



Ministry of Environmental
Protection and Natural
Resources of Ukraine



GHG emissions emitted due to Russia's war in Ukraine





STATE TERRORISM AGAINST UKRAINE AND UKRAINIANS

Aggressive invasion, genocide, killings, torturing, raping civil population – genocide and environmental degradation as **ecocide** –

Civil / critical infrastructure targets as the main target
of the Russian hostilities in Ukraine

To destroy industrial and developmental potential
of Ukraine

ENVIRONMENT MATTERS

while it considered to be secondary issue during conflicts:

pollution of air, water, lands, fires, deforestation, destruction of ecosystems

economic destruction

45% of Ukraine's GDP, **75%** of industry

entering or conducting military operations of the

nation's protected natural areas

wars destroy **habitats, kill wildlife, generate pollution and remake ecosystems entirely**, with consequences that ripple through the decades.

The long-term environmental impacts of war



**economic
(energy, food)
insecurity**



**social adaptation /
instability**



**institutional responds
(governance and
management)**

ENVIRONMENTAL DAMAGE

in 7 months since the large-scale of Russian invasion of Ukraine began

> **2000** cases of environmental damage recorded

mln **2,9** hectares of the Emerald Network sites under threat of destruction

20% of protected areas in Ukraine are under threat

EUR bln

36 estimated losses including:

EUR bln

11.4
damage to soil

EUR bln

24.6
damage for air pollution



NUCLEAR AND RADIATION THREATS FOR UKRAINE AND EUROPE

the terrorist state continues blackmailing by launching missile attacks at the Ukrainian nuclear power plants

The Zaporizhzhia NPP:

under Russian occupation and regular shelling since March 24 2022, high risk of nuclear accident

The South Ukrainian NPP:

attacked by Russians on 19 September missile exploded 300 meters from operating nuclear power units



**POLLUTION
CAUSED
DIRECTLY BY
HOSTILITIES**

From 24 February

224,956
explosive devices, and

2,130
aircraft bombs

were neutralized in Ukraine

Russian troops regularly use phosphorus shells, which are banned by international law

DAMAGE TO FORESTS

thousand hectares

450

of forest occupied
or in the hostilities zones

Under occupation:

63

foresties

15

forestry enterprises

mln hectares

2,45

of forest

and

27

forestry enterprises

has been liberated from occupation and need to be restored

DAMAGE TO NATURAL RESERVES AND PROTECTED ECOSYSTEMS

Under threat of destruction:

160 = 2.9

Emerald

mln hectares

Network sites

16 = 627,3

Ramsar sites

thousands of hectares

20%

of protected areas

in Ukraine are

affected by the war

812

protected areas

under threat

mln hectares

0,9

of protected areas

suffer from the effects

of war

10 National parks

8 National reserves

2 Biosphere reserves

are under occupation

DAMAGE TO WATER RESOURCES

EUR mln

7.9

estimated amount of losses

EUR mln

7.71

will be required for restoration on irrigation
drainage and hydrotechnical structures*

497

water management facilities
have been damaged or destroyed

*according to the World bank assessment in a 10-year perspective

IMPACT OF WAR ON RAW MATERIALS



Russia occupied

2,209

deposits of energy resources
metals and mineral worth

12.7

EUR trillion



GREENHOUSE GAS EMISSIONS CAUSED BY WAR

At least

33 million tons
of CO₂eq

the total estimate of greenhouse gas emissions directly related to Russia's armed aggression against Ukraine

49 million tons
of CO₂eq

potential of greenhouse gases due to the reconstruction of infrastructure and buildings destroyed or damaged during war

Climate damage caused by Russia's war in Ukraine

Irota Ecolodge
Climate Focus
KT-Energy
Carbon Limits
Ministry of Environment and
Natural Resources of Ukraine

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Centre for Environmental
Initiatives Ecoaction
Kyiv School of Economics
One Click LCA Ltd
The International Climate
Initiative (IKI)

Initiative on GHG accounting of war

COP27 side-event

*Dealing with military and conflict related
emissions under the UNFCCC*

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Why this assessment?

