



Carbon Reduction Strategy

Houben NV - Hasselt

November 2024

GENERAL PROJECT DATA

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1. INTRODUCTION

1.1 CO₂ PERFORMANCE LADDER

The CO₂ performance ladder is a tool and certification scheme that can be used in public procurement to encourage CO₂ reductions. By incorporating the ladder into public procurement, contracting authorities can help reduce CO₂ emissions in their activities.

The CO₂ performance ladder is a certified management system that encourages companies to reduce CO₂ in both a structural manner, within operations and in projects as well as in the supply chain. Certification is carried out by an accredited and independent body. To encourage certification based on the CO₂ performance ladder, a fictive discount is granted in procurement contracts to companies that score well on the ladder. Companies that are certified following a specific level on the CO₂ performance ladder and thus make efforts in CO₂ reduction have a greater chance of obtaining public contracts.

In the CO₂ Performance Ladder, the Capability Maturity Model is translated into five levels, rising from 1 to 5. For each level, a fixed set of requirements is defined and connected to the CO₂ performance of the organization and its projects. These requirements stem from four perspectives (A through D), each with its weighting factor. An organization's place on this ladder is determined by the highest level at which the organization meets all requirements. In the spirit of the CO₂ Performance ladder, an individual perspective cannot be viewed separately from the other perspectives. Each higher level includes the requirements of the lower levels. The organization must be permanently active with current performance at the lower levels.

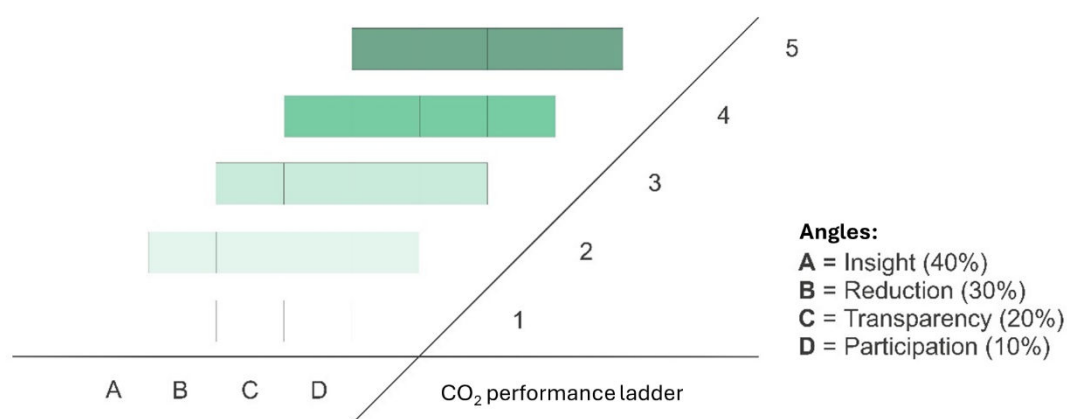


Figure 1: The CO₂ performance ladder perspectives and levels

1.2 GOAL AND STRUCTURE OF THE DOCUMENT

In 2023, Houben NV started to take a structured approach to the organisation's CO₂ emissions as part of their initiatives towards a more sustainable business. This Carbon Reduction Strategy is part of this approach and aims to methodologically outline the possibilities and goals of the organisation, based on the requirements as formulated by the CO₂ performance ladder manual v3.1 and ISO 50001 (see the appendix for specific references to the different parts of the ISO requirements). Using this document, Houben NV aims to reflect on how they have set goals regarding CO₂e (and energy) reduction measures, and how they are planned, implemented, monitored, and evaluated.

The Carbon Reduction Strategy stems from the sustainable ambition endorsed by Houben NV's management. This statement reflects Houben NV's ambition to continuously strive for optimal CO₂ and energy management. Houben NV strongly believes that energy- and CO₂ management act hand in hand, hence why energy- and CO₂ management throughout this document can be used synonymously and intertwined. Reporting energy consumption in both total consumption and CO₂e emissions can make the various energy sources comparable, without losing the information behind the calculations. Therefore, the impact of energy use on the environment can be expressed in terms of the amount of CO₂e released during consumption. This report focuses solely on the CO₂e emissions, while energy consumption is reported in the Carbon Footprint report of 2023.

The Carbon Reduction Strategy described in this document serves as an organic structurization of Houben NV's path towards a more sustainable business approach. It serves to identify, plan, monitor and evaluate reduction measures. For this reason, a carbon reduction management plan is updated regularly, mapping out the effective reduction and adjusting the plan accordingly. The ambition level of the organization thus plays an important role.

The aspects that are covered in this Carbon Reduction Management Plan are discussed in the following chapters:

1. Chapter 1: Introduction
2. Chapter 2: CO₂ reduction ambition and scope
3. Chapter 3: Governance of the Carbon Reduction Strategy
4. Chapter 4: Summary company carbon footprint
5. Chapter 5: Reduction plan for Houben NV's own operations (scope 1&2)
6. Chapter 6: Monitoring and evaluation of Carbon Reduction Strategy

1.3 SUMMARY TABLE

Company name	Houben NV
Description of the organization	Houben NV is a construction company, with construction projects in both the private and public sectors. The projects are supervised by them from start to finish. This can range from new construction, renovation, restoration to aftercare and maintenance.
Footprint calculation according to following standard:	Greenhouse Gas Protocol - Corporate standard CO ₂ performance ladder manual v3.1
Chosen consolidation approach (equity share, operational control or financial control)	Operational control: This means that a company considers 100% of the emissions released by its activities over which it has control. A company is assumed to have operational control over an activity if the company has full authority to set and implement its operational policies for the activity.
Description and address of the site(s) that are within the organizational boundary of the company	Site 1: Hasselt (office, penthouse): Prins Bisschopssingel 36 Hasselt Site 2: Beringen (warehouse): Schoebroekstraat 58 Beringen Site 3: Houthalen (office Future Clima): Lijsterstraat 30 Houthalen-Helchteren Construction sites in different location in Flandres and Wallonia
Description of the activities that are within the organizational boundary of the company (Description of inventory boundary)	The activities of Houben NV which cause emissions can be summarized: • Electricity consumption by: office activities, lighting, construction activities and other technical installations; • Fuel consumption due to: heating of the buildings, processes, use of passenger cars and other vehicles;

Table 1: Company Description

2. CO₂ REDUCTION AMBITION AND SCOPE

2.1 CO₂ REDUCTION AMBITION

Carbon reduction measures refer to the reduction of greenhouse gas emissions, their impact is determined according to the Greenhouse Gas Protocol - Company Standard in line with the expectations defined in the CO₂ performance ladder manual v3.1. The objective of the Carbon Reduction Strategy is to reduce the organization's footprint in the direction of limiting global warming to the ambition level of 2°C.

Houben NV commits to reducing its absolute emissions with 30% by 2030, compared to the reference year of 2023. Our CO₂e reduction target for 2030 is based on a realistic assessment of our current capabilities and resources, aiming for substantial progress within our operational constraints and reflects our commitment to continuous improvement and contribution to climate goals.

	Target (type + class)		Scope	Absolute reduction target from base year 2023 (%)	Maximum emissions in 2030 (tCO ₂ e)
Target	Absolute	2°C	1+2 (+ business travel)	30%	1.190,95 tCO ₂ e

Table 2: Objective of the reduction plan

The reduction measures are evaluated once a year and adjusted according to the effective reduction achieved (see also Chapter 6).

2.2 ORGANIZATIONS WITHIN ORGANISATIONAL BOUNDARY

In determining the organizational boundaries of the listed businesses within Houben NV, a top-down approach is followed. A company is assumed to have operational control over an activity if the company has full authority to set and implement its operational policies for the activity. Based on a thorough study to eliminate non-relevant and empty entities within the boundary, the organizational boundary shown in Figure 2 is seen as the entire scope of which this plan applies.

Organigram nog toe te voegen

Figure 2: All entities within the organizational boundary considered for this reduction management report under the entity Houben NV.

