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Addressing the energy crisis:

A halfway assessment of Greece's performance on its European obligations

BRIEFING NOTE

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According to the International Energy Agency[1], the unprecedented energy crisis we are experiencing at least since mid-2021 is a fossil fuel crisis. It is directly linked to Europe's dependence on fossil gas, whose soaring prices skyrocketed following Russia's war against Ukraine, pushing up the cost of electricity to unimaginable heights.

In response to these developments and under the REPowerEU energy crisis plan, the European Union decided to set much higher targets regarding the reduction of fossil gas consumption by 2030, as compared to those of the pre-war 'fit for 55' package. Furthermore, the EU decided to take additional and more urgent measures to reduce gas use in view of this winter (2022-2023).

Reducing overall gas consumption: In order to ensure an adequate supply of fossil gas, under Regulation 2022/1369[2], each EU-27 Member State is obliged to reduce its total consumption of fossil gas -regardless of origin- over the eight-month period of August 2022-March 2023 by at least 15% compared to a reference period. The latter is either the average of the corresponding eight-month periods of the last five years (2017-2021) or the previous eight-month period alone (August 2021-March 2022) for Member States that during the past year increased their dependence on fossil gas by at least 8% compared to the five-year average -a condition that Greece fulfils.

Reducing gross electricity consumption: In addition to reducing gas consumption, and in order to address the electricity price crisis, the European Union has also decided that each Member State should take measures to reduce gross electricity consumption, both overall and during peak hours, thus reflecting its emphasis on energy saving as a means of addressing the energy crisis.

In particular, under Regulation 2022/1854[3], *"Member States shall endeavour to implement measures to reduce their total monthly gross electricity consumption by 10 % compared to the average of gross electricity consumption in the corresponding months of the reference period". The latter is defined as "the period from 1 November to 31 March in the five consecutive years preceding the date of entry into force of this Regulation, starting with the period from 1 November 2017 to 31 March 2018".*

Reducing gross electricity consumption during peak hours: Regulation 2022/1854**Error! Bookmark not defined.** includes an additional target with regard to peak hours. Specifically, each Member State is required to reduce gross electricity consumption during peak hours over the period December 2022 - March 2023 by 5% compared to a reference scenario. The latter shall be determined by the transmission system operators of each Member State and may include historical data from the reference period of the Regulation, namely, the past five years. The peak hours in Greece were set to be 18:00-21:00[4]. However, the reference scenario has not yet been formally defined.

[1] IEA, World Energy Outlook 2022, https://bit.ly/3jipSK6
[2] Council Regulation (EU) 2022/1369 of 5 August 2022 on coordinated demand-reduction measures for gas. https://bit.ly/3HnISif
[3] Council Regulation (EU) 2022/1854 of 6 October 2022 on an emergency intervention to address high energy prices. https://bit.ly/3HelMe4
[4] Article 143Z of Law 4001/2011 και CMD ΥΠΕΝ/ΔΗΕ/135277/4706/20.12.2022 (GG 6649/B/23-12-2022) https://bit.ly/3HMNWys

Below, Greece's performance with regard to the three aforementioned obligations is briefly analyzed, based on data by national (Hellenic Gas Transmission System Operator SA, DESFA; Independent Power Transmission Operator S.A., IPTO, Hellenic Electricity Distribution Network Operator SA, HEDNO) and European databases (Eurostat, ENTSO-e). The time period of this analysis begins with the entry into force of each decision and concludes in December 2022, i.e., approximately in the middle of the critical period for which the EU-27 short-term targets were set[5,6].

I. Fossil Gas Consumption

As Greece is eligible for the derogation provided by Regulation 2022/1369 on gas demand reduction measures, the country's contractual obligation is to reduce its total fossil gas consumption during August 2022-March 2023 by 15% *as compared to the previous eight-month period alone (August 2021-March 2022)* rather than the corresponding five-year average.

