

# ATV 碳足跡專案： 從數據到決策

BEST ERP 實習顧問團隊

2025.08.22



# 01

## Company Overview 公司介紹

# Company Overview | 公司介紹



雍御企業股份有限公司

創立於2003年

員工人數：103人

資本額：3億

行業類別：汽車及其零件製造業





02

## Product Introduction 產品介紹

# Product Introduction | 產品介紹



SPORT 系列



UTILITY 系列



YOUTH 系列



# 03

## Introduction 專案背景

# Introduction | 專案背景

01

ATV 產業以歐洲為主要市場，  
雍御企業 95% 的營業額來自歐洲市場

02

歐洲客戶要求供應商提供 產品碳足跡  
(Carbon Footprint of Products, CFP)  
報告，作為報價與交貨依據。

03

如何在現有資源下，快速生成可信且可追溯的 CFP，  
成為雍御企業的關鍵挑戰



# 04

## Mission 任務

# Mission | 任務

問題意識：

能否在不額外增加人力的情況下，讓產品碳足跡自動生成、即時回報、精準可查？

目標：

1. 建立一套碳足跡數據鏈接架構
2. 確保碳足跡透明化與可追溯性
3. 提升雍御企業對國際客戶的交付競爭力



# 05

## Study 研究現況

# Study | 研究現況

## 資料分散與蒐集困難

活動資料分散於 **ERP**、**MES**、**EMS**，難以整合人工蒐集耗時、格式不一，容易出錯。ATV 零件多樣複雜，資料易遺漏

## 碳足跡盤查耗時與成本過高

傳統碳足跡盤查耗時 6–8 個月，每款 ATV 盤查成本高達 40 萬元以上

## Top-down 方法侷限

僅能粗略分配無法精確對應到 個別ATV機種



# 06

## Top-down vs. Bottom-up 碳足跡分析方法比較

# Top-down vs. Bottom-up | 碳足跡分析方法比較

若要符合 產品層級碳足跡的要求，ATV 製造必須從 Top-down 跨越到 Bottom-up。

分析方法	Top-down ( 傳統自上而下 )	Bottom-up ( 由下而上 )
計算方式	以企業總排放量為基礎，依產量或營收比例分攤	以實際活動數據 (Activity Data) 為基礎，逐零件與製程追溯
優點	計算快速	精準到單一產品層級、可追溯數據來源
缺點	缺乏產品層級精準度，無法反映製程差異	需跨系統整合 ( ERP+MES+EMS ) 、資料處理較複雜
適用場景	粗略估算、內部高階管理報告	精準 CFP 報告
可信度	低 ( 僅估算平均值 )	高 ( 基於實際數據、透明可驗證 )



