



CLIMATE DAMAGE CAUSED BY RUSSIA'S WAR IN UKRAINE

24 February 2022 – 23 February 2026

By the Initiative on GHG Accounting of War
February 2026

Preface

This paper summarises research calculating the carbon emissions created since Russia’s full scale invasion of Ukraine began four years ago. It is based on detailed analysis and modelling that pinpoints only those emissions attributable to the war. The underlying methodologies remain largely unchanged since the [previous iteration](#) published in October 2025 covering three years of war, a report that offers the reader a more detailed explanation of the calculations given in this assessment.

The underlying datasets have been updated for this edition from a wide range of authoritative sources, although not all data sources were complete up to 23 February 2026. Numbers will be updated once available in a next assessment.

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Executive Summary

Russia's full-scale invasion of Ukraine drove greenhouse gas emissions (GHG) up by **75 million tonnes of CO₂ equivalent (tCO₂e)** in the war's fourth year, bringing the total since 24 February 2022 to **311 million tCO₂e**. This large figure is comparable to the annual emissions of France or half of Germany's yearly emissions.

While emissions rose across all impact categories during the fourth year, war-driven landscape fires surged for the second consecutive year. Unusually hot and dry conditions – likely intensified by global warming – turned even minor sparks from combat into uncontrollable blazes, as firefighting remained impossible. This vicious cycle underscores how armed conflict and climate change exacerbate one another. Emissions from reconstruction efforts also spiked, particularly in the energy sector, as Russia escalated attacks on Ukraine's electricity and heating infrastructure during the harsh winter of 2025–2026.

At COP30 in Brazil, Ukraine announced plans to hold Russia accountable for these war-related emissions. The Ukrainian government will file a claim under the Environmental Damage category of the Register of Damage for Ukraine, part of the International Claims Mechanism. Using a social cost of carbon of \$185 per tCO₂e, the total **climate damage claim exceeds 57 billion USD**.

