

# SpacelInvader Climate Report 2021



*“SpacelInvader is carbon negative, because SpacelInvader’s patented pallet system reduces the environmental impact of its clients’ transports”*

In its first climate report, SpacelInvader documents a combined indirect CO2 reduction of 6,645 tons through its clients’ use of the SpacelInvader pallet racks. A number expected to increase considerably as more pallet racks are put into use.

## Table of Contents

1.	<b>Introduction of SpacelInvader</b>	<b>page 3</b>
2.	<b>The carbon footprint of SpacelInvader's business operations in 2021</b>	<b>page 4</b>
2.1	<b>SpacelInvader's efforts to reduce society's carbon footprint</b> - circular business model sees products fully utilised and in use for longer	<b>page 5</b>
2.2	<b>SpacelInvader's efforts to reduce its own carbon footprint</b> - focus on own transportation and reuse of aluminium	<b>page 6</b>
3.	<b>Ongoing efforts to reduce society's carbon footprint</b> - research into possibility of buying recovered aluminium	<b>page 7</b>
4.1	<b>SpacelInvader's patented pallet system reduces climate effects of clients' transport operations</b>	<b>page 8</b>
4.2	<b>SpacelInvader's climate model calculates clients' reduced carbon footprint achieved through a reduction in deliveries</b>	<b>page 9</b>
4.3	<b>The more pallet positions the SpacelInvader system opens up for its clients, the greater the CO2 reductions</b>	<b>page 10</b>



The climate calculation is developed in consultation with **KOBRA Advice**, which has also consulted on the development of the company's climate model: **GreenSpacelImpact (GSI)**.

*The GSI model helps determine how much CO2 SpacelInvader's clients can save by using the company's solution.*

## 1. Introduction of SpacInvader

SpacInvader is a Danish greentech company actively engaged in the circular economy as it helps the transportation and logistics industry optimise freight capacity and lessen its environmental footprint.

SpacInvader's climate solution offers both a documented reduction in a supply chain's CO2 emissions, and a high return on investment.

With its patented pallet rack system, SpacInvader makes it possible to double-stack pallet freight in trucks, warehouses and at the final destination – securely and safely. The system solves significant challenges in the logistics chain and addresses key factors therein: *low vehicle fill rate and empty runs*. The SpacInvader system also documents a positive climate effect with CO2 savings between 10-30% for carriers using the

pallet racks. The racks makes it possible to deliver the same amount of freight in fewer trips. Thereby reducing both the number of kilometers driven, and the number of trucks used by carriers.

The climate report is the company's first account of its carbon footprint, and incorporates all of the company's operations through its branches SpacInvader ApS and SpacInvader Europe ApS.



## 2. The carbon footprint of Space-Invader's business operations in 2021

SpaceInvader's environmental accounting incorporates all of the company's operations and presents modelling of the company's own carbon footprint, as well as a calculation of the CO2 savings SpaceInvader's solution yields for its clients.

Greenhouse gas emissions from SpaceInvader's operations are calculated using CO2 equivalents (CO2e) based on the GHG-protocols rules and detailed guidelines for distribution of emissions under scope 1, 2, and 3, and subsections under scope 3.

The table below shows the distribution of Space-Invader's carbon footprint measured in tons CO2 equivalents for 2021 compared to 2020.

In 2021, SpaceInvader's collected carbon footprint under scope 1-3 was 151.5 tons CO2e, equal to 0.04 kg. pr. Danish krone (DKK) of revenue.

SpaceInvader doesn't emit CO2e under scopes 1 and 2, as we have outsourced our production to subcontractors and our headquarters are located in rented office space on Refshaleøen in Copenhagen, Denmark.

The majority of our carbon footprint stems from the purchase of our aluminum racks, which are produced by two subcontractors on the island of Sjælland. Of the 81 tons of CO2 emitted as a result of purchases made in 2021, 63 of those are from the production and processing of aluminum materials for the production of pallet racks by the subcontractors.

Racks are made-to-order, and we produce the finished racks directly at the subcontractor's facilities, who assemble the racks and ship them to clients. We thereby avoid surplus production and superfluous transport by not distributing via our own warehouse. This contributes to the reduction of emissions through transports.

