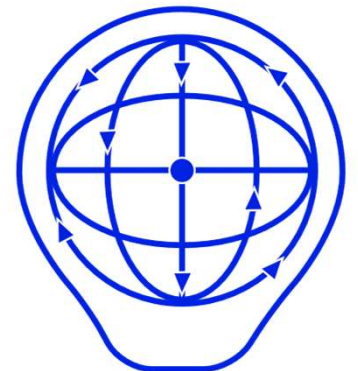


# Netherlands Innovation Network

Connecting Innovation Worldwide

## NL East Med H2 Opportunities

Racheli Kreisberg, PhD, [racheli@nost.org.il](mailto:racheli@nost.org.il)



Netherlands  
Innovation  
Network

## Who am I?

- ▶ Innovation Attaché, NL embassy in IL (2016-)
- ▶ EU collaborative research projects (2004-2017)



Born in NL



Immigrated to IL



Dutch Israeli H<sub>2</sub> projects



# NL Innovation Policy and Energy

- ▶ Energy transition societal challenge
- ▶ Energy top sector - public private partnership
- ▶ Mission Driven Innovation Policy

- ▶ 55% reduction of national greenhouse gas emissions by 2030 aiming for no CO<sub>2</sub>-related emissions by 2050 compared to 1990;
- ▶ An entirely carbon-neutral / climate neutral electricity system by 2050.
- ▶ A carbon-neutral / climate neutral built environment by 2050.
- ▶ Carbon-neutral industry with reuse of raw materials (circular economy).
- ▶ Zero-emission mobility of people and goods by 2050.
- ▶ A sustainable and completely circular economy by 2050, with resource use halved by 2030.





## Innovation Attache Activities

- ▶ Develop bilateral innovation opportunities
  - ▶ Organize missions to and from NL
  - ▶ Scout for IL technology for NL MultiNationals (MNEs)
  - ▶ Search for NL and/or IL partners for EU projects
  - ▶ Transfer knowledge between NL and IL
- 

# Focus on Hydrogen



<https://www.youtube.com/watch?v=zdcyMMuliHs>

## NL IL Hydrogen Activities in Israel 2020-2023

- ▶ Basic H<sub>2</sub> course (Sep 2020) & Dutch Israeli Mini Symposia (2021)
- ▶ Dutch Hydrogen Valley (H<sub>2</sub>V) Summer School (August 2021)
- ▶ IL H<sub>2</sub> delegation to NL (May 2022)
- ▶ Horizon Europe and FCH-JU calls (small-scale H<sub>2</sub>V) (April 2023)
- ▶ NL H<sub>2</sub> delegation to IL (June 2023)
- ▶ Israeli Women in Green Hydrogen event (June 2023)

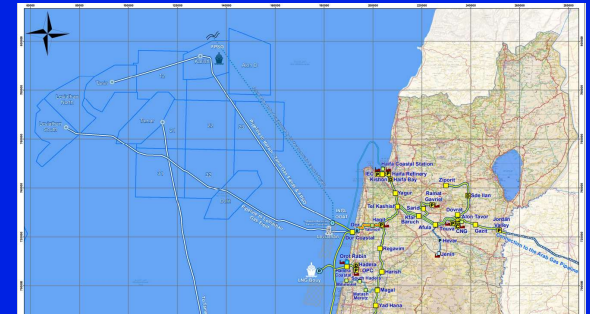


# NL IL Hydrogen Agreements

- ▶ Agreement signed between Gasunie and INGL to develop IL's hydrogen infrastructure (Aug 2022)
  - ▶ Benchmarking with EU experience
  - ▶ INLG's specific opportunities and challenges
  - ▶ Hydrogen system planning



Master Plan headlines		
<b>Technical GASUNIE</b>	<b>Regulatory INGL / NGA</b>	<b>Business Strategy TASC</b>
<ul style="list-style-type: none"><li>• Benchmarking with European experience</li><li>• INGL's specific opportunities and challenges</li><li>• Hydrogen system planning</li></ul>	<ul style="list-style-type: none"><li>• INGL's License</li><li>• Permitting</li><li>• Standardization</li></ul>	<ul style="list-style-type: none"><li>• Market evaluations</li><li>• INGL's business model</li></ul>



## Beyond the NL IL cooperation – NL Eastern Mediterranean Cooperation

- [TEL] Energy related activities (i.e., hydrogen, natural gas) were mutually beneficial to both countries: IL provided NL with innovation, access to natural gas, desalination technologies, cybertech and a foothold in the MENA region for international cooperation. NL provided IL with knowledge, infrastructure, technology, and consulting services.

