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2021 WORLD FUEL CELL CONFERENCE

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Name	Professor Dr. Detlef Stolten	
Affiliation	Juelich Research Center, Director of the Institute of Techno-Economic Systems Analysis (IEK-3)	
Invited Plenary Lecture		
Presentation Title	Hydrogen Becoming a Commodity: A Requisite for Future Carbon-neutral Energy Systems Getting Reliable and Affordable	
Abstract (Approximately 200 words)	<p>Owing to ever more palpable climate change and its economic consequences there is a worldwide ambition to making energy systems renewable. The main pillars are photovoltaics, windmills, to a lesser degree bio sources and hydropower. The first technologies provide cheap but fluctuating electricity; and areas of extremely high insulation or average wind speeds generally are sparsely populated for good, though exactly these reasons can provide cheap electricity. Hence, converting this electricity to a storable gas like hydrogen and transport it to highly populated regions - which represent energy sinks - is an important strategy to making the future renewable energy system affordable and reliable. Furthermore, it reduces the energy storage requirements for compensating sustained lulls of renewable energy. This talk will link a study on German energy provision resulting into 13 million tons of hydrogen to be imported with one on international hydrogen production, outlining the technologies, cost and casting a light on societal aspects and requirements to make such projects happen in the countries of origin. As for the production of hydrogen detailed studies have been conducted for over 20 regions worldwide. This comprises the placing of the renewable energy, selecting the necessary infrastructure means including water supply for electrolysis and evaluating the cost for production and shipping. The approach, select specific results and lessons learned will be presented.</p>	
Biographical Sketch (Approximately 200 words)	<p>Professor Dr. Detlef Stolten is the director of the Institute of Techno-Economic Systems Analysis (IEK-3) at the Juelich Research Center, Germany, and chair for fuel cells at RWTH Aachen University since 2000. His research focuses on electrochemistry and process engineering for different types of fuel cells and electrolyzers. Energy systems analysis and energy strategy form a new research topic since 2010. It focuses on interconnecting the energy sectors and the role of storage encompassing gas and electric grid modeling, renewable power input, transportation energy requirements and storage via hydrogen, methane, LOHC and other options incl. renewable hydrogen production via electrolysis. For 12 years he worked in the industry with Bosch and Daimler Benz/Dornier. He is chairman of the Executive Committee of the Technology Collaboration Program 'Advanced Fuel Cells' of the International Energy Agency, Vice President of the International Association of Hydrogen Energy, member of the advisory board of the society Process and Chemical Engineering of the Association of German Engineers, member of the supervisory board of the Wuppertal Institute for Climate, Environment and Energy and member of the scientific advisory board of the Max Planck Institute for Dynamics of Complex Technical Systems. He published over 340 scientific articles and edited six books on the topics of hydrogen, fuel cells, carbon capture and on the transition to renewable energy systems.</p>	