statkraft 2025; Reuters 2025; IEA 2025a). And it is relevant to study barriers towards long-term investments in hydrogen technologies. This article is the first step towards this overarching goal – and we seek to establish a foundation for understanding how the role of policy communication can be studied empirically in future work. It is conducted as a literature study in which the aim is to identify

success criteria for policymakers seeking to influence industrial actors. The intention of this article is to explore how governments can succeed with hydrogen policies and ambitions, focusing on the role of communication.

The article does not contain an analysis of policy instruments. There are already numerous studies that have analyzed gaps in the policy landscape on various aspects of hydrogen technologies (e.g., Chen et al. 2025; Quitzow et al. 2024; Quitzow and Zabanova 2024; Delpisheh et al. 2026; Latapí et al. 2024). Rather, the focus is on how policymakers can communicate with the industry to support policies and policy instruments to achieve their goals. Although examples from a Norwegian context will be used throughout the article, the results are applicable to other contexts as well.

The context of hydrogen as an energy carrier and relevant policy instruments in addition to clarification of key conceptsare introduced in section 2. In section 3, the literature search isdescribed.Relevant factors for policy communication identified in the literature search is presented in section 4. The relevance of these factors in the context of hydrogen policies are discussed in section 5.

2. Context and Concepts

In this section, we will briefly introduce the context which is the introduction of hydrogen as an energy carrier and define important concepts.

2.1.*Context*

Hydrogen is a hazardous substance and unfavorable conditions (such as leaks in confined spaces) can cause major accidents (e.g., Rand and Dell 2008; Sørensen 2005; Moretto and Quong 2022).There are several obstacles that may affect the viability of hydrogen as an energy carrier at a large scale.

First, there are safety-related concerns for workers that handle hydrogen (e.g., liquid hydrogen is -253°C requiring safety equipment to prevent cryogenic burns for workers) and for people exposed to hydrogen that is stored or used in populated areas (Norwegian Government 2020). Second, the volatility is a challenge for certain applications such as rail transport (and particularly railway tunnels) (Norwegian Government 2020) although it is encouraged by the European Commission (European Commission 2020). Third, there are significant uncertainties related to technological development required for both production and application. This also applies to costs which still represent a major barrier as hydrogen cannot compete with conventional fuels (HM Government 2021). Due to these uncertainties there are risks associated with investing in hydrogen projects. This is evident from the role that safety concerns have taken in several ongoing local planning processes in Norway. Here, the localization of hydrogen facilities has engaged local communities and resulted in public uproar (Slotsvik et al. 2026) – which is a source of uncertainty for the organizations behind the initiatives.

Medrano-Sánches and Ochoa-Tataje (2024) argues that clear communication and institutional trust are important factors for public acceptance of green hydrogen – a finding that occurs in numerous studies conducted in different countries. Furthermore, their analysis of perceptions of green hydrogen suggests that strengthening the communication of the beneficial aspects of hydrogen is key.

The use of hydrogen as an energy carrier is not cost-efficient when compared to conventional fuels. There are various predictions about when the price of hydrogen technologies will become competitive and the predictions also varies across countries and regions (IEA 2025a). It is also contingent on a multitude of different factors – economic disincentives (such as carbon taxes), financial incentives (programs supporting the development of green technologies), innovation, cost of materials, etc. (see e.g., Fazeli et al. 2022; Quitzow and Zabanova 2025). There are uncertainties about if and when hydrogen can be introduced as a viable and sustainable/logical alternative to conventional fuels.

The hydrogen road maps and strategies outlines policy instruments such as increased funding from public entities, increasing the taxation of CO_2, introducing zero-emission standards in public procurements, and different subsidies (such as exemption from taxation) (Quitzow and Zabanova 2025, 2024). Several studies map existing policy instruments and/or explore the need for additional instruments to be implemented to accelerate the introduction of hydrogen as an energy carrier (e.g., Guillotin et al. 2025; Latapì et al. 2024; Wolf 2025). It is interesting to note that in a recent review of Norwegian hydrogen policies, Skjærseth et al. (2024) notes that the political and

financial priorities in Norway were quite aligned in the first couple of years but there has been a decrease in funding of hydrogen activities. This is seen in relation to the uncertainty of technologies, costs, infrastructure, safety, etc.

