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ESG TRAINING WORKSHOP
ESG 環境, 社會和管治培訓工作坊
SECTION 4: CARBON FOOTPRINT ASSESSMENT
第四節: 產品碳足跡評估

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19 Jul 2024

AGENDA 議程

Carbon Footprint Assessment 產品碳足跡評估

01

Scope 1,2,3 Green House Gases (GHGs) Emission
範圍 1、2、3 溫室氣體 (GHG) 排放

02

Measurement Methodology and Standards
測量方法和標準

03

Corporate Carbon Footprint
企業碳足跡

04

Product Carbon Footprint
產品碳足跡

05

Examples of Ecological Design for Products
產品生態化設計實例

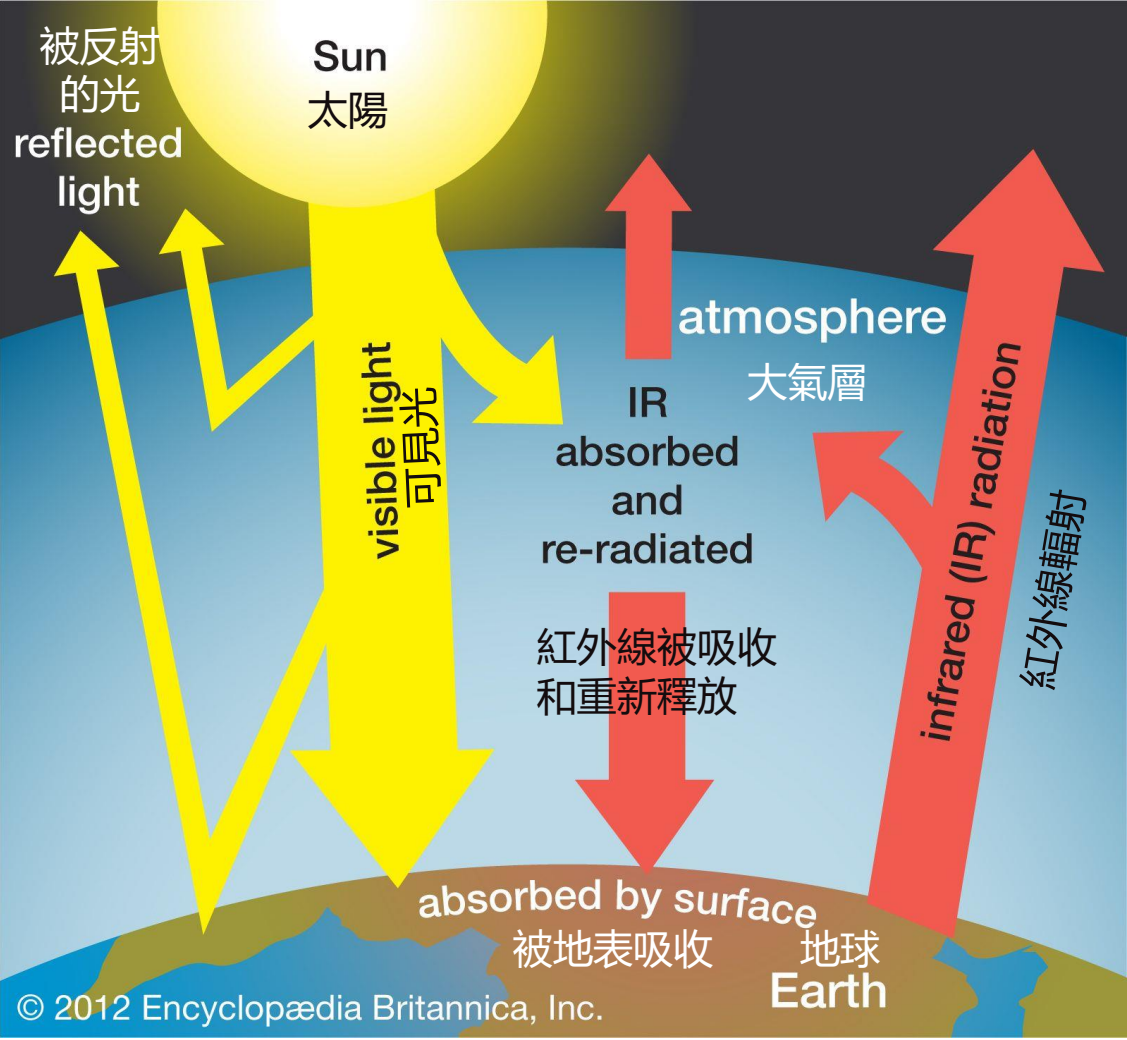


01

**SCOPE 1,2,3 GREEN HOUSE
GASES (GHGS) EMISSION
範圍 1、2、3 溫室氣體
(GHG) 排放**



GREENHOUSE EFFECT 溫室效應



Source: Britannica, T. Editors of Encyclopaedia (2024, May 31). *greenhouse effect*. *Encyclopedia Britannica*. <https://www.britannica.com/science/greenhouse-effect>



GLOBAL AVERAGE TEMPERATURE

全球平均氣溫

- **Global average temperature increased 0.74 degree(C) in the past 100 years from 1906-2005, indicates an average annual increase 0.0074 degree(C)**
 - **全球平均氣溫在1906到2005年的一百年間升了0.74度，即平均每年上升0.0074度**
- **In the past 50 years from 1956-2005**
- **由1956到2005年的50年**
 - Temperature increased 0.13 degree(C) per 10 years, indicates an average annual increase 0.013 degree(C). The % increase is 2 times as comparing with the passed 100 years
 - **每10年上升0.13度，即平均每年上升0.013度，升幅是過去100年的兩倍**
- **In the past 12 years from 1997-2008**
- **(由1997到2008年)的12年**
 - There is 11 years (1998, 2005, 2003, 2002, 2004, 2006, 2007, 2001, 1997, 2008, 1999) listed in the warmest 12 years
 - **有11年(1998, 2005, 2003, 2002, 2004, 2006, 2007, 2001, 1997, 2008, 1999)名列最暖的12年**



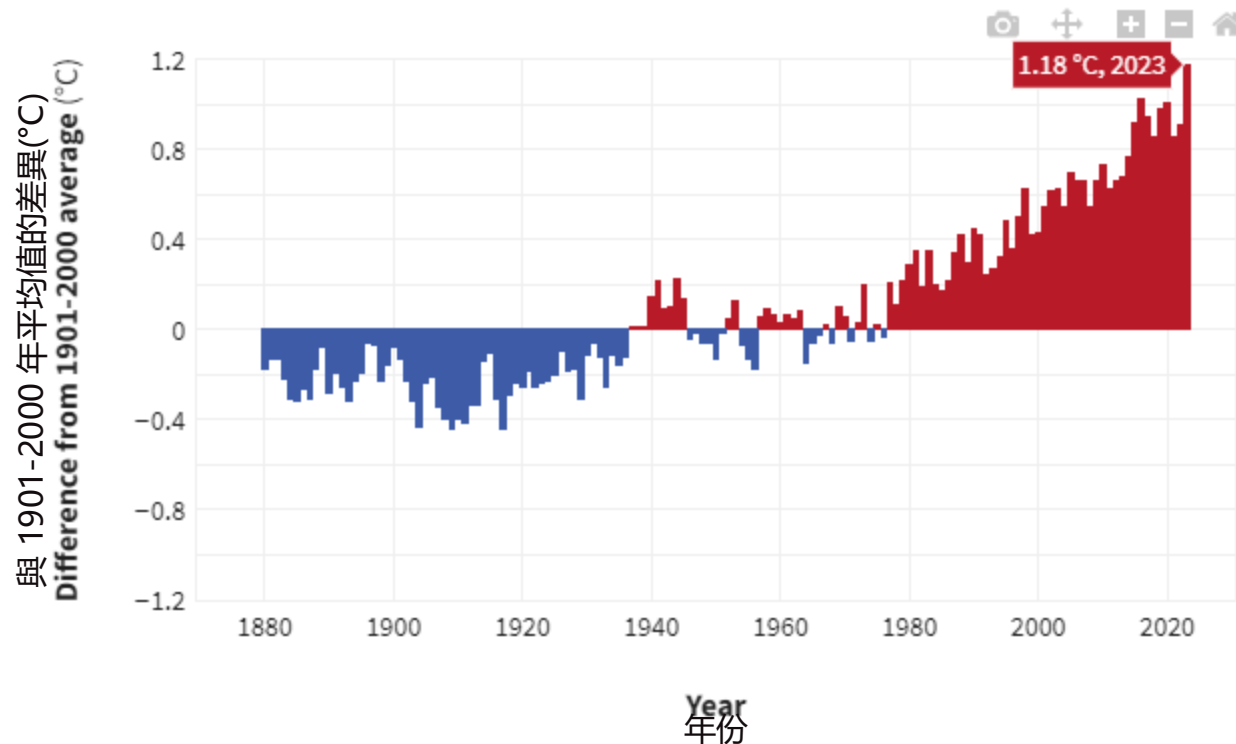
CHANGE OF GLOBAL AVERAGE SURFACE TEMPERATURE

全球平均表面氣溫的變化

Yearly surface temperature from 1880 - 2023 compared to the 20th-century average (1901-2000).

1880 年至 2023 年的年地表溫度與 20 世紀平均值（1901 年至 2000 年）的比較

GLOBAL AVERAGE SURFACE TEMPERATURE

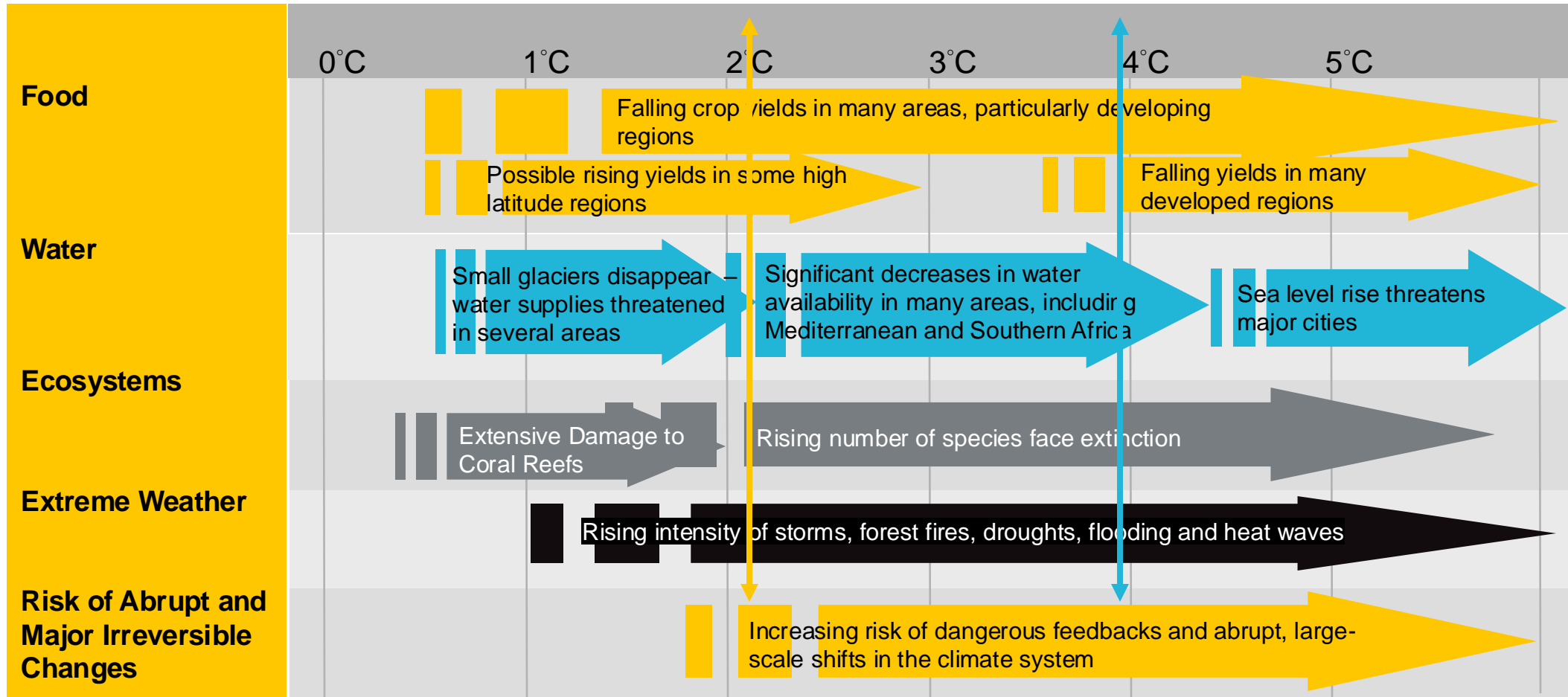


- Blue bars indicate cooler-than-average years
- Red bars show warmer-than-average years
- 藍色: 氣溫低於平均的年份
- 紅色: 條顯示高於平均的年份



Major Effects of Global Average Temperature Change

全球平均氣溫改變的主要影響



Global Temperature Change (Relative to the change of 1980-1999)

CARBON EMISSION REDUCTION TARGET

減排目標



Country / City 國家/城市	Base Year 基準年	Year of Achievement 達成年份	Reduction Target 減排目標
EU 歐盟	1990	2030	55% (Absolute 絕對值)
US 美國	2005	2030	50-52% (Absolute 絕對值)
India 印度	2005	2030	45% (Intensity 碳強度)
China 中國	2005	2030	60-65% (Intensity 碳強度)
Hong Kong 香港	2005	2030	65-70% (Intensity 碳強度)





CARBON EMISSION REDUCTION TARGET IN CHINA

中國減排目標

- 中國政府在哥本哈根氣候峰會前宣佈：
 - 到2020年中國單位GDP二氧化碳排放要比2005年下降40%到45%
 - 為碳排上限作準備，七個省市碳排放交易試辦陸續啟動
 - 發改委能源研究所研究員表示，發改委正研究於2016-2020實施碳排上限
 - 將於第十三個五年計畫定立總的排放目標
 - 中國七個省市碳排放交易試點包括北京、上海、天津等亦已於2013年陸續正式交易
 - 試點中的企業必須公開碳排放量
 - 其中深圳碳排放交易市場已於2013年六月十七日正式啟動
 - 超過六百家企業已完成碳核查



CARBON EMISSION REDUCTION TARGET IN CHINA

中國減排目標

- The Chinese government announced before the Copenhagen climate summit:
-
- By 2020, China's carbon dioxide emissions per unit of GDP will fall by 40% to 45% compared to 2005
-
- In preparation for the carbon emission cap, seven provinces and cities have launched carbon emissions trading trials.
-
- A researcher at the Energy Research Institute of the National Development and Reform Commission, said that the National Development and Reform Commission is studying the implementation of a carbon emission cap from 2016 to 2020.
-
- A total emission target will be set in the 13th Five-Year Plan
-
- Carbon emissions trading pilot projects in seven provinces and cities in China, including Beijing, Shanghai, and Tianjin, have also been officially launched in 2013.
-
- Companies in the pilot must disclose carbon emissions

Source: <http://www.laohucaijing.com/News/3946.html>



CARBON EMISSION REDUCTION TARGET IN CHINA

中國減排目標

深圳碳交易滿年：635家企業碳排放下降370萬噸

- 2013年，即深圳碳市場首個履約期內
- 被納入監管的635家管控工業企業溫室氣體排放量較基期(2011年)下降了**370萬噸**，**下降率約為11%**
- 製造業企業工業增加值增長**792億元**，增長率為**29%**
- 因此萬元工業增加值碳排放強度較基期下降了**0.13噸/萬元**，下降率達**23%**
- 超出城市“十二五”年均碳強度下降要求
- 廣東省要求深圳市“十二五”期間碳排放強度**下降21%**



CARBON EMISSION REDUCTION TARGET IN CHINA

中國減排目標

- Shenzhen carbon trading comes full year: 635 companies reduce carbon emissions by 3.7 million tons
-
- In 2013, the first compliance period of the Shenzhen carbon market.
-
- The greenhouse gas emissions of the 635 regulated industrial enterprises under supervision fell by 3.7 million tons compared with the base period (2011). The decline rate is about 11%.
-
- The industrial added value of manufacturing enterprises increased by 79.2 billion yuan, a growth rate of 29%.
-
- Therefore, the carbon emission intensity per 10,000 yuan of industrial added value dropped by 0.13 tons/10,000 yuan compared with the base period, with a decrease rate of 23%.
-
- Exceeds the city's "12th Five-Year Plan" annual average carbon intensity reduction requirements



CARBON EMISSION REDUCTION TARGET IN CHINA

中國減排目標

發改委：力爭2017年全面啟動全國碳排放權交易市場

- 2015年「巴黎氣候高峰會」(COP21)上，各國達成減量協定
- 為了履行協定，中國在第十三個五年規劃中落實奉行低碳及綠色發展之路
- 確保實現2020年應對氣候變遷目標，亦為2030年實現碳排放達峰奠定基礎
- 落實方案其中一個重點在於加速推動**全國碳交易市場**建設
- 建立健全**碳排放權初始分配制度**
- 力求2017年全面啟動全國碳排放權交易市場



