

Verification Statement

AB Volvo's 2019, 2020, and 2021 GHG emissions inventory, and 2021 GHG emissions targets, energy savings, energy and waste data

Issued to: AB Volvo, 405 08 Göteborg, Sweden

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Guidehouse has independently verified, with a limited level of assurance, AB Volvo's:

1. Scope 1 (direct), Scope 2 (indirect), and Scope 3 (indirect) Lifetime Use of Sold Products greenhouse gas (GHG) emissions inventory of AB Volvo in 2019, 2020, and 2021.
2. Progress on its GHG targets, including absolute GHG targets for Scope 1 and 2, sold construction equipment and sold Volvo Penta engines, and GHG intensity targets for sold heavy duty trucks, sold buses and production logistics in 2021.
3. Progress on its target on implemented energy saving measures in 2021.
4. Total energy consumption and total waste generation in 2021.

The GHG Scope 1, 2 and 3 inventory results are verified according to ISO 14064-3¹, meeting the requirements provided in the GHG Protocol Corporate Standard², the ISO 14064-1³ standard, the GHG Protocol Scope 2 Guidance⁴, and the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard⁵. Progress on AB Volvo's targets, energy consumption and waste generation data are verified following the general principles of completeness, transparency, consistency, and accuracy.

The 2019, 2020, and 2021 AB Volvo Scope 1, 2, and 3 Lifetime Use of Sold Products GHG emissions inventory represents a total amount of:

Parameter	2019	2020	2021
Scope 1 GHG emissions	0.245 Mton CO ₂ eq.	0.205 Mton CO ₂ eq.	0.245 Mton CO ₂ eq.
Scope 2 GHG emissions			
- Market based	0.124 Mton CO ₂ eq.	0.121 Mton CO ₂ eq.	0.114 Mton CO ₂ eq.
- Location Based	0.215 Mton CO ₂ eq.	0.193 Mton CO ₂ eq.	0.204 Mton CO ₂ eq.
Scope 3 Use of Sold Products lifetime GHG emissions			
- Trucks	219 Mton CO ₂ eq.	143 Mton CO ₂ eq.	180 Mton CO ₂ eq.
- Buses	14 Mton CO ₂ eq.	8 Mton CO ₂ eq.	5 Mton CO ₂ eq.
- VCE	70 Mton CO ₂ eq.	74 Mton CO ₂ eq.	82 Mton CO ₂ eq.
- Penta	20 Mton CO ₂ eq.	16 Mton CO ₂ eq.	19 Mton CO ₂ eq.
Biogenic CO ₂ emissions from direct combustion	0.006 Mton CO ₂ eq.	0.005 Mton CO ₂ eq.	0.010 Mton CO ₂ eq.

¹ International standard ISO 14064-3, Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions". International Organization for Standardization (ISO). March 2006, Geneva, Switzerland. The standard is available at www.iso.org.

² The GHG Protocol, A Corporate Accounting and Reporting Standard, revised Edition. World Business Counsel for Sustainable Development (WBCSD) and World Resource Institute (WRI), March 2004. ISBN 1-56973-568-9. The protocol is available at www.ghgprotocol.org.

³ International standard ISO 14064-1, Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals". International Organization for Standardization (ISO). March 2006, Geneva, Switzerland. The standard is available at www.iso.org.

⁴ GHG Protocol Scope 2 Guidance, An amendment to the GHG Protocol Corporate Standard, World Resource Institute, 2015. ISBN: 978-1-56973-850-4. The protocol is available at www.ghgprotocol.org.

⁵ GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard. World Business Counsel for Sustainable Development (WBCSD) and World Resource Institute (WRI), September 2011. ISBN 978-1-56973-772-9. The protocol is available at www.ghgprotocol.org.

The 2021 AB Volvo GHG targets progress, energy efficiency measures savings, energy consumption, and waste generation results are as follows:

Parameter	2021 results
Scope 1 and 2 absolute GHG emissions	3% decrease in total emissions from 2019-2021
Scope 3 sold construction equipment absolute GHG emissions	17% increase in total emissions from 2019-2021
Scope 3 sold Volvo Penta absolute GHG emissions	5% decrease in total emissions from 2019-2021
Scope 3 sold heavy duty trucks GHG intensity	2% decrease in emissions per vehicle kilometre from 2019-2021
Scope 3 sold buses GHG intensity	6.5% increase in emissions per vehicle kilometre from 2019-2021
Production logistics GHG intensity	5% increase in emissions per produced unit from 2018-2021
Total energy savings from efficiency measures at production sites	15 GWh
Total energy consumption	2,423 GWh
Total waste generation	332,075 Metric tons

Verification Objectives

- To assess completeness of the GHG emissions inventory, GHG targets, energy efficiency savings, energy consumption, and waste generation data reports (i.e., environmental data);
- To determine the extent of conformity of AB Volvo's GHG calculation methodology and emissions report with the GHG Protocol Corporate Standard, the GHG Protocol Scope 2 Guidance, the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, and ISO 14064-1;
- To evaluate the data information systems and its controls/management used for determining AB Volvo's environmental data;
- To assess whether the AB Volvo's environmental data assertion is without material discrepancy.

