Life cycle assessment

Carbon footprint report
Polestar 4 coupé

Produced in Busan, South Korea

Model year
2027

4

This report is for information only and (1) is based solely on an analysis of Polestar 4 coupé (model year 2027) Dual motor and Rear motor, produced in Busan, South Korea, and does not include information regarding any other Polestar vehicle and (2) does not include any commitments for current or future products or carbon footprint impacts. Full study methodology is available in the first Polestar 4 life cycle assessment report, available via this link: Polestar 4 LCA report. To get a full understanding of the methodology used to calculate the carbon footprints in this report, it is recommended to read the previous report in conjunction with this one.

The result of this study is dependent upon agreed and validated information from Polestar's suppliers and sub-suppliers. During the course of a vehicle program life there could arise changes and non-compliances within the supply chain, should such changes or non-compliances arise, Polestar will take corrective actions to achieve the results presented in this report.

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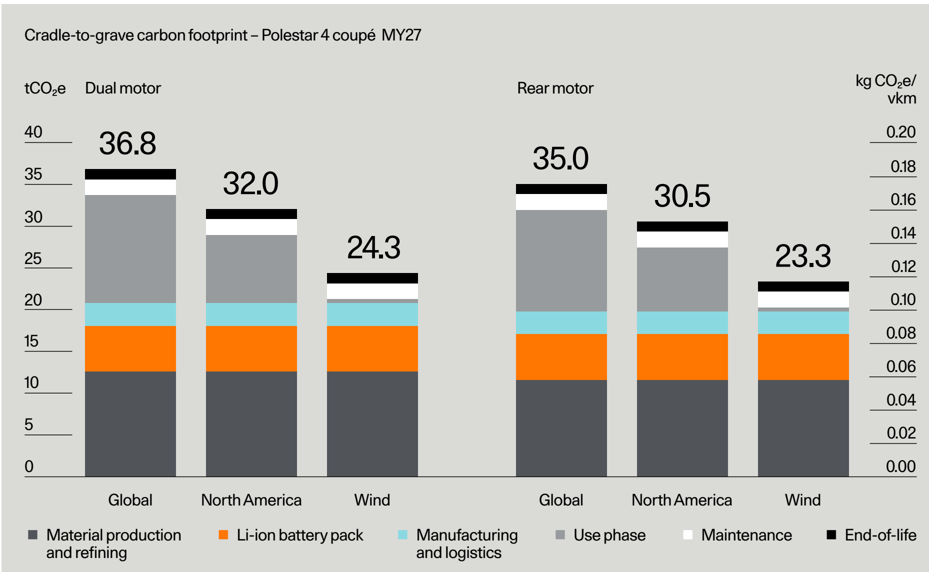

← Figure 1

Carbon footprint for Polestar 4 coupé variants, with different electricity mixes in the use phase. The axis to the left, as well as the data labels, presents the result per functional unit (200,000 km lifetime driving distance) in tCO_2e. The axis to the right presents the result in kg CO_2e using a secondary functional unit of 1 vkm (vehicle kilometer, 200,000 km lifetime driving distance).

At the end of 2023, a carbon footprint report of Polestar 4 "Long range Dual motor", Long range Single motor" and "Standard range Single motor" model year 2024 and 2025 was published. The carbon footprints presented in this report only represent vehicles produced in Busan, South Korea. The Polestar 4 from model year 2026 and onwards does not come with the Standard range Single motor. From the present model year, 2027, there have been naming changes of the model and variants of the vehicle. The Polestar 4 has been renamed the "Polestar 4 coupé" and the Long range Dual motor variant has been renamed "Dual motor" and the Long range Single motor has been renamed "Rear motor". This report assesses these two variants of the Polestar 4 coupé, these changes are only changes in name and no changes in the actual vehicle.

The carbon footprint presented in this report is based on a Life Cycle Assessment (LCA). The LCA is performed according to ISO LCA standards[1]. In addition, the "Product Life Cycle Accounting and Reporting Standard"[2] published by the Greenhouse Gas Protocol has been used for guidance in methodological choices. Given the great number of variables and possible methodological choices in LCA studies, these standards generally provide few strict requirements to be followed. Instead, they mostly provide guidelines for the practitioner. For this reason, care should be taken when comparing our results with results from other vehicle manufacturers' carbon footprints. In general, Polestar have made some conservative assumptions, in order not to underestimate the impact from unknown data. Methodological choices and data sources are described in the previous Polestar 4 LCA report. Some methodological and data changes have been made, which are described in this report. To get a full understanding of the methodology used to calculate the carbon footprints in this report, it is recommended to read the first report Polestar 4 LCA report. This previous report corresponds to Polestar 4 model years 2024 and 2025.

The carbon footprint includes emissions from upstream supplier activities, manufacturing, logistics, use phase of the vehicle and the end-of-life phase. The functional unit chosen is "The use of a Polestar 4 coupé vehicle driving 200,000 km between the full years of 2026 to 2040".

Changes have been made in the Polestar 4 battery supply chain which have led to reductions in the cradle-to-gate carbon footprint of the Dual motor and Rear motor Polestar 4 coupé variants. The first Polestar 4 carbon footprint report used preliminary WLTP (Worldwide Harmonised Light Vehicle Test Procedure) figures for energy consumption in the use phase while this report uses the certified WLTP figures. Methodological changes in the use phase have also been made in this report to the previous report, this includes accounting for changes in driving patterns throughout the vehicle lifetime. Accounting for these driving patterns leads to the cradle-to-grave carbon footprint result in this report being comparable to Polestar vehicle carbon footprint reports currently published as of February 2026.

As shown in Figure 1, the life cycle (cradle-to-grave) carbon footprints are 24.3-36.8 tCO_2e for Dual motor and 23.3-35.0 tCO_2e for Rear motor. The range in results is caused by differences in electricity mix scenarios, where the highest value reflects that a global electricity mix is used in the vehicle use phase (for vehicle charging) while the lowest value reflects that wind power is used.

1 ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines" and ISO 14040:2006 "Environmental management – Life cycle assessment – Principles and framework"

2 https://ghgprotocol.org/sites/default/files/standards/Product-Life-CycleAccounting-Reporting-Standard_041613.pdf

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Battery pack
Complete vehicle battery including battery cells, modules and battery pack structure.