In their 2025 review, The International Energy Agency (IEA)(2025a)state that the development of hydrogen technologies are slower than expected with remaining barriers related to costs, infrastructure etc. Although there is still optimism regarding the possibilities of a large-scale implementation, there is an observed lulled growth that is related to financial aspects and policy uncertainty (IEA 2025b).

2.2.*Key concepts*

There are various understandings of *policy*and what it entails(Ball 1993). A simple explanation is that policy is "an attempt to solve problems"(Ward et al. 2016). Whereas some are focused on regulatory aspects others have a wider perspective. In this article, we adopt a broad understanding in which policy is understood as focused attention to a subject matter and is related to the process of managing it (such as the formulation of goals and associated measures to reach these)(see Colebatch 2009).Policy involves both shared goals and the construction of a "basis for collective action among participants with quite diverse views on the nature of the task" (Colebatch 2009, p.4).Policy is viewed as "an attempt to persuade social actors to subscribe to particular beliefs that delineate action" (Ward et al. 2016).

Policy instruments are the measures taken to reach these goals. Howlett et al. (2009) introduce a classification scheme based on the characteristics of different policy instruments: nodality (information), audit (law), treasure (financial) and organization (governmental structure). More specifically, policy instruments can be taxation of undesired activities or products and/or subsidies of desired activities and products, information campaigns and regulatory measures (Kelly 2012; Hettiarachchi and Kshourad 2019). In this article, we focus on policy instruments introduced by supranational organizations and governments.

Policy communication is used about the communication of hydrogen policies (policy goals, instruments, etc.) from policymakers to the affected parties (here: the industry). The purposes of policy communication can be to generate awareness, to increase understanding of why a policy has been implemented, to motivate adherence or compliance, etc. Although this is the perspective relevant for this article, policy communication is often used to describehow interest groups, organizations and academics can communicate with policymakers (authorities) to influence policies.

3. Methodology

This article concerns the identification of drivers and barriers for investments in hydrogen technologies, where an important step is to identify literature that can be used to enlighten the use of policy instruments and policy communication between policymakers and the industry. We have conducted a literature search with the purpose of finding aspects or factors that can be used to explain how communicative efforts from governing institutions affects industrial investment decisions.

The initial focus of the literature search was on policy communication. The results were not aligned with the intentions of this article and the search was therefore extended to other forms of governmental communication with the aim of identifying success criteria that can be transferable to other contexts. Contributions from different academic disciplines has been found relevant. The results from the literature search are presented and summarized in the following chapter. Their relevance for studying hydrogen investments is discussed in section 5 in addition to challenges related to the application of policy communication literature on hydrogen investment decisions.

4. Results

Policy communication studies often concern how the public can affect governmental policies through lobbying, communicating results of scientific research etc. In other words, the focus is on how to influence policymakers whereas this article concerns how policymakers can influence decisionmakers in the industry. Additionally, policy communication research often targets how government institutions can communicate with citizens to promote or discourage certain behavior, e.g., how to encourage citizens to make more sustainable choices (e.g., de Vries 2020; Bertolotti and Catellani 2014). This focus is not necessarily

fruitful for the purpose of this article and requires a broader approach to the literature.Therefore, it was relevant to look at literature from other disciplines that address communication and influence.

For instance, Cialdini is concerned with persuasion and influence. He introduces six principles of influence (or weapons of influence) that seek to explain decision-making behavior and how to affect it:

(i) Reciprocation
(ii) Commitment and consistency
(iii) Social proof
(iv) Liking
(v) Authority
(vi) Scarcity
(vii) Unity

The principle of(i) reciprocation refers to the inclination of returning a favor, (ii) commitment and consistency – people tend to act consistently with previous actions and behavior, (iii) the principle of social proof refer to the inclination of observing our peers to identify correct behavior or actions – this is especially relevant in situations characterized by uncertainty, (iv) liking – people are more susceptible to suggestions from people that they like or share similar traits with, (v) authority – people tend to follow the advice of authority figures or people that are recognized as experts that are deemed credible, (vi) scarcity refers to the tendency to be drawn to options that are believed to have limited availability, and (vii) unity – people are more easily influenced when they consider themselves part of a group – i.e., a shared identity is powerful.

Moreover, Cialdini (2016)argues that although the seven "weapons of influence" can be utilized to change how people think and act, another powerful method for influencing actions is to ensure that a subject matter receives attention. He points to various strategies for how to attract or keep attention on a matter – or to be part of the agenda setting.