# 07

## Idea 靈感

# Idea | 靈感



不是建立模型後再人工填數而是  
讓數據主動說話、即時演算

每輛 ATV 的碳足跡數據應該可以 隨產線自動生成  
透過Power BI 平台整合 ERP、MES、EMS 等資料來源，自動產出產品層  
級的碳排放數據

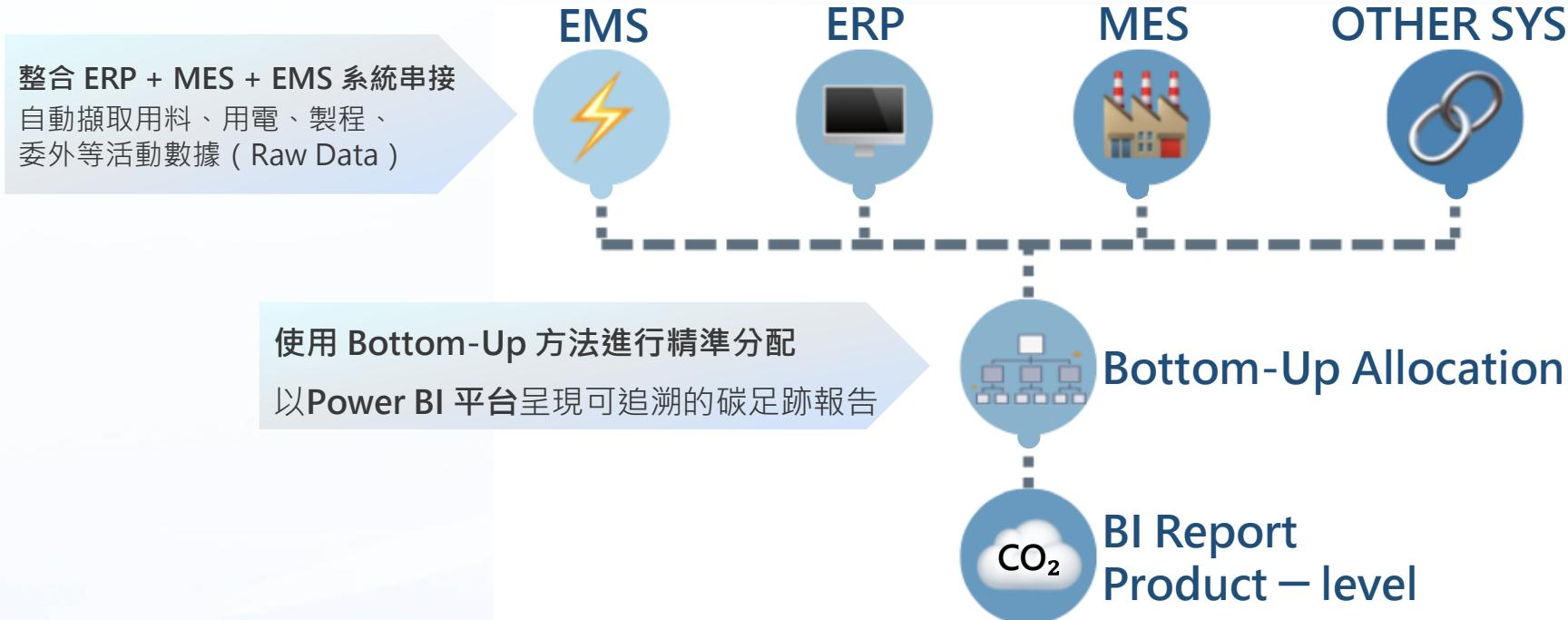


# 08

## Methods 研究方法

# Methods | 研究方法

資料流整合 ( Data Integration ) 與活動基礎法 ( ABC, Activity-Based Carbon )





09

## Live Demo

# Live Demo

**Display material BOM: General Item Overview**

Material AM-AMX600UL-H07 AMX600UL

Plant 2513 Access motor

Alternative BOM 1

Position Effectivity Initial Screen

Material Document General

Item	ICt	Component	Component description	Quantity
0010 L		<a href="#">AM-E38-H01</a>	Engine 600cc (Motion)	1
0020 L		<a href="#">AM-23200-A40-001</a>	Rear Drive Shaft Assembly	2
0030 L		<a href="#">AM-81200-A40-010</a>	Front Shock Absorber - Black Spring / 25	2
0040 L		<a href="#">AM-82200-A40-010</a>	Rear Shock Absorber / 25% Stiffer	2
0050 L		<a href="#">AM-23200-A40-011</a>	Front Drive Shaft Assembly	2
0060 L		<a href="#">AM-24110-A43-000</a>	Tire (Front) Bighorn	2
0070 L		<a href="#">AM-24115-A43-000</a>	Tire (Rear) Bighorn	2
0080 L		<a href="#">AM-31335-A81-000</a>	Brake Caliper Assembly	4
0090 L		<a href="#">AM-71000-P06-000</a>	Main Frame - Black Painted	1
0100 L		<a href="#">AM-15233-A81-010</a>	Radiator Hose - Upper / Lower	1

Entry 1 / 10

**Display Material AM-AMX600UL-H07 (Finished Product)**

Material AM-AMX600UL-H07 AMX600UL

General Data

Base Unit of Measure	EA	Each	Material Group	AC001
Old material number		Ext. Matl Group		
Division		Lab/Office		
Product allocation		Prod. Hierarchy		
Cross-Plant Material		Valid from		
Assign effect. vals	<input type="checkbox"/>	GenItemCatGroup	NORM	Standard item