In absolute terms and according to DESFA's data, with the previous year's period used as a reference for the calculation of the 15% cut in consumption, the latter during this eight-month reduction period should not exceed 40.98 TWh; if the reduction were to be calculated based on the five-year average, the consumption during the same period would be further reduced to 35.33 TWh. In other words, the derogation that the Greek government invoked immediately following the European Commission's announcement -and eventually obtained- has led to a much looser commitment compared to most EU-27 Member States, increasing the allowed domestic consumption by 5.65 TWh.

Nevertheless, the country's performance during the first five months of the implementation period (August-December 2022) far exceeds the bar set by the government (Figure 1). Specifically, Greece managed to restrict its five-month consumption to 20.41 TWh, namely reducing it by 30.8% compared to the respective period of 2021 (more than double the contractual obligation) and by 18.2% (-4.55 TWh) compared to the 2017-2021 average. These findings demonstrate that Greece did not need to invoke any derogation in order to contribute to the common target to the same -corresponding- extent as most EU-27 Member States.

The end-use category that contributed most to this performance was industry, with consumption during the five-month period of August-December 2022 decreasing by 2.21 TWh compared to the five-year average, followed by electricity production (-1.58 TWh) and distribution networks (-0.76 TWh).

[5] For more information on trends in electricity production, please see our monthly reports: https://thegreentank.gr/trends_electricity_en/

[6] For more information on trends in domestic fossil gas consumption and imports, please see our monthly reports: https://thegreentank.gr/gaswatch-en/

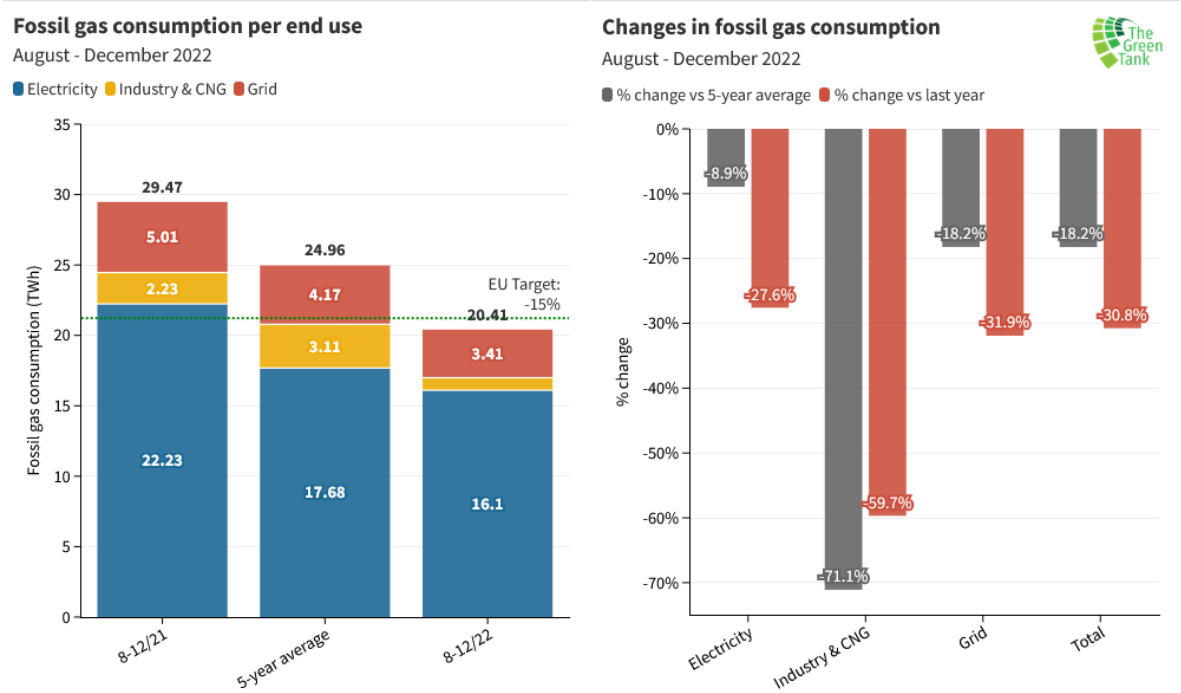

Figure 1*: Fossil gas consumption (left) and respective rates of change (right), overall and by use category, during the five months August-December 202, as compared to the same period of the previous year; the 2017-2021 five-year average; and the 15% reduction target compared to the five-year average set by the EU-27 (dotted line). Source: DESFA*

