Carbon Impact Report

2024

INSTA INNOVATION CENTER

Introduction

The built environment contributes significantly to global greenhouse gas emissions and resource use. As demand for housing and infrastructure grows, the construction sector faces mounting pressure to reduce its environmental footprint. This Carbon Impact Report by InstaBuilt—a leader in volumetric and panelized construction—addresses the need for transparency, data-driven action, and climate accountability.

The report analyzes three key indicators: population, GDP, and CO_2 emissions. These offer insights into how construction relates to economic growth, energy use, and environmental stress. Population drives building demand, GDP reflects development and investment capacity, and CO_2 emissions measure environmental impact.

InstaBuilt's offsite construction model reduces carbon emissions, waste, and lifecycle impacts. Its systems are designed for sustainability at every stage, from material sourcing to installation, positioning the company as a climate-focused innovator.

Beyond national emissions data, the report highlights modular construction's role in climate mitigation. While high-income countries advance low-carbon building through policy, emerging economies present opportunities to replace traditional methods with modular solutions. InstaBuilt's approach aligns with these global trends.

In conclusion, this report reflects InstaBuilt's commitment to sustainability and its role in decarbonizing construction. It provides a foundation for further innovation, investment, and climate-resilient development.

Chapter 1: Global CO_2 Emissions and Economic Activity

National and Regional CO_2 Emission Levels

In 2024, global CO_2 emissions reached a record high of approximately 36.8 billion tonnes. The distribution of these emissions varies significantly across countries and regions, influenced by factors such as population size, economic activity, energy sources, and industrialization levels.

The following table lists the top five countries by total CO_2 emissions in 2024:

Country	Total CO_2 Emission (Million Tonnes)
China	11,903
United States	4,911
India	3,062
Russia	1,816
Japan	989

CO_2 Emissions Per Capita

Per capita emissions provide insight into the average individual's contribution to a country's total emissions. In 2023, the global average was approximately 4.76 metric tons per person. However, these average masks significant disparities among countries. The table below highlights selected countries with their per capita CO_2 emissions:

Country	Per Capita CO_2 Emissions (Metric Tons)
China	14.21
United States	13.11
India	8.66
Russia	8.89
Japan	1.89

Regional CO_2 Emissions Analysis

Analyzing CO_2 emissions by region reveals distinct patterns:

Asia

Home to the largest emitters, with China and India leading in total emissions.

North America

The United States and Canada have high per capita emissions, reflecting energy-intensive lifestyles and economies.

Europe

Many countries have implemented policies leading to reduced emissions, though per capita figures vary.

Africa

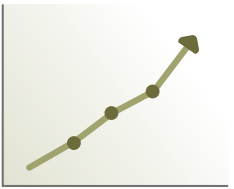
Despite a growing population, the continent's total and per capita emissions remain relatively low.

Relationship Between GDP and CO_2 Emissions: Carbon Intensity of Economies

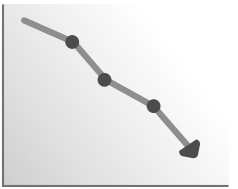
Carbon intensity refers to the amount of CO_2 emissions produced per unit of economic output, typically measured as kilograms of CO_2 per dollar of GDP. It serves as an indicator of how efficiently an economy utilizes energy and resources in relation to its economic activities.

Global Trends

Historically, economic growth has been closely linked to increased CO_2 emissions. However, recent data indicates a shift in this relationship. According to the International Energy Agency (IEA), advanced economies have demonstrated the possibility of decoupling economic growth from CO_2 emissions. For instance, the United States has doubled its GDP since 1990, while CO_2 emissions have returned to high levels. Similarly, the European Union's economy grew by 66% over the same period, with a 30% reduction in CO_2 emissions.
This decoupling is attributed to factors such as improved energy efficiency, a shift from coal to cleaner energy sources, and the implementation of environmental regulations.



GDP



CO_2 Emissions

Regional Variations

The carbon intens ity of economies varies significantly across regions:

High-Income Countries

Generally, exhibit lower carbon intensity due to advanced technologies and a higher share of service-oriented industries.

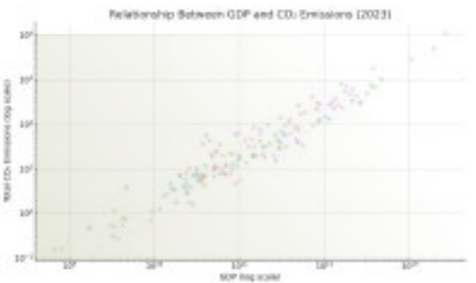
Emerging Economies

Often have higher carbon intensity, reflecting reliance on energy-intensive industries and fossil fuels.

For example, data from Our World in Data illustrates that countries like Norway and Switzerland have low carbon intensity, while nations such as China and India exhibit higher values.

Implications for Policy and Industry

Understanding the relationship between GDP and CO_2 emissions is crucial for formulating effective climate policies. The relationship between Gross Domestic Product (GDP) and carbon dioxide (CO_2) emissions in 2023/2024 highlights the continuing challenge of decoupling economic growth from environmental impact. Analysis of global data reveals a generally positive correlation between GDP and total CO_2 emissions, indicating that larger economies tend to emit more carbon due to higher levels of industrial activity, energy consumption, and infrastructure development. However, the degree of emissions per unit of economic output (known as carbon intensity) varies significantly across countries. Some high-income nations have managed to reduce their carbon intensity through cleaner energy sources, energy efficiency measures, and technological innovation, while many emerging economies continue to exhibit higher carbon intensities, reflecting reliance on fossil fuels and heavy industry. This divergence underscores the importance of targeted policies and investments to lower emissions without hindering economic development, particularly in sectors such as construction and real estate, where sustainable practices can play a transformative role.



Therefore, reducing carbon intensity can be achieved through:

Energy Efficiency

Implementing technologies and practices that reduce energy consumption per unit of output.

Renewable Energy

Transitioning to low-carbon energy sources to power economic activities.

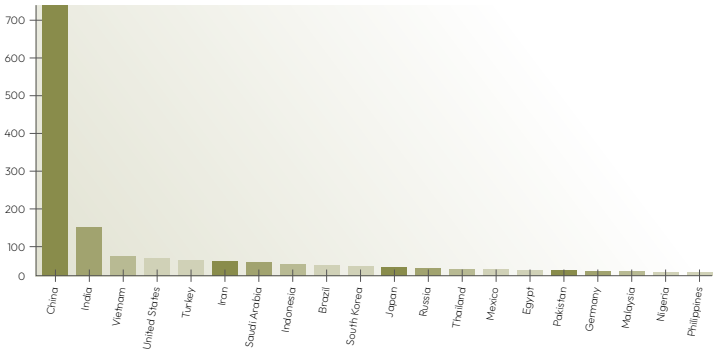
Structural Economic Changes

Shifting from manufacturing-based economies to service-oriented sectors.