CARBON EMISSION REDUCTION TARGET IN CHINA

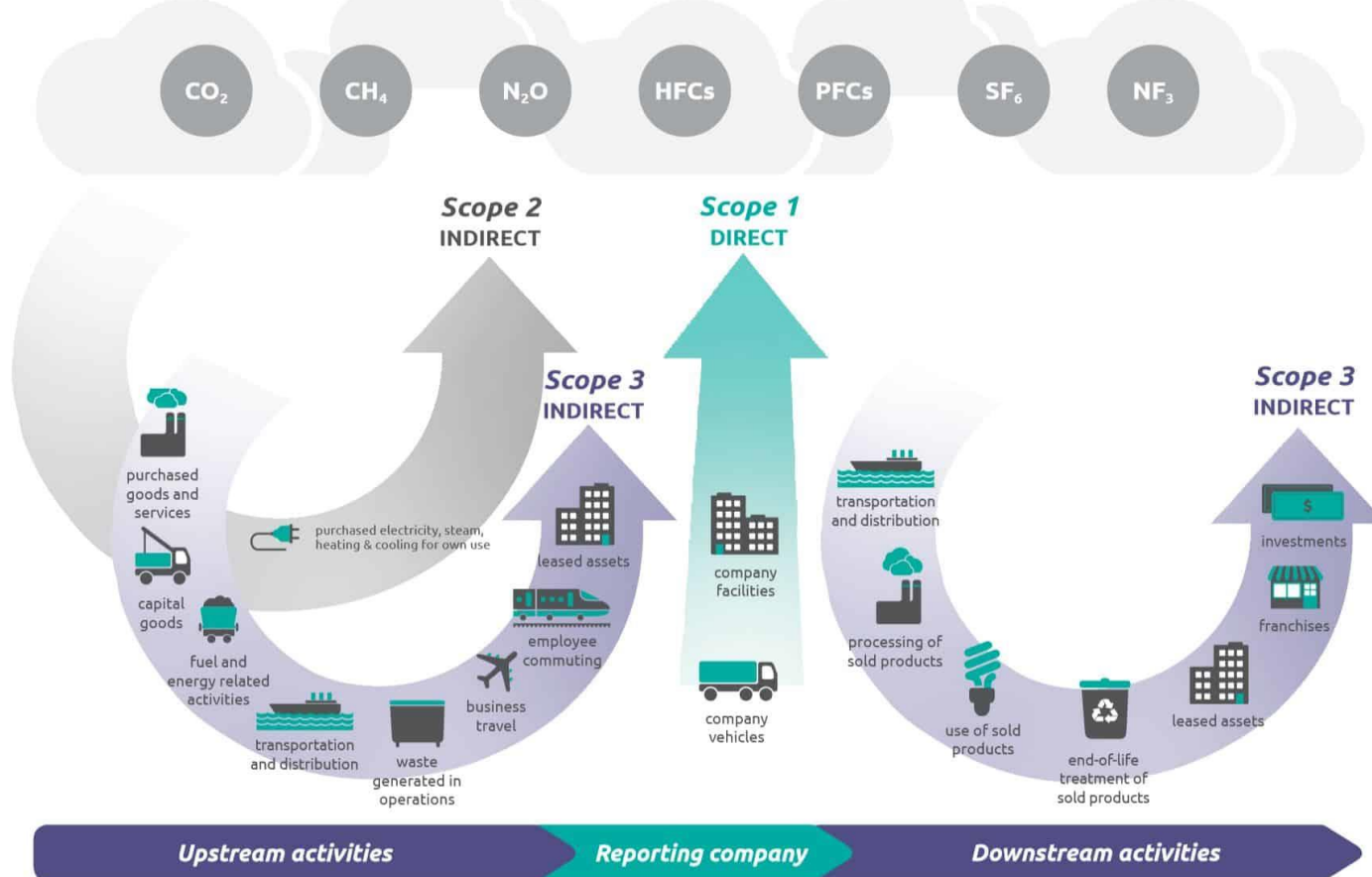
中國減排目標

- **National Development and Reform Commission: Strive to fully launch the national carbon emissions trading market in 2017**
-
- At the 2015 Paris Climate Summit (COP21), countries reached a reduction agreement
-
- In order to fulfill the agreement, China has implemented the path of low-carbon and green development in the 13th Five-Year Plan.
-
- Ensure the achievement of the 2020 climate change goals and lay the foundation for reaching the peak of carbon emissions in 2030
-
- One of the key points of the implementation plan is to accelerate the construction of the **national carbon trading market**
-
- **Establish and improve the initial allocation mechanism on carbon emission rights**

GHG PROTOCOL (SCOPE 3 INDIRECT EMISSION) 溫室氣體協議書(範圍三非直接排放)



- GHG Protocol establishes comprehensive global standardized frameworks to **measure and manage greenhouse gas (GHG) emissions**. 建立了全面的全球標準化框架來衡量和管理溫室氣體 (GHG) 排放。
- The Corporate Value Chain (Scope 3) Accounting and Reporting Standard allows companies to **assess their entire value chain emissions impact** and identify where to focus reduction activities.
企業價值鏈 (範圍 3) 會計和報告標準允許公司評估其整個價值鏈排放影響並確定減排活動的重點。



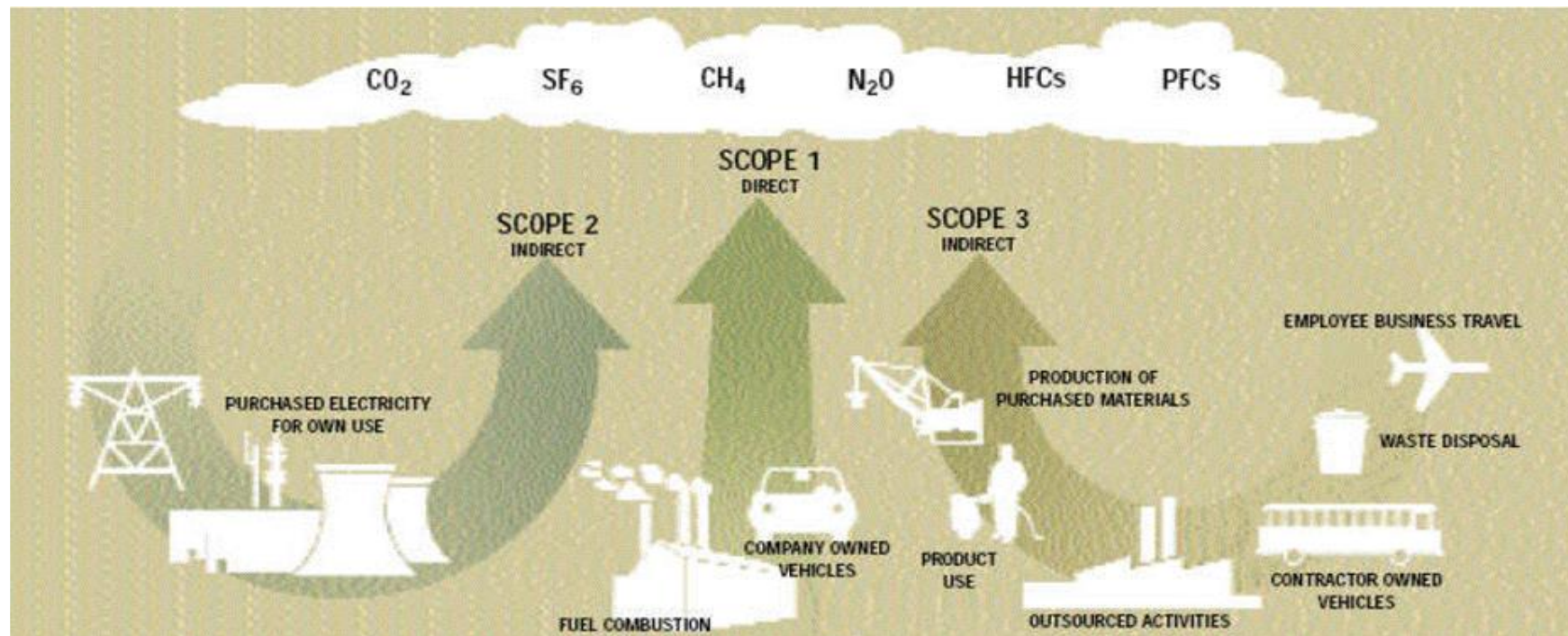
When the global mandatory requested to report GHG emission in Scope 1 & 2, some stakeholders are looking forward for **Scope 3** in their consideration. 持份者已經考慮範圍三納入管治範圍中。



THE GREENHOUSE GAS PROTOCOL 溫室氣體盤查議定書

範圍涵蓋了京都議定書中的六種管制氣體 (6 kinds of GHG) :

二氧化碳(CO₂)、甲烷(CH₄)、氧化亞氮(N₂O)、
氫氟碳化物(HFCs)、全氟碳化物(PFCs)及六氟化硫(SF₆)





GHG ASPECTS IDENTIFICATION

溫室氣體因素識別

According to GHG protocol, 3 different scopes are defined:

根據《溫室氣體議定書》包含範圍1/2/3排放:

- **Scope 1:** Direct GHG emissions, occur from sources that are owned or controlled by the company, which includes stationary combustion unit such as boiler, furnace etc and company owned mobile combustion unit like vehicles, ships etc.
 - 範圍 1:是直接溫室氣體排放, 包括如鍋爐、熔爐等靜止排放源, 以及公司自己擁有的移動排放源包括車輛和船
- 船等。
- **Scope 2:** Indirect GHG emission, accounts for GHG emissions from the generation of purchased electricity consumed by the company, such as purchased electricity, heat and steam.
 - 範圍 2:是電力間接排放, 在這裡電力指的是工廠購買的電、熱力和冷氣。
- **Scope 3:** Other indirect emission, activities covers business travel, employee commute, emissions from noncompany owned vehicles, waste disposal,...etc. (Scope 3 is optional)
 - 範圍 3:其它間接排放是所有範圍1和2之外的排放, 包括商務旅行、僱員上下班、非公司所屬的車輛、廢棄物處理等。 (範圍3排放的報告是可選的)

CASE STUDY OF SCOPE 3 CALCULATION IN SPORTSWEAR INDUSTRY – COMPANY N



Emissions Sources	FY21 Metric Tons CO ₂ e and/or Evaluation Status	Scope of Reported Emissions	Emissions Calculation Methodology	% Of Emissions Calculated Using Data Obtained From Suppliers or Value Chain Partners
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Upstream 從原材料生產, 物料加工, 到完成產品等

1 Purchased Goods and Services	9,679,222	Includes emissions across brands and product engines, including from raw materials production, materials manufacturing, materials finishing, and finished goods manufacturing.	Emissions data is calculated using primary activity data and extrapolations. CO ₂ e emissions include CO ₂ , CH ₄ , and N ₂ O. Brand and Converse footwear finished goods manufacturing emissions data is derived from 100% primary data and represents nearly 90% of the emissions in finished goods manufacturing. For this subset, vendors provide monthly energy consumption: from the local utility grid, onsite generators, other fuels, and purchased steam. For electricity: kWh values are multiplied by CO ₂ e emissions factors for electricity purchased from the local utility grid by the country/region in which the factory resides. For onsite generation and other fuels: CO ₂ e emissions are calculated using the IPCC bottoms up calculation methodology. CO ₂ e methodologies are used for emissions estimates outside of footwear finished goods manufacturing based on lifecycle analysis data applied to product creation data, and employ conservative assumptions to avoid understating footprint. To evaluate value chain footprint, we identified and quantified CO ₂ e emissions created at each stage of the value chain. The impact of each individual product differs considerably, based on its profile, materials used, size and weight, method of manufacture, and location of production, use, and disposal. Several internal and external tools were used to develop this estimation including: Materials Sustainability Index and Enablon.	30%
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(1) 購買的產品與服務

依據溫室氣體協議書(範圍三非直接排放)

Based on GHG Protocol (Scope 3 Value Chain) standard



CASE STUDY OF SCOPE 3 CALCULATION IN SPORTSWEAR INDUSTRY – COMPANY N (CONT.)



<i>Emissions Sources</i>	<i>FY21 Metric Tons CO₂e and/or Evaluation Status</i>	<i>Scope of Reported Emissions</i>	<i>Emissions Calculation Methodology</i>	<i>% Of Emissions Calculated Using Data Obtained From Suppliers or Value Chain Partners</i>
2 Capital Goods	● Not relevant	does not have significant investment in capital goods as most manufacturing equipment is owned and operated by contracted factories.	N/A	N/A
3 Fuel and Energy-Related Activities Not Included in Scope 1 or 2	● 13,025	Includes emissions associated with the extraction, production, and transportation of fuels and energy purchased and reported in Scope 1 and 2 footprint. Does not include upstream electricity emissions, T&D losses, or other onsite fuels besides natural gas (propane, diesel, biogas, hi-sene).	Emissions data is calculated using primary activity data, extrapolated consumption, and publicly available CO ₂ e emissions factors. Consumption is multiplied by the emissions factor, using an identical global factor across all countries and regions.	58%
4 Upstream Transportation and Distribution	● 544,099	Includes ~95% of global inbound transportation and ~95% of global outbound transportation via the following modes of transportation: air, ocean, truck and rail. Excludes Non comp paid freight. Also included is the shipment via air freight of AirBags produced in North America and shipped as components for footwear manufacturing to manufacturing partners in Asia.	Transactional data is applied to a third-party transportation carbon calculator against industry standard emissions factors (distance traveled x cargo weight or volume x emission factor). Upstream emissions from air transport of airbag components is calculated using industry standard air freight emission factors per ton-mile and production volume.	100%

(2) 資本支出

(3) 燃料與能源相關活動

(4) 上游運輸及配送

CASE STUDY OF SCOPE 3 CALCULATION IN SPORTSWEAR INDUSTRY – COMPANY N (CONT.)



<i>Emissions Sources</i>	<i>FY21 Metric Tons CO₂e and/or Evaluation Status</i>	<i>Scope of Reported Emissions</i>	<i>Emissions Calculation Methodology</i>	<i>% Of Emissions Calculated Using Data Obtained From Suppliers or Value Chain Partners</i>
5 Waste Generated in Operations	● 1,810	Emissions relative to the fate of the waste generated in our own operations including HQs and DCs.	Total HQs and DC waste not diverted from landfill multiplied by a lifecycle assessment-based emission factor for municipal waste sent to landfill.	100%
6 Business Travel	● 3,395	Includes emissions from commercial air travel.	Air CO ₂ emissions are estimated based on number and distance of trips. Short haul trips are less fuel efficient per mile flown. Longer-haul flights become less efficient due to the need to carry more fuel.	100%
7 Employee Commuting	● 85,746	Emissions associated with the transportation of employees between their homes and work locations. Represents full time employees.	Internal employee commuting survey data is used to inform the allocation of methods/modes that applies to its global employee base. Each mode is assigned an emission factor relative to fuel type. Assumptions are made about the average number of working days per year and the average distance between an employee's home and worksite and compensate for the COVID-19 slowdown during FY21 Q4.	20%
8 Upstream Leased Assets	● Not relevant	does not have significant emissions from upstream leased assets.	N/A	N/A

(5) 營運產生之廢棄物處理

(6) 商務旅行

(7) 員工通勤

(8) 上游租賃資產

CASE STUDY OF SCOPE 3 CALCULATION IN SPORTSWEAR INDUSTRY – COMPANY N (CONT.)



<i>Emissions Sources</i>	<i>FY21 Metric Tons CO₂e and/or Evaluation Status</i>	<i>Scope of Reported Emissions</i>	<i>Emissions Calculation Methodology</i>	<i>% Of Emissions Calculated Using Data Obtained From Suppliers or Value Chain Partners</i>
9 Downstream Transportation and Distribution	● 78,184	Includes emissions from Non comp paid freight. Excludes emissions from consumers traveling to stores.	Transactional data is applied to a third-party transportation carbon calculator against industry standard emissions factors (distance traveled x cargo weight or volume x emission factor Non comp paid freight is determined calculating the difference between Inbound and Outbound freight and using the outbound freight emissions factor to determine total emissions.	0%
10 Processing of Sold Products	● Not relevant	products are finished consumer goods and do not undergo any additional processing once sold.	N/A	N/A
11 Use of Sold Products	● 5,734,039	These emissions are associated with washing and drying sold apparel and socks. We assumed for the value chain footprint exercise that footwear and equipment were not washed. Based on our footprinting work, we estimate that about 35% of the emissions throughout our value chain are emitted during the use phase of products. These emissions are out of scope of moonshot ambition.	There is no primary emissions data available from use of products. Consumer Usage: Water and Energy Usage was estimated based on the following assumptions – only apparel units and socks were considered. Each item was assumed washed 52 times in one year. The washing assumptions were based on regional consumer washing practices and estimates of washing machine types by region. CO ₂ e was based on regional conversion factors applied to the estimated energy usage.	N/A

(9) 下游運輸及配送

(10) 售出產品之加工

(11) 售出產品之使用

CASE STUDY OF SCOPE 3 CALCULATION IN SPORTSWEAR INDUSTRY – COMPANY N (CONT.)



<i>Emissions Sources</i>	<i>FY21 Metric Tons CO₂e and/or Evaluation Status</i>	<i>Scope of Reported Emissions</i>	<i>Emissions Calculation Methodology</i>	<i>% Of Emissions Calculated Using Data Obtained From Suppliers or Value Chain Partners</i>
12 End-of-Life Treatment of Sold Products	● 418,080	These emissions are associated with the disposal of products including landfill and incineration.	There is no primary emissions data available for end-of-life treatment of 's products. To evaluate 's value chain footprint, we identified and quantified CO ₂ e emissions created at each stage of the value chain. The impact of each individual product differs considerably, based on its profile, materials used, size and weight, method of manufacture, and location of production, use and disposal. Several internal and external tools were used to develop this estimation including Enablon, 's Materials Sustainability Index and EPA's Waste Reduction Model (WARM). End of Life Stage: at the disposal stage we assumed the finished good is disposed of at the end of one year.	0%
13 Downstream Leased Assets	● Not relevant	does not have significant emissions from downstream leased assets.	N/A	N/A
14 Franchises	● Not relevant	does not have significant emissions from franchises.	N/A	N/A
15 Investments	● Not relevant	does not have significant emissions from investments.	N/A	N/A

(12) 售出產品的最終處置

(13) 下游租賃資產

(14) 連鎖/特許經銷

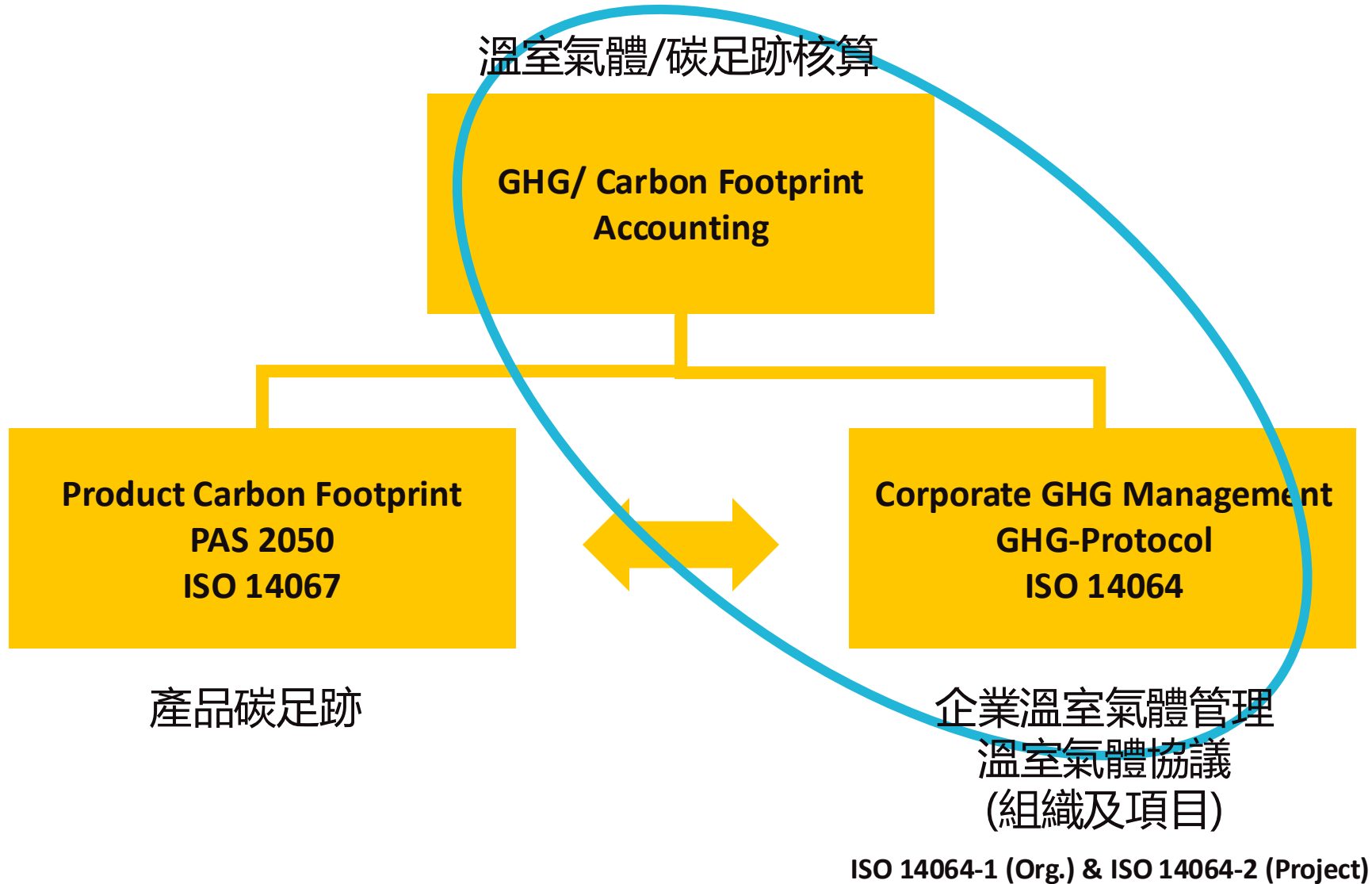
(15) 投資

02

MEASUREMENT METHODOLOGY AND STANDARDS 測量方法和標準



CARBON FOOTPRINTS RELATED STANDARDS 相關標準



03

**CORPORATE CARBON FOOTPRINTS
(FOR MANUFACTURER)
企業碳足跡 (以工廠為例)**



GHG SOURCES 溫室氣體排放源

HVAC system 空調系統:

