



With the contribution of the LIFE  
Programme of the European Union  
LIFE20 CCM/GR/001642

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## CO<sub>2</sub>toCH<sub>4</sub>: Demonstration of a mobile unit for hybrid energy storage based on CO<sub>2</sub> capture and renewable energy sources



**Dr. Christos Roumpos,  
Director of Mining Engineering and Closure Planning Department**



PPC  
Renewables



ARISTOTLE  
UNIVERSITY  
OF THESSALONIKI



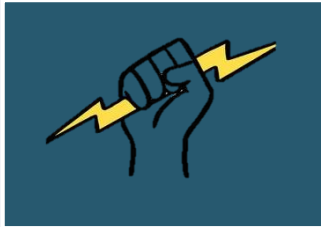
HELLENIC AGRICULTURAL  
ORGANIZATION - DEMETER



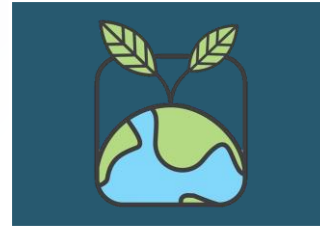
# Why CO<sub>2</sub>toCH<sub>4</sub> LIFE project is important for PPC?



# PPC – Environmental Policy



- ▶ **Public Power Corporation (PPC) is Greece's largest electricity generation and supply company**



- ▶ **PPC embraces sustainable resources of energy**
- ▶ **Addresses environmental concerns**
- ▶ **Promotes economic growth**
- ▶ **Moves forward to a sustainable and resilient energy future**

# Geographical Distribution of Power Plants

## Lignite Power Plants

7 PP, 2.585 MW  
(St. Dimitrios PP(1595MW), Melitis PP (330 MW), Ptolemais PP V(660MW))

## Hydroelectric Power Plants

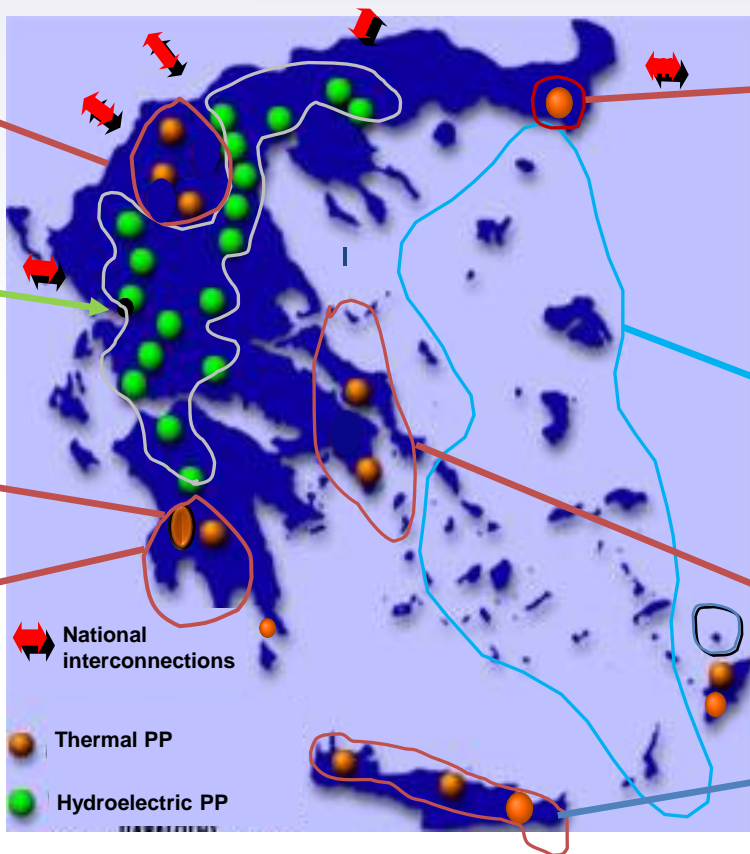
16 PP, 3.171 MW  
(PPC RENEWABLES S.A.  
9 PP, total power: 47 MW)

