



第三屆ESG全球倡議論壇  
3rd ESG Global Initiative Forum

**BAS減碳教育訓練案例分享**  
**BAS Decarbonization Training**  
**– Industry Case Studies**

中華自行車永續聯盟協會(BAS)  
陳松君 Jeff

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BICYCLING ALLIANCE  
FOR SUSTAINABILITY

# Chapter 1

## 教育訓練概況

Education and training

# 減碳教育訓練(2023.09~11) Sponsored by BAS

## Carbon Reduction Education and Training

序號 NO.	課程名稱 Course Title	序號 NO.	課程名稱 Course Title
1	工廠節能之科技與管理 Strategies of technology and management for factory energy conservation	6	國內外氣候治理與企業碳風險 Dynamic climate governance and carbon risk on industries
2	綠電導入策略及機制 The introduction strategy and mechanism of renewable energy on enterprise	7	冷凍空調及動力機械技術 Refrigeration & air conditioning and power machinery energy conservation technologies
3	低碳製程與監控 The introduction strategy and mechanism of renewable energy on enterprise	8	台灣自行車產業淨零行動與資源策略 Net zero action and resources strategy of taiwan bicycle industry
4	既有建築低碳化 Low-carbon retrofitting path of existing buildings	9	低碳產品設計暨循環經濟材料使用 Low-carbon product design and circular material use in the bicycle industry
5	熱電回收技術及系統 Thermoelectric generators: technologies and applications	10	歐盟綠色政綱與自行車產業之挑戰與商機 Opportunities and challenges of the European green deal for the bicycle industry

