

Project IRIS

Carbon Capture and e-Methanol Production

IENE Workshop

Prospects for the Implementation of CCUS Technologies in Greece and SE Europe
National Hellenic Research Foundation

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AVIN



Paris summit 2015

A pivotal event for the environment and the energy landscape

- ❖ A legally binding document signed by 196 countries
- ❖ Submit National Determined Contributions
- ❖ Technology transfer and financial support for the developing countries

The Goal

- ❖ By 2050, limit global warming well below 2,0°C compared to pre-industrial levels
- ❖ Achieve a climate neutral world by mid-century

On track?

- Current pledges reduce GHG emissions by 7,5% by 2030

2050: A challenging equation

Population
+1,9Billion

GDP
+130%

+40%
Energy

-40%
Intensity

The expected role of CC(U)S

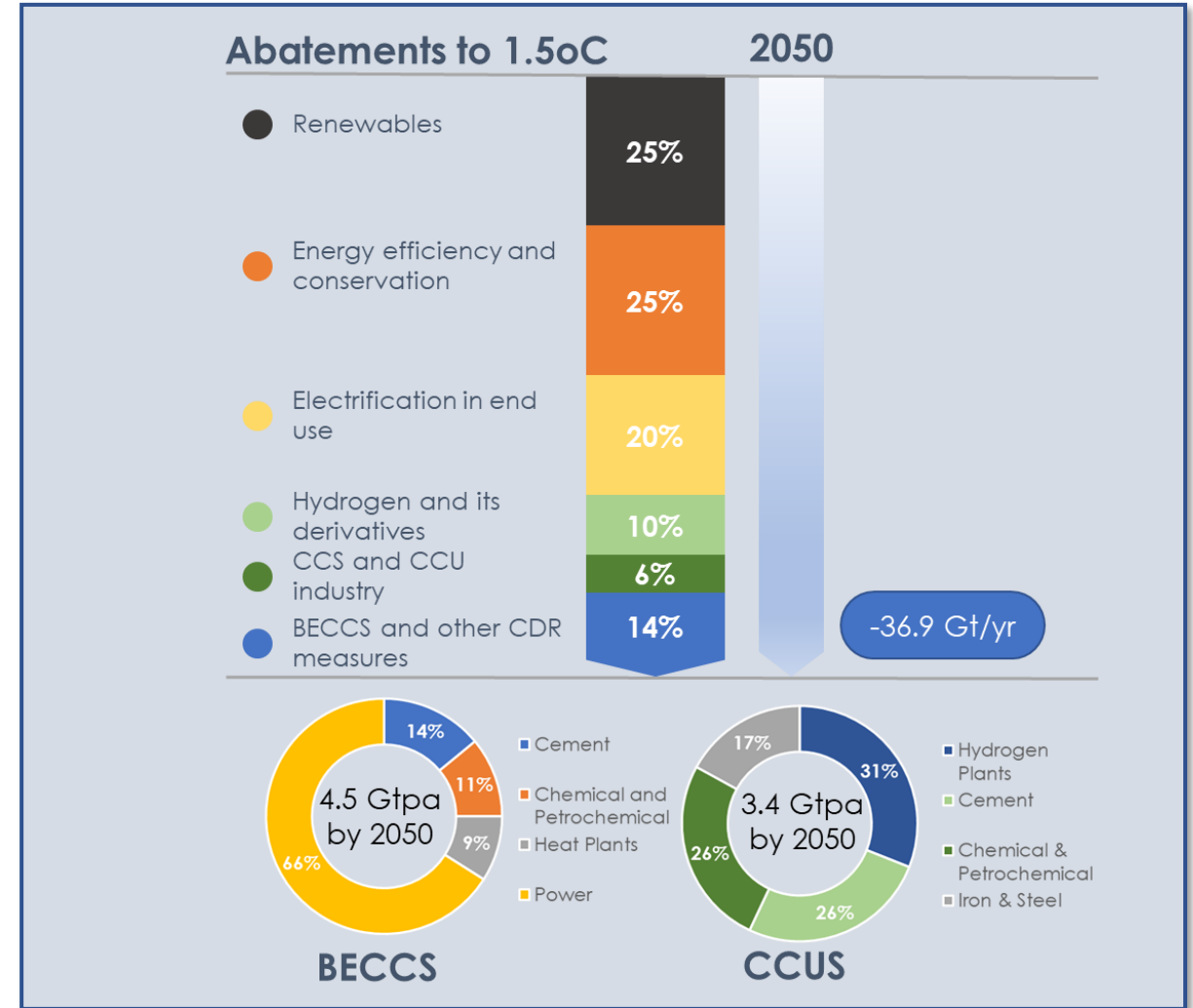
CC(U)S's role is considered pivotal for the achievement of NZE

Initially focused on Natural Gas processing and Power plants

- ❖ Targets for CCUS now include steel & cement plants, LNG liq. plants, refineries & petrochemical plants, blue hydrogen and other hard to abate sectors
- ❖ BECCS is gaining pace as a negative-emissions measure; availability of sustainable biomass is a question (appx.40-50EJ of biomass; 0,9-1,4Gtoe)

Current capture and storage: 40Mt CO2 p.a.