Material authorization group

Authorization Group	
---------------------	--

Dimensions/EANs

Gross Weight	353	Unit of Weight	KG
Net Weight	352		
Volume	0.000	Volume Unit	
Size/dimensions			
EAN/UPC		EAN category	

Packaging material data

Matl Grp Pack.Mats	
Ref. mat. for pkg	

Basic Data Texts

# Live Demo

Program Edit Goto System Help

Production Order Information System

List PPIOH000 Order Headers

Layout 000000000001 Standard Layout

Production Orders

Planned Orders

**Selection**

Select. at Header Level

Production Order	to		
Material	am-am	<input type="button" value="o"/>	
Production Plant	Material	Material description	Language
Planning Plant	AM-AMX600UL-H07	AMX600UL	EN
Order Type		to	
MRP Controller		to	
Production Supervisor		to	
Production Version		to	
Sold-to Party		to	
Sales Order		to	
Sales Order Item		to	
WBS Element		to	
Sequence Number		to	
Priority		to	
Status Selection Profile		and	
System Status	<input type="checkbox"/> Excl.	<input type="checkbox"/> and	<input type="checkbox"/> Excl.
Stock Segment		to	<input type="button" value="o"/>

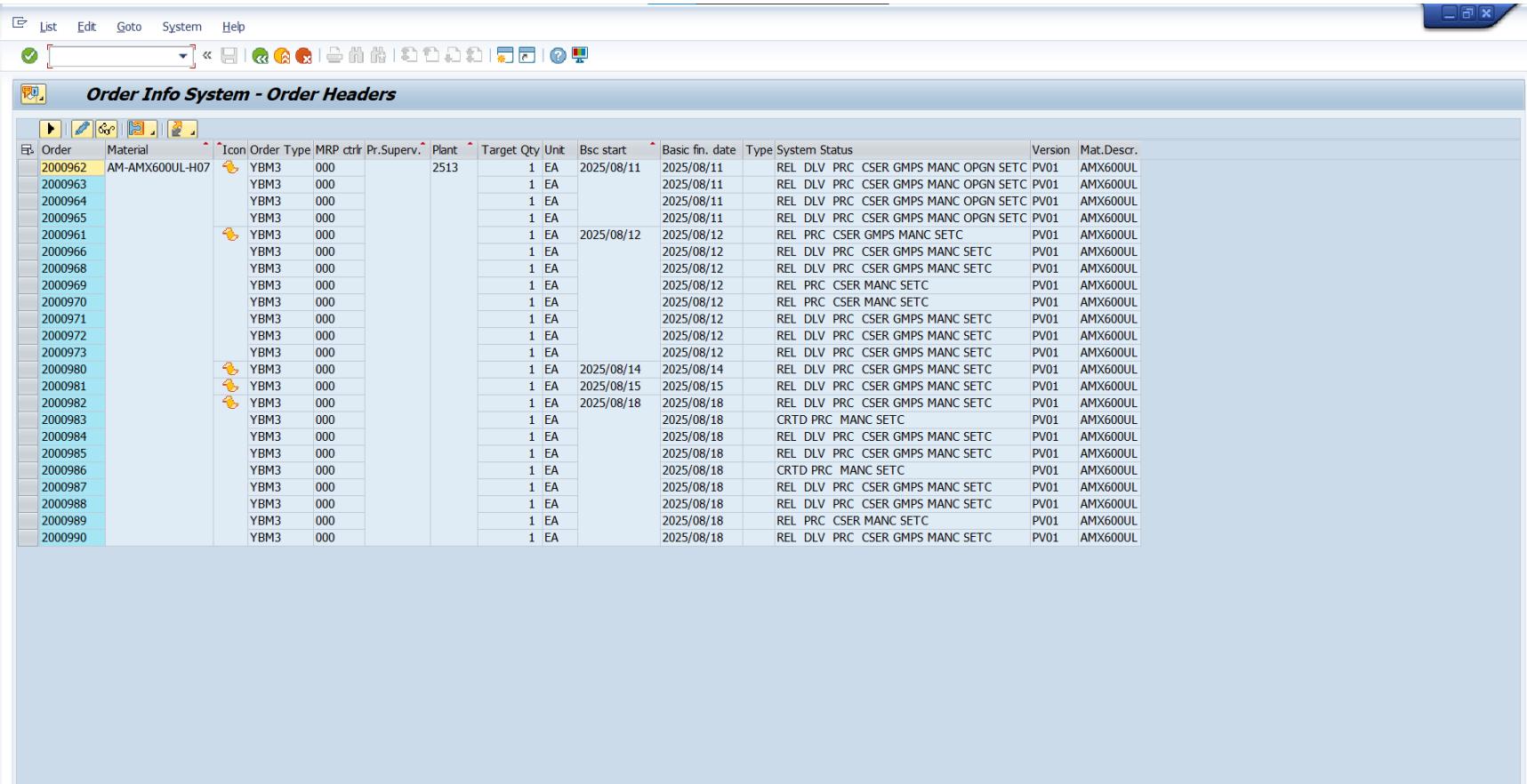
Select. at Operation Level

Work Center	to	<input type="button" value="o"/>
Plant	to	<input type="button" value="o"/>
Status Selection Profile		

