

# NEW EUROPEAN UNION GREEN DEAL IN TOUGH TIMES OF COVID-19 PLAGUE

Zenon Foltynowicz<sup>1</sup>

<sup>1)</sup> Poznan University of Economics and Business, Poland E-mail: zenon.foltynowicz@ue.poznan.pl

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#### Abstract

The European Union has been trying for years to tackle the problem of progressive environmental degradation and climate change by introducing various types of strategies. With the creation of the new European Commission, another paradigm change occurred and the European Green Deal is to be a new European Union development strategy.

The overall objective of this paper is to make a case for the argument, that coronavirus Covid-19 pandemic will affect the implementation of the new EU green strategy.

On the basis of the review and critical analysis of source materials, the objectives of the European Green Deal will be presented in the article, as well as the diverse approach of different member countries to this new initiative.

As a result, the unexpected impact of a coronavirus pandemic on the implementation of this strategy is demonstrated. It can be concluded that the lessons learned from the crisis will help us return to the normal functioning of our societies and economies, and sustainable development after the end of the pandemic, if at all.

#### Keywords

European Green Deal, EU development strategy, coronavirus pandemic, Covid-19

#### **JEL Classification** 050, 056

#### Introduction

The title of the article is a paraphrase of the title of the well-known novel by Gabriel García Márquez "Love in the time of the plague" (Spanish: El amor en los tiempos del cólera). The author describes a seemingly stable reality into which, however, from time to time cholera epidemics and civil wars creep in. The present (April 2020) situation seems to be similar, not just in the European Union (EU). The purpose of this article is to show how coronavirus Covid-19 pandemic will affect the implementation of the new EU green strategy.

The European Green Deal proposed by the European Commission (EC) at the end of 2019 was to lead to such a stable reality by 2050. Europe is to become the first climate-neutral continent by 2050 (EGD, 2020).

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For years, the European Union has been trying to fight the problem of progressive environmental degradation and climate change by introducing various types of strategies. We had IPP - an Integrated Product Policy, a Europe of "recycling", a Resource Efficient Europe (Muradin, 2019). In 2012, the strategy of bioeconomics, otherwise known as the bioeconomy or the green economy, was pompously introduced (Carus and Dammer, 2018). It was trusted that if the large-scale introduction of bioplastics - biodegradable, compostable, generally "organic" – began, the problem of waste packaging materials will be solved. Bioeconomy was a response to the need to implement a Sustainable Development strategy following the Rio Declaration (EC, 2019a).

As part of the implementation of the Sustainable Development Strategy, it was stated that the traditional, linear consumption model should be abandoned and instead a closed-loop approach should be applied. And so the idea of a new economy was born, commonly known as the circular economy (CE) (Ellen MacArthur Foundation, 2013). As part of this trend, the slogans "Europe without waste" or "no packaging solution" appeared (COM, 2014). The European Union quickly got involved in the CE, seeing it as an opportunity to support the sustainable development strategy (EC, 2015). Among other things, the European Commission set a target of 2030 to increase the recycling of plastic packaging stating that "the only long term solution is to reduce plastic waste by recycling and reusing more." (EC, 2019b). A European Strategy for Plastics in a Circular Economy (EC, 2019b.) is a derivative of Ellen MacArthur Foundation The New Plastics Economy: Rethinking the future of plastics Ellen MacArthur Foundation, 2018. Among the strategy points, several of them directly concern packaging. The assumptions of the strategy are already generally known. The strategy's goal is, among others, to ensure that all plastic packaging will be recyclable by 2030 (EC, 2019b). It is also expected to contribute to achieving the goals of Sustainable Development and the Paris Agreement by 2030 (EC, 2019b).

At the same time, bioeconomics is also gradually transforming into a circular bioeconomy (Carus and Dammer, 2018). In parallel with the implementation of the Sustainable Development strategy, the fight is underway to reduce greenhouse gas emissions to prevent climate change. It is necessary to reduce  $CO_2$  emissions to prevent an average temperature rise of 2 °C by 2050 to avoid a climate catastrophe. At the COP21 summit in Paris, world leaders pledged to stop global warming at 1.5 °C by the end of the century. However, actions taken so far do not seem to be sufficient. With the above in mind, let's consider what actions should be taken to successfully implement EU Green Deal when hopefully the pandemic is over?