Transportation and distribution of the racks from the subcontractor to the client is the other big item in our environmental accounting with CO2e emissions of roughly 58 tons in 2021. The racks are transported in trucks to clients in Denmark, Norway and the rest of Europe, and returned on trucks if the number of racks a client needs changes, if repairs are needed, or if the rental agreement ends.

Add to this the carbon footprint of employees' business travels, accounting for approximately 10 tons CO2e, and other smaller items like energy use in rented office space (2.1 tons), waste produced on company property (0.2 tons), and employee commuting (0.1 tons).

Overview of the company's collected CO2e emissions in 2020 and 2021		
	2020 Tons CO <sub>2</sub> -e	2021 Tons CO <sub>2</sub> -e
Scope1. Consumption of fuel and direct emissions in connection to business operations	0.0	0.0
Scope 2 Consumption of electricity and heat in connection to business operations	0.0	0.0
Scope 3.1: Purchased materials, goods, and services	134.8	81.3
Scope 3.5: Waste produced on company property	0.2	0.2
Scope 3.6: Business travel	12.4	9.9
Scope 3.7: Employee commuting	0.3	0.1
Scope 3.8: Upstream leased activities	2.8	2.1
Scope 3.9: Downstream transportation and distribution	49.3	57.9
<b>Total (Tons CO<sub>2</sub>-e)</b>	<b>199.7</b>	<b>151.5</b>
Total by revenue (kgs. CO <sub>2</sub> e pr. DKK of revenue)	0.07	0.04

\*)GHG = green house gasses (6 variants of green house gasses) \*\*) **Scope 1, 2, 3:** Scope 1: Direct emissions, Scope 2: Indirect emissions og Scope 3: Other indirect emissions. Ref.: <https://global-compact.dk/wp-content/uploads/2020/08/klimaguide.pdf>

## 2.1 SpacelInvader's circular business model reduces society's carbon footprint

- circular business model sees products fully utilised and in use for longer

SpacelInvader (SI) produces and rents stackable pallet racks made from recycled aluminium. Our solution makes it possible to stack pallets carrying freight optimally and higher in trucks and warehouses. With double-stacking, clients are able to reduce the number of trips they make, and thereby also reduce transportation needs and save many tons of CO<sub>2</sub>. Wholesale and retail clients also reduce their need for storage space. Read more about our clients' CO<sub>2</sub> savings in the last chapter of this report (4.3).

We have established a circular business model for how we produce and utilise our racks. In our business model, our clients rent the racks on a flexible basis. That means they can easily return racks in need of repairs, or adjust the number of racks in their pool, should a need arise.

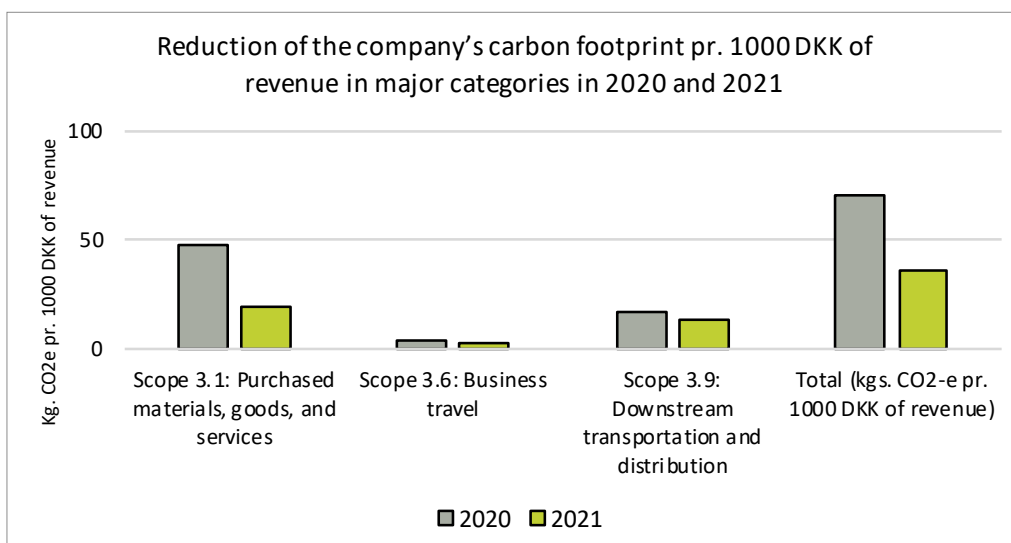
With this flexible and adjustable agreement, our clients can operate with exactly as many racks as they need, and thereby adapt their resource consumption to the needs of their business.

