

Independent Verification Opinion

Verification Opinion No.:
C690722-2023-AG-TWN-DNV

Issued Place:
Taipei

Issued Date:
08 July, 2024

This is to verify initiate reporting of Greenhouse Gas Inventory Management Report (2023) of

MANDARIN AIRLINES CO., LTD.

Scope of Verification

DNV Business Assurance (DNV) has been commissioned by MANDARIN AIRLINES CO., LTD. ('the Organization') to perform a verification of the greenhouse gas statements of Greenhouse Gas Inventory Management Report (2023) (hereafter the "Inventory Report") in Taiwan with respect to the sites listed as Appendix A.

The Reporting Boundary for the verification including direct GHG emissions and removals, indirect GHG emissions from imported energy, indirect GHG emissions from transportation, indirect GHG emissions from products used by the Organization and indirect GHG emissions associated with the use of products from the Organization. The further descriptions for the Reporting Boundary and verification procedure are listed in Appendix B.

Verification Criteria and GHG Programme

The verification was performed on the basis of ISO 14064-1:2018 as well as criteria given to provide for consistent GHG emission identification, calculation, monitoring and reporting.

The verification was conducted in accordance with ISO 14066:2011, ISO 14065:2020, ISO14064-3:2019

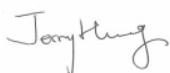
Verification Opinion

It is DNV's opinion that the Inventory Report (2023), which was published on 26 April 2024 is free from material discrepancies in accordance with the verification criteria identified as stated above. The opinion is decided based on the following approaches,

- For the Direct (Category 1) and Indirect GHG emissions from imported energy (Category 2), the reliability of the information within the Inventory Report (2023) were verified with reasonable level of assurance.
- For the other indirect GHG emissions, the involved information was verified and tested using agreed-upon procedures, AUP, defined in Inventory Report.

Also, the GHG information as stated in Appendix C have been verified during the process.

Jerry Huang
GHG Verifier



Place and date:

Taipei, 08 July, 2024

For the issuing office:

DNV Business Assurance Co., Ltd.
29Fl., No. 293, Sec. 2, Wenhua Rd.,
Banqiao District, New Taipei City
220, Taiwan



Management Representative



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Supplement to Verification Opinion

Process and Methodology

The reviews of the Inventory Report and relevant documents, and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

Quantification of Greenhouse Gas Emission

The Inventory Report covering the period 1 January, 2023 to 31 December, 2023, it is DNV's opinion that GHG emissions and removals identified within the Reporting Boundary has been included in the Inventory Report as claimed in accordance with the verification criteria identified as stated above, and results in quantification of GHG emissions that are real, transparent and measurable.

Organizational Boundary of Verification

☐ Financial Control ☒ Operational Control ☐ Equity Share

GHGs Verified

☒ CO₂ ☒ CH₄ ☒ N₂O ☒ HFCs ☒ PFCs ☒ SF₆ ☒ NF₃

The Quantification of GHG emissions:

Category		Emission (ton CO ₂ e)
Category 1	Direct GHG emissions and removals	126,743.458
1.1	Stationary combustion emissions	2.0834
1.2	Mobile emissions	126,730.6885
1.3	Process emissions	-
1.4	Fugitive emissions	10.6864
Category 2	Indirect GHG emissions from imported energy	742.4217
2.1	Indirect emissions from imported electricity	742.4217
Category 3	Indirect GHG emissions from transportation	17.5934
3.5	Business travel	17.5934
Category 4	Indirect GHG emissions from products used by an organization	28,656.503
4.1.1	Purchased goods and services	1.8553
4.1.2	Purchase Fuel and Energy Emission (Indirect emissions not included in Cat.1 & Cat.2)	28,627.1977
4.3	Emissions from the disposal of solid and liquid waste	27.4500
Category 5	Indirect GHG emissions associated with the use of products from the organization	-
Category 6	Indirect GHG emissions from other sources	-
Total Emissions of Category 1 & Category 2		127,485.880
Total Emissions of 6 Categories		156,159.976

The Imported Energy Indirect Emissions was calculated based on 2023 electricity emission factor of 0.494 kg CO₂e/kwh, which was announced by Bureau of Energy, Ministry of Economic Affairs. The Global Warming Potential (GWP) defined in IPCC AR6 (2021) has been chosen and correctly referred by the Organization. *The scope of indirect emissions, other than Imported Energy with specified/limited list of sources, was defined by MANDARIN AIRLINES CO., LTD. 's own pre-determined criteria for significance of indirect emissions, considering the intended use of the GHG inventory.