#### New paradigm

On November 28, 2019, the European Parliament announced a state of climate crisis through a special resolution (EP, 2019). In this document, Parliament called on the European Commission to act decisively in the area of climate and environmental protection. EU should cut emissions by 55% by 2030 to become climate neutral by 2050 as well as reduce global emissions from shipping and aviation. EP decided to set an example in the adopted document and undertook to replace the vehicles he used with zero-emission ones. He also called for the establishment of one seat for the EP, as MEPs are constantly traveling between Brussels and Strasbourg. As many as 429 MEPs voted for the resolution. This shows that the EU institutions are starting to take the topic of climate protection seriously. This shows how important climate is on the political agenda of the European Union.

With the creation of the new European Commission and the entrustment of Ursula von der Leyen as the President, another paradigm change occurred leading to The European Green Deal as a new EU development strategy. Goals that can be found in the European Green Deal are the following (EGD, 2020):

1. Achieving climate neutrality by 2050 - The Commission was expected to present a draft of the first-ever European climate law in March 2020;

2. Protection of human life, animals, and plants by limiting pollution;

3. Supporting companies on the path to global leadership in the field of clean products and technologies;

4. Ensure that the transformation takes place fairly and inclusively.

To achieve these goals, it will be necessary, among others, to reduce the emission of the energy sector, thermo-modernization of buildings, supporting the development of the green economy (through investments in ecological technologies, such as renewable energy sources, recycling) and the introduction of clean forms of transport (e.g. electric vehicles). The implementation of this strategy will entail huge financial outlays, which may be difficult for many national economies to bear.

A new financial instrument supporting those EU countries for which decarbonization is a particularly difficult challenge is to be the Just Transition Fund, which will count EUR 100 billion (EC, 2020a). They will be allocated to energy transformation mainly in the countries of Central and Eastern Europe in the next seven years.

The Commission also planned to implement the Sustainable Europe Investment Plan, under which the EC will invest EUR 260 billion a year (EC, 2020b).

Poland, initially also Hungary and the Czech Republic, raised objections to the New Green Deal. What were Poland's fears? As we know, Poland's energy mix is based on 90% on coal energetic, emitting CO<sub>2</sub> amounts to 1,433,105,066 tonnes CO<sub>2</sub>eq. annually (KOBIZE, 2020). The government decided that moving away from coal energy in such a short time and switching to renewable energy would be practically impossible. Are these fears valid?

Here I would like to raise the following two issues. Initially,  $CO_2$  emissions were regulated by the Kyoto Protocol, which proved to be inefficient and which we are slowly forgetting (Napoli, C., 2012). The second case: the cause of the destruction of the ozone layer turned out to be freons. In the fight for the prevention of the formation of an ozone hole, the implementation of the Montreal Protocol has proven successful, requiring the withdrawal of freons from use and replacing them with ecological substitutes (Wachowski et all, 2001). We are now hearing less and less about this problem, and the hole in the ozone layer has recovered (UN, 2018)!

An interesting thing from the past is also the so-called National Emission Ceilings Directive (EEA, 2001), which was introduced to reduce  $SO_2$  emissions, mainly to prevent acid rain. The assumptions were radical, namely the reduction of emissions was to be as much as 35%. For Poland, at that time it was not feasible because many species burned in coal power plants are highly sulfated. Also, crude oil imported to Poland contains large amounts of sulfur.

The problem seemed impossible to overcome. However, Norwegian funds came to the rescue. Poland used them for pro-ecological investments, including for flue gas desulphurization from power plants. Thanks to the installed installation, not only  $SO_2$  has been captured completely, but also huge amounts of gypsum were obtained (byproduct), which are used by construction. In this way, Poland has met the requirements of the "sulfur directive" in 2010 (OECD, 2015). Besides, sulfur is extracted in the Lotos refinery in such quantities that meet the needs of the Polish chemical industry! For this reason, it was possible to close the sulfur mine in Tarnobrzeg!