Most of all, it means we ensure a high level of utilisation of the racks our clients use and, which sees them used both more frequently, and for longer than if they had been bought outright in a more traditional purchase agreement.

The circular business model of offering our solution as a needs-based rental service as opposed to traditional sale has obvious environmental benefits. The effective capacity utilisation and running repairs of the racks means we need to produce fewer racks than if we sold them.

That much is obvious if we compare our CO<sub>2</sub>e emissions from 2020 and 2021: 2020 was SpacelInvader's first year of significant revenue. That's why we produced considerably fewer racks in 2020 than in 2021, even if 2021 saw considerable revenue growth. That's because the products we placed with clients in 2020 still generate revenue for SpacelInvader in 2021, and damaged racks were repaired for the most part. This causes the carbon footprint from purchasing racks, both overall and pr. DKK spent, to fall significantly between 2020 and 2021.

Our carbon footprint from the purchase of racks in 2021 is solely based on rental agreements entered with new clients, while most existing clients continue to use the racks they started with.



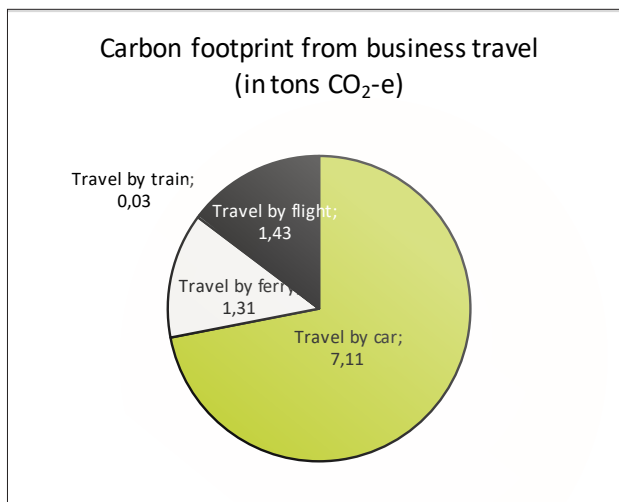
## 2.2 SpacInvader's efforts to reduce our carbon footprint

### - focus on own transportation and reuse of aluminium

A significant portion of our carbon footprint is derived from transports, namely bringing racks to and from customers, and employees' business travel.

We limit transportation of the racks to and from clients by delivering directly to them and not storing and distributing racks from a depot. We also work with carriers who combine transportation of racks with other freight or return goods.

We strive to make as many business trips as possible in rented electric or hybrid cars from the Danish shared car service LetsGo. In addition, we aim to minimise air travel, and we have only made 6 return flights in 2021, a year which was also affected by reduced travel due to COVID-19.



The carbon footprint from employee commuting has been kept to a minimum, as employees exclusively used their own electric cars, public transport, or bikes in order to get to work in 2021.

Employees have also worked from home to a great extent. In part due to the pandemic in 2021, and in part because some of the company's salespeople work from home and make sales calls at clients' locations.

As a result of the business model where racks are rented to clients and returned in case repairs are needed, or if they're to be redistributed to other clients, we avoid creating end-of-life waste by leaving racks with the clients. All racks that are defective or no longer in use are collected and handled by SpacInvader.

Clients return racks to our subcontractors, who:

- Recirculate returned racks to new clients.
- Repair defective racks and return them to existing clients, or recirculate to new clients.
- Replace defective parts that cannot be mended, and send the discarded aluminium to Stena Recycling, who work to make sure reusable aluminium material from the racks is recovered and put to use in secondary aluminium materials.

We thereby make sure we always keep aluminium materials in a closed loop with a minimum of down-cycling. That has a tremendous positive effect on the environment, because production of primarily aluminium is a carbon-intensive process.

This is the primary explanation for our company's very low scope 3 carbon footprint based on waste (0.2 tons). In 2021, the reuse of aluminium via our aluminium supplier Stena Recycling meant a negative carbon footprint of -3.5 tons outside of scope, because the recovered secondary aluminium material replaces primarily new material.