Total  
42 hours

# 課程的五個面向 Five aspects of the course





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# Chapter 2

案例

Case

The cases are mainly  
those not shared on  
the BAS forum

## 熱電回收 Thermoelectric recovery

## 能源管理系統 ISO 50001

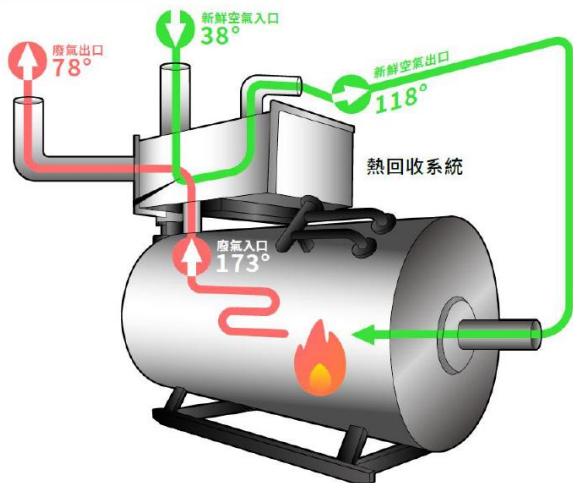
### 天心



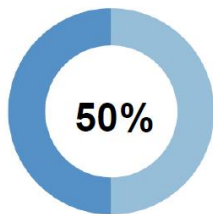
### 威輪



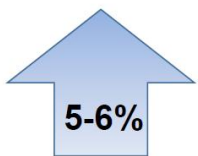
減少大氣熱傷害



減少50%瓦斯用量 / 每月



鍋爐效率提升5-6%



### ENERGY MANAGEMENT SYSTEM 能源管理系統與ISO 50001認證

#### EMS能管系統

建立智慧能源監控系統，實現對全廠80%用電設備的即時監控。透過智慧電表的數據收集與分析，能精準掌握能源使用狀況，找出節能潛力點，為能源優化提供數據基礎。

監控覆蓋率  
80%

系統狀態  
已建置  
即時監控中



#### ISO 50001認證

2025年取得ISO 50001能源管理系統認證，透過PDCA（計劃-執行-檢查-行動）循環持續改善能源績效，設定每年節能目標1%，系統化推動能源管理。

年度節能目標

1%

持續透過PDCA循環優化能源使用效率

#### ISO 50001 PDCA循環

P

Plan 計劃

制定能源政策與目標，  
規劃改善措施

D

Do 執行

實施能源管理計劃與  
改善方案

C

Check 檢查

監測能源績效，評估  
目標達成度

A

Act 行動

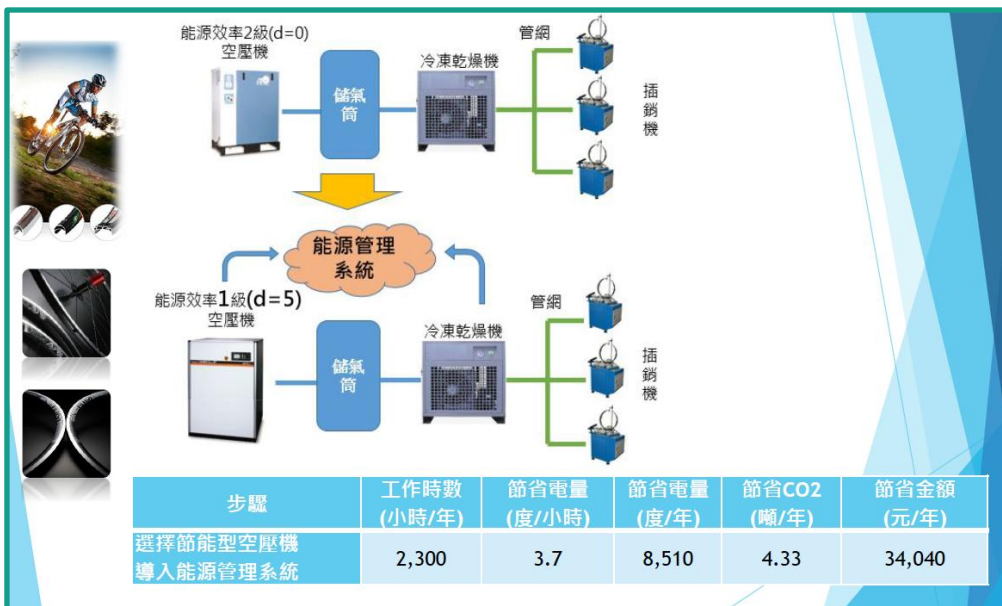
持續改善，修正能源  
管理策略

透過系統化的能源管理，實現每年1%節能目標，持續提升能源效率

# 冷凍空調 Refrigeration & air conditioning

雅輪 **A-RIM**

瑩信 





**更換變頻空壓機**  
平均每台變頻空壓機可節省固頻空壓機的38%的電力



**汰換變頻冷氣**  
2022~2024年逐年分階段更換新變頻冷氣機組6台，約估總計可減少6.19噸CO<sub>2</sub>e

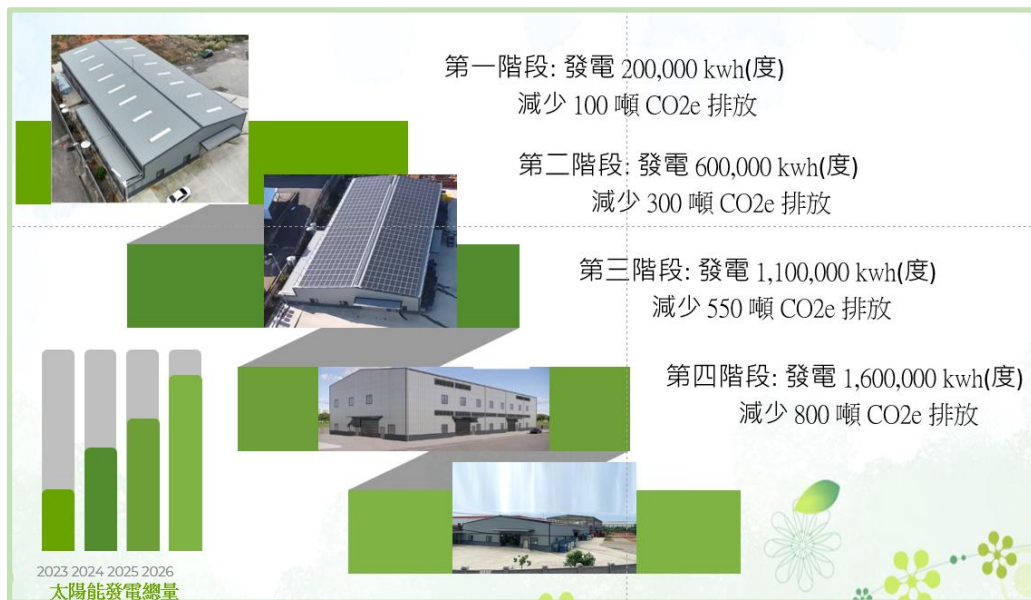
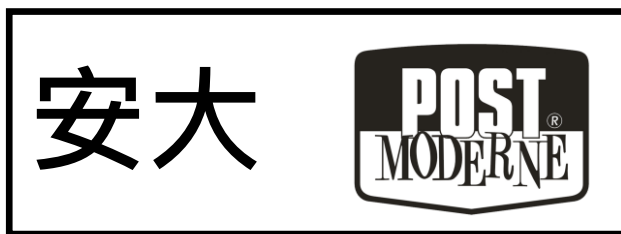