## Megalopolis V

1 Thermal PP, 832 MW  
(Megalopolis PP)

## Megalopolis lignite PP

300 MW



## Komotini

1 Thermal PP, 485 MW

## Island Not Interconnected System

32 Autonomous and local stations, 738 MW

## Attiki/Evoia

2 Thermal PP, 1372 MW

Crete/Rhodes  
5 Thermal PP,  
1.046 MW

# PPC increases its focus on renewable energy sources



**Solar power  
installations**



**Wind Farms**

# Life CO<sub>2</sub> to CH<sub>4</sub> aligns with the objectives in the EU green agreement



## CUTTING EDGE TECHNOLOGIES

- ▶ Practical Applications
- ▶ Embracing Innovation



## SUSTAINABLE SOLUTION

- ▶ Reduction of Emissions



## EU GREEN AGREEMENT

- ▶ Clear energy transition
- ▶ Climate neutrality by 2050

# Life CO<sub>2</sub> to CH<sub>4</sub> Goals

## DEVELOPMENT OF AN INDUSTRIAL PROCESS

that combines

- ▶ Energy storage
- ▶ Capture and utilization of CO<sub>2</sub>

# Construction of a mobile unit



## Exhaust Gases

- ▶ Tested specifically with those from a **power plant**



## Hydrogen

- ▶ Generated through **water electrolysis**



## Biomethane

- ▶ Can be injected into the **natural gas grid**
- ▶ Serves as a versatile and flexible energy storage solution



# Utilization of Biomethane



**Biomethane**



**Electricity**



**Heat**

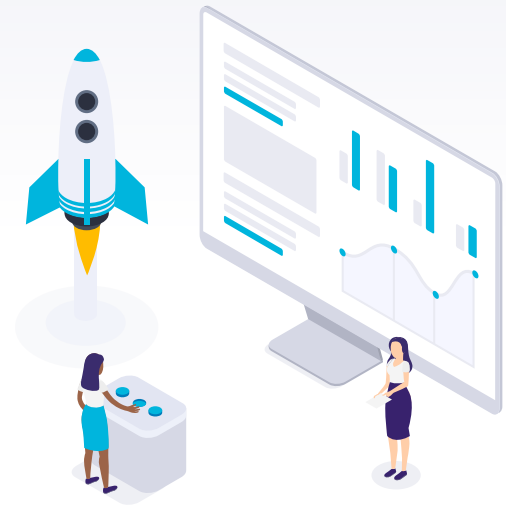


**Transportation Fuel**

## Why is the project important for PPC?

- ▶ The project deals with the  $\text{CO}_2$  to  $\text{CH}_4$  conversion which declares that such a conversion would act effectively **in mine waste treatment** and in sustainable energy production.
- ▶ This conversion enables the **utilization of  $\text{CO}_2$** , a pollutant, by transforming it into a **valuable resource**. By using renewable  $\text{CH}_4$  a **closed carbon** cycle is developed, and the atmospheric concentration of  $\text{CO}_2$  is reduced. Thus, circular economy practices are implemented.
- ▶ Storage of  $\text{H}_2$  poses challenges due to its low density, but by combining it with  $\text{CO}_2$  to form methane, a higher energy density fuel is achieved, enhancing its **storage capabilities** without significant infrastructure modifications.
- ▶ The PPC **mine closure strategy** aims at a sustainable phase-out where the mining areas will be reclaimed based on the principles of Just Transition.
- ▶ The outcome of the project can offer solutions for **powering isolated locations** such as islands and isolated areas.

# How is the project associated with the production of CO<sub>2</sub>?



## How is the project associated with the production of CO<sub>2</sub>?

- ▶ **CO<sub>2</sub> emissions** refer to the release of carbon dioxide (CO<sub>2</sub>) into the atmosphere as a result of human activities.
- ▶ The **LIFE CO2toCH4** project is associated with the production of CO<sub>2</sub> in the framework of **reducing the carbon footprint** (e.g., reducing the CO<sub>2</sub> emissions).
- ▶ That is achieved through the conversion to a **new energy source: the CH<sub>4</sub>**.

# How is the project associated with the production of CO<sub>2</sub>?

The project focuses on **two key aspects**

- ▶ **CO<sub>2</sub> Capture**, from exhaust gases.

By capturing the **CO<sub>2</sub>**, the project prevents its release into the atmosphere, helping to mitigate its impact as a greenhouse gas.

- ▶ **CO<sub>2</sub> Utilization**.

The captured **CO<sub>2</sub>** is utilized as a feedstock in the production of methane. Hydrogen is combined with the captured **CO<sub>2</sub>** to generate methane, which can serve as a non-fossil biofuel.

Thank you

Dr. Christos Roumpos  
C.Roumpos@dei.gr



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