

## Trends and challenges in the development of the Israeli energy sector

**Dr. Amit Mor**

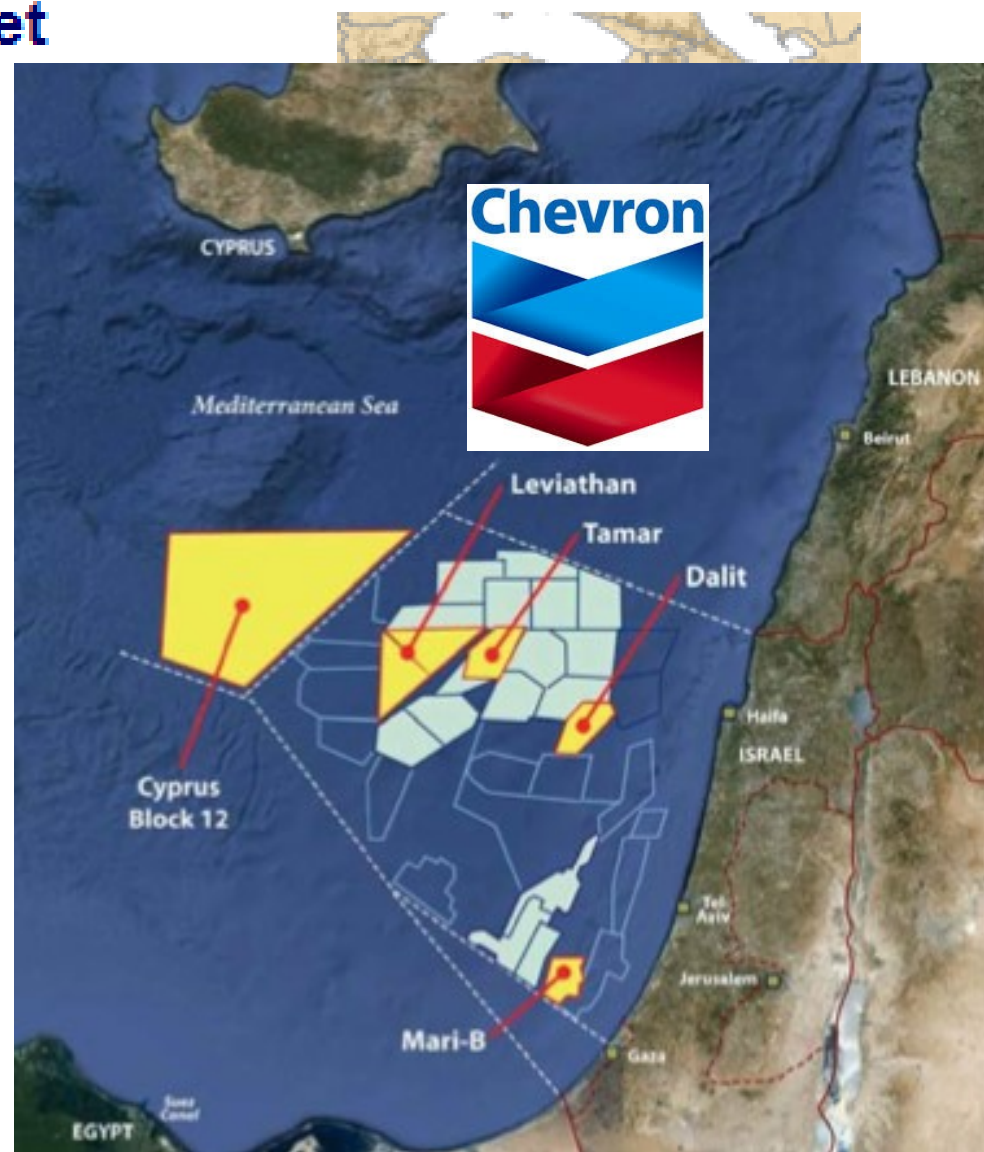
**CEO, Eco Energy Financial & Strategic Consulting**  
**Senior Research Associate, The Institutes of Policy & Strategy**  
**Senior Lecturer, Reichman University and the Technion**