**ECONOMIC  
PLAN**

- ▶ IL serves as **gateway** between **green H<sub>2</sub>** producing Gulf countries and Europe/NL through IL seaports and/or Mediterranean gas pipelines





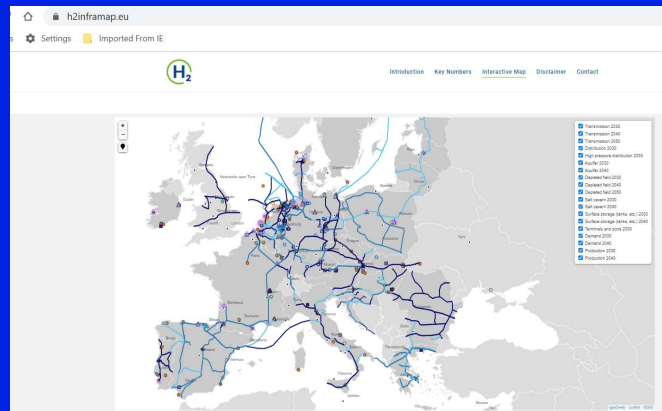
## Natural Gas Infrastructure in East Med Basin

- ▶ EastMed-Poseidon pipeline - supported by Israel, Cyprus, and Greece, would guarantee alternative supplies for Europe, which is weaning itself off Russian piped gas
- ▶ Chevron CEO announces Israel gas pipeline could supply Europe with NG (March 2022, Greekcitytimes.com )



# Hydrogen Infrastructure in Europe

- ▶ The REPowerEU Plan aimed at reducing dependence on Russian fossil fuels and speed up the green transition
- ▶ REPowerEU set a target of 10 million tonnes of domestic renewable H<sub>2</sub> production and 10 million tonnes of imports by 2030



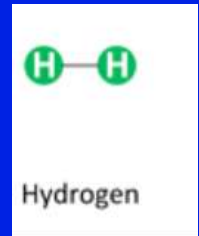
# Hydrogen Maritime Transport - Shipping



## ▶ Liquid form

▶ Pros: no need to convert

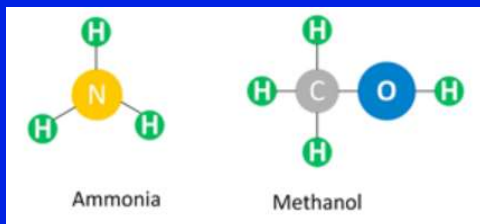
▶ cons: liquefaction consumes ~33% of H<sub>2</sub>



## ▶ H<sub>2</sub> derivatives (i.e., ammonia, methanol, LOHC )

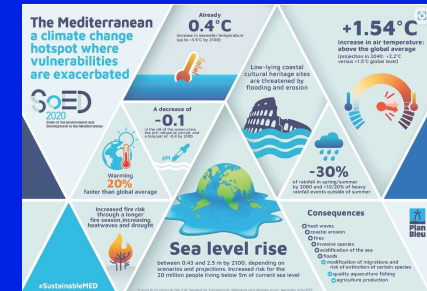
▶ pro: cheaper, lower volatility, easier storage, NH<sub>3</sub> as feedstock

▶ Cons: (re)conversion costs at origin and destination



# The MENA region and Climate Challenge – a regional need for clean energy

- ▶ MENA is home to more than 510 million people
- ▶ MENA is warming 20% faster than global average
- ▶ MENA Coastal zones face disaster risks:
  - ▶ flooding and erosion
  - ▶ salinization of river deltas and aquifers



## The MENA region and Climate Challenge – a regional need for clean energy

### ▶ Reduced precipitation

- ▶ 2° C global warming -> reduce precipitation by ~10-15%
- ▶ 2-4° C -> reduce precipitation by up to 30% in Southern Europe



### ▶ Sea water temperature increase

- ▶ expected rise between 1.8° C and 3.5° C by 2100
- ▶ temperature hotspots in Spain and in in the East Med

