Russia's war in Ukraine: An overview of climate impacts

Nadia Litim [1]
Faculty of law of Badji-Mokhtar, Annaba (Algeria)
E-mail: nadia.litim@univ-annaba.dz

Received: 24./03/2023 *Accepted: 07./06/2023* *Published:15./06/2023*

Abstract

This research paper aims to highlight the different impacts of Russian's war on Ukraine and analyze its consequences on the climate change. In fact, this current war, began on February 24, 2022 has unexpected impacts on global climate.

The research paper used the descriptive method and reached a number of conclusions and proposals, the most important of which is that however, the Russian's invasion of Ukraine has some positive consequences on the climate change, especially in clean energy transition, it unfortunately inflicted catastrophic impacts not only on the Ukraine's environment but also, it is putting the future of global climate at risk. This war increased significantly the fossil fuels consumption and contributed to the slow implementation of the global climate agenda. In addition, it caused a large amount of greenhouse gases emissions that warm the Earth's atmosphere and accelerate the global climate change.

Keywords: Climate; Impact; Russian; Ukraine; War.

***Corresponding author**: Nadia Litim, **e-mail:** nadia.litim@univ-annaba.dz.*

. INTRODUCTION:

Russia's war of Ukraine, began on February 24, 2022 had several consequences which extended beyond the borders of Ukraine to the entire world. After more than years ago, the Russia's invasion still causes not only catastrophic human consequences and humanitarian crisis, but also it has significant impacts on the climate change.

However, this war damaged the Ukraine environment and destroyed its natural ecosystems and polluted the environment; each military

operation causes pollution of air, water, and land with toxic substances and increases the amount of greenhouse gas emissions in the atmosphere which are considered as the main cause of the current climate change, it led to several positive consequences on climate change.

- The importance of study:

One of the most important benefits of this study is to recognize the unexpected impacts of Russian invasion of Ukraine on the climate change. Especially, this study allows to discover both positive and negative consequences of this war on the global warming, which is considered today as the biggest threat to human existence.

- The problem statement:

This research paper aims to highlight the different impacts of Russian‘s war on Ukraine and analyze its positive and negative consequences on the climate change. In other word, the problem statement of this study is: **How does the Russian‘s invasion of Ukraine affect the climate change?**

This main problem statement is formulated in the research questions as follows:

- How does the Russia’s war of Ukraine increase the amount of green house gas emissions?
- What are the impacts of Russian‘s war on global climate agenda?
- How does the Russia’s invasion led to a rise in the fossil fuels consumption in the world?
-How can this war be used to mitigate the current climate change?

- The method of study:

The research paper used the descriptive method which is the appropriate choice in order to identify the different consequences of the Russia’s invasion of Ukraine on the climate change and define its different positive and negative impacts.

- The study plan:

The research paper is divided into two parts: The first one aims to study the negative impacts of Russia’s war on the climate change. The second part focused on the positive impacts of this war.

2. Negative impacts of Russia's invasion of Ukraine on the climate change:

Climate change has become one of the major challenges of the 21st century, not only for its environmental impacts, but above all for its expected negative consequences on food security, human health, economic growth, migration or social and international inequalities. (Jean-Marc Touzard, 2017, p. 3)

In fact, Russia's war on Ukraine has several negative consequences on the climate change. Some impacts can already be identified; such as: The increase of greenhouse gas emissions, the noticeable rise in the fossil fuels consumption and the slow implementation of the global climate agenda.

2.1 The increase of greenhouse gas emissions:

Sadly**,** Russia's invasion of Ukraine led to significant increase of greenhouse gas emissions in the atmosphere. For more than years ago, the full-scale war totals more than 100 million tCO2e. This is the equivalent of the total GHG emissions over the same period in a country like the Netherlands. The amount is also the equivalent of adding nearly 16 million cars to the UK's roads for two years. (Klerk, 2022, p. 4)

As a number of impacts of this war have not yet been taken into consideration, there figures are likely to underestimate the true level of emissions. The longer Russia's war continues, the higher final figures will be. (Klerk, 2022, p. 4)

It should be noted that the greenhouse gas emissions are the main cause of the current global warming, emitted by human activities. By burning fossil fuels and reducing CO2 absorption through deforestation, economic activity increases the concentration of greenhouse-gases (GHG), producing a net, increasing gain in global temperatures. (Aguayo, 2009, p. 98)