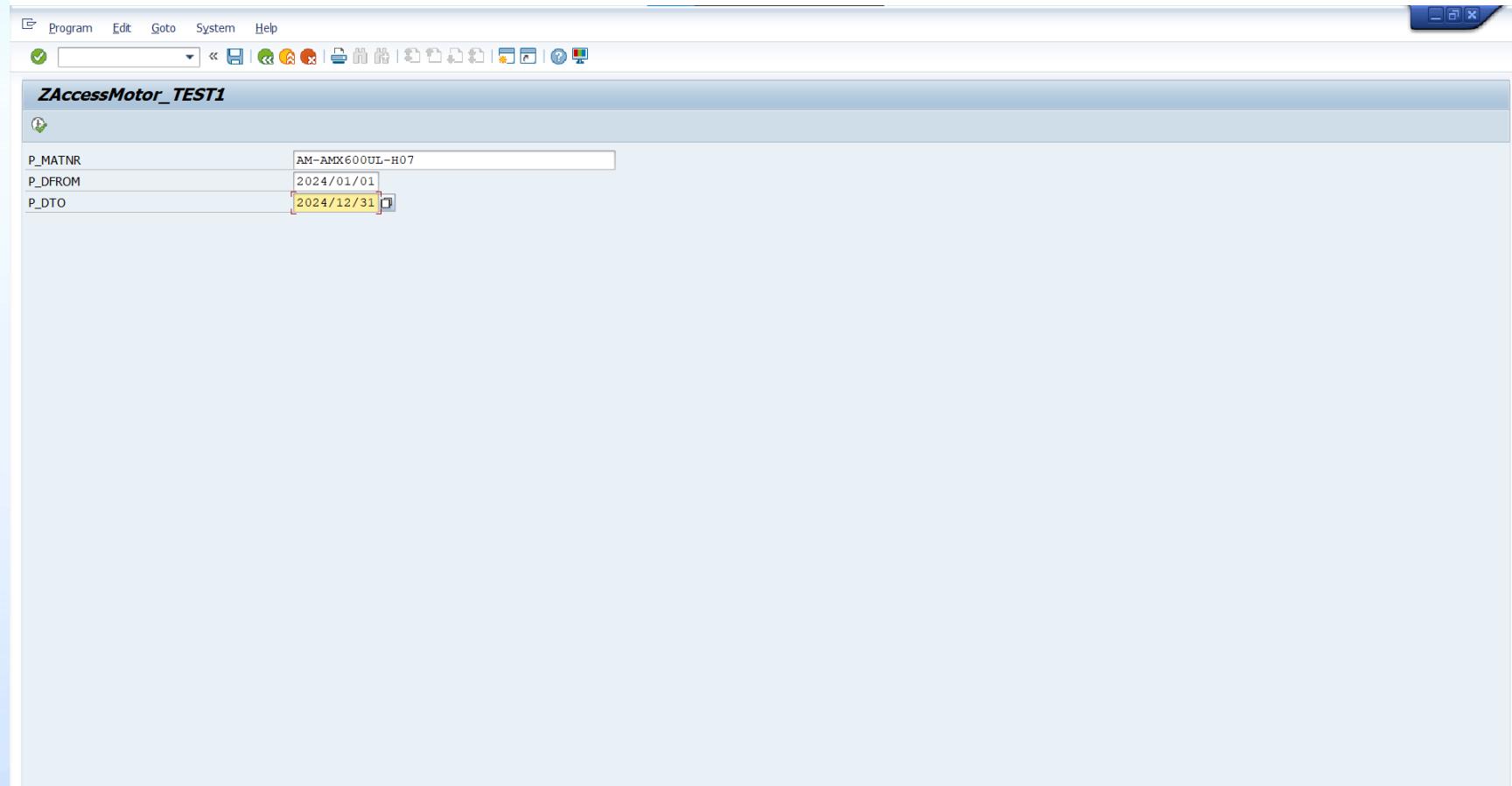
SAP

COOIS ncus4ap INS 9:09 PM 8/19/2025

# Live Demo



# Live Demo



# Live Demo

System Help

ZAccessMotor\_TEST1

碳足跡資料匯出 - 查詢成品料號: AM-AMX600UL-H07  
時間區間: 20240101 ~ 20241231

Item	Type	GHG Scope	GHG Category	Quantity	Unit	Total CO <sub>2</sub> e	Plant	Company	LCA Stages	Period	Valid to	Note
AM-15233-A81-010	ROH	Scope3		1.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-23200-A40-001	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-23200-A40-011	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-24110-A43-000	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-24115-A43-000	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-31335-A81-000	ROH	Scope3		4.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-71000-F06-000	ROH	Scope3		1.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-81200-A40-010	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-82200-A40-010	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-E38-H01	ROH	Scope3		1.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	

# Live Demo

System Help