Cradle-to-gate
A cradle-to-gate assessment considers impacts at parts of the product's life cycle; in Polestars studies it starts from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing and ends after the vehicle has been transported to sales market.

Cradle-to-grave
A cradle-to-grave assessment considers impacts at each stage of the product's life cycle, from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, logistics, product use, recycling, and ultimately, end-of-life treatment.

Dataset (LCI or LCIA dataset)
A dataset containing life cycle information of a specified product or other reference (e.g. site, process), covering descriptive metadata and quantitative life cycle inventory and/or life cycle impact assessment data, respectively.

End-of-life
End-of-life means the end of a product's life cycle. Traditionally it includes waste collection and waste treatment, e.g. re-use, recycling, incineration, landfill, etc.

Functional unit
Quantified performance of a product system for use as a reference unit.

GHG
Greenhouse gases. These are gases that contribute to global warming, e.g. carbon dioxide (CO_2), methane (CH4), nitrous oxide (N2O), as well as freons/CFCs. Greenhouse gases are often quantified as a mass unit of CO_2e, where "e" is short for equivalents.

Life cycle
Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal.

Life Cycle Assessment (LCA)
Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life.

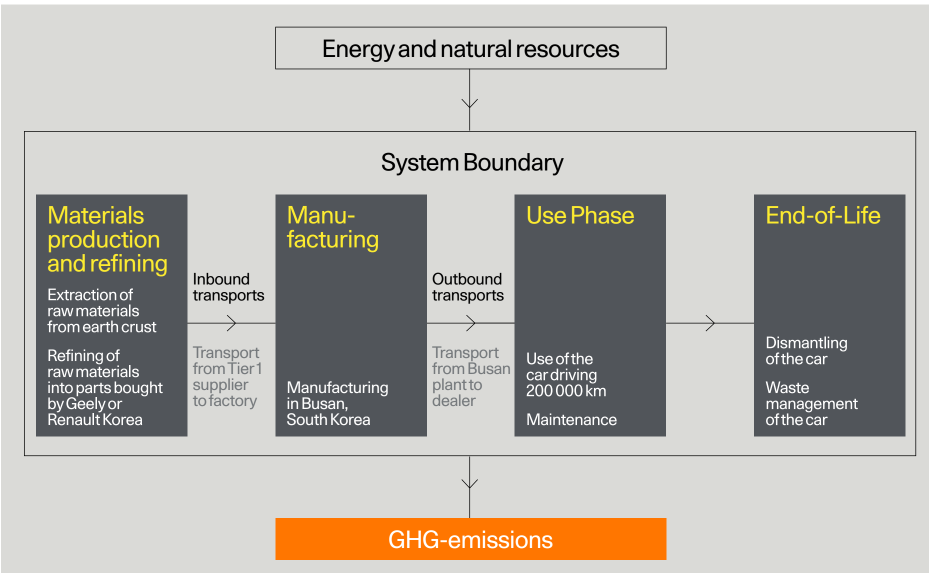
DM / RM
Dual motor / Rear motor

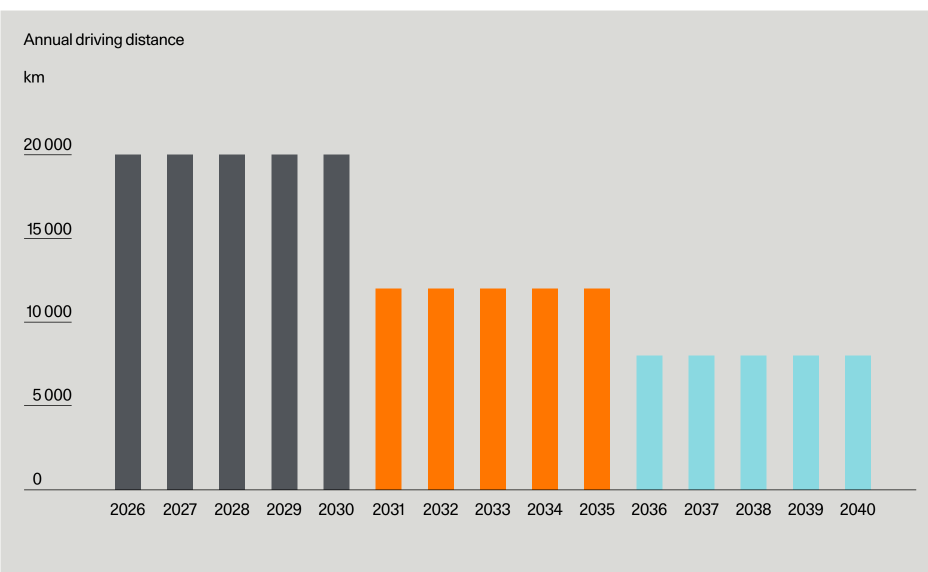
MY
Model year (e.g., MY27 equals model year 2027)

Raw material
Primary or secondary material that is used to produce a product.

tCO_2e
Metric tonne carbon dioxide equivalents.

WLTP
Worldwide Harmonised Light Vehicle Test Procedure, used for certification of vehicles in the EU





← Figure 2

Assumed driving distances in kilometers per year during the lifetime of the vehicle.

← Figure 3

Assumed driving distances in kilometers per year during the lifetime of the vehicle.

Changes in methodology and data since previous Polestar 4 LCA

The previously published Polestar 4 LCA report describes and motivates the way of working to obtain data, data sources, LCA databases and software, relation to standards, system boundaries, allocation methods, assumptions, and limitations. The original report also describes material categories, manufacturing methods, logistics, use phase, and end-of-life treatment. Polestar aims to make continuous improvements to the LCA methodology. Methodological changes can lead to either a higher or a lower carbon footprint of the vehicle.

This chapter only describes the changes made in either methodology or data, from the previous Polestar 4 LCA. All other methodology is the same as in the previous Polestar 4 LCAs and is described in Polestar 4 LCA report. The updated use phase methodology provide a more accurate estimation of the carbon footprint and increases the overall cradle-to-grave comparability across Polestars four car line-up (see Polestar 2, Polestar 3 & Polestar 5 LCAs).