**IENE, Thessaloniki, May 25, 2023**

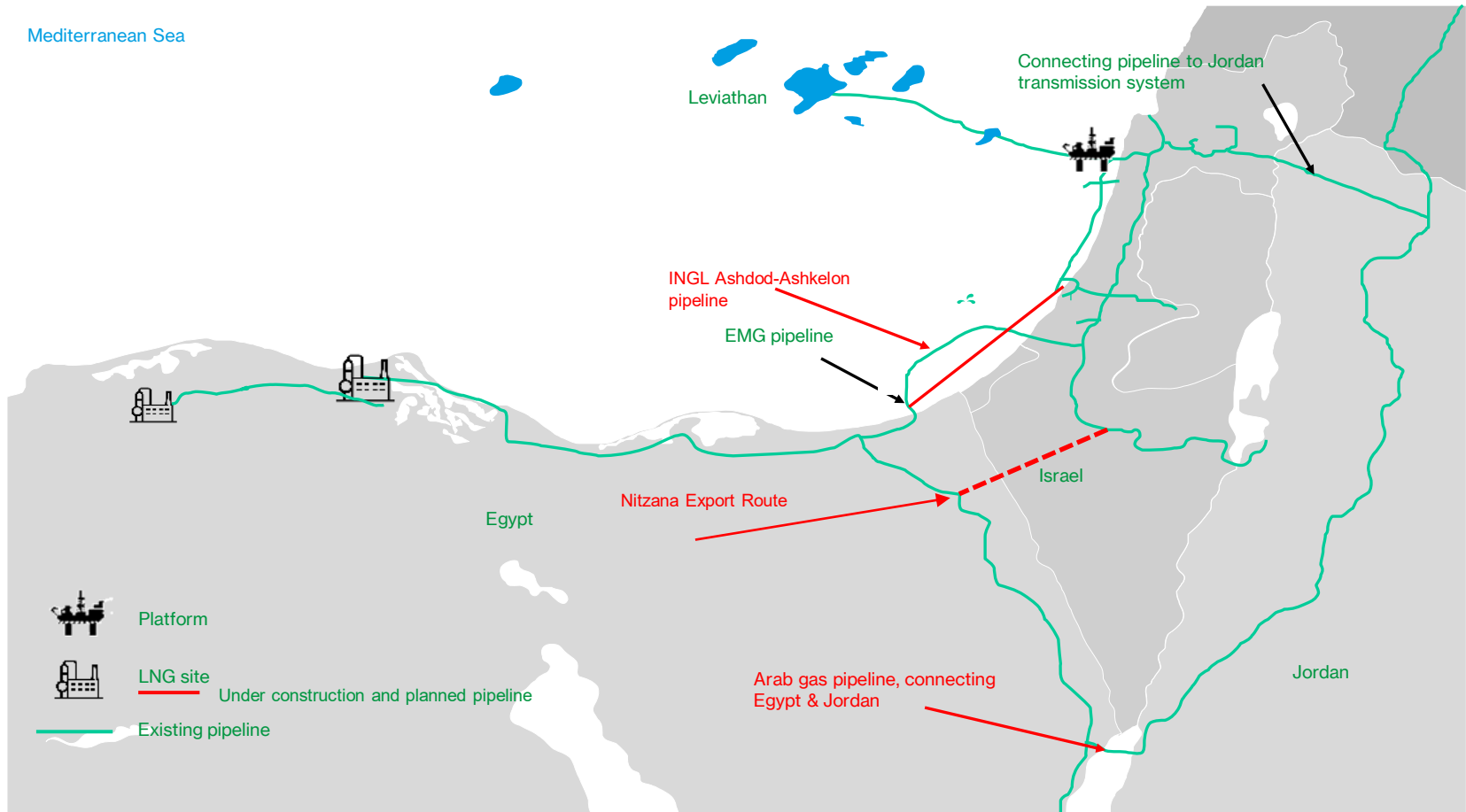


# Significant recent natural gas discoveries offshore Israel by Noble Energy and its Israeli partners totaling **35** trillion cubic feet

- ▶ Noble Energy came to Israel in the late '90s
- ▶ Noa discovered in 1999, Mari-B in 2000
- ▶ Andromeda drilled in 2001, Hanna in 2003, each dry holes
- ▶ Acquired more permits and licenses in 2006-2008, conducted additional seismic surveys
- ▶ Tamar and Dalit discovered in 2009
- ▶ Leviathan discovered in 2010
- ▶ Leviathan appraisal, Tamar development drilling, continued exploration in 2011



