



Annual treatment with NovoPen® incl. drug and needles

Carbon Footprint Report

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1. Background

Novo Nordisk's environmental strategy, Circular for Zero, and the certified ISO14001 Environmental Management System, drive continuous improvements in our environmental performance by setting high ambitions and integrating environmental considerations into daily business activities. Here, life cycle assessment/product carbon footprint is an integrated part of our product development process.

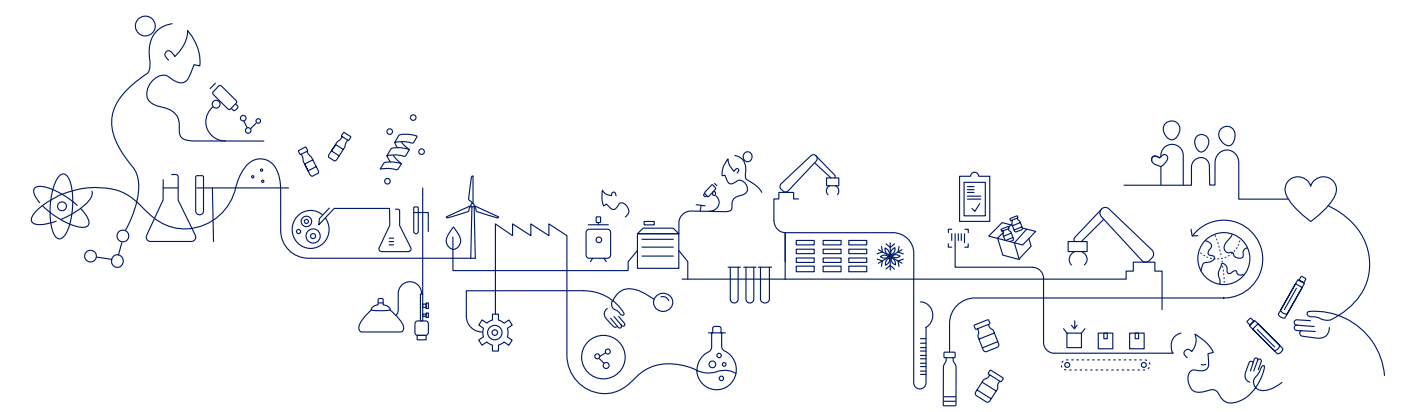
This document presents the Product Carbon Footprint of one year treatment with the different NovoPen's® (NovoPen® 4, NovoPen® 5, NovoPen® 6, NovoPen Echo®, NovoPen Echo® Plus) in combination with a range of drug substances (API), including the use of NovoFine® needles and Penfill® cartridges, hereafter referred to as the [drug product's brand name] Penfill® NovoPen® carbon footprint, e.g. Actrapid® Penfill® NovoPen® carbon footprint. The carbon and plastic footprint of the different NovoPen's® will be presented in separate chapters.

The carbon footprint for the yearly treatment is based on full third-party verified carbon footprint reports for the different drug substances, delivery solutions (device or oral) and needles included in this report.

The data presented in this document supports marketing claims and Q&As about the product carbon footprint. The data should not be used for comparison with competitor products or for claims related to 'green' or 'environmentally friendly' products.

2. Methodology

The carbon footprint of a product is calculated by adding the greenhouse gas emissions (in kg CO₂ equivalents) from different stages of the product life cycle. The product carbon footprint of one year of treatment is calculated by adding the contributions from the drug substance, the delivery system and the needle¹.



The Novo Nordisk carbon footprint calculations follow the Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices², which is built on international life cycle assessment standards. The reports are third-party reviewed by PricewaterhouseCoopers Advisory.

The carbon footprint calculations are based on production data from 2022 and cover relevant drug substances, delivery system and needles as shown in Table 1. For each brand, the carbon footprints are calculated for the use in three major markets: Europe, the US and Japan. The calculations are made using Excel and the life cycle assessment tool *LCA for Experts*³.

Table 1. Products involved in the calculations for one year of treatment with NovoPen®.

Drug substance	Delivery systems**	Cartridge**	Needle**
Insulin analogues	- NovoPen® 4 - NovoPen® 5 - NovoPen® 6 - NovoPen Echo® - NovoPen Echo® Plus	- Penfill® - Excipients* (incl.WFI)	- NovoFine® - NovoFine® Plus

Notes:

* Excluded due to proven low impact on carbon emissions, except for water (for injection).

** Including both secondary & tertiary packaging.

¹ Including the packaging for delivery systems and needles.

² Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices, GHG Protocol Product Life Cycle Accounting and Reporting Standard, November 2012. At: http://ghgprotocol.org/sites/default/files/ghgp/Summary-Document_Pharmaceutical-Product-and-Medical-Device-GHG-Accounting_November-2012_0.pdf.

³ Formerly GaBi.

The carbon footprint has inherent uncertainties and should be regarded as an indicative level and not as a precise measure. The uncertainties relate to the data collected from Novo Nordisk production, the data on carbon footprint for each of the processes (e.g. plastic granulate production), carbon footprint impact factors and the key assumptions (e.g. distribution patterns). Moreover, the calculations consider that Novo Nordisk sources renewable energy through certificates, which results in a lower carbon footprint than if average electricity was used.

2.1 Drug substance

The Defined Daily Dose (DDD) is the assumed average maintenance dose per day for a drug used for its main indication in adults. The DDD for insulin analogues (aspart, degludec, detemir or human insulin) is 40 international units (IU), corresponding to a weekly dose of 280 units, according to the WHO, see Table 2.

Table 2 Overview of defined dose of drug substance for the different products.

Brand name	Frequency	Drug substance
Insulin analogue: Actrapid®, Fiasp®, Insulatard®, Levemir®, Mixtard®, NovoMix®, NovoRapid®, Ryzodeg ⁴ and Tresiba®.	Daily	40 IU aspart, degludec, detemir, human insulin or icodec

2.2 Delivery system

NovoPen® is a reusable pen with an assumed lifetime of 5 years.

NovoPen® is compatible with a variety of Novo Nordisk's drug products, available in a range of strengths tailored to the specific therapy area and delivered in Penfill®, see Table 3.

Table 3 Overview of drug product strength based on substance concentration and primary packaging size.

Brand name	Drug substance content	Cartridge (Penfill [®]) [mL]	Strength
[Insulin analogue] U100 NovoPen®	300 IU	3	100 IU/mL

Due to the physical design of the cartridge, a small volume of drug product is lost between the neck and the shoulders. The filling volume is adjusted to account for this loss with an additional 2.4% drug product volume. This has been considered as well for the estimation of the carbon footprint.

2.3 Needles

Novo Nordisk offers a series of needles for combination with our delivery systems. In this assessment, three different needles, namely, NovoFine®, NovoFine® Plus, and NovoFine® Plus (co-pack), are included for the EU and US markets. For the Japanese market only NovoFine® Plus is available.