3. GOVERNANCE OF THE CARBON REDUCTION STRATEGY

3.1 GOVERNANCE OF THE CARBON REDUCTION STRATEGY

Governance of the Carbon Reduction Strategy is vested in the following roles within Houben NV's management. These people and roles are involved in the CO₂-Performance ladder framework, responsible for the sustainable transition of the company activities of the group.

Name	Role
Peter Rouvrois	Prevention adviser, CO ₂ -Performance ladder Project Manager
Gerry Vanhoonacker	HR Director
Ignace Houben	Director of Quality and Aftercare
Veronique Houben	Director of Business Development
Andres Lesire	Commercial Director

Table 3: Roles involved in implementation CO₂-Performance ladder framework

The first point of contact for anything related to the CO₂ performance ladder is the CO₂-Performance ladder Project Manager. The other people listed in the table above, part of Houben NV's management, are together ultimately responsible for the functioning of the Carbon Reduction Strategy within the organization. The CO₂-Performance ladder Project Manager generally follows the implementation of the CO₂ performance ladder within the organization, with support from the Director of Quality and Aftercare for the implementation for the specific reduction measures. Changes to the system, the manual and other documentation of the CO₂ performance ladder are followed up by the CO₂-Performance ladder Project Manager. For more information on the division of responsibilities within the Governance team, we refer to Chapter 5.

3.2 PDCA-CYCLE AS BASIS FOR THE CARBON REDUCTION STRATEGY

The CO₂ performance ladder framework, as well as the ISO 50001, are both based on the principles of continuous improvement. This continuous improvement is supported in both frameworks using a Plan-Do-Check-Act (PDCA) or Deming wheel. This framework has also become the basis for the Carbon Reduction Strategy of Houben NV.

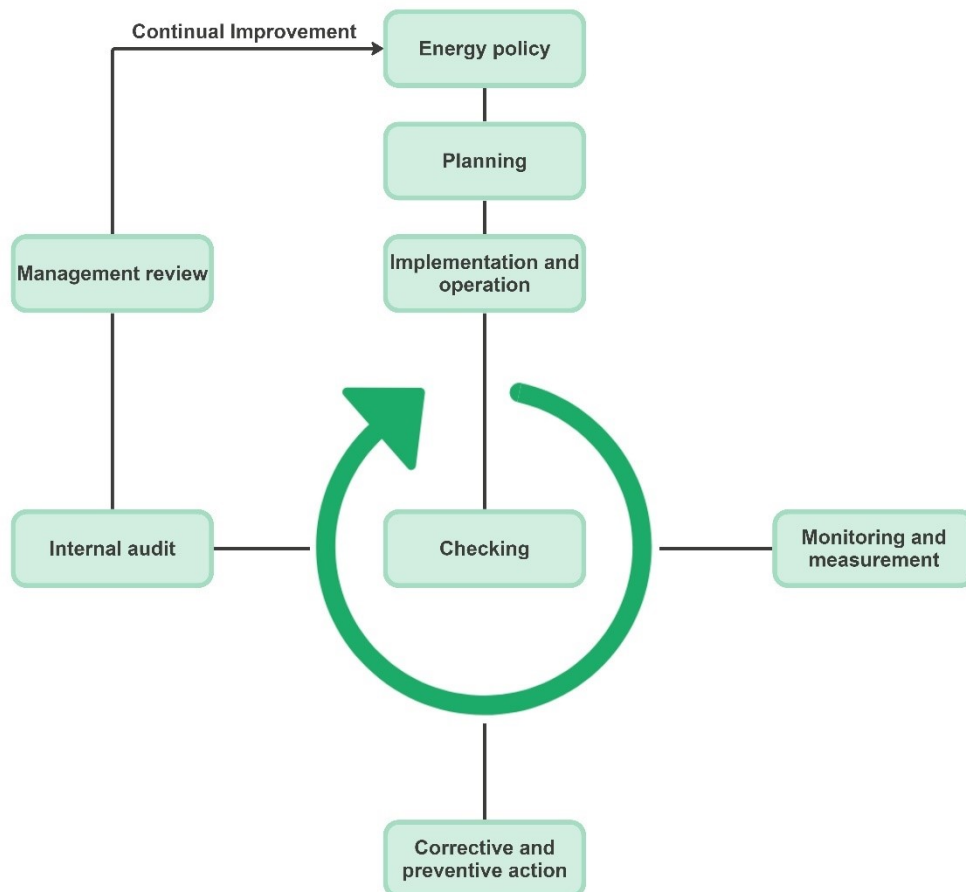


Figure 3: PDCA cycle as basis for the Carbon Reduction Strategy of Houben NV SA

1. **In the PLAN phase** of the Carbon Reduction Strategy, the focus is on initiating carbon management measures within the organization. This involves a systematic series of steps aimed at developing a comprehensive carbon reduction plan. The goal is to establish a framework that guides subsequent efforts to minimize the organization's carbon footprint.
2. **During the DO phase**, the initial carbon reduction proposal transforms into a detailed project plan. This includes defining tasks, assigning responsibilities and authority, and fostering effective communication strategies. These efforts are essential for integrating carbon management seamlessly into the organizational structure.
3. The heart of carbon management lies in the **CHECK phase**, where regular measurement and analysis of carbon emissions take place. Through consistent monitoring and comparison of carbon data, insights into the effectiveness of implemented measures are gained. This phase serves as a diagnostic tool to identify any deviations and ensures ongoing optimization of carbon emissions.

4. **The ACT phase** is activated when implemented measures do not sufficiently reduce carbon emissions based on the analyzed data. In such cases, a thorough examination is conducted to identify areas for improvement and necessary adjustments to achieve the intended carbon reduction goals. Conversely, if the measures prove highly effective, the organization proactively explores opportunities for further carbon reduction. This phase emphasizes the importance of remaining vigilant and responsive to the outcomes of implemented carbon management measures, fostering a continuous improvement mindset in reducing the organization's carbon impact. Within this strategy, we see the 'act' phase as an evaluation phase every 3 years.

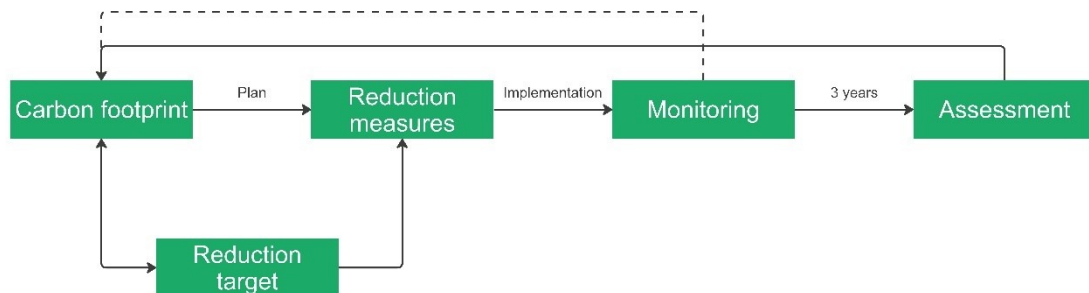


Figure 4: Trajectory of reduction management.

4. SUMMARY COMPANY CARBON FOOTPRINT

The carbon footprint of an organisation is divided into 3 different categories according to the GHG protocol:

- Scope 1: direct emissions because of business operations.
- Scope 2: indirect emissions due to the consumption of purchased electricity from the grid.
- Scope 3: indirect emissions resulting from the upstream and downstream of an organisation's value chain.