It should, therefore, be hoped that also this time fate will smile at Poland, the government will make the right decision about joining New Green Deal, which will allow Poland to benefit from significant financial support, especially for moving away from coal. As already mentioned, in the case of Poland it will not be an easy process, even though coal production in Poland is falling. In 1993, 131,000 tons of coal was mined, and in 2019 it was over half as much - 61,000 tons. In recent years, however, imports have increased from both Russia and even Australia! The future of coal in Germany, Poland and the Czech Republic, the

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European coal heartland, have been explored by Osicka (Osicka et all., 2019). The Czech Republic, Hungary, and Poland – all coal-reliant countries – want to win financial guarantees before backing the Green Deal.

Indeed, initially, the Polish government intended to go at its own pace. However, the latest (beginning of April) announcements indicate that it will support the assumptions of the New Green Deal.

## The European Green Deal

The new European Commission President Ursula von der Leyen announced the European Green Deal on the 11<sup>th</sup> of December, 2019 (EC, 2019d).

The figure below illustrates the various elements of the Green Deal.

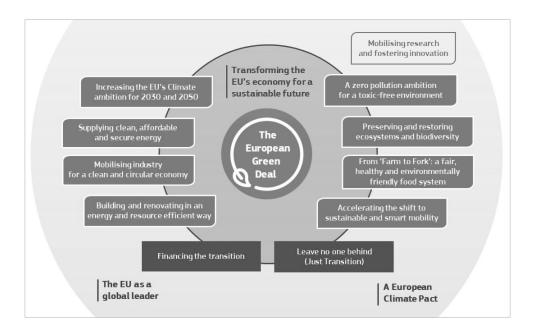


Fig. no. 1 The European Green Deal Source: COM, 2019

A description of the strategy elements concerned can be found in the EC Communication (COM, 2019), therefore they will not be discussed in detail. Only two important points will be mentioned: the new climate policy and support for the circular economy. Circular Economy is claimed as the number one priority of the European Green Deal (ECOS, 2019). To make the circular economy a reality, the next Circular Economy Action Plan (CEAP) had been expected in March 2020 (EC, 2020c). In a new CEA Plan for a Cleaner and More Competitive Europe legislative and non-legislative measures targeting areas, where action at the EU level may bring real added value, were planed (EC, 2020c). In addition to CEAP, in March 2020 they were to be presented, among others, Proposal on a European 'Climate Law' enshrining the 2050 climate neutrality objective, EU Industrial Strategy, EU Biodiversity Strategy for 2030, and the European Climate Pact launched (EC, 2019c).

#### A bull in a china shop

However, "a bull in a china shop" suddenly appeared! Maybe not literally "a bull", but something tiny, namely a virus in Chinese Wuhan. Initially underrated, it turned into a pandemic. Fate likes to mock ambitious plans, including achieving climate neutrality by 2050, and in this case, he did it with a coronavirus. It poses the greatest threat to public health, which entails a serious threat of a painful economic recession as well as other consequences. Questions arise about how has the pandemic and resulting economic meltdown will affects markets for renewable energy, clean transportation, sustainable food systems, and the circular economy (GreenBiz, 2020)? How and how much will their development and deployment be hampered? It's a mixed bag, with some technologies suffering and others continuing their relentless growth. For example, the originator of the Zoom platform, which became extremely popular in the era of e-learning during home quarantine, unexpectedly became a billionaire.

GreenBiz analysts (GreenBiz, 2020) expect in the coming months' dynamic market changes. They (GreenBiz, 2020) wonder, among others:

• How the record-low price of oil is impacting markets for EVs and clean-energy solutions as well as recycled plastics

• How the virtual shutdown of foodservice operations and restaurants is changing consumption patterns and disrupting food waste programs

• How the economic downturn is impacting venture investments in clean technologies

• How volatile energy markets will impact the uptake of clean energy and transform corporate procurement options

• How recycling and materials recovery systems are shifting due to health concerns

• The changing dynamics of reusables in the age of contagion

Skeptics say that the European Green Deal has no chance to take off in the first half of 2020. It is simply unreal because of the crisis ahead. Citizens will expect economies to return to normal levels and activity as soon as possible, whereas Climate Policy will put a heavy burden on national economies, while money is needed today for citizens and businesses to counter the effects of the coronavirus.