⁴ 40 IU with the distribution of 70% degludec, 30% aspart

NovoFine® Plus needles are sold in packs of 100 pcs in EU and US markets and packs of 70 pcs in JP market. NovoFine® Plus (co-pack) are assumed co-packed with one NovoPen® and 4 needles as a representative for a co-pack.

Novo Nordisk recommends discarding the needle after use. However, market research shows that many patients use the needle several times⁵. To reflect an average patient, the one-year treatment scenario is based on the use of one needle per day, which can be considered a conservative estimate.

⁵ Roper U.S. Diabetes 2014 Patient Study. Insulin devices market. GFK, November 2014

3. NovoPen® 4

3.4 Carbon footprint NovoPen® 4

This section presents the carbon footprints for specific treatments (assumptions described in Section 2) with NovoPen® 4 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the carbon footprints from drug substance, delivery system, cartridge and needles are shown as well as the total carbon footprint per patient per year.

To put the results into perspective, the resulting carbon footprints has been recalculated into the distance driven by an average car (see Section 3.4.4).

3.4.1 European market

Table 4. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 4 and NovoFine®

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	9.0
Fiasp®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	8.9
Insulatard®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	9.0
Levemir®Penfill® NovoPen® 4	6.9	0.4	0.1	4.5	0.2	2.6	0.2	14.3	14.8
Mixtard®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	9.0
NovoMix®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	8.9
NovoRapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.6	0.2	8.5	8.9
Ryzodeg®Penfill® NovoPen® 4	1.8	0.4	0.1	4.5	0.2	2.6	0.2	9.2	9.7
Tresiba®Penfill® NovoPen® 4	2.1	0.4	0.1	4.5	0.2	2.6	0.2	9.5	10.0

Table 5. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 4 and NovoFine® Plus.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Fiasp®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	7.9	8.4
Insulatard®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Levemir®Penfill® NovoPen® 4	6.9	0.4	0.1	4.5	0.2	2.0	0.2	13.8	14.2
Mixtard®Penfil® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	8.0	8.5
NovoMix®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	7.9	8.4
NovoRapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.0	0.2	7.9	8.4
Ryzodeg®Penfill® NovoPen® 4	1.8	0.4	0.1	4.5	0.2	2.0	0.2	8.7	9.2
Tresiba®Penfill® NovoPen® 4	2.1	0.4	0.1	4.5	0.2	2.0	0.2	9.0	9.5

Table 6. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 4 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.1	11.4
Fiasp®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.0	11.3
Insulatard®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.1	11.4

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Levemir®Penfill® NovoPen® 4	6.9	0.4	0.1	4.5	0.2	2.1	3.0	13.8	17.2
Mixtard®Penfil® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.1	11.4
NovoMix®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.0	11.3
NovoRapid®Penfill® NovoPen® 4	1.1	0.4	0.1	4.5	0.2	2.1	3.0	8.0	11.3
Ryzodeg®Penfill® NovoPen® 4	1.8	0.4	0.1	4.5	0.2	2.1	3.0	8.7	12.1
Tresiba®Penfill® NovoPen® 4	2.1	0.4	0.1	4.5	0.2	2.1	3.0	9.1	12.4

3.4.2 US market

Table 7. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 4 and NovoFine®.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.3	10.8
Fiasp®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.2	10.7
Insulatard®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.3	10.8
Levemir®Penfill® NovoPen® 4	6.9	0.6	0.1	3.3	0.3	5.3	0.2	16.0	16.6
Mixtard®Penfil® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.3	10.8
NovoMix®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.2	10.7

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
NovoRapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	5.3	0.2	10.2	10.7
Ryzodeg®Penfill® NovoPen® 4	1.8	0.6	0.1	3.3	0.3	5.3	0.2	11.0	11.5
Tresiba®Penfill® NovoPen® 4	2.1	0.6	0.1	3.3	0.3	5.3	0.2	11.3	11.8

Table 8. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 4 and NovoFine® Plus

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.8	8.3
Fiasp®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.7	8.3
Insulatard®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.8	8.3
Levemir®Penfill® NovoPen® 4	6.9	0.6	0.1	3.3	0.3	2.8	0.2	13.6	14.1
Mixtard®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.8	8.3
NovoMix®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.7	8.3
NovoRapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	2.8	0.2	7.7	8.3
Ryzodeg®Penfill® NovoPen® 4	1.8	0.6	0.1	3.3	0.3	2.8	0.2	8.5	9.0
Tresiba®Penfill® NovoPen® 4	2.1	0.6	0.1	3.3	0.3	2.8	0.2	8.8	9.3

Table 9. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 4 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
Fiasp®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
Insulatard®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
Levemir®Penfill® NovoPen® 4	6.9	0.6	0.1	3.3	0.3	6.8	3.0	17.6	20.9
Mixtard®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
NovoMix®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
NovoRapid®Penfill® NovoPen® 4	1.1	0.6	0.1	3.3	0.3	6.8	3.0	11.8	15.1
Ryzodeg®Penfill® NovoPen® 4	1.8	0.6	0.1	3.3	0.3	6.8	3.0	12.5	15.8
Tresiba®Penfill® NovoPen® 4	2.1	0.6	0.1	3.3	0.3	6.8	3.0	12.8	16.1

3.4.3 Japanese market

Table 10. Carbon footprint of one year's treatment of one patient in the **Japanese** market (NovoFine plus 70pcs).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 4 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.7	9.4
Fiasp®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.6	9.4
Insulatard®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.7	9.4
Levemir®Penfill® NovoPen® 4	6.9	0.3	0.1	4.1	0.4	3.1	0.3	14.4	15.2
Mixtard®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.7	9.4
NovoMix®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.6	9.4
NovoRapid®Penfill® NovoPen® 4	1.1	0.3	0.1	4.1	0.4	3.1	0.3	8.6	9.4
Ryzodeg®Penfill® NovoPen® 4	1.8	0.3	0.1	4.1	0.4	3.1	0.3	9.3	10.1
Tresiba®Penfill® NovoPen® 4	2.1	0.3	0.1	4.1	0.4	3.1	0.3	9.6	10.4

3.4.4 Comparison to other measurements

To put this into perspective for a non-expert, the carbon footprint of the yearly treatment (including API, delivery system, needle (NovoFine®Plus) and packaging) has been recalculated into a distance driven by an average new car at the European market in 2023⁶.

One year of treatment with [drug substance brand name] NovoPen® 4 corresponds to driving 79-143 km in an average new car in Europe. For a more detailed comparison, select a specific treatment in [Table 11](#).