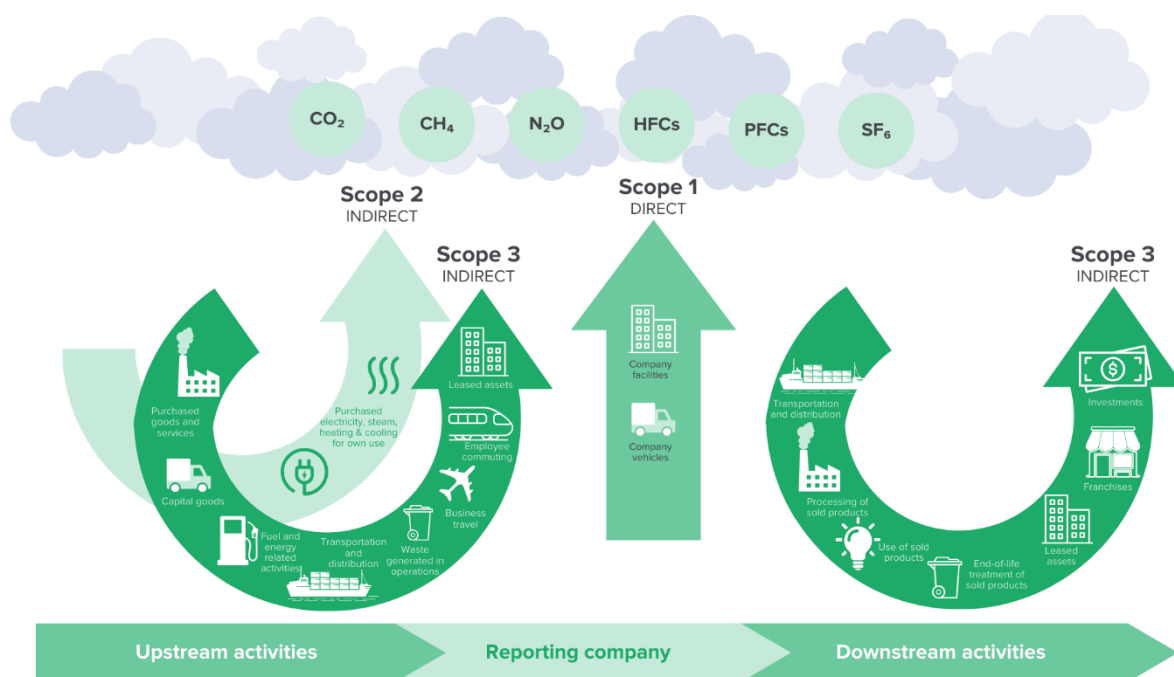


Figure 5: Different scopes according to the GHG-protocol

The same structure will be followed to subdivide identified reduction measures.

Houben NV's carbon footprint was calculated in detail and discussed in the report CarbonFootprint_HoubenNV_2023. In this report, the complete scope 1 and 2 emissions of Houben NV were calculated, as well as all scope 3 emissions.

This initial inventory of CO₂e emissions was performed in 2023 for Houben NV, which will serve as the base year (see further). Houben NV's activities in 2023, which cause emissions, can be summarized as follows:

- Electricity consumption by: office activities, lighting, construction activities and other technical installations;
- Fuel consumption due to: heating of the buildings, processes, use of passenger cars and other vehicles;

4.1 OVERVIEW SCOPE 1 AND 2 EMISSIONS YEAR IN 2023

The table below shows the consolidated CO₂ footprint of Houben NV for the year 2023. There can be seen that scope 1 has an impact of 85,79% while Scope 2 has an impact of 14,21% on the CO₂ footprint of Houben NV.

Scope	Tonnes CO ₂ e	% scope 1 + 2
Scope 1	1.459,59	85,79%
Scope 2 - market-based	241,77	14,21%
Business travel	0,00	0,00%
Total	1.701,36	100,00%

Table 4: CO₂e footprint Houben NV 2023

The overall view, including all subcategories, is shown in the figure below. The Scope 1 and 2 emissions account for 1.701,36 tCO₂e in total. The stationary emissions – which include the fossil fuel consumption of the heating of buildings and water, as well as for the power group at construction sites - account for 44,27%. The mobile emissions – which include the fossil fuel consumption of the passenger cars and delivery vehicles – have an impact of 41,52% on the carbon footprint. The Scope 2 emissions – which include the electricity consumption of the (construction) sites – have an impact of 14,21%. Both Scope 1 and 2 fall within the organisational, and operational scope of Houben NV.

In calculating the footprint for the CO₂ Performance Ladder, it is imperative to consider emissions associated with the production of fuel and energy. Therefore, emissions linked to fuel and energy are incorporated into each section of the calculation of scopes 1 and 2. This inclusion ensures a comprehensive assessment of the Houben NV footprint, encompassing the entire Well-To-Wheel cycle of the fuel and energy sources.

There was no business travel in 2023.

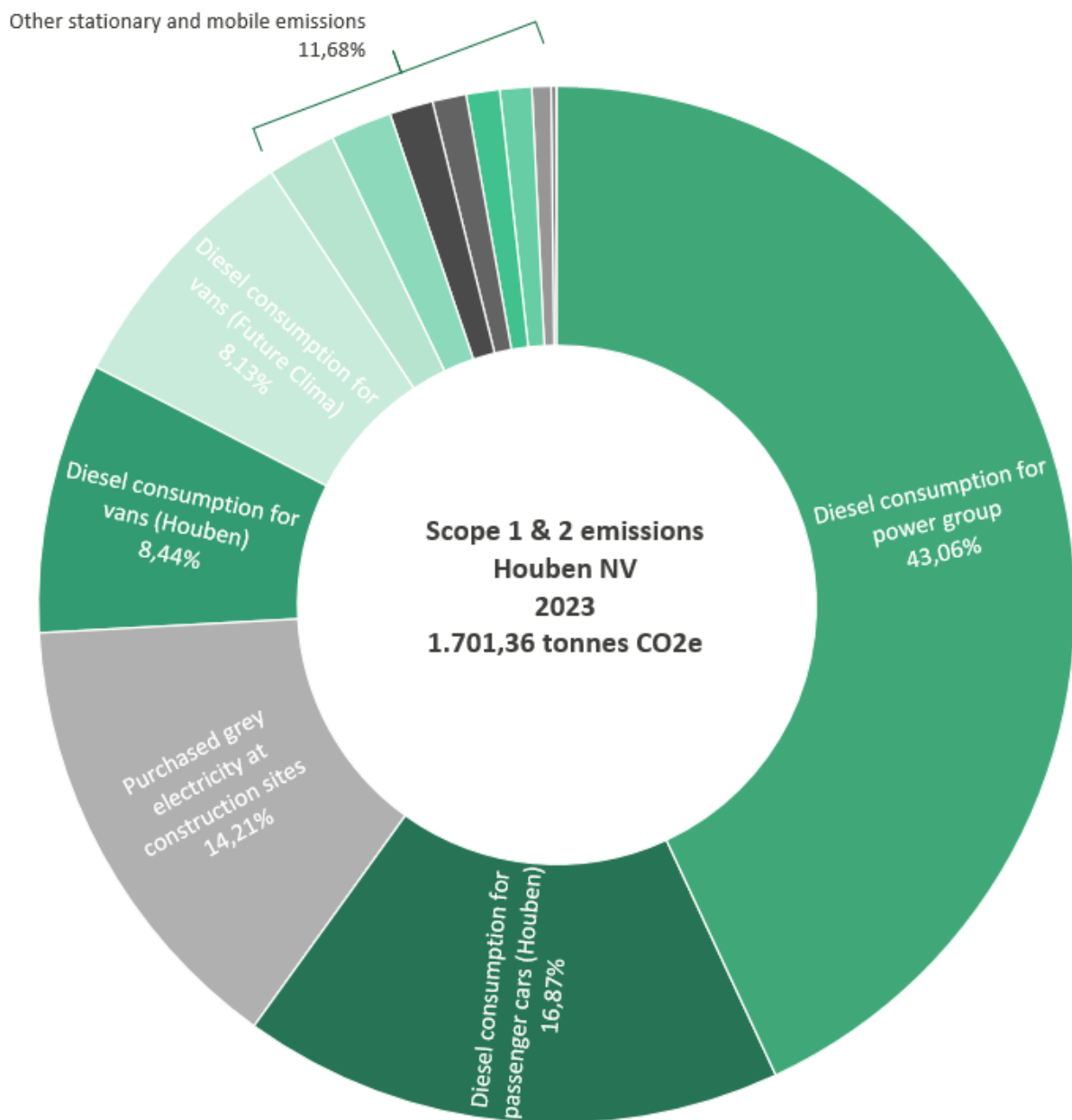


Figure 6: CO₂e footprint Houben NV in 2023 including subcategories.