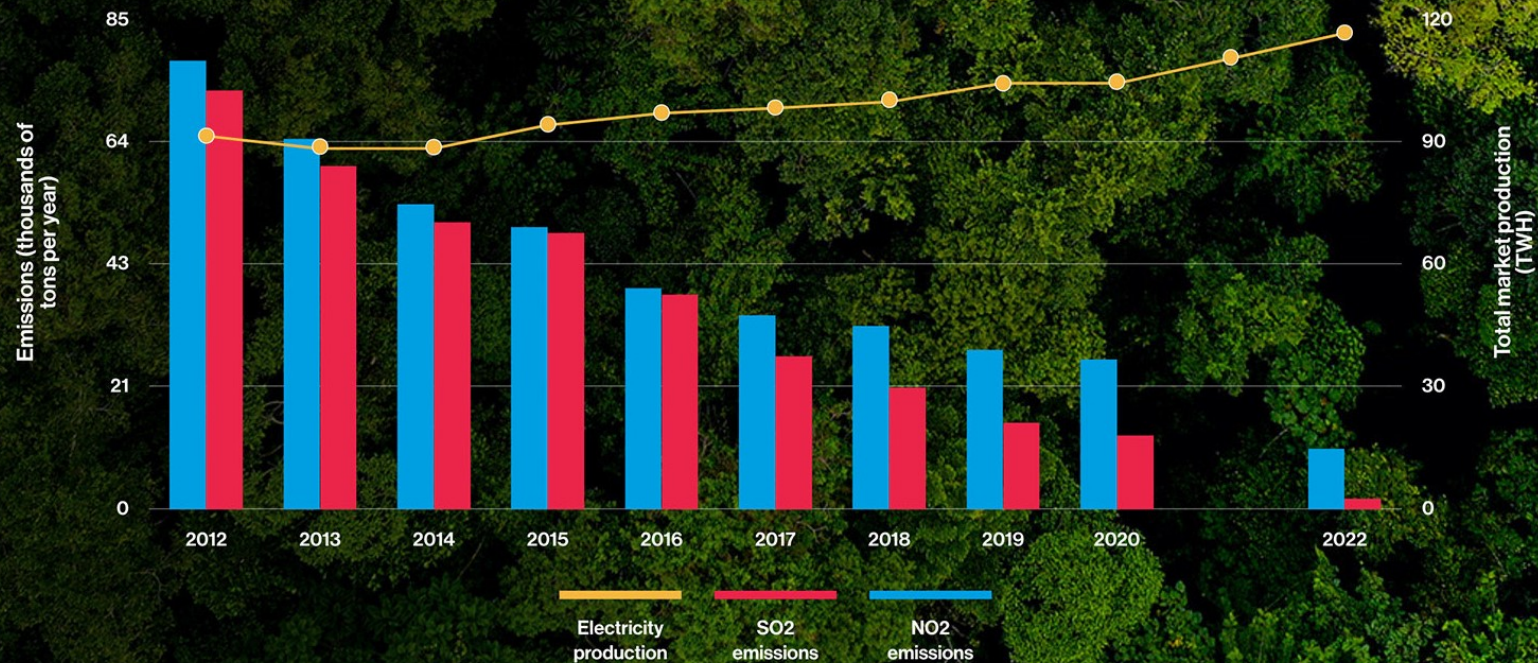
# Regional Gas Connectivity Update





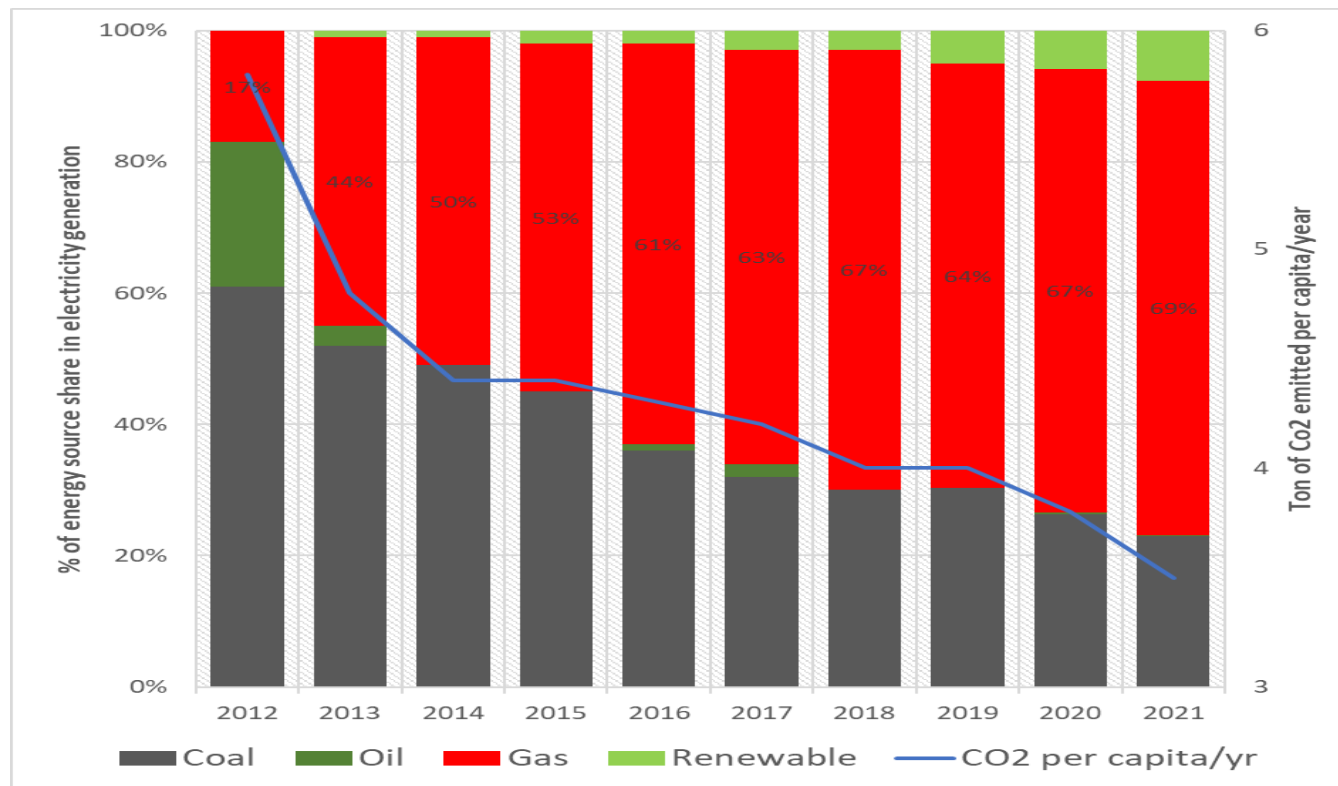
# A Dramatic Drop in Pollutant Emissions