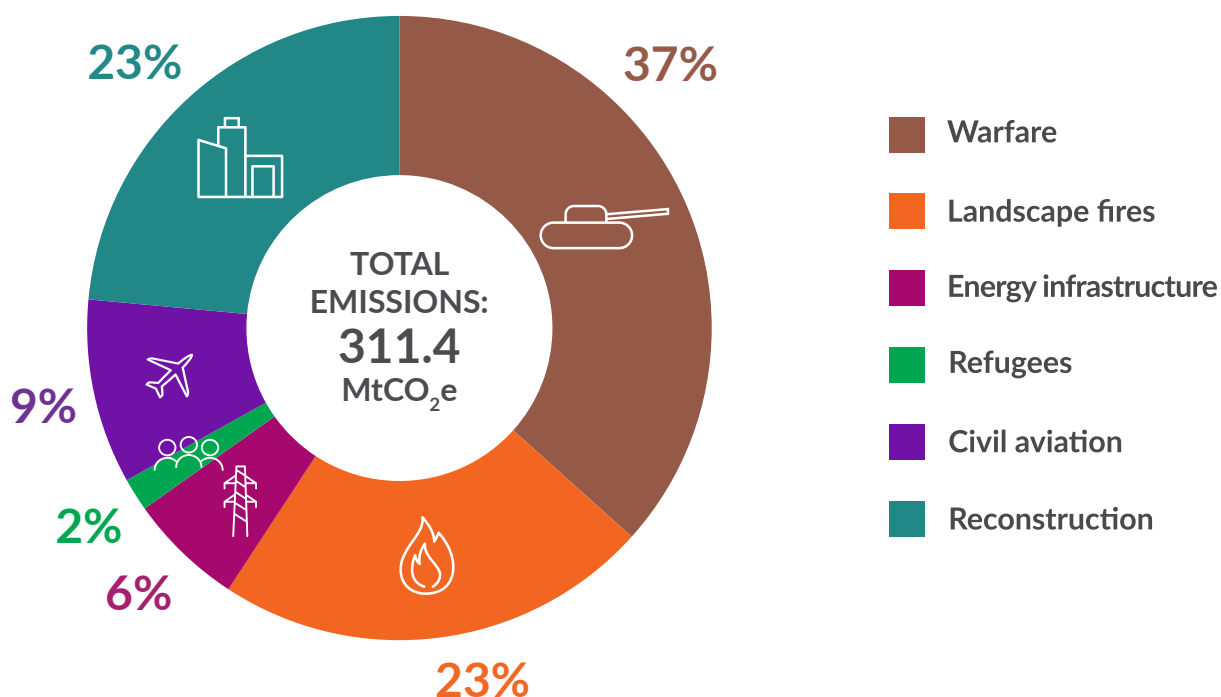


Figure 1: GHG emissions for each impact category

Impact category	Emissions after 48 months (MtCO ₂ e)	Percentage %
Warfare	114.1	37
Landscape fires	70.3	23
Energy infrastructure	18.6	6
Refugees	5.3	2
Civil aviation	29.8	9
Reconstruction	73.3	23
TOTAL	311.4	100