5. REDUCTION PLAN FOR HOUBEN NV'S OPERATIONS (SCOPE 1 & 2)

The reduction plan covers a period of 6 years (2024-2030) to achieve the absolute emission reduction as identified above.

This chapter includes the identification of possible measures to reduce scope 1 and 2 emissions. Correct estimates of the specific impact and investment cost will require a study performed by Houben NV before any investment is made. The table below provides an overview of all the identified reduction measures per scope and energy domain. It shows how the reduction plan provides measures for every emission source.

When all these measures are implemented by no later than 2030, the annual footprint in 2030 will be 30% lower than in 2023.

As in the base year 2023, no business travel was performed by Houben NV, it was decided to leave business travel out of scope for the current measure identification exercise. Houben NV commits itself to accurately monitor any business travel in the coming years and report in the annual carbon footprint update.

5.1 POSSIBLE REDUCTION MEASURES

The table below summarises reduction measures identified by Houben NV to reduce Scope 1 and 2 emissions. Since identifying reduction measures is an iterative process and specific studies still need to be conducted, it is possible that the choices concerning the implementation of reduction measures will be adjusted over time. In the table below, the impact of the individual reduction measures can be found, as well as the total impact of implementing the reduction measures.

Scope	Energy domain	Reduction measure	Reduction potential (tCO ₂ e)	Reduction potential (%)
General	Raising awareness	Raising awareness among employees and subcontractors about energy consumption	-	-
Scope 1	Transition from diesel to biodiesel in vehicle fleet	Forklifts	29,09	1,71%
	Electrification of vehicle fleet	Forklifts	32,56	1,91%
		Passenger cars (Houben and Future Clima)	360,93	21,21%
	increase euro standard	Trucks (Houben)	0,31	0,02%
	Sustainable heating	Elimination heating in joinery Beringen	(11,95)	(0,70%)
Scope 2	Optimization compressed air consumption	Pressure reduction of the compressors	0,89	0,05%
		Monitoring compressed air leaks	5,89	0,35%
	PV installation	Solar panels in Houthalen	0,00	0,00%
		Solar panels in Beringen	0,00	0,00%
	Heating panels	Replacement of electrical heaters with ceiling heating panels in construction trailers	9,60	0,56%
	Battery storage	Using a Portable Battery Energy Storage System (BESS)	91,58	5,38%
		as an alternative for a power group at construction sites		

	Sustainable procurement policy	Sustainable procurement policy of electrical appliances used in construction trailers such as refrigerators and microwaves	-	-
	Relighting LED and instalment of sensors	Relighting to LED lighting in combination with motion and/or daylight sensors	4,97	0,29%
	High frequency battery chargers	Switching from conventional to high-frequency battery chargers for electric forklifts	0,10	0,01%
	Green electricity contract	Transfer of all construction sites to a green electricity contract	(240,03)	(14,11%)
Total	Without green electricity contract on construction sites		506,81	29,95%
	With green electricity contract on construction sites		746,84	43,90%

Table 5: Overview of scope 1 and 2 reduction measures

The table is obtained after considering and brainstorming different options to reduce Houben NV's carbon footprint. Taking into account the evolution of certain technologies and available investment budgets, some options are currently not included in Houben NV's roadmap. However, this roadmap will be thoroughly reviewed every three years and adjusted if necessary on the basis of the evolution of the emissions over time. Some measures that are currently not included in the roadmap are the following: use of biodiesel in vans and/or trucks, electrification of vans, installation of heat pumps in Beringen and/or Houthalen. The preconditions of these measures will be further followed up by Houben NV, such as the price of biodiesel or presence of charging options for electric vans.

5.2 ROADMAP

Based on an analysis by our external partner Encon, as well as through several workshops performed in August 2024, different reduction measures were identified and ordered in the expected implementation period in the roadmap below. The roadmap is a collaborative overview constructed by the management and CO₂-Performance ladder Project Manager of Houben NV in control over the Carbon Reduction Strategy and will be updated over time as discussed in the next chapter. Before the introduction of an implementation, every measure is evaluated based on a cost-benefit analysis. If this analysis shows a positive outcome, the measure is implemented as discussed below.

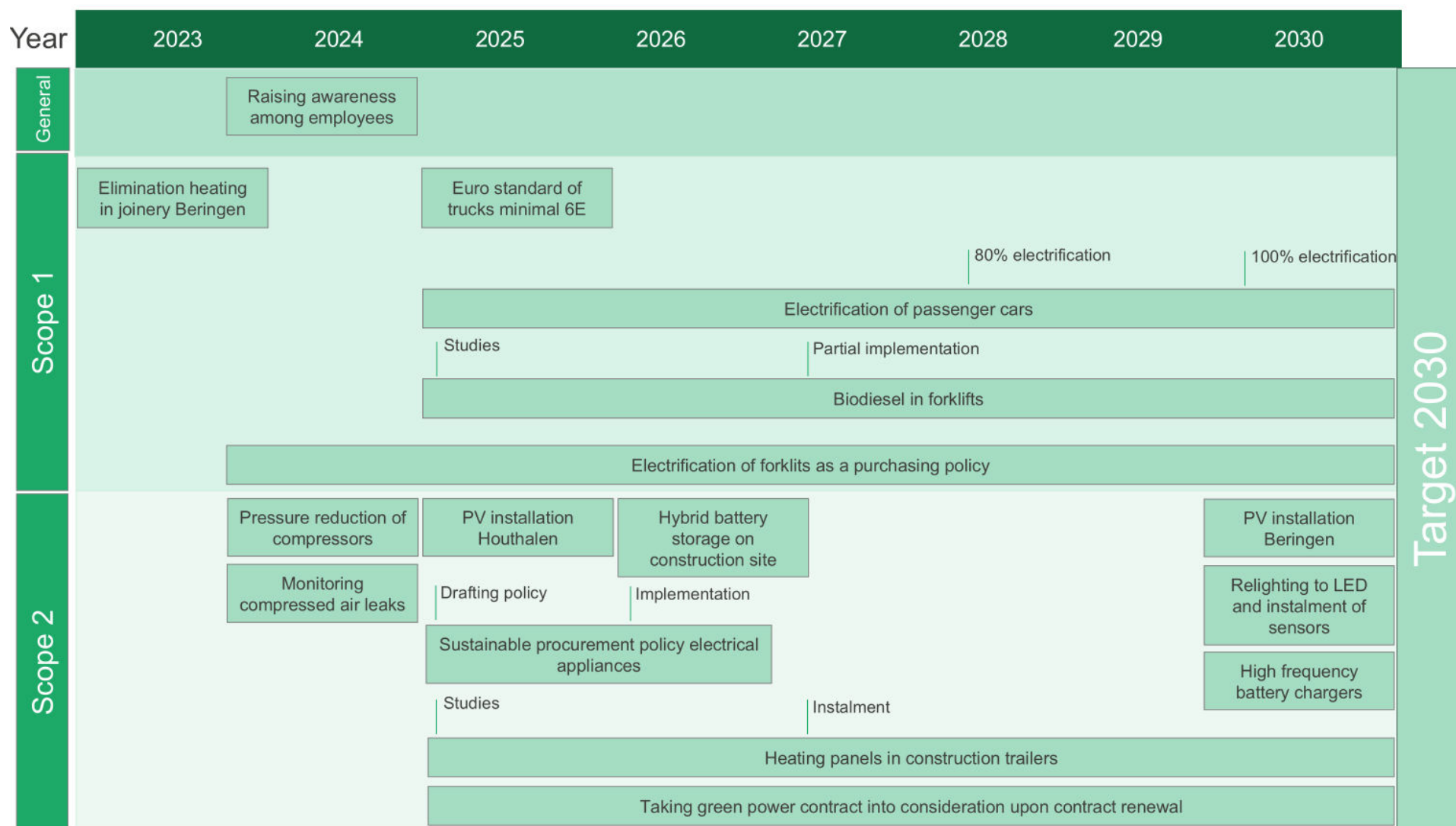


Figure 7: Roadmap of timing of reduction measures by Houben NV.