**包裝回收再利用**  
推動包裝紙箱重複再利用，減少廢棄紙箱消耗。



**改用天然氣鍋爐**  
淘汰燃燒重油鍋爐，引進天然氣鍋爐，每月可減少約20噸CO<sub>2</sub>e

## 太陽能 Solar energy



### Environment 再生能源應用 建置太陽能發電

因應2050年淨零排放的目標，我們提升再生能源的使用效率，導入屋頂型太陽能光電系統，發電容量約480.6KW，有效降低溫室氣體排放。  
同時，安裝太陽能板後，廠內建築溫度下降了2°C，使得冷氣設定不需調那麼低，不僅提升了工作環境的舒適度，還有效降低了能耗。





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# 製程減碳 Process Decarbonization

## 製程優化 Process optimization

## 低碳設備 Low-carbon equipment

# 浩盟 PROWHEEL

# 六哥



### 工藝減碳重塑邏輯

通過工藝創新、設備升級與能源結構優化，從源頭重構生產能效模型。

#### 溫鍛替代冷鍛

摒棄高能耗、高污染的冷鍛+化學鈍化流程，採用加熱延展溫鍛一體化工藝，單位產品能耗下降超18%，同步消除重金屬廢水風險。



#### 綠電賦能製造(太陽能)

廠區屋頂鋪設3,728 kWp光伏電站，2025年發電量滿足32%生產用電需求，年減碳約2,800噸CO<sub>2</sub>e，穩步邁向RE100承諾。

1

2

3

#### 工藝效率革命

6066曲柄實現“一模兩穴一次成型”，節省整班次人力與設備運行；將原先注塑模具由“一出二”升級為“一出十六”，產出效率提升8倍，單位產品電力消耗銳減。



#### 全廠改用電動堆高機

電動堆高機除可減少碳排放外，特性為低噪音低震動及無空氣污染，更適合在工廠內操作



#### 全廠更換LED燈管

廠區照明日光燈管40W已全面更換為LED燈管20W，節約一半的能耗

## 減塑包裝

## Plastic reduction packaging

## 綠建築

## Green building

新可大 SCADA

乃興 NUVO

### 減塑包裝/低碳印刷 環保包材導入

導入環保包材力行減塑，印刷油墨捨棄價格低廉、顏色鮮艷的石化油墨，改用大豆bio-based油墨，雖然價格提高且色彩飽和度相對降低，但透過與客戶溝通議和推廣企業ESG經營理念。