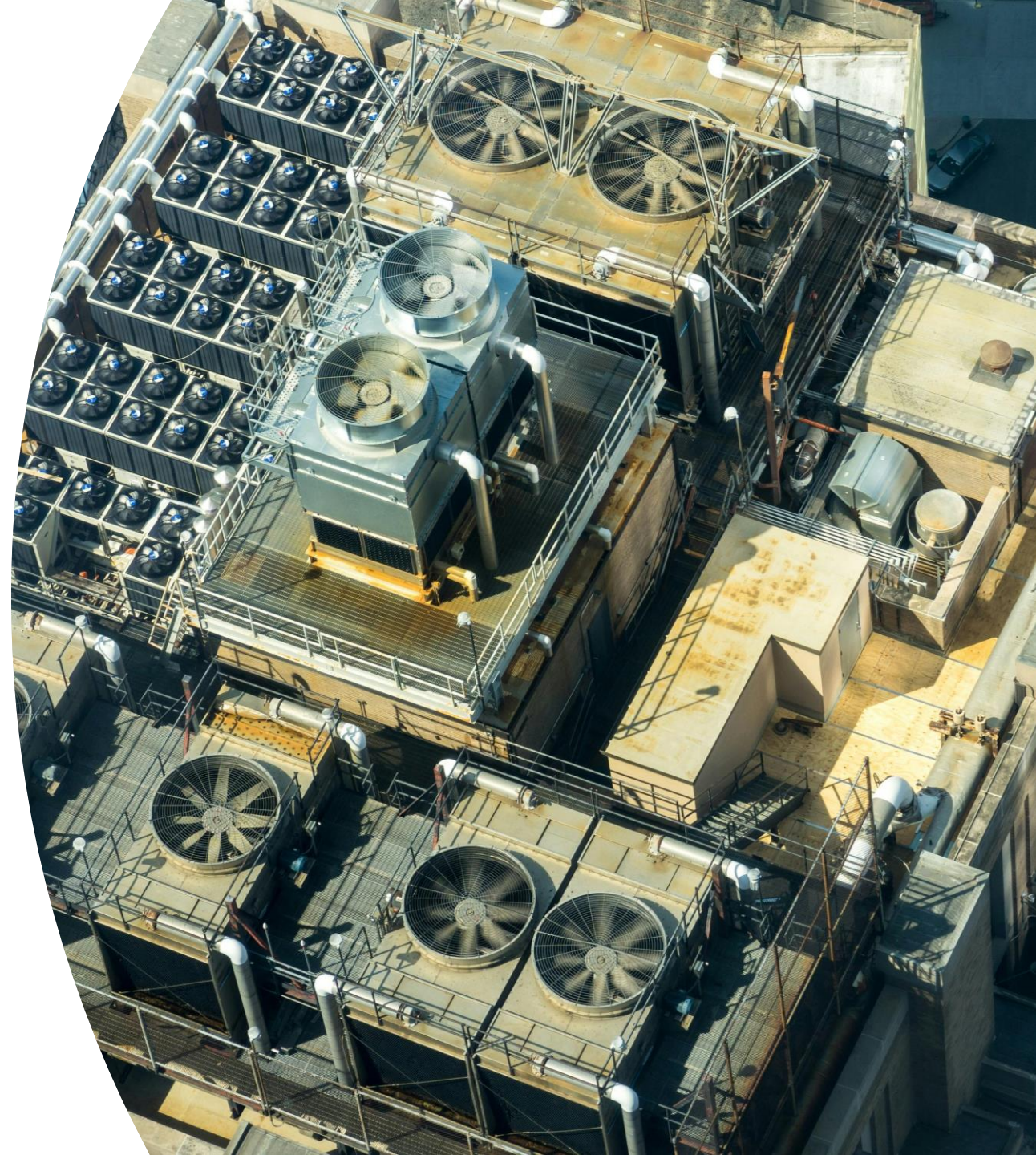
Electricity 電

Scope 2 範圍二

Refrigerant 制冷劑

(e.g. R22、HFC134a)

Scope 1 範圍一





GHG SOURCES 溫室氣體排放源

Electricity system 電力系統:

Electricity 電

Scope 2 範圍二

Diesel 柴油

(Electricity generator 後備發電機)

Scope 1 範圍一



GHG SOURCES 溫室氣體排放源

Steam system 蒸氣鍋爐系統(製衣業):

Diesel 柴油

Coal 煤

Wood waste 木材 (生物質)

Scope 1 範圍一

Electricity 電

Scope 2 範圍二





GHG SOURCES 溫室氣體排放源



Canteen 飯堂:

Diesel 柴油

LPG 液化石油氣

Natural Gas 天然氣

Scope 1 範圍一

Electricity 電

Scope 2 範圍二

GHG SOURCES 溫室氣體排放源

Production facilities 生產設備:

Welding 焊接(五金業)

[CO₂、Argon 氬氣、LPG、乙炔 Acetylene (C₂H₂)]

Metal surface treatment 金屬表面處理

(五金業) [燃燒甲醇 Methanol (CH₃OH)、乙醇 Ethanol (C₂H₅OH)、丙烷 Propane (C₃H₈)]

Heater 加熱器 [Natural Gas 天然氣]

Scope 1 範圍一

Electricity 電

Scope 2 範圍二





GHG SOURCES 溫室氣體排放源

Extinguisher 滅火器:

CO2二氧化碳

ABC powder ABC乾粉

Scope 1 範圍一

Septic tank 化糞池*

Scope 1 範圍一

Remark*

consider the emission from human power

考慮需要廠工所引致的排放

GHG SOURCES 溫室氣體排放源

Wastewater treatment 廢水處理系統

Scope 1 範圍一

Supplier data 供貨商用電、用氣處

Scope 3 範圍三

Renewable energy – Solar panel

再生能源-太陽能板

Renewable energy application 再生能源





GHG CALCULATION

溫室氣體計算

$$\text{活動數據} \times \text{排放係數/因子} = \text{溫室氣體排放}$$
$$\text{Activity Data} \times \text{Emission Factor} = \text{GHG emissions}$$

例子:

- Diesel usage 柴油使用量 = 3 liters
- Emission factor 排放因子* = 2kg CO₂e / liter diesel
- GHG emissions 碳排放 = 3 X 2 = 6 kg CO₂e

*Remark:

Some emission factors are provided in CO₂, CH₄ and N₂O, they will involve GWP conversion
一些排放因子以 CO₂、CH₄ 和 N₂O 的形式提供它將涉及GWP轉換



WHAT IS CO2E? 什麼是CO2E?

CO2e represented the convention between six GHGs
六種溫室氣體轉換到二氧化碳當量

The following six GHGs (Kyoto gases):
以下六種溫室氣體（京都氣體）：

For example:
Ratio CH₄ = 25 of CO₂
Activity Data x Emission Factor x GWP ratio = CO₂e

例子: CH₄ 比例 = 25 Co₂
活動資料 x 排放因子 x GWP 比例 = CO₂e

	Emission 排放	Chemical formula	GWP	Sources 來源	
二氧化碳	Carbon dioxide	CO ₂	1	Combustion processes	燃燒過程
甲烷	Methane	CH ₄	25	Landfills, coal mining, wastewater treatment, biomass combustion	堆填、煤炭開採、廢水處理、生物質燃燒
氧化亞氮	Nitrous oxide	N ₂ O	298	Agricultural soils and nitric acid production	農業土壤和硝酸生產
氫氟烴	HFCs	-	124 - 14800	Substitutes for ozone depleting substance, semiconductor manufacturing	消耗臭氧層物質的替代品、半導體製造
六氟化硫	Sulphur hexafluoride	SF ₆	22800	Electrical transmission and distribution	輸電和配電
全氟化合物	PFCs	-	7390 - 12200	Substitutes for ozone depleting substance, semiconductor manufacturing	消耗臭氧層物質的替代品、半導體製造

GWP: Global warming potentials of Greenhouse Gases (source: IPCC, 2007)
溫室氣體的全球暖化潛力



GHG CALCULATION

溫室氣體計算

Septic Tank 化糞池

Average no. of staff of the month X average no. of days of each staff staying in the factory (including working & non-working days) of the month

入數月份的平均員工人數 X 在入數月份每位員工平均在廠逗留日數 (包括工作及非工作天數)

Remark備註:

For above calculation, one of the method is to take the summation of the following 2 parts
上述的計算，其中一個方法是採納以下2個部分的總和:

- Average no. of staff in working days X no. of working days of the month
在入數月份的工作日平均員工人數 X 該月份的工作日數
- Average no. of staff in non-working days X no. of non-working days of the month
在入數月份的非工作日平均員工人數 X 該月份的非工作日數

Depends on different situations, you can use your own method for estimation
根據不同情況，您可以選擇適合貴工廠的方法進行估算。



THE GREENHOUSE GAS PROTOCOL

溫室氣體盤查議定書

- GHG emissions may come from energy related emission sources or non-energy related emission sources
 - 溫室氣體排放可由能源相關或非能源相關的排放源排放出來
- Examples of **energy related** emission sources: **能源相關**的排放源例子
 - Combustion of natural gas in boilers 鍋爐燃燒天燃氣
 - Combustion of diesel / gasoline in vehicles 汽車燃燒柴油或汽油
- Examples of **non-energy related** emission sources: **非能源相關**的排放源例子
 - Fugitive emissions of refrigerant 冷卻劑洩漏
 - Wastewater treatment system 廢水處理系統

DATA COLLECTION & INPUT 資料收集及輸入



Electricity bill, fuel/material usage record, meter record, purchasing invoice, production output record...etc

電費單, 燃料用量紀錄, 儀表紀錄, 採購發票單據, 生產數量紀錄....

Account Number 88000-22222-1	Total Amount Due \$79,123.00	Autopay on 15-02-11	Business Plus Hotline: 2678 2688 Website: www.ctponline.com.hk
Energy Charge:			
On-Peak	@ 63.2 ¢	41,369 units	\$26,145.21
Off-Peak	@ 56.2 ¢	45,931 units	25,813.22
Demand Charge:			
On-Peak	@ \$ 61.9	240 kVA	14,856.00
Off-Peak	@ \$ 24.2	0 kVA	0.00
Fuel Clause	@ 14.1 ¢		12,309.30
Odd Cents Brought Forward			0.18
Odd Cents Carried Forward			-0.91
Total Amount			\$79,123.00

Vehicle Mark 車牌號碼	Month 月份	Fuel 燃油	Qty in Litre 燃油數量(公升)	Amount (HK\$) 總金額(港幣)
	Sep 2018	Synergy Supreme+	63.05	\$998.70
	Sep 2018	Synergy Supreme+	79.17	\$1,253.20
	Sep 2018	Synergy 柴油	48.50	\$383.20
	Sep 2018	Synergy Supreme+	266.95	\$4,225.70
	Sep 2018	Synergy Extra	87.56	\$1,286.20
	Sep 2018	Synergy Supreme+	110.78	\$1,753.60
	Sep 2018	Synergy Supreme+	57.73	\$913.80
	Sep 2018	Synergy Extra	44.77	\$664.40
	Sep 2018	Synergy Extra	202.08	\$2,968.50
	Sep 2018	Synergy Supreme+	47.42	\$757.70
	Sep 2018	Synergy Extra	174.21	\$2,564.30
	Sep 2018	Synergy Extra	175.86	\$2,583.40
	Sep 2018	Synergy Extra	212.73	\$3,133.00
	Sep 2018	Synergy Extra	290.08	\$4,277.90

Data input once a month

每月資料輸入一次



DATA COLLECTION & INPUT

資料收集及輸入

Electricity bill, fuel/material usage record, meter record, purchasing invoice, production output record...etc

電費單, 燃料用量紀錄, 儀表紀錄, 採購發票單據, 生產數量紀錄....

供电局电费复核单 2009.12

抄表序号: 19
户号: 3000019255* 上次抄表日期: 2009-12-01 本次抄表日期: 2010-01-01 变压器容量: 630

户名: 累计月份: 1

资产编号	电表号	性质	本月指数	上月指数	功能	倍率	变损	换表电量	加减电量	分项差	电量	单价	合计电费
3000523755	282015	考核表	10189.37	10074.95	无功	200	10937	0	0	0	32019		
3000523755	282015	大工业1-10 总	3396.76	33502.55	有功	200	2197	0	0	0	69237		
3000523755	282015	大工业1-10 峰	12979.18	12855.83	有功	200	808	0	0	-1	25477	1.0842	27622.16
3000523755	282015	大工业1-10 平	16954.28	16779.93	有功	200	1143	0	0	-1	35012	0.6775	24398.13
3000523755	282015	大工业1-10 谷	3904.3	3866.79	有功	200	246	0	0	0	7748	0.3647	2826.7

有功电量: 69237 无功电量: 32019 力率: 0.91 调整率: -0.0015 计费容量: 630 变压器国家标准:
电度电费: 54845.99 基本电费: 14490 调整电费: -98.62 违约金: 电费总计: 54845.99 金额结算: 69237.37 * 金额结算不含违约金
备注: 金额结算不含违约金

金额(大写): 陆万玖仟玖佰叁拾柒元叁角柒分
总表电量: 0 分表电量: 67040 (总一分)/总%:

4400073140 广东增值税专用发票 No. 09242732

开票日期: 2009年02月19日

名称:	纳税人识别号:	3<68127-8+67812>>3-47	加密版本: 01
地址、电话:	4400073140	65**7/+1>23<42104*820	
开户行及帐号:	26683-0534*157007>>5-	09242732	
货物或应税劳务名称	规格型号	单位	数量
汽油	97#	公升	1065.41
		单价	金额
		4.8290626359	5144.93
		税率	税额
		17%	874.64
合计			¥ 5144.93
价税合计(大写)		陆仟零壹拾玖圆伍角柒分	
		(小写) ¥ 6019.57	

第三联: 发票联 购货方记账凭证

Data input once a month

每月資料輸入一次



DATA COLLECTION & INPUT

資料收集及輸入

燃料單位 (Fuel unit)

北61号区(汝湖镇虾村) 0752-2811028	码	4912,		
惠州市江北支行 81232	区	752*6		
11091001		91282		
规格型	Unit	单位	数量	单价
Ton	吨	73.84	646.01769912	

Inputs

Flows	Quantities	Amount	Units	T
↕	Mass	0.0372	kg	X



DATA COLLECTION & INPUT

資料收集及輸入

燃料數量 (Fuel QTY)

用电量	分项差	Electricity Usage 电量	单价
0		32019	
0		69237	
-1		25417	1.0842

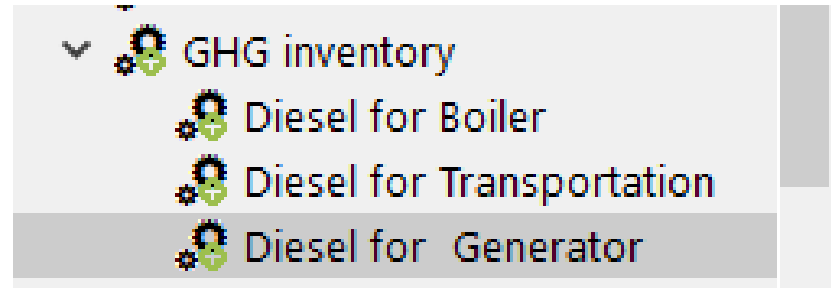
Outputs

Parameter	Flows	Quantities	Amount /	Units	Trade
■	Electricity [Electric power]	Energy (net cal	0.00112	kWh	X



DATA COLLECTION & INPUT 資料收集及輸入

活動設立 (Activity set-up)



- Each emission source should be counted individually, for example: diesel consumption of boilers cannot be counted together with diesel generators and diesel car
- 每項排放源活動需獨立統計燃料用量，舉例：鍋爐用柴油排放源數據，不可包括如發電機、柴油車等等的柴油用量



DATA COLLECTION & INPUT 資料收集及輸入

實際用量作輸入(Actual Fuel Usage input)

- The basic principle for data input should rely on actual consumption amount. If purchased record is involved, need to pay attention on the data input at the beginning / end of a year which should be normalized.(Normalization)
- 應輸入基本原則，如要用購買紀錄作輸入，則需留意年度頭尾的用量要進行常態化。
 - 例：2008 及 2009 作資料輸入 (Ex: 2008 & 2009 as data input)鍋爐柴油購買紀錄: (Boiler Diesel purchasing record)2008年8月(2008 Aug): 500公升(liters),**2008年12月(2008 Dec):200公升(liters),** 2009年2月(2009 Feb): 500公升(liters).....
- Assume the previous purchased volume is almost used up before every new purchase, when input 2008 Dec / 2009 Jan data, the input amount 200 liters allocated to each month can be either estimated by considering the proportion of their production volume or evenly distributing among them.(See what situation is applicable)
- 假設購買前已差不多用完上次的購買量，在輸入2008年12月及2009年1月用量時，可按2008年12月及2009年1月的生產量的比例或平均比例(按實際情況決定)，把200公升柴油分配到這兩個月內。



DATA COLLECTION & INPUT 資料收集及輸入

生物燃料(Biological Fuel)