Risk and crisis communication literature offers recommendations for how governments can communicate to (and with) the public about risk and provide information during difficult situations.Risk communication is an important part of risk management. Though the aim of risk communication has shifted over the years it is now often seen at a mutual process in which the involved actors are to develop an understanding of a phenomena and associated assessments and "arrive at a balanced judgement that reflects the factual evidence about the matter at hand in relation to their own interests and values" (OECD 2002 referenced in Renn 2008). According to Renn (2008), good risk communication can enable mutual trust between stakeholders and informed decision making.Renn (2008) summarize trust, confidence and credibility as important prerequisites for risk communication.

The importance of trust also appear in other studies of public perception and governmental communication such as Singh et al. (2026) who highlights the importance of building trust to enhance public acceptance, and Xu and Xu (2025) who argues that "… trust directly influences perceived costs, risks, and benefits, as well as positive and negative impacts". Velimirovi• et al. (2026) look at trust, transparency and scientific rigor as important factors when studying public perception and policy development. Moreover, trust can be analyzed at different levels – from person, through institution to the socio-political climate (Renn 2008).

To summarize, influence or successful communication is related to the following aspects:

- "Weapons of influence" – such as commitment, authority, and unity,
- Attention,
- Trust,
- Confidence, and
- Credibility.

5. Discussion

Policymakers are dependent on industrial investments in research and technology to achieve their goals of introducing hydrogen as an energy carrier at a large scale. Recent analyses of hydrogen policies indicate that there is an increasing gap between goals and policy instruments that support them(Skjærseth et al. 2024). And while there is still significant activity in the industry, some are withdrawing their investments. Due to previous waves of interest in hydrogen technologies, it is interesting to study what policymakers can do to reduce the likelihood of it occurring again – which is why we are concerned with policy communication.

At the same time, it is important to acknowledge that industrial investment decisions

are dependent on numerous factors such as financial viability. As the future of hydrogen is uncertain, there are financial risks associated with investing in R&D – which is why risk communication literature can be relevant when analyzing the relationship between policymakers and the industry.

Cialdini(2016; 2014)present the principles of influence as an opportunity to avoid manipulation from people seeking to take advantage of the way people are inclined to act. In this article, we seek to establish a foundation for how to understand barriers and drivers in hydrogen investments through policy communication. The intention is therefore to identify aspects that can shape industrial investment decisions and how these can be utilized by policymakers as a driver for the continued interest in development, production and use of hydrogen as an energy carrier.

In the following, we will focus on Cialdini's (2014)principles for influence in the context of hydrogen investments and relate these to trust, confidence and credibility, and also attention, from the risk communication literature where relevant.

Reciprocation– according to this principle, the industry may feel inclined to invest in hydrogen technologies if they feel indebted to the policymakers. For instance, such an obligation could come from arrangements offering substantial financial enabling start-up or continuation of industry projects. Policymakers could identify actions that can lead industrial actors to feel some sort of obligation to invest in the development of hydrogen technologies. Further, there are clearly incentives in establishing a good relationship with powerful policymakers controlling framework conditions.

Commitmentand consistency– industrial actors are prone to make decisions in line with previous commitments which can be beneficial for policymakers. This making it important to drive attention to ownerships and responsibilities. Previous commitments to and positive attitudes towards R&D initiatives will make it more challenging to change their minds – and can be used to persuade further commitments. This is a stark contrast to e.g., Statkraft that have previously made investments in hydrogen technologies but are withdrawing these commitments due to a lack of financial viability (Statkraft 2025)and is interesting to explore further.

The principle of **social proof**can prove to be problematic for policymakers because several large actors that have been involved in the hydrogen landscape are now pursuing other opportunities. There is a possibility that these decisions can cause ripple effects in the industry and nudging other industrial actors stall hydrogen investments in favor of other opportunities. In the same way, documented success stories inside e.g. the EU or in certain Asian countries, could have the opposite effect, leading to an impression that projects are profitable under certain conditions.

Likingcan be related to several success criteria for risk communication, such as trust, confidence and credibility, and also attention. Following Cialdini's(2014) line of thought, the industry is more likely to invest in hydrogen technologies if they find policymakers to be likeable – if they trust, have confidence in and are perceived as credible. The recent observation of an increasing gap between policy goals and policy instruments can represent a challenge for liking, trust, confidence and credibility as it is necessary to overcome the fact that hydrogen is not cost efficient compared to existing technologies.