Table 1: Total emissions after four years of war



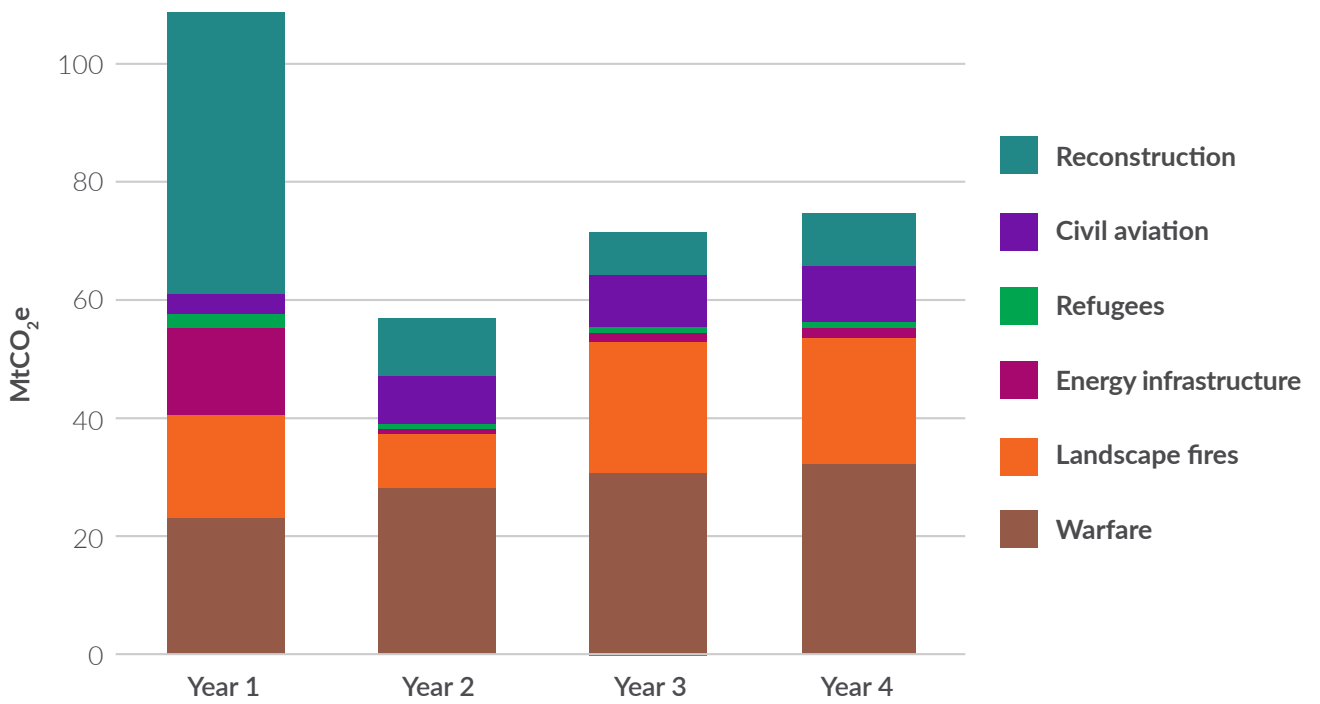


Figure 2: War emissions per 12-month period

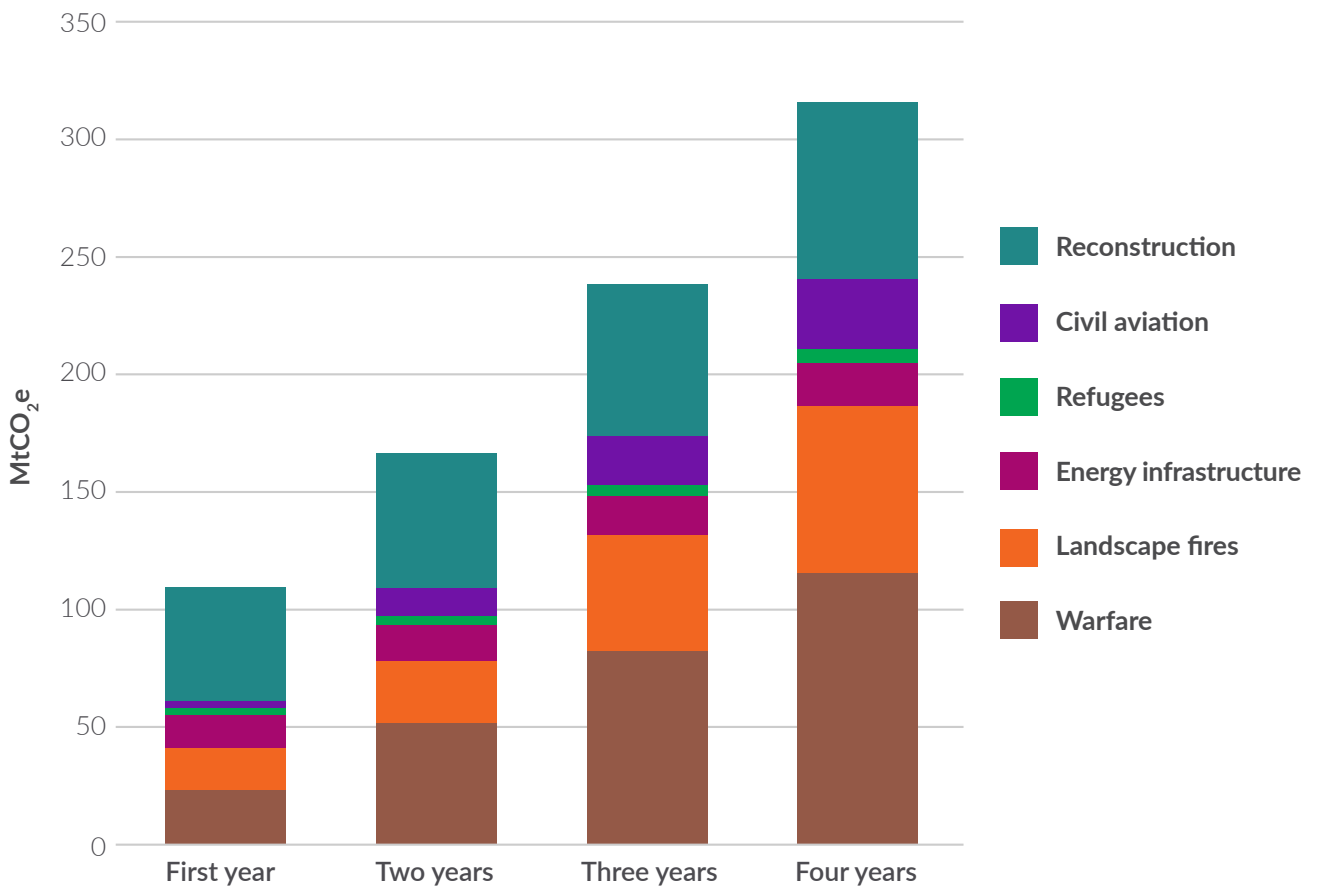


Figure 3: Accumulation of war emissions over four years

1. Warfare

Despite relatively stable frontlines, the war's persistent combat – marked by relentless attacks and localised intense battles – has sustained high fuel demand and ammunition consumption. Although battlefield tactics and equipment use have evolved, armed forces still rely heavily on fossil fuels to power tanks, armoured vehicles, and the expanding logistical networks supporting military operations.

Fossil fuel consumption, for example by tanks and fighter jets, account for 90% of all warfare emissions. The remaining 10% stems primarily from ammunition production and the replacement of destroyed military hardware.

While drones now cause over half of all battlefield losses, artillery retains its critical role in firepower. Restored supply chains and increased production have enabled Ukraine to intensify its artillery operations, driving up overall emissions. Meanwhile, emissions tied to equipment losses have remained stable, as Ukraine's higher documented losses have been offset by reduced reported losses among Russian forces.

