

## **Methodology - Assumptions**

The following data are being used to analyze the carbon dioxide emissions (CO<sub>2</sub>) of the Greek power plants that participate in the European Emissions Trading System (EU-ETS):

1. Annual emissions data (tn CO<sub>2</sub>) of plants from the [Union Registry](#) of the EU-ETS.
2. Electricity generation data (MWh) of lignite and fossil gas units from the monthly [Energy Reports of the Greek IPTO \(ADMIE\)](#)
3. Electricity generation data (MWh) of oil-fired units in the non-interconnected islands (NII) from [HEDNO's monthly Statistical Reports](#).

For the estimation of the monthly emissions for every thermal power plant in Greece, the following assumptions are made:

### **I. Estimation of monthly emissions**

Annual power plant emissions are published in April of each year for the preceding year. For the months for which no data is available, the emissions are being estimated by multiplying the emission factor of each plant (tn/MWh) with the corresponding monthly electricity generation (MWh) obtained from the monthly reports of IPTO and HEDNO. The emission factor for each plant is estimated based on the official annual emissions and electricity generation data of the last three years and is assumed to be the same for all months of each year.

### **II. Emission of the CHP Aluminium plant**

The carbon dioxide emissions of the fossil gas-fired combined heat and power (CHP) Aluminium plant for the years 2019-2021, were obtained from the Ministry of Environment and Energy via an Access to Information Request, as the data available in the ETS registry cover the entire industrial activity of the industry and not only the production of electricity and heat. The emission factor of the CHP is calculated according to the data obtained from the Ministry and the ones extracted from IPTO's monthly reports for electricity generation. The calculated emission factor is then used to estimate the emissions of the CHP plant for all months that no official emission data is available.

### **III. Estimation of electricity generation in Non-Interconnected Islands (NII)**

The electricity generation from the power plants of the Crete, Rhodes and Kos-Kalymnos island systems is presented in HEDNO's reports for each system as a whole and not per power plant within each island system. However, in EU ETS data is provided for the emissions of each plant. In order to estimate the emissions of these plants for the months where no data is available, the emission factors of all plants for each of the above island systems are assumed to be equal to each other. In addition, it is assumed that the share of each plant's electricity generation in the total electricity generation of the island system is equal to the corresponding share of the plant's emissions in the total emissions of the same island system. The latter share is obtained from the official emissions data for the last three years.

Furthermore, given that the electricity generation data for the non-interconnected islands is provided by HEDNO with a time lag of one month compared to the data of the interconnected

network that is provided by the Greek IPTO, the electricity generation of the island plants for the last month is assumed to be equal to that of the same month of the previous year, after adjusting for the trends of the previous months of the current year compared to those of the previous year.

Finally, the analysis does not include the emissions from the power plants on the 16 islands that do not participate in the EU-ETS (Ag. Efstratios, Agathonisi, Amorgos, Anafi, Antikithyra, Arkioi, Astypalea, Gavdos, Donousa, Erikoussa, Kythnos, Megisti, Othonoi, Serifos, Skyros, Symi). Based on HEDNO's data, electricity generation from these plants constitutes about 2% of the total in the non-interconnected islands for the three-year period 2020-2022. It is further noted that the oil-fired power plants of Skyros and Symi participated in the EU ETS in 2022. However, since this was not the case in 2019, the base year for PPC's bond loans, their emissions were not included in the relevant comparisons. In any case, the cumulative emissions from the plants on these two islands in 2022 were lower than 0.28% of the total from oil-fired plants in the same year.

#### **IV. Estimation of missing data in the electricity production for year 2013**

1. **Lignite and fossil gas plants:** The electricity generation of the units fueled by fossil gas and lignite for the first 5 months of the year 2013 is not included in the available reports of the Greek IPTO. The missing data was estimated based on the assumption that the share of each plant in the total electricity generation of the relevant fuel in the first half of 2013, is equal to the share of the same plant in the same fuel's total electricity generation in the second half of the year.
2. **Non-interconnected islands:** HEDNO's monthly reports for year 2013 do not include the electricity generation for the islands of Thira, Ikaria, Patmos and Sifnos. In order to estimate these missing values, it was assumed that the percentage of the electricity generation in each of these islands over the electricity generation in the rest of the islands in 2013 was equal to the average such percentage for the years 2014 to 2018, for which data is available.

#### **V. Emission factor of new plants**

Since there is no historical emissions data for the new lignite plant "Ptolemaida 5" and the new fossil gas plant "Ag. Nikolaos 2" that were recently started operating, the value of the emission factor indicated in the relevant Environmental Impact Assessments was used to estimate their monthly emissions from the corresponding electricity generation data (1 tn/MWh for Ptolemaida 5 and 0.332 tn/MWh for Ag. Nikolaos 2).