5.3 MEASURES DETAILS & RESPONSIBILITIES

All measures identified above were elaborated and shown their feasibility for Houben NV in a separate report. Within the workshop performed in June 2024, these measures were then explored on the following elements:

1. Individual responsibility within the management team
2. Specific key performance indicators to monitor the implementation of the measure throughout time.

5.3.1 SUMMARY OF MEASURES

Before diving into individual responsibilities and key performance indicators, the following sections explain high level how every measure is perceived as necessary to achieve the carbon reduction target of 30% by 2030.

5.3.1.1 RAISING AWARENESS AMONG EMPLOYEES AND SUBCONTRACTORS

Educating employees and subcontractors about energy efficiency helps reduce the organization's energy consumption. When employees are mindful of energy consumption—whether it's turning off unused equipment, optimizing heating and cooling systems, or reducing lighting use—small actions collectively result in significant cost savings.

A specific example what is being focused on within Houben NV is raising awareness among subcontractors to ensure that construction trailer doors are closed when the heating is on, which can be challenging but essential for maintaining security, energy efficiency, and comfort on the job site.

As the potential savings from this measure are highly staff-dependent, no specific reduction has been calculated.

5.3.1.2 TRANSITION FROM DIESEL TO BIODIESEL IN FORKLIFTS

Since several forklifts in use today use diesel as fuel, it may be interesting to replace diesel with biodiesel or HVO in the short term. This could significantly reduce emissions linked to the consumption of the forklifts, without having to buy new vehicles.

Using HVO100 is an effective way reduce overall CO₂e emissions. This is because renewable biodiesel such as HVO100 comes from biogenic waste streams such as vegetable frying oil waste. Plant materials absorb CO₂e from the atmosphere during their life cycle as they grow through photosynthesis and store it in their plant structure. Only waste streams should be used to make biodiesel. Making biodiesel from food products such as corn or oils, which are still suitable for food, is not considered renewable, therefore these are not HVO fuels.

Biodiesel in the form of HVO100 is offered by several parties at various locations in Belgium. Some of the well-known distributors are Neste, Total, Maes-oil, etc. The figure below shows the locations where HVO100 is available.

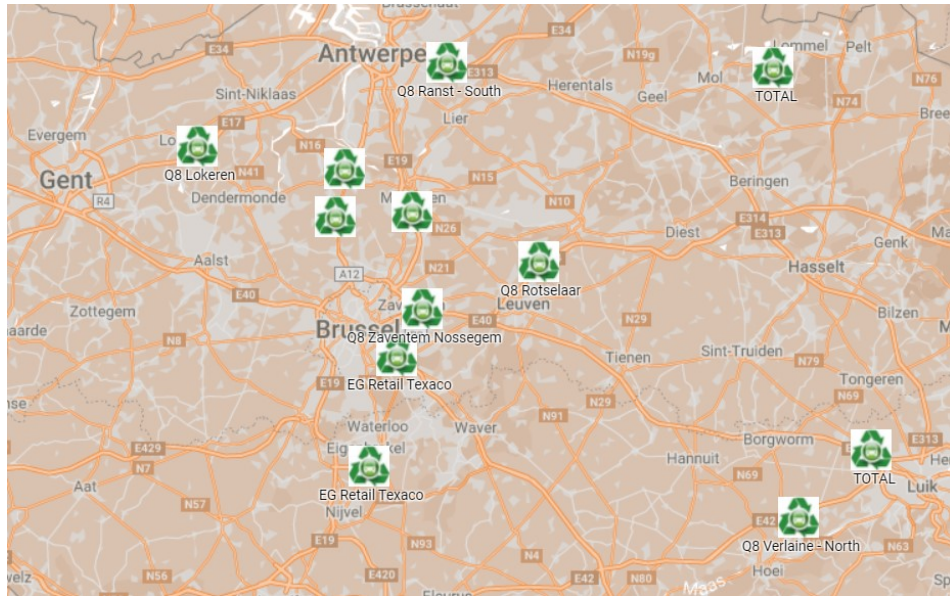


Figure 8: Availability of HVO100 in Belgium

From 2025, further research will be carried out on which vehicles are suitable to use biodiesel in, as well as from which parties biodiesel can be purchased. If all diesel consumed in the forklifts can be eliminated and HVO100 would be used instead, almost 90% of emissions related to the forklifts can be reduced. This corresponds to a reduction of 1,71% in the scope 1 and 2 emissions.

5.3.1.3 ELECTRIFICATION OF FORKLIFTS

Next to the use of biodiesel in forklifts, the electrification of the forklifts is also considered an interesting and feasible reduction measure. An electric forklift overall has a higher purchase price. However, the extra purchase cost is compensated over the lifetime because the power costs are substantially lower. Next to the lower power costs and lower emissions, making electric forklifts a sustainable option, there are several other advantages:

- Improved performance and productivity: Electric forklifts accelerate quicker and are more maneuverable, making it easier to move products.
- Increased safety and operator comfort: Electric forklifts produce less noise and vibration. Next to that there is no need to use flammable fuels and the air quality will be improved.
- Longer lifespan and durability: Electric forklifts generally have a longer lifespan.

This measure will become part of the procurement policy. Diesel-powered forklifts are currently already in use. If additional forklifts are purchased, or a forklift needs replacement, preference will be given to purchasing an electric forklift. This will ultimately lead to 100% of forklifts being electrified. As this depends on the replacement times of the forklift trucks already in use, no specific year can already be determined when electrification will be complete.

This measure will bring a reduction of 1,91% in the scope 1 and 2 emissions. As the emissions that are being reduced are linked to the same activity at the measure about the use of biodiesel in forklifts, the reduction cannot be added up. The use of biodiesel will be implemented in the short term, while the electrification will be implemented throughout the time.

5.3.1.4 ELECTRIFICATION OF PASSENGER CARS

Electric mobility offers a short-term solution for reducing the environmental impact of motorised passenger transport. Both in terms of CO₂ emissions and air quality, the electric motor offers significant advantages over the combustion engine. Besides, fossil driven cars have become finite resource in the recent years. Beyond environmental benefits, transitioning to EVs is expected to yield operational efficiencies, including reduced fuel and maintenance costs, contributing to long-term financial savings.

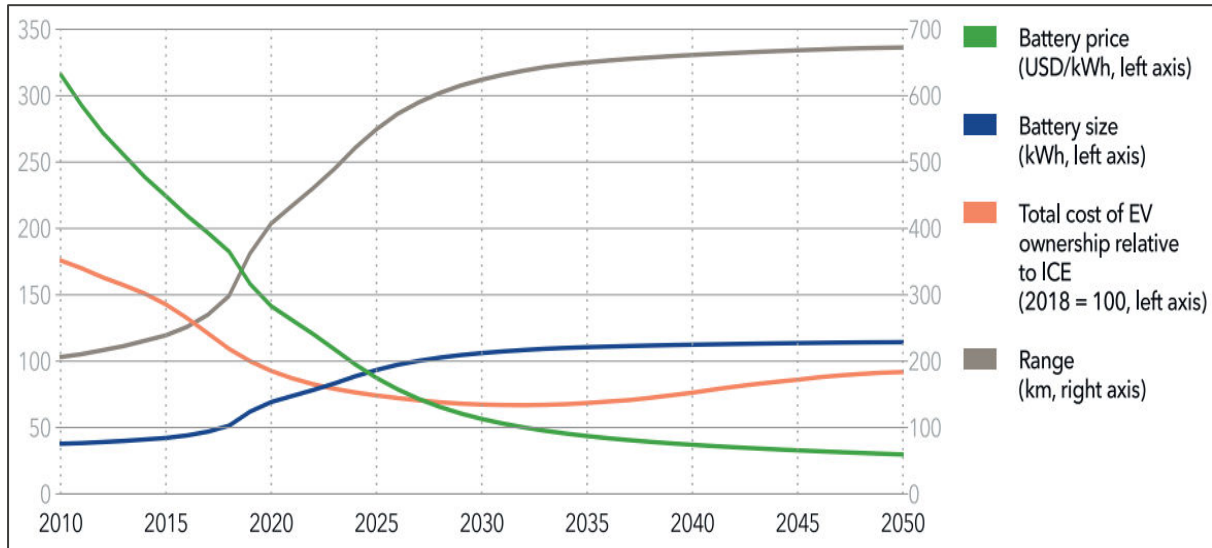


Figure 9: Evolution of purchase cost, battery size and range for electric passenger cars in Europe (DNV GL Energy Outlook 2021)

If all passenger cars are electrified in the future, 21,21% of the scope 1 and 2 emissions can be reduced. In this calculation, it is assumed that the electricity purchased for charging the cars is green electricity, as green electricity is currently purchased at the different sites. By 2030, it is expected that 100% of the passenger cars are electrified. The intermediate target of 80% electrification of the passenger cars by 2028 is set, which can support Houben NV in the follow-up of this reduction measure.