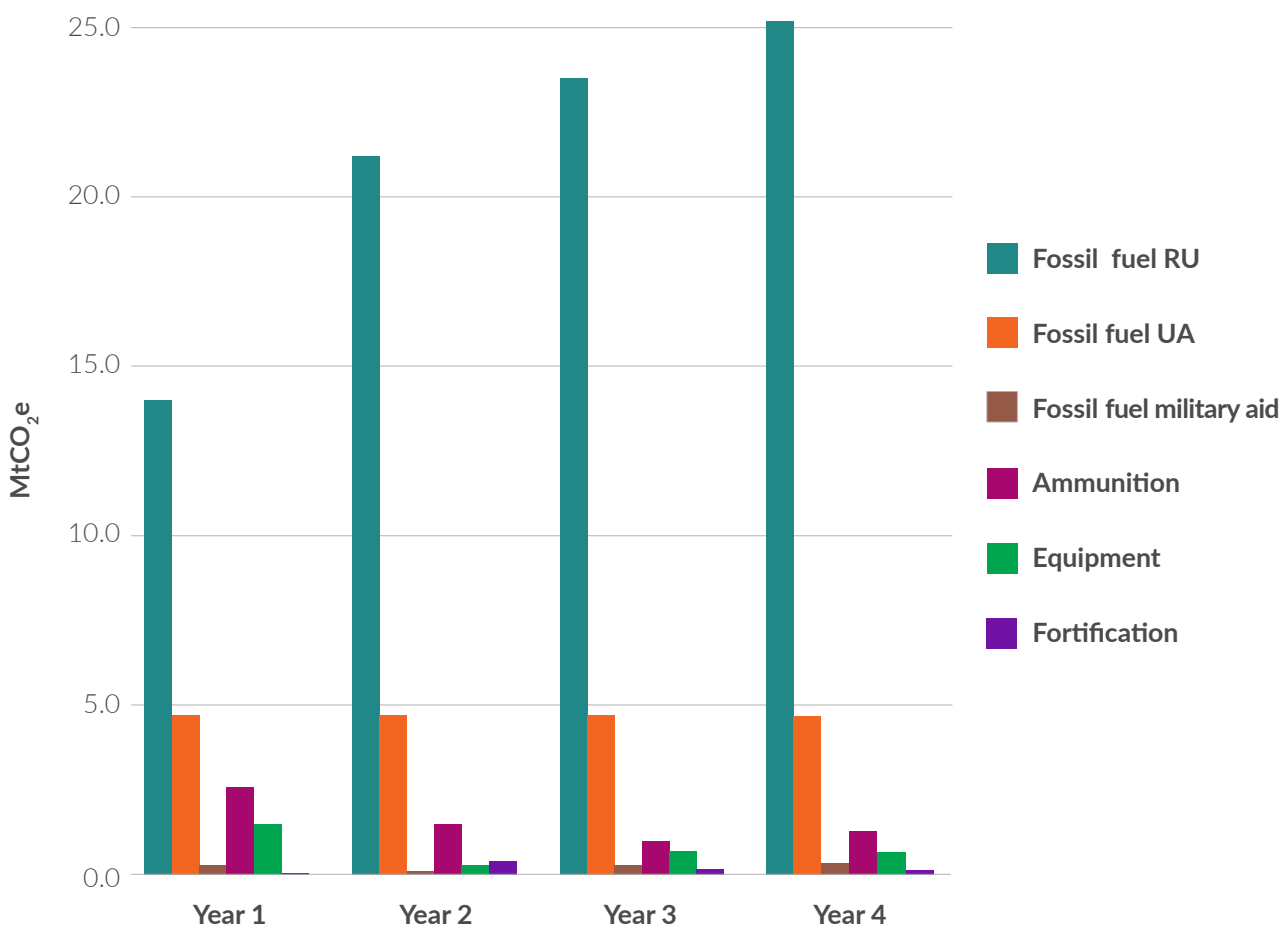


Figure 4: GHG emissions from warfare

2. Landscape fires

In 2025, Ukraine experienced 1.39 million hectares of natural landscape fires – far exceeding pre-war levels. Climatological data showed that both the summers of 2024 and 2025 were exceptionally hotter and drier than average, a trend likely exacerbated by climate change.

