



CARBON EMISSIONS OF RUSSIAN MILITARY PREPARATIONS ACROSS THE BORDERS OF UKRAINE

December 2021 – February 2022



Carbon emissions of **136 193 tonnes of CO₂e** have been already emitted by Russian military troops located across the borders of Ukraine only in December 2021 – February 2022.

SPECIFIC SOURCES OF CARBON EMISSIONS



Diesel consumption due to the movement of tanks and armored vehicles



Relocation of military troops and vehicles by train



Fossil fuels' consumption for heating and cooking at temporary military bases



Diesel consumption by the navy ships' movement

BATTALION TACTICAL GROUP (BTG)

Militaries	850
Infantry fighting vehicles	33
Armored vehicles/ Tanks	11
Strela 10 missile systems	3
Grad systems	12
Gvozdika systems	12
Borisoglebsk-2 complexes	3
Ural vehicles	20

DIESEL CONSUMPTION OF BTG VEHICLES

Type of the vehicle	Consumption, liters/100 km
Infantry fighting vehicle	92
Armored vehicles/ Tank	400
Strela 10 missile system	110
Grad system	50
Gvozdika system	110
Borisoglebsk-2 complexe	100
Ural vehicle	40

EMISSIONS FROM DIESEL CONSUMPTION OF ARMORED VEHICLES AND MILITARY EQUIPMENT

Total carbon emissions – 34 790 tonnes of CO₂e.

The following assumptions were used for calculations:

- Movement of the vehicles from their permanent bases to the train stations and from the stations to the temporary bases constitutes 100 km;
- Everyday trainings foresee movement of all the vehicles at the distance of 10 km during 60 days;
- Diesel consumption per one battalion tactical group – approx. 9 tonnes/100 km;
- The quantity of the diesel corresponds to the fuel consumption by the vehicles that constitute 150 battalion tactical groups.

EMISSIONS FROM FOSSIL FUELS' CONSUMPTION FOR HEATING, COOKING AND FOOD AND WATER DELIVERY AT TEMPORARY BASES

Total carbon emissions – 52 522 tonnes of CO₂e.

Carbon emissions were calculated on the basis of the following assumptions:

- 130 000 militaries¹ accommodated in 6500 tents (20 person per tent);
- Heating and cooking are ensured by diesel generators;
- Diesel consumption per one tent – 50 liters/day;
- Food and drinking water consumption – 4 kg/person with a delivery at the distance of 100 km by HGV with a maximum load of 17 tonnes.

¹ According to the reports of mass media and estimation of experts and state officials

EMISSIONS FROM DIESEL CONSUMPTION BY NAVY SHIPS

Total carbon emissions – 36 756 tonnes of CO₂e.

Carbon emissions were calculated on the basis of the following assumptions:

- Six navy ships were relocated from the Northern and Baltic seas to the Mediterranean Sea;
- Movements of other navy ships were excluded from the calculations;
- It is assumed that the ships navigated at the distance of 6000 miles with a speed of 16 knots during 20 days;
- Diesel consumption per one ship constitutes 50 tonnes/day;
- Emissions from other ships movement were considered at the level of 18 000 tCO₂ indeed conservatively (giving the fact that some ships are beeb relocated from the Pacific Ocean).

EMISSIONS FROM THE RELOCATION OF MILITARY TROOPS AND VEHICLES BY TRAIN

Total carbon emissions – 12 126 tonnes of CO₂e.

Carbon emissions were calculated on the basis of the following assumptions:

- Relocation of the vehicles from their permanent bases to the temporary bases at the distance of 2500 km;
- The trains needed for relocation respects the quantity of vehicles that constitute 52 standard battalion tactical groups.
- Emission factor for Russian train transport constitutes 0,00000725 tCO₂/tonne/km.

CONCLUSIONS

- The calculations above are based on conservative assumptions; effective emissions are much higher as only two months period was taken into account and limited carbon emission sources were addressed (e.g. fuel consumption by Russian aviation, movements and relocation of rockets and other weapon).
- Carbon penalties should be applied to the Russian Federation for disregarding Paris Agreement principles.
- Dedicated system for monitoring of carbon emissions due to Russian military aggression against Ukraine shall be developed to accurately calculate the damage to world climate.
- Possible military aggression of the Russian Federation will cause much higher emissions damaging inter alia Ukrainian soil and its organic carbon.



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