Verification Opinion

☒ unmodified ☐ modified ☐ adverse

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid. This Verification Opinion is based on the information made available to us and the engagement conditions detailed above. Hence, DNV cannot guarantee the accuracy or correctness of the information. DNV cannot be held liable by any party relying or acting upon this Verification Opinion.

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DNV ZNATW-OP-F50, Rev.11, 2024-4

Appendix to Verification Opinion No. C690722-2023-AG-TWN-DNV

APPENDIX A

The organization boundary of MANDARIN AIRLINES CO., LTD.

No.	Sites	Address
1	華信航空總公司 Mandarin Airlines Headquarters	台北市松山區敦化北路 405 巷 123 弄 3 號 No. 3, Aly. 123, Ln. 405, Dunhua N. Rd., Songshan Dist., Taipei City 105, Taiwan (R.O.C.)
2	台北站(含台北維護組及聯管中心) Taipei Station	台北市松山區敦化北路 340-9 號 No. 340-9, Dunhua N. Rd., Songshan Dist., Taipei City 105, Taiwan (R.O.C.)
3	台中站(含台中維護組及台中倉儲) Taichung Station	台中市沙鹿區中航路一段 168、200 號 No. 168、200, Sec. 1, Zhonghang Rd., Shalu Dist., Taichung City 433, Taiwan (R.O.C.)
4	高雄站(含高雄維護組) Kaohsiung Station	高雄市小港區中山四路 2 號 No. 2, Zhongshan 4th Rd., Xiaogang Dist., Kaohsiung City 812, Taiwan (R.O.C.)
5	花蓮站 Hualien Station	花蓮縣新城鄉嘉里村嘉里路機場 1 號 No. 1, Jichang, Jiali Rd., Xincheng Township, Hualien County 971, Taiwan (R.O.C.)
6	台東站 Taitung Station	台東縣台東市民航路 1100 號 No. 1100, Minhang Rd., Taitung City, Taitung County 950, Taiwan (R.O.C.)
7	金門站 Kinmen Station	金門縣金湖鎮尚義機場 2 號 No. 2, Kinmen Airport, Jinhu Township, Kinmen County 891, Taiwan (R.O.C.)
8	馬公站(含馬公勤務組) Makung Station	澎湖縣湖西鄉隘門村 126-5 號 No. 126-5, Aimen, Huxi Township, Penghu County 885, Taiwan (R.O.C.)
9	南竿站 Nangan Station	連江縣南竿鄉復興村 220 號 No. 220, Fuxing Vil., Nangan Township, Lienchiang County 209, Taiwan (R.O.C.)

APPENDIX B

The Reporting Boundary of MANDARIN AIRLINES CO., LTD. Greenhouse Gas Inventory Management Report (2023)

Indirect emissions verification procedures:

Category	Subcategory	Verification Procedures
Category 3	3.5 Business travel	- Business travel by high speed rail in Taiwan - Emission factor form Taiwan HSR website
Category 4	4.1.1 Upstream purchased goods	-Purchasing city water -Bill and invoice of water suppliers
	4.1.2 Purchase Fuel and Energy Emission (Indirect emissions not included in Cat.1 & Cat.2)	- Including Electricity, gasoline, diesel and aviation fuels - Bill and invoice from suppliers
	4.3 Waste treatment and transportation	-Weights of solid and liquid wastes from contractors contract and bills - Distance of transportation from operation sites to treatment sites
Category 5*	Indirect GHG emissions associated with the use of products from the organization	Not Significant Emissions
Category 6*	Indirect GHG emissions from other sources	Not Significant Emissions

NOTE: *The scope of indirect emissions, other than Imported Energy with specified/limited list of sources, was defined by MANDARIN AIRLINES CO., LTD. 's own pre-determined criteria for significance of indirect emissions, considering the intended use of the GHG inventory.

APPENDIX C

For direct emissions and removals, quantified separately for each GHG as below:

GHG Type	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Total
Emissions (ton CO ₂ e)	126,292.6401	148.1721	291.9597	10.686	0.0000	0.0000	0.0000	126,743.458
Proportion (%)	99.64	0.12	0.23	0.01	0.00	0.00	0.00	100