For companies in the construction and real estate industry, such as InstaBuilt, focusing on sustainable building practices and materials can contribute to lowering the carbon intensity of the sector.

Construction-related emissions by countries

The chart above highlights the top 20 countries by cement-related CO_2 emissions in 2023-2024, serving as a proxy for identifying regions where construction-related emissions are especially high. Cement production is one of the most carbon-intensive processes in the construction industry, accounting for a significant share of embodied emissions in buildings and infrastructure. Countries such as China, India, and Vietnam dominate this list, reflecting their large-scale urbanisation and infrastructure expansion. Other notable contributors include Turkey, Iran, and Indonesia, which are also experiencing rapid construction growth. These regions present both a challenge and an opportunity: while emissions are high, the potential impact of low-carbon construction technologies, such as modular and panelised systems, is substantial.
This data provides a valuable baseline for monitoring trends and targeting efforts to decarbonise the construction sector globally.



Cement CO_2 Emissions per Capita (2023-2024)

This category contains countries where the average individual is associated with high cement-related emissions. Smaller nations with booming construction sectors relative to population size, such as Qatar, United Arab Emirates, and Turkmenistan, top the list. These figures suggest intensive infrastructure development or export-oriented cement production.

Cement CO_2 Emissions per GDP (2023-2024)

This category economies that emit the most cement-related CO_2 relative to their economic output. Countries such as Uzbekistan, Iraq, and Pakistan exhibit high emissions intensity, indicating a heavier reliance on carbon-intensive construction in their economic structure.

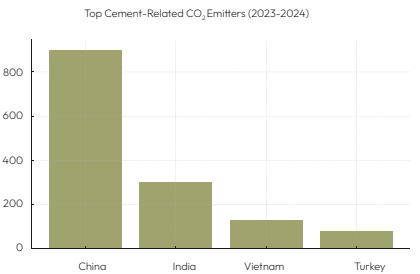
Construction-Specific Emissions: The Case of Cement Production

Among all construction-related sources, cement production stands out as one of the most carbon-intensive processes, owing to the chemical decomposition of limestone (calcination) and the combustion of fossil fuels in kilns. Analysis of the 2023-2024 dataset reveals that countries such as China, India, Vietnam, and Turkey are among the leading emitters of cement-related CO_2 emissions in absolute terms. These nations are characterized by high rates of urbanization and infrastructure expansion, which in turn drive substantial demand for concrete and building materials. However, when normalized by population and economic output, different trends emerge. Countries such as Qatar, Turkmenistan, and the United Arab Emirates exhibit disproportionately high emissions per capita, reflecting either concentrated mega-project development or export-driven cement production. Likewise, economies such as Uzbekistan and Pakistan display elevated emissions intensity per unit of GDP, indicating structural dependence on carbon-intensive building methods. These patterns underscore the necessity of targeted interventions in the construction materials sector, where innovations such as low-carbon cement, modular construction, and circular material reuse offer significant mitigation potential. For a company like InstaBuilt, which utilizes volumetric and panelized systems, the findings reinforce the strategic importance of material efficiency and design innovation in contributing to both national and global decarbonization goals.

China

India

Vietnam



earthwise

At Instabuilt, we're working to reduce our carbon footprint by choosing smarter materials, cutting down on waste, and designing with efficiency from the ground up. For us, sustainability isn't a buzzword — it's just the right way to build.

CO2 Emissions by Scope and Sources

This section presents the total carbon dioxide equivalent (tCO2) emissions reported in tons for each region and year, along with related indicators such as emission intensity. In 2023, the combined emissions across these regions reached 7,285.54 tCO2. This figure increased in 2024, rising to 7,462.17 tCO2. The year-on-year difference between 2023 and 2024 was 176.63 tCO2, reflecting a growth of approximately 2.42 percent.
While this increase appears moderate, it still highlights the ongoing environmental challenge of reducing carbon emissions. It emphasizes the need to continue efforts to lower emission levels and strengthen carbon reduction strategies in order to address climate change effectively.

Resource Efficiency Overview (2023 and 2024)

This section highlights the company's progress in managing key resources over two years: water use, paper for printing, waste, and reusable electronic equipment. The data shows efforts to reduce environmental impact and improve efficiency.

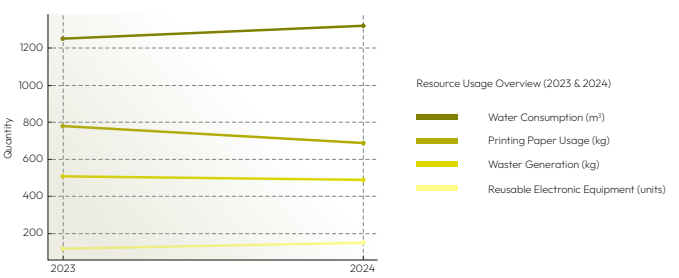
In 2023, water usage was 1,250 cubic meters, rising to 1,320 in 2024, likely due to expanded operations or workforce growth.

Printing paper use dropped from 780 kg in 2023 to 690 kg in 2024, thanks to digital tools and paper-saving policies.

Waste generation declined slightly, from 510 kg in 2023 to 490 kg in 2024, reflecting better waste management and recycling.

Reusable electronics rose from 120 units in 2023 to 150 in 2024, showing commitment to circular economy practices and waste reduction.

The accompanying graph illustrates these trends for 2023 and 2024, supporting ongoing environmental planning and efficiency improvements.



CO_2 Emissions by Source

This chapter extracts and visualizes the global CO_2 emissions data across several sources and per capita values. The data spans from 1950 onward and includes the following sources:

Cement CO_2 emissions

Shows emissions from cement production, highlighting industrial growth trends.

Coal CO_2 emissions

Indicates reliance on coal, often peaking mid-century and declining with the transition to cleaner energy.

Oil CO_2 emissions

Reflects transportation and industrial usage, growing with global energy demands.

Gas CO_2 emissions

Illustrates the rise in natural gas as a "bridge fuel" in the energy transition.

Flaring CO_2 emissions

Shows emissions from burning excess natural gas in oil extraction.

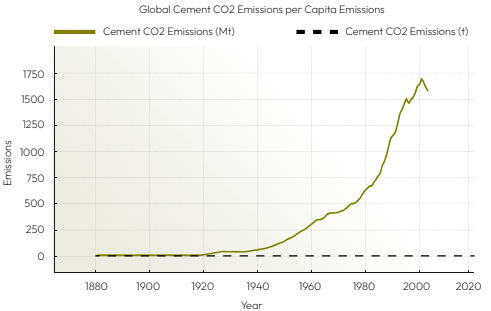
Other industrial CO_2 and per capita

Captures emissions not categorized above, indicating smaller or mixed-source contributions.