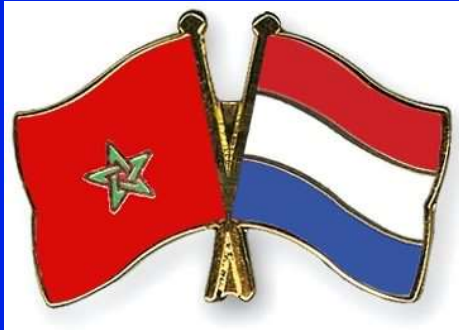




# The Role of large MENA countries

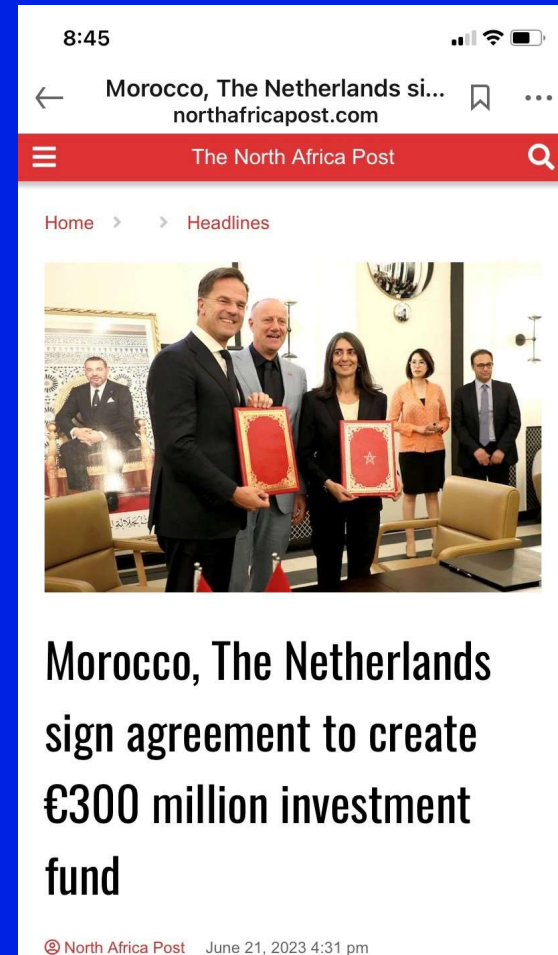
- ▶ Producing and transporting green hydrogen





# Morocco

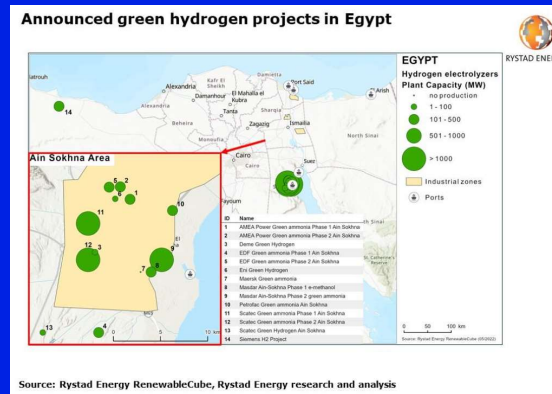
- ▶ NL Morocco sign 300 ME investment fund - hydrogen (June 2023)
- ▶ **H2 Production:** green hydrogen production facilities





# Egypt

## Green H2 projects in Egypt



## Hydrogen summit 13-14 Sep 2023

egpythydrogen2023.com

Official Supported by: Egyptian Ministry of Planning, Egyptian Ministry of Economic Planning, Egyptian Ministry of Energy, Egyptian Ministry of Petroleum & Mineral Resources, Egyptian Ministry of Industry, Trade & Economic Cooperation

Strategic Partner: HYDROGEN EGYPT

an event of: ENERGY REFORM EGYPT

HOME AGENDA EXHIBITION SPONSOR PAST HYDROGEN VENUE REGISTER Media

**The Largest Events for Hydrogen Leaders in Egypt and Africa**

13-14 September, 2023 | The Nile Ritz-Carlton, Cairo

- 2 Day Conference +
- 2000+ Attendees
- 65+ Speakers
- 500+ Participants
- 150+ Government Officials
- 40+ Exhibitors
- 500sqm+ Exhibition Floor

# Egypt

- ▶ **Signing** of Egypt's first green H2 facility in the Suez Canal Economic Zone and the first integrated green hydrogen plant in Africa at **COP27**



- ▶ **Investment:** European Bank for Reconstruction and Development (EBRD) **US\$ 80 million loan** to develop the Egypt's first green hydrogen facility



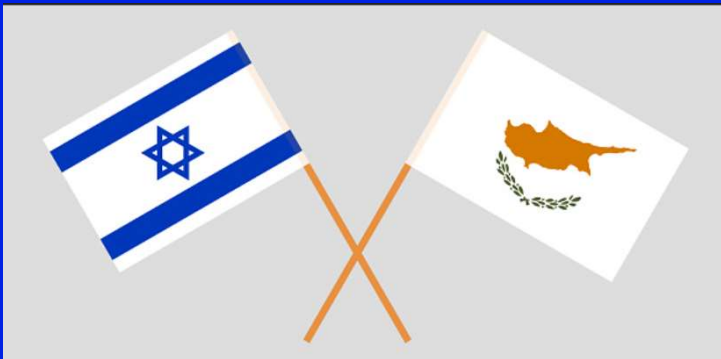
## Saudi Arabia

- ▶ MoU between NL and Saudi Arabia during the World Hydrogen Summit (WHS) in Rotterdam (May 2023)
- ▶ NL as partners for transferring the hydrogen to Europe
- ▶ **Investment:** NEOM Green Hydrogen Company (NGHC) \$8.4 billion agreement with banks and investment firms for a green H<sub>2</sub> production facility