Authority – the relevance of utilizing authority figures in this context is unclear as the industry often have more expert knowledge than the policymakers. At the same time, authority and credibility are overlapping. An authority coming from an educational background, can have a profession etc. that makes people (and the message they are communicating) credible. Typically, there are strong authorities in larger organizations taking a larger financial responsibility or covers parts of the risks. For instance, EU as an organization having an interest in industrial developments inside the union, is clearly requiring a certain status and authoritytowards national interests. This strengthening attention related to the motivation of the actor and why the investments are sound. Regarding the attention aspect, being implicitly relevant to all of Cialdini's six principles, it clearly represents a powerful tool to clarify expectations the authority has for the industrial actors.

Scarcityis not necessarily as relevant in this context. Although one could argue that some policy instruments target scarcity – public procurements, applications for research funds and grants etc. have an element of scarcity as there are limited funds available and multiple actors are competing for it – creating competition which can increase a sense of urgency. Another possibility is to utilize the urgency of replacing conventional energy sources with carbon-neutral alternatives such as hydrogen and hydrogen derivatives.

This relates to the idea of **unity**– and hydrogen technologies being presented as part of the solution to reduce carbon emissions. It is portrayed as a common goal that is prioritized by national and international policymakers and has been on the agenda consistently for years.

6. Conclusion and Recommendations for Future Research

Cialdini's(2014) principles are relevant because policy communication can be viewed as a form of persuasion. Governments and supranational organizations have developed ambitious plans for a hydrogen future but is dependent on the industry to achieve these visions. In addition to concrete policy instruments such as financial incentives and legal requirements, there are non-tangible conditions that can influence these decisions.

We have viewed hydrogen investments from a risk perspective – arguing that the future of hydrogen is uncertain in terms of timeline, financial viability etc. In addition to policy instruments, policy communication can be a driver for hydrogen investments – and a lack thereof can be a barrier. Assuming that policymakers can dem up for some of the uncertainties through policy communication.

We have explored success criteria for influence and communication and discussed the relevance of these in relation to the current state of hydrogen technologies.Cialdini's six principles for influence overlap with important aspects of risk communication. In future studies, these aspects can be used to structure the collection of empirical data from both policymakers and the industry to get a more thorough understanding of drivers and barriers of hydrogen investments.

Acknowledgement

This research is funded by HyValue partners and the Research Council of Norway (grant number 333151).

References

Ball, Stephen J. 1993. "What Is Policy? Texts, Trajectories and Toolboxes." *Discourse: Studies in the Cultural Politics of Education* 13 (2): 10–17. https://doi.org/10.1080/0159630930130203.

Bertolotti, Mauro, and Patrizia Catellani. 2014. "Effects of Message Framing in Policy Communication on Climate Change." *European Journal of Social Psychology* 44: 474–86.

Chen, Xiaoyu, Lin Zheng, Guotian Cai, Xiaoling Qi, and Jiaxin He. 2025. "Promoting Innovation: Policy Impacts on Global Hydrogen Value Chain." *Renewable and Sustainable Energy Reviews* 223 (November): 116014. https://doi.org/10.1016/j.rser.2025.116014.

Cialdini, Robert. 2016. *Pre-Suasion: A Revolutionary Way to Influence and Persuade.* Simon & Schuster.

Cialdini, Robert B. 2014. *Influence: Science and Practice*. 5th edition. Pearson Education.

Colebatch, Hal. 2009. *Policy*. McGraw-Hill Education UK.

Delpisheh, Mostafa, Iraj Moradpoor, AmirHossein Souhankar, Diamantis Koutsandreas, and Nilay Shah. 2026. "Advancing the Hydrogen Economy: Economic, Technological, and Policy Perspectives for a Sustainable Energy Transition." *Renewable and Sustainable Energy Reviews* 226 (January): 116238. https://doi.org/10.1016/j.rser.2025.116238.

European Commission. 2020. *A Hydrogen Strategy for a Climate-Neutral Europe*. https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf.

Fazeli, Reza, Fiona J. Beck, and Matt Stocks. 2022. "Recognizing the Role of Uncertainties in the Transition to Renewable Hydrogen." *International Journal of Hydrogen Energy* 47 (65): 27896–910. https://doi.org/10.1016/j.ijhydene.2022.06.122.

Guillotin, Arnauld, Claire Bergaentzlè, Virginie Dussartre, Thomas Heggarty, Olivier Massol, and Yannick Perez. 2025. "Hydrogen Subsidies under Three Pillar-Frameworks: A European-United States Multi-Stakeholder Comparison." *Renewable and Sustainable Energy Reviews* 211.