In the power sector

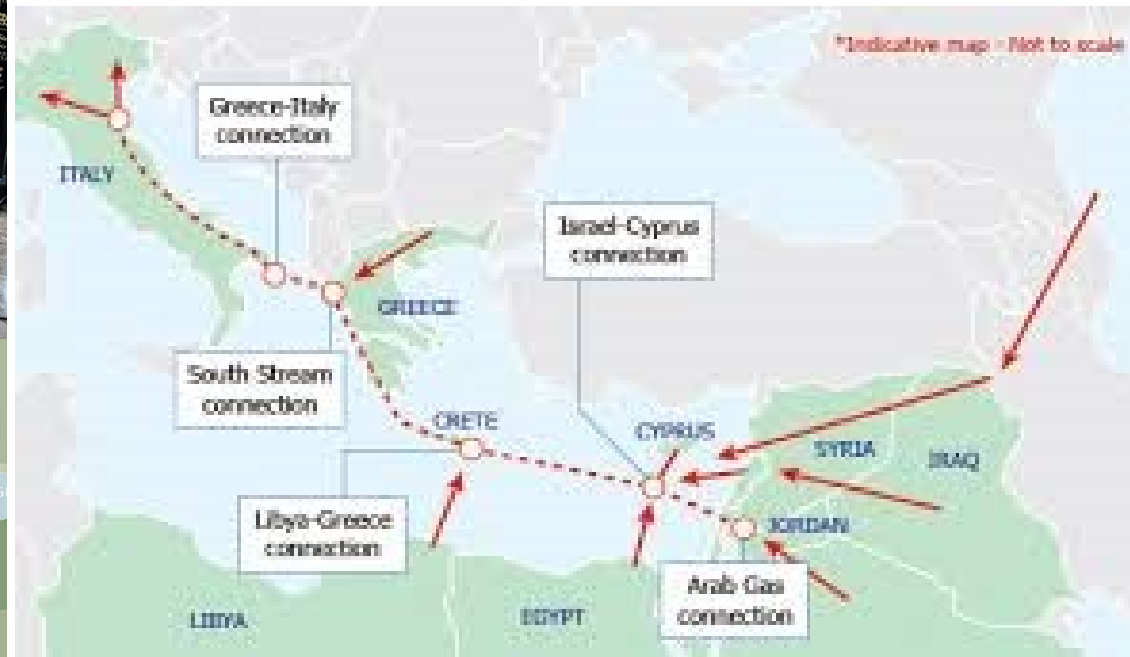




## Leading Role in Decarbonizing the Region – Israel CO<sub>2</sub> Emission per Capita



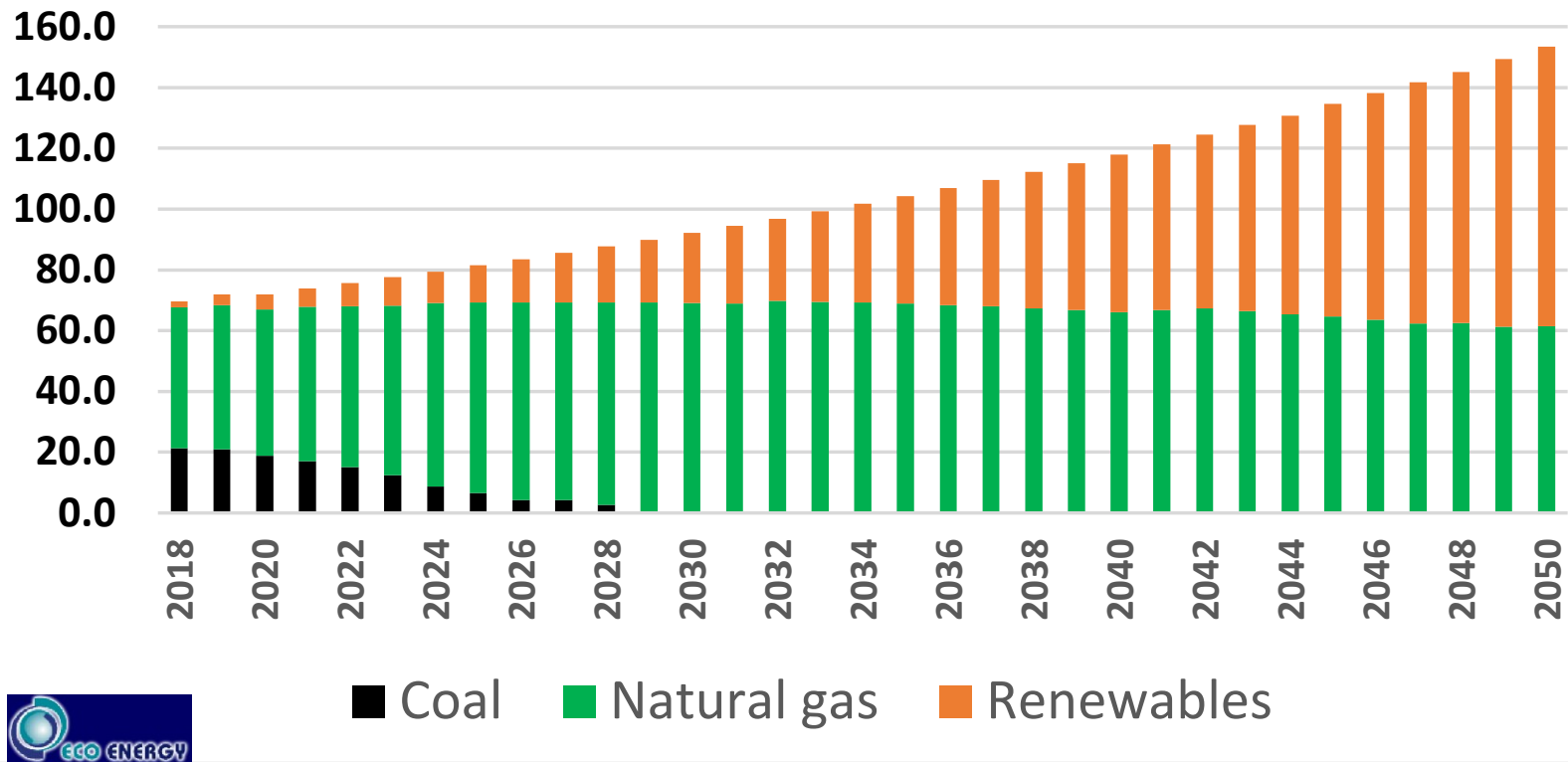
# East MED Gas Pipeline – a pipedream?



# Export of Israeli natural gas via Jordan and Syria to Lebanon



## Electricity Demand Forecast 2022-2050 By Fuel, TeraWatt Hour



Source: Eco Energy, March 2021





### WHAT IS CCUS?

Carbon Capture, Utilization, and Storage is a method of significantly reducing CO<sub>2</sub> emissions to the atmosphere.