- ❖ 2030: 1.2Gt CO2 p.a. for NZE (all planned projects account for <15%)
- ❖ 2050: 4.2Gt CO2 p.a. (or even 6.0 – 10.0 Gt CO2 p.a.)
- ❖ Annual investments in CCUS, are expected to reach \$120B to \$150B beyond 2035

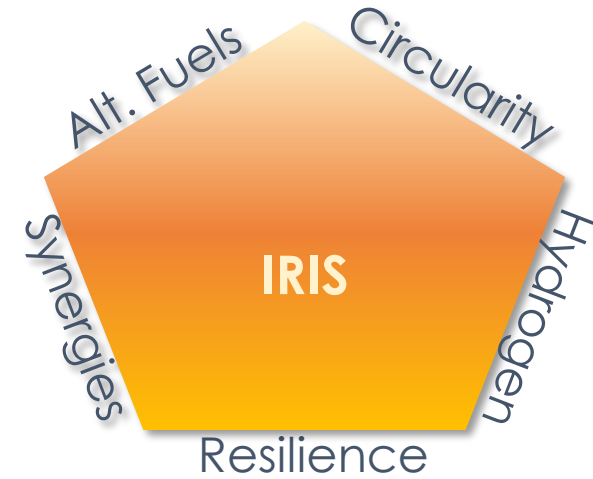


- IRENA, Reaching Zero with Renewables – CAPTURING CARBON, 2021
- McKinsey & Company, Scaling the CCS industry to achieve net zero emissions, October 2022

Project IRIS

A project that serves MOH's main strategic directions

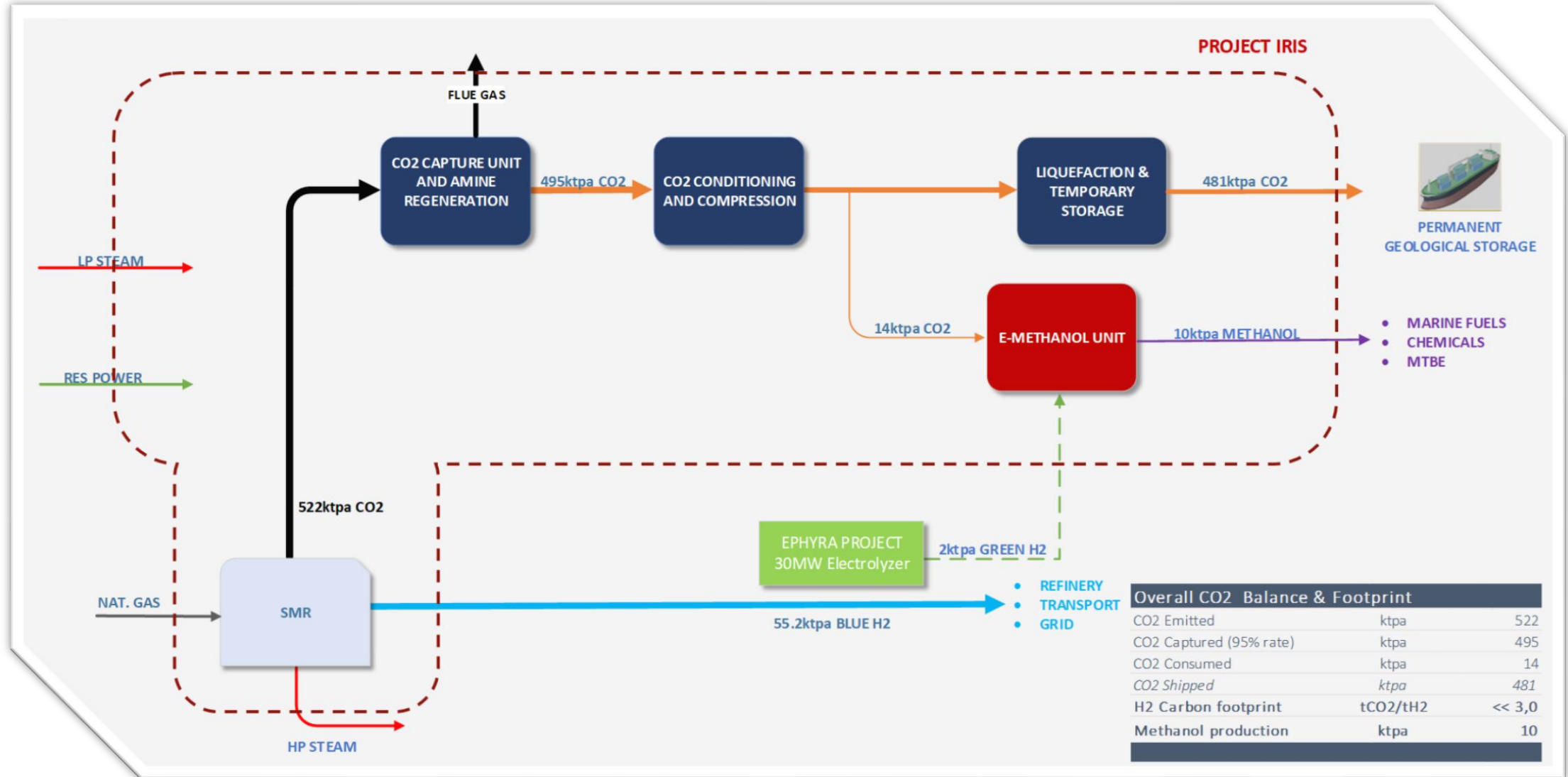
- ❖ Increases resilience by drastically reducing GHG emissions
- ❖ Defending MOH's sustainability targets
- ❖ MOH becomes a major Blue Hydrogen producer while expanding the capacity to further decarbonize its operations
- ❖ Materializes CO₂ circularity via the production of e-Methanol
- ❖ Reduces Scope 3 emissions through the introduction of low carbon methanol and hydrogen to end uses
- ❖ Synergies with existing projects (TriEres Hydrogen valley)