- Besides the humanitarian crisis, the full-scale Russian invasion of Ukraine negatively impacts the environment
- Local environmental damage has been documented where possible, the impact on the climate through emissions of Greenhouse Gasses (GHGs) was so far unknown
- Direct impacts of GHG emissions assessed in four sectors
- Period from the invasion in February until September (7 months)
- First assessment only, updates will follow



FOUR SECTORS ASSESSED

1 - Refugees and Internal Displaced Persons (IDPs)

Transport emissions

2 - Warfare

Fuel emissions
Ammunition usage

3 - Fires

Uncontrolled fires
due to explosions

4 - Civilian Infrastructure

Emissions for reconstruction of destroyed/damaged apartments, hospital, roads, etc.

REFUGEES AND IDPs

At least

1.4

million tons

of CO₂eq

the total estimate of greenhouse gas emissions related to movement of refugees

7,710,924

refugees from Ukraine recorded across Europe



4,386,102

refugees from Ukraine registered for Temporary Protection or similar national protection schemes in Europe

More details: [Operational Data Portal](#)
[Ukraine Refugee Situation](#)

6,243,000

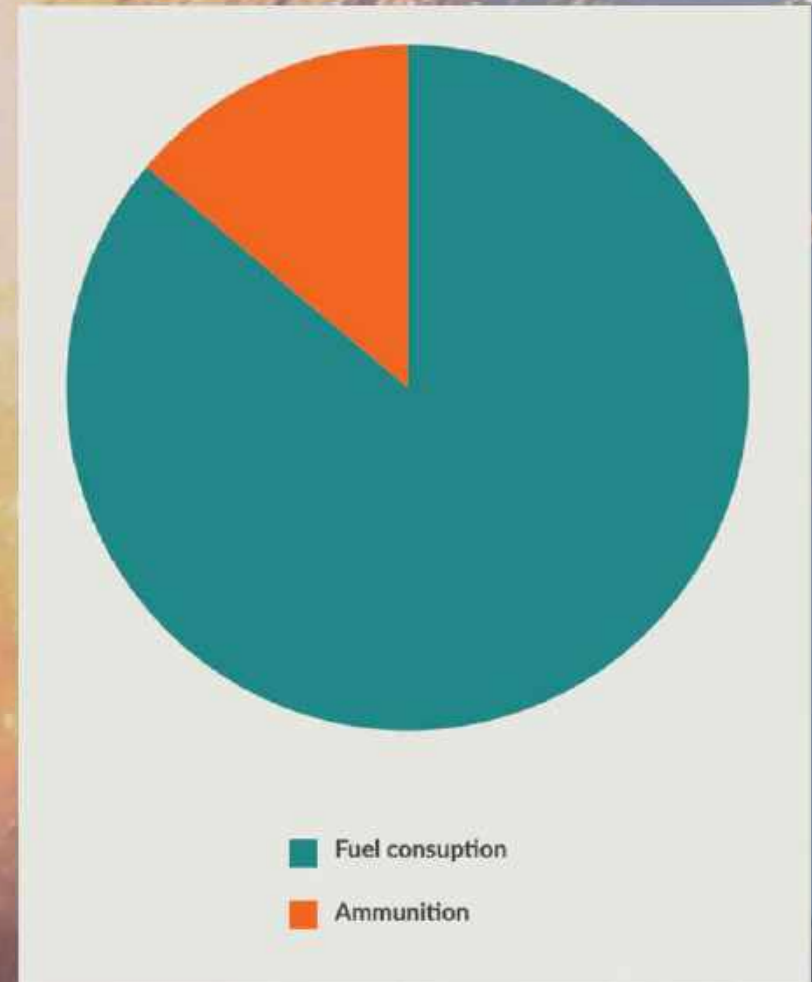
estimated number of IDPs in Ukraine
Source: [Internal Displacement Report](#)

WARFARE

From 24 February

Increase military fuel consumption
Massive ammunition usage

	th. tCO ₂ e
Subtotal fuel consumption	7,636
Subtotal ammunitions	1,219
TOTAL	8,855



FIRES IN UKRAINE

Total area over 1 ha

486162

total area of fires, ha

6215

number of fires

57225 area of forest fires, ha

3364 area of fires in artificial zones, ha

2242 area of fires in other territories, ha

371715 area of agricultural fires, ha

51609 area of fires of other natural components, ha

COMPARING FIRES IN 2021 AND 2022

maps of fires (area over 1 ha) for 7 months of war on the territory of Ukraine



(24/02/2021-24/09/2021)



(24/02/2022-24/09/2022)

data from various satellite systems for the relevant periods

A photograph of firefighters in full gear working at a fire scene. The background is filled with bright orange and yellow flames and thick smoke. The firefighters are wearing helmets and jackets with reflective stripes. One firefighter in the foreground is wearing a red helmet and a dark jacket with yellow reflective stripes. Another firefighter is wearing a white helmet. The scene is chaotic and dangerous.