In particular, the decline in gas use in electricity production was a consequence of the larger contribution of RES, which increased by 14.3% during 2022, as compared to 2021[7]. Combined with the 3.3% decrease in electricity consumption over 2022, this increase in RES largely covered the 14% annual decline in gas use for electricity production. Moreover, RES development contributed to a reduction in net electricity imports (-6.4%) and maintained lignite use at roughly the same low levels as in 2020 and 2021 (Figure 2).

[7] The Green Tank. Trends in electricity production – December 2022 https://bit.ly/3wTeQOJ

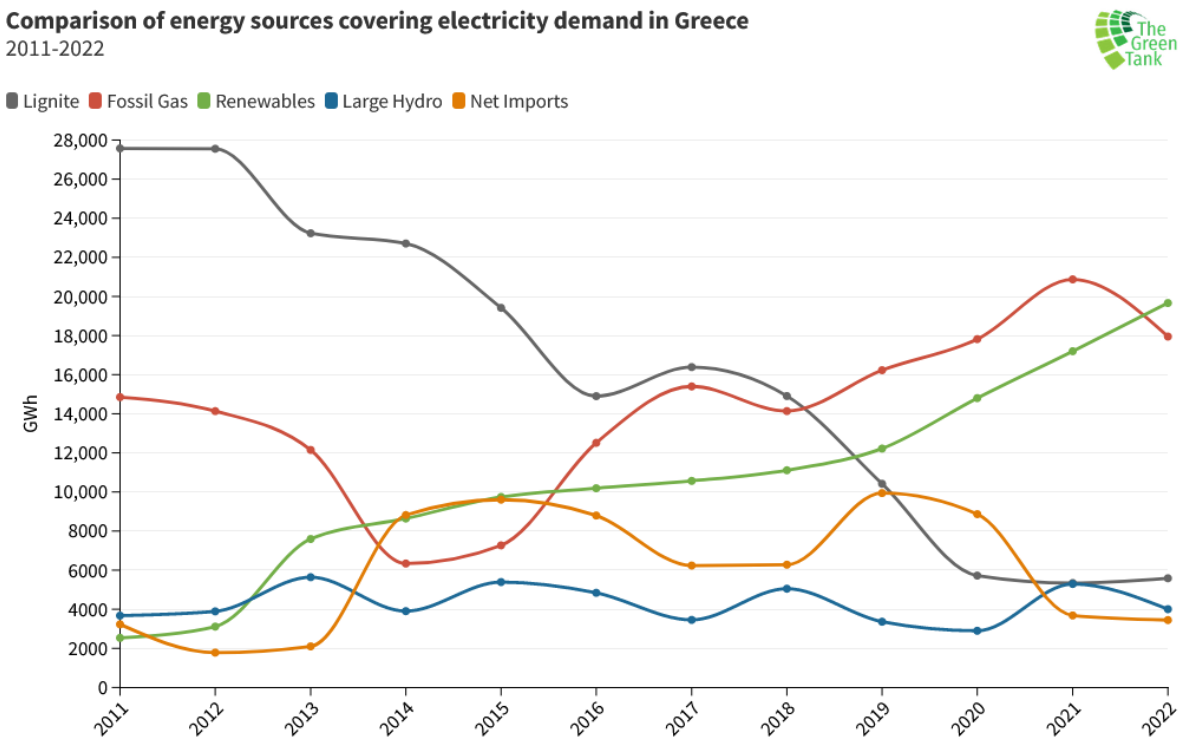

***Figure 2**: The evolution of the electricity production mix in the interconnected grid of Greece for the period 2011-2022. Source: IPTO*

