



## NL-IL Mini-Symposium on Green Hydrogen Production

Date: 29 April 2021 11:00-13:00 IL time / 10:00-12:00 NL time

Location: Online, via Zoom

Registration: <https://www.eventbrite.com/e/dutch-israeli-mini-symposium-on-green-hydrogen-production-and-electrolyzers-tickets-140278112611>

Link to YouTube Live: <https://youtu.be/MnipNtd1vK8>

### Background:

Clean hydrogen production is the focus on the second Dutch Israeli mini symposium on hydrogen and renewable energy. Topics to be covered include the entire hydrogen value chain, solar energy as a source for green hydrogen, scaling up of electrolyzers, decoupled water splitting. Special attention will be devoted to bi- and multi-lateral R&D cooperation through Horizon Europe and FCH-JU.

### Program

IL time (10:00 NL time)

- 11:00-11:05 **Welcome notes**
- Dr. [Racheli Kreisberg](#), Innovation Attaché, Netherlands Embassy in Israel and Israeli Dutch Innovation Center ([IDIC](#))
  - Dr. [Mark Boneschanscher](#), Managing Director, Eindhoven Institute for Renewable Energy Systems
- 11:05-11:35 **A system perspective on hydrogen**  
Prof. [Ad. Van Wijk](#), professor of Future Energy Systems, Technical University of Delft
- 11:35-11:50 **New solar energy technology 24/7/365**  
[Doron Tamir](#), Co-founder of Luminescent Solar Power
- 11:55-12:10 **Scaling up of electrolyzers**  
Dr. [Thijs de Groot](#) (Nouryon & Eindhoven University of Technology)
- 12:10-12:25 **Scaling up of decoupled water splitting at H2Pro**  
Prof. [Gideon Grader](#), [H2Pro](#)
- 12:30-12:45 **Key technology challenges for electrolyzers and the route for upscaling and possibilities for cooperation**  
[Lennart van der Burg](#), TNO
- 12:45-13:00 **Discussion and action items**



## Biosketches and Information on Companies and Organisations

### Dr. Mark Boneschanscher



Mark Boneschanscher is the managing director of the Eindhoven Institute for Renewable Energy Systems (EIRES). He believes that both science and industry have a crucial role to play in the energy transition. He is therefore actively involved in setting up both scientific as well as public-private collaborations in EIRES. His goal is to speed up the energy transition by industrialization of innovative renewable energy systems.

### Lennart van der Burg



Lennart van der Burg is a hydrogen expert and as business development manager green hydrogen responsible for the hydrogen R&D development program within TNO. In 2020 only, the program contains more than 50 projects related to hydrogen production, transportation, storage and application. Lennart is also leading the Power-2-Hydrogen program line of the Shared research initiative VoltaChem. Here we work together with industry on the improvement of water electrolyzers with respect to cost, performance and upscaling. Lennart has a strong dedication to tackle climate change and is besides TNO active as a local councillor and as a social entrepreneur on sustainable lifestyle. Lennart has over 10-year experience in the renewable energy and water technology sector and has a master degree in environmental economics and water management.

**TNO** is the Dutch applied research organisation where over 3,400 professionals creating innovations that boost the sustainable competitive strength of industry and well-being of society. Please visit our website and look at our current Hydrogen innovations. TNO is one of the leading applied research institutes in the field of hydrogen. More than 15 research departments spread over 5 units are collectively working on innovations along the entire hydrogen value chain from production to infrastructure, storage and final applications. We bring engineers, business analysts and social scientists together to create insights into the future of hydrogen technologies. TNO is involved in over 50 hydrogen related projects. From developing new materials in our Faraday lab to work on pre-feasibility and engineering studies for large scale deployment in project such as North2 and the Gigawatt project.

### Prof. Gideon Grader, H2Pro



Prof. Grader joined the Technion Faculty of Chemical Engineering in 1990. In 2007, he became the Founding Director of the Nancy and Stephen Grand Technion Energy Program (GTEP), a position he held until 2015. The Center aims to ensure the university's role as a key player in energy research. Prof. Grader has served as the department's Dean 2016-2019. Prof. Grader's research focuses on the development of ceramics for energy applications, combustion of non-carbon fuels and hydrogen generation. His recent research centers on creating new ways to produce hydrogen from water by advanced



electrolysis methods. In cooperation with Prof. Rothschild from the Material Science department, he developed an innovative way to simplify the process and save about 25% in the energy required to produce the hydrogen. Their results were patented and published in Nature Materials in 2017 and Nature Energy in 2019. A new Technion startup company, H2Pro, was launched in 2019 to commercialize this technology. In 2020 H2Pro won 1st place in the Shell new Energy Challenge competition. Born in Jerusalem, Prof. Grader received his bachelor's degree in chemical engineering from the University of California, Berkeley, where he graduated first in his class in 1982. He received his doctorate in chemical engineering from California Institute of Technology in 1986. From 1987 to 1989, he was a member of the technical staff of the Ceramic Materials Department at the AT&T Bell Laboratories in New Jersey, where he also spent a sabbatical year as a visiting scientist in 1996. Prof. Grader's work has been recognized with a number of awards, including the Kenneth T. Whitby Award, an Alon grant, the Goldberg Prize for Excellence in Research, the Hershel and Hilda Rich Technion Innovation Award, and the Henry Taub Prize for Excellence in Research. In 2020 Prof. Grader and Prof. Rothschild won Israel Prime Minister Eric and Shelia Samson Prize in oil alternatives.

**H2PRO:** H2PRO was founded in 2019 by leading hydrogen experts from the Technion (Israel Institute of Technology): Dr. Hen Dotan and Profs.