7 MONTHS OR 214 DAYS OF IN UKRAINE

compared to the same period in 2021

112

increased by times

the total number of fires

38

increased by times

the total area

GHG EMISSIONS RELATED TO FIRES AFTER 7 MONTHS OF WAR

million tons of CO₂e

16

Emissions
from forest fires

2.6

Emissions
from fires in artificial

4

Emissions
from agricultural fires

0.4

Emissions from fires
of other natural components

23

million tons
of CO₂e

Total emissions

RECONSTRUCTION CIVILIAN INFRASTRUCTURE

Example: Residential Sector

	UNIT	STOCK UNITS	DAMAGED UNITS
DESTROYED			
Apartment buildings	pcs.	178,921	6,153
Private houses	pcs.	8,984,976	65,847
Dormitories	pcs.	7,114	85
DAMAGED			
Apartment buildings	pcs.	178 921	9,490
Private houses	pcs.	8,984,976	54,069
Dormitories	pcs.	7 114	155

Table 6. Destroyed and damaged units in the residential sector

TOTAL EMISSION FOR CIVILIAN INFRASTRUCTURE

ITEM	Emissions, th. tCO ₂ e	Emissions, %
Residential buildings	28,432	58,4
Social sector	1,055	2,2
Health care	96	0,2
Educational and science	2,232	4,6
Culture, religion, sports, and tourism	1,818	3,7
Infrastructure	6,006	12,3
Retail	814	1,7
Vehicles	2,448	5,0
Energy	1,314	2,7
Industry and business services	3,615	7,4
Utilities	840	1,7
TOTAL	48,670	100



SUMMARY OF GHG EMISSIONS

1.4 million tons
of CO₂eq
movement of refugees

23.8 million tons
of CO₂eq
fires

8.9 million tons
of CO₂eq
military warfare

48.7 million tons
of CO₂eq
reconstruction

+14.6 million tons
of CO₂eq
Nordstream 1 & 2

DISTRIBUTION OF GHG EMISSIONS



- Civilian infrastructure
- Fires
- Leakage Nord Stream 1 & 2
- Warfare
- Refugees and IDPs

The total emissions, after seven months of full fledged war, add up to the GHG emissions of The Netherlands (7 months)

A background image showing soldiers in a field of smoke and fire, suggesting a war zone. The sky is blue with white clouds, and there are trees in the background. The overall scene is one of conflict and destruction.

WAR-RELATED GHG EMISSIONS ARE CAUSED BY THE AGRESSOR

A global accounting framework is needed to attribute correctly

- Emissions directly and indirectly caused by military action
- Emissions that will be caused by remediating the impact of the war

Sovereignty of occupied territories need to be reconfirmed

- Emissions from occupied territories seized by the agressor should be always attributed according to international law

A large fire is burning in a building, with bright orange and yellow flames and thick black smoke rising. In the foreground, two firefighters in full gear are visible. One firefighter on the left is holding a hose that sprays water onto the fire. Another firefighter stands to the right, observing the scene. The fire is contained within a structure that appears to be a building or a large container, with a chain-link fence in front of it. The overall scene is dramatic and intense, capturing a moment of active firefighting.

Download full report

<https://climatefocus.com/publications/>

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A large fire is burning at night, with bright orange and yellow flames rising from a structure. In the foreground, two firefighters in full gear are visible, one of whom is spraying water onto the fire. The scene is illuminated by the fire and the firefighters' equipment.

Key takeaways

- GHG emissions 7 months of war: 100 mln tCO₂e. Comparable to emissions of The Netherlands (7 months)
- Many impacts not (yet) accounted for; real number probably much higher
- These additional emissions harm our climate; reaching 1.5 °C goal even more difficult
- With each extra month of Russian aggression, more climate damage will be done

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A large fire is burning at night, with bright orange and yellow flames rising from a structure. In the foreground, two firefighters in full gear are visible, one on the left and one in the center, both looking towards the fire. A chain-link fence is in the middle ground, and a red fire hose is visible on the ground. The scene is illuminated by the fire and some ambient light.

THANK YOU FOR ATTENTION

PLEASE SUPPORT UKRAINE