**1 CAPTURE**  
CO<sub>2</sub> at the source (instead of releasing it into the atmosphere)

**2 TRANSPORT**  
the CO<sub>2</sub> to an injection site (usually by pipeline)

**3 STORE**  
the CO<sub>2</sub> permanently in geologic layers over 4,500 feet underground

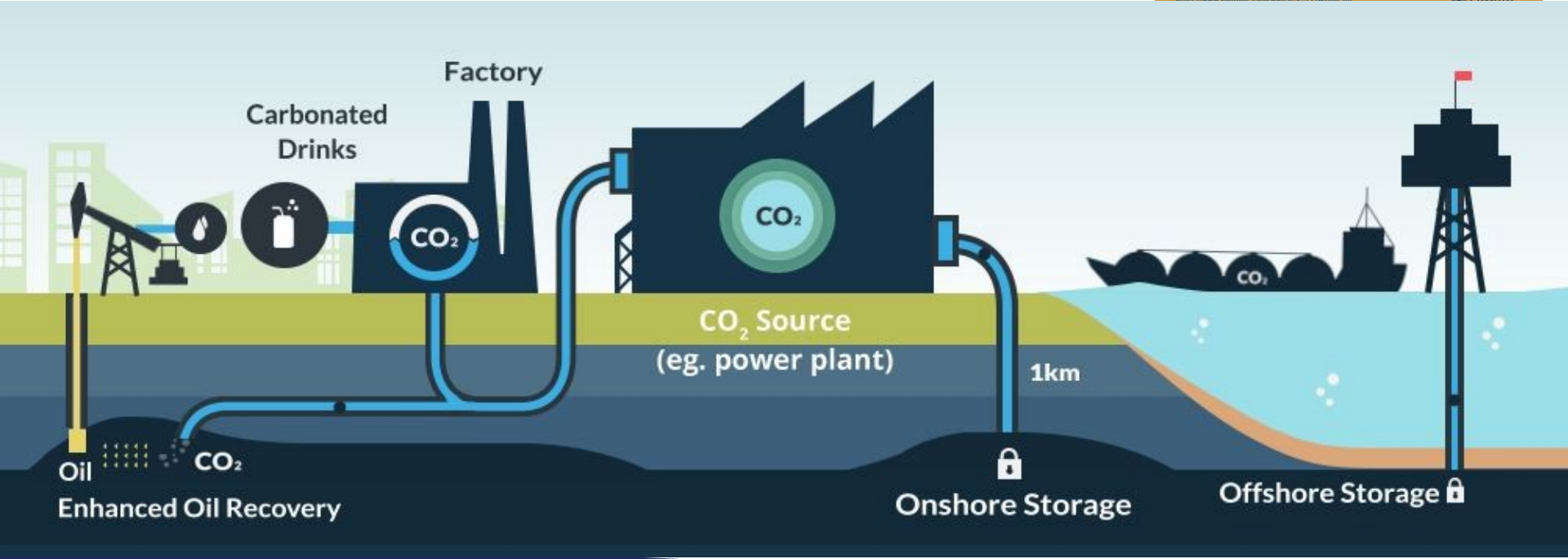
**LOW-CARBON ENERGY FOR NORTH DAKOTA**

Please see this video link for more information regarding CCUS and CarbonSAFE technology.  
<https://www.youtube.com/watch?v=5ZiWmP8R>

“We think that it is possible to have a zero emission use of coal and so carbon capture and storage is a big part of achieving that vision.”  
Wade Boeshans  
President and General Manager, BN Coal