ZAccessMotor\_TEST1

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AM-23200-A40-011	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-24110-A43-000	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-24115-A43-000	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-31335-A81-000	ROH	Scope3		4.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-71000-F06-000	ROH	Scope3		1.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-81200-A40-010	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-82200-A40-010	ROH	Scope3		2.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	
AM-E38-H01	ROH	Scope3		1.000	EA	0.000	2513	Access Motor	Access Motor	2024/01/01	2024/12/31	

匯出成功, 檔案路徑: C:\Users\Public\Documents\碳足跡\_範疇三.csv

SAP

ZAMFP | ncus4ap | INS | 9:12 PM | 8/19/2025 | 英 | 印 | 8

# Live Demo

(ERP、EMS、MES)

## 活動數據

公共廢棄物  
製程廢棄物  
EMS系統  
ERP系統  
MES系統

(產品碳足跡資訊網)

$$\times \text{ 排放係數} = \text{ 碳足跡}$$

# Live Demo

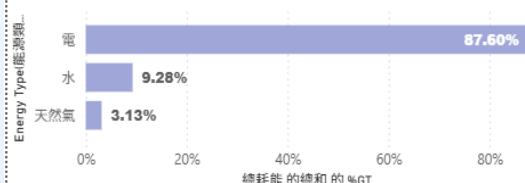
雍御企業股份有限公司

2024/1/1~2024/12/31

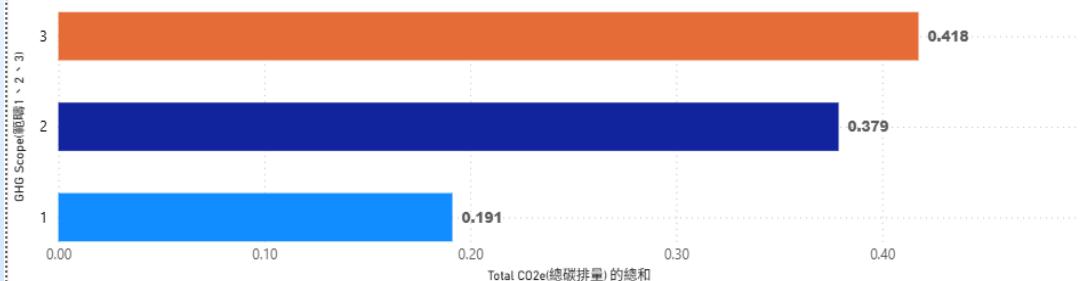
碳足跡排放(tCO<sub>2</sub>e)