⁶ European Environment Agency (2023) . Average carbon dioxide emissions per km from new passenger cars (106.4 g CO₂ eq/km), [CO₂ emissions performance of new passenger cars in Europe | European Environment Agency's home page](#)

Table 11. The distance (km) travelled in an average new car in Europe that would equal the carbon footprint of one year's treatment of a patient with the specified treatment.

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Actrapid®Penfill® NovoPen® 4	80	78	89
Fiasp®Penfill® NovoPen® 4	79	78	88
Insulatard®Penfill® NovoPen® 4	80	78	89
Levemir®Penfill® NovoPen® 4	134	132	143
Mixtard®Penfil® NovoPen® 4	80	78	89
NovoMix®Penfill® NovoPen® 4	79	78	88
NovoRapid®Penfill® NovoPen® 4	79	78	88
Ryzodeg®Penfill® NovoPen® 4	86	85	95
Tresiba®Penfill® NovoPen® 4	89	88	98

3.5 Plastic footprint NovoPen® 4

The plastic footprint is defined by Novo Nordisk as the amount of plastic⁷ used by a patient or an organisation during a specific treatment. The footprint includes any plastic placed on the market by Novo Nordisk, regardless of its origin (virgin, recycled, fossil or non-fossil). The footprint is calculated both with and without secondary and tertiary packaging.

This section presents the plastic footprint for specific treatments (assumptions described in Section 2) with NovoPen® 4 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the plastic footprints from the delivery system, cartridge, needle and packaging are shown as well as the total plastic footprint per patient per year.

Table 12 Plastic footprint for the different elements required for yearly treatment with *NovoPen® 4* combined with NovoFine® with and without packaging.

Brand name	NovoPen® 4 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Fiasp®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Insulatard®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Levemir®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Mixtard®Penfil® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
NovoMix®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
NovoRapid®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Ryzodeg®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48
Tresiba®Penfill® NovoPen® 4	17	0.3	15	50	93	303	0.12	0.48

⁷ Rubber not included

Table 13. Plastic footprint for the different elements required for yearly treatment with *NovoPen® 4* combined with *NovoFine® Plus* with and without packaging.

Brand name	NovoPen® 4 [g plastic/year]			Penfill® [g plastic/year]			NovoFine® plus [g plastic/year]			One year treatment [kg plastic/year]		
	Delivery system	Packaging		Cartridge	Packaging		Needle	Packaging		Excl. packaging	Incl. packaging	
		All	EU/US	JP	EU/US	JP	All	EU/US	JP	All	EU/US	JP
Actrapid®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Fiasp®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Insulatard®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Levemir®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Mixtard®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoMix®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoRapid®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Ryzodeg®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Tresiba®Penfill® NovoPen® 4	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56

Table 14. Plastic footprint for the different elements required for yearly treatment with *NovoPen® 4* combined with *NovoFine® Plus* (co-pack) with and without packaging.

Brand name	NovoPen® 4 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Fiasp®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Insulatard®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Levemir®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Mixtard®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
NovoMix®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
NovoRapid®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Ryzodeg®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50
Tresiba®Penfill® NovoPen® 4	17	0.3	15	50	143	279	0.17	0.50

4. NovoPen® 5

4.6 Carbon footprint NovoPen® 5

This section presents the carbon footprints for specific treatments (assumptions described in Section 2) with NovoPen® 5 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the carbon footprints from drug substance, delivery system, cartridge and needles are shown as well as the total carbon footprint per patient per year.

To put the results into perspective, the resulting carbon footprints has been recalculated into the distance driven by an average car (see Section 4.6.4).

4.6.1 European market

Table 15. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 5 and NovoFine®

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Fiasp®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
Insulatard®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Levemir®Penfill® NovoPen® 5	6.9	0.5	0.1	4.5	0.2	2.6	0.2	14.4	14.9
Mixtard®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoMix®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
NovoRapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
Ryzodeg®Penfill® NovoPen® 5	1.8	0.5	0.1	4.5	0.2	2.6	0.2	9.3	9.8
Tresiba®Penfill® NovoPen® 5	2.1	0.5	0.1	4.5	0.2	2.6	0.2	9.6	10.1

Table 16. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 5 and NovoFine® Plus.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Fiasp®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Insulatard®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Levemir®Penfill® NovoPen® 5	6.9	0.5	0.1	4.5	0.2	2.0	0.2	13.9	14.3
Mixtard®Penfil® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoMix®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
NovoRapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Ryzodeg®Penfill® NovoPen® 5	1.8	0.5	0.1	4.5	0.2	2.0	0.2	8.8	9.3
Tresiba®Penfill® NovoPen® 5	2.1	0.5	0.1	4.5	0.2	2.0	0.2	9.1	9.6

Table 17. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 5 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Fiasp®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4
Insulatard®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Levemir®Penfill® NovoPen® 5	6.9	0.5	0.1	4.5	0.2	2.1	3.0	13.9	17.3
Mixtard®Penfil® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
NovoMix®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4
NovoRapid®Penfill® NovoPen® 5	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4
Ryzodeg®Penfill® NovoPen® 5	1.8	0.5	0.1	4.5	0.2	2.1	3.0	8.8	12.2
Tresiba®Penfill® NovoPen® 5	2.1	0.5	0.1	4.5	0.2	2.1	3.0	9.2	12.5

4.6.2 US market

Table 18. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 5 and NovoFine®.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Fiasp®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Insulatard®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Levemir®Penfill® NovoPen® 5	6.9	0.7	0.1	3.3	0.3	5.3	0.2	16.1	16.7
Mixtard®Penfil® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
NovoMix®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
NovoRapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Ryzodeg®Penfill® NovoPen® 5	1.8	0.7	0.1	3.3	0.3	5.3	0.2	11.1	11.6
Tresiba®Penfill® NovoPen® 5	2.1	0.7	0.1	3.3	0.3	5.3	0.2	11.4	11.9

Table 19. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 5 and NovoFine® Plus

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Fiasp®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
Insulatard®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Levemir®Penfill® NovoPen® 5	6.9	0.7	0.1	3.3	0.3	2.8	0.2	13.7	14.2
Mixtard®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
NovoMix®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
NovoRapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
Ryzodeg®Penfill® NovoPen® 5	1.8	0.7	0.1	3.3	0.3	2.8	0.2	8.6	9.1
Tresiba®Penfill® NovoPen® 5	2.1	0.7	0.1	3.3	0.3	2.8	0.2	8.9	9.4

Table 20. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 5 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Fiasp®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Insulatard®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Levemir®Penfill® NovoPen® 5	6.9	0.7	0.1	3.3	0.3	6.8	3.0	17.7	21.0
Mixtard®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoMix®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoRapid®Penfill® NovoPen® 5	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Ryzodeg®Penfill® NovoPen® 5	1.8	0.7	0.1	3.3	0.3	6.8	3.0	12.6	15.9
Tresiba®Penfill® NovoPen® 5	2.1	0.7	0.1	3.3	0.3	6.8	3.0	12.9	16.2