The leaders of the 27 European Union countries during the last (26/03/2020) meeting of the European Council (Consilium, 2020), which due to circumstances had to be held remotely, agreed that the coronavirus is the Community's most pressing problem and the reconstruction of the European economy should be based on very specific principles. The priority now is to fight the coronavirus pandemic and its immediate consequences. The Commission reacts with a proposal for a Coronavirus Response Investment Initiative that will provide 37 billion euro of investment under cohesion policy to address the consequences of the crisis. 7.5 billion euros are to be launched immediately.

However, supporters of the European Green Deal say that it will not be an economic burden at all, but a solution that will alleviate the coming economic crisis. Investments that are part of climate policy are perceived by them as a kind of anchor of stability, which the entire European Union has been preparing to adopt for years, adopting regulations and obligations, such as climate law, which aims to make the goal of climate neutrality by 2050 irreversible to give confidence to private sector investors.

#### Unexpected coronavirus environmental effects

Industry lockdown due to the coronavirus has unexpected positive environmental side effects. There's an unlikely beneficiary of coronavirus: The planet (CNN, 2020). Coronavirus temporarily reduced China's CO2 emissions by 25 percent over the first four-week period as well as a dramatic reduction in nitrogen dioxide emissions was observed (IEEE, 2020). Coronavirus could trigger the biggest fall in carbon emissions since World War Two,

however, the decline could be short-lived (Weforum, 2020). Also, air pollution has decreased in urban areas across Europe during the coronavirus period (Reuters, 2020). For the first time in almost 30 years, residents in the Punjab, northwestern state of India can actually see the Himalayan Moutain Range (Sarakshi Rai, 2020). There are reports of other similar phenomena from around the world.

# Conclusions

The European Green Deal is to be a new European Union development strategy. However, its implementation from the beginning of 2020 was unexpectedly interrupted by the outbreak of the coronavirus epidemic. Due to the necessity in lockdown, it has a significant impact on the global economy, which falls in crisis. The article deals with Green Deal only for the EU. It should be noted, however, that the issues of climate change mitigation are also present in the election programs of US presidential candidates. The Green New Deal and China's Green Revolution also are affected by Covid-19 pandemic.

The issues of coronavirus pandemic impact discussed not only on EU New Green Deal but also on other aspects are very actual topics, so this is a research contribution to the literature. However, we should begin to prepare the necessary means to return to the normal functioning of our societies and economies and sustainable growth, taking into account, inter alia, ecological and digital transformation and learning all lessons from the crisis. This will require a coordinated recovery strategy, a comprehensive recovery plan, and unprecedented investment.

However, the question arises what will happen to climate change mitigation policies, when big industries and major national economies of the world want to rapidly speed up the production and growth after the lock-downs are over? Are we simply going to back to intensive emissions increases and other unsustainable business and policy practices that directly or indirectly created the current crisis? COVID-19 is a very clear example of the interdependency and the mutual feedback loops between environmental, economic, and social dimensions of sustainability.

## References

- Carus, M. and Dammer, L., 2018. *The "Circular Bioeconomy" Concepts, Opportunities and Limitations*, Nova paper #9 on bio-based economy 2018-01, [online] Available at: <a href="http://bio-based.eu/?did=120804&vp\_edd\_act=show\_download">http://bio-based.eu/?did=120804&vp\_edd\_act=show\_download</a> [Accessed 3 April 2020].
- CNN, 2020. *There's an unlikely beneficiary of coronavirus: The planet*, [online] Available at: <a href="https://edition.cnn.com/2020/03/16/asia/china-pollution-coronavirus-hnk-intl/index.html">https://edition.cnn.com/2020/03/16/asia/china-pollution-coronavirus-hnk-intl/index.html</a> [Accessed 3 April 2020].
- COM, 2014. Towards a circular economy: A zero waste programme for Europe, [online] Available at: <a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3</a> A52014DC0398> [Accessed 3 April 2020].
- COM, 2019. *The European Green Deal*, COMMUNICATION 640, [online] Available at: <a href="https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52019DC0640&from=EN>">EN></a> [Accessed 14 April 2020].
- Consilium, 2020. Video conference of the members of the European Council, 26 March 2020, [online] Available at: <a href="https://www.consilium.europa.eu/en/meetings/">https://www.consilium.europa.eu/en/meetings/</a> european-council/2020/03/26/> [Accessed 14 April 2020].
- EEA, 2001. Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants, [online]

Available at: <a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX</a> %3A32001L0081> [Accessed 3 April 2020].