Consequently, in order for Greece to reduce its cumulative consumption over the present eight-month period by 15% compared to the five-year average (as most EU-27 Member States), the remaining fossil gas "budget" for the January-March 2023 quarter is 14.92 TWh, which is 10.1% (-1.68 TWh) below the five-year (2018-2022) average consumption during the respective quarter. This "budget" further increases if Greece chooses to fulfil its obligation under the derogation. Specifically, in order to cut cumulative consumption over the eight-month period of August 2022-March 2023 by 15% compared to last year's respective period (instead of the five-year average), Greece's remaining consumption allowance rises to 17.98 TWh, namely, just 0.76 TWh or 4.1% below the consumption recorded during the January-March 2022 quarter.

Dependence on Russian fossil gas

Following Russia's invasion of Ukraine, reducing dependence on fossil gas -especially of Russian origin- became a priority for the entire European Union; it constitutes one of the central goals of the REPowerEU plan.

DESFA's data show that in 2022 our country succeeded to reduce net imports of Russian fossil gas, i.e., those only covering domestic consumption, by 68.3% compared to 2021. Specifically, net imports from Russia through the Sidirokastro gateway and the Turkstream pipeline decreased from 27.94 TWh (39.84% share of total net imports) in 2021 to 8.85 TWh (15.62% share) in 2022. Especially during the last quarter of the year, they were negligible. It should however be noted that,

in October and November 2022, Greece imported 2.03 TWh of liquefied natural gas (LNG) from Russia via the Agia Triada gateway.

In order to compare Greece's performance regarding the degree of decoupling from Russian gas with the EU-27 average, we employed Eurostat's monthly import data, which are, however, only available up to November 2022. The latter -also in line with DESFA's data- show that Greece managed to reduce its net imports of Russian gas via the Turkstream pipeline, during each month of 2022 as compared to the respective month of 2021. Cumulatively, imports decreased by 68.4% over the first eleven months of 2022 compared to the same period in 2021. This performance was significantly better than that of the EU-27, as the corresponding cumulative average decrease in Russian pipeline gas imports to the EU-27 during January-November 2022 was 28.6% (Figure 3).