Updates to system boundary

Since this report focus on the Polestar 4 coupé produced in Busan, South Korea the geographical system boundary has changed. Figure 2 describe the updated system boundary.

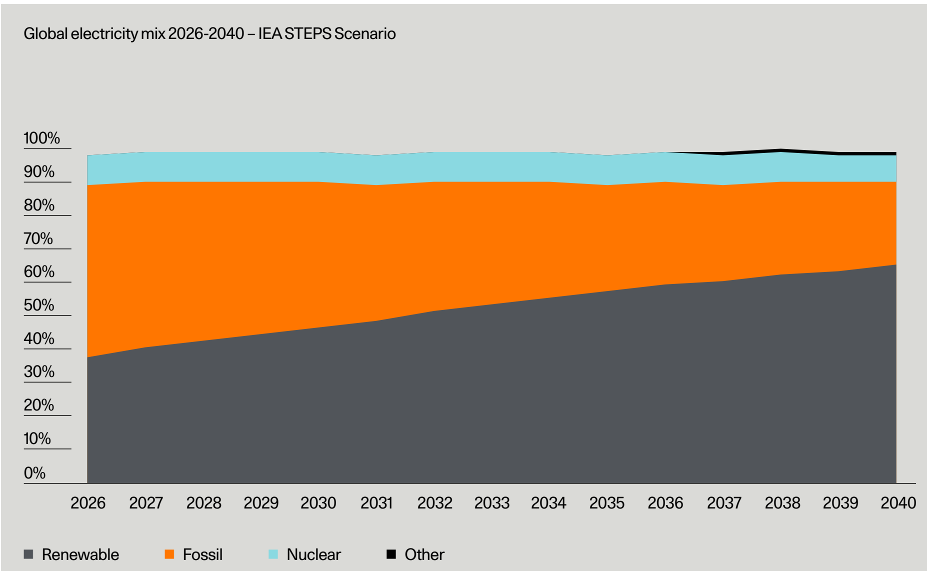
Updated use phase assumptions

The previous use phase assumption can be found in the previous report, section 2.10. To be able to calculate the emissions in the use phase of the vehicle, the distance driven is needed together with the energy use, as well as emissions from electricity generation. The vehicle lifetime driving distance for Polestar vehicles has been set to 200 000 km, and energy use of the vehicle corresponds to driving according to the WLTP driving cycle, according to the lower consumption figures in Table 1. WLTP does not take all driving conditions into account, for example WLTP assumes a driving condition where heating or cooling is not necessary and no use of infotainment in use.

This could, especially for certain markets, lead to an underestimated energy use figure. The analysis assumes that 50% of a vehicle's total lifetime mileage is covered in the initial five years, equivalent to 20 000 kilometers per year, while 30% is driven in the subsequent five years, amounting to 12 000 kilometers annually. During the last five years of the vehicle's life, it is assumed that the yearly distance driven is 8 000 km, illustrated in Figure 3.

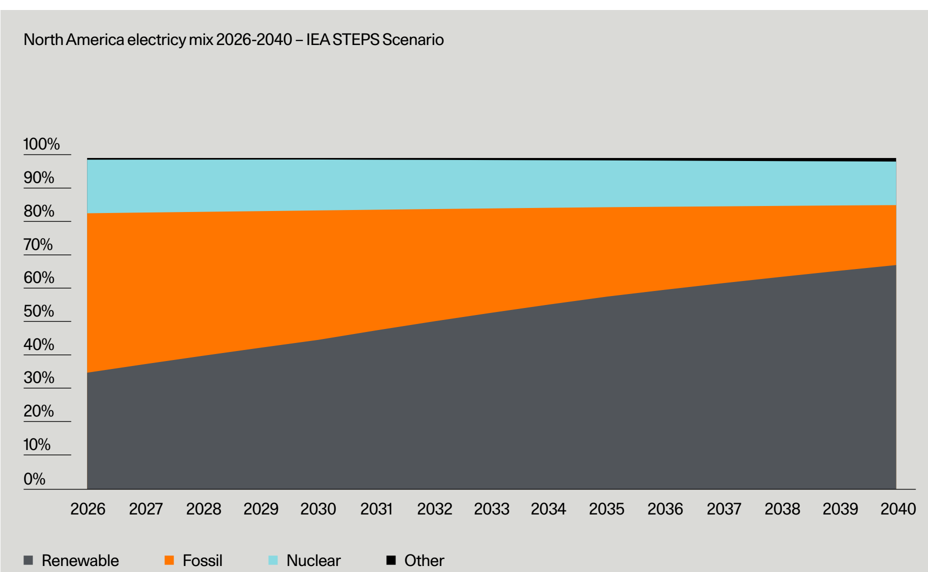
Electricity generation is modelled according to three cases: global and North American grid mix and a specific source of electricity, wind power. The previous LCA study of Polestar 4 did not consider a North American grid mix, the present study does since the vehicles produced in South Korea are primarily intended for the North American market. Current and future global and North American electricity generation mixes are based on the World Energy Outlook 2024 Extended Dataset[3] from IEA between the years 2026-2040. The previous LCA study utilized data from the World Energy Outlook 2022 Extended Dataset which predicted slightly lower shares of renewables in the grid mixes compared to the 2024 dataset. IEA uses the Global Energy and Climate (GEC) Model to explore possible future energy related scenarios based on different assumptions. For this study, STEPS (Stated Policies Scenario) has been used to determine the electricity generation mixes used to charge the vehicles in the use phase. STEPS reflects current policy settings based on a sector-by-sector and country-by-country assessment of the specific policies that are in place, as well as those that have been announced by governments around the world.

3 World Energy Outlook 2024 Extended Dataset - IEA



← Figure 4

Predicted share of energy production sectors in the Stated Policies Scenario STEPS for global electricity mix.



← Figure 5

Predicted share of energy production sectors in the Stated Policies Scenario STEPS for North American electricity mix.

Figure 4 and Figure 5 visually represent the development of electricity sources. It is evident that the generation of electricity from fossil sources is expected to diminish, gradually being replaced by renewable sources based on the IEA STEPS data.