Gideon Grader and Avner Rothschild in collaboration with the team that founded Viber, Juno and iMesh. The company's mission statement is to enable the wide scale adoption of sustainable hydrogen fuel by

introducing a novel production technology. H2PRO is based on years of research by the founding team at the Technion, which resulted in development of E-TAC (Electrochemical, Thermally Activated Chemical) water splitting - H2PRO's core technology.  
<https://www.h2pro.co/>

#### Dr. Thijs de Groot



Thijs de Groot has a broad chemical engineering knowledge, especially in process design, physical properties and separation science. In his industrial career he has led projects on the production of sustainable methanol (from carbon dioxide and hydrogen), the production of organic carbonates and the capture of carbon dioxide. These projects were typically carried out in combination with knowledge institutes and/or universities and resulted in six patent applications. In a more recent project of AkzoNobel and TU/e he has investigated spinning disk technology to radically reduce equipment size in the chlor-alkali business of AkzoNobel. This resulted in two patent applications and a few publications. In his academic research Thijs focuses on the intensification of electrochemical processes to enable operation at higher current densities and pressures. Achieving this would enable more cost-effective electrochemical processes. The intensification requires a combination of different disciplines, including electrocatalysis, membrane science, chemical reactor engineering and computational fluid dynamics. Current work is focused on the evaluation of different cell designs, membranes, and high temperature and pressure operation for both chlor-alkali electrolysis and alkaline water electrolysis.



**Nouryon** (formerly AkzoNobel Specialty Chemicals) is the Industries worldwide rely on essential chemistry in the manufacture of everyday products such as paper, plastics, building materials, and personal care items. Nouryon has about 10,000 employees and operates in over 80 countries around the world.





### Dr. Racheli Kreisberg



Dr. Racheli Kreisberg serves since January 2016 as the Innovation Attaché of the Holland Innovation Network, Ministry of Economic Affairs, at the Netherlands Embassy in Israel. She is responsible for developing R&D and business collaborations between Dutch and Israeli companies, Universities and research institutions. Her work is focused on the High-Tech Systems and Materials (HTSM) top-sector, i.e., photonics, robotics, cyber, agro-tech as well as the Life Science and Agro&Food top sectors. Prior to this position she managed her own consultancy company that specialized in the initiation and management of collaborative EU research projects and she serves as an evaluator of the EU. Dr. Kreisberg was the Head of the Bioinformatics Unit of Tel Aviv University between 1998-2005. Dr. Kreisberg holds a PhD in Biotechnology and Molecular Microbiology from Tel Aviv University (TAU), an Executive MBA from TAU, an MSc in Chemistry (summa cum laude) from the Technion Israel Institute of Technology.

### Doron Tamir, co-founder Luminescent



Mr. Doron Tamir is one of the Israeli pioneers in utility-scale solar energy deployment, with involvement in hundreds of MW of installed plants worldwide (partner of EDF EN 2009-2019). Doron is the Co-founder of Luminescent a new solar technology that can generate 24/7 solar electricity.

**Luminescent**, a PV/CSP hybrid, generates electricity and heat simultaneously through one receiver. Luminescent enables 40% conversion efficiency, with 20% coming from the PV and the other 20% from the heat that is stored and converted to electricity using its heat engine. Luminescent offers an affordable and reliable source of energy generation. Its new technology can bring true 24/7/365 solar solutions with a low LCOE of .04 cents. Luminescent can provide a source of green energy for the electrolyzer that requires high load factor electricity to produce green hydrogen at the cost of grey hydrogen.

Luminescent combines expertise from both academia and the solar industry, including Prof. Carmel Rothschild, head of an optical engineering course; and Mr. Doron Tamir, a solar energy developer with over 500 MW of PV experience. After five years of R&D, the company is now able to build a real base-load solar solution. In Q1 2021, it will prove the basic concept of Luminescent, which has been chosen as the most important solar energy concept in 2016 by the Optical Society of America (OSA), with patent number US2015/0171251. Luminescent is currently building a lab-scale 20 kW output power of LSP pilot system, with the goal of proving the potential for 40% efficiency.

### Prof. Ad van Wijk, Future Energy Systems at TU Delft



Ad van Wijk is part-time Professor Future Energy Systems at TU Delft, the Netherlands. He is guest professor at KWR Water Research Institute to develop and implement the research program Energy and Water. He is special advisor to Hydrogen Europe, representing European industry, national associations, and research centers to develop European hydrogen policies with the EU commission. He is hydrogen ambassador at the 'New Energy Coalition' to realize the green hydrogen economy in



the Northern Netherlands. And he holds several advisory and supervisory board positions. Van Wijk has studied physics and did his Ph-D on Wind Energy and Electricity Production at Utrecht University in the Netherlands. He worked as a Researcher and Associate Professor, between 1983 and 1997 in the Department of Science, Technology and Society at Utrecht University. In 1984, van Wijk founded the company Ecofys, which eventually grew into Econcern. Econcern developed many new sustainable energy products, services and projects. Examples include the 120 MW offshore wind farm Princess Amalia in the North Sea, several multi-MW solar farms in Spain, a solar cell manufacturing plant Solland and a bio-methanol plant in the Netherlands. Since 2011 van Wijk is appointed as professor Future Energy Systems at TU Delft. His research focuses on the energy systems of the future. Especially he will do research on hydrogen energy systems and fuel cell cars and has realized “the Green Village” at the TU Delft campus. Van Wijk achieved many important prizes for excellent entrepreneurship. Amongst others he was Dutch entrepreneur of the year in 2007 and Dutch top-executive in 2008. Van Wijk was honored by KWR, by appointing him Honorary Fellow in 2018.