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May 27-29, 2026 - Island of KOS, Greece

#	**Vassiliki Missa** Chemical Engineer, Msc	
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Presentation title:	**Health and Safety Challenges Across the Hydrogen Value Chain: A Comprehensive Review**	

Following the global oil crisis, hydrogen has emerged as a promising alternative energy source, particularly with the rapid expansion of renewable energy sources (RES) in the late 2020s, enabling the large-scale production of green hydrogen derived from RES. Today, hydrogen has both established and emerging applications across several operational sectors, as well as in clean transport fuels, building heating, power generation, and energy storage. In line with Europe's overarching goal of decarbonization, hydrogen—especially green hydrogen produced via water electrolysis powered by RES—represents a viable substitute for fossil fuels, in contrast to hydrogen derived from carbon-emitting processes. However, despite significant technological advancements, the hydrogen value chain poses distinctive Health, Safety, and Environment (HSE) challenges that require systematic analysis to ensure safe and sustainable operations. This study presents a comprehensive literature review of HSE risks associated with hydrogen use in various technical applications, conducted within the framework of an EU-funded project which focuses on enhancing resource efficiency in process operations through a holistic approach that integrates process intensification and digital technologies across the pre-processing, processing, and post-processing stages. The present review examines safety considerations throughout the four main stages of the hydrogen life cycle: production, storage, transportation and distribution, and utilization. Hydrogen production methods include water electrolysis, natural gas reforming, and thermochemical or biological processes. The predominant safety concerns during production relate to hydrogen's intrinsic flammability and explosiveness, particularly when electrical energy is involved. Hydrogen storage—whether as a compressed gas, cryogenic liquid, or within solid materials such as metal hydrides—presents further challenges concerning containment, leakage prevention, and pressure control. Its transportation and distribution demand specialized infrastructure and strict safety protocols due to hydrogen's low density and high diffusivity. Finally, during utilization, hydrogen's conversion into heat or power introduces additional fire and explosion risks in the presence of ignition sources. Overall, the findings underscore the necessity for advanced HSE management strategies across the hydrogen value chain. Addressing these challenges through systematic assessment and preventive measures is essential to ensuring that hydrogen technologies contribute safely and effectively to Europe's decarbonization goals.

Short CV:

Mrs. Vassiliki Missa is a Chemical Engineer and Managing Director of EUROCORE, the Brussels-based entity of GEP Group. With over 20 years of experience in occupational health and safety and European research and innovation, she works at the intersection of industry, research, and policy. Her work focuses on ensuring that emerging technologies are developed and implemented in a safe, sustainable, and operationally effective way.

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CV:	

Vassiliki Missa is a Chemical Engineer and Managing Director of EUROCORE, the Brussels-based entity of GEP Group, focusing on research, innovation and European collaborations.

She has more than 20 years of experience in occupational health and safety, environmental management, and European research and innovation projects. A significant part of her career has been closely linked with the National Technical University of Athens (NTUA), where she has participated in and managed numerous EU-funded projects in areas such as energy systems, advanced materials, circular economy and environmental technologies.

Her work spans the full lifecycle of European projects, including proposal development, coordination and implementation, with a strong emphasis on translating research outcomes into practical applications. She has contributed to projects addressing topics, such as sustainable construction materials, water systems and resource efficiency, working at the interface between academia, industry and policy.

At EUROCORE, she leads activities that connect innovation with real-world industrial needs, ensuring that emerging technologies are developed and implemented in a way that is safe, compliant and operationally effective.

Her expertise lies in bridging research and practice, supporting organisations in managing technological change while maintaining high standards of safety and sustainability.