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ESTIMATION OF THE CORONAVIRUS CRISIS IMPACT ON THE ENERGY AND ECONOMIC SECURITY OF THE NATIONAL ECONOMY²

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The energy security of the state is an essential component of its economic security. In turn, energy security is determined by the stability of the energy sector, which must continuously meet the energy production and consumer needs of enterprises and the population [1–15, 16-29, 41-46]. Changes in energy needs of economic entities caused by global and local threats (particularly by the COVID-19 pandemic) lead to fluctuations in energy consumption that negatively affects the stability of the energy sector and, consequently, energy and economic security of the national economy. Tracking these fluctuations and their further forecasting are powerful tools for state regulation of energy production and consumption, prevention of energy crises, and economic losses.

To identify the nature of changes in domestic business entities' and individuals' energy consumption before and during the coronavirus crisis, we have conducted a study of electricity consumption dynamics in 2018–2020. Using the data on monthly electricity consumption/production in Ukraine, we identified the corresponding fluctuations using the Butterworth filter (based on methodological approaches [16, 29-40; 48-58]). In particular, we analyzed the influence of coronavirus and quarantine restrictions on the cyclical components of electricity consumption by the Ukrainian population (Fig. 1).

Fig. 1 shows that the smallest amplitude of fluctuations was observed in 2020 since deviations from the trend component were within 5%. However, there were differences in electricity consumption in 2020 compared to previous periods. Since the announcement of quarantine measures in March, the population's electricity consumption has started to increase, despite the fact that in previous years at the end of March (end of the heating season), electricity consumption decreased. In 2018-2019, the cyclical minimum of electricity consumption was in May, after which this indicator began to rise. In 2020, the cyclical minimum of electricity consumption was in June.

²The publication was prepared in the framework of the research project № 2020.01/0135 "Formation of economic mechanisms for sustainable development of renewable energy in the conditions of global and local threats to energy security of Ukraine", funded by the National Research Foundation of Ukraine

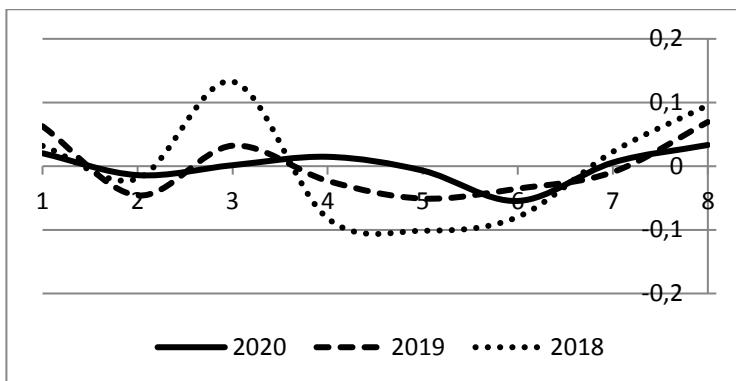


Figure 1 – Fluctuations in electricity consumption by the Ukrainian population (for all consumer groups) in 2018–2020 (for 8 months of each year) (developed by the authors)

Let us consider the cyclical component of electricity consumption by the Ukrainian industry (Fig. 2).

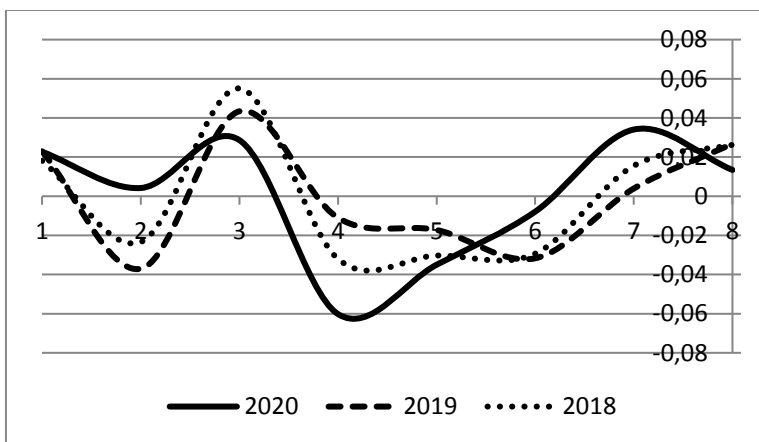


Figure 2 – Fluctuations in electricity consumption by the Ukrainian industry (for all consumer groups) in 2018–2020 (for 8 months of each year) (developed by the authors)

Fig. 2 shows that in 2020, the Ukrainian industry failed to reach its usual

maximum cyclical values of electricity consumption in March 2020 (the decline was at 6% of the trend level). Instead, quarantine measures in May and June caused minimal cyclical values of electricity consumption. In addition, the cyclical component of industrial electricity consumption in 2020 was different from the ones in two previous years.

Thus, the coronavirus crisis has made its specific adjustments in electricity consumption by the two groups of consumers discussed above. From the point of view of energy and economic security, the current crisis is forcing energy companies to restructure their normal work modes considering the new peaks of energy demand. Each wave of the coronavirus crisis is projected to lead to an increase in households' energy consumption and, accordingly, a reduction in the energy load of industrial enterprises.

The probability of illness of employees of energy generating companies threatens the normal work rhythm of the entire energy and economic system. That is why energy companies need to pay more attention to the introduction of Smart-grid technologies to ensure the country's energy and economic security.

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