-	-
Total Scope 3 Emissions [tonne CO ₂] \\ 总计 范围 3 排放量[吨 CO ₂]	0
Total Emissions [tonne CO ₂] \\ 总计 排	0
2.3 Biological Emission \\ 生物排放	
Type of emission \\ 排放类型	CO ₂ \\ 吨CO ₂
-	-
2.4 Base year emissions \\ 重新计算基准年	
Significant emissions changes that trigger base year emissions recalculation. 产生重大的排放变化导致基准年的重新计算 ^[4]	None \\ 无

- CO₂ from Biofuel such as wood is not counted towards the company carbon footprint, will count separately.
- 生物燃料如木料，二氧化碳不會計算在整體的碳排放數據內，只會獨立計算出來。

04

PRODUCT CARBON
FOOTPRINTS
產品碳足跡

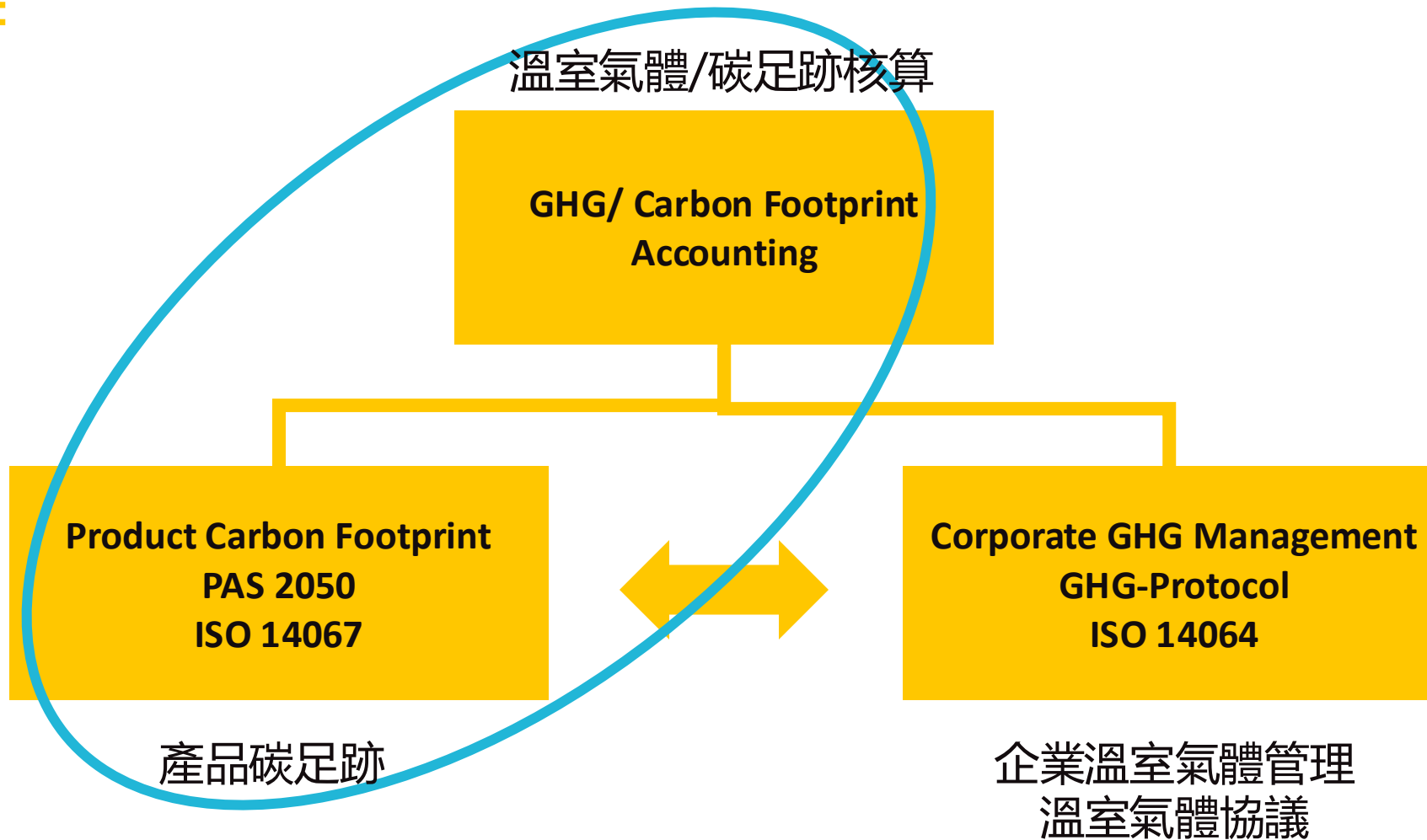


ROADMAP FOR RELEVANT STANDARDS OF PRODUCT CARBON FOOTPRINT (PCF) PCF相關標準路線圖



Overview for Product Carbon Footprint:

產品碳足跡:

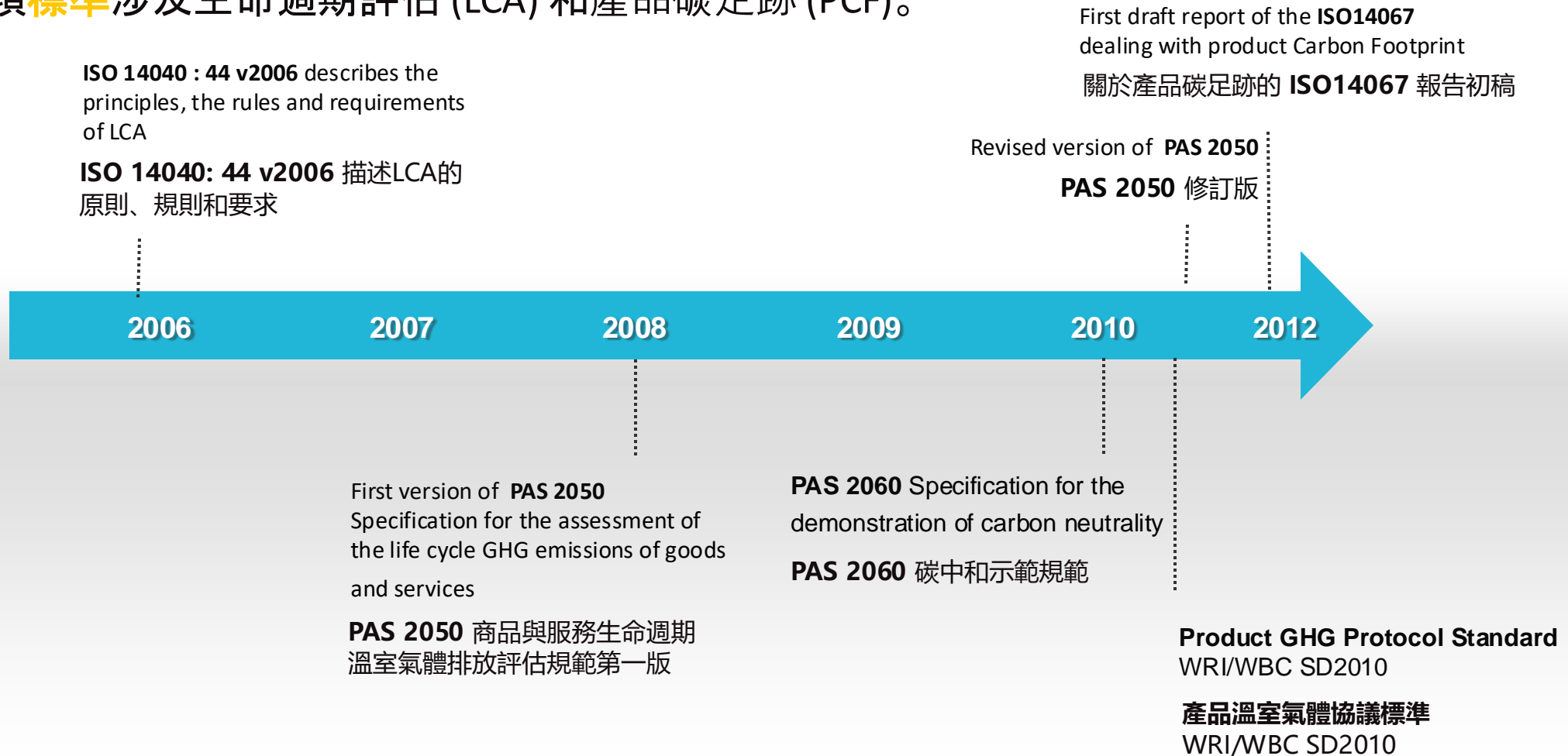




ROADMAP FOR RELEVANT STANDARDS OF PRODUCT CARBON FOOTPRINT (PCF)

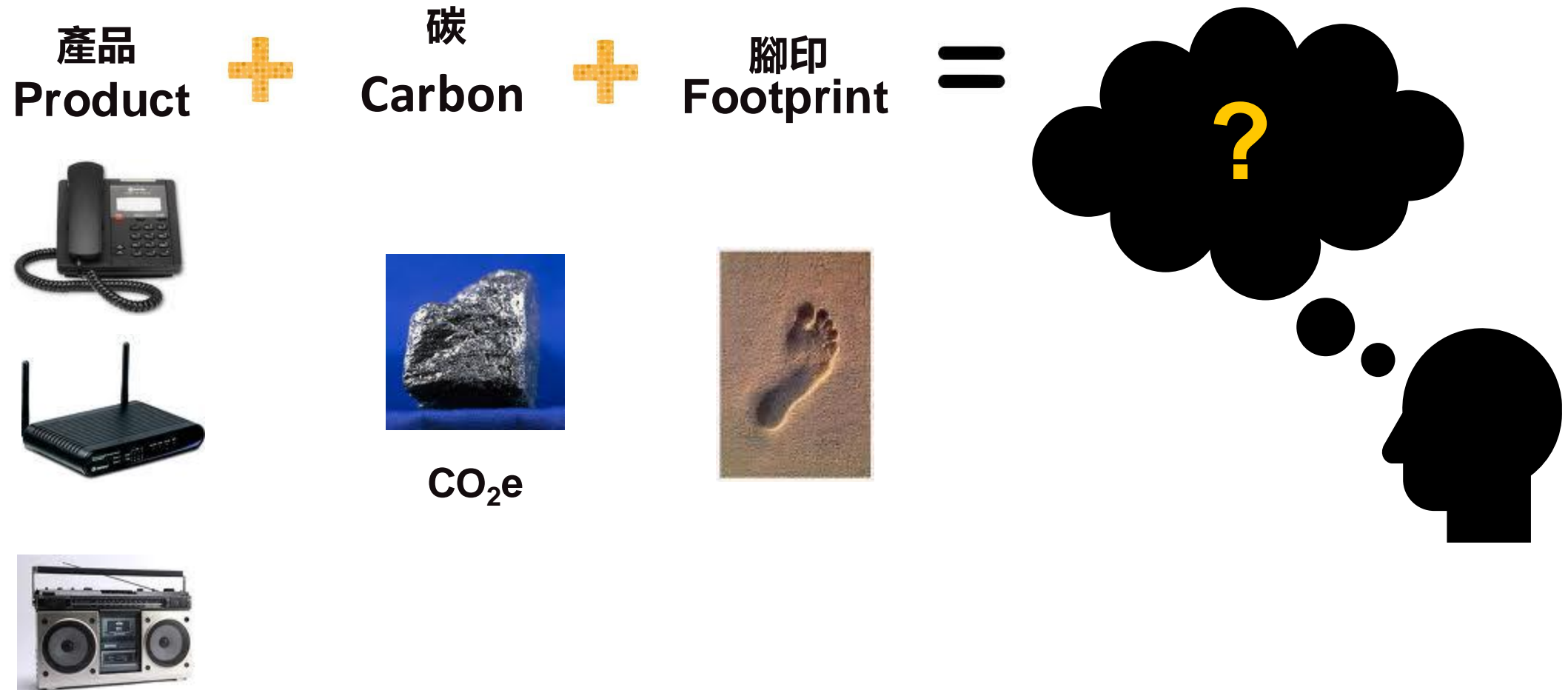
PCF相關標準路線圖

- Several **standards** deal with Life Cycle Assessment (LCA) & carbon footprint of products (PCF).
- 多項**標準**涉及生命週期評估 (LCA) 和產品碳足跡 (PCF)。



WHAT IS PRODUCT CARBON FOOTPRINT (PCF)?

什麼是產品碳足跡 (PCF)?





CORPORATE VS PRODUCT LEVEL

企業層面與產品層面

Corporate Footprint:

- Identifies direct regulatory and financial exposure
- Identifies key direct opportunities for action
- Addresses corporate brand

企業碳足跡：

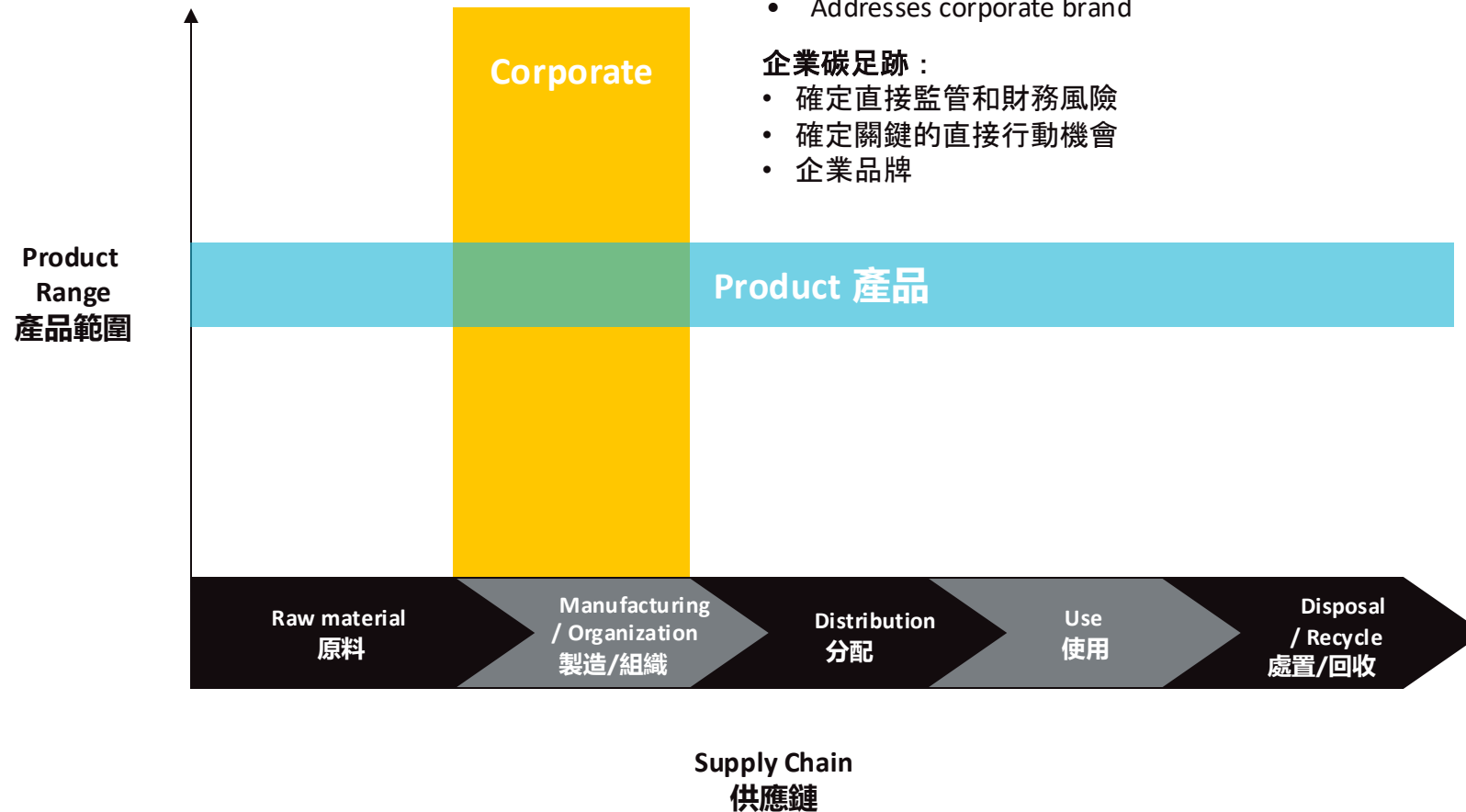
- 確定直接監管和財務風險
- 確定關鍵的直接行動機會
- 企業品牌

Product Footprint:

- Appeals to consumers
- Looks at impacts outside company boundary

產品足跡：

- 對消費者的吸引力
- 著眼於公司範圍之外的影響



METHODOLOGY OF PCF

PCF的計算方法



Life Cycle Assessment
生命週期評估



上游

製造

下游

Upstreaming

Manufacturing

Down streaming



Material selection
and parts
manufacturing

Manufacturing
process

Transportation
運輸

Use
phase

Disposal
處置

材料選擇和零件製造

製造過程

使用階段

將上游消耗的原
料和能源轉化為
二氧化碳當量

Conversion of
upstream consumed
Raw Material and
Energy to CO₂e

將製造消耗的
能源轉換為二
氧化碳當量

Conversion of
manufacturing
consumed Energy to
CO₂e

將下游消耗的
能源轉化為二
氧化碳當量

Conversion of
downstream
consumed
Energy to CO₂e

e.g.

1.5 kg CO₂ equiv.

0.05 kg CO₂ equiv.

10 kg CO₂ equiv.