...but a challenging project

- ❖ Multifaceted project with a tight time schedule
- ❖ Construction and operation in a heavily congested industrial complex
- ❖ Very high demand for utilities
- ❖ Fleet development is an issue
- ❖ Revenues uncertainty and the development of relevant markets

Project's Perimeter



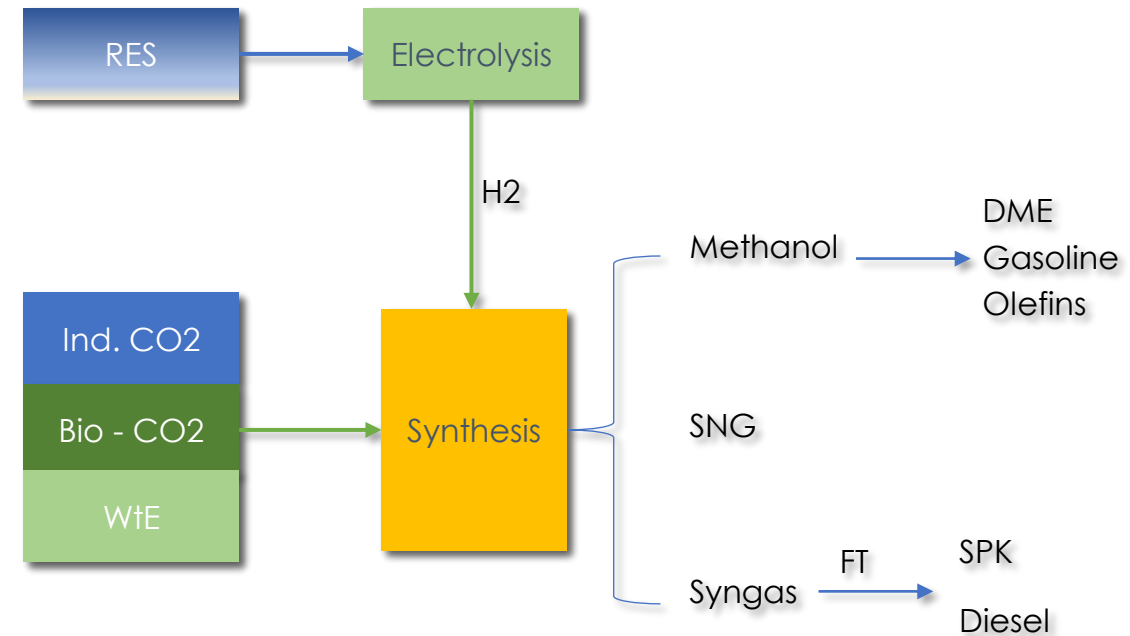
Methanol production

IRIS becomes one of the first projects to implement carbon utilization

- ❖ E-fuels: an option for the hard to abate sectors
- ❖ Methanol presents an option for the shipping industry
- ❖ Methanol is the precursor of high value chemicals and fuels
- ❖ Current regulatory framework provides for the use of captured fossil CO₂
- ❖ On-site availability of green H₂ is a major contributing factor
- ❖ Catalytical hydrogenation of CO₂ is gaining momentum with new plants coming online