These emissions are accelerating faster than the worst scenarios projected by the Intergovernmental Panel on Climate Change. If the trend of the last 20 years continues, GHG emissions will increase between 40% and 60% from 2000 to 2050, producing an increase of between 2.5 and 4.5°C in the Earth's mean temperature compared with that of 2000. This

temperature increase could trigger irreversible, catastrophic changes in the atmosphere. (Aguayo, 2009, p. 98)

So, Russia's war of Ukraine has caused a large amount of warming gases to be released into the atmosphere. The war has led directly to emissions of 33 million tons of greenhouse gases that warm the Earth's atmosphere, claimed Ruslan Strilets, Ukraine's environmental protection minister. "Russia has turned our natural reserves into a military base. Russia is doing everything to shorten our and your horizons. Because of the war, we will have to do even more to overcome the climate crisis," he said. (Rannard, 2022)

GHG emissions from the Russian invasion of Ukraine include both emissions from preparation for the war (e.g., the relocation of troops, training activities, staging before the invasion, the manufacture of munitions and equipment, etc.) and the warfare (e.g., emissions from fuel combustion by armour and vehicles, logistics trucks and aircraft, emissions from the firing of munitions and explosions, etc.) and post-war emissions (e.g. emissions associated with the reconstruction activities). (Klerk, 2022, p. 23)

The following table explains the total warfare emissions resulted from the use of munitions and explosives in Ukraine during the current Russian war on Ukraine:

Table 1: Total GHG emissions from the warfare in 2022

	th. tCO2e %
Emissions from fuel consumption by the Russian Army	4,779
Emissions from fuel consumption by the Ukrainian Army	1,593
Emissions from Air Force	1,036
Pre-invasion force accumulation	136
Invasion and Russian troops' operational movement	74
Delivery of artillery munitions from temporary warehouses to the battlefield	18
Subtotal fuel consumption	7,636
Emissions from the use of artillery munitions	20
Emissions from the manufacture of artillery munitions	918,000
Emissions from the use of other munitions	5,933

Emissions from the manufacture of other munitions	275
Subtotal ammunitions	**1,219**

Source:
Lennard de Klerk & all, 2022, p. 13.

While the world is struggling to drastically reduce GHG emissions to limit the average global temperature increase to 1.5 ºC, these extra emissions caused by the war make it even more difficult to reach the goals of the Paris Agreement. (Klerk, 2022, p. 5)

It should be noted that the 2015 Paris Agreement offers hope that a comprehensive global effort is being made to combat climate change. The agreement calls for an ambitious 55% reduction in greenhouse gases by 2050. (Gordon, 2016, p. 13)

In addition, the Russian military attacks contribute dramatically to many forest fires and agricultural fires. In 2021, Ukraine lost 66.4kha of natural forests, (Ukraine, 2021). Between the start of the Russian invasion on February 24 and the end of May 2022, more than 160,000 hectares of Ukrainian forest burned down in regions affected by hostilities. (Hrynyk, 2023) This means more destruction of natural source of green house gas.

In otherwise, the increase in the atmospheric concentration of greenhouse gases, in particular CO2, contributes to further climate change. So, forest can effectively help stabilize the climate as a source of carbon emission. (Bouget, 2020, p. 86)

We should not forget that with Russian timber suppliers, contending with sanctions, the departure from the country of international certifying structures, and redirection of exports (primarily to China), this has increased the burden on forests in other regions of the world. (Davydova, 2023)

