

Independent Verification Opinion

Verification Opinion No.:
C681927-2023-AG-TWN-DNV

Issued Place:
Taipei

Issued Date:
20 May, 2024

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

CHINA AIRLINES LTD.

Scope of Verification

DNV Business Assurance (DNV) has been commissioned by CHINA AIRLINES LTD. ('the Organization') to perform a verification of the greenhouse gas statements of Greenhouse Gas Inventory Management Report (2023) (hereafter the "Inventory Report") 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 B, C and D have been verified during the process.

Jerry Huang
GHG Verifier



Place and date:

Taipei, 20 May, 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	6,052,838.1480
Category 2	Indirect GHG emissions from imported energy	16,839.3588
	119,000 kWh of renewable energy used by organization, corresponding to T-REC No: 19SP0031-B023000001 ~ 19SP0031-B023000119	0
Category 3	Indirect GHG emissions from transportation	3,401.4545
Category 4	Indirect GHG emissions from products used by an organization	1,385,398.5165
Category 5	Indirect GHG emissions associated with the use of products from the organization	410.5486
Category 6	Other GHG emissions from products used by an organization	-
Total		7,458,888.026

Category		Emission (ton CO ₂ e)
Biogenic Emissions	Direct GHG emissions CO ₂ emissions from bio-fuel	76.215

(The Imported Energy Indirect Emissions was calculated based on 2022 electricity emission factor of 0.495 kg CO₂-e/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 CHINA AIRLINES LTD. 's own pre-determined criteria for significance of indirect emissions, considering the intended use of the GHG inventory.

Verification Opinion

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Appendix to Verification Opinion No. C681927-2023-AG-TWN-DNV

APPENDIX A

The organization boundary: CHINA AIRLINES LTD. TAIWAN OFFICES (headquarter and subsidiary units)

Site	Address
China Airlines	Headquarters (No. 1, Hangzhan S. Rd., Dayuan District, Taoyuan City 337041, Taiwan R.O.C.) and other subsidiary offices: <ul style="list-style-type: none">- Taipei Branch Office (No. 131, Sec. 3, Nanjing E. Rd., Zhongshan Dist., Taipei City 104107, Taiwan R.O.C)- Taipei Songshan Park (No. 6, Alley 123, Lane 405, Tunhwa N. Rd., Songshan Dist., Taipei City, Taiwan R.O.C and No. 81, Sec. 4, Mingquan E. Rd., Taipei City, Taiwan R.O.C)- Kaohsiung Branch Office (No. 38, Xinguang Rd., Lingya Dist., Kaohsiung City, Taiwan and Room A, Fl 6, No. 358, Sec. 1, Tungmen Rd., Tainan, Taiwan R.O.C)
Engineering and Maintenance Organization	No. 6 & 15, Hangqin S. Rd., Dayuan Dist., Taoyuan City, Taiwan



APENDIX A(continue)