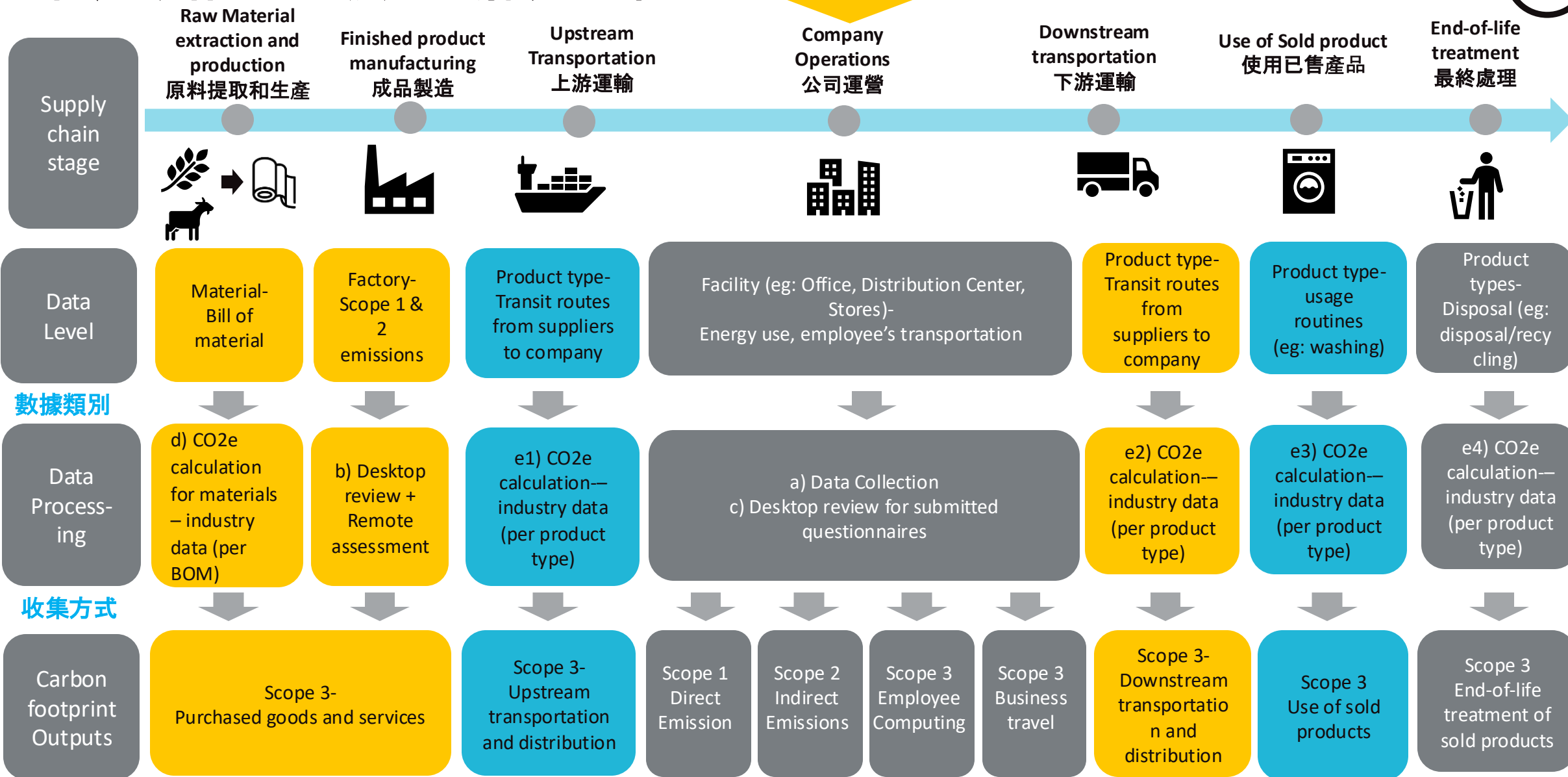
PCF = 11.55 kg CO₂ equivalent

Product Carbon Footprint

產品碳足跡

CARBON FOOTPRINT SOLUTIONS BY SUPPLY CHAIN STAGE

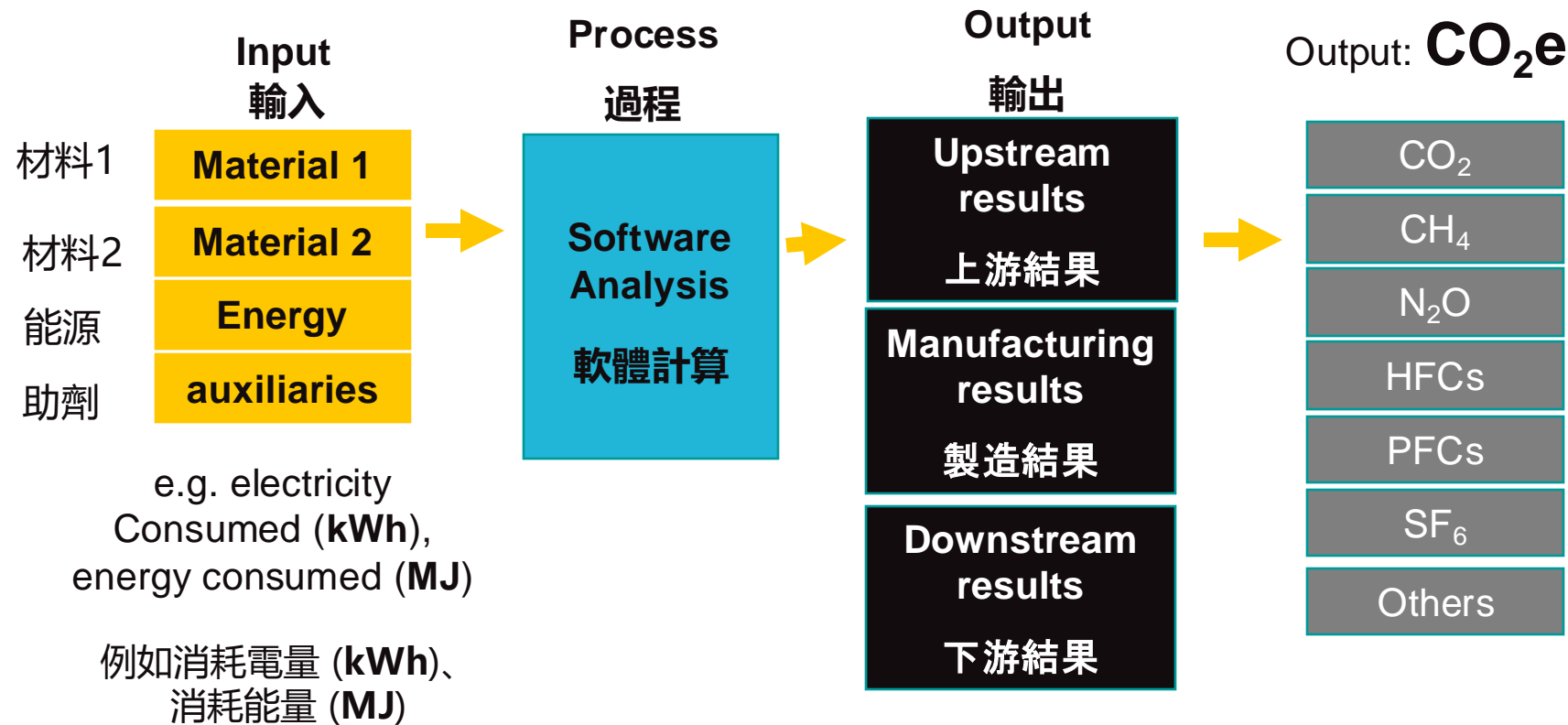
供應鏈階段的碳足跡解決方案



METHODOLOGY OF PCF

PCF的計算方法

- Primary Data 初級活動數據和 Secondary Data 次級數據應透過將活動數據乘以活動的排放因子來轉換為溫室氣體
- 排放量排放量可以透過全球領先的LCA軟體計算，例如LCA for expert (Gabi) ...



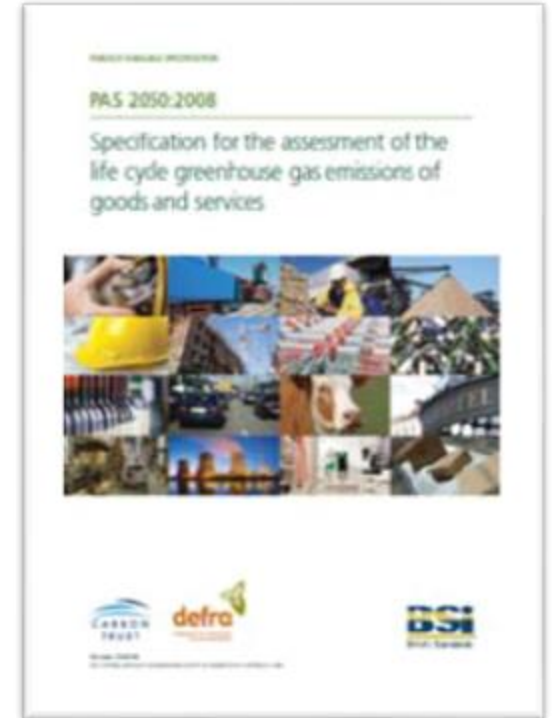
PRODUCT CARBON FOOTPRINT STANDARD 產品碳足跡標準



Product Carbon Footprint – PAS 2050

產品碳足跡 – PAS 2050

- Provides a **common method** of assessing product GHG emissions associated with the life cycle of **goods** and **services**.
提供評估與**商品**和**服務**生命週期相關的產品溫室氣體排放的**通用方法**。
- Allows internal assessment of the existing life cycle GHG emissions of product and seeking for improvement in new version and **reduce the manufacturing cost**.
允許對產品現有生命週期溫室氣體排放進行內部評估，並尋求新版本的改進並**降低製造成本**。
- Provide a **benchmark** for ongoing programmers aimed at reducing GHG emissions
為旨在減少溫室氣體排放的持續程式設計師提供**基準**
- Allows for a **comparison** of goods or services using a common, recognized and standardized approach to life cycle GHG emissions,
允許使用通用、公認和標準化的生命週期溫室氣體排放方法對商品或服務進行**比較**,
- **Supporting document** of Company based Carbon footprint measurement.
基於公司的碳足跡測量的**支持文件**。
- **Based on existing (ISO14040-44) LCA technique**
基於現有 (ISO14040-44) LCA 技術



Product Carbon Footprint
– PAS 2050:2008 or new update

Assessing the life cycle greenhouse gas emissions of **goods** and **services**

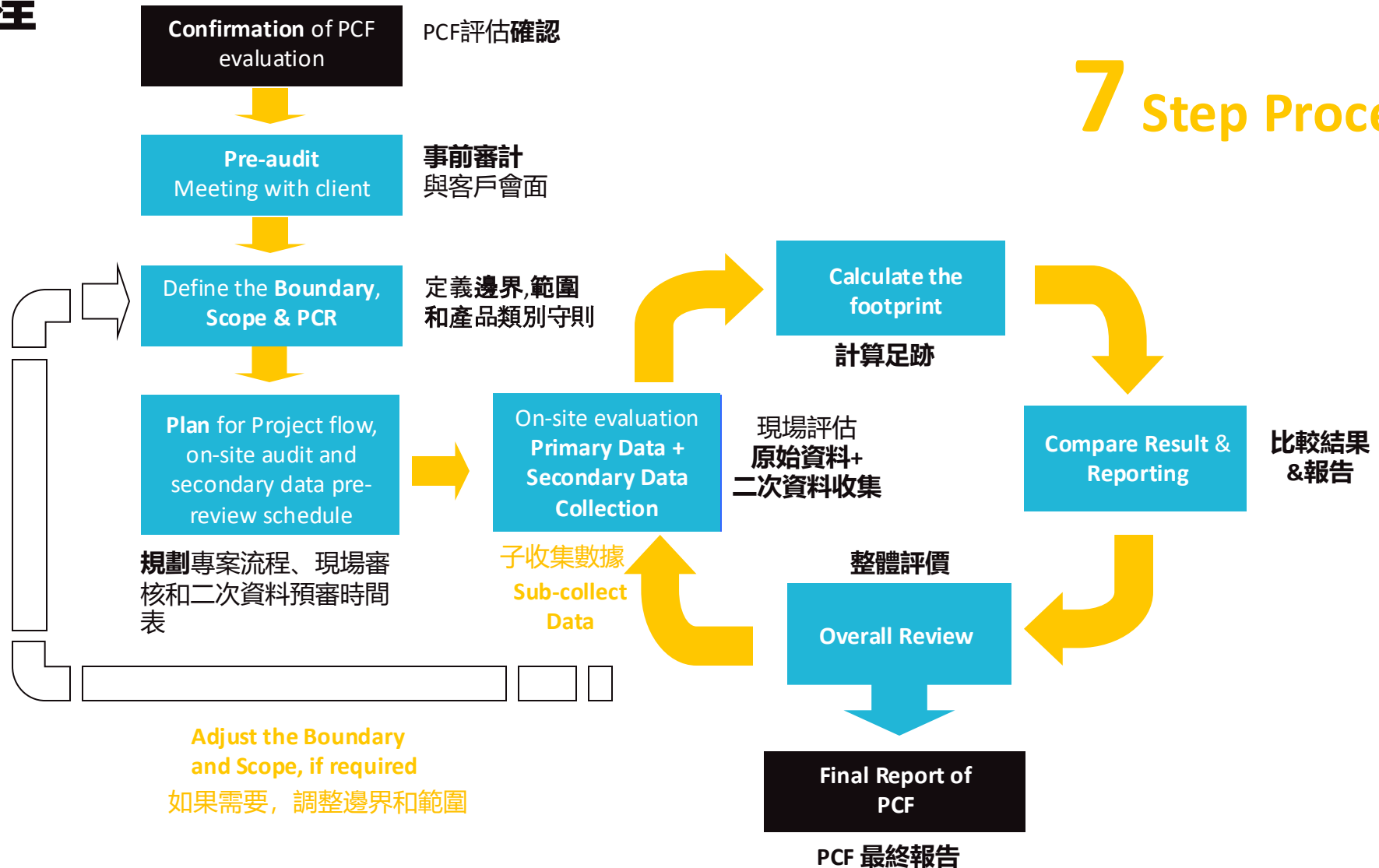
評估**商品**和**服務**的生命週期溫室氣體排放



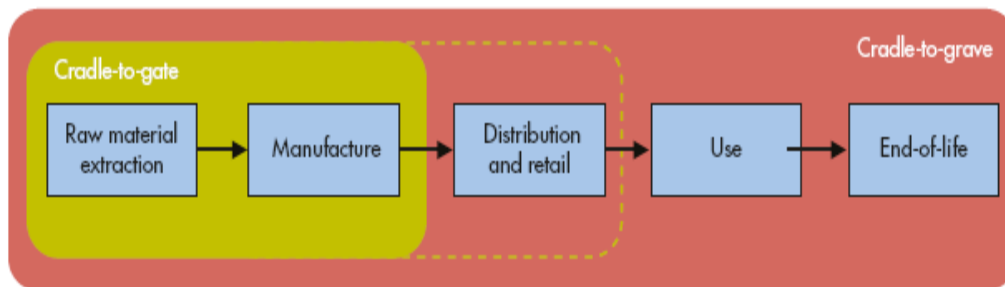
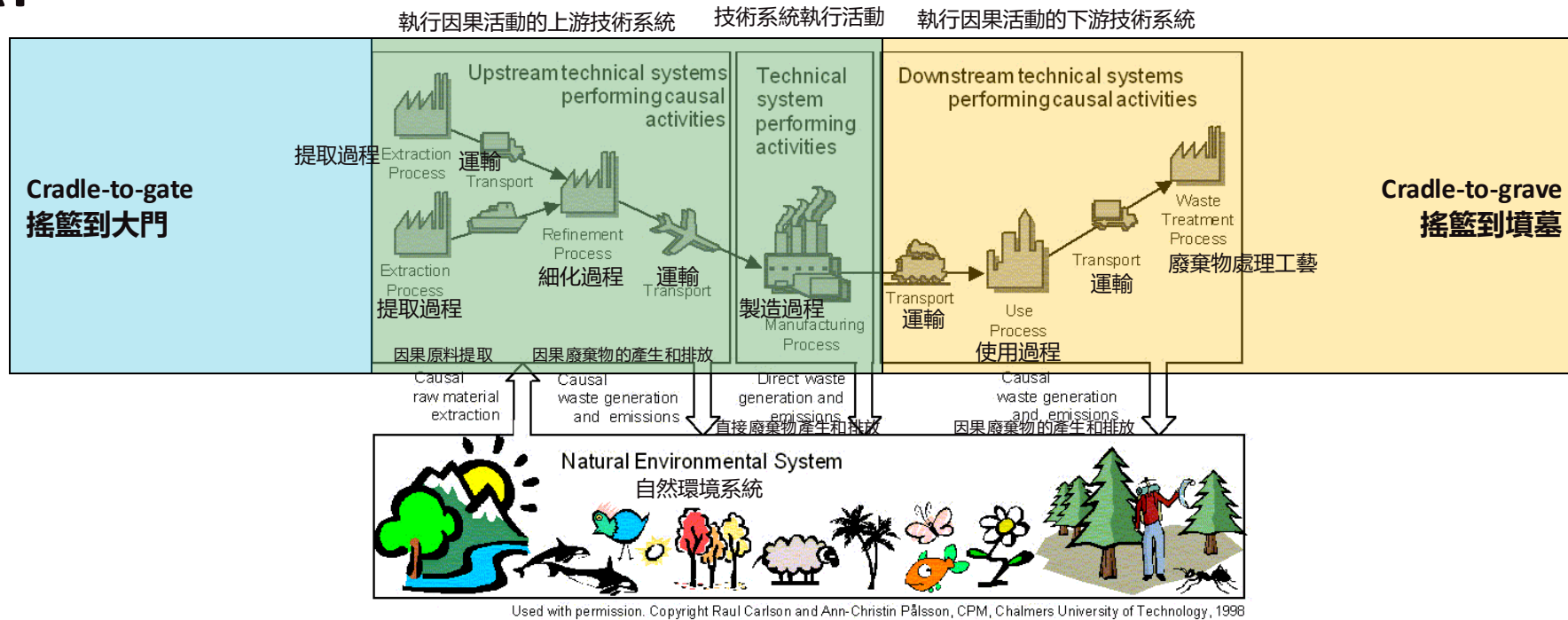
WORKFLOW OF PRODUCT CARBON FOOTPRINT (PCF)

PCF的流程

7 Step Process



BOUNDARY 邊界



Note: cradle-to-gate boundaries can vary according to the position of the 'gate'

Cradle-to-gate: These assessments are commonly used where a buyer has asked a supplier to provide information on the carbon footprint of the product they supply.

從搖籃到大門：這種評估通常用於買家要求供應商提供其所供應產品的碳足跡資訊的情況。

Cradle-to-grave: These assessments lack the completeness of a full cradle-to-grave assessment, and may miss a large proportion of the impact for certain products. E.g. for energy-using products, the vast majority of the overall carbon footprint will result from the electricity used in the use phase.