4.6.3 Japanese market

Table 21. Carbon footprint of one year's treatment of one patient in the **Japanese** market (NovoFine plus 70pcs).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Fiasp®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Insulatard®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 5 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Levemir®Penfill® NovoPen® 5	6.9	0.4	0.1	4.1	0.4	3.1	0.3	14.5	15.3
Mixtard®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
NovoMix®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
NovoRapid®Penfill® NovoPen® 5	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Ryzodeg®Penfill® NovoPen® 5	1.8	0.4	0.1	4.1	0.4	3.1	0.3	9.4	10.2
Tresiba®Penfill® NovoPen® 5	2.1	0.4	0.1	4.1	0.4	3.1	0.3	9.7	10.5

4.6.4 Comparison to other measurements

To put this into perspective for a non-expert, the carbon footprint of the yearly treatment (including API, delivery system, needle (NovoFine®Plus) and packaging) has been recalculated into a distance driven by an average new car at the European market in 2023⁸.

One year of treatment with [drug substance brand name] NovoPen® 5 corresponds to driving 79-144 km in an average new car in Europe. For a more detailed comparison, select a specific treatment in Table 22.

Table 22 The distance (km) travelled in an average new car in Europe that would equal the carbon footprint of one year's treatment of a patient with the specified treatment.

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Actrapid®Penfill® NovoPen® 5	81	79	89
Fiasp®Penfill® NovoPen® 5	80	79	89
Insulatard®Penfill® NovoPen® 5	81	79	89
Levemir®Penfill® NovoPen® 5	135	133	144

⁸ European Environment Agency (2023) . Average carbon dioxide emissions per km from new passenger cars (106.4 g CO₂ eq/km), [CO₂ emissions performance of new passenger cars in Europe | European Environment Agency's home page](#)

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Mixtard®Penfill® NovoPen® 5	81	79	89
NovoMix®Penfill® NovoPen® 5	80	79	89
NovoRapid®Penfill® NovoPen® 5	80	79	89
Ryzodeg®Penfill® NovoPen® 5	87	86	96
Tresiba®Penfill® NovoPen® 5	90	88	99

4.7 Plastic footprint NovoPen® 5

The plastic footprint is defined by Novo Nordisk as the amount of plastic⁹ used by a patient or an organisation during a specific treatment. The footprint includes any plastic placed on the market by Novo Nordisk, regardless of its origin (virgin, recycled, fossil or non-fossil). The footprint is calculated both with and without secondary and tertiary packaging.

This section presents the plastic footprint for specific treatments (assumptions described in Section 2) with NovoPen® 5 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the plastic footprints from the delivery system, cartridge, needle and packaging are shown as well as the total plastic footprint per patient per year.

Table 23 Plastic footprint for the different elements required for yearly treatment with *NovoPen® 5* combined with NovoFine® with and without packaging.

Brand name	NovoPen® 5 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Fiasp®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Insulatard®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Levemir®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Mixtard®Penfil® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
NovoMix®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
NovoRapid®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Ryzodeg®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48
Tresiba®Penfill® NovoPen® 5	16	0.3	15	50	93	303	0.12	0.48

⁹ Rubber not included

Table 24. Plastic footprint for the different elements required for yearly treatment with *NovoPen® 5* combined with *NovoFine® Plus* with and without packaging.

Brand name	NovoPen® 5 [g plastic/year]			Penfill® [g plastic/year]			NovoFine® plus [g plastic/year]			One year treatment [kg plastic/year]		
	Delivery system	Packaging		Cartridge	Packaging		Needle	Packaging		Excl. packaging	Incl. packaging	
		All	EU/US	JP	EU/US	JP	All	EU/US	JP	All	EU/US	JP
Actrapid®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Fiasp®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Insulatard®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Levemir®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Mixtard®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoMix®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoRapid®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Ryzodeg®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Tresiba®Penfill® NovoPen® 5	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56

Table 25. Plastic footprint for the different elements required for yearly treatment with *NovoPen*® 5 combined with *NovoFine*® Plus (co-pack) with and without packaging.

Brand name	NovoPen® 5 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 5	17	0.3	15	50	143	279	0.17	0.50
Fiasp®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
Insulatard®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
Levemir®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
Mixtard®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
NovoMix®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
NovoRapid®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
Ryzodeg®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50
Tresiba®Penfill® NovoPen® 5	16	0.3	15	50	143	279	0.17	0.50

5. NovoPen® 6

5.8 Carbon footprint NovoPen® 6

This section presents the carbon footprints for specific treatments (assumptions described in Section 2) with NovoPen® 6 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the carbon footprints from drug substance, delivery system, cartridge and needles are shown as well as the total carbon footprint per patient per year.

To put the results into perspective, the resulting carbon footprints has been recalculated into the distance driven by an average car (see Section 5.8.4).

5.8.1 European market

Table 26. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 6 and NovoFine®

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Fiasp®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Insulatard®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Levemir®Penfill® NovoPen® 6	6.9	0.5	0.1	4.5	0.2	2.6	0.2	14.4	14.9
Mixtard®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoMix®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoRapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Ryzodeg®Penfill® NovoPen® 6	1.8	0.5	0.1	4.5	0.2	2.6	0.2	9.3	9.8
Tresiba®Penfill® NovoPen® 6	2.1	0.5	0.1	4.5	0.2	2.6	0.2	9.6	10.1

Table 27. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 6 and NovoFine® Plus.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Fiasp®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Insulatard®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Levemir®Penfill® NovoPen® 6	6.9	0.5	0.1	4.5	0.2	2.0	0.2	13.9	14.4
Mixtard®Penfil® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoMix®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoRapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Ryzodeg®Penfill® NovoPen® 6	1.8	0.5	0.1	4.5	0.2	2.0	0.2	8.8	9.3
Tresiba®Penfill® NovoPen® 6	2.1	0.5	0.1	4.5	0.2	2.0	0.2	9.1	9.6

Table 28. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen® 6 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Fiasp®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5
Insulatard®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Levemir®Penfill® NovoPen® 6	6.9	0.5	0.1	4.5	0.2	2.1	3.0	14.0	17.3
Mixtard®Penfil® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
NovoMix®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5
NovoRapid®Penfill® NovoPen® 6	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5
Ryzodeg®Penfill® NovoPen® 6	1.8	0.5	0.1	4.5	0.2	2.1	3.0	8.9	12.2
Tresiba®Penfill® NovoPen® 6	2.1	0.5	0.1	4.5	0.2	2.1	3.0	9.2	12.5