Hettiarachchi, Hiroshan, and Chandrashekar Kshourad. 2019. "Promoting Waste-to-Energy." In *Current Developments in Biotechnology and Bioengineering*. Elsevier. https://doi.org/10.1016/B978-0-444-64083-3.00009-9.

HM Government. 2021. *UK Hydrogen Strategy*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011283/UK-Hydrogen-Strategy_web.pdf.

Howlett, Michael, M. Ramesh, and Anthony Perl. 2009. *Studying Public Policy: Policy Cycles & Policy Subsystems*. Vol. 3. Oxford University Press.

IEA. 2019. *The Future of Hydrogen: Seizing Today's Opportunities*. IEA. https://iea.blob.core.windows.net/assets/9e3a3493-b9a6-4b7d-b499-7ca48e357561/The_Future_of_Hydrogen.pdf.

IEA. 2025a. *Global Hydrogen Review 2025*. https://iea.blob.core.windows.net/assets/a6c466dd-b6f0-44bd-a60a-6940eccfb1c3/GlobalHydrogenReview2025.pdf.

IEA. 2025b. "Low-Emissions Hydrogen Projects Are Set to Grow Strongly despite Wave of Cancellations and Persistent Challenges." IEA, September 12. https://www.iea.org/news/low-emissions-hydrogen-projects-are-set-to-grow-strongly-despite-wave-of-cancellations-and-persistent-challenges.

Kelly, Geoff. 2012. "Sustainability at Home: Policy Measures for Energy-Efficient Appliances." *Renewable and Sustainable Energy Reviews* 16 (9): 6851–60. https://doi.org/10.1016/j.rser.2012.08.003.

Latapí, Mauricio, Brynhildur Davíðsdóttir, David Cook, Lára Jóhannsdóttir, Andrea Marin Radoszynski, and Kenneth Karlsson. 2024. "Hydrogen Fuel Cells in Shipping: A Policy Case Study of Denmark, Norway, and Sweden." *Marine Policy* 163 (May): 106109. https://doi.org/10.1016/j.marpol.2024.106109.

Latapì, Mauricio, Brynhildur Davíðsdóttir, David Cook, Làra Jòhannsdòttir, Andrea Marin Radoszynski, and Kenneth Karlsson. 2024. "Hydrogen Fuel Cells in Shipping: A Policy Case Study of Denmark, Norway, and Sweden." *Marine Policy* 163 (2024).

Medrano-Sánches, Emilio José, and Freddy Antonio Ochoa-Tataje. 2024. "Impact of Green Hydrogen on Climate Change in Peru: An Analysis of Perception, Policies, and Cooperation." *Energy Conversion and Management: X* 24 (2024).

Moretto, Pietro, and Spencer Quong. 2022. "Legal Requirements, Technical Regulations, Codes, and Standards for Hydrogen Safety." In *Hydrogen Safety for Energy Applications: Engineering Design, Risk Assessment, Codes and Standards*, edited by Alexei Kotchourko and Thomas Jordan. Butterworth Heinemann.

Norwegian Government. 2020. *The Norwegian Government's Hydrogen Strategy: Towards a Low Emission Society*. https://www.regjeringen.no/contentassets/40026db2148e41eda8e3792d259efb6b/y-0127e.pdf.

Quitzow, Rainer, Almudena Nunez, and Adela Marian. 2024. "Positioning Germany in an International Hydrogen Economy: A Policy Review." *Energy Strategy Reviews* 53 (May): 101361. https://doi.org/10.1016/j.esr.2024.101361.

Quitzow, Rainer, and Yana Zabanova, eds. 2024. *The Geopolitics of Hydrogen: Volume 1: European Strategies in Global Perspective*. Studies in Energy, Resource and Environmental Economics. Springer.

Quitzow, Rainer, and Yana Zabanova, eds. 2025. *The Geopolitics of Hydrogen: Volume 2: Major Economies and Their Strategies*. Studies in Energy, Resource and Environmental Economics. Springer.

Rand, D. A. J., and Ronald Dell, eds. 2008. *Hydrogen Energy: Challenges and Prospects*. RSC Energy Series. RSC Publishing.

Renn, Ortwin. 2008. *Risk Governance: Coping with Uncertainty in a Complex World*. Earthscan Risk in Society Series. Earthscan.