Amounts of electricity from different energy sources have in this study been paired with appropriate LCI datasets from Sphera professional database (see Appendix 1) to determine the total climate impacts from different electricity generation mixes, both direct (at the site of electricity generation) and upstream. On average, the emissions throughout the entire use phase amount to 0.34 kg CO_2e/kWh for the global electricity mix scenario and 0.22 kg CO_2e/kWh for the North American electricity mix scenario.

Considering the anticipated changes in electricity generation—specifically, the reduction in fossil fuel-based electricity and the concurrent increase in renewable electricity forecasted from 2026, it is expected that yearly emissions from electric vehicle usage will decline. The distances driven, described in Figure 2, are multiplied by the emission factors corresponding to each year, reflecting the changes in global and North American electricity mix.

Material production and refining updates

Large parts of the supply chain of raw materials to vehicle parts to Polestar 4 vehicles produced in Busan, Korea are assumed to still originate from China. Thereby, most LCI datasets remain unchanged from the previous Polestar 4 LCA study.

Aluminium production and refining

As in the previous Polestar 4 LCA, all aluminium is assumed to be produced in China, which is based on an expert judgement by Polestar logistics specialists. Even though the vehicle is produced in Korea, this is a reasonable assumption since Korea has a limited production capacity of aluminium. The aluminium used in some identified parts in the vehicles comes from smelters utilising renewable electricity for smelting, specifically hydropower. Additionally, some parts also containing recycled aluminium have been identified. The recycled content includes both post-consumer material and post-industrial material in accordance with the definition of recycled content in ISO 14021 "Environmental Labels and Declarations". The share of aluminium produced using renewable electricity has been modelled with a fossil emission factor representing hydropower aluminium smelting in China. The share of aluminium produced using recycled aluminium has been modelled using a partly aggregated dataset (open energy inputs). The Sphera dataset "RNA: Secondary aluminium ingot (95% recycled content)" is used as the raw material for the recycled content modelling. Compared to the first model year of Polestar 4, the amount of recycled aluminium has increased, this increase in recycled aluminium has replaced some of the aluminium previously classified as aluminium from smelters using renewable electricity.

Table 1 →

Aluminium from different sources by share of total aluminium weight, excluding battery pack aluminium.

Polestar 4 coupé MY27	Dual motor	Rear motor
Aluminium from smelters using renewable electricity	37%	40%
Recycled aluminium	24%	18%
Standard Chinese aluminium	40%	42%

Steel production and refining

The raw material dataset used for the material category "unalloyed steel" has an output of rolled and galvanised steel. A processing process is then added to all steel. Which processing that is chosen depends on whether the steel is stamped in the factory or not. Hence, the steel categorised as unalloyed steel in the material library is divided into two sub-groups depending on the manufacturing process following the rolling and galvanising of the steel:

1. The steel that is processed and stamped in the manufacturing plant in Busan. The material utilisation degree is confidential.
2. The rest of the steel, which is distributed in various components of the car. The material utilisation degree is according to the chosen database dataset, i.e. literature value.

The same raw material datasets as in the original Polestar 4 carbon footprint study are used in this study as these datasets are primarily based on Asian regional averages. Thereby these datasets are still valid for the steel and iron raw material originating from South Korea.

The scrap produced in the processes of making the steel parts for the car, independent of processes, is included in the carbon footprint, and the same cut-off as for aluminium is applied. The ecoinvent dataset "RoW: market for scrap steel" is used top model the recycled content of steel. Only post-industrial and post-consumer scrap is modelled as recycled content.

Battery pack carbon footprint updates

In the first Polestar 4 LCA report the battery pack was wrongfully referred to as "battery modules". The term "battery modules" is often referred to as a subcomponent of the complete "battery pack", thereby the battery pack is a larger component which holds battery cells, battery modules and the carrier and protective structure which is the battery pack. This is an important distinction since Polestar uses separate battery carbon footprint studies, made by the battery supplier in collaboration with Polestar, to account for the carbon footprint of vehicle batteries. In the case of Polestar 4, these LCAs account for the complete battery pack.

The supplier LCA was updated during 2024 and were included in the carbon footprint calculation of the Polestar 4 variants of model year 2026. The same battery pack is present in Polestar 4 model year 2027 produced in Busan, Korea. The major change in the updated supplier LCA is improved data quality concerning the aluminium in the battery. Increased recycled content of aluminium in the battery pack and battery module structure as well as aluminium from smelters utilizing renewable electricity in the battery pack structure has been identified, which has led to a reduction of the battery pack carbon footprint of 2.1 tCO_2e. The recycled content includes both post-consumer material and post-industrial material in accordance with the definition of recycled content in ISO 14021 “Environmental Labels and Declarations”. Polestar aims to increase the recycled content of post-consumer materials in the future, as this material is more in-line with principles of circular economy.

Logistics data updates

The previous LCA study of Polestar 4 assessed vehicles produced in Hangzhou Bay, China, thereby there have been changes for the vehicles produced in Busan, South Korea as there have been changes in the supply chain. These changes in transport patterns influence both the inbound and outbound logistics GHG emissions.

Volvo Cars Corporation handles outbound logistics, hence data on GHG emissions has been provided by Volvo Cars Corporation. Data has been provided in the form of estimated GHG emissions per vehicle transported from Busan, South Korea to specific markets, this has been combined with predicted sales figures of Polestar 4 coupé per market during the full year 2026 to calculate the average GHG emissions per transported Polestar 4 coupé vehicle. Emission factors from the Network for Transport Measures (NTM) have been used as a basis for calculations. The methodology to calculate emissions is developed in line with the ISO Standard 14083 “Quantification and reporting of greenhouse gas emissions arising from transport chain operations”.

For the inbound logistics of Polestar 4 coupé, estimations on the average GHG emissions per vehicle produced in the Busan plant has been used. These have been calculated by Geely and reviewed by Polestar. Estimations are being used since actuals are not yet available for logistics to and from the Busan plant. In future iterations of this report, actuals will be incorporated.