As illustrated below, the war itself has become a major catalyst for these fires, with the majority occurring along or near frontlines. The years 2024 and 2025 serve as alarming examples of how climate change and armed conflict amplify each other, fuelling a vicious cycle of environmental destruction and accelerated global warming.

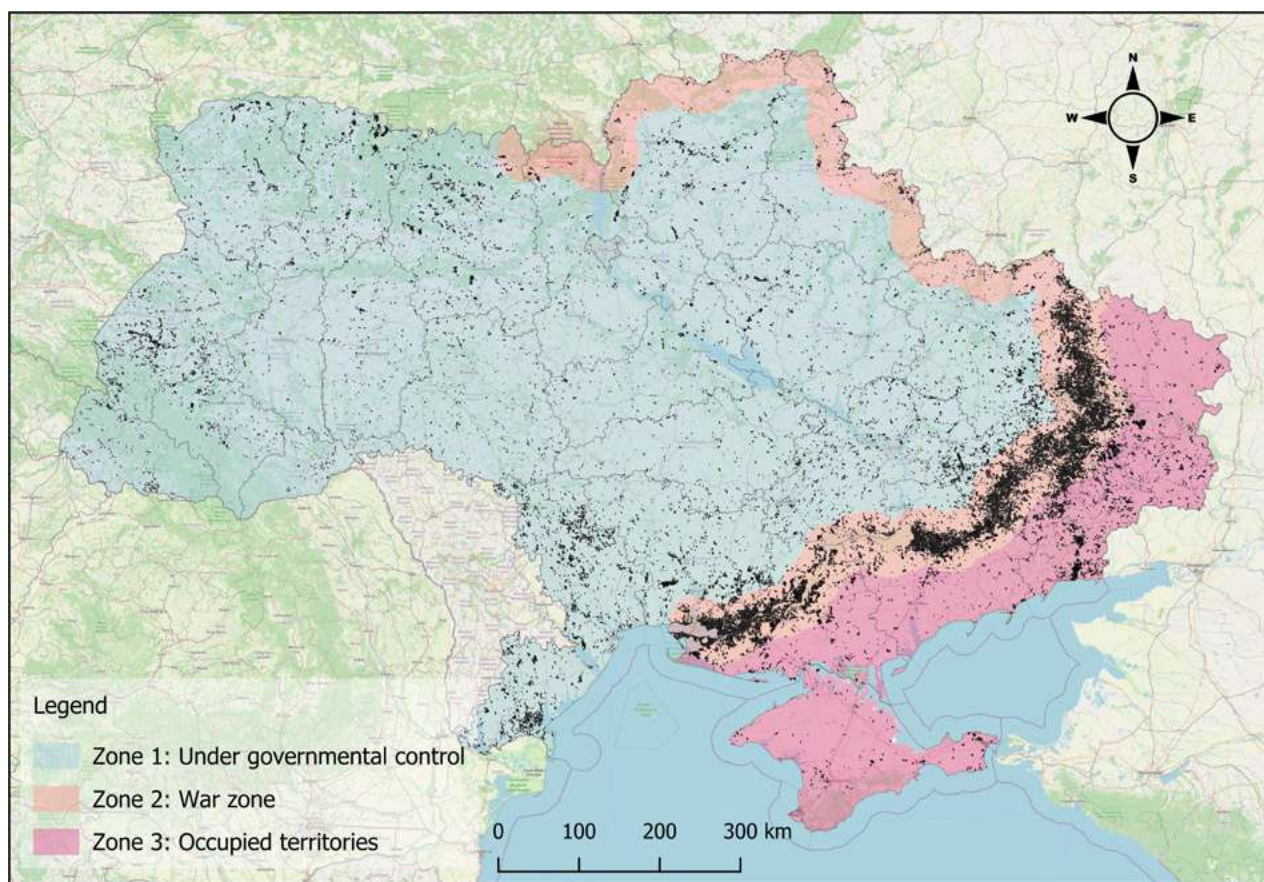


Figure 5: Fires in natural landscape in 2025

Landscape fires are a natural phenomenon having other causes than armed conflict. To isolate the war's direct impact on fires in the war zone (Zone 2), fire intensities there were compared with those in similar landscapes and weather conditions in government-controlled areas (Zone 1). This approach allowed us to distinguish fires directly linked to hostilities from those with other origins. For Zones 1 and 3, a generic attribution factor was used to account for the war's indirect effects – specifically, reduced firefighting capacity due to personnel shortages, equipment limitations, and airspace closures.