OE 收縮膜/ 氣泡袋包裝改為紙盒&牛皮紙



牛皮紙包裝盒



→ CB-00167

印刷 → 使用大豆印刷油墨

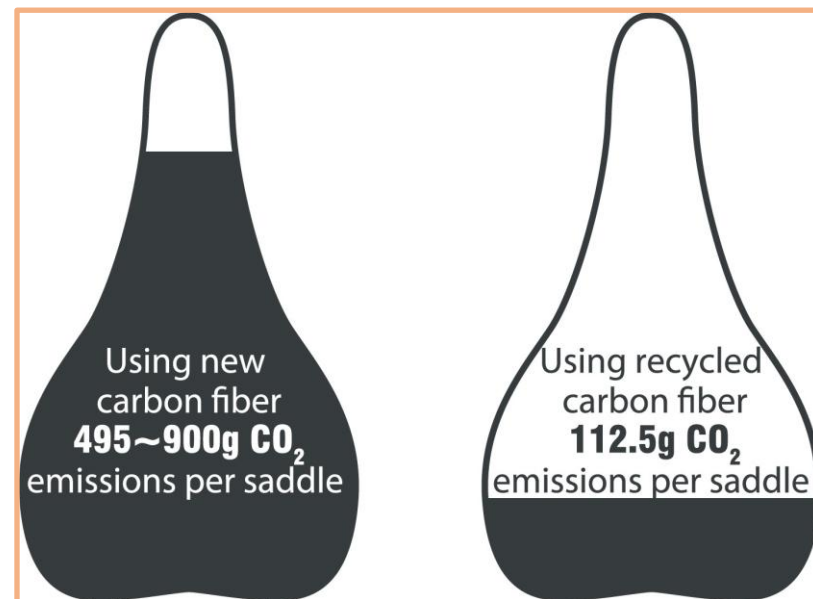
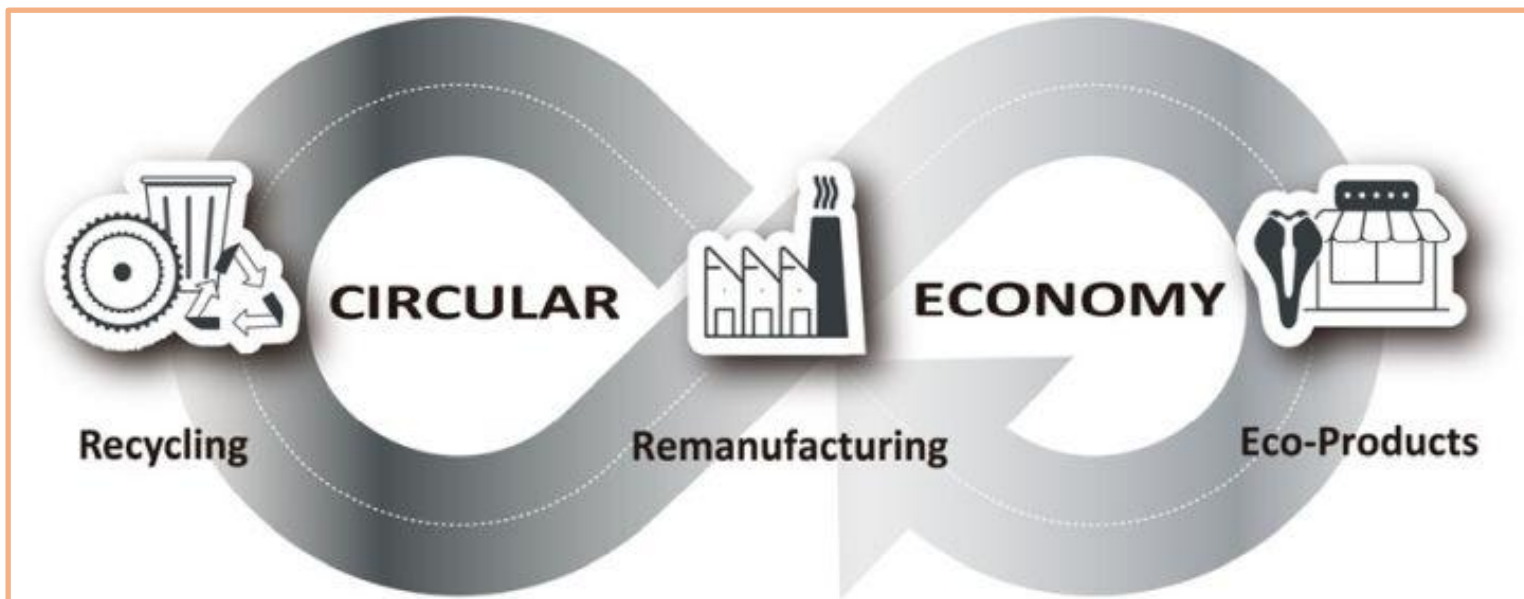
有效減少重金屬元素和有機溶劑所帶來的汙染