Cement CO_2 emissions

The following chart illustrates the long-term evolution of global carbon dioxide emissions originating from cement production, alongside the corresponding emissions on a per capita basis. From 1950 onwards, cement-related CO_2 emissions have shown a consistent upward trajectory, driven largely by the rapid industrialization and urban expansion occurring in both developed and developing economies. This steady increase reflects the vital role cement plays in infrastructure, housing, and urban development, particularly as countries experience population growth and urban migration.

Cement CO_2 emissions per capita have also grown over time, although the pace of this growth has been more gradual compared to total emissions. This indicates that while global demand for cement has surged, much of this increase has been offset by rising global population figures, which spread the emissions over a larger base. Still, the trend suggests that cement production remains a significant and growing contributor to individual carbon footprints, especially in countries with high infrastructure needs or limited access to lower-emission building technologies.
The chart demonstrates the dual challenge faced by policymakers and the construction industry: balancing the economic and social need for construction materials with the environmental imperative to reduce emissions. It underscores the importance of investing in cleaner cement production technologies and considering alternative materials in order to decouple construction growth from environmental degradation.



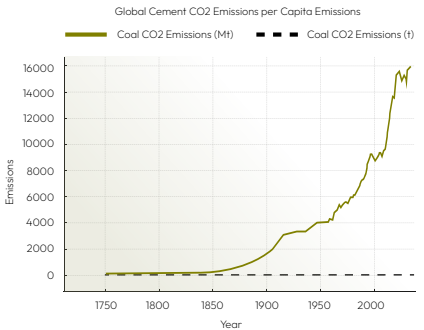
Coal CO_2 emissions

Here we present a historical trend of global carbon dioxide emissions resulting from coal combustion, alongside coal CO_2 emissions per capita. Over the decades, coal has remained one of the most dominant sources of carbon emissions worldwide, largely due to its critical role in electricity generation and heavy industry, particularly in the early stages of global industrialization and economic expansion.

Total emissions from coal combustion show a pronounced rise during the second half of the 20th century, reaching peaks in periods associated with heightened industrial activity, especially in countries undergoing rapid economic development. Although some industrialized nations have taken steps to reduce reliance on coal in recent years (shifting toward natural gas, renewables, or nuclear power) the overall global trajectory remains elevated, fueled by growing energy demands in parts of Asia and other emerging economies.

Per capita coal emissions also display a noticeable increase over time, although this trend appears more volatile. In some periods, per capita emissions level off or decline slightly, often reflecting shifts in energy policy, economic slowdowns, or transitions to cleaner energy sources. Still, coal remains a significant component of individual carbon footprints in many countries, particularly where it is the primary energy source.

This chart underscores the central role coal has played in powering industrial and economic growth, while also highlighting its environmental cost. As the global community grapples with climate targets and the urgency of reducing greenhouse gas emissions, the transition away from coal toward cleaner, more sustainable energy sources will be essential.



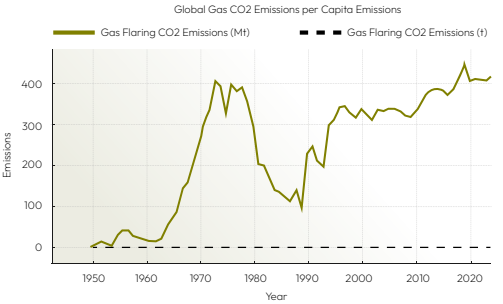
Gas Flaring CO_2 Emissions

He we explain the evolution of carbon dioxide emissions resulting from gas flaring, along with per capita emissions. Gas flaring occurs when excess natural gas, produced during oil extraction, is burned off instead of being captured and used. This practice is often employed in oil fields where there is insufficient infrastructure to store or transport the gas, particularly in remote or underdeveloped regions.

Total CO_2 emissions from gas flaring rose significantly in the early decades, reflecting increased oil production activity and limited technological capacity to manage associated gas. Over time, global initiatives and regulatory efforts have aimed to reduce flaring due to its environmental and economic costs. Despite these efforts, the emissions curve reveals persistent levels of flaring, particularly in regions where oil extraction remains a primary economic activity.

Per capita emissions from gas flaring show a more moderate but steady trend, indicating that while the overall population has grown, the practice of flaring continues at levels that still contribute noticeably to individual carbon footprints. The gap between total and per capita curves suggests that improvements in flaring technology or gas utilization have not been implemented uniformly across the globe.

This chart highlights the need for more effective policies and technologies to capture and use flared gas. Reducing gas flaring not only helps lower greenhouse gas emissions but also represents a missed opportunity to harness a valuable energy resource.



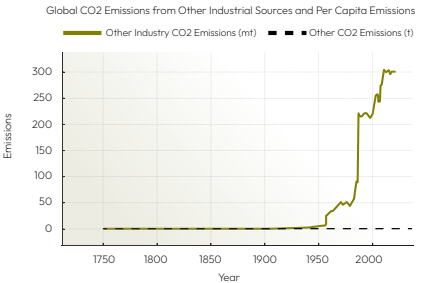
Other industrial sources of CO_2 Emissions

The chart presents the global carbon dioxide emissions from other industrial sources not specifically categorized under cement, coal, oil, gas, or flaring, along with their per capita equivalents. These sources include a broad range of smaller-scale or mixed industrial processes that collectively contribute to global CO_2 emissions, such as emissions from chemicals production, waste treatment, and various manufacturing operations.

From the 1950s to the present, total emissions from these other industrial activities have shown a gradual increase, reflecting broader industrialization and global economic expansion. Although the absolute quantities are relatively smaller compared to emissions from major fossil fuels, the upward trend indicates that these miscellaneous sources are an increasingly relevant component of the global emissions profile.

The per capita curve has remained relatively low and steady over the decades, highlighting that while these emissions are significant in aggregate, their individual impact is modest. This suggests that they arise from a wide dispersion of activities across sectors and regions, often tied to specific industrial practices or local economic conditions.

Despite their smaller scale, emissions from other industrial sources should not be overlooked. Many of these activities are difficult to decarbonize due to technical and economic constraints, and they often fall outside the focus of major policy frameworks. Addressing emissions in this category requires targeted strategies, including technological innovation, process efficiency, and tighter environmental standards.



A summary comparing all sources

Cement production has steadily increased CO_2 emissions due to global urbanization and infrastructure growth. While per capita emissions have risen more moderately, cement remains hard to decarbonize because of its dependence on limestone calcination.