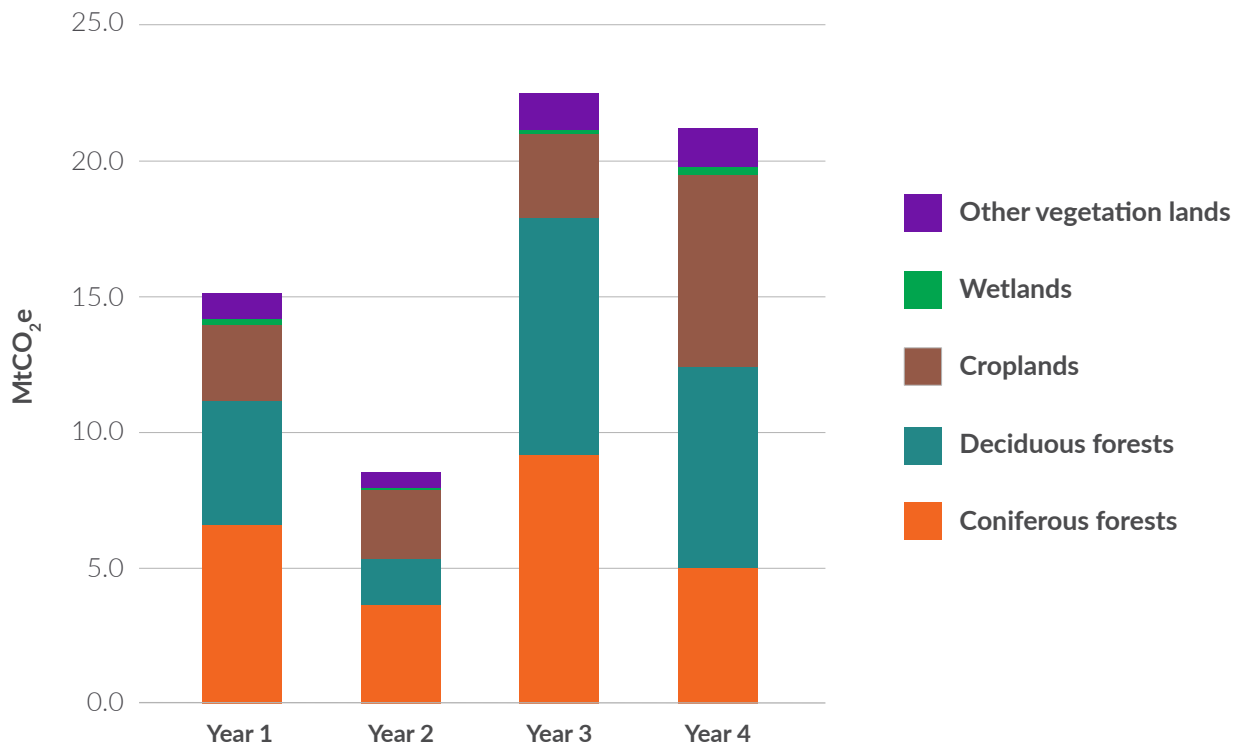


Figure 6: War attributed GHG emissions from fires in natural landscapes

3. Energy infrastructure

During the war's fourth year, Russian forces escalated their assaults on Ukraine's energy infrastructure, exploiting the harsh winter—when temperatures plummeted below -20°C — to maximise impact. Between March and December 2025, at least 15 large attacks targeted gas production and storage facilities. This surge intensified in January and February 2026, with 19 additional strikes on civilian infrastructure, deliberately timed to deprive the population of energy amid extreme cold.

Russian forces also focused on thermal power plants and high-voltage substations, critical nodes linking nuclear facilities to the national grid. The resulting damage caused prolonged blackouts, forcing businesses and civilians to rely on diesel generators, petrol-powered alternatives, and limited energy storage solutions.

In response, Ukraine's Defence Forces conducted over 140 attacks on Russian oil refineries and depots—both within Russia and occupied territories — marking a 50% increase in such operations compared to the previous year.