0.988

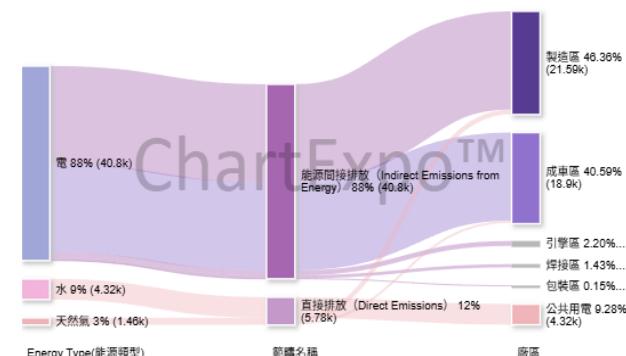
耗能能源類型(EMS)(kgCO<sub>2</sub>e)



總碳排的範疇分布(tCO<sub>2</sub>e)



EMS活動排放(kgCO<sub>2</sub>e)



# Live Demo

雍御企業股份有限公司

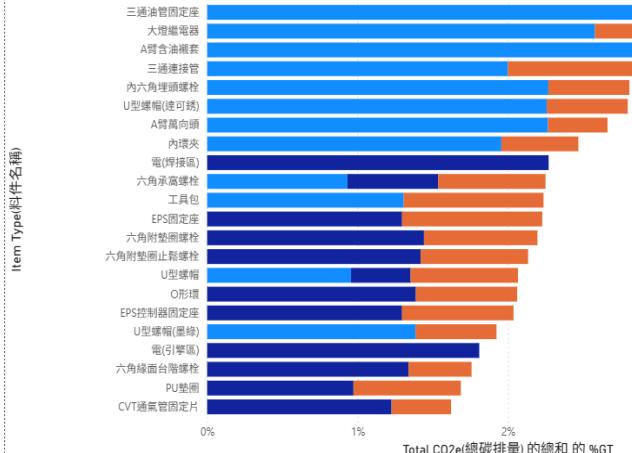
2024/1/1~2024/12/31

碳足跡排放(tCO<sub>2</sub>e)

**0.988**

各範疇細項在總碳排放中的比例(tCO<sub>2</sub>e)

GHG Scope(範疇1、2、3) ● 1 ● 2 ● 3



GHG Scope(範疇1、2、3) ● 1 ● 2 ● 3



MES製成活動排放(kgCO<sub>2</sub>e)

ED (電箱) 5% (22.38k)

烤漆 5% (22.38k)

焊接 11% (44.76k)

組裝 11% (44.76k)

電瓶 11% (44.76k)

噴砂 5% (22.38k)

噴砂 + ED 5% (22.38k)

噴砂 + ED + 烤漆黑 11% (44.76k)

歐打 + 調曲 5% (22.38k)

NC 加工 5% (22.38k)

切削鉆孔 5% (22.38k)

包裝 11% (44.76k)

折彎 5% (22.38k)

沖壓 5% (22.38k)

車 + 滾花 5% (22.38k)

直接排放 ( Direct Emissions ) 53% (233.79k)

能源間接排放  
(Indirect Emissions from Energy)  
47% (201.41k)

活動 activity

範疇名稱

範疇細項 (改)



10

# Results 初步成果

# Results | 初步成果

- ATV 80% 的活動數據已能串接至系統，降低人工蒐集成本
- 透過 Bottom-up 模式，能生成 產品層級的 CFP 報表
- 客戶可獲取每台 ATV 的碳足跡資訊，增強交付透明度

內部效益：

- 減少人工作業錯誤
- 提升決策速度



11

SFM

讓碳足跡自動生成  
成為企業競爭優勢

# Live Demo

sfm-trial.eu20.footprint.sustainability.cloud.sap/launchpad?help-serviceLayerVersion=EXT&help-dataUrlWPB2=https%3A%2F%2Feducation.hana.ondemand.com%2Feducation%2Fwa%2Ftad%2F&sap-language=EN&help-autoStartTour...