The organization boundary: CHINA AIRLINES LTD. OVERSEAS BRANCH OFFICES

Sites	Address
Cargo Sales & Services Mainland China	Suite 22F, No.726 Of West Yanan Road, Changning District, Shanghai, China
Beijing Office	Bright China Chang An Building, Tower2, Unit 1025, No.7 Jianguomen Nei Avenue, Beijing, China
Shanghai Office	Suite 22A, No.726 Of West Yanan Road, Changning District, Shanghai, China
Guangzhou Office	Room 1210, 12th Floor, Teem Tower, No.208 Of Tianhe Road, Tianhe District, Guangzhou, Guangdong, China
Shenzhen Office	Room 4805, Office Tower, Shun Hing Di Wang Commercial Center, No.5002 Of Shen Nan East Road, Luohu District, Shenzhen, Guangdong, China
Chengdu Office	Room 1608, South Tower, Baoli Center Building, No.7, Consulate Rd. Chengdu, China
Zhengzhou Office	Rooms 1102, Tower B, Yuhong International Building, No.59 Of Zijingshan Road, Zhengzhou, Henan, China
Xiamen Office	Unit 3310, 33rd Floor, Bank Center, No.189 Of Xiahe Road , Xiamen, Fujian, China
Nanjing Office	Room1201,Longsheng Building,No.23 Hongwu Road,Qinhuai District,Nangjing, Jiangsu Province, China
Fuzhou Station	Room 2508, Zhonggeng Youth Plaza, No.83 Of East Road, Gulou District, Fuzhou, Fujian, China
Chongqing Station	Room 2202, No.3 Building, Zhongyu Plaza, No.86 Of Hongjin Avenue, Yubei District, Chongqing, China
Wuxi Station	Room 1611-1612, 16th Floor, Columbus building, No 282, ChangJiang North Road, New District Wuxi, Jiangsu · China
Qingdao Office	Unit 2801, Office Tower, Shangri-La Centre, No.9 Xiang Gang Zhong Lu, Qingdao, China
Wuhan Office	Room 1315, 13F, New World International Trade Building,568 Jianshe Avenue , Wuhan, China
Cargo Sales & Services, Japan	Nittochi-Uchisaiwaicho Bldg. 8F, 1-2-1 Uchisaiwaicho, Chiyoda-ku, Tokyo, 100-0011, Japan
Tokyo Branch	Nittochi-Uchisaiwaicho Bldg. 8F, 1-2-1 Uchisaiwaicho, Chiyoda-ku, Tokyo, 100-0011, Japan
Osaka Branch	Nakanoshima Mitsui Bldg. 9F 3-3, 3-Chome Nakanoshima Kita-Ku Osaka-Shi, Osaka 530-0005, Japan
Sapporo Branch	Jo Mitsui Building 3F, Kita 1, Nishi 5, Chuo-ku, Sapporo, Hokkaido, Japan
Shizuoka Station	Shizuoka Aripport Terminal Bldg. 1F, 3336-4, Sakaguchi, Makinohara-Shi, Shizuoka, 421-0411, Japan
Toyama Station	Toyama Airport International Terminal Building 3F, 191 Akigashima, Toyama-Shi, 939-8252, Japan
Kagoshima Station	Kagoshima Airport Internatianl Terminal Bldg. 1355-4 Fumoto, Kirishima, Kagoshima 899-6404, Japan
Miyazaki Station	Miyazaki Airport, Akae Miyazaki 880-0912, Japan
Nagoya Branch	3F, NMF Nagoya-Fushimi Building, Nishiki 2-9-27, Naka-ku, Nagoya, Aichi, 460-0003, Japan
Fukuoka Branch	Daihakata Bldg. 8F, 2-20-1 Hakata Ekimae, Hakata-Ku, Fukuoka 812-0011, Japan
Hiroshima Branch	Hiroshima-Mitsui Bldg. 7F 2-7-10, Ote-Machi, Naka-Ku, Hiroshima-Shi, Hiroshima, 730-0051, Japan
Takamatsu Station	Takamatsu Airport Building, Oka, Konan-cho, Takamatsu, Kagawa, 761-1401, Japan
Kumamoto Station	Kumamoto Airport Int'l Terminal Bldg. 1802-2 Oyatsu, Mashiki-machi, Kamimashiki-gun, Kumamoto 861-2204, Japan
Okinawa Branch	Uehara Bldg 1F, 2-2-7, Maejima, Naha-city, Okinawa 900-0016, Japan
Korea Branch	3F, eplaza Bldg., 25, Sejong-daero 4-gil, Jung-gu, Seoul, Republic of Korea 04527
Busan Branch	3162,3F Gimhae Int'l Airport 108, Gonghang-jinnipro, Gangseo-gu, Busan, Korea 46718
Hong Kong Branch	Suites 2701-2705, 27F Devon House, Taikoo Place, 979 King's Road, Hong Kong
Thailand Branch	No. 1, Q House Lumpini Building, Room 1103, 11th Fl., South Sathorn Rd., Kwang Thung Mahamek, Khet Sathorn, Bangkok 10120, Thailand
Chiang Mai Branch	Chiang Mai International Airport, 2nd Fl., Room C 2016

Lack of fulfillment 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.

DNV Business Assurance Co., Ltd. 29Fl., No.293, Sec.2, Wenhua Road 220 Ban Chiau Dist., New Taipei City Taiwan TEL: +886-2-82537800, website: <https://www.dnv.com/tw/>

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

APENDIX A(continue)