## The Role of Small EastMed Countries

- ▶ Energy relations between CY and IL are strong and being further developed



Israeli Energy Minister Israel Katz with Energy Minister George Papanastasiou on Gas pipeline from Israel to Cyprus ([June 2023](#))

# Israel

## ▶ Innovation - Startup Nation



- ▶ Green H2 production (H2Pro, Hydrolite, QD-Sol)
- ▶ CCUS - Aerovation
- ▶ NH3 as H2 carrier (GenCell)

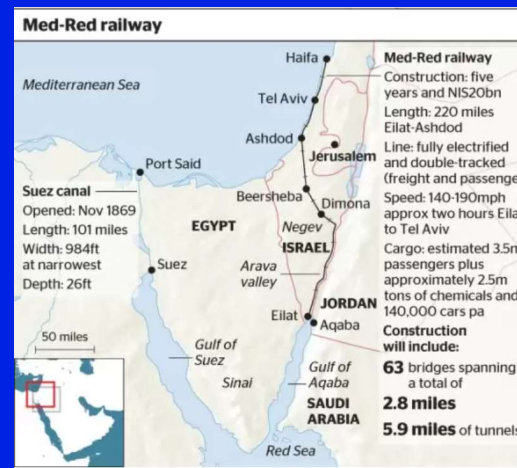
### QD-SOL wins Aviram Foundation startup competition in Morocco

The Israeli company fights climate change by developing technology to produce green quantum hydrogen. Second place went to Israeli startup Carbon Blue, which removes CO2 from oceans instead of the atmosphere

Andre Tabacof 12.03.18.05.23

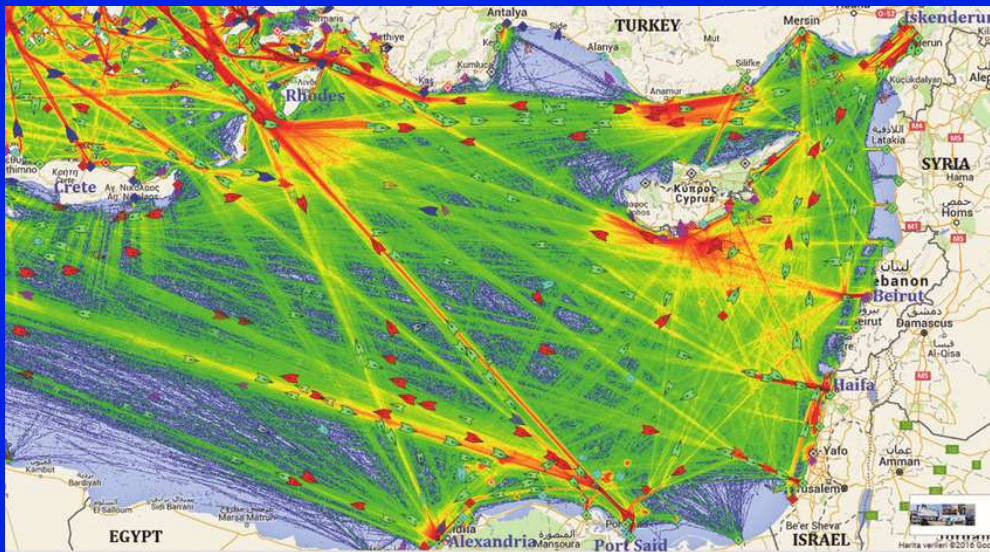
# Israel & Abraham Accord

## ▶ Corridor between the Gulf Countries and Europe



# Cyprus

- ▶ Refueling of ships travelling in the Mediterranean basin



# Concrete Offer

## ▶ Gasunie hydrogen seminar



### About the seminar

This seminar will focus on the complete value chain/eco system of hydrogen based green energy. Our key experts will guide you through the options of each steps along the value chain. The following topics will be addressed in a structured fashion:

- **Features of hydrogen:**
  - › Physical properties
  - › Hydrogen as an energy carrier
  - › Safety aspects of hydrogen
- **Hydrogen demand:**
  - › Consumer categories (Industrial, power production, households)
  - › Fuel switch options
- **Hydrogen supply:**
  - › International H<sub>2</sub> value chain
  - › Hydrogen production: electrolysis
  - › Import: pipeline and/terminals
- **Transport:**
  - › New pipelines versus retrofit of existing gas pipelines
  - › Compression
  - › Storage
- **Commercial:**
  - › Integration with other fuels and electricity
  - › To blend or not to blend
  - › Hydrogen market and (commercial) regulatory models
- **Development of technical regulation, certification and standards**
- **System integration: thinking in energy needs rather than electricity or gas.**

We provide this as a 1,5 day seminar which we can provide to you on-site.

**gasunie**  
infrastruktur







## Contact Details

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