Period covered

Parameter	Period covered
Scope 1, 2, and 3 Use of Sold Products GHG inventory; absolute GHG targets for Scope 1 and 2, sold construction equipment and sold Volvo Penta engines; and GHG intensity targets for sold trucks and buses	1 January 2019 – 31 December 2021
Production logistics GHG intensity targets	1 January 2018 – 31 December 2021
Energy efficiency savings, energy consumption, and waste generation	1 January 2021 – 31 December 2021

Verification standard

ISO 14064-3 (for GHG emissions inventory only).

Level of assurance

The level of assurance agreed is limited.

Scope Verification

The verification covered AB Volvo's environmental data, including direct (Scope 1) and indirect (Scope 2 and Scope 3 Use of Sold Products) GHG emissions; absolute GHG targets for Scope 1 and 2, sold

construction equipment and sold Volvo Penta engines; GHG intensity targets for sold trucks, sold buses and production logistics; energy efficiency savings; energy consumption and waste generation from AB Volvo's Group's global operations. For GHGs, all relevant GHG emissions as specified within the applicable standards of the GHG Protocol and ISO (CO₂, N₂O, CH₄, SF₆, PFC, HFC and NF₃) are included in the inventory and verification.

In line with previous years, AB Volvo has consistently and correctly applied the “operational control” consolidation approach to determine the organisational boundaries. Within the organisational boundaries, all production locations including its logistics sites (warehouses and distribution hubs), dealers, company cars and service vans that are owned or operated by AB Volvo are covered. Excluded are smaller buildings and sites mainly leased with office or small dealerships.

Description Verification Process

The verification of AB Volvo's environmental data as described above was performed in the period between September 2021 and February 2022. As a first step, several online meetings were organised in which the scope of the verification, the GHG calculation methodology, and the data collection process were discussed and subsequently reviewed by Guidehouse. On 11-12 October 2021, Guidehouse did a “historical data audit” including the revision of the updates to 2019 and 2020 Scope 1 & 2 GHG emission results due to scope extensions (i.e., inclusion of smaller sites, dealers, company cars and service vans), as well as 2019, 2020, and (available) 2021 Scope 3 Use of Sold Products GHG emissions data.

On 7-8 December 2021, Guidehouse did a pre-audit (referred to as “mid-year audit”) to prepare sites as well as all business units involved for the final audit beginning of February 2022. In these meetings, AB Volvo introduced Guidehouse to the status quo of e.g., 2021 energy consumption and waste generation values, energy savings measures implemented, preliminary sold trucks and buses and production logistics GHG intensity, etc., and Guidehouse reviewed and validated these. Additionally, before the mid-year audit, a first data set with Q1-Q3 2021 energy, waste, and Scope 1 and 2 GHG emissions data for the AB Volvo sites was exported from UL Pure and reviewed by Guidehouse. Big changes compared to the previous year as well as missing data points were already flagged and (where possible) subsequently checked and confirmed or altered by AB Volvo. A sample⁶ of eight sites was selected for a more detailed review during the mid-year audit, including the verification of the IT data collection, calculation system UL PURE, selected underlying data sources, and final calculation results.

Finally, on 1-3 February 2022, Guidehouse performed the final audit. Guidehouse reviewed the final 2019, 2020, and 2021 Scope 3 Use of Sold Products GHG emissions; final 2021 energy efficiency savings; and final 2021 progress on absolute GHG targets for Scope 1 and 2, sold construction equipment and sold Volvo Penta engines, and on GHG intensity targets for sold trucks, sold buses and production logistics. Additionally, before the final audit, Guidehouse exported the energy, waste, and Scope 1 and 2 GHG emissions data for each AB Volvo site for the entire year 2021. Guidehouse analysed and checked the data for plausibility and completeness. A second sample of five sites was selected for a more detailed review during the final audit, which included again the verification of the IT data collection, calculation system UL PURE, selected underlying data sources, and final calculation results. Normally, the audits are done on-site at AB Volvo in Gothenburg, but due to COVID, all the audits were performed virtually.