Maintenance

The previous Polestar 4 LCA did not account for maintenance of the vehicle during the use of the product. This present study incorporates a maintenance scenario. For the 15 years lifespan of the vehicle, it is assumed that some vehicle parts are required to be replaced. The data for maintenance of the vehicle is based on data for maintenance of a typical Polestar vehicle and not specific to the Polestar 4 coupé. The maintenance list is presented in Table 2. It is assumed that the number of items represents groups of items, e.g. one wiper blade represents the entire set of the two wiper blades. The vehicle tyres are designed to last 40 000 km. It is assumed that the tyres are not changed just before EoL, therefore 16 tyres need to be changed during the vehicle lifetime. For each part the corresponding item is found in the BoM and specific material data is used together with the corresponding dataset, in the same way as material production and refining. However, only standard Chinese aluminium is used for the parts which contain aluminium, meaning that no share of recycled aluminium or aluminium from smelters using renewable electricity is assumed to be part of any replacement components.

Table 2 →

Maintenance parts changed during the lifetime of the vehicle of 15 years and 200 000 km driven.

Vehicle part	Unit	#
Wiper blades	number of sets	39
Tyres	number of items	16
Brake fluid	litres	2
Brake pads	number of items	24
Brake discs	number of items	4
Battery, 12 V	number of items	3
Steering joint	number of items	1
Link arm	number of items	2
Condenser	number of items	1
AC fluid	number of AC container volume	2
Cabin filter	number of items	12

Manufacturing data updates

The Polestar 4 assessed in this report is produced in Renault Koreas plant in Busan, a plant which is owned by both Renault Group and Geely Auto[4]. To model the carbon footprint of the manufacturing, actual electricity and natural gas consumption per manufactured vehicle for the full year of 2024 has been used. During 2024 no Polestar vehicles have been produced in the plant, however the incorporation of Polestar production is not estimated to contribute to an increase in electricity consumption per produced vehicle. For all Polestar 4 vehicles produced from 2026, 100% renewable electricity is expected to be used from the use of on-site solar. This is approximately three months after the start of production. However, since the vehicle will be produced for several years, the estimated effect of this has been included in this vehicle study. The carbon footprint from electricity has been modelled using the Sphera dataset "KR: Electricity from photovoltaic" and the natural gas usage has been modelled using "CN: Thermal energy from natural gas" due to the unavailability of South Korean data on thermal energy from natural gas in Sphera.

4 Busan Plant (RKM) - Renault Group

The products

The study assesses both Polestar 4 model year 2027 variants: the Dual motor, and the Rear motor. Both variants have been developed in collaboration with Zhejiang Geely Holding Group and are produced in Hangzhou Bay, China and Busan Korea. This report only assesses the Polestar 4 being produced in Busan. The variants are produced with different specifications. This study encompasses the specifications expected to have the largest sales volumes. Descriptions of the studied vehicles are presented in Table 3 & 4, and the material composition of both variants is available in Appendix 5. Since the previous report, the energy efficiency of the Rear motor variant during driving has been reduced from 18.1 to 17.8 kWh/100 km.

Table 3 →

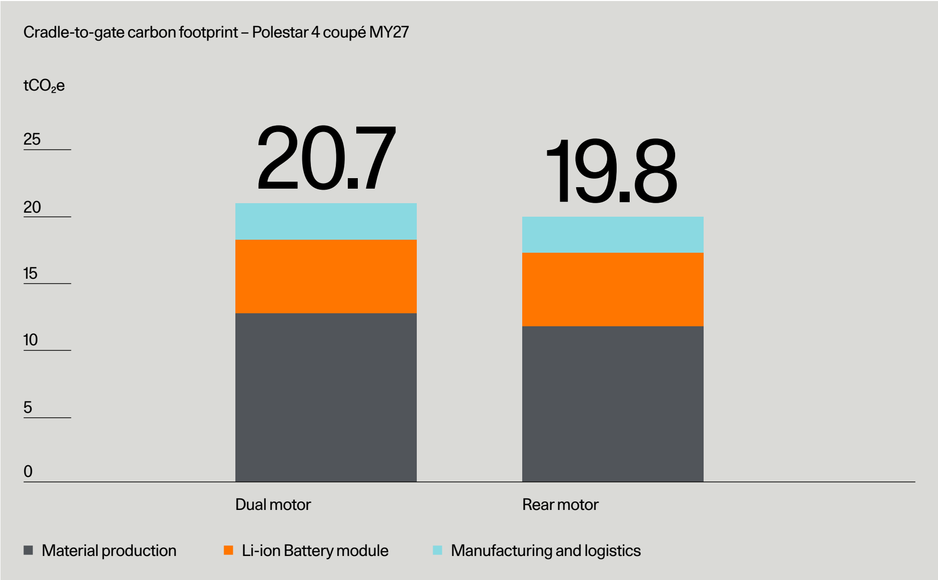
Studied vehicles and corresponding weights in kg.

Polestar 4 coupé MY27	Dual motor	Rear motor
Total weight (kg)	2,351	2,229
Li-ion battery pack weight (kg)	581	581

Table 4 →

Descriptions of the Polestar 4 coupé MY27 variants.

Polestar 4 coupé MY27	Dual motor	Rear motor
Battery capacity	100 kWh	100 kWh
Output	400 kW 544 hp 686 Nm	200 kW 272 hp 343 Nm
Energy consumption (WLTP)	19.0 kWh/100 km	17.8 kWh/100 km
Preliminary range (WLTP)	590 km	620 km



← Figure 6

Cradle-to-gate carbon footprint for the Polestar 4 coupé MY27 variants, including Materials production, Li-ion battery pack and Manufacturing and Logistics. Results are shown in tCO_2e per functional unit.

Figure 6 and Table 5 present the cradle-to-gate carbon footprint of both variants of the Polestar 4 Coupé. The Rear motor variant has the lower cradle-to-gate carbon footprint at 19.8 tCO_2e compared to the Dual motor variant at 20.7 tCO_2e. Figure 7-8 and Table 6-7 present the cradle-to-grave carbon footprint of the two Polestar 4 coupé variants, as well as the carbon footprint distributed into life cycle phases. Depending on variant and electricity mix scenario, the life cycle carbon footprint varies between 23.3 and 36.8 tCO_2e. The largest variability in the results is due to the choice of electricity mix in the use phase. In the case of global electricity mix, the use phase accounts for almost 40% of the life cycle carbon footprint, while in the case of wind power, the use phase accounts for only 2%. This displays the importance of choice of electricity mix scenario when studying the life cycle carbon footprint of an electric vehicle as well as the influence drivers of EVs can have over their usage carbon footprint by e.g., choosing renewable electricity contracts for home charging.