從搖籃到墳墓：此評估缺乏完整的從搖籃到墳墓評估的完整性，並且可能會遺漏某些產品的很大一部分影響。例如，對於用能產品來說，整體碳足跡的絕大多數將來自於使用階段所使用的電力。

PRODUCT CATEGORY RULES (PCR)

產品類別守則



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EPD Library



PCR Library



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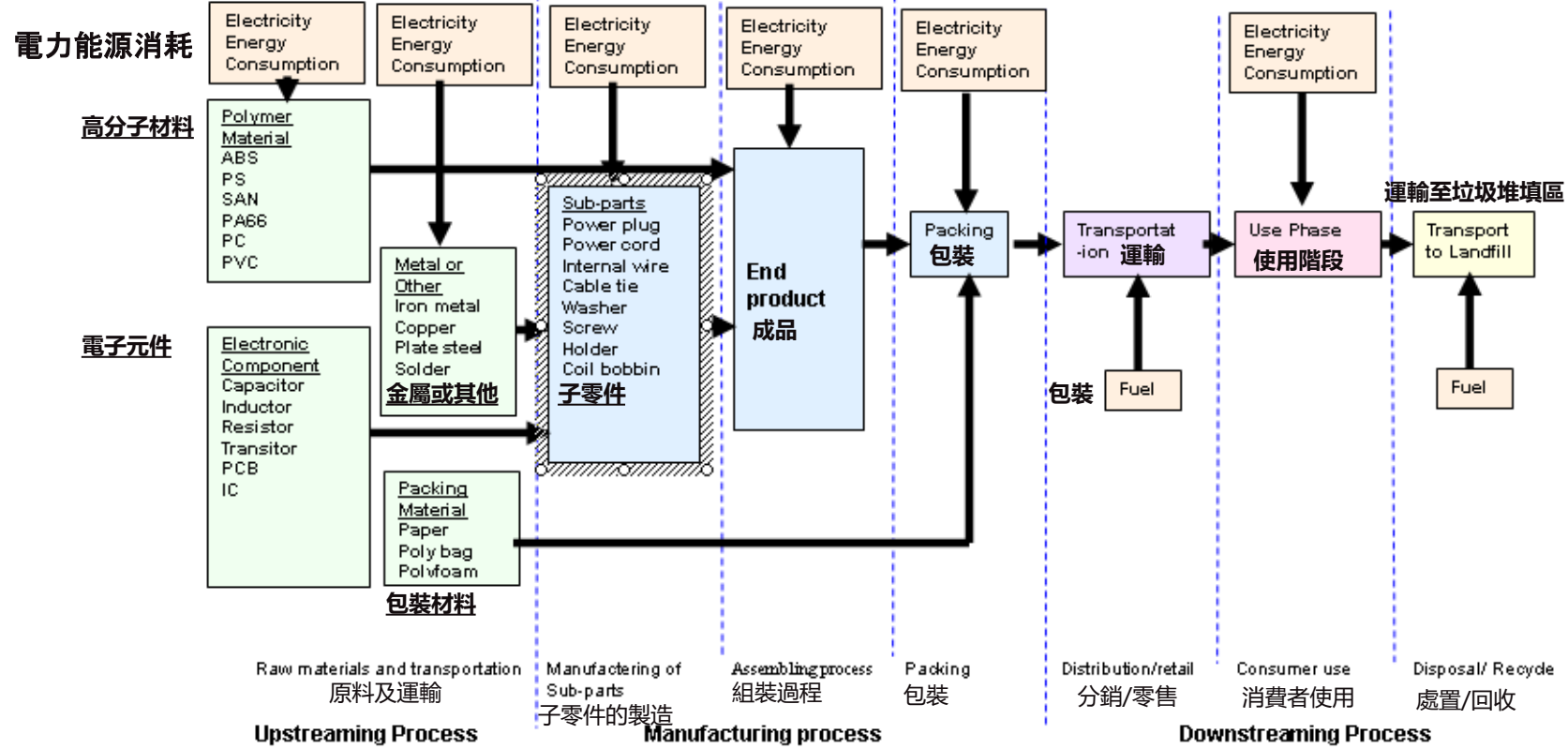
- ▼ Abrasive products (c-PCR to PCR 2019:14)
- ▼ Air ducts, substantial materials (non-construction product)
- ▼ Air-conditioning machines
- ▼ Apparel, except fur and leather apparel
- ▼ Arable and vegetable crops
- ▼ Arable crops (expired 2020-12-15)
- ▼ Asphalt mixtures (Europe, Australia)
- ▼ Bakery products
- ▼ Basic aluminium products and special alloys
- ▼ Basic chemicals
- ▼ Basic inorganic chemicals n.e.c.
- ▼ Basic products from forestry
- ▼ Bearings, bearings units and parts thereof
- ▼ Being updated - Absorbent hygiene products

EXAMPLE: POWER SUPPLY PROJECT

例子: 電源供應器



Process Flow for Power Supply



物料名稱	單位	數量	單位	消耗量
410-140-220	個	1		0.45
500-140-200	個	1		0.71
120-120-200	個	1		0.54
107-40	個	1		203.18
				0.01
P-800	個	1		0.60
P-1000	個	1		0.70
P-1500	個	1		0.70
440-140-220-140-140	個	1		11.00
5-120mm-200	個	1		17.26
150-150-EP2	個	1		11.48
150mm	個	1		0.00
44	個	1		10.01
80mm	個	1		1.01
150mm	個	1		0.14
150-150-100-EP2	個	1		4.73
150	個	1		2.50
150-150-100-EP2	個	1		1001.24
150-150	個	1		0.50
150-150	個	1		0.42
150-150	個	1		310.21
150-150	個	1		10.30
150	個	1		90.00
150	個	1		0.20
1500-10	個	1		1.00
1500-1000	個	1		887.00
1500-1000	個	1		90.00
1500-1040-100	個	1		0.80
1500	個	1		0.01
1500	個	1		8.80
1500	個	1		0.01
1500	個	1		8.47
1500	個	1		0.01
1500	個	1		31.16
1500	個	1		0.14
1500	個	1		0.01
1500	個	1		1.44
150-150	個	1		203.18
150-150	個	1		0.01
150-150	個	1		0.09
1500	個	1		0.01
1500	個	1		0.01
1500	個	1		0.00
1500	個	1		0.01
1500	個	1		0.01
1500	個	1		0.05





EXAMPLE: POWER SUPPLY

例子: 電源供應器

Emission results of Power Supply

電源供應器排放結果

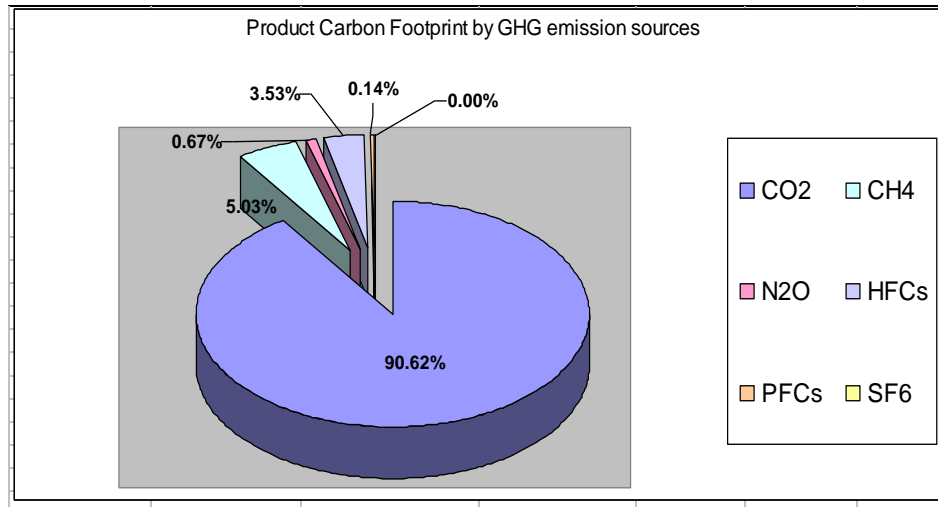
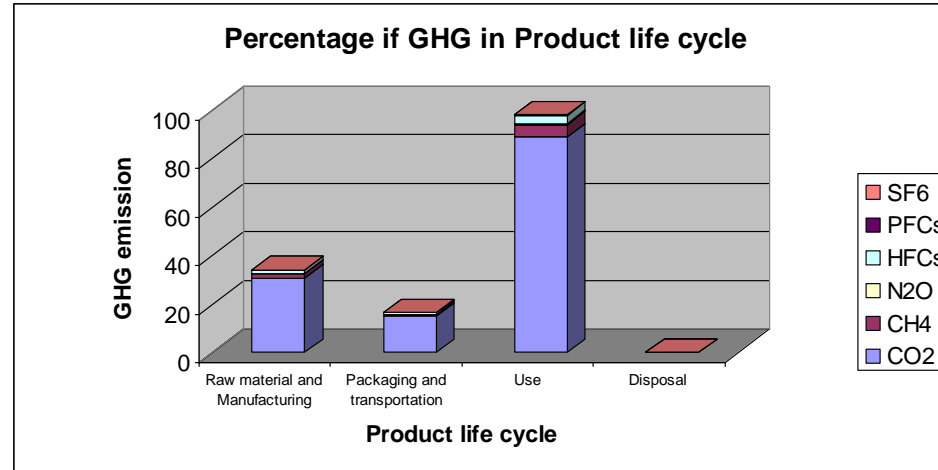
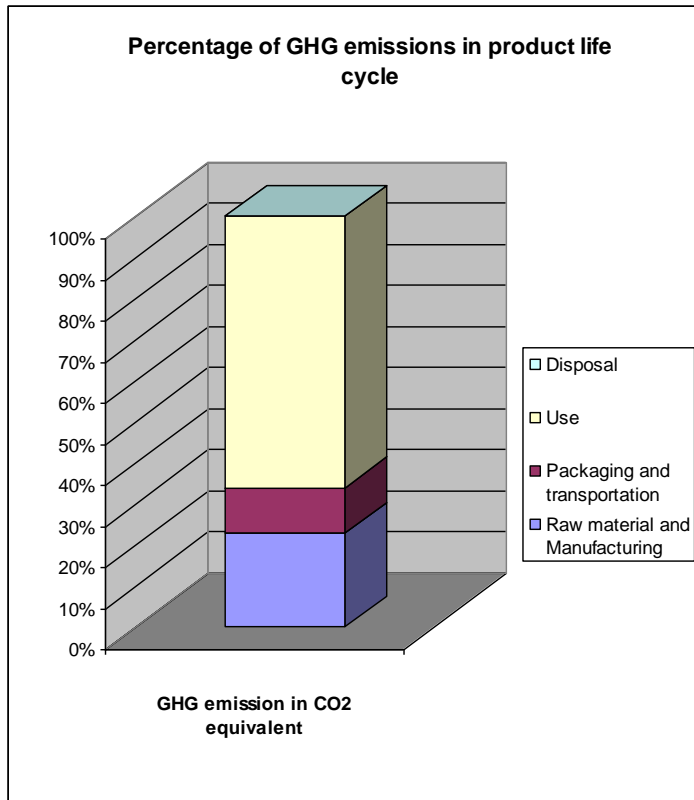
		中國	歐洲	美國	中國	歐洲	美國
General Power Supplier GWP (in kg eq CO2) 電源供應器 GWP (kg eq CO2)		Absolute values 絕對值			Relative values (in %) 相對值 (%)		
		China	Europe	USA	China	Europe	USA
零件供應商的運輸配送	Transport distribution from component's supplier	0.17			0.10%	0.12%	0.10%
插頭插腳生產	Plug pins production	1.83			1.04%	1.24%	1.12%
電線生產	Cable production	2.63			1.50%	1.79%	1.61%
銅線生產	Copper wire production	1.05			0.60%	0.71%	0.64%
電子元件生產	Electronic component production	4.52			2.58%	3.07%	2.77%
螺絲生產	Screw production	0.83			0.47%	0.56%	0.51%
PCB 生產	PCB production	10.88			6.20%	7.39%	6.66%
塑膠蓋和其他聚合物零件的生產	Plastic cover and other polymer parts production	5.55			3.16%	3.77%	3.40%
元件焊接	Component Soldering	1.67			0.95%	1.13%	1.02%
組裝作業	Assembly operations	3.59			2.05%	2.44%	2.20%
包裝	Packaging	1.23			0.70%	0.84%	0.75%
運輸配送至零售商店	Transport distribution to retailer shop	0.16	15.21	18.88	0.09%	0.11%	0.10%
使用的電力 (滿載時)	Use phase electricity (when full load)	141.33	98.02	110.42	80.53%	95.99%	86.51%
處置 - 掩埋或焚燒	Disposal - Landfill or Incineration	0.05	0.06	0.12	0.03%	0.03%	0.03%
Total		175.49	147.24	163.37	100%	100%	100%



EXAMPLE: POWER SUPPLY PROJECT

例子: 電源供應器

Emission results of Power Supply 電源供應器排放結果





EXAMPLE: LAPTOP COMPUTER

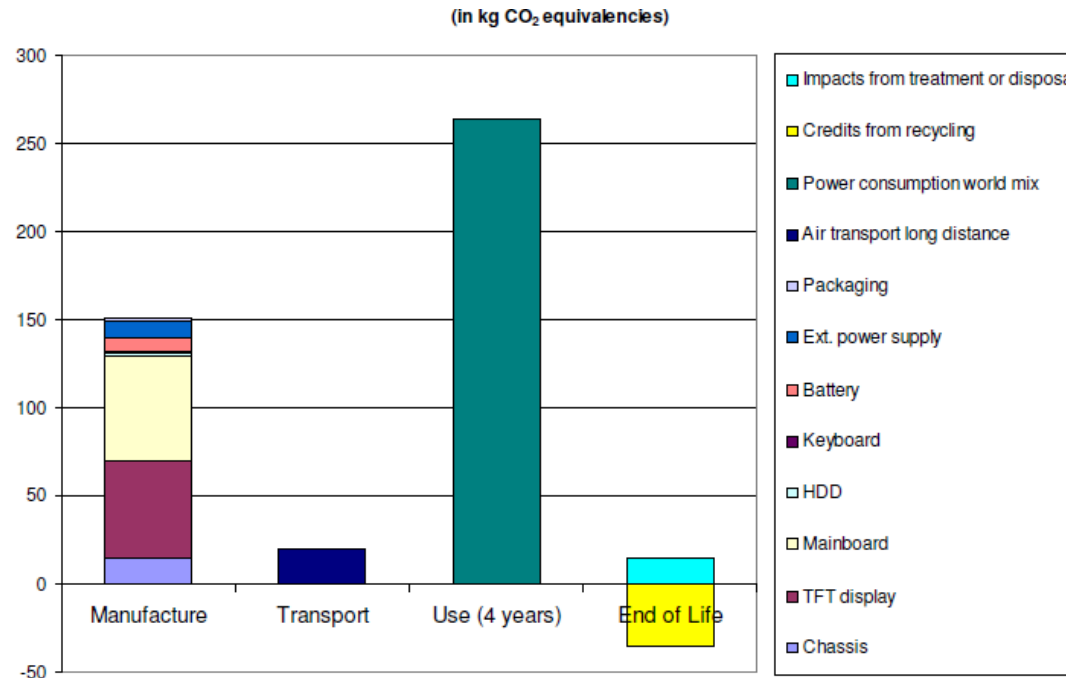
例子: 筆記型電腦

Sample: Laptop Computer

- Total mass about 1.5 kg
- 14" TFT display
- HDD 3.5", 1GB RAM, graphic on board, single core processing unit
- External PSU with cable to plug
- Li-ion battery about 300g
- Use phase assumed to be 4 years, typical usage

樣本：筆記型電腦

- 總質量約1.5公斤
- 14" TFT 顯示屏
- HDD 3.5"、1GB RAM、板載顯示卡、單核心處理單元
- 帶電纜插頭的外部 PSU
- 鋰離子電池約300g
- 使用階段假定為 4 年，典型使用情況





EXAMPLE: CD DOCKING PROJECT

例子：CD 對接器



加工機械	使用的能源
Process Machinery*	Energy Used (MJ)
Molding of HI-PS	4.13
Molding of ABS	4.99
Injection of HDPE	0.00
Injection of PC	0.08
Molding of PC	0.34
Machining metal stamping of steel	0.30
Machining metal stamping of cast iron	0.41
Machining metal stamping of aluminium	0.12
Soldering of copper	0.37
Machining metal stamping of copper	0.11
Injection of PVC and copper	0.35
Wave-soldering of solder	0.83
Solder	0.56
Wave-soldering of printed wiring board FR4 1s1I (AuNi, rigid, single layer)	1.35
Reflow-solder of IC	1.56
Wave-soldering of resistors	0.78
Wave-soldering of capacitors	2.96
Reflow-solder of capacitors	0.75
Wave-soldering of coil	0.02
Wave-soldering of LCD display	0.54
Printing of paper woody uncoated	0.03
Injection & print of chromo cardboard (GC)	1.32
Injection & print of corrugated board mixed	1.63
Molding of pulp board	0.88

EXAMPLE: CD DOCKING PROJECT

例子：CD 對接器



材料種類

Material Type*
HI-PS
ABS
PCB
Resistor
Copper
Cast iron
IC
Aluminium
Steel
Solder
LCD
PVC
Capacitor
Coil
PC



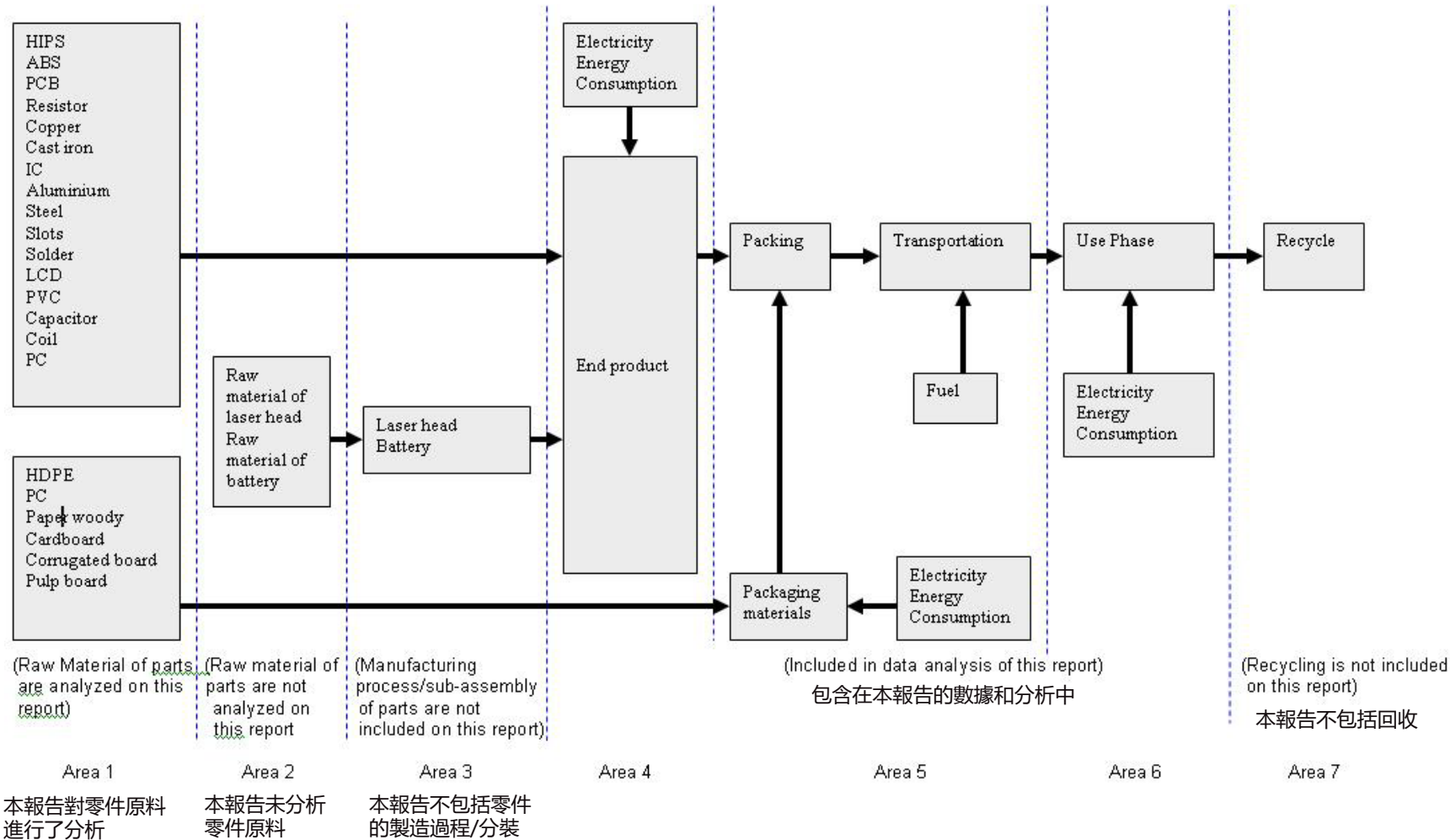
材料種類

Material Type*	Weight in kg
HI PS	0.4645
ABS	0.3515
PCB	0.07983
Resistor	0.04832
Copper	0.11506
Cast iron	0.21468
IC (includes diodes and micro switches)	0.00978
Aluminium	0.01139
Steel	0.0291
Solder	0.0137
LCD	0.00613
PVC	0.00768
Capacitor	0.0363511
Coil	0.00221
PC	0.017



EXAMPLE: CD DOCKING PROJECT

例子：CD 對接器



05

**EXAMPLES OF ECOLOGICAL
DESIGN FOR PRODUCTS
產品生態化設計實例**



EXAMPLE: CELL PHONES



20% 回收或可再生成分

超過 38% 的製造業電力來自供應商清潔能源項目

Progress toward our 2030 goal

20% recycled or renewable content¹

Over 38% of manufacturing electricity sourced from supplier clean energy projects²

Smarter chemistry³

- Arsenic-free display glass
- Mercury-free
- Brominated flame retardant-free
- PVC-free
- Beryllium-free

Longevity

iPhone 15 Pro and iPhone 15 Pro Max feature Ceramic Shield as well as IP68 water and dust resistance that enhance the durability of the device.⁴



Responsible packaging

99% fiber-based, due to our work to eliminate plastic in packaging⁵

100% recycled or responsibly sourced wood fibers

由於我們致力於消除包裝中的塑料，因此 99% 以纖維為基礎

100% 回收或負責任採購的木纖維

Recovery

Return your device through Apple Trade In, and we'll give it a new life or recycle it for free.