⁶ These sites were selected based on the following criteria: sites with significant total energy consumption and/or total waste generation, sites from different geographies, sites with data points that stood out in the comparison with previous year, and sites that have not been audited in earlier years.

During the verification, the roles and responsibilities between the verifier and the responsible party (AB Volvo) as described in ISO 14064-3 were taken into account.

Limitations of Assurance Statement

Guidehouse's responsibility is to carry out a limited assurance engagement on the proposed calculation methodology, dataset used and final calculation result, in order to provide conclusions on the conformity of the annual emissions data with the principles and requirements of the WBCSD/WRI GHG Protocol and ISO. Guidehouse does not accept or assume any responsibility for any other purpose or to any other person or organisation. Any reliance such third party may place on the information request is entirely at its own risk.

Conclusions

Guidehouse has independently verified, with a limited level of assurance the:

1. Scope 1 (direct), Scope 2 (indirect), and Scope 3 Lifetime Use of Sold Products (indirect) greenhouse gas (GHG) emissions inventory of AB Volvo in 2019, 2020, and 2021, according to ISO 14064-3⁷, meeting the requirements provided in the GHG Protocol Corporate Standard⁸, the ISO 14064-1⁹ standard, the GHG Protocol Scope 2 Guidance¹⁰, and the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard¹¹.
2. Progress on absolute GHG targets for Scope 1 and 2, sold construction equipment and sold Volvo Penta engines; GHG intensity targets for production logistics, sold heavy duty trucks and sold buses; reported savings from energy efficiency measures; total energy consumption and total waste generation of AB Volvo in 2021, performed following the general principles of completeness, transparency, consistency, and accuracy.

Based on the process and procedures conducted, we conclude that:

- There is no evidence that the reported 2019, 2020, and 2021 AB Volvo's environmental data (as described above) is not materially complete, transparent, consistent, accurate and reported in line with the requirements of the GHG Protocol, the ISO 14064-1 standard, or the general principles of completeness, transparency, consistency, and accuracy.
- No evidence was found that misstatements and/or data gaps have material effects on the level of reported GHG emissions, energy efficiency savings, energy consumption and waste generation.

Verified by:

Lead Assessor:



Caspar Noach
Associate Director
Utrecht, 09 February 2022

Technical reviewer:



Véronique Vera
Senior Consultant
London, 09 February 2022

⁷ International standard ISO 14064-3, Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions". International Organization for Standardization (ISO). March 2006, Geneva, Switzerland. The standard is available at www.iso.org.

⁸ The GHG Protocol, A Corporate Accounting and Reporting Standard, revised Edition. World Business Counsel for Sustainable Development (WBCSD) and World Resource Institute (WRI), March 2004. ISBN 1-56973-568-9. The protocol is available at www.ghgprotocol.org.

⁹ International standard ISO 14064-1, Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals". International Organization for Standardization (ISO). March 2006, Geneva, Switzerland. The standard is available at www.iso.org.

¹⁰ GHG Protocol Scope 2 Guidance, An amendment to the GHG Protocol Corporate Standard, World Resource Institute, 2015. ISBN: 978-1-56973-850-4. The protocol is available at www.ghgprotocol.org.

¹¹ GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard. World Business Counsel for Sustainable Development (WBCSD) and World Resource Institute (WRI), September 2011. ISBN 978-1-56973-772-9. The protocol is available at www.ghgprotocol.org.

About Guidehouse

Guidehouse is a leading global provider of consulting services to the public and commercial markets with broad capabilities in management, technology, and risk consulting. We help clients address their toughest challenges with a focus on markets and clients facing transformational changes, technology-driven innovation and significant regulatory pressure. Headquartered in Washington DC, the company has more than 12,000 professionals in more than 50 locations.

With over 700 consultants, our global Energy, Sustainability, and Infrastructure segment is the largest in the industry. We collaborate with and serve as trusted advisors to utilities and energy companies, large corporations, investors, NGOs, and the public sector to help them thrive in the rapidly changing energy, resources, and infrastructure environment. Our highly skilled professionals form exceptional teams to help our clients transform their businesses, manage complexity and change, accelerate operational performance, manage critical programs, manage risk, meet compliance requirements, and improve operations and systems to address today's most complex issues. We lead through our insights and excel at strategy, transformation, and implementation, creating more sustainable and resilient countries, governments, companies, cities, and infrastructure.

No member of the Guidehouse project team has a business relationship with AB Volvo, other than the work regarding the GHG accounting and reporting of AB Volvo. We have conducted this assurance independently and there has been no conflict of interest.