Sites	Address
Bali Branch	Departure International Terminal 2nd floor no. AO-12B Ngurah Rai International Airport, Tuban - Bali, Indonesia
Malaysia Branch	Unit 30.2, Level 30, Menara AIA Sentral, No.30, Jalan Sultan Ismail, Bukit Bintang, 50250 Kuala Lumpur
Penang Branch	Unit 9.04, Level 9, Menara Boustead Penang, 39 Jalan Sultan Ahmad Shah, 10050 Penang, Malaysia
Singapore Branch	302 Orchard Road, #14-01 Tong Building Singapore 238862
Cambodia Branch	#10, St.596 Toul Kork, Sangkat Beoung Kok II, Khan Toul Kork, Phnom Penh, Cambodia
Myanmar Branch	No. 353/355, Bo Aung Kyaw Street, Yangon, Myanmar
Philippines Branch	G/F Unit-1, Golden Empire Tower, 1322 Roxas Blvd corner Padre Faura Street, Ermita, Metro Manila
Cebu Branch	Arrival Level Terminal 2, Mactan Cebu International Airport, Pusok, Lapu-Lapu City
Indonesia Branch	Intiland Tower, M1 Floor, Jl.Jend.Sudirman Kav.32, Jakarta 10220, Indonesia
Vietnam Branch	1B,7F Crescent Plaza 105 Ton Dat Tien St., Dist.7, Ho Chi Minh City, Vietnam
Hanoi Branch	Unit 2, 4th Floor, Opera Business Center, 60 Ly Thai To Street, Hoan Kiem District, Hanoi, Vietnam
Da Nang Branch	Office no.O-1-10, Da Nang Int'l Airport, Hoa Thuan Tay Ward, Hai Chau District, Da Nang
Palau Branch	P.O.BOX 10027 Koror, Republic of Palau 96940
Australia Branch	Suite 1, L1, The Nigel Love Building, 10 Arrivals Crt. Sydney International Airport Mascot NSW 2020
Brisbane Branch	1G 35, Brisbane International Terminal, Airport Drive, Brisbane Airport QLD 4008, Australia
Melbourne Branch	Level 2. T2 NORTH END. Terminal 2 Departure Drive Tullamarine. Melbourne Airport 3045
New Zealand Branch	GM60, Level 1, Auckland International Airport, Auckland 2150, New Zealand
India Branch	323, 3rd Floor, MGF Metropolis Mall, MG Road, Gurgaon, Haryana 122001, India
Los Angeles Branch	200 N. Continental Blvd., Suite 100, El Segundo, CA 90245, U.S.A.
New York Branch	633 3rd Ave., 8th Fl., Suite 800, New York, NY 10017, U.S.A.
San Francisco Branch	433 Airport Blvd., Suite 501 Burlingame, CA 94010, U.S.A.
Honolulu Branch	1830 Ala Moana Blvd Room 212, Honolulu, Hawaii 96815
Anchorage Branch	4600 Postmark Drive, Ste. Na.142, Anchorage, AK99502, U.S.A.
Canada Branch	Suite 240-10451 ShellbridgeWay, Richmond, British Columbia, V6X 2W8, Canada
Cargo Sales & Services The Americas	5651 West 96th Street , Los Angeles, CA 90045, U.S.A.
Guam Branch	518 Pale San Vitores Road, Suite 202, Concorde Center, Tumon, Guam 96913, USA
Netherlands Branch	Officia Gebouw I, De Boelelaan 7, 6th Floor, 1083 HJ Amsterdam, The Netherlands
Germany Branch	Kaiserstr. 53, 60329 Frankfurt, Germany
Italy Branch	Via Lucullo 3, 00187, Rome, Italy
Cargo Sales & Services, Europe	G2044-2051 Cargo Centre/Luxair L1360 Luxembourg
Austria Branch	Mariahilfer Strasse 123/8 O.G. 1060 Vienna, Austria
The United Kingdom Branch	Minstrel House, 1F, 2 Chapel Place, Rivington Street, London, EC2A 3DQ
Czech Republic Branch	(Unit 4102) Aviatická 1048/12, 161 00 Praha 6-Ruzyně Czech Republic

APPENDIX B

The Reporting Boundary of CHINA AIRLINES LTD. Greenhouse Gas Inventory Management Report (2023)

Indirect emissions verification procedures:

Category	Subcategory	Verification Procedures
Category 2	2.1 Imported electricity	-Bill and invoice from suppliers (TPC)
Category 3	3.1 Upstream transportation and distribution	-Weight of purchasing goods and raw material report -Distance of transportation from supplier
	3.2 Business travel	- Business travel by air craft. - Business travel distance from departure air port to destination air port -ICAO emission factor
	3.3 Employees commuting	- Distances of shuttle bus between Taiwan air ports - CCA carbon footprint platform emission factor
	3.4 Visitors transportation	- Visitors registration record - Distances from departure to Taiwan HQ
Category 4	4.1 Upstream purchased goods	-Weight of purchasing goods and raw material report
	4.1 Purchase Fuel and Energy Emission (Indirect emissions not included in Cat.1 & Cat.2)	-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
	4.4 Use of assets	- VIP room electricity used
Category 5*	5.1 Downstream leased assets	- Downstream leased assets in HQ - Electricity used
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 CHINA AIRLINES 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)	6,031,629.4894	7,067.6425	13,860.9392	279.8105	0.0000	0.0000	0.0000	6,052,838.148
Proportion (%)	99.65	0.12	0.23	0.00	0.00	0.00	0.00	100