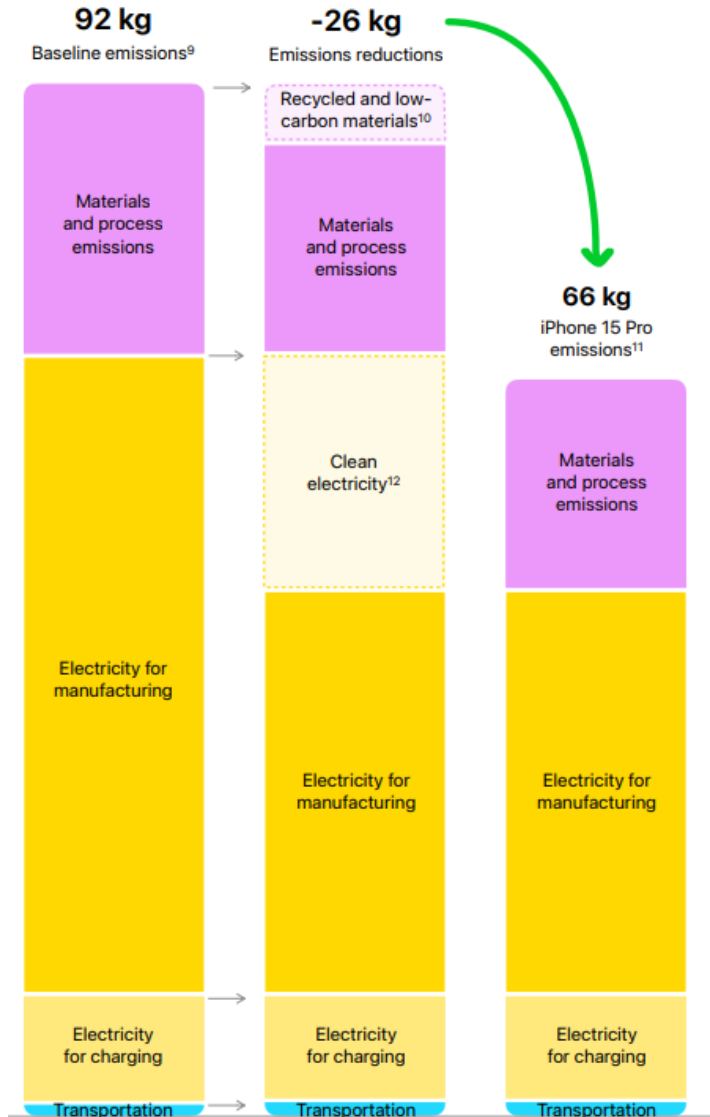
Responsible manufacturing

Apple Supplier Code of Conduct sets strict standards for the protection of people in our supply chain and the planet.

EXAMPLE: CELL PHONES



- 與基準相比，Cell Phone P 的排放量減少了 28%。
- Cell Phone P 和 Cell Phone P Max 含有 20% 的可回收或可再生材料，使 Cell Phone P 和 Cell Phone P Max 的排放量減少了近 6%。
- 與供應商合作將 Cell Phone 的生產過渡到 100% 清潔電力。
- 供應商迄今已實施的清潔電力解決方案已使 Cell Phone P 和 Cell Phone P Max 的排放量減少了 21%。





EXAMPLE: CELL PHONES

Greenhouse gas emissions were calculated using a life cycle assessment (LCA) methodology in accordance with ISO 14040, ISO 14044, and ISO 14067 standards and based on Pro with 128GB. The LCA boundary for this product includes the physical product and all of its components, as well as all in-box accessories.

溫室氣體排放量是根據 ISO 14040、ISO 14044 和 ISO 14067 標準採用生命週期評估 (LCA) 方法計算得出的，計算依據是 128GB 的 Cell Phone P。此產品的 LCA 範圍包括實體產品及其所有組件，以及所有盒內配件。

Greenhouse gas emissions	Pro 128GB	Pro Max 256GB
Total product footprint	66 kg CO ₂ e	75 kg CO ₂ e
Apple emissions from utility-purchased electricity (scope 2)	0 kg CO ₂ e	0 kg CO ₂ e
Life cycle product emissions (scope 3)	66 kg CO ₂ e	75 kg CO ₂ e
• Production	83%	83%
• Transportation	3%	3%
• Product use	15%	15%
• End-of-life processing	<1%	<1%
GHG reductions achieved ⁹	↓29%	↓30%

Note: Percentages may not total 100 due to rounding.

We've also calculated the product carbon footprint for different configurations.

Configuration	iPhone 15 Pro	iPhone 15 Pro Max
256GB	71 kg CO ₂ e	75 kg CO ₂ e
512GB	83 kg CO ₂ e	87 kg CO ₂ e
1TB	107 kg CO ₂ e	110 kg CO ₂ e

LCA emissions LCA排放

Cell Phone P 128G 減排29%
Cell Phone P max 256G 減排30%

LCA emissions of different models
不同型號的LCA排放量



EXAMPLE: SUSTAINABLE MATERIALS AND PACKAGING

EXAMPLE: 可持續使用材料和包裝

>600

materials grades have been tested for our products so far. Some, like bio-PE, are now in use.

18%

of all of our resin orders in 2023 were procured under the mass balance principle.

>200

different botanical elements and Minifigure accessories made from bio-PE.

到目前為止已測試了 600 種材料等級。其中一些，例如生物聚乙烯，現已投入使用。

2023 年所有樹脂訂單的 18% 是根據質量平衡原則採購的。

超過 200 種不同的植物元素和配件由生物 PE 製成。

Sustainable packaging

We have an ambition to make our packaging more sustainable. This means introducing recyclable packaging across all areas of our business from our core products to licensed products produced by our partners. Currently 93% of our packaging by weight is made from paper, cardboard and other paper-based materials.

93% 的包裝由紙、紙板和其他紙基材料製成。



← Paper-based pre-pack bags:
The new flat bottom design allows bricks to fill up effectively and can now stand up.



紙基預先包裝袋：
新的平底設計使磚塊能夠有效填充並且現在可以直立

PACKAGING DESIGN EXAMPLE: BBQ GRILL

包裝設計實例: 烤肉架



Original box photo
原始盒子照片



New design box photo (without printing)
新設計包裝盒照片 (無列印)



PACKAGING DESIGN EXAMPLE: BBQ GRILL

包裝設計實例: 烤肉架

Report Summary

Original packaging use carton box with simple partition & EPS foam, it cannot protect the product well during the transportation and easy to be broken, so it's hard to pass the packaging test. The new packaging solution removed the simple partition & EPS. The size of the carton was reduced but the carton strength has been improved with new partition. The new packaging solution offers good protection which shall reduce damage rate and improve container utilization.

Before & After Comparison:

	Before	After	Change
Packaging Optimization			
Packaging Design Analysis	Inside carton box, simple partition and 3 Pcs EPS foam, it can't protect product well during transit.	New packaging remove them and improve the partition to fix the position of product well.	▲ Improved (New packaging can pass Internal SPT test, and only use paper, it is more environment friendly)
Packing with product Gross Weight (Kg)	87.18 Kg	92.90 Kg	▼ +5.72 Kg (+6.6%)
Material Usage (m2)	10.37 m2 + 3 Pcs EPS foam	12.85 m2	N/A – Cannot compare due to removal of EPS foam. (cardboard increase of 24% as remove EPS foam)
Overall Dimension (mm)	875*770*630	843*761*636	▲ -3.9%
Packaging Cost for one packaging	USD14.41	USD14.13	▲ -0.28 USD * (-1.9%)
Transportation Optimization			
a 40' HQ Container	152 Carton	165 Carton	▲ +13 Carton (+8.6%)
Cost saving for one 40' HQ Container			▲ -299 USD **

新的包裝解決方案取消了簡單的隔間和 EPS。採用新的隔板，紙箱尺寸減小，但紙箱強度提高。新的包裝解決方案提供了良好的保護，可降低損壞率並提高容器利用率。

新包裝可通過內部SPT測試，僅使用紙張，更環保

Reduced volume, lower packaging costs, and increased single-shipping volume, reduce carbon