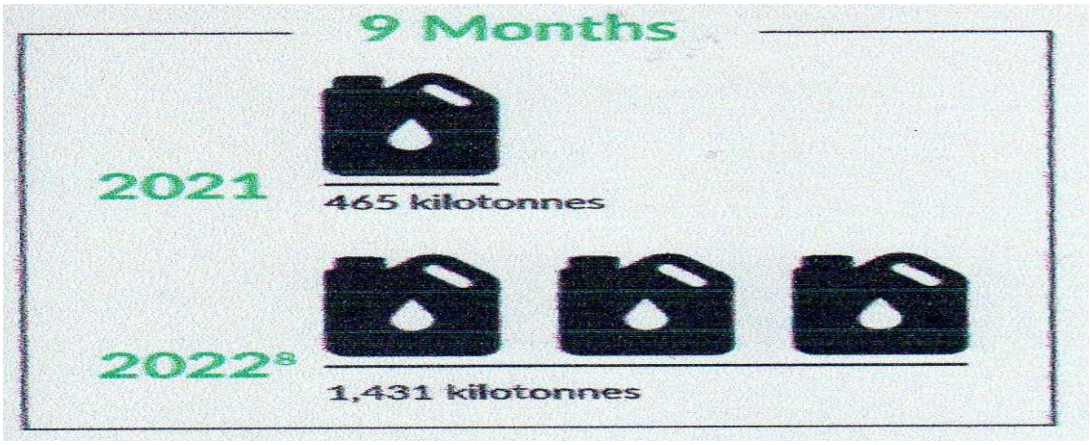
2.2 The rise in the Fossil fuels consumption:

Fossil fuels have since the Industrial Revolution shaped our economy and even our civilization, and getting rid of them raises profound and complex issues. Furthermore, at the moment no energy is at the same time abundant, clean, safe and (reasonably) cheap. (Schubert, 2017, p. 970)

It is also an essential component of military operations as they are used by tanks and armored vehicles, aircrafts, other military vehicles, as well as by logistics vehicles carrying munitions, soldiers, foods and other general cargoes. Consuming large quantities of fuel leads to significant greenhouse gases emissions and climate change impacts related to the war. (Klerk, 2022, p. 9)

Actual fuel consumption is likely to be significantly higher since additional supply routes used during the seven months of the Russian invasion included supplies from Belarus to the Northern Ukraine and supplies from temporarily occupied Crimea to the Southern Ukraine. Total fuel consumption could reach up to at least 1.5 million tonnes. (Klerk, 2022, p. 10) The following figure shows the higher increase of fossil fuels consumption during 9 month ago (2021-2022):

Fig.1. increase of fossil fuels consumption in 2021 & 2022



Source:
Lennard de Klerk & all, 2022, p. 9.

2.3 Slow implementation of the global climate agenda:

In the months following the invasion, it seemed that climate issues were slipping down the agenda, and that the financing of programs to reduce emissions (primarily in developing countries) would be cut, partly as a result of a sharp increase in spending by Western countries on arms. The

threat emerged of a slowdown in decarbonization. (Davydova, 2023)

In addition, the climate and biodiversity was not part of the official agenda at two recent major UN conferences on the environment: the COP27 climate change conference in November 2022 and the COP15 biodiversity conference in December 2022, the war in Ukraine has created new problems on the energy market and forced a new appraisal of the transition to renewable energy. (Davydova, 2023)

3. Positive impacts of Russia's invasion of Ukraine on the climate:

Fortunately, the Russian's war on Ukraine has some positive consequences on climate change, especially after the interrupt of supplies of natural gas from Russia to Europe, which forced the world to look for alternative sources of energy supply and accelerate the entire transition to renewable energy.

In addition, Ukraine rebuilding will create opportunities for green recovery and accelerate its transition to a clean and sustainable energy in the EU and worldwide.

3.1 Accelerating the clean energy transition:

It should clarify that war in Ukraine led on one hand, to encourage the use of fossils fuels and nuclear power. Europe has historically been very dependent on Russia to meet its energy needs. Natural gas represents about 20% of its energy mix (the different sources of energy that are used to make electricity) and in 2021, about 40% of all the natural gas imported by Europe came from Russia. (war, 2022)

When Russia invaded Ukraine, the European Union retaliated by imposing economic sanctions on the country, and particularly on its banks to hinder financial flows. As the war progressed, sanctions became harsher, many exports to Russia were banned, pipeline projects were stopped and several countries began boycotting Russian oil and gas. (war, 2022)

This situation forced Europe to look for alternative sources of energy supply. For example, the life-time of some nuclear power plants has been extended in Belgium and Germany, dormant coalfired power plants have been reactivated and Liquefied Natural Gas (LNG) supplies have been increased and will increase in the coming years. (Klerk, 2022, p. 6)

In addition, the global energy markets are transforming: Many countries have changed their oil and gas suppliers, and are hurriedly building infrastructure for liquefied natural gas, relaunching coal stations, considering extending the lifespan of nuclear power stations (or building new ones), and investing in new fossil fuel projects. (Davydova, 2023)