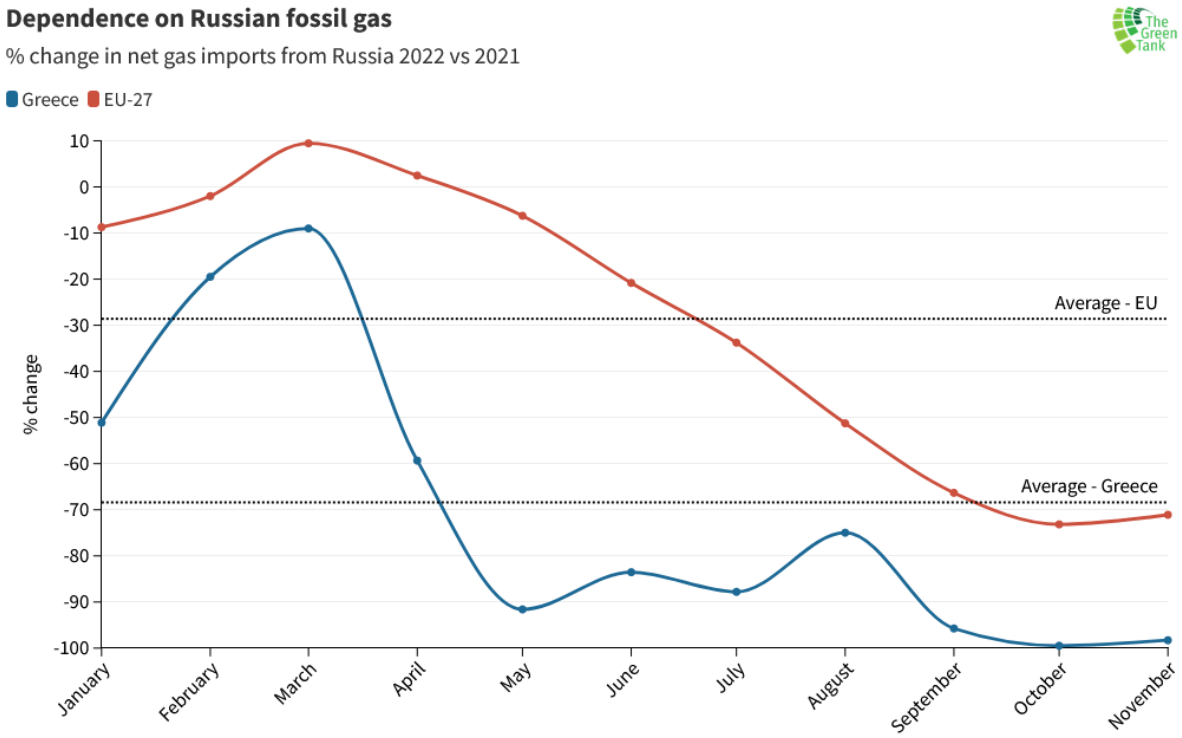

***Figure 3**: Monthly percentage change in pipeline imports of Russian fossil gas in 2022 compared to 2021. Period: January - November 2022. Blue: Greece; red: EU-27. Dotted lines: Average change for Greece and EU-27 Source: Eurostat.*

II. Total Electricity Consumption

EU's target of cutting monthly gross electricity consumption by 10%, as compared to the 2017-2021 five-year period average, is evaluated next. Below, we present data for each month of the reference period (November-March), based on IPTO's and HEDNO's data on the interconnected grid and the non-interconnected islands, respectively. In November 2022, namely the first month of implementation of the measure, Greece practically reached the target, as consumption decreased by 9.95%. In December 2022, the country's performance improved, as it far exceeded the target, cutting consumption by 12.6% compared to the five-year average. Therefore, cumulatively over

these two months (November-December 2022), Greece exceeded the -10% target: there was an 11.4% cut in electricity consumption, as compared to the five-year average of the same two-month period. Compared to 2021 alone, the cumulative reduction over this two-month period was even larger (-12.1%) (Figure 4).