5.8.2 US market

Table 29. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 6 and NovoFine®.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Fiasp®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Insulatard®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Levemir®Penfill® NovoPen® 6	6.9	0.7	0.1	3.3	0.3	5.3	0.2	16.2	16.7
Mixtard®Penfil® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
NovoMix®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
NovoRapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Ryzodeg®Penfill® NovoPen® 6	1.8	0.7	0.1	3.3	0.3	5.3	0.2	11.1	11.6
Tresiba®Penfill® NovoPen® 6	2.1	0.7	0.1	3.3	0.3	5.3	0.2	11.4	11.9

Table 30. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 6 and NovoFine® Plus

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
Fiasp®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Insulatard®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
Levemir®Penfill® NovoPen® 6	6.9	0.7	0.1	3.3	0.3	2.8	0.2	13.7	14.2
Mixtard®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
NovoMix®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
NovoRapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Ryzodeg®Penfill® NovoPen® 6	1.8	0.7	0.1	3.3	0.3	2.8	0.2	8.6	9.1
Tresiba®Penfill® NovoPen® 6	2.1	0.7	0.1	3.3	0.3	2.8	0.2	8.9	9.4

Table 31. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen® 6 and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Fiasp®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Insulatard®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Levemir®Penfill® NovoPen® 6	6.9	0.7	0.1	3.3	0.3	6.8	3.0	17.7	21.0
Mixtard®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoMix®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoRapid®Penfill® NovoPen® 6	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Ryzodeg®Penfill® NovoPen® 6	1.8	0.7	0.1	3.3	0.3	6.8	3.0	12.6	15.9
Tresiba®Penfill® NovoPen® 6	2.1	0.7	0.1	3.3	0.3	6.8	3.0	12.9	16.2

5.8.3 Japanese market

Table 32. Carbon footprint of one year's treatment of one patient in the **Japanese** market (NovoFine plus 70pcs).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen® 6 [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Fiasp®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Insulatard®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Levemir®Penfill® NovoPen® 6	6.9	0.4	0.1	4.1	0.4	3.1	0.3	14.5	15.3
Mixtard®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
NovoMix®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
NovoRapid®Penfill® NovoPen® 6	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Ryzodeg®Penfill® NovoPen® 6	1.8	0.4	0.1	4.1	0.4	3.1	0.3	9.5	10.2
Tresiba®Penfill® NovoPen® 6	2.1	0.4	0.1	4.1	0.4	3.1	0.3	9.8	10.5

5.8.4 Comparison to other measurements

To put this into perspective for a non-expert, the carbon footprint of the yearly treatment (including API, delivery system, needle (NovoFine®Plus) and packaging) has been recalculated into a distance driven by an average new car at the European market in 2023¹⁰.

One year of treatment with [drug substance brand name] NovoPen® 6 corresponds to driving 80-144 km in an average new car in Europe. For a more detailed comparison, select a specific treatment in Table 33.

¹⁰ European Environment Agency (2023) . Average carbon dioxide emissions per km from new passenger cars (106.4 g CO₂ eq/km), [CO₂ emissions performance of new passenger cars in Europe | European Environment Agency's home page](#)

Table 33. The distance (km) travelled in an average new car in Europe that would equal the carbon footprint of one year's treatment of a patient with the specified treatment.

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Actrapid®Penfill® NovoPen® 6	81	80	90
Fiasp®Penfill® NovoPen® 6	80	79	89
Insulatard®Penfill® NovoPen® 6	81	80	90
Levemir®Penfill® NovoPen® 6	135	134	144
Mixtard®Penfil® NovoPen® 6	81	80	90
NovoMix®Penfill® NovoPen® 6	80	79	89
NovoRapid®Penfill® NovoPen® 6	80	79	89
Ryzodeg®Penfill® NovoPen® 6	87	86	96
Tresiba®Penfill® NovoPen® 6	90	89	99

5.9 Plastic footprint NovoPen® 6

The plastic footprint is defined by Novo Nordisk as the amount of plastic¹¹ used by a patient or an organisation during a specific treatment. The footprint includes any plastic placed on the market by Novo Nordisk, regardless of its origin (virgin, recycled, fossil or non-fossil). The footprint is calculated both with and without secondary and tertiary packaging.

This section presents the plastic footprint for specific treatments (assumptions described in Section 2) with NovoPen® 6 in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the plastic footprints from the delivery system, cartridge, needle and packaging are shown as well as the total plastic footprint per patient per year.

Table 34. Plastic footprint for the different elements required for yearly treatment with *NovoPen® 6* combined with *NovoFine®* with and without packaging.

Brand name	NovoPen® 6 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Fiasp®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Insulatard®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Levemir®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Mixtard®Penfil® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
NovoMix®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
NovoRapid®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Ryzodeg®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48
Tresiba®Penfill® NovoPen® 6	16	0.3	15	50	93	303	0.12	0.48

¹¹ Rubber not included

Table 35. Plastic footprint for the different elements required for yearly treatment with *NovoPen® 6* combined with NovoFine® Plus with and without packaging.

Brand name	NovoPen® 6 [g plastic/year]			Penfill® [g plastic/year]			NovoFine® plus [g plastic/year]			One year treatment [kg plastic/year]		
	Delivery system	Packaging		Cartridge	Packaging		Needle	Packaging		Excl. packaging	Incl. packaging	
		All	EU/US	JP	EU/US	JP	All	EU/US	JP	All	EU/US	JP
Actrapid®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Fiasp®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Insulatard®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Levemir®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Mixtard®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoMix®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoRapid®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Ryzodeg®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Tresiba®Penfill® NovoPen® 6	16	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56

Table 36. Plastic footprint for the different elements required for yearly treatment with *NovoPen*® 6 combined with *NovoFine*® Plus (co-pack) with and without packaging.

Brand name	NovoPen® 6 [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Fiasp®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Insulatard®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Levemir®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Mixtard®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
NovoMix®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
NovoRapid®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Ryzodeg®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50
Tresiba®Penfill® NovoPen® 6	16	0.3	15	50	143	279	0.17	0.50

6. NovoPen Echo®

6.10 Carbon footprint NovoPen Echo®

This section presents the carbon footprints for specific treatments (assumptions described in Section 2) with NovoPen Echo® in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the carbon footprints from drug substance, delivery system, cartridge and needles are shown as well as the total carbon footprint per patient per year.

To put the results into perspective, the resulting carbon footprints has been recalculated into the distance driven by an average car (see Section 6.10.4).