- EC, 2015. *First Circular Economy Action Plan*, [online] Available at: <a href="https://ec.europa.eu/environment/circulareconomy/first\_circular\_economy\_action\_plan.html">https://ec.europa.eu/environment/circulareconomy/first\_circular\_economy\_action\_plan.html</a> [Accessed 3 April 2020].
- EC, 2019a. *Towards a sustainable Europe by 2030*, [online] Available at: <a href="https://ec.europa.eu/info/publications/towards-sustainable-europe-2030\_en">https://ec.europa.eu/info/publications/towards-sustainable-europe-2030\_en</a> [Accessed 3 April 2020].
- EC, 2019b. A European Strategy for Plastics in a Circular Economy. [pdf] Available at: <a href="https://ec.europa.eu/commission/sites/beta-political/files/plastics-factsheet-challenges-opportunities\_en.pdf">https://ec.europa.eu/commission/sites/beta-political/files/plastics-factsheet-challenges-opportunities\_en.pdf</a>> [Accessed 3 April 2020].
- EC, 2019c. Annex to the Communication on the European Green Deal Roadmap Key actions, [online] Available at: <a href="https://ec.europa.eu/info/publications/">https://ec.europa.eu/info/publications/</a> communicationeuropean-green-deal en> [Accessed 3 April 2020].
- EC, 2019d. A European Green Deal. [online] Available at: <a href="https://ec.europa.eu/">https://ec.europa.eu/</a> info /strategy/priorities-2019-2024/european-green-deal\_en> [Accessed 3 April 2020].
- EC, 2020a. European Green Deal Just Transition Fund, [online] Available at: <a href="https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12113-Fast-track-interservice-consultation-on-the-SEIP-including-a-JTM-and-the-JTF->">https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12113-Fast-track-interservice-consultation-on-the-SEIP-including-a-JTM-and-the-JTF-></a> [Accessed 3 April 2020].
- EC, 2020b. Financing the green transition: The European Green Deal Investment Plan and Just Transition Mechanism, [online] Available at: <a href="https://ec.europa.eu/regional\_policy/en/newsroom/news/2020/01/14-01-2020-financing-the-green-transition-the-european-green-deal-investment-plan-and-just-transition-mechanism">https://ec.europa.eu/regional\_policy/en/newsroom/news/2020/01/14-01-2020-financing-the-green-transition-the-european-green-deal-investment-plan-and-just-transition-mechanism</a>> [Accessed 3 Apr 2020].
- EC, 2020c. Circular Economy Action Plan for a Cleaner and More Competitive Europe. [pdf] Available at: <a href="https://ec.europa.eu/environment/circular-economy/pdf/new-circular-economy">https://ec.europa.eu/environment/circular-economy/pdf/new-circular-economy</a> plan.pdf> [Accessed 3 Apr 2020].
- ECOS, 2019. *Circular Economy, number one priority of the European Green Deal,* [online] Available at <a href="https://ecostandard.org/news\_events/circular-economy-number-one-priority-of-the-european-green-deal">https://ecostandard.org/news\_events/circular-economy-number-one-priority-of-the-european-green-deal</a> [Accessed 10 Apr 2020].
- EGD, 2020 European Green Deal, [online] Available at: <a href="https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\_en">https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\_en</a> [Accessed 3 April 2020].
- Ellen MacArthur Foundation, 2013. *Towards the circular economy 1*. [pdf] Available at: <a href="https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf">https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf</a> [Accessed 3 April 2020].
- Ellen MacArthur Foundation, 2018. *The New Plastics Economy: Rethinking the future of plastics*, [online] Available at: <a href="https://www.ellenmacarthurfoundation">https://www.ellenmacarthurfoundation</a>. org/ publications/the-new-plastics-economyrethinking-the-future-of-plastics> [Accessed 3 April 2020].
- EP, 2019. *The European Parliament declares climate emergency*, [online] Available at: <<u>https://www.europarl.europa.eu/news/en/press-room/20191121IPR67110/the-european-parliament-declares-climate-emergency>[Accessed 3 April 2020].</u>
- GreenBiz, 2020. Coronavirus and the Clean Economy, [online] Available at: <a href="https://www.greenbiz.com/webcast/coronavirus-and-clean-economy">https://www.greenbiz.com/webcast/coronavirus-and-clean-economy</a> [Accessed 14 April 2020].