The single motor variant has a lower carbon footprint than the dual motor variant. This is due to that it 1) has one less motor and thereby requires less materials, resulting in less impact from material extraction and manufacturing. The lower material mass also leads to 2) a lower total vehicle weight, that increases energy efficiency and lowers the use phase carbon footprint.

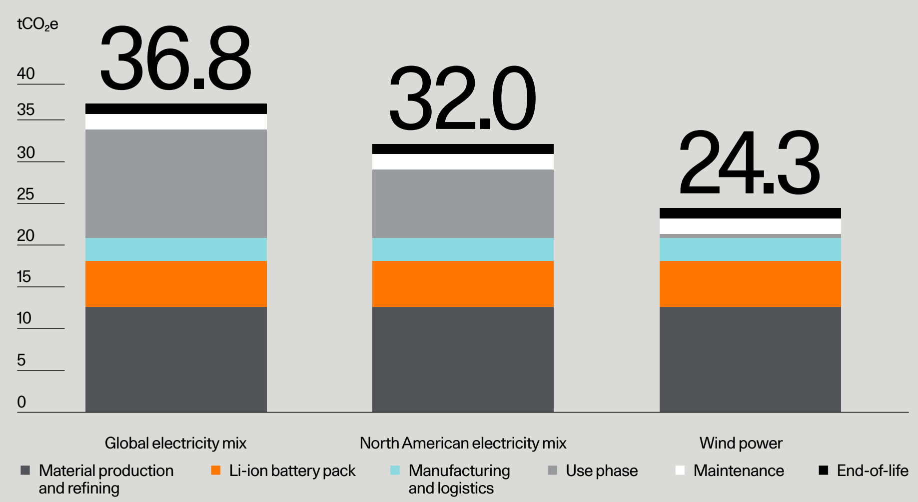
Figure 9-10 in Appendix 3 presents a breakdown of material contribution to the carbon footprint of the two Polestar 4 coupé variants. Aluminum represents the highest share of the carbon footprint at 36-37% while steel and iron represent 31-32%.

Table 5 →

Cradle-to-gate carbon footprint for the Polestar 4 coupé MY27 variants, including Materials production, Li-ion battery pack, Manufacturing and Logistics. Results are shown in tCO_2e. Note: Totals may not sum due to rounding.

Polestar 4 coupé MY27	Dual motor	Rear motor
Material production	12.6	11.6
Li-ion battery pack	5.5	5.5
Manufacturing and logistics	2.7	2.7
Total cradle-to-gate	20.7	19.8

Cradle-to-grave carbon footprint – Polestar 4 coupé MY27 Dual motor



Cradle-to-grave carbon footprint – Polestar 4 coupé MY27 Rear motor

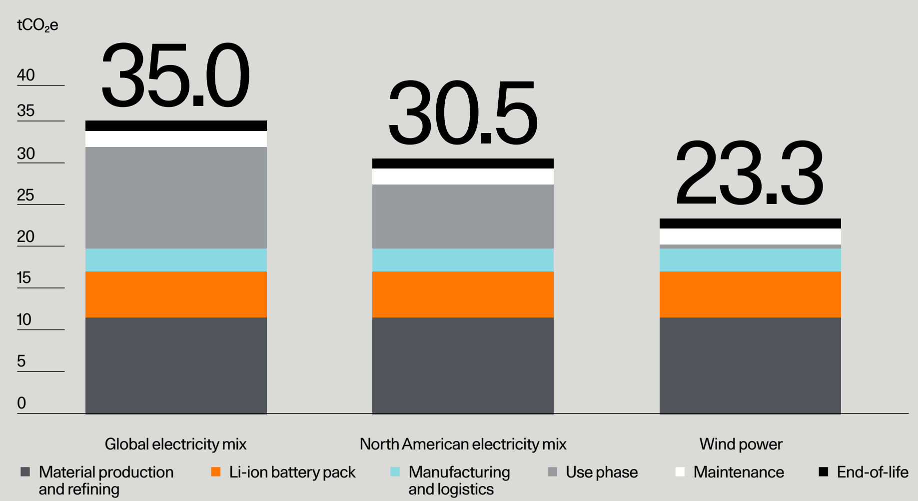


Table 6 →

Cradle-to-grave carbon footprint for Polestar 4 coupé Dual motor, with different electricity mixes used in the use phase. Results are shown in tCO_2e per functional unit. Note: Totals may not sum due to rounding.

Polestar 4 coupé Dual motor MY27	Global electricity mix	American electricity mix	Wind power
Material production	12.6	12.6	12.6
Li-on battery pack	5.5	5.5	5.5
Manufacturing and logistics	2.7	2.7	2.7
Use phase	13.0	8.2	0.5
Maintenance	1.9	1.9	1.9
End-of-life	1.2	1.2	1.2
Cradle-to-grave	36.8	32.0	24.3

← Figure 7

Cradle-to-grave carbon footprint for Polestar 4 coupé Dual motor, with different electricity mixes in the use phase. Results are shown in tCO_2e per functional unit (200,000 km lifetime range).

Table 7 →

Cradle-to-grave carbon footprint for Polestar 4 coupé Rear motor, with different electricity mixes used in the use phase. Results are shown in tCO_2e per functional unit. Note: Totals may not sum due to rounding.

Polestar 4 coupé Rear motor MY27	Global electricity mix	American electricity mix	Wind power
Material production	11.6	11.6	11.6
Li-on battery pack	5.5	5.5	5.5
Manufacturing and logistics	2.7	2.7	2.7
Use phase	12.2	7.7	0.5
Maintenance	1.9	1.9	1.9
End-of-life	1.2	1.2	1.2
Cradle-to-grave	35.0	30.5	23.3

← Figure 8

Cradle-to-grave carbon footprint for Polestar 4 coupé Rear motor, with different electricity mixes in the use phase. Results are shown in tCO_2e per functional unit (200,000 km lifetime range).