6.10.1 European market

Table 37. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® and NovoFine®

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Fiasp®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
Insulatard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Levemir®Penfill® NovoPen Echo®	6.9	0.5	0.1	4.5	0.2	2.6	0.2	14.4	14.9
Mixtard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoMix®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
NovoRapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.0
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.5	0.1	4.5	0.2	2.6	0.2	9.3	9.8
Tresiba®Penfill® NovoPen Echo®	2.1	0.5	0.1	4.5	0.2	2.6	0.2	9.6	10.1

Table 38. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® and NovoFine® Plus.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Fiasp®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Insulatard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Levemir®Penfill® NovoPen Echo®	6.9	0.5	0.1	4.5	0.2	2.0	0.2	13.9	14.3
Mixtard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoMix®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
NovoRapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.0	8.5
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.5	0.1	4.5	0.2	2.0	0.2	8.8	9.3
Tresiba®Penfill® NovoPen Echo®	2.1	0.5	0.1	4.5	0.2	2.0	0.2	9.1	9.6

Table 39. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Fiasp®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Insulatard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Levemir®Penfill® NovoPen Echo®	6.9	0.5	0.1	4.5	0.2	2.1	3.0	13.9	17.3
Mixtard®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
NovoMix®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4
NovoRapid®Penfill® NovoPen Echo®	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.4
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.5	0.1	4.5	0.2	2.1	3.0	8.8	12.2
Tresiba®Penfill® NovoPen Echo®	2.1	0.5	0.1	4.5	0.2	2.1	3.0	9.2	12.5

6.10.2 US market

Table 40. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® and NovoFine®.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Fiasp®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Insulatard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Levemir®Penfill® NovoPen Echo®	6.9	0.7	0.1	3.3	0.3	5.3	0.2	16.1	16.7
Mixtard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
NovoMix®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
NovoRapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.7	0.1	3.3	0.3	5.3	0.2	11.1	11.6
Tresiba®Penfill® NovoPen Echo®	2.1	0.7	0.1	3.3	0.3	5.3	0.2	11.4	11.9

Table 41. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® and NovoFine® Plus

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Fiasp®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
Insulatard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Levemir®Penfill® NovoPen Echo®	6.9	0.7	0.1	3.3	0.3	2.8	0.2	13.7	14.2
Mixtard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
NovoMix®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
NovoRapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.8	8.4
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.7	0.1	3.3	0.3	2.8	0.2	8.6	9.1
Tresiba®Penfill® NovoPen Echo®	2.1	0.7	0.1	3.3	0.3	2.8	0.2	8.9	9.4

Table 42. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Fiasp®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Insulatard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Levemir®Penfill® NovoPen Echo®	6.9	0.7	0.1	3.3	0.3	6.8	3.0	17.7	21.0
Mixtard®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoMix®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoRapid®Penfill® NovoPen Echo®	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.7	0.1	3.3	0.3	6.8	3.0	12.6	15.9
Tresiba®Penfill® NovoPen Echo®	2.1	0.7	0.1	3.3	0.3	6.8	3.0	12.9	16.2

6.10.3 Japanese market

Table 43. Carbon footprint of one year's treatment of one patient in the **Japanese** market (NovoFine plus 70pcs).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Fiasp®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Insulatard®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Levemir®Penfill® NovoPen Echo®	6.9	0.4	0.1	4.1	0.4	3.1	0.3	14.5	15.3
Mixtard®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
NovoMix®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
NovoRapid®Penfill® NovoPen Echo®	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Ryzodeg®Penfill® NovoPen Echo®	1.8	0.4	0.1	4.1	0.4	3.1	0.3	9.4	10.2
Tresiba®Penfill® NovoPen Echo®	2.1	0.4	0.1	4.1	0.4	3.1	0.3	9.7	10.5

6.10.4 Comparison to other measurements

To put this into perspective for a non-expert, the carbon footprint of the yearly treatment (including API, delivery system, needle (NovoFine®Plus) and packaging) has been recalculated into a distance driven by an average new car at the European market in 2023¹².

One year of treatment with [drug substance brand name] NovoPen® Echo corresponds to driving 79-144 km in an average new car in Europe. For a more detailed comparison, select a specific treatment in Table 44.

Table 44. The distance (km) travelled in an average new car in Europe that would equal the carbon footprint of one year's treatment of a patient with the specified treatment.

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Actrapid®Penfill® NovoPen Echo®	81	79	89
Fiasp®Penfill® NovoPen Echo®	80	79	89
Insulatard®Penfill® NovoPen Echo®	81	79	89

¹² European Environment Agency (2023) . Average carbon dioxide emissions per km from new passenger cars (106.4 g CO₂ eq/km), [CO₂ emissions performance of new passenger cars in Europe | European Environment Agency's home page](#)

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Levemir®Penfill® NovoPen Echo®	135	133	144
Mixtard®Penfil® NovoPen Echo®	81	79	89
NovoMix®Penfill® NovoPen Echo®	80	79	89
NovoRapid®Penfill® NovoPen Echo®	80	79	89
Ryzodeg®Penfill® NovoPen Echo®	87	86	96
Tresiba®Penfill® NovoPen Echo®	90	88	99

6.11 Plastic footprint NovoPen Echo®

The plastic footprint is defined by Novo Nordisk as the amount of plastic¹³ used by a patient or an organisation during a specific treatment. The footprint includes any plastic placed on the market by Novo Nordisk, regardless of its origin (virgin, recycled, fossil or non-fossil). The footprint is calculated both with and without secondary and tertiary packaging.

This section presents the plastic footprint for specific treatments (assumptions described in Section 2) with NovoPen Echo® in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the plastic footprints from the delivery system, cartridge, needle and packaging are shown as well as the total plastic footprint per patient per year.

Table 45 Plastic footprint for the different elements required for yearly treatment with *NovoPen® Echo* combined with *NovoFine®* with and without packaging.

Brand name	NovoPen Echo® [g plastic/year]		Penfill® [g plastic/year]		NovoFine® [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Fiasp®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Insulatard®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Levemir®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Mixtard®Penfil® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
NovoMix®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
NovoRapid®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Ryzodeg®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48
Tresiba®Penfill® NovoPen Echo®	17	0.3	15	50	93	303	0.12	0.48

¹³ Rubber not included

Table 46. Plastic footprint for the different elements required for yearly treatment with *NovoPen Echo*® combined with *NovoFine*® Plus with and without packaging.

Brand name	NovoPen Echo® [g plastic/year]			Penfill® [g plastic/year]			NovoFine® plus [g plastic/year]			One year treatment [kg plastic/year]		
	Delivery system	Packaging		Cartridge	Packaging		Needle	Packaging		Excl. packaging	Incl. packaging	
	All	EU/US	JP	All	EU/US	JP	All	EU/US	JP	All	EU/US	JP
Actrapid®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Fiasp®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Insulatard®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Levemir®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Mixtard®Penfil® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoMix®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoRapid®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Ryzodeg®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Tresiba®Penfill® NovoPen Echo®	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56

Table 47. Plastic footprint for the different elements required for yearly treatment with *NovoPen Echo*® combined with *NovoFine*® Plus (co-pack) with and without packaging.