### 3. Ongoing efforts to reduce carbon footprint

- research into possibility of buying recovered aluminium

At SpaceInvader, we continue to develop our circular business model of production, rental, and recirculation of aluminum racks.

We strive to continuously identify new ways for us to reduce our carbon footprint, both in terms of direct emissions, and how our solution can enable even greater environmental benefits for our clients.

One of our most important initiatives going forward will be researching the possibilities of increasing our purchasing of recovered aluminium, and eventually revisit our sourcing contracts depending on the results of the research.

« We have a green DNA and our green tech solution is a part of society's circular, sustainable economy »

**Pool of racks**

*Flexible rental model to ensure optimal number of racks in client's pool*

**Immediate climate and environmental benefit**

*Better space utilisation means fewer trucks on the road and thereby a reduction in clients' CO2 emissions*

**Less waste**

*Less packaging required, as well as less damaged freight*



**Patented products**

*Designed for production with 100% recyclable aluminium*

**Cradle-2-Cradle Production**

*Produced using recirculated aluminium, so everything's recycled and without any waste*

**Cradle-2-Cradle handling**

*Repair and recycling of all racks in rental pool*

Today, we buy secondary, recovered aluminium for the molded top of our racks, while we buy new aluminium for the rack's posts and bottom. If we can maintain efficiency in the production process and the rack's durability with secondary aluminium, we will look to increase our buying of this material.

As already mentioned, all aluminium is recovered from SpaceInvader's decommissioned racks by Stena

Recycling to be turned into secondary aluminium, which is resold. If we were to increase our purchasing of secondary aluminium, it therefore wouldn't change SpaceInvader's core circular business model. With the right parameters in place, it will for the time being drive the market increasingly towards closed-loop recycling, where the production of primarily new aluminium is replaced by secondary, recovered aluminium.

## 4.1 SpacInvader's patented pallet system reduces climate effects of clients' transport operations

The Danish transportation sector emits 29% of Demark's total CO2 emissions. Approximately a third of that figure stems from heavy road transports. The sector is currently extraordinarily challenged, because it to a large degree still relies on fossil fuels and infrastructures that are hard to transition. At the same time, the sector is facing high freight prices, a poor rate of utilisation of its resources, empty runs, slim margins and an acute shortage of drivers. Rapidly growing eCommerce and high fuel prices only make matters worse.

In 2021, SpacInvader made its biggest impact in helping reduce CO2 emissions from heavy transports, doing so by increasing its rentals and activation of pallet racks with our clients, who use the racks to optimise and double-stack pallet freight.

Our modular pallet rack system makes it possible to pack, handle and deliver freight in two or three levels, up to a height of 240 cm. That way more pallet positions are opened up in the truck's bed, allowing carriers

to load more pallets as a result. Pallets that otherwise would have needed to be delivered with another truck. On a yearly basis, that leads to significant reductions in deliveries and fewer kilometers driven in order to deliver the same amount of goods.

Clients save money spent on fuel and become more climate-friendly as a result. Society stands to benefit from this significantly reduced CO2 emission from heavy road transportation. With fewer deliveries, you simultaneously save fuel and CO2 emissions going back through the value chain, from extraction of oil, and production and distribution of fuel.

Our sustainable business model leads to even greater CO2 savings, because we reuse aluminium for our rack production, which is part of a circular flow based on a flexible rental model, whereby we optimise resources in both the production and use of the racks.

In 2021, SpacInvader's solution helped clients like PostNord, Bring/Posten Norge, Blue Water Shipping, VELUX and Solar save great amounts of CO2 and other transport-related emissions because of the delivery runs they no longer have to make.





## 4.2 SpacInvader's climate model calculates clients' reduced carbon footprint through a reduction in deliveries

In collaboration with KOBRA Advice, SpacInvader has developed a climate model, **GreenSpaceImpact** (GSI), capable of determining clients' reduced carbon footprint based on their specific operational specifications. The GSI model calculates savings in kilometers driven and consequential reductions in CO2 based on added pallet positions, specifically in terms of saved deliveries,