# Carbon Capture Utilization & Storage



# What is Hydrogen? Chemistry

## The Hydrogen Atom

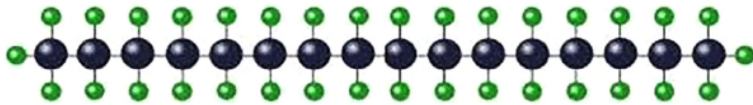
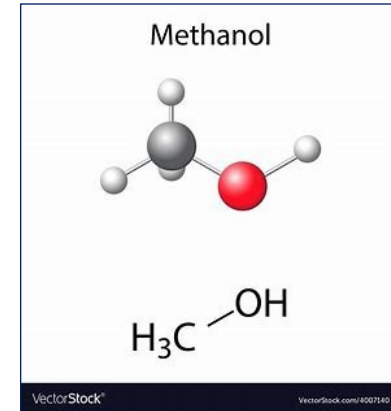
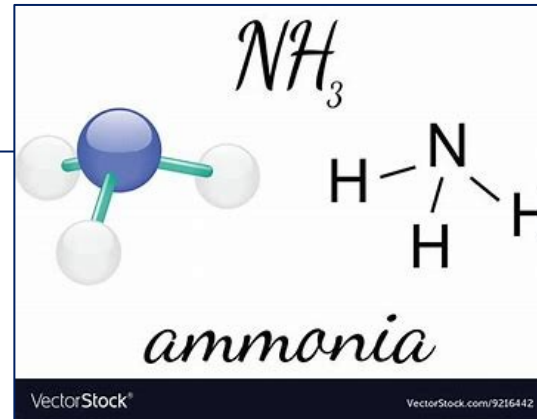
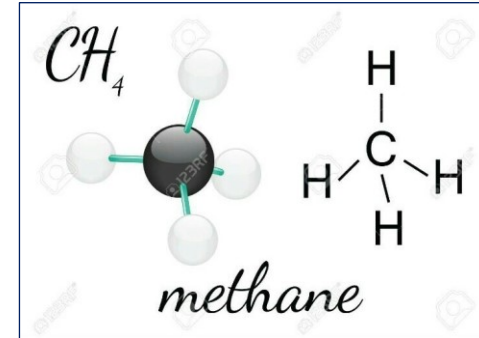
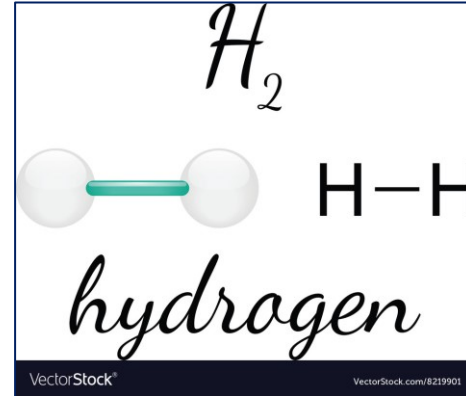
- One electron orbiting a nucleus
- 1 proton =  $Z$  = atomic number
- 0 neutrons =  $N$
- Total mass =  $A = Z + N = 1$
- Add a neutron and you have Deuterium =  ${}^2\text{H} = \text{D}$