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- IEEE, 2020. *The Coronavirus Outbreak Is Curbing China's CO<sub>2</sub> Emissions*, [online] Available at: <a href="https://spectrum.ieee.org/energywise/energy/environment/">https://spectrum.ieee.org/energywise/energy/environment/</a> coronavirus-outbreak-curbing-china-co2-emissions> [Accessed 15 April 2020].
- KOBIZE, 2020. Poland's National Inventory Report 2019. The National Center for Emissions Management. [pdf] Available at: <a href="https://www.kobize.pl/uploads/materialy/materialy\_do\_pobrania/krajowa\_inwentaryzacja\_emisji/NIR\_POL\_2019\_23.05">https://www.kobize.pl/uploads/ materialy/materialy\_do\_pobrania/krajowa\_inwentaryzacja\_emisji/NIR\_POL\_2019\_23.05</a> .2019.pdf> [Accessed 3 April 2020].
- Muradin, M. and Foltynowicz, Z., 2019. The Circular Economy in the Standardized Management System. *Amfiteatru Economic*, 21(special issue no.13), pp.871-883.
- Napoli, C., 2012. Understanding Kyoto's Failure. SAIS Review of International Affairs, 32(2), pp.183-196.
- OECD, 2015. Environmental Performance Reviews: Poland 2015, [online] Available at: <a href="https://www.oecd.org/poland/oecd-environmental-performance-reviews-poland-2015-9789264227385-en.htm">https://www.oecd.org/poland/oecd-environmental-performance-reviews-poland-2015-9789264227385-en.htm</a>> [Accessed 3 April 2020].
- Osička, J., Kemmerzell, J., Zoll, M., Lehotský, L., Černoch, F. and Knodt, M., 2020. What's next for the European coal heartland? Exploring the future of coal as presented in German, Polish and Czech press. *Energy Research & Social Science*, 61. Article Number: 101316.
- Reuters, 2020. Coronavirus lockdowns give Europe's cities cleaner air, [online] Available at: <a href="https://www.reuters.com/article/us-health-coronavirus-air-pollution/coronavirus-lockdowns-give-europes-cities-cleaner-air-idUSKBN21G0XA">https://www.reuters.com/article/us-health-coronavirus-air-pollution/coronaviruslockdowns-give-europes-cities-cleaner-air-idUSKBN21G0XA</a> [Accessed 12 April 2020].
- Sarakshi, R., 2020. The Himalayas are visible from India for the first time in 30 years because of Covid-19 lockdown, [online] Available at: <a href="https://www.esquireme.com/content/45334-the-himalayas-are-visible-from-india-for-the-first-time-in-30-years-because-of-covid-19-lockdown">https://www.esquireme. com/content/45334-the-himalayas-are-visible-from-india-for-the-first-time-in-30-yearsbecause-of-covid-19-lockdown</a>> [Accessed 12 April 2020].
- UN, 2018. Ozone layer finally healing after damage caused by aerosols, [online] Available at: <a href="https://www.theguardian.com/environment/2018/nov/05/ozone-layer-healing-after-aerosols-un-northern-hemisphere">https://www.theguardian.com/environment/2018/nov/05/ozone-layer-healing-after-aerosols-un-northern-hemisphere</a> [Accessed 3 April 2020].
- Weforum, 2020. Coronavirus could trigger biggest fall in carbon emissions, [online] Available at: <a href="https://www.weforum.org/agenda/2020/04/coronavirus-could-trigger-the-biggest-fall-in-carbon-emissions-since-world-war-two-according-to-experts-d9b4629e47/>[Accessed 15 April 2020].">https://www.weforum.org/agenda/2020/04/coronavirus-could-trigger-the-biggest-fall-in-carbon-emissions-since-world-war-two-according-to-experts-d9b4629e47/>[Accessed 15 April 2020].</a>
- Wachowski, L., Kirszensztejn, P. and Foltynowicz, Z., 2001. Ecological replacements of ozone-depleting substances. *Polish J. Env. Study*, 10(6), pp.415-435.