SAP Footprint Overview

Standard\*

GHG Emissions  
5.20 Ton  
February 2023

Scope 1 – Direct Emissions: 0.24 Ton

Scope 2 – Purchased Energy: 0.20 Ton  
Market-Based Method

Scope 3 – Indirect Value Chain Emissions: 4.76 Ton

GHG Emissions Trends  
Last 6 periods

Corporate CO<sub>2</sub>e Balance  
Including Product Inventory

Inflow	Outflow	Total
Scope 1 – Direct Emissions	Sold Products	1.82 Ton
Scope 2 – Purchased Energy	Internal Product Consumption	1.33 Ton
Scope 3 – Indirect Value Chain Emissions	Closing: Product Inventory	6.54 Ton
	Non-Product Emissions	0.01 Ton
<b>Total</b>	<b>Total</b>	<b>9.70 Ton</b>

# Live Demo



Footprint Overview ▾

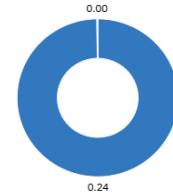


Standard\* ▾



## Scope 1 – Direct Emissions

Emissions by GHG Category | Ton



- Scope 1 – Stationary Combustion
- Scope 1 – Process Emissions
- Scope 1 – Fugitive Emissions

## Scope 2 – Purchased Energy

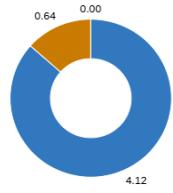
Emissions by GHG Category | Ton



- Scope 2 – Purchased Electricity

## Scope 3 – Indirect Value Chain Emissions

Emissions by GHG Category | Ton



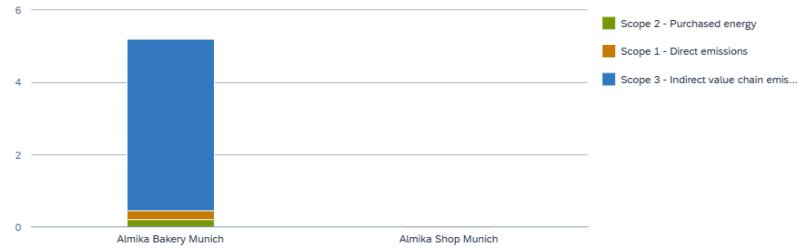
- Scope 3.1 – Purchased Goods and Services
- Scope 3.3 – Fuel– and Energy–Related Activities
- Scope 3.5 – Waste Generated in Operations