Brand name	NovoPen Echo® [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Fiasp®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Insulatard®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Levemir®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Mixtard®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
NovoMix®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
NovoRapid®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Ryzodeg®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50
Tresiba®Penfill® NovoPen Echo®	17	0.3	15	50	143	279	0.17	0.50

7. NovoPen Echo® Plus

7.12 Carbon footprint NovoPen Echo® Plus

This section presents the carbon footprints for specific treatments (assumptions described in Section 2) with NovoPen Echo® Plus in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the carbon footprints from drug substance, delivery system, cartridge and needles are shown as well as the total carbon footprint per patient per year.

To put the results into perspective, the resulting carbon footprints has been recalculated into the distance driven by an average car (see Section 7.12.4).

7.12.1 European market

Table 48. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® Plus and NovoFine®

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.5	0.1	4.5	0.2	2.6	0.2	14.4	14.9
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.6	0.2	8.6	9.1
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.5	0.1	4.5	0.2	2.6	0.2	9.3	9.8
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.5	0.1	4.5	0.2	2.6	0.2	9.6	10.1

Table 49. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® Plus and NovoFine® Plus.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.5	0.1	4.5	0.2	2.0	0.2	13.9	14.4
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.0	0.2	8.1	8.6
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.5	0.1	4.5	0.2	2.0	0.2	8.8	9.3
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.5	0.1	4.5	0.2	2.0	0.2	9.1	9.6

Table 50. Carbon footprint of one year's treatment of one patient in the **European** market with NovoPen Echo® Plus and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.5	0.1	4.5	0.2	2.1	3.0	14.0	17.3
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.2	11.5
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.5	0.1	4.5	0.2	2.1	3.0	8.1	11.5
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.5	0.1	4.5	0.2	2.1	3.0	8.9	12.2
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.5	0.1	4.5	0.2	2.1	3.0	9.2	12.5

7.12.2 US market

Table 51. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® Plus and NovoFine®.

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.7	0.1	3.3	0.3	5.3	0.2	16.2	16.7
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.4	10.9

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	5.3	0.2	10.3	10.9
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.7	0.1	3.3	0.3	5.3	0.2	11.1	11.6
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.7	0.1	3.3	0.3	5.3	0.2	11.4	11.9

Table 52. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® Plus and NovoFine® Plus

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.7	0.1	3.3	0.3	2.8	0.2	13.7	14.2
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.5
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	2.8	0.2	7.9	8.4
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.7	0.1	3.3	0.3	2.8	0.2	8.6	9.1
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.7	0.1	3.3	0.3	2.8	0.2	8.9	9.4

Table 53. Carbon footprint of one year's treatment of one patient in the **US** market with NovoPen Echo® Plus and NovoFine® Plus (co-pack).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus (co-pack) [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.7	0.1	3.3	0.3	6.8	3.0	17.7	21.0
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.7	0.1	3.3	0.3	6.8	3.0	11.9	15.2
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.7	0.1	3.3	0.3	6.8	3.0	12.6	15.9
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.7	0.1	3.3	0.3	6.8	3.0	12.9	16.2

7.12.3 Japanese market

Table 54. Carbon footprint of one year's treatment of one patient in the **Japanese** market (NovoFine plus 70pcs).

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Actrapid®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Fiasp®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5

Brand name	Drug substance [kg CO ₂ -eq./year]	NovoPen Echo® Plus [kg CO ₂ -eq./year]		Penfill® [kg CO ₂ -eq./year]		NovoFine® plus [kg CO ₂ -eq./year]		One year treatment [kg CO ₂ -eq./year]	
		Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
Insulatard®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
Levemir®Penfill® NovoPen Echo® Plus	6.9	0.4	0.1	4.1	0.4	3.1	0.3	14.5	15.3
Mixtard®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.8	9.5
NovoMix®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
NovoRapid®Penfill® NovoPen Echo® Plus	1.1	0.4	0.1	4.1	0.4	3.1	0.3	8.7	9.5
Ryzodeg®Penfill® NovoPen Echo® Plus	1.8	0.4	0.1	4.1	0.4	3.1	0.3	9.5	10.2
Tresiba®Penfill® NovoPen Echo® Plus	2.1	0.4	0.1	4.1	0.4	3.1	0.3	9.8	10.5

7.12.4 Comparison to other measurements

To put this into perspective for a non-expert, the carbon footprint of the yearly treatment (including API, delivery system, needle (NovoFine®Plus) and packaging) has been recalculated into a distance driven by an average new car at the European market in 2023¹⁴.

One year of treatment with [drug substance brand name] NovoPen Echo® Plus corresponds to driving 79-144 km in an average new car in Europe. For a more detailed comparison, select a specific treatment in Table 55.

Table 55. The distance (km) travelled in an average new car in Europe that would equal the carbon footprint of one year's treatment of a patient with the specified treatment.

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Actrapid®Penfill® NovoPen Echo® Plus	81	80	90
Fiasp®Penfill® NovoPen Echo® Plus	80	79	89
Insulatard®Penfill® NovoPen Echo® Plus	81	80	90

¹⁴ European Environment Agency (2023) . Average carbon dioxide emissions per km from new passenger cars (106.4 g CO₂ eq/km), [CO₂ emissions performance of new passenger cars in Europe | European Environment Agency's home page](#)

Brand name	EU	US	JP
	<i>Km travelled</i>	<i>Km travelled</i>	<i>Km travelled</i>
Levemir®Penfill® NovoPen Echo® Plus	135	134	144
Mixtard®Penfil® NovoPen Echo® Plus	81	80	90
NovoMix®Penfill® NovoPen Echo® Plus	80	79	89
NovoRapid®Penfill® NovoPen Echo® Plus	80	79	89
Ryzodeg®Penfill® NovoPen Echo® Plus	87	86	96
Tresiba®Penfill® NovoPen Echo® Plus	90	89	99

7.13 Plastic footprint NovoPen Echo® Plus

The plastic footprint is defined by Novo Nordisk as the amount of plastic¹⁵ used by a patient or an organisation during a specific treatment. The footprint includes any plastic placed on the market by Novo Nordisk, regardless of its origin (virgin, recycled, fossil or non-fossil). The footprint is calculated both with and without secondary and tertiary packaging.

This section presents the plastic footprint for specific treatments (assumptions described in Section 2) with NovoPen Echo® Plus in combinations with a range on drug substances (delivered in Penfill®) and needles in the three representative markets, Europe, US and Japan. The contribution to the plastic footprints from the delivery system, cartridge, needle and packaging are shown as well as the total plastic footprint per patient per year.

Table 56 Plastic footprint for the different elements required for yearly treatment with *NovoPen Echo® Plus* combined with NovoFine® with and without packaging.