Coal combustion has long been the top source of global CO_2 emissions, especially during industrial growth in the West and Asia. Though per capita emissions have recently plateaued as cleaner energy gains ground, coal still poses a major climate challenge.

Oil combustion, driven by transport and industry, has kept emissions high since the mid-20th century. Per capita emissions remain elevated in wealthier nations, and oil's role in transport and petrochemicals makes it hard to replace.

Natural gas, though cleaner than coal or oil, has seen rising emissions and growing per capita use. Its widespread adoption in power and heating adds to the climate burden, despite its reputation as a "bridge fuel."

Gas flaring—burning off excess natural gas during oil extraction—remains a wasteful, avoidable source of emissions. Though small in scale, it reflects infrastructure gaps and inefficiencies.

Other industrial sources (e.g., chemicals, waste) contribute steadily to emissions. Though small individually, they're collectively significant and often harder to regulate.

Each sector contributes differently to global CO_2 emissions, requiring targeted, multi-faceted strategies for effective climate action.

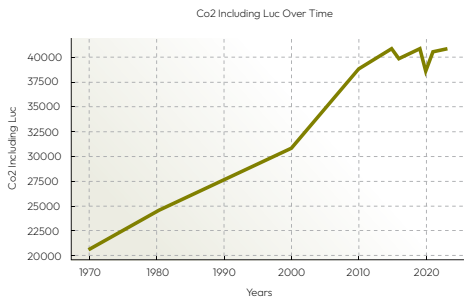

nature


health

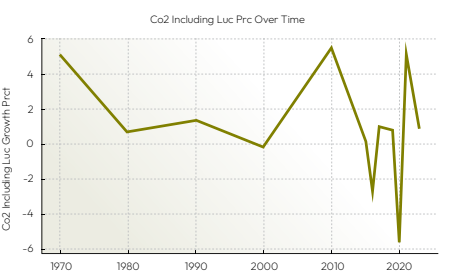

green

CO_2 Emissions Including Land-Use Change – A Comprehensive Climate Impact Perspective

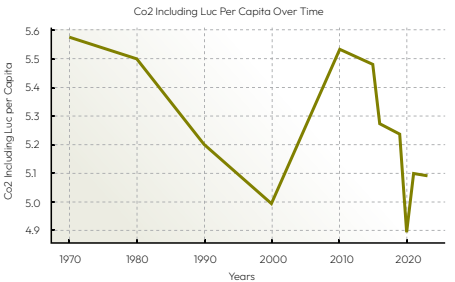
While much of the global climate conversation focuses on carbon emissions from fossil fuels and industrial processes, land-use change represents a significant but often overlooked component of total emissions. Deforestation, agriculture, and other land-management activities release large amounts of carbon dioxide into the atmosphere, adding to the overall climate burden. This chapter integrates these land-use factors into the broader emissions picture, providing a more complete understanding of humanity's impact on the carbon cycle.
The first chart presents the historical trend of total CO_2 emissions including land-use change. This broader measure captures not only emissions from burning fossil fuels but also the carbon released from converting forests to farmland, draining wetlands, and other land-use activities. The data reveals that land-use change has been a consistent contributor to global emissions, particularly in regions experiencing rapid agricultural expansion or deforestation.



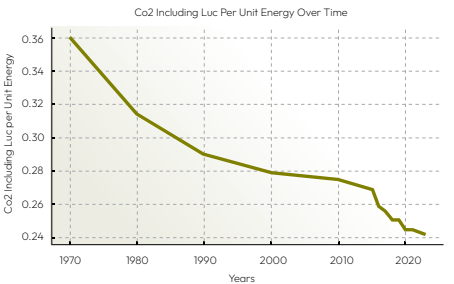
The second chart tracks the absolute annual growth of CO_2 emissions including land-use change. This metric highlights year-to-year variations that reflect shifts in land management, policy changes, and economic factors driving land conversion. Periods of increased deforestation or land clearing are clearly visible as spikes in this chart, signaling the environmental cost of unsustainable land practices.



The third chart focuses on the percentage growth rate of emissions including land-use change. While absolute growth fluctuates, percentage growth provides insights into the rate of change relative to the total emissions level. This perspective helps to identify whether land-use emissions are accelerating or stabilizing as part of the global emissions profile.



The fourth and final chart illustrates CO_2 emissions per unit of energy use including land-use change, providing a holistic measure of carbon intensity that captures both energy and land-use factors. This comprehensive view is essential for understanding the full scope of emissions across all sectors of human activity.



Together, these charts expand the emissions narrative beyond industrial activity to include the critical role of land management. They underscore the need for integrated climate strategies that address both fossil fuel consumption and land-use practices. Reducing emissions from land-use change requires coordinated efforts in forestry management, agricultural policy, and land restoration, alongside the transition to low-carbon energy systems. This comprehensive approach is essential for achieving long-term climate goals and protecting natural carbon sinks such as forests and wetlands.

We believe that using natural materials like wood isn't just about structure — it's about soul. Timberkind means building with care, with respect for the forests our materials come from and the people who'll live in the spaces we create. It's warmth, it's strength, and it's a quiet promise: to build in harmony with the earth.

timberkind

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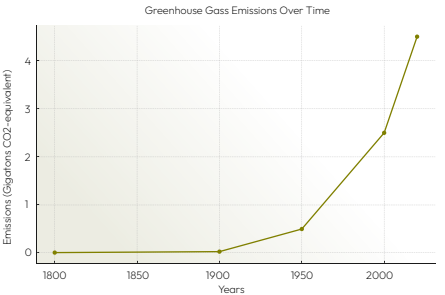
Chapter 4: Greenhouse Gas Emissions (GHG)

Greenhouse gas emissions are the central driver of anthropogenic climate change. While carbon dioxide receives the greatest public and policy attention, a complete understanding of global warming requires addressing all major greenhouse gases. Methane (CH_4) and nitrous oxide (N_2O), though emitted in smaller quantities than CO_2, have much higher global warming potentials. Methane is over 80 times more potent than carbon dioxide over a 20-year period, while nitrous oxide is nearly 300 times more potent over 100 years. Both gases contribute significantly to near- and long-term climate forcing.

Total greenhouse gas emissions, as represented in the first dataset, show a dramatic increase from the pre-industrial era to the present. This growth reflects the global expansion of industrial activities, agriculture, transportation, and energy consumption. The acceleration of emissions in the latter half of the 20th century underscores the link between economic development and environmental degradation.