Albeit its small size, the methanol unit contributes to the opening of CO₂ market

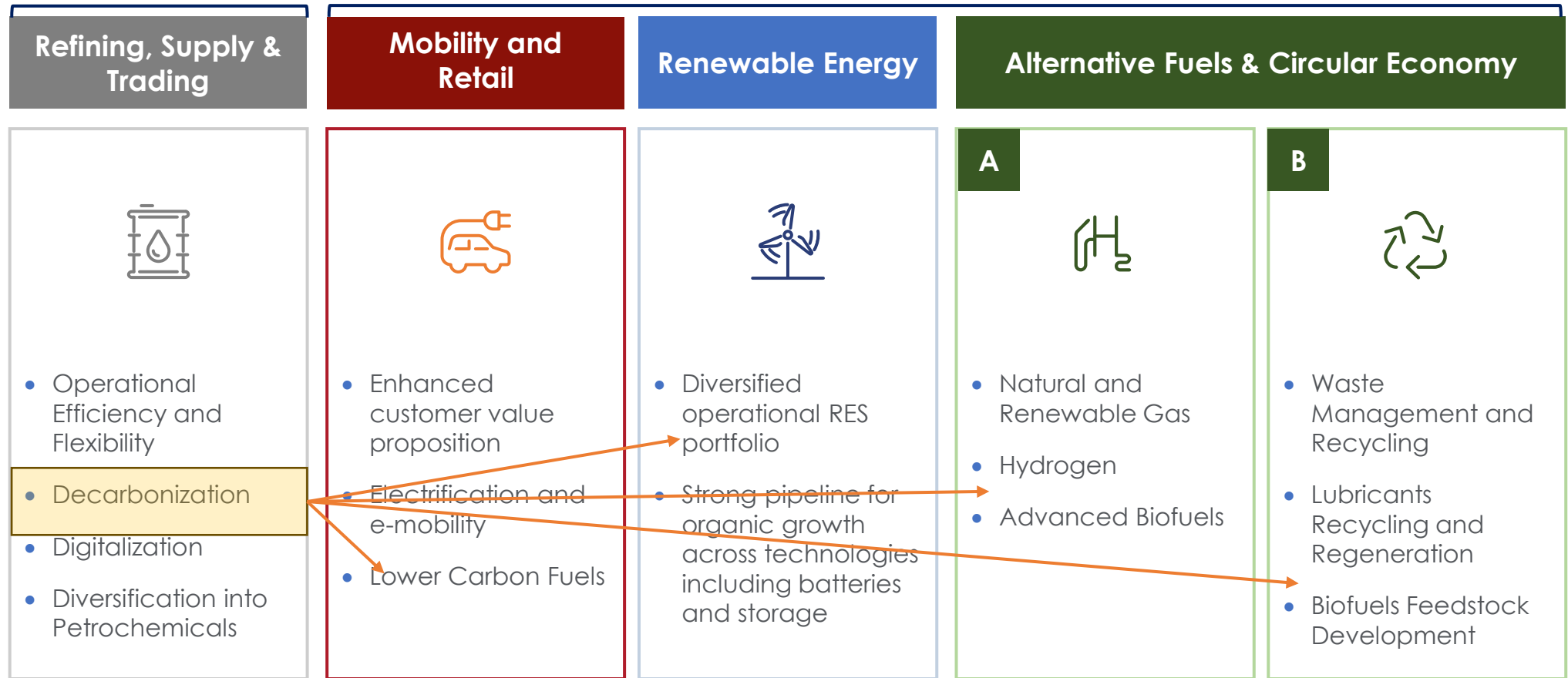
- ❖ Operating in a demanding industrial complex in tandem with the capture unit
- ❖ Allows for the testing of different business models, including sourcing of CO₂ from 3rd parties
- ❖ Circularity is served



Strategic pillars guiding our path forward

Resilience

Sustainable Growth



Driving Growth and Change Across a Diverse, Multi-Energy Portfolio



Thank you very much!

AVIN

Coral
Shell Licensee

Coral
GAS

LPC
Lubricants & Petroleum Corporation

nrg

more
energy

MOTOR OIL