APPENDIX C (Continue)

Emission of Reporting Boundary: CHINA AIRLINES LTD. TAIWAN OFFICES (headquarter and subsidiary units)

Quantification of other indirect emissions (in tonnes CO₂e):

Category		Emission (ton CO ₂ e)
Category 1	Direct GHG emissions and removals	6,051,595.6589
1.1	Stationary combustion emissions	388.0032
1.2	Mobile emissions	6,050,927.6523
1.3	Process emissions	0.1929
1.4	Fugitive emissions	279.8105
Category 2	Indirect GHG emissions from imported energy	15,767.2305
2.1	Indirect emissions from imported electricity	15,767.2305
	119,000 kWh of renewable energy used by organization, corresponding to T-REC No: 19SP0031-B023000001 ~ 19SP0031-B023000119	0
Category 3	Indirect GHG emissions from transportation	3,401.4545
3.1	Emissions from upstream transport and distribution for goods	85.4141
3.2	Business travel	31.9254
3.3	Employee commuting	3,281.3130
3.4	Visitors transportation	2.8020
Category 4	Indirect GHG emissions from products used by an organization	1,385,398.5165
4.1	Purchased goods and services	20,445.8906
4.2	Purchase Fuel and Energy Emission (Indirect emissions not included in Cat.1 & Cat.2)	1,362,856.8740
4.3	Emissions from the disposal of solid and liquid waste	1,176.8057
4.4	Use of assets	918.9463
Category 5	Indirect GHG emissions associated with the use of products from the organization	410.5486
5.1	Downstream leased assets	410.5486
Total		7,456,573.409

Category		Emission (ton CO ₂ e)
Biogenic Emissions	Direct GHG emissions CO ₂ emissions from bio-fuel	76.215

(The Imported Energy Indirect Emissions was calculated based on 2022 electricity emission factor of 0.495 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 CHINA AIRLINES LTD.'s own pre-determined criteria for significance of indirect emissions, considering the intended use of the GHG inventory.

APPENDIX C (Continue)

Emission of Reporting Boundary:

CHINA AIRLINES LTD. OVERSEAS BRANCH OFFICES Detail emissions information was listed in Annex

Quantification of other indirect emissions (in tonnes CO₂e):

Category		Emission (ton CO ₂ e)
Category 1	Direct GHG emissions and removals	1,242.4891
Category 2	Indirect GHG emissions from imported energy	1,072.1283
Total		2,314.6174

(The Imported Energy Indirect Emissions was calculated based on 2022 electricity emission factor of 0.495 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.)

APPENDIX D

CHINA AIRLINES LTD. 2023 GHG REDUCTION KPI

Sub-item operation				relative emission reduction (tonnes CO ₂ e) in 2023)
sub-item number	Control measures	relative reduction	unit	
1-1	Monthly statistics on power generation and solar radiation to calculate power generation efficiency	119.000	megawatt hour (MWh)	58.905
2-1	Replacement of Lighting system, from 28W	39.680	megawatt hour (MWh)	19.642
3-1	Replace the high voltage transformer in Songshan Park	97.939	megawatt hour (MWh)	48.480
4-1	Replaced the Engine repair factory CH6 chilled water main unit (300 USRT)	169.454	megawatt hour (MWh)	83.880
4-2	Replaced No. 6 air compressor	202.299	megawatt hour (MWh)	100.138
4-3	Replaced No. 12 air compressor	22.186	megawatt hour (MWh)	10.982
5-1	Replace the old fuel-consuming equipment (gasoline)	70.102	KL gasoline	165.100
6-1	Replace the old fuel-consuming equipment (diesel)	198.555	KL diesel	525.420
7-1	Purchase two electric pallet jacks to replace oil-based equipment."	3.720	KL gasoline	7.770
8-1	Afforestation in Taoyuan Hengshan Calligraphy Art Park	0.22	Ton CO ₂ e	0.22