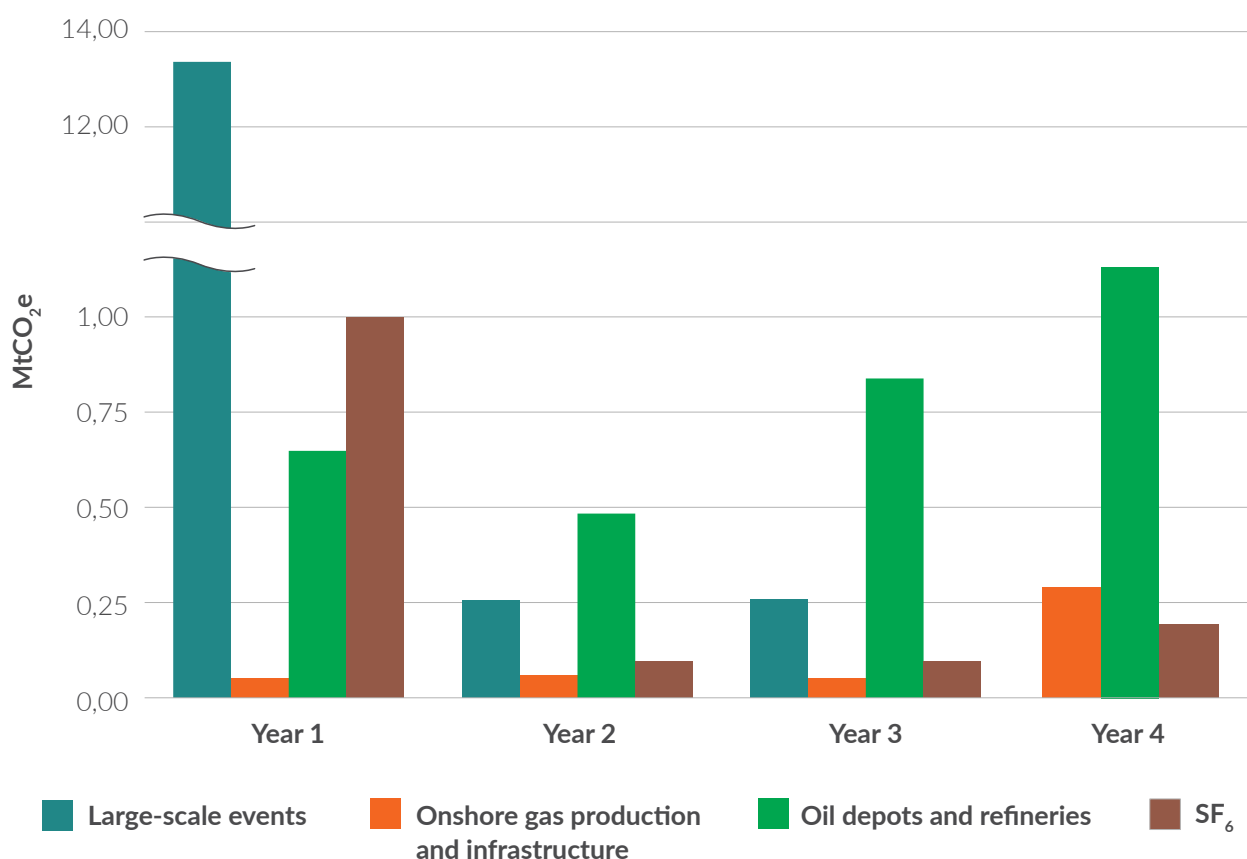


Figure 7: GHG emissions resulting from damage inflicted on energy infrastructure

4. Refugees

In the war's fourth year, the number of refugees registered in Europe and beyond rose to 5,898,150 persons, reversing the trend of decline due to Ukrainians returning home. Meanwhile, travel by refugees visiting family and friends still in Ukraine contributed to transport emissions, though at relatively low levels.

5. Civil aviation

The October 2025 three-year assessment introduced an innovative methodology to estimate the rise in kerosene use caused by ongoing airspace closures over Ukraine and Russia. While global aviation emissions have rebounded from the COVID-19 pandemic – now exceeding pre-pandemic levels – the persistent airspace restrictions continue to drive higher kerosene consumption as general flight activity increased in 2025.