## Plants

Top 5 – Highest Emissions

By Scope

Emissions by Plants | Ton

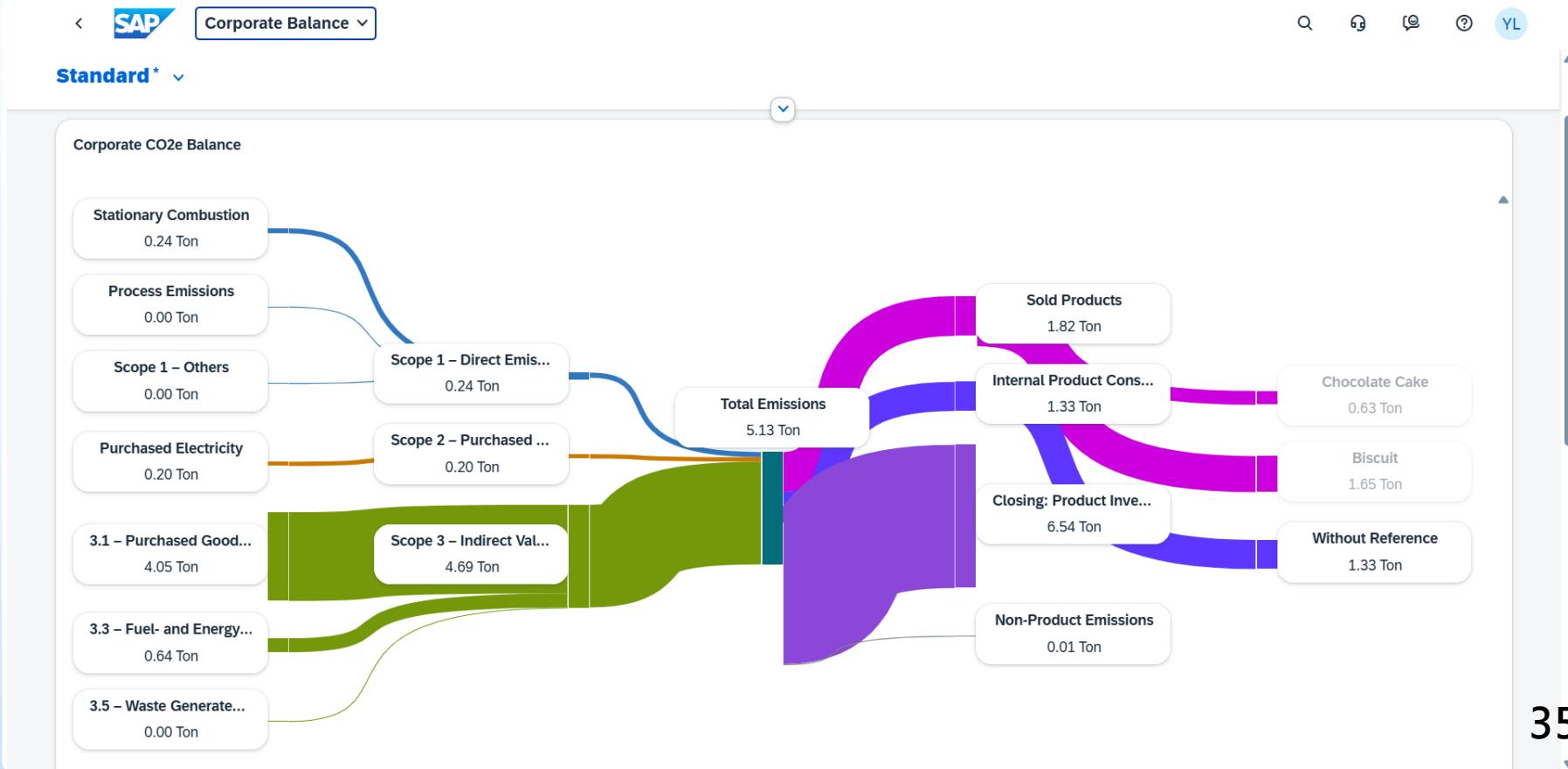


Purchased Products

# Live Demo

SAP Corporate Balance - Google Chrome

sfm-trial.eu20.footprint.sustainability.cloud.sap/launchpad?help-autoStartTour=PR\_ZF3RBG88V43659A6W799A912&help-dataUrlWPB2=https%3A%2F%2Feducation.hana.ondemand.com%2Feducation%2Fwa%2Ftad%2...



# SFM | 讓碳足跡自動生成，成為企業競爭優勢

01

碳足跡不只是合規門檻，更是競爭優勢。

02

成為率先完成 CFP 自動化的 ATV 製造商，將在全  
球市場搶占先機。

03

借助 SAP SFM 讓碳足跡數據從合規工具進化為決  
策引擎。

# 感謝SAP原廠顧問指導，帶領我們瞭解SAP永續解決方案



為了專案，我們把夜熬穿，全力以赴



MM  
Hilda 陳玟諺



FI  
York 羅章佑



PM & SD  
Edric 陳俊橋



PP  
Andy 孫宇謙



CO  
Cindy 程思佳

THE END  
THANKS