footprint per trip per product

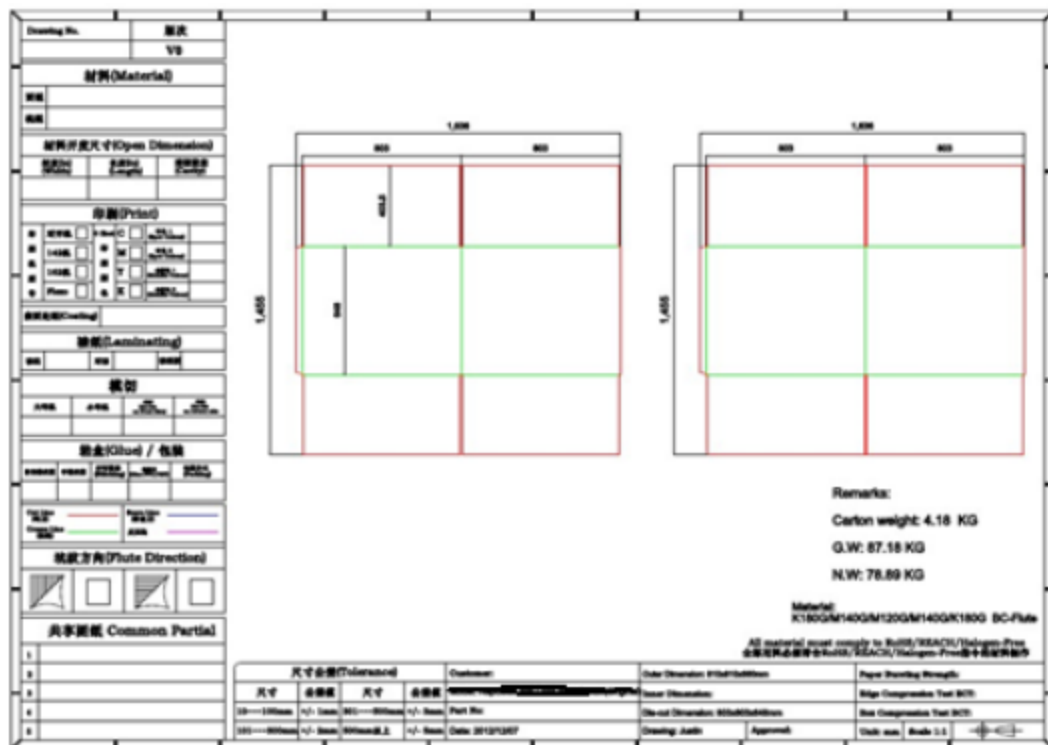
體積減小，包裝成本降低，單次運送量增加，減少每件產品在每次行程的碳足跡

PACKAGING DESIGN EXAMPLE: BBQ GRILL

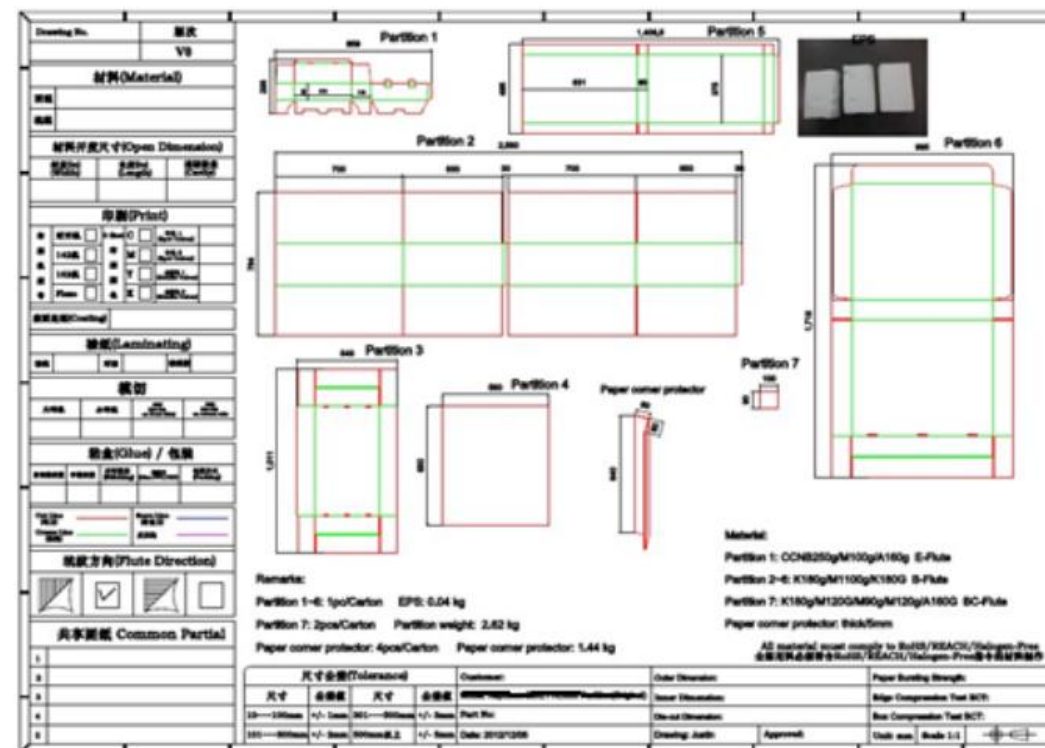
包裝設計實例: 烤肉架



Original carton box drawing
原始紙箱圖



Original Partition and EPS foam drawing
原始隔間與EPS泡棉圖

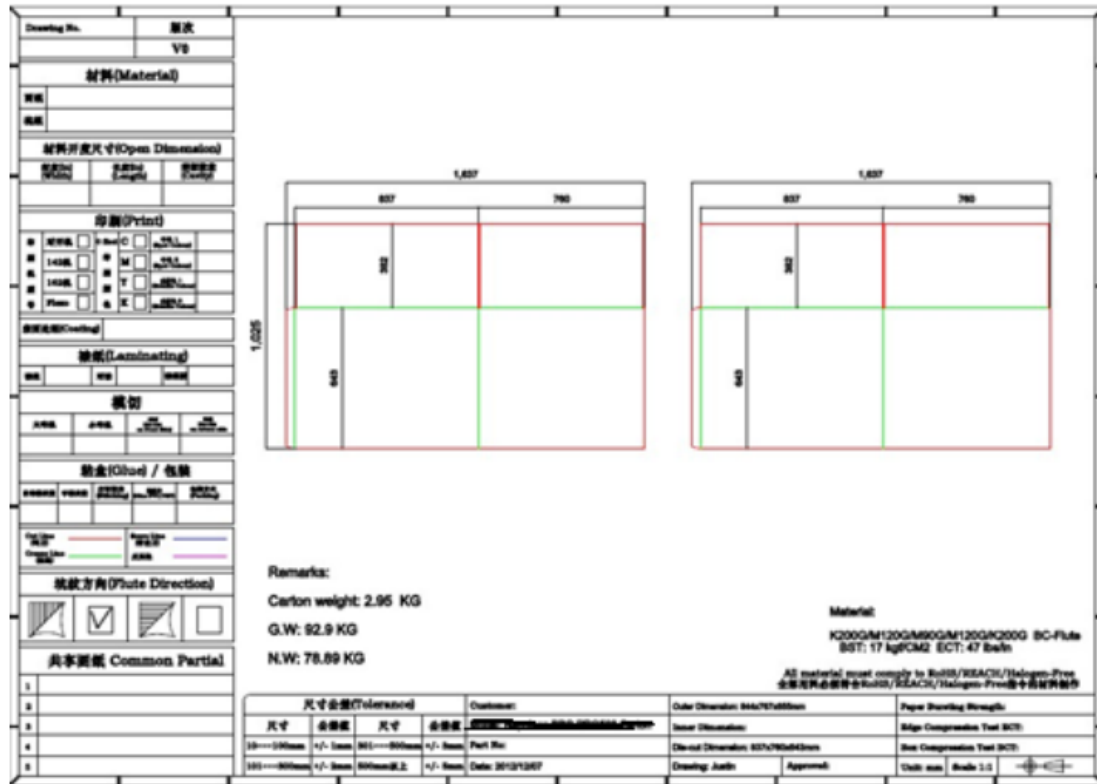




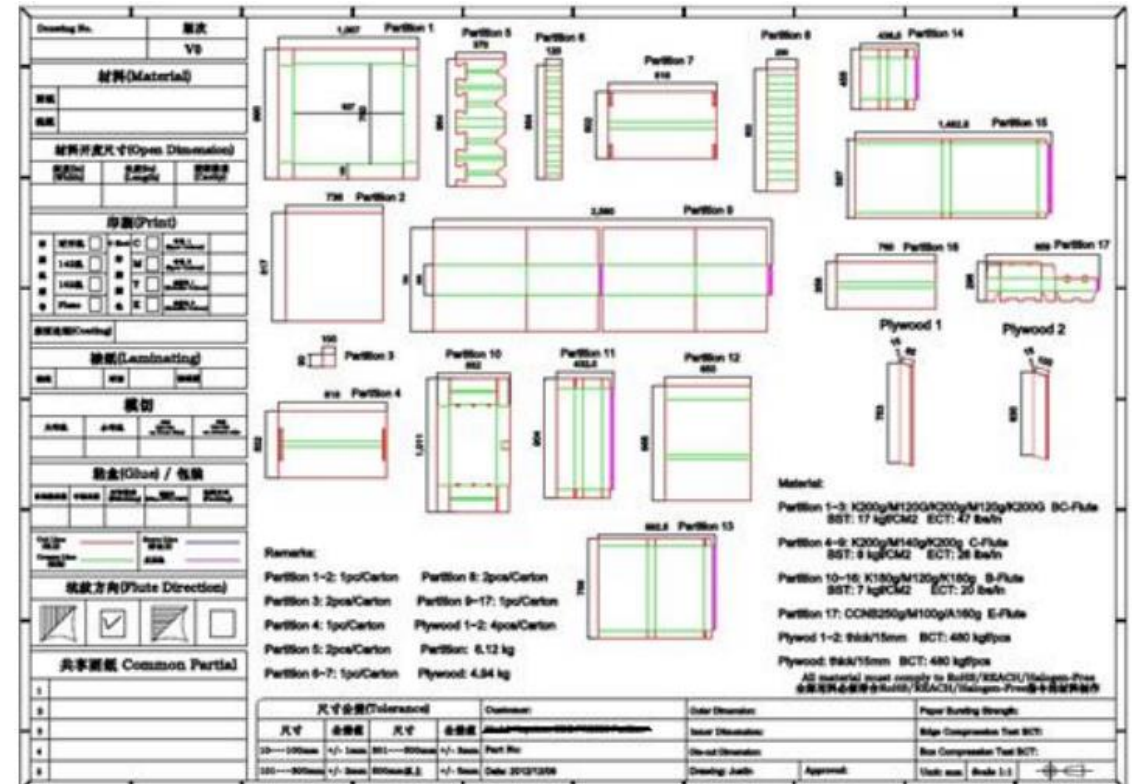
PACKAGING DESIGN EXAMPLE: BBQ GRILL

包裝設計實例: 烤肉架

New Packaging Drawing for Carton Box
新紙箱包裝圖



New Packaging Drawing for Partition
新分區包裝圖



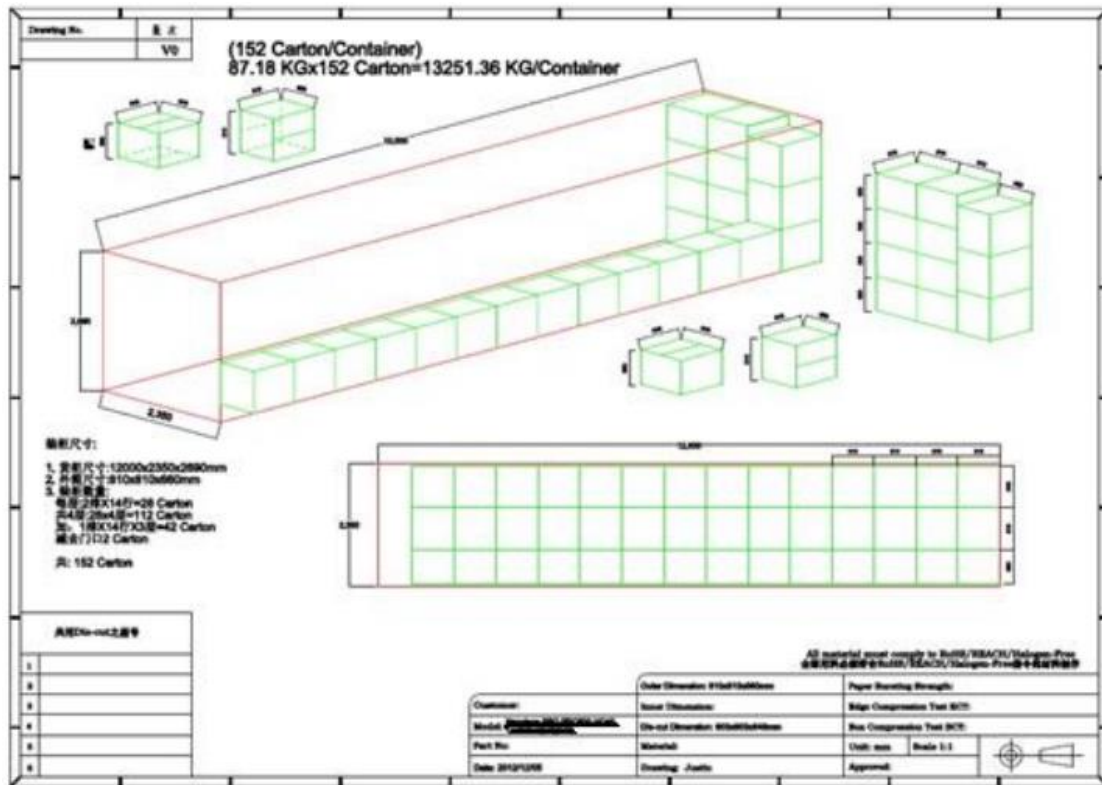


PACKAGING DESIGN EXAMPLE: BBQ GRILL

包裝設計實例: 烤肉架

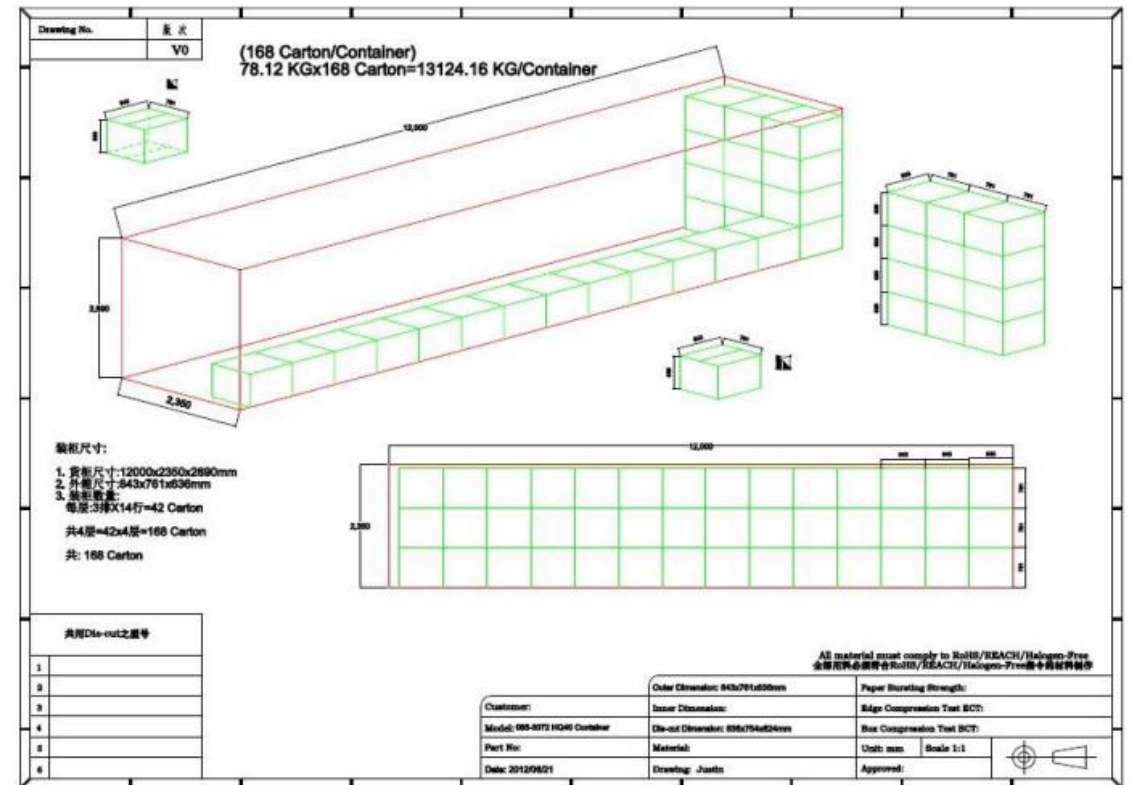
The original packaging for 40' HQ Container loading scheme (152 Carton)

原包裝為40'HQ貨櫃裝載方案 (152件)



New Packaging Solution for 40' HQ Container loading scheme (168 Carton)

40' HQ貨櫃裝載方案的新包裝解決方案 (168件)



WORKSHOP 工作坊

CARBON FOOTPRINT CALCULATION 碳排放計算



LCMP FOR SUPPLY CHAIN / MANUFACTURERS 低碳製造計劃對供應鏈/製造商



- This programme is organized by **WWF HK**

本項目由香港世界自然基金會主辦

Aims at reducing GHG emissions generated by **factories related** facilities

旨在減少工廠相關設施產生的溫室氣體排放

Provide corporate with **measurement tools** of their effectiveness in reducing GHG emissions

為企業提供工具,有效協助減少溫室氣體排放

Equip corporate with best practice in GHG management and consumption reduction

為企業提供溫室氣體管理和減少消耗的最佳實踐方案

Intertek provide **3rd Party Verification** Services

- Intertek 提供第三方驗證服務

https://www.wwf.org.hk/en/whatwedo/climate_and_energy/what_can_businesses_do/lcmp/



MARKET ENGAGEMENT: VIA CARBON LABELING & CERTIFICATION

市場參與：通過碳標籤和認證



Name of scheme/ Certifier	Operator, Public/ Private	Launch	Nation of Origin	Accounting Method	Companies	Products & services
Approved by Climatop/ Climatop	Private	2008	Switzerland	ISO 14040	11	65
Bilan CO ₂ / E. Leclerc	Private	2008	France	ISO 14040 ISO 14044	1	20,000 price tags
Carbon Connect/ CarbonCounted™ Standards	Private	2007	Canada	unspecified LCA	unknown	22
Carbonlabels.org/ Conscious Brands	Private	2008	Canada	unspecified LCA	unknown	unknown
Carbon Reduction label/ Carbon Trust	Public	2008	U.K.	PAS 2050	20	3,829
carboNZero™ programme, CEMARS™ / CarboNZero	Private	2008	New Zealand	PAS 2050 ISO 14064	87	approx. 246
Certified CarbonFree/ Carbon Fund	Private	2007	U.S.	PAS 2050 ISO 14044 ⁽¹⁾	16	77
Climate Conscious Carbon Label/ The Climate Conservancy	Private	2007	U.S.	unspecified LCA	unknown	unknown
Climate Certification for the Food Chain/ KRAV, Svenskt Sigill, Kvalitetssystem AB	Private	2010	Sweden	ISO 14040	7	61
Cool CO ₂ label/ KEITI	Public	2009	South Korea	PAS 2050	unknown	>360
Eosta climate Neutral/ TUV Nord	Private	2009	Germany	ISO 14040 ISO 14044 ⁽¹⁾	unknown	unknown
German Product Carbon Footprint/ Project/ Product Carbon Footprint/ Project	Private	2009	Germany	ISO 14040 ISO 14044 ⁽¹⁾	8	10
Green Index Rating/ Timberland	Private	2009	U.S.	unspecified LCA	unknown	8
Indice carbone casino/ Casino France	Private	2009	France	unspecified LCA	unknown	629
METI Carbon Footprint/ METI	Private	2009	Japan	unspecified LCA	unknown	460
Pilot Californian carbon Labeling/ California State Senate Labeling Act 2008	Private	2008	U.S.	unspecified LCA	unknown	unknown
SGS Carbon neutrality/ SGS	Private	2009	Switzerland	ISO 14040 ISO 14044 ⁽¹⁾	unknown	unknown
Stop Climate Change/ AGRA-TEG	Private	2007	Germany	PAS 2050 GHG Protocol	11	unknown
Taiwan BSI Product Carbon Footprint/ British Standard Institute	Public	2010	Taiwan	PAS 2050 ISO 14001 ⁽²⁾	unknown	unknown
Thailand Carbon Reduction Label/ Thailand Greenhouse Gas Management Organization	Public	2009	Thailand	PAS 2050	100	458
TUV Nord Cert/ TUV Nord	Private	2008	Germany	ISO 14001 ⁽²⁾ EMAS ⁽³⁾	Unknown	unknown
Zurueck zum Ursprung/ Hofer	Private	2009	Austria	unspecified LCA	unknown	79

Notes: (1) The ISO 14044 standard provides the requirements and guidelines for an LCA [43].
 (2) The ISO 14001 standard provides the general requirements for an environmental system [17].
 (3) EMAS stands for the European eco-management and audit scheme [18].
 All other accounting methods have been described in more detail in section 2.1.

Overview of
Diverse Carbon
Labeling Programs
Worldwide
全球各種碳標籤
計劃概述



Independently verified!

This product has been independently verified in accordance with ISO 14040:2006 & ISO 14044:2006 standards and PAS 2050:2008 specification.

The carbon footprint / water consumption / energy consumption is:

- X kg of CO₂ eq. per functional unit. /
- X liters of water consumed per functional unit. /
- X MJ of energy consumed per functional unit.

www.intertek.com/consumer/certified



標準

STANDARDS

Internationally recognized
National and regional
國際認可
國家和地區

可訪問性

ACCESSIBILITY

Restricted
Partially open
Open to public
access
受限，部分開放
向公眾開放

目的

PURPOSE

Carbon specific
More environment-friendly factors
受限，部分開放
向公眾開放

可靠性

RELIABILITY

Gov. certify
3P certify
Self-declared
政府證明，
第三方認證
自我聲明

展示

DISPLAY

Visual only
Quantitative disclosure
Grading
僅視覺
定量揭露 級別



MARKET ENGAGEMENT: EXAMPLE ON ENVIRONMENT PRODUCT DECLARATION 市場參與：環境產品聲明範例

Product Category Rules
產品類別規則

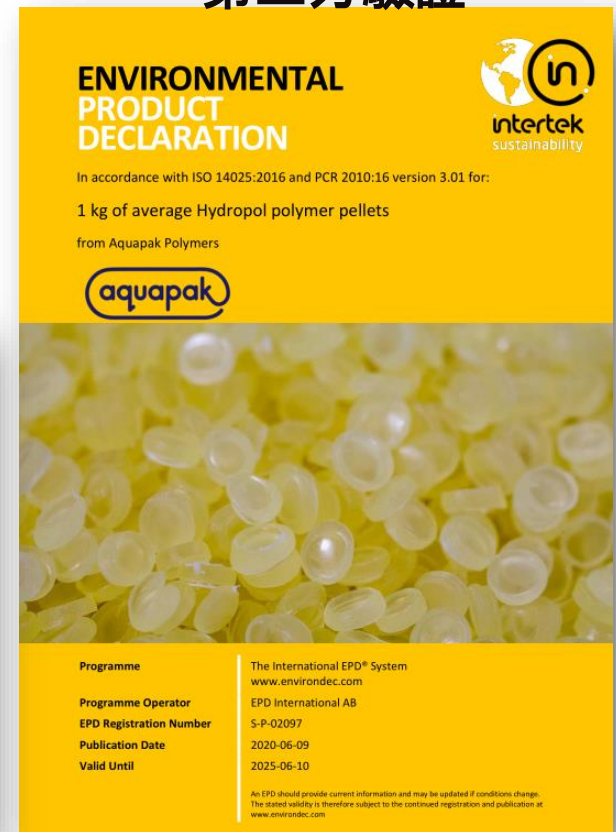
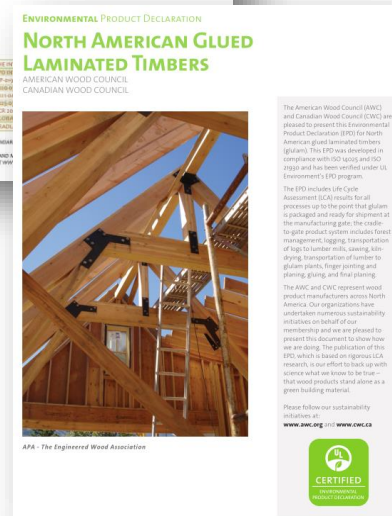
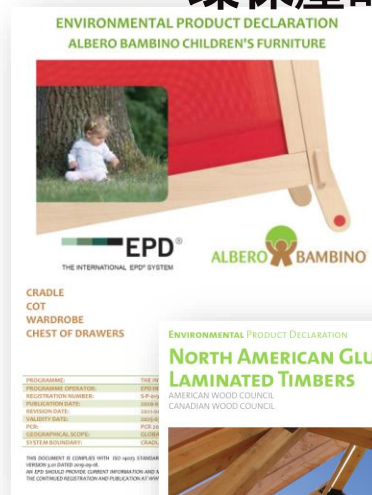
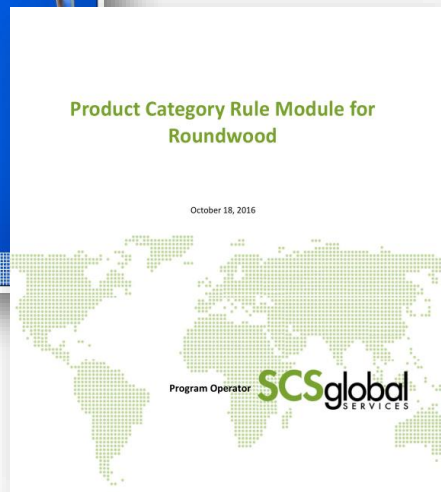
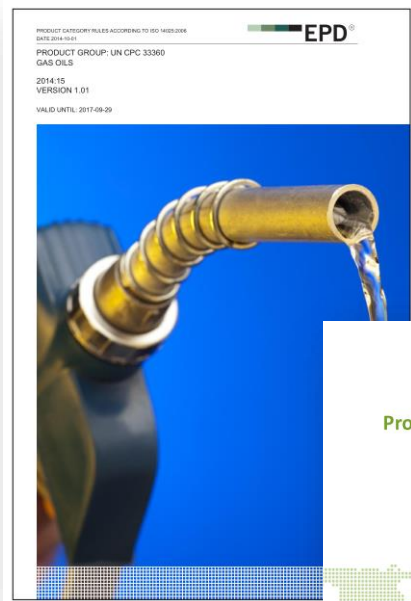
Life Cycle Assessment
生命週期評估

Environmental Product Declaration

Third Party Verification

環保產品聲明

第三方驗證



intertek

Total Quality. Assured.