Reuters. 2025. *Cancelled and Postponed Green Hydrogen Projects*. July 23. https://www.reuters.com/sustainability/climate-energy/cancelled-postponed-green-hydrogen-projects-2025-07-23/.

Singh, Richa, Darragh Doherty, Sewon Lee, et al. 2026. "Insights from an Invited Expert Panel Using a World Café: Establishing a National Human Biomonitoring Programme Communication Strategy." *Environment International* 208 (February): 110040. https://doi.org/10.1016/j.envint.2025.110040.

Skjærseth, Jon Birger, Per Ove Eikeland, Tor Håkon Inderberg, and Marie Lie Larsen. 2024. "Norway's Hydrogen Strategy: Unveiling Green Opportunities and Blue Export Ambitions." In *The Geopolitics of Hydrogen*, edited by Rainer Quitzow and Yana Zabanova.

Slotsvik, Tone N., Brynhild Stavland, and Kjestveit. 2026. "Safety and Security Arguments in Resistance to Ammonia Production Plants: A Case Study from Sauda, Norway." In *Proceedings of the 36th European Safety and Reliability Conference*, edited by José C. Matos, Paulo B. Lourenço, Michael Beer, Daniel Oliveira, and Edoardo Patelli. Research Publishing, Singapore.

Sørensen, Bent. 2005. *Hydrogen and Fuel Cells: Emerging Technologies and Applications*. 1st ed. Sustainable World Series. Elsevier Academic Press.

Statkraft. 2025. "Statkraft Stanser Utviklingen Av Nye, Grønne Hydrogenprosjekter [Statkraft

Stops the Development of New Green Hydrogen Projects].” Statkraft, May 8. https://www.statkraft.no/presserom/nyheter-og-pressemeldinger/2025/Statkraft-stanser-ny-utvikling-av-gr_81nne-hydrogenprosjekter/.

Stavland, Brynhild. 2025. *Safety Regulation in the Context of a Large-Scale Implementation of Hydrogen as an Energy Carrier*. PhD Thesis UiS, No. 865. University of Stavanger. https://uis.brage.unit.no/uis-xmlui/bitstream/handle/11250/3198229/PhD_Brynhild%20Stavland_open.pdf?sequence=4&isAllowed=y.

The Federal Government of Germany. 2020. *The National Hydrogen Strategy*. https://www.bmwk.de/Redaktion/EN/Publikationen/Energie/the-national-hydrogen-strategy.pdf?__blob=publicationFile&v=1.

U.S. Department of Energy. 2023. *U.S. National Clean Hydrogen Strategy and Roadmap*. https://www.hydrogen.energy.gov/clean-hydrogen-strategy-roadmap.html.

Velimirovi•, Ana, Zoran Jovovi•, Siniša Berjan, Hamid El Bilali, and Mohammad S. Allahyari. 2026. “Public Perception of Genetically Modified Organisms (GMOs) in Montenegro: Insight for Sustainable Biotechnology and Policy Development.” *GM Crops & Food* 17 (1): 2620884. https://doi.org/10.1080/21645698.2026.2620884.

Vries, Gerdien de. 2020. “Public Communication as a Tool to Implement Environmental Policies.” *Social Issues and Policy Review* 14 (1): 244–72. https://doi.org/10.1111/sipr.12061.

Ward, S. C., C. Bagley, T. Lumby, T. Hamilton, P. Woods, and A. Roberts. 2016. “What Is ‘Policy’ and What Is ‘Policy Response’? An Illustrative Study of the Implementation of the Leadership Standards for Social Justice in Scotland.” *Educational Management Administration & Leadership* 44 (1): 43–56.

Wolf, Andre. 2025. “Public Support for the Roll-out of Renewable Hydrogen in Europe: A Real Options Perspective.” *International Journal of Hydrogen Energy* 97 (2025): 1440–52.

Xu, Haonan, and Ruoxuan Xu. 2025. “How to Enhance Public Acceptance and Intentions towards Biodiesel Technology: The Roles of Environmental Motivation, Trust, and Perceived Effects.” *Sustainable Futures* 10 (2025). https://doi.org/10.1016/j.sftr.2025.101195.

Yap, Jiazhen, and Benjamin McLellan. 2023. “A Historical Analysis of Hydrogen Economy Research, Development, and Expecations, 1972 to 2020.” *Environments* 10 (11). https://doi.org/10.3390/environments10010011.