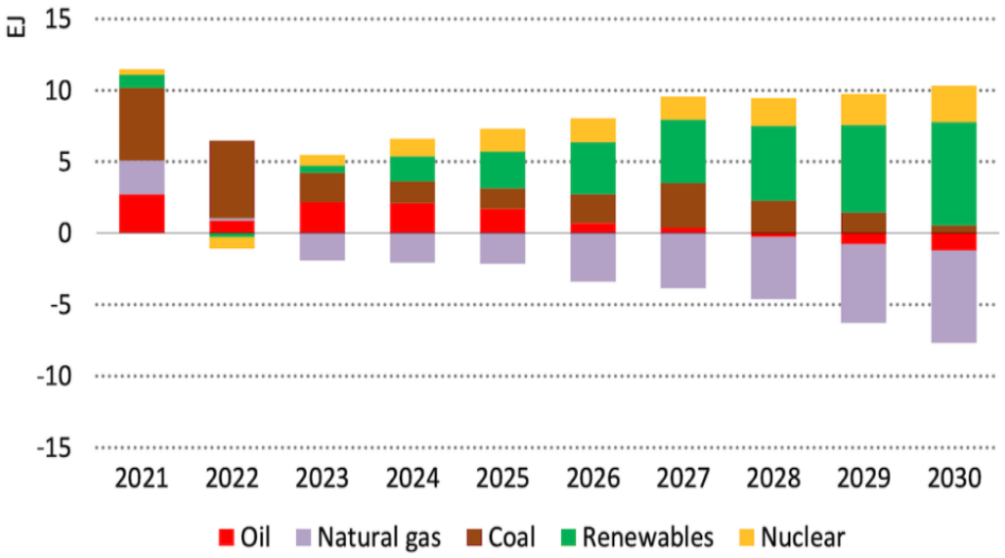
The desire to cut energy ties with Russia has disrupted the global fossil fuel market, leading to a sharp rise in gasoline and electricity prices. This has spurred general discontent among the population, fears of rising energy poverty, and trucker strikes. As a result, many governments are promising to cut taxes on fossil fuel. Even in California, a US state known for its commitment to climate action, the Governor recently proposed a US$400 yearly rebate per car to bring residents some relief. (war, 2022)

On the other hand, it seems that this encouragement of the fossils fuels consumption and nuclear power are temporary. Many countries are accelerating today its policies related to the entire clean energy transition.

In this context, the IEA's World Energy Outlook 2022 is predicting that fossil fuels will peak in the next five years, "thanks to" Russia's war and the resultant energy crisis. National climate promises are being turned into policies that improve energy security, which mostly means reducing dependence on gas. That means global energy demand growth to 2030 will "almost entirely" be met by renewable. (Evans, 2022)

This figure of the expectation of renewable energy demand shows that renewable energy transition will be higher for each year, than expected in 2021:

Fig.2. Global renewable energy transition to 2030



Source:
Simon Evans, 2022.

3.2 The green recovery of Ukraine:

The redirection of investment flows in Ukraine is very likely to occur after the war. For instance, a significant share of financial resources that were estimated to be required for the implementation of Ukraine's Nationally Determined Contribution (NDC) is likely to be redirected to the post-war reconstruction. Such long-term impacts bring significant risks of further adverse effects on the climate and growth of GHG emissions (e.g. due to a higher reliance on coal as a substitute for natural gas, slowing down the introduction of new climate policies, reliance on carbon-intensive infrastructure, etc). (Klerk, 2022, pp. 25-26)

In fact, the experts told that rebuilding Ukraine will cause significantly more emissions, up to 49 million tons of carbon dioxide. Since the start of the war in February, the country claims to have gathered evidence of 2,000 "environmental crimes" costing 37 million euros, including destruction of forests, release of toxic gases, and damage to water facilities. (Rannard, 2022)

Efforts should be made to reduce the likelihood of such risks

occurring, to create opportunities for green recovery of Ukraine and to accelerate the transition to a green sustainable economy in the EU and worldwide. (Klerk, 2022, p. 26)