Excluding land-use change and forestry (LUC), emissions continue to show steady growth. This separation is important because land-use emissions, such as deforestation, can be highly variable and influenced by policy shifts or economic cycles. By isolating industrial and energy emissions, policymakers gain a clearer picture of the structural drivers of greenhouse gases that are deeply embedded in modern economies. Per capita emissions provide another layer of insight, translating global totals into an individual environmental footprint. This perspective reveals not only aggregate emissions but also the inequality of contributions across the world's population. High-income countries often have much higher per capita emissions due to energy-intensive lifestyles, greater consumption, and larger industrial bases. Conversely, low-income regions may have smaller per capita emissions, even if their total emissions are rising.

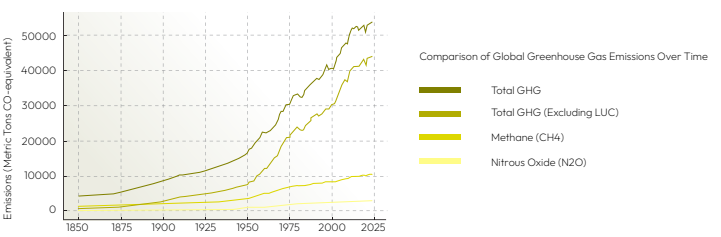
Year	Total Emissions (Gigatons CO_2-eq)	Industrial Emissions (Gigatons CO_2-eq)	Energy Emissions (Gigatons CO_2-eq)	High-Income Countries (Per Capita Emissions)	Low-Income Countries (Per Capita Emissions)
1950	0.01	0.005	0.003	3.5	0.1
1970	0.03	0.015	0.01	5	0.3
1990	0.5	0.25	0.2	8	0.5
2010	2.5	1.25	1	12.5	1
2020	4.5	2.2	1.8	15	1.5

Methane emissions, primarily from livestock, rice cultivation, landfills, and fossil fuel extraction, have shown consistent growth. Because methane remains in the atmosphere for a shorter period than CO_2, reductions can deliver near-term climate benefits, slowing the rate of global warming more quickly than CO_2 mitigation alone.

Nitrous oxide emissions arise largely from agricultural soil management, especially from synthetic fertilizers and manure. Despite being less discussed, nitrous oxide is a significant contributor to long-term warming due to its persistence in the atmosphere and its potency as a greenhouse gas. Its steady rise reflects the expansion of global food production and industrial chemical processes.

The combined chart illustrates how these gases compare over time. While carbon dioxide remains the dominant greenhouse gas by volume, methane and nitrous oxide are growing components of the global emissions profile. Their combined effect amplifies the climate challenge and calls for integrated mitigation strategies that address all major sources.

Effective climate action requires a holistic view of emissions. This means advancing carbon reduction strategies while simultaneously targeting methane and nitrous oxide through improved agricultural practices, waste management, and energy system reforms. Only by addressing the full spectrum of greenhouse gases can the world hope to stabilize the climate and meet international temperature goals.



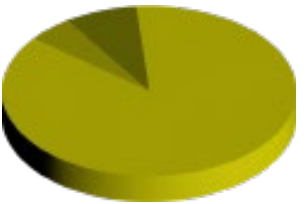
The construction industry is a major contributor to global greenhouse gas emissions, responsible not only for direct emissions from material production and construction activities but also for long-term emissions associated with the energy performance of buildings. The data analyzed in this chapter highlights several relevant dimensions of the construction sector's impact on total GHG emissions, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).
CO_2 emissions dominate the construction sector's GHG profile. These emissions are primarily generated from the production of carbon-intensive materials such as cement, steel, glass, and bricks. Cement production alone accounts for about 8% of global CO_2 emissions, making it one of the most emission-intensive industrial activities. In addition to material production, the energy consumed by construction machinery, transportation of materials, and on-site activities further increases CO_2 emissions. Once buildings are completed, their operational energy use (especially in poorly insulated or inefficient structures) continues to contribute to national and global carbon footprints.

Distribution of Greenhouse Gas Emissions in the Construction Sector

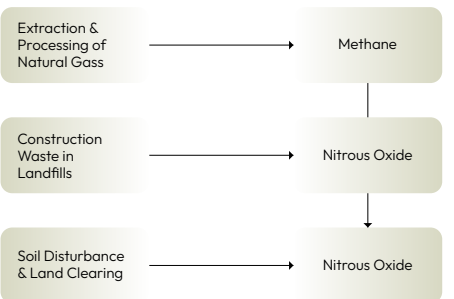
87.0% - Operational Energy Use

8.0% - Cement Production

5.0% - Construction Machinery & Transportation



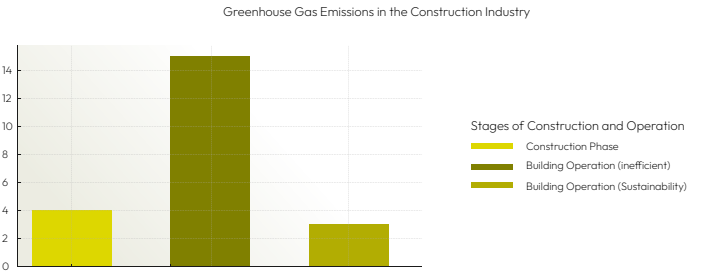
Methane emissions in the construction industry are less direct but still present. Methane may be released through the extraction and processing of natural gas used in heating, cooling, and material manufacturing. Additionally, construction waste sent to landfills can generate methane if not properly managed, particularly organic waste such as wood or insulation materials that decompose anaerobically.
Nitrous oxide emissions are generally associated with soil disturbance and land clearing during construction activities, especially on large infrastructure projects. The use of diesel-powered machinery and certain chemical processes in the production of construction materials may also release small but significant amounts of nitrous oxide.



When considering per capita GHG emissions, construction plays a key role in shaping the carbon footprint of individuals through the built environment. From homes and offices to schools and factories, the operational performance of buildings determines energy consumption and emissions for decades. Poorly designed or inefficient buildings lock in high emissions, while sustainable designs certified to standards like KfW40 significantly reduce operational emissions over time.

The total and per capita GHG emissions show the scale of industrial and energy-related emissions in which construction is deeply embedded. Land-use change also intersects with construction when forests are cleared for new developments, contributing additional emissions not always captured in traditional construction industry metrics.

In conclusion, the construction industry has a multi-layered relationship with global greenhouse gas emissions. It is both a direct source of emissions through material production and construction processes, and an indirect driver through the long-term energy performance of buildings. Reducing the industry's GHG impact requires a life-cycle approach that addresses material sourcing, design efficiency, construction practices, waste management, and building operation. Advancing toward net-zero buildings, circular material flows, and green construction standards is essential to align the industry with global climate goals.