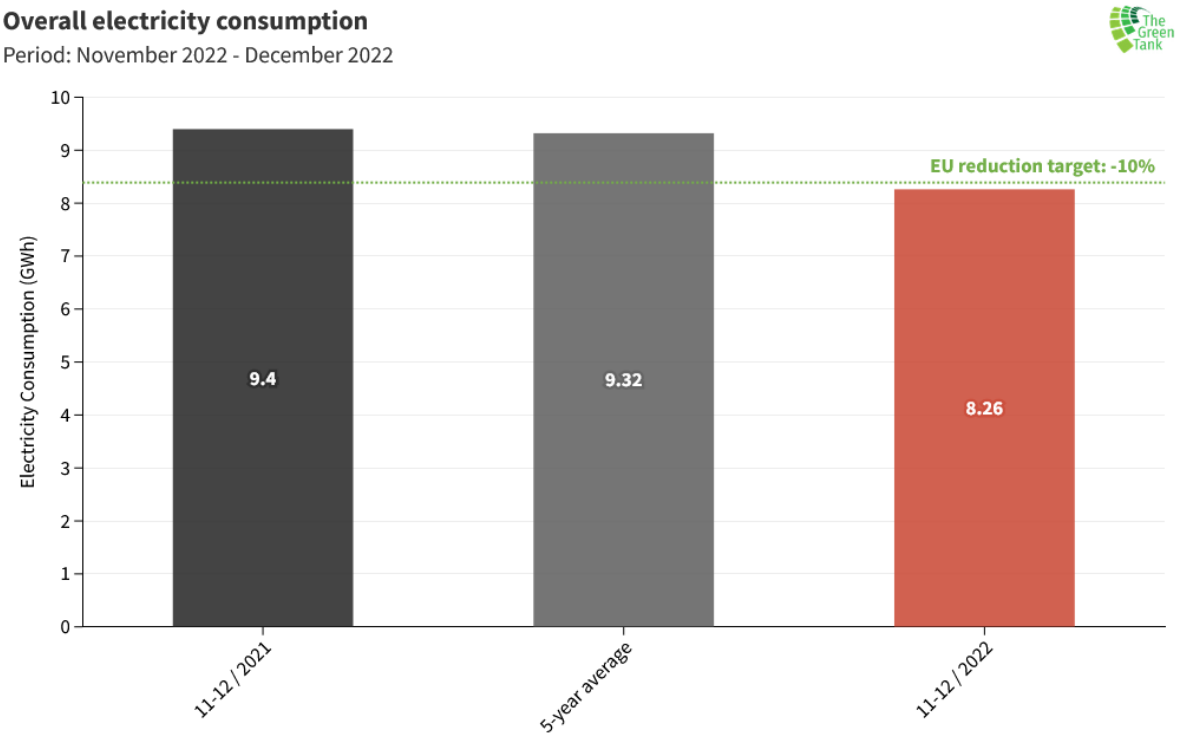

***Figure 4**: Cumulative gross electricity consumption during November-December 2022 and comparison with consumption during the same period of 2021; the five-year average; and the European target of -10%. Sources: IPTO; HEDNO*

As a result of Greece's performance in terms of total consumption in the interconnected grid during the first two months of the Regulation's implementation, and in order for the country to cumulatively reach the -10% target for the entire reduction period, the remaining electricity "budget" for the January-March 2023 quarter is 12.9 TWh. This represents a 10.7% cut compared to the 2018-2022 five-year average regarding the same quarterly period. Thus, if Greece continues to reduce consumption during the next quarter, even at a slightly lower rate than in the first two months of the reduction period, it will succeed in meeting its target.

III. Electricity consumption during peak hours

Subsequently, we assessed the country's progress towards achieving a 5% cut in electricity consumption during peak hours (18:00 to 21:00, as set by Greece). The reference scenario on the basis of which the reduction will be calculated has yet to be determined; thus, the electricity consumption in the interconnected grid during the peak hours of each day of December 2022 - namely, the first month of implementation of the Regulation's relevant provision- was compared

with the average consumption during the same peak hours of the respective day of the past five years (2017-2021). The relevant calculations were based on ENTSO-e hourly data.

The results (Figure 5) show that, every day in December 2022, electricity consumption during peak hours fell to levels even lower than the target of -5% compared to the five-year average (2017-2021), as it ranged from -5.3% to as low as -25.4%. The average daily reduction for the month of December was -13.8% compared to the five-year average, while the year-over-year decline was even greater (-14.7%).