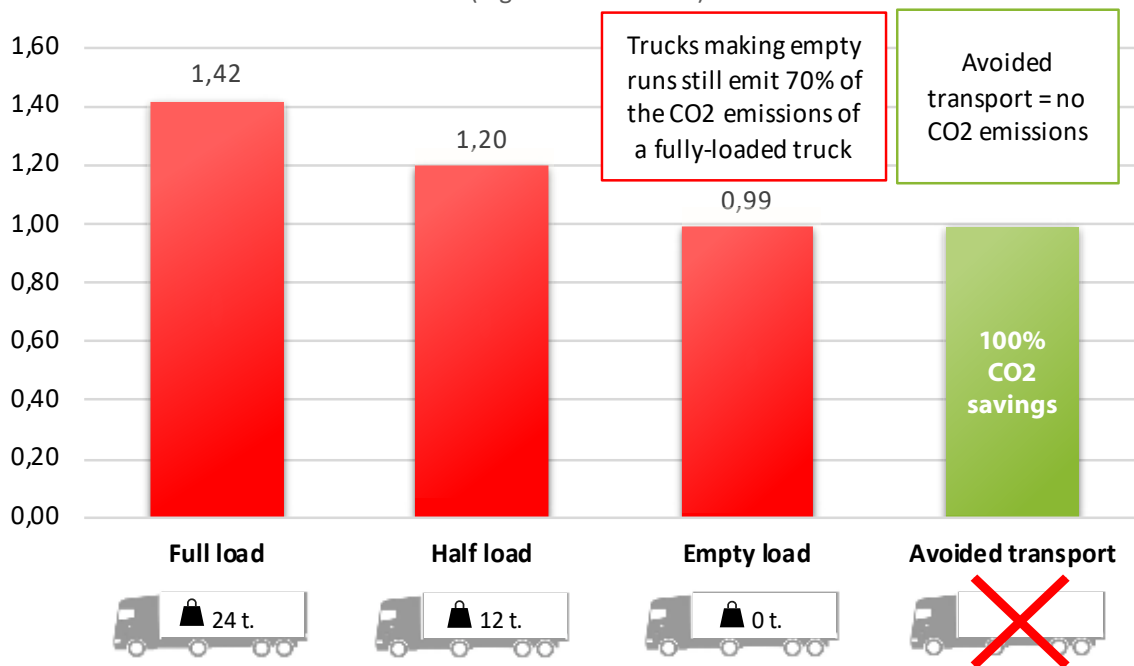
number and length of transports, trucks' maximum load weight and average fuel consumption. The GSI model determines the amount of saved CO2.

The model takes into account both the reduction in fuel consumption from avoided deliveries and the slight increase in fuel use on remaining deliveries due to pallets from avoided deliveries being moved onto more densely packed delivery runs.

The total saved fuel consumption and CO2 from every delivery run avoided will always be significantly higher than any added fuel consumption and CO2 by the

### CO2 emissions by a truck at different levels of fill

(Rigid > 17 tons HGV)



Source: Department for Environment, Food & Rural Affairs (DEFRA): Conversion factors 2021: full set (for advanced users) - revised January 2022.

### Example

With SpacInvader's pallet racks, you save one out of five delivery runs (20% fewer runs) averaging 400 km. pr. day with 24 tons trucks. Fuel consumption is reduced by 46,400 litres diesel pr. year because of this reduction in deliveries made, while the added weight of the slightly more he-

avily packed trucks only consumes an additional 10,800 litres of diesel. That equates to net savings of 25,600 litres diesel and a CO2 reduction of approx. 112 tons a year. Thereto you add the immediate avoided emissions from reduced drives and avoided well-to-tank emissions from reduced fuel consumption.

\*Well-to-tank" emissions is the amount of CO2 that's emitted throughout the supply chain from extraction of oil to the production and consumption of diesel.

remaining deliveries, as pallets are moved onto more densely packed trucks or redistributed onto several.

**Note: Every time a truck make a drive unloaded (empty runs), it'll emit 70% of the CO2 it would have emitted while fully loaded.**

As the diagram below illustrates, a 24-tons truck (HGV) with an average diesel fuel consumption emits approx. 0.99 kg. CO2 pr. driven kilometre. When the truck is filled from empty to half-full, to fully loaded, its fuel consumption rises from approx. 31 litres to 37 litres to 44 litres diesel pr. 100 km. driven.