- 申請綠建築EEWH及綠色工廠
- 佔地總面積2200 坪
- 原廠房可用面積1400坪\_新廠房總樓地板面積6400坪 (未來可用面積增加4倍)

# 碳纖維回收 Carbon fiber recycling

維樂 + 速聯



# 延長使用壽命 Extend product lifespan

# 使用再生料 Post-Consumer Recycled Material

## 拓肯 **TOKEN**



產品原始設計導入維修權

- 簡化零件、共用零件
- 重視產品使用壽命，降低維修需求
- 產品設計時即規劃拆卸與安裝的維修功能



維修友善

- 不因重複拆卸與安裝，而造成零件損壞
- 避免使用特殊工具介面
- 消耗品 (培林) 避免使用特殊規格，確保消費者有不只一個管道取得維修品

## 瑞振



PCR回收料使用

SW-BH-115A/B



Any customized products



(Photo from National GEOGRAPHIC)



## 台灣自行車產業淨零碳排路徑規劃書 Taiwan Bicycle Industry Net Zero Roadmap



### 「台灣 2050 淨零排放路徑及策略總說明」 與自行車產業之關聯性

在 2022 年 3 月，國家發展委員會正式發布「台灣 2050 淨零排放路徑及策略總說明」，提出四大策略，包含能源轉型、產業轉型、生活轉型、社會轉型，以及兩大基礎，分別是科技研發和氣候法制，整體策略從排放源占比最大的發電方式，將從現況燃煤為主的型態轉變為自然永續的發電形式，乃至公民個人生活行為，例如日常運輸將朝電動化、零排放發展，以淨零排放的思維，改變人類對環境的作為。

自行車產業雖然非屬首批被要求節能減排之用電大戶六大重點產業，在全球供應鏈積極響應淨零排放行動的同時，也難以置身事外，歐盟作為台灣最大自行車輸出市場，針對其進口產品研擬課徵碳邊境調整稅，美國也持續針對相關碳費用法案討論，隨著世界各國致力於在 2050 年達成淨零排放行動的同時，台灣自行車產業面臨市場的需求不僅是提供品質優良、性能卓越的產品，而是在產品全生命週期實現節能減碳和淨零排放的價值。