5.3.1.5 INCREASE EURO STANDARD OF TRUCKS

A truck with a higher Euro norm offers significant environmental and operational advantages. It produces lower emissions of harmful pollutants such as nitrogen oxides (NO_x) and particulate matter, improving air quality and helping businesses meet stricter environmental regulations. Additionally, higher Euro norm vehicles often have greater fuel efficiency, leading to reduced operating costs over time. For the above reason, Houben will focus on raising the Euro standard of the trucks they own and operate. By 2025, they will drive with the Euro standard 6E minimum.

When comparing the general fuel consumption of a Euro standard 5 truck with a Euro standard 6 truck, it can be seen that in general, the Euro standard 6 truck is 3% to 5% more efficient in terms of fuel consumption. Since Houben was already working on raising the Euro standard of their trucks in 2023, it is estimated that consumption can become 3% more efficient in the future. This provides a 0,02% reduction in Scope 1 and 2 emissions for Houben-owned trucks.

5.3.1.6 ELIMINATION HEATING IN JOINERY BERINGEN

The joinery in Beringen is heated with natural gas. When heating a large working hall with regular heating systems to provide heat for the few people working in the hall, inefficiency are caused. For this reason, Houben started looking for a way to limit the natural gas consumption used in heating the halls. Options to implement targeted heat in large halls are electric tube heaters or infrared heating. However, due to the limited heat demand, it was decided not to install a new heating system. If at certain times there is still a heat demand, electric heaters are used sporadically.

When comparing the natural gas consumption of 2022 and 2023, it can be seen that more than 40% of the natural gas consumption of Beringen is eliminated. This results in a reduction of the Scope 1 and 2 emissions of 0,70%. It is however possible that electricity consumption will increase due to the sporadic use of electric heaters. However, these are such small elements that are used very infrequently, making this increase considered negligible. As this measure was already carried out in 2023, this reduction has no impact on the emissions in the future, and is not reflected in the reduction target of Houben by 2030.

5.3.1.7 PRESSURE REDUCTION OF COMPRESSORS

Compressed air is and remains one of the most expensive forms of energy. This is because the efficiency of a compressed air system is quite low. The total amount of energy supplied to the compressor in the form of electricity is almost entirely (85-95%) converted into heat during compression. The efficiency of a compressor is therefore only 5-15%. The figure shown is the result of a simulation of the Life Cycle Cost of a standard 75 kW compressed air system over 20 years. It gives an overview of the ratio of total costs over the life of the installation:

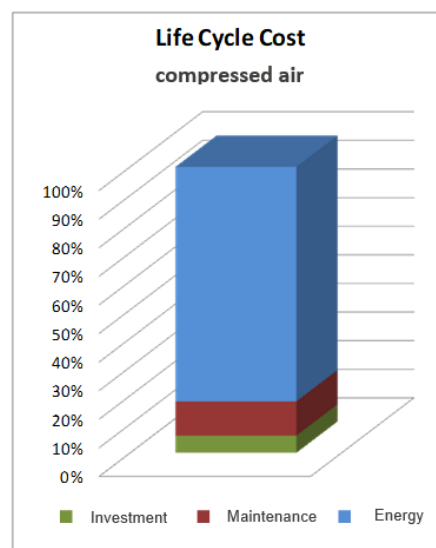


Figure 10: Cost distribution compressed air installations

It is therefore very important to keep the set pressure as low as possible. A reasonable value is between 0,2 and 0,4 bar higher than the minimum pressure required for the applications. On average, it is considered that reducing the required pressure by 1 bar will reduce the power consumption of the compressor by 6%.

In 2024, the pressure of the compressor in Beringen will be reduced from 7,7 bar to approximately 7 bar which will reduce the Scope 1 and 2 emissions with 0,05%.

5.3.1.8 MONITORING COMPRESSED AIR LEAKS

The importance of thoroughly checking for leakages in compressed air piping arises from the fact that at previously studies companies, it was found by measurement that the percentage of leakages varied between 20% and 40%. The most sensitive locations for compressed air leakages are the connections to the compressor, dryer and compressed air tank, the couplings in the piping network and the compressed air tools.

Some of this loss can be avoided by raising awareness among the personnel about leakages in the compressed air lines and then repairing the identified leakages. Of course, regular measurement with an ultrasonic detector is also possible (this measuring device costs about 1.500 euros) and may give better results.

Monitoring the compressed air leaks in Beringen with an ultrasonic detector can reduce the expected share of leaks of 25% to 20%. This would lead to a reduction in the Scope 1 and 2 emissions of 0,35%, executed in 2024. Despite only relatively small reductions possible through compressed air measures, these remain interesting measures as they overall have a short payback period.

5.3.1.9 PV INSTALLATION

An interesting way for a company to generate its own sustainable energy is through solar energy. Here, the sun's rays are converted into usable electrical energy. As a result, the generated energy does not need to be purchased and savings are made on the energy bill. The upfront costs of solar installations can be offset by long-term savings on electricity bills and potential incentives or tax benefits for renewable energy investments. In addition, the electricity that is used from the solar panels will have an emission factor that is significantly lower than purchased grey electricity in the scope 2 emissions.

However, because the electricity purchased on the different sites is green, the installation will have no impact on the scope 1 and 2 emissions. Nevertheless, this remains an interesting measure, both in terms payback time and communication to stakeholders. In order to draw up a credible reduction plan, scope 2 is not only expected to be reduced by the purchase of green electricity. As this requires practically no effort, the various stakeholders and consumers attach more importance to credible and local reduction. It is therefore recommended to also invest in, for example, PV installations or to introduce reduction measures that reduce electricity consumption.

Hasselt

There are already solar panels at the Hasselt site, with the amount of solar panels tailored to current consumption.

Houthalen

Solar panels have already been installed on the roof in Houthalen. However, they are currently not connected and therefore not yet in operation. This connection will be made in 2025.

Beringen

In Beringen, the possibilities of installing solar panels will be further explored. At the site, parts of the roof are not strong enough to install a PV system on. Further research will have to be done to determine whether certain parts are strong enough, and if this is not the case, whether a ground installation is also a possibility, such as a carport with solar panels.



Figure 11: Carport with solar panels Waasland shopping center

5.3.1.10 HEATING PANELS IN CONSTRUCTION TRAILERS

Currently, electric heating is used in the construction trailers. In the future, efforts could be made to adapt the heating to more efficient methods such as ultraviolet heating via heating panels. This could additionally be combined with a detection system that ensures that the heating and/or air conditioning are turned off if windows are opened.

Replacing electrical heaters with ceiling heating panels in a construction trailer can lead to significant energy savings, often between 20% and 40%. The savings result from more efficient heat delivery, targeted zoning, lower thermostat settings, and faster warm-up times. These factors make ceiling heating panels an effective alternative for maintaining comfort while reducing energy consumption in the specific environment of a construction trailer.



Figure 12: Ceiling heating panel

Replacing the heating panels in the construction trailer lead to an estimated reduction of 0,56% in the Scope 1 and 2 emissions. From 2025, further study will be done on the implementation of the heating panels. It is expected that from 2027 these panels will be installed in new construction trailers, and installed at already existing ones if the heating systems need to be replaced.

5.3.1.11 BATTERY STORAGE

If it is not possible to get sufficient electricity connection on a construction site, or if peak consumption when starting up a crane, for example, poses a problem, a power group is typically used on construction sites. This power group can generate electricity by consuming diesel, that can be used on site.