Brand name	NovoPen Echo® Plus [g plastic/year]		Penfill® [g plastic/year]		NovoFine® [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Fiasp®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Insulatard®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Levemir®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Mixtard®Penfil® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
NovoMix®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
NovoRapid®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Ryzodeg®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48
Tresiba®Penfill® NovoPen Echo® Plus	17	0.3	15	50	93	303	0.12	0.48

¹⁵ Rubber not included

Table 57. Plastic footprint for the different elements required for yearly treatment with *NovoPen Echo® Plus* combined with *NovoFine® Plus* with and without packaging.

Brand name	NovoPen Echo® Plus [g plastic/year]			Penfill® [g plastic/year]			NovoFine® plus [g plastic/year]			One year treatment [kg plastic/year]		
	Delivery system	Packaging	Cartridge	Packaging			Needle	Packaging		Excl. packaging	Incl. packaging	
	All	EU/US	JP	All	EU/US	JP	All	EU/US	JP	All	EU/US	JP
Actrapid®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Fiasp®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Insulatard®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Levemir®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Mixtard®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoMix®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
NovoRapid®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Ryzodeg®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56
Tresiba®Penfill® NovoPen Echo® Plus	17	0.3	0.3	15	50	100	143	261	288	0.17	0.49	0.56

Table 58. Plastic footprint for the different elements required for yearly treatment with *NovoPen Echo® Plus* combined with *NovoFine® Plus* (co-pack) with and without packaging.

Brand name	NovoPen Echo® Plus [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Actrapid®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50

Brand name	NovoPen Echo® Plus [g plastic/year]		Penfill® [g plastic/year]		NovoFine® Plus (co-pack) [g plastic/year]		One year treatment [kg plastic/year]	
	Delivery system	Packaging	Cartridge	Packaging	Needle	Packaging	Excl. packaging	Incl. packaging
	All	EU/US	All	EU/US	All	EU/US	All	EU/US
Fiasp®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
Insulatard®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
Levemir®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
Mixtard®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
NovoMix®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
NovoRapid®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
Ryzodeg®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50
Tresiba®Penfill® NovoPen Echo® Plus	17	0.3	15	50	143	279	0.17	0.50

References

Insulin analogues carbon footprint, Novo Nordisk, Mar 2024

Insulin icodec carbon footprint, Novo Nordisk, Jul 2023

NovoPen® carbon footprint, Novo Nordisk, 2024

Penfill® carbon footprint, Novo Nordisk, Dec 2024

NovoFine® carbon footprint, Novo Nordisk, Dec 2024

Assumptions and background for carbon footprint assessments, Novo Nordisk, Apr 2025

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Novo Nordisk

**Third party verification of Novo Nordisk's carbon footprint
report on the annual treatment with NovoPen® incl. drug and
needles**



Third party verification of Novo Nordisk's carbon footprint report on the annual treatment with NovoPen® incl. drug and needles

May 5th, 2025

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Novo Nordisk has commissioned PricewaterhouseCoopers Advisory (PwC) to review the carbon footprint report on the annual treatment with NovoPen® incl. drug and needles. The critical review (CR) was done according to the ISO/TS 14 071¹, ISO 14 040², ISO 14 044³ recommendations and also according to the "Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices" recommendations. The CR expert is independent from Novo Nordisk and was not involved in the making of the study. To ensure consistency with the principles and requirements of the standards and guidance (ISO/TS 14 071, ISO 14 040, ISO 14 044, and Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices) on life cycle assessment, the CR was performed by the following LCA experts of PwC: Olivier Muller and Clara Tromelin. The conclusions have been provided to Novo Nordisk.

Nature of the CR work, CR process and limitations

The CR has worked according to the requirements of ISO 14 040:2006, ISO 14 044:2006 and of Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices. The work was conducted in April 2025.

¹ ISO/TS 14071 (2014): Environmental management – Life cycle assessment – Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044 (2006)

² ISO 14040 (2006): Environmental management – Life cycle assessment – Principles and framework

³ ISO 14044 (2006): Environmental management – Life cycle assessment – Requirements and guidelines

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The CR of the study appraises the following:

- the methods used are consistent with the standards ISO 14040 and 14044 and Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices;
- the methods used are scientifically and technically valid;
- the data used are appropriate and reasonable in relation to the goal and scope of the study;
- the interpretation reflects the limitations identified and the goal of the study;
- the report is transparent and consistent.

During this period, different oral and written exchanges have been held between PwC and Novo Nordisk, including clarification exchanges regarding the CR comments, and the production of new versions of the carbon footprint reports by Novo Nordisk. Novo Nordisk has taken into account all the comments and has modified and improved its report.

The CR concerns the CR of the following report:

- Annual treatment with NovoPen® incl. drug and needles, carbon footprint, March 2025

This report is based on the following reports that have already been subject to a review by PwC that included an assessment of the LCA model and an analysis of a few key individual datasets (relevance, consistency, completeness):

- Insulin analogues carbon footprint, Novo Nordisk, Mar 2024
- Insulin icodec carbon footprint, Novo Nordisk, Jul 2023
- NovoPen® carbon footprint, Novo Nordisk, 2024
- Penfill® carbon footprint, Novo Nordisk, Dec 2024
- NovoFine® carbon footprint, Novo Nordisk, Dec 2024
- Assumptions and background for carbon footprint assessments, Novo Nordisk, Apr 2025

The present CR report is the synthesis of the final comments.

The present CR report was prepared by PricewaterhouseCoopers Advisory SA (PwC) for Novo Nordisk. We do not accept or assume any liability or duty of care for any other purpose or to any other person to whom the CR report is shown or into whose hands they may come. The use of their report is the sole responsibility of Novo Nordisk.

We remind you that this CR is only based on facts, circumstances and assumptions which have been submitted to us and which are specified in the CR report. Should these facts, circumstances or assumptions be different, our conclusions might be different.

Moreover, the results of the CR should be considered in the aggregate with regard to the assumptions made and not taken individually.

For all matters of interpretation, the original paper copy of the report takes precedence over any other version.

Conclusions of the critical review

The 2025 carbon footprint report on the annual treatment with NovoPen® incl. drug and needles study is in conformity with the standards ISO 14040 and 14044 and Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices.

The models of the production systems are understandable, and an important work of updates was done by Novo Nordisk. Cut-off is in line with general cut-off criteria. The allocation principles and allocation procedures are sufficiently described and are justified.

A specific report, which contains all assumptions and choices, helps to reference and to document understandably.

The collected primary data (measurements) is comprehensive. The used data is suitable and in accordance with the goal of the study.

The interpretation of results is neutral and detailed; the gained insights are understandably presented and are in accordance with the goal of the study. The evaluation, interpretation and taken conclusions are valid in the context of the study.

Neuilly-sur-Seine (France), May 5th, 2025

A handwritten signature in black ink, appearing to read 'O. Muller', with a large, sweeping horizontal stroke at the bottom.

Olivier Muller
Partner of Sustainable Development Department