3

LCA is continuously used for assessing the carbon footprint of Polestar's cars. Major work has been put into building the methodology, and it is continuously being developed. One such development in this study is incorporating Polestars actual carbon footprint from outbound logistics into this study. Another is the incorporation of the latest data from the International Energy Agency STEPS scenario for electricity in the use phase as well as incorporating maintenance of the vehicle.

In this study, the carbon footprints of the two Polestar 4 Coupé variants Dual motor and Rear motor MY27 were calculated, including the life cycle phases materials production and refining, manufacturing, use phase, maintenance and end-of-life.

According to the methodology described in this report and in the previous Polestar 4 LCA report, the cradle-to-grave carbon footprints are 24.3-36.8 tCO_2e for Dual motor, 23.3-35.0 tCO_2e for Rear motor. The range in results is caused by differences in electricity mix scenarios, where the highest value reflects that a global electricity mix is used in the vehicle use phase while the lowest value reflects that wind power is used.

Polestar will continue to improve its LCA methodology to create an even more robust methodology. To follow up more closely on how different sourcing decisions and material choices impact the results, Polestar also aims at increasing the supplier-specific data used in the LCAs.

A1

In the LCA a large number of generic datasets from databases are used. In this appendix the datasets used are listed in Table 9 and 10. Appendix 1 only presents changes to the datasets used from the previous LCA study on Polestar 4. The original Polestar 4 LCA contains all other datasets used.

← Table 8

Chosen datasets for electricity sources in use phase.

Electricity	Location	Name of LCI dataset	Year	Type	Source
Electricity from solar power	RER	Electricity from photovoltaic Sphera	2019	agg	Sphera professional database
Electricity from wind power	RER	Electricity from wind power Sphera	2019	agg	Sphera professional database
Electricity from geothermal	RER	Electricity from geothermal	2019	agg	Sphera professional database
Electricity from hydro power	RER	Electricity from hydro power Sphera	2019	agg	Sphera professional database
Electricity from bioenergy	RER	Electricity from biomass (solid)	2019	agg	Sphera professional database
Electricity from nuclear power	RER	Electricity from nuclear	2019	agg	Sphera professional database
Electricity from unabated coal	RER	Electricity from hard coal	2019	agg	Sphera professional database
Electricity from unabated gas	RER	Electricity from natural gas	2019	agg	Sphera professional database
Electricity from oil	RER	Electricity from heavy fuel oil (HFO)	2019	agg	Sphera professional database

← Table 9

Chosen datasets for energy sources in manufacturing for Busan plant.

Electricity	Location	Name of LCI dataset	Year	Type	Source
Electricity from solar power	KR	Electricity from photovoltaic	2019	agg	Sphera professional database
Thermal energy from natural gas	CN	Thermal energy from natural gas	2020	agg	Sphera professional database

A2

Appendix 2 – Complete list of Material Library material categories

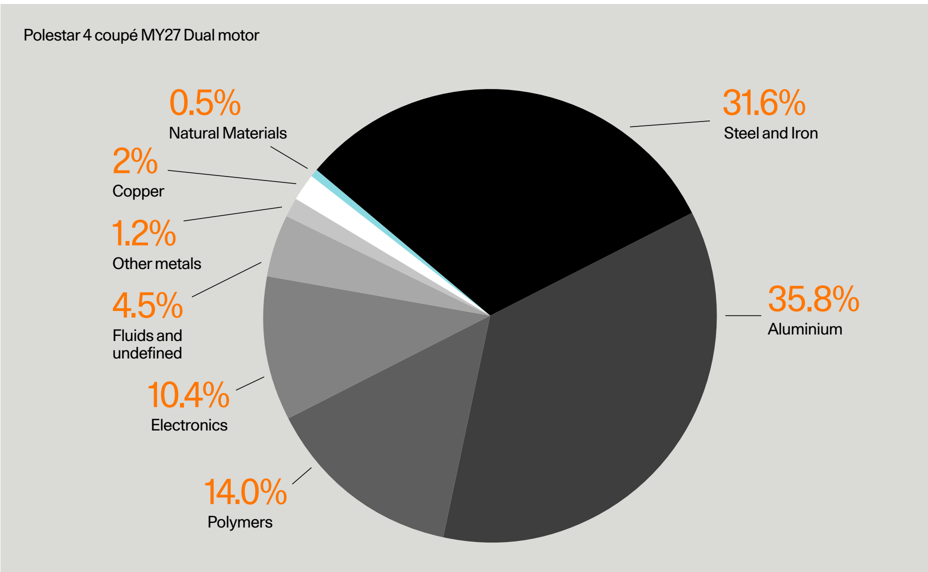
Table 10 →

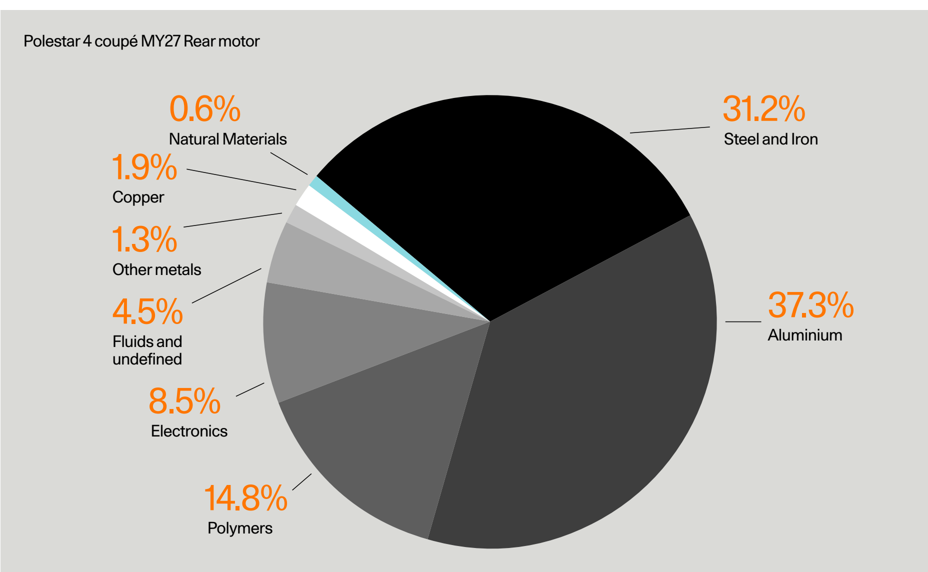
Material library material categories.