The construction industry is a major contributor to global greenhouse gas emissions, responsible not only for direct emissions from material production and construction activities but also for long-term emissions associated with the energy performance of buildings. The data analyzed in this chapter highlights several relevant dimensions of the construction sector's impact on total GHG emissions, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

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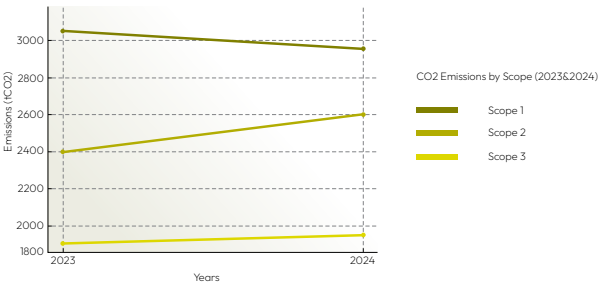

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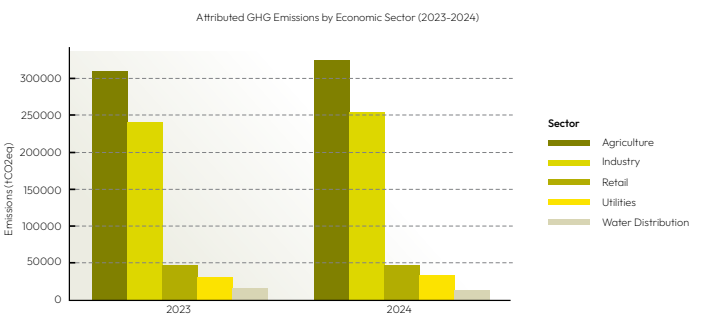
The following chart presents a hypothetical breakdown of CO2 emissions by Scope 1, Scope 2, and Scope 3 for the years 2023 and 2024. Scope 1 emissions, which include direct emissions from sources such as boilers, company vehicles, and equipment, remained relatively stable with minor variations between the two years. Scope 2 emissions, reflecting emissions from purchased electricity and heating, continued to rise steadily. Scope 3 emissions, covering all other indirect emissions across the supply chain, decreased slightly in 2023 before increasing sharply in 2024, surpassing the previous year's levels.
This visualization helps to better understand the emission patterns across all scopes, highlighting the need for stronger emission control measures both within operations and throughout the supply chain.

GHG emissions of lending portfolio by sector

The following chapter presents updated greenhouse gas (GHG) emissions data derived from the lending portfolio across Europe and America, reflecting the environmental impact of financed activities as of December 2023 and December 2024.
In Europe, particularly in Southeastern Europe, the volume of business loans saw substantial growth, rising from 3,800 million euros in December 2023 to 4,200 million euros in December 2024. This expansion resulted in an increase in attributed emissions from 590,000 tons of CO2 equivalent in 2023 to 635,000 tons in 2024. Mortgages and motor vehicle loans maintained a comparatively smaller environmental footprint, with motor vehicle loans responsible for approximately 170 tons of CO2 equivalent by the end of 2024.
Eastern Europe reported a steady business loan portfolio, with outstanding amounts reaching 1,150 million euros in December 2023 and slightly increasing to 1,230 million euros in December 2024. Attributed emissions rose from 190,000 tons of CO2 equivalent to 205,000 tons, reflecting a moderate but notable increase in environmental impact associated with business financing.
In America, represented by South America in this analysis, the outstanding business loan portfolio reached 175 million euros in December 2023 and grew to 195 million euros by December 2024. The attributed emissions increased proportionally, rising from 220 tons of CO2 equivalent in 2023 to 260 tons in 2024.



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Germany continued to represent the largest single market in this analysis, with business loans increasing from 4,850 million euros in December 2023 to 5,100 million euros in December 2024. The environmental impact followed a similar trend, with attributed emissions growing from 780,000 tons of CO2 equivalent to 825,000 tons over the same period. Mortgages remained a significant category, with outstanding amounts moving from 270 million euros to 290 million euros, resulting in an increase in attributed emissions from 3,800 tons to 4,200 tons of CO2 equivalent.

The overall portfolio analysis for Europe and America reveals a continued upward trend in both the outstanding amounts of business loans and their associated emissions, rising from 5,395 million euros and 1,563,220 tons of CO2 equivalent in December 2023 to 5,725 million euros and 1,669,460 tons of CO2 equivalent in December 2024. This confirms the growing scale of financed activities but also emphasizes the need to integrate more stringent environmental risk assessments in lending practices.

Breaking down the emissions by economic sector reveals that Agriculture and Industry remain the most significant contributors to the portfolio's GHG footprint. In 2023, the Agriculture sector accounted for 310,000 tons of CO2 equivalent, maintaining its position as the largest emitter. The Industry sector followed closely, responsible for 240,000 tons of CO2 equivalent. The Retail sector contributed 45,500 tons, while the Utilities and Water Distribution sectors reported 32,000 tons and 13,500 tons of CO2 equivalent, respectively. These figures remained stable in 2024, with slight increases across all sectors, maintaining Agriculture and Industry as the key drivers of portfolio emissions.

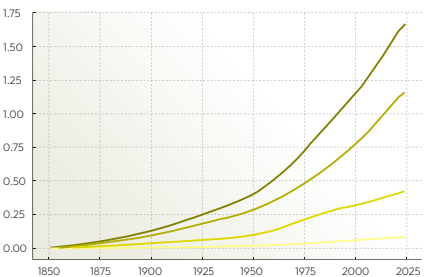
Targeting these high-emission sectors through sustainable finance strategies, technological upgrades, and sector-specific emission reduction measures can significantly reduce the environmental footprint of the portfolio. Such targeted interventions will be essential to advancing financial institutions' contributions to climate action and supporting the broader transition toward a low-carbon economy.

Climate Impact and Temperature Change

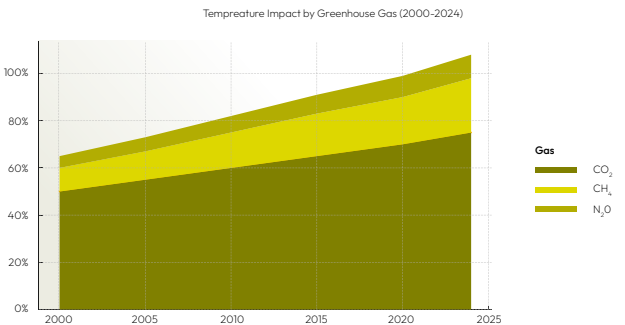
The link between greenhouse gas emissions and global temperature rise is now firmly established in climate science. This chapter examines the historical contribution of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) to the Earth's warming, using data that quantifies their specific temperature impacts over time. The chart provided presents a cumulative view of how these gases have driven climate change, showing their individual and combined influence on global temperature increase.