6. Reconstruction

The conflict inflicted its worst devastation in the early weeks, yet frontline urban areas continue to suffer severe damage. As Russian forces advanced further into eastern Ukraine, they left behind widespread destruction. The intensified attacks on energy infrastructure during the winter of 2025–2026 not only generated direct emissions as detailed under section Energy Infrastructure, but will also produce substantial emissions during reconstruction. Materials like concrete and steel, both carbon-intensive, are expected to account for over 80% of future emissions from rebuilding efforts.

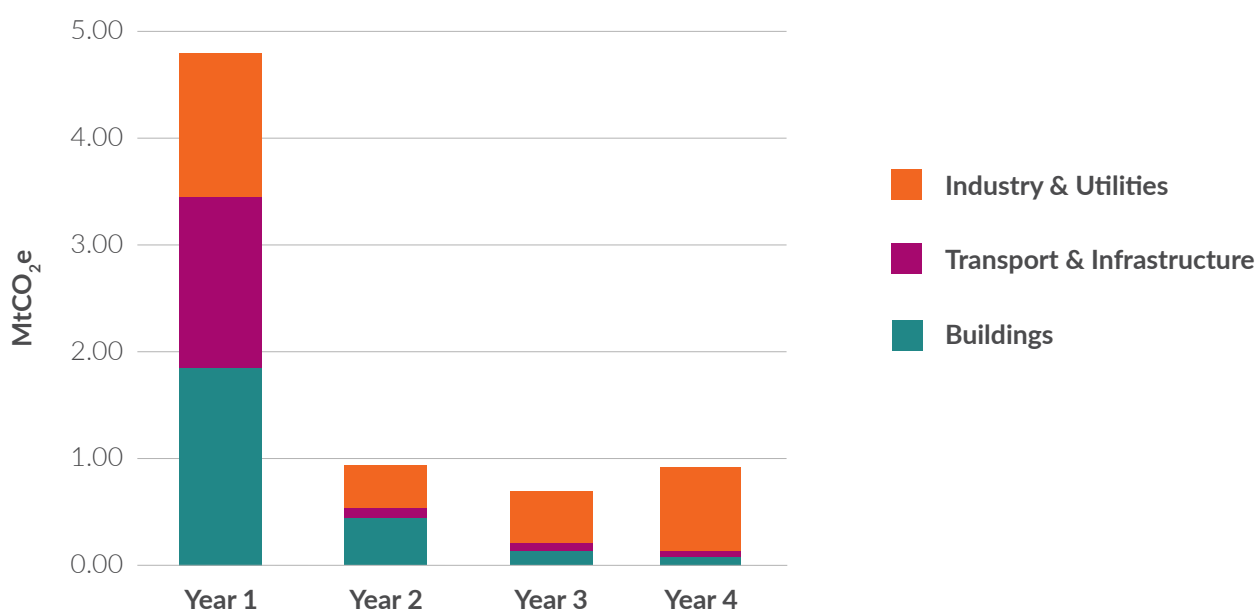


Figure 8: GHG emissions from the future reconstruction

Previous publications

For more details on data sources and methodologies, readers are referred to the [three year report](#) published in October 2025. Assessments are based on the [Guidance on the assessment of conflict-related GHG emissions](#).

All previous assessments by the Initiative on GHG accounting of war can be found here:

- Assessment 7 months (24 February 2022 – 30 September 2022): report1en.warbon.org
- Assessment 1 year (24 February 2022 – 23 February 2023): report2en.warbon.org
- Assessment 18 months (24 February 2022 – 31 August 2023): report3en.warbon.org
- Assessment 2 years (24 February 2022 – 23 February 2024): report4en.warbon.org
- Assessment 3 years (24 February 2022 – 23 February 2025): report5en.warbon.org

Ukrainian language versions can be found here:

- [Guidance of the assessment of conflict-related GHG emissions](#)
- Assessment 7 months (24 February 2022 – 30 September 2022): report1ua.warbon.org
- Assessment 1 year (24 February 2022 – 23 February 2023): report2ua.warbon.org
- Assessment 18 months (24 February 2022 – 31 August 2023): report3ua.warbon.org
- Assessment 2 years (24 February 2022 – 23 February 2024): report4ua.warbon.org
- Assessment 3 years (24 February 2022 – 23 February 2025): report5ua.warbon.org