Green recovery opportunities should be investigated and become materialized as part of international efforts to support the reconstruction of Ukraine after the war. Such opportunities could include reliance on low-carbon materials for the reconstruction of damaged and destroyed civilian infrastructure, support of distributed renewable energy generation and energy storage, and the use of climate finance instruments to attract additional investments. (Klerk, 2022, p. 26)

4. CONCLUSION

Finally, it seems clear that the impact of Russian‘s war on Ukraine extends beyond the borders of Ukraine to the entire world. However, this invasion has some positive consequences on the climate change, especially that many countries such as the EU members are increasingly convinced of the necessity to abandon the fossil fuels and promote the use of clean energy, it has negative impacts on climate change, especially it led to a significant augmentation of greenhouse gas emissions in atmosphere, which are considered as the main cause of the current climate change.

Unfortunately, at the moment of writing, the war on Ukraine is still going on, which means the amount of greenhouse gas emissions, will be on the rise.

In addition, the Russia’s invasion of Ukraine increased the fossil fuels consumption and contributed to the slow implementation of the global climate agenda.

Ukraine started collecting evidence of environmental crimes in order to seek compensation from Russia for damage caused, but who will compensate humanity for the global warming?

Unfortunately, the climate change is the greatest risk which threatens human life; it is not time to recul. All countries must continue to struggle in order to limit the global warming. **So, it is recommended to**:

-fulfill its obligations of Paris agreement on climate change in order to reduce the amount of greenhouse gas emissions by 2030;

-restrict its fossil fuel consumption and accelerate the clean energy transition;
-continue to execute the global climate agenda although the current war in order to limit the global warming.

5. Bibliography List:

- Journal article:

-Christophe Bouget & all (2020), Changement climatique: La biodiversité Forestière à La Croisée des Enjeux de Conservation et d'Atténuation, Sciences Eaux & Territoires, Ed. Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE), Paris, N°: 33.
-Francisco Aguayo (2009), Climate Change Mitigation and Institutions for Sustainable Development, Finance & Bien Commun, Ed. De Boeck Supérieur, Belgium, N°: 34-35.
-Frederick Gordon (2016), Climate Change Policies After The 2015 Paris Agreement, L'Europe en Formation, Ed. Centre international de formation européenne, Nice, France, N°: 380, 2016/2.
-Jean-Marc Touzard, Sophie Boutillier (2017), Focus: Innovations and Solutions for Climate Change, Journal of Innovation Economics & Management, Ed. De Boeck Supérieur, Belgium, N°: 24.
-Katheline Schubert (2017), The Energy Transition Agenda: An Economic Perspective, Revue d'économie politique, Ed. Dalloz, Paris, Vol.127, 2017/6.

- Internet websites:

- Angelina Davydova (2023), How Russia's War Is Impacting the Global Environmental Agenda, Available at: https://carnegieendowment.org/politika/88773 (Consulted on: 03/03/2023)
- Georgina Rannard (2022), COP27: War causing huge release of climate warming gas, claims Ukraine, Available at: https://www.bbc.com/news/science-environment-63625693 (Consulted on: 09/03/2023)
-Lennard de Klerk & all (2022), Climate Damage Caused By Russia'S War In Ukraine by Initiative on GHG accounting of war, Climatefocus, Available at:

https://climatefocus.com/wpontent/uploads/2022/11/ClimateDamageinUkraine.pdf (05/03/2023)
-Simon Evans (2022), Russia's war is accelerating the clean energy transition, says IEA, Energy post Available at: https://energypost.eu/russias-war-is-accelerating-the-clean-energy-transition-says-iea/ (Consulted on: 13/03/2023)
-The climate Consequences of the Ukraine-Russia War (2022), Climate trade, Available at: https://climatetrade.com/ukraine-russia-climate-consequences/ (Consulted on: 10/03/2023)
-Ukraine (2021), Global Forest Watch, Available at: https://www.globalforestwatch.org/dashboards/country/UKR/?category=fires (Consulted on: 15/03/2023)
-Yehor Hrynyk (2023), Russia's Invasion is Putting The future of Ukraine's Forests At Risk, Atlantic Council, Available at: https://www.atlanticcouncil.org/blogs/ukrainealert/russias-invasion-is-putting-the-future-of-ukraines-forests-at-risk/(Consulted on: 19/03/2023)