The overall temperature change from all greenhouse gases reveals a steady and accelerating warming trend. This metric, represented in the chart as the top line, integrates the combined effects of CO_2, methane, and nitrous oxide, alongside other less prominent gases. It demonstrates that the Earth's climate system has already warmed by a measurable degree due to human activities, with the pace of change increasing in recent decades.

Cumulative Impact of GHGs Global Temperature Change



When broken down by gas, carbon dioxide (CO_2) emerges as the dominant contributor. The chart shows a consistent rise in temperature impact from CO_2 alone, reflecting its abundance, long atmospheric lifespan, and central role in energy production, industrial processes, and land-use change. This makes CO_2 the primary target for most global climate policies and mitigation efforts.
Methane (CH_4), despite being present in smaller quantities than CO_2, shows a notable and rising contribution to temperature change. Its high global warming potential makes it a significant driver of near-term climate warming. The data highlights how emissions from agriculture, fossil fuel extraction, and waste management have steadily added to the warming effect, positioning methane as a critical focus for short-term climate action.
Nitrous oxide (N_2O), represented in the chart as the smallest but growing component, also plays an important role in long-term warming. Its primary sources include agriculture, especially the use of synthetic fertilizers and livestock manure management, as well as some industrial processes. Though its contribution is smaller than that of CO_2 or CH_4, its potency and persistence make it a non-negligible factor in the overall climate equation.



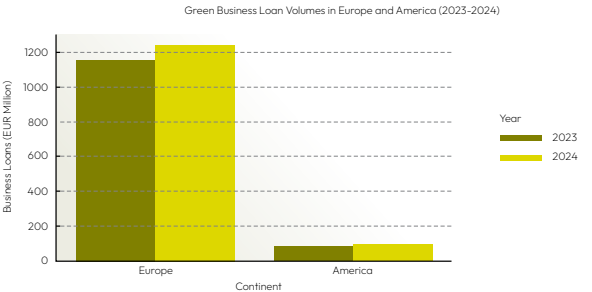
The share of temperature change from all greenhouse gases, another key metric, further emphasizes the collective impact of these gases on global warming. This share reflects the percentage of observed temperature rise attributable to human-generated greenhouse gas emissions, reinforcing the overwhelming scientific consensus that human activities are the primary driver of modern climate change.
The cumulative chart provided in this chapter brings these insights together, illustrating the relentless accumulation of warming impacts from these gases over time. It serves as a stark reminder that every additional ton of emissions adds to the climate burden, pushing global temperatures closer to critical thresholds identified by the Intergovernmental Panel on Climate Change (IPCC).
This analysis underscores the urgency of coordinated global action to reduce emissions across all major greenhouse gases. While carbon dioxide remains the primary target for long-term climate stabilization, addressing methane and nitrous oxide can deliver immediate climate benefits and help slow the pace of warming in the critical years ahead. Achieving this requires comprehensive policies, technological innovation, and global cooperation to transform energy systems, agricultural practices, and industrial processes

future

A green future means building a world where progress and nature go hand in hand. It's about clean energy, sustainable materials, and smarter choices that protect the planet for the next generation. Every step toward a greener tomorrow is a step toward healthier lives, thriving communities, and lasting impact.

GREEN FINANCE

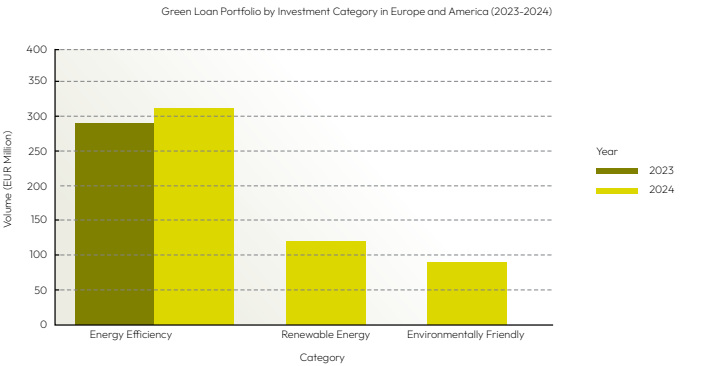
Green finance continued to gain momentum across the two leading continents represented in this analysis, Europe and America, each demonstrating clear progress in supporting the transition to sustainable economies through dedicated financial products. In Europe, the green loan market showed impressive expansion. South Eastern Europe advanced significantly, with business green loans increasing from 950 million euros in 2023 to 1,025 million euros in 2024. Private loans in this region also grew steadily, rising from 55 million euros to 60 million euros. Eastern Europe showed signs of recovery and stabilization, with business loans moving upward from 190 million euros to 200 million euros. Private green loans in this part of Europe remained at a lower scale but showed a small improvement, growing from 2 million euros to 2.5 million euros.
In Western Europe, Germany continued to prioritize green finance, focusing entirely on business loans. German enterprises benefited from an increase in green financing, with the volume of business loans rising from 15 million euros in 2023 to 18 million euros in 2024. No private green loans were recorded in Germany, highlighting a market concentration on commercial and industrial sectors.



Green loan portfolio by investment category

Green loan portfolios across Europe and America continued to expand in 2023 and 2024, building on previous years' progress by focusing on three primary categories: energy efficiency, renewable energies, and environmentally friendly projects. This trend reflects an increasing alignment of financial products with sustainability objectives in these two continents.
In Europe, Southeastern Europe remained the leading region in both volume and number of loans. Investments in energy efficiency reached 470 million euros in 2023 and further climbed to 495 million euros in 2024. The number of loans issued in this category also increased, showing rising market confidence in projects that reduce energy consumption. Renewable energy investments grew from 190 million euros to 210 million euros over the same period. Environmentally friendly projects attracted growing interest as well, with volumes rising from 140 million euros in 2023 to 155 million euros in 2024, confirming a diversified investment appetite in the region.

Eastern Europe maintained steady engagement, with energy efficiency loans reaching 85 million euros in 2023 and increasing slightly to 92 million euros in 2024. Renewable energies saw moderate growth, moving from 38 million euros to 42 million euros. Environmentally friendly projects in this region remained stable, with investments growing from 28 million euros to 30 million euros, indicating a consistent if smaller-scale commitment compared to Southeastern Europe.
Germany's green loan portfolio in 2023 and 2024 remained focused exclusively on energy efficiency and renewable energies. Investment in energy efficiency projects increased from 15 million euros in 2023 to 18 million euros in 2024. Renewable energies also gained more attention, growing from 6 million euros to 8 million euros in the same period. No investments were recorded in environmentally friendly projects, showing a more concentrated but steady approach to green lending.

