



## **Energy and Covid 19 – Analysis of the Impact on the Global Energy Matrix**

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### **1. Introduction**

The great pandemics that devastated humanity allowed the analysis of their historical impacts in human, social, and economic fields. However, the impact on the area of consumption and generation of energy was not explicitly explained. In a way, it is understandable because, until the eighteenth century, energy consumption was in a primary stage in the way man used it.

In the 19th and until the middle of the 20th century, even though the use of energy by man, complexity and impact on human life was low compared to what we see in the second half of the 20th century until today.

The question to be answered in this article is whether health and sanitation crises affect or alter the use, demand, and consumption of present and/or future energy, and how. To carry out a correlation, we must define the scope of the areas of analysis and the time of their application considered by this study.

### **2. Methodology**

This research was carried out through the search for systematic literature review, a bibliographic and documental survey [1,2]. The following electronic databases were selected as sources of scientific data: Google Scholar, Web of Science, and INIS. The query strategy consisted in the use of search tools for keywords related to the topic, with the primary descriptors "pandemics and society", "Covid-19", "energy consumption and economy", "energy matrix" and "electricity", as well as others to expand the themes. Other materials from different sources also supported, such as the content expressed in books, interviews with scientists, and reports.

The research was carried out from December 2019 to July 2021. From the content analysis, the information from these documentary and bibliographic references, when they presented the same objective approach of this study, was systematized, and correlated.

### **3. Results and Discussion**

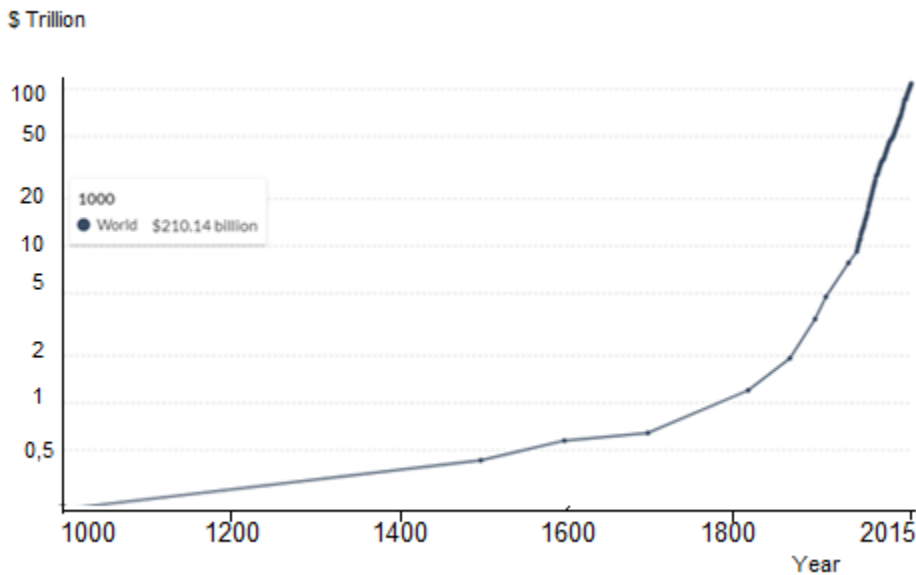
Diseases, or rather the germs that cause them, are not prejudiced of any kind; they are indifferent to us and our well-being, but we must respect them as skillful opponents and of great strength and resilience. They have been present in the world for a long time before humanity even existed. COVID-19, a disease of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which still affects humanity, is the pandemic of the 21st century, identified in Wuhan, Hubei province in December 2019, China [3,4].

To analyze the impacts of the pandemic on the global energy matrix, verifying whether they will be permanent and the characteristics of these changes for the daily lives of humanity, and whether nuclear energy will have greater participation in the matrix after the pandemic.

### 3.1 World Energy Demand and the Energy Matrix

Energy is fundamental for human development; its availability determines access to health, food, education, safety, and well-being [5]; this relationship became evident after the British Industrial Revolution, 1760, based on energy from the coal, and from which energy has become a key production factor [6], as Fig. 1 demonstrates, the inflexion of the World Gross Domestic Product (GDP) curve starts from mid- from the 18th century.

The correlation of energy with the economy causes it to be "evil" economic. It is economic good, capable of improving the standard of living of billions of people. Energy drives economic productivity and industrial growth and is fundamental to the functioning of any economy [7]. Ensuring universal access to electricity, especially for billions of people in developing countries who do not have access to services or whose consumption levels are far below industrialized countries, is a crucial goal that can spur growth and transformation in our World [8].



**Figure 1** – World GDP in the millennium last [9]

Sources: World GDP - Our world in data based on World Bank and MADDISON; OurWorldInData.org/economic-growth [10]

The global energy matrix is shown in Fig. 2, but it is necessary to discuss that the matrix format is not static. It will necessarily change, seeking to meet essential priorities and, necessarily, essential for the maintenance of human society.