${}^1\text{H}$

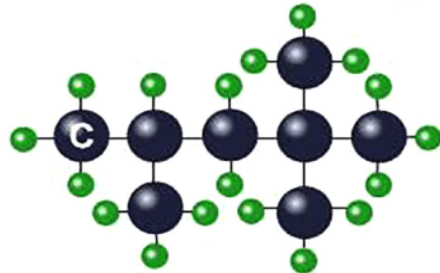
${}^2\text{H}$

$\text{H}_2\text{O}$

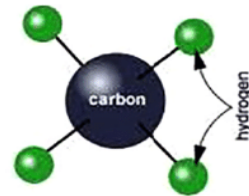
A water molecule



a. A Diesel Molecule  $\text{C}_{16}\text{H}_{34}$



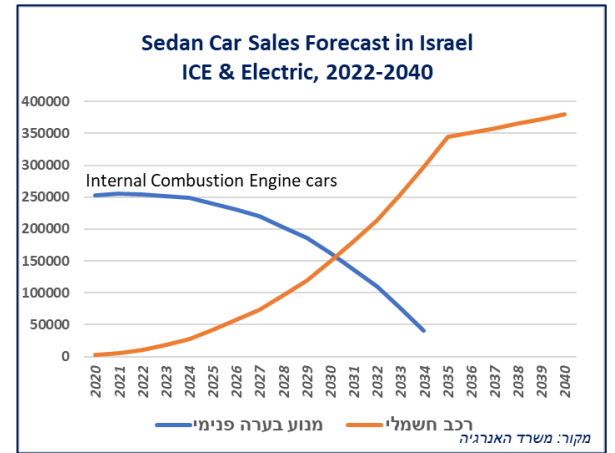
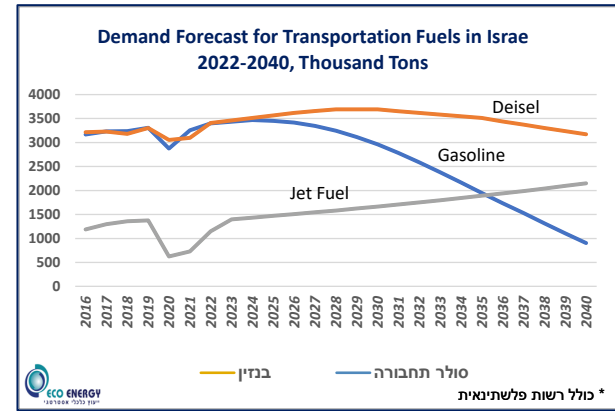
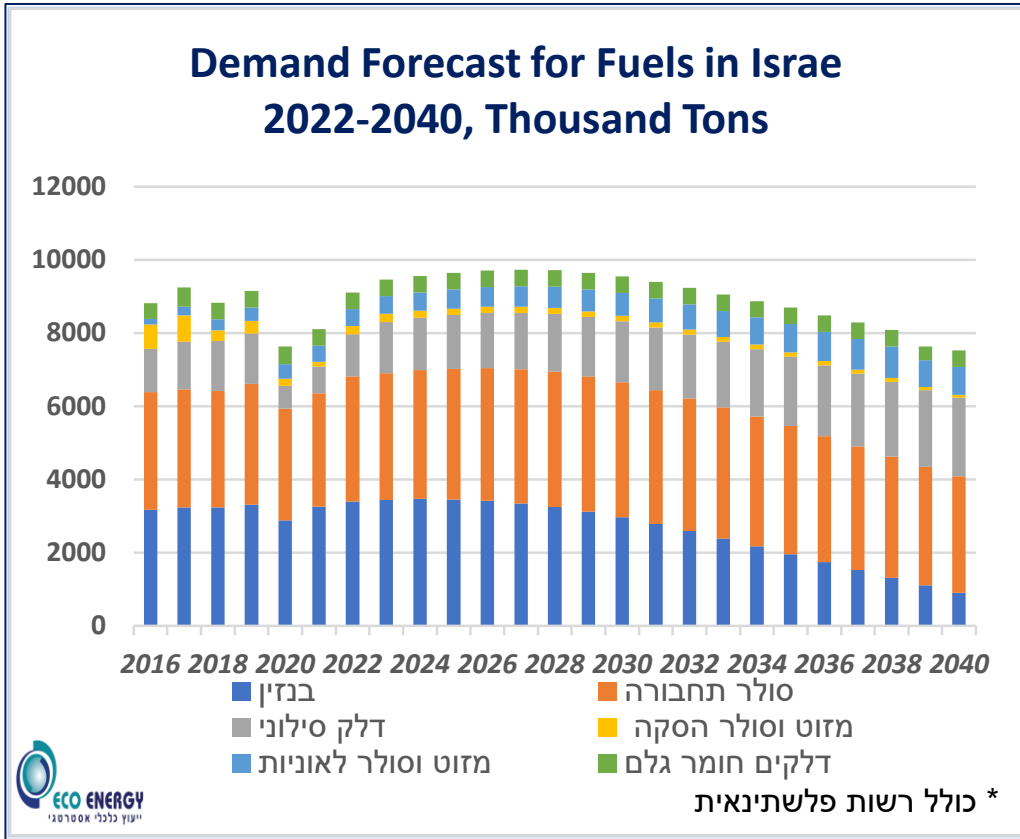
b. A Gasoline Molecule  $\text{C}_8\text{H}_{18}$



c. A Methane Molecule  $\text{CH}_4$

**1 Kg of Hydrogen = 3.8 Liters of Gasoline**

# Demand Forecast for Fuels in Israel



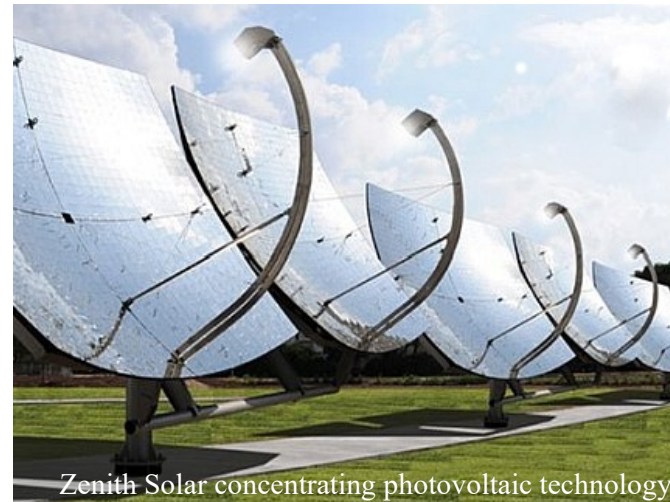
**Demand for oil products in Israel will remain strong in the coming decades**



# The Clean Transportation Vision



# Natural gas, energy storage & renewable energy to enhance energy and environmental security



**Thank You**