Material name	Material group
ABS (filled)	Polymers
ABS (unfilled)	Polymers
Aluminium	Aluminium
Aramid	Polymers
Brake fluid	Fluids & Undefined
Carbon Fibre	Fluids & Undefined
Cast iron	Steel & Iron
Catalytic coating	Fluids & Undefined
Cathode	Fluids & Undefined
Ceramic	Fluids & Undefined
Copper	Copper
Copper alloys	Copper
Cotton	Natural Materials
Damper	Fluids & Undefined
E/P (filled)	Polymers
E/P (unfilled)	Polymers
Elastomer	Polymers
Electronics	Electronics
EPDM	Polymers
EVAC (filled)	Polymers
EVAC (unfilled)	Polymers
Ferrite magnet	Fluids & Undefined
Float glass	Fluids & Undefined
Friction	Fluids & Undefined
GF-Fibre	Fluids & Undefined
Glycol	Fluids & Undefined
Lead (12V battery)	Fluids & Undefined
Leather	Natural Materials
Lubricants	Fluids & Undefined

Material name	Material group
Magnesium	Other Metals
Mineral	Natural Materials
NdFeB	Other Metals
Natural rubber	Natural Materials
PA (filled)	Polymers
PA (unfilled)	Polymers
PBT (filled)	Polymers
PBT (unfilled)	Polymers
PC (filled)	Polymers
PC (unfilled)	Polymers
PC+ABS (filled)	Polymers
PC+ABS (unfilled)	Polymers
PE (filled)	Polymers
PE (unfilled)	Polymers
PET (filled)	Polymers
PET (unfilled)	Polymers
PMMA (filled)	Polymers
PMMA (unfilled)	Polymers
Polyester	Polymers
Polyurethane	Polymers
POM (filled)	Polymers
POM (unfilled)	Polymers
PP (filled)	Polymers
PP (unfilled)	Polymers
PVB (unfilled)	Polymers
PVC (filled)	Polymers
PVC (unfilled)	Polymers
R-1234yf	Fluids & Undefined
Recycled Aluminium	Aluminium

Material name	Material group
Recycled Polymer	Polymers
SBR	Polymers
Silicone rubber	Polymers
Steel, Sintered	Steel & Iron
Steel, Stainless, Austenitic	Steel & Iron
Steel, Stainless, Ferritic	Steel & Iron
Steel, Unalloyed	Steel & Iron
Sulphuric acid	Fluids & Undefined
Talc	Fluids & Undefined
Thermoplastic elastomers	Polymers
Thermoplastics	Polymers
Undefined	Fluids & Undefined
Washer fluid	Fluids & Undefined
Wood (paper, cellulose, etc.)	Natural Materials
Zinc	Other Metals





← Figure 9

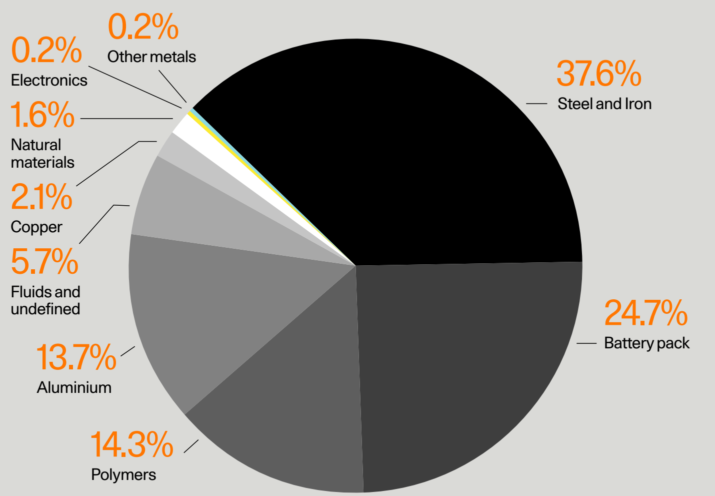
Contribution from different material groups, excluding battery pack, to the carbon footprint from materials production and refining for Polestar 4 coupé Dual motor.

Figure 9-10 presents how the different material groups, excluding the battery pack, contribute to the carbon footprint from materials production and refining for the two Polestar 4 coupé variants.

← Figure 10

Contribution from different material groups, excluding battery pack, to the carbon footprint from materials production and refining for Polestar 4 coupé Rear motor.

Polestar 4 coupé MY27 Dual motor

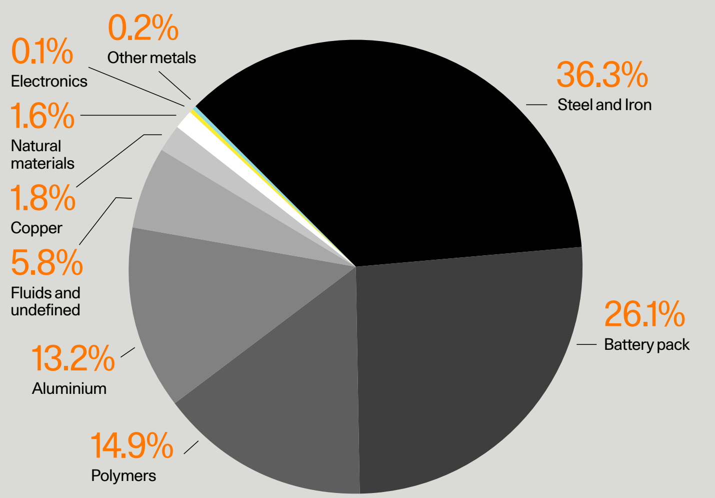


← Figure 11

Weight shares per material category, Polestar 4 coupé Dual motor.

Figure 11-12 presents the material composition of the Polestar 4 coupé Dual motor and Rear motor, based on material mass.

Polestar 4 coupé MY27 Rear motor



← Figure 12

Weight shares per material category, Polestar 4 coupé Rear motor.