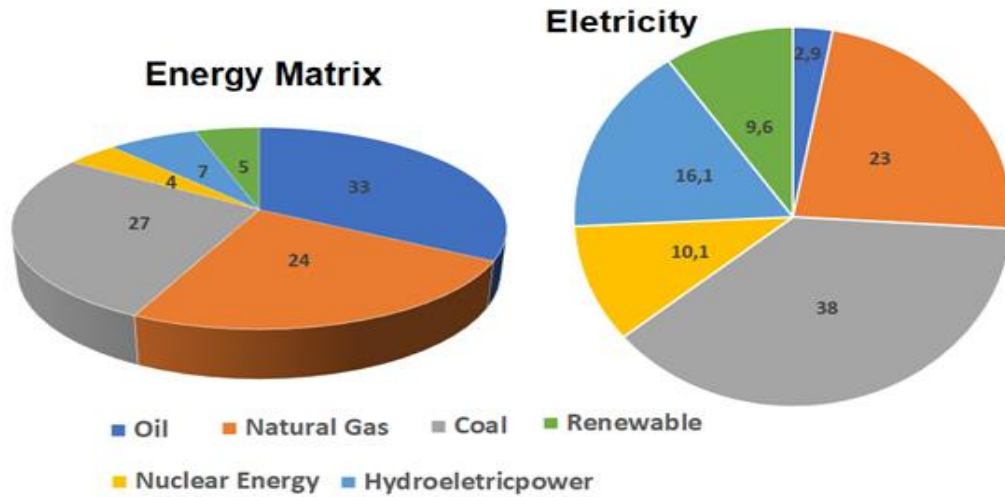


Figure 2 –Global Energy Matrix

Source: bp. Plc – Statistical Review of World Energy 2020 | 69th edition [11]

The effects of the new coronavirus pandemic go beyond health, economic, political, and environmental areas, reaching society. Specifically, the energy, electrical and thermal supply sector, both for transport and production, or for services and related and for social use, suffered notable impacts, not necessarily the same, although they are essential to guarantee the needs of society and individuals [12].

Fig. 3 shows the variation in CO2 emissions generated by the major (financial) crises that occurred in recent decades, the figure indicates that during crisis there is a reduction in CO2 generation to the atmosphere, but that just after the generation curve returns to its growth trend [13].

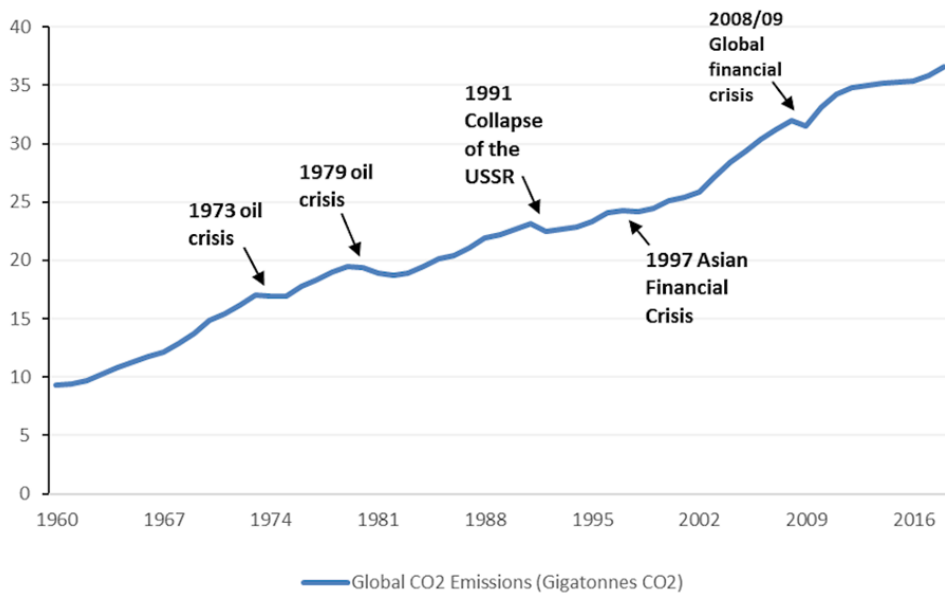


Figure 3 – CO2 Emissions and Previous Economic Crises [13]

### 3.2 The Antagonistic Reality of the Post Pandemic Energy Matrix

All predictions for the World reaction, in the economic and social view, the pandemic, antagonized the energy supply, a situation that proved to be greater and more impactful than the health emergency itself, which should extend the time for society's return to the usual conditions, generating an increase in inequality in the world.

The situation demonstrated is not something foreign to the energy market supply or demand crises are relatively frequent, governments should avoid that in the future, people have a perception that reaching the targets for emission of effect gases greenhouse has a high economic cost.

### 4. Conclusions

The verification of the permanent growth of CO<sub>2</sub> generation, even after crises of economic impact, confirms that the energy matrix will not change due to the COVID-19 epidemic, decline during the acute phase of the pandemic, happened due to the economic slowdown and not a structural change in how the world fuels its cars or produces the electricity it consumes. But the current indicators of the Intergovernmental Panel on Climate Change 2021, and the climate reality that we see daily, demonstrate that our consumption of energy based on fossil fuels will have to decrease and that we depend on a policy that develops new tools and takes advantage of existing ones. Show effectives in mitigating the impacts of this energy migration, being evident that nuclear energy has an important position in the portfolio of energy generation sources for the future of the world.

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