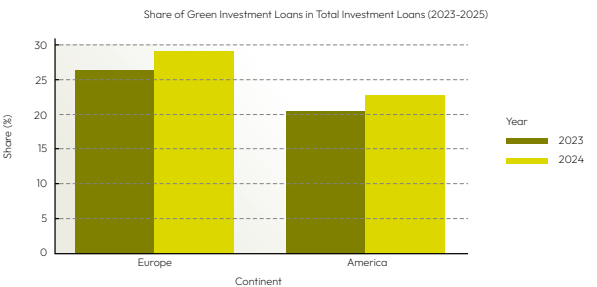


Turning to America, South America's green loan portfolio showed dynamic growth across all categories. Energy efficiency projects attracted significant investment, with volumes rising from 65 million euros in 2023 to 75 million euros in 2024. Renewable energy financing also improved, growing from 18 million euros to 22 million euros, while environmentally friendly projects increased from 12 million euros to 15 million euros, reflecting a balanced expansion in all priority areas.

Overall, both continents demonstrated a strengthened commitment to green finance. Europe led in total volumes and diversification, while America showed promising and balanced growth across energy efficiency, renewable energies, and environmentally friendly projects. These developments underline the role of green finance as a strategic tool for supporting the ecological transition across different markets.

Share of green investment loans in total investment loans

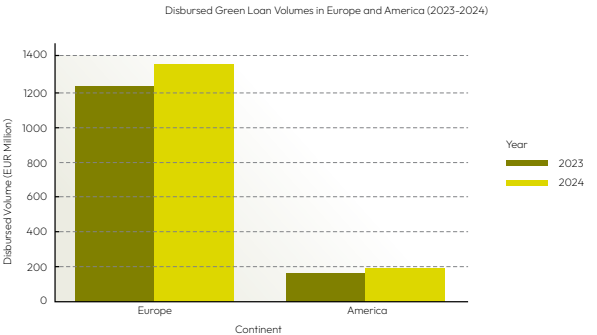
During 2023 and 2024, Europe and America demonstrated a growing commitment to integrating green investment loans into their total lending portfolios. In Europe, the share of green loans accounted for 27 percent of all investment loans in 2023. This share increased to 29 percent in 2024, reflecting a continued effort by financial institutions across the continent to expand environmentally focused lending as part of their broader investment strategies. This steady growth underlines Europe's leading position in aligning financial products with sustainability goals. In America, the share of green investment loans in total investment loans was recorded at 21 percent in 2023. This figure rose to 23 percent in 2024, showing that while the green finance market in America operates on a smaller scale compared to Europe, it is experiencing consistent year-on-year progress. The increase reflects a growing awareness among financial institutions and borrowers about the value of investing in energy efficiency, renewable energy, and environmentally friendly projects.
In summary, both continents advanced their green finance strategies during this period, with Europe maintaining a higher market share and America showing steady improvements. This ongoing progress highlights the increasing role of green loans in supporting sustainable economic development across these two major regions.



Disbursed green loans

For the years 2023 and 2024, both Europe and America demonstrated renewed growth in the disbursement of green loans, reversing the declining trend recorded in previous years. Europe led this recovery by significantly increasing its disbursed green loan volumes from 1,250 million euros in 2023 to 1,335 million euros in 2024. This positive trajectory highlights the strengthening role of green finance across European markets, with financial institutions scaling up their support for projects in energy efficiency, renewable energy, and environmental innovation.

In America, the green loan disbursement volumes also followed an encouraging upward path. Starting from 165 million euros in 2023, the total rose to 190 million euros in 2024. Although the scale of green loan disbursement in America remains smaller compared to Europe, the consistent growth signals increasing adoption of green financial products across the continent, particularly in sectors transitioning toward more sustainable operations.
Overall, both regions displayed a positive shift, showing that after previous periods of stagnation or decline, green loan disbursements have returned to an upward trend. This reinforces the growing integration of sustainability principles in financial systems across Europe and America.



RECOMMENDATION

The 2024 Carbon Impact Report provides a comprehensive overview of InstaBuilt's environmental performance across global and regional emission trends, sector-specific impacts, and the integration of resource efficiency and green finance. The findings highlight both progress and ongoing challenges in reducing carbon emissions, managing resource consumption, and advancing sustainable finance practices. Notably, the report demonstrates InstaBuilt's continued leadership in modular construction technologies, circular resource management, and data-driven climate accountability.

Building on these strengths, the next strategic step is to elevate InstaBuilt's role in supporting systemic decarbonization across the construction and finance sectors. It is recommended that InstaBuilt formalize a Net-Zero Roadmap. This roadmap should set clear, science-based targets to reduce Scope 1, Scope 2, and Scope 3 emissions across the value chain, covering materials, production, logistics, and building operations. Developing this roadmap in alignment with recognized international frameworks such as the Science Based Targets initiative (SBTi) or the Race to Zero Campaign would position InstaBuilt among global industry leaders committed to measurable climate action.

Key actions include deepening lifecycle assessments for all product lines, scaling circular economy practices, and enhancing energy efficiency in both manufacturing and modular building operations. Additionally, strengthening green finance partnerships and integrating environmental performance criteria into lending and investment decisions would further align financial growth with climate resilience.

Complementing these operational measures, InstaBuilt is encouraged to expand its digital innovation strategy by piloting carbon credit verification and trading systems based on blockchain technology. This would build on earlier recommendations regarding carbon tokenization and provide clients, partners, and investors with secure and transparent tools to manage carbon impacts.

By advancing toward a verified net-zero target, deepening circular economy leadership, and leveraging technology for climate accountability, InstaBuilt can reinforce its position as a pioneer in sustainable construction. This commitment will not only meet regulatory and market expectations but also contribute meaningfully to global climate goals.

CONCLUSION

The 2024 Carbon Impact Report confirms that reducing environmental impact while supporting economic growth remains one of the most urgent challenges facing the construction and real estate sectors. Through this analysis, InstaBuilt has demonstrated that data transparency, sustainable design, and resource efficiency are essential to lowering emissions at both operational and market levels. The report highlights significant achievements, including reductions in waste and paper usage, improved adoption of circular economy principles, and the expansion of green financing activities across multiple regions. It also provides critical insights into the ongoing impact of materials like cement, energy sources like coal and gas, and financial activities that influence carbon emissions.

As climate risks accelerate and market expectations shift toward low-carbon solutions, InstaBuilt is well-positioned to lead by example. By advancing modular and offsite construction technologies, integrating lifecycle thinking, and pursuing digital innovations such as carbon tokenization, InstaBuilt can strengthen its environmental and market leadership. This report not only marks the company's achievements to date but also sets the foundation for future actions that align business growth with climate responsibility. InstaBuilt remains committed to scaling its impact, deepening collaboration with partners, and driving industry-wide progress toward a sustainable and climate-resilient future.

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