We only see a maximum fuel increase in fuel consumption of 13 litres pr. 100 driven km. – and typically significantly less, as the truck you avoid sending out on a run is normally not fully loaded – by moving pallets onto one other or more trucks. Meanwhile, you save 31 litres fuel consumption for every 100 km. of truck transportation that's avoided.

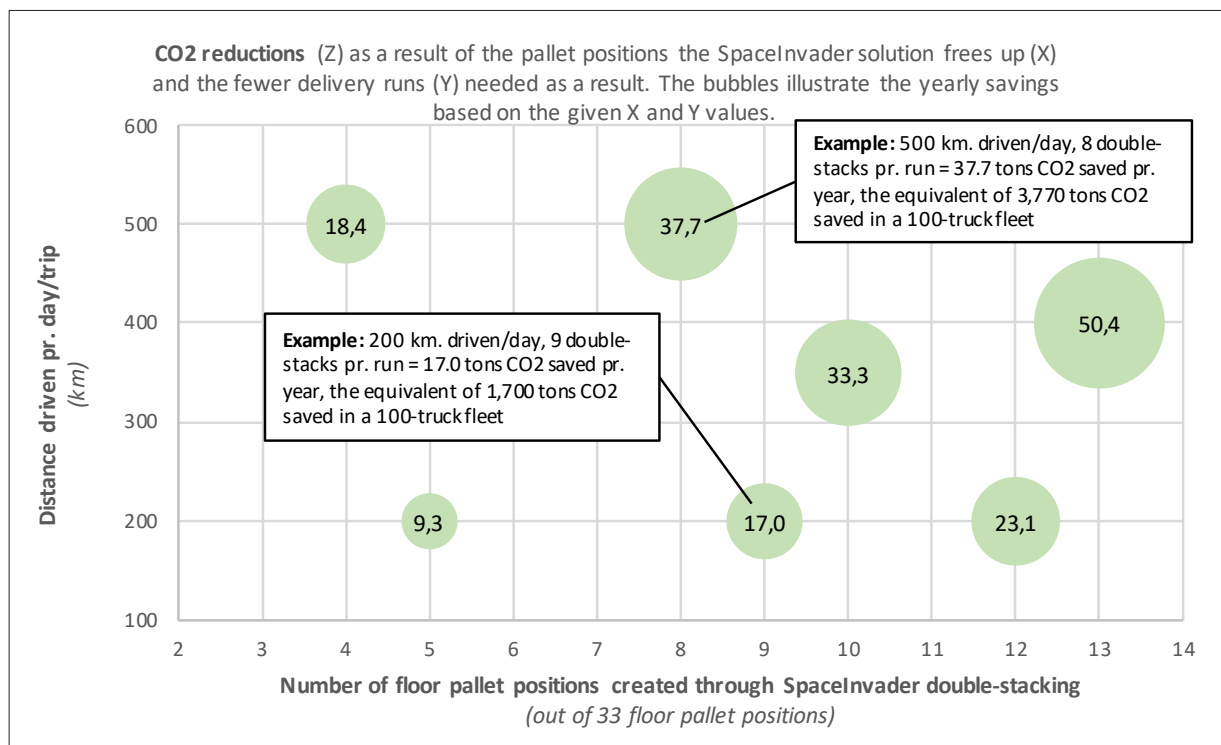
Therefore there will always be great net savings in both fuel consumption and CO2 emissions, when goods are stacked more optimally and therefore capable of being transported on fewer delivery runs.

### 4.3 The more pallet positions the SpacelInvader system opens up for its clients, the more CO2 is saved

The number of runs and how much fuel and CO2 SpacelInvader's clients can save over the course of a year depends both on their logistics patterns and opportunities to open up pallet positions on each individual run. The benefits materialise when clients double-stack pallet freight with SpacelInvader's pallet rack solution.

In the matrix below, using SpacelInvader's GSI model, you'll see a calculation of how much CO2 a carrier can save on every truck pr. year when they use SpacelInvader's pallet racks. (As an example, the model shows a carrier who uses 24-ton trucks with 33 pallet positions and a fuel consumption of 3.1 km/litre.)

If the pallet racks on average free up a mere 8 of the 33 pallet positions through double-stacking, the yearly net savings is 37.7 tons CO2 and 12,000 litres of diesel pr. truck based on a metric of said truck driving 500 km. a day (180,000 km. pr. truck pr. year).