An alternative, more sustainable way, to handle this problem on a construction site, is to use a Portable Battery Energy Storage System (BESS). This is a mobile unit designed to store electrical energy in batteries and supply it as needed. These systems are becoming increasingly popular for various applications, including construction sites.



Figure 13: BESS system

An additional benefit of this system is its potential to charge electric passenger cars and vans on construction sites. Given that the lack of adequate charging infrastructure is a significant barrier to the electrification of vans, this capability could provide a valuable solution.

In 2026, the first hybrid battery storage will be used on a construction site. Depending on the findings of this test, its use will be expanded. The reductions achievable with the implementation of this system are very dependent on the construction sites they can be used on, and for what purposes they are deployed. If it will be possible to implement this system on 5 construction sites, reducing 50% of the diesel consumption currently used in the power groups, this measure will have an impact of 5,38% on the scope 1 and 2 emissions. This figure will be further investigated and fine-tuned if the impact becomes more clear by conducting pilot projects.

Other options for alternative ways to handle low electricity supply and peak consumption at construction sites such as solar power systems and hydrogen fuel cells will be followed up further in the future. If the applicability of these technologies becomes greater for Houben, there will be deeper research into what the impact of putting the technology into use might be.

5.3.1.12 SUSTAINABLE PROCUREMENT POLICY

A sustainable procurement policy is a policy drawn up by an organisation that includes set values and actions that will be taken into account every time a new product is purchased. The policy can cover specific products, such as emission-intensive products or can cover all of the products purchased.

For Houben, it may be interesting to apply a sustainable procurement policy specifically to purchased electrical appliances such as fridges and microwaves. These are appliances that are frequently purchased for use in construction trailers. It can be said that new energy-efficient appliances (label A+ to A++) use up to more than 50% less energy than similar, older electrical appliances. For replacement investments, it is recommended to always opt for electrical appliances with at least label A+.

A specific policy will be drafted by Houben in 2025 and implemented from 2026. The emission reduction that can be achieved will depend on the policies that will be drafted.

5.3.1.13 RELIGHTING LED AND INSTALMENT OF SENSORS

When choosing a new lighting installation, a decision is often made purely on the basis of the investment cost. However, considered over the total lifetime of a lighting installation, the energy efficiency of the lighting installation is a much more important factor.

The figure below shows a simulation of the Life Cycle Cost of a lighting installation of 100 luminaires over 20 years. Here the investment cost is 20%, maintenance 10% and energy costs 70% of the total cost. Since electricity consumption mainly determines costs, a lighting installation with optimal illuminance and lighting comfort but with the lowest possible energy consumption should be chosen. Better lighting also increases comfort, quality of work, productivity and worker safety.

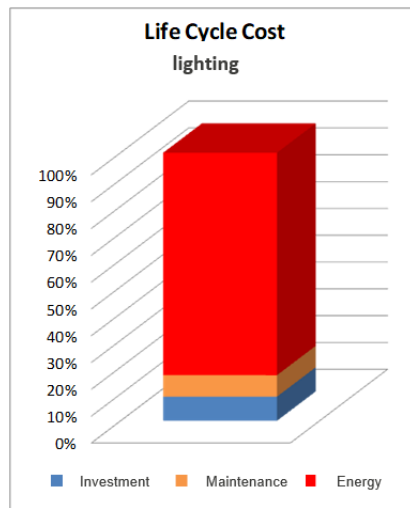


Figure 14: Cost breakdown of lighting installation

By 2030, Houben will have all the lighting installation on the different sites relighted to LED. Next to that, the motion and/or daylight sensors will be implemented in locations where relevant. In large warehouses, for example, movement sensors can be interesting if only sporadic people are present in certain parts of the warehouse. Daylight sensors can also be interesting in warehouses if there are daylight domes. Correct adjustment of the sensors to daylight can bring interesting savings.

Specific studies will have to indicate the exact electricity reduction of the described lighting measures. In general, 40 to 50% of electricity consumption can be reduced when relighting to LED. When this relighting is combined with movement sensors and/or daylight sensors, an additional reduction of 20 to 30% can be achieved.

It is estimated that around 0,29% of Scope 1 and 2 emissions can be reduced at the sites of Houben because of the reduction measures of lighting. Additional reductions can be achieved if the construction trailers also focus on LED lighting in combination with possible motion sensors. As relighting only diminishes the energy consumption of a site slightly, it might seem like a negligent impact. However, relighting is always paired with cost-saving in the future, liberating the potential budget for other measures connected to the relevant sites.

5.3.1.14 HIGH FREQUENCY BATTERY CHARGERS

At the moment, two of the four forklifts are electric. In the future, Houben will focus on electrification of all the forklifts, when current forklifts on diesel will have to be replaced or when additional forklifts will be purchased. To ensure long battery life, it is important to charge the battery of electric forklifts properly. Choosing a good battery charger is crucial in this respect. Two main types of battery chargers can be distinguished, namely conventional chargers and high-frequency chargers. High-frequency chargers have rectifiers which, as the word says, rectify the current at high frequency. This makes the transformer and associated losses much smaller. High-frequency charging results in less heat production and thus higher efficiency. Typical values for the efficiency of converting alternating current to direct current is 75% for conventional chargers and 90% for high-frequency chargers.



Figure 15: Battery modules

The difference in efficiency is such that it makes economic sense to immediately replace all existing conventional charging stations with high-frequency ones. Although a high-frequency (HF) charger is more expensive to purchase, the additional cost is quickly offset by the savings in energy and maintenance costs. The investment can be recovered between 2 to 3 years.

By 2030, all conventional battery chargers will be replaced by high-frequency ones. When converting the two currently in use conventional battery chargers to high-frequency ones, a reduction of 0,01% of the Scope 1 and 2 emissions will be obtained.

5.3.1.15 GREEN ELECTRICITY CONTRACT

Today, the different entities within Houben NV purchase green electricity from their suppliers. By using green power contracts in addition, organizations commit to purchasing electricity generated from renewable sources such as wind or solar, thereby reducing reliance on fossil fuel-based electricity. The purchase of this green electricity is at the moment used in a dual strategy with the installation of PV installations.

At the moment, the electricity purchased at the construction sites is grey. When new contracts are concluded, the options in terms of green electricity will be examined. Depending on the availability and price at the time, the decision will be made. Construction sites tend to work with short-term contracts, making it less likely to obtain interesting rates.

If all electricity would be purchased green for the construction sites, 14,11% of Scope 1 and 2 emissions could be reduced. This percentage does not take into account other reduction measures that reduce the amount of electricity purchased. Consequently, this percentage can change depending on the implementation of other measures. Because of the uncertainty of the implementation of this reduction measure, it is not taken into account when deciding on the reduction target.

5.3.2 RESPONSIBILITY MATRIX HOUBEN NV

Individual responsibilities per reduction measure were identified within Houben NV. The named person will be responsible (R) for implementing the measures, as well as monitoring the impact of the measure. For each measure, it will be necessary to look more specifically at which people and departments need to be involved to implement the specific measure. The responsibility matrix is dynamic over time and will be part of the evaluation cycle as discussed in the next chapter.

5.3.2.1 GENERAL

	Commercial Director (Andres)	Communications department
Raising awareness among employees and subcontractors	R	R

Table 6: Responsibility matrix for the general measures and actions for Houben NV.

5.3.2.2 SCOPE 1

	Director of Quality and Aftercare (Ignace)	HR Director (Gerry)
Transition from diesel to biodiesel in forklifts	R	
Electrification of passenger cars	R	R
Electrification of forklifts	R	
Increase euro standard of trucks	R	
Elimination heating in joinery Beringen	R	

Table 7: Responsibility matrix for the scope 1 measures and actions for Houben NV.

5.3.2.3 SCOPE 2

	Director of Quality and Aftercare (Ignace)
Pressure reduction of compressors	R
Monitoring compressed air leaks	R
PV installation	R
Heating panels in construction trailers	R
Battery storage	R
Sustainable procurement policy	R
Relighting LED and instalment of sensors	R
High frequency battery chargers	R
Green electricity contract	R

Table 8: Responsibility matrix for the scope 2 measures and actions for Houben NV.