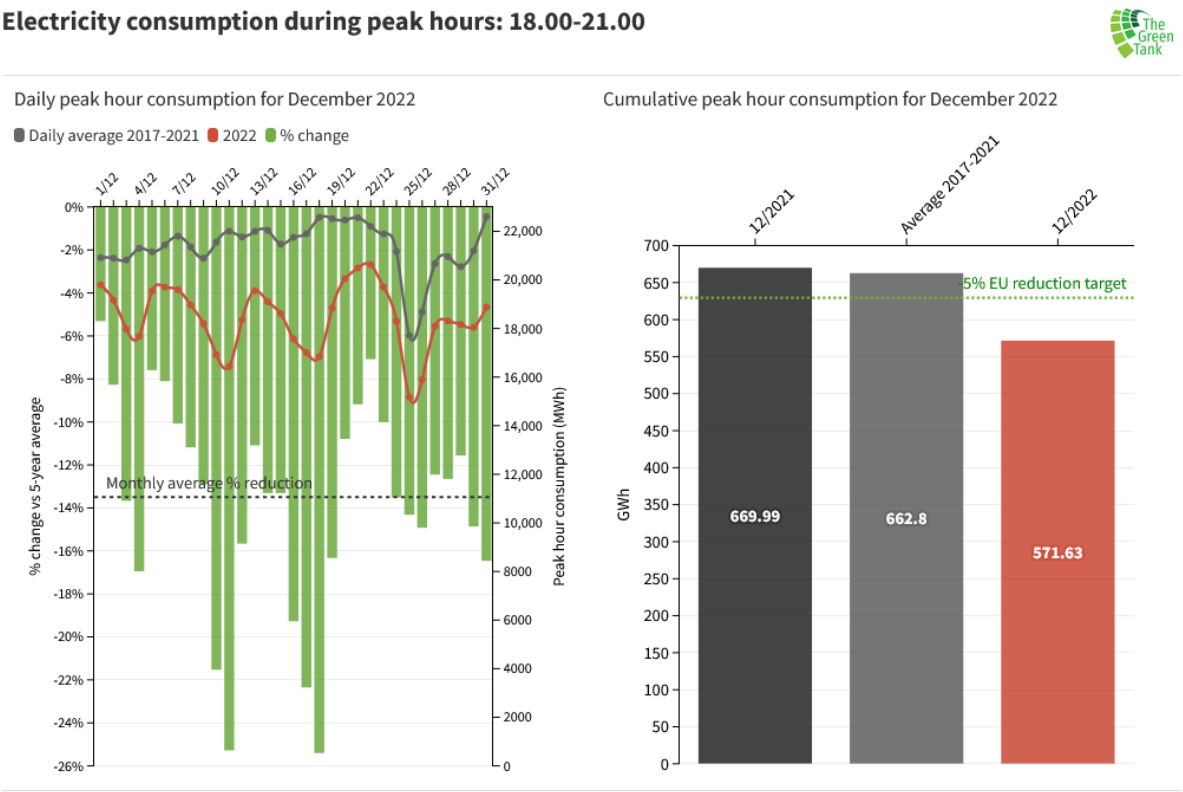

***Figure 5**: Daily (left) and cumulative (right) electricity consumption during peak hours (18.00-21.00) during the month of December 2022 and comparison of cumulative performance during December 2022 with both the 2017-2021 five-year period average and December 2021.*

Conclusion

The findings of this analysis show that, midway through the winter, **Greece is adequately meeting all three of its obligations** under the two extraordinary Regulations adopted in August and October 2022, respectively. In particular, the country has achieved:

- **an 18.2% reduction** in total fossil gas consumption compared to the five-year average during the first five months (August-December 2022) of implementation of the relevant EU-27 Regulation, which aims at a 15% reduction over the eight-month period of August 2022-March 2023 compared to the average of the respective 2017-2021 periods.

- **a 68.3% decrease** in dependence particularly on imported - via pipelines - Russian gas used to meet domestic demand for the whole of 2022 compared to 2021; this constitutes a significantly better performance than the corresponding EU-27 average.

- **an 11.4% reduction** in gross electricity consumption in the interconnected grid and non-interconnected islands compared to the five-year average during the first two months (November-December 2022) of implementation of the relevant EU-27 Regulation; the latter aims at a 10% monthly reduction during the five-month period November 2022-March 2023 compared to the 2017-2021 five-year average.

- **a 13.8% reduction** in electricity consumption on the interconnected grid during peak hours compared to the five-year average during the first month (December 2022) of implementation of the relevant EU-27 Regulation; the latter aims at a 5% reduction in gross consumption at all peak hours over the four-month period of December 2022-March 2023 compared to a baseline scenario. The latter remains to be determined but may include historical data on the past five years (2017-2021).

Given the warm winter so far and the growing contribution of RES to electricity generation, together with the ongoing uncertainty regarding the evolution of fossil gas supply prices, the achievement of all three targets by Greece by the end of the period of the exceptional measures (March 2023) seems convincing.

Nonetheless, aside from complying with European obligations, the decline in fossil fuel consumption, combined with the boost in both energy savings and renewable energy sources, all evidenced by the data of the past few months, will also cut citizens' and businesses' electricity bills and contribute to addressing both the energy-economic and climate crises.