A typical line-haul truck drives 150,000 km./year, or 417 km./day, if going by 360 days/year.  
SpacelInvader's total supply of racks alleviates 6,645 tons CO2 pr. year. \*37.7 / 8x1,410 set = 6,645 tons CO2 pr. year.

If the carrier has more than one truck, the collected yearly savings is made even greater. If the scenario is four trucks that all drive the above-mentioned distance, one of those trucks would become superfluous and the CO2 savings would therefore be  $4 \times 37.7 \text{ tons} = 151 \text{ tons CO}_2$ .

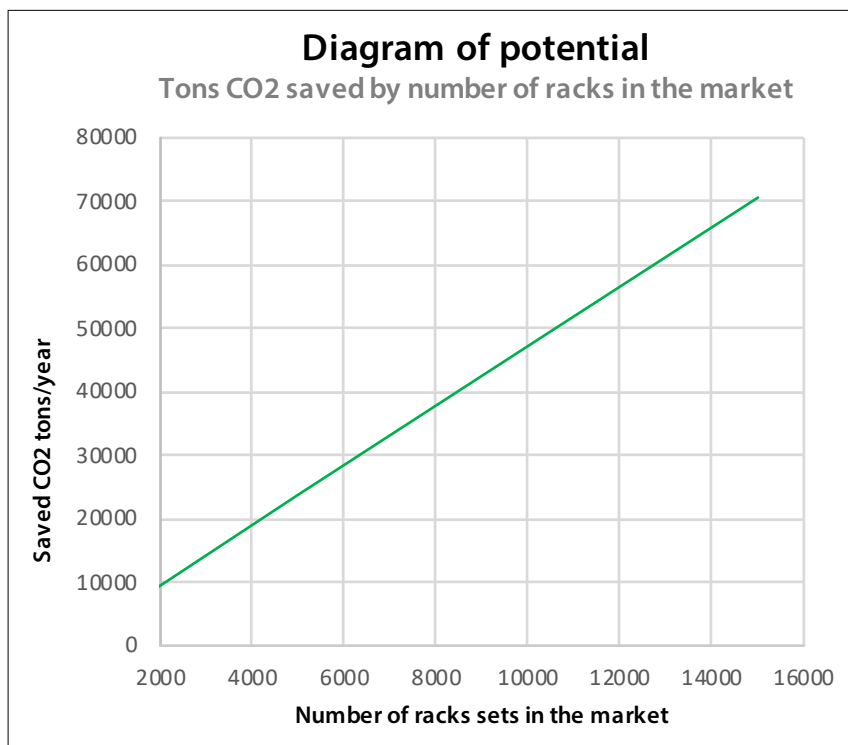
An example of real-world results reached through the use of the SpacelInvader is PostNord Logistics. Starting in 2021, PostNord operates with approximately 300 pallet rack sets in its daily freight delivery operation. The company saves around every eighth delivery run, which reduces its carbon footprint by 12.8%

In 2021, our rented pallets reduced carbon footprints of many other clients who could similarly effectivise to make fewer drives. **Taken together, the amount of CO2 these clients saved by using the SpacelInvader solution far surpasses SpacelInvader's own modest CO2 emission of 151.5 tons.**

**That year, SpacelInvader's clients collectively saved 6,645 tons of CO2 from entering the atmosphere.** By this we mean the CO2 those clients save indirectly when they reduce their amount of driven miles/runs with help

from the SpacelInvader solution. The CO2 savings are calculated using SpacelInvader's previously mentioned GSI climate model.

**SpacelInvader therefore is carbon negative, and considerably so, as our solution enables our clients to reduce their carbon footprint. And this reduction will only grow as time goes on. SpacelInvader is a young company, and our ambition is to accelerate the widespread implementation of our patented product in the coming years across Europe. As shown in the graph detailing the potential of the solution, 15,000 pairs of SpacelInvader racks in circulation would do away with 70,000 tons of CO2e on a yearly basis – the equivalent of 2,000 trucks no longer making deliveries or the collected yearly emissions of 6,000 Danes. The potential is massive, as currently the average vehicle fill rate on Europe's trucks is a mere 56%. It's SpacelInvader's mission to see to it that this number grows.**



*Based on driving distance of 500 km. and 8 SpacelInvader double-stacked pallets pr. delivery*