5.3.3 MEASURE'S GOALS AND KEY PERFORMANCE INDEX

To effectively monitor the effect of a measure and the implementation of that measure, specific goals and key performance indicator can be identified. This can be used by the responsible per measure to evaluate the integration annually. For reduction measures for which a specific KPI can be relevant to calculate, an example of a KPI is given.

Scope	Reduction measure	Evaluated Key performance indicator
Scope 1	Transition from diesel to biodiesel in forklifts	Total conversion to biodiesel consumption compared to total (bio)diesel consumption
	Electrification of forklifts	Number of electric forklifts compared to all forklifts
	Electrification of passenger cars	Number of electric passenger cars compared to all vehicles
	Increase euro standard of trucks	Number of trucks with euro standard of at least 6 compared to all trucks
Scope 2	PV installation	Generated solar electricity compared to total electricity consumption (self-generated and from the grid)
	Heating panels in construction trailers	Number of construction trailers with heating panels compared to total trailers
	Battery storage	Number of construction sites with a battery storage system compared to total construction sites
	Sustainable procurement policy	Number of electrical appliances purchased according to policy compared to total purchases
	Relighting to LED	Number of lighting that is LED compared to all lighting
	High frequency battery chargers	Number of high frequency battery chargers compared to conventional battery chargers
	Green electricity contract	Total conversion to green electricity compared to consumption grey electricity

Table 9: Key performance indices for measures identified for Houben NV.

5.3.4 LEVEL OF AMBITION OF HOUBEN NV COMPARED TO THE SECTOR

The targets set by Houben NV are in line with the 2°C target of the Paris climate agreement. This means that Houben NV will reduce its emissions by at least 30% between 2023 and 2030.

To achieve this target, the initial focus will be on reducing emissions related to transport, as these emissions have a large impact on the organisation's footprint. In addition, it will remain important to focus on industry-specific emissions, e.g. related to the fossil fuel and electricity consumption of construction sites and construction trailers. Staying informed about possible reduction measures in this regard will remain important for Houben NV to have an ambitious CO₂ management system. The use of renewable energy has already been an important topic for Houben NV the last years; certain steps have already been taken in this regard.

Overall, Houben NV identifies itself as a middle ground player among its industry peers by its balance of ambition with practicality. By focusing on practical strategies, we ensure that our initiatives are both impactful and achievable. This middle-ground approach allows us to maintain a leading role in driving change while remaining grounded in the realities of the construction sector.

5.4 DOCUMENTATION OF THE USE OF MEASURES IN PROJECTS

If, in the future, Houben NV carries out projects for which a CO₂-related award advantage has been obtained, separate documentation will be provided for these projects. For these projects, the emissions related to the project activities will be specifically mapped out, in line with how this is currently done at organisational level. For these projects, it will be examined which identified measures in this document are relevant to apply, and whether additional measures are interesting to apply.

6. MONITORING AND EVALUATION OF CARBON REDUCTION STRATEGY

Tracking and analysis are essential in monitoring reduction measures to determine their effectiveness and, if necessary, take measures to adjust. Houben NV makes a distinction between monitoring and evaluation.

Monitoring is an annual reflective moment in which the management comes together and constructs the Management Review as required by the CO₂ performance ladder. For this, they use the key performance indices and responsibility matrix as discussed above, and make sure the key performance indices are compared to the annual carbon footprint comparison. On top of that, they use the internal audit also required by the CO₂ performance ladder to identify proactive corrective actions in case of any problems.

Evaluation is a three-year process at the end of a certification cycle within the CO₂ performance ladder framework. Here, there will be a new workshop held as done in August 2024 to identify the next steps, new measures, new targets/update targets, and potentially launch an updated Carbon Reduction Strategy.

6.1 MONITORING OF THE MEASURES' IMPLEMENTATION

Each year, the annual update of the CO₂e footprint is performed, and the identified responsible management member will synthesize the key performance indices drawn up for each reduction measure. With this, the Carbon Reduction Strategy is assessed with the entire management team, and corrective actions are decided during the Management Review meeting. Corrective actions can also include an update of the responsibility matrix as identified in the previous chapter.

6.1.1 ANNUAL CO₂E FOOTPRINT

The CO₂e footprint update will take place in the second quarter of each year for the previous year, with the period overarching January to December of the previous year. To be compliant with a level 3 on the CO₂ performance ladder, this emission inventory will be drawn up for Scope 1 and 2, as well as business travel if applicable. This update will also include a trend analysis to compare the most recent CO₂e footprint with the base year of 2023 and evaluate how far Houben NV is from the target of 30% emission reduction by 2030. In the second quarter, a first trend analysis will be done for the biggest emission sources to check if yearly goals are on track. Any implemented measure has been quantified in terms of total emission reduction, such that this amount can be considered as an 'expected CO₂e footprint' in a certain year.

The collection of data will be consistent with the data collected for 2023 to optimize comparability. This is done by following the same data collection as was done in previous years, but with more granularity for the most important hotspots if possible (such as energy consumption of construction sites).

6.1.2 ROLE OF THE MANAGEMENT REVIEW MEETING

The Management Review meeting is an annual meeting held by the indicated team responsible for the Carbon Reduction Strategy. The following questions will be handled to draw up the high-level action plan for the next year:

- Will the reduction target for the current year be achieved?
- Will the reduction target for the present period be achieved?
- Status of implementation of energy consumption reduction measures
- New energy consumption reduction opportunities
- Topicality effectiveness of energy management program
- Topicality of energy policy
- Employee engagement
- Communication effectiveness

6.1.3 CONSTRUCTION AND GOAL OF THE MANAGEMENT REVIEW

After the Management Review Meeting, a Management Review is prepared annually, compliant with the CO₂ performance ladder requirements. The Management Review includes the annual assessment of operations. The outcome of this assessment and the conclusions to be drawn from it are input for the following year's action plan and/or action plan.

6.2 EVALUATION OF THE CARBON REDUCTION STRATEGY

After the end of a certification cycle (3 years), the management team comes together in a new workshop such as the one held in August 2024. The goal of this workshop is the following:

1. Synthesis of progress on measures by using the key performance indicators as identified for each measure.
2. New division of responsibilities
3. New identification of measures, using:
 - a. Research performed throughout the three years.
 - b. Necessary reduction to achieve the 30% reduction compared to base year 2023.
 - c. Box of ideas provided by Houben NV to all employees.
 - d. Potential new external study work.
4. Re-evaluation of Carbon Reduction Strategy, potentially with new key performance indices framework
5. Re-evaluation of the Communication plan

ANNEXES

ANNEX 1: ISO 50001 REQUIREMENTS

The CO₂ performance ladder manual requires the use of the ISO 50001 as a frame of reference but does not require the full implementation of this management system. The list below shows the ISO 50001 requirements and the specific references of the inclusion of the requirement in the management plan.

Analyse energy use and consumption based on measurements and other data			
A	i	Identify current energy sources	4.1 Overview Scope 1 and 2 emissions year in 2023
	ii	Evaluate past and present energy use and consumption	4.1 Overview Scope 1 and 2 emissions year in 2023:
Based on analysis of energy use and consumption, identify the areas of significant energy use, i.e.			
B	i	Identify facilities, equipment, systems, processes and personnel working for, or on behalf of, the organization that significantly affect energy use and consumption	4.1 Overview Scope 1 and 2 emissions year in 2023 : More specific identification is done in the full carbon footprint report.
	ii	Identify other relevant variables affecting energy uses	/
	iii	Determine the current energy performance of facilities, equipment, systems, and processes related to identified significant energy uses	4.1 Overview Scope 1 and 2 emissions year in 2023: More specific information is given in the full carbon footprint report.
	iv	Estimate future energy use and consumption	5. Reduction plan for Houben NV's operations (scope 1 & 2)
C	Identify, prioritize, and record opportunities for improving energy performance		5.Reduction plan for Houben NV's operations (scope 1 & 2)

Table 10: Identification of ISO 50001 requirement in Carbon Reduction Strategy of Houben NV.

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