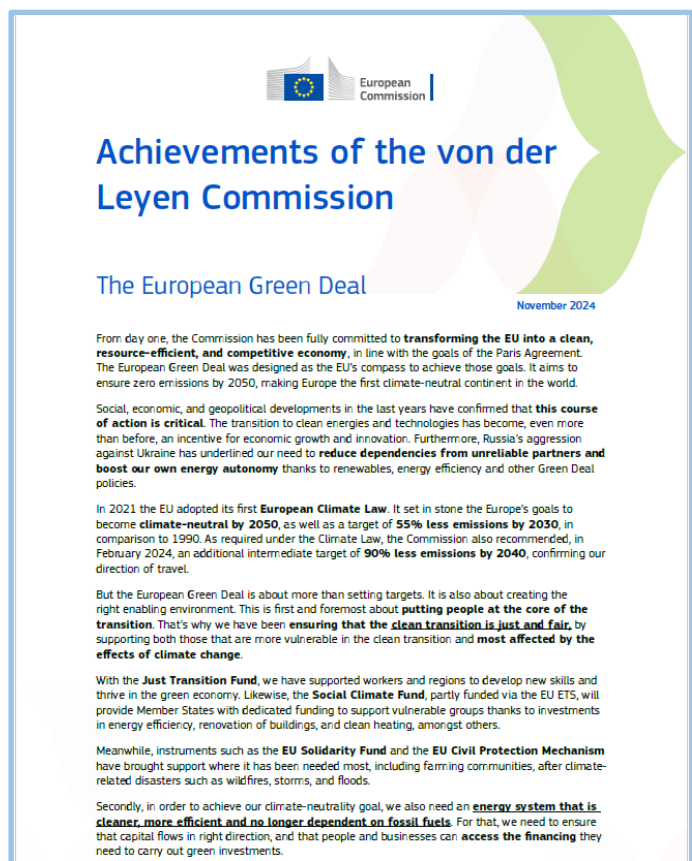



## 歐盟綠色政綱概要

The European Green Deal Abstract

## 自行車產業發展白皮書

White Paper on Bicycle Industry Development



 European Commission

### Achievements of the von der Leyen Commission

The European Green Deal

November 2024

From day one, the Commission has been fully committed to **transforming the EU into a clean, resource-efficient, and competitive economy**, in line with the goals of the Paris Agreement. The European Green Deal was designed as the EU's compass to achieve those goals. It aims to ensure zero emissions by 2050, making Europe the first climate-neutral continent in the world.

Social, economic, and geopolitical developments in the last years have confirmed that **this course of action is critical**. The transition to clean energies and technologies has become, even more than before, an incentive for economic growth and innovation. Furthermore, Russia's aggression against Ukraine has underlined our need to **reduce dependencies from unreliable partners and boost our own energy autonomy** thanks to renewables, energy efficiency and other Green Deal policies.

In 2021 the EU adopted its first **European Climate Law**. It set in stone the Europe's goals to become **climate-neutral by 2050**, as well as a target of **55% less emissions by 2030**, in comparison to 1990. As required under the Climate Law, the Commission also recommended, in February 2024, an additional intermediate target of **90% less emissions by 2040**, confirming our direction of travel.

But the European Green Deal is about more than setting targets. It is also about creating the right enabling environment. This is first and foremost about **putting people at the core of the transition**. That's why we have been **ensuring that the clean transition is just and fair**, by supporting both those that are more vulnerable in the clean transition and **most affected by the effects of climate change**.

With the **Just Transition Fund**, we have supported workers and regions to develop new skills and thrive in the green economy. Likewise, the **Social Climate Fund**, partly funded via the EU ETS, will provide Member States with dedicated funding to support vulnerable groups thanks to investments in energy efficiency, renovation of buildings, and clean heating, amongst others.

Meanwhile, instruments such as the **EU Solidarity Fund** and the **EU Civil Protection Mechanism** have brought support where it has been needed most, including farming communities, after climate-related disasters such as wildfires, storms, and floods.

Secondly, in order to achieve our climate-neutrality goal, we also need an **energy system that is cleaner, more efficient and no longer dependent on fossil fuels**. For that, we need to ensure that capital flows in right direction, and that people and businesses can **access the financing** they need to carry out green investments.



### WHITE PAPER ON BICYCLE INDUSTRY DEVELOPMENT

Declaration of Resilience, Health, and savEARTH

**PEDALLING CYCLING PARADISE**

WHITE PAPER ON BICYCLE INDUSTRY DEVELOPMENT  
VERSION JUNE, 2025

BICYCLE INDUSTRY DEVELOPMENT WHITE PAPER  
OFFICIAL DIGITAL DOWNLOAD

Version June, 2025



臺灣自行車輸出業同業公會  
TAIWAN BICYCLE ASSOCIATION

bas 中華自行車永續聯盟協會  
BICYCLING ALLIANCE FOR SUSTAINABILITY

財團法人自行車暨健康科技工業研究發展中心  
Cycling & Health Tech Industry R&D Center

財團法人自行車新文化基金會  
CYCLING LIFE STYLE FOUNDATION



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# Chapter 3

合作平台

Collaboration Platform



Cycling = Zero Carbon Mobility





## 以上是會員的案例也代表著BAS的成果

The above are member case studies,  
which also represent the achievements of BAS.



CHINESE



ENGLISH



BICYCLING ALLIANCE FOR SUSTAINABILITY